



SERVICE MANUAL

Front axle system

Steiger® 370 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 370 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Quadtrac® CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Quadtrac® Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Quadtrac® Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Quadtrac® Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 620 Powershift, TIER



**4B [JEEZ00000FF314001 -], Steiger® 620 Powershift, scraper, TIER 4B
[JEEZ00000FF314001 -], Steiger® 620 Quadtrac® Powershift, TIER 4B
[JEEZ00000FF314001 -]**



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Front axle system - 25

Powered front axle - 100

Steiger® 370 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 370 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Quadtrac® CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Quadtrac® Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT,



TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT, scraper,
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TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift,
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scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 620 Powershift, TIER
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[JEEZ00000FF314001 -]



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Powered front axle - 100

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SERVICE

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(*) See content for specific models

Powered front axle - Torque

300 Series axles

Item	Metric value	U.S. value
Wheel to hub bolts	755 – 850 N·m	555 – 625 lb ft
Axle to frame mounting bolts (lubed)	665 – 745 N·m	490 – 550 lb ft
Driveshaft mounting bolts	115 – 129 N·m	85 – 95 lb ft

Item	Metric value	U.S. value
Final drive housing to differential housing mounting bolts	284 – 298 N·m	209 – 220 lb ft
Pinion cover mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential case cover mounting bolts (ring gear)	285 – 319 N·m	210 – 235 lb ft
Left hand differential bearing carrier bolts	89 – 100 N·m	65 – 74 lb ft
Brake retaining ring mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential pinion pin retainer bolts	75 – 83 N·m	54 – 61 lb ft
Bevel Pinion lube tube retaining clip bolt	24 – 30 N·m	18 – 22 lb ft
Bevel pinion yoke retaining bolt	377 – 677 N·m	278 – 499 lb ft
Differential lock solenoid coil nut	7 – 9 N·m	5 – 7 lb ft

400 Series axles

Item	Metric value	U.S. value
Wheel to hub bolts	755 – 850 N·m	555 – 625 lb ft
Axle to frame mounting bolts (lubed)	665 – 745 N·m	490 – 550 lb ft
Driveshaft mounting bolts	115 – 129 N·m	85 – 95 lb ft

Item	Metric value	U.S. value
Final drive housing to differential housing mounting bolts	284 – 298 N·m	209 – 220 lb ft
Pinion cover mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential case mounting bolts (ring gear)	284 – 298 N·m	209 – 220 lb ft
Left hand differential bearing carrier bolts	89 – 100 N·m	65 – 74 lb ft
Brake retaining ring mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential pinion gear pin bolts	75 – 83 N·m	54 – 61 lb ft
Bevel pinion lube tube retaining clip bolt	24 – 30 N·m	18 – 22 lb ft
Bevel pinion yoke retaining bolt	377 – 677 N·m	278 – 499 lb ft
Differential lock solenoid coil nut	7 – 9 N·m	5 – 7 lb ft

500 Series axle

Item	Metric value	U.S. value
Wheel to hub bolts	755 – 850 N·m	555 – 625 lb ft
Axle to frame mounting bolts (lubed)	665 – 745 N·m	490 – 550 lb ft
Driveshaft mounting bolts	115 – 129 N·m	85 – 95 lb ft

Item	Metric value	U.S. value
Final drive housing to differential housing mounting bolts	284 – 298 N·m	209 – 220 lb ft
Pinion cover mounting bolts	284 – 298 N·m	209 – 220 lb ft
Differential case mounting bolts (ring gear)	284 – 298 N·m	209 – 220 lb ft
Left hand differential bearing carrier bolts	89 – 100 N·m	65 – 74 lb ft
Right hand brake carrier mounting bolts	146 – 165 N·m	108 – 122 lb ft
Brake retaining ring mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential pinion gear pin bolts	75 – 83 N·m	54 – 61 lb ft
Bevel pinion lube tube retaining clip bolt	24 – 30 N·m	18 – 22 lb ft

Item	Metric value	U.S. value
Bevel pinion yoke retaining bolt	377 – 677 N·m	278 – 499 lb ft
Port block retaining bolts (if equipped)	89 – 100 N·m	65 – 74 lb ft

500 Series Quadtrac axles

Item	Metric value	U.S. value
Axle to frame mounting bolts (lubed)	712 – 793 N·m	525 – 585 lb ft
Driveshaft mounting bolts	96 – 110 N·m	70 – 80 lb ft
Front bumper mounting bolts	106 – 120 N·m	78 – 89 lb ft
Wedge block mounting bolts	13 – 23 N·m	10 – 17 lb ft

Item	Metric value	U.S. value
Offset housing to differential housing mounting bolts	284 – 298 N·m	209 – 220 lb ft
Final drive to offset housing bolts	284 – 298 N·m	209 – 220 lb ft
Axle yoke to offset housing (and ring gear) mounting bolts	284 – 298 N·m	209 – 220 lb ft
Differential ring gear bolts	297 – 325 N·m	219 – 240 N·m
Pinion cover mounting bolts	284 – 298 N·m	209 – 220 lb ft
Axle center housing to rear frame bolts (rear axle only)	285 – 319 N·m	210 – 235 lb ft
Left hand differential bearing carrier bolts	89 – 100 N·m	65 – 74 lb ft
Right hand brake carrier mounting bolts	146 – 165 N·m	108 – 122 lb ft
Brake retaining ring mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential pinion gear pin bolts	75 – 83 N·m	54 – 61 lb ft
Bevel pinion lube tube retaining clip bolt	24 – 30 N·m	18 – 22 lb ft
Bevel pinion yoke retaining bolt	377 – 677 N·m	278 – 499 lb ft
Port block retaining bolts (if equipped)	52 – 58 N·m	38 – 43 lb ft
Offset bearing carrier cover bolts	89 – 100 N·m	65 – 74 lb ft

600 Series axles

Item	Metric value	U.S. value
Wheel to hub bolts	755 – 850 N·m	555 – 625 lb ft
Axle to frame mounting bolts (lubed)	665 – 745 N·m	490 – 550 lb ft
Driveshaft mounting bolts	115 – 129 N·m	85 – 95 lb ft

Item	Metric value	U.S. value
Final drive housing to differential mounting bolts	434 – 480 N·m	320 – 354 lb ft
Pinion cover mounting bolts	284 – 298 N·m	209 – 220 lb ft
Differential case cover mounting bolts (ring gear)	285 – 319 N·m	210 – 235 lb ft
Bevel pinion yoke retaining bolt	377 – 677 N·m	278 – 499 lb ft
Left hand differential bearing carrier bolts	89 – 100 N·m	65 – 74 lb ft
Right hand brake carrier mounting bolts	145 – 165 N·m	108 – 122 lb ft
Left hand differential bearing carrier seal retaining screws	8 – 10 N·m	70.8 – 88.5 lb in
Right hand brake carrier seal retainer screws	8 – 10 N·m	70.8 – 88.5 lb in
Brake piston bore insert	89 – 100 N·m	65 – 74 lb ft
Brake retaining ring mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential pinion gear pin bolts	75 – 83 N·m	54 – 61 lb ft
Bevel pinion lube tube retaining clip bolt	26 – 35 N·m	19 – 26 lb ft
Port block retaining bolts (if equipped)	35 – 58 N·m	26 – 43 lb ft

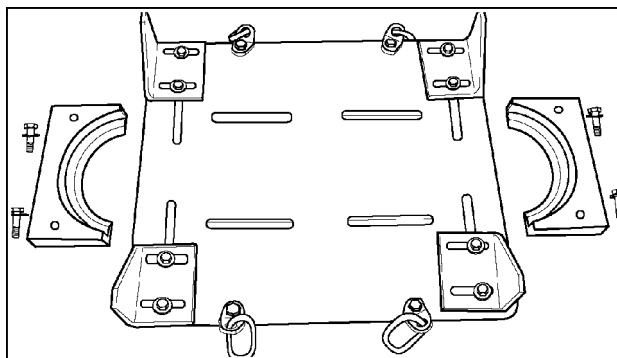
600 Series Quadtrac axles

Item	Metric value	U.S. value
Axle to frame mounting bolts (lubed)	712 – 793 N·m	525 – 585 lb ft
Driveshaft mounting bolts	96 – 110 N·m	70 – 80 lb ft
Wedge block mounting bolts	13 – 23 N·m	10 – 17 lb ft

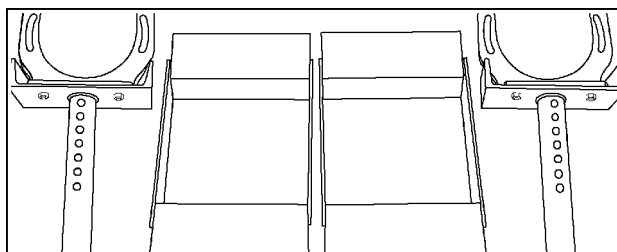
Item	Metric value	U.S. value
Offset housing to differential housing mounting bolts	284 – 298 N·m	209 – 220 lb ft
Final drive to offset housing bolts	284 – 298 N·m	209 – 220 lb ft
Axle yoke to offset housing (and ring gear) mounting bolts	284 – 298 N·m	209 – 220 lb ft
Differential ring gear bolts	297 – 325 N·m	219 – 240 N·m
Pinion cover mounting bolts	89 – 100 N·m	65 – 74 lb ft
Axle center housing to rear frame bolts (rear axle only)	285 – 319 N·m	210 – 235 lb ft
Left hand differential bearing carrier bolts	89 – 100 N·m	65 – 74 lb ft
Right hand brake carrier mounting bolts	146 – 165 N·m	108 – 122 lb ft
Brake retaining ring mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential pinion gear pin bolts	75 – 83 N·m	54 – 61 lb ft
Bevel pinion lube tube retaining clip bolt	24 – 30 N·m	18 – 22 lb ft
Bevel pinion yoke retaining bolt	244 – 271 N·m	180 – 200 lb ft
Port block retaining bolts (if equipped)	52 – 58 N·m	38 – 43 lb ft
Offset bearing carrier cover bolts	89 – 100 N·m	65 – 74 lb ft
Axle shaft bearing locking nut set screws	32.5 – 43.9 N·m	24 – 32.4 lb ft

Powered front axle - Special tools - 400 Series axles

Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

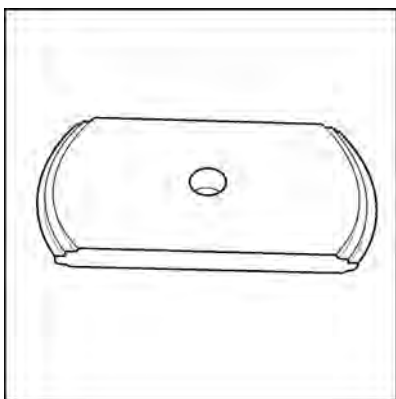


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CAS2694 Axle lifting adapter plate

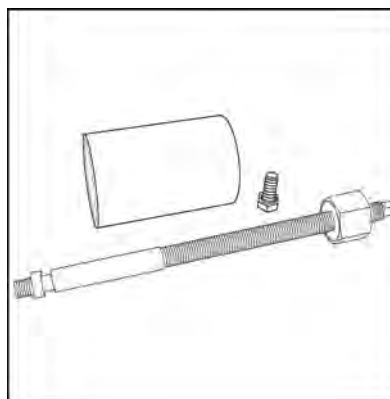
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CAS2695 Jack stand adapter post and dolly cart



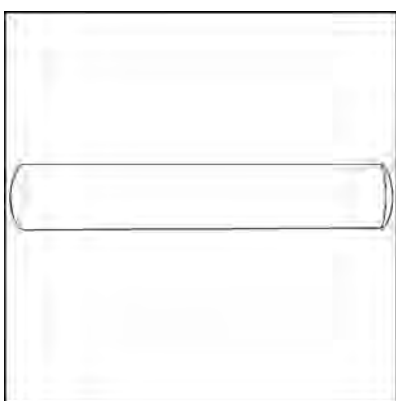
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CAS2663 Final drive housing bearing cup remover/installer



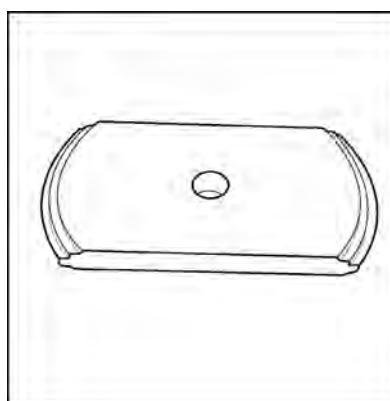
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CAS2666 Axle shaft/pinion bearing cone installer



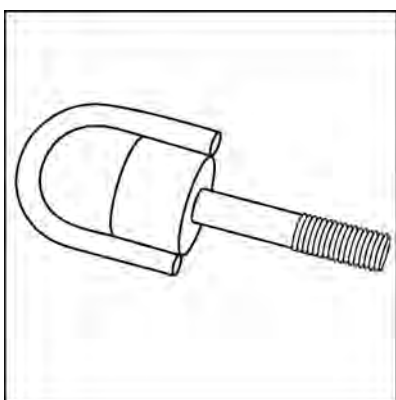
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CAS2750 Axle shaft outer bearing installer



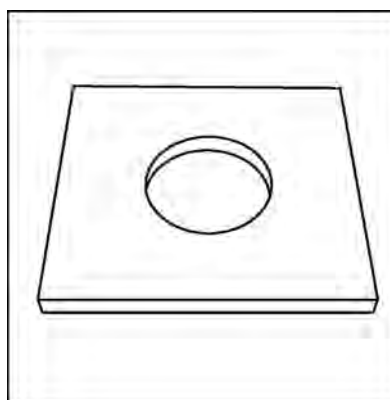
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CAS2667 CNH299041 Final drive housing inner bearing cup remover



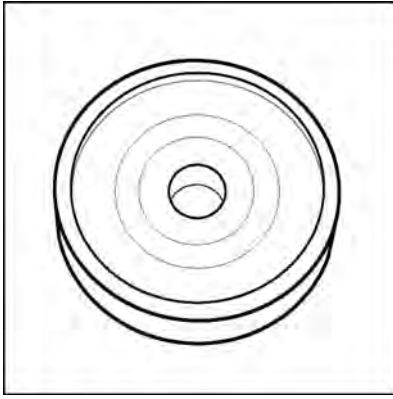
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380002920 Axle shaft lifting eye



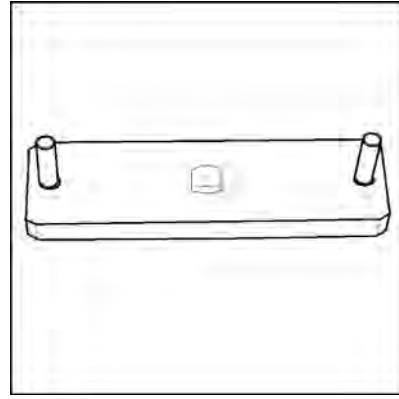
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CAS2668 CNH299051 Axle shaft outer bearing press plate



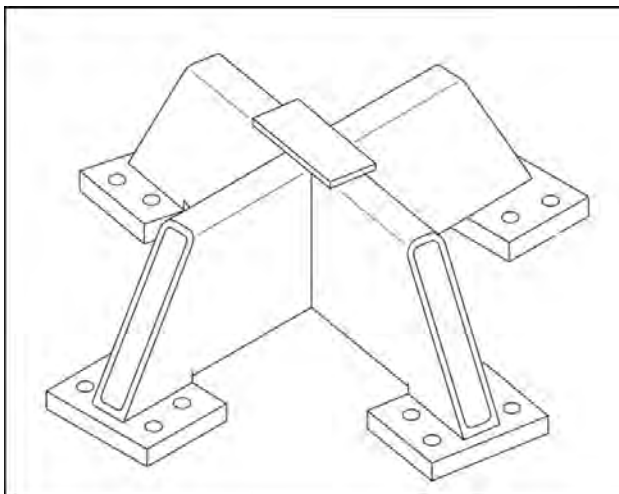
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CNH299042 Brake carrier bearing cone installer



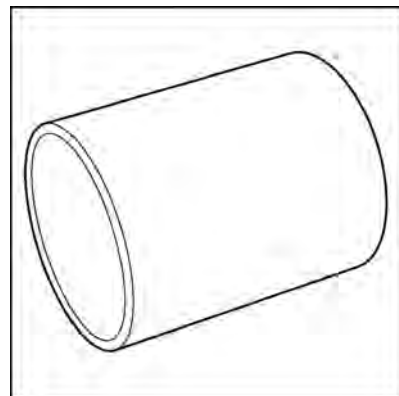
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CAS2674 Sun gear torque adapter



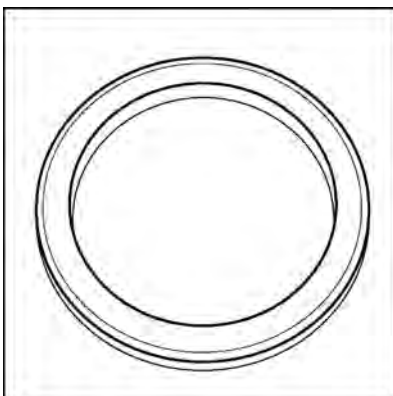
11

380002851 Axle shaft remover bar



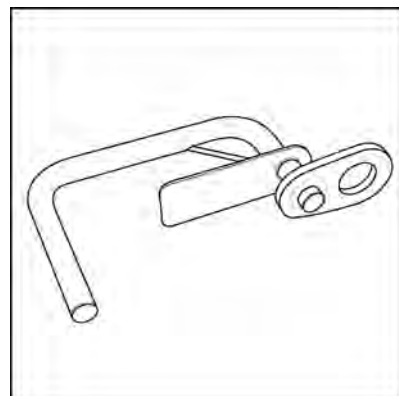
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CAS2729 Planetary gear pilot tube



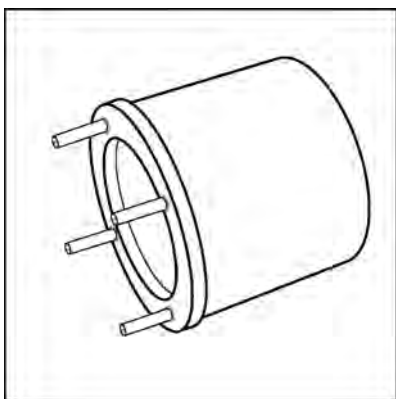
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CAS2507 Axle seal installer



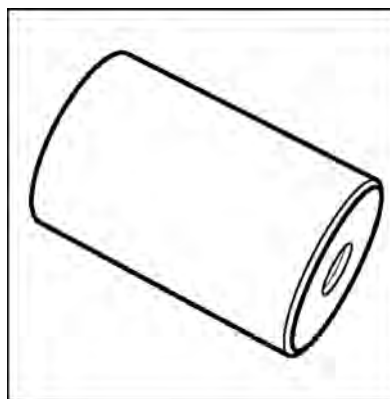
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CAS2676 Planetary assembly lifting hook



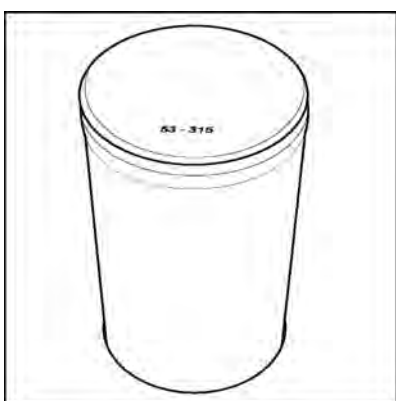
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CAS2692 Bearing heater adapter



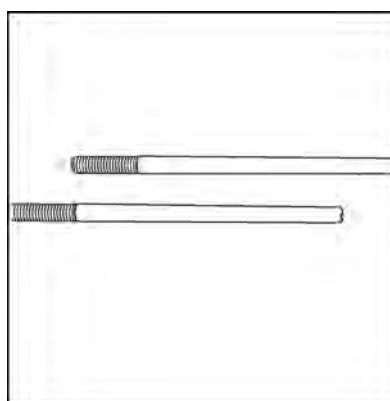
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CAS1675-2 Pinion depth gauge block



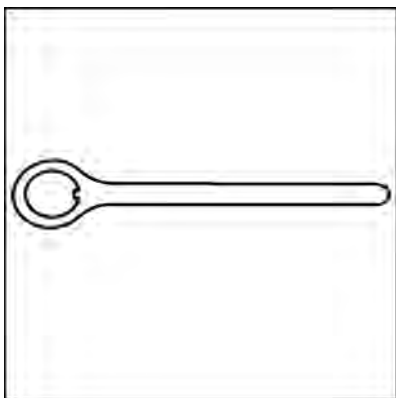
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CNH299138 Driver anvil



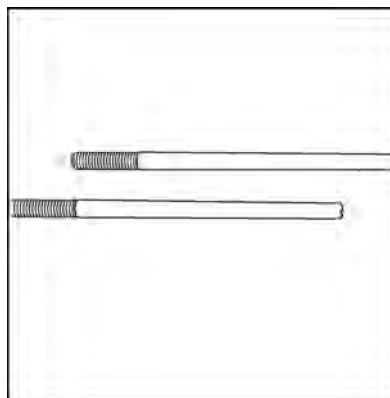
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CNH299079 Alignment stud set



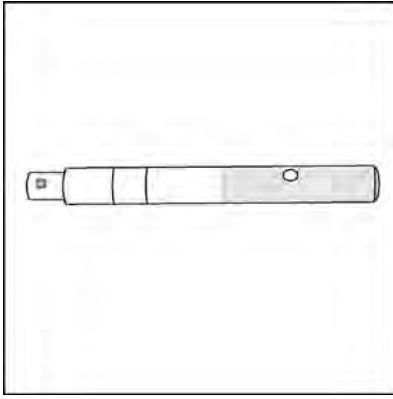
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CAS2748 Axle wrench



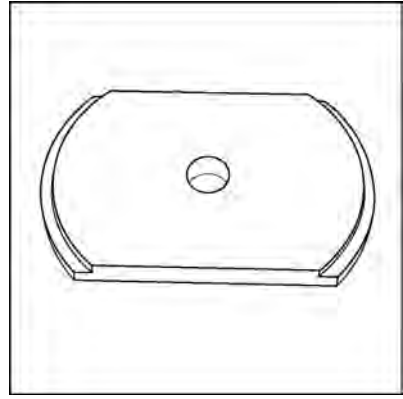
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CNH299137 Alignment stud set



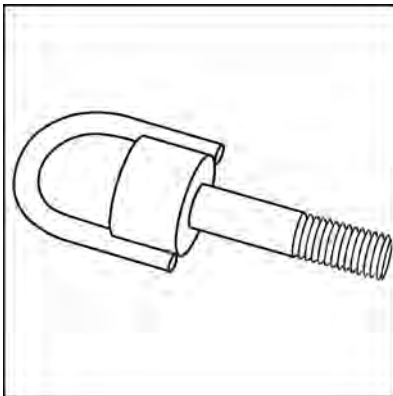
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CNH299077 Short bearing driver handle



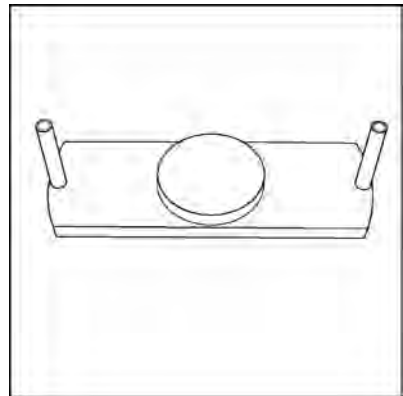
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CAS2501 Bearing cup installer



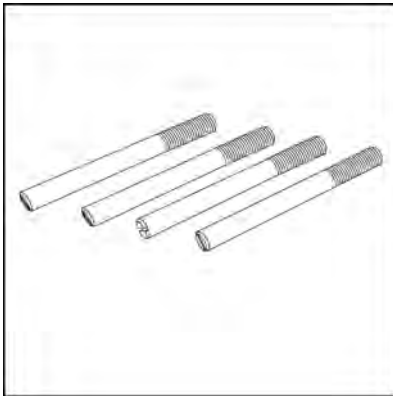
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380002921 Lifting eye hook



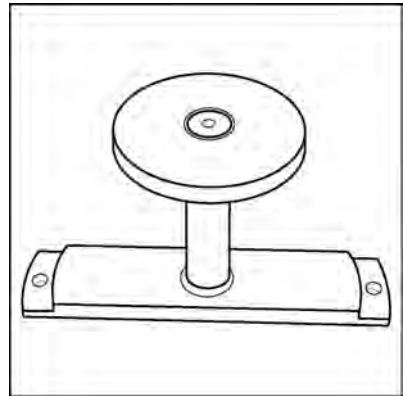
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CAS2505 Brake disc aligner



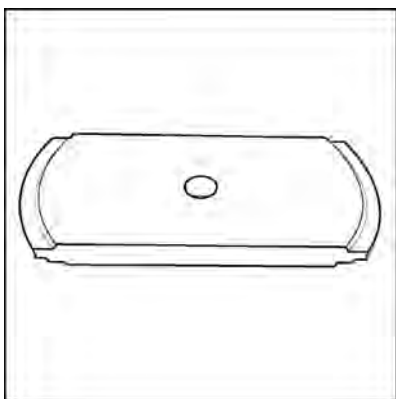
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CAS2496 Alignment stud set



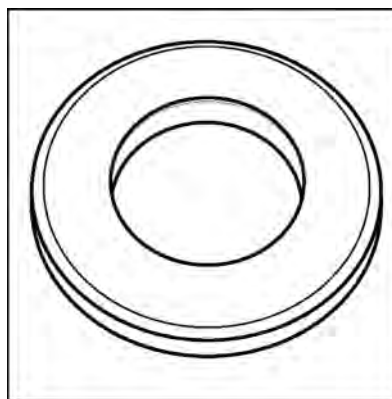
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CAS2506 Pinion depth gauge arbor



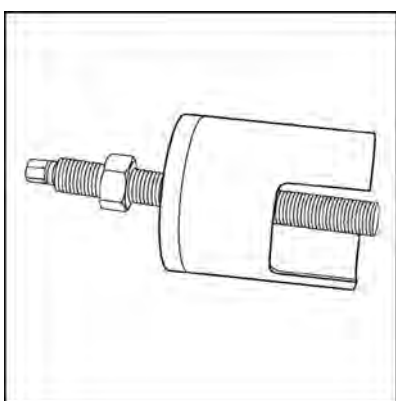
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CNH299083 Bearing cup installer



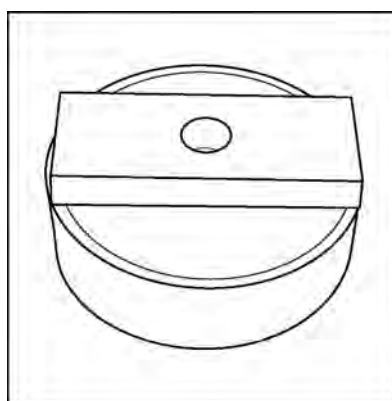
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CAS2503 Bevel pinion seal installer



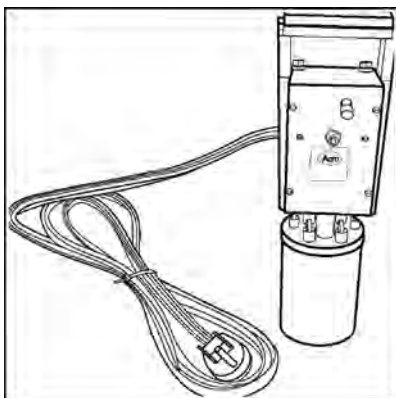
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CAS2511 Pinion bearing preload compressor



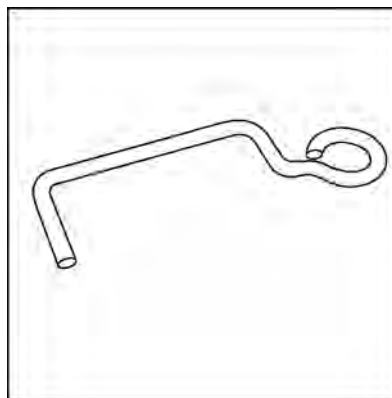
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CAS2516 Bearing installer



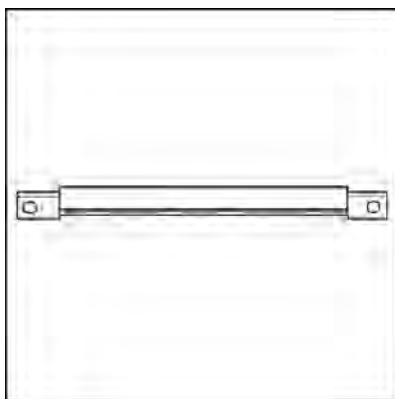
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CNH299134 Gear/bearing heater



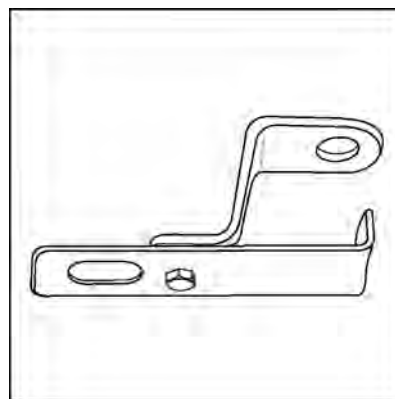
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CNH299075 Lifting hook



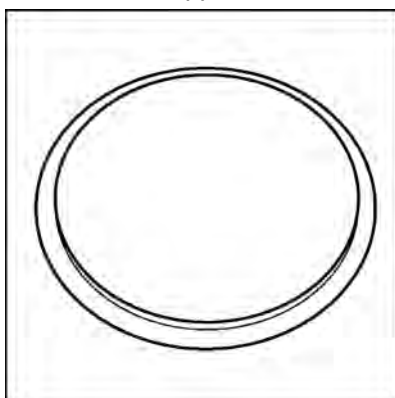
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CNH299141 Differential support bracket



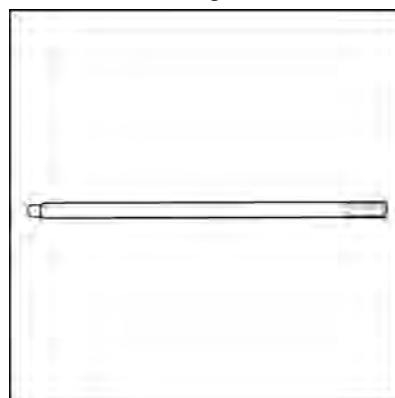
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CNH299140 Differential lifting bracket



RCPH10FWD469ABJ 35

CAS2510 Adapter plate



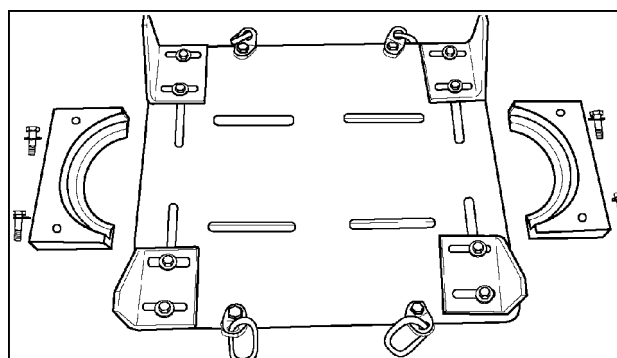
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CAS2405 Long bearing driver handle

Powered front axle - Special tools - 500 and 600 Series axles

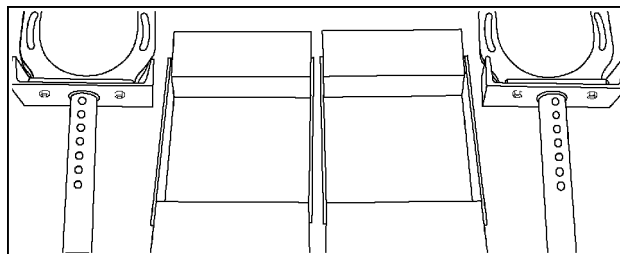
Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 500	NA
Steiger® 540 Quadtrac®	NA
Steiger® 580 Quadtrac®	NA
Steiger® 580	NA
Steiger® 620 Quadtrac®	NA
Steiger® 620	NA

Axle removal tools



RCPH10FWD597AAJ 1

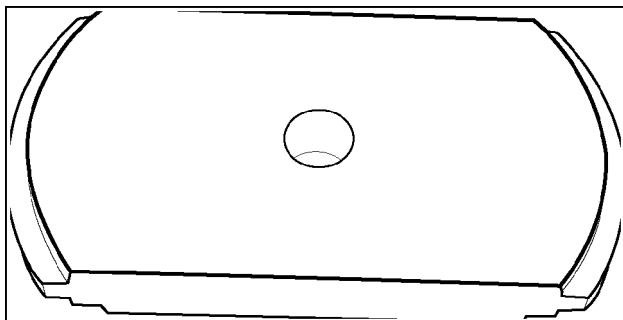
CAS2694 Axle lifting adapter plate



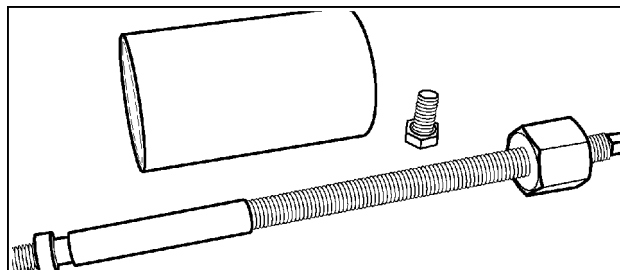
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CAS2695 Jack stand adapter post and dolly cart

500 Series axles

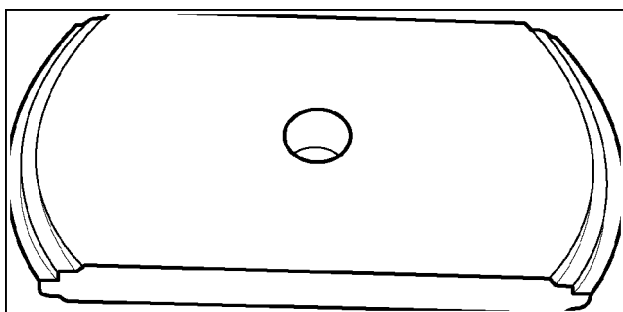


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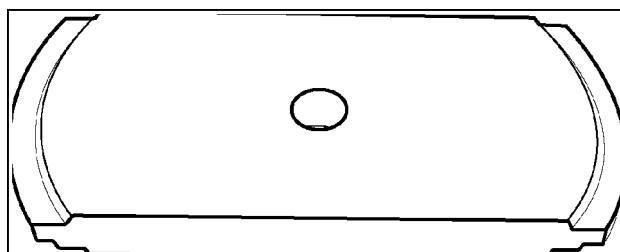
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CAS2663 Trumpet housing bearing cup remover-installer **CAS2666** Axle shaft/pinion bearing cone installer



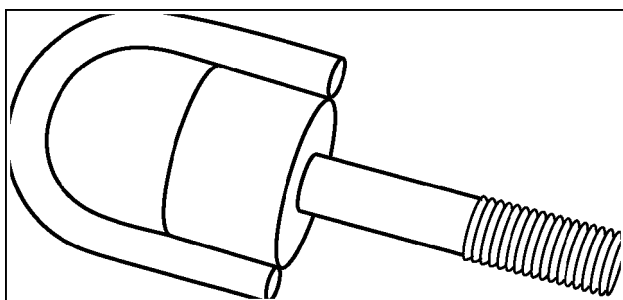
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CNH299050 Pinion inner bearing cup installer



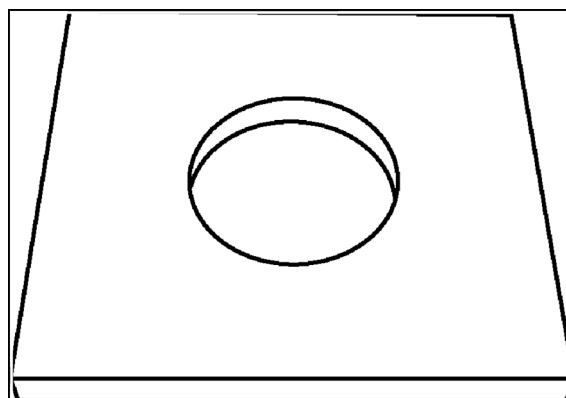
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CAS2667 CNH299041 Trumpet housing inner bearing cup remover



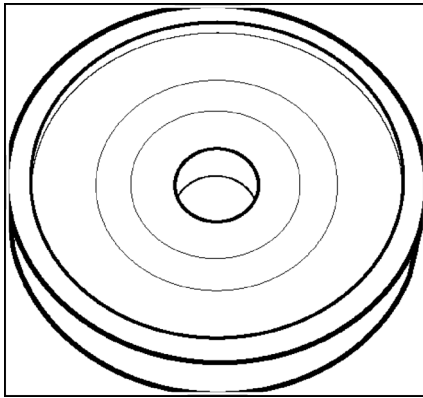
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380002920 Axle shaft lifting eye



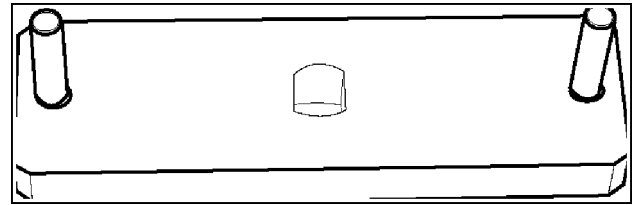
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CAS2668 CNH299051 Axle shaft outer bearing press plate



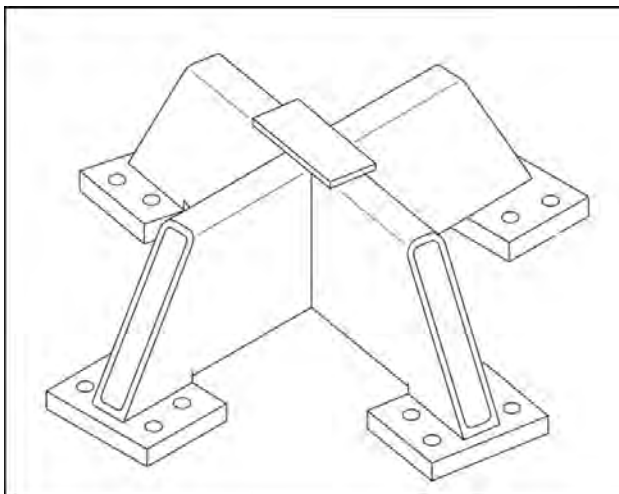
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CNH299042 Brake carrier bearing cone installer



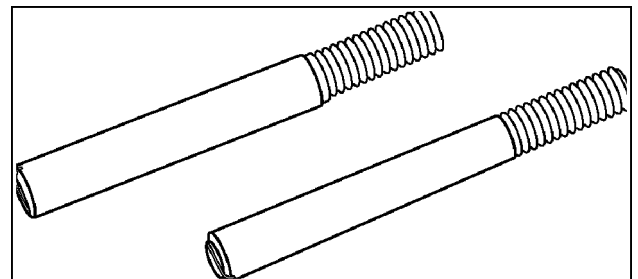
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CAS2674 Sun gear torque adapter



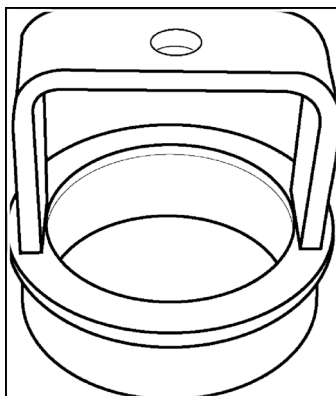
11

380002851 Axle shaft remover bar



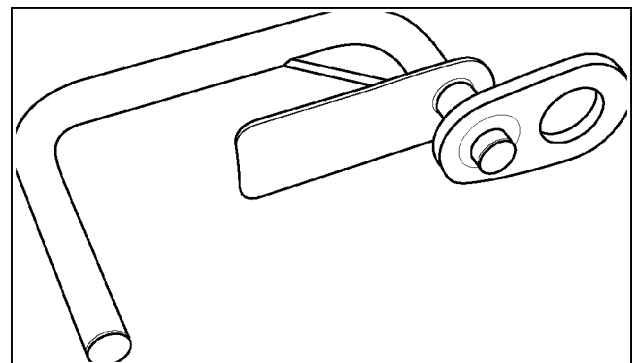
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CAS2675 Brake assembly alignment stud set



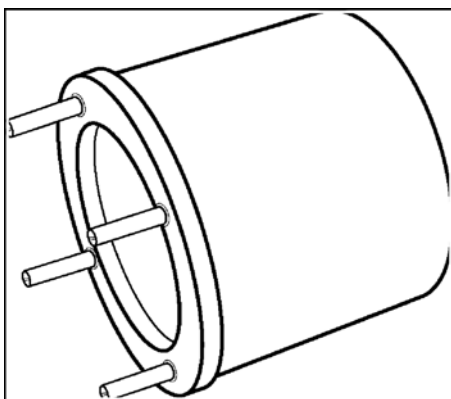
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CAS2673 Pinion seal installer



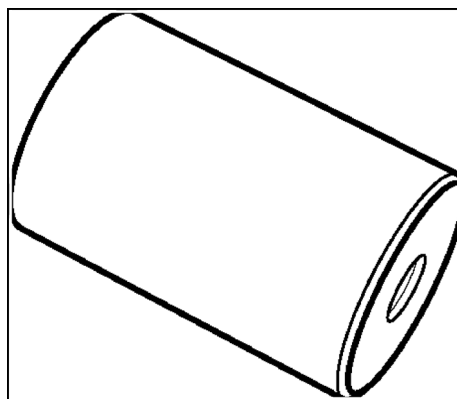
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CAS2676 Planetary assembly lifting hook



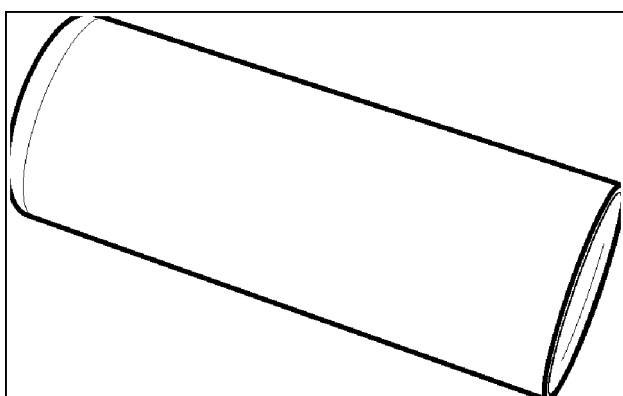
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CAS2692 Bearing heater adapter



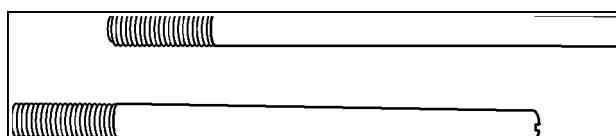
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CAS1675-2 Pinion depth gauge block



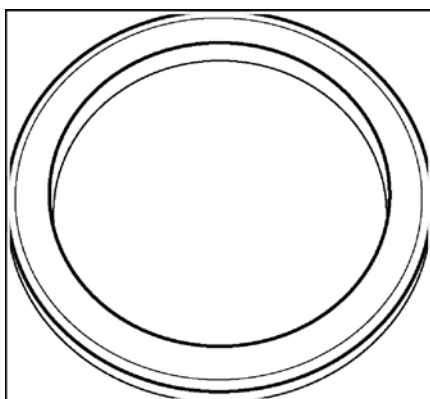
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CNH299048 Planetary gear pilot sleeve



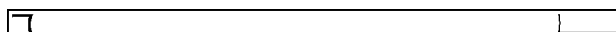
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CNH299079 Alignment stud set



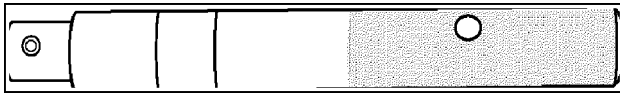
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CAS2507 Axle seal installer



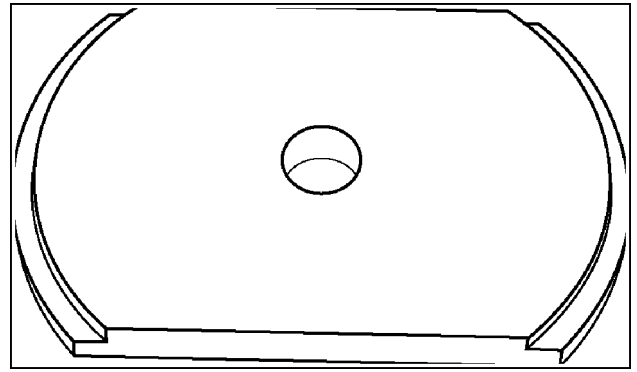
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CAS2405 Long bearing driver handle



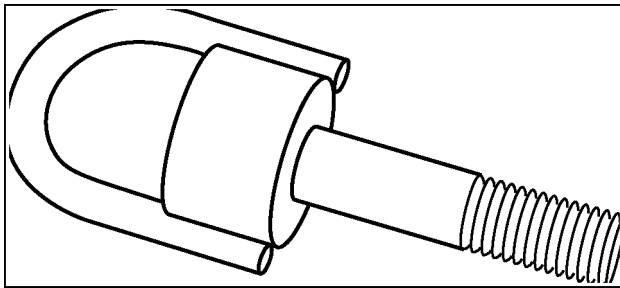
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CNH299077 Short bearing driver handle



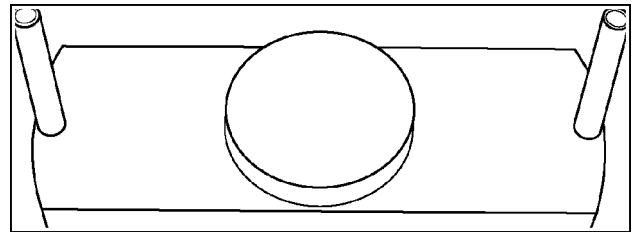
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CAS2501 Bearing cup installer



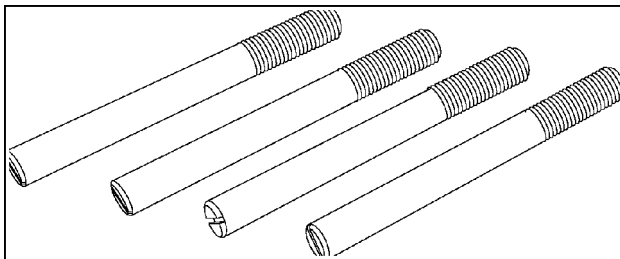
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380002921 Lifting eye bolt



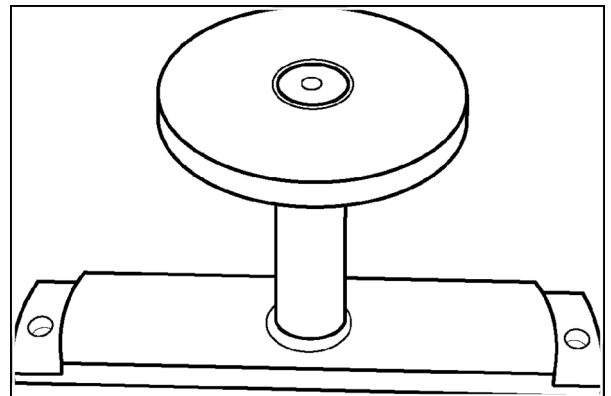
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CAS2505 Brake disc aligner



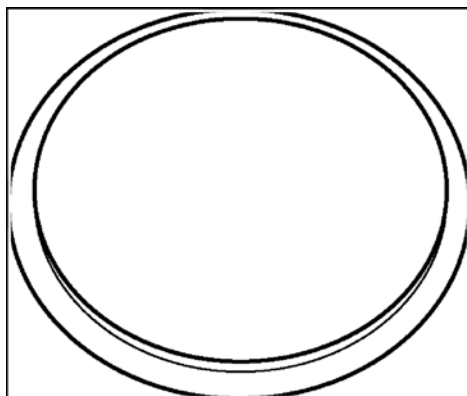
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CAS2496 Alignment stud set



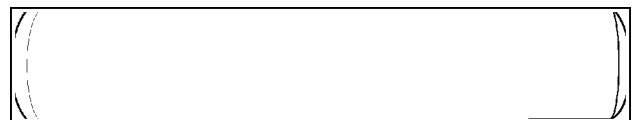
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CAS2506 Pinion depth gauge arbor



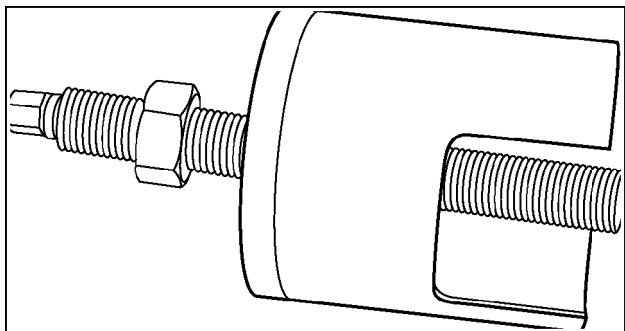
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CAS2510 Bearing cup remover/adaptor plate



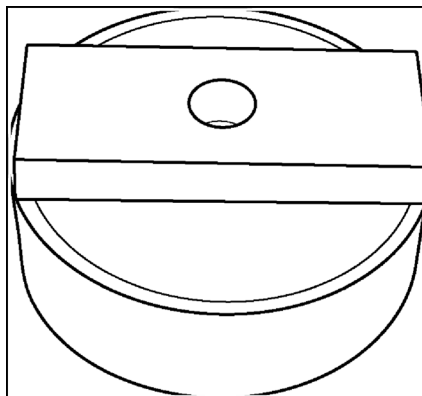
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CAS2514-2 Axle shaft outer bearing installer



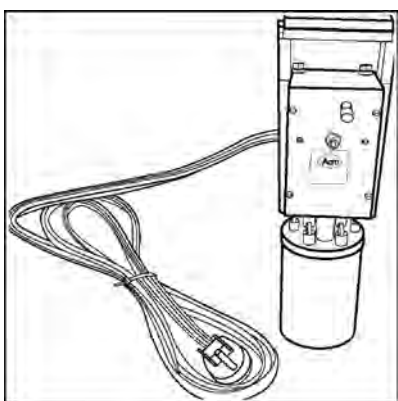
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CAS2511 Pinion bearing preload compressor



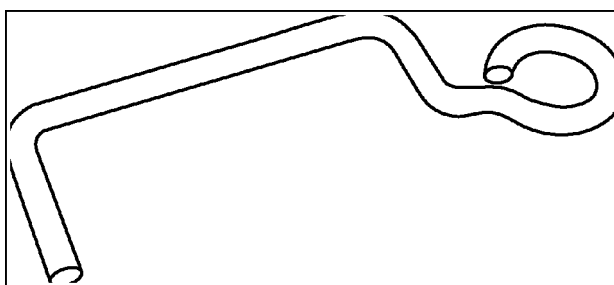
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CAS2516 Bearing installer



RCPH10FWD880AAJ 31

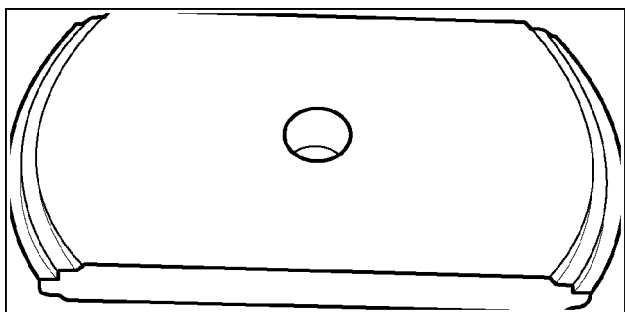
CNH299134 Gear/bearing heater



RCPH10FWD883AAJ 32

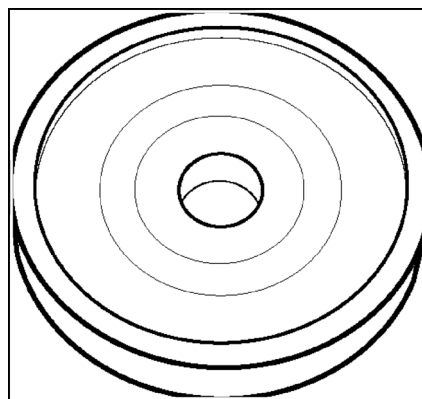
CNH299075 Lifting hook

500 Series Quadtrac axles



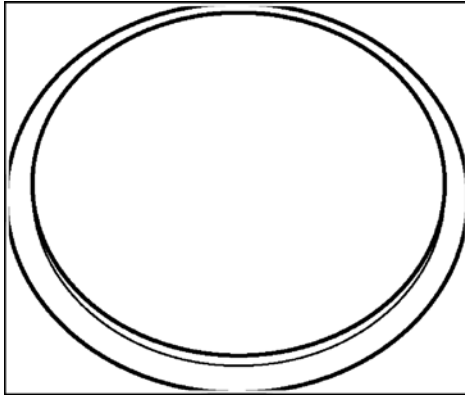
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CNH299050 Pinion inner bearing cup installer.



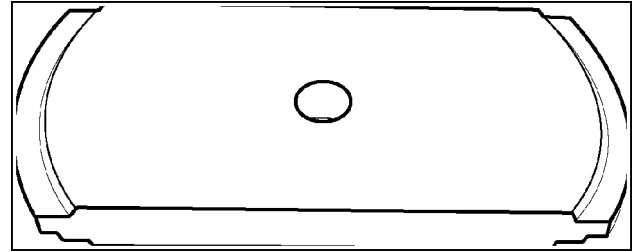
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CNH299042 Bearing cone installer



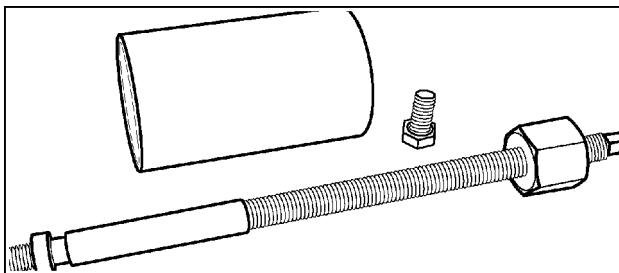
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CAS2510 Adapter plate



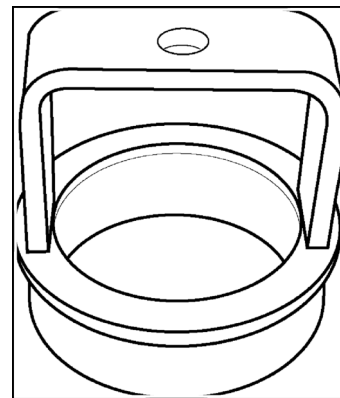
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CAS2667 Final drive housing inner bearing cup remover



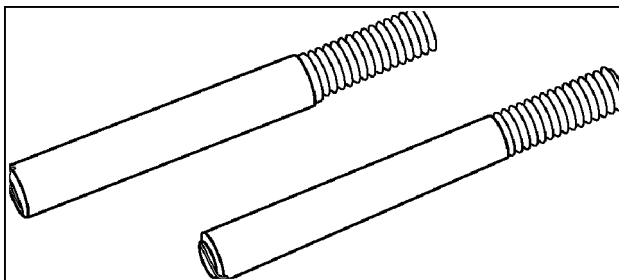
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CAS2666 Axle shaft pinion bearing cone remover



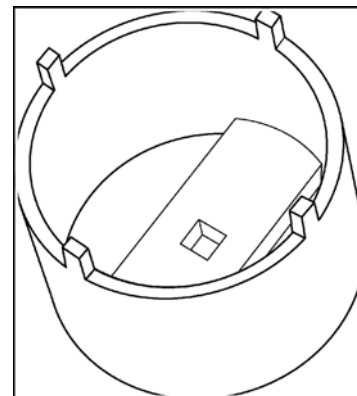
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CAS2673 Pinion seal installer



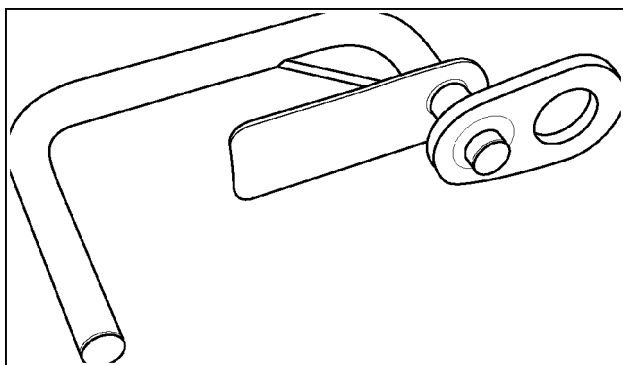
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CAS2675 Brake assembly alignment stud set



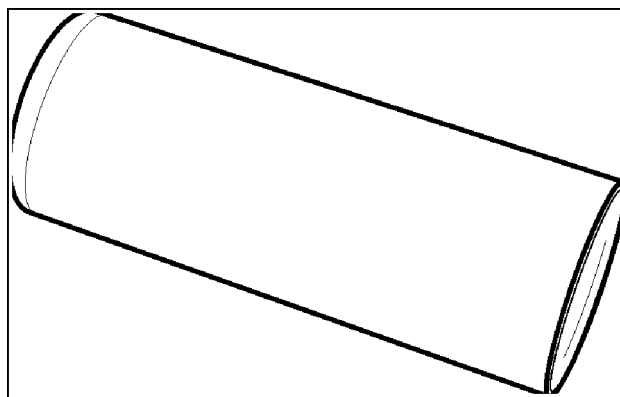
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380002570 Axle nut spanner wrench



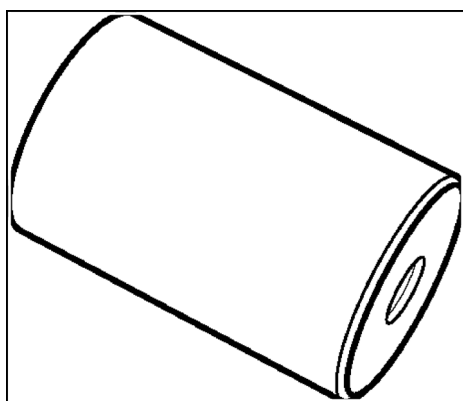
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CAS2676 Planetary assembly lifting hook



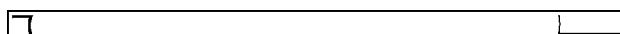
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CAS2729 Planetary gear pilot sleeve



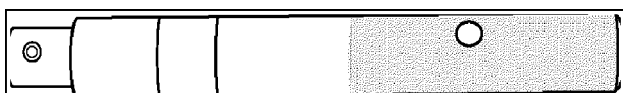
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CAS1675-2 Pinion depth gauge block



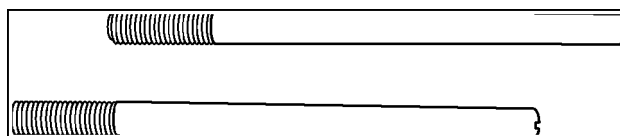
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CAS2405 Long bearing driver handle



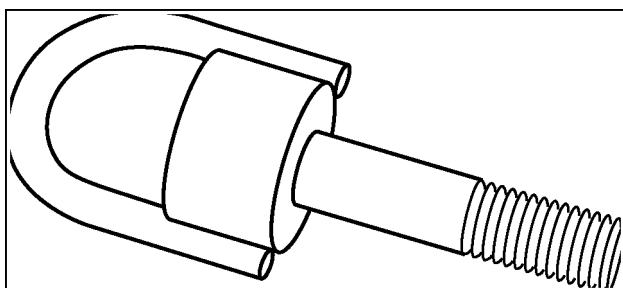
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CNH299077 Short bearing driver handle



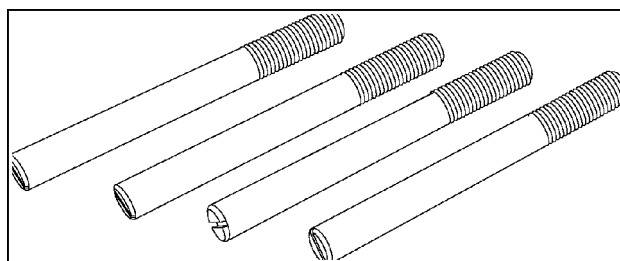
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380000884 Alignment stud set



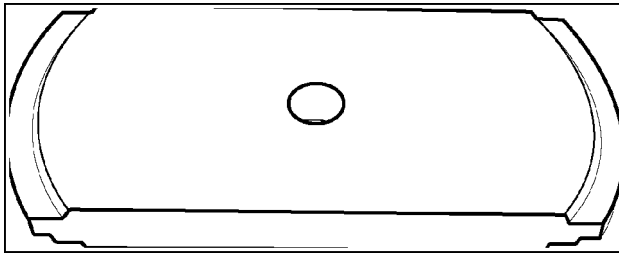
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380002921 Lifting eye bolt



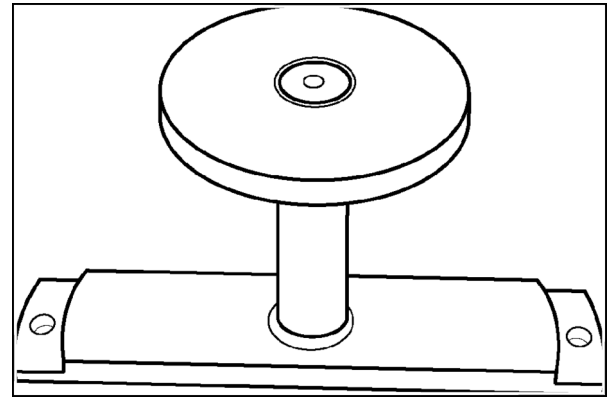
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CAS2496 Alignment stud set



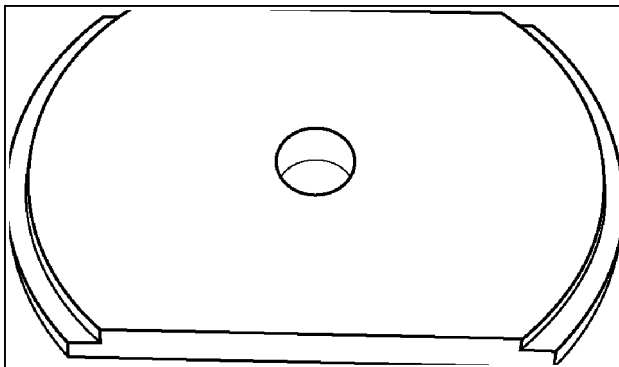
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CNH299083 Bearing cup installer



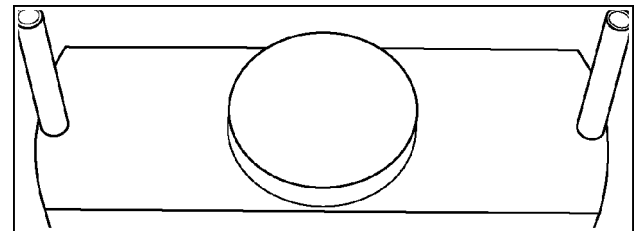
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CAS2506 Pinion depth gauge arbor



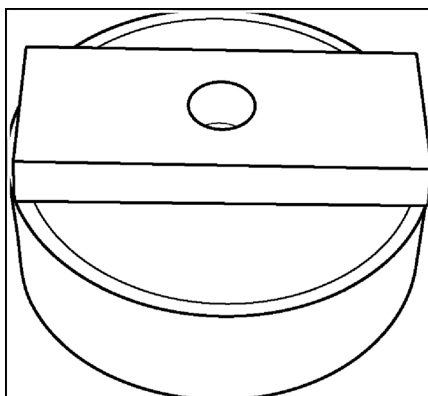
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CAS2501 Bearing cup installer



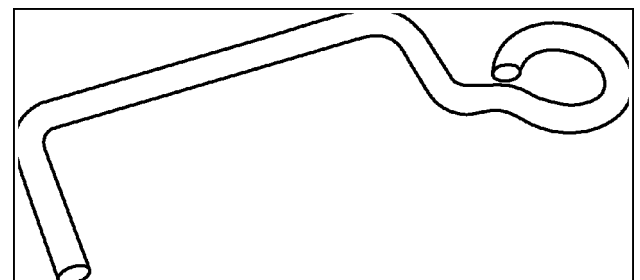
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CAS2505 Brake disc aligner



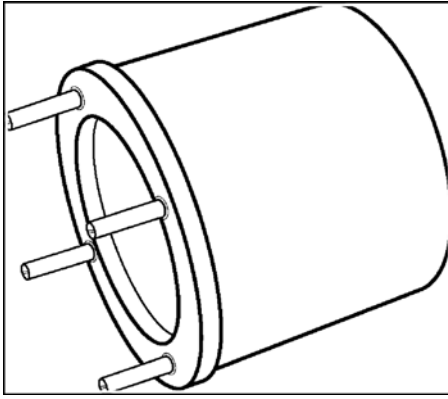
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CAS2516 Bearing installer



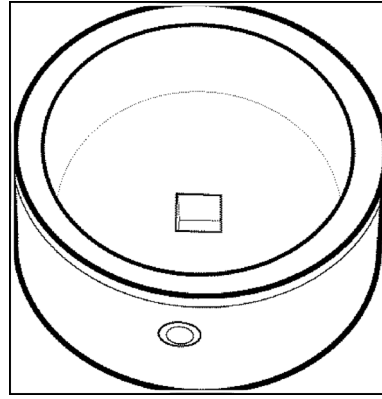
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CNH299075 Lifting hook



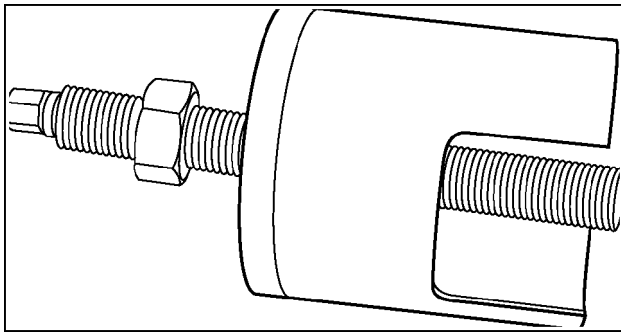
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CAS2692 Bearing heater adapter



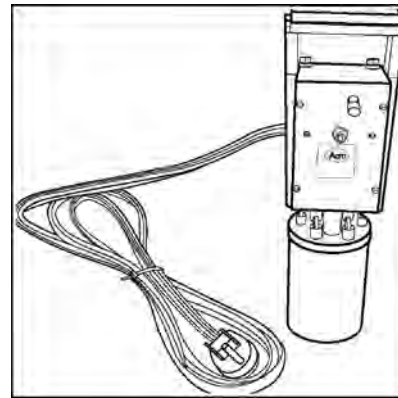
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CAS2508 Rolling torque adapter



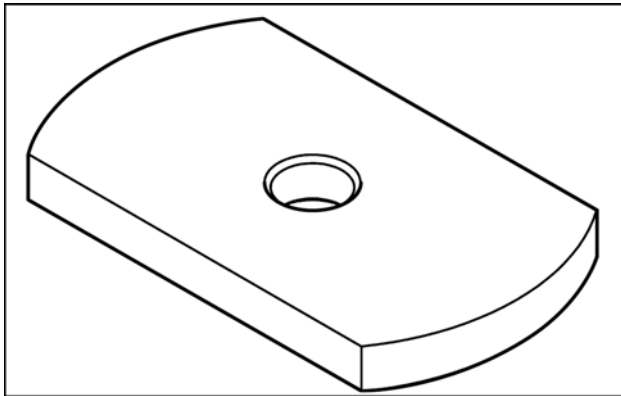
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CAS2511 Pinion bearing preload compressor



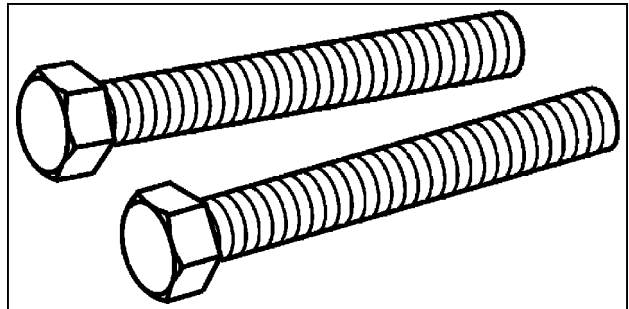
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CNH299134 Gear/bearing heater



RCPH10FWD170ABJ 59

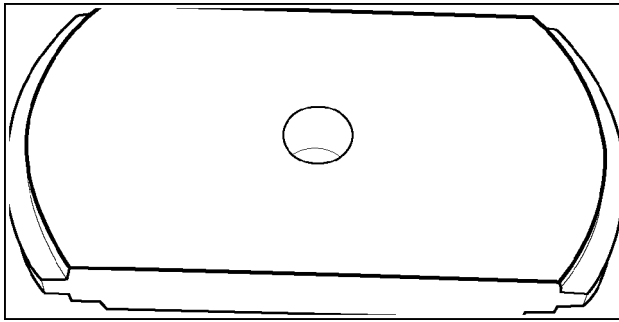
CAS2739 Bearing driver plate



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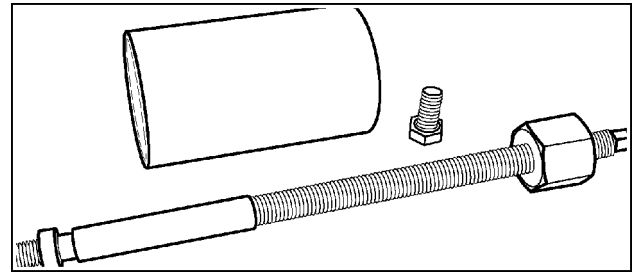
CAS2738 Push out bolts

600 Series axles



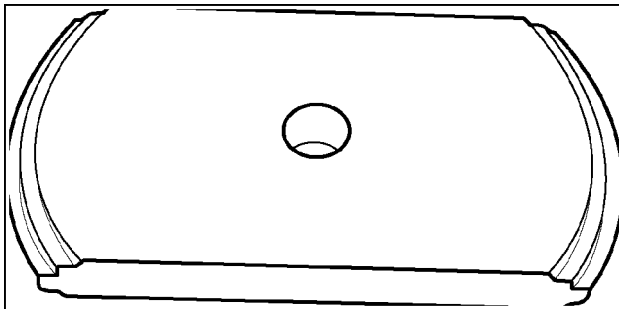
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CAS2663 Trumpet housing bearing cup remover-installer



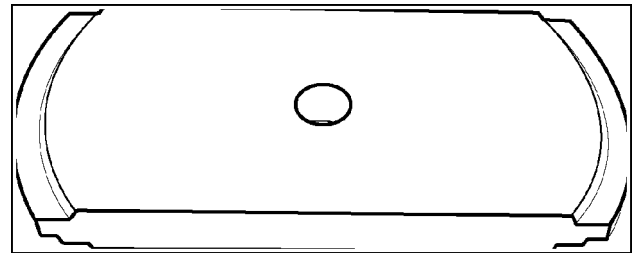
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CAS2666 Axle shaft/pinion bearing cone installer



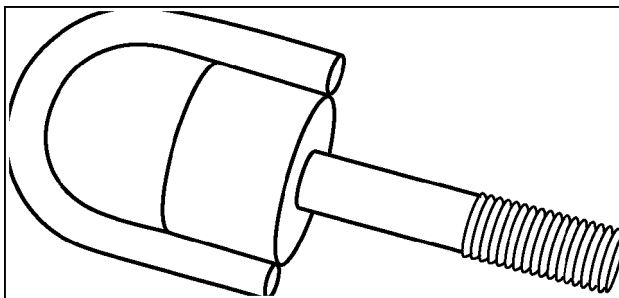
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CNH299050 Pinion inner bearing cup installer



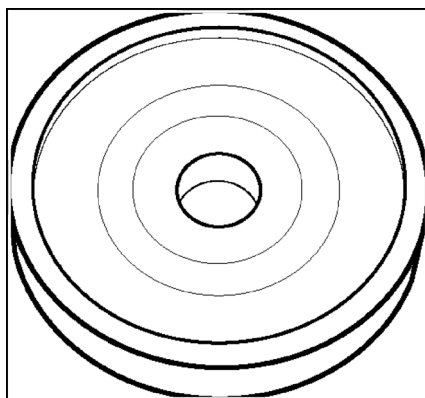
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CAS2667 CNH299041 Trumpet housing inner bearing cup remover



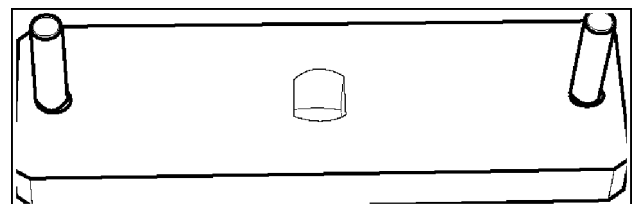
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380002920 Axle shaft lifting eye



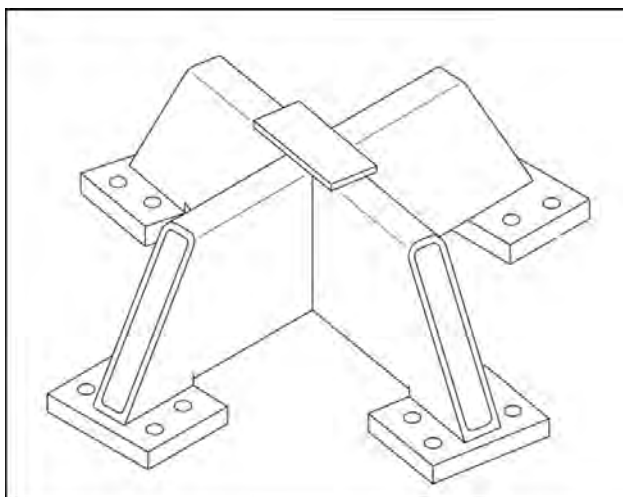
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CNH299042 Brake carrier bearing cone installer



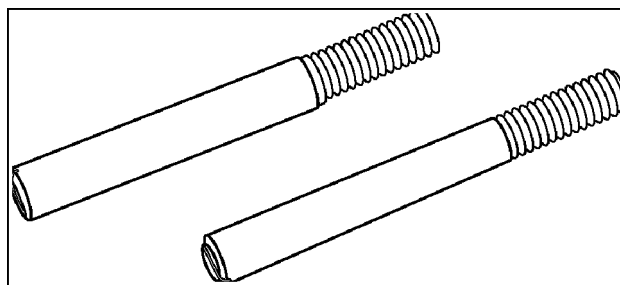
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CAS2674 Sun gear torque adapter



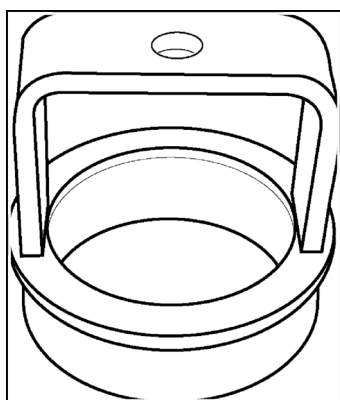
68

380002851 Axle shaft remover bar



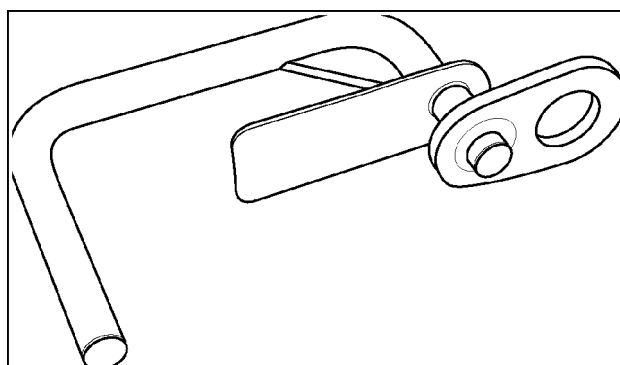
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CAS2675 Brake assembly alignment stud set



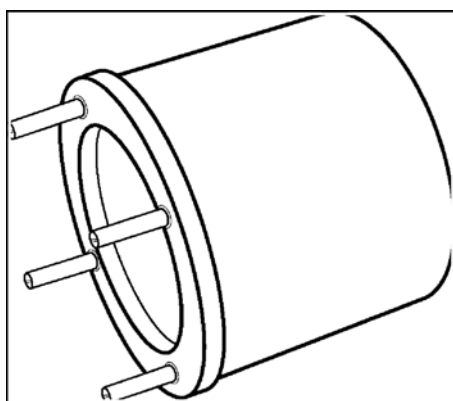
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CAS2673 Pinion seal installer



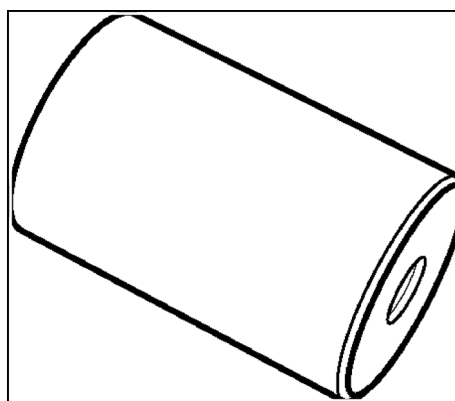
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CAS2676 Planetary assembly lifting hook



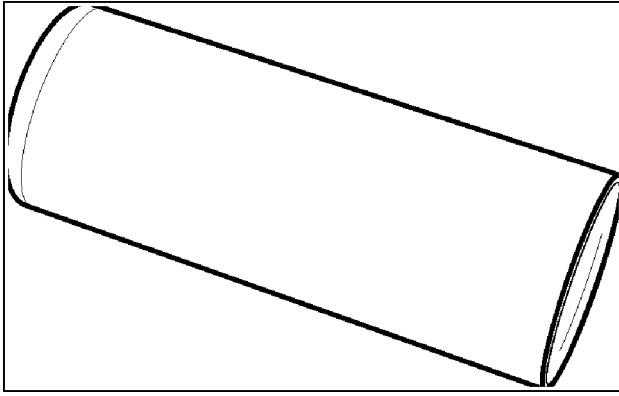
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CAS2692 Bearing heater adapter



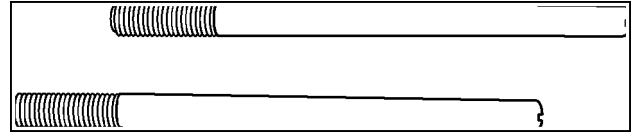
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CAS1675-2 Pinion depth gauge block



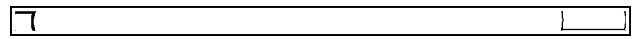
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CNH299048 Planetary gear pilot sleeve



RCPH10FWD870AAJ 75

CNH299079 Alignment stud set



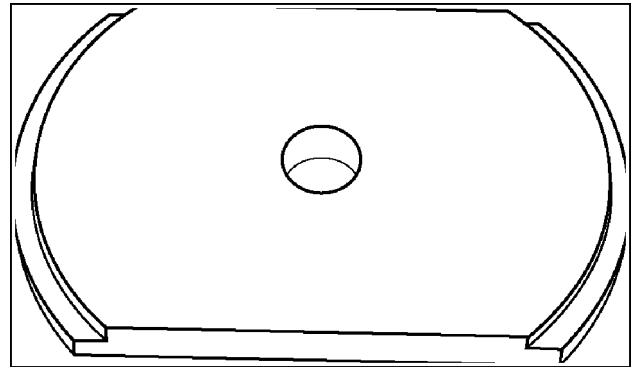
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CAS2405 Long bearing driver handle



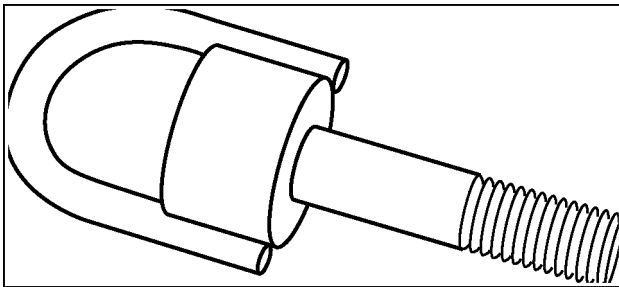
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CNH299077 Short bearing driver handle



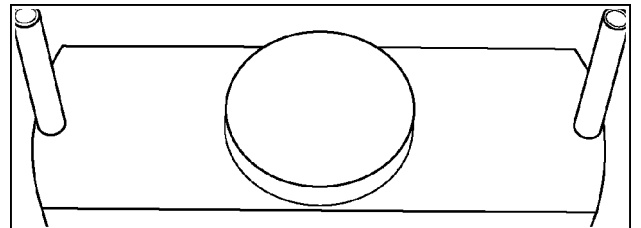
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CAS2501 Bearing cup installer



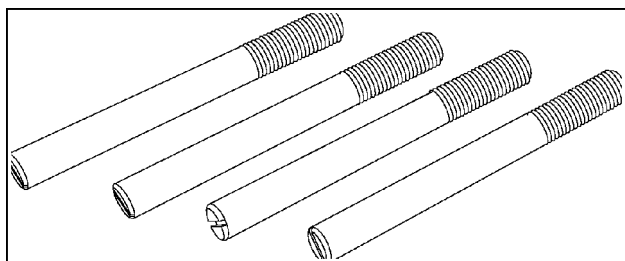
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380002921 Lifting eye bolt

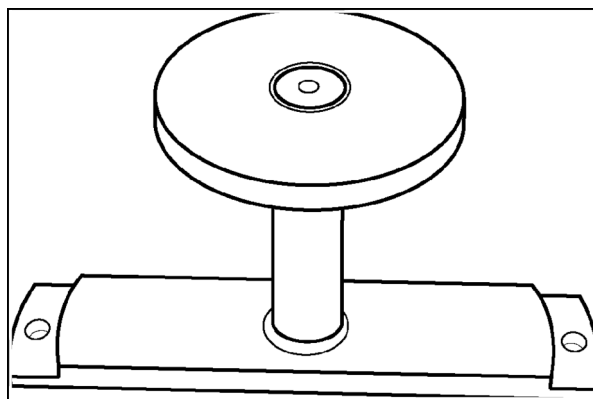


RCPH10FWD876AAJ 80

CAS2505 Brake disc aligner



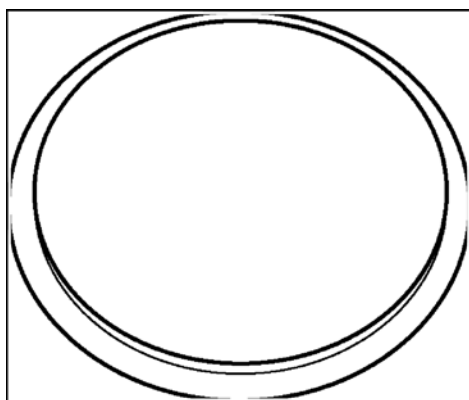
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RCPH10FWD877AAJ 82

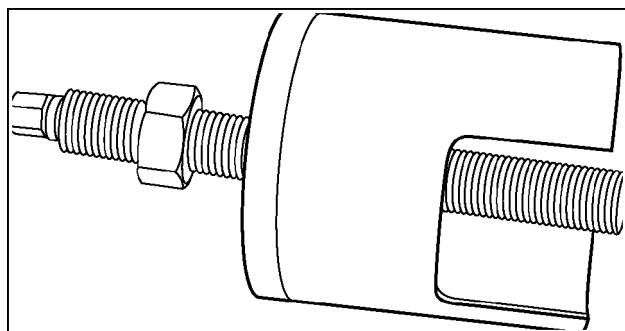
CAS2496 Alignment stud set

CAS2506 Pinion depth gauge arbor



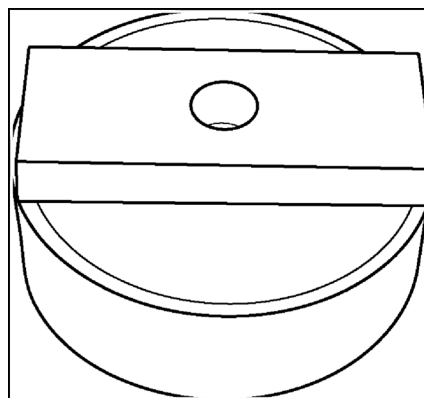
RCPH10FWD878AAJ 83

CAS2510 Bearing cup remover/adaptor plate



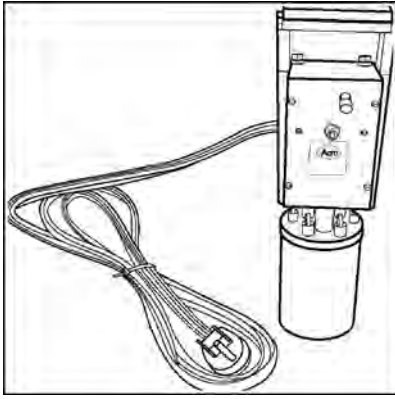
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CAS2511 Pinion bearing preload compressor



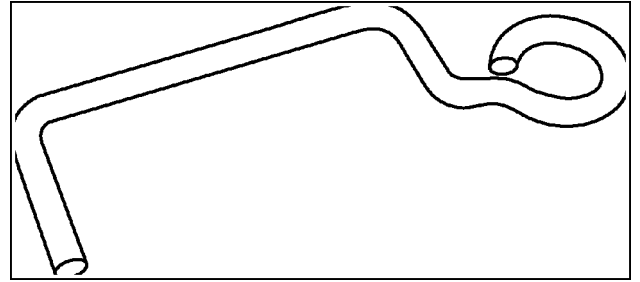
RCPH10FWD882AAJ 85

CAS2516 Bearing installer



RCPH10FWD880AAJ 86

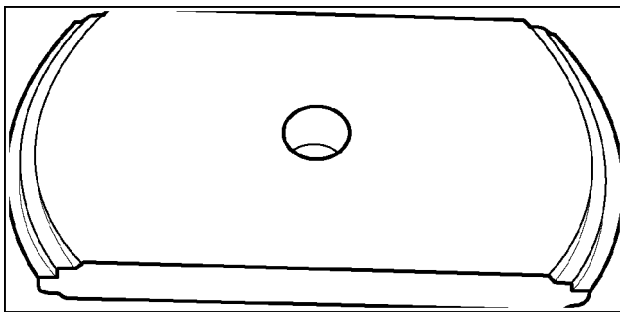
CNH299134 Gear/bearing heater



RCPH10FWD883AAJ 87

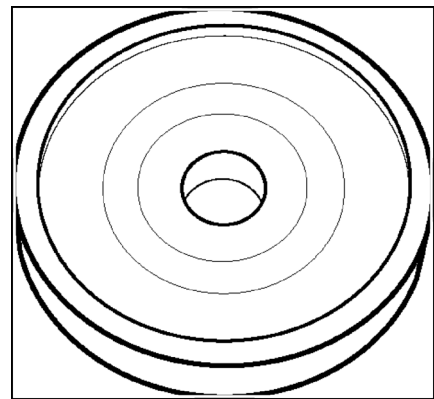
CNH299075 Lifting hook

600 Series Quadtrac axles



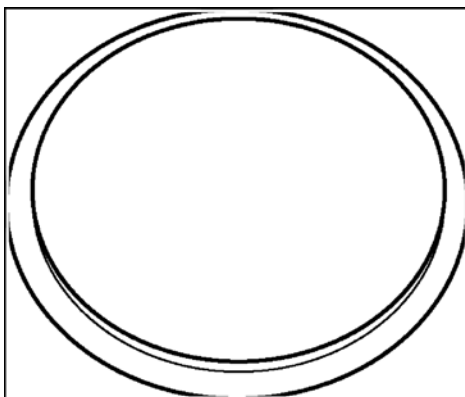
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CNH299050 Pinion inner bearing cup installer.



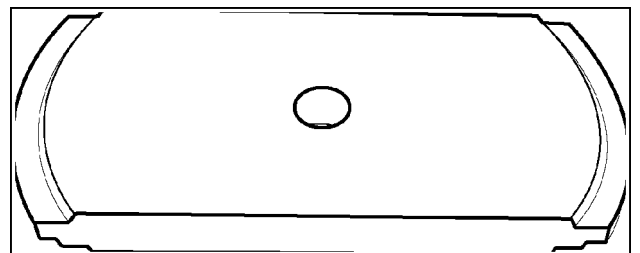
RCPH10FWD860AAJ 89

CNH299042 Bearing cone installer



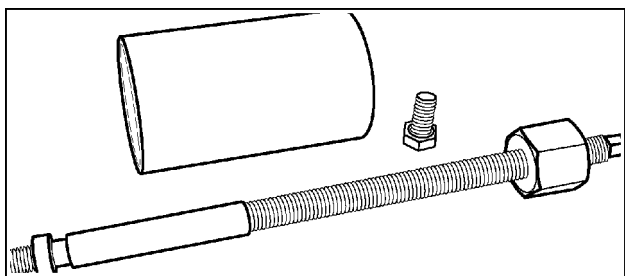
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CAS2510 Adapter plate

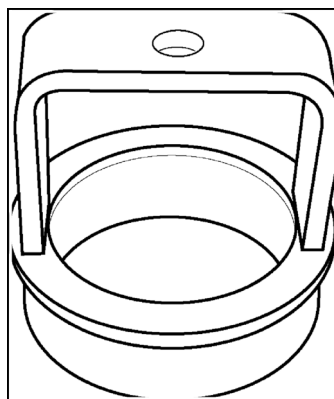


RCPH10FWD858AAJ 91

CAS2667 Final drive housing inner bearing cup remover



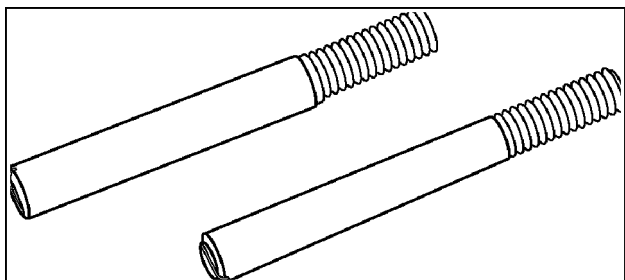
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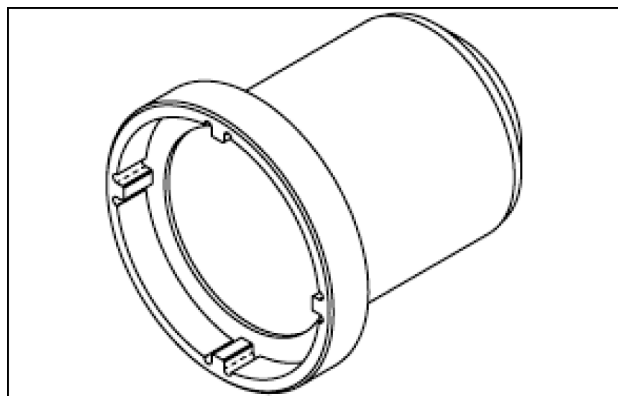
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CAS2666 Axle shaft pinion bearing cone remover

CAS2673 Pinion seal installer



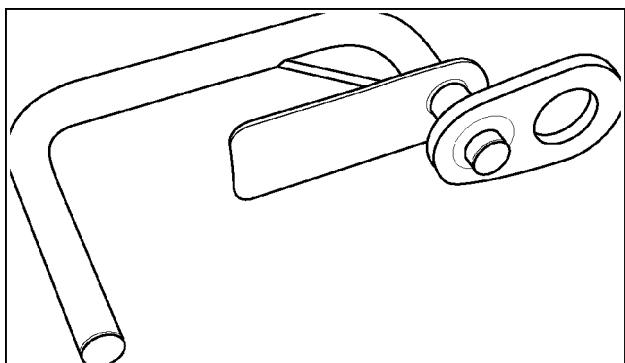
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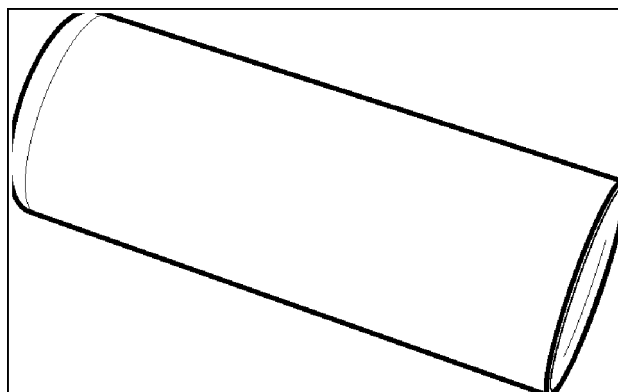
95

CAS2675 Brake assembly alignment stud set

380002906 Axle nut spanner wrench



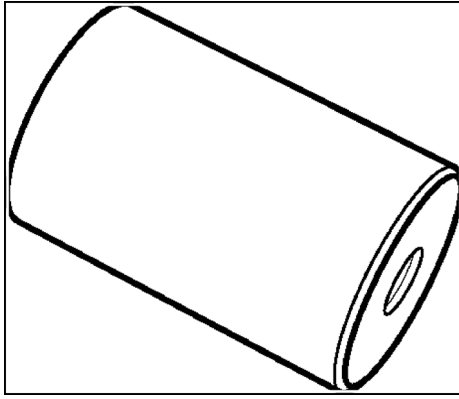
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RCPH10FWD129ABJ 97

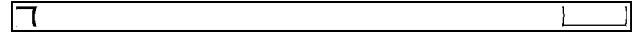
CAS2676 Planetary assembly lifting hook

CAS2729 Planetary gear pilot sleeve



RCPH10FWD869AAJ 98

CAS1675-2 Pinion depth gauge block



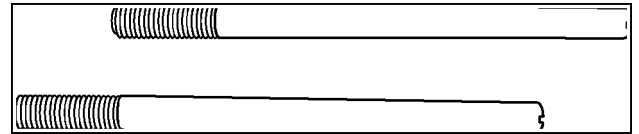
RCPH10FWD871AAJ 99

CAS2405 Long bearing driver handle



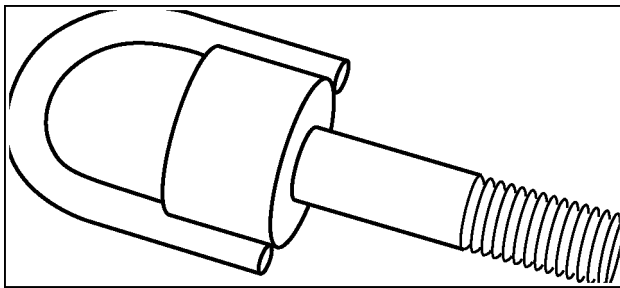
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CNH299077 Short bearing driver handle



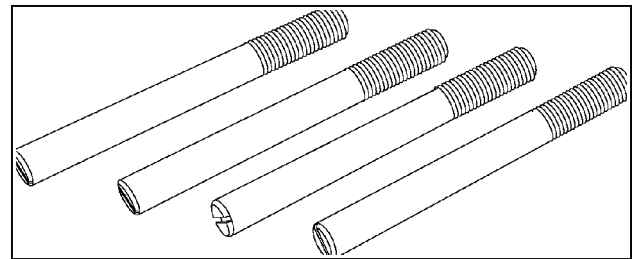
RCPH10FWD870AAJ 101

380000884 Alignment stud set



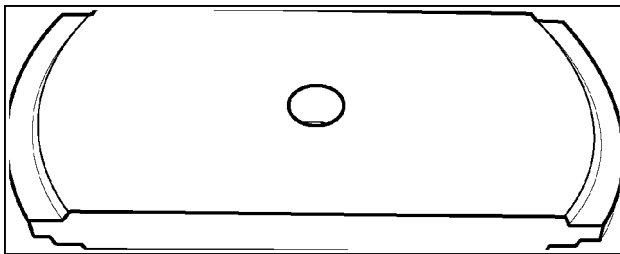
RCPH10FWD873AAJ 102

380002921 Lifting eye bolt



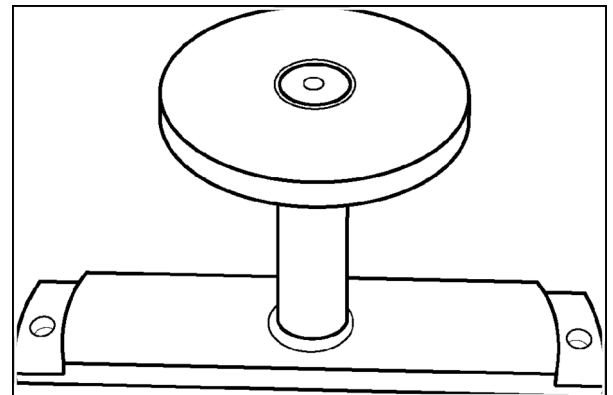
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CAS2496 Alignment stud set



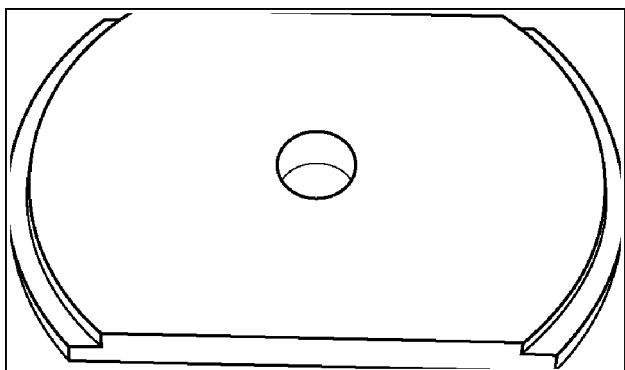
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CNH299083 Bearing cup installer

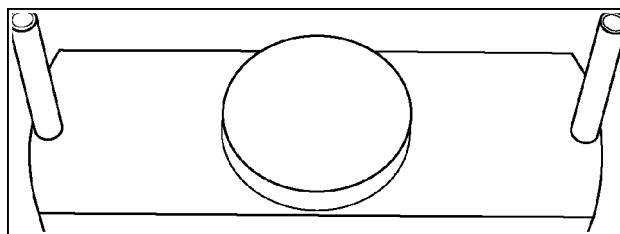


RCPH10FWD877AAJ 105

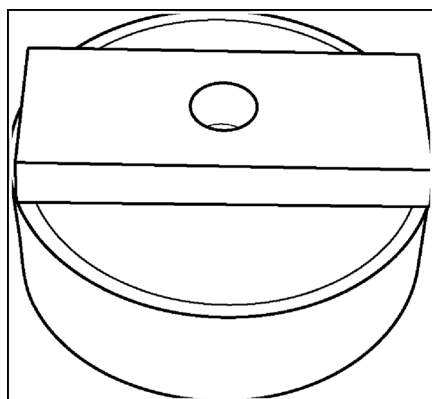
CAS2506 Pinion depth gauge arbor



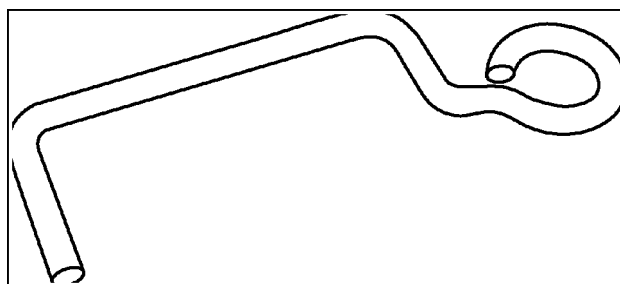
CAS2501 Bearing cup installer



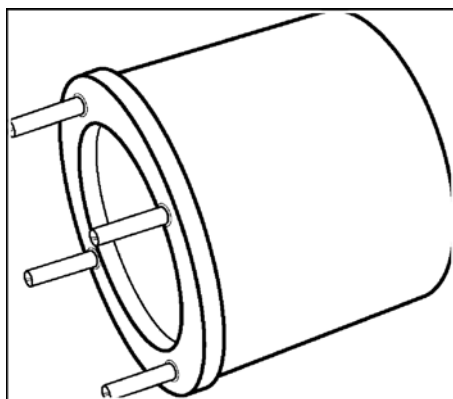
CAS2505 Brake disc aligner



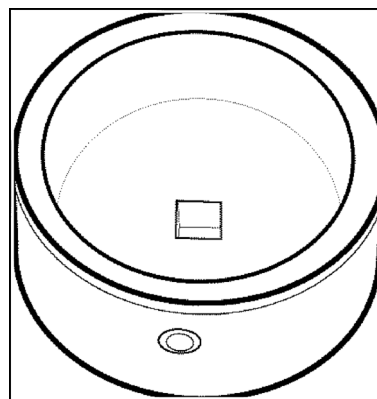
CAS2516 Bearing installer



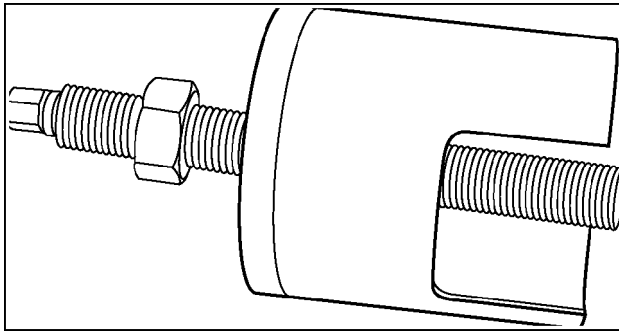
CNH299075 Lifting hook



CAS2692 Bearing heater adapter

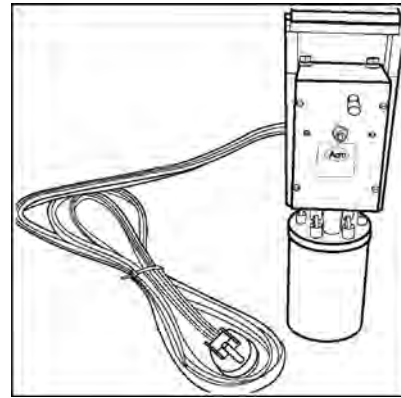


CAS2508 Rolling torque adapter



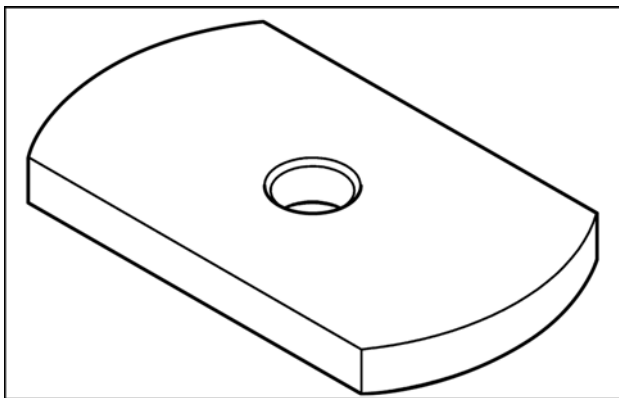
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CAS2511 Pinion bearing preload compressor



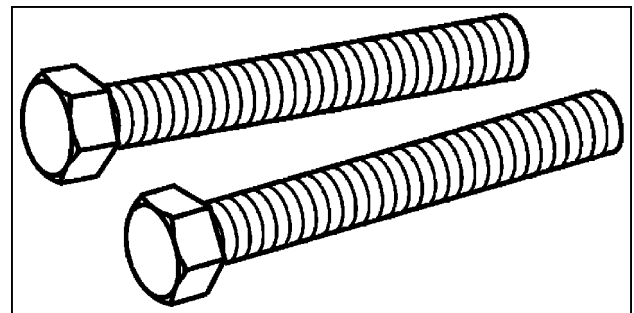
RCPH10FWD880AAJ 113

CNH299134 Gear/bearing heater



RCPH10FWD170ABJ 114

CAS2739 Bearing driver plate



RCPH10FWD171ABJ 115

CAS2738 Push out bolts

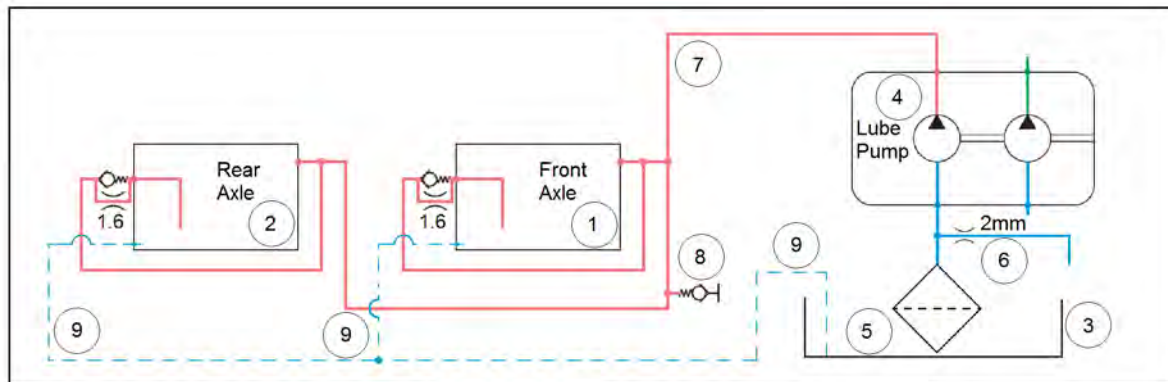
Powered front axle - Overview - Axle lubrication system

Overview

The 4WD tractors use a pressurized lubrication system for the front drive axle (1), the rear drive axle (2) and also for the optional power take off (PTO) output drop box, (if equipped). Axle lubrication oil is drawn from and returned back to the hydraulic reservoir (3). The lubrication pump (4) is a gear pump mounted furthest from the transmission in the hydraulic pump assembly. The lube pump draws oil from the hydraulic reservoir through a suction screen (5) but also draws air from the top of the reservoir to cause the pump to deliver aerated lube oil to the axles. Air is introduced to the lube pump inlet through a separate air line from the top of the reservoir, through a 2 mm (0.079 in) orifice (6) drilled into the side of the suction tube. The lube oil is aerated to slightly pressurize the inside of the axles to force the lube oil to return back to reservoir without flooding the axles. Because the lubrication system operates at a very low pressure, 1.7 bar (25.0 psi) the pump can tolerate the introduction of the air into the inlet. Because the hydraulic oil is used for the axle lubrication, use the oil specified in the operators manual because of its proven performance.

The lube pump supplies a common aerated oil supply to both axles. Outlet flow from the lube pump (7) connects to a tee near the front axle and then splits to send a common pressurized lube oil supply to both the front and rear axles. The lube oil pressure is controlled by a 1.7 bar (25 psi) check valve installed at each axle. There is a lube oil pressure test port (8) located in the plumbing near the front axle. On the large axles, the test port is located at the right side of the axle. On the small axles, the pressure test port is located in the front axle lube supply plumbing at the left side. When the hydraulic oil is at operating temperature, the lube oil pressure will be approximately 1.7 bar (25 psi).

The aerated oil causes a slight buildup of air pressure within the axles. The lube oil collects at the bottom of the axle housings. On the 500 and 600 series axles, the return oil port (9) is located low at the drive shaft input side of the axle. With this return port location, the air pressure causes virtually all of the oil to collect and return from the axle housing. On these large axles, the axles operate with a low the internal oil level to prevent generation of heat while roading. On the 315 and 425 axles, a standpipe is installed inside the axle housing at the return port. A cross drilled hole is located in the side of this standpipe is 75.5 mm (2.97 in) below the centerline of the differential. Because of the standpipe, the smaller axles operate with more oil within the axle housing. The return oil hose from the rear axle passes through the articulation joint along with the lube supply oil hose and also other hydraulic plumbing. The return hoses from both axles connect to a manifold pipe near the reservoir which is then connected to the reservoir.



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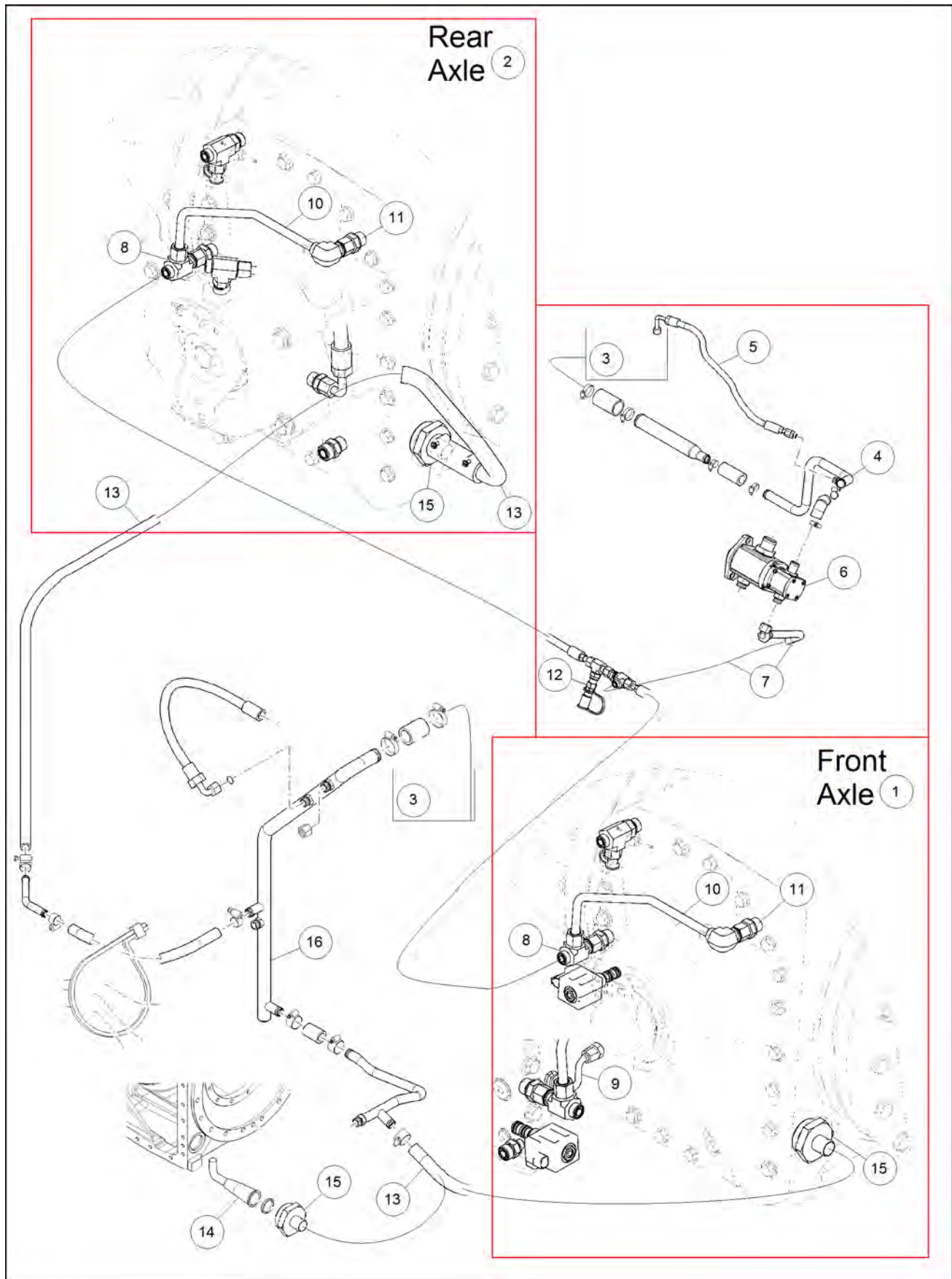
1. Front axle	6. Air suction tube
2. Rear axle	7. Outlet flow from lube pump
3. Hydraulic reservoir	8. Lube oil pressure test port
4. Lube pump	9. Return oil port
5. Suction screen	

315 and 425 series wheeled axle lubrication - System components involved

The main components of the 315 and 425 axle lubrication system are:

- 315 or 425 Series 4WD Tractor Drive Axles – The drive axles have internal passages and orifices which deliver the lube oil to the exact area required.
 1. Front axle **(1)**
 2. Rear axle **(2)**
- Hydraulic reservoir **(3)** – Oil from the hydraulic reservoir is also used for axle lubrication.
- Lube pump oil inlet tube **(4)** – Lubrication hydraulic Oil is drawn from the reservoir through the upper suction screen within the reservoir
- Lube pump air inlet tube **(5)** – Air is introduced into the inlet oil to the lubrication pump through a separate line connected to the top of the reservoir. A **2 mm (0.079 in)** orifice drilled into the side of the inlet tube regulates the amount of air introduced into the lube oil. This air causes the lube oil to aerate, which causes a slight pressure buildup within the axle housing. The slight pressure buildup within the axle forces the oil which collects at the bottom of the axles to return to the reservoir.
- The lubrication pump **(6)** is a gear pump mounted at the outboard end of the hydraulic pump assembly. The pump operates at very low pressure so the aerated oil does not cause damage to the pump.
- Lubrication oil flows from a common outlet **(7)** of the lube pump and then through a tee. The lube oil then splits to provide a common supply to both the front and rear axles.
- Lube oil is delivered to an inlet tee **(8)** at the input shaft side of each axle
 1. From this input oil tee, oil is delivered into the internal pinion gear mesh, differential, brakes, and final drive planetaries.
 2. On the front 315 and 425 axles, there is a small external tube **(9)** feeding lube oil to the pinion shaft bearings.
 3. From the input oil tee, an external tube **(10)** carries excess lube oil to a **1.7 bar (25 psi)** check valve **(11)** at the opposite side of the differential housing, which regulates the lube oil pressure delivered to each axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet.
- The pressure of the lube oil delivered to the axles can be measured at the pressure test port **(12)** located inside the left frame side sheet, near the front axle.
- Oil separates from the aerated lube oil at the bottom center of the axle housings and then returns from the axles from a large oil return line **(13)** connected to the lower area of the axle. Air from the aerated oil collects above the oil and creates a slight internal pressure within the axles, which forces the oil to return to the reservoir. To control the operating oil level within the axle a return standpipe **(14)** is inserted under the lube oil return fitting **(15)** in the 315 and 425 series axles. This standpipe causes the operating oil level within these axles to be approximately **75.5 mm (2.97 in)** below the differential centerline.
- The return oil hose from the rear axle passes through the articulation joint of the tractor and connects to a lube oil return manifold **(16)** near the reservoir. The return oil from the front axle also connects to the return manifold.

1. Front axle	9. External tube to pinion
2. Rear axle	10. External tube to check valve
3. Hydraulic reservoir	11. 1.7 bar (25 psi) check valve
4. Lube pump oil inlet tube	12. Pressure test port
5. Lube pump air inlet tube	13. Oil return line
6. Lubrication pump	14. Oil return standpipe
7. Lube pump common outlet	15. Lube oil return fitting
8. Lube oil inlet tee	16. Lube oil return manifold

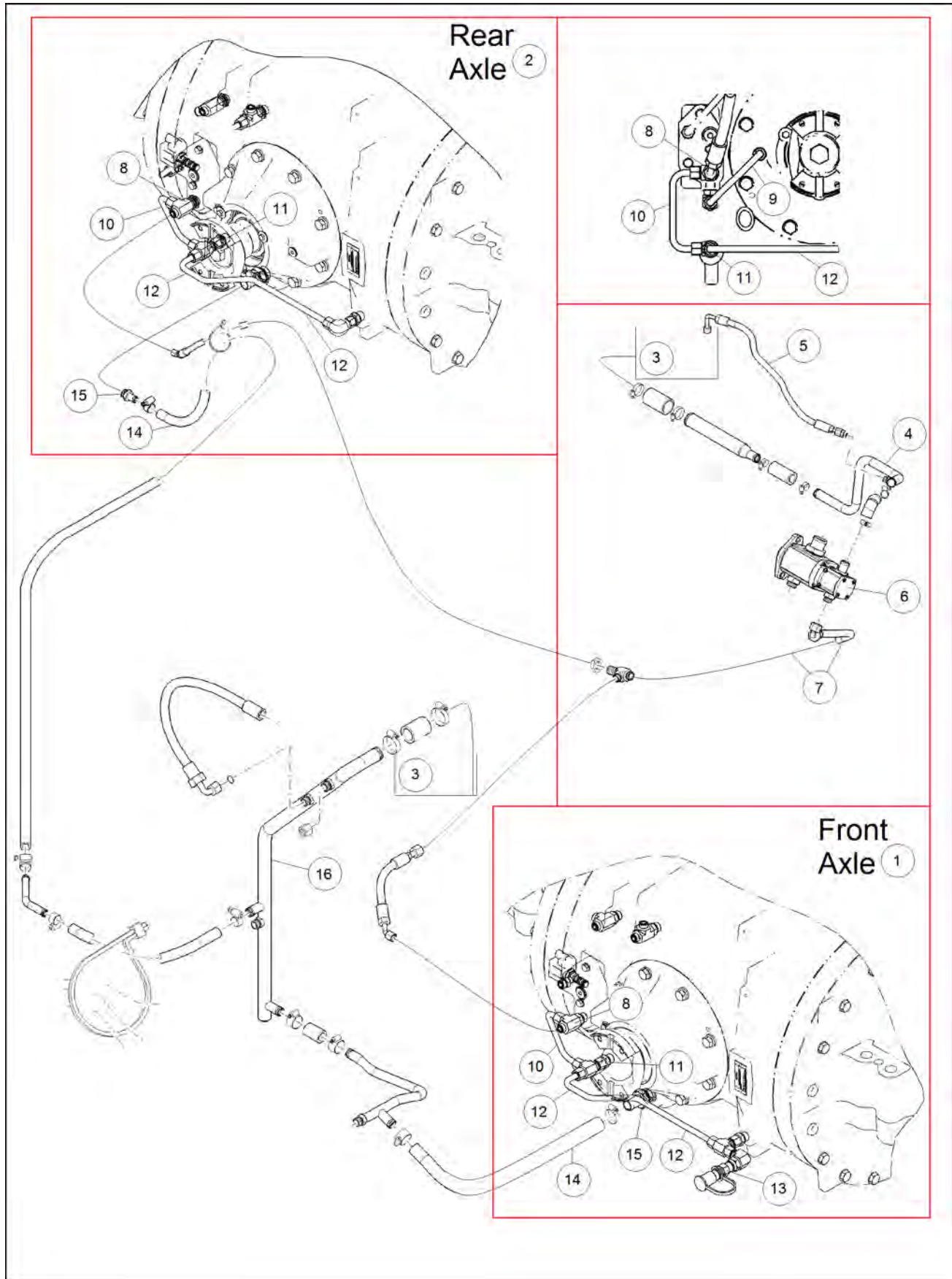


500 and 600 series wheeled axle lubrication - System components involved

The main components of the 500 and 600 wheeled axle lubrication system are:

- 500 or 600 Series 4WD Tractor Drive Axles – The drive axles have internal passages and orifices which deliver the lube oil to the exact area required.
 1. Front axle **(1)**
 2. Rear axle **(2)**
- Hydraulic reservoir **(3)** – Oil from the hydraulic reservoir is also used for axle lubrication.
- Lube pump oil inlet tube **(4)** – Lubrication hydraulic Oil is drawn from the reservoir through the upper suction screen within the reservoir
- Lube pump air inlet tube **(5)** – Air is introduced into the inlet oil to the lubrication pump through a separate line connected to the top of the reservoir. A **2 mm (0.079 in)** orifice drilled into the side of the inlet tube regulates the amount of air introduced into the lube oil. This air causes the lube oil to aerate, which causes a slight pressure buildup within the axle housing. The slight pressure buildup within the axle forces the oil which collects at the bottom of the axles to return to the reservoir.
- The lubrication pump **(6)** is a gear pump mounted at the outboard end of the hydraulic pump assembly. The pump operates at very low pressure so the aerated oil does not cause damage to the pump.
- Lubrication oil flows from a common outlet **(7)** of the lube pump and then through a tee. The lube oil then splits to provide a common supply to both the front and rear axles.
- Lube oil is delivered to an inlet tee **(8)** at the input shaft side of each axle
 1. From this input oil tee, oil is delivered into the internal differential area and brakes.
 2. On the front 500 and 600 wheeled axles, there is an external tube **(9)** feeding lube oil to the pinion shaft bearings and the ring and pinion bevel gear mesh area.
 3. From the input oil tee, an external tube **(10)** carries lube oil to a tee at final drive planetary on the same side of the axle as the lube oil supply. Excess lube oil then passes through a **1.7 bar (25 psi)** check valve **(11)** to that final drive planetary. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet. This check valve regulates the lube oil pressure delivered to each axle.
 4. From the planetary supply tee, a crossover tube **(12)** delivers lube oil to the opposite final drive planetary through a **1.6 mm (0.063 in)** orifice fitting.
- The pressure of the lube oil delivered to the axles can be measured at the pressure test port **(13)** located at the planetary on the right side of the front axle.
- Oil separates from the aerated lube return oil at the bottom center of the axle housings and then returns from the axles from a large lube oil return line **(14)** connected to the lower area of the axle. Air from the aerated oil collects above the oil and creates a slight internal pressure within the axles, which forces the oil to return to the reservoir. The return fitting **(15)** is located at the bottom center of the axle housing. Because of the location of the return fitting, the operating oil level within the axle housing is very low in the 500 and 600 series axles to prevent heat buildup.
- The return oil hose from the rear axle passes through the articulation joint of the tractor and connects to a lube oil return manifold **(16)** near the reservoir. The return oil from the front axle also connects to the return manifold.

1. Front axle	9. External tube to pinion
2. Rear axle	10. External tube to lube supply side planetary
3. Hydraulic reservoir	11. 1.7 bar (25 psi) check valve
4. Lube pump oil inlet tube	12. Crossover tube to opposite side Planetary
5. Lube pump air inlet tube	13. Lube pressure test port
6. Lubrication pump	14. Lube oil return line
7. Lube pump common outlet	15. Lube oil return fitting
8. Lube oil inlet tee	16. Lube oil return manifold

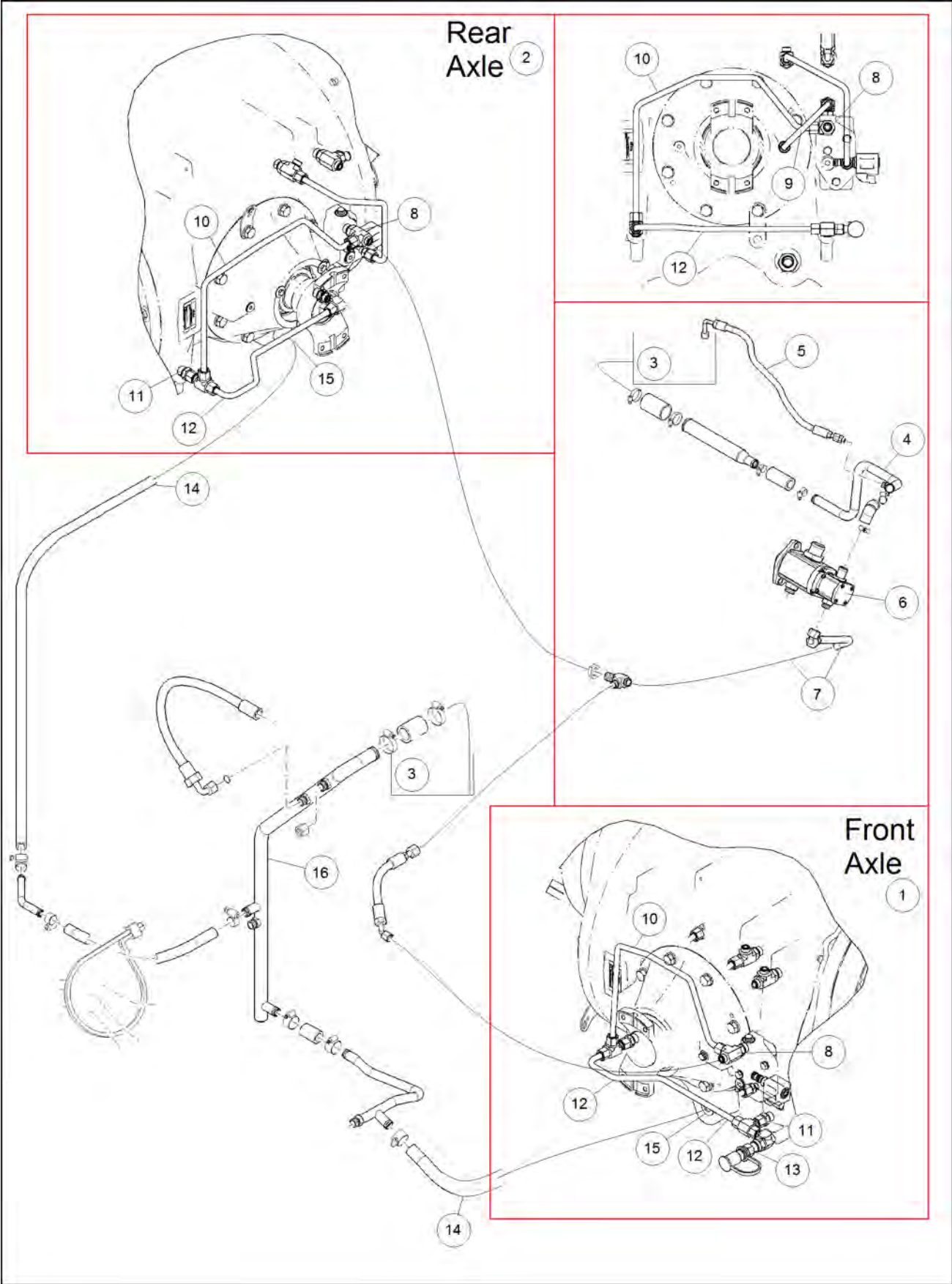


Quadtrac series axle lubrication - System components involved

The main components of the 500 and 600 Quadtrac axle lubrication system are:

- Quadtrac Series 4WD Tractor Drive Axles – The drive axles have internal passages and orifices which deliver the lube oil to the exact area required.
 1. Front axle **(1)**
 2. Rear axle **(2)**
- Hydraulic reservoir **(3)** – Oil from the hydraulic reservoir is also used for axle lubrication.
- Lube pump oil inlet tube **(4)** – Lubrication hydraulic Oil is drawn from the reservoir through the upper suction screen within the reservoir
- Lube pump air inlet tube **(5)** – Air is introduced into the inlet oil to the lubrication pump through a separate line connected to the top of the reservoir. A **2 mm (0.079 in)** orifice drilled into the side of the inlet tube regulates the amount of air introduced into the lube oil. This air causes the lube oil to aerate, which causes a slight pressure buildup within the axle housing. The slight pressure buildup within the axle forces the oil which collects at the bottom of the axles to return to the reservoir.
- The lubrication pump **(6)** is a gear pump mounted at the outboard end of the hydraulic pump assembly. The pump operates at very low pressure so the aerated oil does not cause damage to the pump.
- Lubrication oil flows from a common outlet **(7)** of the lube pump and then through a tee. The lube oil then splits to provide a common supply to both the front and rear axles.
- Lube oil is delivered to an inlet tee **(8)** at the input shaft side of each axle
 1. From this input oil tee, oil is delivered into the internal differential area and brakes.
 2. On the Quadtrac series axles, there is an external tube **(9)** feeding lube oil to the pinion shaft bearings and the ring and pinion bevel gear mesh area.
 3. From the input oil tee, an external tube **(10)** carries lube oil to a tee at final drive planetary on the same side of the axle as the lube oil supply. Excess lube oil then passes through a **1.7 bar (25 psi)** check valve **(11)** to that final drive planetary. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet. This check valve regulates the lube oil pressure delivered to each axle.
 4. From the planetary supply tee, a crossover tube **(12)** delivers lube oil to the opposite final drive planetary through a **1.6 mm (0.063 in)** orifice fitting.
- The pressure of the lube oil delivered to the axles can be measured at the pressure test port **(13)** located at the planetary on the right side of the front axle.
- Oil separates from the aerated lube return oil at the bottom center of the axle housings and then returns from the axles from a large lube oil return line **(14)** connected to the lower area of the axle. Air from the aerated oil collects above the oil and creates a slight internal pressure within the axles, which forces the oil to return to the reservoir. The return fitting **(15)** is located at the bottom center of the axle housing. Because of the location of the return fitting, the operating oil level within the axle housing is very low in the Quadtrac series axles to prevent heat buildup.
- The return oil hose from the rear axle passes through the articulation joint of the tractor and connects to a lube oil return manifold **(16)** near the reservoir. The return oil from the front axle also connects to the return manifold.

1. Front axle	9. External tube to pinion
2. Rear axle	10. External tube to lube supply side planetary
3. Hydraulic reservoir	11. 1.7 bar (25 psi) check valve
4. Lube pump oil inlet tube	12. Crossover tube to opposite side Planetary
5. Lube pump air inlet tube	13. Lube pressure test port
6. Lubrication pump	14. Lube oil return line
7. Lube pump common outlet	15. Lube oil return fitting
8. Lube oil inlet tee	16. Lube oil return manifold

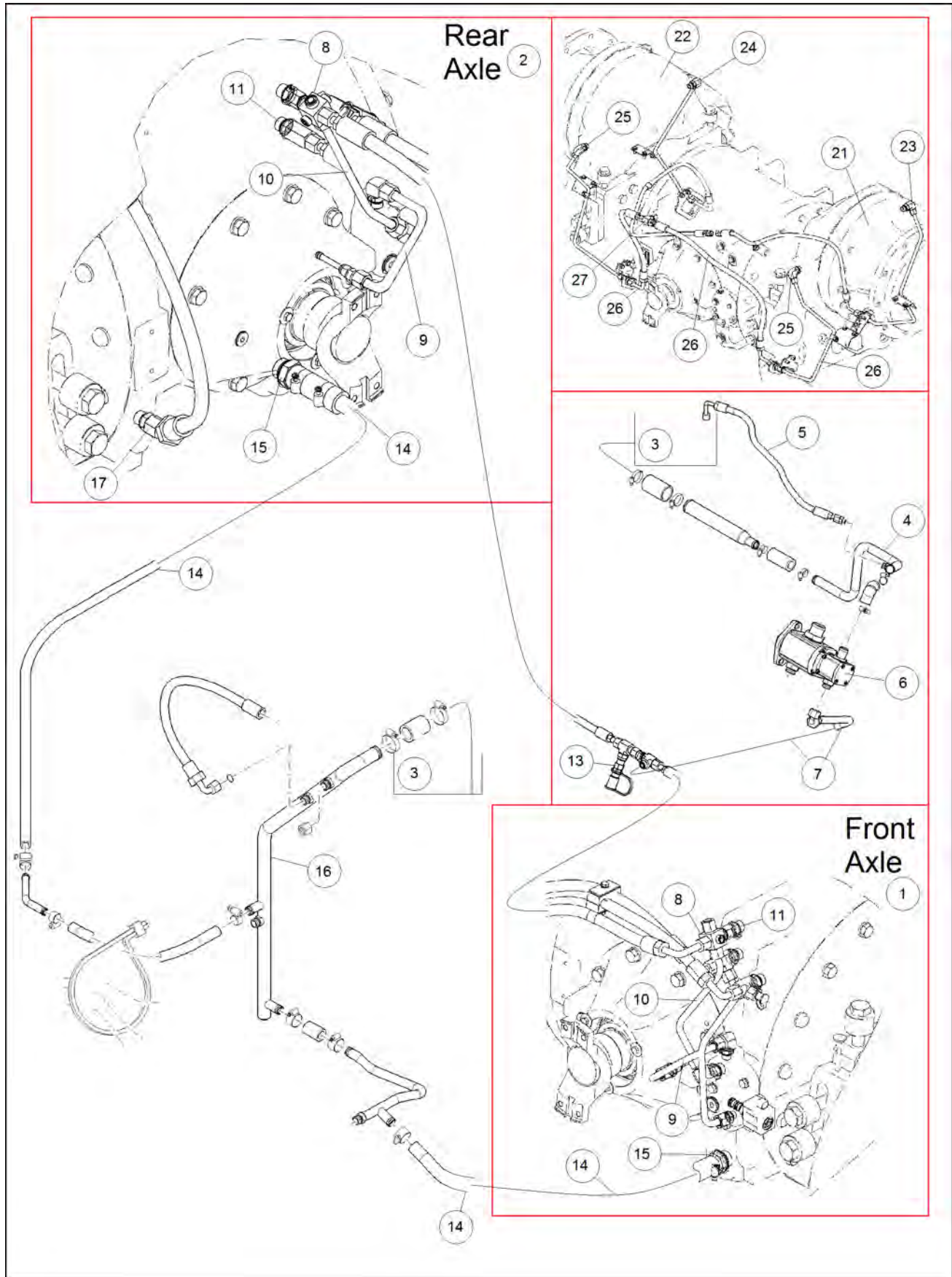


Rowtrac series axle lubrication - System components involved

The main components of the Rowtrac axle lubrication system are:

- Rowtrac Series 4WD Tractor Drive Axles – The drive axles have internal passages and orifices which deliver the lube oil to the exact area required.
 1. Front axle **(1)**
 2. Rear axle **(2)**
- Hydraulic reservoir **(3)** – Oil from the hydraulic reservoir is also used for axle lubrication.
- Lube pump oil inlet tube **(4)** – Lubrication hydraulic Oil is drawn from the reservoir through the upper suction screen within the reservoir
- Lube pump air inlet tube **(5)** – Air is introduced into the inlet oil to the lubrication pump through a separate line connected to the top of the reservoir. A **2 mm (0.079 in)** orifice drilled into the side of the inlet tube regulates the amount of air introduced into the lube oil. This air causes the lube oil to aerate, which causes a slight pressure buildup within the axle housing. The slight pressure buildup within the axle forces the oil which collects at the bottom of the axles to return to the reservoir.
- The lubrication pump **(6)** is a gear pump mounted at the outboard end of the hydraulic pump assembly. The pump operates at very low pressure so the aerated oil does not cause damage to the pump.
- Lubrication oil flows from a common outlet **(7)** of the lube pump and then through a tee. The lube oil then splits to provide a common supply to both the front and rear axles.
- Lube oil is delivered to an inlet special fitting **(8)** at the input shaft side of each axle
 1. From this lube oil supply special fitting, excess lube oil then passes through a **1.7 bar (25 psi)** check valve **(11)** to the axle center section. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet. This check valve regulates the lube oil pressure delivered to each axle.
 2. From this lube oil supply special fitting, lube oil is delivered into the internal differential area and brakes through the external tube to the lube supply to the differential internal components **(10)**.
 3. On the Rowtrac series axles, there is an external tube **(9)** feeding lube oil to the pinion shaft bearings and the ring and pinion bevel gear mesh area.
- The pressure of the lube oil delivered to the axles can be measured at the pressure test port **(13)** located inside the left frame side sheet, near the front axle.
- Oil separates from the aerated lube return oil at the bottom center of the axle housings and then returns from the axles from a large lube oil return line **(14)** connected to the lower area of the axle. Air from the aerated oil collects above the oil and creates a slight internal pressure within the axles, which forces the oil to return to the reservoir. The return fitting **(15)** is located at the bottom center of the axle housing. Because of the location of the return fitting, the operating oil level within the axle housing is very low in the Rowtrac series axles to prevent heat buildup.
- The return oil hose from the rear axle passes through the articulation joint of the tractor and connects to a lube oil return manifold **(16)** near the reservoir. The return oil from the front axle also connects to the return manifold.

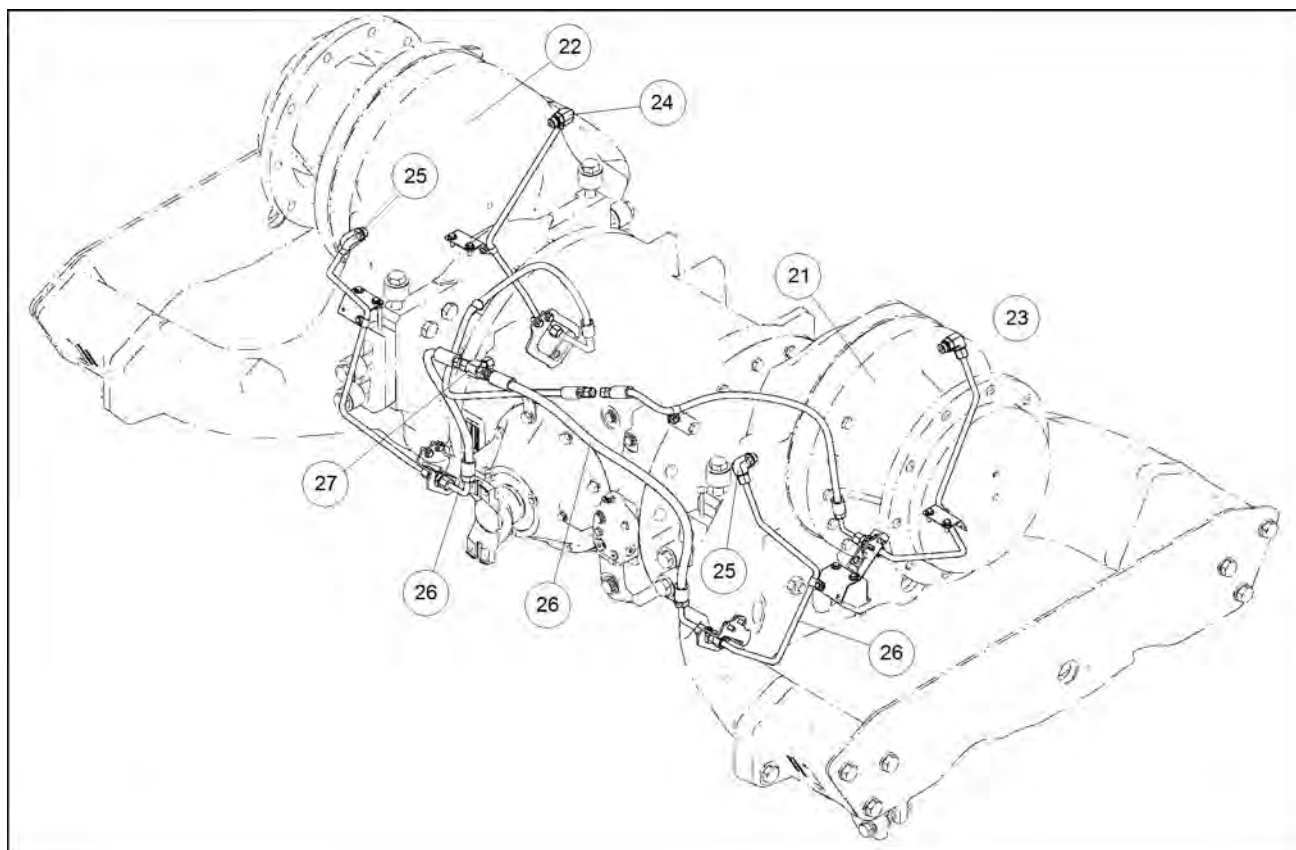
1. Front axle	9. External tube to pinion
2. Rear axle	10. External tube to lube supply side planetary
3. Hydraulic reservoir	11. 1.7 bar (25 psi) check valve
4. Lube pump oil inlet tube	12. Crossover tube to opposite side Planetary
5. Lube pump air inlet tube	13. Lube pressure test port
6. Lubrication pump	14. Lube oil return line
7. Lube pump common outlet	15. Lube oil return fitting
8. Lube oil inlet tee	16. Lube oil return manifold



Rowtrac series axle lubrication - System components involved (continued)

The main components of the Rowtrac axle lubrication system are:

- Rowtrac Series 4WD Tractor Drive Axles have final drive upboxes at the ends of each axle. These upboxes do not have common passages with the axle center section so they require external plumbing to supply the required lubrication oil and then return it back to the axle center section.
 1. Axle upbox on lube oil supply side **(21)**
 2. Axle upbox on opposite lube oil supply side **(22)**
- Lube oil is delivered from the lube supply pump to a lube supply oil inlet special fitting **(8)** at the input shaft side of each axle.
 1. From one side of this lube oil supply special fitting, lube supply oil is delivered to the axle outboard vehicle side plumbing **(23)** of the lube supply side upbox.
 2. From opposite side of this lube oil supply special plumbing, lube supply oil is delivered to the axle outboard vehicle side fitting **(24)** opposite of the lube supply side upbox.
 3. From the axle inboard side upbox return fitting **(25)** oil returns through the upbox lube return plumbing **(26)** to a lube return **(27)** tee on the drive shaft input side of the axle.



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1. Front axle	13. Lube pressure test port
2. Rear axle	14. Lube oil return line
3. Hydraulic reservoir	15. Lube oil return fitting
4. Lube pump oil inlet tube	16. Lube oil return manifold
5. Lube pump air inlet tube	21. Axle upbox on lube oil supply side axle
6. Lubrication pump	22. Axle upbox on opposite lube oil supply side
7. Lube pump common outlet	23. Upbox lube supply plumbing
8. Lube oil supply special fitting	24. Upbox lube supply plumbing
9. External tube to pinion	25. Upbox lube return fitting
10. External tube to lube supply side planetary	26. Upbox lube return plumbing
11. 1.7 bar (25 psi) check valve	27. Upbox lube return tee
12. Crossover tube to opposite Side Planetary	

315 and 425 series wheeled axle lube oil system schematic detailed explanation

The 4WD tractors use a pressurized lubrication system for the front drive axle (1), the rear drive axle (2) and also for the optional power take off (PTO) output drop box (3), (if equipped). Axle lubrication oil is drawn from and returned back to the hydraulic reservoir (4). The lubrication pump (5) is a gear pump mounted furthest from the transmission in the hydraulic pump assembly. The lube pump draws oil from the hydraulic reservoir through a suction screen (6) and also draws air from the top of the reservoir to cause the pump to deliver aerated lube oil to the axles. Air is introduced to the lube pump inlet through a separate air line (7) from the top of the reservoir, through a **2 mm (0.079 in)** orifice drilled into the side of the suction tube, near the lube pump. The lube oil is aerated to slightly pressurize the axles to force the lube oil to return back to reservoir without flooding the axles with oil. Because the lubrication oil system operates at a very low pressure, **1.7 bar (25 psi)**, the pump can tolerate the introduction of the air into the inlet. Because the hydraulic oil is used for the axle lubrication, use the oil specified in the operators manual because of its proven performance.

The lube pump supplies a common aerated oil supply (8) to both axles. Outlet flow from the lube pump connects to a tee near the front axle and then splits to send a common pressurized lube oil supply to both the front and rear axles. There is a lube pressure test port (9) located inside the left frame side sheet, near the front axle. When the hydraulic oil is at operating temperature, the lube pressure will be approximately **1.7 bar (25 psi)**.

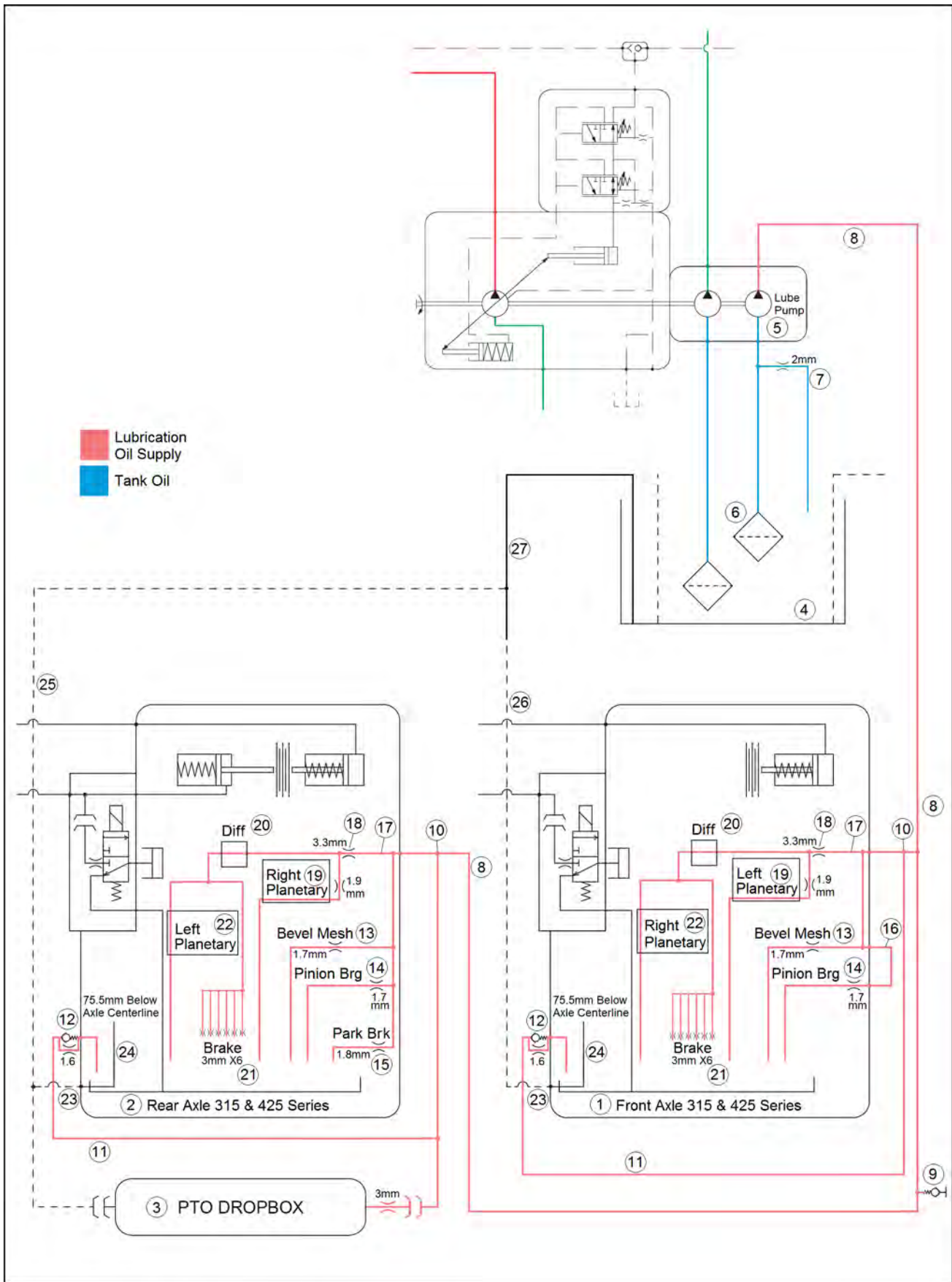
Lubrication oil from the lube pump (8) is delivered to a tee (10) on the driveshaft input side of each axle. From the input oil tee, an external tube (11) carries excess lube oil to a **1.7 bar (25 psi)** check valve (12) at the opposite side of the differential housing, which regulates the lube oil pressure delivered to each axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet to allow some lubrication oil to pass through before it opens. Also on units equipped with a PTO, a PTO lubrication line connects to a tee fitting at the check valve on the rear axle to supply lubrication oil to the PTO dropbox.

Also from this input oil tee, oil is delivered into the internal pinion gear mesh (13), pinion shaft bearings (14), and park brake (15). On the front axle, the lube oil is delivered to the pinion bearing through a small external tube (16). Lube oil also then flows through an internal jumper tube (17) with a **3.3 mm (0.13 in)** orifice (18) in the end of it to the brake side planetary (19) and to the differential (20) area. Lube oil that flows through the differential area then flows to the brakes (21) and ring gear side planetary (22).

The aerated oil causes a slight buildup of pressure within the axles. The lube oil collects at the bottom of the axle housings. On the 315 and 425 series axles, the return port (23) is located low on the side at the drive shaft input side of the axle. With this return port location, the air pressure causes the oil to collect and return from the axle housing. On the 315 and 425 axles, a standpipe (24) is installed inside the axle housing at the return port. A cross drilled hole is located in the side of this standpipe is **75.5 mm (2.97 in)** below the centerline of the differential. Because of the standpipe, the 315 and 425 axles operate with more oil within the axle housing. The return oil hose from the rear axle (25) passes through the articulation joint along with the lube supply oil hose and also other hydraulic plumbing. The rear axle return hose and the front axle return hose (26) connect to a return manifold pipe (27) near the reservoir which is then connected to the reservoir.

1. Front axle	15. Park brake lube
2. Rear axle	16. External lube tube to pinion
3. PTO Dropbox	17. Internal jumper tube
4. Hydraulic reservoir	18. Differential internal lube orifice
5. Lubrication pump	19. Brake side planetary lube
6. Suction screen	20. Differential lube
7. Lube pump air inlet tube	21. Brake lube
8. Aerated lube oil supply to both axles	22. Ring gear side planetary lube
9. Lube pressure test port	23. Lube return port
10. Lube oil supply tee at axle	24. Lube return standpipe
11. Crossover tube to check valve	25. Rear axle return hose
12. 1.7 bar (25 psi) check valve	26. Front axle return hose
13. Bevel mesh lube	27. Lube return manifold
14. Pinion shaft bearing lube	

Front axle system - Powered front axle



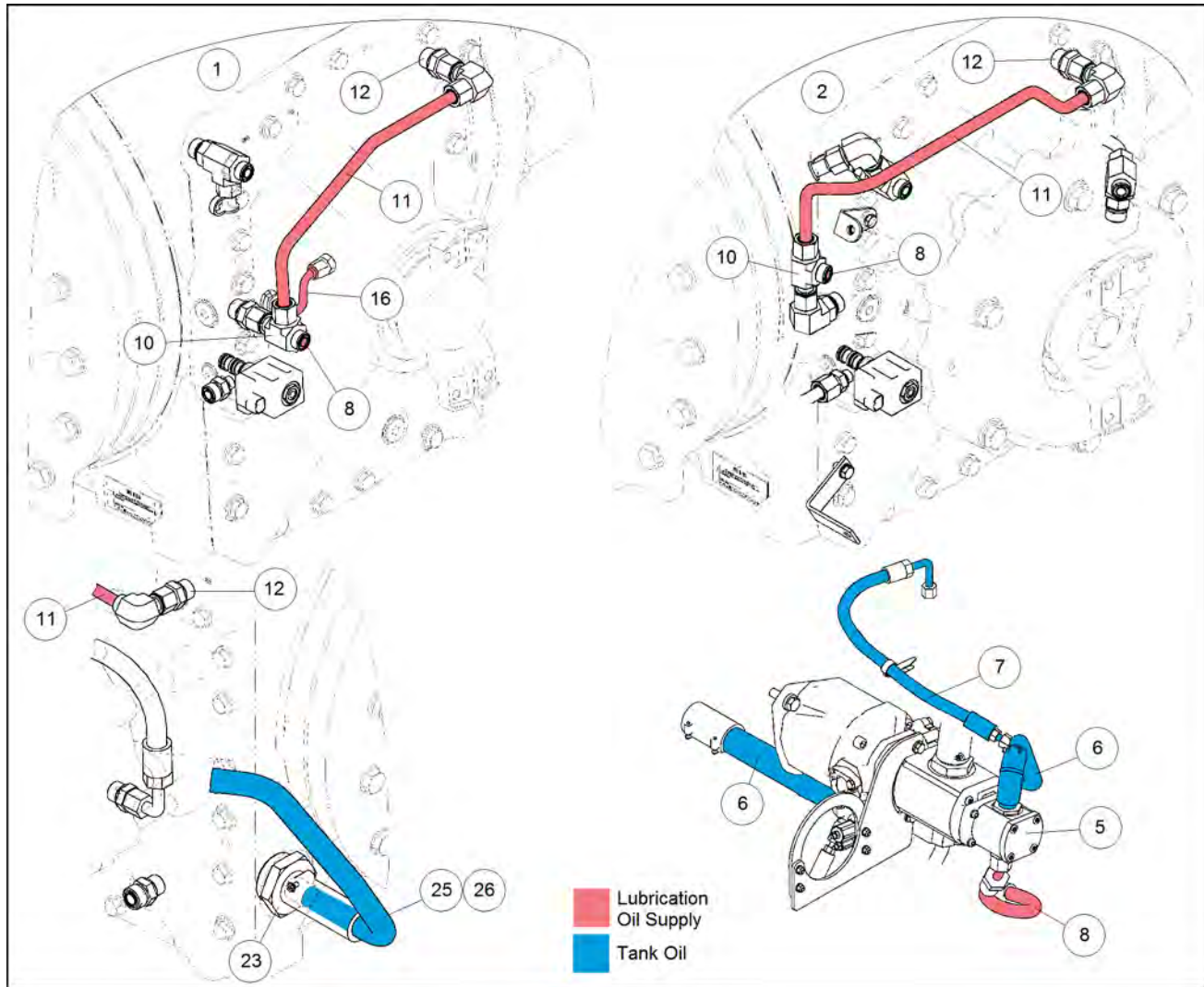
315 and 425 series wheeled axle lube external plumbing components

The 4WD tractors use a pressurized lubrication system for the front drive axle **(1)**, the rear drive axle **(2)** and also for the optional power take off (PTO) output drop box, (if equipped). Axle lubrication oil is drawn from and returned back to the hydraulic reservoir. The lubrication pump **(5)** is a gear pump mounted furthest from the transmission in the hydraulic pump assembly. The lube pump draws oil from the hydraulic reservoir through a supply tube **(6)** and also draws air from the top of the reservoir to cause the pump to deliver aerated lube oil to the axles. Air is introduced to the lube pump inlet through a separate air line **(7)** from the top of the reservoir, through a **2 mm (0.079 in)** orifice drilled into the side of the suction tube, near the lube pump. The lube oil is aerated to slightly pressurize the axles to force the lube oil to return back to reservoir without flooding the axles with oil. Because the lubrication oil system operates at a very low pressure, **1.7 bar (25 psi)**, the pump can tolerate the introduction of the air into the inlet. Because the hydraulic oil is used for the axle lubrication, use the oil specified in the operators manual because of its proven performance. The lube pump supplies a common aerated oil supply **(8)** to both axles. Outlet flow from the lube pump connects to a tee near the front axle and then splits to send a common pressurized lube oil supply to both the front and rear axles.

Lubrication oil from the lube pump is delivered to a tee **(10)** on the driveshaft input side of each axle. From the input oil tee, an external tube **(11)** carries excess lube oil to a **1.7 bar (25 psi)** check valve **(12)** at the opposite side of the differential housing, which regulates the lube oil pressure delivered to each axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet to allow some lubrication oil to pass through before it opens. Also from this input oil tee, oil is delivered into the internal pinion gear mesh, pinion shaft bearings, and park brake. On the front axle **(1)**, the lube oil is delivered to the pinion bearing through a small external tube **(16)**. Lube oil also then flows through an internal jumper tube to the brake side planetary and to the differential area. Lube oil that flows through the differential area then flows to the brakes and ring gear side final drive planetary.

The aerated oil causes a slight buildup of pressure within the axles. The lube oil collects at the bottom of the axle housings. On the 315 and 425 series axles, the return port **(23)** is located low on the side at the drive shaft input side of the axle. With this return port location, the air pressure causes the oil to collect and return from the axle housing. On the 315 and 425 axles, a standpipe is installed inside the axle housing at the return port. A cross drilled hole is located in the side of this standpipe is **75.5 mm (2.97 in)** below the centerline of the differential. Because of the standpipe, the 315 and 425 axles operate with more oil within the axle housing. The return oil hose **(25)** from the rear axle passes through the articulation joint along with the lube supply oil hose and also other hydraulic plumbing. The rear axle return hose and the front axle return hose **(26)** connect to a return manifold pipe near the reservoir which is then connected to the reservoir.

Front axle system - Powered front axle



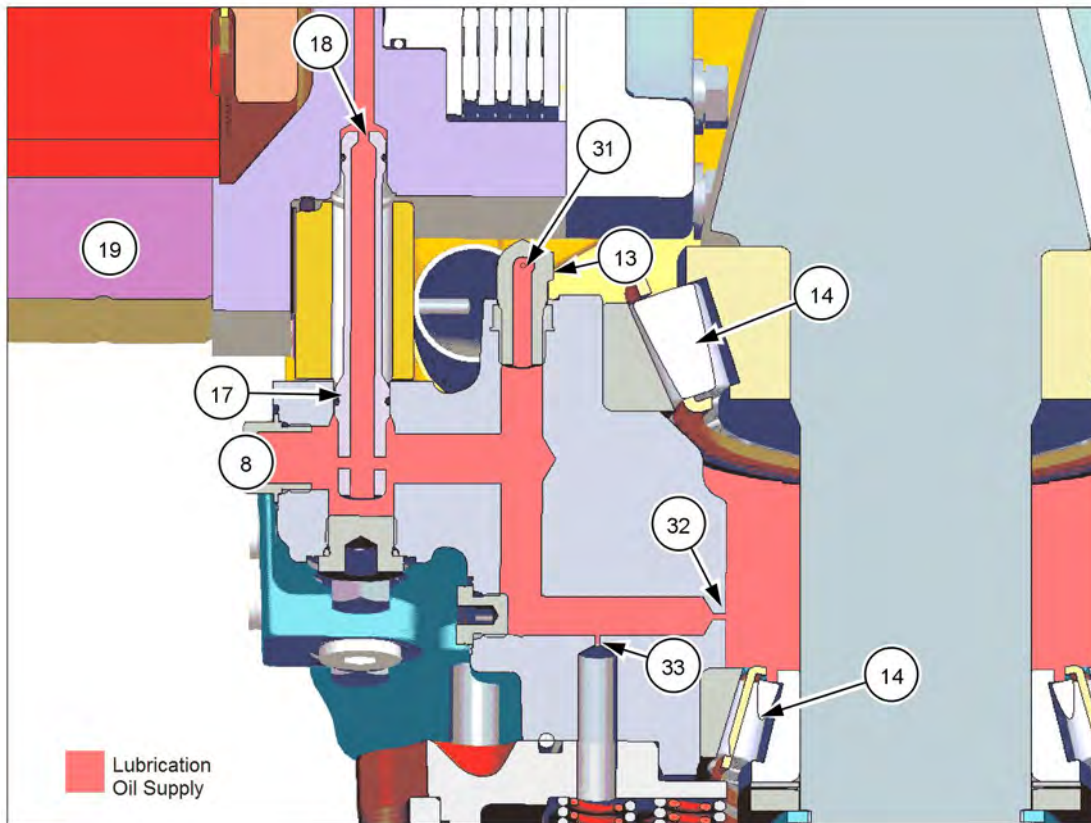
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1. Front axle	11. Crossover tube to check valve
2. Rear axle	12. 1.7 bar (25 psi) check valve
5. Lubrication pump	16. External lube tube to pinion
6. Lube pump supply tube	23. Lube return port
7. Lube pump air inlet tube	25. Rear axle return hose
8. Aerated lube oil supply to both axles	26. Front axle return hose
10. Lube oil supply tee at axle	

315 and 425 series axle lube oil internal passage detailed explanation

Lubrication oil from the lube pump **(8)** is delivered to a tee on the driveshaft input side of each axle. From the input oil tee, an external tube carries excess lube oil to a **1.7 bar (25 psi)** check valve at the opposite side of the differential housing, which regulates the lube oil pressure delivered to each axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet. From this input oil tee, oil is delivered into the internal pinion gear mesh, differential, brakes, and final drive planetaries.

Within the axle assembly, the lube oil is delivered to where it is required. Lube oil is delivered directly to the bevel pinion and ring gear mesh area through an elbow **(13)** with a **1.7 mm (0.067 in)** orifice **(31)** and a steel tube. On the front axle, the pinion shaft bearings **(14)** are lubricated through a small external tube. The lube flow to the front axle pinion bearing is regulated by a fitting with a **1.7 mm (0.067 in)** orifice. Inside the rear axle, the pinion shaft bearings **(14)** are lubricated through an internal passage with a **1.7 mm (0.067 in)** orifice **(32)**. Inside the rear axle, the park brake is lubricated through an internal passage with a **1.8 mm (0.071 in)** orifice **(33)**.

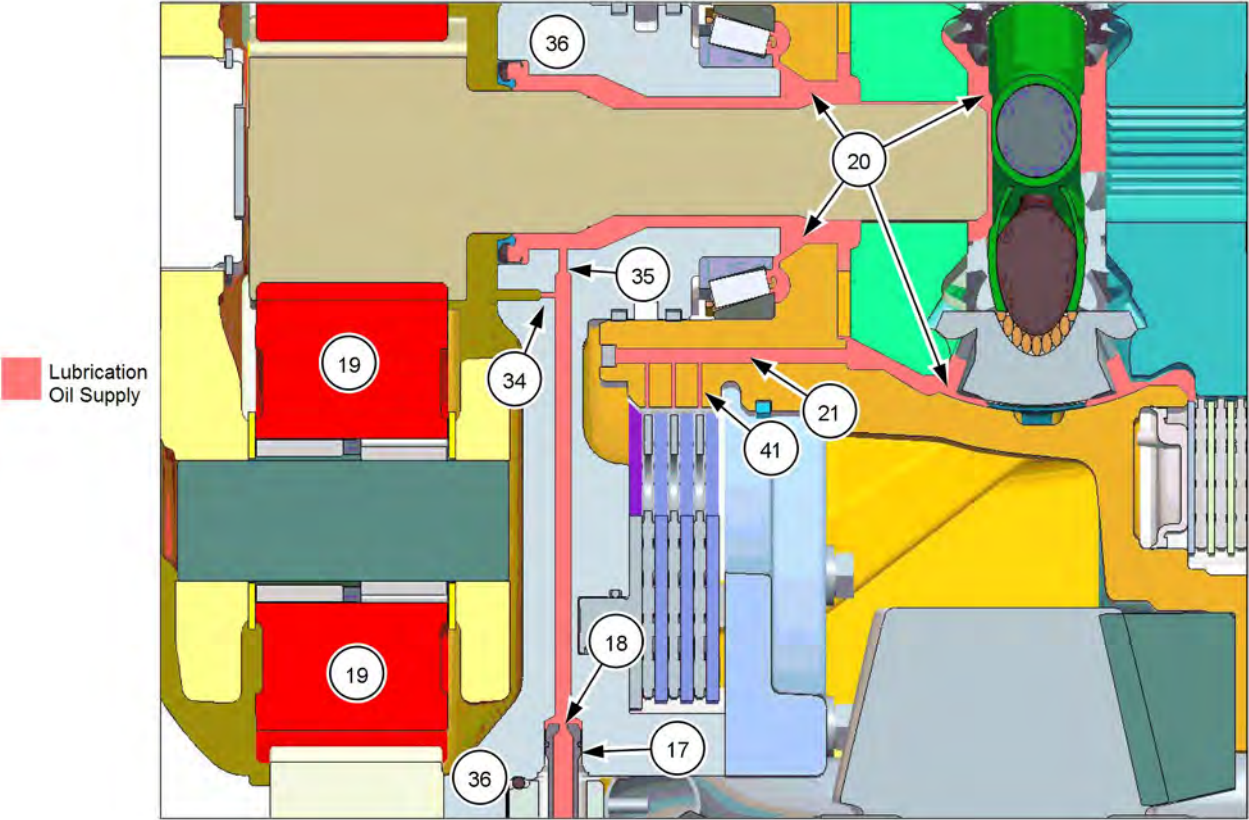


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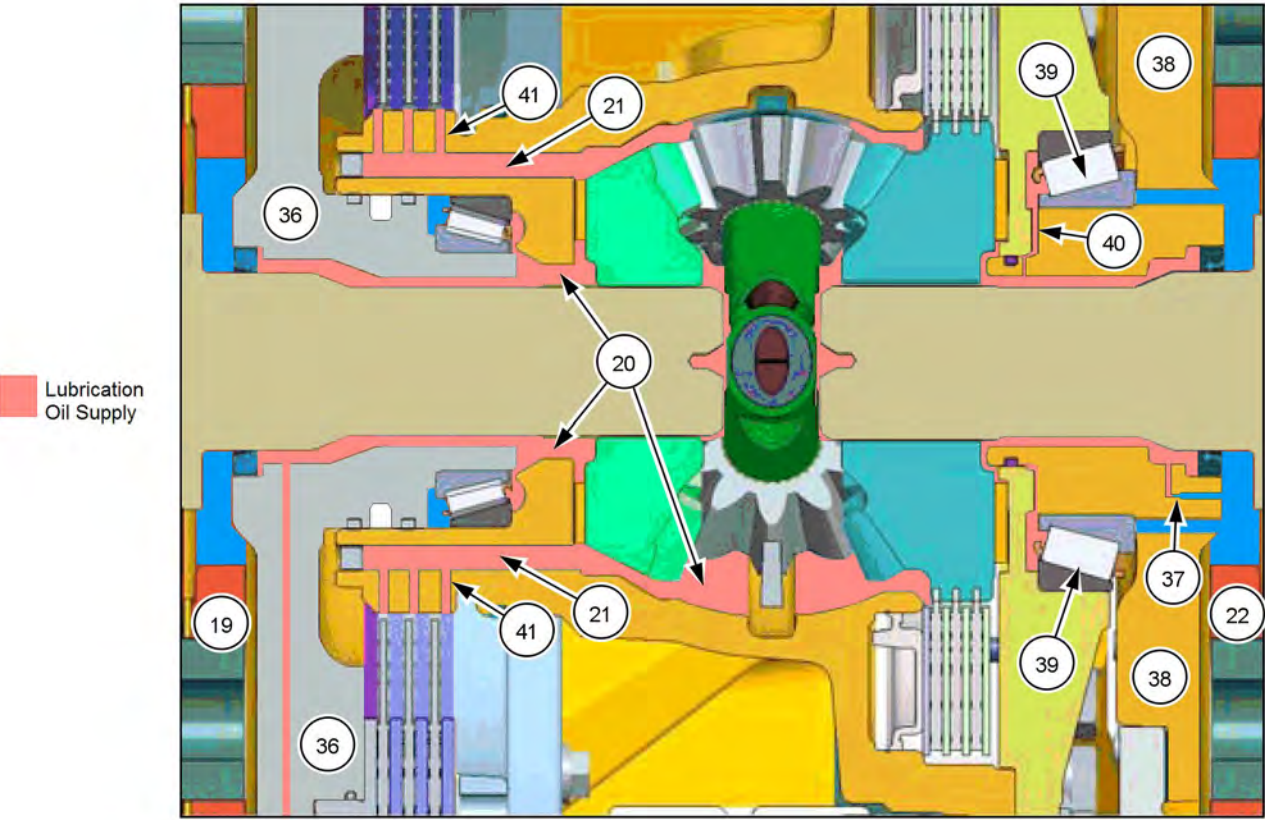
8. Lube oil supply from pump	32. Pinion shaft bearing lube orifice
13. Ring gear mesh area lube elbow	33. Park brake lube orifice
14. Pinion shaft bearing lube	34. Brake side planetary lube orifice
17. Internal jumper tube	35. Diff internal lube orifice in brake carrier
18. Differential internal lube orifice	36. Brake carrier
19. Brake side planetary	37. Ring gear side planetary lube orifice
20. Differential lube	38. Bearing carrier
21. Brake disc lube	39. Ring gear side bearing
22. Ring gear side planetary	40. Ring gear side bearing lube orifice
31. Ring gear mesh area lube elbow orifice	41. Brake lube orifices

Lube oil flows to the remainder of the internal axle components through a jumper tube (17) with a 3.3 mm (0.13 in) orifice (18) in the end of it. The final drive planetary located on the brake (19) side of the axle is lubricated through an internal passage with a 1.9 mm (0.075 in) orifice (34). Lube oil is also delivered to the inside of the differential through an internal passage in the brake carrier with a 3.2 mm (0.126 in) orifice (35) in the brake carrier (36). Lube oil flows through the differential (20) to the final drive planetary on the ring gear side (22) of the axle through an 3.81 mm (0.15 in) orifice (37) in the bearing carrier (38). The ring gear side bearing (39) is supplied lube oil through a 2.3 mm (0.091 in) orifice (40) in the bearing carrier. Lube oil also flows to the brake discs (21) through the differential through six 3 mm (0.118 in) orifices (41) drilled in the splined area.

8. Lube oil supply from pump	32. Pinion shaft bearing lube orifice
13. Ring gear mesh area lube elbow	33. Park brake lube orifice
14. Pinion shaft bearing lube	34. Brake side planetary lube orifice
17. Internal jumper tube	35. Diff internal lube orifice in brake carrier
18. Differential internal lube orifice	36. Brake carrier
19. Brake side planetary	37. Ring gear side planetary lube orifice
20. Differential lube	38. Bearing carrier
21. Brake disc lube	39. Ring gear side bearing
22. Ring gear side planetary	40. Ring gear side bearing lube orifice
31. Ring gear mesh area lube elbow orifice	41. Brake lube orifices



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500 and 600 series wheeled and Quadtrac axle lube oil schematic detailed explanation

The 4WD tractors use a pressurized lubrication system for the front drive axle (1), the rear drive axle (2) and also for the optional power take off (PTO) output drop box (3), (if equipped). Axle lubrication oil is drawn from and returned back to the hydraulic reservoir (4). The lubrication pump (5) is a gear pump mounted furthest from the transmission in the hydraulic pump assembly. The lube pump draws oil from the hydraulic reservoir through a suction screen (6) and also draws air from the top of the reservoir to cause the pump to deliver aerated lube oil to the axles. Air is introduced to the lube pump inlet through a separate air line (7) from the top of the reservoir, through a **2 mm (0.079 in)** orifice drilled into the side of the suction tube, near the lube pump. The lube oil is aerated to slightly pressurize the axles to force the lube oil to return back to reservoir without flooding the axles with oil. Because the lubrication system operates at a very low pressure, **1.7 bar (25 psi)** the pump can tolerate the introduction of the air into the inlet. Because the hydraulic oil is used for the axle lubrication, use the oil specified in the operators manual because of its proven performance.

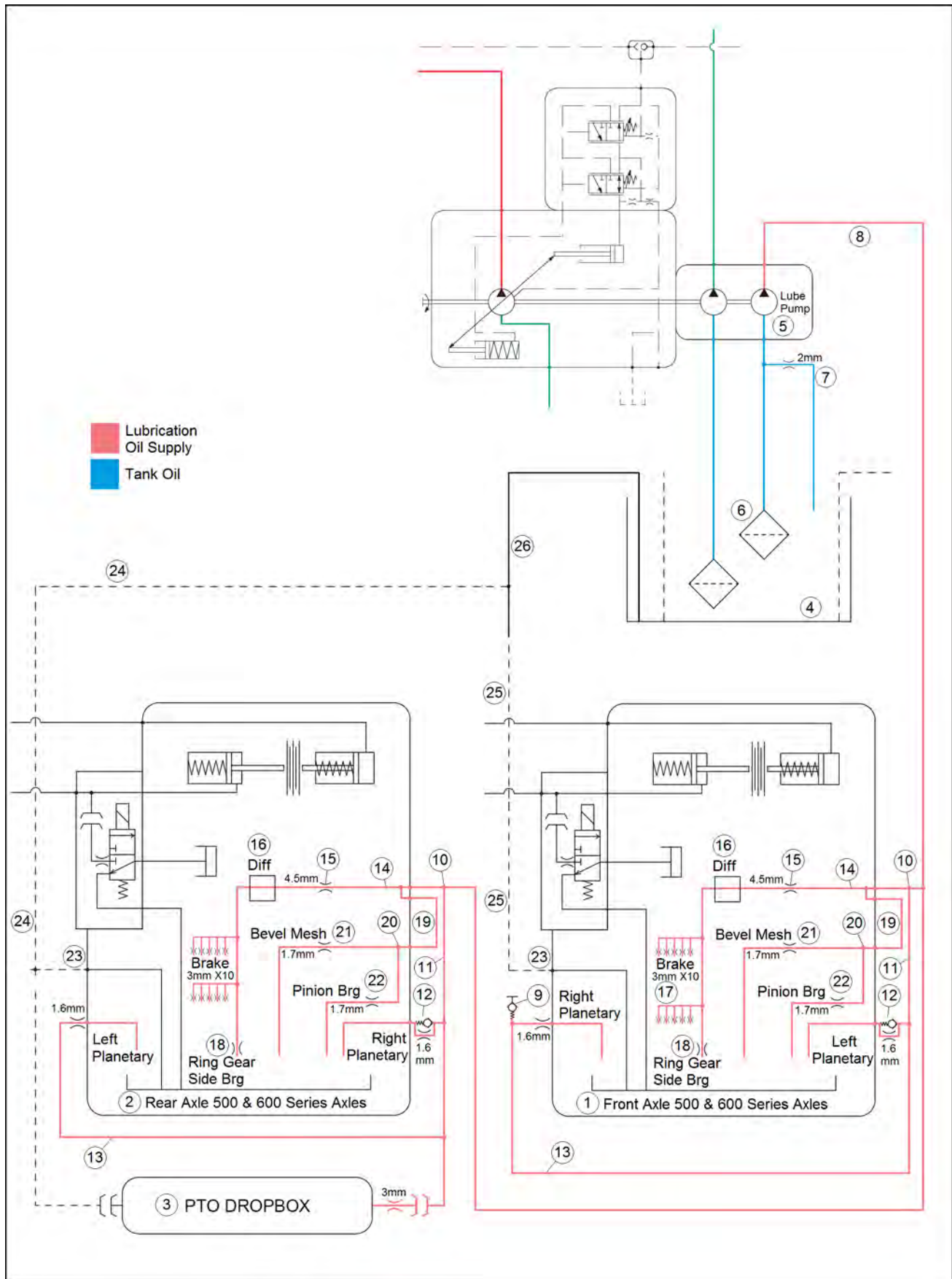
The lube pump supplies a common aerated oil supply (8) to both axles. Outlet flow from the lube pump connects to a tee near the front axle and then splits to send a common pressurized lube oil supply to both the front and rear axles. The lube pressure is controlled by a **1.7 bar (25 psi)** check valve installed at each axle. There is a lube pressure test port (9) located on a tee at the right side of the front axle. When the hydraulic oil is at operating temperature, the lube pressure will be approximately **1.7 bar (25 psi)**.

Lubrication oil from the lube pump (8) is delivered to an oil inlet tee (10) on the driveshaft input side of each axle. From the input oil tee, an external tube (11) carries excess lube oil to final drive planetary lube tee at the brake side of the differential housing. Lubrication oil is delivered to the brake side planetary through a **1.7 bar (25 psi)** check valve fitting (12) at the tee. This check valve regulates the lube oil pressure delivered to the axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet to allow a controlled amount of lubrication oil to flow to the planetary. Also connected to this planetary lube tee is another external steel tube (13) which carries lube oil to final drive planetary on the opposite, ring gear, side of the axle. Also on units equipped with a PTO, a PTO lubrication line connects to a tee fitting at the ring gear side planetary on the rear axle to supply lubrication oil to the PTO dropbox.

Also from the input oil tee, lube oil flows to the internal differential area of the axle through a jumper tube (14) with a **4.5 mm (0.177 in)** orifice (15) in the inboard end. The lube oil then flows through the differential (16), to the service brake discs through ten **3 mm (0.118 in)** orifices (17) drilled in the splined area and also to the ring gear side bearing (18) through a **2.3 mm (0.091 in)** orifice.

1. Front axle	14. Internal jumper tube to differential lube
2. Rear axle	15. Differential internal lube orifice
3. PTO Dropbox	16. Differential lube
4. Hydraulic reservoir	17. Brake lube orifices
5. Lubrication pump	18. Ring gear side bearing lube
6. Suction screen	19. External tube to pinion and bevel mesh
7. Lube pump air inlet tube	20. Pinion bearing and bevel mesh orifice tube
8. Aerated lube oil supply to both axles	21. Bevel mesh lube supply
9. Lube pressure test port	22. Pinion bearing lube orifice
10. Lube oil supply tee at axle	23. Lube return port
11. External tube to brake side planetary	24. Rear axle return hose
12. 1.7 bar (25 psi) check valve	25. Front axle return hose
13. External tube to ring gear side planetary	26. Lube return manifold

Front axle system - Powered front axle

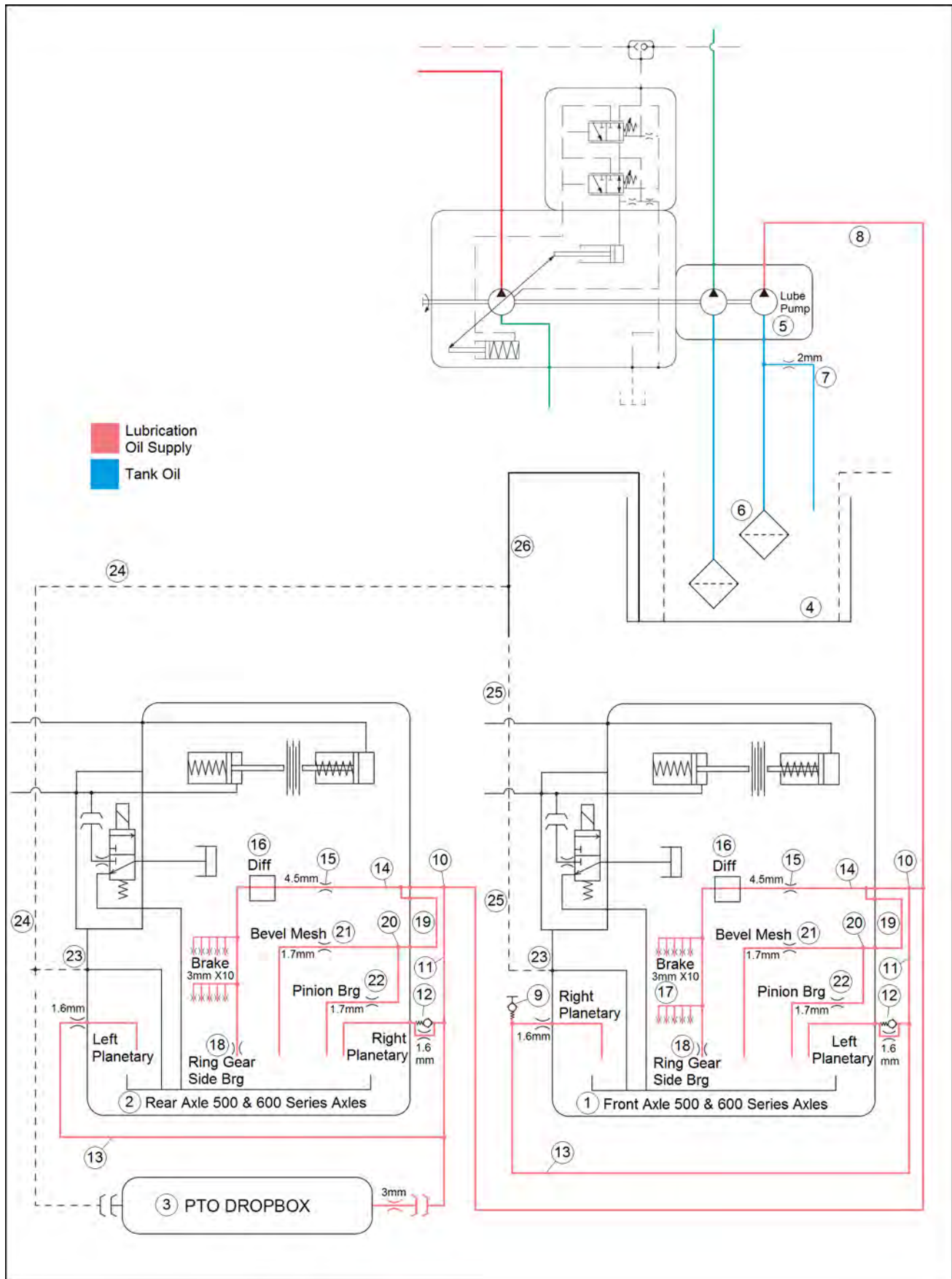


An external pinion bearing and bevel gear mesh lube tube **(19)** connects to an internal passage at the lube inlet tee. This external tube then connects to the port on the axle front cover which supports the pinion shaft. A pinion bearing and bevel mesh orifice tube **(20)** is installed under the supply fitting. Lube oil flows through this orifice tube to an elbow **(21)** with a **1.7 mm (0.067 in)** orifice and then through a small tube to spray lube oil directly on the bevel ring and pinion gear mesh point. Lube oil also then flows through a **1.7 mm (0.067 in)** pinion bearing lube orifice **(22)** in the side of the orifice tube to the pinion bearing cavity to lubricate these bearings. After flowing through the pinion bearing area, oil then flows to a plugged passage on the opposite side of the front axle cover.

The aerated oil causes a slight buildup of pressure within the axles. The lube oil collects at the bottom of the axle housings. On the 500 and 600 series axles, the return port **(23)** is located low at the center on the drive shaft input side of the axle. With this return port location, the air pressure causes virtually all of the lubrication oil to collect and return from the axle housing. On these large axles, the axles operate with a low the internal oil level to prevent generation of heat while roading. The return oil hose from the rear axle **(24)** passes through the articulation joint along with the lube supply oil hose and also other hydraulic plumbing. The rear axle return hose and the front axle return hose **(25)** connect to a return manifold pipe **(26)** near the reservoir which is then connected to the reservoir.

1. Front axle	14. Internal jumper tube to differential lube
2. Rear axle	15. Differential internal lube orifice
3. PTO Dropbox	16. Differential lube
4. Hydraulic reservoir	17. Brake lube orifices
5. Lubrication pump	18. Ring gear side bearing lube
6. Suction screen	19. External tube to pinion and bevel mesh
7. Lube pump air inlet tube	20. Pinion bearing and bevel mesh orifice tube
8. Aerated lube oil supply to both axles	21. Bevel mesh lube supply
9. Lube pressure test port	22. Pinion bearing lube orifice
10. Lube oil supply tee at axle	23. Lube return port
11. External tube to brake side planetary	24. Rear axle return hose
12. 1.7 bar (25 psi) check valve	25. Front axle return hose
13. External tube to ring gear side planetary	26. Lube return manifold

Front axle system - Powered front axle



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500 and 600 series wheeled axle lube external plumbing components

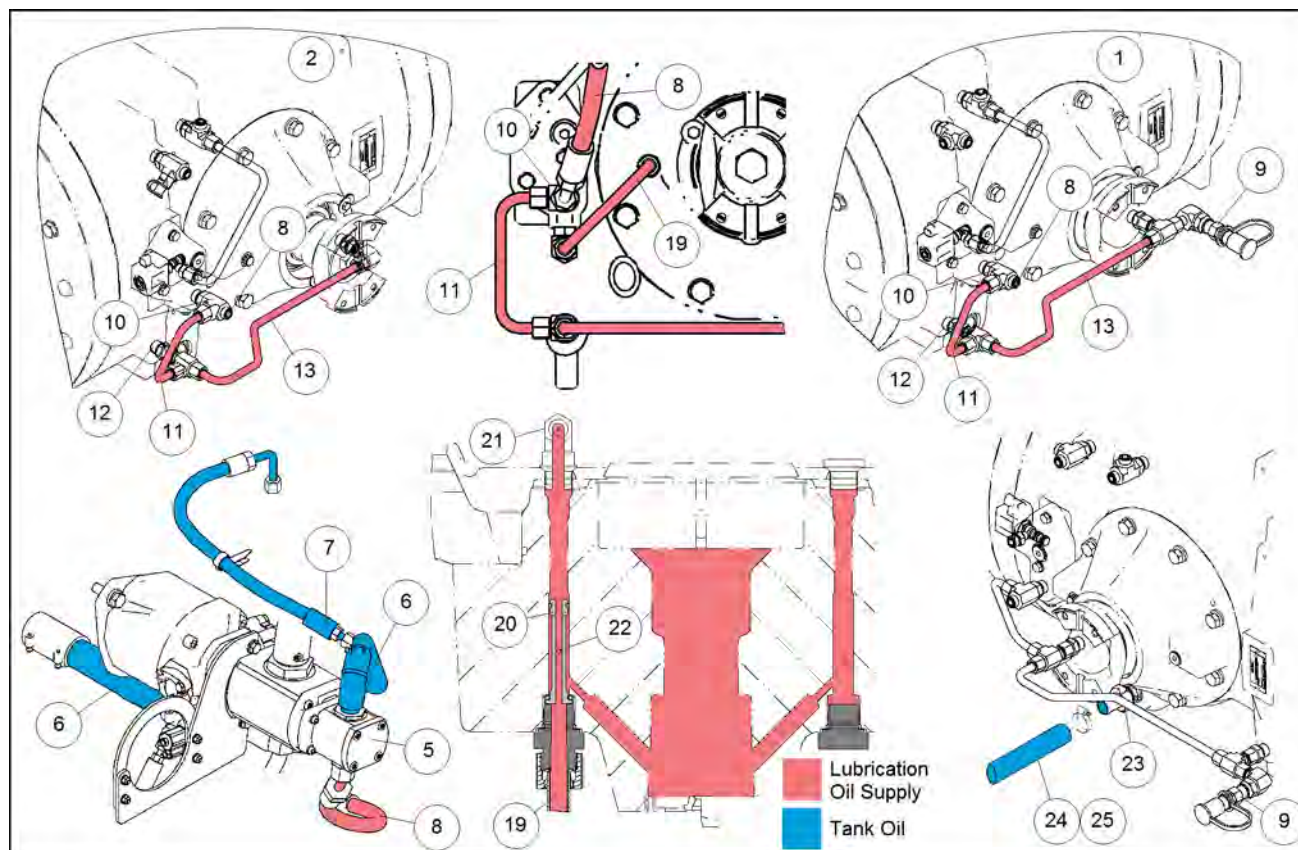
The 4WD wheeled tractors use a pressurized lubrication system for the front drive axle **(1)**, the rear drive axle **(2)** and also for the optional power take off (PTO) output drop box, (if equipped). Axle lubrication oil is drawn from and returned back to the hydraulic reservoir. The lubrication pump **(5)** is a gear pump mounted furthest from the transmission in the hydraulic pump assembly. The lube pump draws oil from the hydraulic reservoir through a supply tube **(6)** and also draws air from the top of the reservoir to cause the pump to deliver aerated lube oil to the axles. Air is introduced to the lube pump inlet through a separate air line **(7)** from the top of the reservoir, through a **2 mm (0.079 in)** orifice drilled into the side of the suction tube, near the lube pump. The lube oil is aerated to slightly pressurize the axles to force the lube oil to return back to reservoir without flooding the axles with oil. Because the lubrication oil system operates at a very low pressure, **1.7 bar (25 psi)**, the pump can tolerate the introduction of the air into the inlet. Because the hydraulic oil is used for the axle lubrication, use the oil specified in the operators manual because of its proven performance. The lube pump supplies a common aerated oil supply **(8)** to both axles. Outlet flow from the lube pump connects to a tee near the front axle and then splits to send a common pressurized lube oil supply to both the front and rear axles.

Lubrication oil from the lube pump **(8)** is delivered to an inlet oil tee **(10)** on the driveshaft input side of each axle. From the input oil tee, an external tube **(11)** carries excess lube oil to final drive planetary lube tee at the brake side of the differential housing. Lubrication oil is delivered to the brake side planetary through a **1.7 bar (25 psi)** check valve fitting **(12)** at the tee. This check valve regulates the lube oil pressure delivered to the axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet to allow a controlled amount of lubrication oil to flow to the planetary. Also connected to this planetary lube tee is another external steel tube **(13)** which carries lube oil to final drive planetary on the opposite, ring gear, side of the axle.

Also from the input oil tee, lube oil flows to the internal differential area of the axle through a jumper tube. The lube oil then flows through the differential, to the service brake discs and also to the ring gear side bearing.

An external pinion bearing and bevel gear mesh lube tube **(19)** connects to an internal passage at the lube inlet tee. This external tube then connects to the port on the axle front cover which supports the pinion shaft. A pinion bearing and bevel mesh orifice tube **(20)** is installed under the supply fitting. Lube oil flows through this orifice tube to an elbow **(21)** with a **1.7 mm (0.067 in)** orifice and then through a small tube to spray lube oil directly on the bevel ring and pinion gear mesh point. Lube oil also then flows through a **1.7 mm (0.067 in)** pinion bearing lube orifice **(22)** in the side of the orifice tube to the pinion bearing cavity to lubricate these bearings. After flowing through the pinion bearing area, oil then flows to a plugged passage on the opposite side of the front axle cover.

The aerated oil causes a slight buildup of pressure within the axles. The lube oil collects at the bottom of the axle housings. On the 500 and 600 series axles, the return port **(23)** is located low at the center on the drive shaft input side of the axle. With this return port location, the air pressure causes virtually all of the lubrication oil to collect and return from the axle housing. On these large axles, the axles operate with a low the internal oil level to prevent generation of heat while roading. The return oil hose from the rear axle **(24)** passes through the articulation joint along with the lube supply oil hose and also other hydraulic plumbing. The rear axle return hose and the front axle return hose **(25)** connects to a return manifold pipe **(26)** near the reservoir which is then connected to the reservoir.



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1. Front axle	12. 1.7 bar (25 psi) check valve
2. Rear axle	13. External tube to ring gear side planetary
5. Lubrication pump	19. External tube to pinion and bevel mesh
6. Lube pump supply tube	20. Pinion bearing and bevel mesh orifice tube
7. Lube pump air inlet tube	21. Bevel mesh lube supply elbow
8. Aerated lube oil supply to both axles	22. Pinion bearing lube orifice
9. Lube pressure test port	23. Lube return port
10. Lube oil supply tee at axle	24. Rear axle return hose
11. External tube to brake side planetary	25. Front axle return hose

500 and 600 series wheeled axle lube oil internal passage detailed explanation

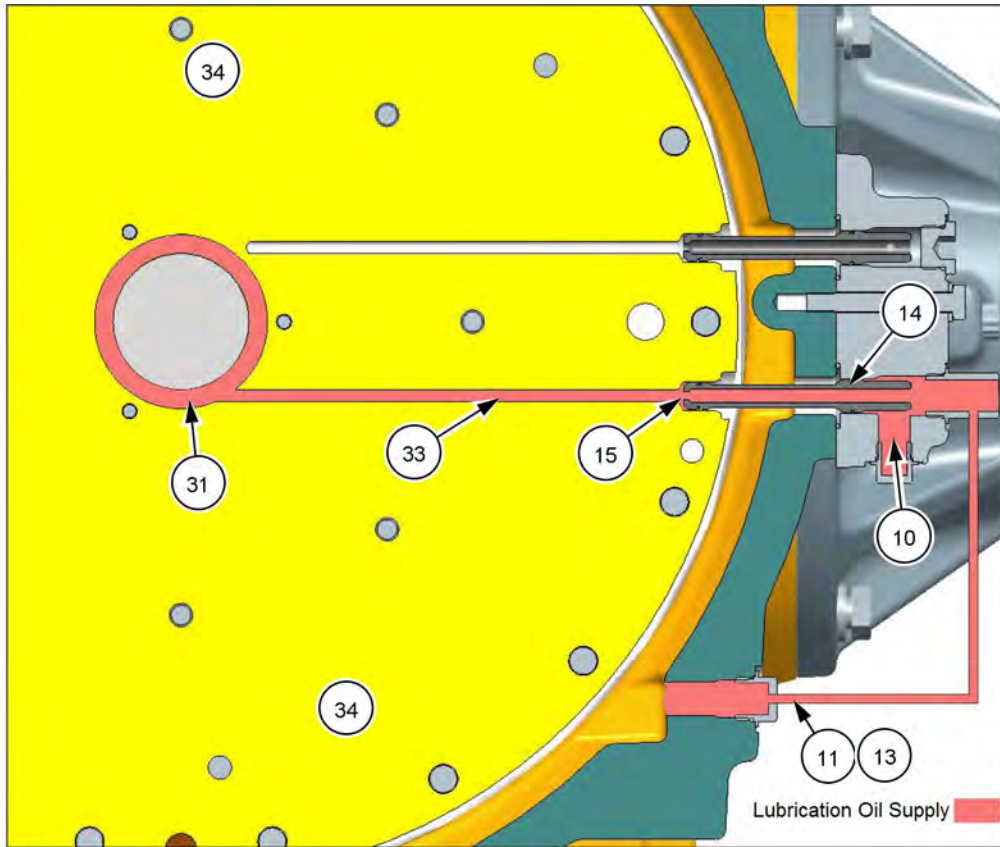
Lubrication oil from the lube pump (8) is delivered to a tee on the driveshaft input side of each axle. From the input oil tee, an external tube carries excess lube oil to a **1.7 bar (25 psi)** check valve fitting (12), which regulates the lube oil pressure delivered to the axle. Also, from this input oil tee, oil is delivered into the internal differential, and brakes.

From the input oil tee, lube oil flows to the internal differential area of the axle through a jumper tube (14) with a **4.5 mm (0.177 in)** orifice (15) in the inboard end. The jumper tube delivers lubrication oil to the differential lubrication oil area (31) around the sun gear shaft (32) area through a drilled passage (33) in the brake carrier (34). This lube oil flows to the brake side differential bearing (35). The lube oil then flows through the differential (16) to the brake discs (36) through ten **3 mm (0.118 in)** orifices (17) drilled in the splined area. Lube oil also flows through the differential to lubricate the ring gear side differential bearing (37) through a **2.3 mm (0.091 in)** orifice (38).

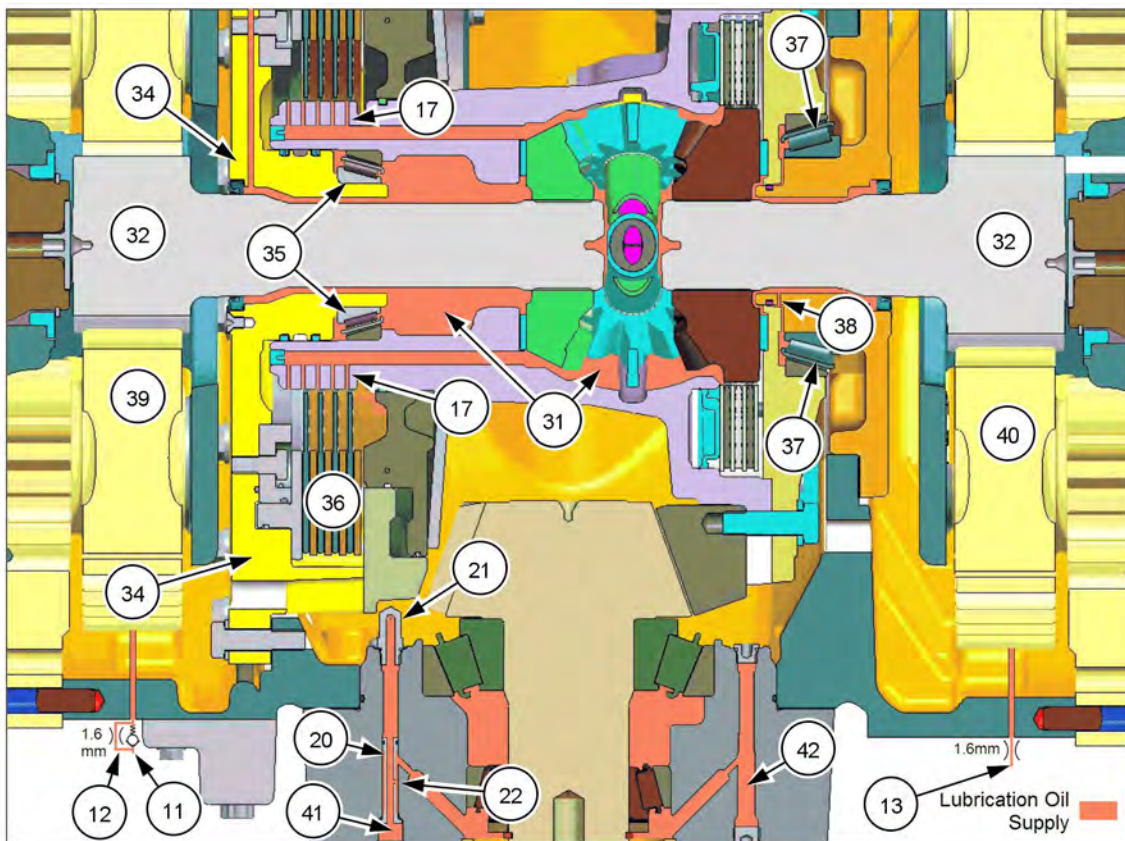
Lubrication oil from the lube pump (8) is delivered to an oil inlet tee (10) on the driveshaft input side of each axle. From the input oil tee, an external tube (11) carries excess lube oil to final drive planetary lube tee at the brake side of the differential housing. Lubrication oil is delivered to the brake side planetary (39) through a **1.7 bar (25 psi)** check valve fitting (12) at the tee. This check valve regulates the lube oil pressure delivered to the axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet to allow a controlled amount of lubrication oil to flow to the planetary. Also connected to this planetary lube tee is another external steel tube (13) which carries lube oil to ring gear side planetary (40) on the opposite side of the axle.

An external pinion bearing and bevel gear mesh lube tube connects to an internal passage at the lube inlet tee. This external tube then connects to the pinion shaft lube port (41) on the axle front cover which supports the pinion shaft. A pinion bearing and bevel mesh orifice tube (20) is installed under the supply fitting. Lube oil flows through this orifice tube to an elbow (21) with a **1.7 mm (0.067 in)** orifice and then through a small tube to spray lube oil directly on the bevel ring and pinion gear mesh point. Lube oil also then flows through a **1.7 mm (0.067 in)** pinion bearing lube orifice (22) in the side of the orifice tube to the pinion bearing cavity to lubricate these bearings. After flowing through the pinion bearing area, oil then flows to a plugged passage (42) on the opposite side of the front axle cover.

8. Aerated lube oil supply to both axles	31. Differential lubrication oil area
10. Lube oil supply tee at axle	32. Sun gear shaft
11. External tube to brake side planetary	33. Drilled passage
12. 1.7 bar (25 psi) check valve	34. Brake carrier
13. External tube to ring gear side planetary	35. Brake side differential bearing
14. Internal jumper tube to differential lube	36. Brake discs
15. Differential internal lube orifice	37. Ring gear side differential bearing
16. Differential lube	38. Ring gear side bearing lube orifice
17. Brake lube orifices	39. Brake side planetary
20. Pinion bearing and bevel mesh orifice tube	40. Ring gear side planetary
21. Bevel mesh lube supply	41. Pinion shaft lube port
22. Pinion bearing lube orifice	42. Plugged passage



RAIL14TR00957FA 15



RAIL14TR00958FA 16

500 and 600 series Quadtrac axle lube external plumbing components

The 4WD Quadtrac tractors use a pressurized lubrication system for the front drive axle (1), the rear drive axle (2) and also for the optional power take off (PTO) output drop box, (if equipped). Axle lubrication oil is drawn from and returned back to the hydraulic reservoir. The lubrication pump (5) is a gear pump mounted furthest from the transmission in the hydraulic pump assembly. The lube pump draws oil from the hydraulic reservoir through a supply tube (6) and also draws air from the top of the reservoir to cause the pump to deliver aerated lube oil to the axles. Air is introduced to the lube pump inlet through a separate air line (7) from the top of the reservoir, through a **2 mm (0.079 in)** orifice drilled into the side of the suction tube, near the lube pump. The lube oil is aerated to slightly pressurize the axles to force the lube oil to return back to reservoir without flooding the axles with oil. Because the lubrication oil system operates at a very low pressure, **1.7 bar (25 psi)**, the pump can tolerate the introduction of the air into the inlet. Because the hydraulic oil is used for the axle lubrication, use the oil specified in the operators manual because of its proven performance. The lube pump supplies a common aerated oil supply (8) to both axles. Outlet flow from the lube pump connects to a tee near the front axle and then splits to send a common pressurized lube oil supply to both the front and rear axles.

Lubrication oil from the lube pump (8) is delivered to an oil inlet tee (10) on the driveshaft input side of each axle. From the input oil tee, an external tube (11) carries excess lube oil to final drive planetary lube tee at the brake side of the differential housing. Lubrication oil is delivered to the brake side planetary through a **1.7 bar (25 psi)** check valve fitting (12) at the tee. This check valve regulates the lube oil pressure delivered to the axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet to allow a controlled amount of lubrication oil to flow to the planetary. Also connected to this planetary lube tee is another external steel tube (13) which carries lube oil to final drive planetary on the opposite, ring gear, side of the axle.

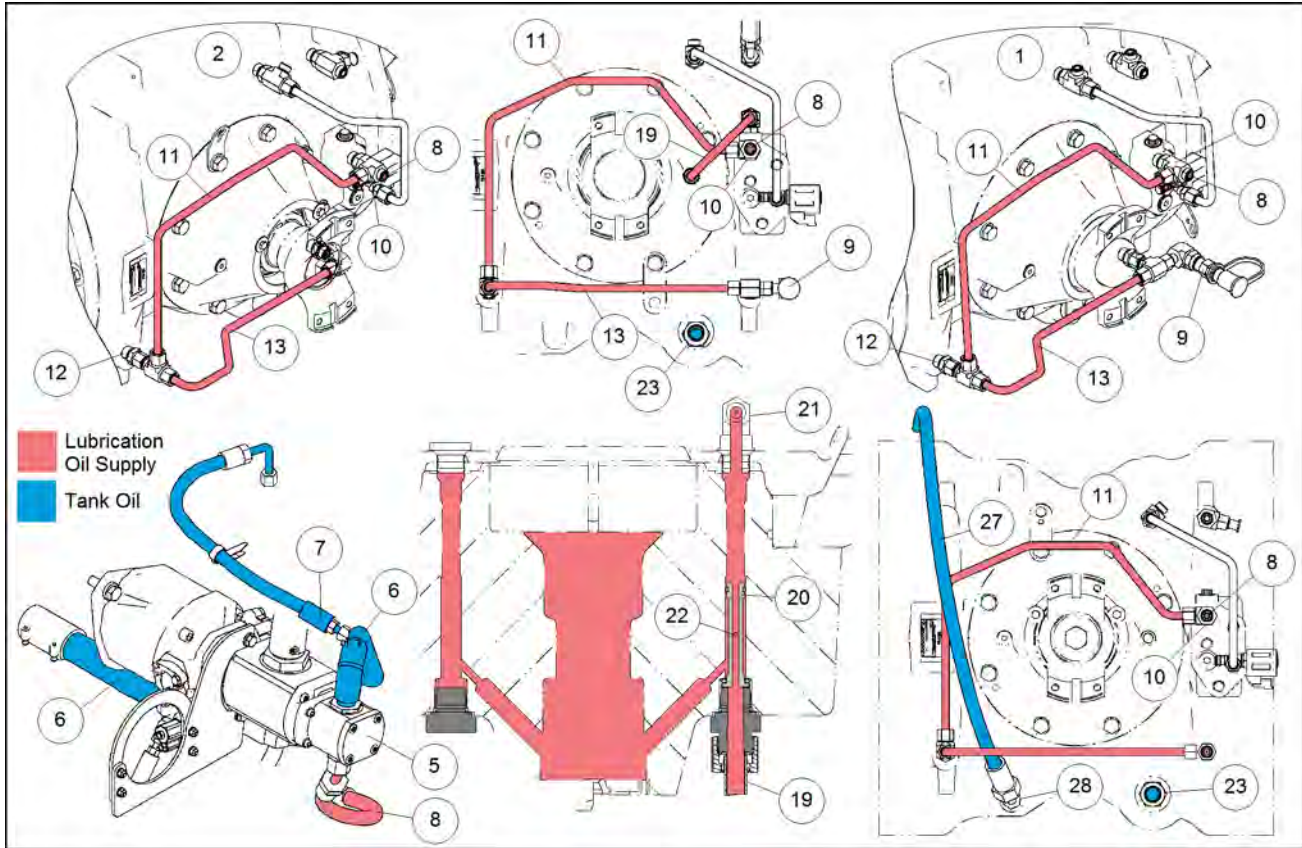
Also from the input oil tee, lube oil flows to the internal differential area of the axle through a jumper tube. The lube oil then flows through the differential, to the service brake discs and also to the ring gear side bearing.

An external pinion bearing and bevel gear mesh lube tube (19) connects to an internal passage at the lube inlet tee. This external tube then connects to the port on the axle front cover which supports the pinion shaft. A pinion bearing and bevel mesh orifice tube (20) is installed under the supply fitting. Lube oil flows through this orifice tube to an elbow (21) with a **1.7 mm (0.067 in)** orifice and then through a small tube to spray lube oil directly on the bevel ring and pinion gear mesh point. Lube oil also then flows through a **1.7 mm (0.067 in)** pinion bearing lube orifice (22) in the side of the orifice tube to the pinion bearing cavity to lubricate these bearings. After flowing through the pinion bearing area, oil then flows to a plugged passage on the opposite side of the front axle cover.

The aerated oil causes a slight buildup of pressure within the axles. The lube oil collects at the bottom of the axle housings. On the Quadtrac series axles, the return port (23) is located low at the center on the drive shaft input side of the axle. With this return port location, the air pressure causes virtually all of the lubrication oil to collect and return from the axle housing. On these large axles, the axles operate with a low the internal oil level to prevent generation of heat while roading. The return oil hose from the rear axle (24) passes through the articulation joint along with the lube supply oil hose and also other hydraulic plumbing. The rear axle return hose and the front axle return hose (25) connects to a return manifold pipe near the reservoir which is then connected to the reservoir.

At the rear axle, the auxiliary valve drain hose (27) connects to the auxiliary valve drain fitting (28) at the front of the rear axle housing.

Front axle system - Powered front axle



RAIL14TR00959FA 17

1. Front axle	13. External tube to ring gear side planetary
2. Rear axle	19. External tube to pinion and bevel mesh
5. Lubrication pump	20. Pinion bearing and bevel mesh orifice tube
6. Lube pump supply tube	21. Bevel mesh lube supply elbow
7. Lube pump air inlet tube	22. Pinion bearing lube orifice
8. Aerated lube oil supply to both axles	23. Lube return port
9. Lube pressure test port	24. Rear axle return hose
10. Lube oil supply tee at axle	25. Front axle return hose
11. External tube to brake side planetary	27. Auxiliary valve drain hose
12. 1.7 bar (25 psi) check valve	28. Auxiliary valve drain fitting

Rowtrac Axle lube oil system schematic detailed explanation

The 4WD Rowtrac tractors use a pressurized lubrication system for the front drive axle (1), the rear drive axle (2) and also for the optional power take off (PTO) output drop box (3), (if equipped). Axle lubrication oil is drawn from and returned back to the hydraulic reservoir (4). The lubrication pump (5) is a gear pump mounted furthest from the transmission in the hydraulic pump assembly. The lube pump draws oil from the hydraulic reservoir through a suction screen (6) and also draws air from the top of the reservoir to cause the pump to deliver aerated lube oil to the axles. Air is introduced to the lube pump inlet through a separate air line (7) from the top of the reservoir, through a **2 mm (0.079 in)** orifice drilled into the side of the suction tube, near the lube pump. The lube oil is aerated to slightly pressurize the axles to force the lube oil to return back to reservoir without flooding the axles with oil. Because the lubrication system operates at a very low pressure, **1.7 bar (25 psi)** the pump can tolerate the introduction of the air into the inlet. Because the hydraulic oil is used for the axle lubrication, use the oil specified in the operators manual because of its proven performance.

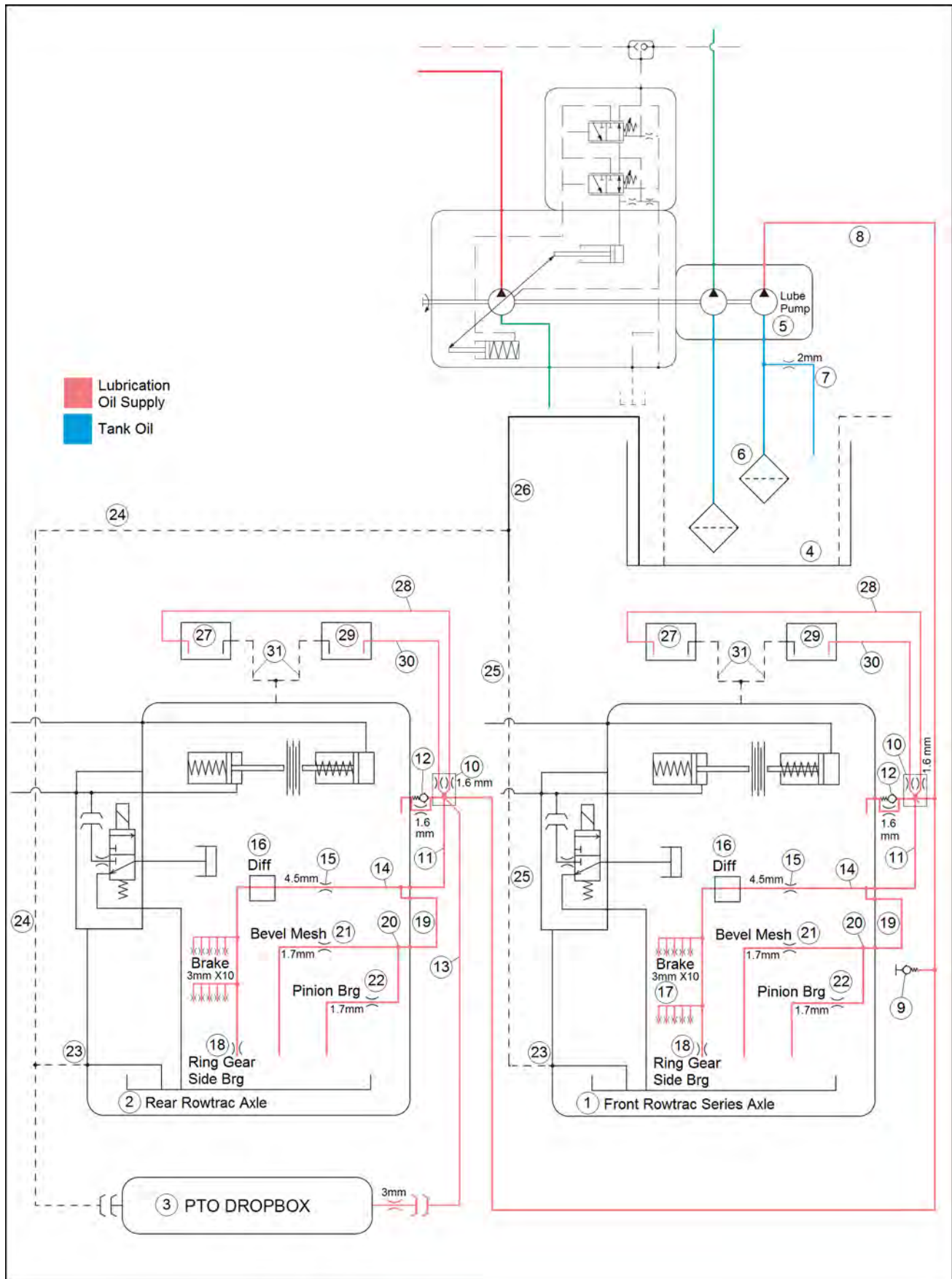
The lube pump supplies a common aerated oil supply (8) to both axles. Outlet flow from the lube pump connects to a tee near the front axle and then splits to send a common pressurized lube oil supply to both the front and rear axles. There is a lube pressure test port (9) located inside the left frame side sheet, near the front axle. When the hydraulic oil is at operating temperature, the lube pressure will be approximately **1.7 bar (25 psi)**.

Lubrication oil from the lube pump (8) is delivered to a special input cross fitting (10) on the driveshaft input side of each axle. From the input cross fitting, excess lube oil passes into the differential housing, through a **1.7 bar (25 psi)** check valve fitting (12) at the cross fitting. This check valve regulates the lube oil pressure delivered to the axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet to allow a controlled amount of lubrication oil to flow to the axle.

Also connected to this input cross fitting is an external steel tube (11) which carries lube oil to the internal differential area of the axle through a jumper tube (14) with a **4.5 mm (0.177 in)** orifice (15) in the inboard end. The lube oil then flows through the differential (16), to the service brake discs through ten **3 mm (0.118 in)** 3mm (.118 inch) orifices (17) drilled in the splined area and also to the ring gear side bearing (18) through a **2.3 mm (0.091 in)** orifice. Also on units equipped with a PTO, a PTO lubrication line (13) connects to the input cross fitting at the rear axle to supply lubrication oil to the PTO dropbox.

1. Front axle	17. Brake lube orifices
2. Rear axle	18. Ring gear side bearing lube
3. PTO Dropbox	19. External tube to pinion and bevel mesh
4. Hydraulic reservoir	20. Pinion bearing and bevel mesh orifice tube
5. Lubrication pump	21. Bevel mesh lube supply
6. Suction screen	22. Pinion bearing lube orifice
7. Lube pump air inlet tube	23. Axle lube return port
8. Aerated lube oil supply to both axles	24. Rear axle return hose
9. Lube pressure test port	25. Front axle return hose
10. Lube oil supply cross at axle	26. Lube return manifold
11. External tube to internal diff and brake lube	27. Axle ring gear side upbox
12. 1.7 bar (25 psi) check valve	28. Axle ring gear side upbox lube supply
13. External tube to PTO dropbox lube	29. Axle brake side upbox
14. Internal jumper tube to differential lube	30. Axle brake side upbox lube supply
15. Differential internal lube orifice	31. Axle upbox lube return oil
16. Differential lube	

Front axle system - Powered front axle



Rowtrac axle lube oil system schematic detailed explanation (continued)

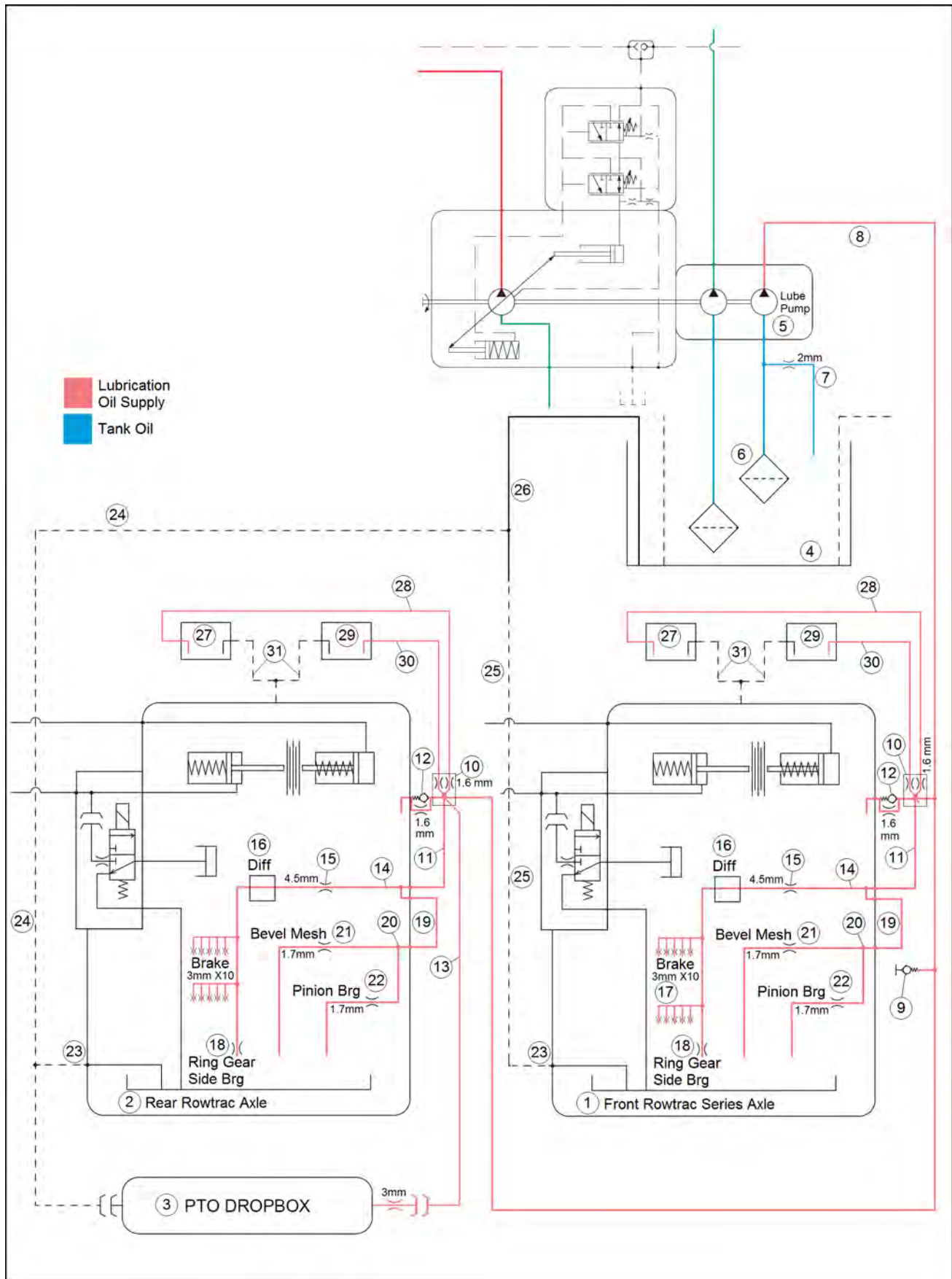
An external pinion bearing and bevel gear mesh lube tube **(19)** connects to an internal passage at the lube inlet cross fitting. This external tube then connects to the port on the axle front cover which supports the pinion shaft. A pinion bearing and bevel mesh orifice tube **(20)** is installed under the supply fitting. Lube oil flows through this orifice tube to an elbow **(21)** with a **1.7 mm (0.067 in)** orifice and then through a small tube to spray lube oil directly on the bevel ring and pinion gear mesh point. Lube oil also then flows through a **1.7 mm (0.067 in)** pinion bearing lube orifice **(22)** in the side of the orifice tube to the pinion bearing cavity to lubricate these bearings. After flowing through the pinion bearing area, oil then flows to a plugged passage on the opposite side of the front axle cover.

On Rowtrac axles, the final drive upboxes are separate from the axle housing so they require external plumbing to provide lubrication. Lubrication oil flows through a **1.6 mm (0.063 in)** orifice in the input oil cross fitting **(10)** to the axle ring gear side upbox **(27)** through the ring gear side upbox lube supply plumbing **(28)**. Lubrication oil also flows through another **1.6 mm (0.063 in)** orifice in the input oil cross fitting to the axle brake side upbox **(29)** through the axle brake side upbox lube supply plumbing **(30)**. Upbox lube oil **(31)** returns from both of the upboxes to a tee at the input side of the axle housing.

The aerated oil causes a slight buildup of pressure within the axles. The lube oil collects at the bottom of the axle housings. On the Rowtrac axles, the return port **(23)** is located low at the center on the drive shaft input side of the axle. With this return port location, the air pressure causes virtually all of the lubrication oil to collect and return from the axle housing. On these large axles, the axles operate with a low the internal oil level to prevent generation of heat while roading. The return oil hose from the rear axle **(24)** passes through the articulation joint along with the lube supply oil hose and also other hydraulic plumbing. The rear axle return hose and the front axle return hose **(25)** connect to a return manifold pipe **(26)** near the reservoir which is then connected to the reservoir.

1. Front axle	17. Brake lube orifices
2. Rear axle	18. Ring gear side bearing lube
3. PTO Dropbox	19. External tube to pinion and bevel mesh
4. Hydraulic reservoir	20. Pinion bearing and bevel mesh orifice tube
5. Lubrication pump	21. Bevel mesh lube supply
6. Suction screen	22. Pinion bearing lube orifice
7. Lube pump air inlet tube	23. Axle lube return port
8. Aerated lube oil supply to both axles	24. Rear axle return hose
9. Lube pressure test port	25. Front axle return hose
10. Lube oil supply cross at axle	26. Lube return manifold
11. External tube to internal diff and brake lube	27. Axle ring gear side upbox
12. 1.7 bar (25 psi) check valve	28. Axle ring gear side upbox lube supply
13. External tube to PTO dropbox lube	29. Axle brake side upbox
14. Internal jumper tube to differential lube	30. Axle brake side upbox lube supply
15. Differential internal lube orifice	31. Axle upbox lube return oil
16. Differential lube	

Front axle system - Powered front axle



Rowtrac axle lube external plumbing components

The 4WD Rowtrac tractors use a pressurized lubrication system for the front drive axle **(1)**, the rear drive axle **(2)** and also for the optional power take off (PTO) output drop box, (if equipped). Axle lubrication oil is drawn from and returned back to the hydraulic reservoir. The lubrication pump **(5)** is a gear pump mounted furthest from the transmission in the hydraulic pump assembly. The lube pump draws oil from the hydraulic reservoir through a supply tube **(6)** and also draws air from the top of the reservoir to cause the pump to deliver aerated lube oil to the axles. Air is introduced to the lube pump inlet through a separate air line **(7)** from the top of the reservoir, through a **2 mm (0.079 in)** orifice drilled into the side of the suction tube, near the lube pump. The lube oil is aerated to slightly pressurize the axles to force the lube oil to return back to reservoir without flooding the axles with oil. Because the lubrication system operates at a very low pressure, **1.7 bar (25 psi)** the pump can tolerate the introduction of the air into the inlet. Because the hydraulic oil is used for the axle lubrication, use the oil specified in the operators manual because of its proven performance.

Lubrication oil from the lube pump **(8)** is delivered to a special input cross fitting **(10)** on the driveshaft input side of each axle. From the input cross fitting, excess lube oil passes into the differential housing, through a **1.7 bar (25 psi)** check valve fitting **(12)** at the cross fitting. This check valve regulates the lube oil pressure delivered to the axle. There is a lube pressure test port located inside the left frame side sheet, near the front axle. This check valve also has a **1.6 mm (0.063 in)** orifice within the poppet to allow a controlled amount of lubrication oil to flow to the axle.

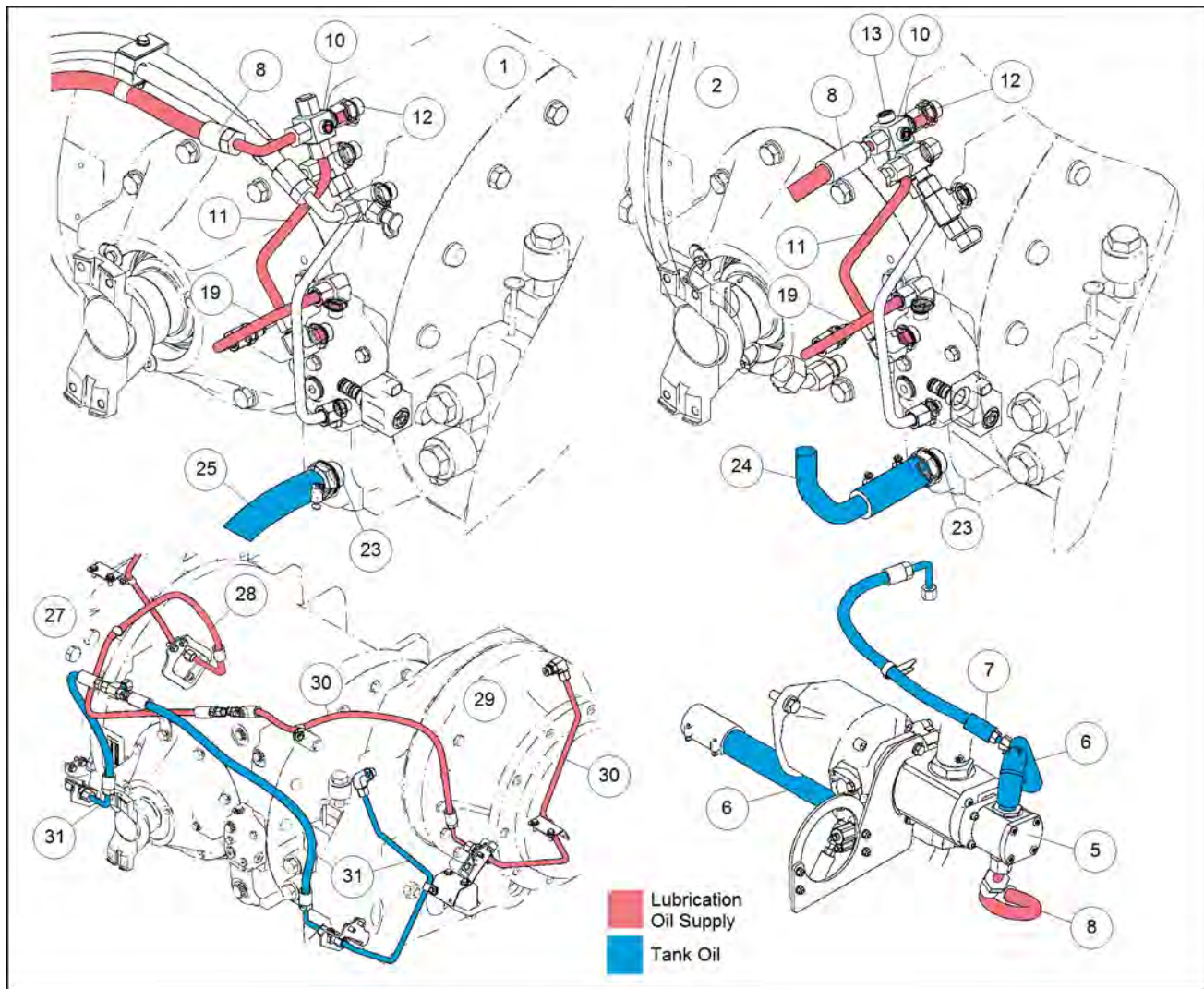
Also connected to this input cross fitting is an external steel tube **(11)** which carries lube oil to the internal differential area of the axle through a jumper tube. The lube oil then flows through the differential, to the service brake discs and also to the ring gear side bearing. Also on units equipped with a PTO, a PTO lubrication port **(13)** connects to the input cross fitting at the rear axle to supply lubrication oil to the PTO dropbox.

An external pinion bearing and bevel gear mesh lube tube **(19)** connects to an internal passage at the lube inlet cross fitting. This external tube then connects to the port on the axle front cover which supports the pinion shaft. A pinion bearing and bevel mesh orifice tube is installed under the supply fitting.

On Rowtrac axles, the final drive upboxes are separate from the axle housing so they require external plumbing to provide lubrication. Lubrication oil flows through a **1.6 mm (0.063 in)** orifice in the input oil cross fitting **(10)** to the axle ring gear side upbox **(27)** through the ring gear side upbox lube supply plumbing **(28)**. Lubrication oil also flows through another **1.6 mm (0.063 in)** orifice in the input oil cross fitting to the axle brake side upbox **(29)** through the axle brake side upbox lube supply plumbing **(30)**. Upbox lube oil **(31)** returns from both of the upboxes to a tee at the input side of the axle housing.

The aerated oil causes a slight buildup of pressure within the axles. The lube oil collects at the bottom of the axle housings. On the Rowtrac axles, the return port **(23)** is located low at the center on the drive shaft input side of the axle. With this return port location, the air pressure causes virtually all of the lubrication oil to collect and return from the axle housing. On these large axles, the axles operate with a low the internal oil level to prevent generation of heat while roading. The return oil hose from the rear axle **(24)** passes through the articulation joint along with the lube supply oil hose and also other hydraulic plumbing. The rear axle return hose and the front axle return hose **(25)** connect to a return manifold pipe **(26)** near the reservoir which is then connected to the reservoir.

Front axle system - Powered front axle



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1. Front axle	19. External tube to pinion and bevel mesh
2. Rear axle	23. Axle lube return port
5. Lubrication pump	24. Rear axle return hose
6. Lube pump supply tube	25. Front axle return hose
7. Lube pump air inlet tube	27. Axle ring gear side upbox
8. Aerated lube oil supply to both axles	28. Axle ring gear side upbox lube supply
10. Lube oil supply cross at axle	29. Axle brake side upbox
11. External tube to internal diff and brake lube	30. Axle brake side upbox lube supply
12. 1.7 bar (25 psi) check valve	31. Axle upbox lube return oil
13. External tube to PTO dropbox lube	

Powered front axle - Dynamic description - 425 Series axles

Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

The axle assembly and components are very heavy. Dry weight of the axle assembly is approximately **1500 kg (3300 lb)**. Be sure all lifting devices and/or support stands are in good shape and have the capacity to lift and/or support the applied load.

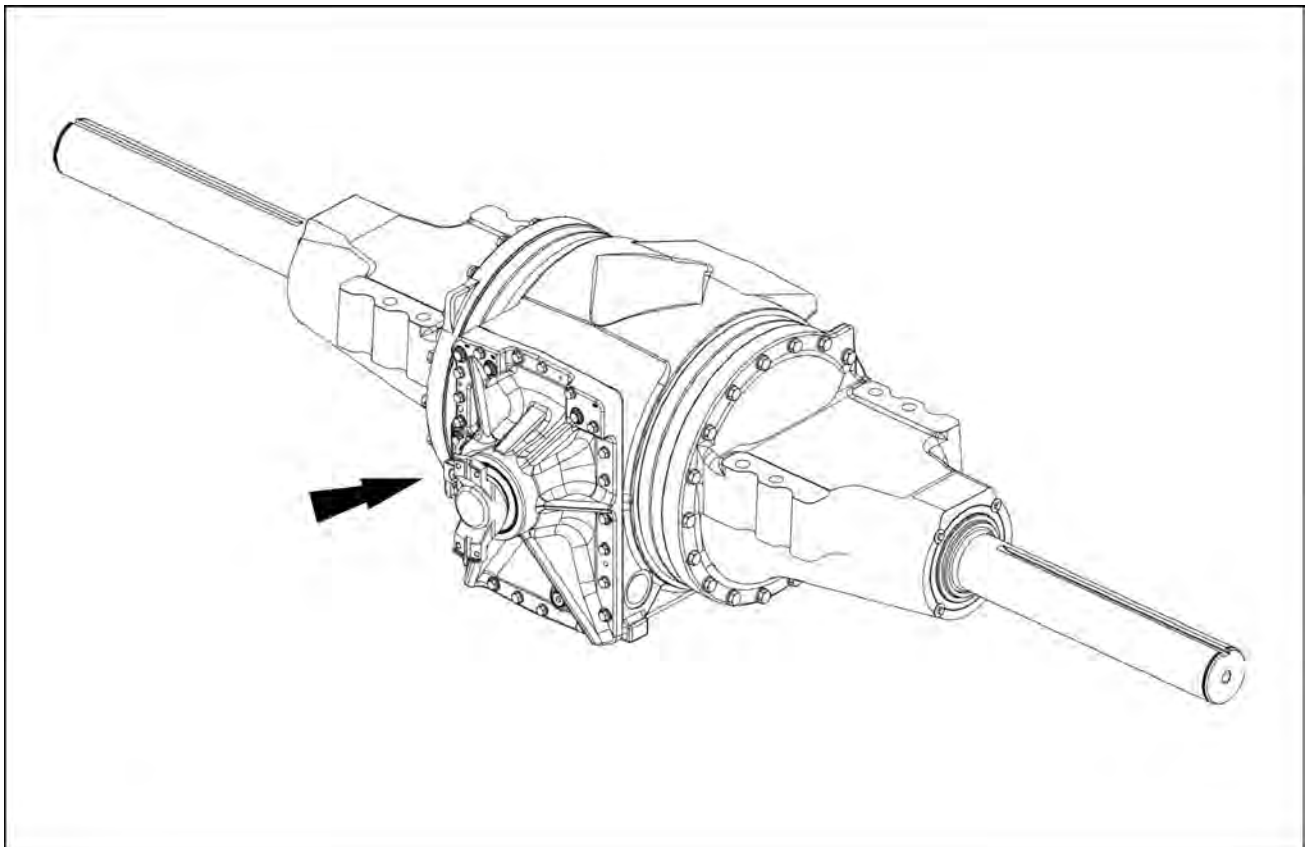
The center housing for the differential must be rotated to different positions several times during the disassembly and assembly procedures. For this reason it is recommended that the differential housing assembly should be mounted in a rotating type repair stand. If a rotating repair stand is not available, axle repair should be performed on a clean concrete shop floor with access to an overhead hoist.

Clean and inspect all components and parts during the disassembly procedure for damage or wear. Replace any damaged or worn parts found.

The axle is metric designed. Gaskets are not used for sealing flange joints in this axle. Use only anaerobic type sealant on all mating surfaces requiring sealing. Follow label directions for cleaning and usage.

All repairs to the axle will require that the axle assembly be removed from the tractor frame. Always refer to the axle model, part number and serial number when ordering replacement parts.

The axle model number and serial number are stamped on a metal plate attached to the axle assembly in the location shown. Always reference these numbers before ordering replacement parts.



RCPH10FWD471ABJ 1

Axle identification plate location

Axle identification plate designations

Axle series	Plate identification	Differential lock	Position	Type	Axle size
425	425FW	No	Front	Bar	127 mm (5 in)
425	425RW	No	Rear	Bar	127 mm (5 in)
425	435FW	Yes	Front	Bar	127 mm (5 in)
425	435RW	Yes	Rear	Bar	127 mm (5 in)
425	440FW	Yes	Front	Flange	127 mm (5 in)
425	440RW	Yes	Rear	Flange	127 mm (5 in)

Powered front axle - Dynamic description - 500 Series axles

Steiger® 500	NA
Steiger® 540	NA

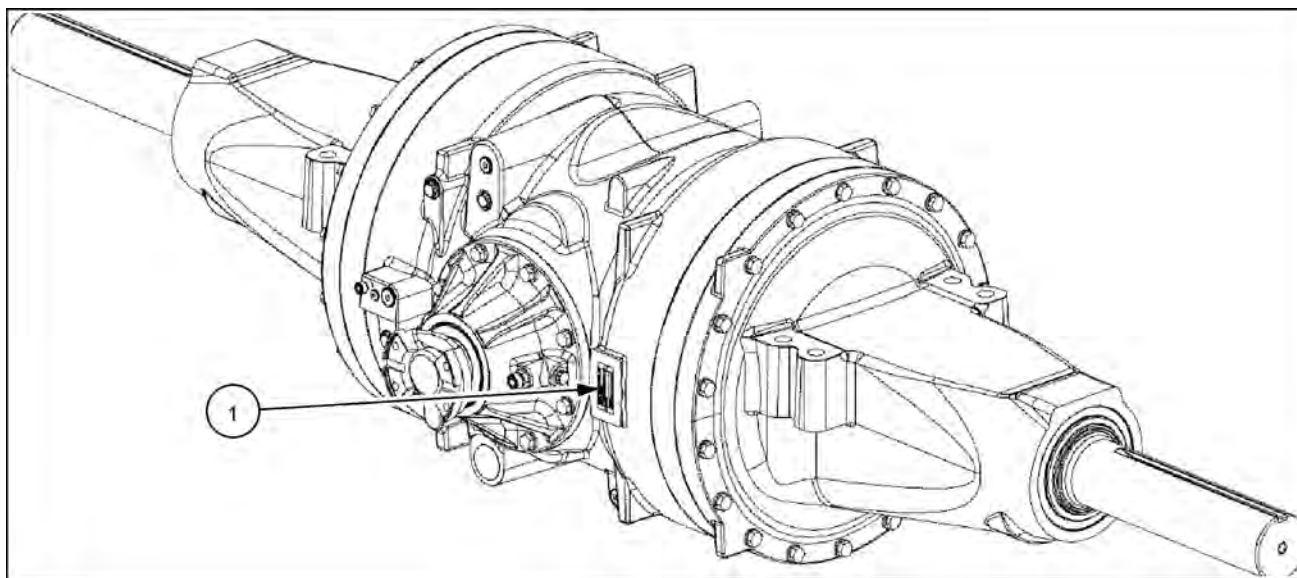
The axle assembly and components are very heavy. Dry weight of the axle assembly is **1875 kg (4133 lb)**. Be sure all lifting devices and/or support stands are in good shape and have the capacity to lift and/or support the applied load. The center housing for the differential must be rotated to different positions several times during the disassembly and assembly procedures. For this reason it is recommended that the differential housing assembly should be mounted in a rotating type repair stand. If a rotating repair stand is not available, axle repair should be performed on a clean concrete shop floor with access to an overhead hoist.

Clean and inspect all components and parts during the disassembly procedure for damage or wear. Replace any damaged or worn parts found.

The axle is metric designed. Gaskets are not used for sealing flange joints in this axle. Use only anaerobic type sealant on all mating surfaces requiring sealing. Follow label directions for cleaning and usage.

All repairs to the axle will require that the axle assembly be removed from the tractor frame. ALWAYS refer to the axle model, part number and serial number when ordering replacement parts.

Axle identification



RCPH10FWD853AAJ 1

The axle model number, serial number and part number are stamped on a metal plate (1) attached to the axle assembly in the location shown. Always reference these numbers before ordering replacement parts.

Axle identification plate designations

Axle series	Plate identification	Differential lock	Position	Type	Axle size
500	515FW	Yes	Front	Bar	115 mm (4.5 in)
500	505FW	No	Front	Bar	115 mm (4.5 in)
500	515RW	Yes	Rear	Bar	115 mm (4.5 in)
500	505RW	No	Rear	Bar	115 mm (4.5 in)

Powered front axle - Dynamic description - 500 and 600 Series Quadtrac®

Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA
Steiger® 580 Quadtrac®	NA
Steiger® 620 Quadtrac®	NA

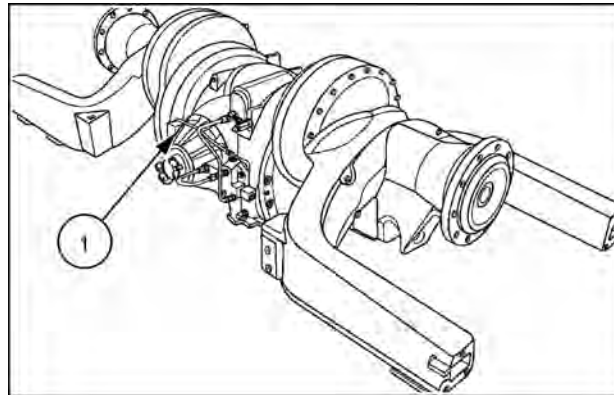
The axle assembly and components are very heavy. Dry weight of the axle assembly is **2232 kg (4920 lb)**. Be sure all lifting devices and/or support stands are in good shape and have the capacity to lift and/or support the applied load. The center housing for the differential must be rotated to different positions several times during the disassembly and assembly procedures. For this reason it is recommended that the differential housing assembly should be mounted in a rotating type repair stand such as the Revolver Repair Stand. If a rotating repair stand is not available, axle repair should be performed on a clean concrete shop floor with access to an overhead hoist.

Clean and inspect all components and parts during the disassembly procedure for damage or wear. Replace any damaged or worn parts found.

The axle is metric designed. Gaskets are not used for sealing flange joints in this axle. Use only anaerobic type sealant on all mating surfaces requiring sealing. Follow label directions for cleaning and usage.

All repairs to the axle will require that the axle assembly be removed from the tractor frame. ALWAYS refer to the axle model, part number and serial number when ordering replacement parts.

Axle identification



RCPH10FWD131FBJ 1

The axle model number and serial number are stamped on a metal plate attached to the axle assembly in the location shown. Always reference these numbers before ordering replacement parts.

Axle identification plate designations

Axle series	Plate identification	Differential lock	Position	Type
500	515FQ	Yes	Front	Quadtrac
500	505FQ	No	Front	Quadtrac
500	515RQ	Yes	Rear	Quadtrac
500	505RQ	No	Rear	Quadtrac
600	615FQ	Yes	Front	Quadtrac
600	605FQ	No	Front	Quadtrac
600	615RQ	Yes	Rear	Quadtrac
600	605RQ	No	Rear	Quadtrac

Powered front axle - Dynamic description - 600 Series axles

Steiger® 580	NA
Steiger® 620	NA

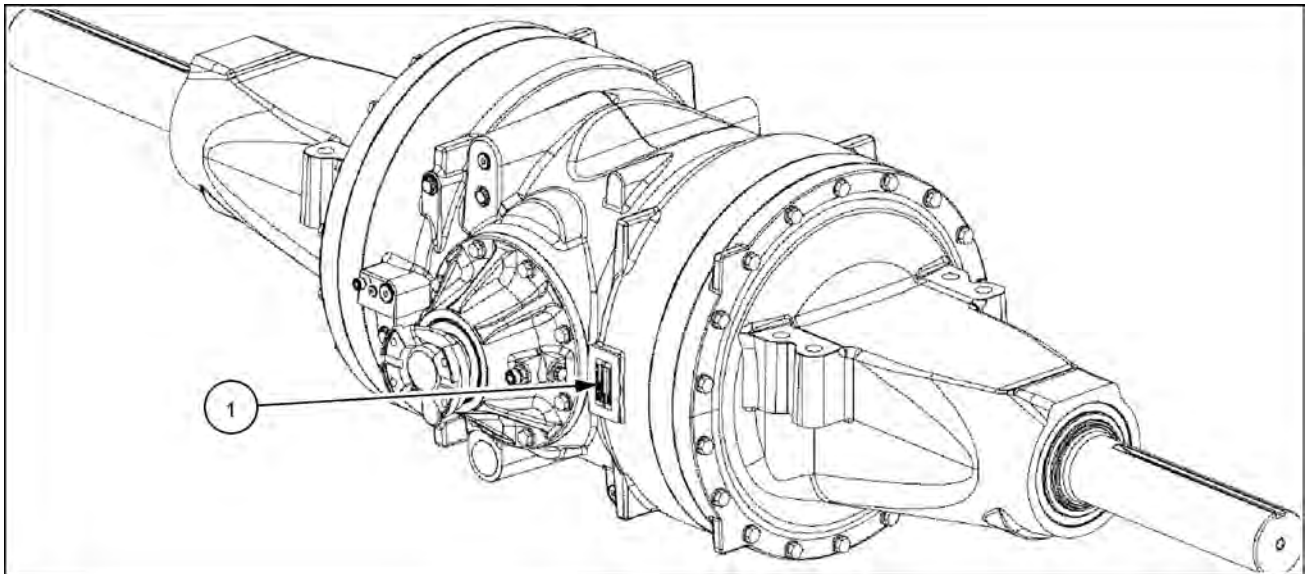
The axle assembly and components are very heavy. Dry weight of the axle assembly is **2170 kg (4784 lb)**. Be sure all lifting devices and/or support stands are in good shape and have the capacity to lift and/or support the applied load. The center housing for the differential must be rotated to different positions several times during the disassembly and assembly procedures. For this reason it is recommended that the differential housing assembly should be mounted in a rotating type repair stand. If a rotating repair stand is not available, axle repair should be performed on a clean concrete shop floor with access to an overhead hoist.

Clean and inspect all components and parts during the disassembly procedure for damage or wear. Replace any damaged or worn parts found.

The axle is metric designed. Gaskets are not used for sealing flange joints in this axle. Use only anaerobic type sealant on all mating surfaces requiring sealing. Follow label directions for cleaning and usage.

All repairs to the axle will require that the axle assembly be removed from the tractor frame. ALWAYS refer to the axle model, part number and serial number when ordering replacement parts.

Axle identification



RCPH10FWD853AAJ 1

The axle model number, serial number and part number are stamped on a metal plate (1) attached to the axle assembly in the location shown. Always reference these numbers before ordering replacement parts.

Axle identification plate designations

Axle series	Plate identification	Differential lock	Position	Type	Axle size
600	615FW	Yes	Front	Bar	140 mm (5.5 in)
600	605FW	No	Front	Bar	140 mm (5.5 in)
600	615RW	Yes	Rear	Bar	140 mm (5.5 in)
600	605RW	No	Rear	Bar	140 mm (5.5 in)

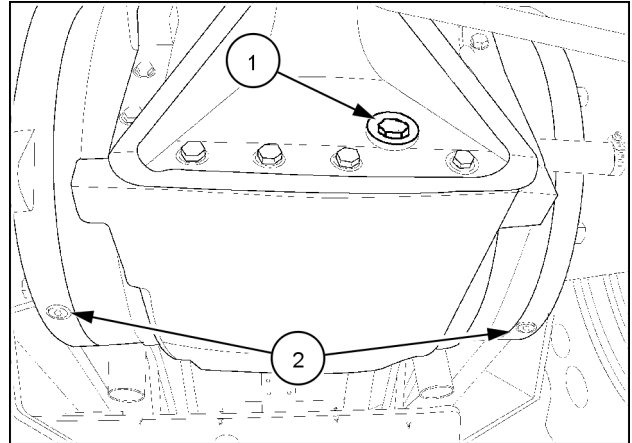
Powered front axle - Remove - Row crop frame wheeled tractors

Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA
Steiger® 500	NA

Prior operation:

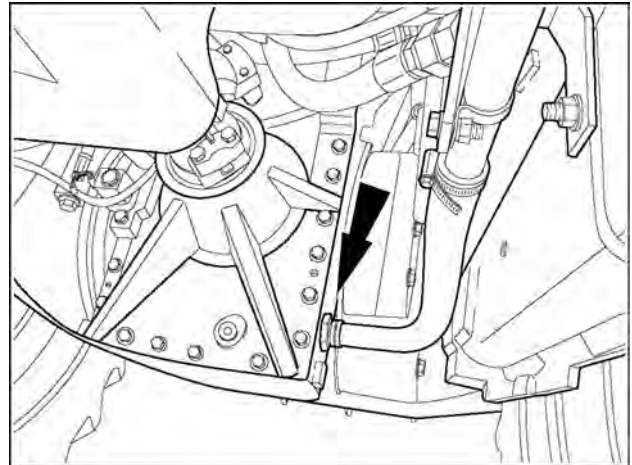
Frame - Raise - Tractor jacking points (39.100)

1. Remove the rear differential plug (1) to drain the center section. Reinstall plug and then remove the two final drive plugs (2) and drain the final drives. Reinstall plugs when drained.



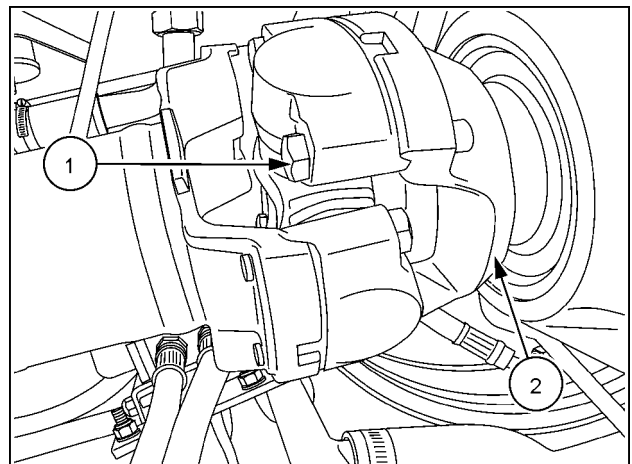
RCPH11FWD104AAM 1

2. Remove the lubrication return hose and clamp from the axle.



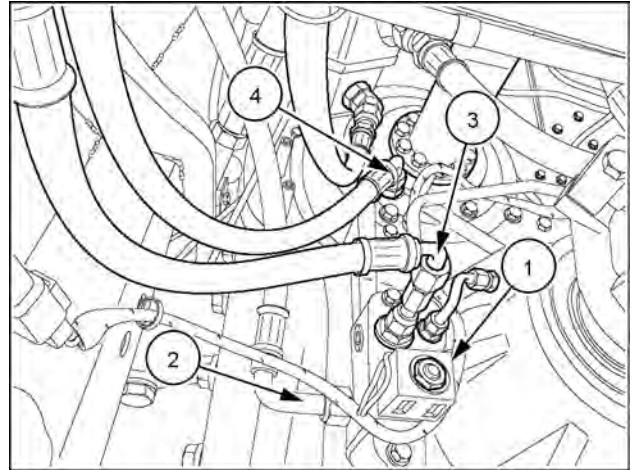
RCPH11FWD105BAM 2

3. Remove the four mounting bolts (1) and move the drive yoke (2) forward away from the drive shaft.



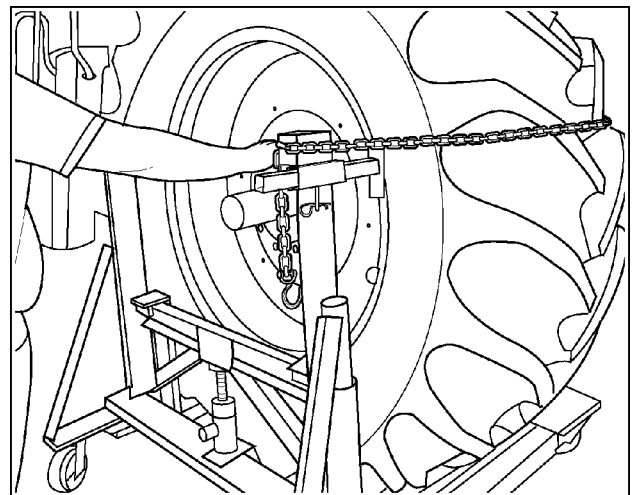
RCPH10FWD608AAJ 3

4. Remove the electrical connector (1) from differential lock solenoid (if equipped). Remove regulator pressure line (2) to differential lock (if equipped). Remove lube line (3), and service brake line (4).



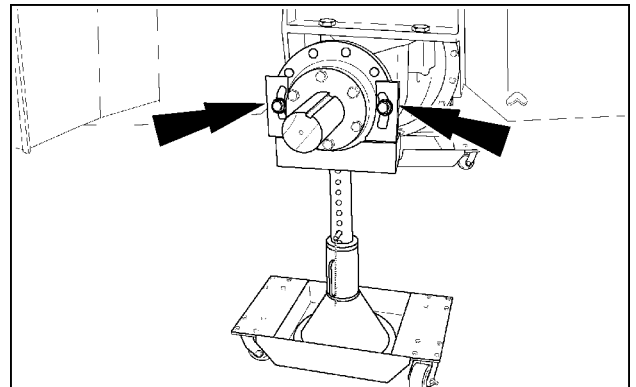
RCPH11FWD106BAM 4

15. Remove the wheel bolts. Use a wheel/axle lift to remove the front wheels from the tractor.



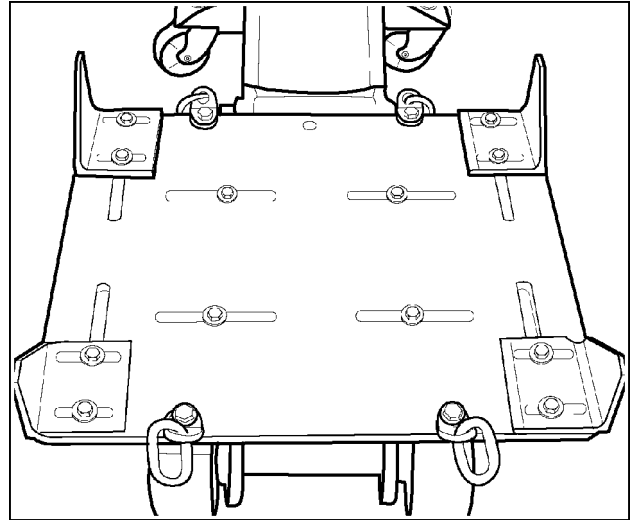
RCPH10FWD623AAJ 5

16. Use two of the wheel bolts with washers to install the **1027004** jack stand adapter post and dolly cart to each wheel hub as shown. Do not tighten the two attaching bolts at this time.



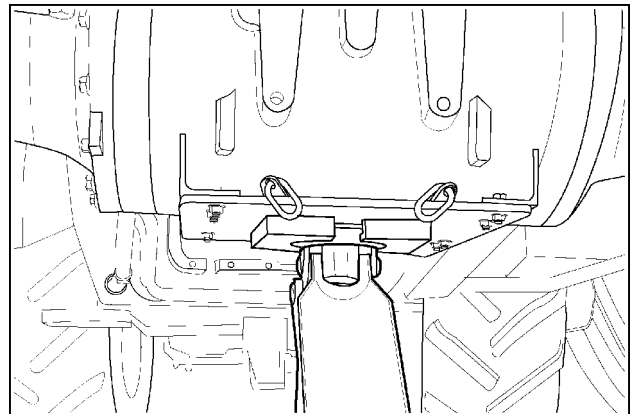
RCPH10FWD624AAJ 6

17. Install the **CAS2694** axle lifting adapter plate to the 20 ton floor jack. Be sure the plate is centered and bolted securely on the jack pad.



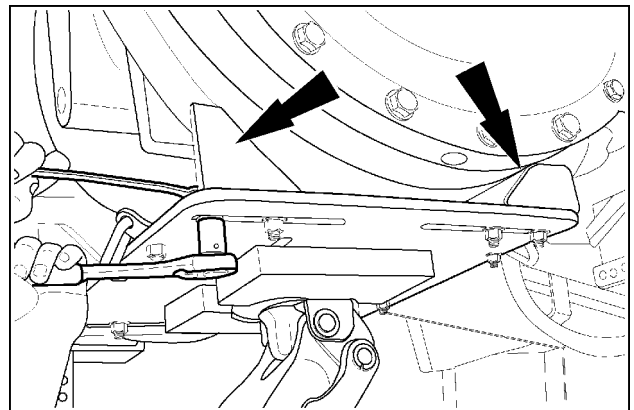
RCPH10FWD625AAJ 7

18. Center the floor jack and adapter plate under the center of the main axle housing. Raise the adapter plate until it touches the axle housing.



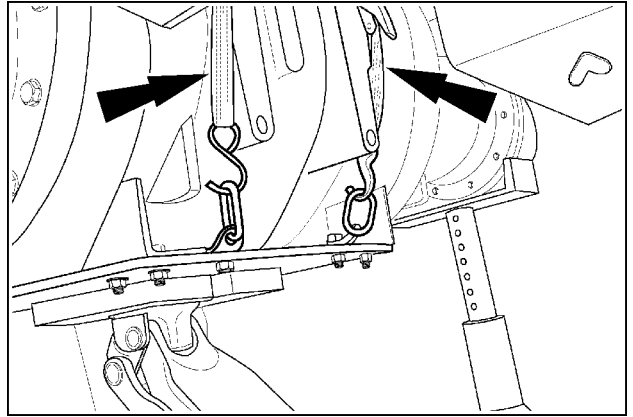
RCPH10FWD626AAJ 8

19. Position the four angle brackets against the axle housing and tighten the bolts. Raise the jack to take up the weight of the axle.



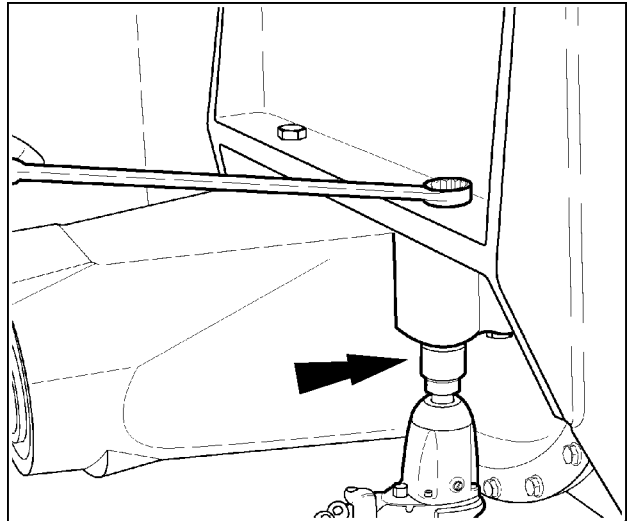
RCPH10FWD627AAJ 9

20. Install the two straps over the axle center housing. Fasten and tighten both straps.



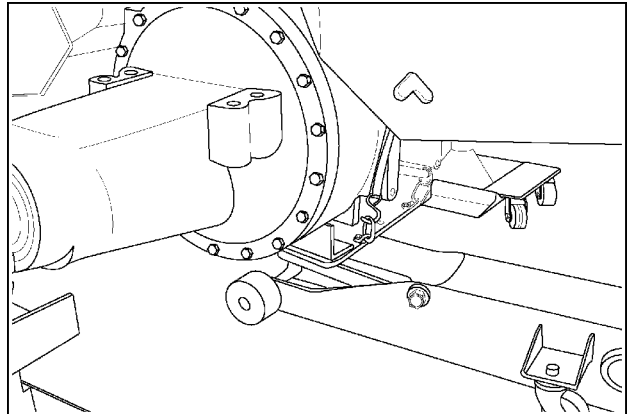
RCPH10FWD628AAJ 10

21. Loosen and remove the four axle mounting bolts and nuts from both sides of the tractor.



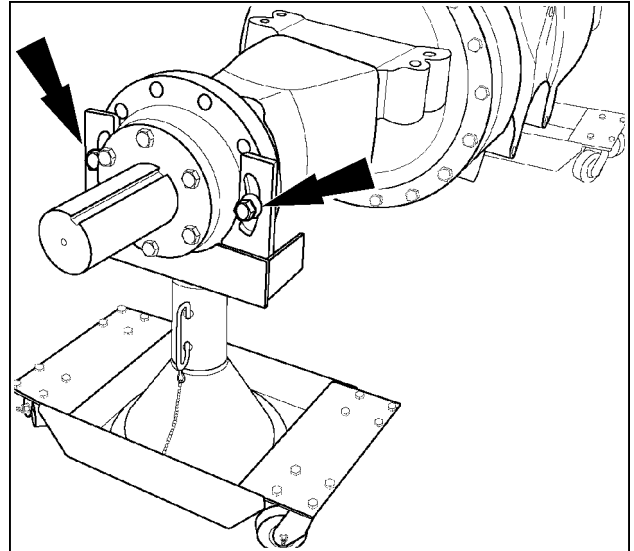
RCPH10FWD629AAJ 11

22. Slowly and carefully lower the axle until it rest securely on the lowest position of the two support stands.



RCPH10FWD630AAJ 12

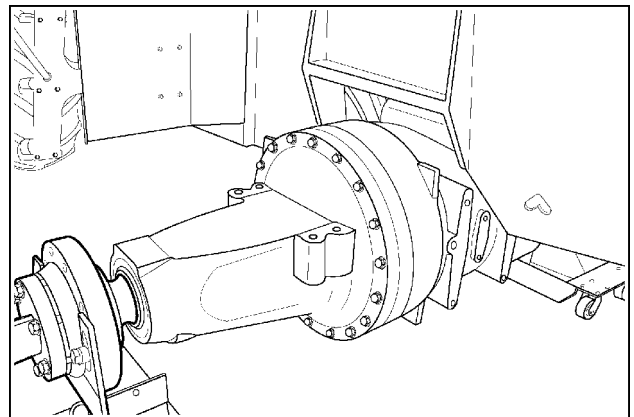
23. Tighten the two bolts securing the brackets to each wheel hub to secure the axle assembly in position.



RCPH10FWD631AAJ 13

24. Loosen and remove the two straps. Lower and remove the floor jack.
25. Carefully remove the axle by rolling it out from under the left hand or right hand side of the tractor.

NOTE: Always keep the dolly carts positioned with the widest part of the cart perpendicular to the axle.

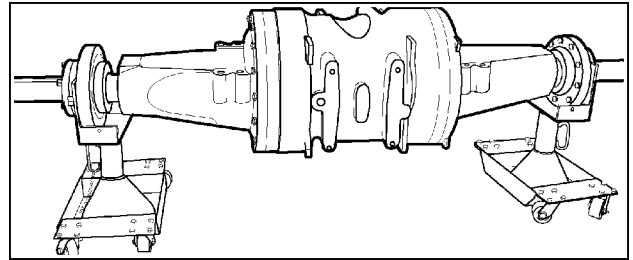


RCPH10FWD632AAJ 14

Powered front axle - Install - Row crop frame wheeled tractors

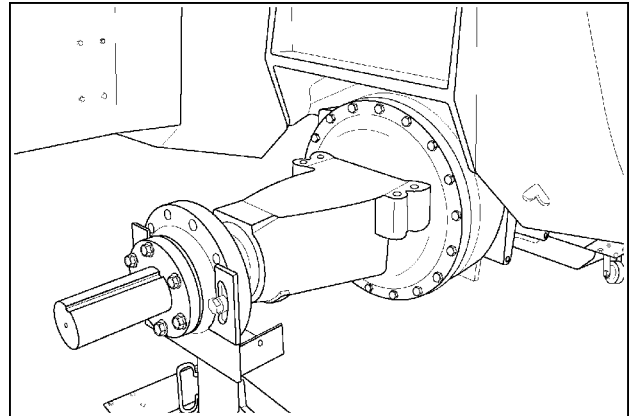
Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA
Steiger® 500	NA

1. Place and secure the axle assembly on the support stands and dolly cart.



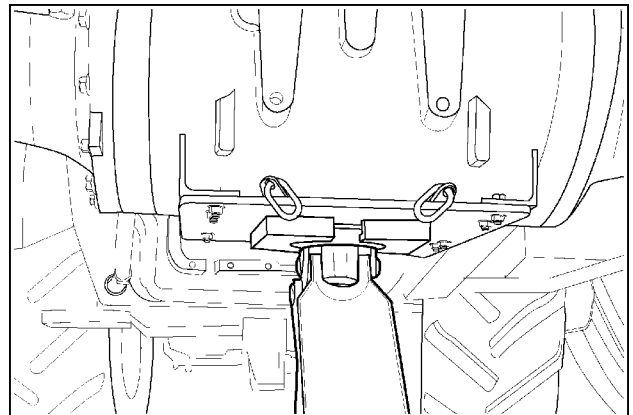
RCPH10FWD633AAJ 1

2. Roll the axle assembly into position under the tractor.



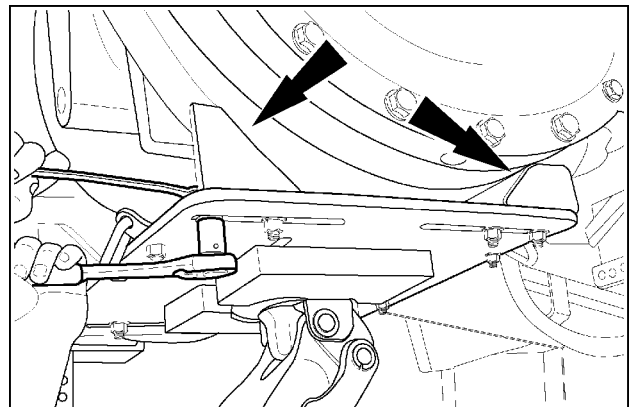
RCPH10FWD634AAJ 2

3. Center the floor jack and **CAS2694** adapter plate under the center of the main axle housing. Raise the adapter plate until it touches the axle housing.



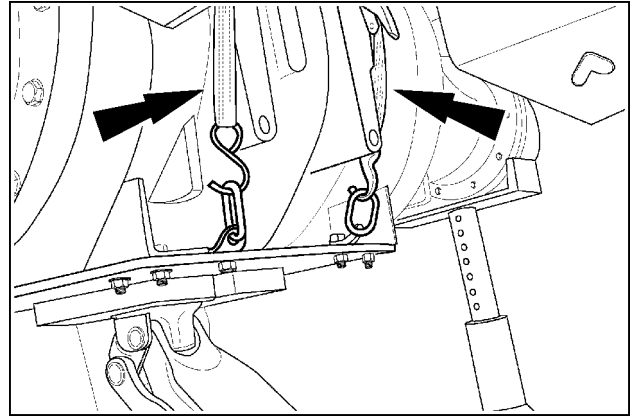
RCPH10FWD626AAJ 3

4. Position the four angle brackets against the axle housing and tighten the bolts. Raise the jack to take up the weight of the axle assembly.



RCPH10FWD627AAJ 4

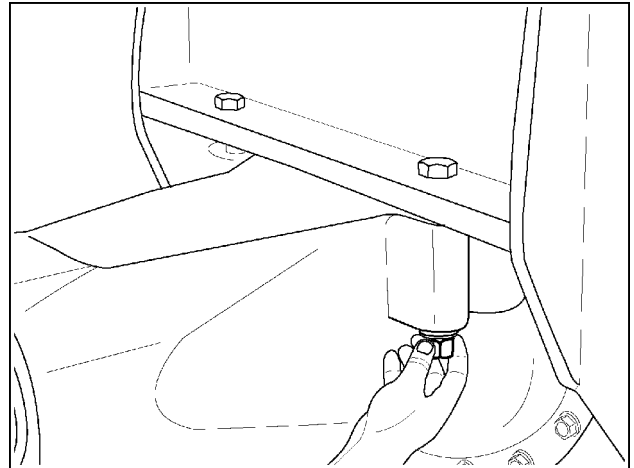
5. Install the two straps over the axle center housing. Fasten and tighten both straps.



RCPH10FWD628AAJ 5

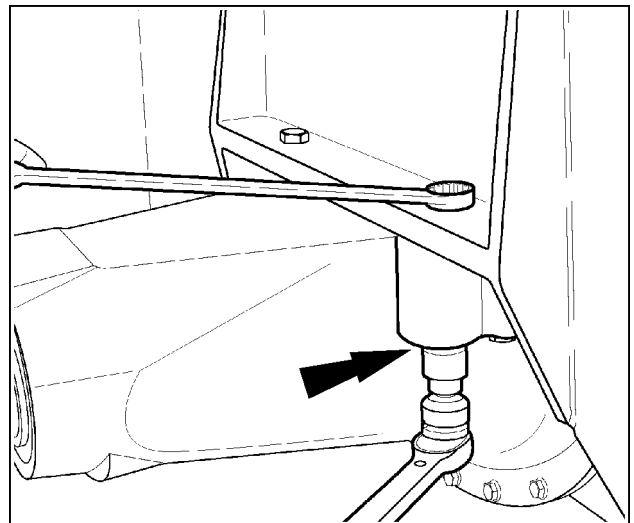
6. Raise and align the axle into position on the mounting pads. Install the axle mounting bolts.

NOTE: Apply a light coat of engine oil on the threads of each bolt.



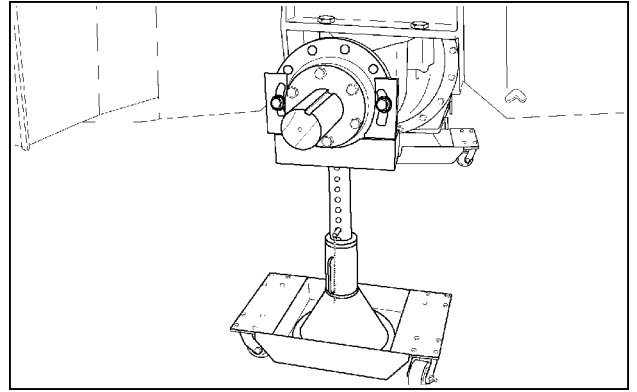
RCPH10FWD635AAJ 6

7. Tighten all axle mounting bolts to the specified torque.



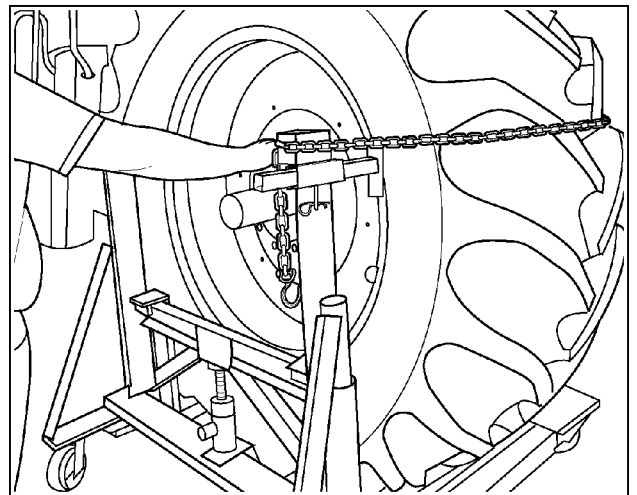
RCPH10FWD636AAJ 7

8. Remove the support stand and dolly cart from the axle hubs.



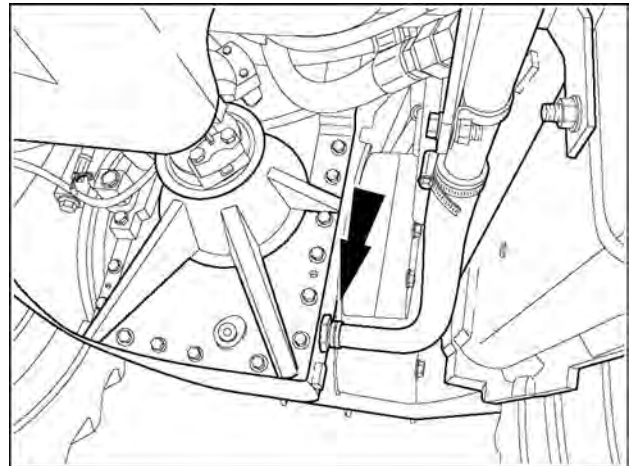
RCPH10FWD624AAJ 8

9. Loosen and remove the two straps, lower and remove the floor jack.
10. Use a wheel and axle lift to install the wheels and wheel bolts. Tighten wheel hub bolts to the specified torque.



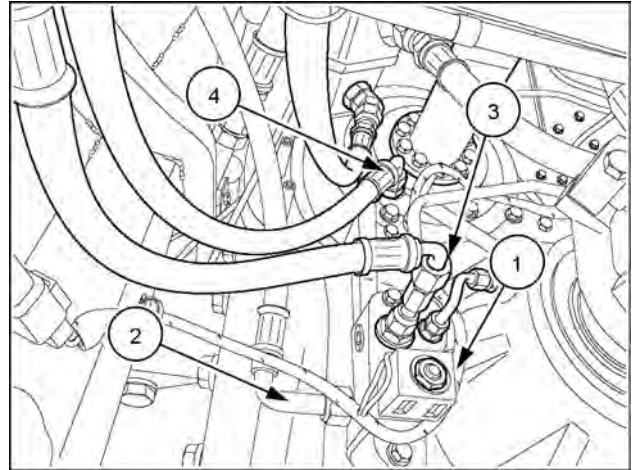
RCPH10FWD623AAJ 9

14. Install the lubrication return hose on the axle.



RCPH11FWD105BAM 10

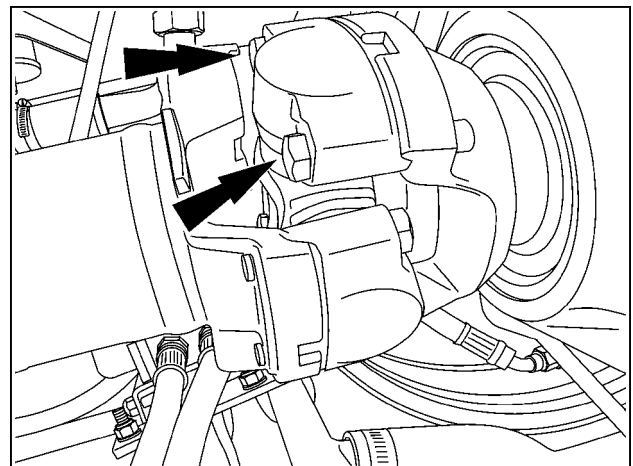
16. Install the electrical connector (1) to the differential lock solenoid (if equipped). Install the regulator pressure line (2) to differential lock (if equipped). Install the lube line (3) and service brake line (4).



RCPH11FWD106BAM 11

22. Install the drive shaft and four attaching bolts. Tighten the bolts to the specified torque.

NOTE: If the drive shaft yokes do not align when installing the driveshaft, raise one wheel off the surface. Use the tow valve to pressurize and release the park brake so that the pinion drive yoke can be turned for alignment with the drive shaft.

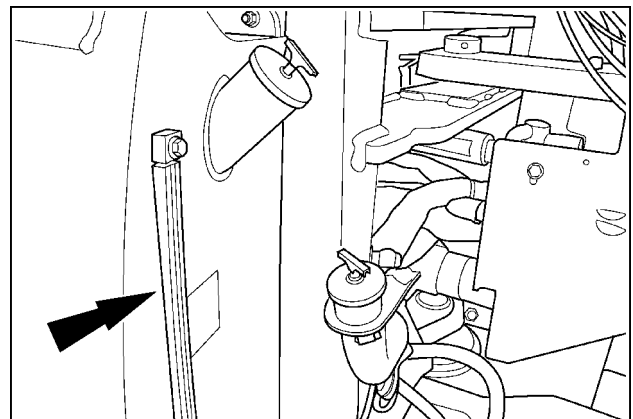


RCPH10FWD608AAJ 12

25. If necessary, change the hydraulic and axle cooling system oil filters. Fill the hydraulic tank to the full mark on the sight gauge. Start the engine to fill the axle housing with oil. Run the engine a short time and shut down to check the oil level in the hydraulic tank. Add oil as necessary to the tank to maintain the oil level within the operating range. Repeat this procedure until the oil level stabilizes in the operating range in the tank.

After the oil level has stabilized in the operating range, operate the differential lock switch (if equipped) on and off several times with the engine running to remove air from the system.

NOTE: This process may take up to 15 minutes to fill the axle and stabilize the hydraulic tank oil level.



RCPH10FWD639AAJ 13

Powered front axle - Remove - High power frame wheeled tractors

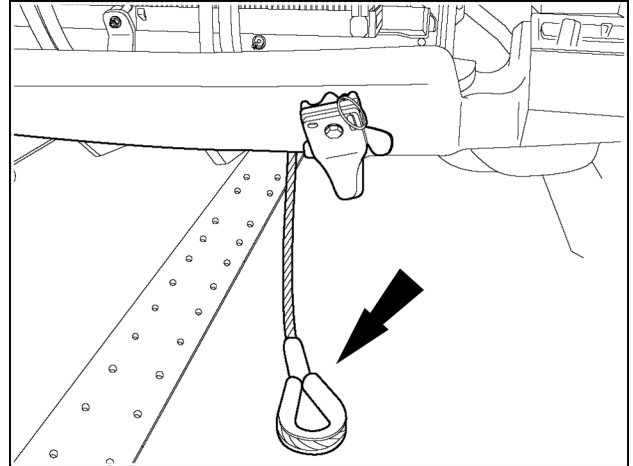
Steiger® 540	NA
Steiger® 580	NA
Steiger® 620	NA

Park the tractor on a smooth and level concrete surface. Remove the switch key and install blocks in front and behind both rear wheels.

Prior operation:

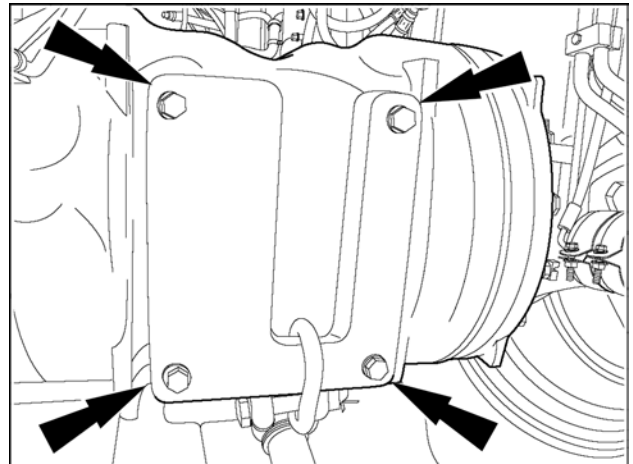
Frame - Raise - Tractor jacking points (39.100)

1. If equipped with a front tow cable, remove the tow ring from the cradle and set it on the ground.



RCPH11FWD124BAM 1

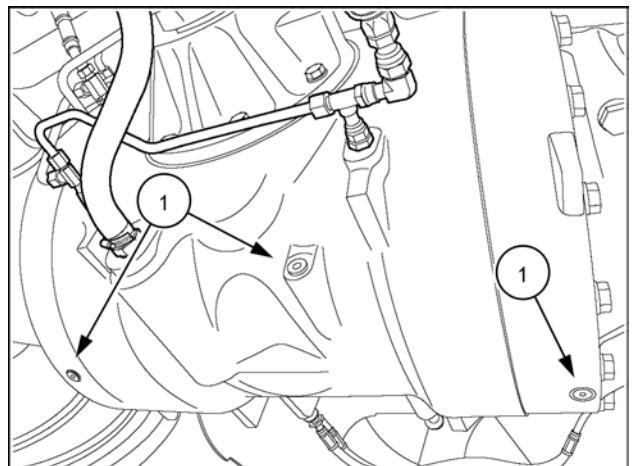
2. Support the tow cable plate (if equipped) on the front axle and remove the four mounting bolts. Lower the support plate to the ground.



RCPH11FWD154BAM 2

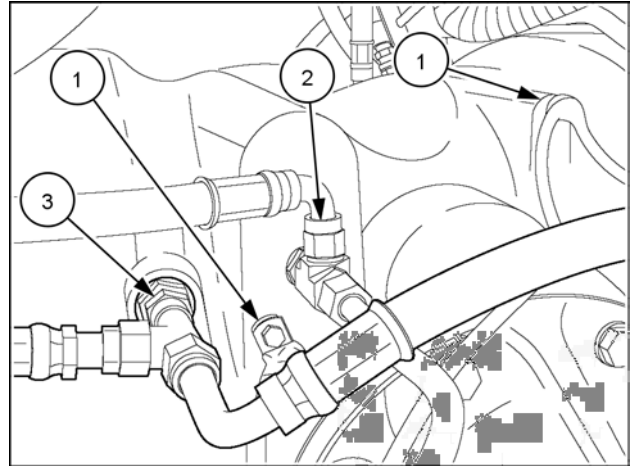
3. Remove the plugs (1) on the bottom of the axle to drain the oil from the final drives. Reinstall the plugs after the oil is drained.

NOTE: The axle can contain up to **68 l (18 US gal)** of oil. Install caps and plugs on all removed fittings and mark all tubes and lines for reassembly.



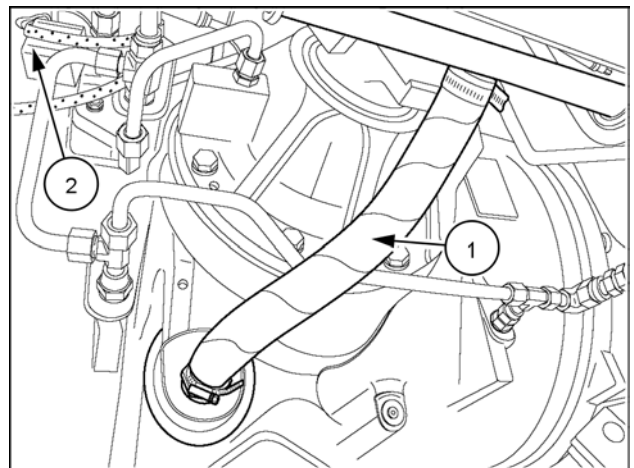
RCPH11FWD120BAM 3

4. Remove the wire harness mounting bolts (1). Remove park brake hose (2) and service brake tee (3).



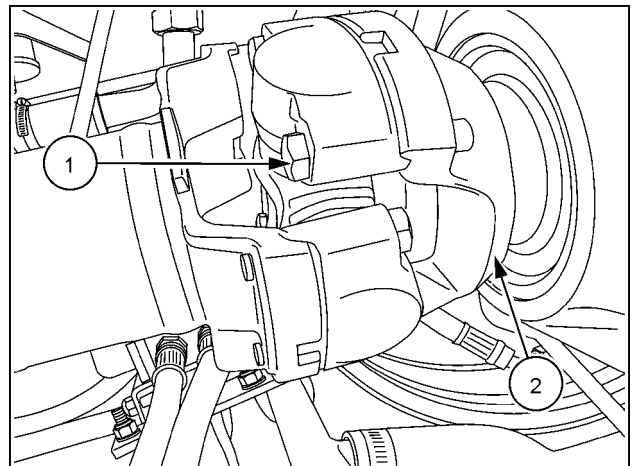
RCPH11FWD121BAM 4

5. Remove the hose (1) from the tractor. If equipped, remove the wire harness connector from the differential lock solenoid coil (2).



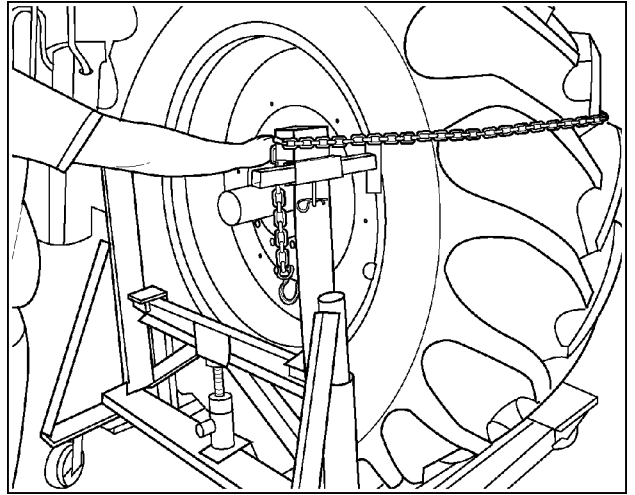
RCPH11FWD119BAM 5

6. Remove the four mounting bolts (1) and move the drive yoke (2) forward away from the drive shaft.



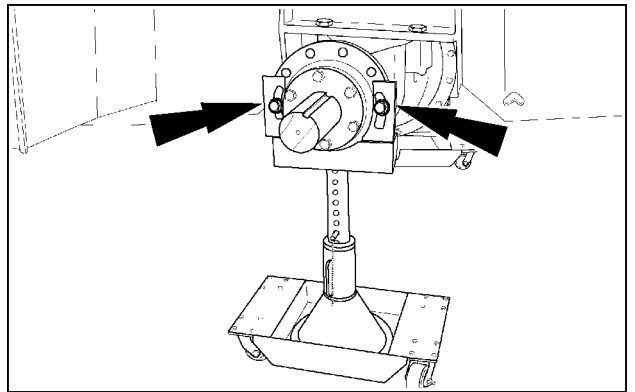
RCPH10FWD608AAJ 6

15. Remove the wheel bolts. Use a wheel/axle lift to remove the front wheels from the tractor.



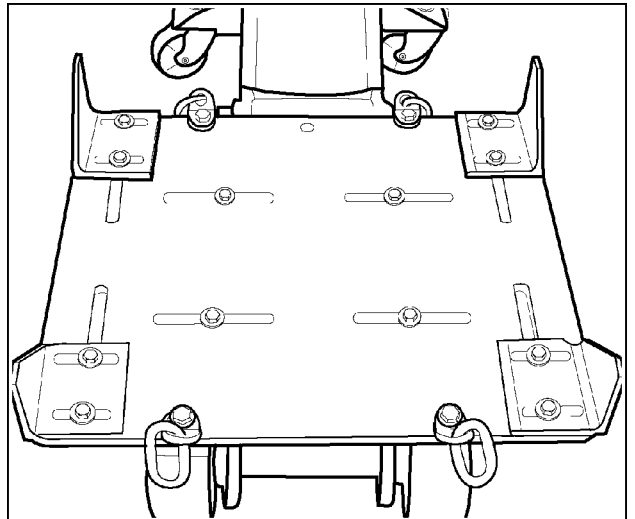
RCPH10FWD623AAJ 7

16. Use two of the wheel bolts with washers to install the **1027004** jack stand adapter post and dolly cart to each wheel hub as shown. Do not tighten the two attaching bolts at this time.



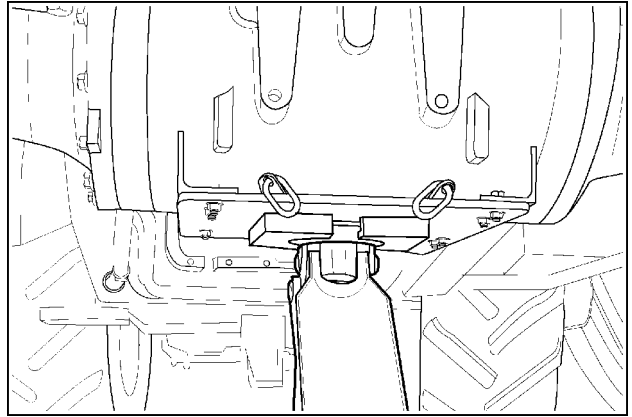
RCPH10FWD624AAJ 8

17. Install the **CAS2694** axle lifting adapter plate to the 20 ton floor jack. Be sure the plate is centered and bolted securely on the jack pad.



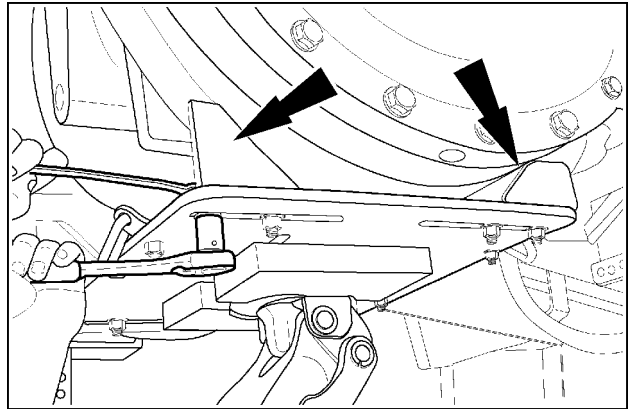
RCPH10FWD625AAJ 9

18. Center the floor jack and adapter plate under the center of the main axle housing. Raise the adapter plate until it touches the axle housing.



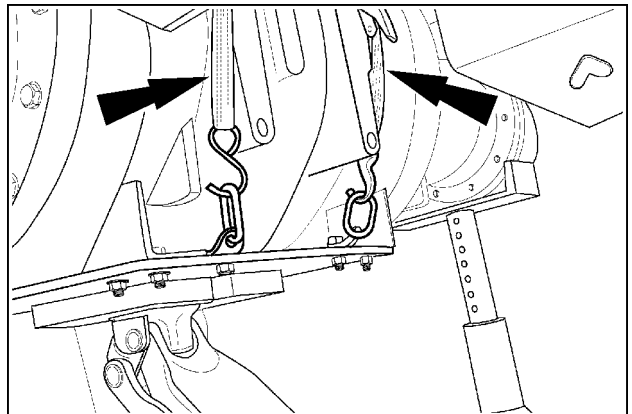
RCPH10FWD626AAJ 10

19. Position the four angle brackets against the axle housing and tighten the bolts. Raise the jack to take up the weight of the axle.



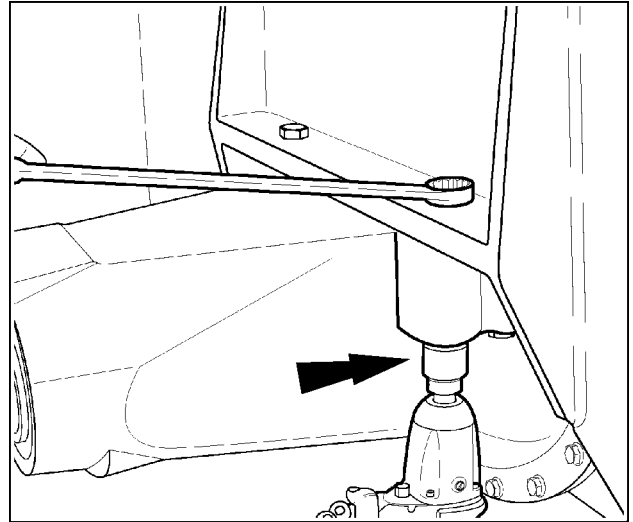
RCPH10FWD627AAJ 11

20. Install the two straps over the axle center housing. Fasten and tighten both straps.



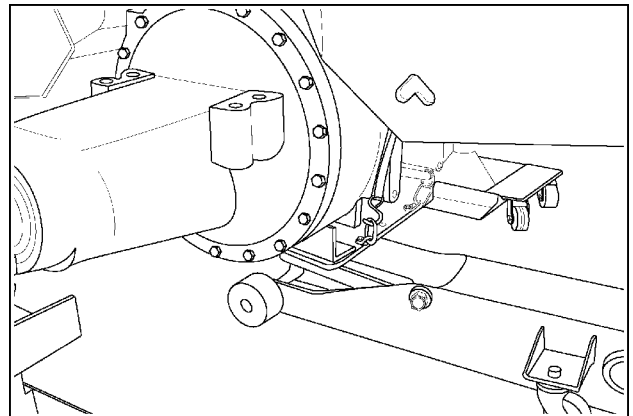
RCPH10FWD628AAJ 12

21. Loosen and remove the four axle mounting bolts and nuts from both sides of the tractor.



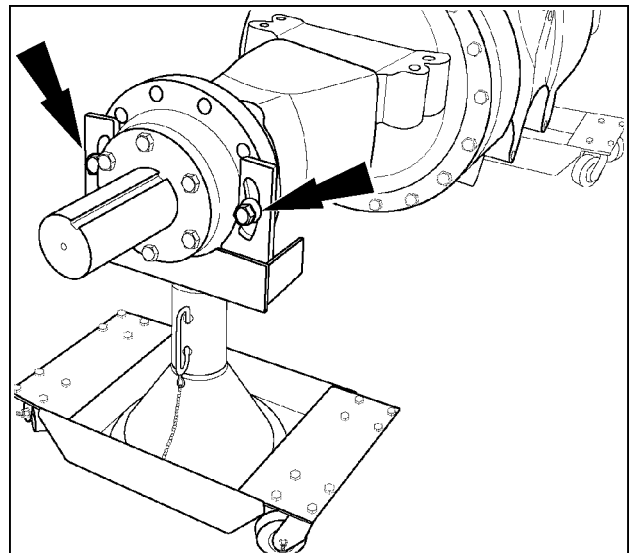
RCPH10FWD629AAJ 13

22. Slowly and carefully lower the axle until it rests securely on the lowest position of the two support stands.



RCPH10FWD630AAJ 14

23. Tighten the two bolts securing the brackets to each wheel hub to secure the axle assembly in position.

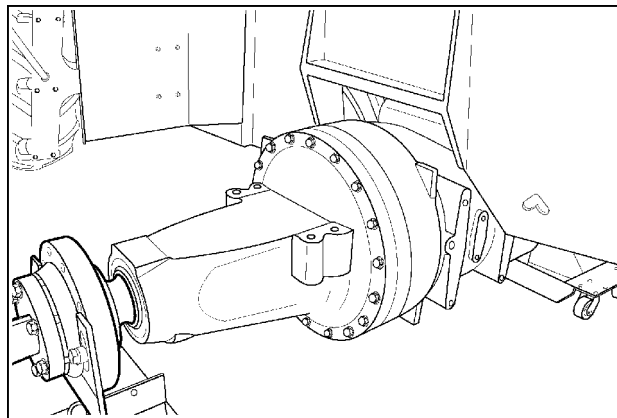


RCPH10FWD631AAJ 15

24. Loosen and remove the two straps. Lower and remove the floor jack.

25. Carefully remove the axle by rolling it out from under the left hand or right hand side of the tractor.

NOTE: Always keep the dolly carts positioned with the widest part of the cart perpendicular to the axle.

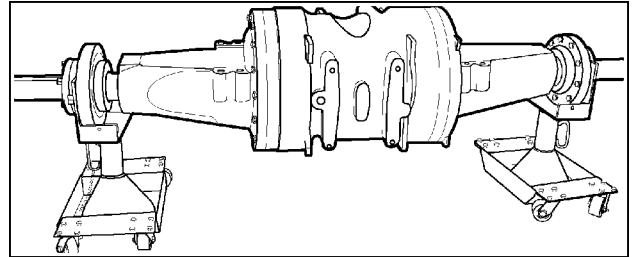


RCPH10FWD632AAJ 16

Powered front axle - Install - High power frame wheeled tractors

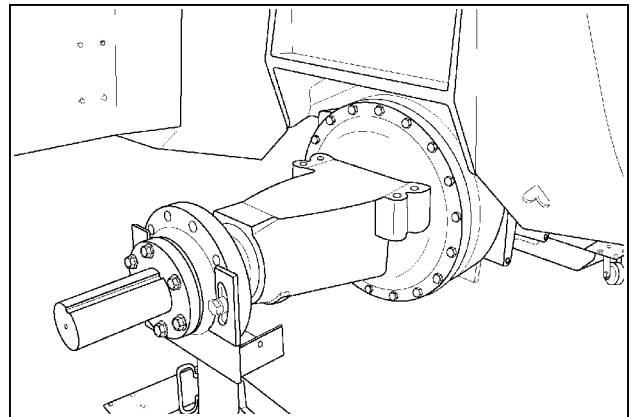
Steiger® 540	NA
Steiger® 580	NA
Steiger® 620	NA

1. Place and secure the axle assembly on the support stands and dolly cart.



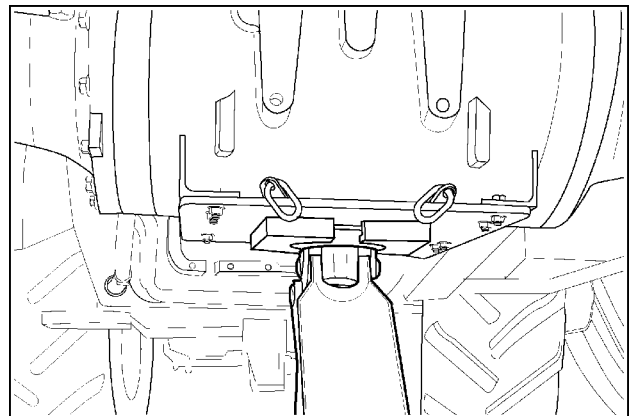
RCPH10FWD633AAJ 1

2. Roll the axle assembly into position under the tractor.



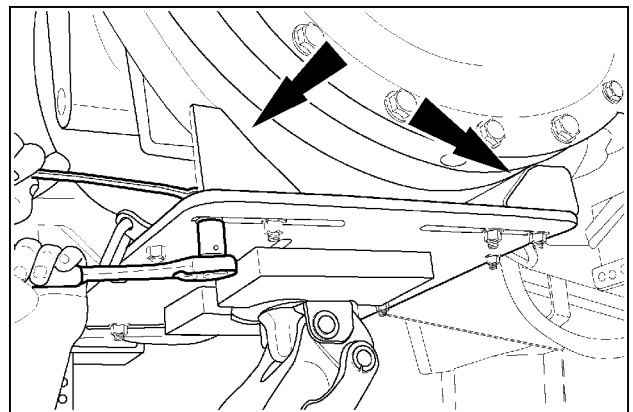
RCPH10FWD634AAJ 2

3. Center the floor jack and **CAS2694** adapter plate under the center of the main axle housing. Raise the adapter plate until it touches the axle housing.



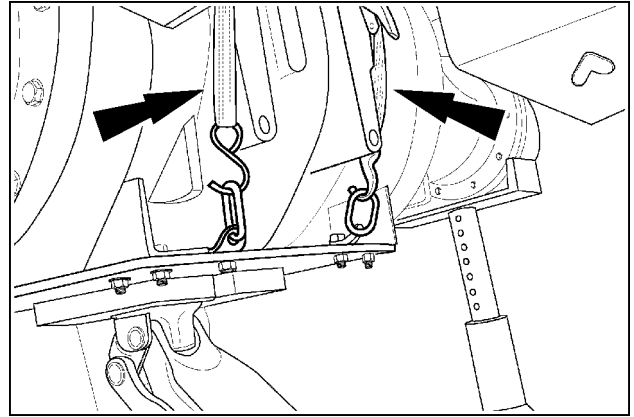
RCPH10FWD626AAJ 3

4. Position the four angle brackets against the axle housing and tighten the bolts. Raise the jack to take up the weight of the axle assembly.



RCPH10FWD627AAJ 4

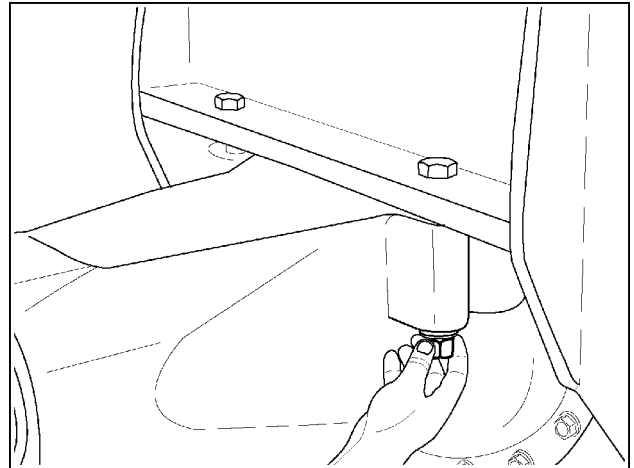
5. Install the two straps over the axle center housing. Fasten and tighten both straps.



RCPH10FWD628AAJ 5

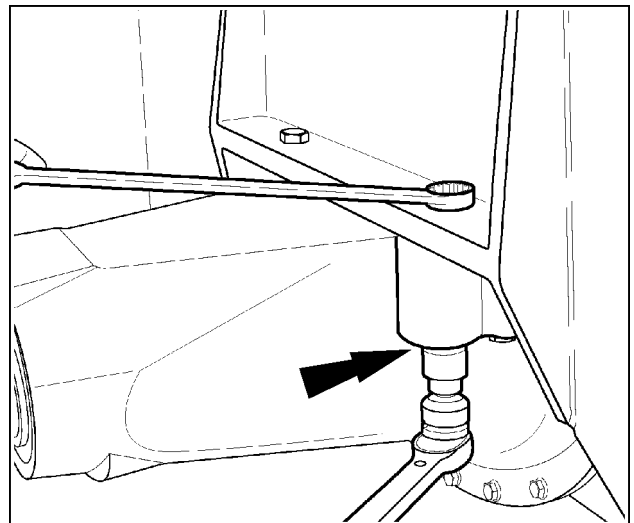
6. Raise and align the axle into position on the mounting pads. Install the axle mounting bolts.

NOTE: Apply a light coat of engine oil on the threads of each bolt.



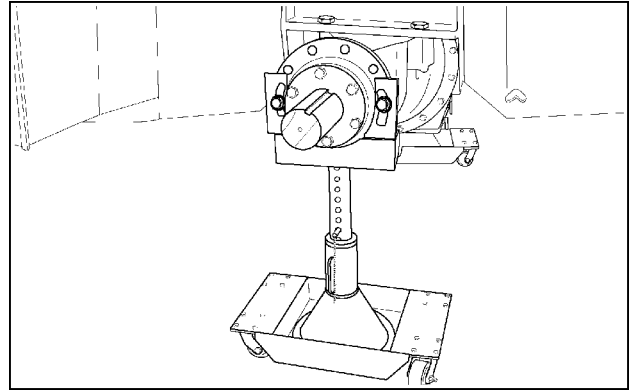
RCPH10FWD635AAJ 6

7. Tighten all axle mounting bolts to the specified torque.



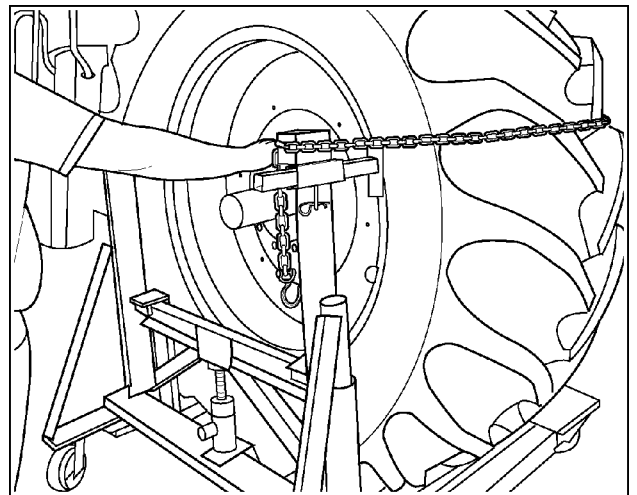
RCPH10FWD636AAJ 7

8. Remove the support stand and dolly cart from the axle hubs.



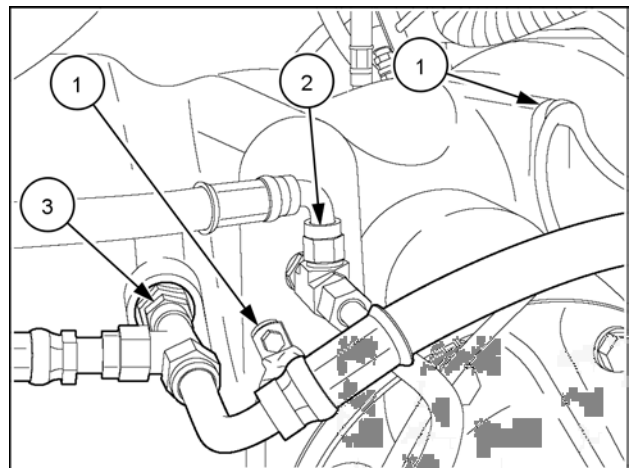
RCPH10FWD624AAJ 8

9. Loosen and remove the two straps, lower and remove the floor jack.
10. Use a wheel and axle lift to install the wheels and wheel bolts. Tighten wheel hub bolts to the specified torque.



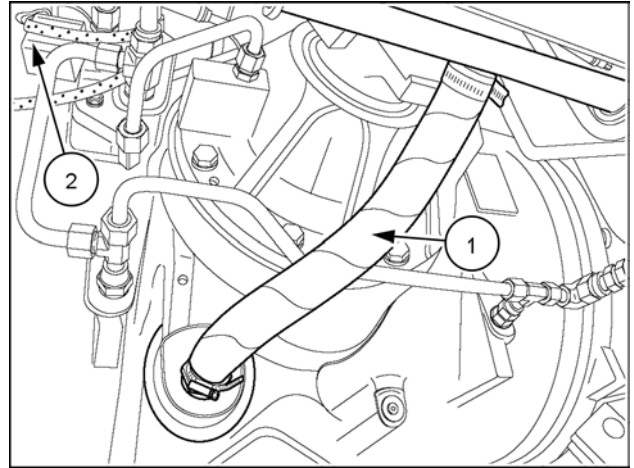
RCPH10FWD623AAJ 9

12. Lower the tractor to the floor. Remove the jacks.
13. Install the wire harness mounting bolts (1). Install park brake hose (2) and service brake tee (3).



RCPH11FWD121BAM 10

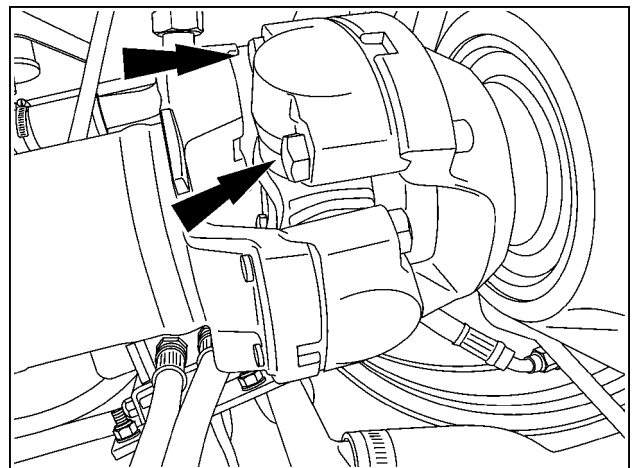
14. Install return hose (1) on to axle. If equipped, install the wire harness connector from the differential lock solenoid coil (2) onto the solenoid.



RCPH11FWD119BAM 11

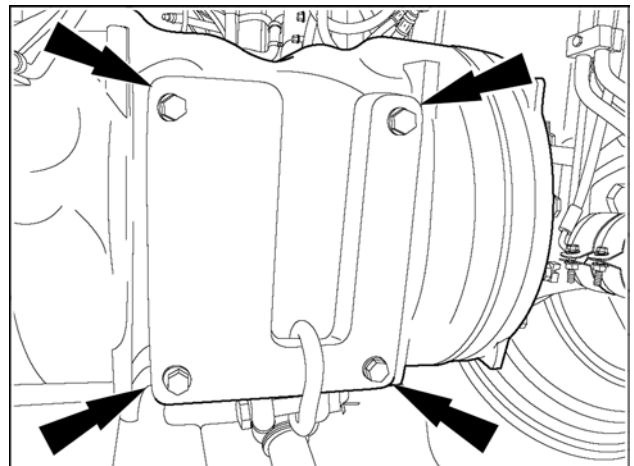
22. Install the drive shaft and four attaching bolts. Tighten the bolts to the specified torque.

NOTE: If the drive shaft yokes do not align when installing the driveshaft, raise one wheel off the surface. Use the tow valve to pressurize and release the park brake so that the pinion drive yoke can be turned for alignment with the drive shaft.



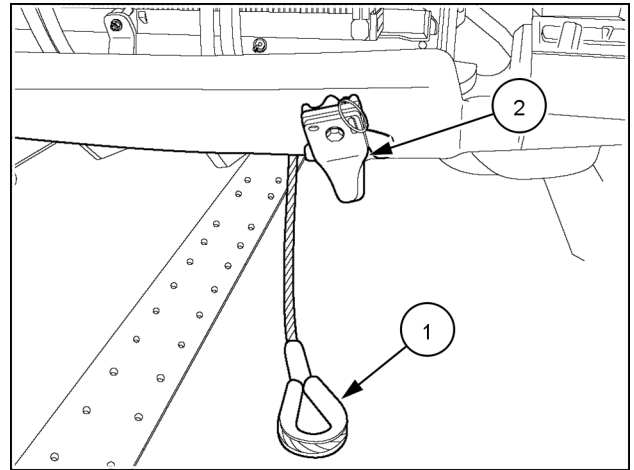
RCPH10FWD608AAJ 12

23. Install the tow cable plate (if equipped) on the front axle with the four mounting bolts.



RCPH11FWD154BAM 13

1. Place the tow ring (1) (if equipped) into tow cable mount (2).

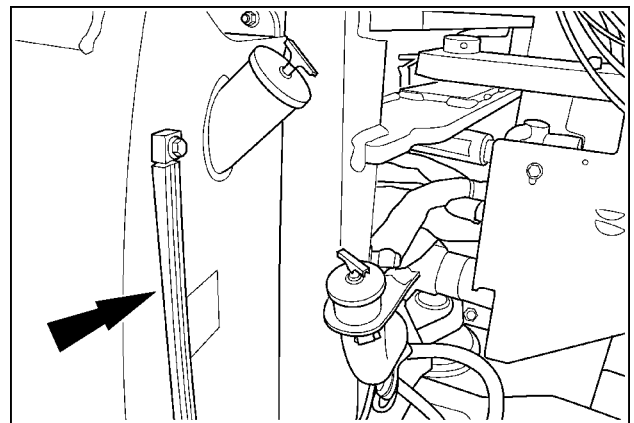


RCPH11FWD124BAM 14

25. If necessary, change the hydraulic and axle cooling system oil filters. Fill the hydraulic tank to the full mark on the sight gauge. Start the engine to fill the axle housing with oil. Run the engine a short time and shut down to check the oil level in the hydraulic tank. Add oil as necessary to the tank to maintain the oil level within the operating range. Repeat this procedure until the oil level stabilizes in the operating range in the tank.

After the oil level has stabilized in the operating range, operate the park brake and differential lock switches on and off several times with the engine running to remove air from the system.

NOTE: This process may take up to 15 minutes to fill the axle and stabilize the hydraulic tank oil level.



RCPH10FWD639AAJ 15

Powered front axle - Remove - Quadtrac® tractors

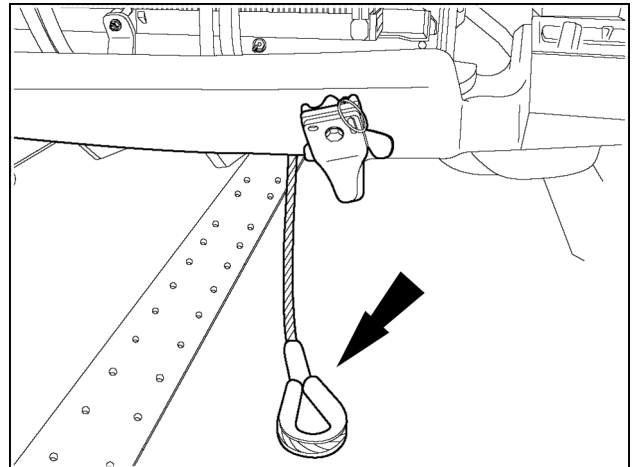
Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA
Steiger® 580 Quadtrac®	NA
Steiger® 620 Quadtrac®	NA

Park the tractor on a smooth and level concrete surface. Remove the switch key. Provide room to roll the axle out from the left hand or right hand side of the tractor.

Prior operation:

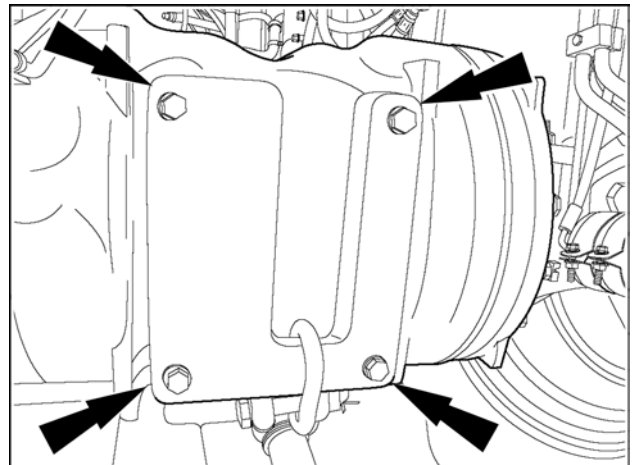
Frame - Raise - Tractor jacking points (39.100) Track frame - Remove - Quadtrac® models (48.130)

1. If equipped with a front tow cable, unhook the tow ring and set it on the ground.



RCPH11FWD124BAM 1

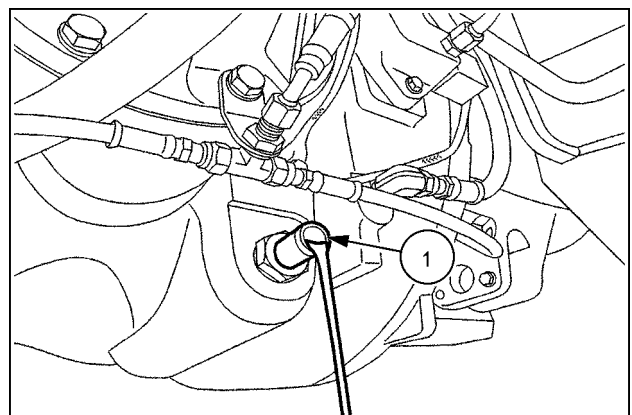
2. Support the tow cable plate (if equipped) on the front axle and remove the four mounting bolts. Lower the support plate to the ground.



RCPH11FWD154BAM 2

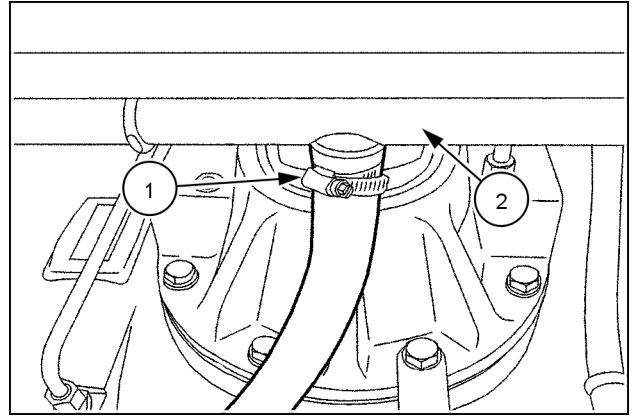
3. To drain the axle, very carefully remove the lube return hose from the axle lube return adapter (1). Use the hose on the adapter (1) as a valve to control the flow as the oil drains from the axle. When the flow is reduced to a controllable amount remove the hose from the adapter (1).

NOTE: The axle can contain up to 68 l (18 US gal) of oil.



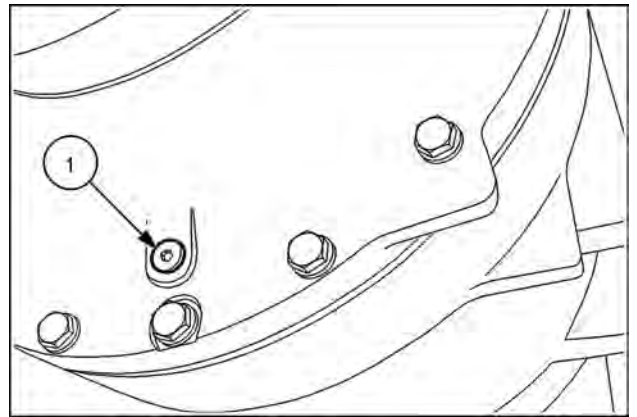
RCPH10FWD640AAJ 3

4. Remove the lube return hose (1) from the tractor hydraulic system return tube (2) .



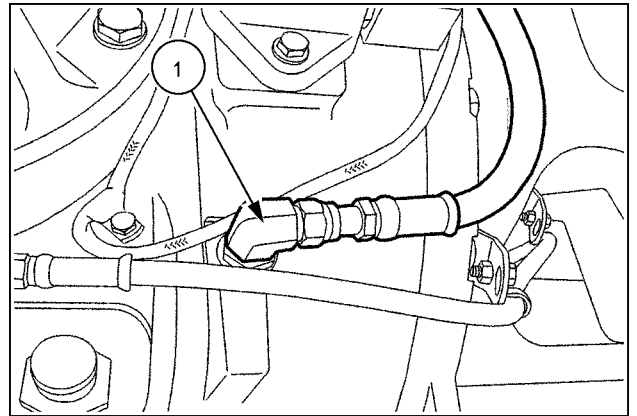
RCPH11FWD157AAM 4

5. Remove the drain plug (1) from the tear drop housing (both sides). Reinstall and tighten the plugs after the oil is drained.



RCPH10FWD642AAJ 5

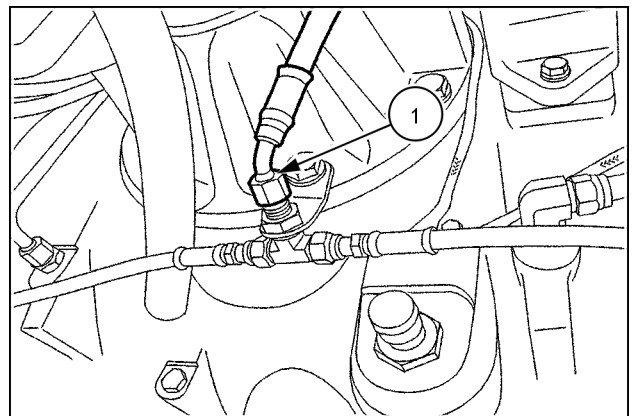
6. Loosen and remove the axle lube return hose (1) from the axle.



RCPH10FWD643AAJ 6

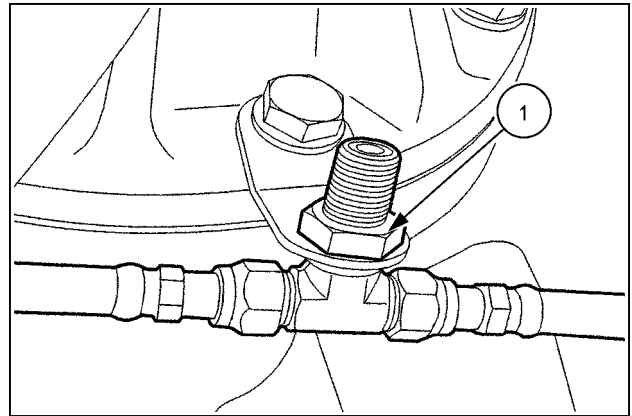
7. Loosen and remove the track tensioning supply hose (1) from the tee fitting.

NOTE: Install caps and plugs on all fittings.



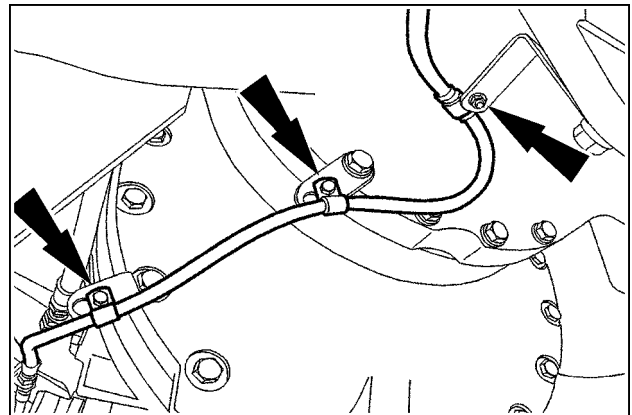
RCPH11FWD156AAM 7

8. Remove the bulkhead nut **(1)** from the track tensioning tee adapter.



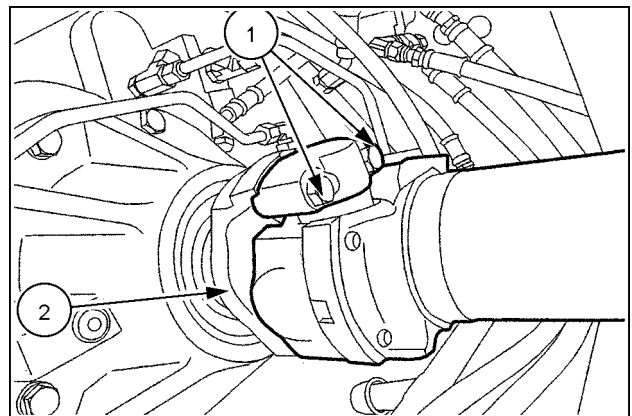
RCPH10FWD645AAJ 8

9. Remove the clamp bolts, nuts and washers from the right and left side track tension hoses. Remove the hose assembly from the tractor.



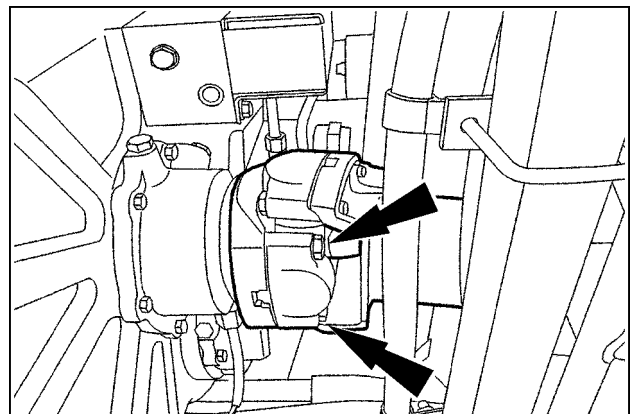
RCPH10FWD646AAJ 9

10. Loosen and remove the four bolts **(1)** from the drive-shaft cross bearing caps. Move the pinion input shaft slip yoke **(2)** away from the driveshaft.



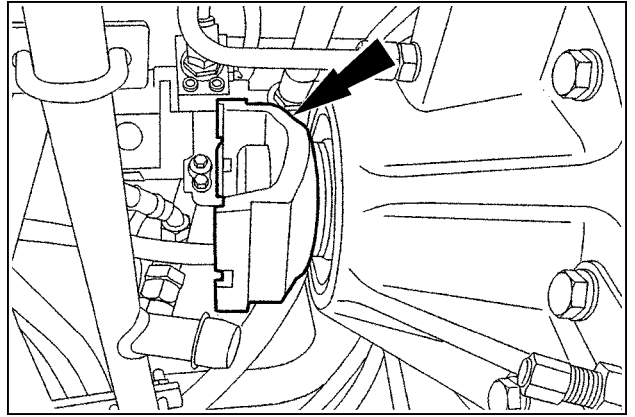
RCPH10FWD647AAJ 10

11. Remove the four bolts from the driveshaft to transmission yoke. Remove the driveshaft from the tractor.



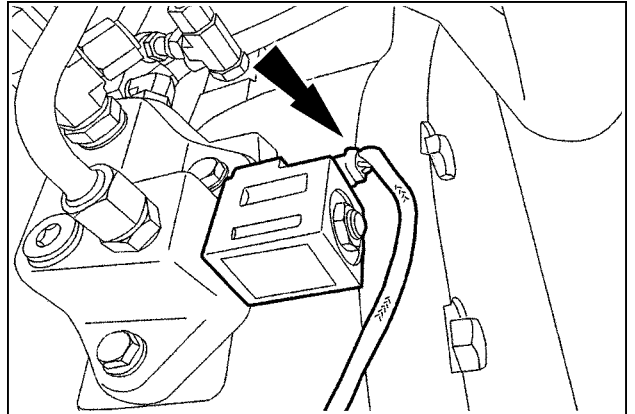
RCPH10FWD648AAJ 11

12. Remove the slip yoke from the axle.



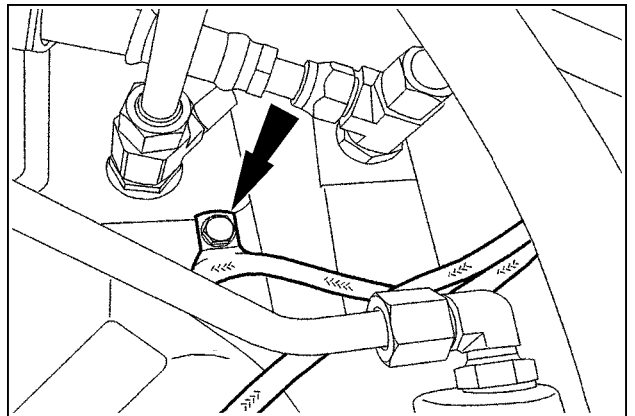
RCPH10FWD649AAJ 12

13. If equipped, remove the wire harness connector from the differential lock solenoid coil.



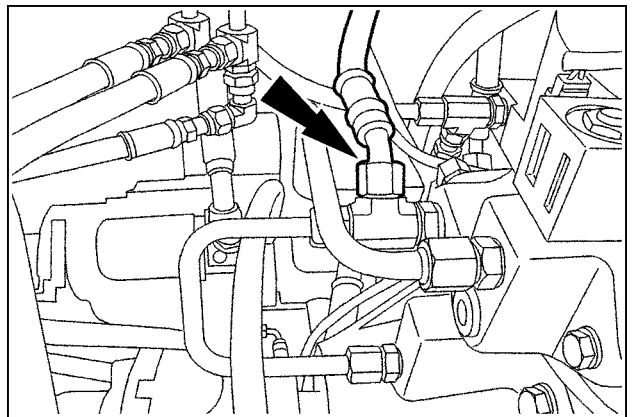
RCPH10FWD650AAJ 13

14. Remove the differential lock wire harness mounting bolts .



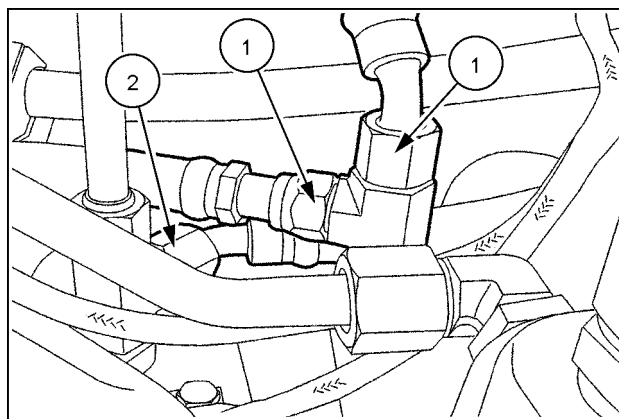
RCPH10FWD651AAJ 14

15. Loosen and remove the axle lube supply hose.



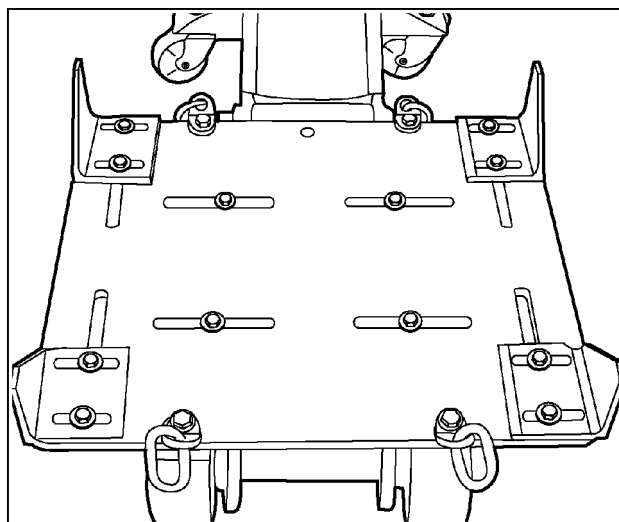
RCPH10FWD653AAJ 15

16. Remove the two service brake hoses (1) and the park brake hose (2).



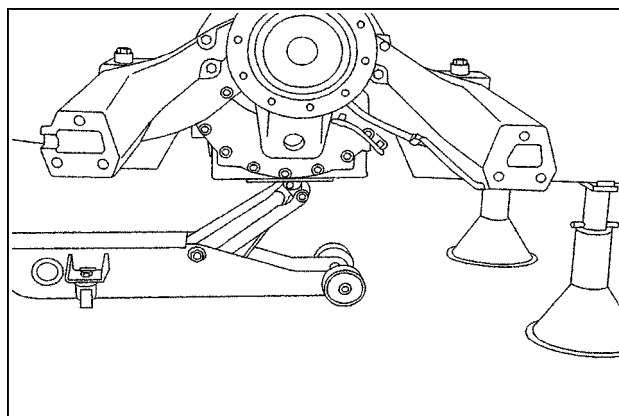
RCPH10FWD654AAJ 16

17. Install the **CAS2694** axle lifting adapter plate to the 20 ton floor jack. Be sure the plate is centered and bolted securely on the jack pad.



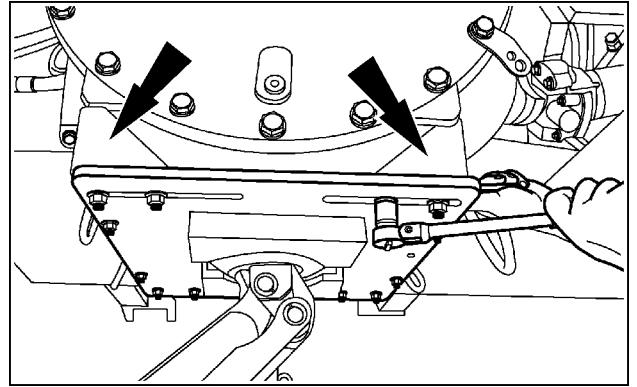
RCPH10FWD663AAJ 17

18. Center the floor jack and adapter plate under the center of the main axle housing. Raise the adapter plate until it touches the axle housing.



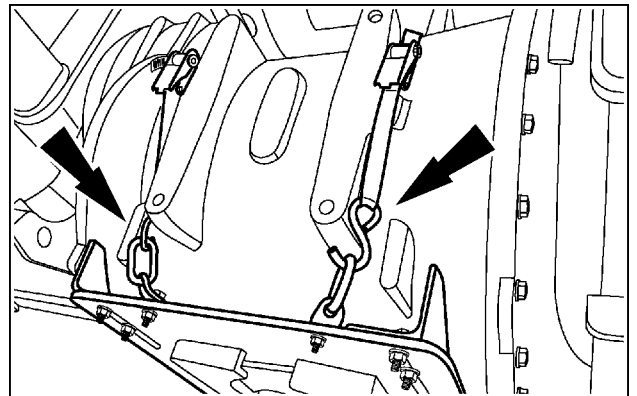
RCPH10FWD664AAJ 18

19. Position the four angle brackets against the axle housing and hand tighten the bolts. Raise the jack to take up the weight of the axle.



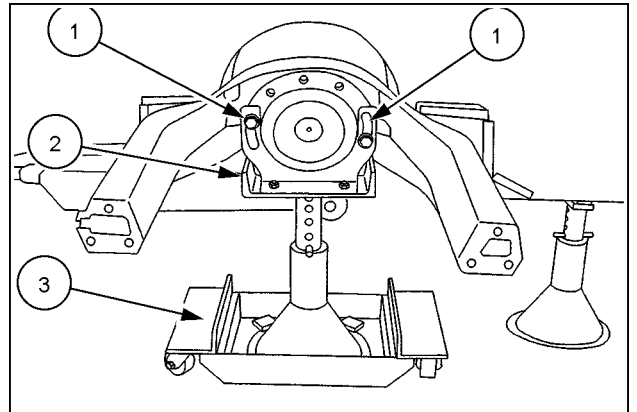
RCPH10FWD665AAJ 19

20. Install the two straps over the axle center housing, fasten and tighten both straps.



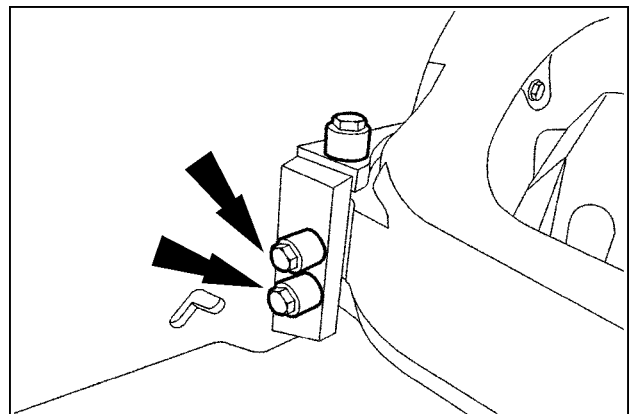
RCPH10FWD666AAJ 20

21. Use two of the wheel bolts (1) with washers to install the **CAS2695** jack stand adapter post (2) and dolly cart (3) to each wheel hub as shown. Do not tighten the two attaching bolts (1) at this time.



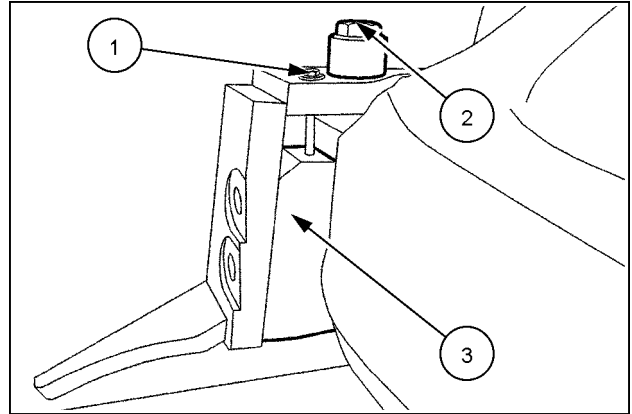
RCPH10FWD667AAJ 21

22. Loosen and remove the four front and four rear yoke mounting bolts from both sides of the tractor.



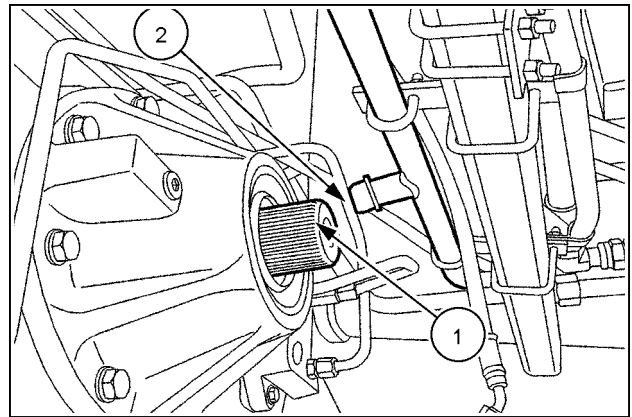
RCPH10FWD668AAJ 22

23. Loosen the wedge tensioning bolt (1) . Loosen the two top yoke mounting bolts (2) on both sides of the tractor to lower the axle until the wedge (3) is loose. Remove the tensioning bolt (1) and wedge. Support the axle with the floor jack and remove the remaining yoke mounting bolts.

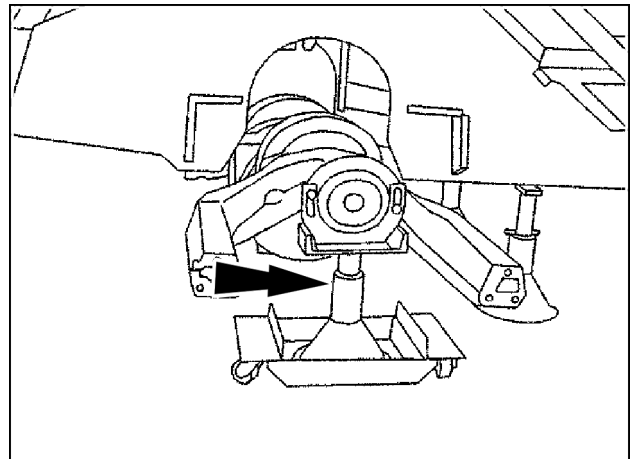


24. Use the floor jack to carefully lower the axle. The axle must be moved slightly forward as it is lowered to allow the pinion input shaft (1) to clear the lube return tube (2).

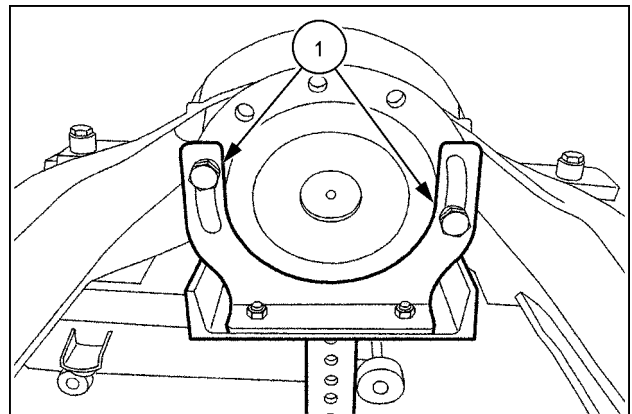
NOTICE: Be sure the axle is lowered evenly from the right and left side of the frame. If the axle starts to tilt when lowering, lift the axle to the frame, reinstall the six mounting bolts and reposition the floor jack and or the **CAS2694** axle lifting adapter plate.



25. Slowly and carefully lower the axle until it rests securely on the lowest position of the two support stands.

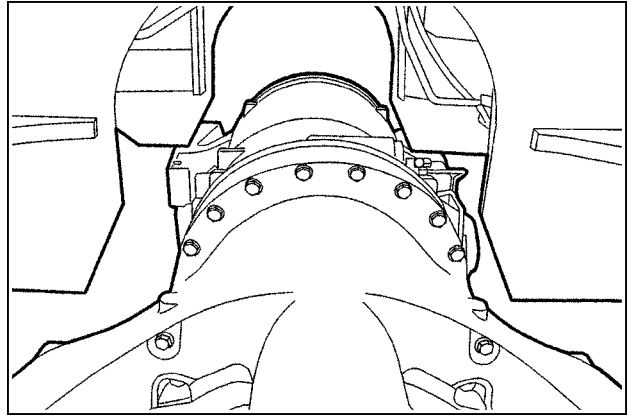


26. Tighten the two bolts (1) on the jack stand adapter plate.



30. Use the floor jack to lift the frame until the axle will clear the frame. Carefully remove the axle by rolling it out from under the left hand or right hand side of the tractor.

NOTE: Always keep the dolly carts positioned with the widest part of the cart perpendicular to the axle.

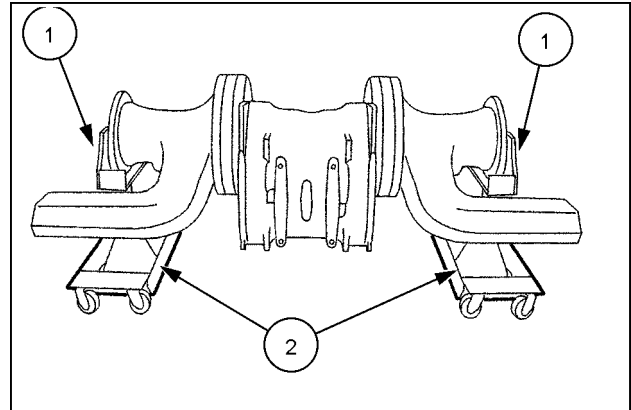


RCPH10FWD673AAJ 27

Powered front axle - Install - Quadtrac® tractors

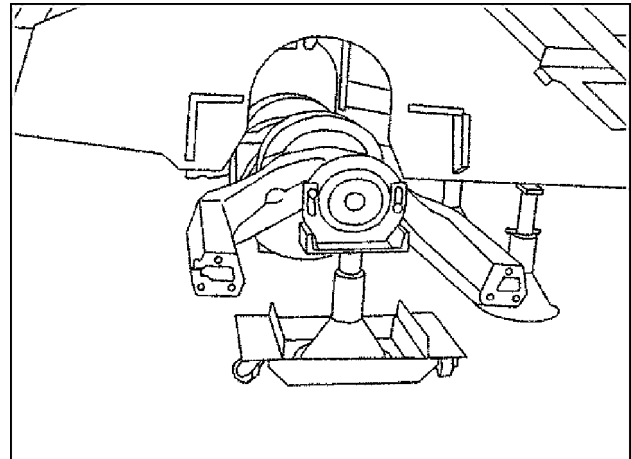
Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA
Steiger® 580 Quadtrac®	NA
Steiger® 620 Quadtrac®	NA

1. Place and secure the axle assembly and undercarriage yokes on the support stands (1) and dolly cart (2).



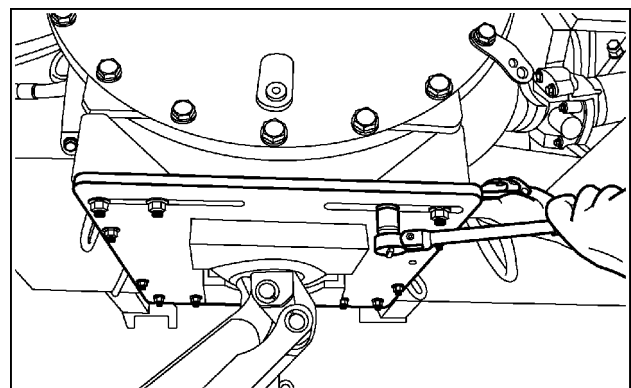
RCPH10FWD674AAJ 1

2. Roll the axle assembly into position under the tractor.



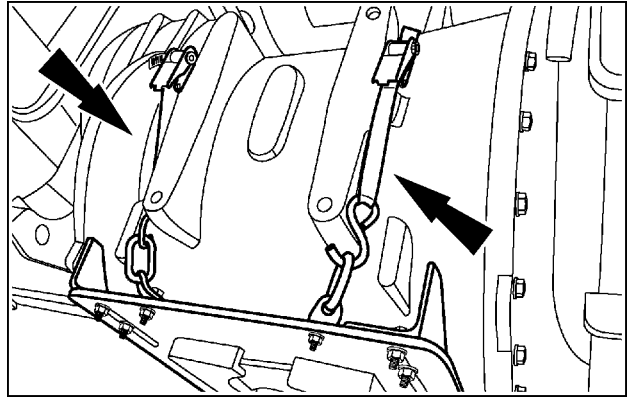
RCPH11FWD155BAM 2

3. Center the floor jack and **CAS2694** adapter plate under the center of the main axle housing. Raise the adapter plate until it touches the axle housing. Position the four angle brackets against the axle housing and tighten the bolts. Raise the jack to take up the weight of the axle assembly.



RCPH10FWD665AAJ 3

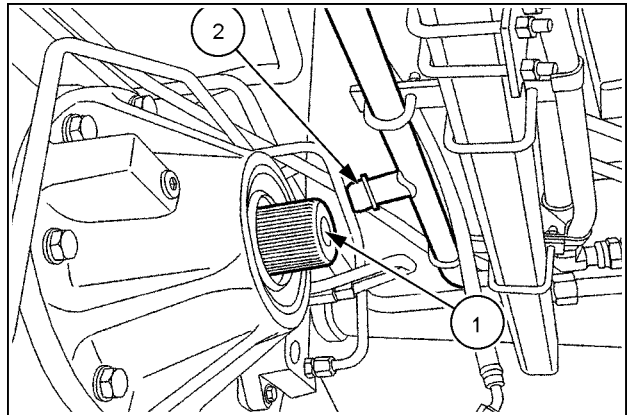
4. Install the two straps over the axle center housing. Fasten and tighten both straps.



RCPH10FWD666AAJ 4

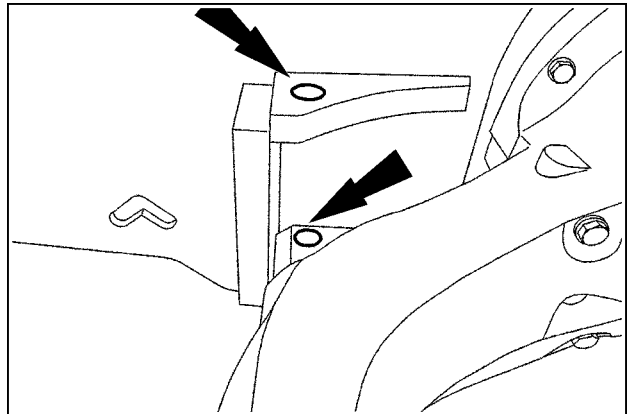
5. Use the floor jack to raise the axle into the front frame.

NOTE: Be careful that the pinion input shaft (1) does not contact the lube return tube (2).



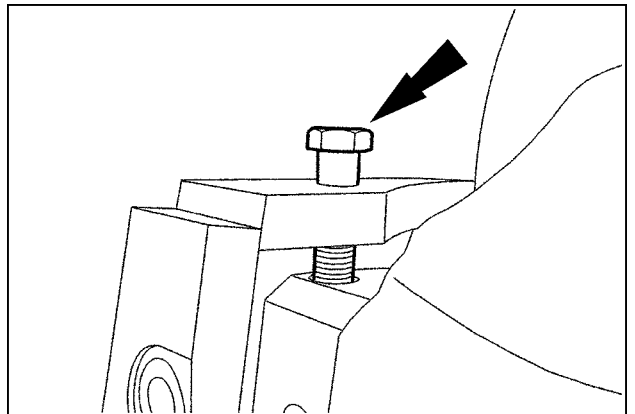
RCPH10FWD670AAJ 5

6. Align the top forward mounting holes as the axle is raised.



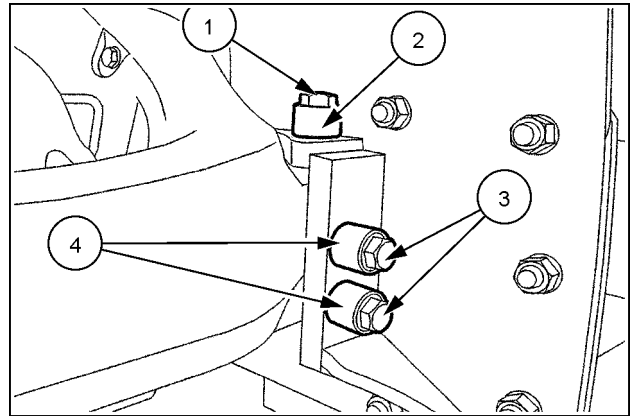
RCPH10FWD675AAJ 6

7. When the axle is close to the frame mount install the top two right and left side mounting bolts without the spacers. The bolts will guide the axle into the final mounting position.



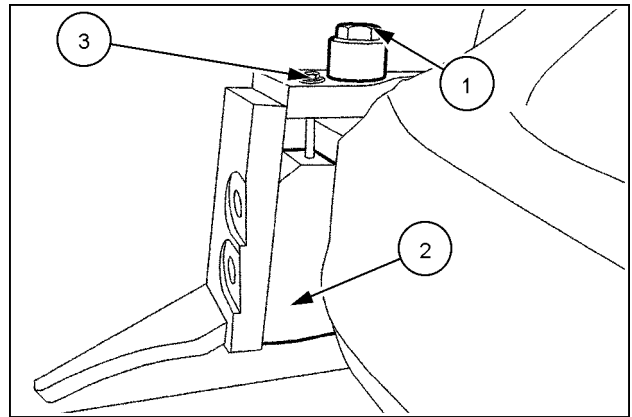
RCPH10FWD676AAJ 7

8. When the axle is completely seated in the frame, remove the four top bolts (1) and install the alignment spacers (2) and bolts (1). Install the two left and right side mounting bolts (3) and alignment washers (4). Tighten the right and left side rear mounting bolts to specifications.



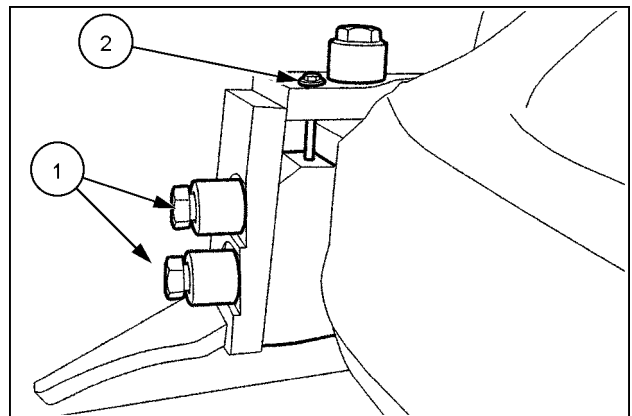
RCPH10FWD677AAJ 8

9. Tighten the right and left side top front bolts (1) to specifications. Install the right and left side wedge blocks (2), bolts (3) and washers.



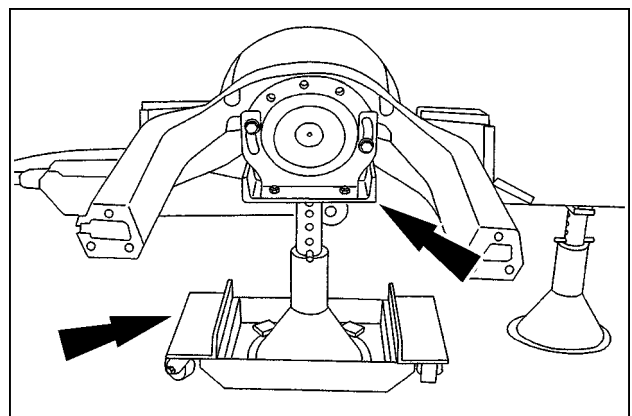
RCPH10FWD669AAJ 9

10. Install the right and left side front mounting bolts (1) and alignment spacers. Tighten the wedge bolt (2) to specifications. Tighten the front mounting bolts (1) to specifications.



RCPH10FWD678AAJ 10

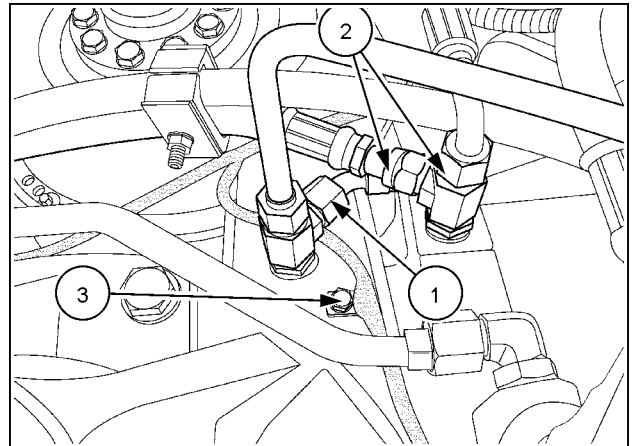
11. Remove the support stand and dolly cart from the axle hubs.



RCPH10FWD667AAJ 11

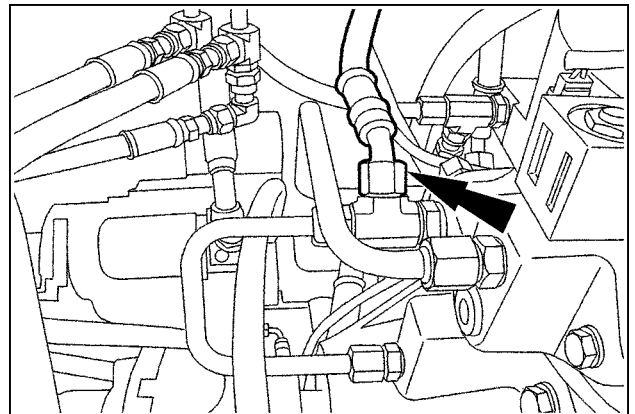
12. Loosen and remove the two straps, lower and remove the floor jack.
13. Install the park brake hose (1) and the two service brake hoses (2). Install the differential lock wire harness mounting bolt (3)

NOTE: Replace all O-rings on all fittings before installing hoses.



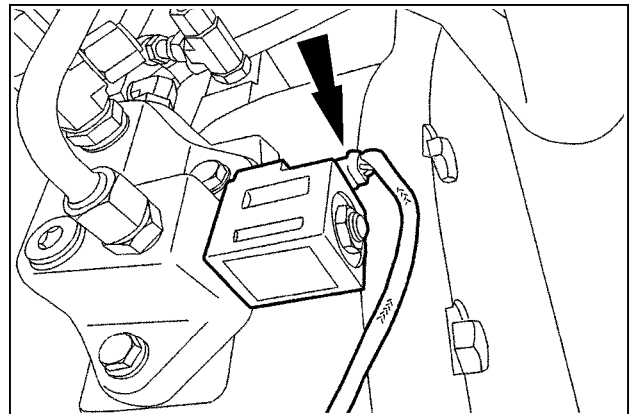
RCPH10FWD679AAJ 12

14. Install the axle lube supply hose.



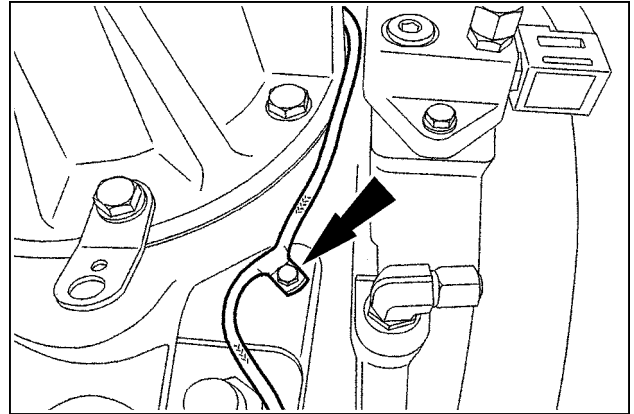
RCPH10FWD653AAJ 13

15. If equipped, install the differential lock wire harness on the solenoid coil.



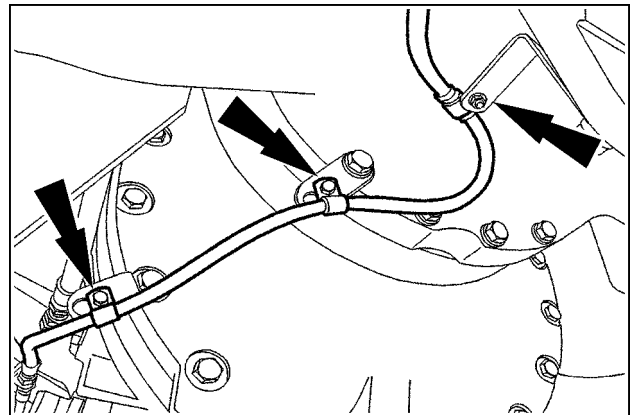
RCPH10FWD650AAJ 14

16. Install the mounting bolt in the differential lock wire harness clamp.



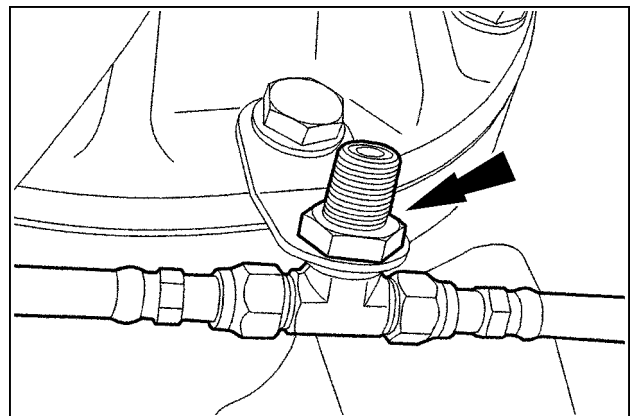
RCPH10FWD652AAJ 15

17. Install the track tension hose assembly on the mounting brackets on both the right and left sides of the axle.



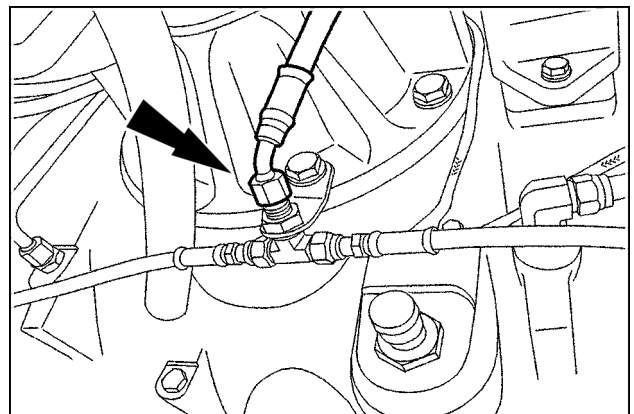
RCPH10FWD646AAJ 16

18. Install the nut on the track tension bulkhead tee adapter.



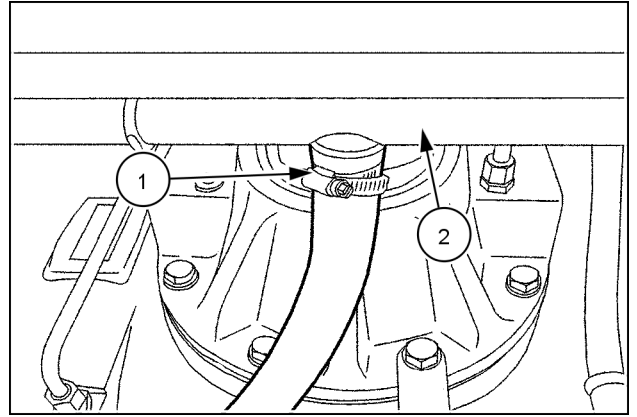
RCPH10FWD645AAJ 17

19. Install the track tensioning supply hose on the tee adapter.



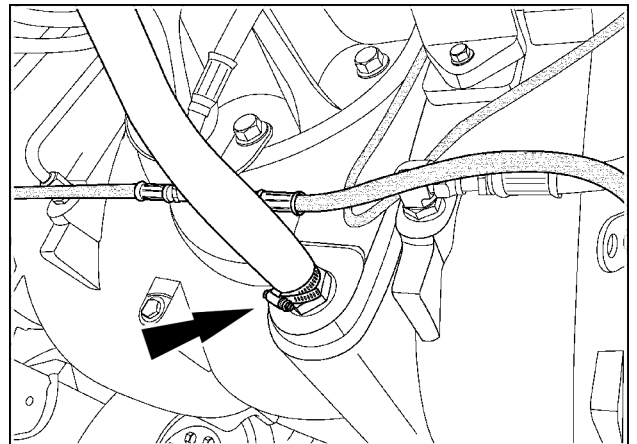
RCPH11FWD156AAM 18

20. Install the lube return hose (1) on the return tube (2).



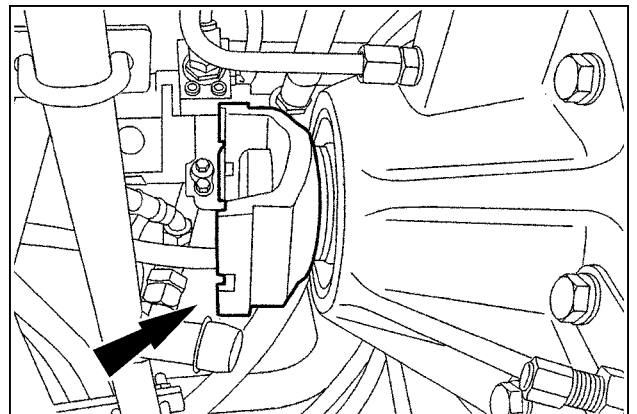
RCPH11FWD157AAM 19

21. Install the lube return line and tighten the hose clamp.



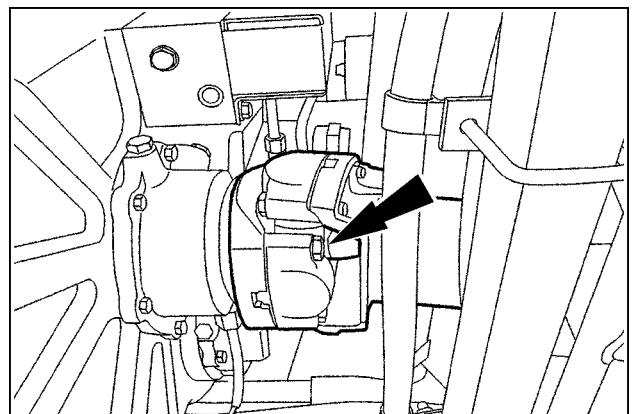
RCPH11FWD158AAM 20

22. Install the slip yoke on the pinion input shaft.



RCPH10FWD649AAJ 21

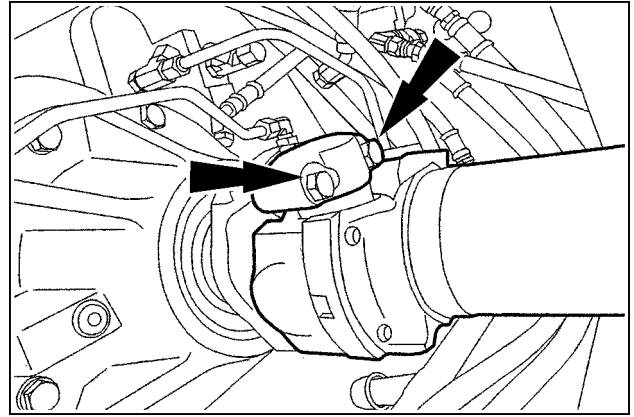
23. Install the front axle drive shaft on the transmission.
Tighten the four mounting bolts to specifications.



RCPH10FWD648AAJ 22

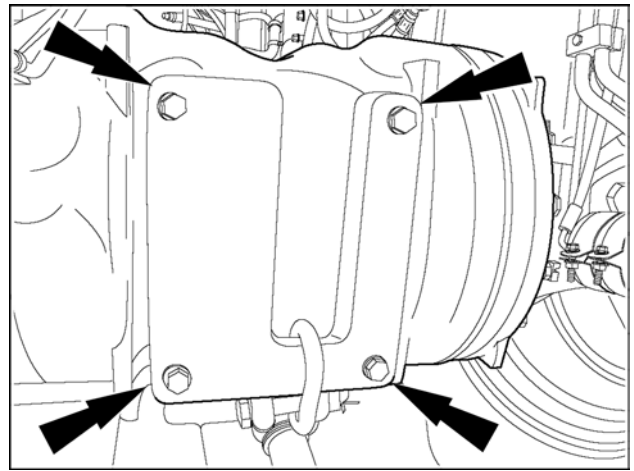
24. Install the drive shaft to the front axle. Tighten the four mounting bolts to specifications.

NOTE: If the drive shaft yokes do not align when installing the drive shaft, raise one track off the surface. Use the tow valve to pressurize and release the park brake so that the pinion drive yoke can be turned for alignment with the drive shaft.



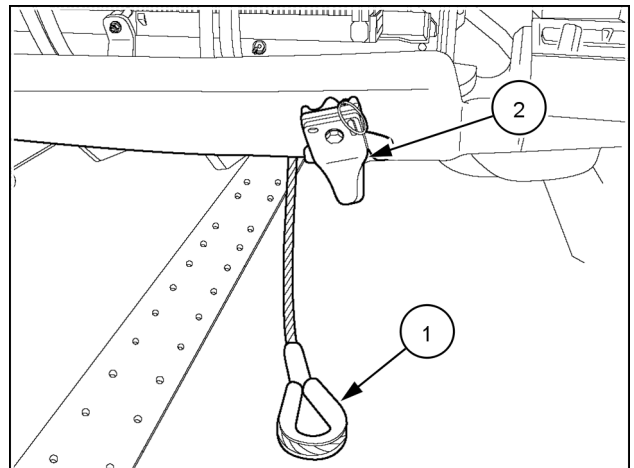
RCPH10FWD647AAJ 23

25. Install the tow cable plate (if equipped) on the front axle with the four mounting bolts.



RCPH11FWD154BAM 24

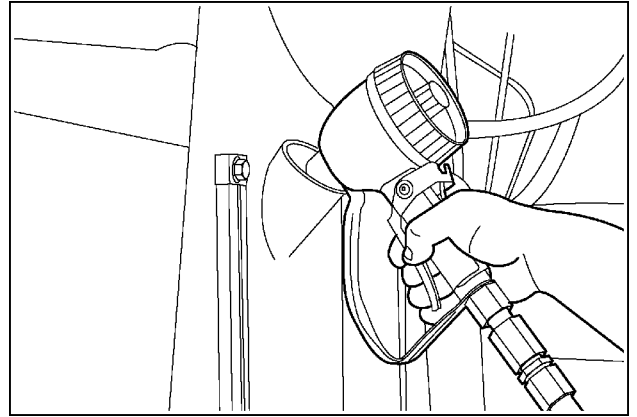
1. Place the tow ring (1) (if equipped) into tow cable mount (2).



RCPH11FWD124BAM 25

2. If necessary, clean the hydraulic tank, change the hydraulic and axle cooling system oil filters. Fill the hydraulic tank to the full mark on the sight gauge. Start the engine to fill the axle housing with oil. Run the engine a short time and shut down to check the oil level in the hydraulic tank. Add oil as necessary to the tank to maintain the oil level within the operating range. Repeat this procedure until the oil level stabilizes in the operating range in the tank. After the oil level has stabilized in the operating range, operate the park brake and differential lock switches on and off several times with the engine running to remove air from the system.

NOTE: This process may take up to 15 minutes to fill the axle and stabilize the hydraulic tank oil level.



RCPH10FWD681AAJ 26

Next operation:

Track frame - Install - Quadtrac® models (48.130)

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(*) See content for specific models



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TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Rowtrac™ CVT, TIER
4B [JEEZ00000FF314001 -], Steiger® 500 Rowtrac™ Powershift, TIER 4B
[JEEZ00000FF314001 -], Steiger® 540 CVT, TIER 4B [JEEZ00000FF314001 -
], Steiger® 540 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger®
540 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® CVT,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® CVT, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Powershift, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 620 Powershift, TIER
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Disassemble - 600 Series axles (*)	262
Assemble - 600 Series axles (*)	289
Disassemble - 600 Series Quadtrac® axles (*)	330
Assemble - 600 Series Quadtrac® axles (*)	355

Differential lock

Leakage test	394
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(*) See content for specific models

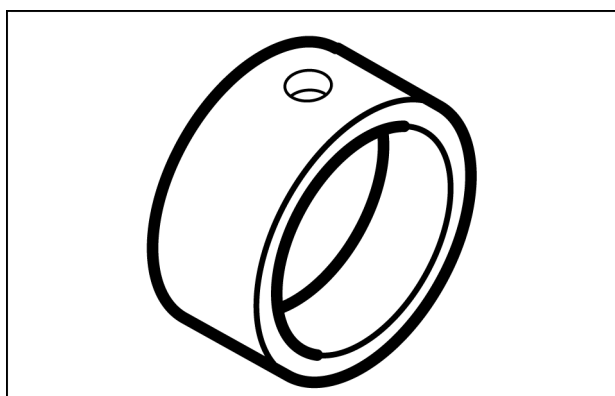
Differential - Torque - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

Item	Metric value	U.S. value
differential extension housing mounting bolts	284 – 298 N·m	209 – 220 lb ft
Pinion cover mounting bolts	284 – 298 N·m	209 – 220 lb ft
Differential case mounting bolts (ring gear)	285 – 319 N·m	210 – 235 lb ft
Left hand differential bearing carrier bolts	89 – 100 N·m	65 – 74 lb ft
Right hand brake carrier mounting bolts	146 – 165 N·m	108 – 122 lb ft
Brake retaining ring mounting bolts	89 – 100 N·m	65 – 74 lb ft
Differential pinion gear pin bolts	73 – 83 N·m	52 – 61 lb ft
Bevel pinion lube tube retaining clip bolt	27 – 35 N·m	20 – 26 lb ft
Bevel pinion yoke retaining bolt	377 – 677 N·m	278 – 499 lb ft
Port block retaining bolts	46 – 62 N·m	34 – 46 lb ft
Pinion lube tube nut	14 – 15.5 N·m	10 – 11 lb ft
Tube assembly nuts, upbox lube return	70 – 77 N·m	52 – 57 lb ft

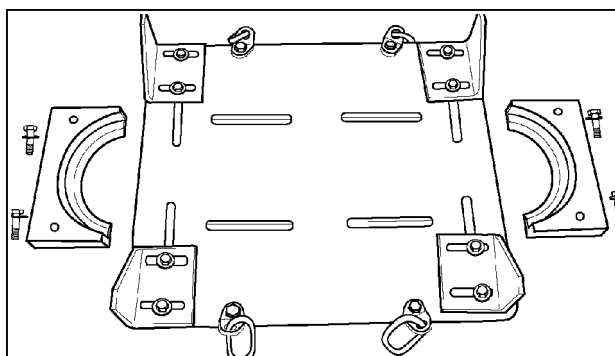
Differential - Special tools - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA



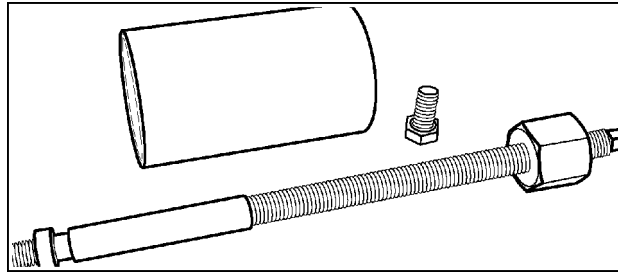
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CAS2508 Rolling torque adapter



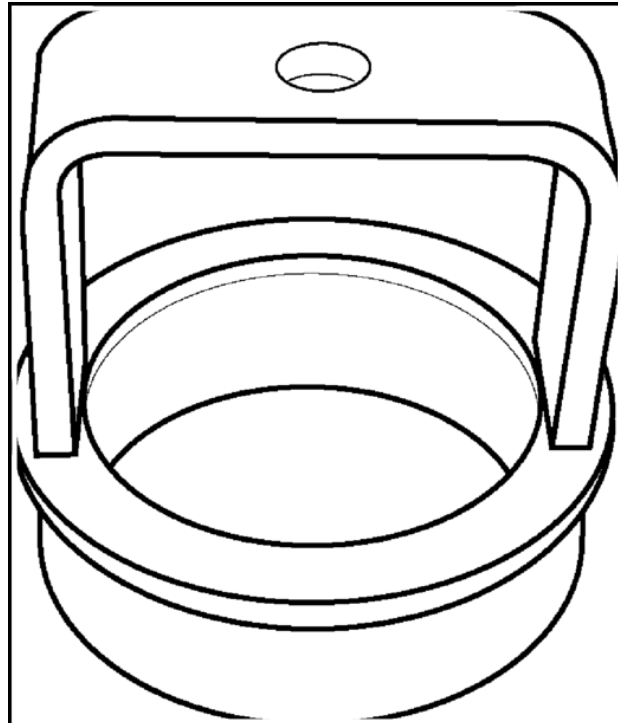
2

CNH299022 Axle handler adapter



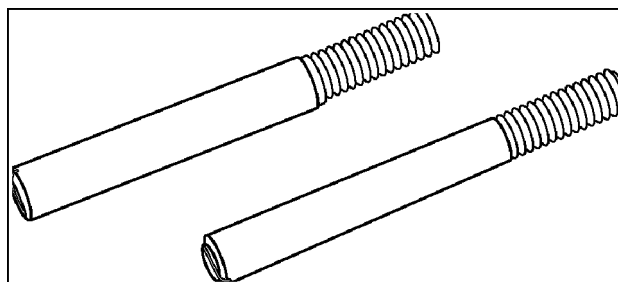
3

CNH299024 Axle shaft/pinion bearing cone installer



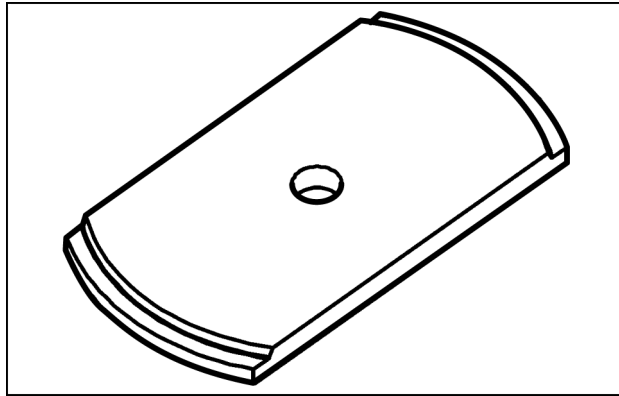
4

CNH299043 Pinion seal installer



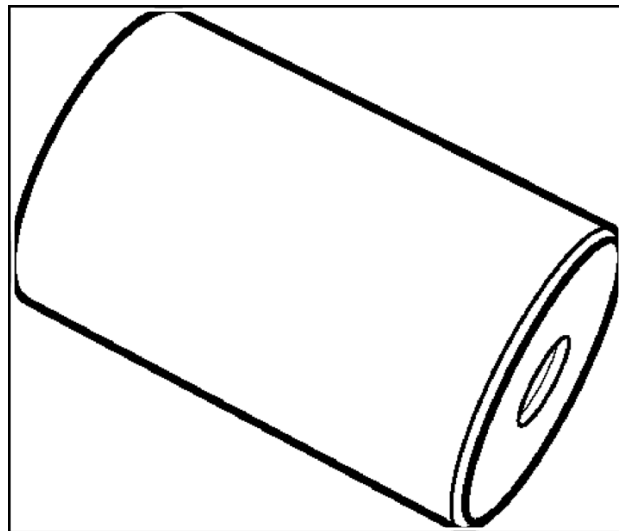
5

CNH299044 Brake assembly alignment stud set



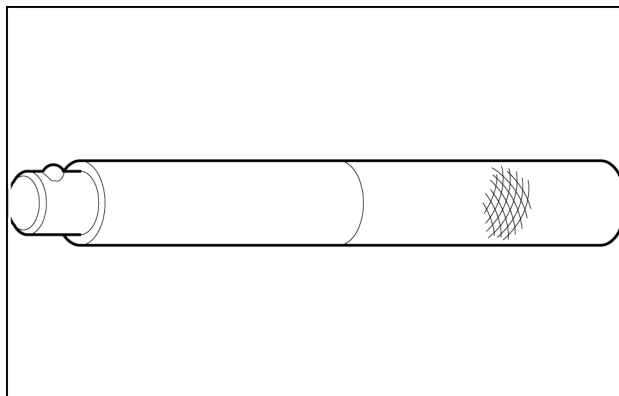
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CNH299050 Bearing cup installer



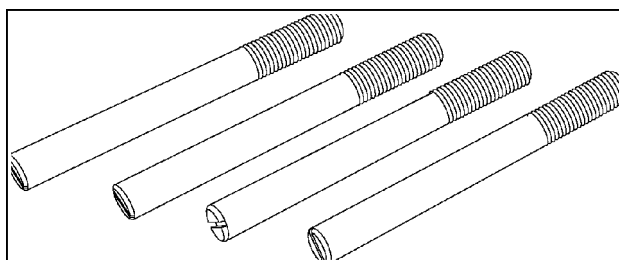
7

CNH299076 Pinion gauge block



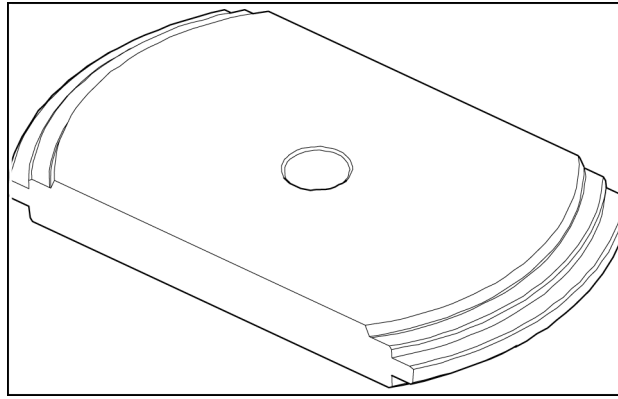
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CNH299077 Driver handle



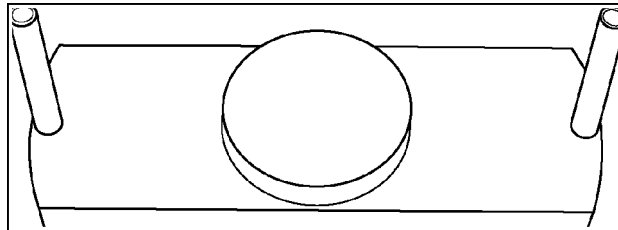
9

CNH299082 Alignment stud set



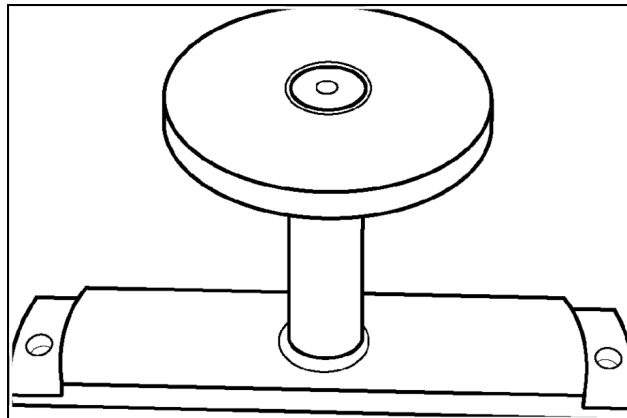
10

CNH299083 Bearing cup installer



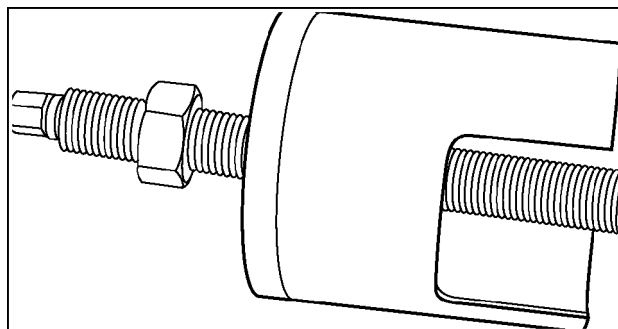
11

CNH299087 Brake spline aligner



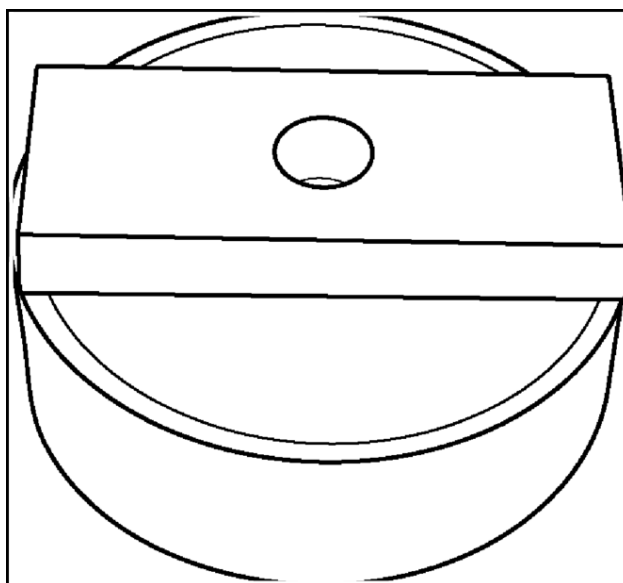
12

CNH299088 Pinion depth gauge arbor



13

CNH299091 Pinion bearing preload compressor



14

CNH299093 Internal ring gear bearing installer

Differential - General specification - 400 Series axles

Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

Axle specifications

Item	Metric value	U.S. value
Axle dry weight (approximate)	1502 kg	3206 lb
Axle bar length	3035 mm	120 in
Bar diameter: 425 series axles	127 mm	5.0 in
Overall reduction ratio	25.4:1	25.4:1
Bevel pinion bearing preload (rolling)	6 – 20 N·m	55 – 180 lb in
Differential bearing preload (rolling)	6 – 13 N·m	55 – 120 lb in
Axle shaft bearing preload (rolling)	20 – 27 N·m	180 – 240 lb in
Bevel ring/pinion gear backlash	0.2 – 0.3 mm	.008 – .012 in
Drive yoke to pinion shaft end clearance	0.1 – 0.2 mm	.005 – .007 in
Oil type	CASE IH AKCELA HY-TRAN® ULTRACTION	

Differential - General specification - 500 Series axles

Steiger® 500	NA
Steiger® 540	NA

Axle specifications

Item	Metric value	U.S. value
Axle dry weight (approximate)	1715 kg	3780 lb
Ring/pinion gear reduction	2.789:1	2.789:1
Final drive reduction	9.032:1	9.032:1
Overall reduction ratio	25.194:1	25.194:1
Bar diameter	115 mm	4.5 in
Bar length	3036 mm	120 in
Bevel pinion bearing preload (rolling)	6 – 20 N·m	55 – 120 lb in
Differential bearing preload (rolling)	6 – 13 N·m	55 – 120 lb in
Axle shaft bearing preload (rolling)	20 – 27 N·m	180 – 240 lb in
Bevel ring/pinion gear backlash	0.2 – 0.3 mm	.008 – .012 in

Item	Metric value	U.S. value
Drive yoke to pinion shaft end clearance	0.1 – 0.2 mm	.005 – .007 in
Oil type	CASE IH AKCELA NEXPLORE™ FLUID	

Differential - General specification - 500 Series Quadtrac® axles

Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA

Axle specifications

Item	Metric value	U.S. value
Axle dry weight (approximate)	4946 kg	2243 lb
Ring/pinion gear reduction	2.789:1	2.789:1
Final drive reduction	4.359:1	4.359:1
Overall reduction ratio	12.160:1	12.160:1
Offset bearing carrier rolling torque: total both gears	13 – 20 N·m	115 – 175 lb in
Offset bearing carrier rolling torque: single gear	6 – 8 N·m	50 – 75 lb in
Bevel pinion bearing preload (rolling)	6 – 20 N·m	55 – 180 lb in
Differential bearing preload (rolling)	6 – 13 N·m	55 – 120 lb in
Axle shaft bearing preload (rolling)	20 – 27 N·m	180 – 240 lb in
Bevel ring/pinion gear backlash	0.2 – 0.3 mm	.008 – .012 in
Drive yoke to pinion shaft end clearance	0.1 – 0.2 mm	.005 – .007 in
Oil type	CASE IH AKCELA NEXPLORE™ FLUID	

Differential - General specification - 600 Series axles

Steiger® 580	NA
Steiger® 620	NA

Axle specifications

Item	Metric value	U.S. value
Axle dry weight (approximate)	2170 kg	4784 lb
Ring/pinion gear reduction	2.789:1	2.789:1
Final drive reduction	9.032:1	9.032:1
Overall reduction ratio	25.194:1	25.194:1
Bar diameter	140 mm	5.5 in
Bar length	3040 mm	120 in
Bevel pinion bearing preload (rolling)	6 – 20 N·m	50 – 180 lb in
Differential bearing preload (rolling)	6 – 14 N·m	55 – 120 lb in
Axle shaft bearing preload (rolling)	14 – 31 N·m	120 – 276 lb in
Bevel ring/pinion gear backlash	0.2 – 0.3 mm	0.009 – 0.014 in
Drive yoke to pinion shaft end clearance	0.08 – 0.13 mm	0.003 – 0.005 in
Oil type	CASE IH AKCELA NEXPLORE™ FLUID	

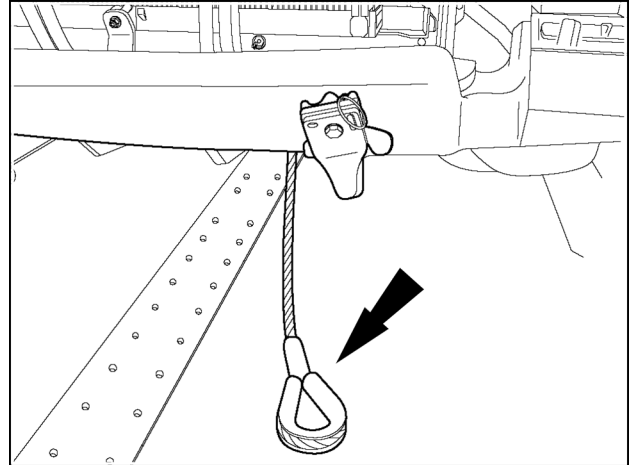
Differential - Remove - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

Prior operation:

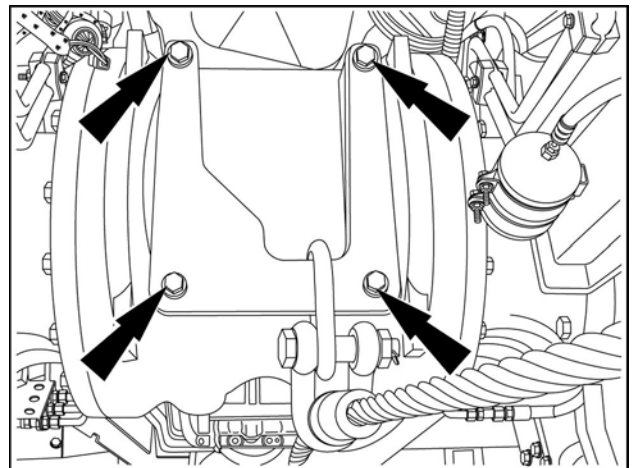
Front axle track yoke assembly - Remove - Rowtrac™ axles (25.500) both sides.

1. If equipped with a front tow cable, unhook the tow ring and set it on the ground.



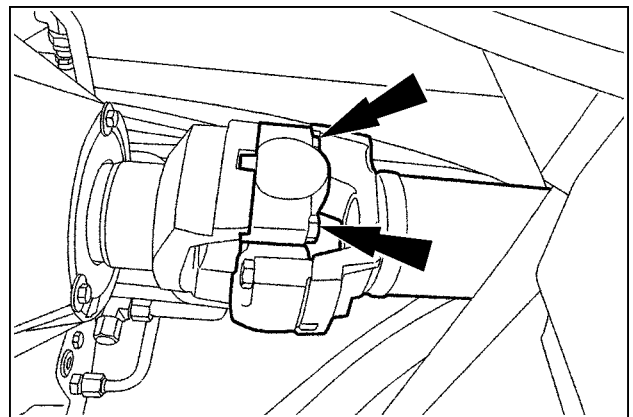
RCPH11FWD124BAM 1

2. Support the tow cable plate (if equipped) on the front axle and remove the four mounting bolts. Lower the support plate to the ground.



RAIL12TR03218AA 2

3. Loosen and remove the four bolts from the drive shaft at the front differential yoke.

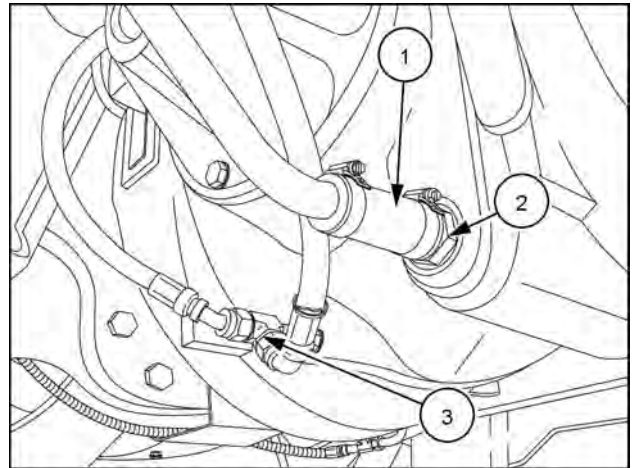


RCPH10FWD745AAJ 3

4. Loosen the hose clamp and carefully remove the lube return hose (1) to drain the differential. Use the hose (1) on the adapter (2) as a valve to control the flow until the hose can be removed.

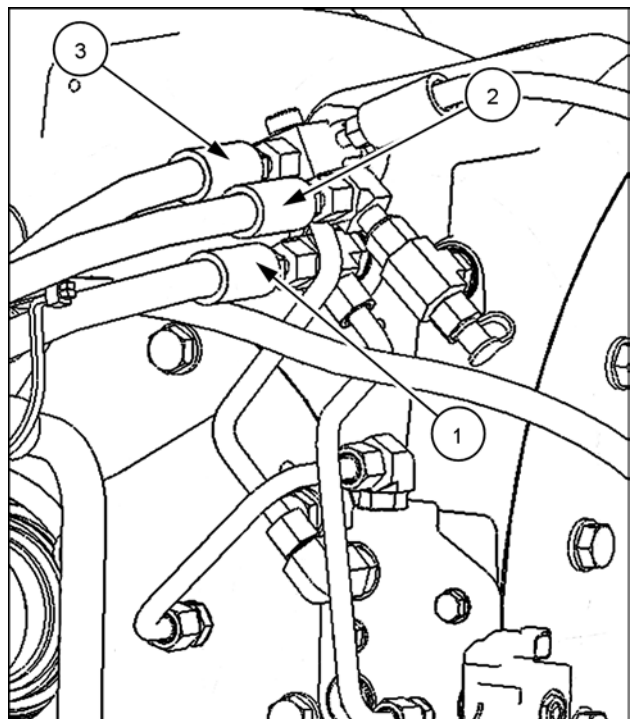
NOTE: The axle will contain up to **68 l (18 US gal)** of oil. Install caps and plugs on all fittings and hoses. Mark all hoses and tube lines for correct assembly.

5. Disconnect the auxiliary valve pilot return hose, or if equipped, disconnect the motor return and pilot return tee adapter (3).



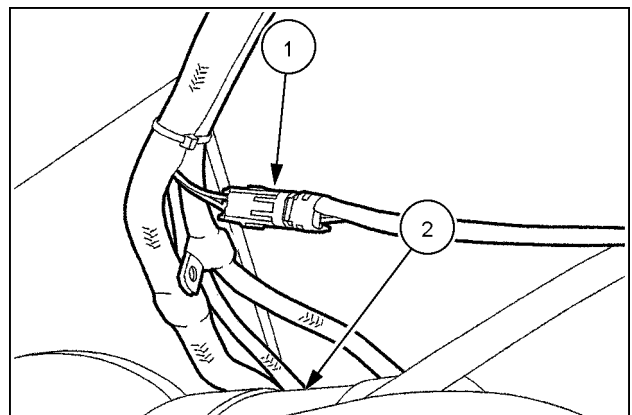
RAIL12TR02979AA 4

6. Disconnect the axle lube supply hose (1). Secure away from the axle.
7. Disconnect the service brake (2) and the parking brake (3) hoses from the axle. Secure the hoses away from axle.



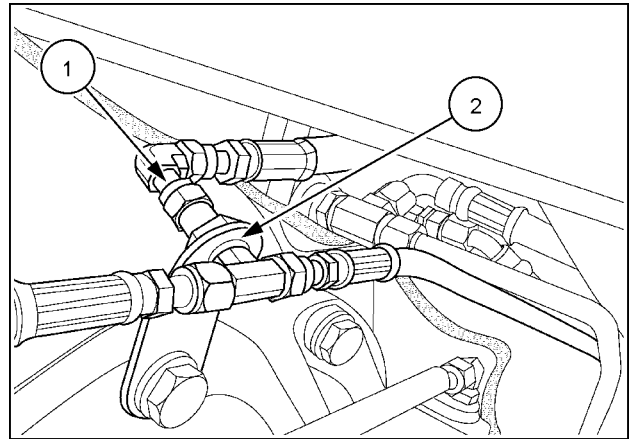
RAIL13TR00506AA 5

8. Disconnect the differential lock wire connector (1) from the rear frame wire harness located on the right hand side above the axle (2).



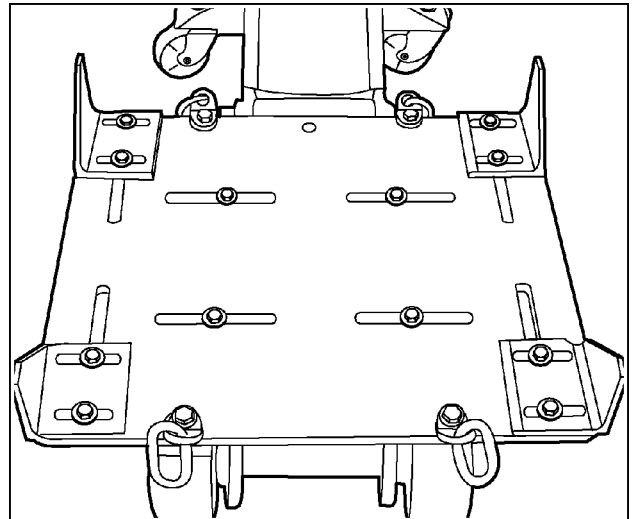
RCPH10FWD754AAJ 6

9. Disconnect the track tension supply hose (1) from the tee fitting and bracket assembly (2) on the pinion carrier.



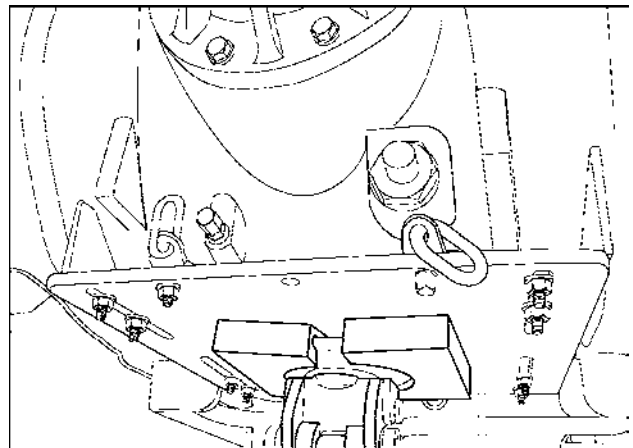
RCPH10FWD756AAJ 7

10. Install the **CAS2694** axle lifting adapter plate to the 20 ton floor jack. Be sure the plate is centered and bolted securely on the jack pad.



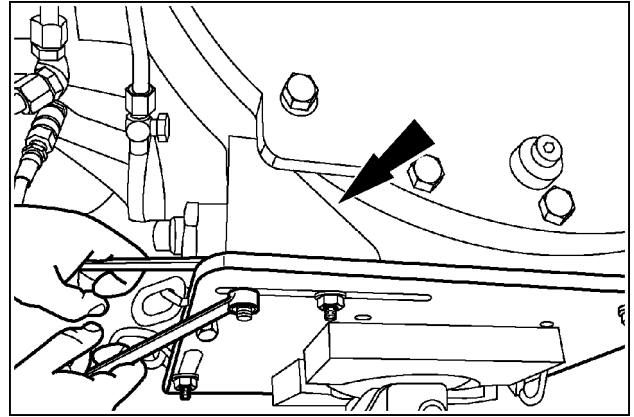
RCPH10FWD759AAJ 8

11. Center and raise the floor jack and adapter plate until it touches the axle housing.



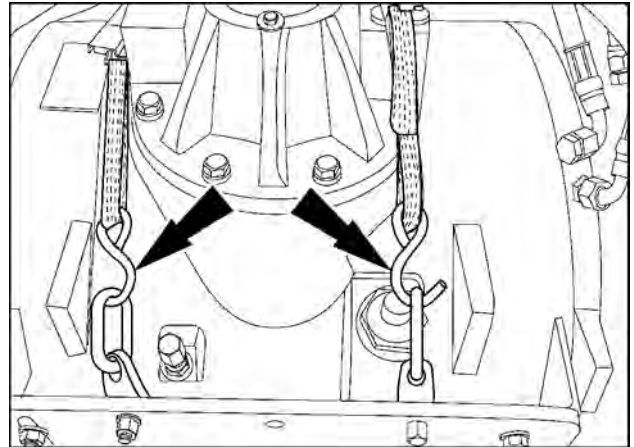
RAIL12TR02643AA 9

12. Position the four angle brackets against the axle housing and tighten the bolts.
13. Raise the jack to support the weight of the axle.



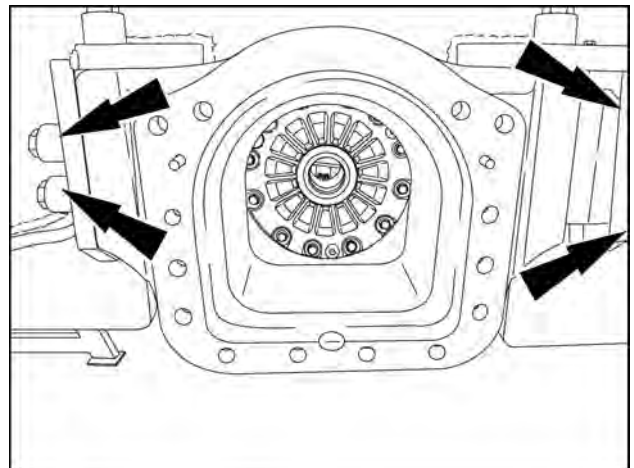
RCPH10FWD761AAJ 10

14. Install the two straps over the axle center housing. Fasten and tighten both straps.



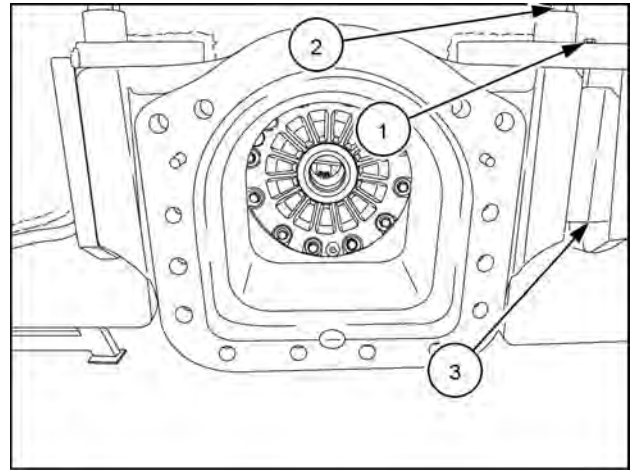
RAIL12TR02976AA 11

15. Remove the four axle yoke side mounting bolts and alignment washers from each side of the tractor.



RAIL12TR01601AA 12

16. Loosen the wedge tensioning bolt (1)
17. Loosen the two top yoke mounting bolts (2) on both sides of the tractor to lower the axle until the wedge (3) is loose.
18. Remove the tensioning bolt (1) and wedge.
19. Support the axle with the floor jack and remove the remaining yoke mounting bolts (2).



RAIL13TR00648AA 13

20. Slowly and carefully lower the differential housing assembly until it rests securely on the lowest position of the jack and roll it out the side of the tractor frame.

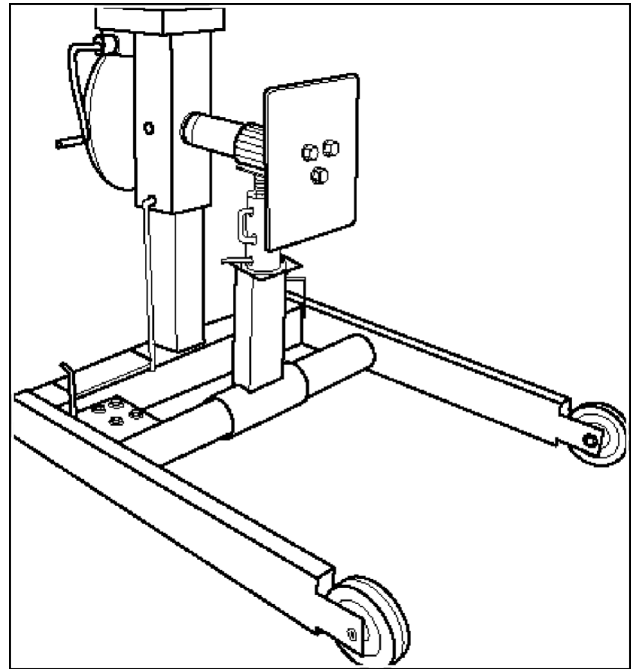
NOTICE: Be sure the housing is lowered evenly from the right and left side of the frame. If the housing starts to tilt when lowering, lift the housing to the frame, reinstall the six mounting bolts and reposition the floor jack and or the axle lifting adapter plate, and repeat the previous steps.

Differential - Disassemble - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

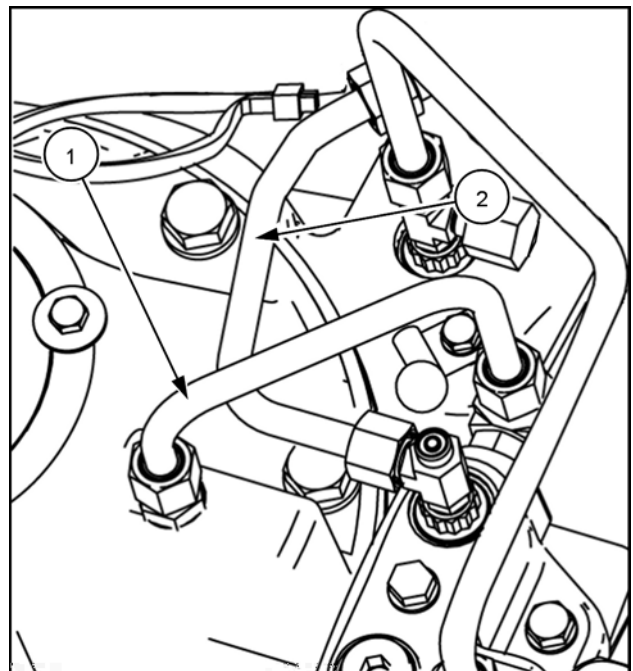
Pinion carrier removal

1. The differential housing must be rotated several times during the disassembly and assembly procedures. If available, the housing should be mounted in a revolver repair stand.



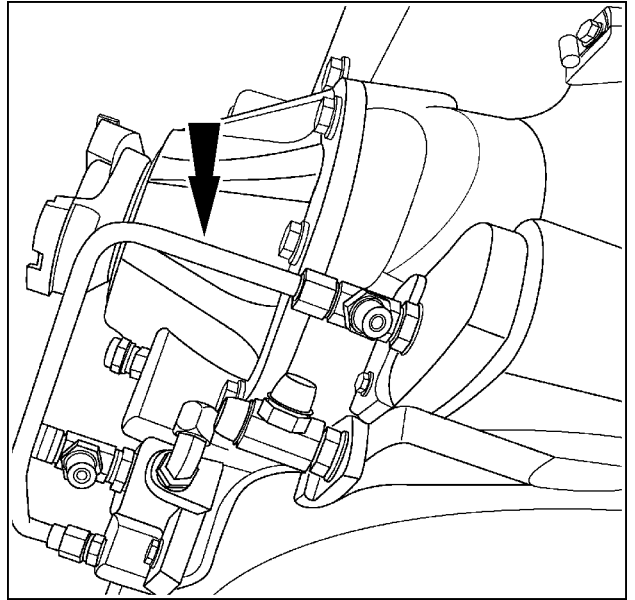
RCPH10FWD941AAJ 1

2. Remove the lube tubes from the port block to the pinion carrier (1) and axle lubrication fitting (2).



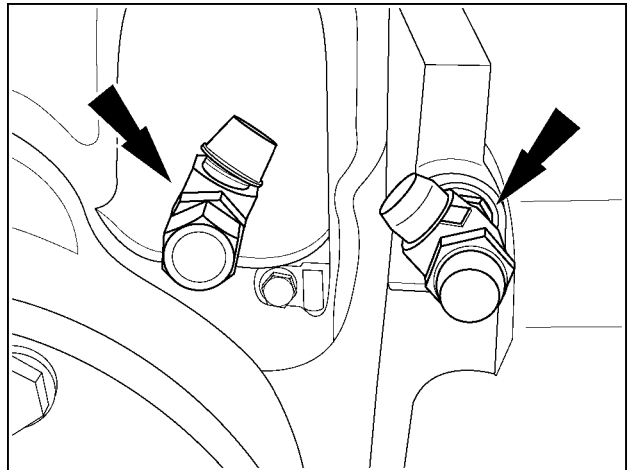
RAIL12TR03341AA 2

3. Remove the tube line from the port block to the park brake supply port.



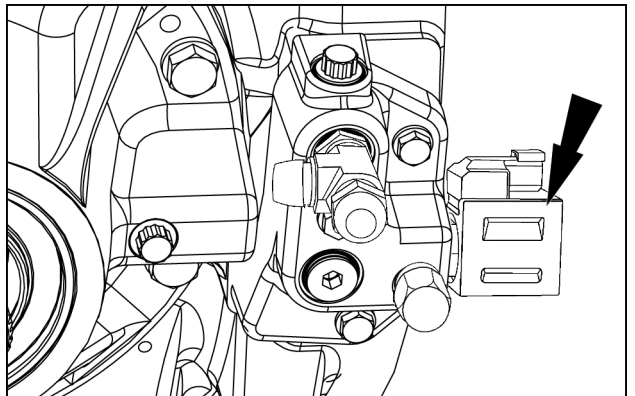
RCPH10FWD944AAJ 3

4. Remove the tee fittings from the park and service brake pressure ports.



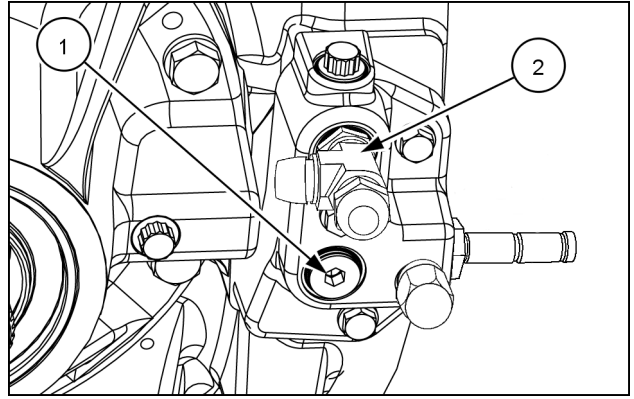
RCPH10FWD945AAJ 4

5. Remove the differential lock solenoid from the port block.



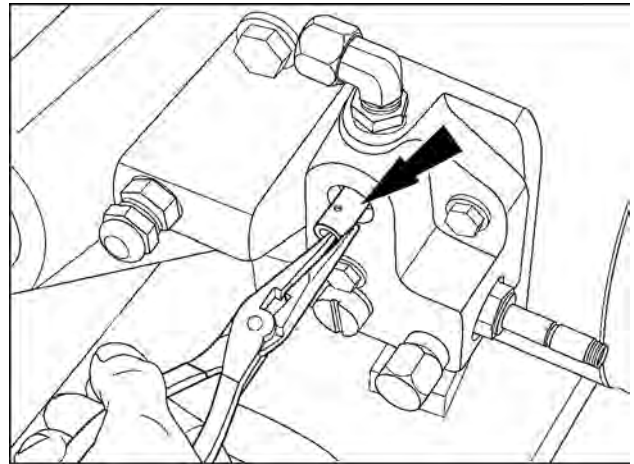
RAIL13TR00345AA 5

6. Remove the plug (1) and tee fitting (2) from the port block.



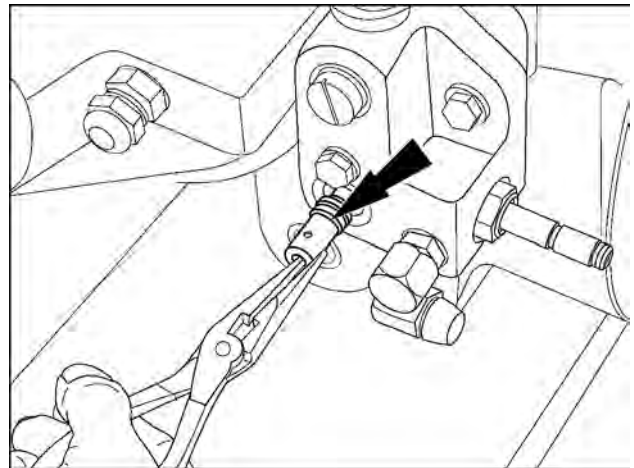
RAIL13TR00343AA 6

7. Remove the jumper tube from the lube port. Discard the O-rings.



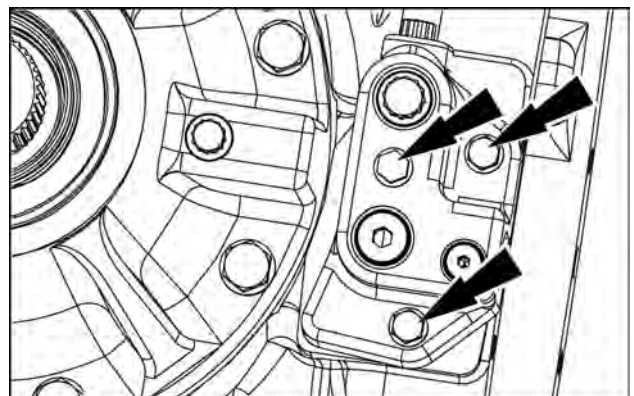
RAIL13TR00352AA 7

8. Remove the jumper tube from the differential lock supply port. Discard the O-rings.



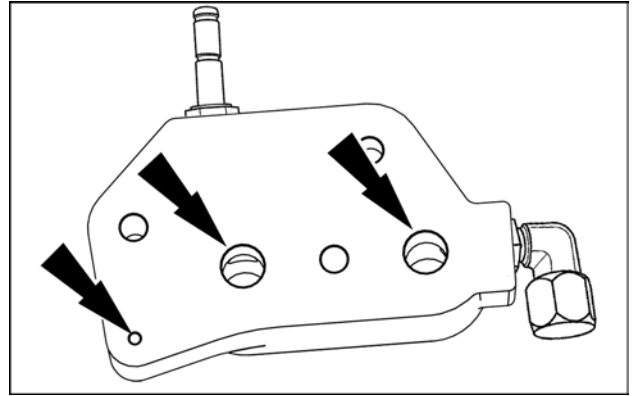
RAIL13TR00353AA 8

9. Remove the three bolts securing the port block to the housing. Remove the port block.



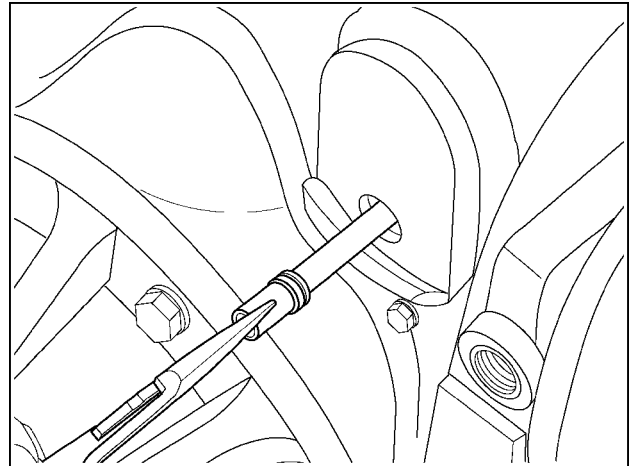
RAIL13TR00350AA 9

10. Discard the O-rings from the port block.



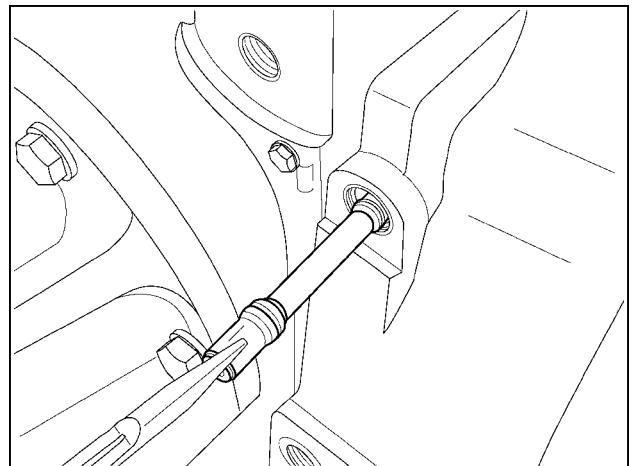
RAIL13TR00346AA 10

11. Remove the jumper tube from the park brake supply port. Discard the O-rings.



RCPH10FWD952AAJ 11

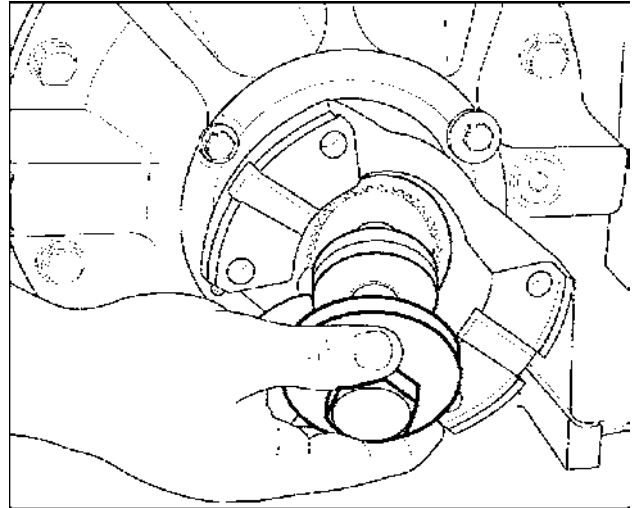
12. Remove the jumper tubes from the brake supply port. Discard the O-rings.



RCPH10FWD953AAJ 12

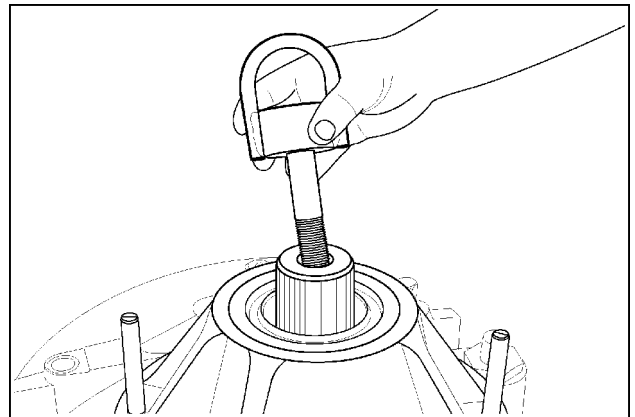
13. If repairing a rear differential, remove the drive yoke retaining bolt, washer, shim pack and O-ring. Retain the shims with the yoke.

NOTE: The front axle drive yoke does not use a retaining bolt. The drive yoke is allowed to slide on the pinion shaft.



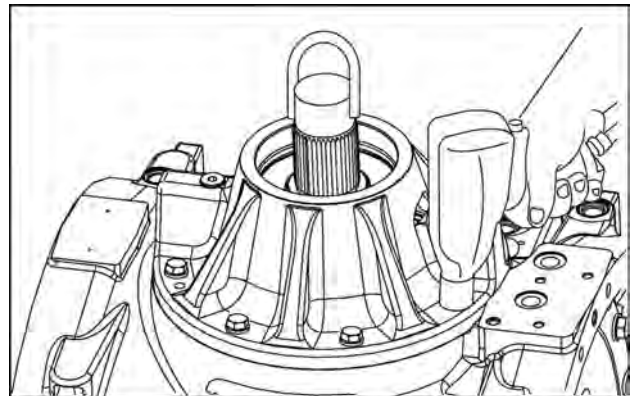
RAIL13TR00351AA 13

14. Install the lifting eye into the pinion gear.



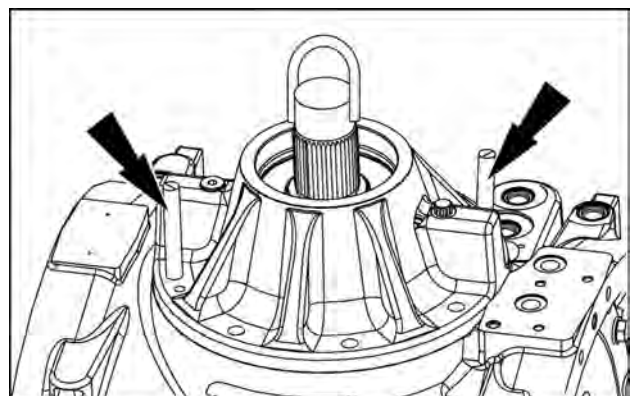
RCPH10FWD955AAJ 14

15. Remove the pinion carrier mounting bolts.



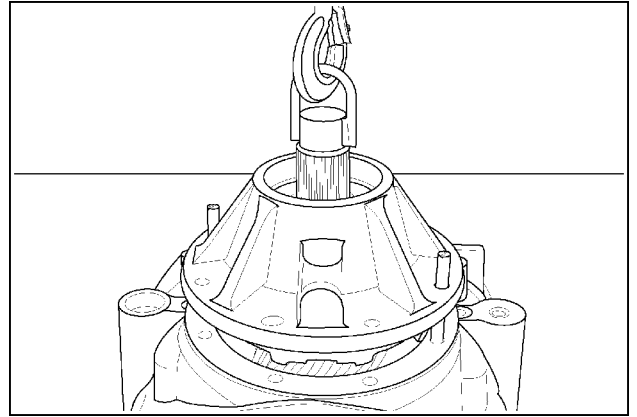
RAIL13TR00347AA 15

16. Install two CNH299082 alignment studs in opposite holes of the pinion carrier.



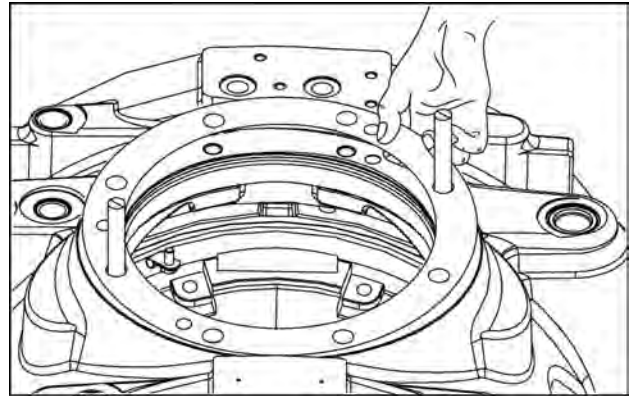
RAIL13TR00348AA 16

17. Use a lifting device to remove the pinion carrier from the housing. Be careful not to damage the shim pack.



RCPH10FWD958AAJ 17

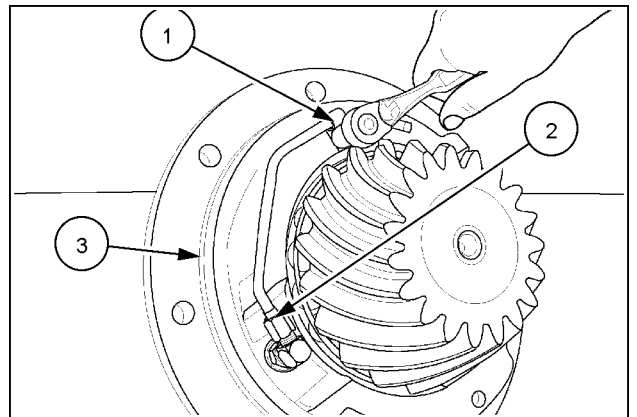
18. Remove and retain the shim pack.



RAIL13TR00349AA 18

Pinion carrier assembly

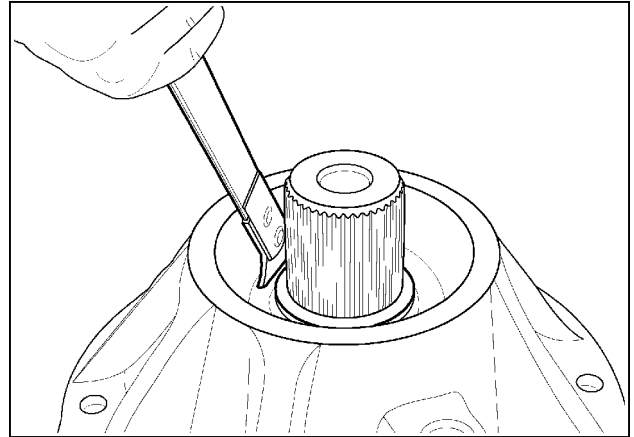
19. Remove the bolt (1) securing the pinion gear lube tube.
20. Disconnect and remove the tube, tube clamp and fitting (2).
21. Remove and discard the large O-ring (3) from the flange of the housing.



RCPH10FWD960AAJ 19

22. Pry the pinion seal from the housing.

NOTE: The rear axle has an oil seal on the pinion shaft. The front axle has an oil seal on the pinion and a dust/grease seal on the outside diameter of the drive yoke.



RCPH10FWD961AAJ 20

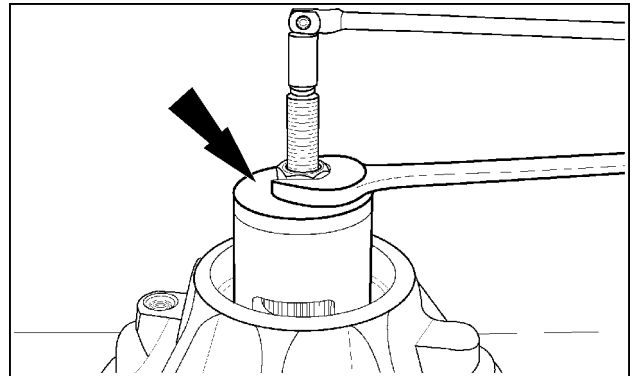
23. Support the pinion carrier on wood blocks on the work surface. Install the **CNH299091** pinion bearing preload compressor. Turn the center bolt tightly into the threaded hole in the pinion gear. Install the thrust washer and nut on the center bolt.

24. Install the **CNH299091** pinion bearing preload compressor. Turn the center bolt tightly into the threaded hole in the pinion gear. Install the thrust washer and nut on the center bolt.

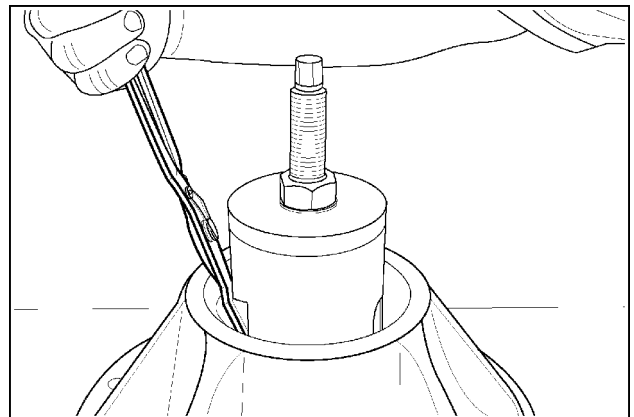
25. Align one window of the compression sleeve with the end gap of the snap ring. Use one wrench to hold the center bolt and a second wrench to tighten the nut to increase the bearing preload and release the pressure against the snap ring.

26. Use a snap ring pliers to remove the snap ring from the groove in the pinion shaft.

NOTE: If pinion bearing preload increased noticeably, remove the compression sleeve to remove the large snap ring.

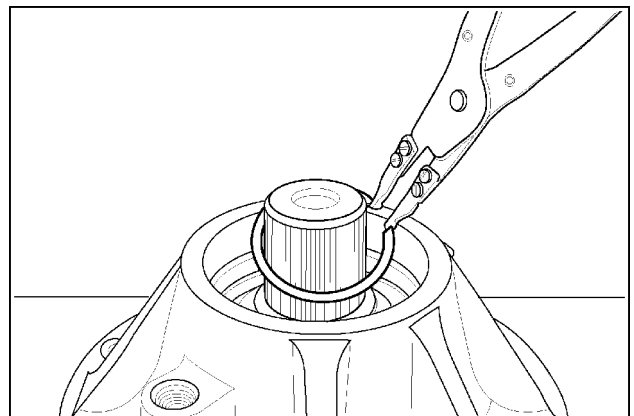


RCPH10FWD962AAJ 21



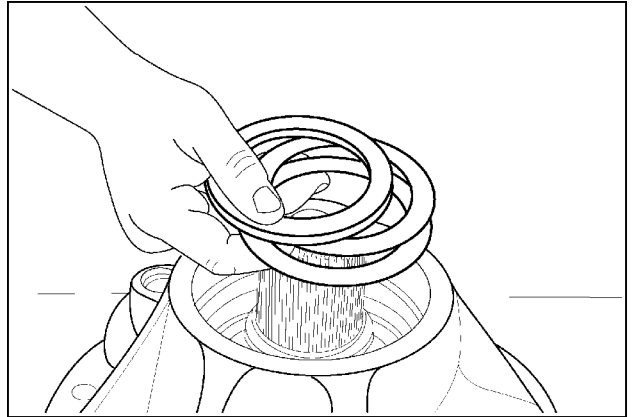
RCPH10FWD963AAJ 22

27. Remove the compression sleeve assembly and snap ring from the pinion shaft.



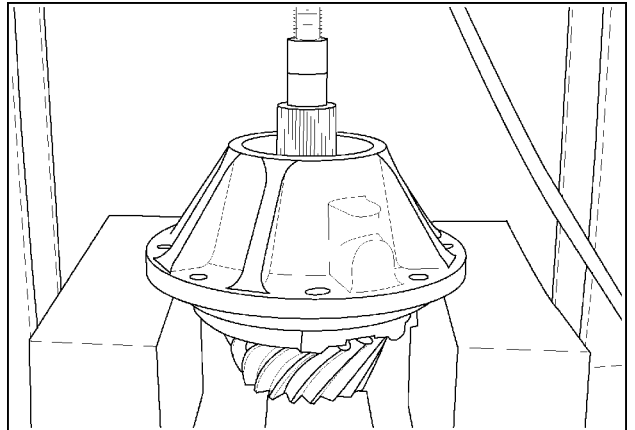
RCPH10FWD964AAJ 23

28. Remove the spacer ring and shim pack. Retain the shims.



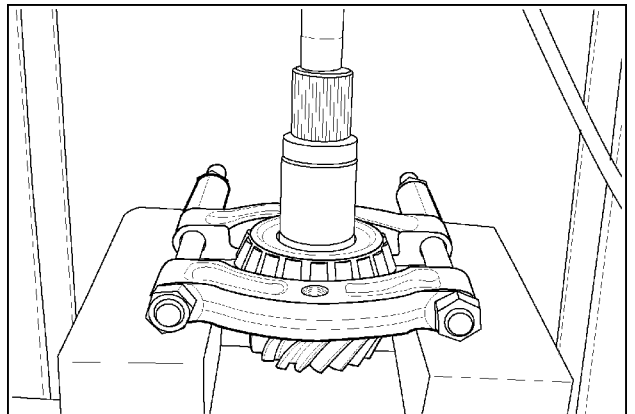
RCPH10FWD965AAJ 24

29. Support the pinion carrier on a press bed. Use the press to push the pinion shaft through the front bearing cone.



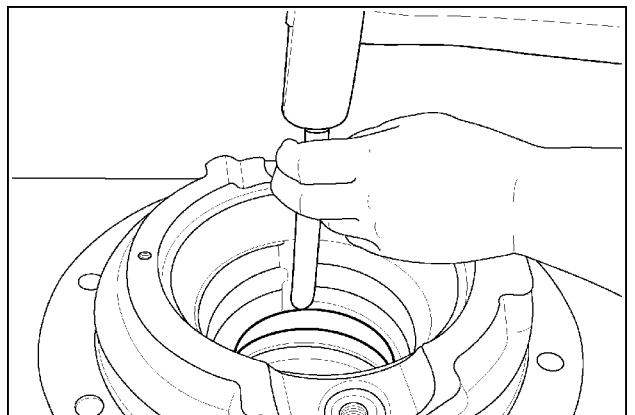
RCPH10FWD966AAJ 25

30. Use a split knife edge puller attachment and press to remove the rear pinion bearing cone.



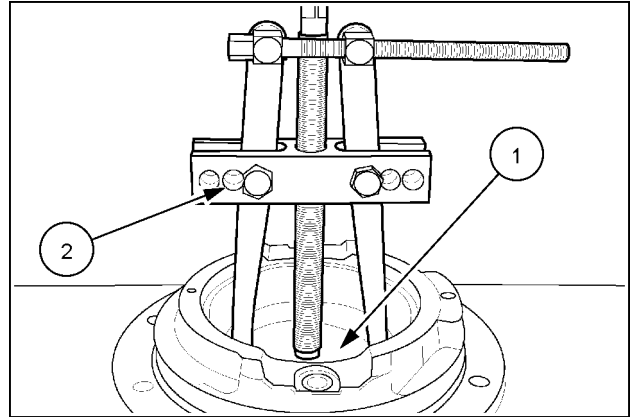
RCPH10FWD967AAJ 26

31. Use a brass drift to remove the outer bearing cup from the carrier housing.



RCPH10FWD968AAJ 27

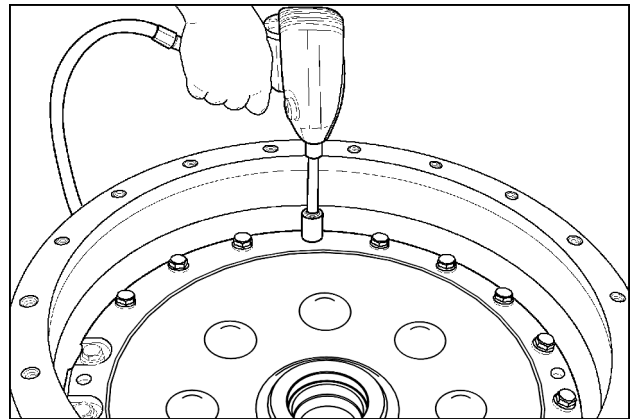
32. Use the **CNH299090** adaptor plate **(1)** and a bearing puller **(2)** to remove the inner bearing cup from the carrier housing.
33. Clean and inspect all parts for damage or wear.
34. Replace any damaged or worn parts.



RCPH10FWD969AAJ 28

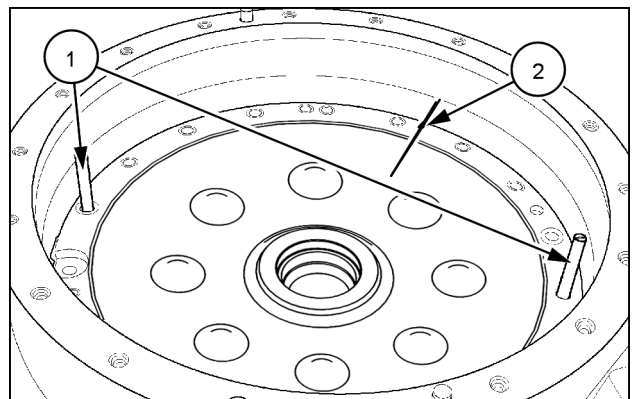
Brake carrier/bearing support removal

35. Rotate the differential housing so that the brake carrier side is on top.
36. Remove the brake carrier retaining bolts and washers.



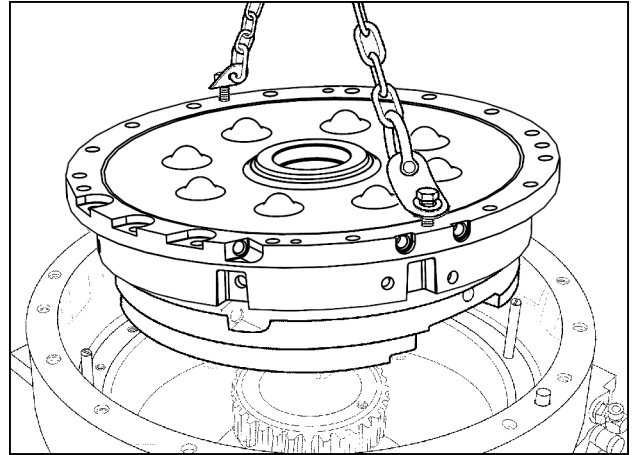
RAIL12TR2316AA 29

37. Install two **CNH299044** alignment studs **(1)** opposite each other.
38. Put a mark **(2)** on the brake carrier and housing for reference during assembly.



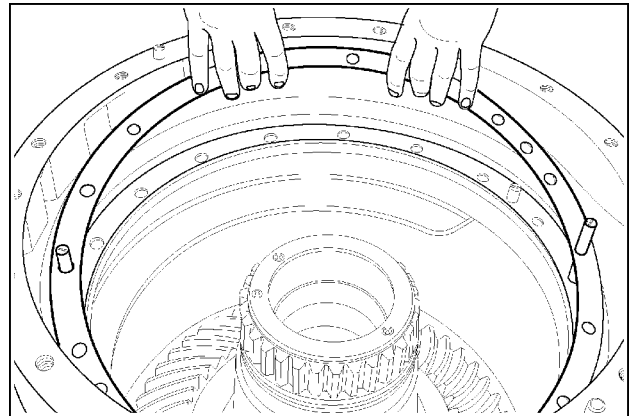
RAIL12TR2317AA 30

39. Two threaded holes are provided in the flange of the carrier assembly. Use two of the retainer bolts that were removed to attach a lifting chain and hoist.
40. Use the hoist to slowly and carefully lift the brake carrier assembly out of the housing. Be careful not to bend or damage the preload shims during removal.



RAIL12TR2305AA 31

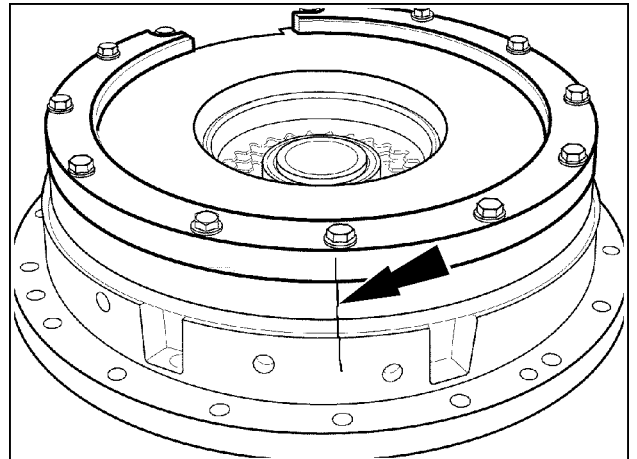
41. Remove and retain the differential bearing preload shims.



RCPH10FWD210ABJ 32

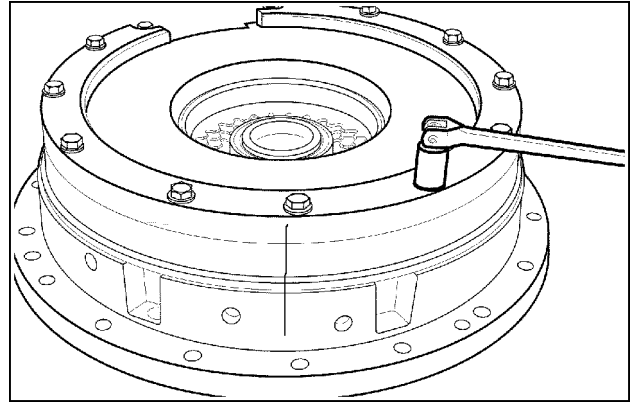
Brake carrier/bearing support disassembly

42. Position the carrier assembly on a sturdy work surface so that the split ring side is on top.
43. Put a mark across the assembly for reference.



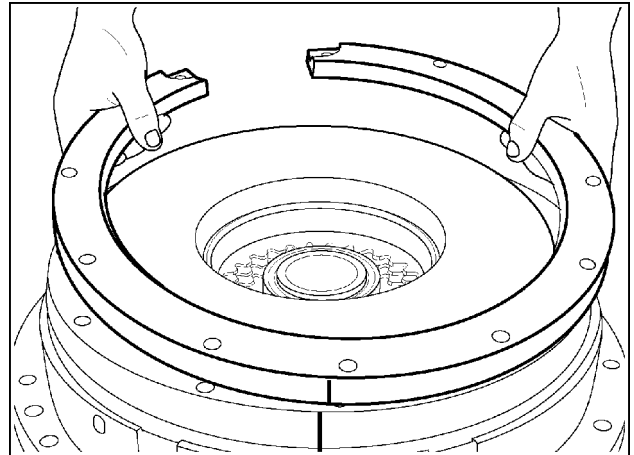
RCPH10FWD211ABJ 33

44. Starting with an end gap bolt, loosen each bolt in sequence one full turn.
45. Repeat until all tension is released against the retaining ring.



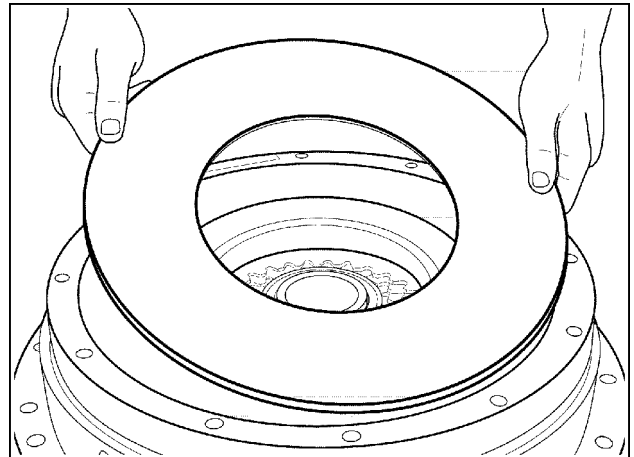
RCPH10FWD212ABJ 34

46. Remove all bolts from the split ring.
47. Remove the split retainer ring.



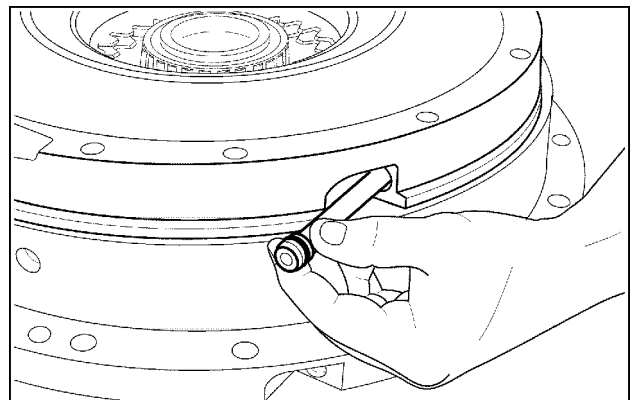
RCPH10FWD213ABJ 35

48. Remove the belleville spring.



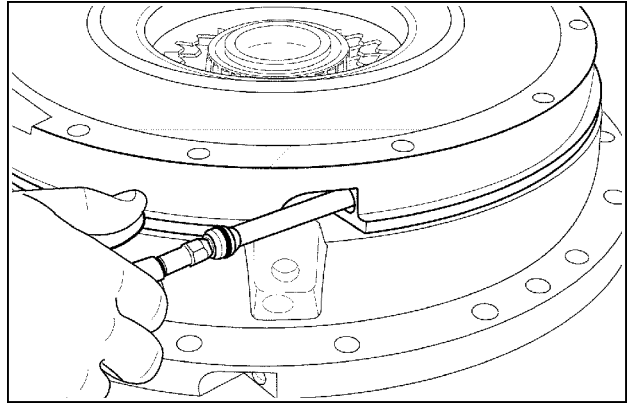
RCPH10FWD214ABJ 36

49. Temporarily install the short jumper tube into the park brake pressure port.



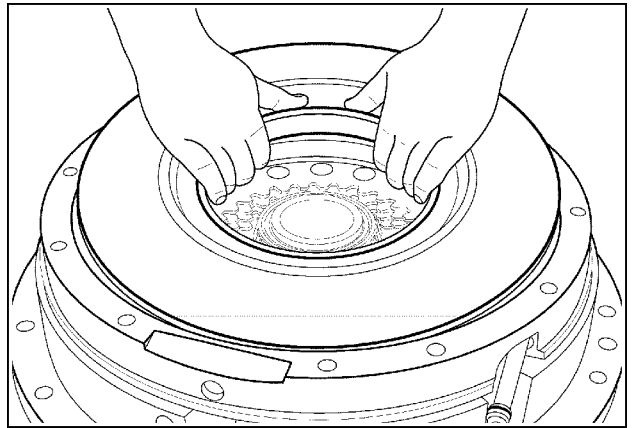
RCPH10FWD215ABJ 37

50. Use a short burst of compressed air to lift the park brake piston out of its bore.



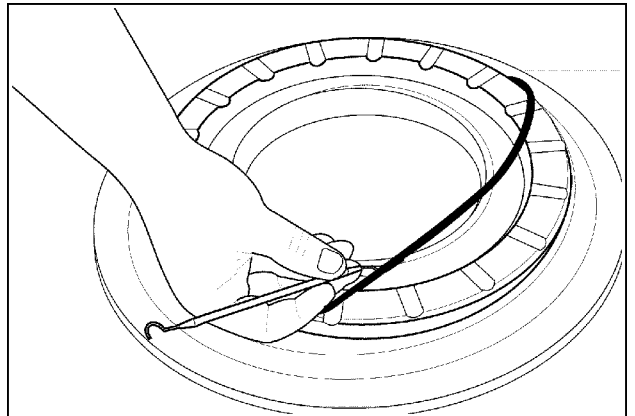
RCPH10FWD216ABJ 38

51. Remove the piston from the backing plate.



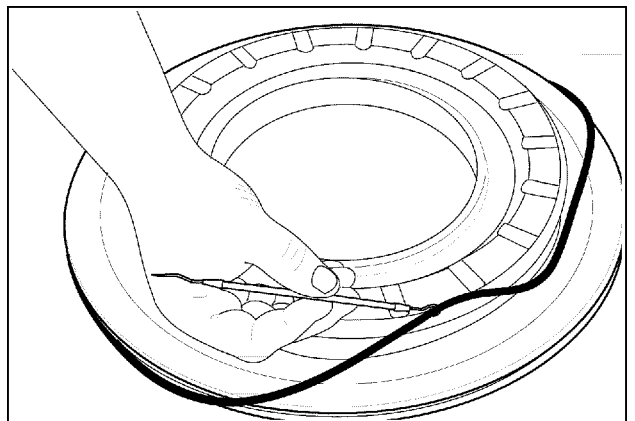
RCPH10FWD217ABJ 39

52. Remove and discard the inner O-ring from the piston.



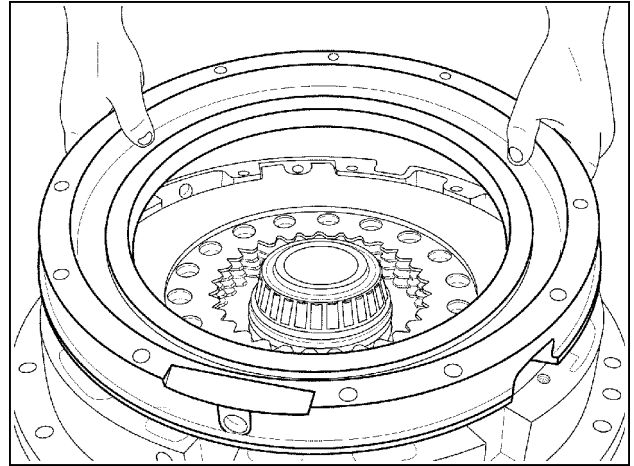
RCPH10FWD218ABJ 40

53. Remove and discard the outer O-ring from the piston.



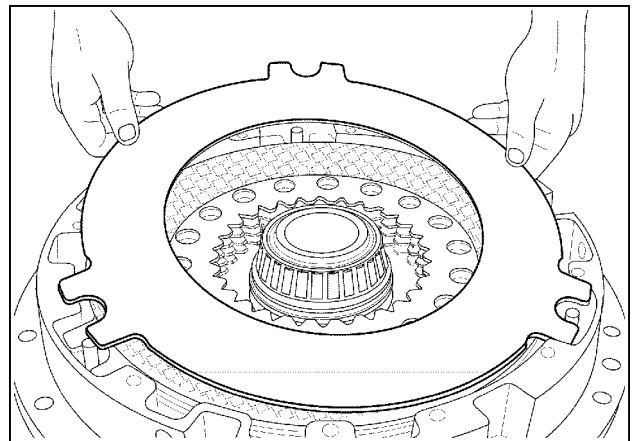
RCPH10FWD219ABJ 41

54. Remove the brake backing plate.



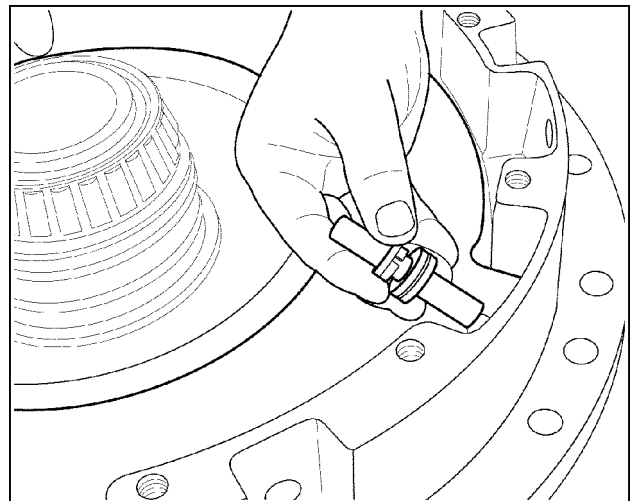
RCPH10FWD220ABJ 42

55. Remove the four brake separator plates and four friction plates from the carrier.



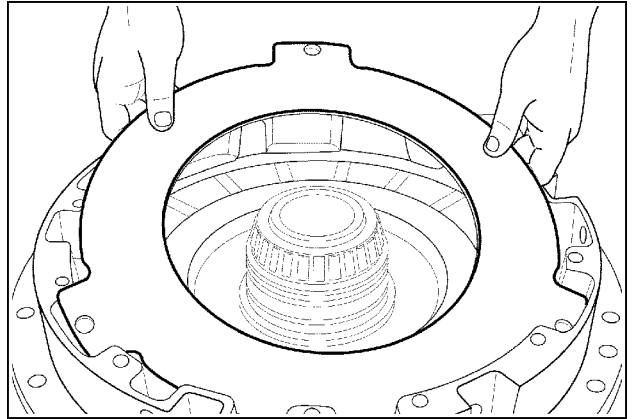
RCPH10FWD221ABJ 43

56. Remove each of the three brake adjuster pins with belleville spring washers.



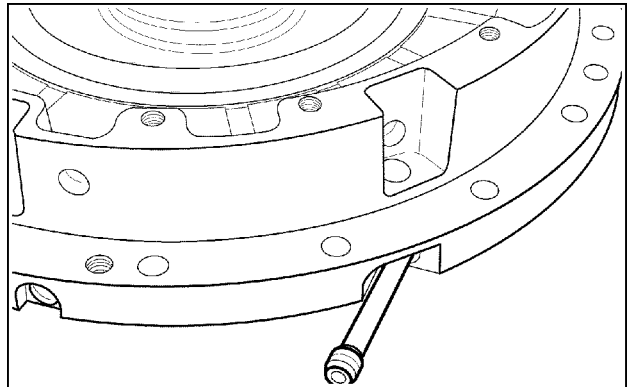
RCPH10FWD222ABJ 44

57. Remove the brake return plate from the carrier.



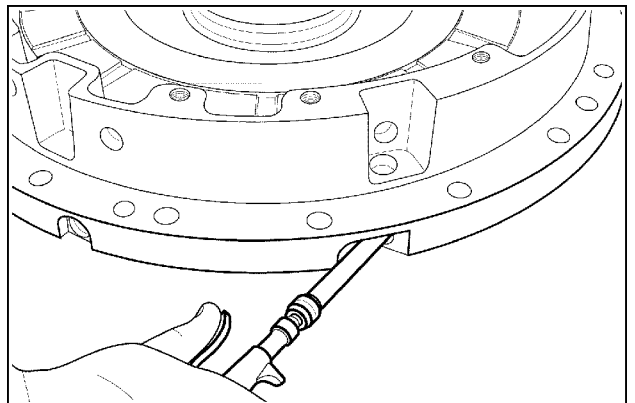
RCPH10FWD223ABJ 45

58. Temporarily install a short jumper tube into the service brake pressure port.



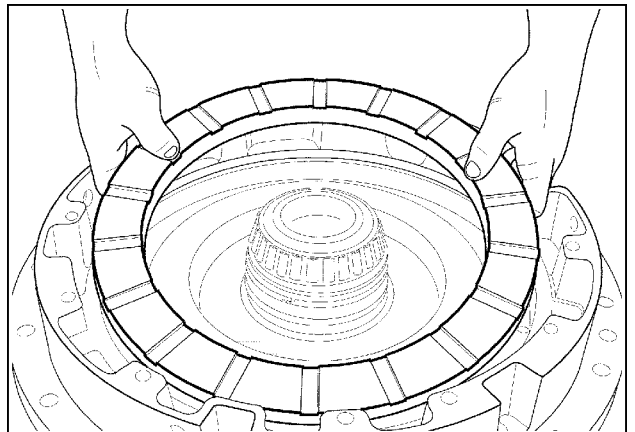
RCPH10FWD224ABJ 46

59. Use a short burst of compressed air to lift the brake piston out of the bore.



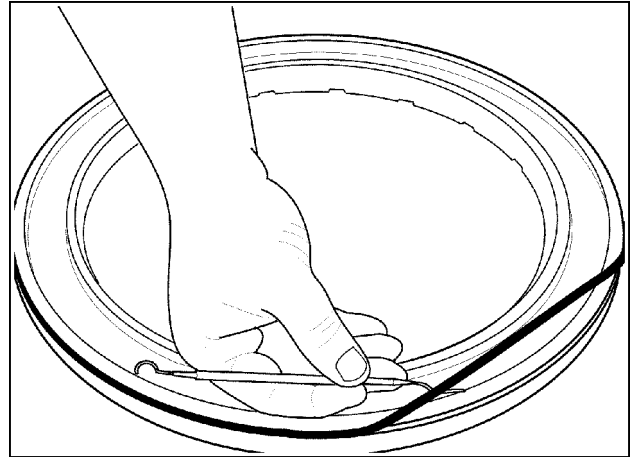
RCPH10FWD225ABJ 47

60. Remove the piston from the carrier.



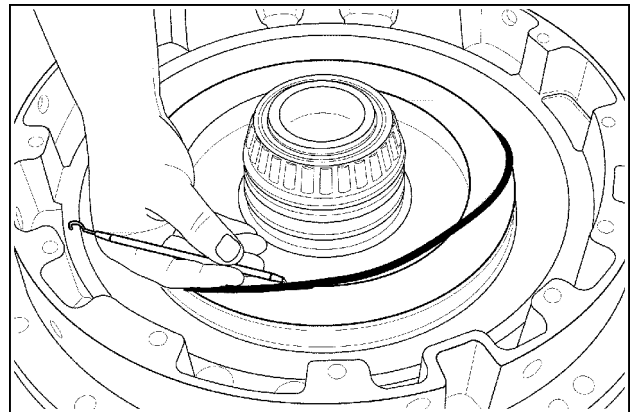
RCPH10FWD226ABJ 48

61. Remove and discard the O-ring from the outside diameter of the piston.



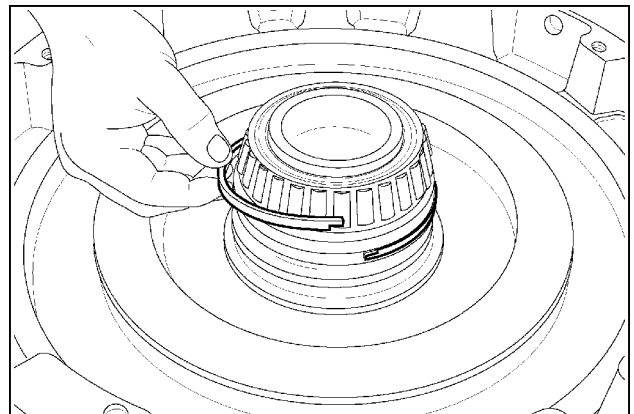
RCPH10FWD227ABJ 49

62. Remove and discard the piston inside diameter O-ring from the carrier.



RCPH10FWD228ABJ 50

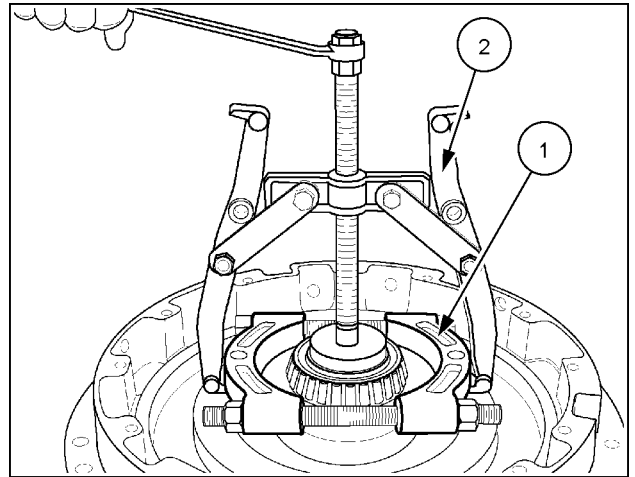
63. Remove and discard the two seal rings from the hub of the carrier.



RCPH10FWD229ABJ 51

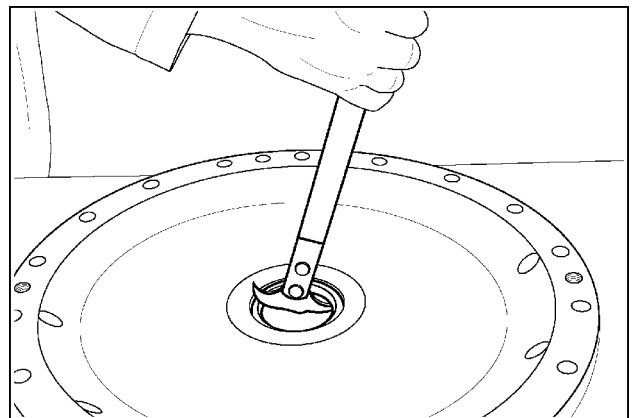
64. If required, use a split knife edge puller attachment (1) and a puller (2) to remove the bearing cone from the hub of the carrier.

NOTE: If possible, place the bearing cup over the bearing cone when removing the bearing.



RCPH10FWD230ABJ 52

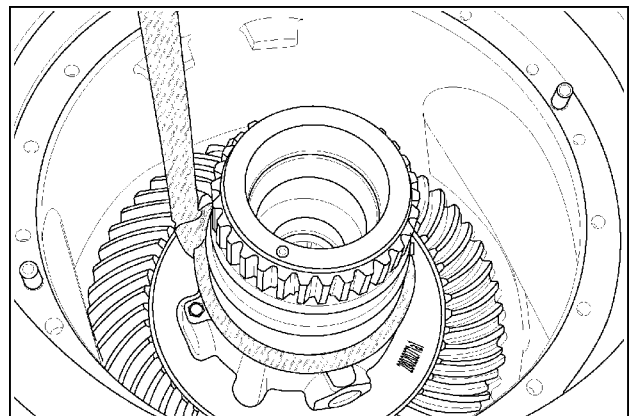
65. Remove and discard the seal.
66. Clean and inspect all brake carrier parts for damage or wear.
67. Replace any damaged or worn parts found.



RCPH10FWD994AAJ 53

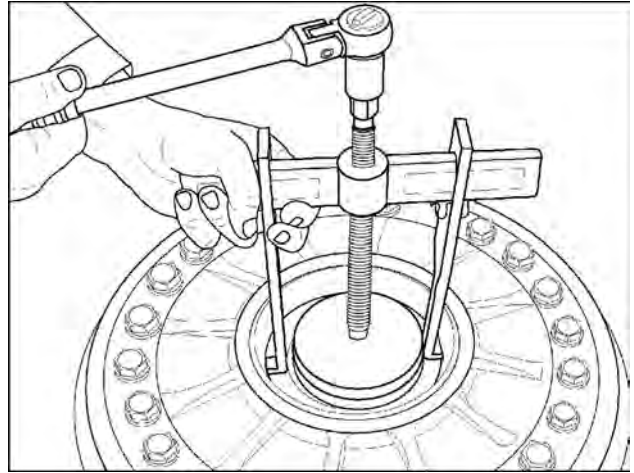
Differential removal and disassembly

68. Position a nylon lifting sling in a choker configuration as low as possible on the differential carrier.
69. Use a hoist to lift the differential from the housing.



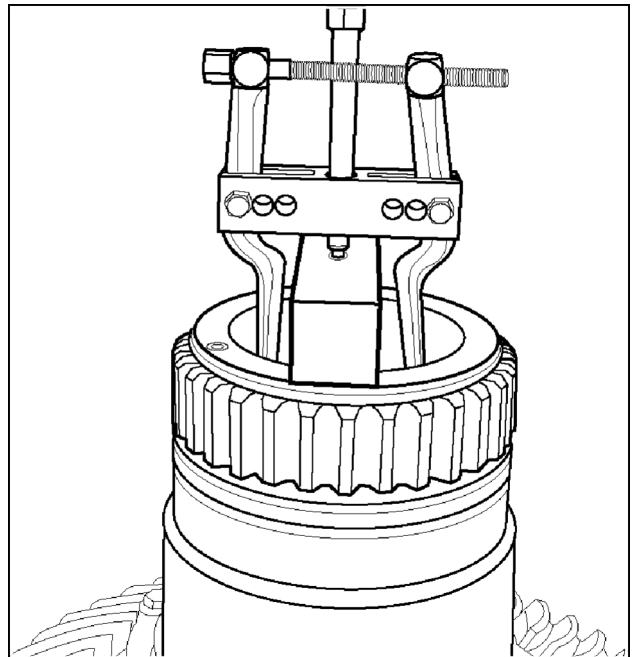
RCPH10FWD998AAJ 54

70. If required, use a bearing puller and step plate to remove the left hand side differential bearing cup.



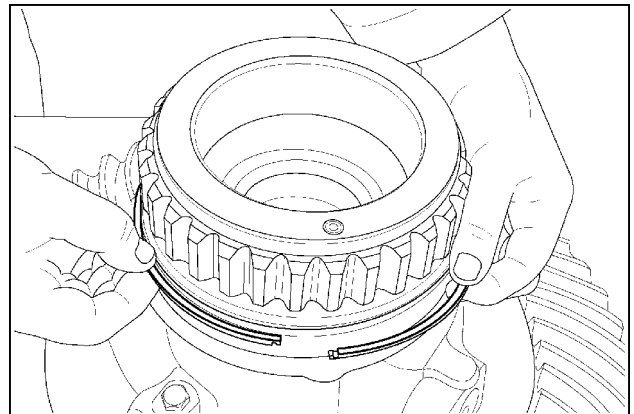
RAIL12TR2261AA 55

71. If required, use a bearing puller and step plate to remove the right hand side differential bearing cup.



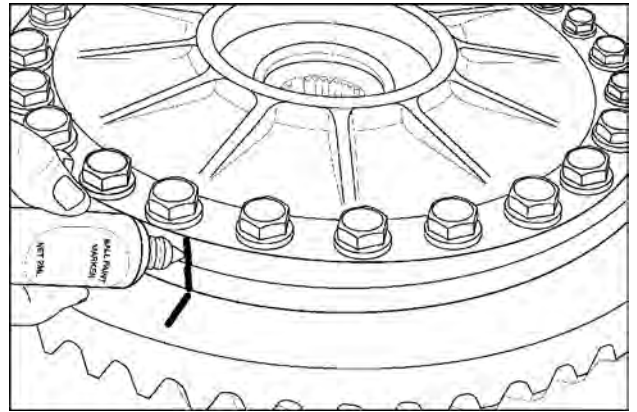
RCPH10FWD001ABJ 56

72. Remove and discard the large seal ring.



RCPH10FWD002ABJ 57

73. Put a mark on the differential case for assembly reference.

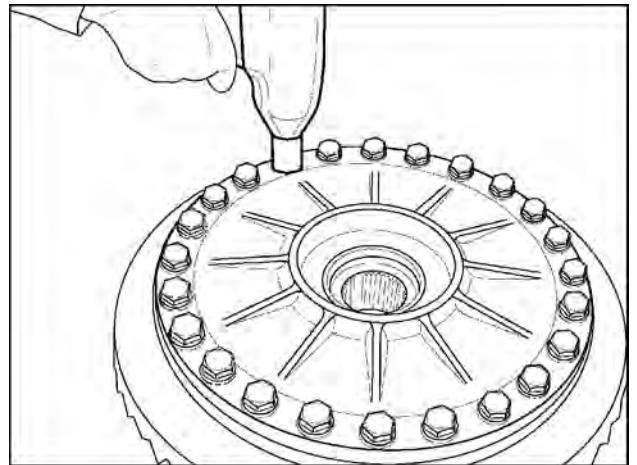


RAIL12TR2271AA 58

74. Remove and discard the ring gear and cover attaching bolts.

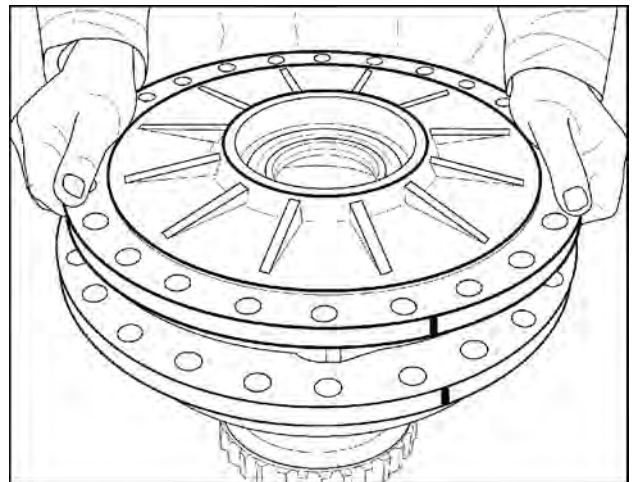
NOTE: The ring gear does not need to be removed unless the case or ring gear is to be replaced.

75. Use a brass drift and hammer to tap the ring gear free from the case.



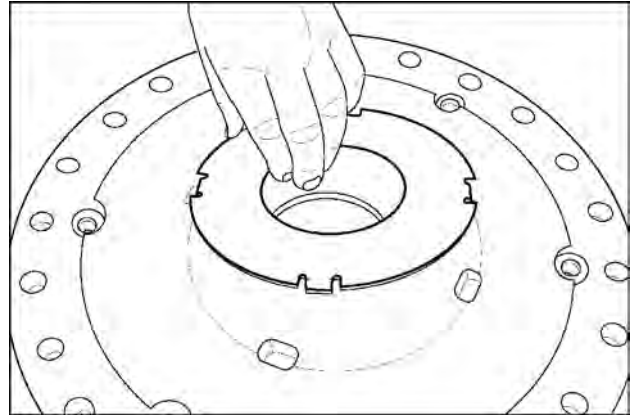
RAIL12TR2272AA 59

76. Remove the differential case cover.



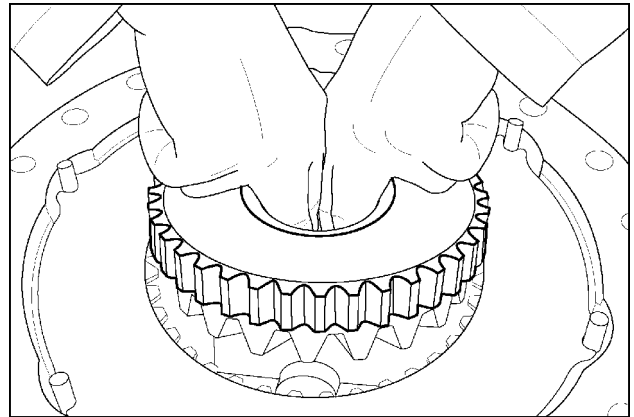
RAIL12TR2273AA 60

77. Remove the large thrust washer from the cover.



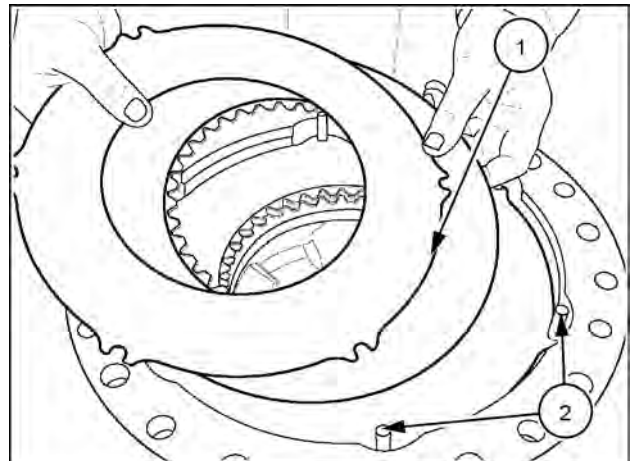
RAIL12TR2274AA 61

78. Remove the differential side gear from the case.



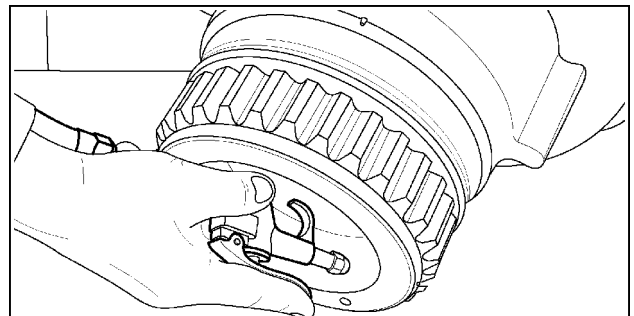
RAIL12TR2275AA 62

79. If equipped with differential lock, remove the four steel separator plates and three friction plates **(1)** from the case.
80. Remove the 6 anti-rotation dowel pins **(2)** from the case.



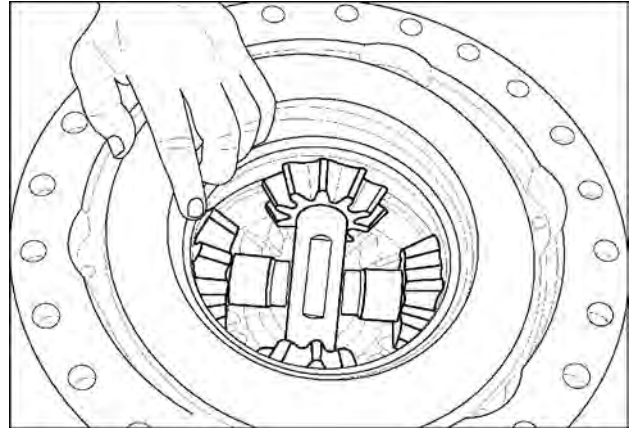
RAIL12TR2276AA 63

81. If equipped with differential lock, use a short burst of compressed air in the oil passage hole in the case to move the differential lock piston out of the bore.



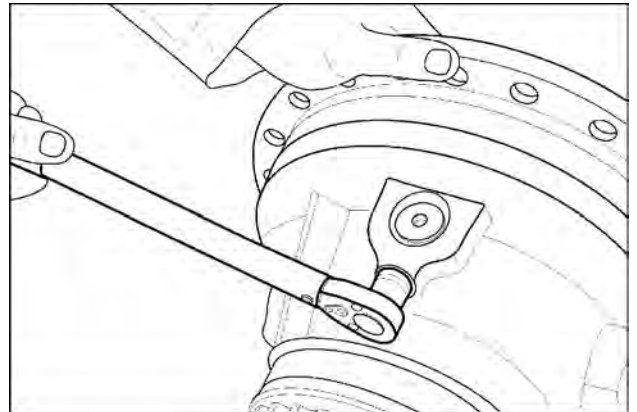
RCPH10FWD009ABJ 64

82. Remove the differential lock piston from the case.



RAIL12TR2277AA 65

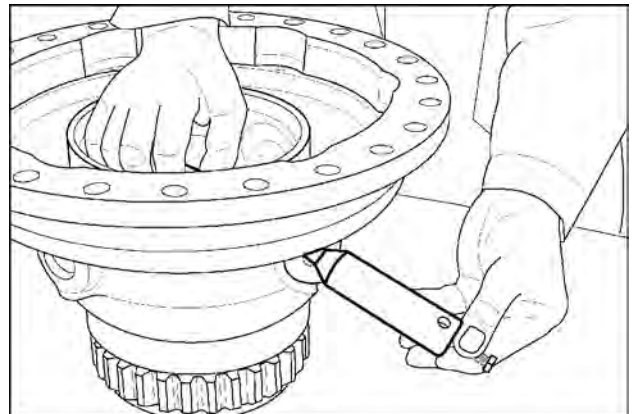
83. Remove the bolts securing the short pinion shafts in the case.



RAIL12TR2278AA 66

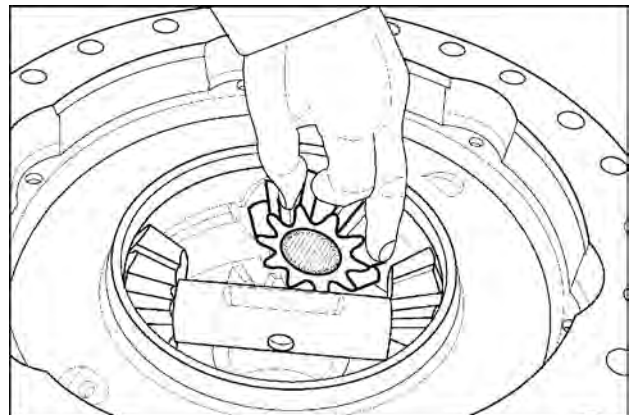
84. Install an M8 x 1.25 bolt into the threaded hole in the end of each short pinion gear shaft.
85. Remove the short shafts and spacer sleeves from the case.

NOTE: There are 28 uncaged needle roller bearings in each of the four pinion gears.



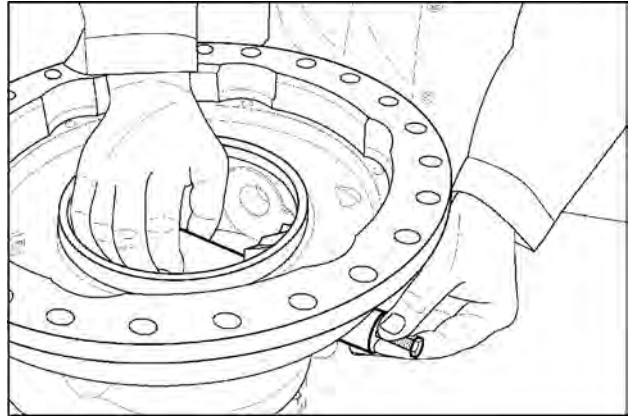
RAIL12TR2279AA 67

86. Remove the differential pinion gears for the short shafts from the case.



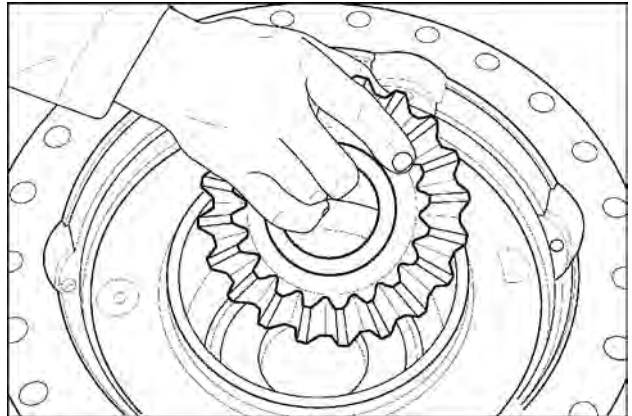
RAIL12TR2280AA 68

87. Use the same procedure to remove the long differential pinion gear shaft, spacer and differential pinion gears.



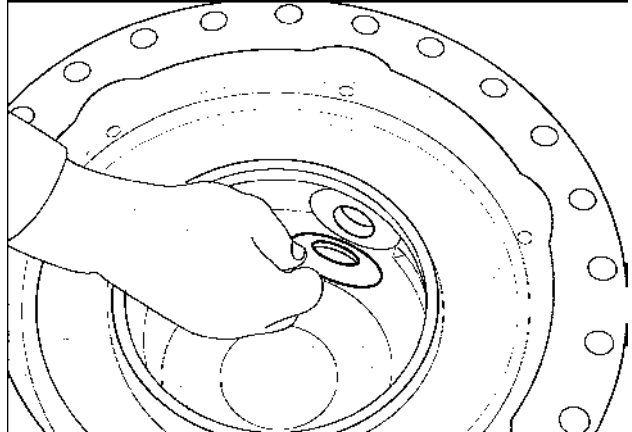
RAIL12TR2281AA 69

88. Remove the side gear from the bottom of the case.



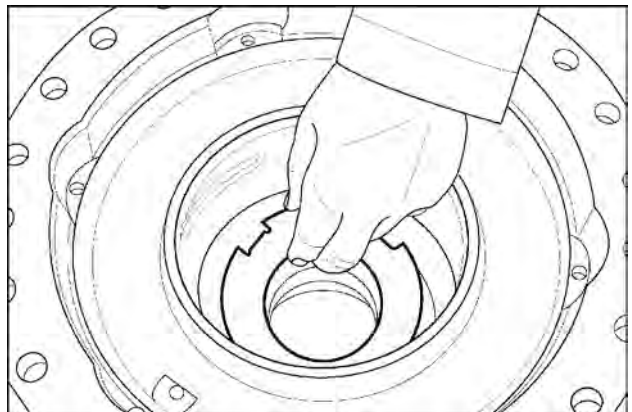
RAIL12TR2282AA 70

89. Remove the thrust washers for each spider gear from the case.



RAIL12TR2283AA 71

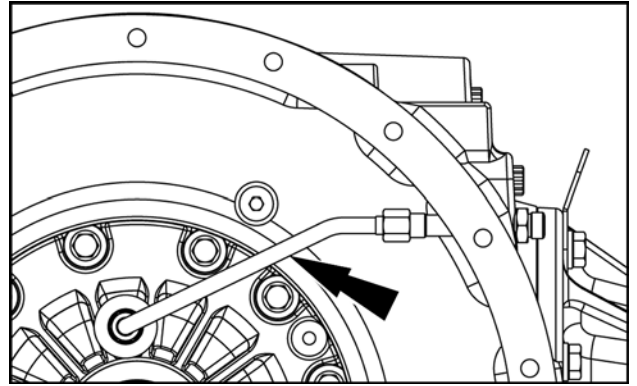
90. Remove the thrust washer for the side gear from the bottom of the case.
91. Clean and inspect all differential parts for damage or wear.
92. Replace any damaged or worn parts found.



RAIL12TR2284AA 72

Left hand differential bearing support disassembly

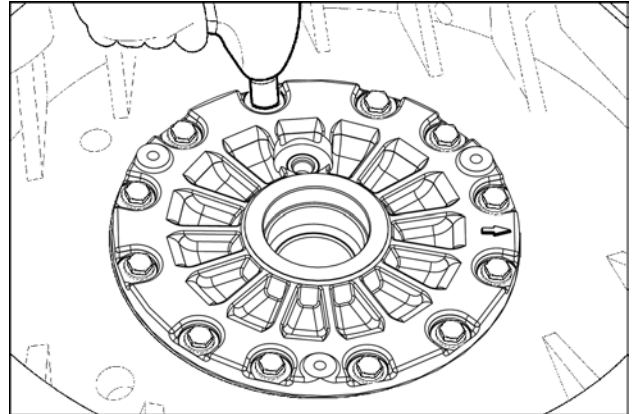
93. Remove the lubrication tube.



RAIL13TR00356AA 73

94. If required, rotate the differential housing so the left hand side differential bearing support carrier is on top.

95. Remove the bearing support retaining bolts and washers.



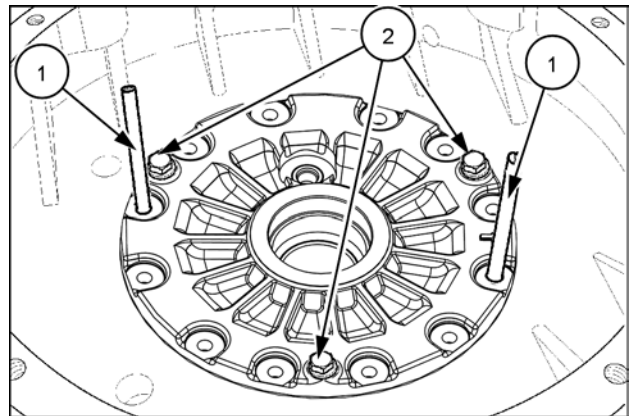
RAIL12TR2306AA 74

96. Install two guide pins (1).

97. Use three of the retaining bolts (2) in the threaded holes provided. Tighten the bolts alternately and evenly to jack the bearing carrier out of the housing.

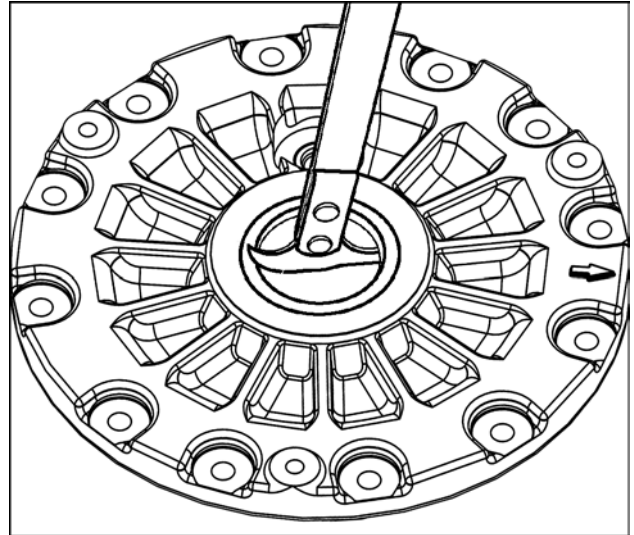
98. Remove the bearing carrier and shims.

NOTE: Be careful not to damage the shims when removing the bearing support.



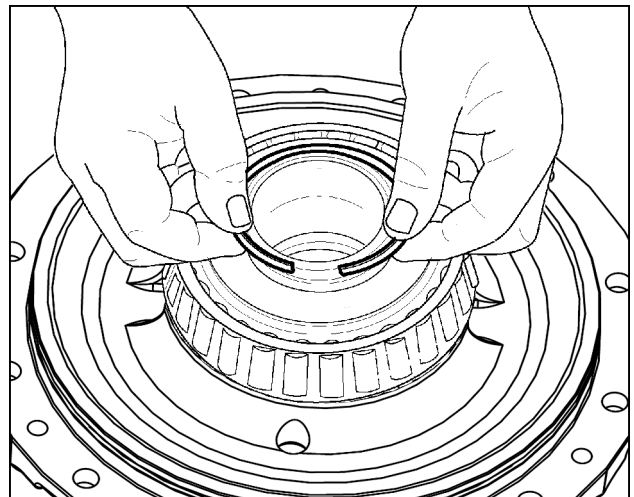
RAIL12TR2307AA 75

99. Remove and discard the oil seal.



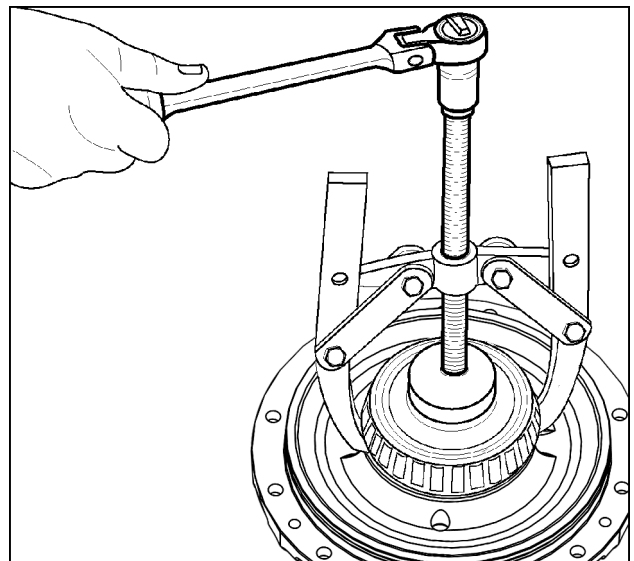
RAIL12TR2285AA 76

100. Remove and discard the seal ring.



RAIL12TR2286AA 77

101. If required, use a bearing puller and step plate to remove the bearing cone from the hub of the bearing carrier.



RAIL12TR2287AA 78

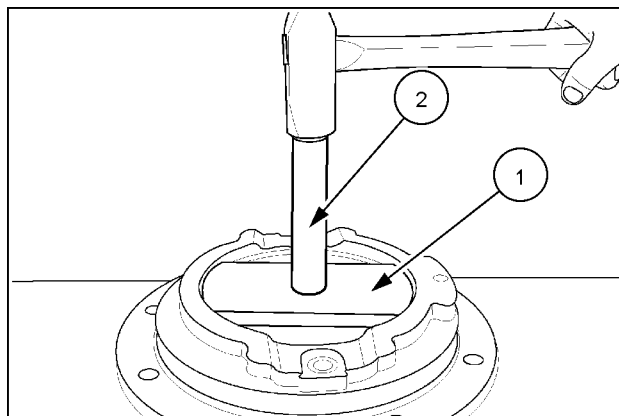
Differential - Assemble - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

Pinion carrier assembly

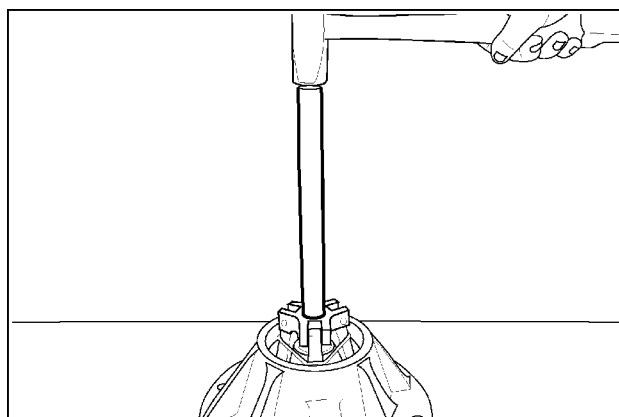
1. Use **CNH299050** bearing cup driver (1) and CNH299077 handle (2) to install the inner bearing cup into the carrier housing. Be sure the bearing cup is seated in the bore.

NOTE: Put a light coat of oil around the outside diameter of the bearing cup before installation.



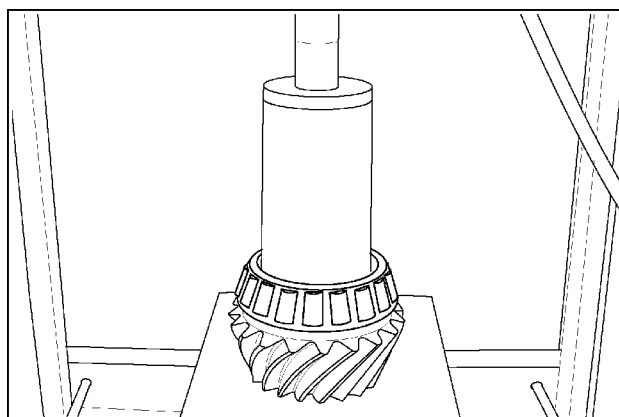
RCPH10FWD023ABJ 1

2. Put a light coat of oil around the outside diameter of the outer pinion bearing cup.
3. Use an universal bearing cup installer to install the outer bearing cup into the carrier.



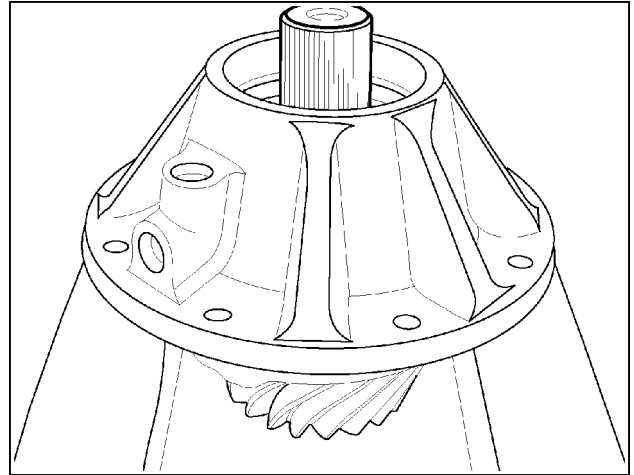
RCPH10FWD024ABJ 2

4. Put a light coat of oil around the inside diameter of the inner pinion bearing cone.
5. Use the **CNH299024** press sleeve and press to install the inner bearing cone on the pinion shaft until seated.



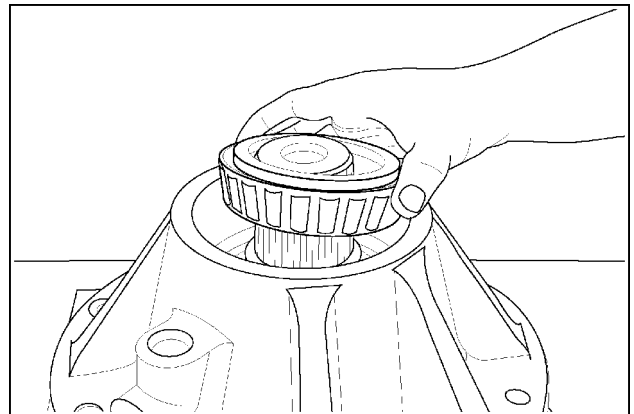
RCPH10FWD025ABJ 3

6. Lubricate the inner bearing cone with clean operating oil.
7. Install the bevel pinion gear into the carrier housing.



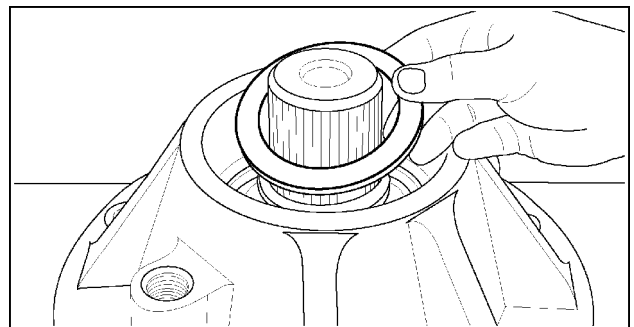
RCPH10FWD026ABJ 4

8. Lubricate the front bearing cone with clean operating oil or assembly grease.
9. Install the bearing cone on the pinion shaft.



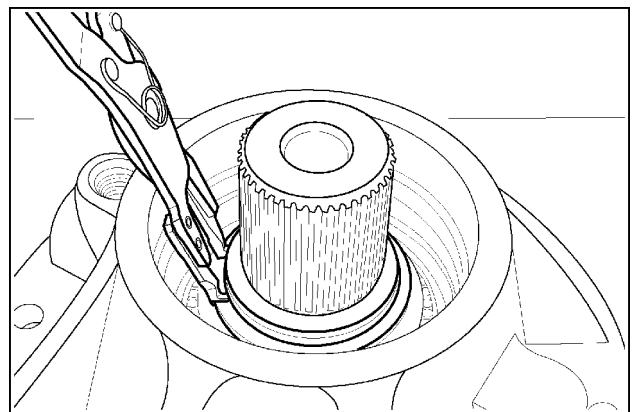
RCPH10FWD027ABJ 5

10. Install the thick spacer ring on the pinion shaft.



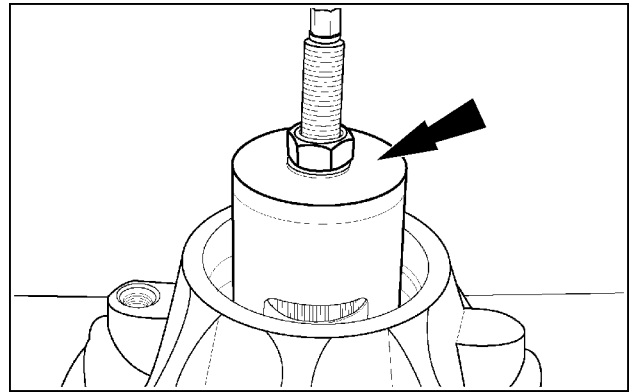
RCPH10FWD028ABJ 6

11. Install a new snap ring on the pinion shaft as far down as possible.



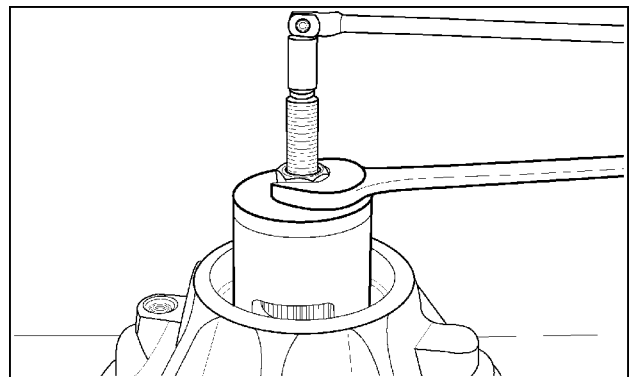
RCPH10FWD029ABJ 7

12. Install and tighten the center bolt of the **CNH299091** pinion bearing compression tool into the end of the pinion shaft.
13. Install the compression sleeve, thrust washer and nut on the center bolt.



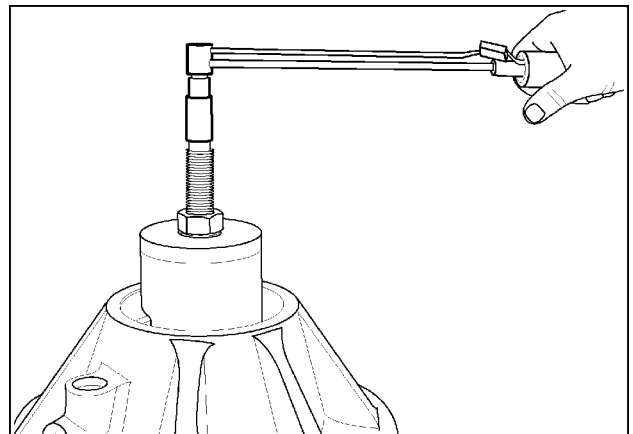
RCPH10FWD030ABJ 8

14. Use one wrench to hold the center bolt and a second wrench to tighten the nut to push the bearing cone on the pinion gear shaft until some resistance is noted when the pinion gear is rotated.
15. Install the snap ring into the groove of the pinion shaft.



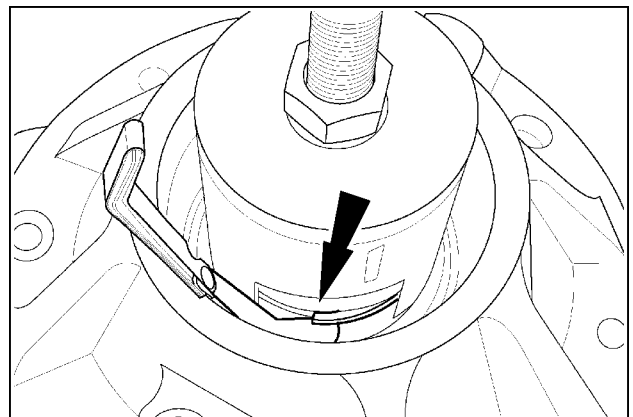
RCPH10FWD962AAJ 9

16. Use a torque wrench on the center bolt to measure rolling torque.
17. Tighten the nut until **19 – 20 N·m (168 – 177 lb in)** of smooth and continuous rolling torque is measured.



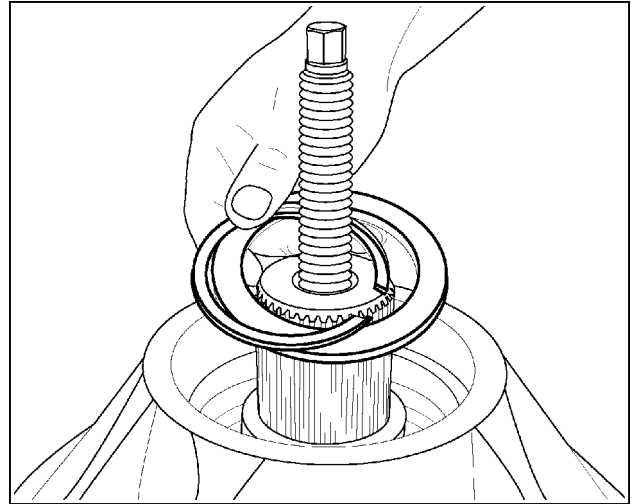
RCPH10FWD031ABJ 10

18. Use an angled feeler gauge to measure and record the distance between the spacer ring and the snap ring. The feeler gauge must be a tight fit.



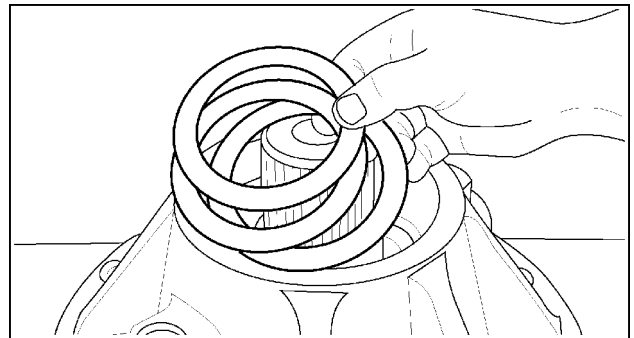
RCPH10FWD032ABJ 11

19. Remove the compression sleeve, snap ring and thick spacer ring.



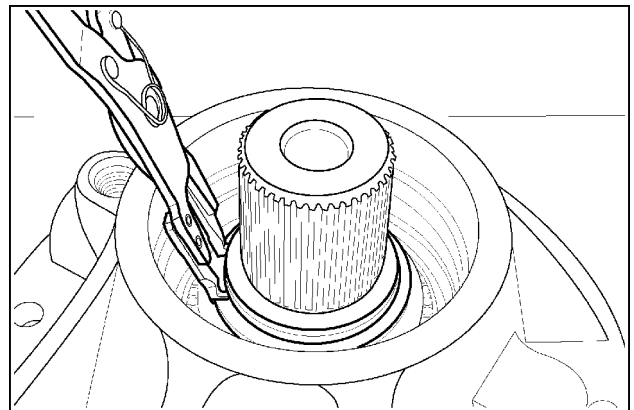
RCPH10FWD033ABJ 12

20. Select a shim combination equal to the distance measured in step 18.
21. Install the selected shim pack (thickest shim first) and thick spacer ring on the pinion shaft.



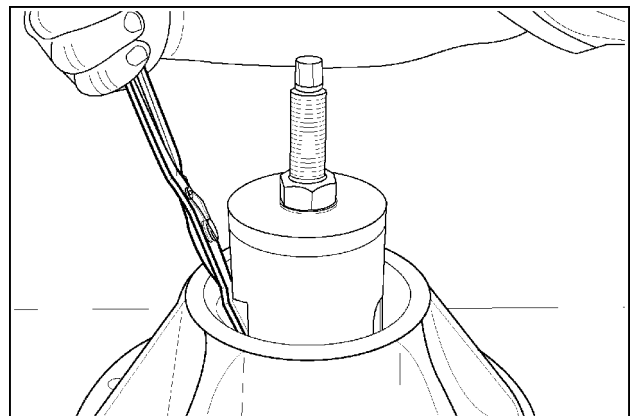
RCPH10FWD034ABJ 13

22. Install the snap ring on the pinion shaft as far down as possible.



RCPH10FWD029ABJ 14

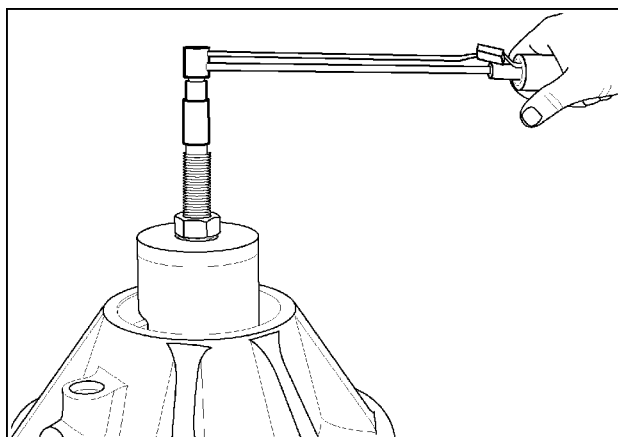
23. Install the compression sleeve, thrust washer and nut on the center bolt.
24. Align the open window of the sleeve with the gap of the snap ring.
25. Tighten the nut on the compression sleeve until the snap ring can be installed in the groove of the shaft. Be sure the snap ring is fully seated in the groove.



RCPH10FWD963AAJ 15

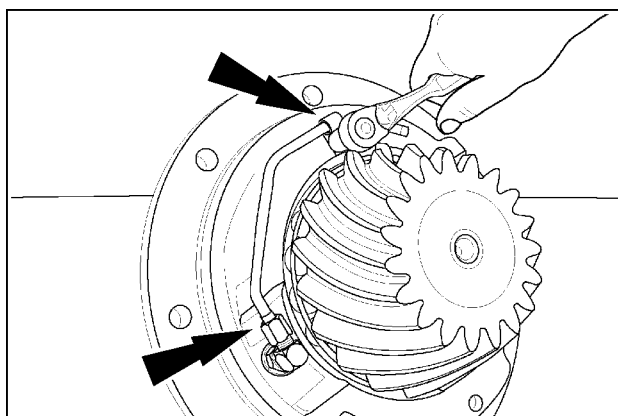
26. Loosen the nut on the center bolt at least two full turns.
27. Strike the head of the center bolt two sharp blows with a heavy hammer to back seat the bearing against the snap ring.
28. Use a torque wrench to check pinion bearing preload. Rolling torque must measure **6 – 20 N·m (53 – 177 lb in)** with no bearing binding or lockup. If rolling torque is out of tolerance, add or remove shims as needed to correct rolling torque.

NOTE: Adjust used bearings towards the low end of the preload tolerance range.



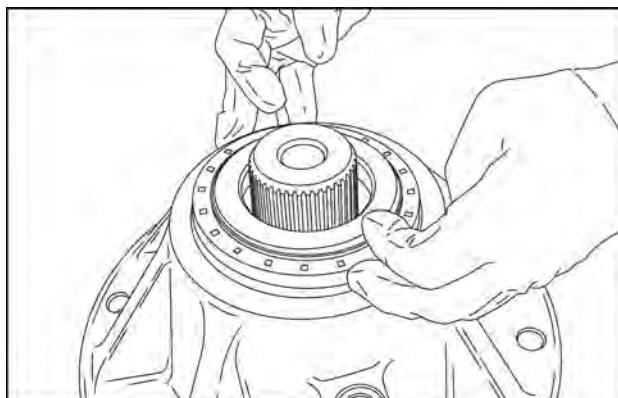
RCPH10FWD031ABJ 16

29. Install the lubrication port fitting, pinion lube tube, retaining clip and bolt. Adjust the tube to direct oil flow at the pinion gear teeth.
30. Tighten the bolt to **27 – 35 N·m (20 – 26 lb ft)**.
31. Adjust the tube to direct oil flow at the pinion gear teeth. Allow a minimum of **6 mm (0.24 in)** clearance between the end of the tube and the bevel gear.
32. Tighten the tube fitting and connection securely.



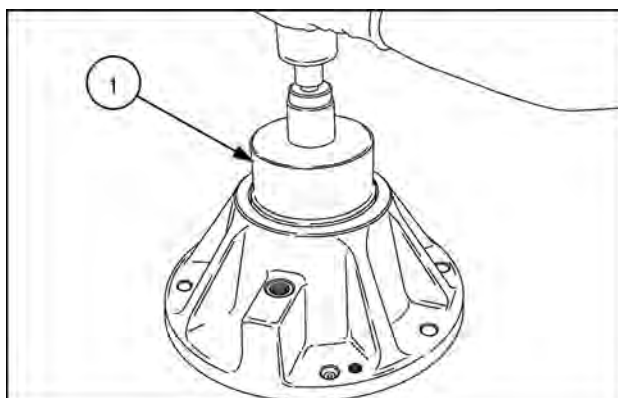
RCPH10FWD960AAJ 17

33. Install the pinion seal over the pinion shaft into the bore of the housing.



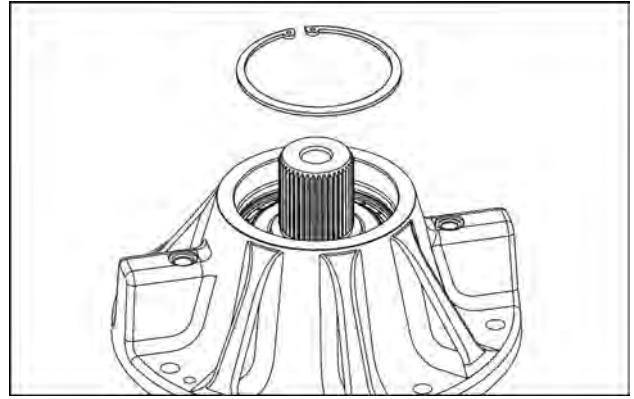
RAIL17TR01392AA 18

34. Use **380003447** pinion seal driver (1) with bolt and washer to draw oil seal down to position.



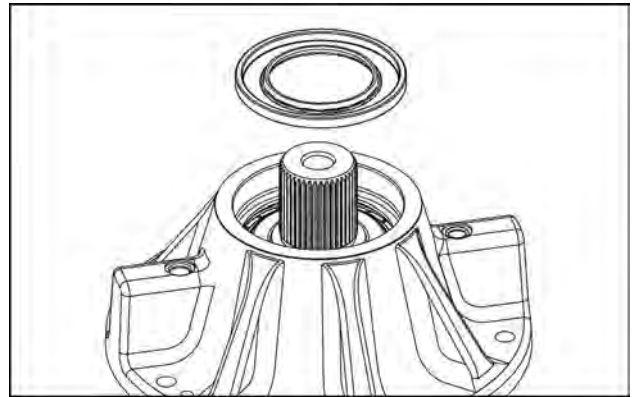
RAIL17TR01393AA 19

35. Install snap ring.



RAIL17TR01399AA 20

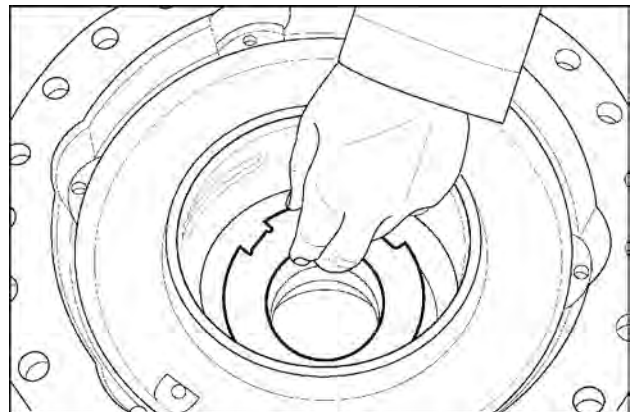
36. Press the dust seal on until it is flush with the housing.



RAIL17TR01398AA 21

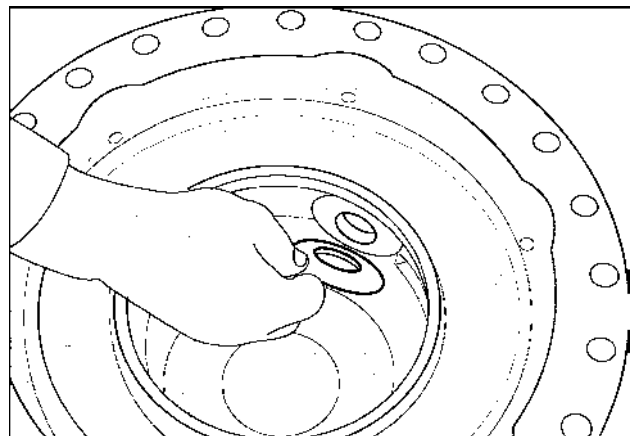
Differential case assembly procedures

37. Lubricate the thrust washer for the case with clean assembly grease.
38. Position the thrust washer tab side down in the bottom of the case.



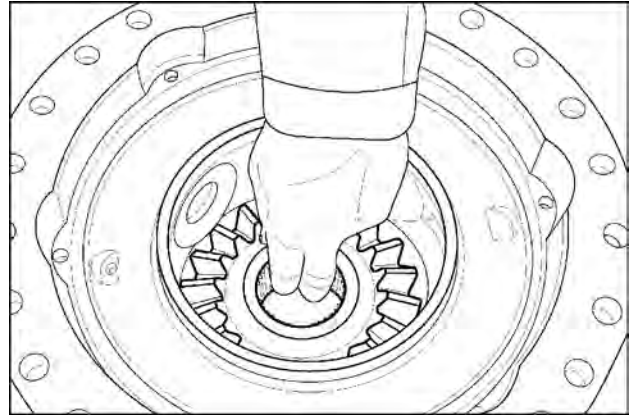
RAIL12TR2284AA 22

39. Lubricate each differential pinion gear thrust washer with clean assembly grease.
40. Install each differential pinion gear thrust washer (tab outward) to engage the slot in the case and centered to the hole.



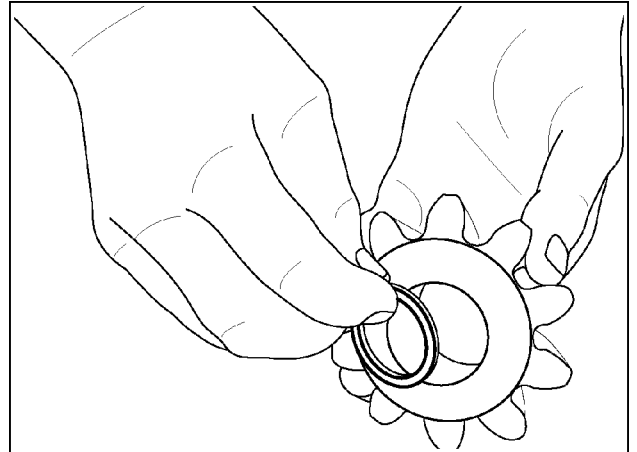
RAIL12TR2283AA 23

41. Install the side gear into the bore in the bottom of the case.



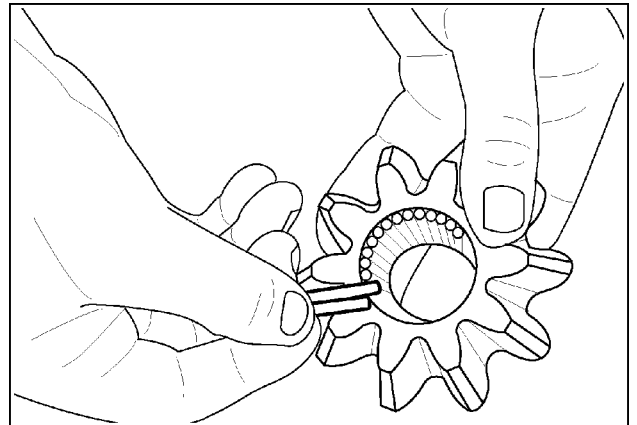
RAIL12TR2288AA 24

42. Lubricate the needle bearing slave ring with clean assembly grease.
43. Install the slave ring into the bore of the differential pinion gear.



RCPH10FWD038ABJ 25

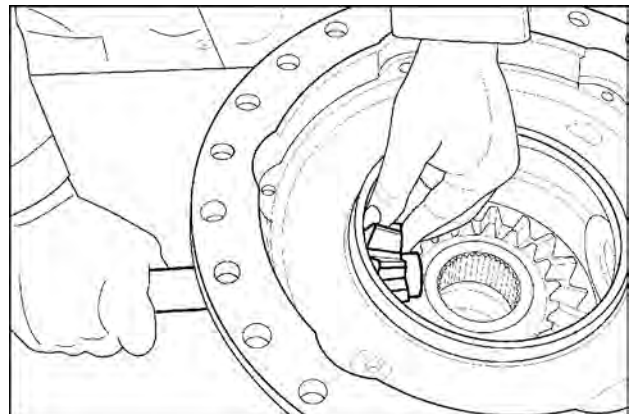
44. Using the slave ring as a needle roller bearing support, use clean assembly grease to install a full compliment of 28 needle roller bearings into each differential pinion gear.



RCPH10FWD039ABJ 26

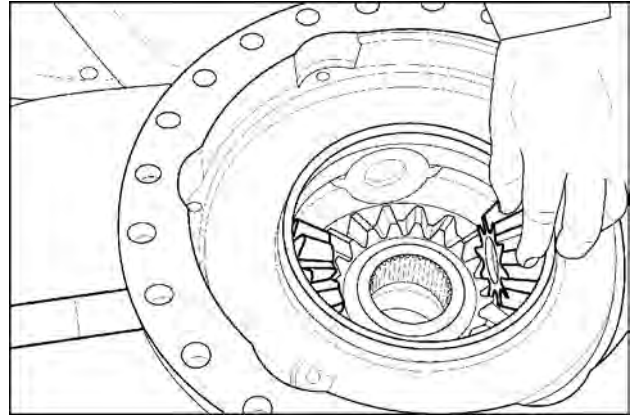
45. Install the first differential pinion gear into the case centered to the hole for the long pin and meshed with the side gear.
46. Push the pin through the case and into the differential pinion gear until the pin is flush with the inner side of the gear.

NOTE: Turn the long pin so that the hole in the center of the pin is horizontal.



RAIL12TR2289AA 27

47. Install the opposite side differential pinion gear centered to the case bore and meshed with the side gear.

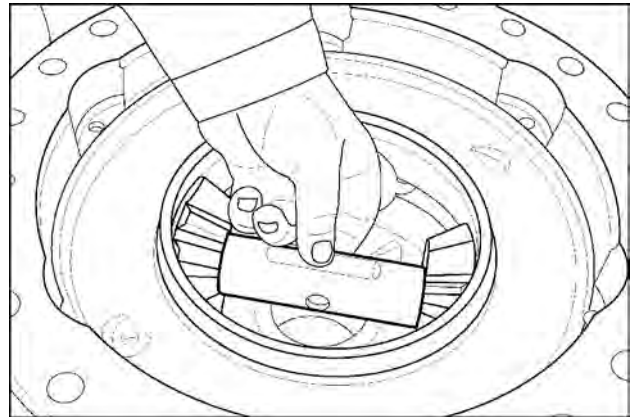


RAIL12TR2290AA 28

48. Install the long spacer sleeve between the two differential pinion gears so that the hole in the center of the sleeve is horizontal.

49. Carefully push the long pin through the spacer sleeve and differential pinion gears until the hole in the pin and spacer sleeve are aligned.

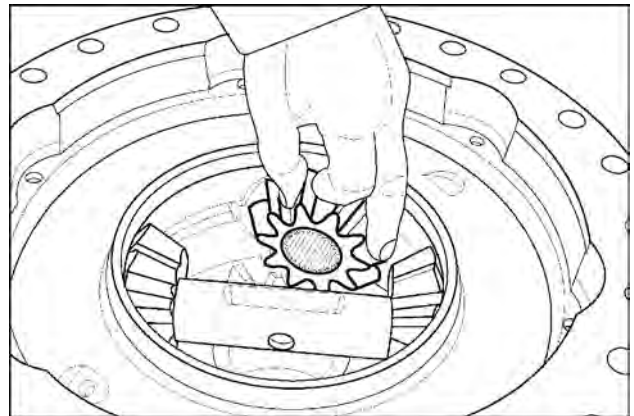
NOTE: Be sure the slave ring and all needle rollers remain in position in each pinion gear. Check the rotation of the pinion gears and bottom side gear. Rotation of the gears must be smooth without lockup.



RAIL12TR2291AA 29

50. Install the differential pinion gears for the short pins into the case in the same manner.

NOTE: The slave ring for each differential pinion gear must be installed on the beveled side of the gear.

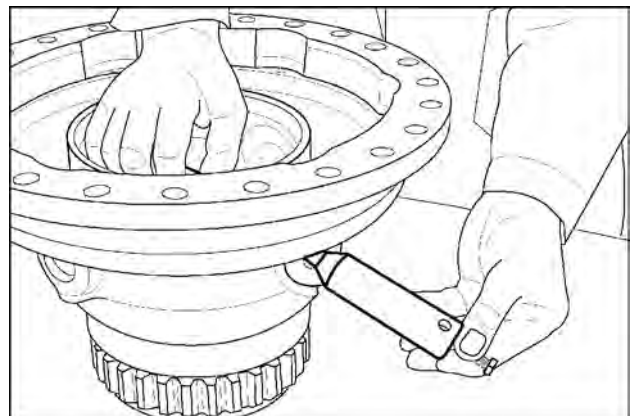


RAIL12TR2280AA 30

51. Position a short spacer sleeve between the pinion gear and long spacer sleeve.

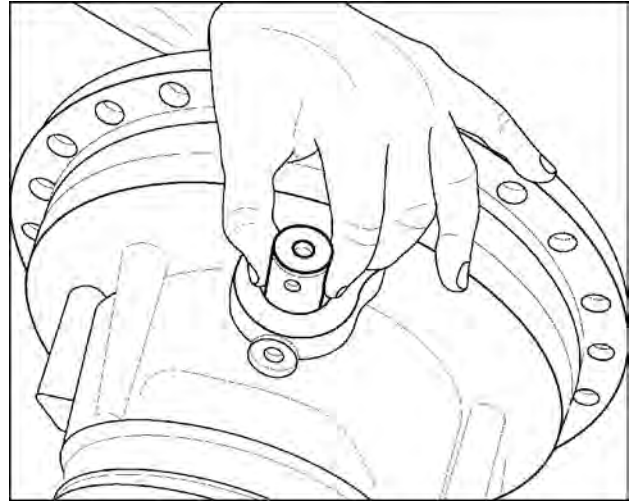
52. Carefully install the pinion pin and short spacer to engage the hole in the long pin and spacer.

NOTE: The large outside diameter of the spacer sleeve must mate against the ends of the needle rollers. Be sure all needle rollers remained in the gear.



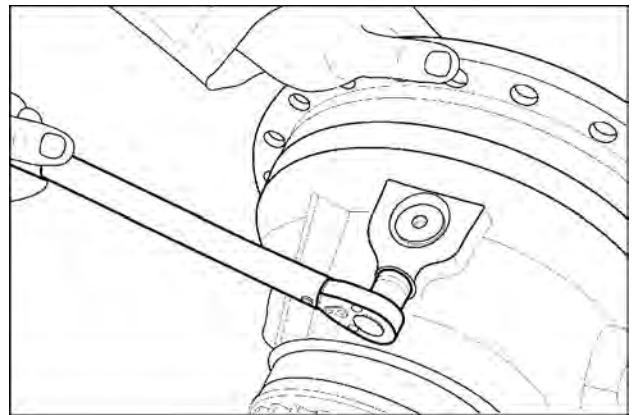
RAIL12TR2279AA 31

53. Align the hole in the end of the short pinion pin with the threaded hole in the case.
54. Repeat this procedure for the opposite short pinion shaft.



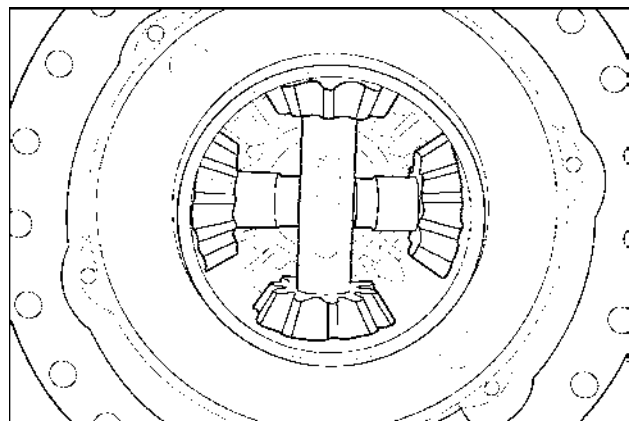
RAIL12TR2292AA 32

55. Install the pinion pin retainer bolts.
56. Tighten each bolt to **73 – 83 N·m (54 – 61 lb ft)**.



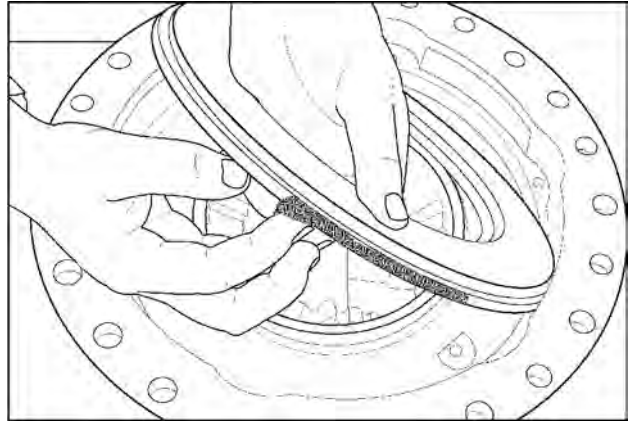
RAIL12TR2278AA 33

57. After all the pinion gears and pins have been installed, check the rotation of the differential gears. There must be no lockup during rotation.



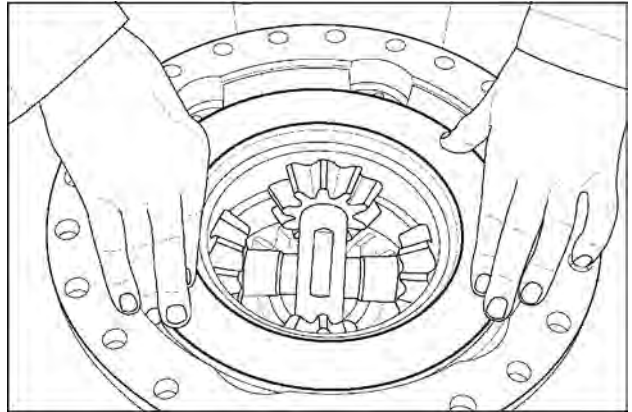
RAIL12TR2293AA 34

58. Lubricate the seals of a new piston with clean assembly grease.



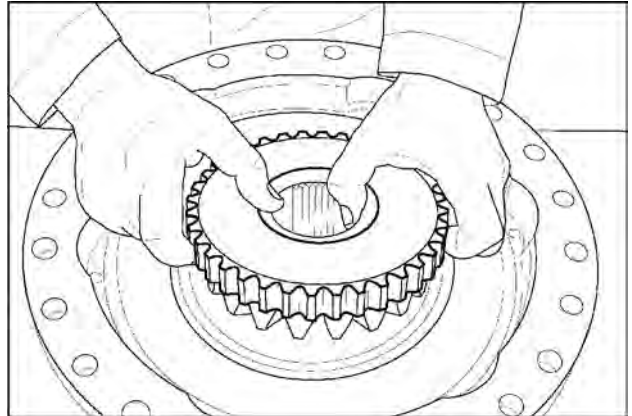
RAIL12TR2294AA 35

59. Hand seat the differential lock piston into the bore of the case.



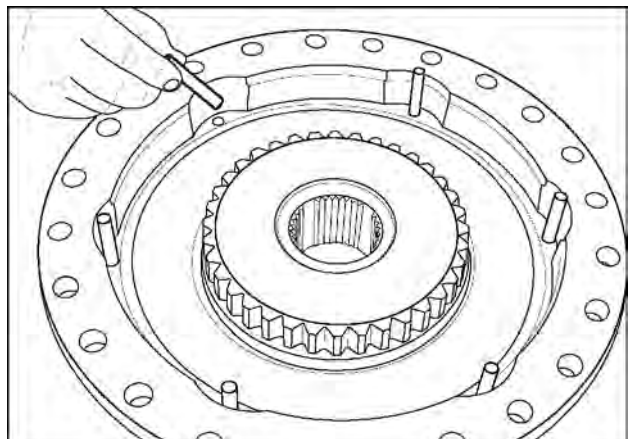
RAIL12TR2295AA 36

60. Install the splined side gear on top of the pinion gears so that all gears are in mesh.



RAIL12TR2296AA 37

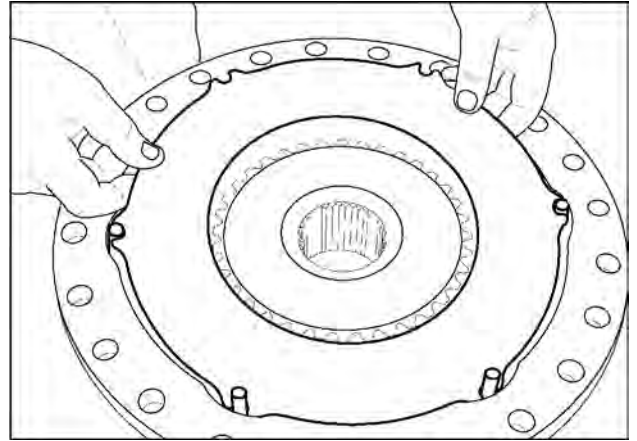
61. Install the six anti-rotation dowel pins into the holes in the case.



RAIL12TR2297AA 38

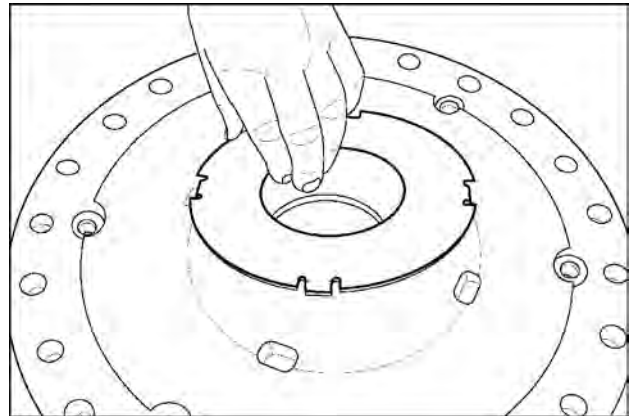
62. Starting with a steel separator plate, alternately install 4 separator plates and 3 friction plates. Be sure the slots in the ears of the separator plates engage the dowel pins.

NOTE: Soak the friction plates in clean operating fluid before installation.



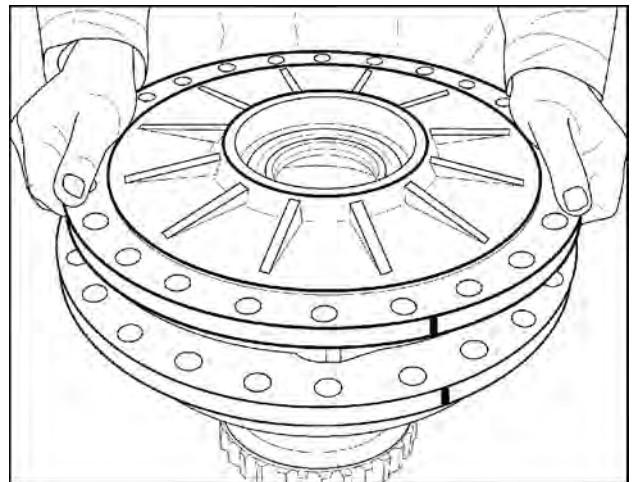
RAIL12TR2298AA 39

63. Lubricate the large thrust washer with clean assembly grease.
64. Install the thrust washer into the cover (tab side down).



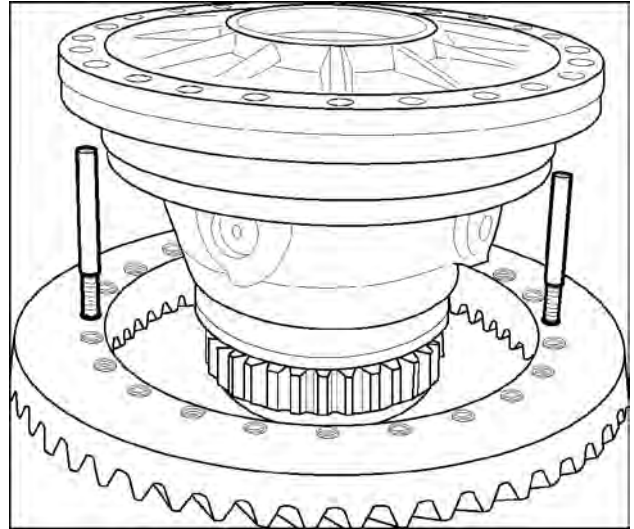
RAIL12TR2274AA 40

65. Install the cover on top of the case so that the match marks align.



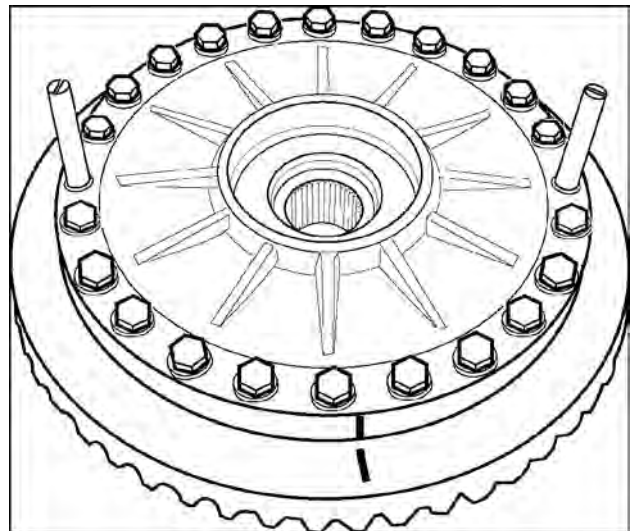
RAIL12TR2273AA 41

66. Put a light coat of oil around the inside diameter of the ring gear.
67. Install two of the CNH299082 alignment studs into opposite holes of the ring gear.
68. Position the differential case over the ring gear.



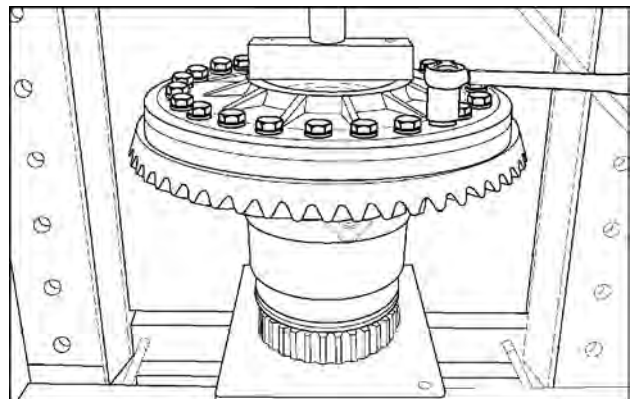
RAIL12TR2299AA 42

69. Position the ring gear on the differential case so the match marks align.
70. Install new retaining bolts and washers.



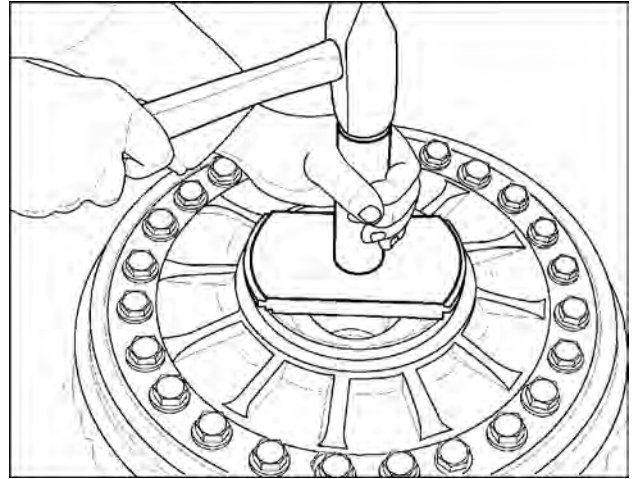
RAIL12TR2300AA 43

71. Clamp the differential assembly in a press. Tighten the retaining bolts alternately and evenly in small increments in a star pattern to **285 – 319 N·m (210 – 235 lb ft)**.



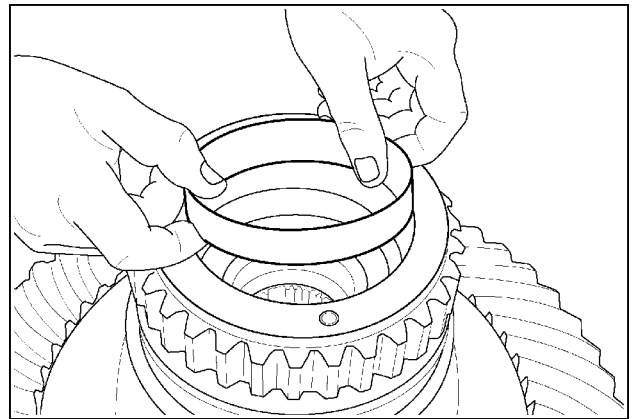
RAIL12TR2301AA 44

72. Put a light coat of oil around the outside diameter of the bearing cup
73. Use the CNH299083 bearing cup installer to install the bearing cup into the cover until fully seated.



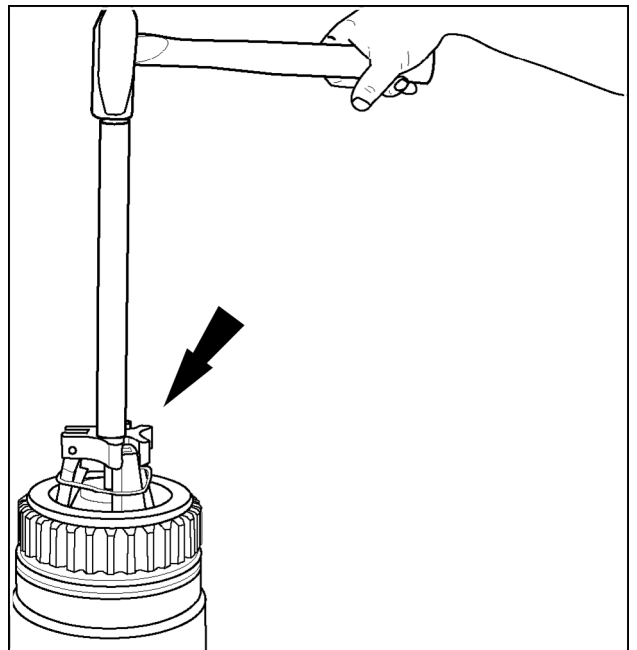
RAIL12TR2302AA 45

74. Put a light coat of oil around the outside diameter of the bearing cup.
75. Position the bearing cup into the bore of the right hand case.



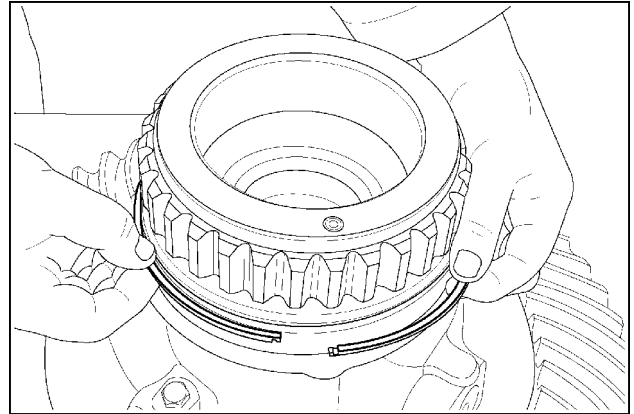
RCPH10FWD054ABJ 46

76. Use a universal bearing cup installer to install the bearing cup until seated.



RCPH10FWD055ABJ 47

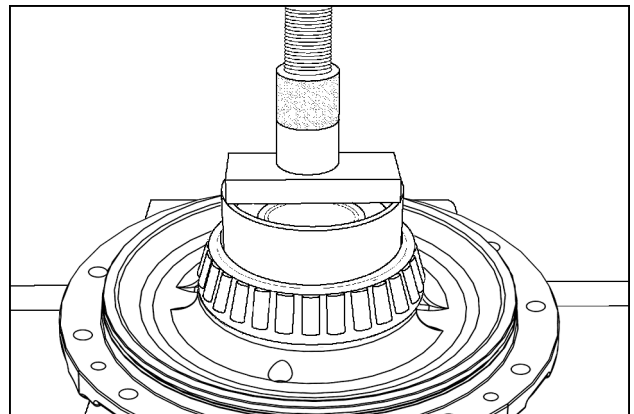
77. Lubricate the groove and the Teflon® seal ring liberally with clean assembly grease.
78. Install the Teflon® seal ring in the groove of the hub. Be sure the ends of the seal ring are connected together.



RCPH10FWD002ABJ 48

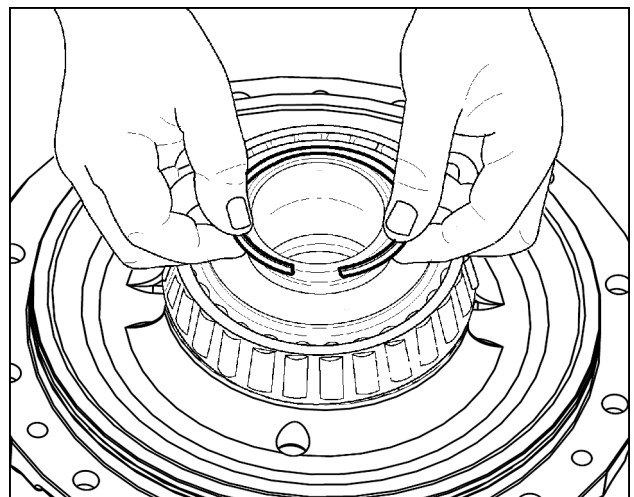
Left hand differential bearing support assembly

79. Put a light coat of oil around the outside diameter of the bearing cup.
80. Use the **CNH299093** bearing installer and a press to install the bearing cone until seated.



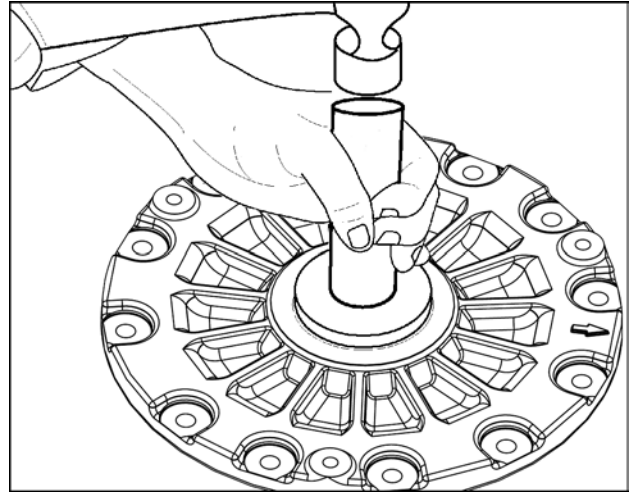
RAIL12TR2304AA 49

81. Lubricate and install a new seal ring in the groove of the bearing hub.



RAIL12TR2286AA 50

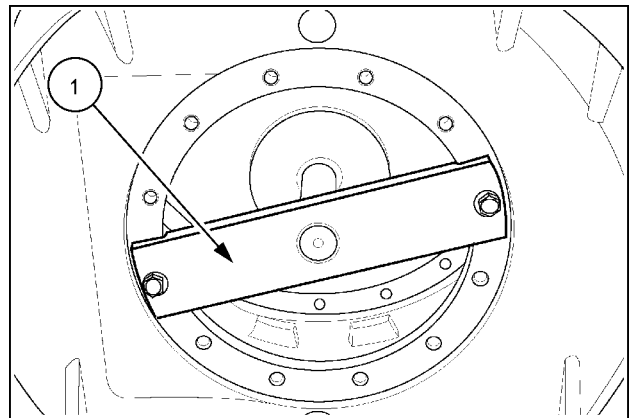
82. Use an appropriate size seal driver to install a new oil seal into the bearing carrier.



RAIL12TR2303AA 51

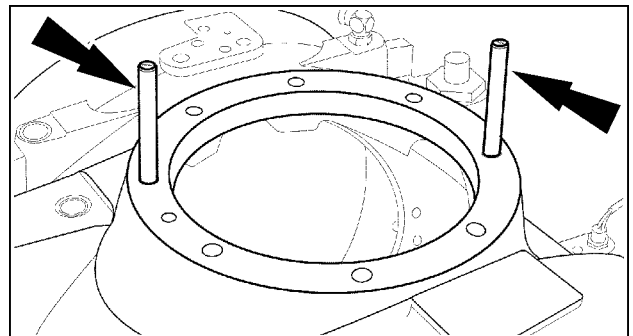
Adjusting bevel pinion gear depth

83. Install the **CNH299088** pinion depth gauge arbor into the bore for the left hand bearing support. Use two of the bearing support retaining bolts and washers.
84. Tighten the bolts to a torque of **47 – 54 N·m (35 – 40 lb ft)**.



RCPH10FWD096ABJ 52

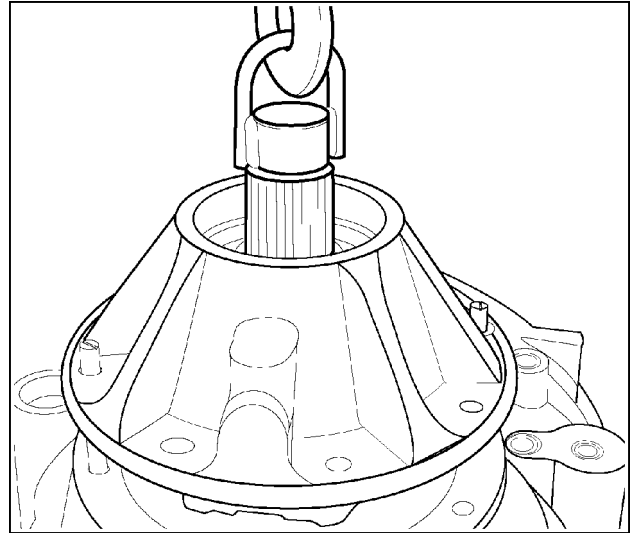
85. Install two of the **CNH299082** alignment studs opposite each other into the mounting flange.



RCPH10FWD235ABJ 53

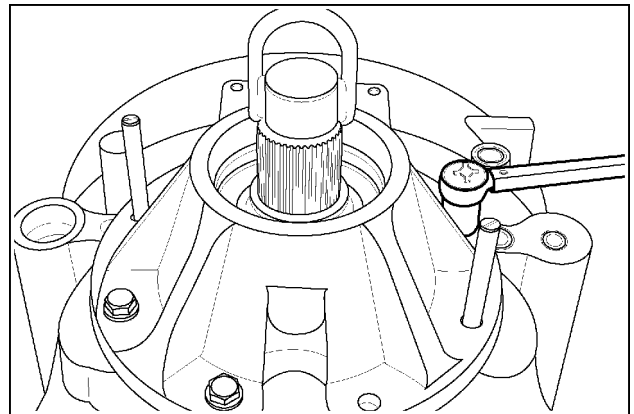
86. Use a lifting eye to install the pinion carrier assembly into the housing.

NOTE: Do not install the shims at this time.



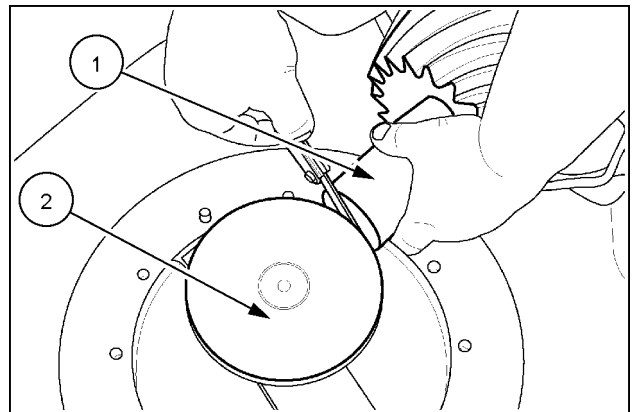
RCPH10FWD081ABJ 54

87. Install four equally spaced carrier assembly retaining bolts and washers.
88. Tighten the bolts to **284 – 298 N·m (209 – 220 lb ft)**.



RCPH10FWD098ABJ 55

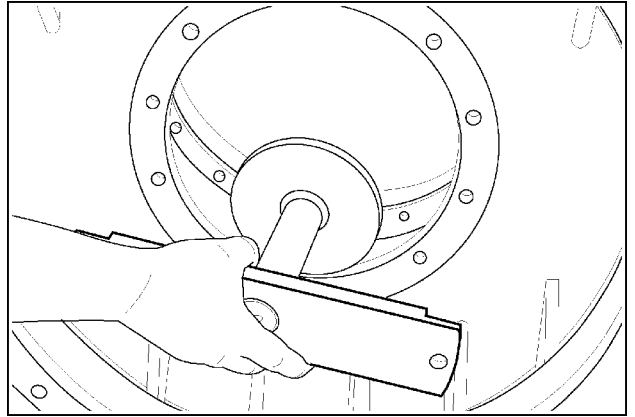
89. Install the CNH299076 gauge block (1) between the pinion and arbor (2) with the hole end of the gauge block held tightly against the end of the pinion.



RCPH10FWD099ABJ 56

90. Use a feeler gauge to measure and record the distance between the end of the gauge block and arbor.

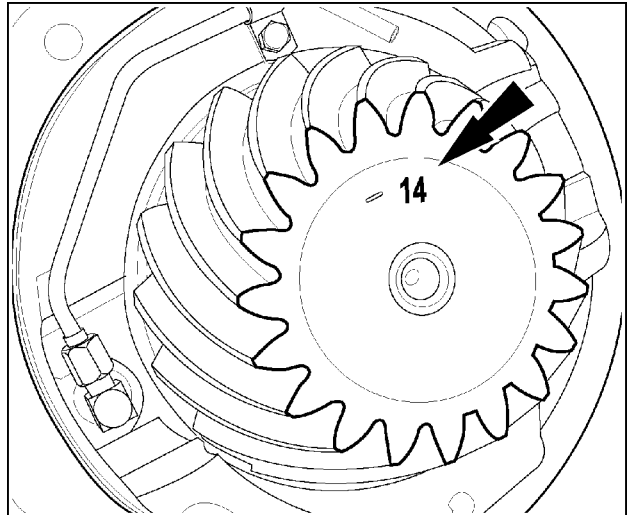
91. Remove the pinion carrier retaining bolts and lift the pinion carrier assembly from the housing.
92. Remove the **CNH299088** arbor.



RCPH10FWD100ABJ 57

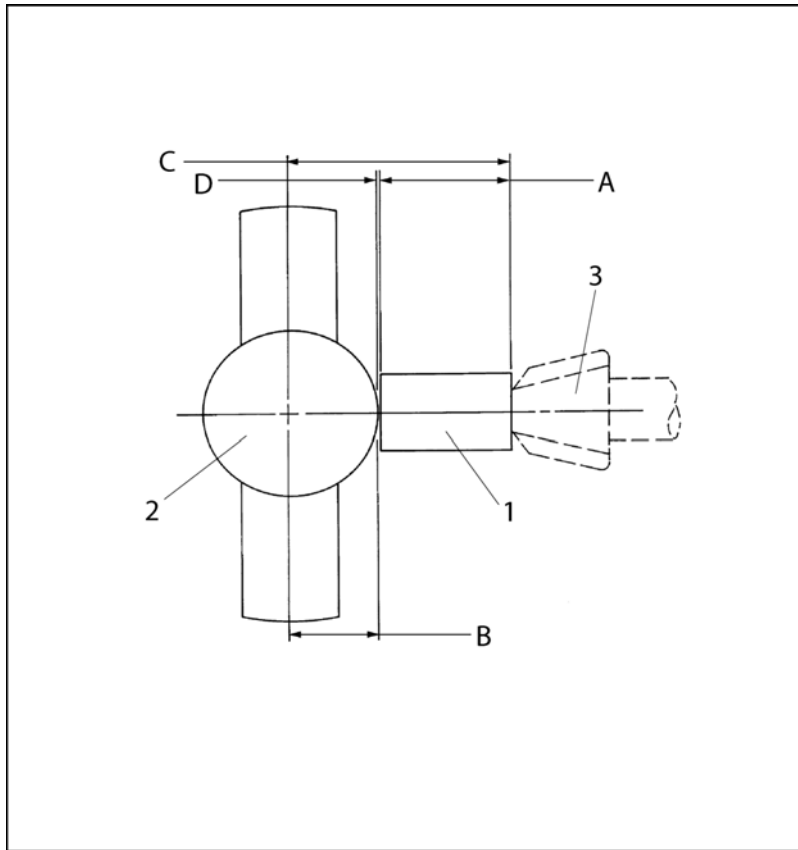
93. A correction factor number is etched onto the head end of the pinion. This number will be shown as a plus or minus adjustment in hundredths of a millimeter. Add or subtract this number from the standard nominal pinion depth dimension.

NOTE: The standard nominal mounting distance for the bevel pinion gear is **175.22 mm (6.90 in)** measured from the head end of the pinion gear to the center line of the differential.



RCPH10FWD101ABJ 58

94. Use the following table and example to calculate the pinion depth shim requirements.



RCPH10FWD120FBJ 59

(1) CNH299088 pinion depth gauge arbor, (2) CNH299076 pinion depth gauge block, (3) pinion

Item	Metric value	U.S. value
A	97.99 mm	3.858 in
B	75.82 mm	2.985 in
C	174.25 mm	6.860 in
D	.44 mm	0.017 in
Gap measurement		

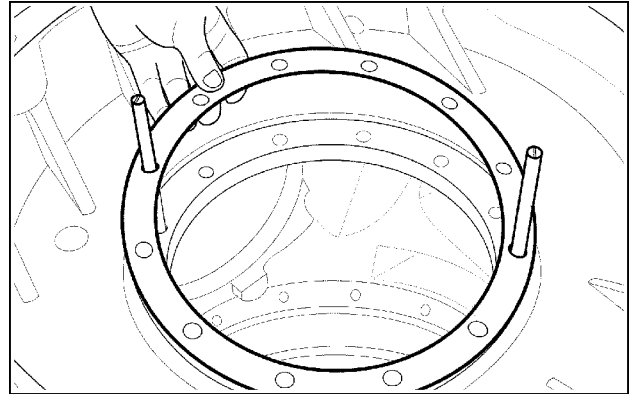
Example:

Item	Metric value	U.S. value
Tool constant dimension (A + B)	173.81 mm	6.840 in
Gap measurement (D)	.44 mm	0.017 in
Total measured distance (A + B + D = C)	174.25 mm	6.860 in
Standard nominal pinion depth	175.22 mm	6.808 in
Reading on the pinion	-0.14 mm	0.005 in
Actual nominal pinion depth	175.08 mm	6.892 in
Minus total measured distance	174.25 mm	6.860 in
Shim requirement	0.83 mm	0.032 in

95. Select a shim combination that will provide the shim requirement calculated in the last step within **0.03 mm (0.001 in)**.

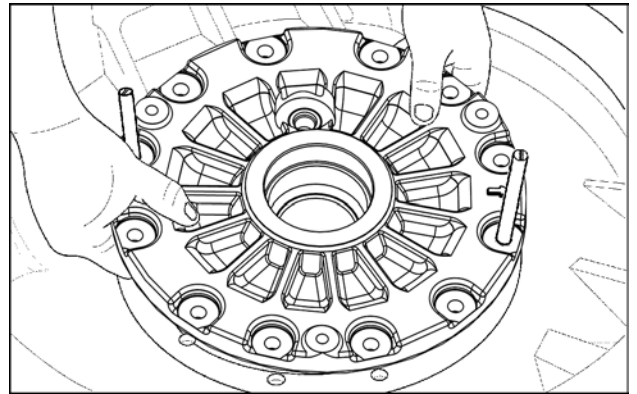
Setting differential carrier bearing preload

96. Install two **CNH299044** guide bolts into opposite holes of the left hand side bearing carrier bore.
97. Install the original bearing preload shim pack over the guide bolts so that all holes align.



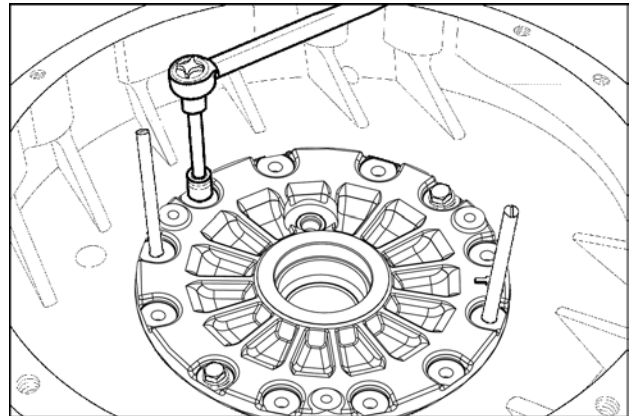
RCPH10FWD236ABJ 60

98. Install the pre-assembled left hand side bearing carrier into the housing.



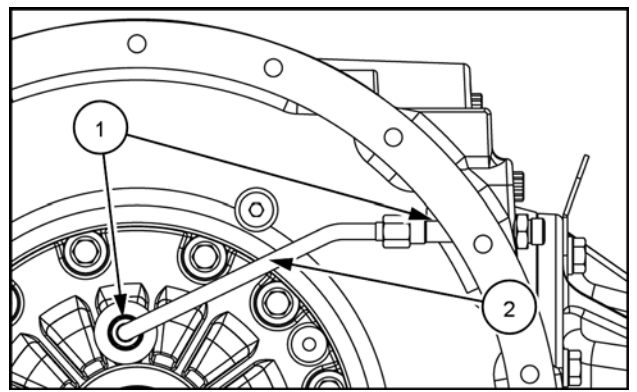
RAIL12TR2308AA 61

99. Remove the guide studs and install four equally spaced retaining bolts with washers.
100. Torque the bolts to **89 – 100 N·m (65 – 74 lb ft)**.



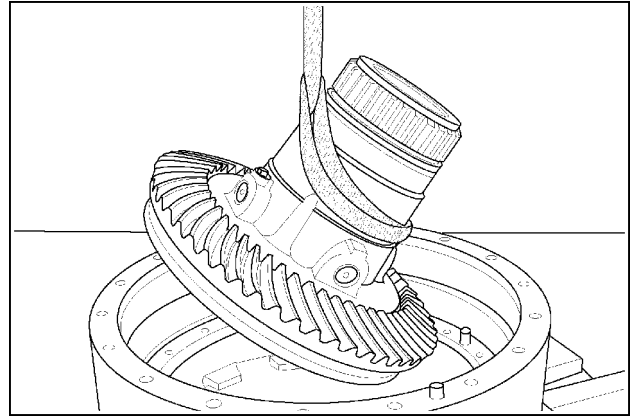
RAIL12TR2309AA 62

101. Assemble fittings (1) and lubrication tube (2) to the bearing carrier and differential housing.



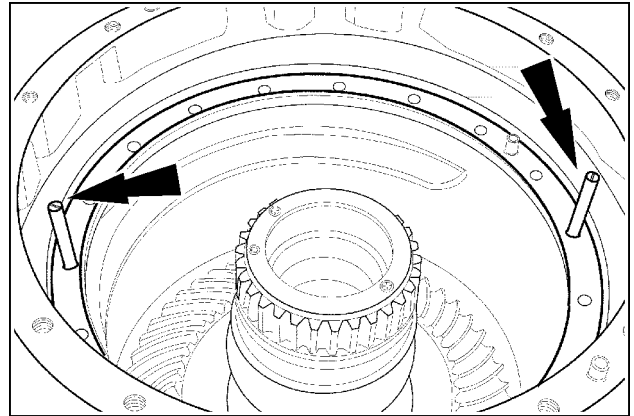
RAIL13TR00356AA 63

102. Rotate the differential housing so the right hand side is up.
103. Use a hoist to slowly and carefully install the differential assembly into the housing to engage the left hand side bearing support.



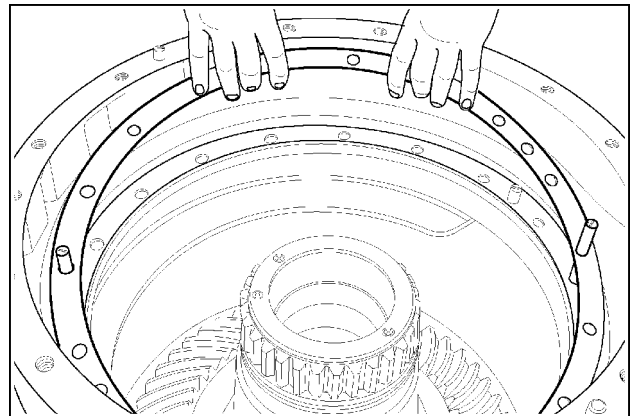
RCPH10FWD107ABJ 64

104. Install two **CNH299044** alignment studs into opposite holes of the housing.



RCPH10FWD239ABJ 65

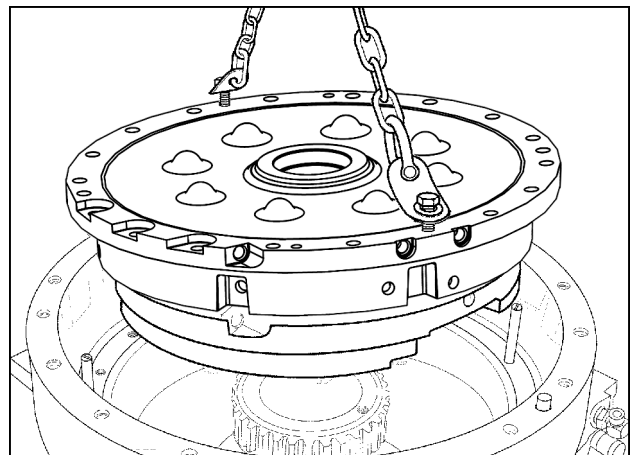
105. Install the original shim pack for the brake carrier and bearing support over the alignment studs so that all holes align.



RCPH10FWD210ABJ 66

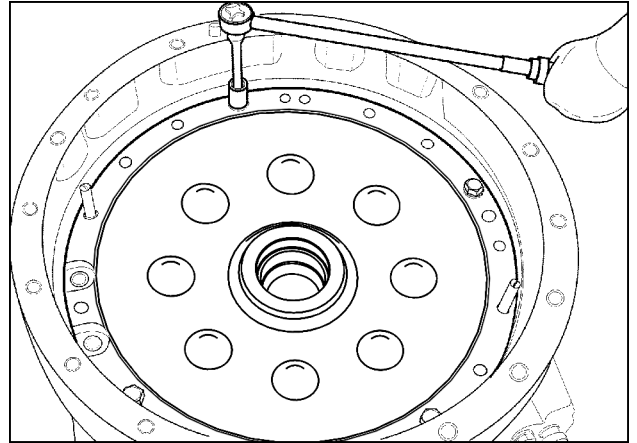
106. Use a hoist to carefully install the brake carrier into the housing so that the marks put on during disassembly, align.

NOTE: The brake discs and seals are not installed in the brake carrier during the bearing preload procedures.



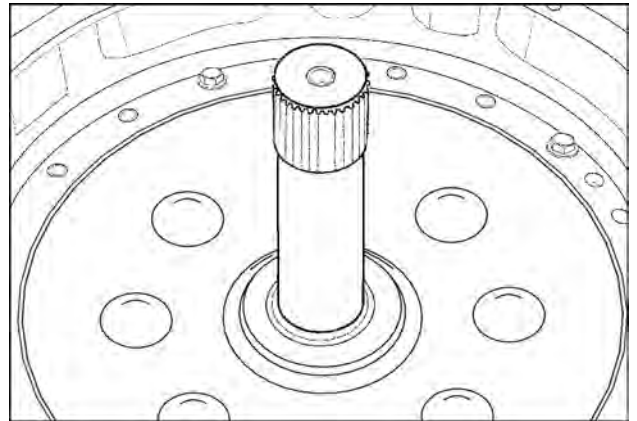
RAIL12TR2305AA 67

107. Install four of the carrier retaining bolts with washers 90 degrees from each other.
108. Torque the bolts evenly to **146 – 165 N·m (108 – 122 lb ft)**.



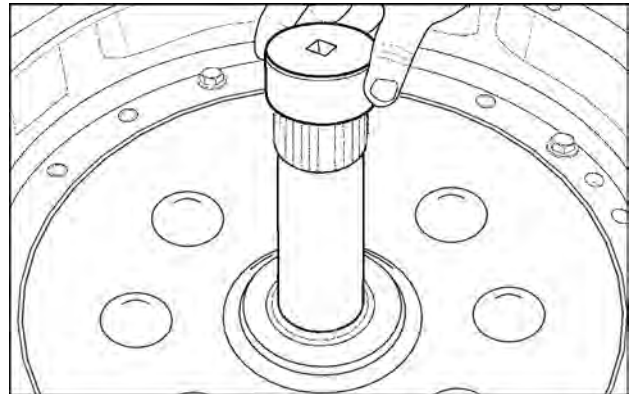
RAIL12TR2310AA 68

109. Install the right hand axle stub shaft into the differential.



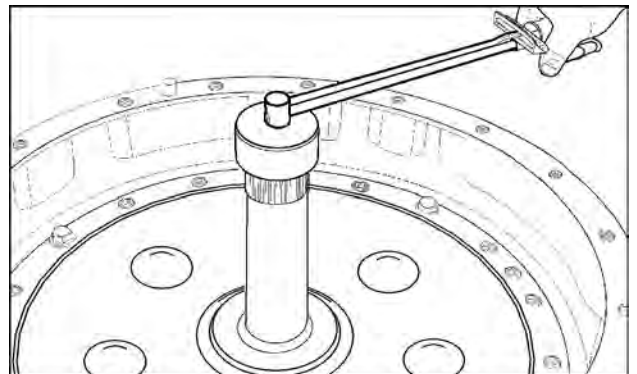
RAIL12TR2346AA 69

110. Install the **CAS2508** differential rolling torque adapter over the gear.



RAIL12TR2347AA 70

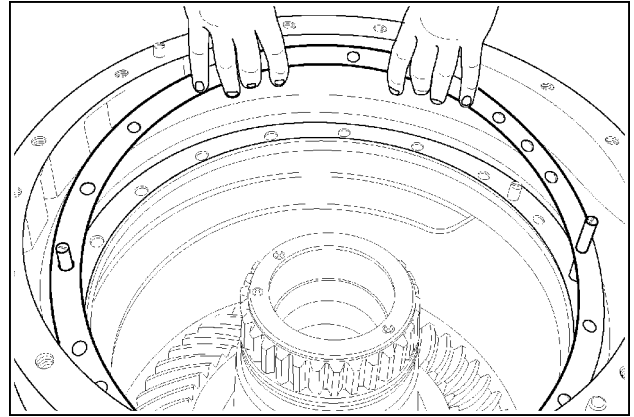
111. Connect a torque wrench to the adapter.
112. Rotate the differential and measure the differential carrier bearing rolling torque. Bearing preload will be correct when **6 – 13 N·m (53 – 115 lb in)** of smooth and consistent rolling torque is measured on the torque wrench.



RAIL12TR2348AA 71

113. If differential bearing preload is out of tolerance, add or remove shims as required from the right hand and/or left hand bearing support shim pack until bearing preload is correct.

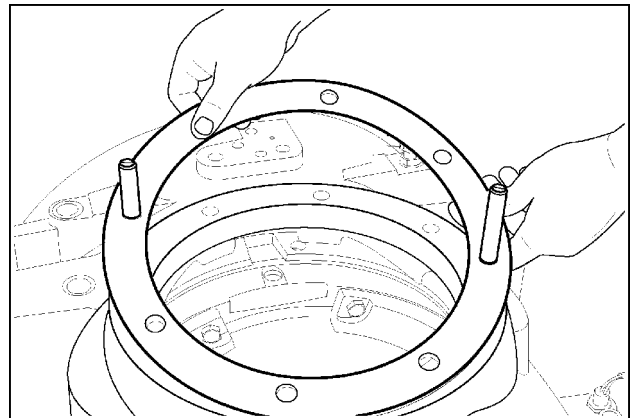
NOTE: Adjust used bearings to the low end of the rolling torque specifications.



RCPH10FWD210ABJ 72

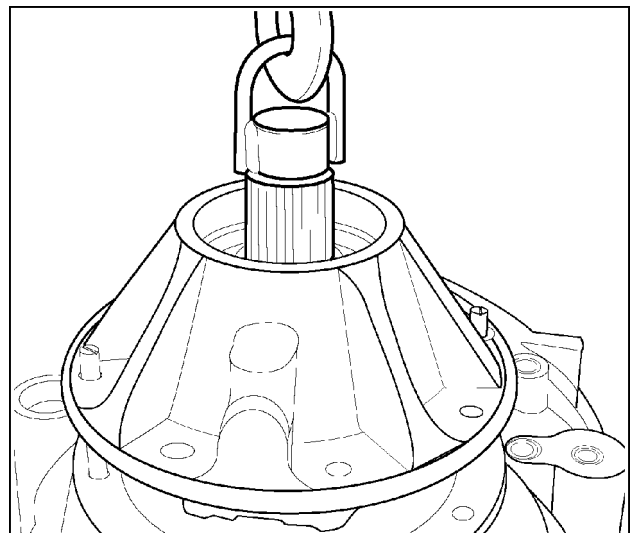
Setting the ring/pinion gear backlash

114. After adjusting differential carrier bearing preload correctly, rotate the housing so the pinion carrier will be on top.
115. Install two CNH299082 alignment studs opposite each other and install the pinion carrier shim pack calculated in step 95.



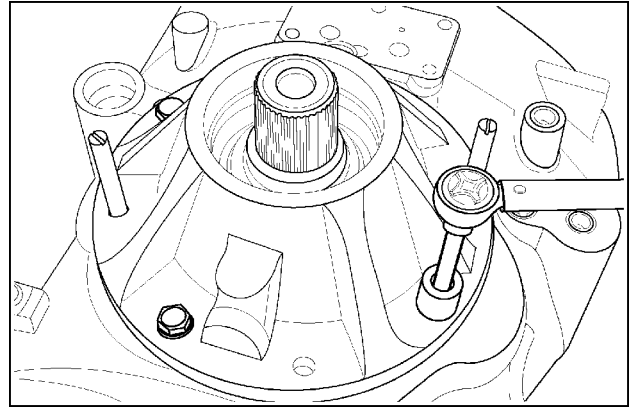
RCPH10FWD244ABJ 73

116. Install the pinion carrier assembly into the housing and remove the lifting eye.



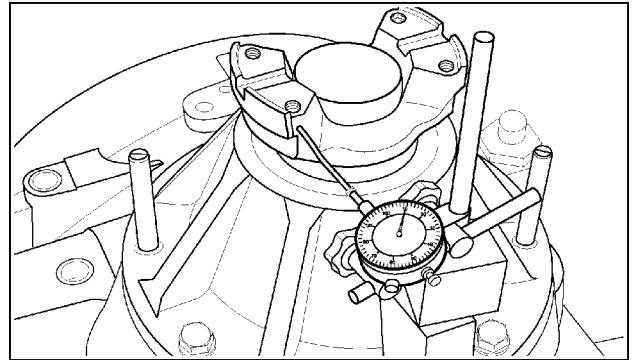
RCPH10FWD245ABJ 74

117. Install four pinion carrier retaining bolts and washers equally spaced.
118. Torque the four bolts to **284 – 298 N·m (209 – 220 lb ft)**.



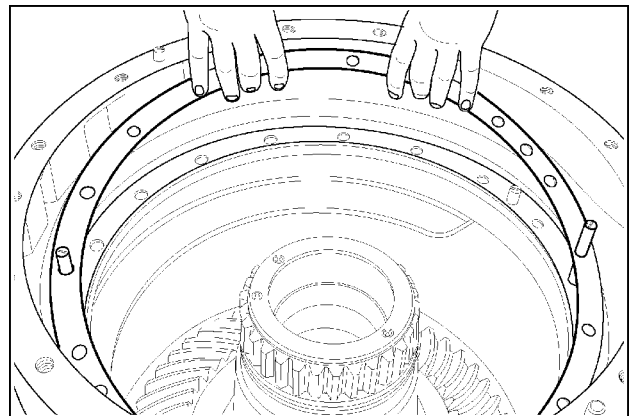
RCPH10FWD114ABJ 75

119. Install the drive yoke on the pinion gear.
120. Use a dial indicator to measure ring/pinion gear backlash. Set the pointer of the dial indicator to contact the outer edge of the drive yoke flange.
121.
 1. Rotate the pinion gear in either direction to achieve full contact with the ring gear.
 2. Do not move the ring gear. Zero the dial indicator.
 3. Rotate the pinion gear in the opposite direction to achieve full contact with the ring gear. Do not move the ring gear.
 4. Record the dial indicator reading.



RCPH10FWD246ABJ 76

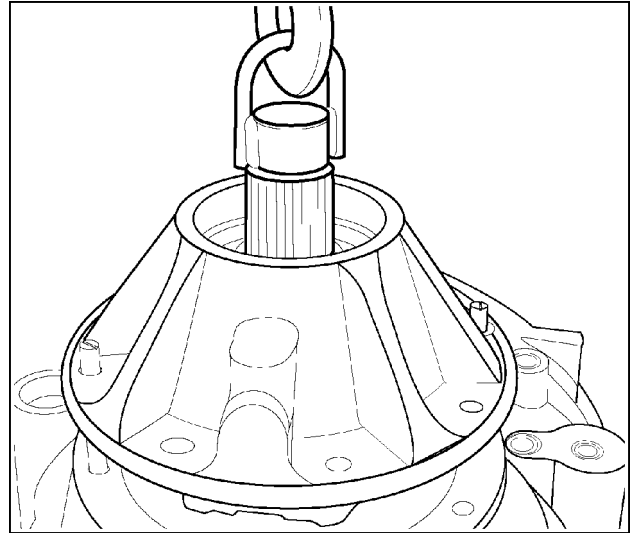
122. Perform this operation two or three times to ensure an accurate measurement. The backlash must be **0.2 – 0.3 mm (0.008 – 0.012 in)**.
123. If too much backlash was measured, the ring gear must be moved closer to the pinion gear. If too little backlash was measured, the ring gear must be moved away from the pinion gear.
124. To adjust the ring and pinion gear backlash, remove shims from one side of the differential and add the same amount to the other side so that differential carrier bearing preload is maintained. Moving a **0.254 mm (0.010 in)** shim from one side to the other will change the backlash approximately **0.169 mm (0.007 in)**.



RCPH10FWD210ABJ 77

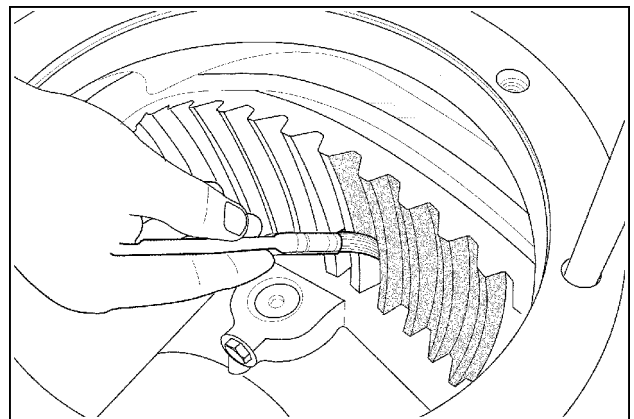
Checking for correct bevel pinion/gear tooth contact

125. After differential bearing preload and ring/pinion gear backlash adjustments have been completed, remove the pinion carrier.



RCPH10FWD081ABJ 78

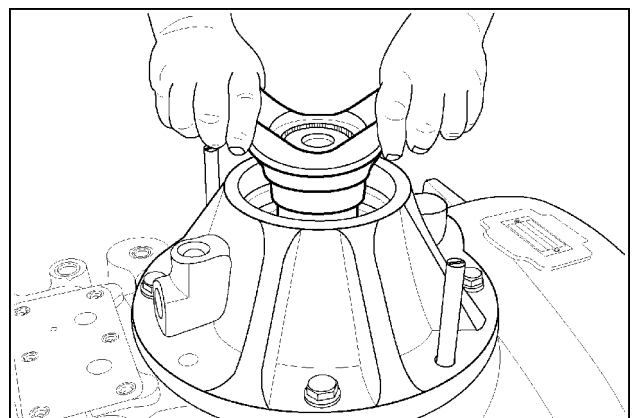
126. Put Prussian Blue or red lead on both sides of several ring gear teeth.



RCPH10FWD116ABJ 79

127. Reinstall the pinion gear carrier and torque the retaining bolts to **284 – 298 N·m (209 – 220 lb ft)**.
128. Turn the pinion several revolutions in both directions to determine the tooth contact pattern.
129. Remove the pinion carrier.

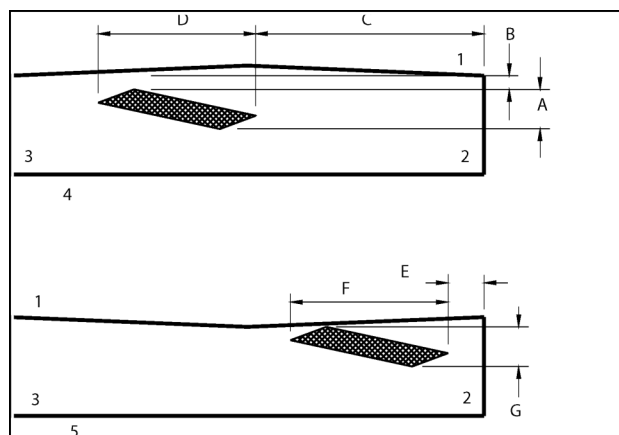
NOTE: See the contact patterns in the following illustrations. The contact pattern of the gear teeth that are shown are approximate shapes. Tooth contact pattern can change from the illustrations.



RCPH10FWD117ABJ 80

130. Inspect the contact pattern of the gear teeth. Compare the contact pattern with the following illustrations and tables, for both the right hand (rear) and the left hand (front) pinion sets, and determine the correct tooth contact pattern.

Right Hand (rear) Pinion Set Contact Pattern:



RCPH10FWD121FBJ 81

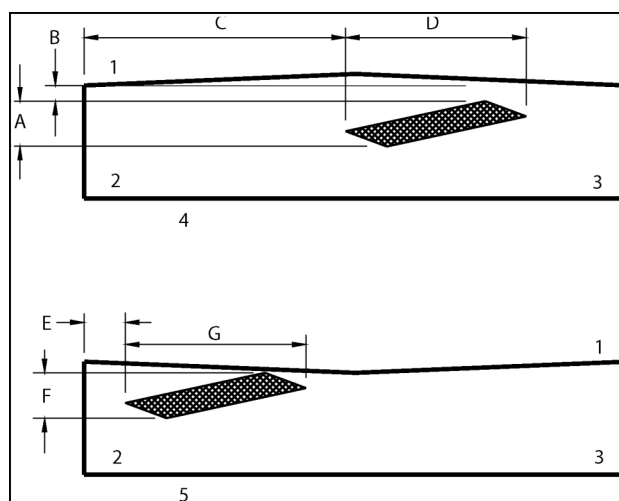
Correct tooth contact pattern: right hand (rear) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	6 – 9 mm	0.236 – 0.354 in
B	3 – 5 mm	0.118 – 0.197 in
C	30 – 35 mm	1.181 – 1.378 in
D	35 – 40 mm	1.378 – 1.575 in
E	10 – 15 mm	0.394 – 0.591 in
F	35 – 40 mm	1.378 – 1.575 in
G	6 – 8 mm	0.236 – 0.315 in

Left hand (front) pinion set contact pattern



RCPH10FWD122FBJ 82

Correct tooth contact pattern: left hand (front) pinion set

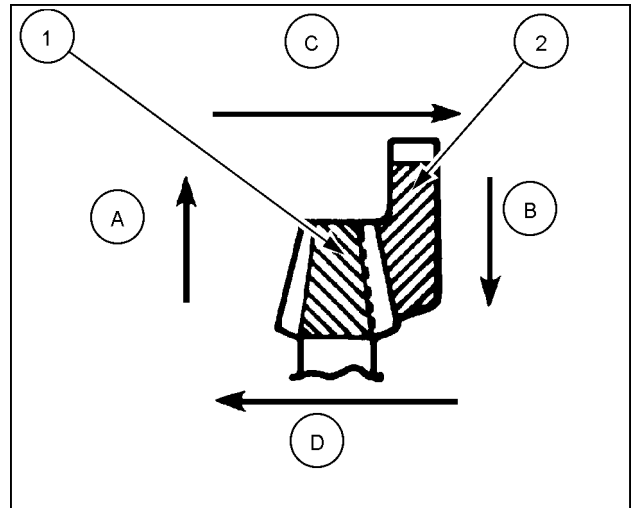
Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	5 – 8 mm	0.197 – 0.315 in
B	2 – 4 mm	0.079 – 0.157 in
C	30 – 35 mm	1.181 – 1.378 in
D	40 – 45 mm	1.575 – 1.772 in
E	10 – 15 mm	0.394 – 0.591 in
F	6 – 8 mm	0.236 – 0.315 in
G	35 – 40 mm	1.378 – 1.575 in

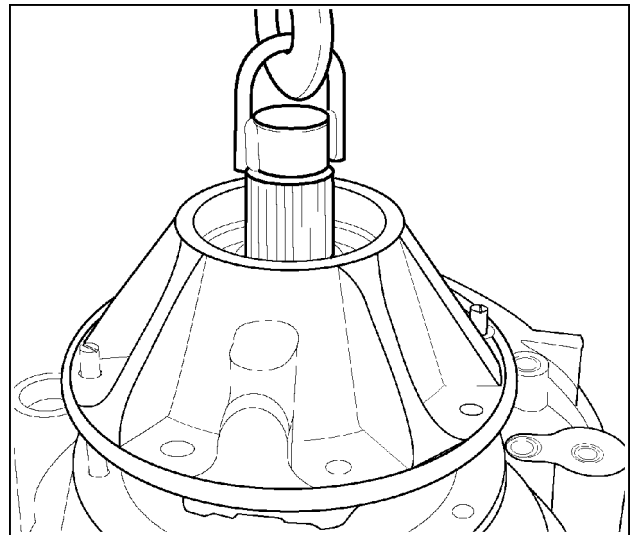
131. Adding or subtracting pinion carrier shims to change pinion depth must be done in small increments until the correct tooth contact pattern is obtained.

(A) Move the drive pinion (1) towards the ring gear (2) to move the contact pattern away from the Toe.
 (B) Move the drive pinion away from the ring gear to move the contact pattern towards the Toe.
 (C) Move the ring gear away from the drive pinion to increase backlash.
 (D) Move the ring gear towards the drive pinion to decrease backlash.



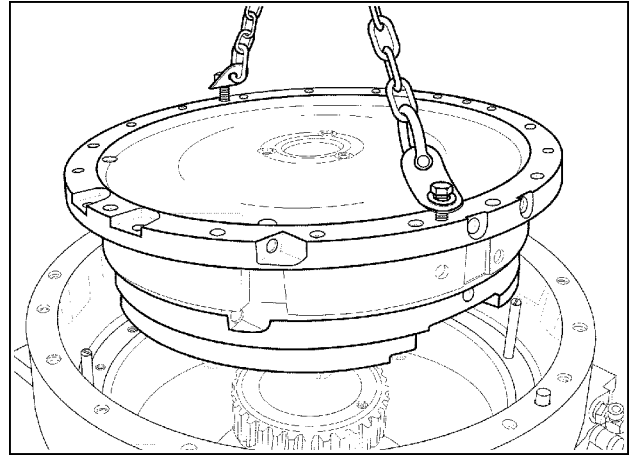
RCPH10FWD123FBJ 83

132. Remove the pinion carrier from the housing.



RCPH10FWD081ABJ 84

133. Rotate the differential housing until the right hand side is on top.
134. Remove the brake carrier from the housing.

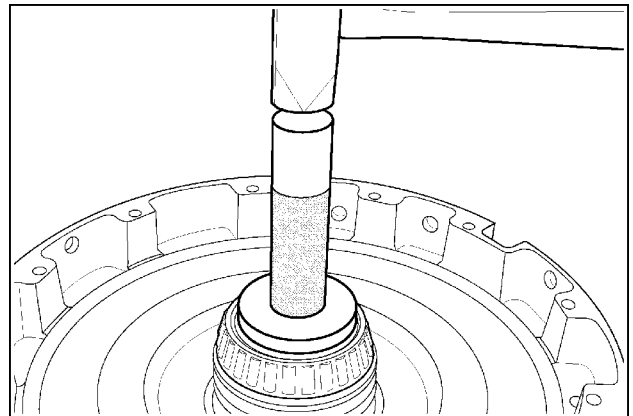


RCPH10FWD209ABJ 85

Right hand brake carrier assembly procedure

135. If removed, install the bearing cone (large side down) on the hub of the carrier. Use the proper size installer and handle to drive the bearing cone on the hub until seated.

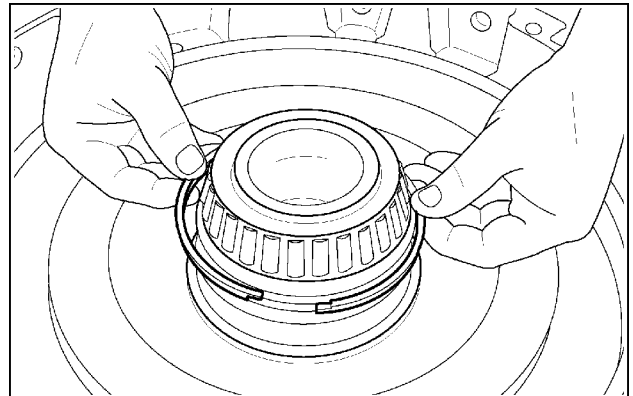
NOTICE: If differential carrier bearing preload, or ring gear and beveled pinion adjustment is required, Do not install the hub seals or brakes at this time. Proceed to step 96. When adjustments are completed or not required, proceed to the next step to complete the brake carrier assembly.



RCPH10FWD247ABJ 86

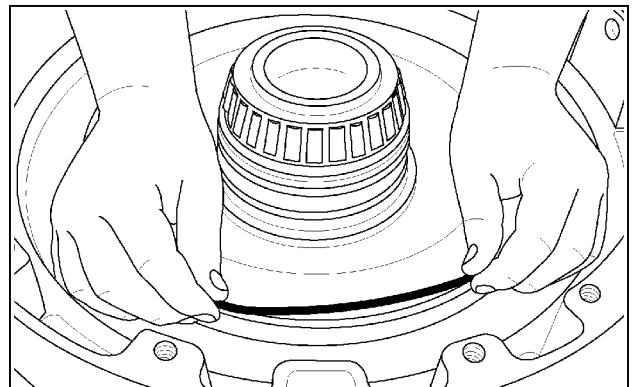
136. Lubricate new hub seal rings liberally with clean grease.
137. Install the two seal rings into the grooves in the hub of the carrier. Be sure the seal ends are lapped together and seals are compressed into the grooves as tightly as possible.

NOTE: Place the ends of each seal ring opposite each other



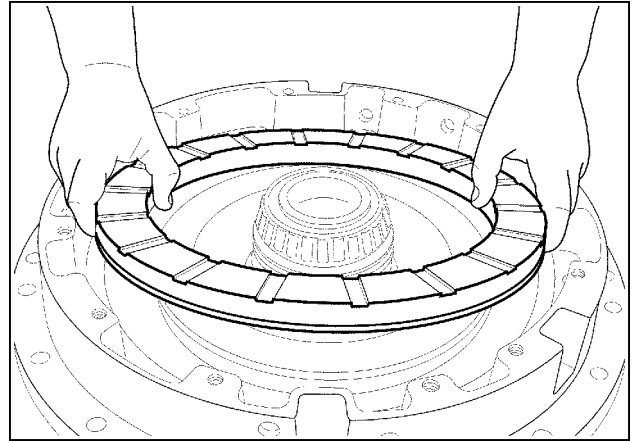
RCPH10FWD248ABJ 87

138. Lubricate a new O-ring for the inside diameter of the service brake piston with clean grease.
139. Install the O-ring in the groove of the carrier. Be sure the O-ring is not twisted.



RCPH10FWD249ABJ 88

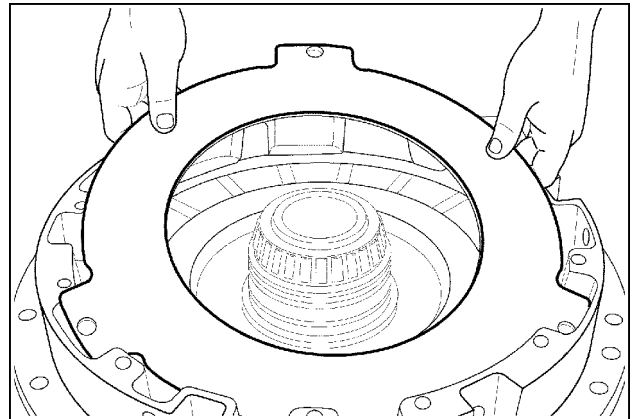
140. Lubricate a new O-ring for the outside diameter of the service brake piston.
141. Install the O-ring in the groove of the piston. Be sure the O-ring is not twisted.
142. Carefully position the piston (flat side up) into the recessed bore of the carrier. Hand seat the piston squarely into the bore.



RCPH10FWD250ABJ 89

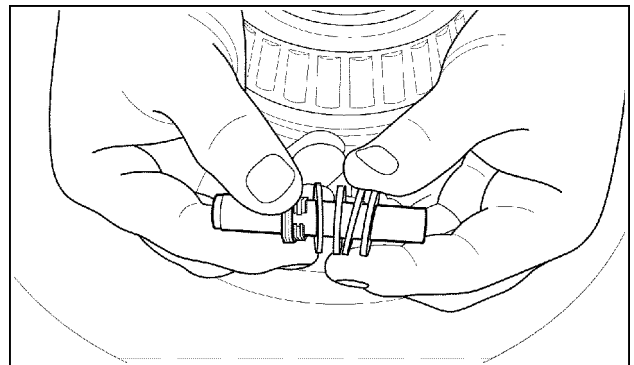
143. Install the brake return plate over the service brake piston aligning the ear tabs with the slots in the support carrier.

NOTE: The brake return plate has holes in the ear tabs.

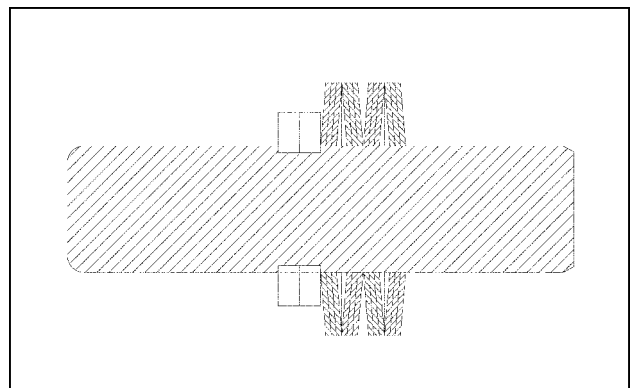


RCPH10FWD223ABJ 90

144. Install the belleville spring washers on the brake adjuster pins. Slide 3 nested washers onto each pinup against the snap rings. Slide 3 nested washers on each pin in the opposing direction followed by 3 more nested washers in an opposing direction for a total of 12 belleville spring washers on each pin.

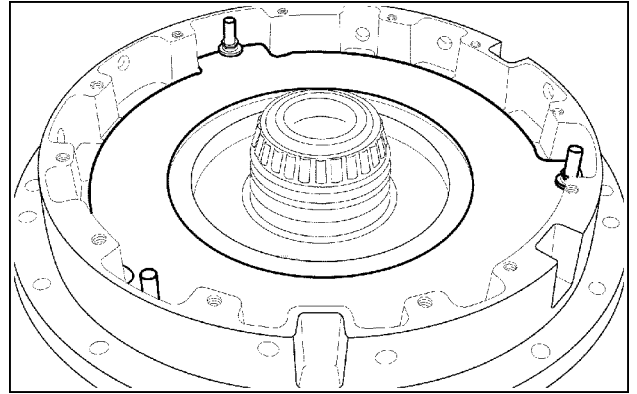


RCPH10FWD251ABJ 91



RCPH10FWD252ABJ 92

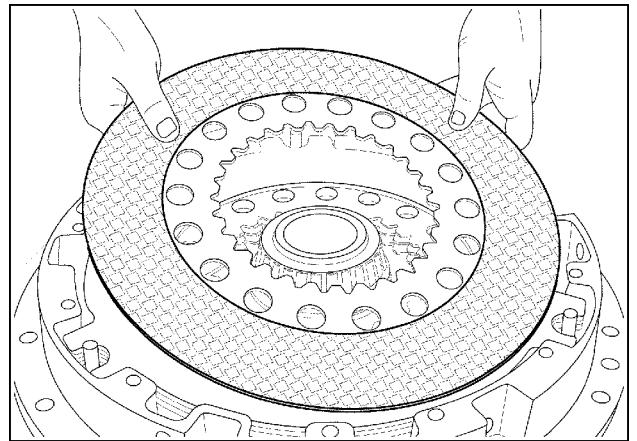
145. Place one pin with washers in each of the holes in the carrier. Be sure the spring washers are seated against the brake return plate and the shorter tapered end of the pin is pointed upwards.



RCPH10FWD253ABJ 93

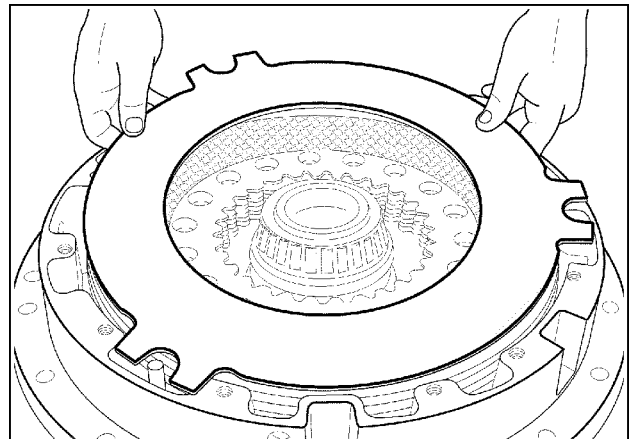
146. Lubricate all friction plates with clean operating fluid.
 147. Install the first friction plate over the brake return plate.

NOTE: Align the friction plate oil cross holes as they are installed.



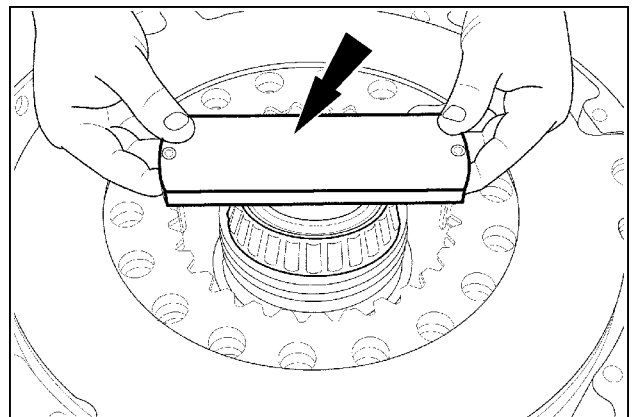
RCPH10FWD254ABJ 94

148. Install a steel separator plate over the first friction plate.
 149. Repeat the steps for remaining plates, alternating friction and separator plates.



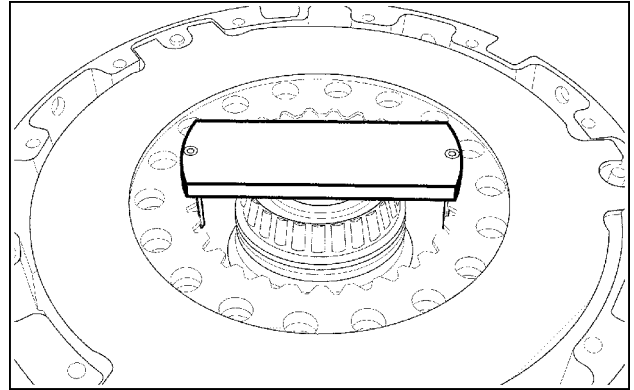
RCPH10FWD255ABJ 95

150. Use the **CNH299087** brake disc alignment tool to align the splines of all brake plates.



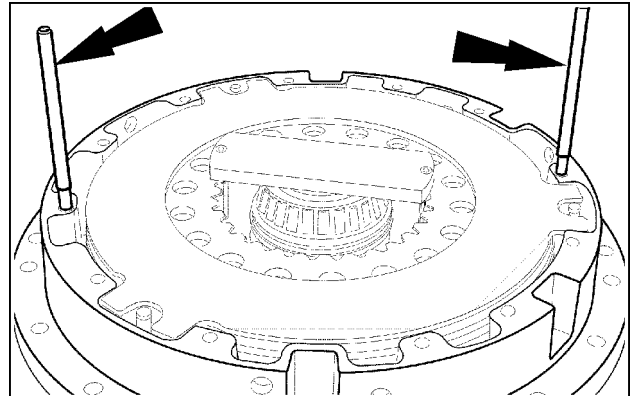
RCPH10FWD256ABJ 96

151. When the brake plates are correctly aligned, the pilot on the bottom of the tool plate must nest in the hub of the carrier as shown.



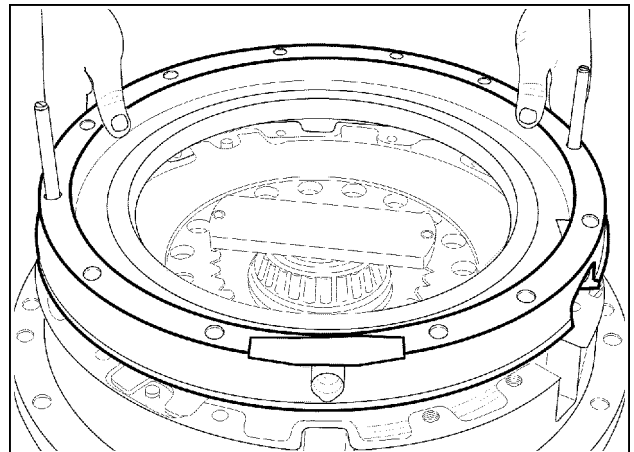
RCPH10FWD257ABJ 97

152. Install the two proper size guide studs into opposite holes of the support carrier.



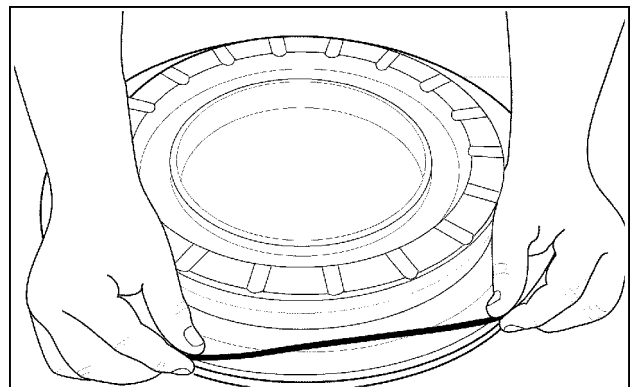
RCPH10FWD258ABJ 98

153. Install the park brake backing plate (recessed side up) over the guide studs so that the assembly match marks align.



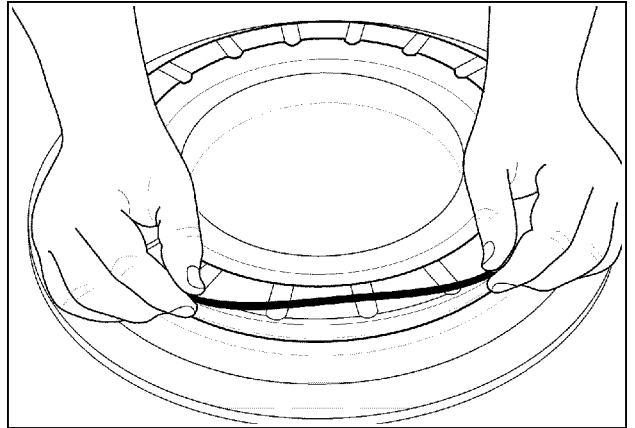
RCPH10FWD259ABJ 99

154. Lubricate and install a new O-ring for the large outside diameter of the park brake piston. Be sure the O-ring is not twisted.



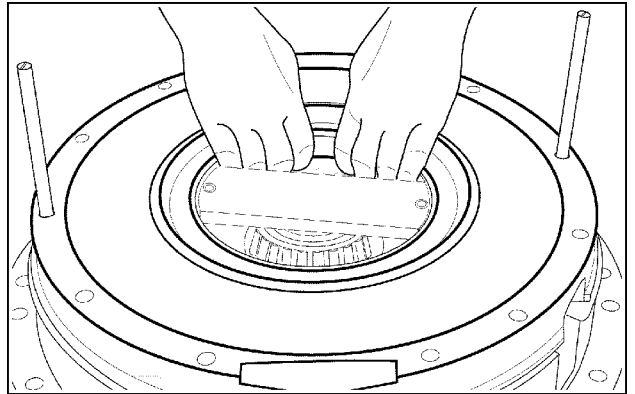
RCPH10FWD260ABJ 100

155. Lubricate and install a new O-ring in the groove of the smaller outside diameter of the piston. Be sure the O-ring is not twisted.



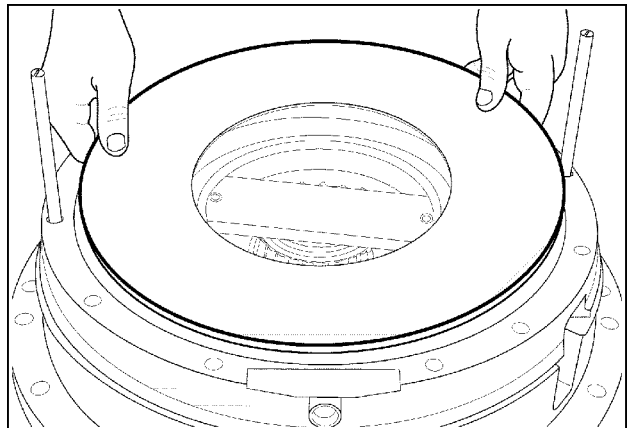
RCPH10FWD261ABJ 101

156. Lubricate the outside diameter and inside diameter of the piston liberally with clean assembly grease.
157. Hand seat the piston squarely into the bore of the backing plate.



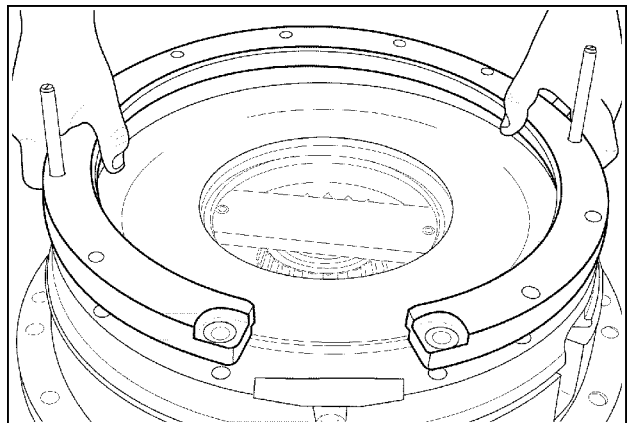
RCPH10FWD262ABJ 102

158. Install the large belleville spring with the cone side down on top of the park brake piston.



RCPH10FWD263ABJ 103

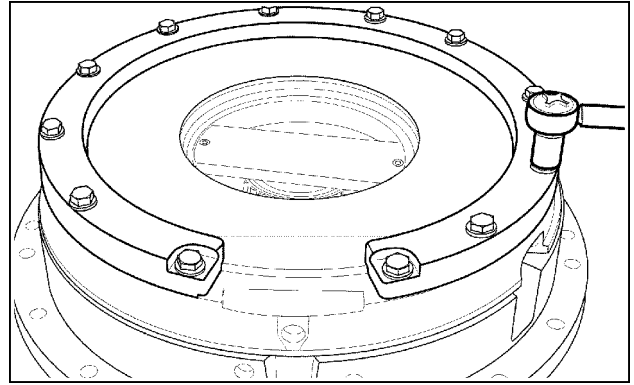
159. Install the retainer ring over the belleville spring.



RCPH10FWD264ABJ 104

160. Install and hand start the 12 bolts with washers to engage the threads.

NOTE: The two shorter length bolts must be installed in the end holes of the ring.

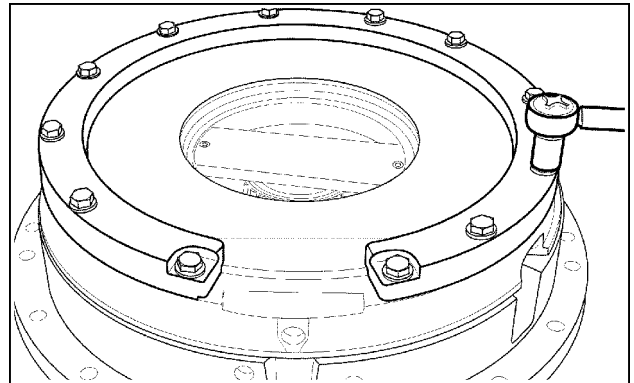


RCPH10FWD265ABJ 105

161. After all bolts have contacted the retainer ring, starting with an end bolt, tighten each bolt in sequence one full turn and repeat until the ring has seated on the backing plate.

162. Torque the bolts to **89 – 100 N·m (65 – 74 lb ft)**.

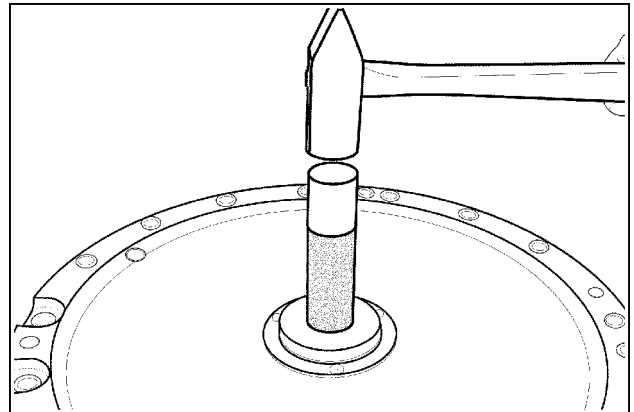
163. Remove the **CNH299087** brake disc alignment tool.



RCPH10FWD265ABJ 106

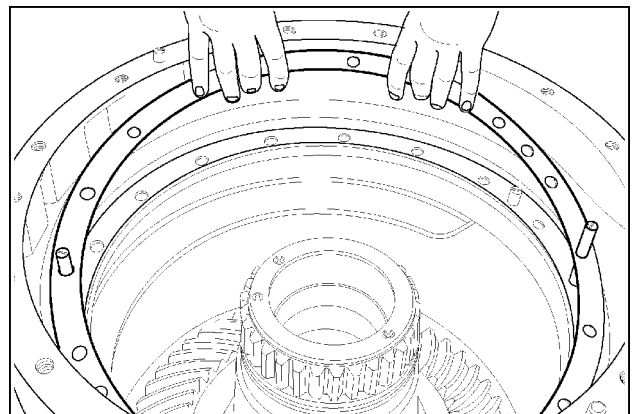
164. Turn the brake carrier assembly over **180°**.

165. With the appropriate size driver install the seal in the carrier.



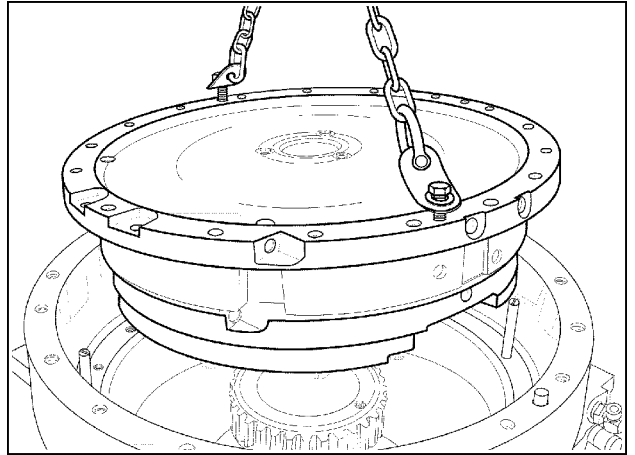
RCPH10FWD266ABJ 107

166. Using the **CNH299044** guide studs, install the pre-selected shim pack for the brake support carrier so that all holes align.



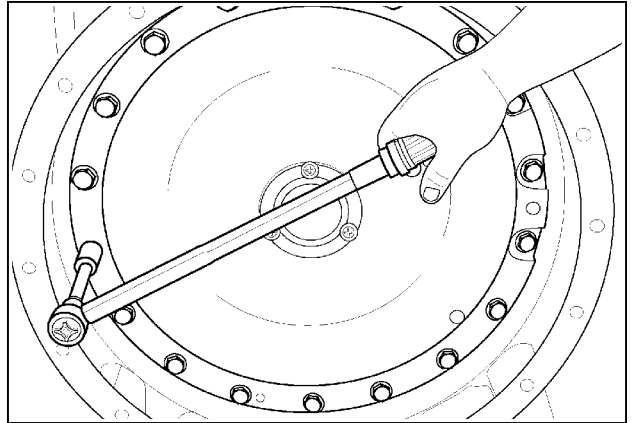
RCPH10FWD210ABJ 108

167. Use a hoist to carefully align and install the brake carrier assembly into the differential housing. Be sure the assembly marks are aligned.



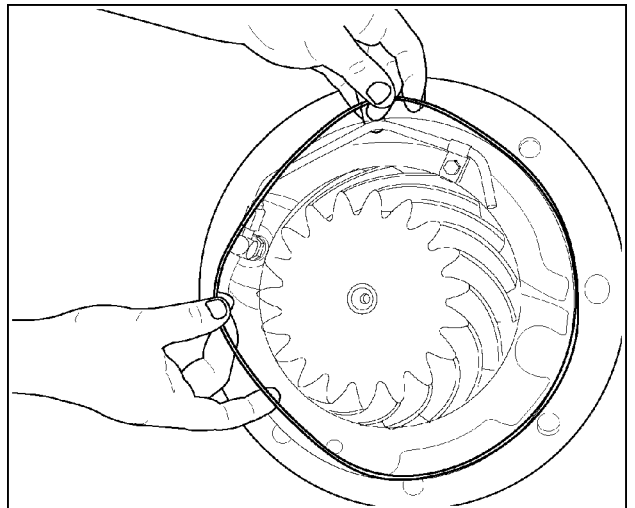
RCPH10FWD209ABJ 109

168. Remove the guide studs.
169. Install the brake carrier retaining bolts and washers.
170. Torque the bolts to **146 – 165 N·m (108 – 122 lb ft)**.



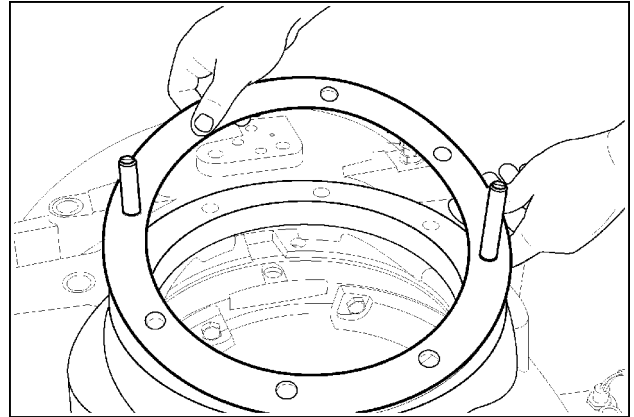
RCPH10FWD267ABJ 110

171. Lubricate and install a new O-ring in the groove around the mounting flange of the pinion carrier. Be sure the O-ring is not twisted.



RCPH10FWD079ABJ 111

172. Use the two CNH299082 alignment studs and install the pre-selected pinion carrier shim pack.

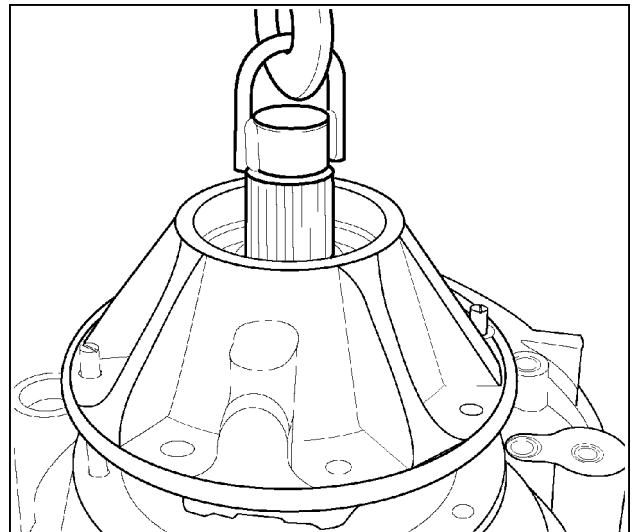


RCPH10FWD244ABJ 112

173. Use the lifting eye to install the pinion carrier assembly into the differential housing. Be sure the assembly marks align.

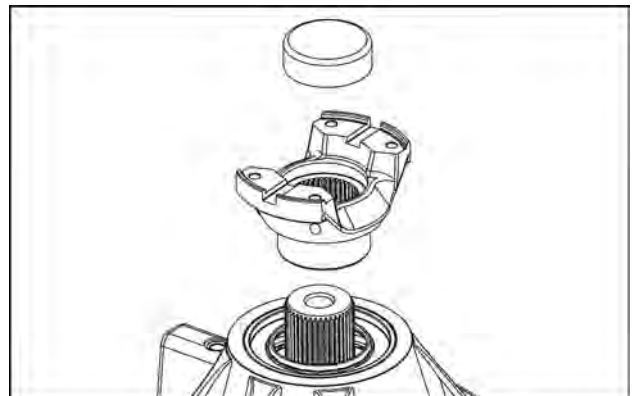
174. Remove the guide studs and the lifting eye.

175. Coat the pinion shaft splines with **MOLYKOTE® G-N METAL ASSEMBLY PASTE**.



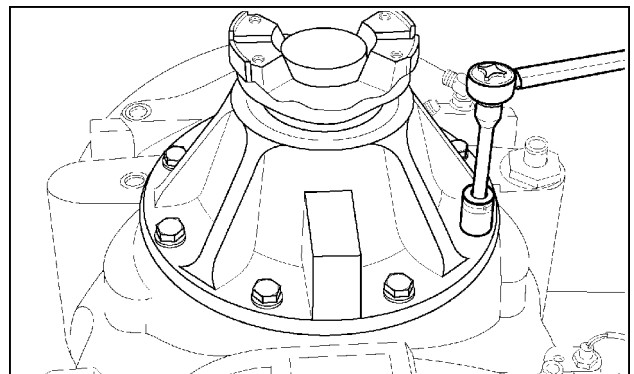
RCPH10FWD081ABJ 113

176. Install the drive yoke and cap. .



RAIL17TR01400AA 114

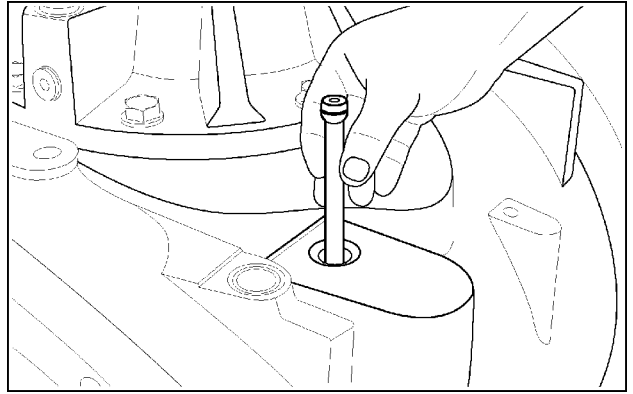
177. Torque the pinion carrier bolts to **284 – 298 N·m (209 – 220 lb ft)**.



RCPH10FWD268ABJ 115

178. Lubricate and install new O-rings on the jumper tube for the park brake.

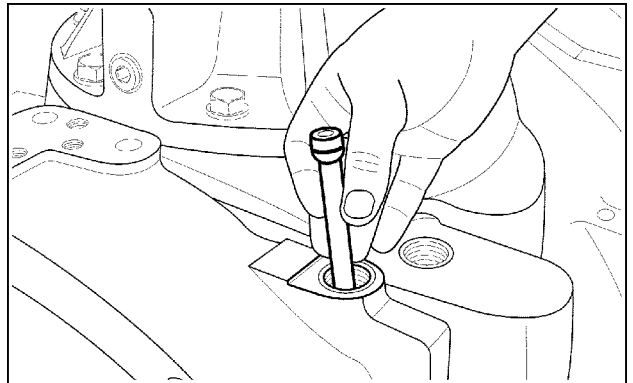
179. Install the jumper tube into the park brake supply port.



RCPH10FWD269ABJ 116

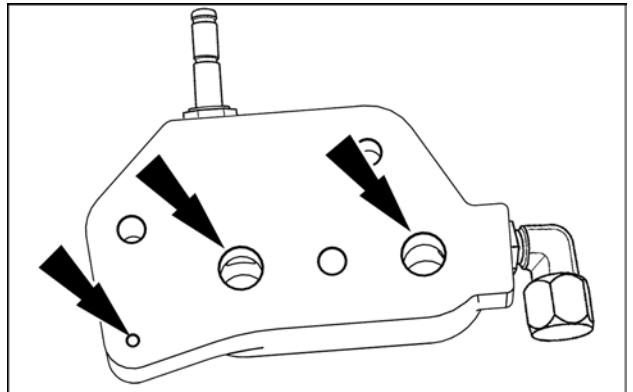
180. Lubricate and install new O-rings on the jumper tube for the service brake.

181. Install the jumper tube into the service brake supply port.



RCPH10FWD270ABJ 117

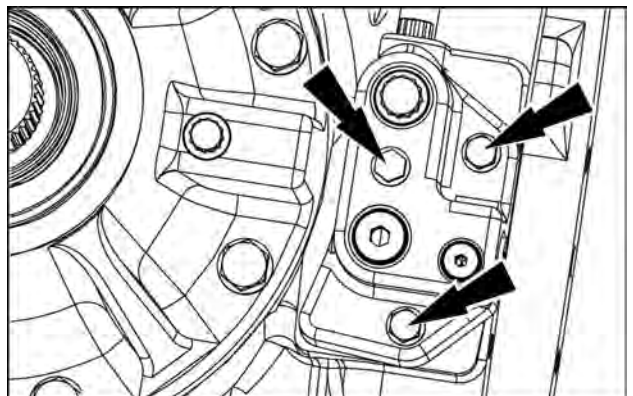
182. Lubricate and install new O-rings on the port block.



RAIL13TR00346AA 118

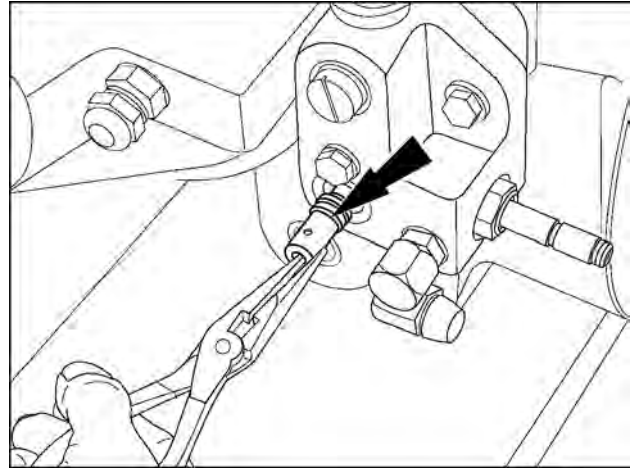
183. Assemble the port block on the differential housing with the three mounting bolts.

184. Torque the retaining bolts to **46 – 62 N·m (34 – 46 lb ft)**.



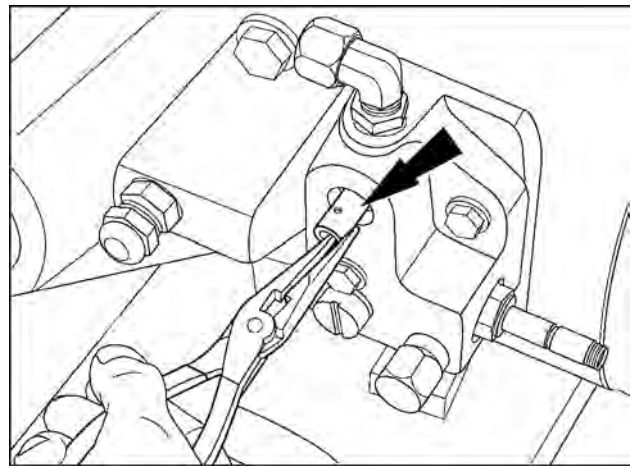
RAIL13TR00350AA 119

185. Lubricate and install new O-rings on the jumper tube for the differential lock.
186. Install the jumper tube into the differential lock supply port.



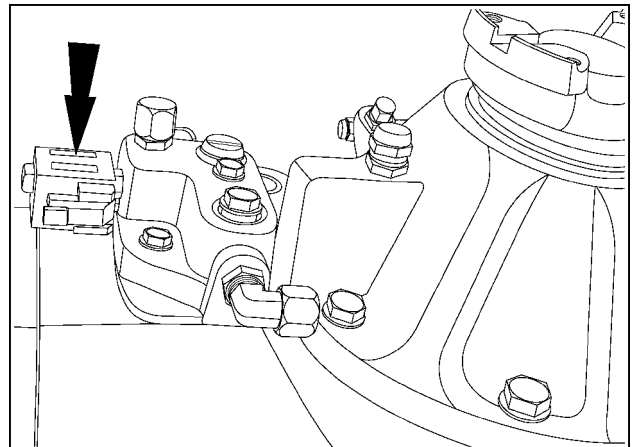
RAIL13TR00353AA 120

187. Lubricate and install new O-rings on the jumper tube for the lube supply.
188. Install the jumper tube into the lube supply port.



RAIL13TR00352AA 121

189. Install the differential lock solenoid on the port block.

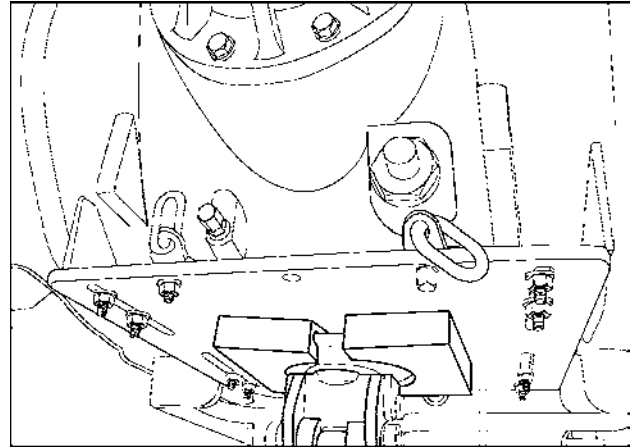


RCPH10FWD091ABJ 122

Differential - Install - Rowtrac™ axles

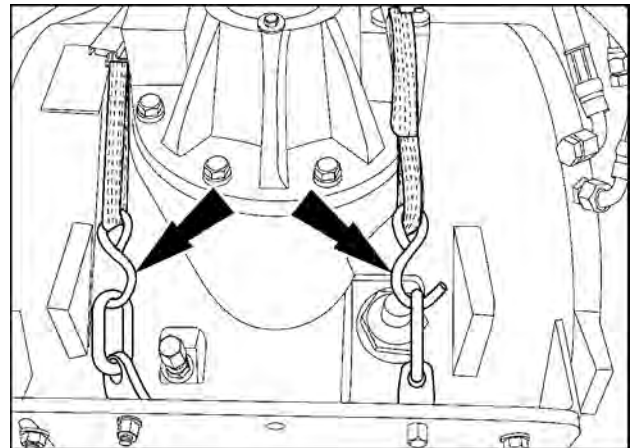
Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

1. Set the differential on to the **CAS2694** axle lifting adapter plate. Be sure the differential housing is centered on the adapter plate.



RAIL12TR02643AA 1

2. Install the two straps over the differential housing. Fasten and tighten both straps.

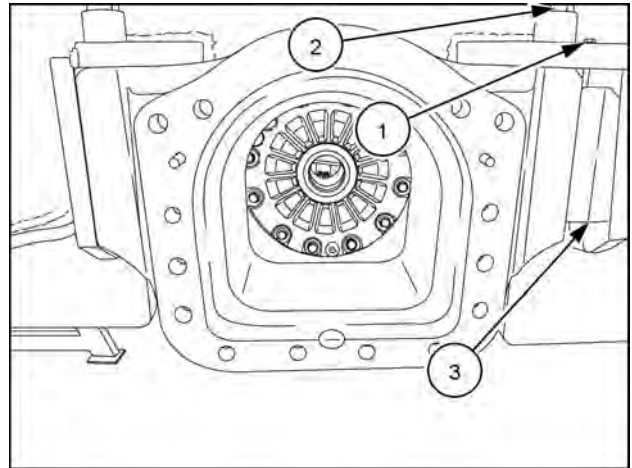


RAIL12TR02976AA 2

3. Roll the differential housing assembly in position under the frame of the tractor.
4. Slowly and carefully raise the differential housing assembly until it rests securely against the frame mounting plates.

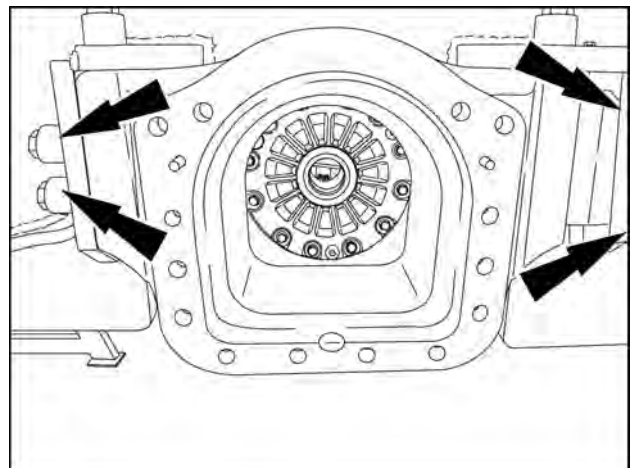
NOTICE: Be sure the housing is raised evenly to the right and left side of the frame. If the housing starts to tilt while raising, lower the housing and reposition the floor jack and/or the axle lifting adapter plate. Then repeat the previous steps.

5. Assemble the wedge and the wedge tensioning bolt (1)
6. Loose assemble the two top yoke mounting bolts (2) on both sides of the tractor to draw up the axle until the wedge (3) is tight.



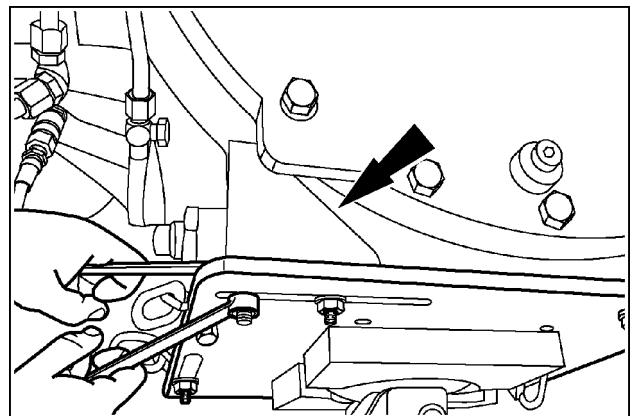
RAIL13TR00648AA 3

7. Install the four axle yoke side mounting bolts and alignment washers on each side of the tractor.
8. Torque the bolts alternately and evenly to **712 – 793 N·m (525 – 585 lb ft)**.



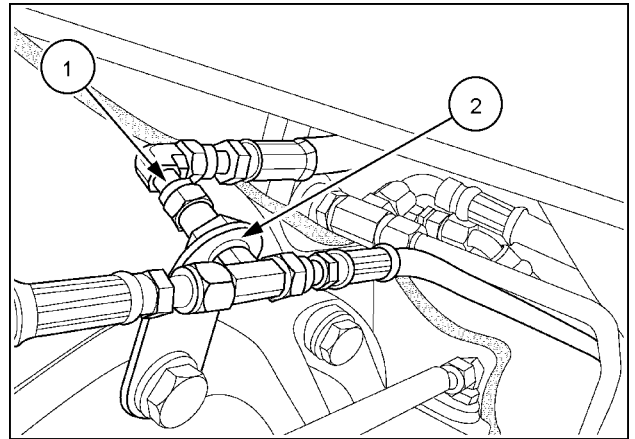
RAIL12TR01601AA 4

9. Disconnect and remove the **CAS2694** axle lifting adaptor and jack from under the housing.



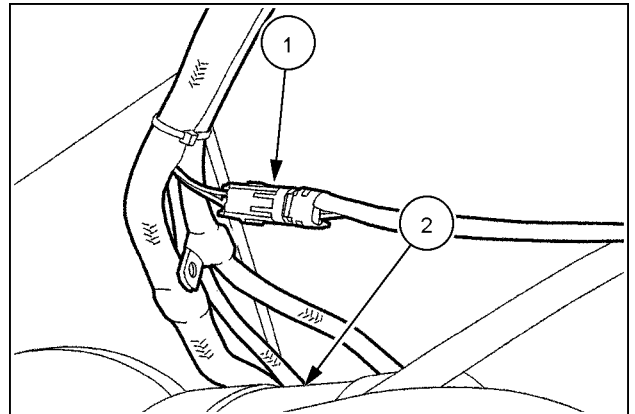
RCPH10FWD761AAJ 5

10. Connect the track tension supply hose **(1)** from the tee fitting and bracket assembly **(2)** on the pinion carrier.



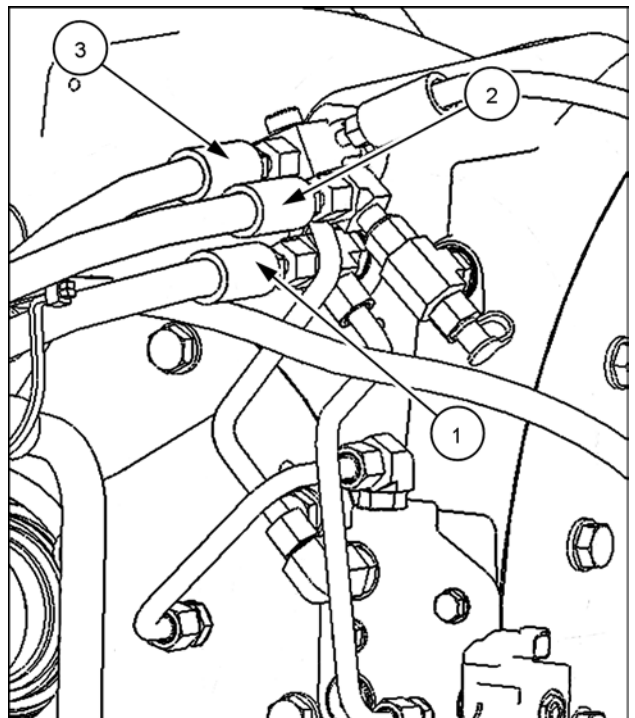
RCPH10FWD756AAJ 6

11. Connect the differential lock wire connector **(1)** from the rear frame wire harness located on the right hand side above the axle **(2)**.



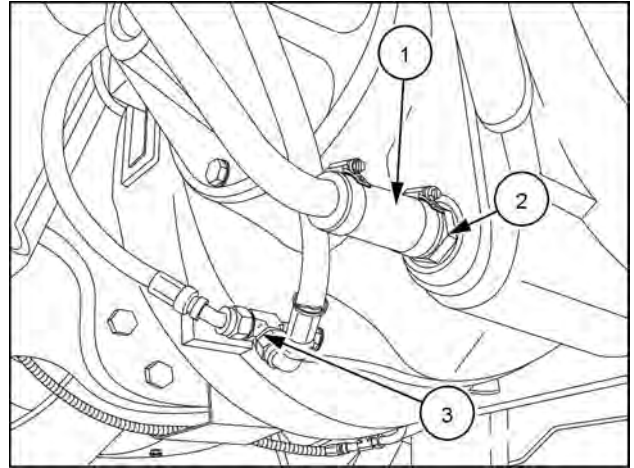
RCPH10FWD754AAJ 7

12. Connect the service brake **(2)** and the parking brake **(3)** hoses from the axle.
13. Connect the axle lube supply hose **(1)**.



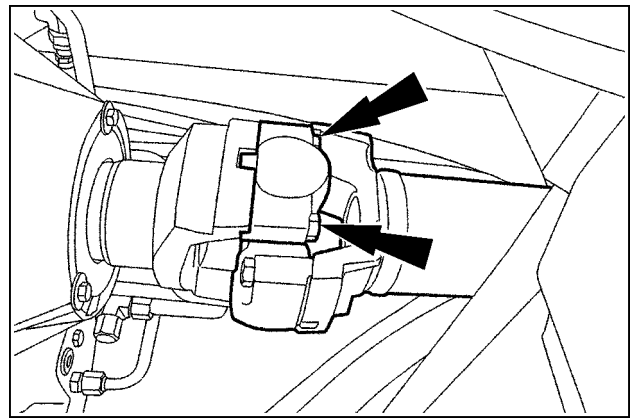
RAIL13TR00506AA 8

14. Connect the lube return hose (1) and tighten the hose clamp.



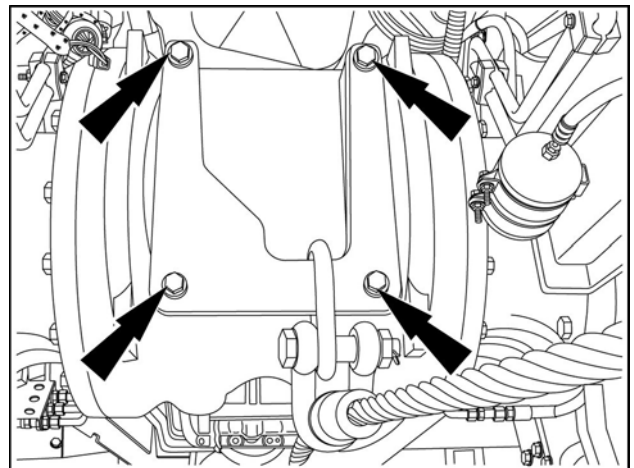
RAIL12TR02979AA 9

15. Assemble the four bolts from the drive shaft to the front differential yoke.
16. Torque the bolts to **115 – 129 N·m (85 – 95 lb ft)**



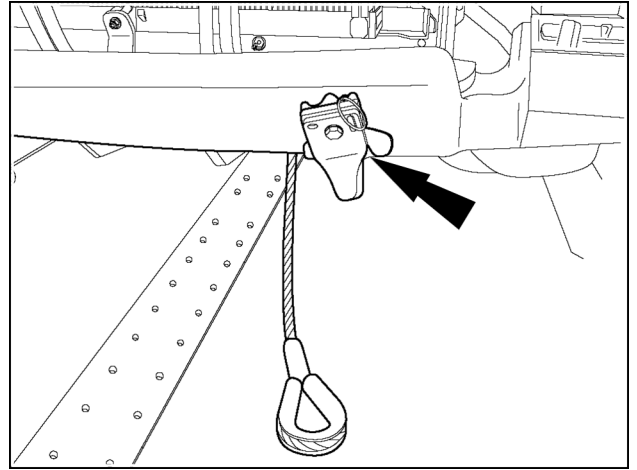
RCPH10FWD745AAJ 10

17. Assemble the tow cable plate (if equipped) on the front axle and secure with the four mounting bolts.



RAIL12TR03218AA 11

18. If equipped with a front tow cable, hook up the tow ring.



RCPH11FWD124BAM 12

Differential - Disassemble - 400 Series axles

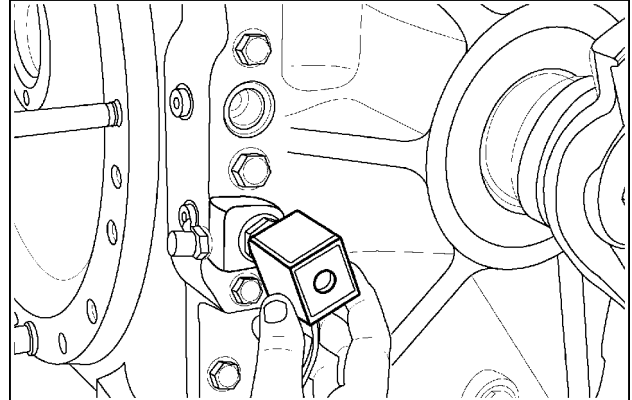
Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

Prior operation:

Final drive - Remove - 400 Series bar axles (25.310)

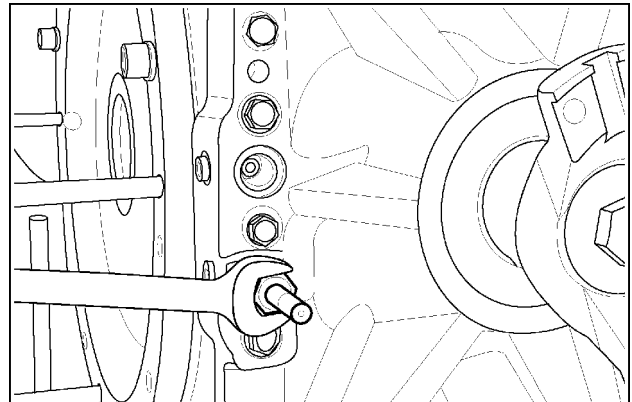
Front cover removal

1. If equipped remove the nut retaining the coil on the stem of the differential lock solenoid valve.



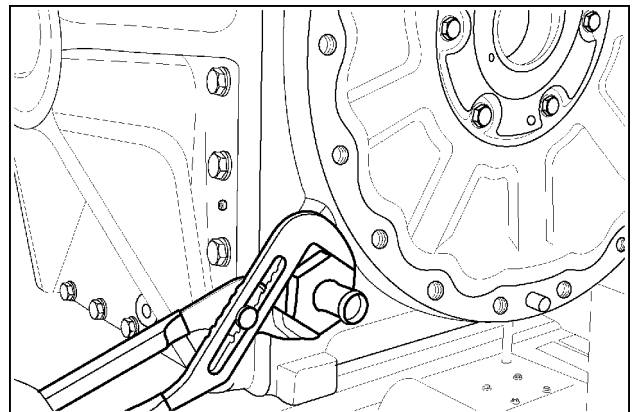
RCPH10FWD332ABJ 1

2. Remove the solenoid valve from the front cover. Remove and discard the O-rings.



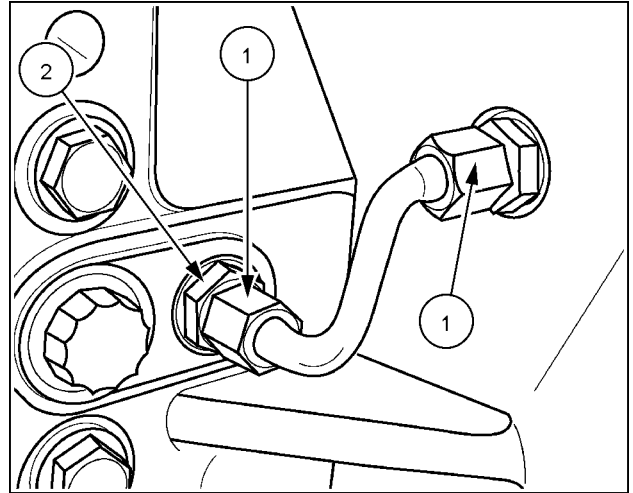
RCPH10FWD333ABJ 2

3. Remove the lube return adapter from the differential housing.



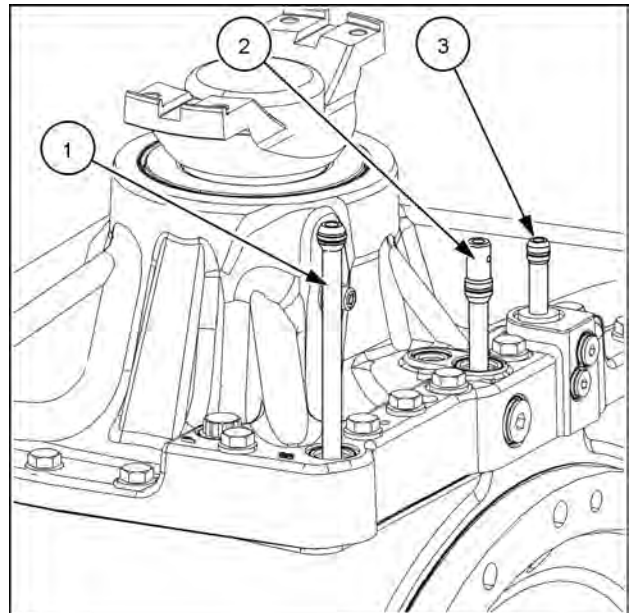
RCPH10FWD334ABJ 3

4. Remove the pinion bearing lube tube (1) and remove the orifice adapter (2).



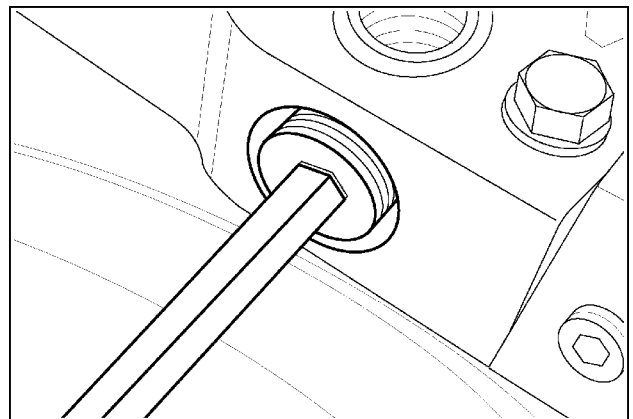
RCPH10FWD335ABJ 4

5. Remove the port adapter fitting and remove the long jumper tube (1) from the service brake port. Remove and discard the O-rings. Remove the port adaptor fitting from the lube oil supply port and remove the short jumper tube (2). Remove and discard the O-rings. If not equipped with differential lock, remove the plug and remove the short jumper tube (3) from the port for the differential.



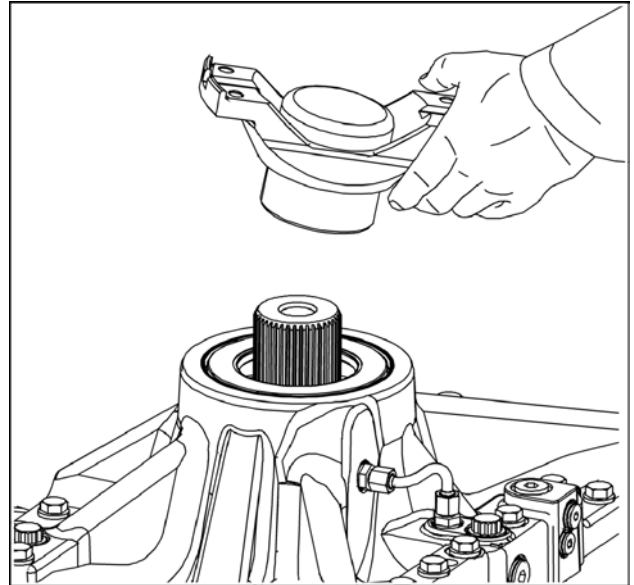
RCPH10FWD536ABJ 5

6. To remove the jet pump orifice, remove the plug from the side of the cover.



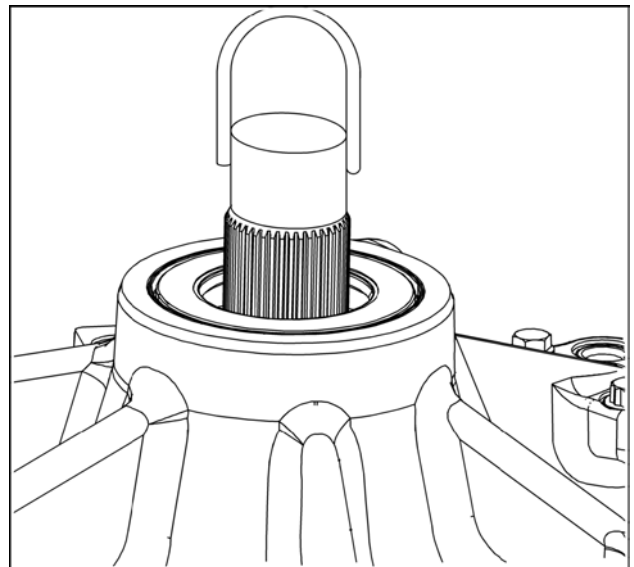
RCPH10FWD339ABJ 6

7. Remove the drive yoke from the pinion shaft.



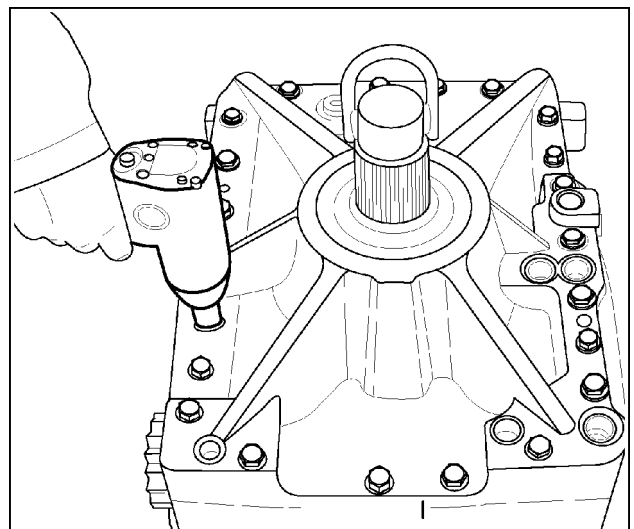
RCPH10FWD549ABJ 7

8. Install the CAS2494 lifting eye bolt into the end of the pinion shaft.



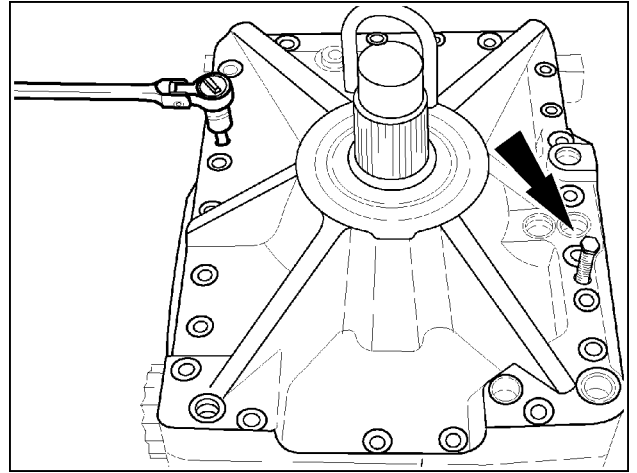
RCPH10FWD538ABJ 8

9. Remove all front cover retaining bolts.



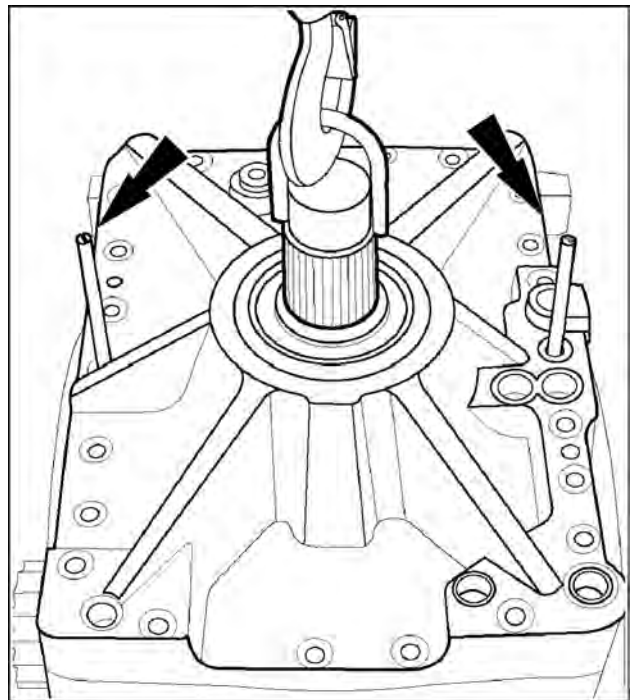
RCPH10FWD342ABJ 9

10. Install two of the retaining bolts into the threaded holes of the cover to use as jack screws. Tighten the two bolts evenly to jack the front cover from the dowel pins.



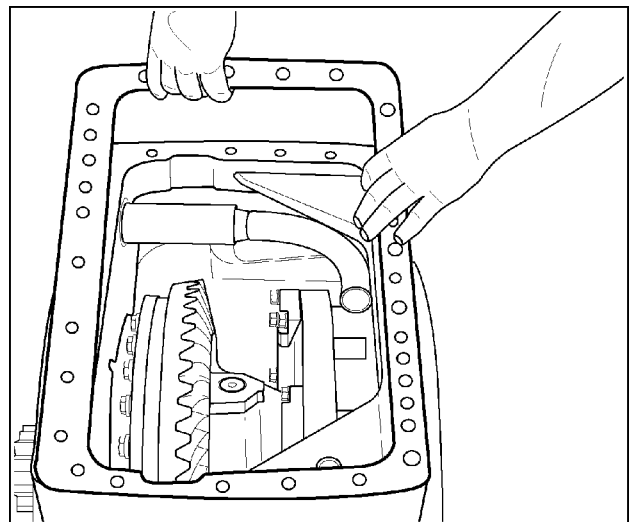
RCPH10FWD344ABJ 10

11. Install two CNH299137 guide studs into the housing. Use a hoist to remove the front cover assembly from the housing.



RCPH10FWD345ABJ 11

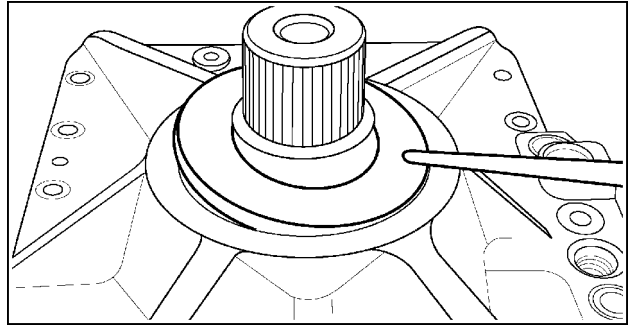
12. Remove and retain the shims.



RCPH10FWD346ABJ 12

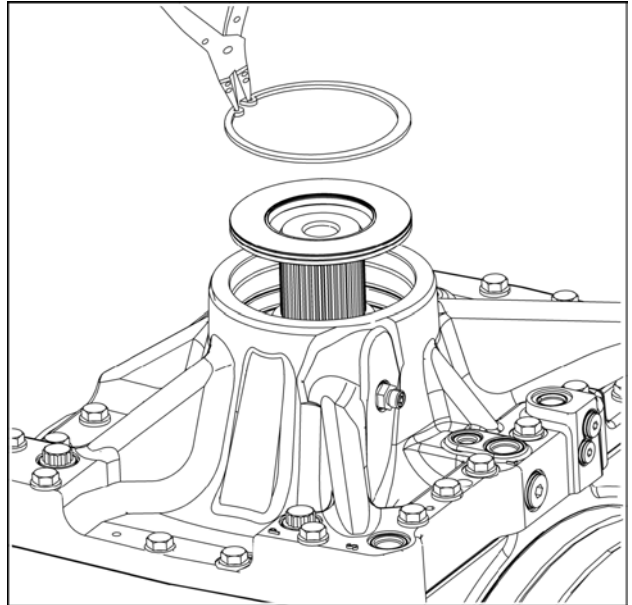
Front cover disassembly

13. Drive a sharp pry into the jacket of the outer pinion seal. Pry the seal from the housing.



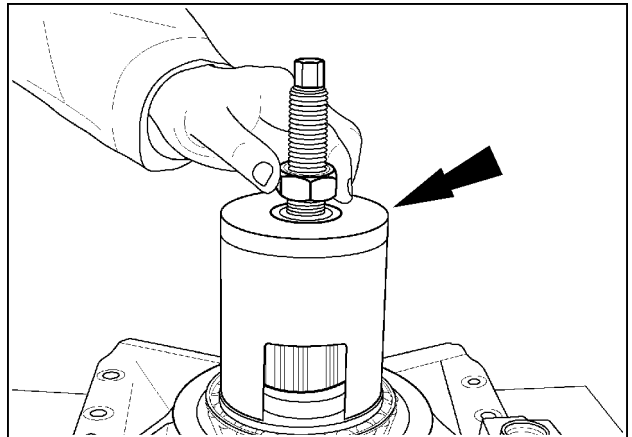
RCPH10FWD347ABJ 13

14. Remove the snap ring and inner seal from the front cover.



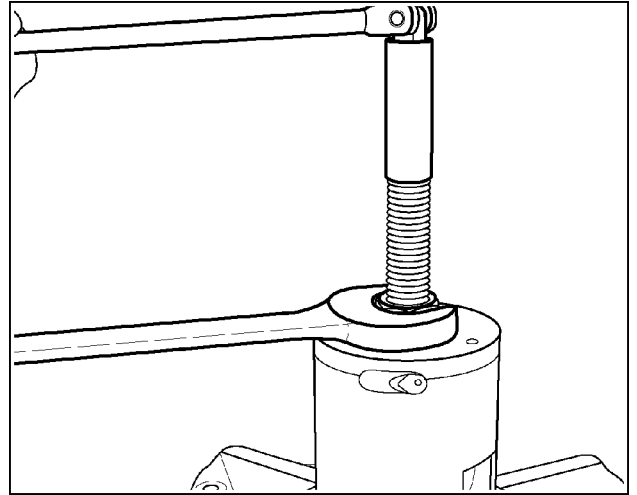
RCPH10FWD494ABJ 14

15. Install the **CAS2511** pinion bearing preload compressor. Turn the center bolt of the compressor tool tightly into the threaded hole in the pinion gear. Install a thrust washer and nut on the center bolt.



RCPH10FWD348ABJ 15

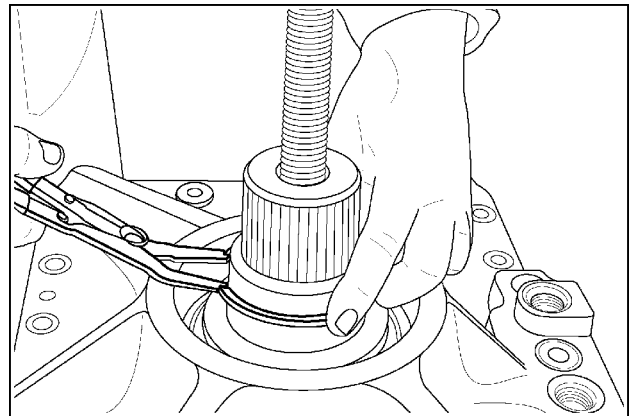
16. Align one of the windows of the compression sleeve with the end gap of the snap ring. Use one wrench to hold the center bolt and a second wrench to tighten the nut until pinion bearing preload is noticeably increased to release the pressure against the snap ring.



RCPH10FWD349ABJ 16

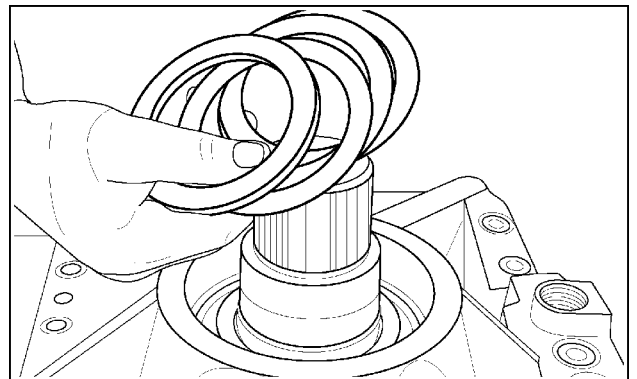
17. Remove the compression tool assembly and snap ring from the pinion gear.

NOTE: If the snap ring is distorted or damaged from the removal procedure it must be discarded and replaced.



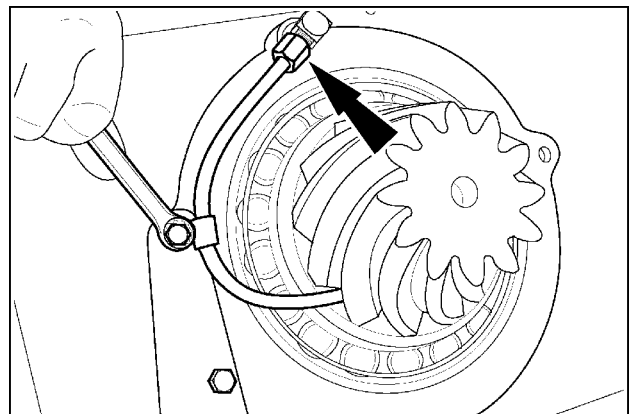
RCPH10FWD350ABJ 17

18. Remove the spacer washer and selective preload adjusting shims. Retain and tag the shims and spacer washer.



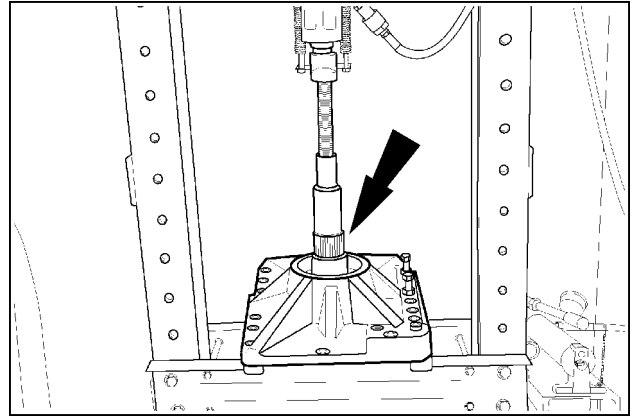
RCPH10FWD351ABJ 18

19. Remove the bolt securing the clamp for the pinion gear lube tube. Disconnect and remove the tube.



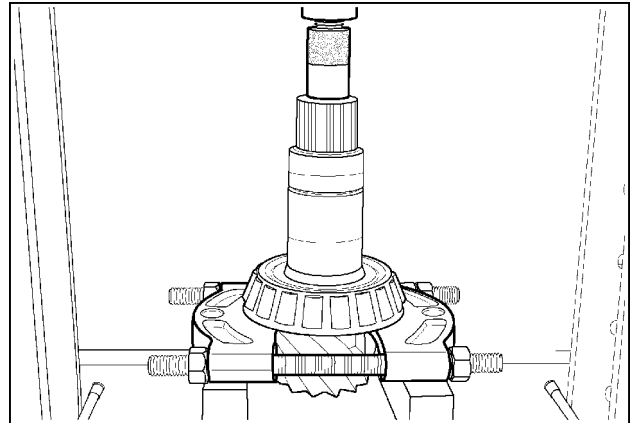
RCPH10FWD352ABJ 19

20. Support the front cover assembly on a press bed. Use the press to push the pinion gear through the front bearing cone.



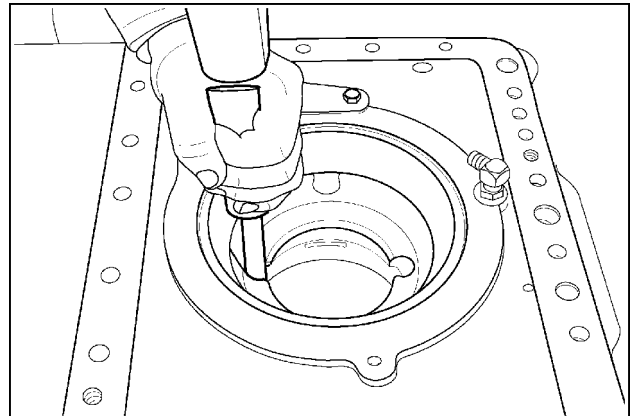
RCPH10FWD353ABJ 20

21. Use a split knife edge bearing puller and press to remove the rear pinion bearing cone.



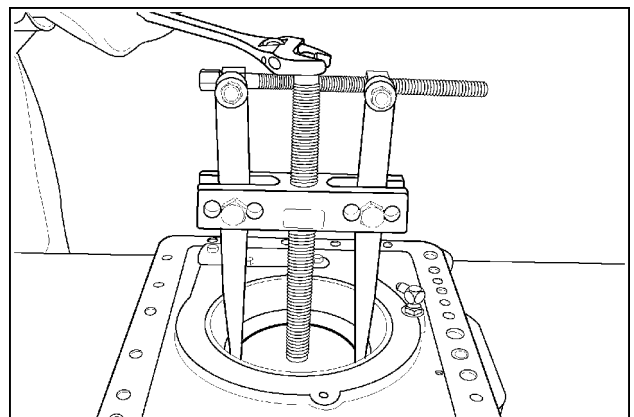
RCPH10FWD354ABJ 21

22. Support the front cover on wood blocks. Use a brass drift to drive out the outer bearing cup.



RCPH10FWD355ABJ 22

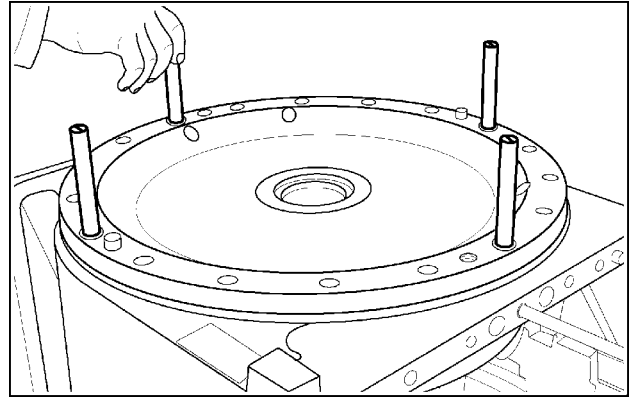
23. Use the **CAS2510** adapter plate and a bearing puller to remove the inner pinion bearing cup. Clean and inspect all parts for damage or wear. Replace any damaged or worn parts found.



RCPH10FWD356ABJ 23

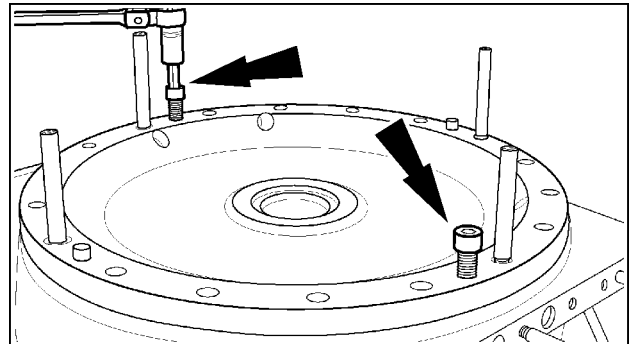
Brake carrier removal

24. Rotate the differential housing so that the right hand side brake carrier is on top and horizontal. Install four **CAS2496** alignment studs at 90 degree intervals from each other.



RCPH10FWD357ABJ 24

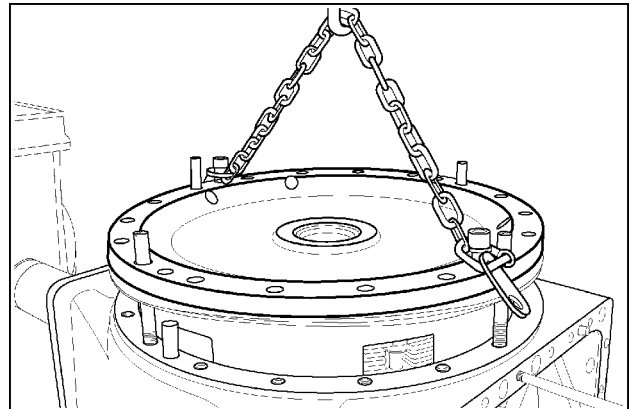
25. Install two bolts in the two threaded holes provided in the flange. Tighten the two bolts evenly to jack the carrier free of the dowel pins.



RCPH10FWD358ABJ 25

26. Use the two bolts to attach a chain and overhead hoist to the brake carrier assembly. Slowly and carefully lift the brake carrier assembly out of the housing.

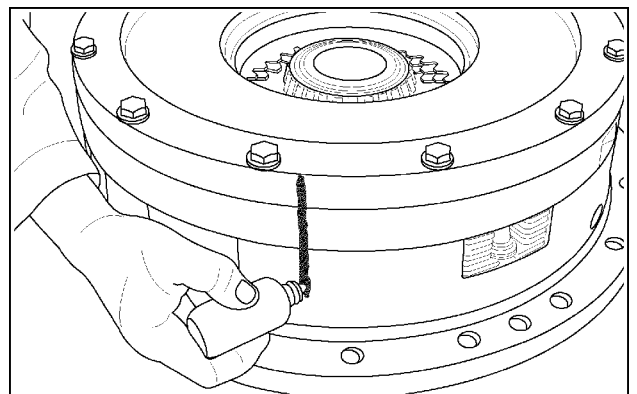
NOTE: To prevent damage to the preload adjusting shims, be sure the shims follow the brake carrier as it is lifted.



RCPH10FWD359ABJ 26

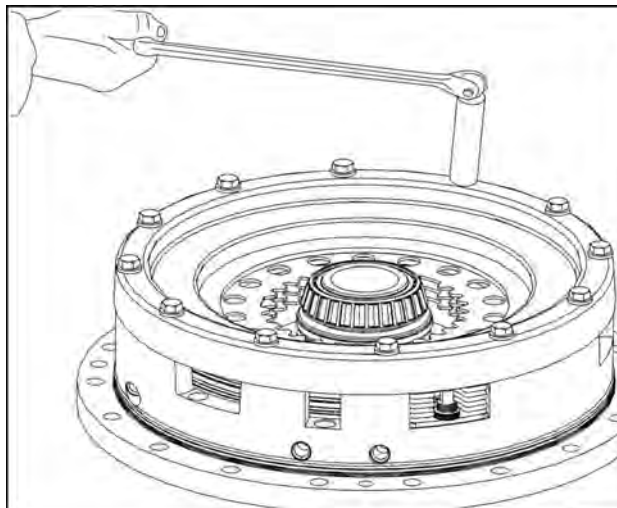
Brake carrier disassembly

27. Position the carrier assembly on a sturdy work surface. Put a mark cross the assembly for reference.



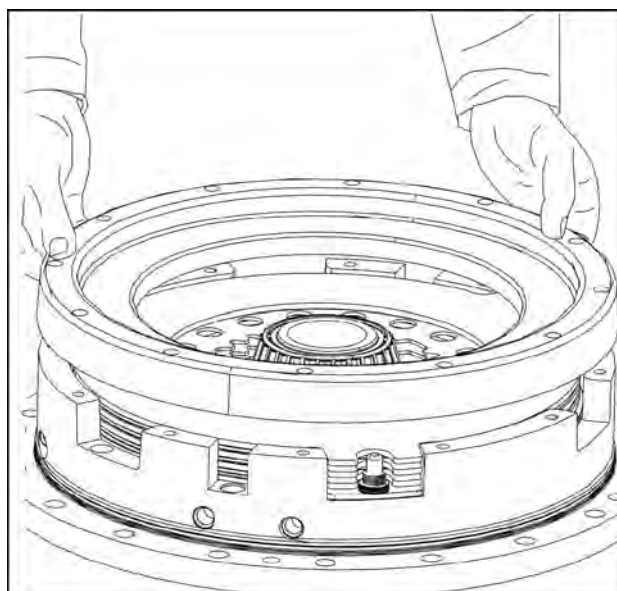
RCPH10FWD974AAJ 27

28. Loosen and remove each bolt and washer securing the backing plate to the carrier.



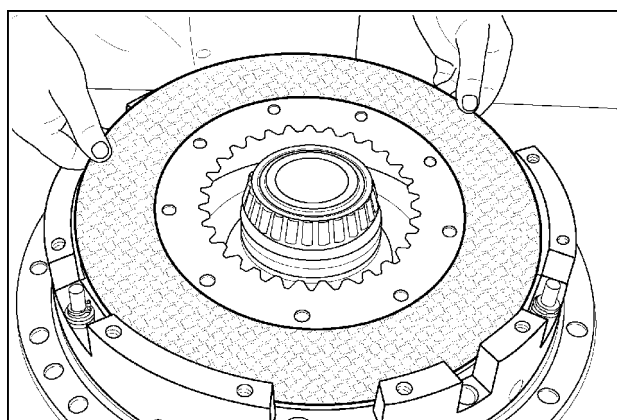
RCPH10FWD495ABJ 28

29. Remove the brake backing plate from the carrier assembly.



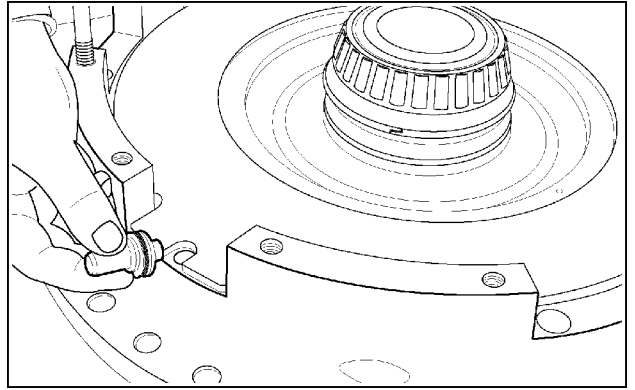
RCPH10FWD496ABJ 29

30. Remove the three brake separator plates and three friction plates from the carrier.



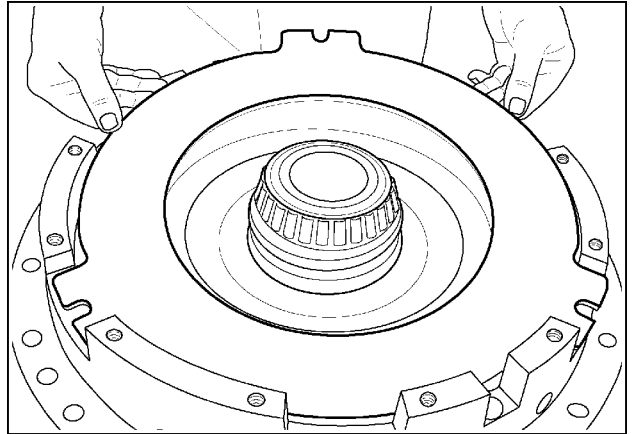
RCPH10FWD984AAJ 30

31. Remove each of the three brake adjuster pins with belleville spring washers.



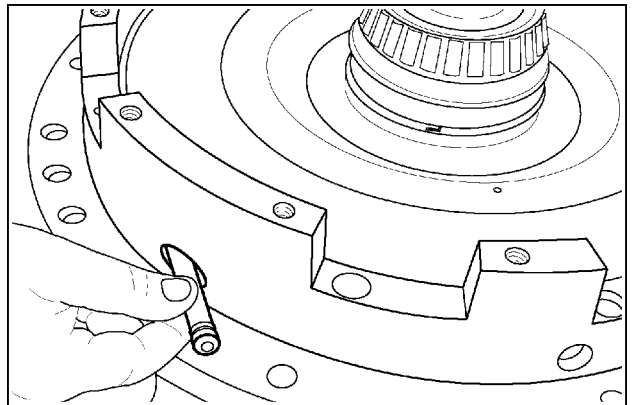
RCPH10FWD985AAJ 31

32. Remove the brake return plate from the carrier.



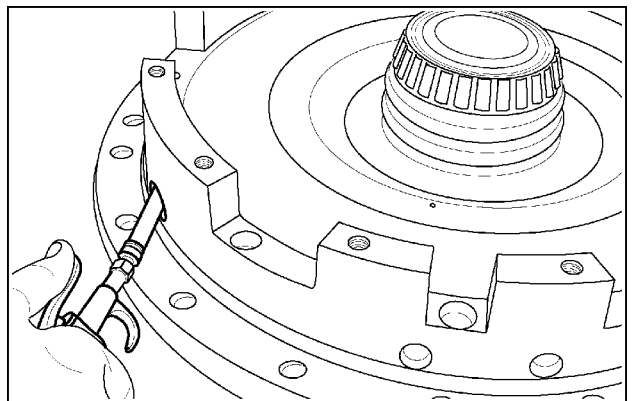
RCPH10FWD986AAJ 32

33. Temporarily install a short jumper tube into the service brake pressure port.



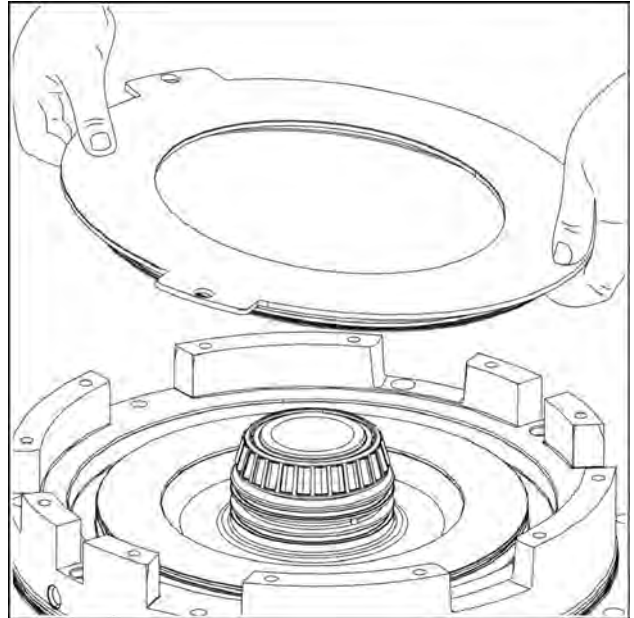
RCPH10FWD987AAJ 33

34. Use a short burst of compressed air to lift the brake piston out of the bore.



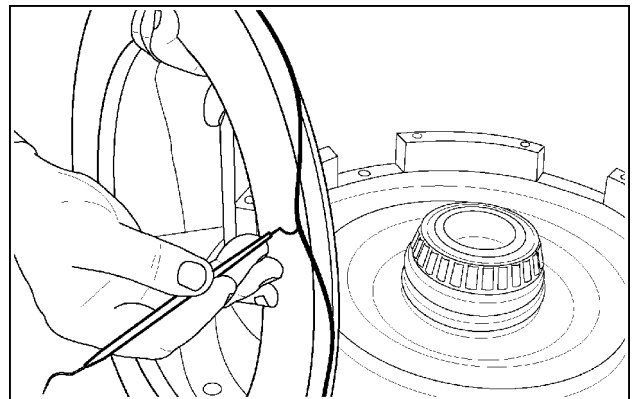
RCPH10FWD988AAJ 34

35. Remove the service brake piston from the carrier.



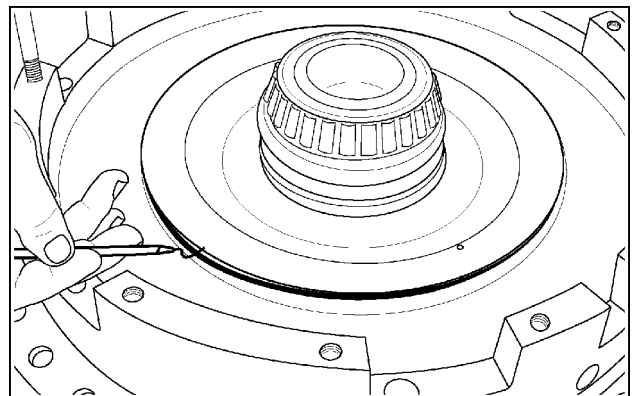
RCPH10FWD497ABJ 35

36. Remove and discard the O-ring from the outside diameter of the piston.



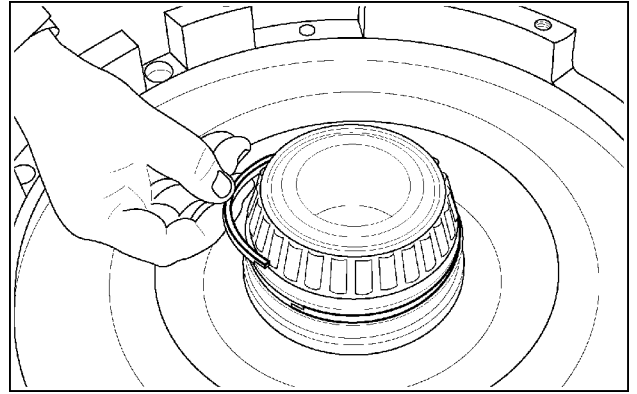
RCPH10FWD990AAJ 36

37. Remove and discard the piston inside diameter O-ring from the carrier.



RCPH10FWD991AAJ 37

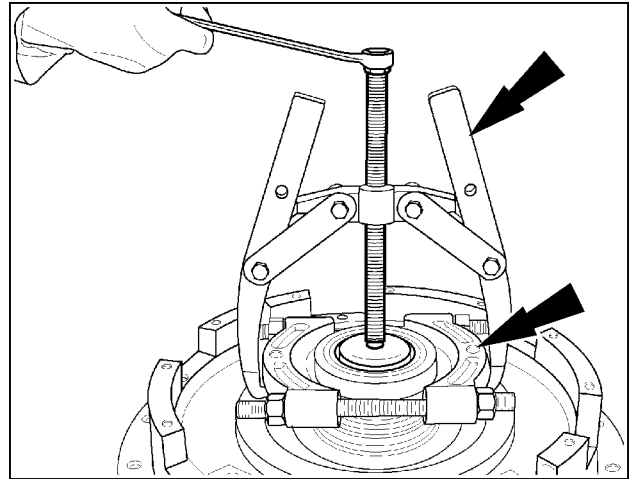
38. Remove and discard the two seal rings from the hub of the carrier.



RCPH10FWD992AAJ 38

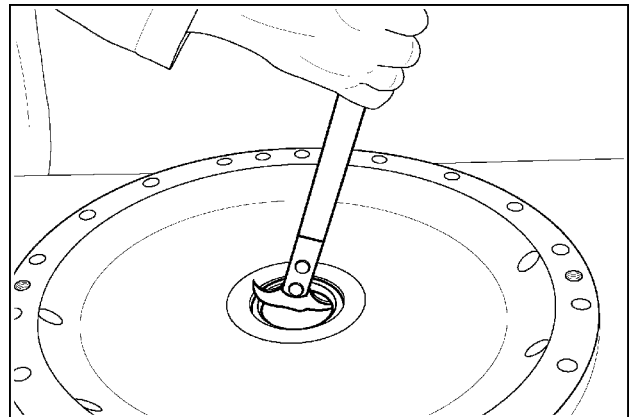
39. If required, use a Split Knife Edge Puller Attachment and Puller to remove the bearing cone from the hub of the carrier.

NOTE: If possible, place the bearing cup over the bearing cone when removing the bearing.



RCPH10FWD993AAJ 39

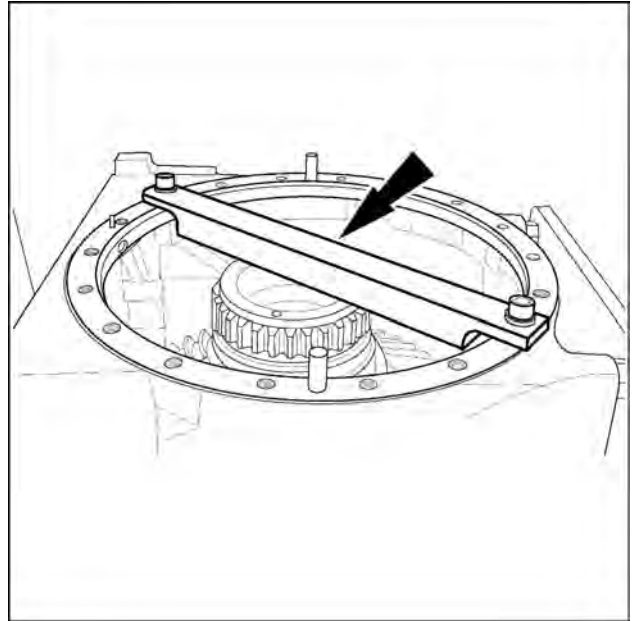
40. Turn the brake carrier housing so the outer side is on top. Remove and discard the seal. Clean and inspect all brake carrier parts for damage or wear. Replace any damaged or worn parts found.



RCPH10FWD994AAJ 40

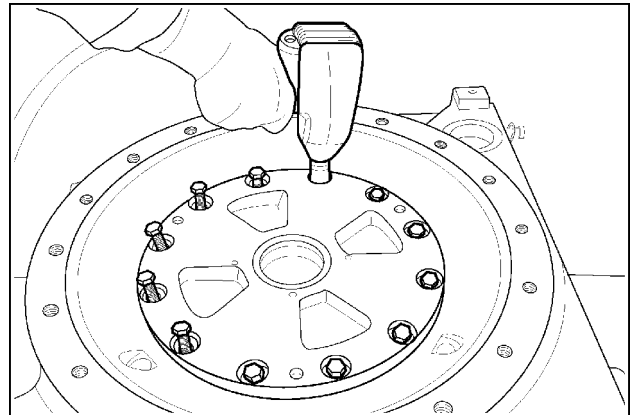
Differential bearing carrier removal and disassembly

41. Install the CAS2502 differential support bracket across the right hand side of the housing. Use two of the socket head bolts to retain the bracket to the housing.



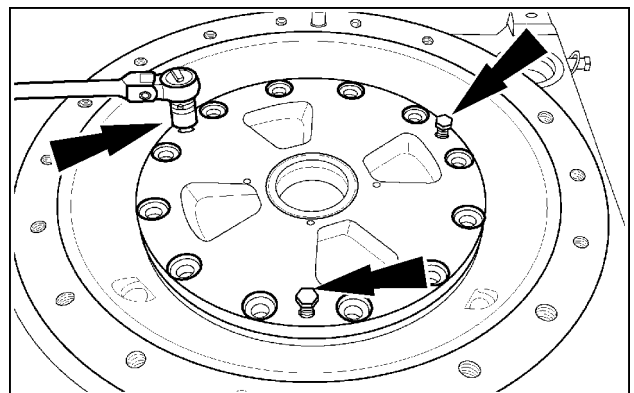
RCPH10FWD370ABJ 41

42. Rotate the differential housing so that the left hand bearing carrier is on top. Remove the bearing carrier retaining bolts and washers.



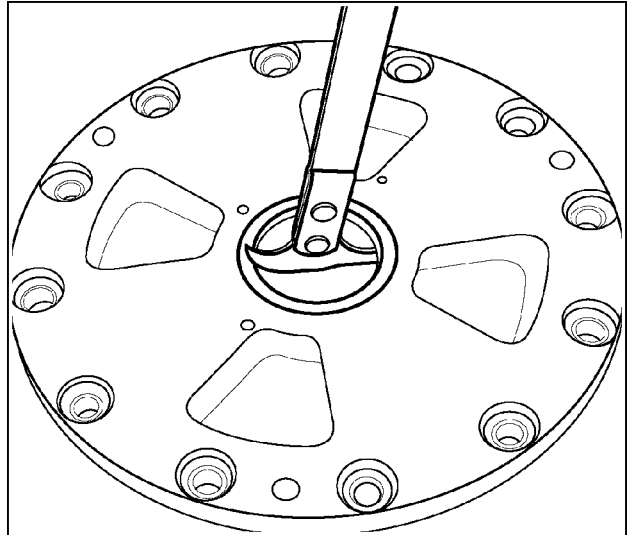
RCPH10FWD371ABJ 42

43. Use three of the retaining bolts in the threaded holes provided. Tighten the bolts alternately and evenly to jack the bearing carrier out of the housing. Remove the bearing carrier and preload shim pack.



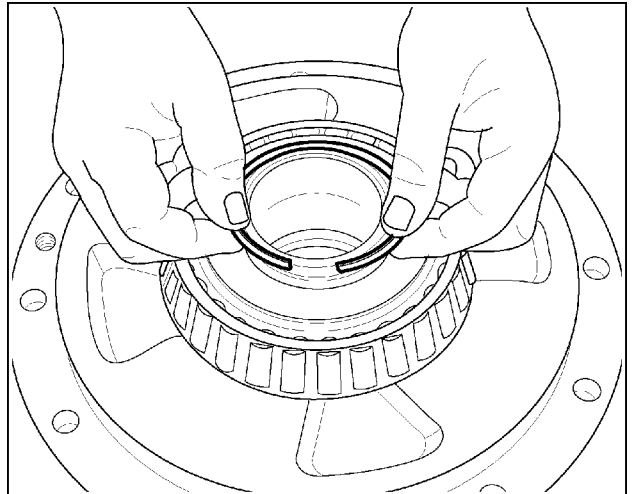
RCPH10FWD372ABJ 43

44. Remove and discard the seal.



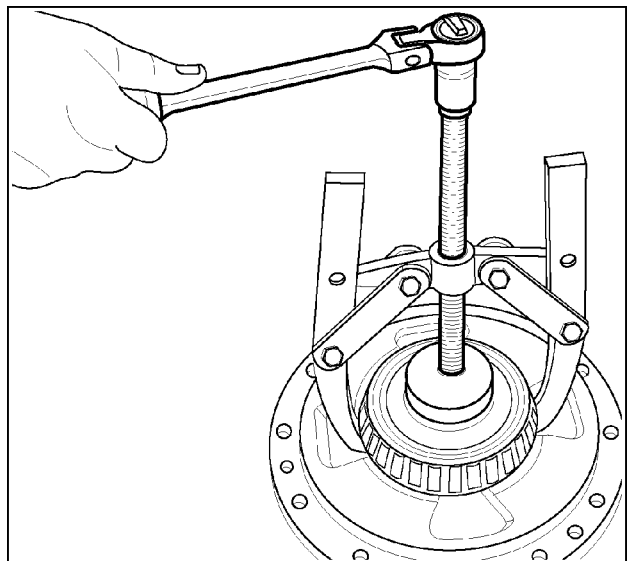
RCPH10FWD020ABJ 44

45. Remove and discard the seal ring.



RCPH10FWD021ABJ 45

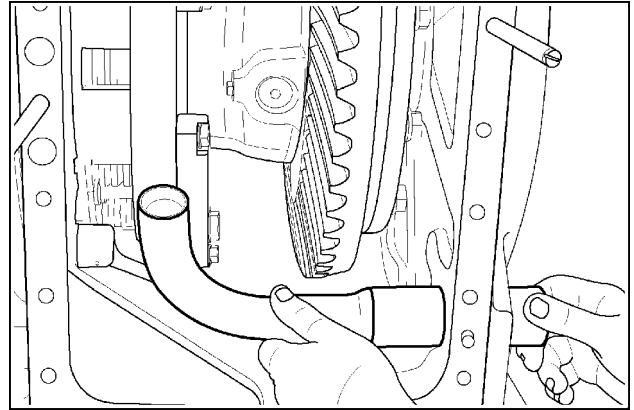
46. If required, use a bearing puller and step plate to remove the bearing cone from the hub of the bearing carrier.



RCPH10FWD022ABJ 46

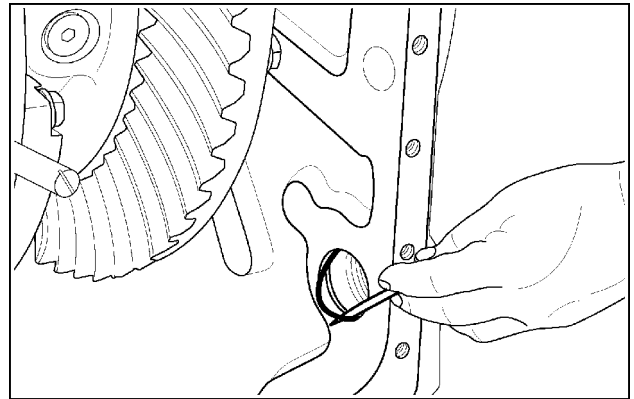
Differential removal

47. Push the oil tube out of the housing.



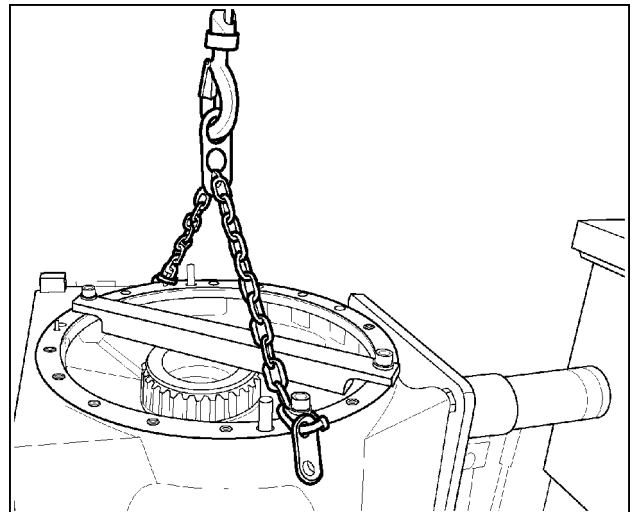
RCPH10FWD360ABJ 47

48. Remove and discard the O-ring for the oil tube.



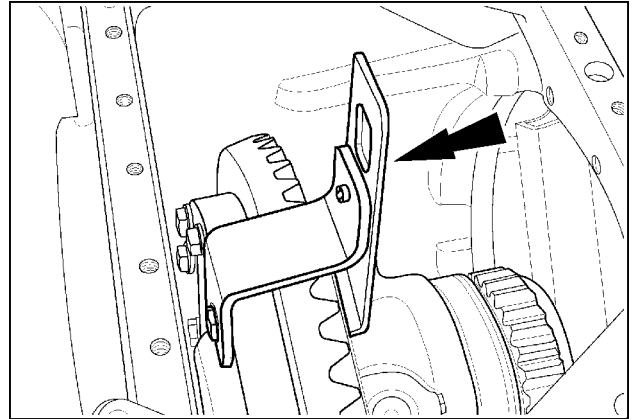
RCPH10FWD361ABJ 48

49. Rotate the housing until the right hand side is on top. Attach a chain fall and overhead hoist to the housing. Take-up the weight and dismount the housing from the repair stand.



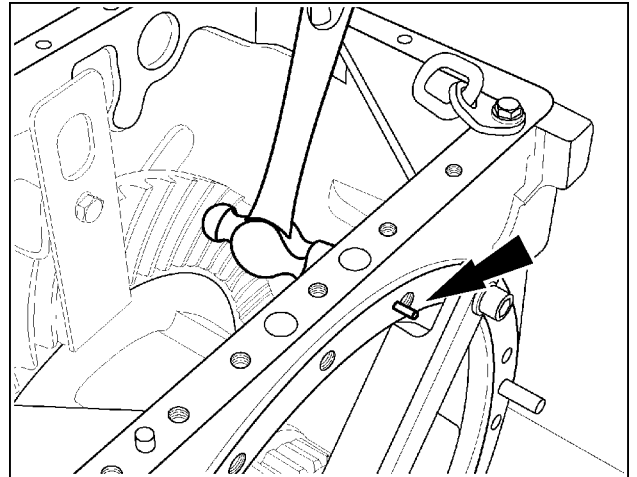
RCPH10FWD362ABJ 49

50. Position the center housing on the floor so the front opening is on top. Attach the CAS2509 differential lifting bracket on the ring gear.



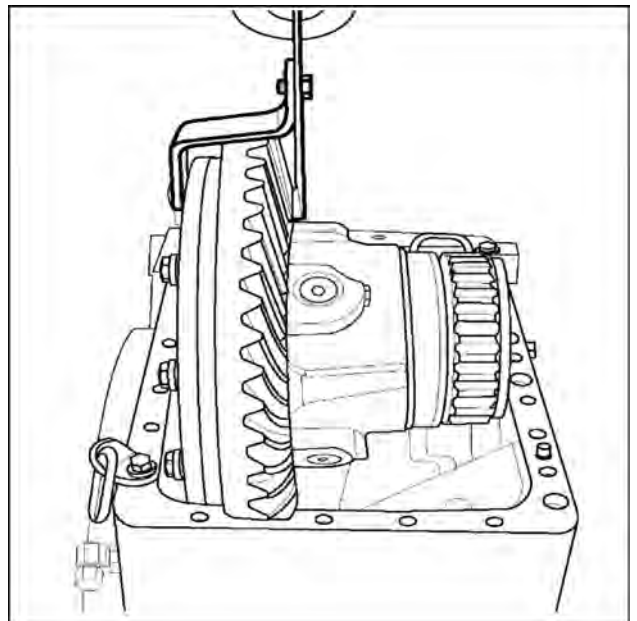
RCPH10FWD363ABJ 50

51. Drive the locating dowel pin for the oil tube outward until flush with the inside of the housing.



RCPH10FWD364ABJ 51

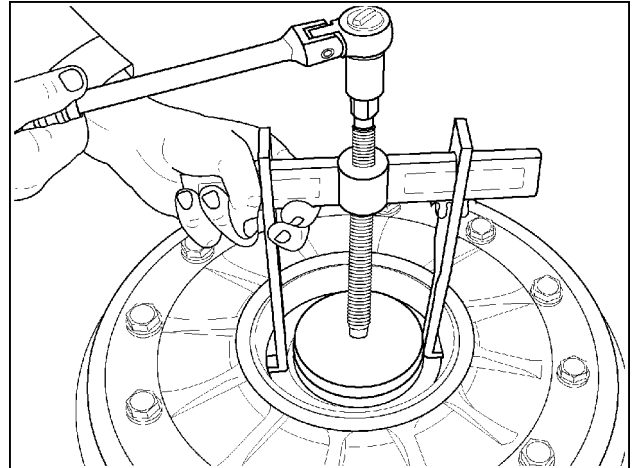
52. Attach an overhead hoist to the lifting bracket. Carefully lift the differential assembly out of the housing.



RCPH10FWD365ABJ 52

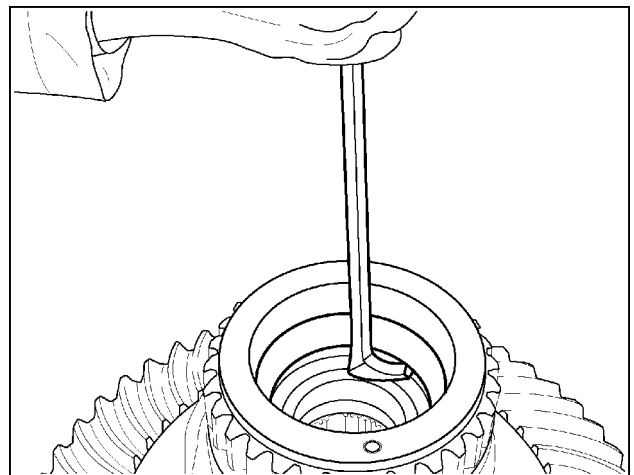
Differential case disassembly procedure

53. If required, use a puller arrangement and step plate to remove the left hand side differential bearing cup.



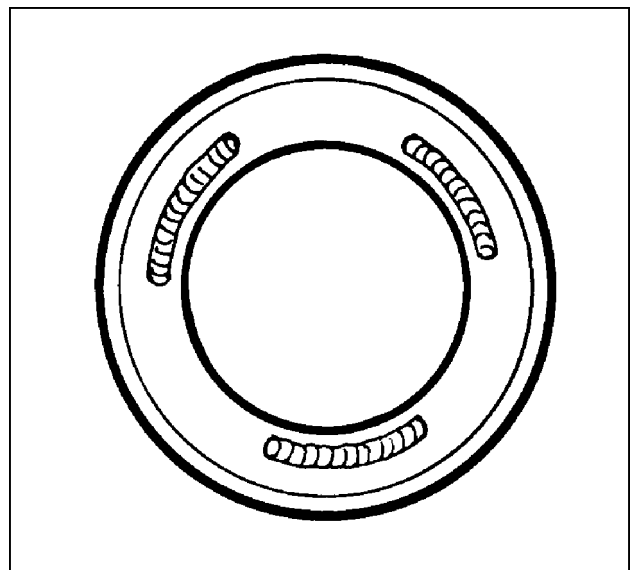
RCPH10FWD366ABJ 53

54. If required, use a rolling head pry bar to remove the right hand side differential bearing cup.



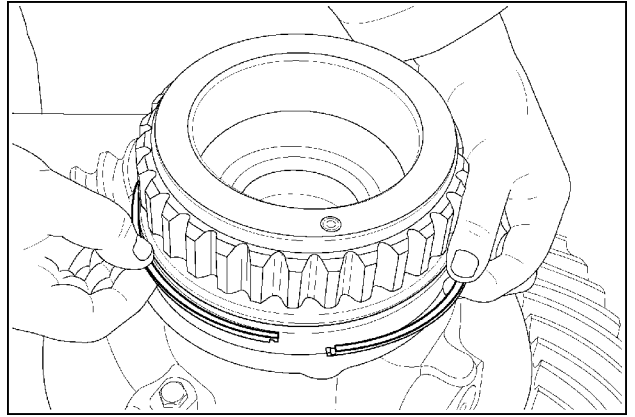
RCPH10FWD367ABJ 54

55. If the bearing cup cannot be removed with a rolling head pry bar an electric welder may be used. Stitch weld three **8 mm (0.315 in) x 25 mm (1 in)** weld beads horizontally in the center of the bearing cup 120 degrees apart. Allow the bearing cup to cool and remove



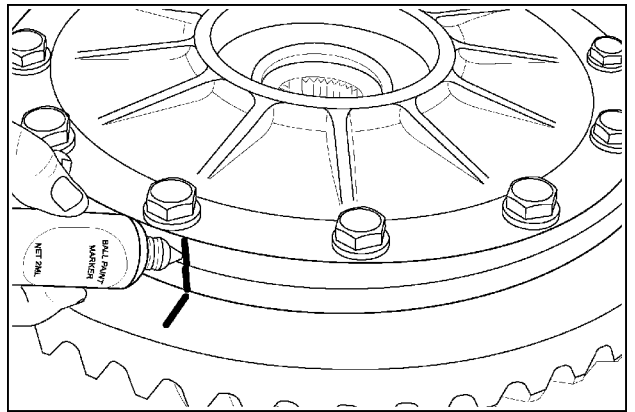
RCPH10FWD368ABJ 55

56. Remove the seal ring from the right hand side of the housing. Discard the seal ring.



RCPH10FWD002ABJ 56

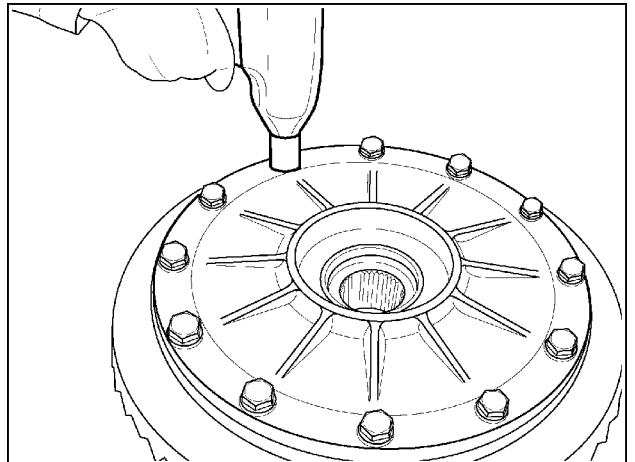
57. Match mark the case and ring gear for assembly reference.



RCPH10FWD003ABJ 57

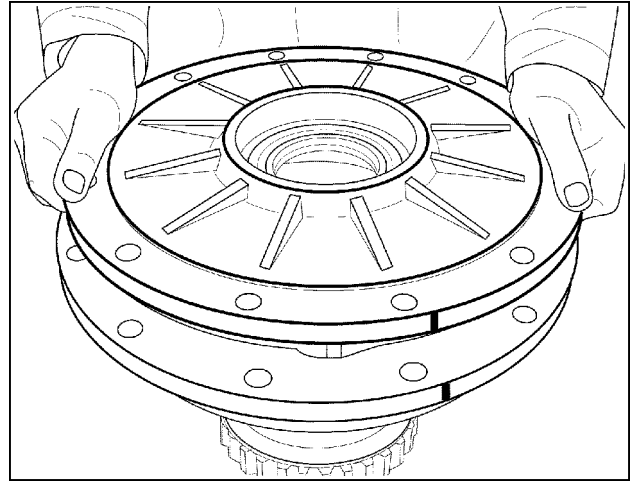
58. Remove the ring gear and case attaching bolts. Use a brass drift and hammer to tap the ring gear free from the case.

NOTE: Production axles will use 24 retainer bolts. The ring gear does not need to be removed unless the case or ring gear is to be replaced.



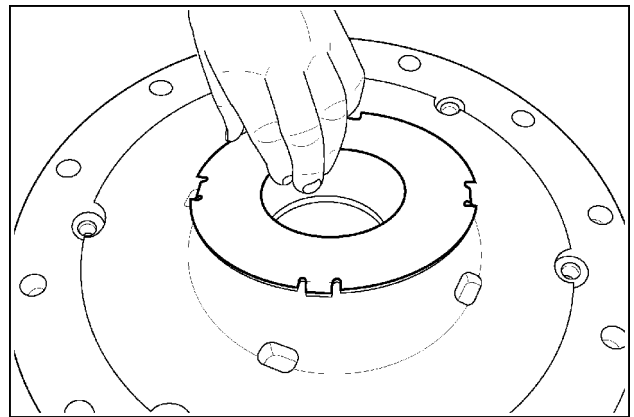
RCPH10FWD004ABJ 58

59. Remove the top (left hand) differential case half.



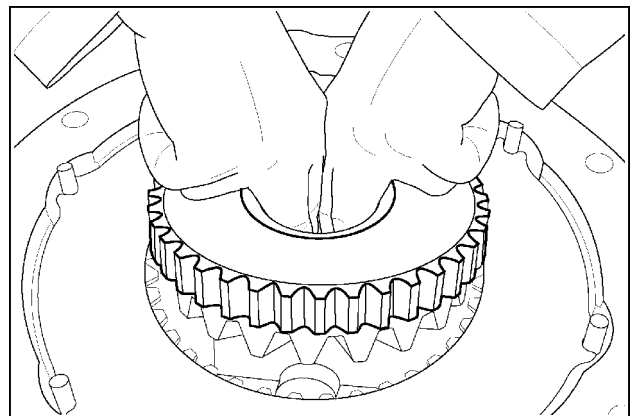
RCPH10FWD005ABJ 59

60. Remove the large thrust washer from the left hand case.



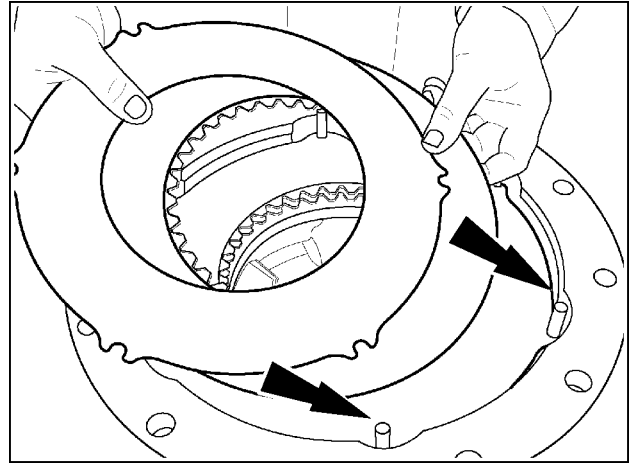
RCPH10FWD006ABJ 60

61. Remove the splined differential side gear from the right hand case half.



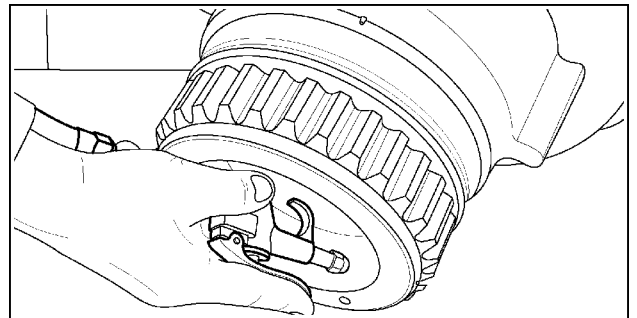
RCPH10FWD007ABJ 61

62. If the differential is equipped with differential lock, proceed with the following instructions.
If the differential is not equipped with differential lock, proceed the step **65**
Remove the four steel separator plates and three friction plates from the case. Remove the 6 anti-rotation dowel pins from the case.



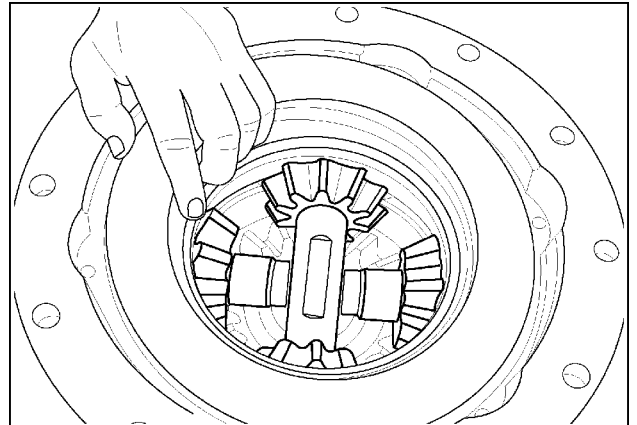
RCPH10FWD008ABJ 62

63. Use a short burst of compressed air in the oil passage hole in the right hand case to move the differential lock piston out of the bore.



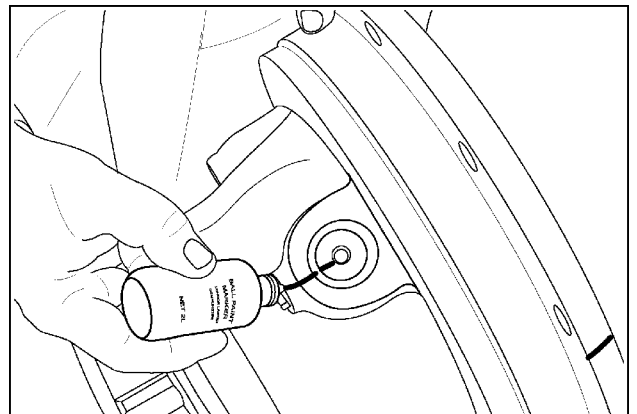
RCPH10FWD009ABJ 63

64. Remove the differential lock piston from the right hand case.



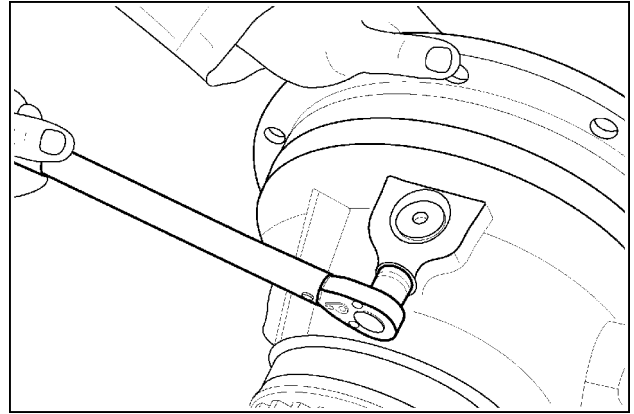
RCPH10FWD010ABJ 64

65. Match mark one of the short pinion gear shafts for assembly reference.



RCPH10FWD369ABJ 65

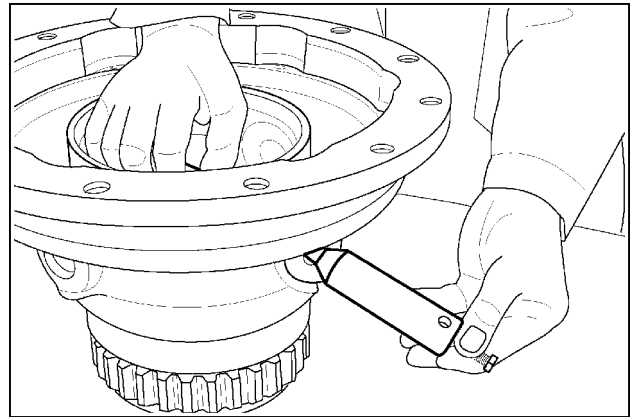
66. Remove the two cross pin bolts from the short pinion gear shaft locations.



RCPH10FWD011ABJ 66

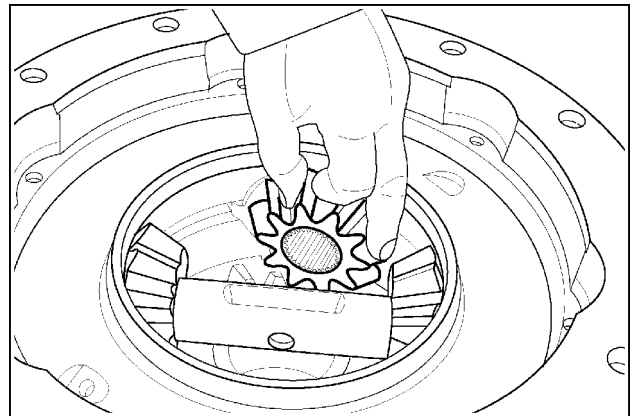
67. Install an M8 x 1.25 bolt into the threaded hole in the end of each short pinion gear shaft. Remove the short shafts and spacer sleeves from the right hand case.

NOTE: There are 28 uncaged needle roller bearings in each of the four pinion gears.



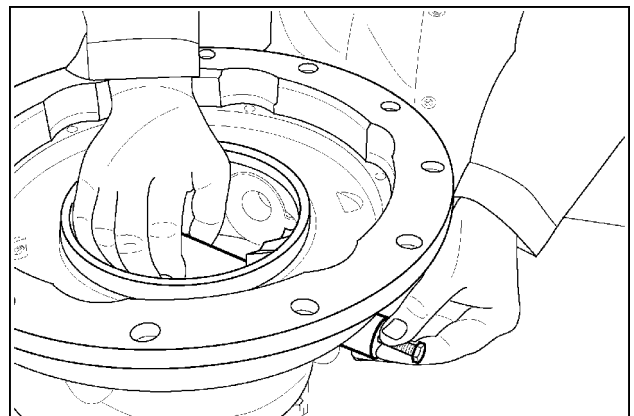
RCPH10FWD012ABJ 67

68. Remove the spider gears for the short shafts from the case.



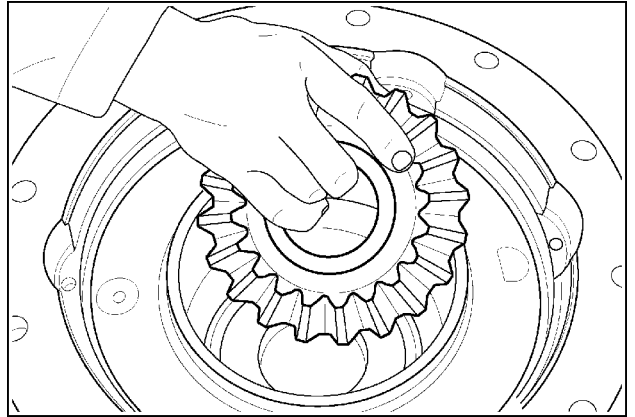
RCPH10FWD013ABJ 68

69. Use the same procedure to remove the long spider gear shaft, spacer and spider gears.



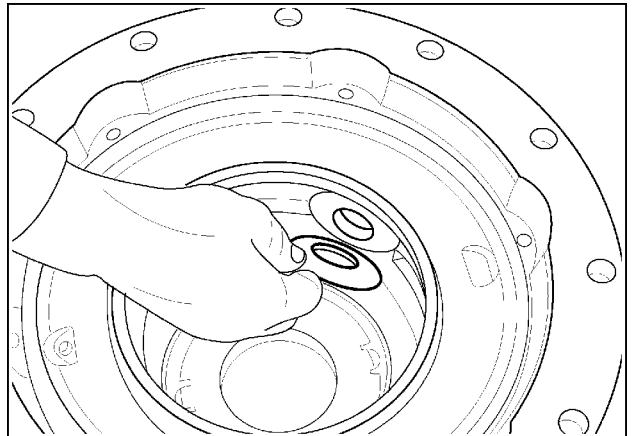
RCPH10FWD014ABJ 69

70. Remove the side gear from the bottom of the case.



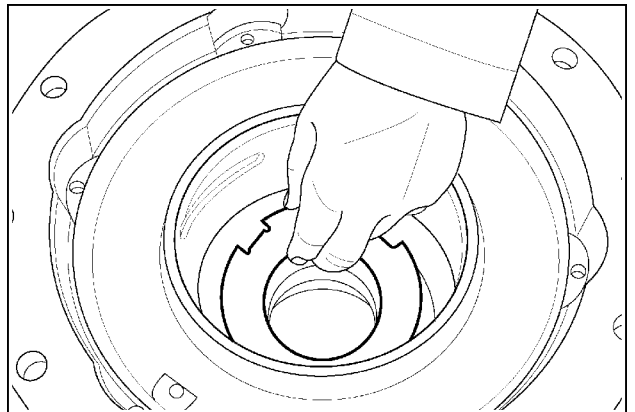
RCPH10FWD015ABJ 70

71. Remove the thrust washers for each spider gear from the case.



RCPH10FWD016ABJ 71

72. Remove the thrust washer for the side gear from the bottom of the case. Clean and inspect all differential parts for damage or wear. Replace any damaged or worn parts found.



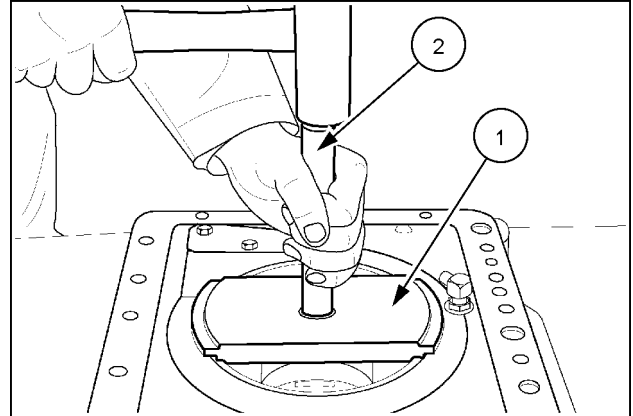
RCPH10FWD017ABJ 72

Differential - Assemble - 400 Series axles

Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

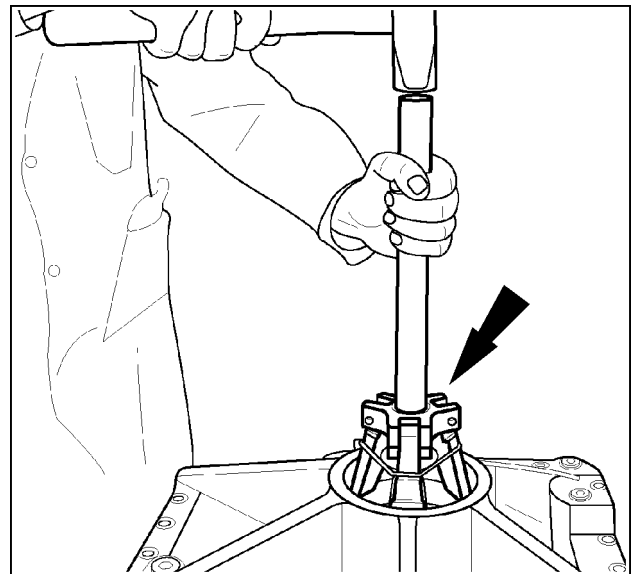
Front cover assembly

1. Use the **CAS2501** bearing cup driver (1) and CAS1716-3 handle (2) to install the inner bearing cup into the cover. Be sure the bearing cup is seated in the bore.



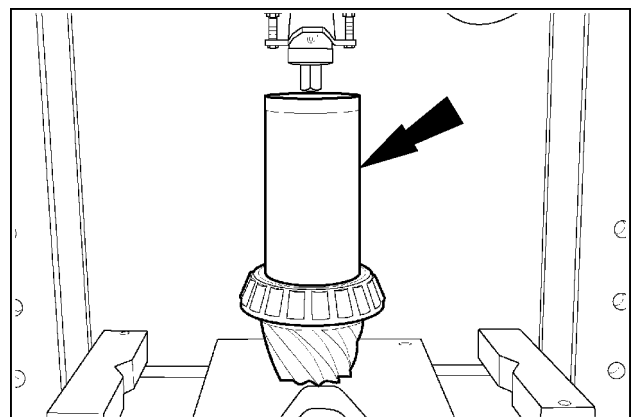
RCPH10FWD373ABJ 1

2. Use a universal bearing cup Installer to install the outer bearing cup until fully seated in the bore of the housing.



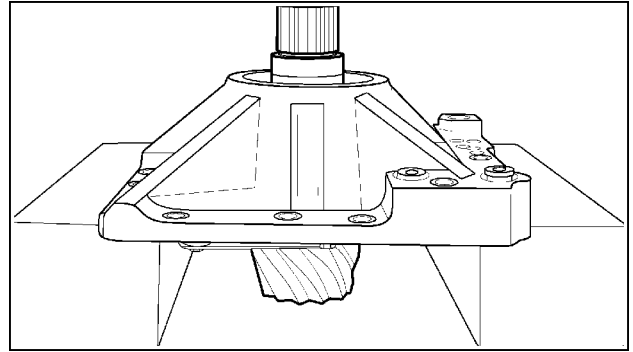
RCPH10FWD374ABJ 2

3. Support the pinion gear (head end down) on a press bed. Use the 53-315 driver anvil as a press sleeve to press the inner bearing cone (large end down) on the pinion gear until seated.



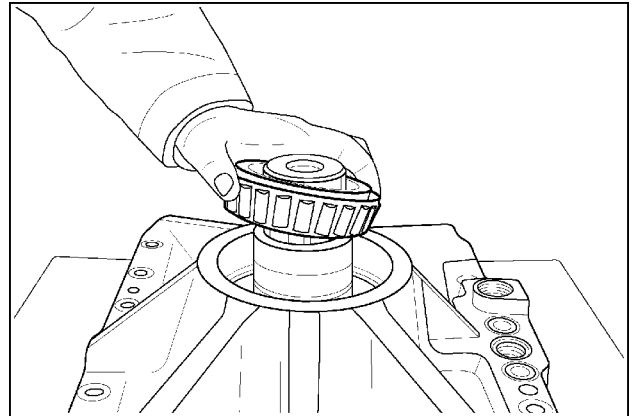
RCPH10FWD375ABJ 3

4. Lubricate the rear bearing with clean operating oil. Install the bevel pinion gear into the front cover.



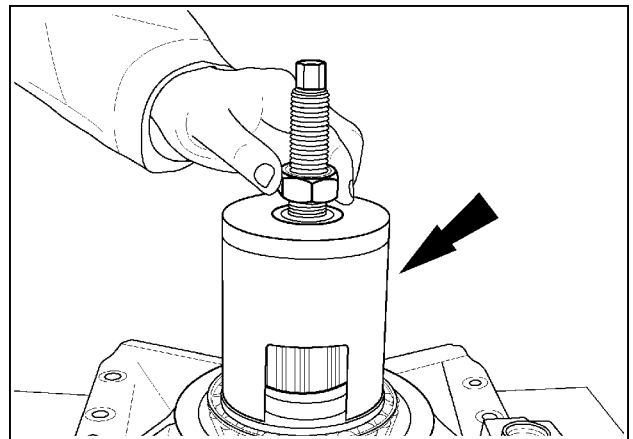
RCPH10FWD376ABJ 4

5. Lubricate the front bearing cone with clean operating oil. Install the bearing cone and thick spacer washer on the pinion shaft.



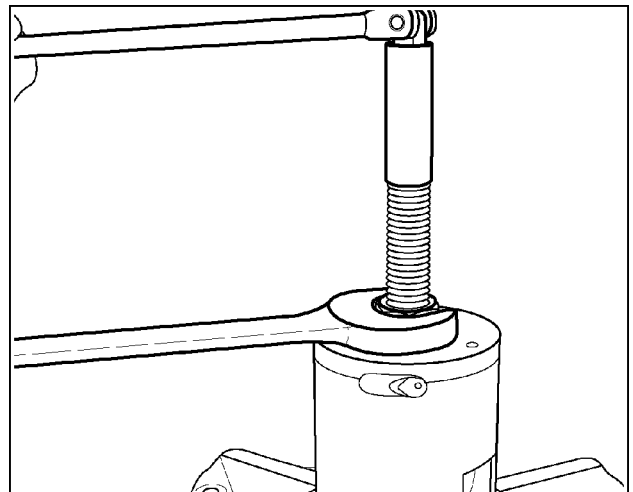
RCPH10FWD377ABJ 5

6. Install and tighten the center bolt of the **CAS2511** pinion bearing preload compression tool into the threaded hole in the pinion shaft. Install the compression sleeve, thrust washer and nut on the center bolt.



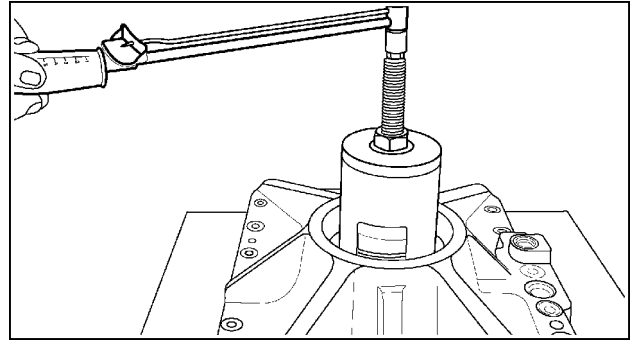
RCPH10FWD348ABJ 6

7. Use one wrench to hold the center bolt and a second wrench to tighten the nut to push the bearing cone on the shaft.



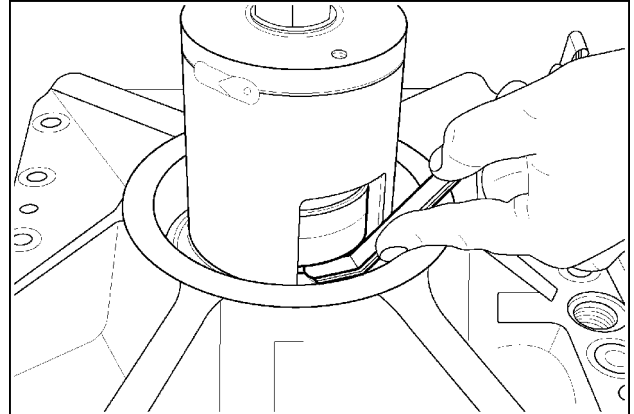
RCPH10FWD349ABJ 7

8. Use a torque wrench on the center bolt to check rolling torque. Tighten the nut until **19 – 20 N·m (170 – 180 lb in)** of smooth and continuous rolling torque is measured on the torque wrench.



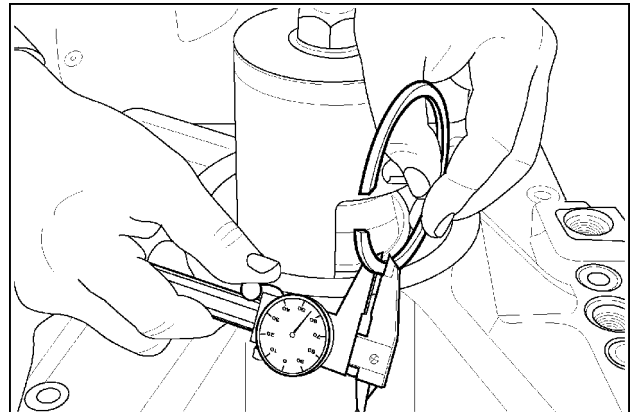
RCPH10FWD378ABJ 8

9. Use an angled thickness gauge to measure and record the distance between the spacer washer and the upper edge of the snap ring groove. The thickness gauge must be a tight fit.



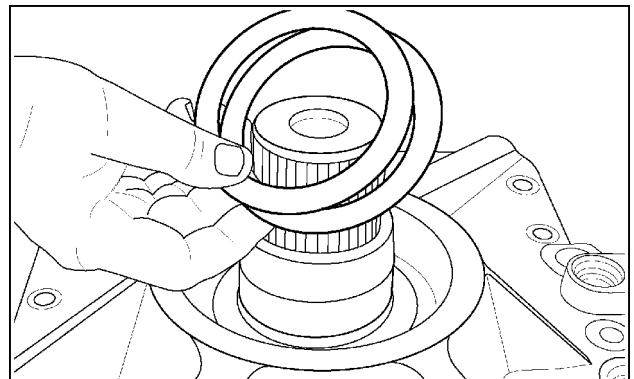
RCPH10FWD438ABJ 9

10. Measure the width of the snap ring. Subtract this dimension from the total distance measured and recorded in step 9.



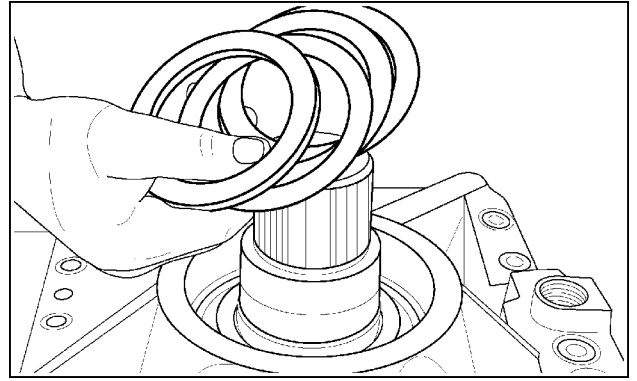
RCPH10FWD379ABJ 10

11. Select a bearing preload shim pack equal to the difference calculated in Step 10 plus an additional **0.076 mm (0.003 in)**. Remove the compression sleeve from the center bolt and the thick spacer washer from the pinion shaft.



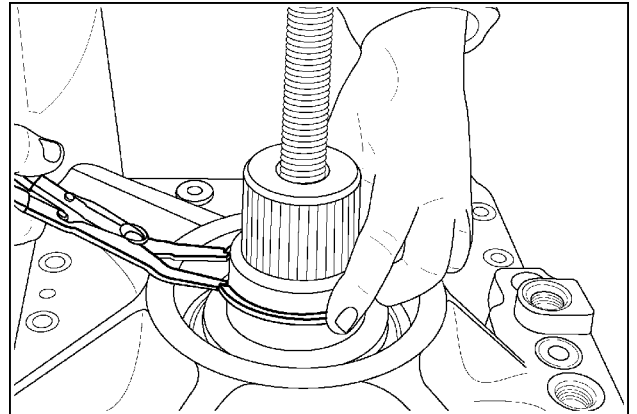
RCPH10FWD439ABJ 11

12. Install the selected shim pack (thickest shim first) and thick spacer washer on the pinion shaft.



RCPH10FWD351ABJ 12

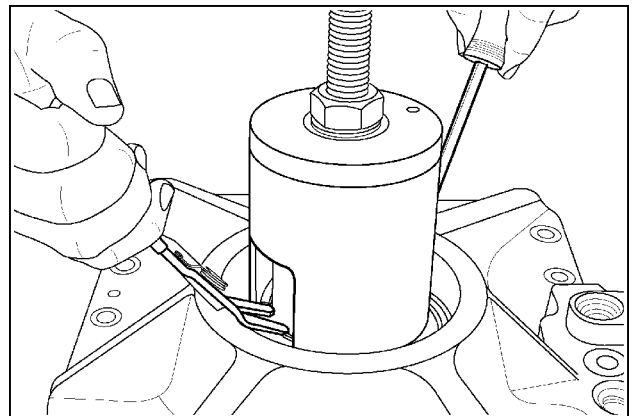
13. Install the snap ring on the pinion shaft as far down as possible.



RCPH10FWD350ABJ 13

14. Install the **CAS2511** compression sleeve, thrust washer and nut on the center bolt. Align the open window of the sleeve with the gap of the snap ring. Tighten the nut on the compression sleeve until the snap ring can be installed in the groove of the shaft. Back off the nut two full turns. Strike the head of the center bolt two sharp blows to seat the bearings and snap ring.

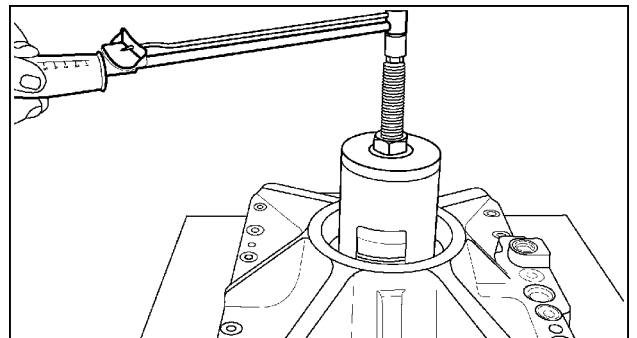
NOTICE: Be sure the snap ring is seated in the groove of the shaft.



RCPH10FWD380ABJ 14

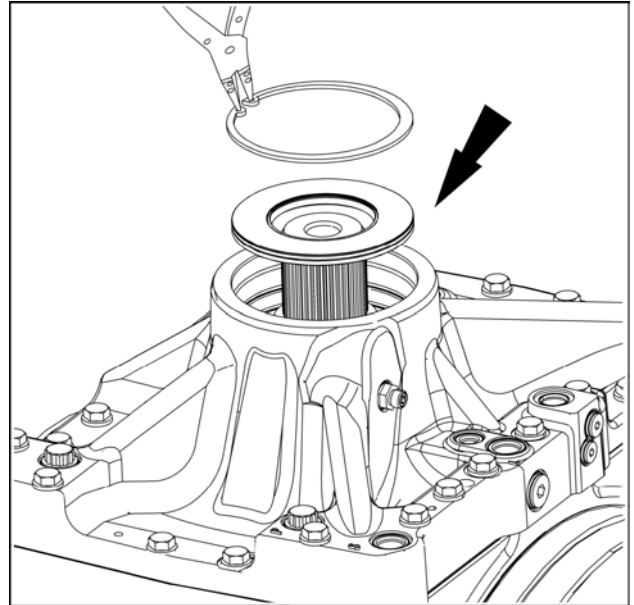
15. Be sure the nut on the compression sleeve bolt is loose. Use a torque wrench to check pinion bearing preload. Rolling torque must measure **6 – 20 N·m (55 – 180 lb in)** with no bearing binding or lockup. If rolling torque is out of tolerance, add or remove shims as needed to correct rolling torque.

NOTE: Adjust used bearings towards the lower end of the preload tolerance range.



RCPH10FWD378ABJ 15

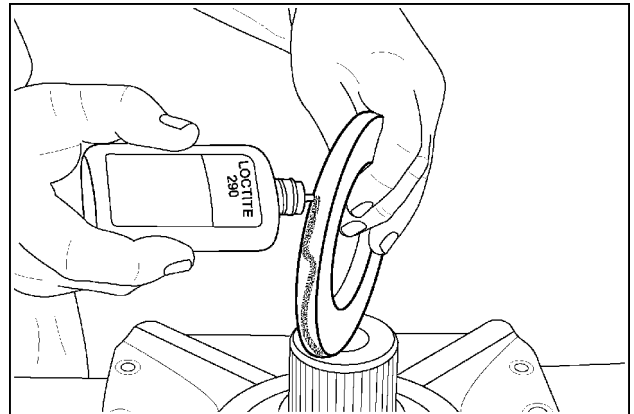
16. Install the inner seal and snap ring into the front cover.



RCPH10FWD494ABJ 16

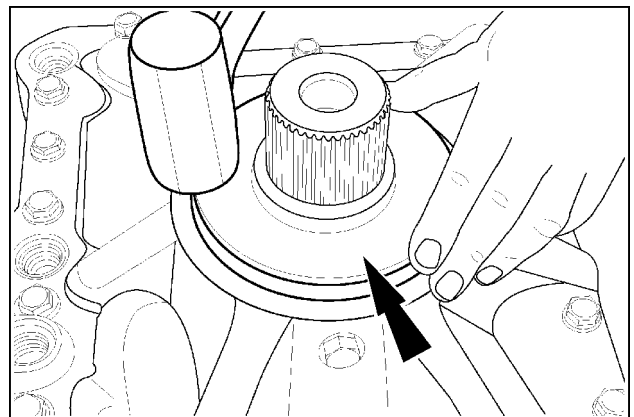
17. Put an adhesive/sealant around the outside diameter of a new pinion seal. Lubricate the lips of the seal with clean lithium grease.

NOTE: Sealant is not required if the seal is rubber coated.



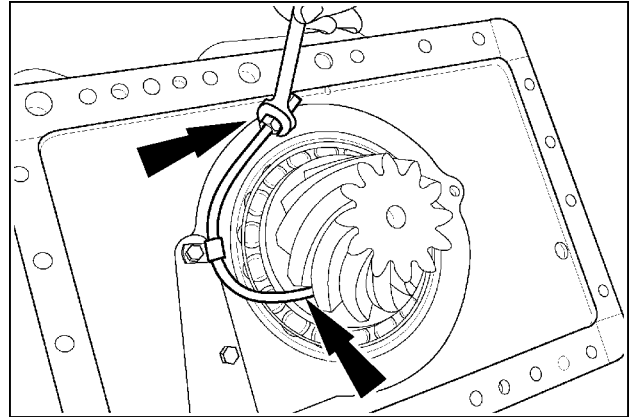
RCPH10FWD381ABJ 17

18. Install the seal over the pinion shaft squarely into the bore of the cover. Use **CAS2503** seal installer and dead blow type hammer to tap the seal into place until the tool seats against the housing.



RCPH10FWD382ABJ 18

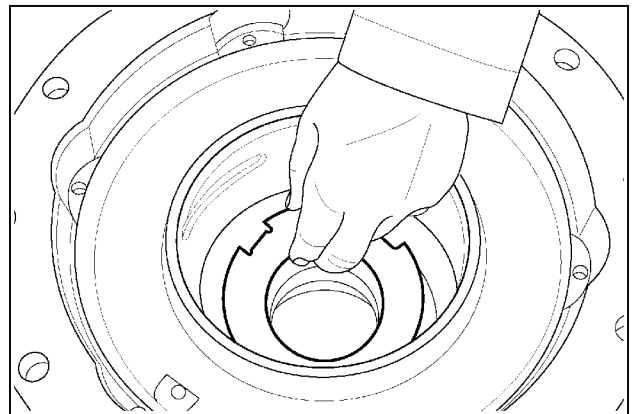
19. Connect the lubrication tube for the bevel pinion gear to the port fitting. Install the tube retaining clip and bolt. Tighten the retaining bolt to the specified torque. Adjust the tube to direct oil flow at the pinion gear teeth. Allow a minimum of **6 mm (0.24 in)** clearance between the end of the tube and the bevel gear. Tighten the tube connection securely.



RCPH10FWD388ABJ 19

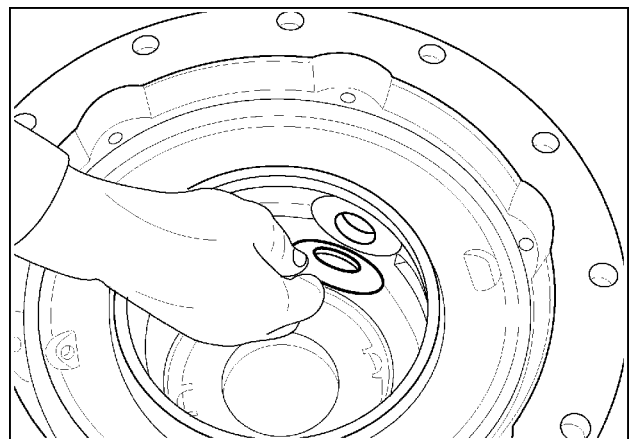
Differential case assembly procedures

20. Lubricate the thrust washer for the right hand case with clean assembly grease. Position the thrust washer tab side down in the bottom of the case.



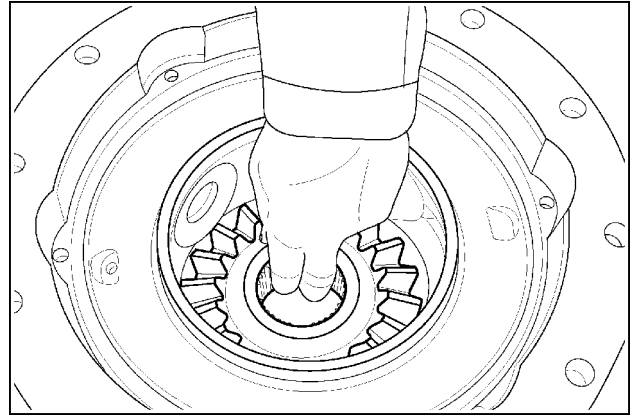
RCPH10FWD017ABJ 20

21. Lubricate each spider gear thrust washer with clean assembly grease. Install each spider gear thrust washer tab outward to engage the slot in the case and centered to the hole.



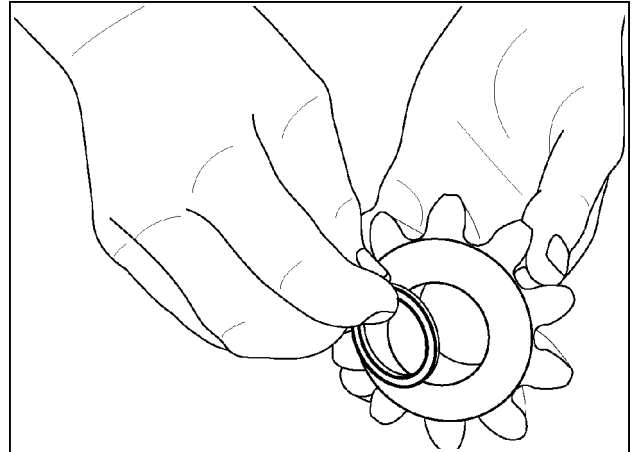
RCPH10FWD016ABJ 21

22. Install the side gear into the bore in the bottom of the right hand case.



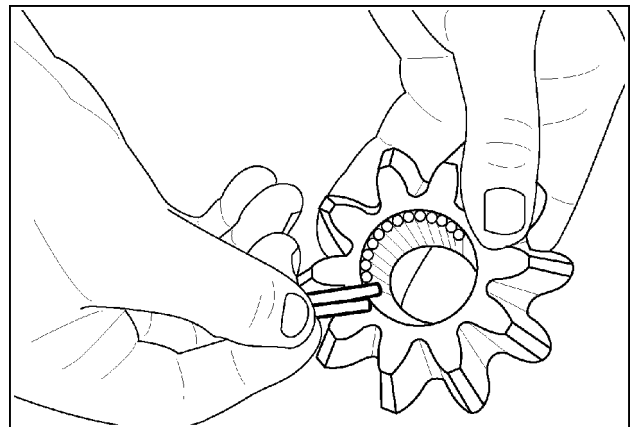
RCPH10FWD037ABJ 22

23. Lubricate the needle bearing slave ring with clean assembly grease. Install the slave ring into the bore on the beveled side of the spider gear.



RCPH10FWD038ABJ 23

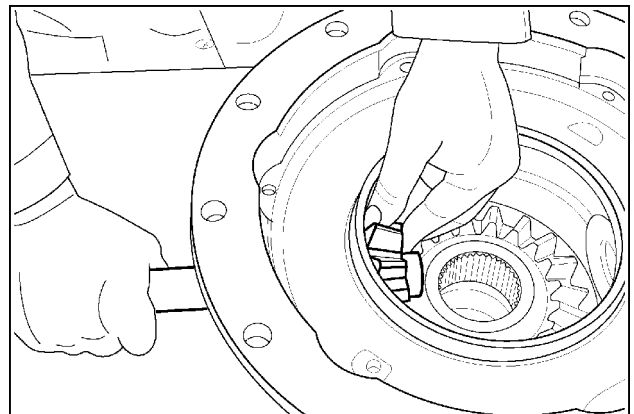
24. Using the slave ring as a needle roller bearing support, use clean assembly grease to install a full compliment of 28 needle roller bearings into each spider gear



RCPH10FWD039ABJ 24

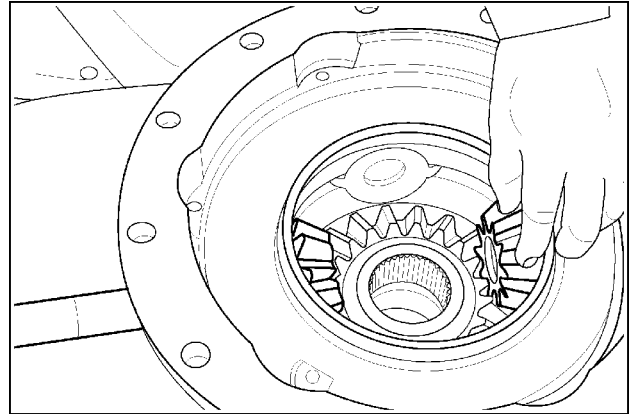
25. Install the first spider gear into the case centered to the hole for the long pin and meshed with the side gear. Push the pin through the case and into the spider gear until the pin is flush with the inner side of the gear.

NOTE: Turn the long pin so that the hole in the center of the pin is horizontal.



RCPH10FWD040ABJ 25

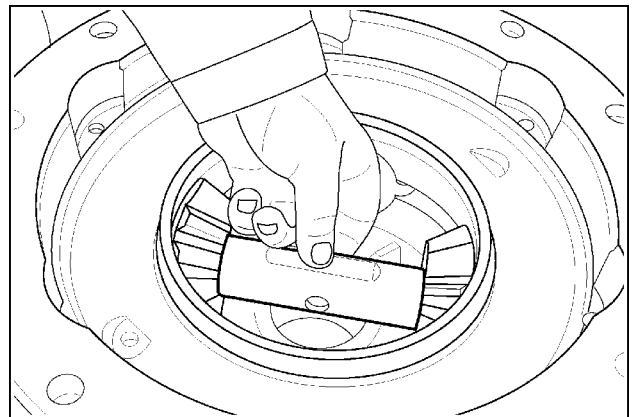
26. Install the opposite side spider gear centered to the case bore and meshed with the side gear.



RCPH10FWD041ABJ 26

27. Install the long spacer sleeve between the two spider gear so that the hole in the center of the sleeve is horizontal. Carefully push the long pin through the spacer sleeve and spider gears until the hole in the pin and spacer sleeve are aligned.

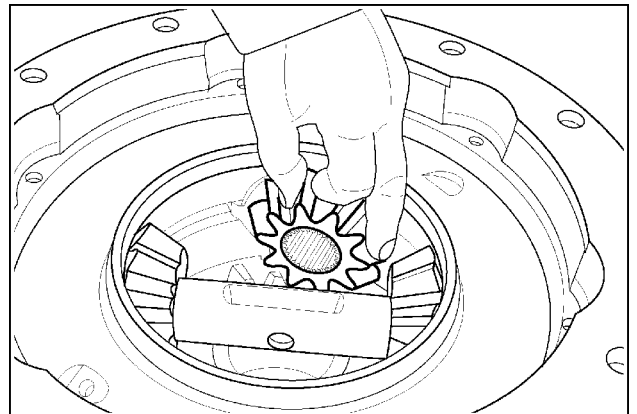
NOTE: Be sure the slave ring and all needle rollers remain in position in each pinion gear. Check the rotation of the pinion gears and bottom side gear. Rotation of the gears must be smooth without lockup.



RCPH10FWD042ABJ 27

28. Install the pinion gears for the short pins into the case in the same manner.

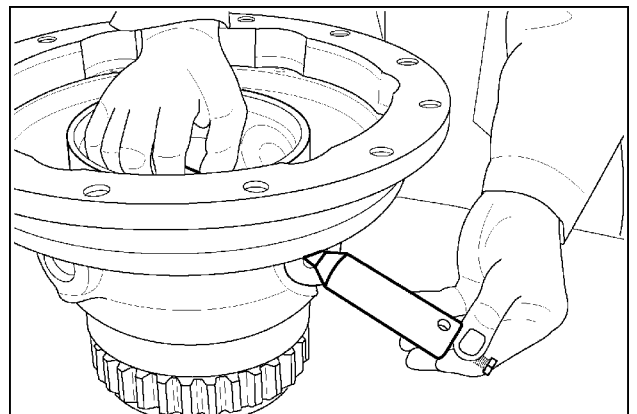
NOTE: The slave ring for each spider gear must be installed on the beveled side of the gear.



RCPH10FWD013ABJ 28

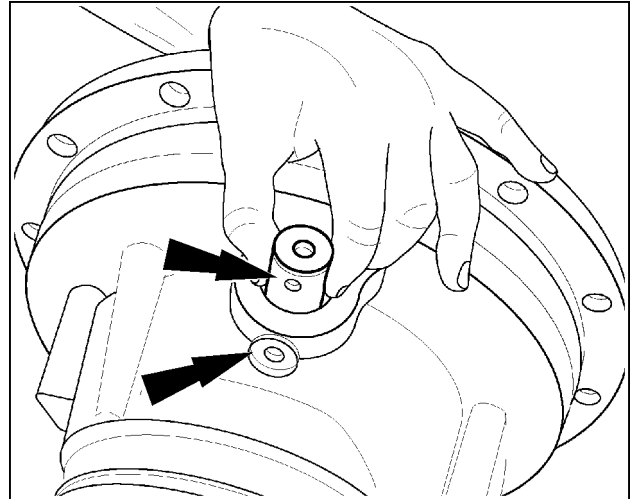
29. Position a short spacer sleeve between the pinion gear and long spacer sleeve. Carefully install the pinion pin and short spacer to engage the hole in the long pin and spacer.

NOTE: The large outside diameter of the spacer sleeve must mate against the ends of the needle rollers. Be sure all needle rollers remained in the gear



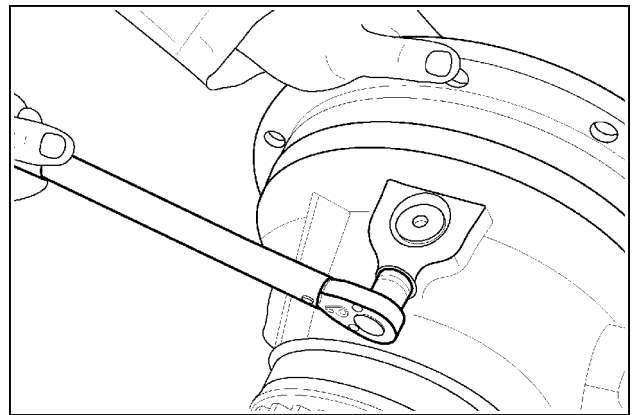
RCPH10FWD012ABJ 29

30. Align the hole in the end of the short pinion pin with the threaded hole in the case. Repeat this procedure for the opposite short pinion shaft.



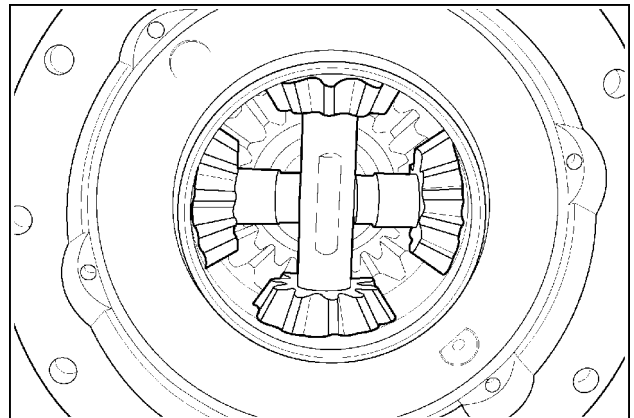
RCPH10FWD043ABJ 30

31. Install the pinion pin retainer bolts. Tighten each bolt to specifications.



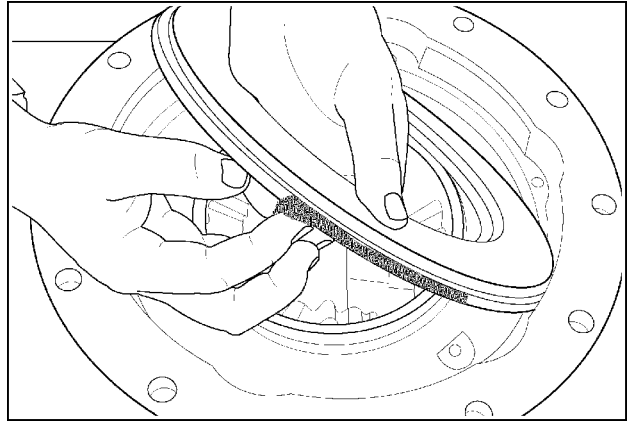
RCPH10FWD011ABJ 31

32. After all the pinion gears and pins have been installed, check the rotation of the differential gears. There must be no lockup during rotation.



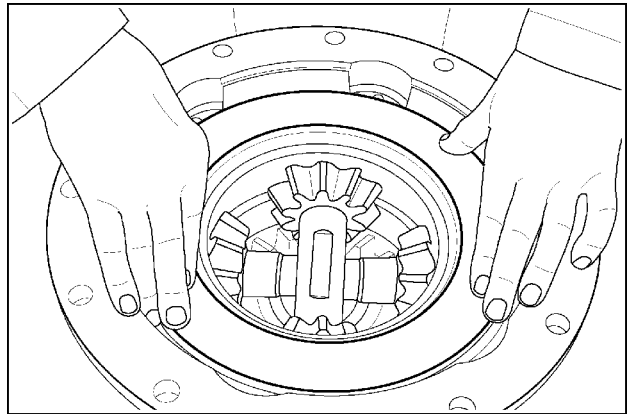
RCPH10FWD044ABJ 32

33. If equipped with differential lock, lubricate the seals of a new piston with clean assembly grease.



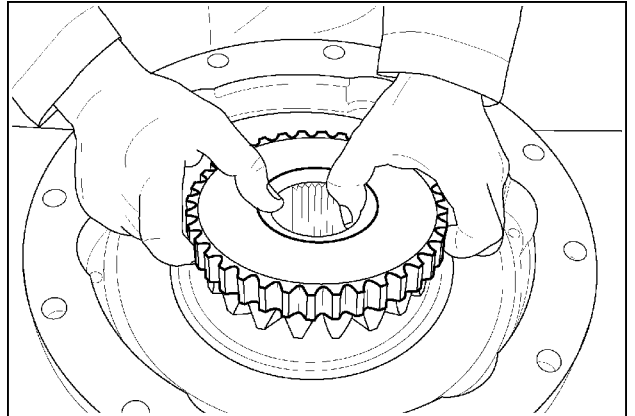
RCPH10FWD045ABJ 33

34. Hand seat the differential lock piston into the bore of the right hand case.



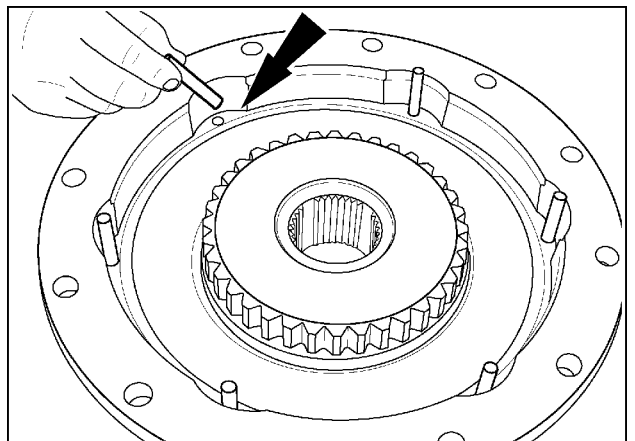
RCPH10FWD046ABJ 34

35. Install the splined side gear on top of the pinion gears so that all gears are in mesh.



RCPH10FWD047ABJ 35

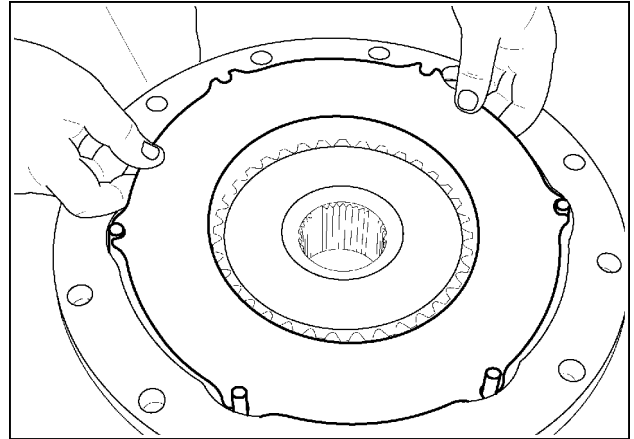
36. If the differential is not equipped with differential lock, proceed to step 38
 If the differential is equipped with differential lock, proceed with the following steps.
 Install the six anti-rotation dowel pins into the holes in the right hand case.



RCPH10FWD048ABJ 36

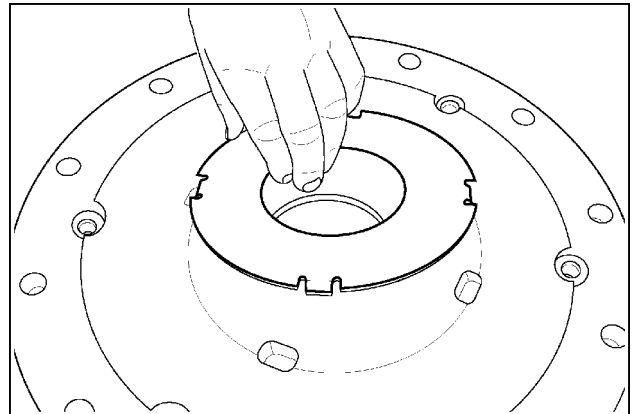
37. Starting with a steel separator plate, alternately install 4 separator plates and 3 friction plates. Be sure the slots in the ears of the separator plates engage the dowel pins.

NOTE: Soak the friction plates in clean operating fluid before installation.



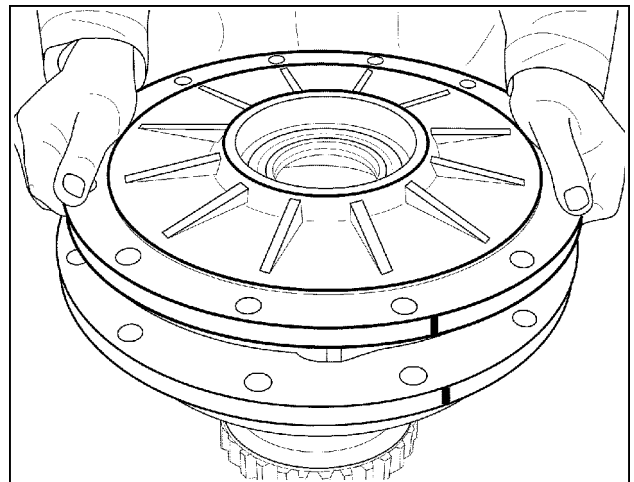
RCPH10FWD049ABJ 37

38. Lubricate the large thrust washer with clean assembly grease. Install the thrust washer into the left hand case (tab side down).



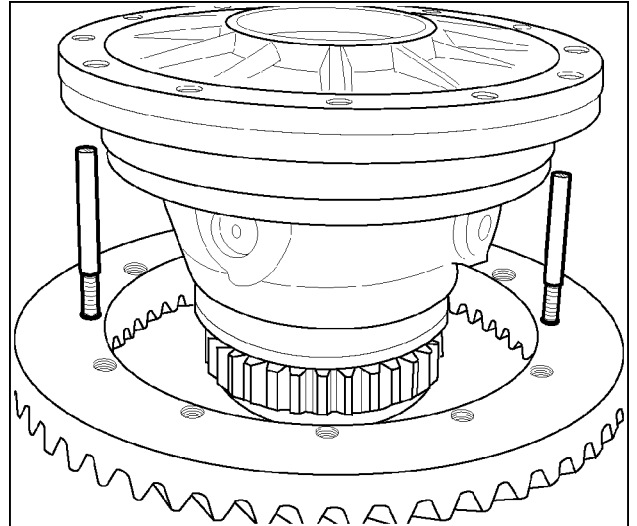
RCPH10FWD006ABJ 38

39. Install the left hand case on top of the right hand case so that the match marks align.



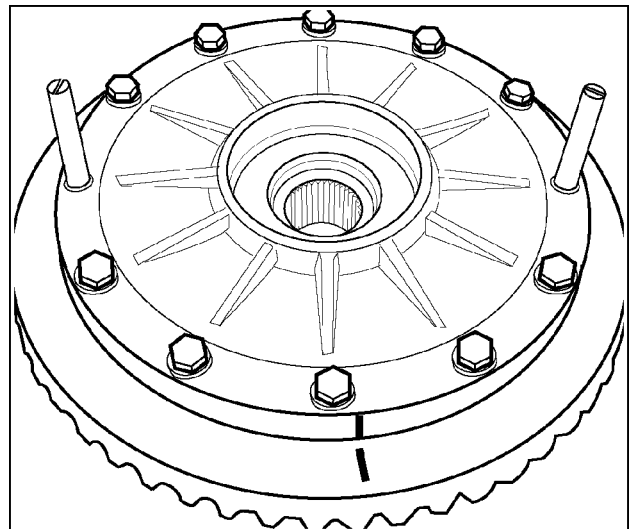
RCPH10FWD005ABJ 39

40. Put a light coat of oil around the inside diameter of the ring gear. Install two of the **CAS2496** alignment studs into opposite holes of the ring gear. Position the differential case over the ring gear.



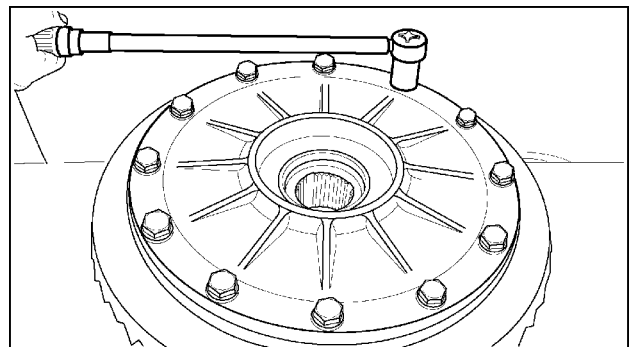
RCPH10FWD050ABJ 40

41. Position the ring gear on the differential case so the match marks align. Install the retaining bolts and washers.



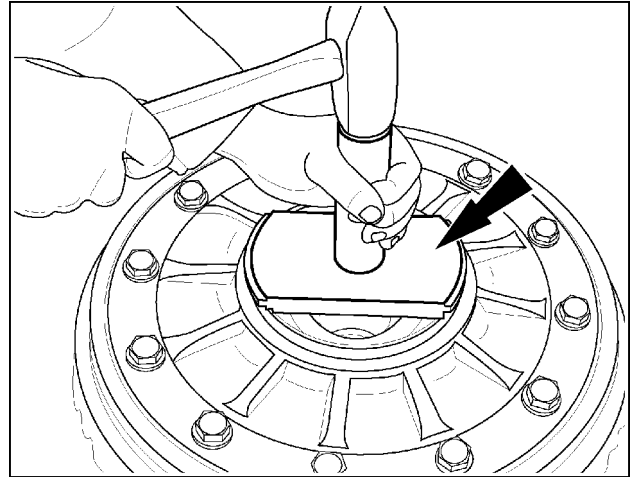
RCPH10FWD051ABJ 41

42. Tighten the retaining bolts alternately and evenly in a star pattern to specifications.



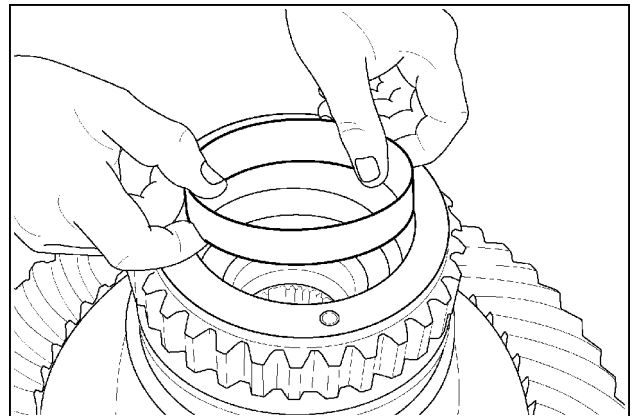
RCPH10FWD390ABJ 42

43. Use the CAS2500 bearing cup installer to install the bearing cup into the left hand case until fully seated.



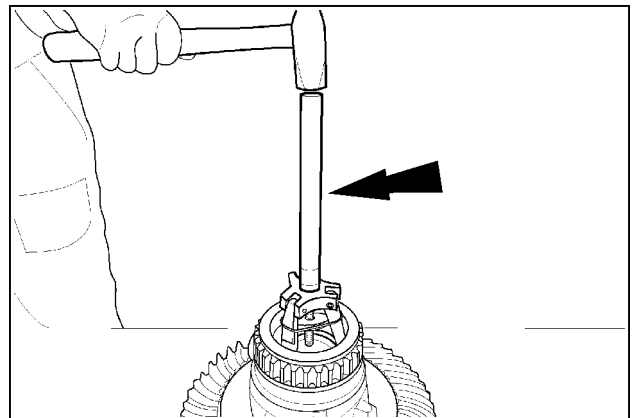
RCPH10FWD053ABJ 43

44. Position the bearing cup into the bore of the right hand case.



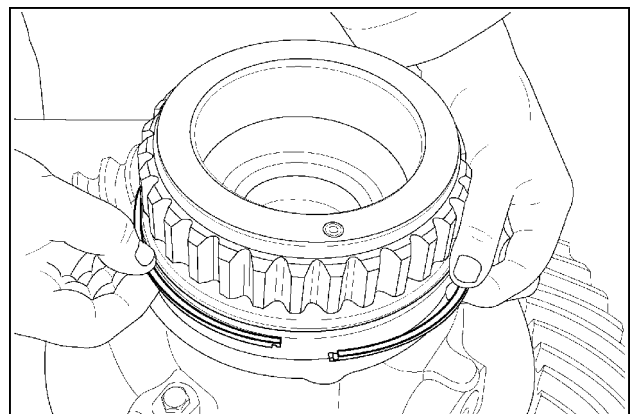
RCPH10FWD054ABJ 44

45. Use a universal bearing cup installer to install the bearing cup until seated.



RCPH10FWD391ABJ 45

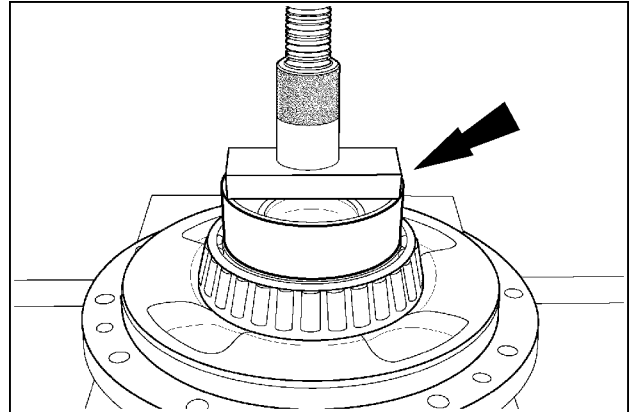
46. Install the Teflon seal ring in the groove of the hub. Lubricate the groove and the seal ring liberally with clean assembly grease. Be sure the ends of the seal ring are connected together.



RCPH10FWD002ABJ 46

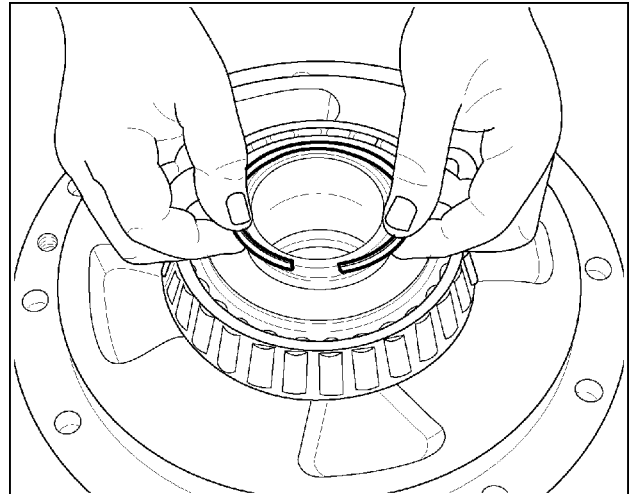
Differential bearing carrier assembly

47. Position the bearing cone (large side down) on the hub of the carrier. Use the **CAS2516** bearing installer and press to install the bearing cone until fully seated.



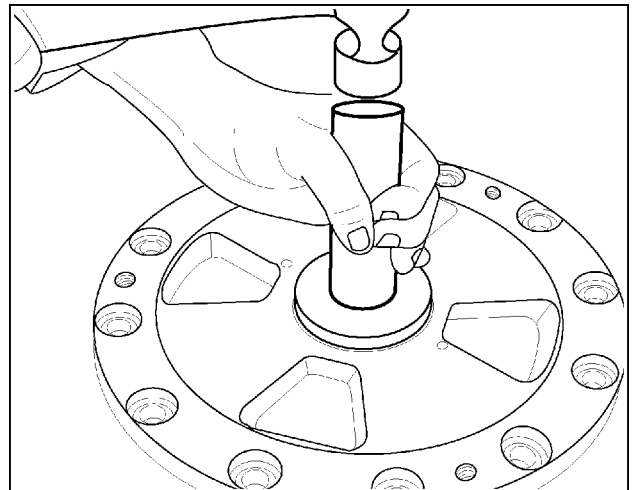
RCPH10FWD392ABJ 47

48. Lubricate and install a new seal ring in the groove of the hub.



RCPH10FWD021ABJ 48

49. Use a seal driver to install a new seal into the bearing carrier.

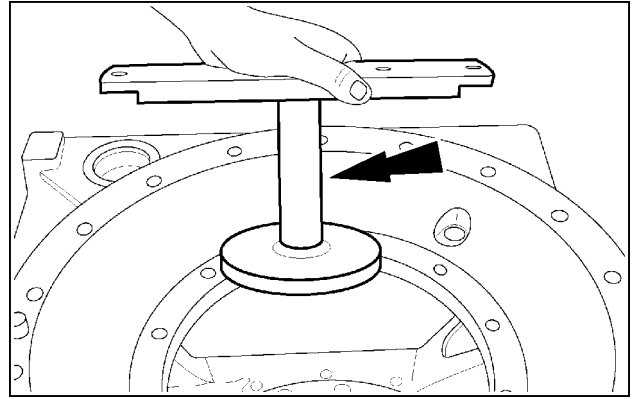


RCPH10FWD095ABJ 49

Adjusting bevel pinion gear depth

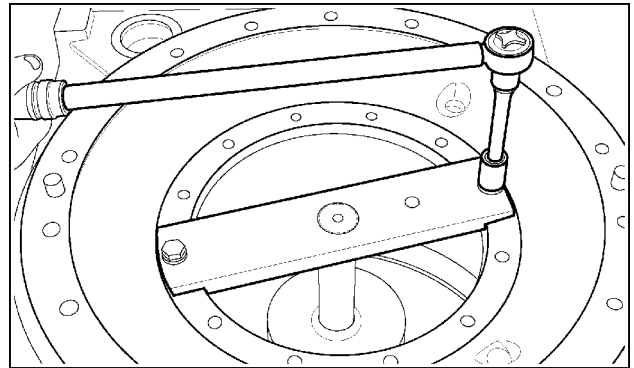
NOTE: The nominal mounting distance for the bevel pinion gear is **174.81 mm (6.88 in)** measured from the head end of the pinion to the center line of the differential. Whenever the ring gear and bevel pinion is replaced, the pinion depth must be adjusted to the nominal mounting distance.

50. Install the **CAS2506** pinion depth gauge arbor into the bore for the left hand bearing support in the housing.



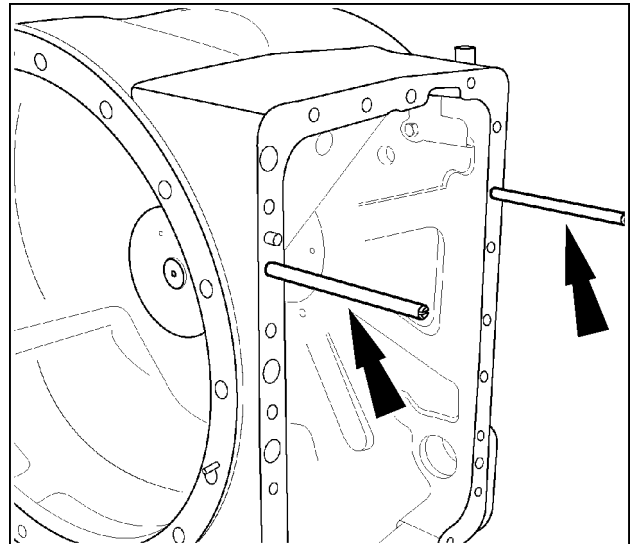
RCPH10FWD393ABJ 50

51. Use two of the bearing support retaining bolts and washers. Tighten the bolts to a torque of **47 – 54 N·m (35 – 40 lb ft)**.



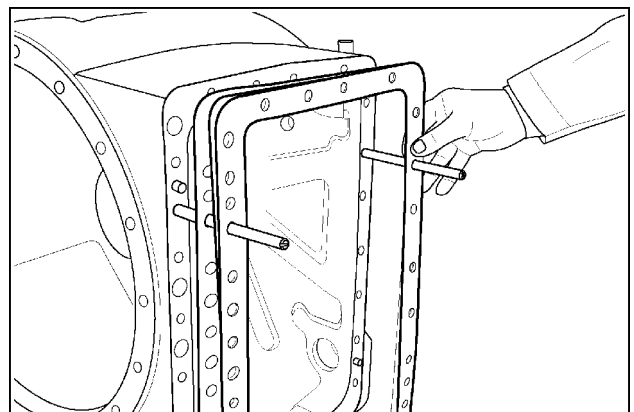
RCPH10FWD394ABJ 51

52. Install the two CAS2479 guide studs into two of the upper holes of the housing opposite each other.



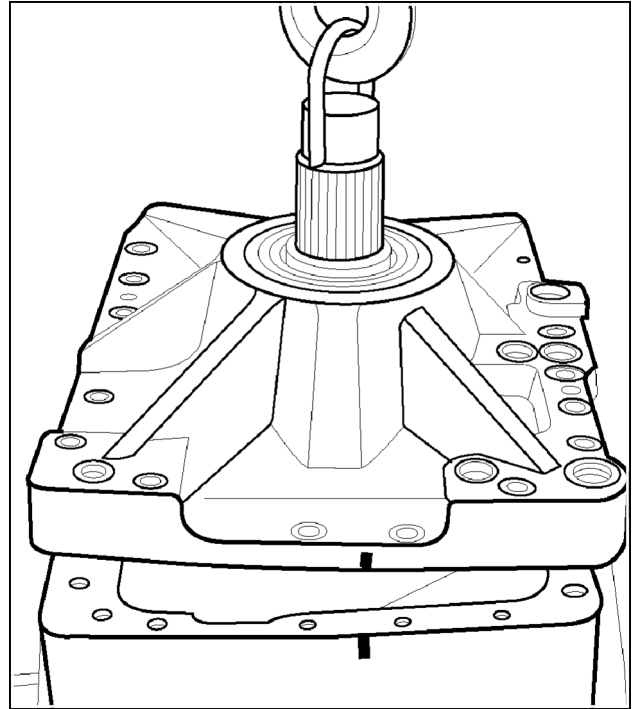
RCPH10FWD395ABJ 52

53. Install the original shim pack for the front cover over the guide studs so all holes align.



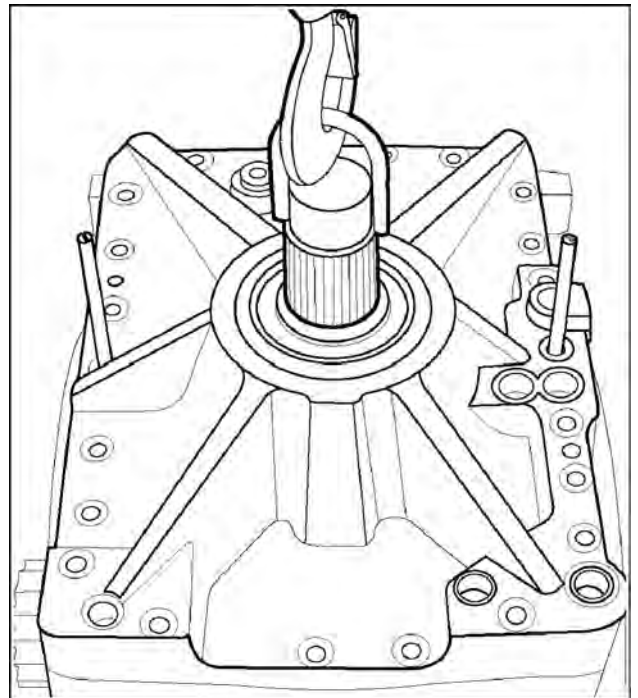
RCPH10FWD396ABJ 53

54. Lift and install the pre-assembled front cover assembly onto the guide studs.



RCPH10FWD397ABJ 54

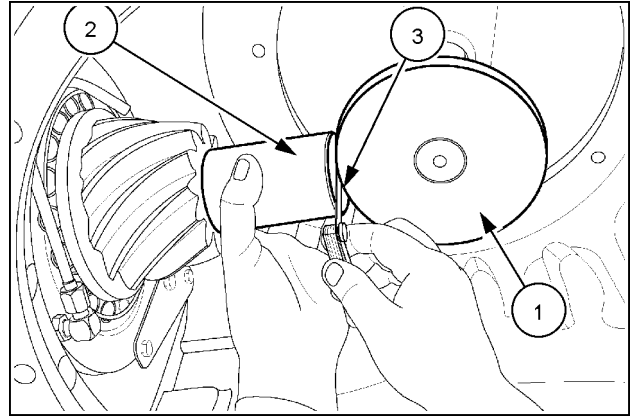
55. Lower the front cover on the guide studs to engage the locating dowel pins. Install retaining bolts and washer in the center top and bottom holes and two bolts on each side of the cover. Tighten the retaining bolts to a torque of **89 – 100 N·m (66 – 74 lb ft)**.



RCPH10FWD345ABJ 55

56. Install the CAS1675-2 gauge block (2) between the pinion and arbor with the hole end of the gauge block held tightly against the head end of the pinion. Use a feeler gauge (3) to measure the distance between the end of the gauge block (2) and the arbor (1). This distance must measure **1 mm (0.039 in)**. Add or remove cover shims as required to obtain this dimension.

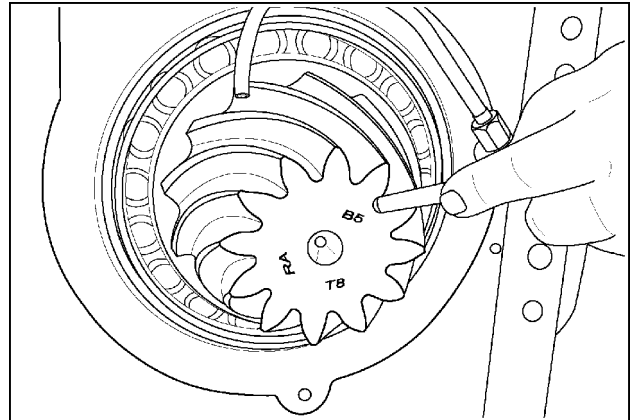
NOTE: This will position the head end of the pinion at the nominal distance of **174.81 mm (6.88 in)** to the center line of the differential.



RCPH10FWD398ABJ 56

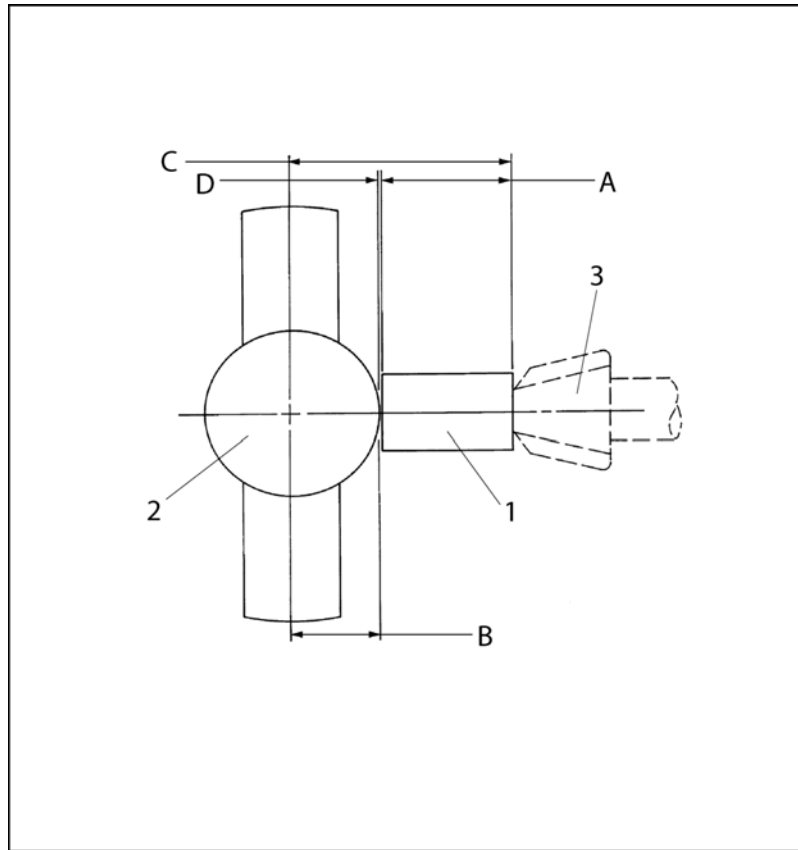
57. A correction factor is etched onto the head end of the pinion. This number will be shown as a plus or minus adjustment in hundredths of a millimeter. Add or subtract this number from the standard nominal pinion depth dimension.

NOTE: The standard nominal mounting distance for the bevel pinion gear is **174.81 mm (6.88 in)** measured from the head end of the pinion gear to the center line of the differential.



RCPH10FWD399ABJ 57

58. Use the following table and example to calculate the pinion depth shim requirements



RCPH10FWD120FBJ 58

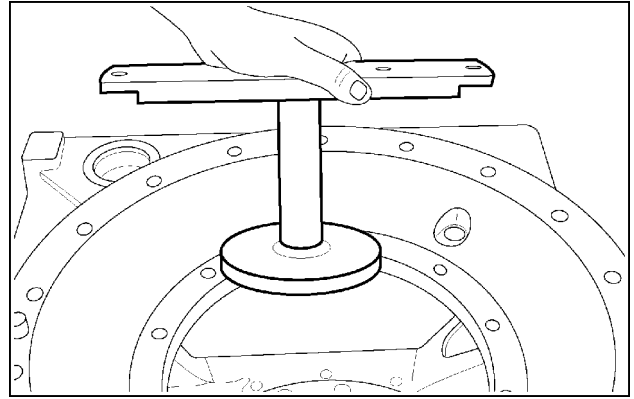
(1) CAS2506 Pinion depth gauge arbor, (2) CAS1675-2 Pinion depth gauge block, (3) Pinion

Item	Metric value	U.S. value
A	97.99 mm	3.858 in
B	75.82 mm	2.985 in
C	174.25 mm	6.860 in
D	.44 mm	0.017 in
Gap measurement		

Example:

Item	Metric value	U.S. value
Tool constant dimension (A = B)	173.81 mm	6.840 in
Gap measurement (D)	.44 mm	0.017 in
Total measured distance (A + B + D = C)	174.25 mm	6.860 in
Standard nominal pinion depth	174.81 mm	6.882 in
Reading on the pinion	-0.07 mm	0.005 in
Actual nominal pinion depth	174.74 mm	6.880 in
Minus total measured distance	174.25 mm	6.860 in
Shim requirement	0.49 mm	0.019 in

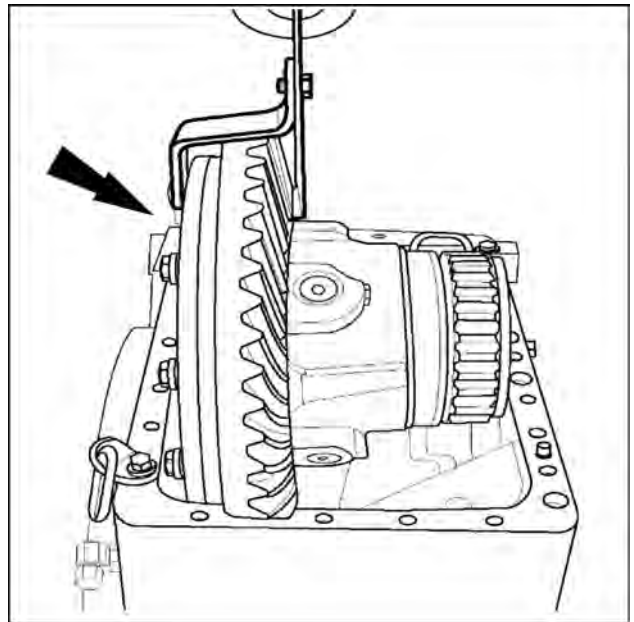
59. Remove the front cover assembly, selected shim pack, and the **CAS2506** pinion depth gauge.



RCPH10FWD400ABJ 59

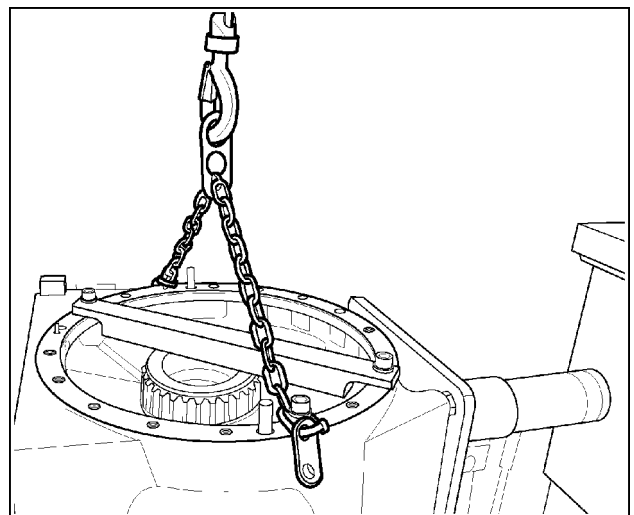
Setting differential carrier bearing preload

60. Install the CAS2502 differential support bracket across the right hand side of the center housing. Use the CAS2509 differential lifting bracket and hoist to install the differential into the center housing.



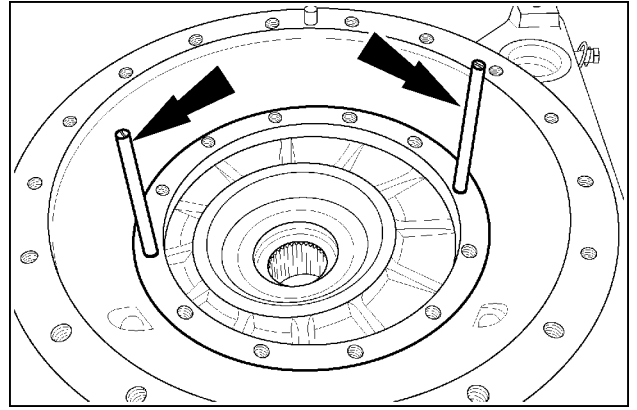
RCPH10FWD365ABJ 60

61. Use a hoist and chain fall to mount the center housing on a revolving repair stand.



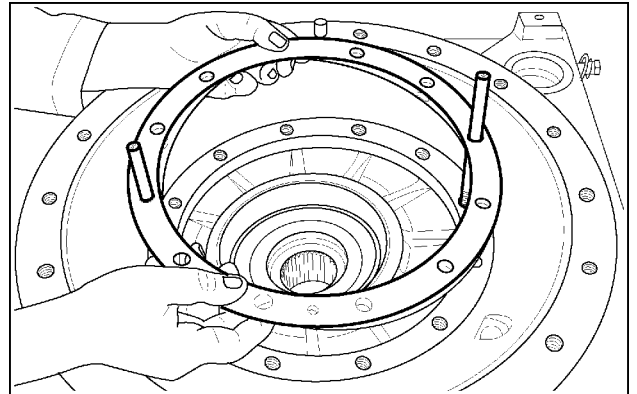
RCPH10FWD362ABJ 61

62. Rotate the center housing so the left hand side is on top and the differential is resting on the support bracket. Install the two CAS2479 alignment studs into opposite holes of the left hand side bearing carrier bore.



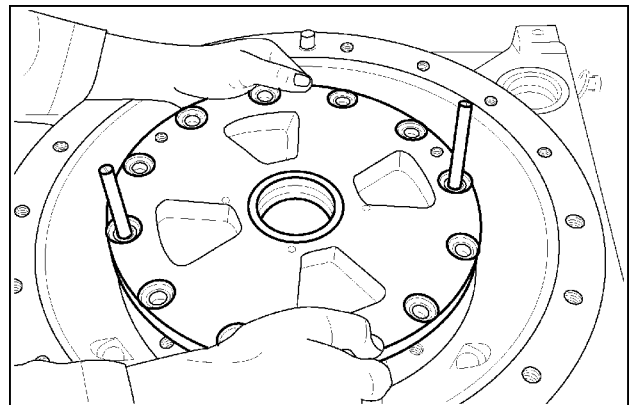
RCPH10FWD401ABJ 62

63. Install the original bearing preload shim pack for the left hand side bearing carrier so that all holes align.



RCPH10FWD402ABJ 63

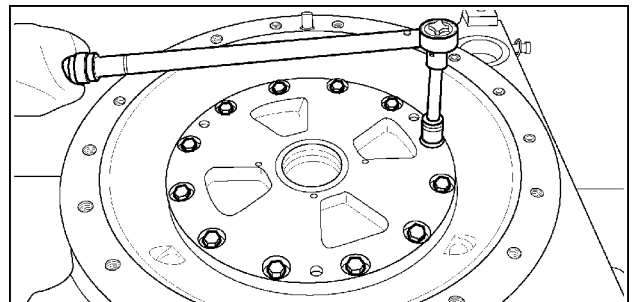
64. Install the pre-assembled left hand side bearing carrier into the housing.



RCPH10FWD403ABJ 64

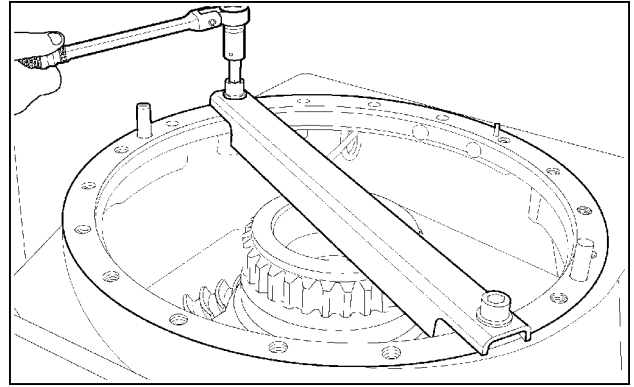
65. Remove the guide studs and install the retaining bolts with washers. Tighten the bolts evenly to specifications.

NOTE: Be sure the differential is centered in the housing so the bearing cone on the carrier will engage the bearing cup in the differential



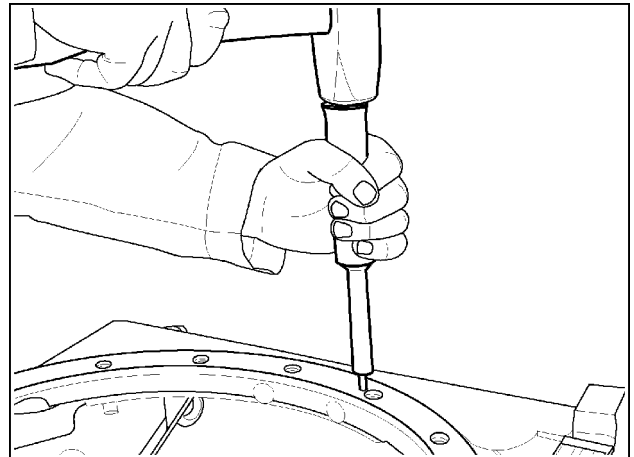
RCPH10FWD404ABJ 65

66. Rotate the housing so the right hand side is on top and the differential is supported in the left hand side bearing carrier. Remove the CAS2502 differential support bracket.



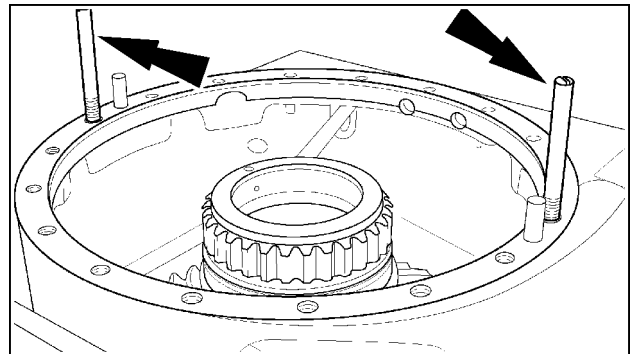
RCPH10FWD405ABJ 66

67. Use a brass drift and hammer to drive in the locating dowel pin for the oil return tube until flush with the housing.



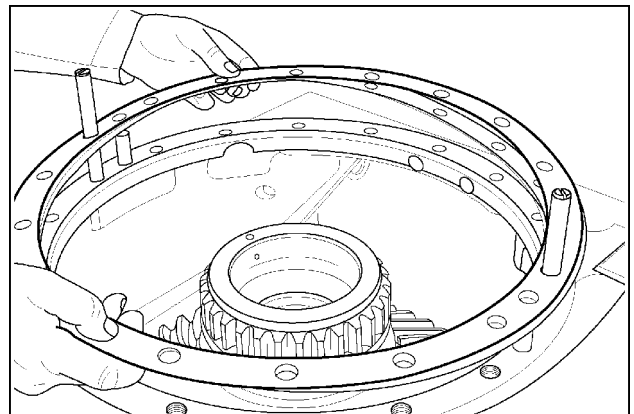
RCPH10FWD406ABJ 67

68. Install two of the **CAS2496** alignment studs into opposite holes of the housing.



RCPH10FWD407ABJ 68

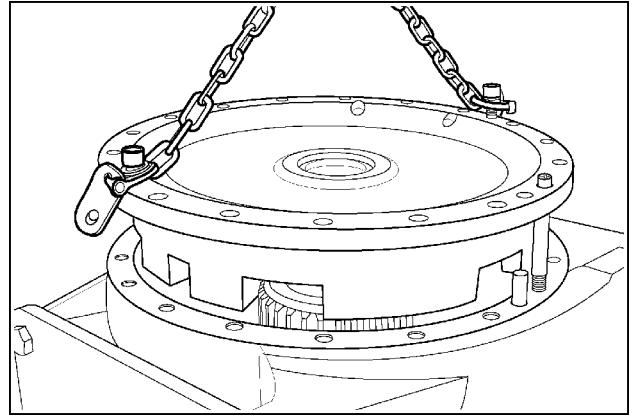
69. Install the original shim pack for the right hand side brake carrier and bearing support over the alignment studs so that all holes align.



RCPH10FWD408ABJ 69

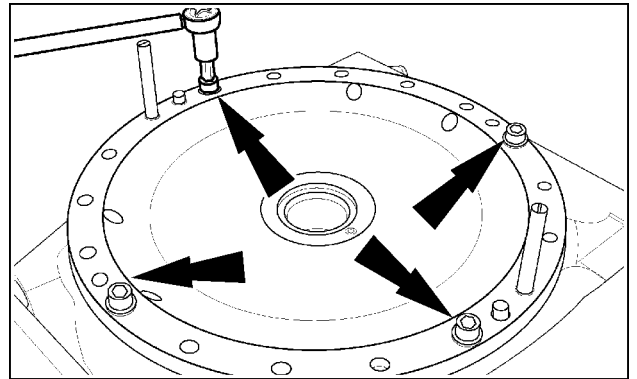
70. Use a hoist and chain fall to carefully install the right hand side brake carrier into the housing so that the assembly match marks align.

NOTICE: The brake friction plates are not installed in the carrier when setting differential carrier bearing preload.



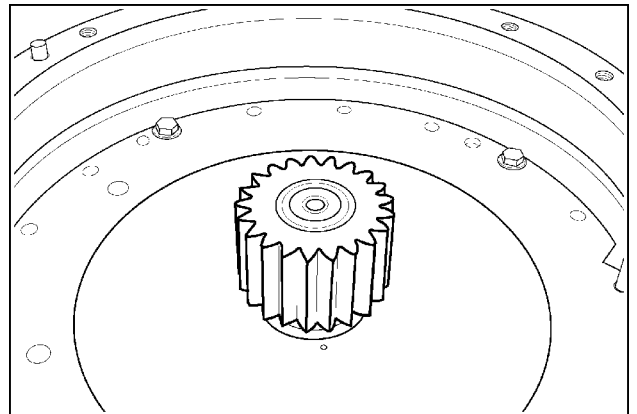
RCPH10FWD409ABJ 70

71. Use four short retaining bolts with washers installed 90 degrees from each other. Tighten the bolts evenly to a final torque of **271 N·m (200 lb ft)**.



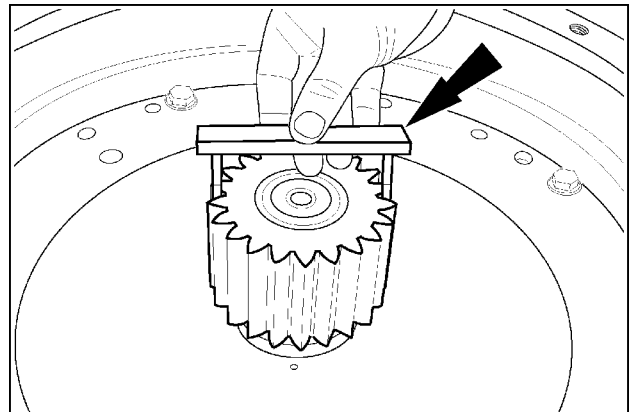
RCPH10FWD411ABJ 71

72. Install the right hand short axle shaft into the differential.



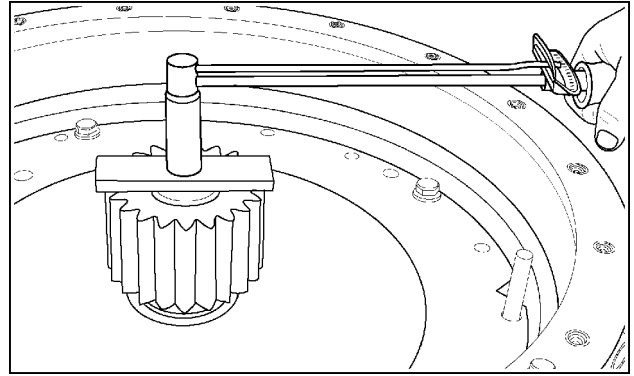
RCPH10FWD110ABJ 72

73. Install the **CAS2674** rolling torque adapter on the axle sun gear to engage two opposite splines.



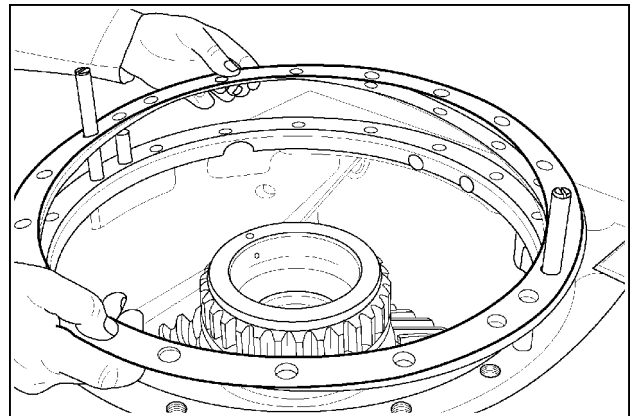
RCPH10FWD111ABJ 73

74. Connect a torque wrench to the adapter. Rotate the differential and measure differential carrier bearing rolling torque. Bearing preload will be correct when **6 – 14 N·m (55 – 120 lb in)** of smooth and consistent rolling torque is registered on the torque wrench.



RCPH10FWD112ABJ 74

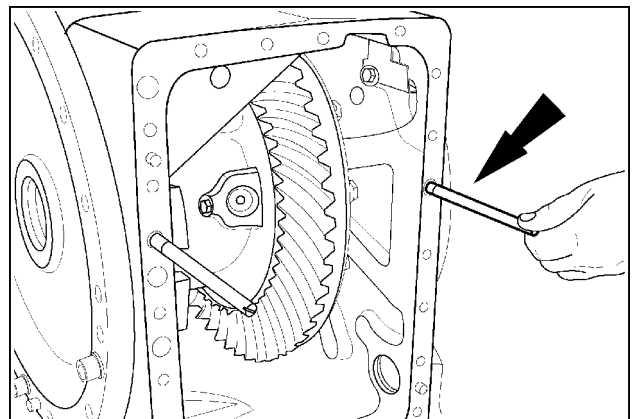
75. If differential bearing preload is out of tolerance, add or remove shims as required from the right hand and/or left hand bearing support shim pack until bearing preload is correct.



RCPH10FWD408ABJ 75

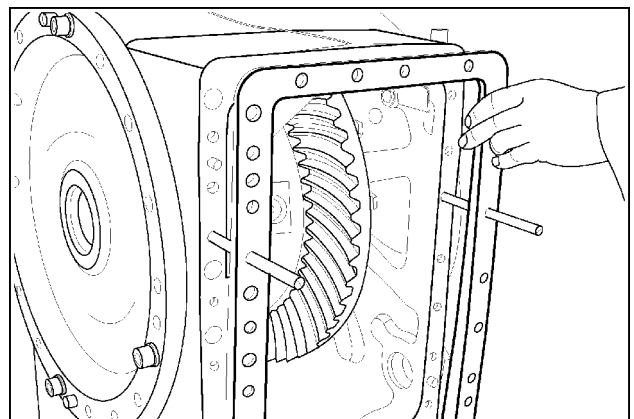
Setting ring/pinion gear backlash

76. After adjusting differential carrier bearing preload correctly, rotate the housing to an upright position and install the two CAS2479 alignment studs opposite each other.



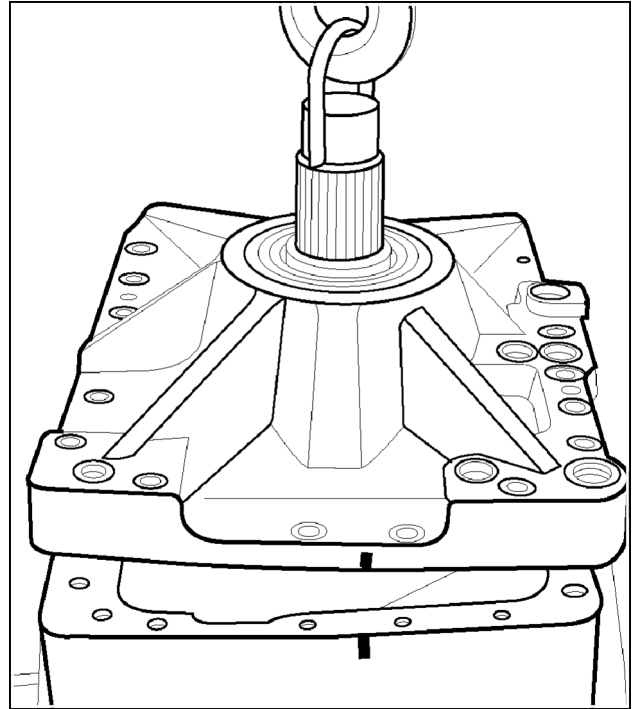
RCPH10FWD412ABJ 76

77. Install the front cover shim pack determined in Step 56 so that all holes align.



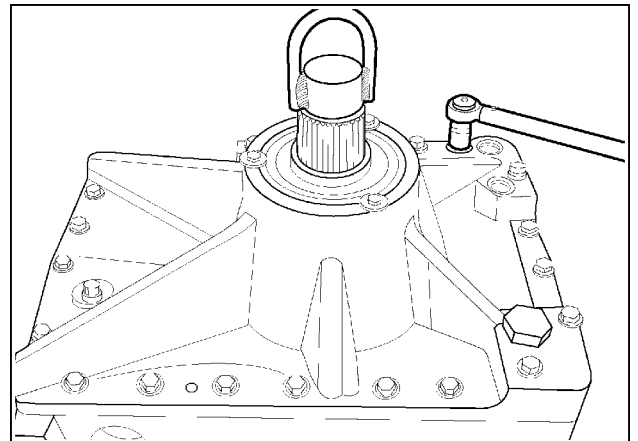
RCPH10FWD413ABJ 77

78. Use a hoist to install the pre-assembled front cover assembly onto the alignment studs.



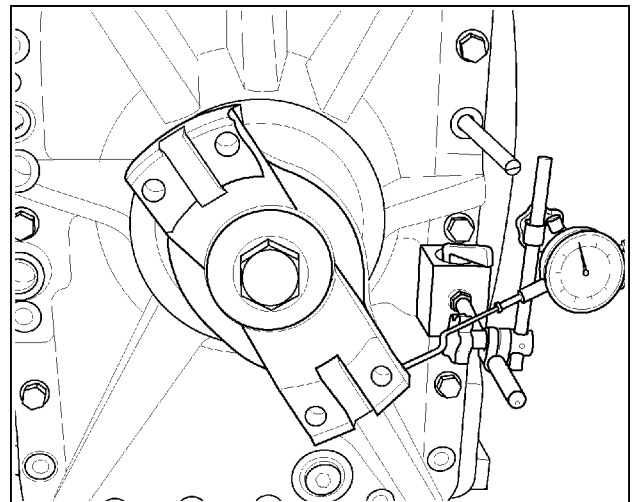
RCPH10FWD397ABJ 78

79. Install retaining bolts with washers in the center top and bottom cover holes and two bolts with washers on each side as shown. Tighten the bolts evenly to specifications.



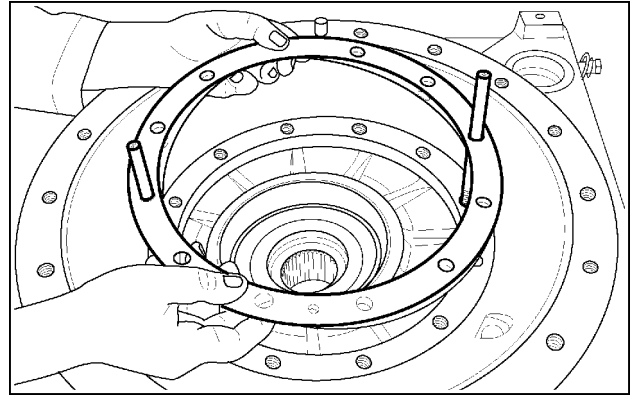
RCPH10FWD414ABJ 79

80. Use a dial indicator to measure ring/pinion gear backlash. Temporarily install the drive yoke onto the pinion shaft. Set the pointer of the indicator to contact the outer edge of the drive yoke flange. Gear backlash must measure **0.2 – 0.3 mm (0.008 – 0.012 in)**.



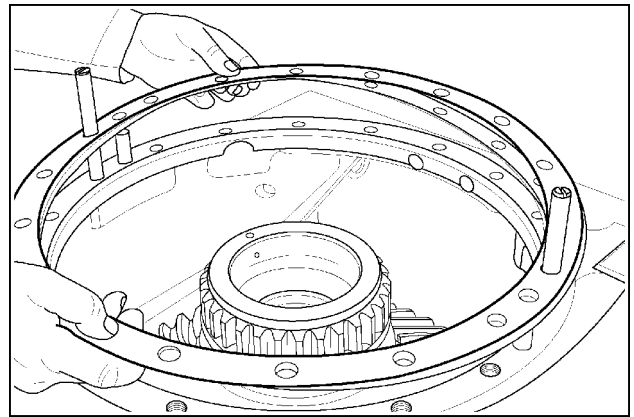
RCPH10FWD415ABJ 80

81. If too much backlash was measured, the ring gear must be moved closer to the pinion gear. Remove shim from the left hand bearing carrier shim pack and add an equal amount of shim to the right hand bearing carrier shim pack to maintain differential bearing preload.



RCPH10FWD402ABJ 81

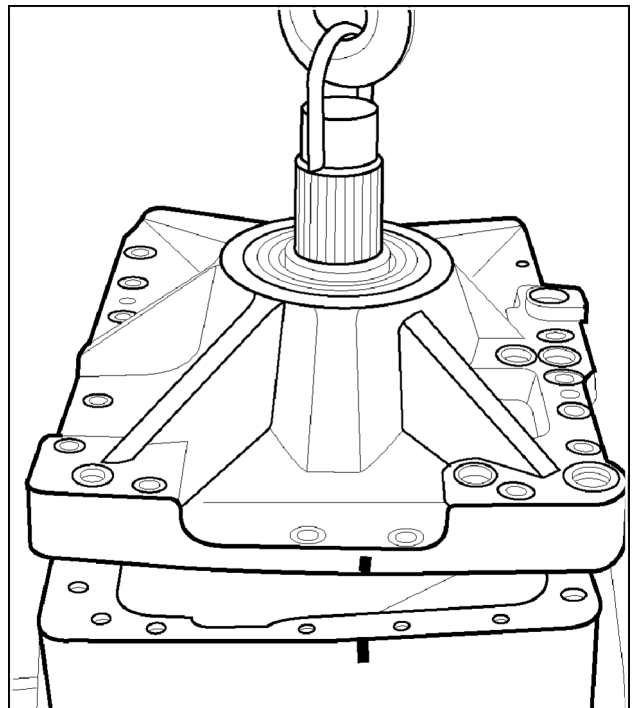
82. If too little backlash was measured, the ring gear must be moved away from the pinion gear. Remove shim from the right hand bearing carrier and add an equal amount of shim to the left hand bearing carrier shim pack to maintain differential bearing preload.



RCPH10FWD408ABJ 82

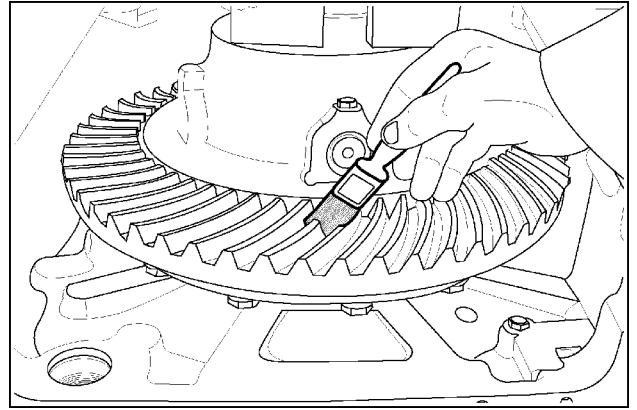
Checking for correct bevel pinion/gear tooth contact

83. After differential bearing preload and ring/pinion gear backlash adjustments have been completed, remove the front cover.



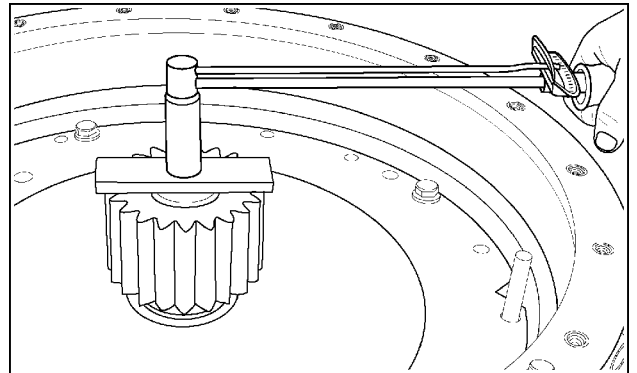
RCPH10FWD397ABJ 83

84. Use colored lead and brush to paint 3 or 4 teeth of the ring gear in three opposite places.



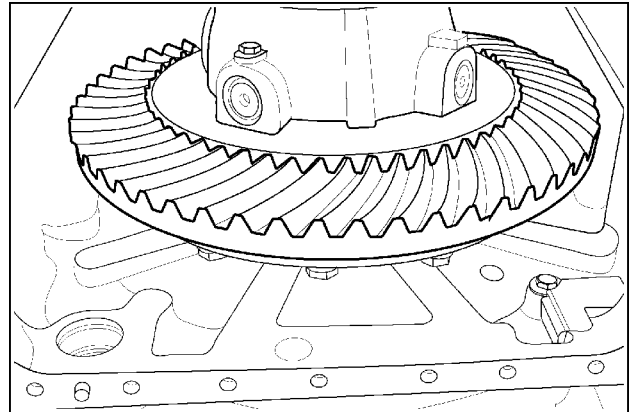
RCPH10FWD416ABJ 84

85. Temporarily reinstall the front cover and selected shim pack as outlined in Step 56. Install a short axle shaft in one side of the differential and use the **CAS2674** bearing preload adapter and wrench to rotate the ring gear 2 to 3 complete revolutions in both directions.



RCPH10FWD417ABJ 85

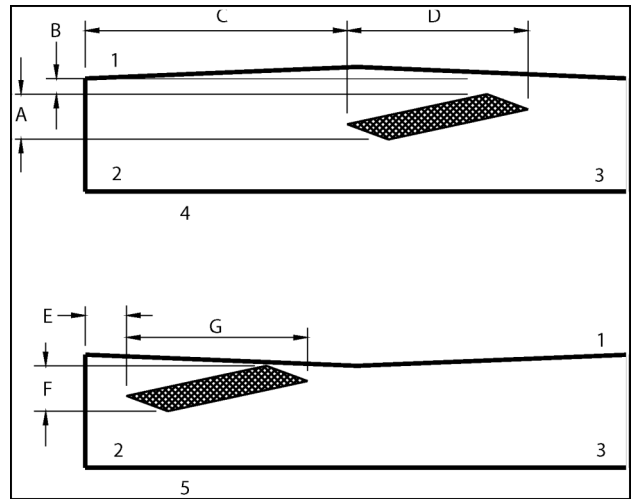
86. Remove the front cover assembly. Examine the ring gear tooth contact pattern. Tooth contact pattern on the drive side should be as close as possible to the following pattern illustrations.



RCPH10FWD418ABJ 86

87. Inspect the contact pattern of the gear teeth. Compare the contact pattern with the following illustrations and tables, for both the right hand (rear) and the left hand (front) pinion sets, and determine the correct tooth contact pattern.

right hand (rear) pinion set contact pattern:



RCPH10FWD122FBJ 87

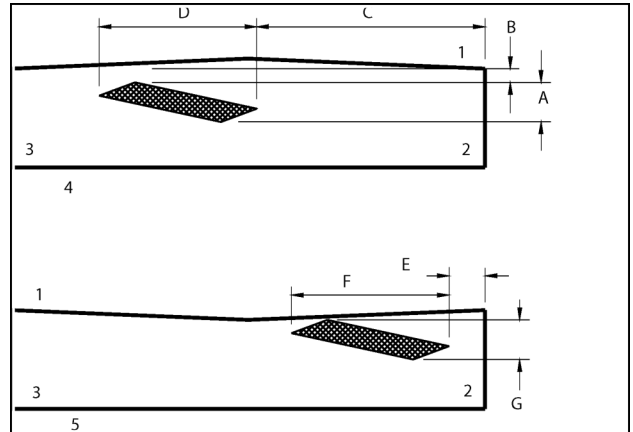
Correct tooth contact pattern: right hand (rear) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	6 – 9 mm	0.236 – 0.354 in
B	3 – 5 mm	0.118 – 0.197 in
C	30 – 35 mm	1.181 – 1.378 in
D	35 – 40 mm	1.378 – 1.575 in
E	10 – 15 mm	0.394 – 0.591 in
F	6 – 8 mm	0.236 – 0.315 in
G	35 – 40 mm	1.378 – 1.575 in

Left hand (front) pinion set contact pattern:



RCPH10FWD121FBJ 88

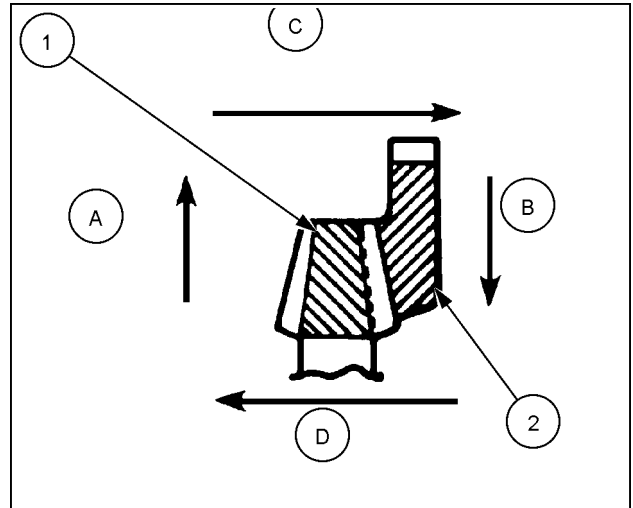
Correct tooth contact pattern: Left hand (front) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

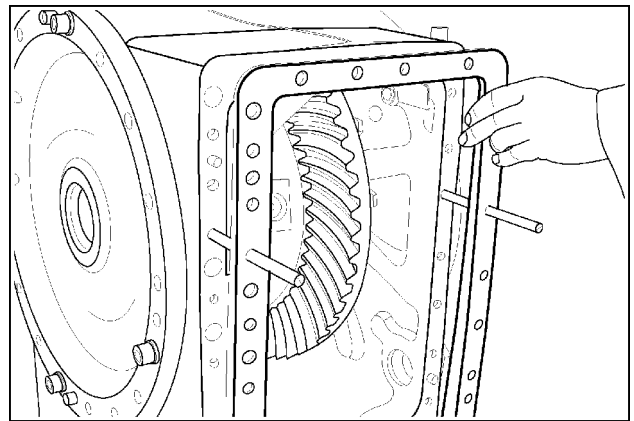
Item	Metric value	U.S. value
A	5 – 8 mm	0.197 – 0.315 in
B	2 – 4 mm	0.079 – 0.157 in
C	30 – 35 mm	1.181 – 1.378 in
D	40 – 45 mm	1.575 – 1.772 in
E	10 – 15 mm	0.394 – 0.591 in
F	35 – 40 mm	1.378 – 1.575 in
G	6 – 8 mm	0.236 – 0.315 in

82. Adding or subtracting pinion carrier shims to change pinion depth must be done in small increments until the correct tooth contact pattern is obtained.
- (A) Move the drive pinion (1) towards the ring gear (2) to move the contact pattern away from the Toe.
 - (B) Move the drive pinion away from the ring gear to move the contact pattern towards the toe.
 - (C) Move the ring gear away from the drive pinion to increase backlash.
 - (D) Move the Ring gear towards the drive pinion to decrease backlash.



RCPH10FWD123FBJ 89

83. Remove the front cover assembly and the final selected shim pack.

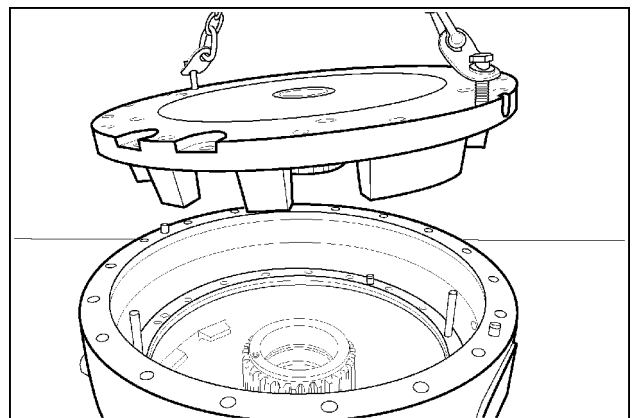


RCPH10FWD413ABJ 90

NOTICE: If differential carrier bearing preload, or ring gear and beveled pinion adjustment is required, do not install the hub seals or brakes at this time. make the proper shim adjustments as described. When adjustments are completed or not required, proceed to the brake carrier assembly procedure.

Brake carrier assembly procedures

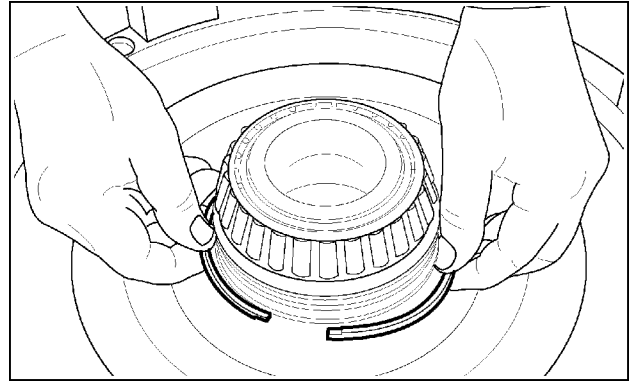
83. After the pinion/gear tooth contact procedure has been completed, remove the brake carrier, with bearing installed, from the differential housing. Remove the four retaining bolts and the four alignment studs, and use a chain hoist to lift the brake carrier assembly from the differential housing.



RCPH10FWD075ABJ 91

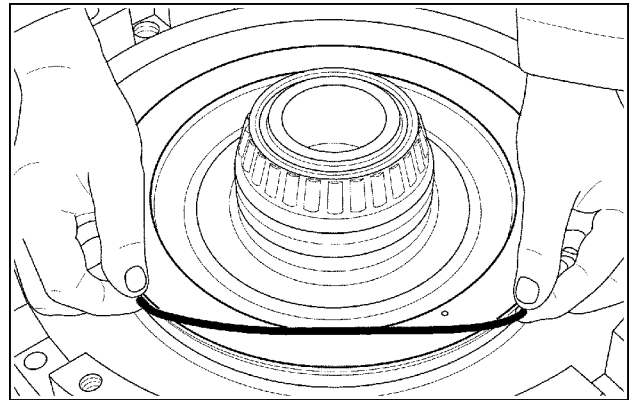
84. Lubricate new hub seal rings liberally with clean grease. Install the two seal rings into the grooves in the hub of the carrier. Be sure the seal ends are lapped together and seals are compressed into the grooves as tightly as possible.

NOTE: Place the ends of each seal ring opposite each other.



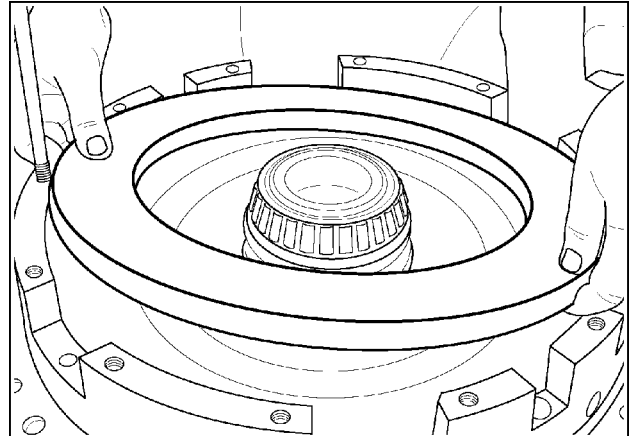
RCPH10FWD057ABJ 92

85. Lubricate a new O-ring for the inside diameter of the service brake piston with clean grease. Install the O-ring in the groove of the carrier. Be sure the O-ring is not twisted.



RCPH10FWD058ABJ 93

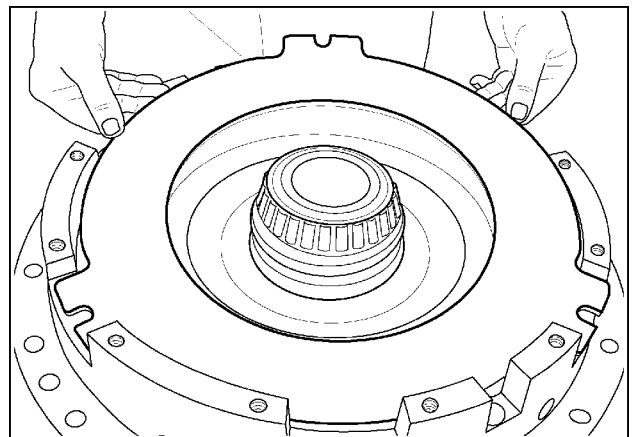
86. Lubricate a new O-ring for the outside diameter of the service brake piston. Install the O-ring in the groove of the piston. Be sure the O-ring is not twisted. Carefully position the piston (flat side up) into the recessed bore of the carrier. Hand seat the piston squarely into the bore.



RCPH10FWD440ABJ 94

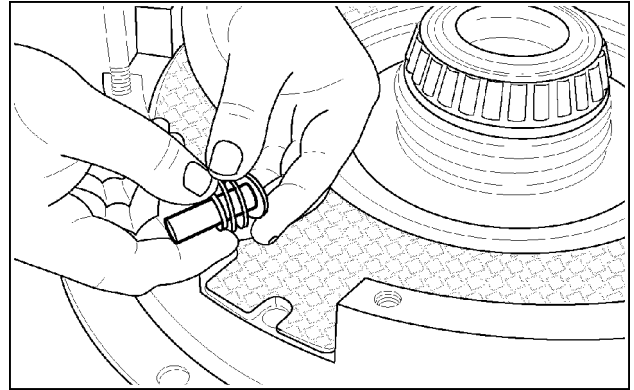
87. Install the brake return plate over the service brake piston aligning the ear tabs with the slots in the support carrier.

NOTE: The brake return plate has holes in the ear tabs.

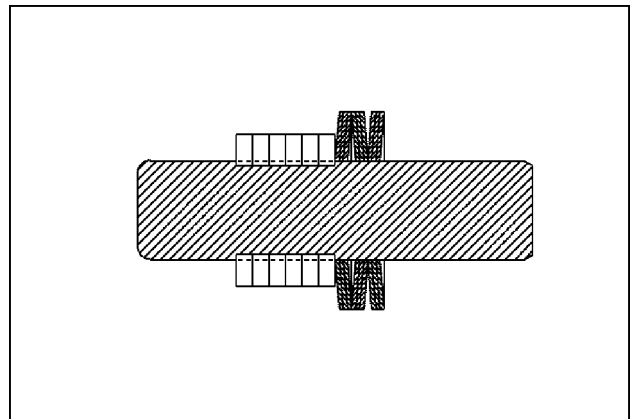


RCPH10FWD986AAJ 95

88. Install the belleville spring washers on the brake adjuster pins. Slide 3 nested washers onto each pinup against the snap rings. Slide 3 nested washers on each pin in the opposing direction for a total of 9 belleville spring washers on each pin.

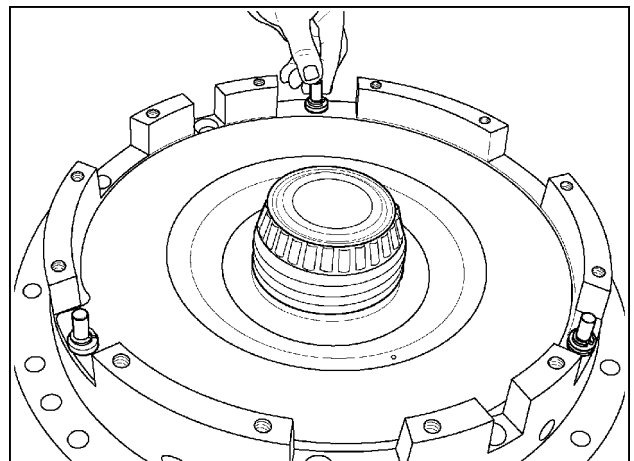


RCPH10FWD059ABJ 96



RCPH10FWD419ABJ 97

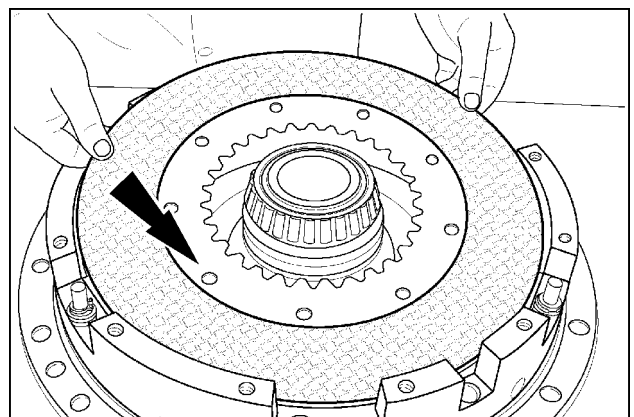
89. Place one pin with washers in each of the holes in the carrier. Be sure the spring washers are seated against the brake return plate and the shorter tapered end of the pin is pointed upwards.



RCPH10FWD061ABJ 98

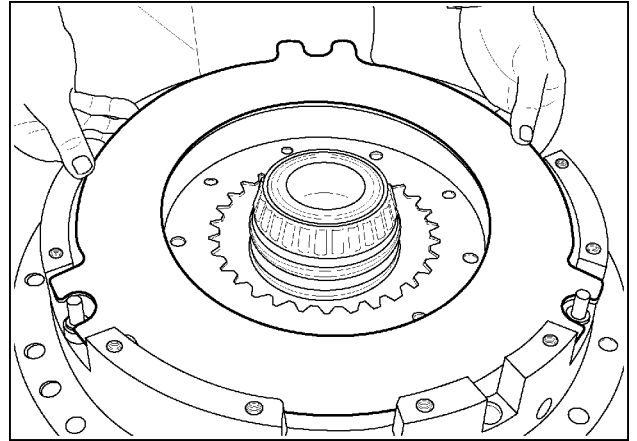
90. Lubricate all friction plates with clean operating fluid. Install the first friction plate over the brake return plate.

NOTE: Align the friction plate oil cross holes as the plates are installed.



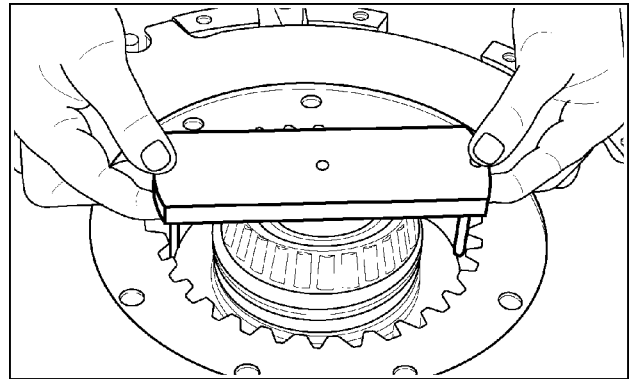
RCPH10FWD984AAJ 99

91. Install a steel separator plate over the first friction plate. Repeat the steps for remaining plates alternating friction and separator plates.



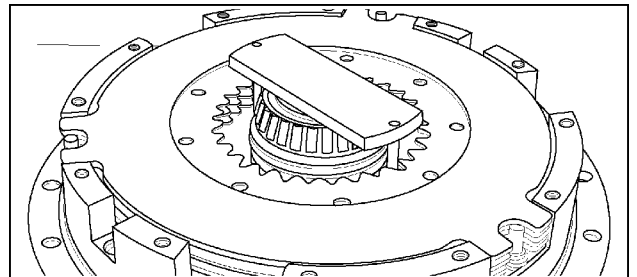
RCPH10FWD062ABJ 100

92. Use the **CAS2505** brake disc alignment tool to align the splines of all brake plates.



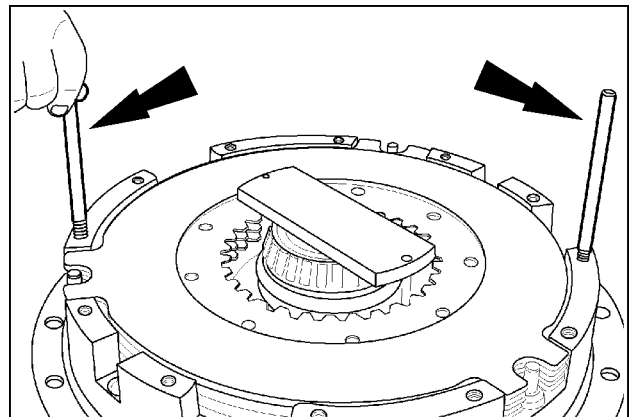
RCPH10FWD063ABJ 101

93. When the brake plates are correctly aligned, the pilot on the bottom of the tool plate must nest in the hub of the carrier as shown.



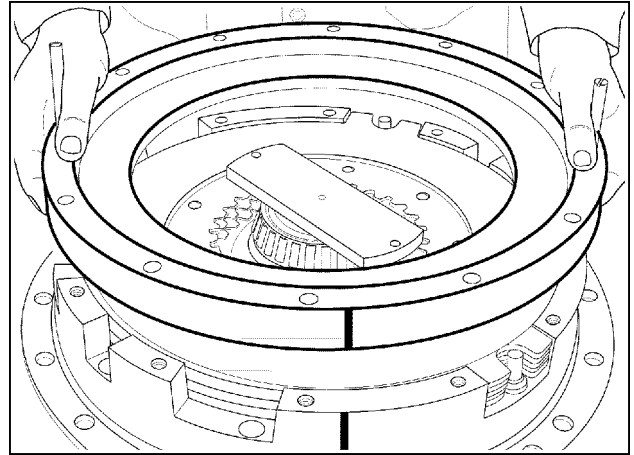
RCPH10FWD064ABJ 102

94. Install the two CAS2479 guide studs into opposite holes of the support carrier.



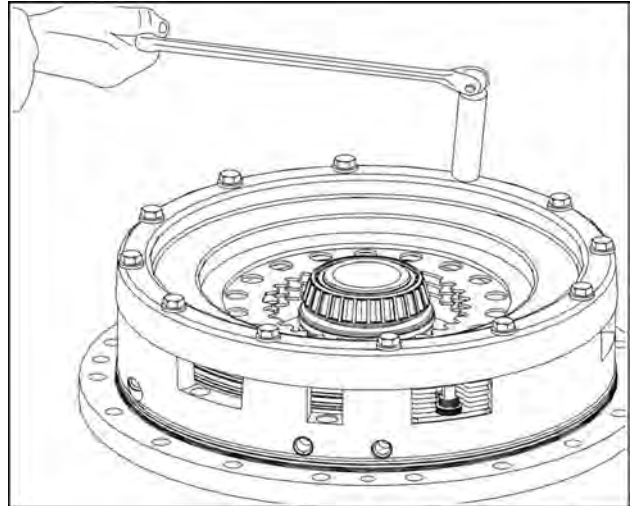
RCPH10FWD065ABJ 103

95. Install the backing plate (recessed side up) over the guide studs so that the assembly match marks align.



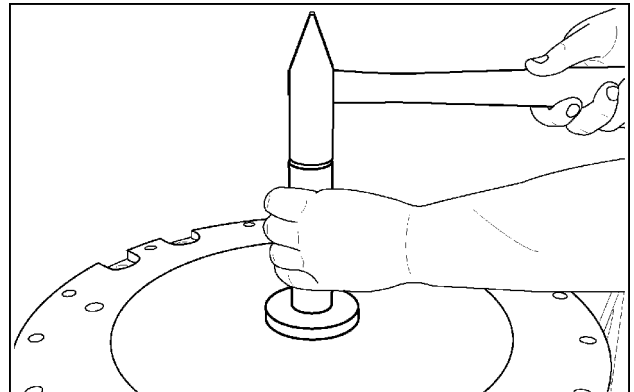
RCPH10FWD066ABJ 104

102. Install and hand start the bolts with washers to engage the threads. After all bolts have contacted the retainer ring, tighten each bolt in sequence one full turn and repeat until the ring has seated. Tighten the bolts to the specified torque. Remove the brake disc alignment tool.



RCPH10FWD495ABJ 105

103. Turn the brake carrier assembly over and install the seal in the carrier.

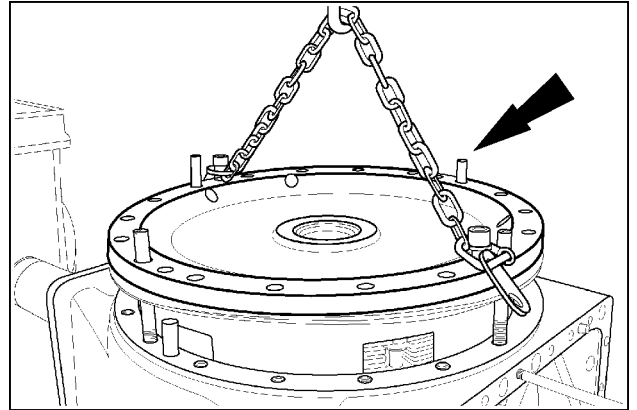


RCPH10FWD074ABJ 106

Bearing carrier/brake support installation

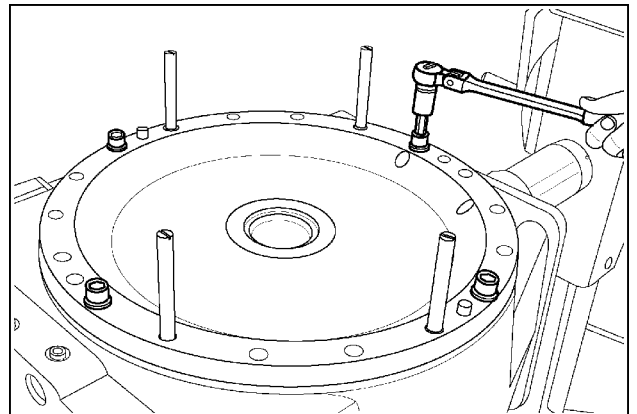
104. Install the four **CAS2496** alignment studs into the right hand side of the center housing opposite each other. Use a hoist and chain fall to align and carefully install the right hand bearing carrier/brake support assembly into the housing. Rock the differential to engage the first brake disc as the assembly is lowered into the housing. Be sure the carrier seats against the housing.

NOTICE: Be sure the match marks put on during disassembly align. The pressure ports in the right hand bearing carrier for the service and park brake must be orientated to the top side of the housing and face the front cover.



RCPH10FWD359ABJ 107

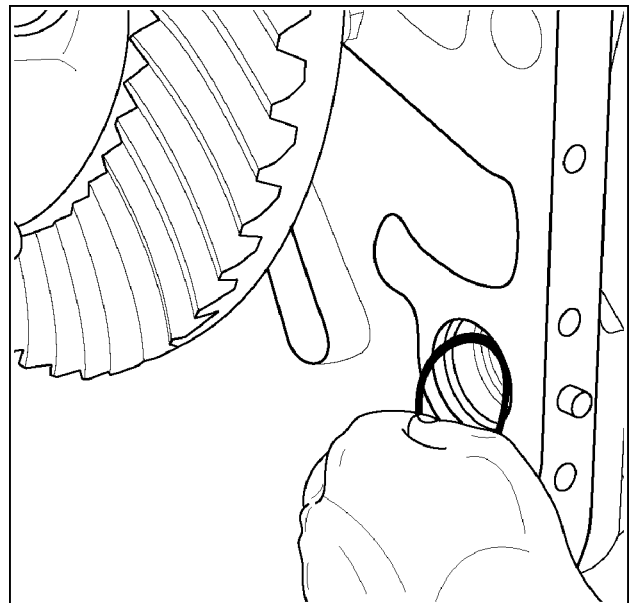
105. Install the mounting bolts to retain the brake carrier assembly. Tighten the bolts to specifications. Remove the alignment studs



RCPH10FWD421ABJ 108

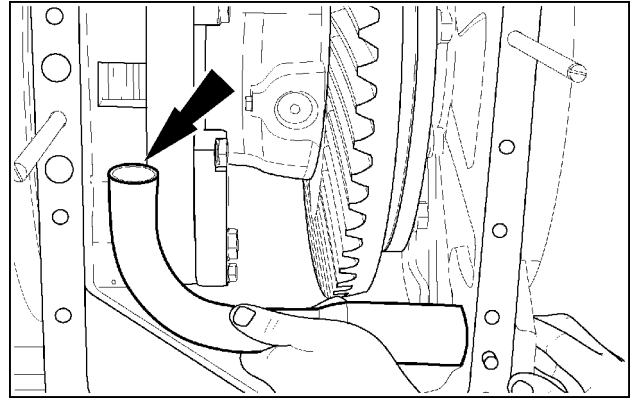
Front cover installation

106. Lubricate a new O-ring for the oil tube with clean assembly grease. Install the O-ring into the groove in the bore of the housing



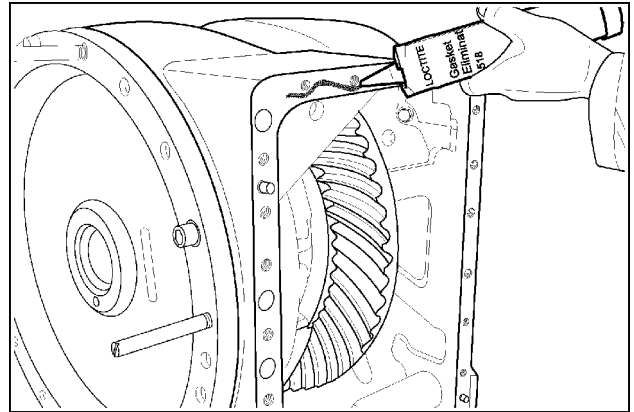
RCPH10FWD422ABJ 109

107. Install the oil tube through the bore in the housing. Turn the tube so the hole in the end of the tube will fully engage the locating dowel pin in the opposite side of the housing.



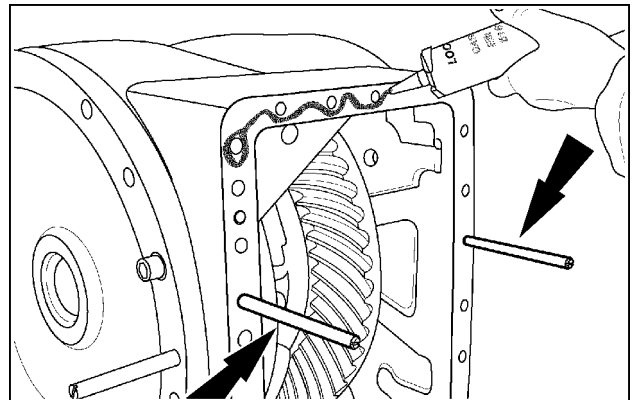
RCPH10FWD423ABJ 110

108. Apply anaerobic sealant around the front cover mating surface of the housing. Ring the pressure port holes with sealant.



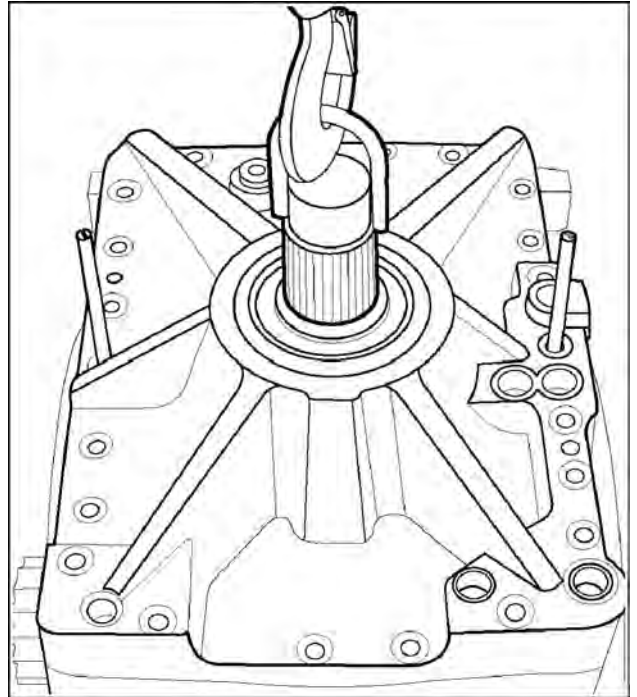
RCPH10FWD424ABJ 111

109. Install the two CAS2479 alignment studs into opposite holes of the housing. Install the preselected pinion depth shim pack over the alignment studs so all holes align. Seat the shims against the sealant and apply a second bead of sealant around the front side of the shim pack in the same manner.



RCPH10FWD425ABJ 112

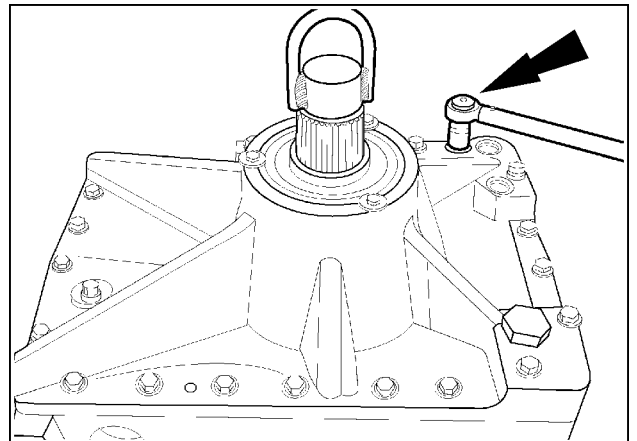
110. Use a hoist to install the front cover assembly on the guide bolts.



RCPH10FWD345ABJ 113

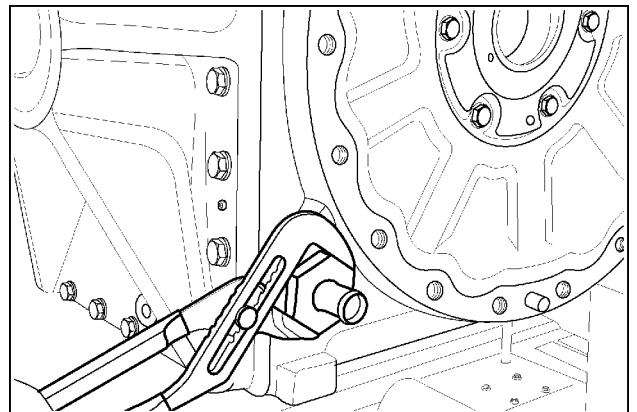
111. Install the front cover retaining bolts with washers. Tighten the bolts evenly to specifications.

NOTE: The longer bolts are used on the porting block side.



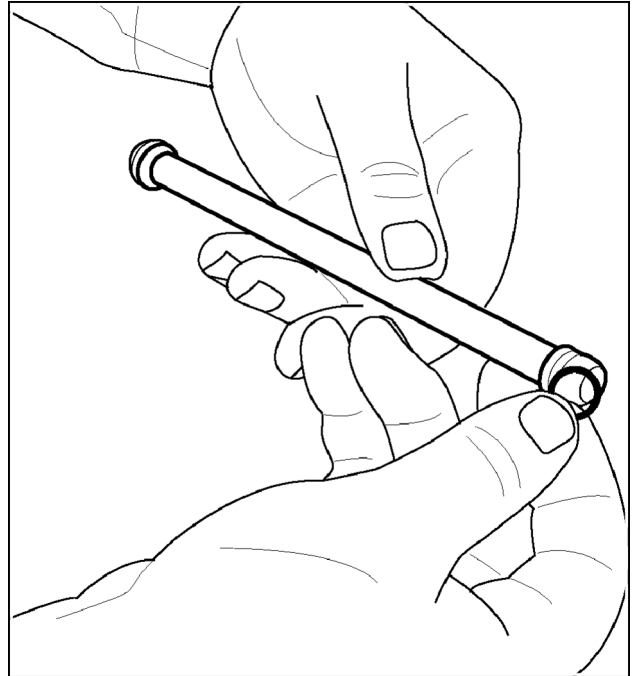
RCPH10FWD414ABJ 114

112. Install the oil return port fitting adapter with a new O-ring.



RCPH10FWD334ABJ 115

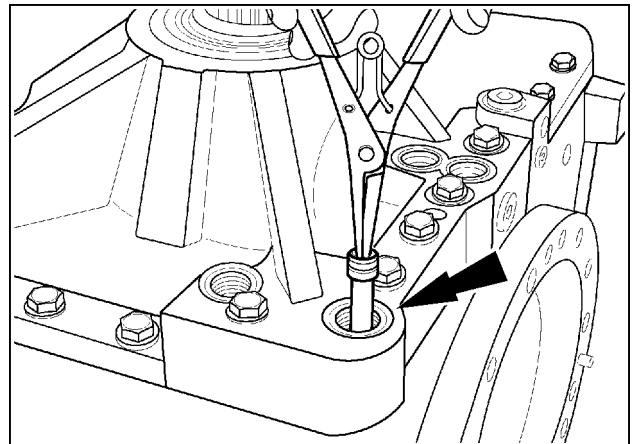
113. Install new O-rings on all oil jumper tubes. Lubricate the O-rings liberally with clean assembly grease.



RCPH10FWD426ABJ 116

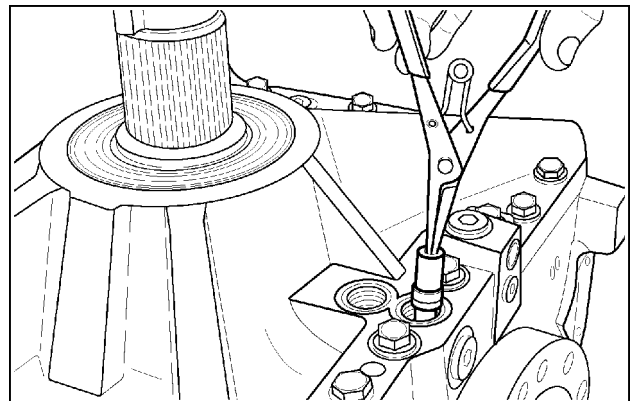
114. Install a long jumper tube into the service brake pressure port of the front cover. Use a blunt instrument to hand seat the jumper tube into the port until fully seated.

NOTE: The small diameter end of the tube must be inserted into the port first.



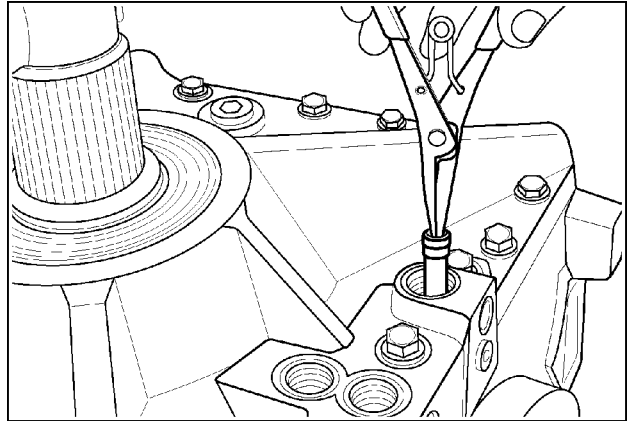
RCPH10FWD441ABJ 117

115. In the same manner, install the short jumper tube with the cross holes in the head end into the lube oil supply port. Install the tube so that the cross holes in the tube align horizontally with the cross holes in the cover. Hand seat the tube.



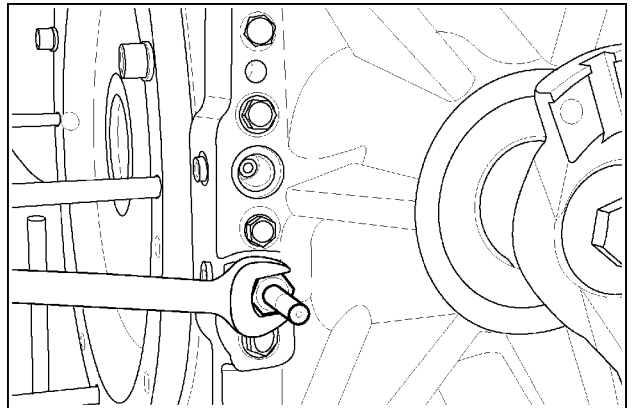
RCPH10FWD337ABJ 118

116. If the differential is not equipped with differential lock, install the short jumper tube into the differential lock port. Hand seat the tube and assemble port plug.



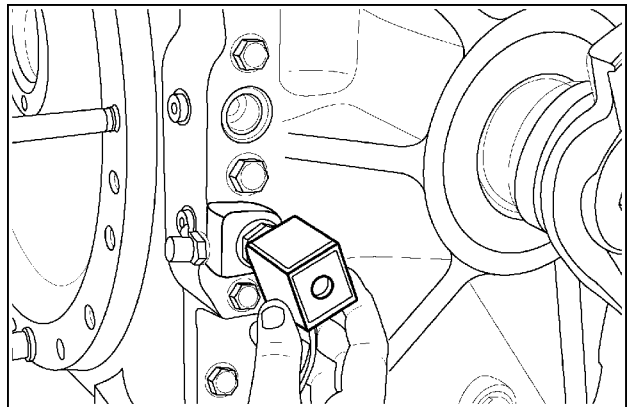
RCPH10FWD338ABJ 119

117. If equipped with differential lock, install new O-rings and install the solenoid stem into the port for the differential lock.



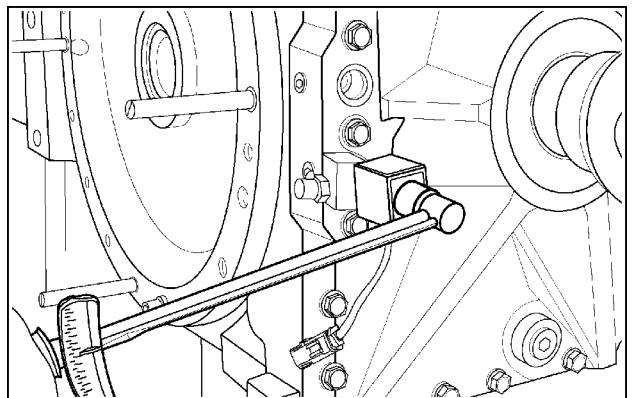
RCPH10FWD333ABJ 120

118. Install the coil onto the stem of the solenoid (flat side out).



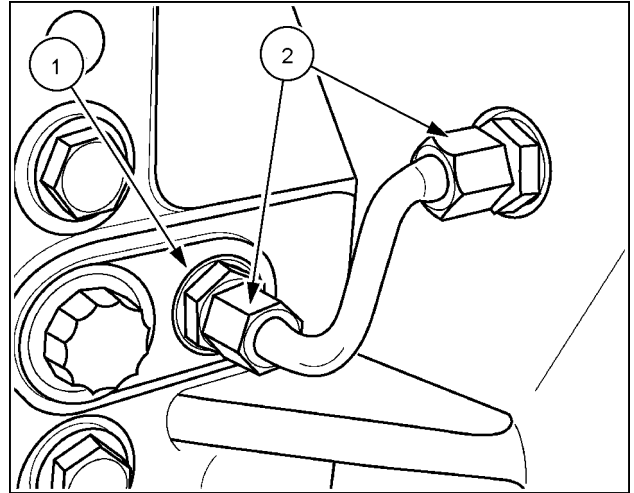
RCPH10FWD332ABJ 121

119. Install the coil retaining nut. Tighten the nut to specifications.



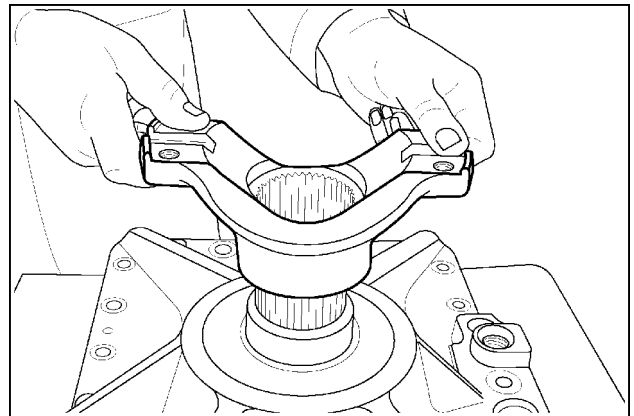
RCPH10FWD427ABJ 122

120. Install the orifice fitting (1) and install the pinion bearing lube tube (2).



RCPH10FWD335ABJ 123

121. Lubricate the splines of the pinion shaft with anti-sieze lubricant or clean grease. Install the drive yoke on the pinion shaft.



RCPH10FWD383ABJ 124

Next operation:

Differential lock - Leakage test (25.102)

Next operation:

Final drive - Install - 400 Series bar axles (25.310)

Differential - Disassemble - 500 Series axles

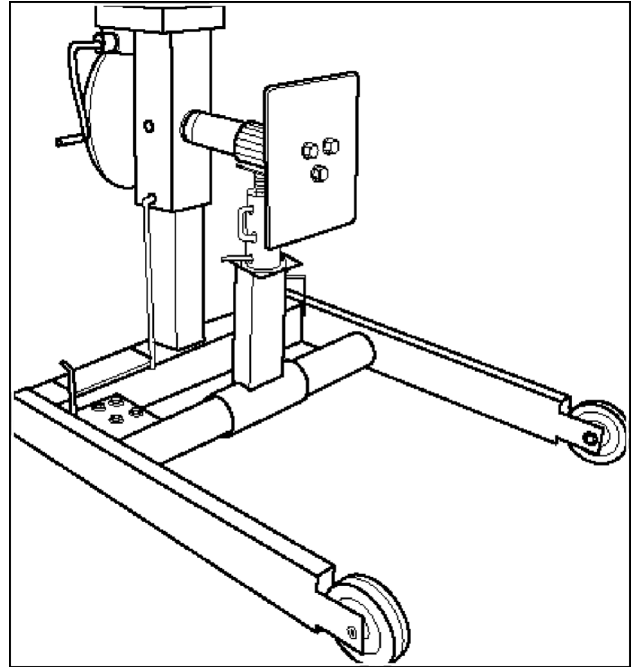
Steiger® 500	NA
Steiger® 540	NA

Prior operation:

Final drive - Remove - 500 Series axles (25.310)

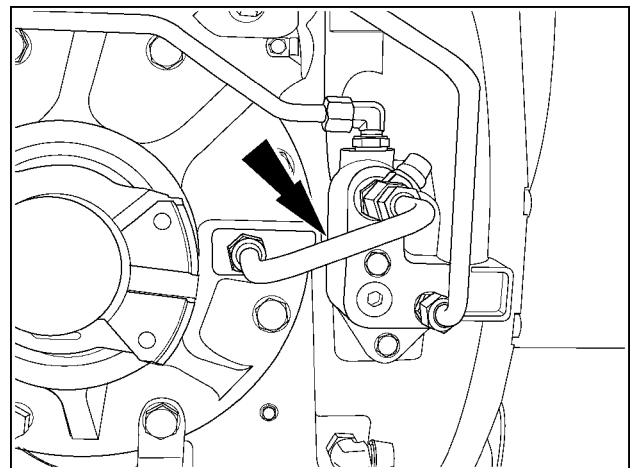
Pinion carrier removal

1. The differential housing must be rotated several times during the disassembly and assembly procedures. If available, the housing should be mounted in a revolver repair stand.



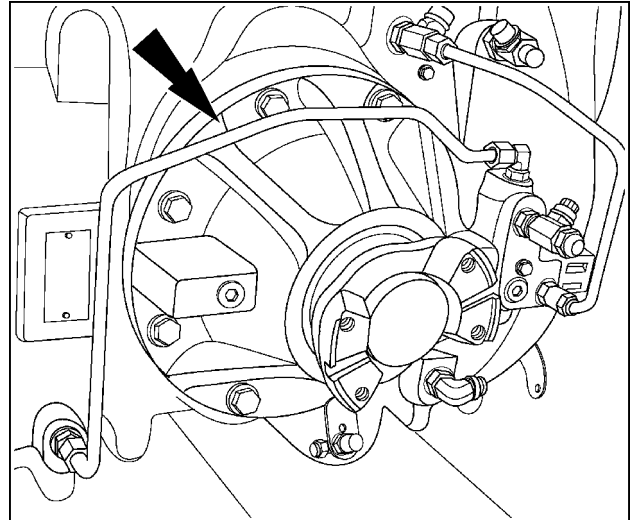
RCPH10FWD941AAJ 1

2. Remove the lube hose from the port block and pinion carrier.



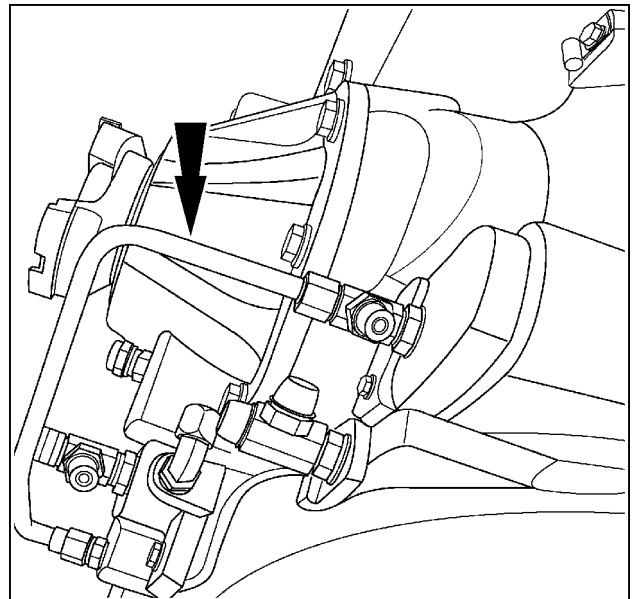
RCPH10FWD942AAJ 2

3. Remove the long tube line from the port block to the differential housing.



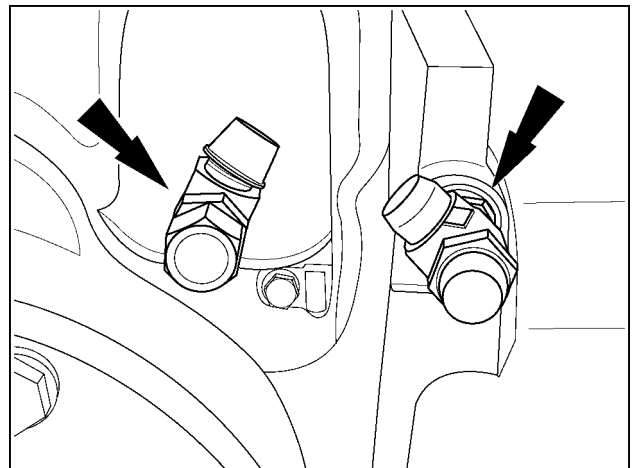
RCPH10FWD943AAJ 3

4. Remove the tube line from the port block to the park brake supply port.



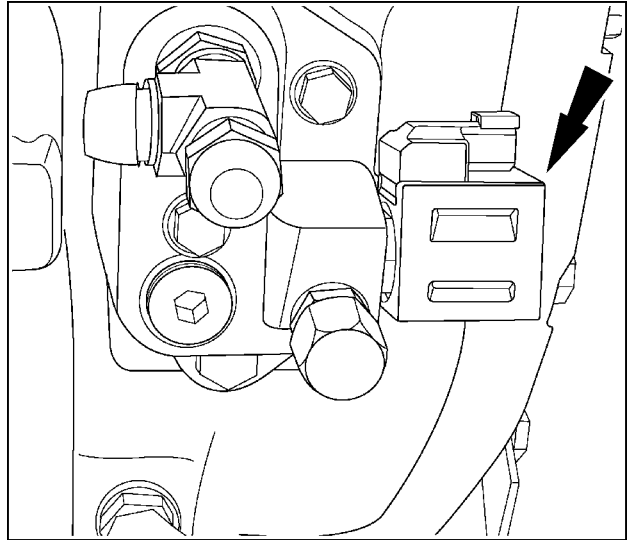
RCPH10FWD944AAJ 4

5. Remove the tee fittings from the service brake pressure port. If repairing the rear axle, remove the tee fitting



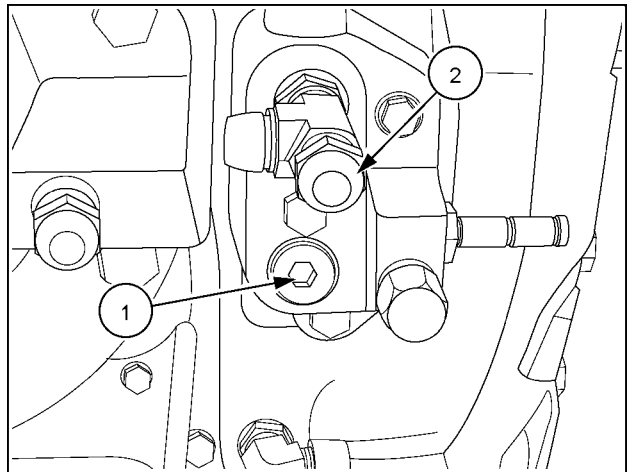
RCPH10FWD945AAJ 5

6. If equipped, remove the differential lock solenoid from the port block.



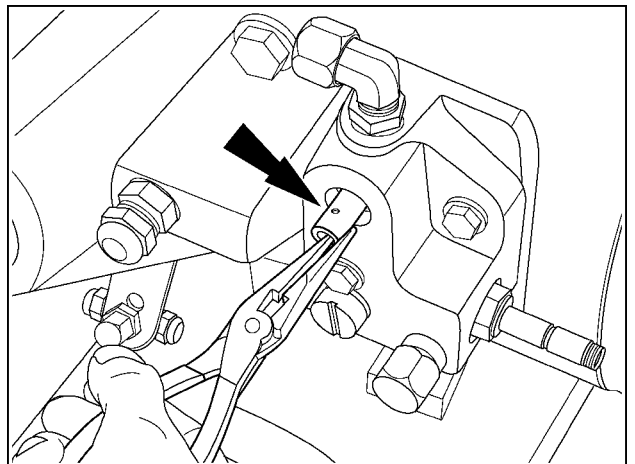
RCPH10FWD946AAJ 6

7. Remove the plug (1) and tee fitting (2) from the port block.



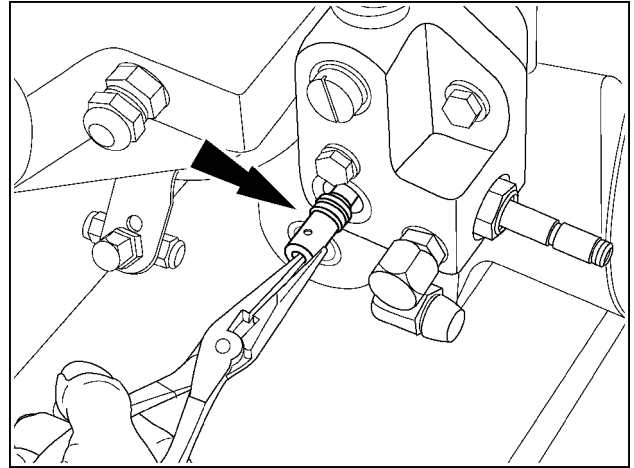
RCPH10FWD947AAJ 7

8. Remove the jumper tube from the lube port. Discard the O-rings.



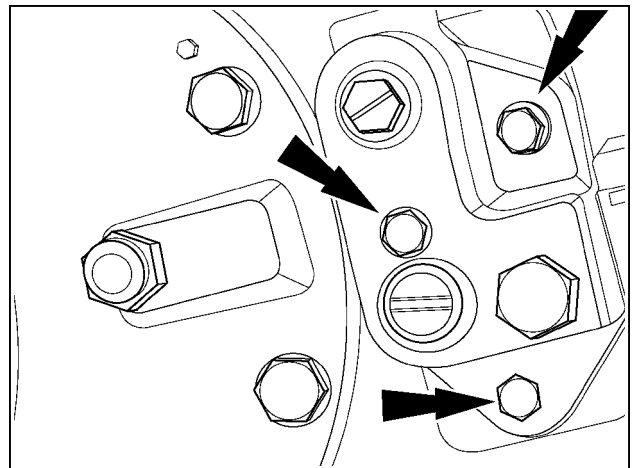
RCPH10FWD948AAJ 8

9. Remove the jumper tube from the differential lock supply port. Discard the O-rings.



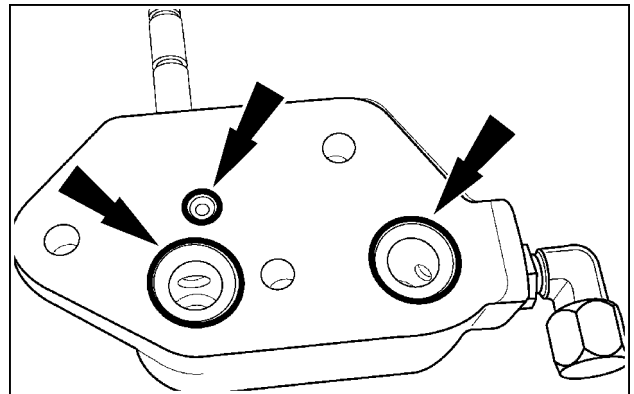
RCPH10FWD949AAJ 9

10. Remove the three bolts securing the port block to the housing. Remove the port block.



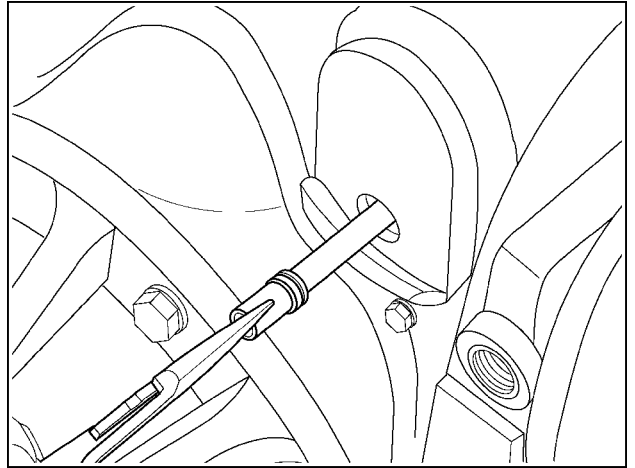
RCPH10FWD950AAJ 10

11. Discard the O-rings from the port block.

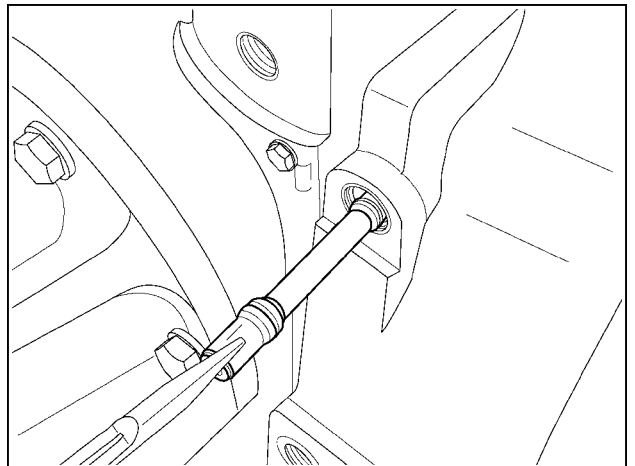


RCPH10FWD951AAJ 11

12. Remove the jumper tube from the park brake supply port. Discard the O-rings.

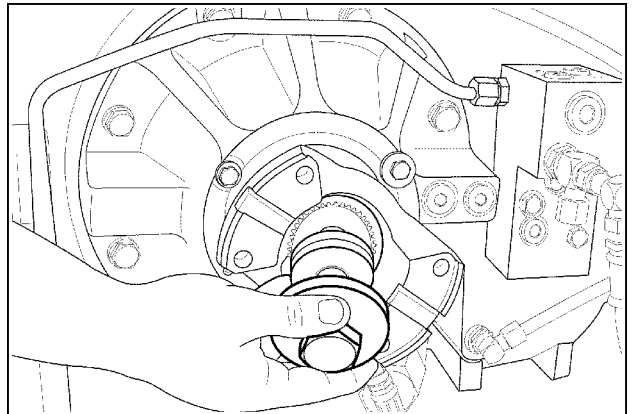


13. Remove the jumper tubes from the brake supply port. Discard the O-rings.

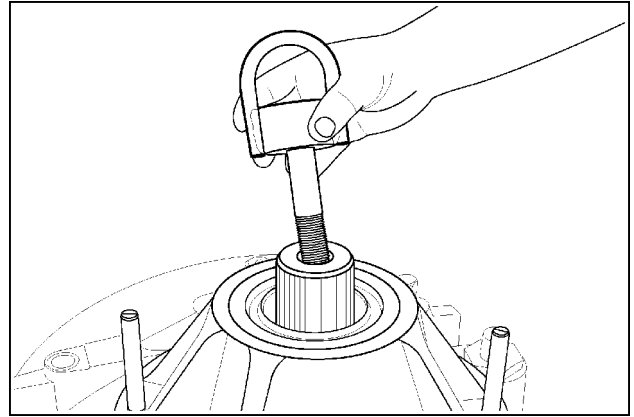


14. If repairing a rear differential, remove the drive yoke retaining bolt, washer, and shim pack. Retain the shims with the yoke.

NOTE: The front axle drive yoke does not use a retaining bolt. The drive yoke is allowed to slide on the pinion shaft.

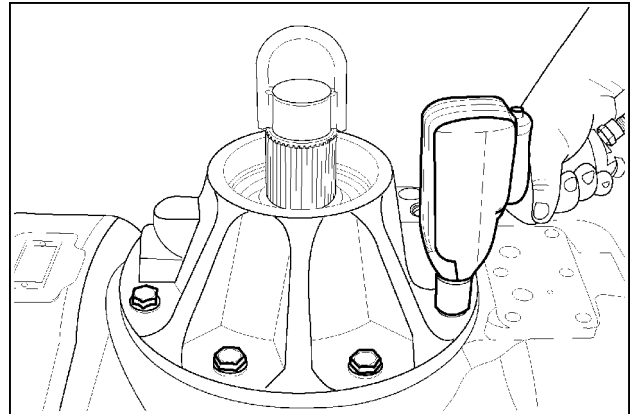


15. Install the CAS2494 lifting eye into the pinion gear.



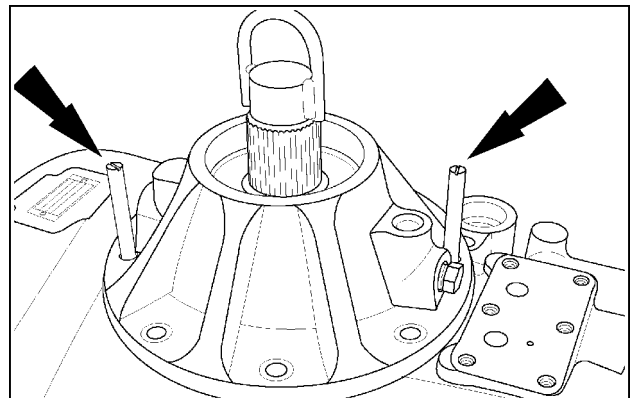
RCPH10FWD955AAJ 15

16. Remove the pinion carrier mounting bolts.



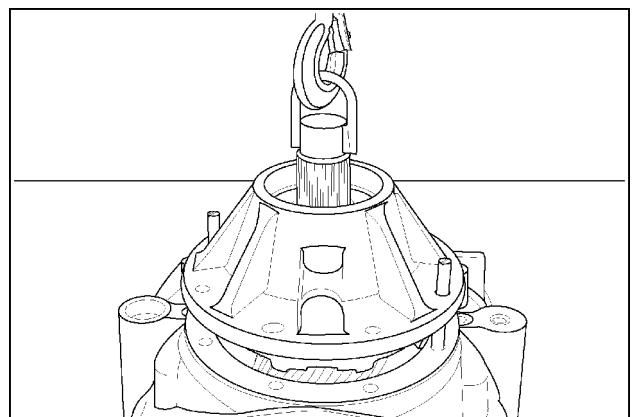
RCPH10FWD956AAJ 16

17. Install two **CAS2496** alignment studs in opposite holes of the pinion carrier.



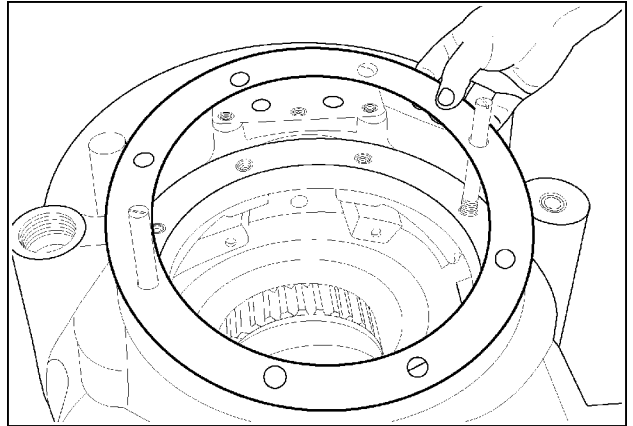
RCPH10FWD957AAJ 17

18. Use a lifting device to remove the pinion carrier from the housing. Be careful not to damage the shim pack.



RCPH10FWD958AAJ 18

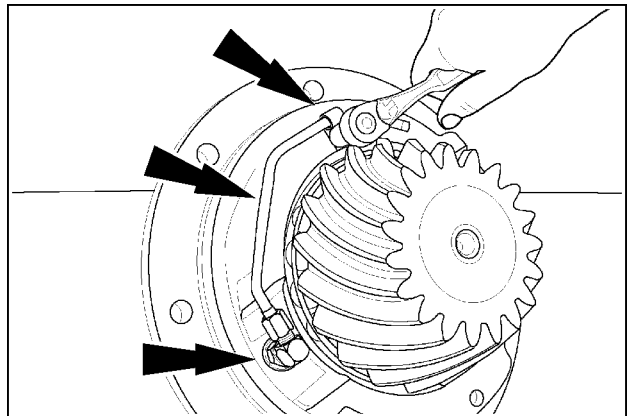
19. Remove and retain the shim pack.



RCPH10FWD959AAJ 19

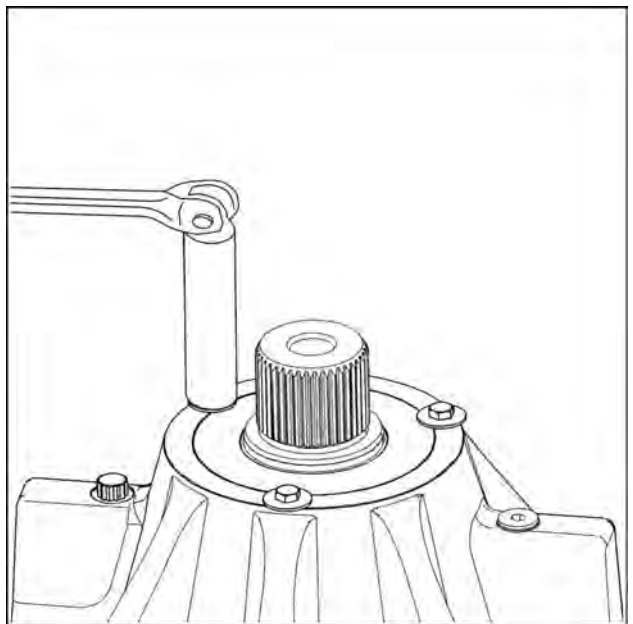
Pinion carrier disassembly

20. Remove the bolt securing the pinion gear lube tube. Disconnect and remove the tube, tube clamp and fitting. Remove and discard the large O-ring from the flange of the housing.



RCPH10FWD960AAJ 20

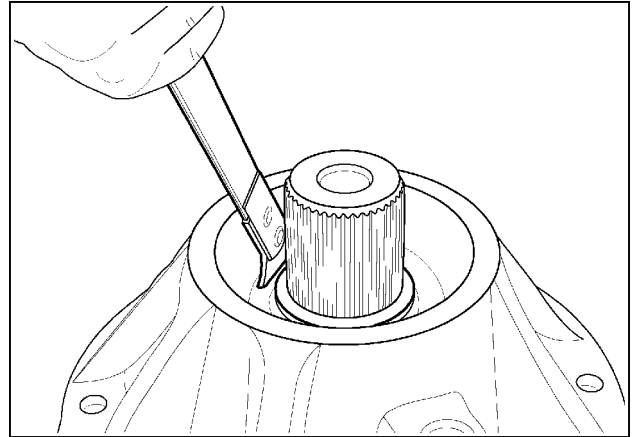
21. If repairing a rear axle, remove the seal retaining bolts and washers.



RCPH10FWD548ABJ 21

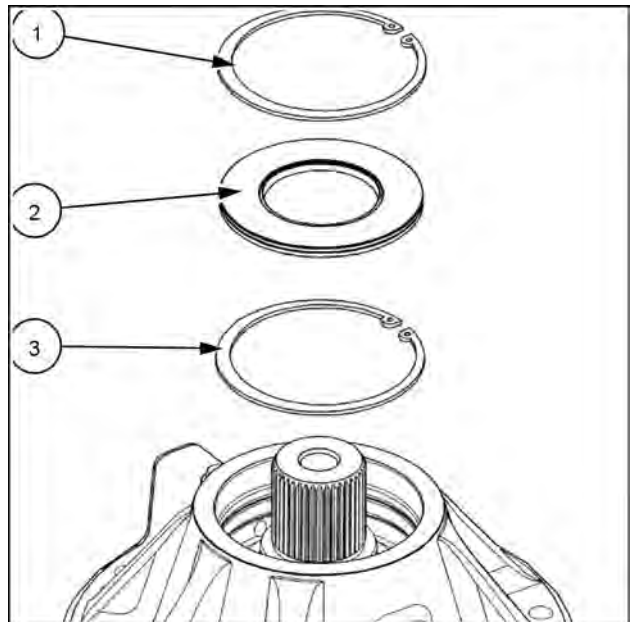
22. Pry the pinion seal from the housing.

NOTE: The rear axle has an oil seal on the pinion gear. The front axle has an oil seal on the pinion and a dust/grease seal on the outside diameter of the drive yoke



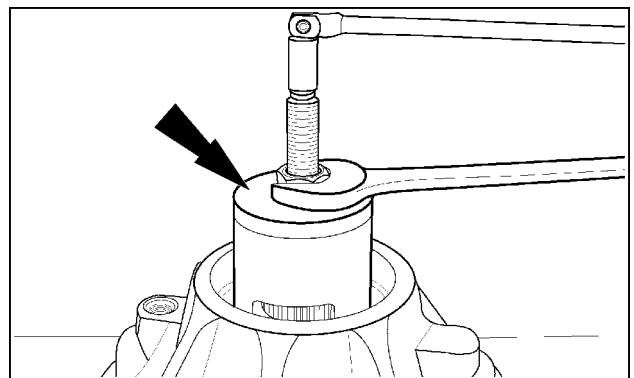
RCPH10FWD961AAJ 22

23. If repairing front axle, remove the snap ring (1), seal (2), and snap ring (3) from the inside diameter of the pinion carrier housing.



RCPH10FWD547ABJ 23

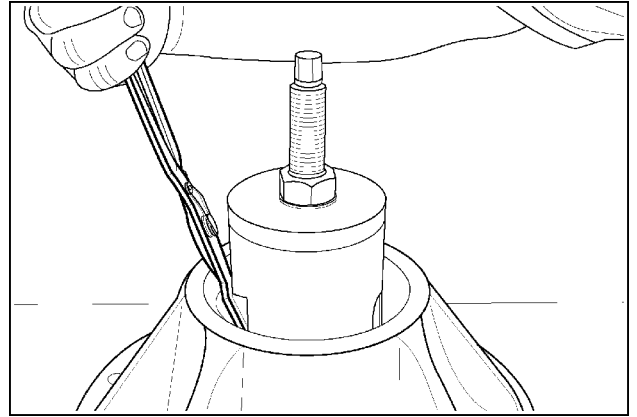
24. Support the pinion carrier on wood blocks on the work surface. Install the **CAS2511** pinion bearing preload compressor. Turn the center bolt tightly into the threaded hole in the pinion gear. Install the thrust washer and nut on the center bolt. Align one window of the compression sleeve with the end gap of the snap ring. Use one wrench to hold the center bolt and a second wrench to tighten the nut to release the pressure against the snap ring.



RCPH10FWD962AAJ 24

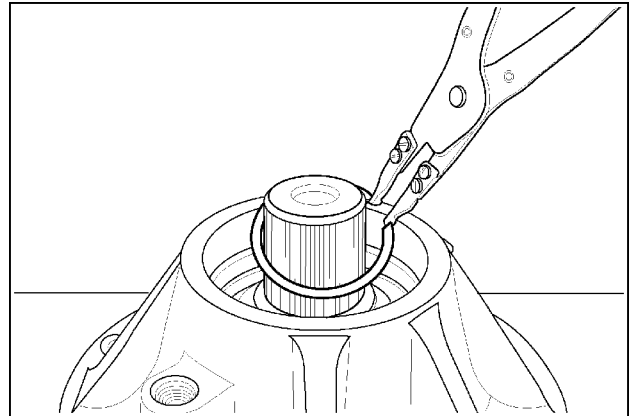
25. Use a snap ring pliers to remove the snap ring from the groove in the pinion shaft.

NOTE: Because of the large diameter of the shaft, it will be necessary to use a flat blade screw driver through the second window of the compression sleeve to work the snap ring from the groove.



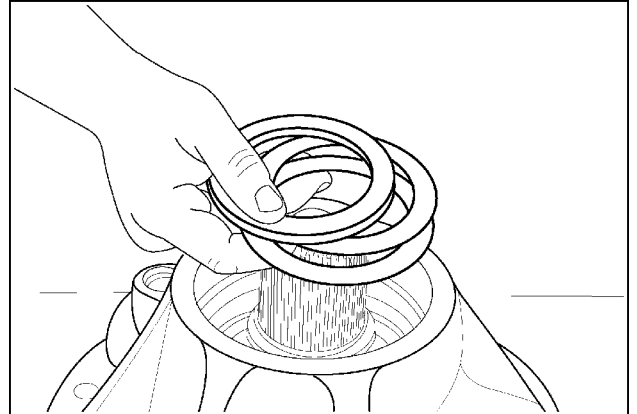
RCPH10FWD963AAJ 25

26. Remove the compression sleeve assembly and snap ring from the pinion gear.



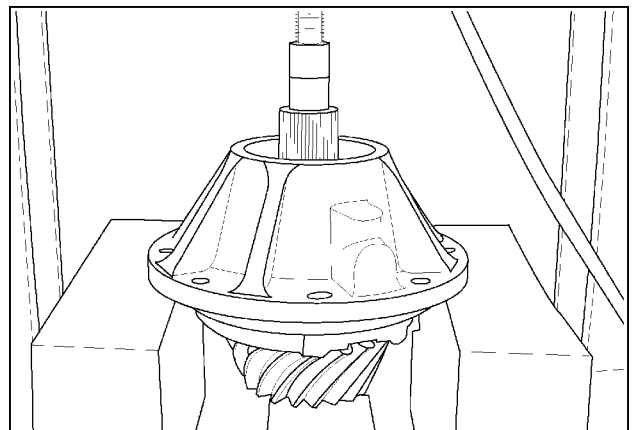
RCPH10FWD964AAJ 26

27. Remove the spacer ring and shim pack. Retain the shims.



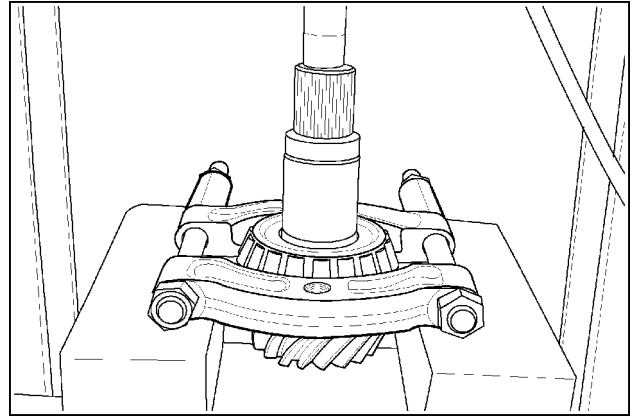
RCPH10FWD965AAJ 27

28. Support the pinion carrier on a press bed. Use the press to push the pinion gear through the front bearing cone. Remove the front bearing from the housing.



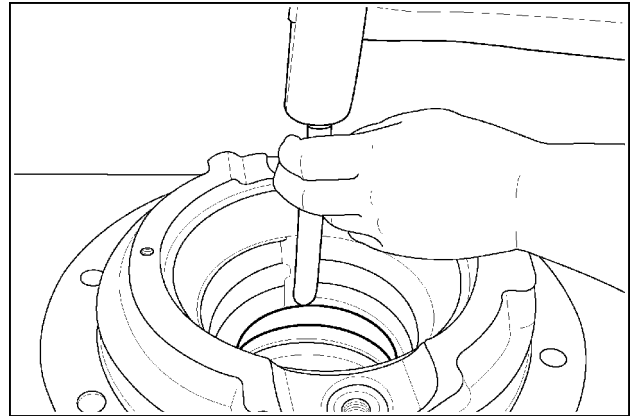
RCPH10FWD966AAJ 28

29. Use a split knife edge puller attachment and press to remove the rear pinion bearing cone.



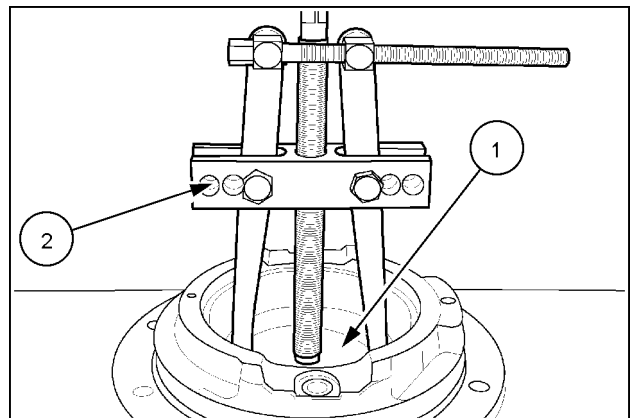
RCPH10FWD967AAJ 29

30. Use a brass drift to remove the outer bearing cup from the carrier housing.



RCPH10FWD968AAJ 30

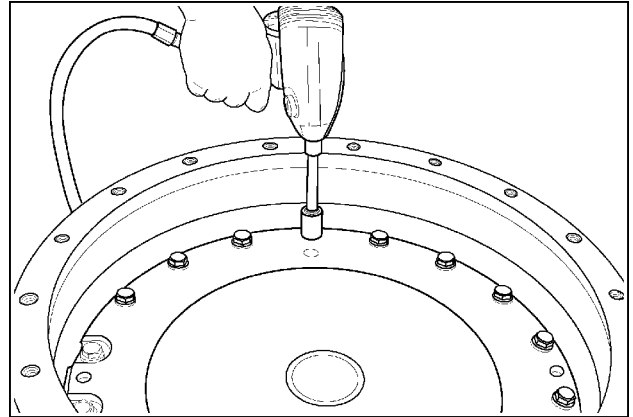
31. Use the **CAS2510** bearing cup remover adaptor plate (1) and a bearing puller (2) to remove the inner bearing cup from the carrier housing. Clean and inspect all parts for damage or wear. Replace any damaged or worn parts.



RCPH10FWD969AAJ 31

Brake carrier/bearing support removal

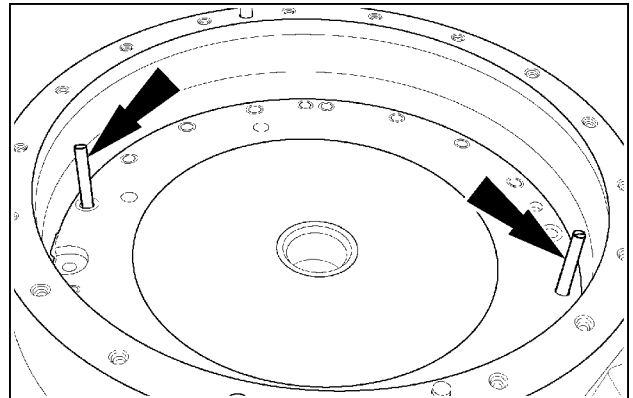
32. Rotate the differential housing so that the brake carrier side is on top. Remove the brake carrier retaining bolts and washers.



RCPH10FWD970AAJ 32

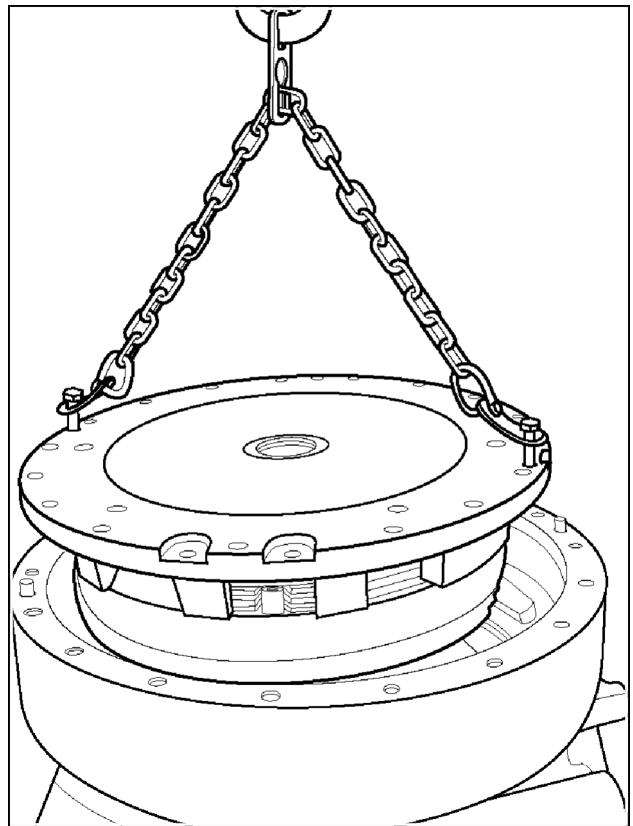
33. Install two **CAS2675** alignment studs opposite each other.

NOTE: Put a mark on the brake carrier and housing for assembly reference



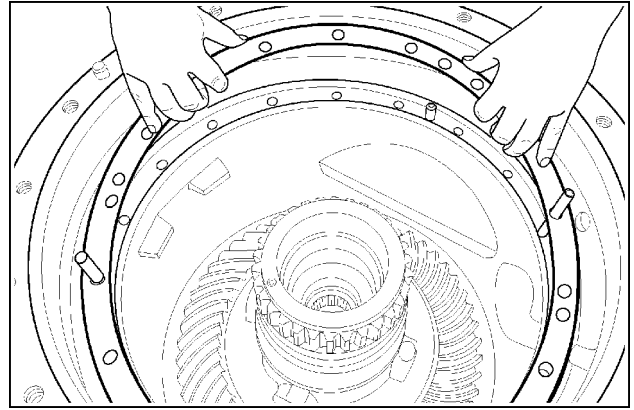
RCPH10FWD971AAJ 33

34. Two threaded holes are provided in the flange of the carrier assembly. Use two of the retainer bolts that were removed to attach a lifting chain and hoist. Use the hoist to slowly and carefully lift the brake carrier assembly out of the housing. Be careful not to bend or damage the preload shims during removal.



RCPH10FWD972AAJ 34

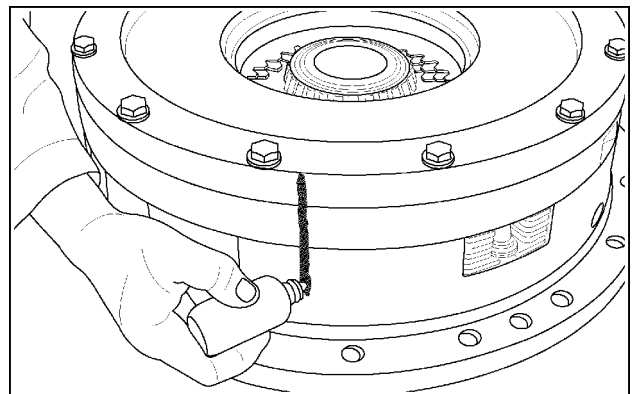
35. Remove and retain the differential bearing preload shims.



RCPH10FWD973AAJ 35

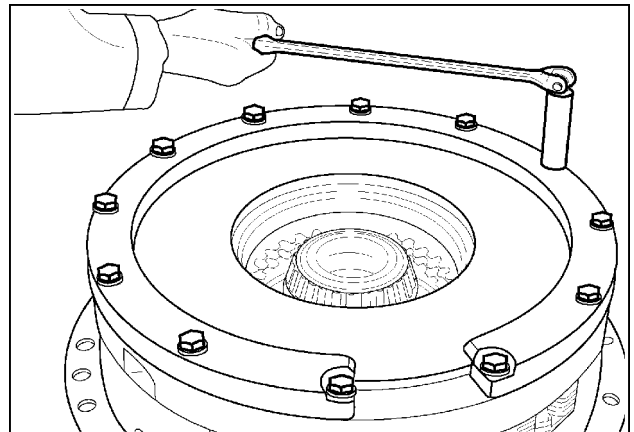
Brake carrier/bearing support disassembly

36. Position the carrier assembly on a sturdy work surface so that the split ring side is on top. Put a mark across the assembly for reference.



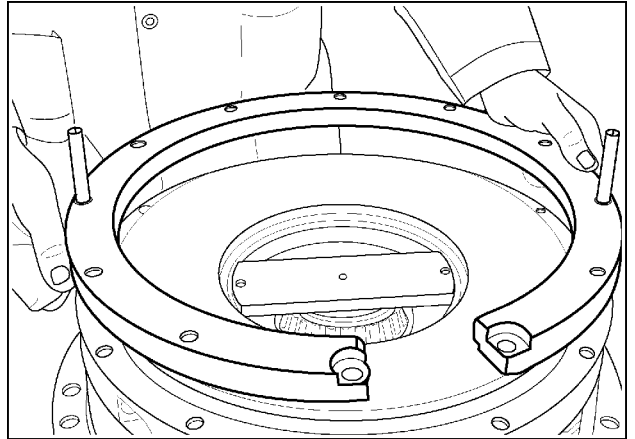
RCPH10FWD974AAJ 36

37. Starting with an end gap bolt, loosen each bolt in sequence one full turn. Repeat until all tension is released against the retaining ring.



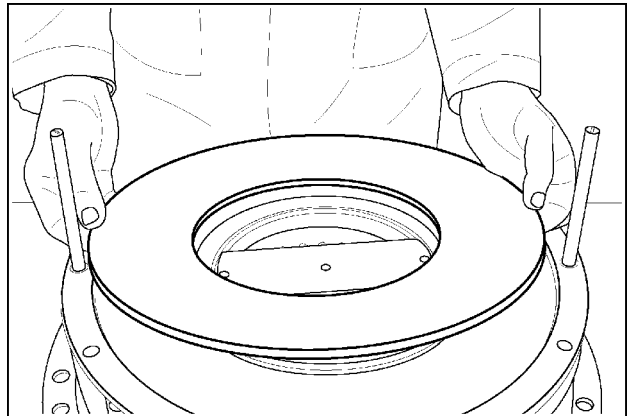
RCPH10FWD975AAJ 37

38. Remove all bolts from the split ring. Remove the split retainer ring.



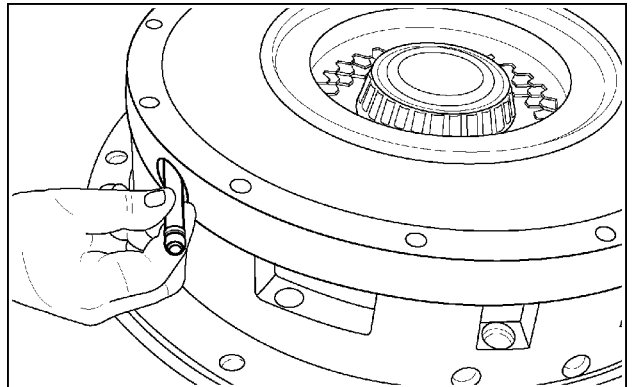
RCPH10FWD976AAJ 38

39. Remove the belleville spring.



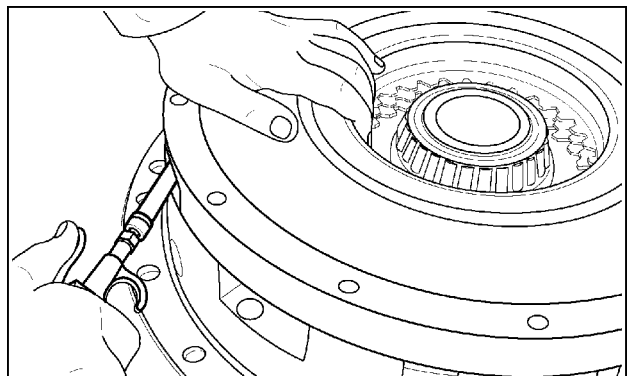
RCPH10FWD977AAJ 39

40. Temporarily install the short jumper tube into the park brake pressure port.



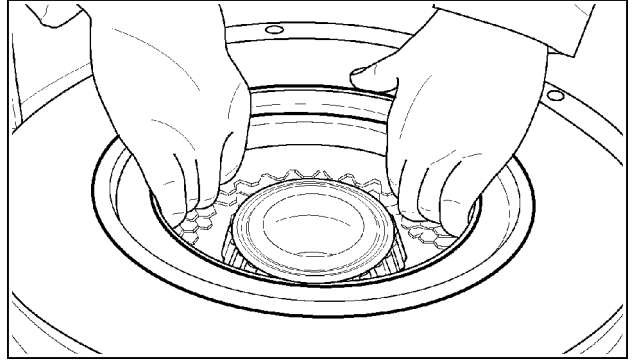
RCPH10FWD978AAJ 40

41. Use a short burst of compressed air to lift the park brake piston out of its bore.



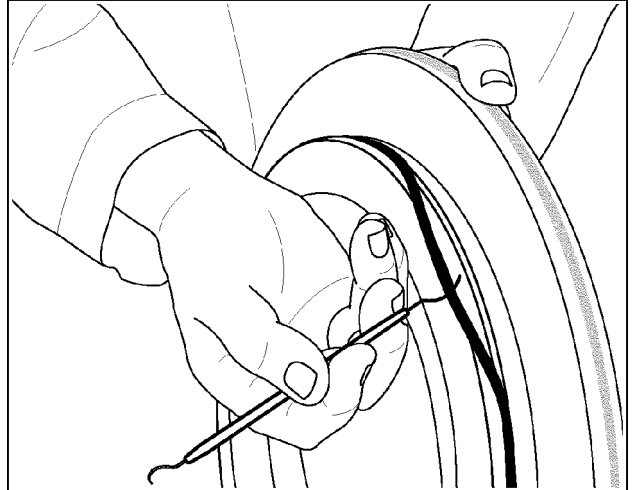
RCPH10FWD979AAJ 41

42. Remove the piston from the backing plate.



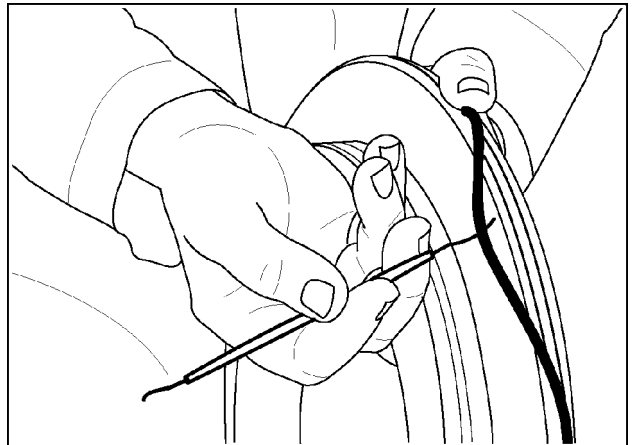
RCPH10FWD980AAJ 42

43. Remove and discard the inner O-ring from the piston.



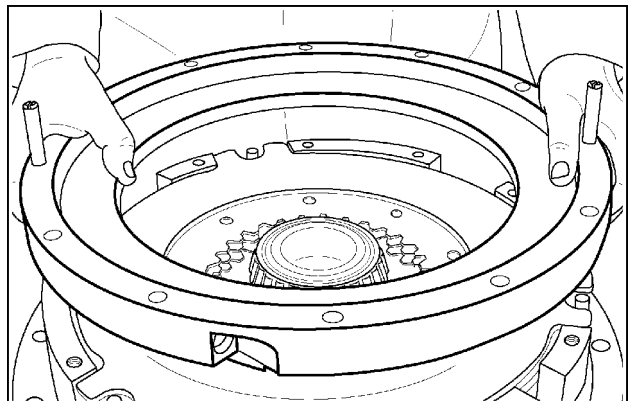
RCPH10FWD981AAJ 43

44. Remove and discard the outer O-ring from the piston.



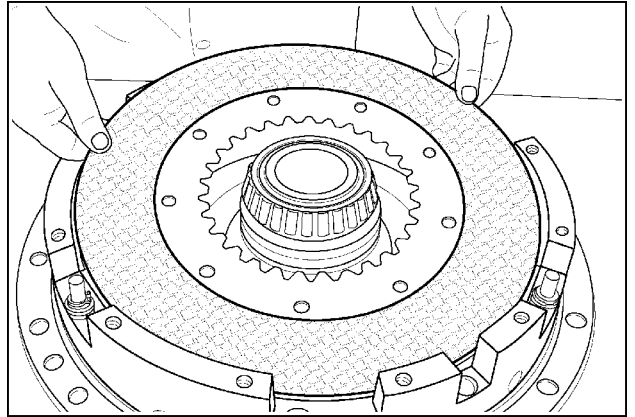
RCPH10FWD982AAJ 44

45. Remove the brake backing plate.



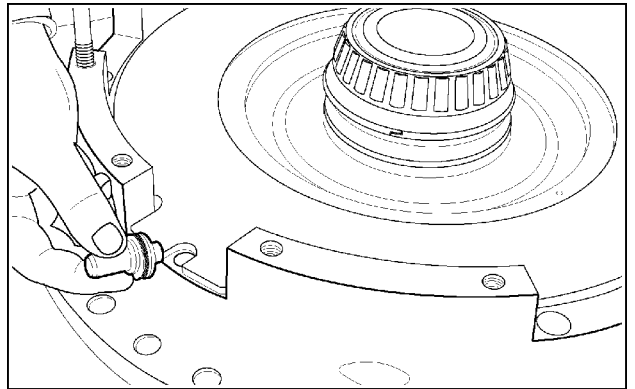
RCPH10FWD983AAJ 45

46. Remove the three brake separator plates and three friction plates from the carrier.



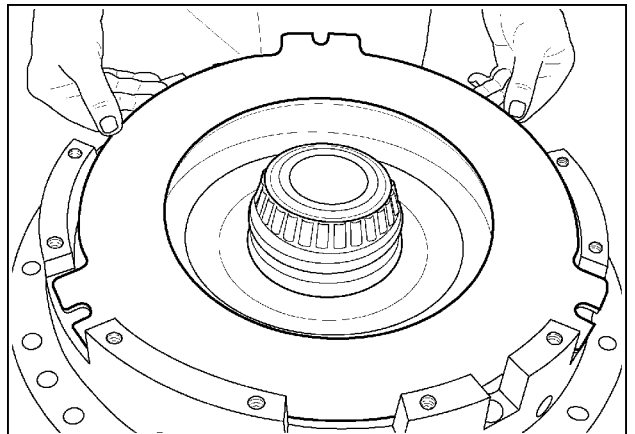
RCPH10FWD984AAJ 46

47. Remove each of the three brake adjuster pins with belleville spring washers.



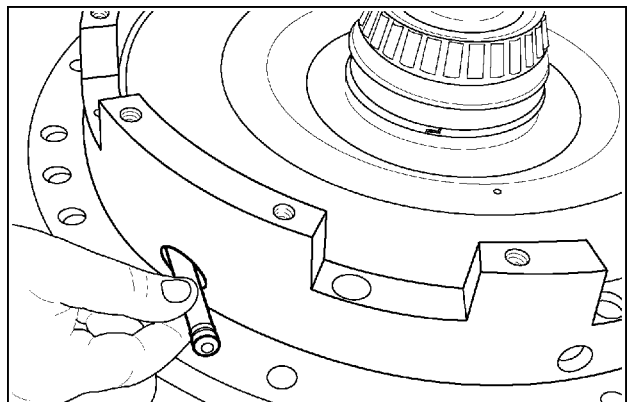
RCPH10FWD985AAJ 47

48. Remove the brake return plate from the carrier.



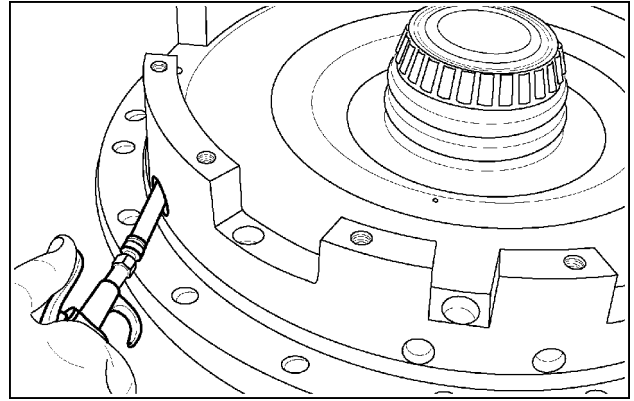
RCPH10FWD986AAJ 48

49. Temporarily install a short jumper tube into the service brake pressure port.



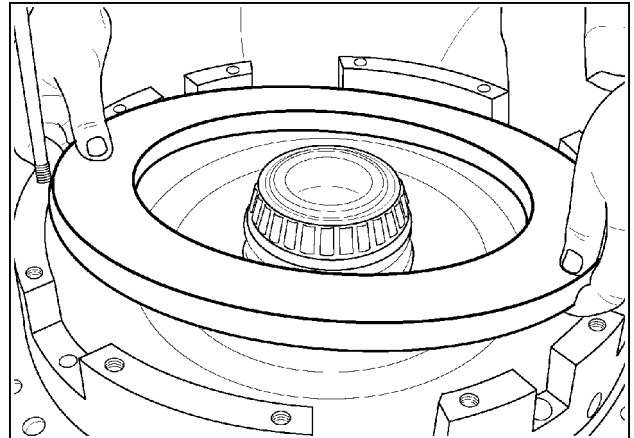
RCPH10FWD987AAJ 49

50. Use a short burst of compressed air to lift the brake piston out of the bore.



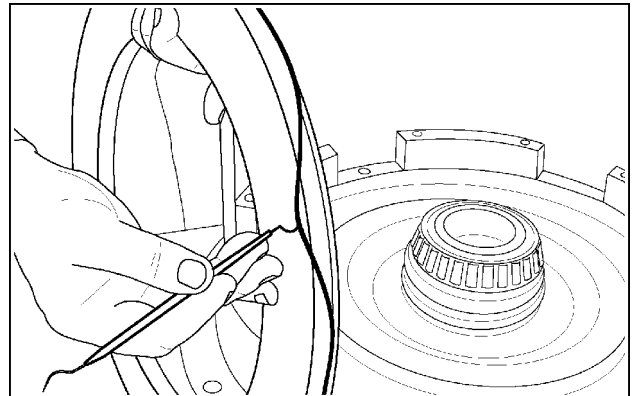
RCPH10FWD988AAJ 50

51. Remove the piston from the carrier.



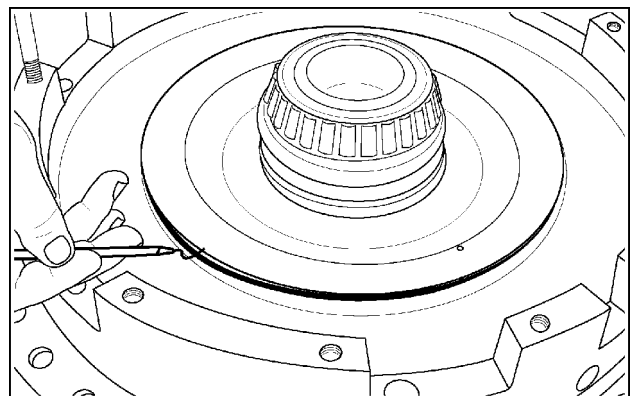
RCPH10FWD989AAJ 51

52. Remove and discard the O-ring from the outside diameter of the piston.



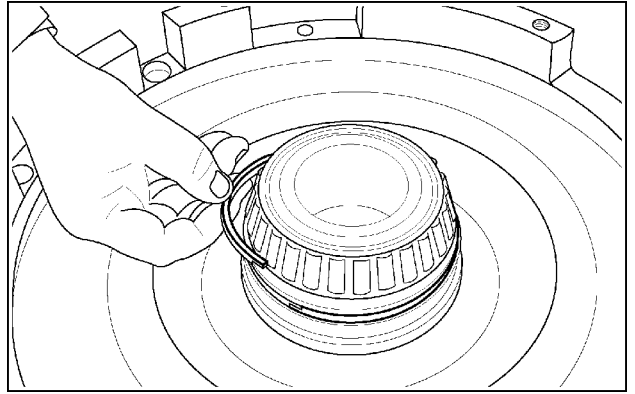
RCPH10FWD990AAJ 52

53. Remove and discard the piston inside diameter O-ring from the carrier.



RCPH10FWD991AAJ 53

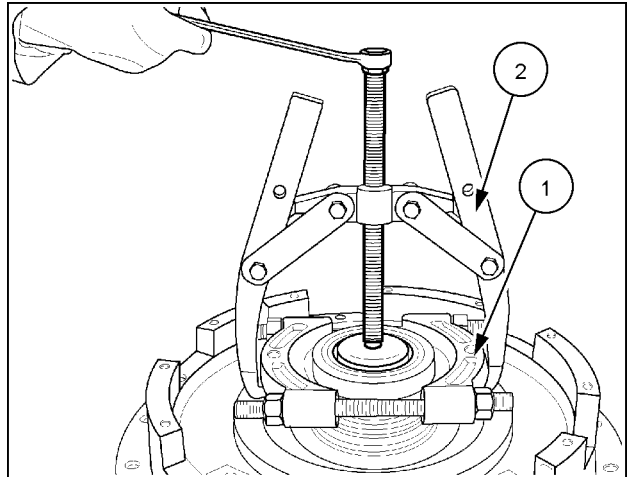
54. Remove and discard the two seal rings from the hub of the carrier.



RCPH10FWD992AAJ 54

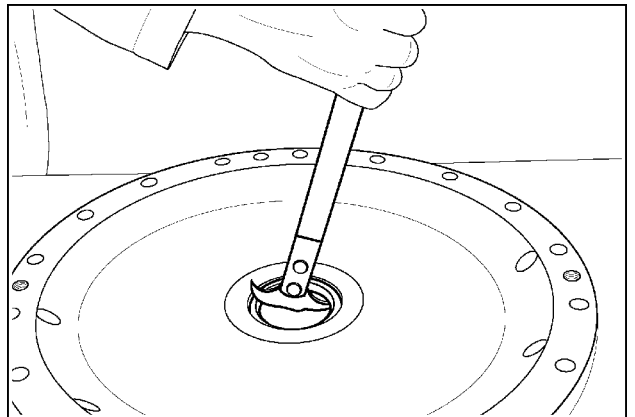
55. If required, use a split knife edge puller attachment (1) and a puller (2) to remove the bearing cone from the hub of the carrier.

NOTE: If possible, place the bearing cup over the bearing cone when removing the bearing.



RCPH10FWD993AAJ 55

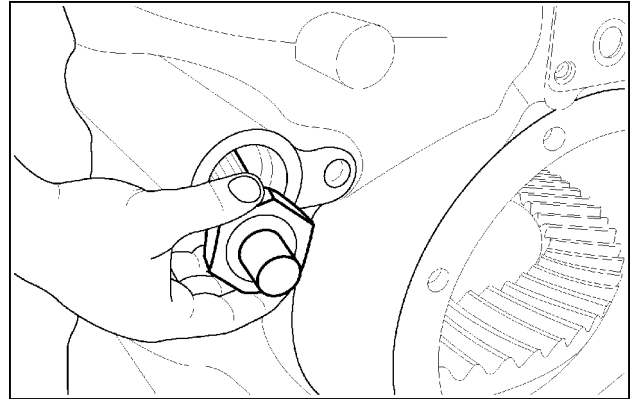
56. Turn the brake carrier housing so the outer side is on top. Remove the seal retaining screws and washers. Remove and discard the seal. Clean and inspect all brake carrier parts for damage or wear. Replace any damaged or worn parts found.



RCPH10FWD994AAJ 56

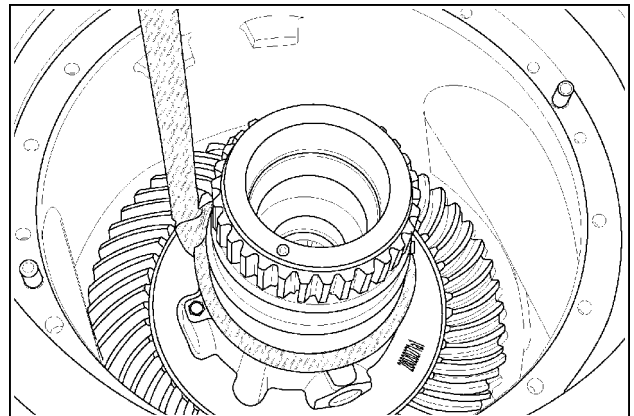
Differential removal and disassembly

57. Remove the lube return mesh screen from the housing.



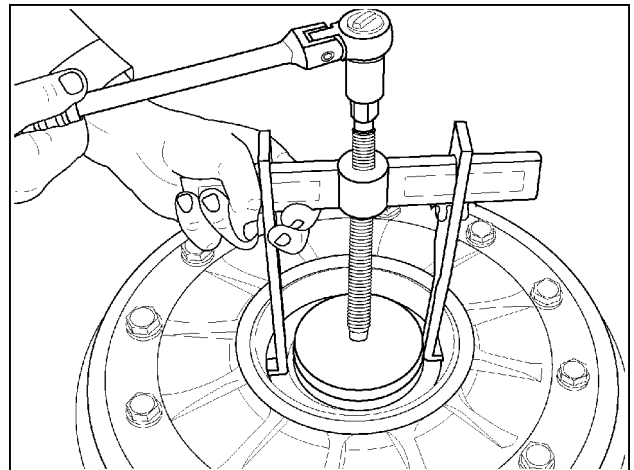
RCPH10FWD995AAJ 57

58. Position a nylon lifting sling in a choker configuration as low as possible on the differential carrier. Use a hoist to lift the differential from the housing.



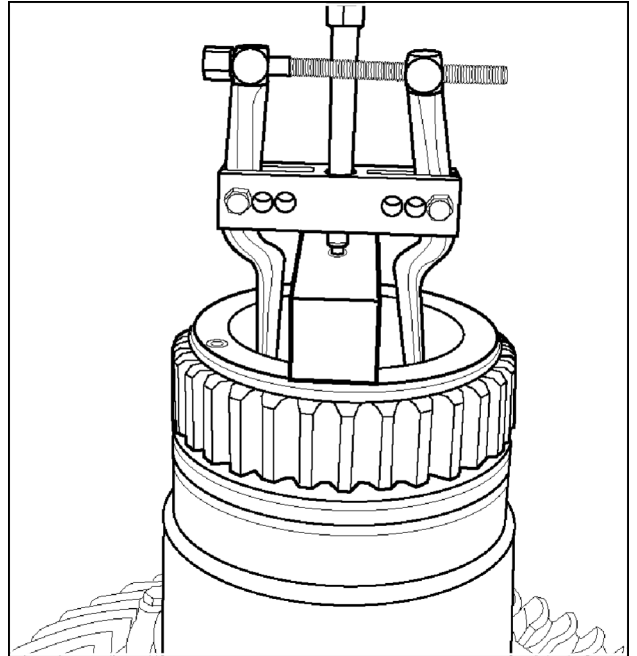
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59. If required, use a bearing puller and step plate to remove the left hand side differential bearing cup.



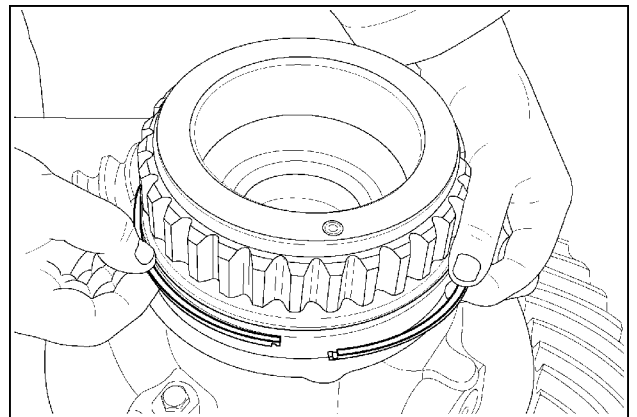
RCPH10FWD999AAJ 59

60. If required, use a bearing puller and step plate to remove the right hand side differential bearing cup.



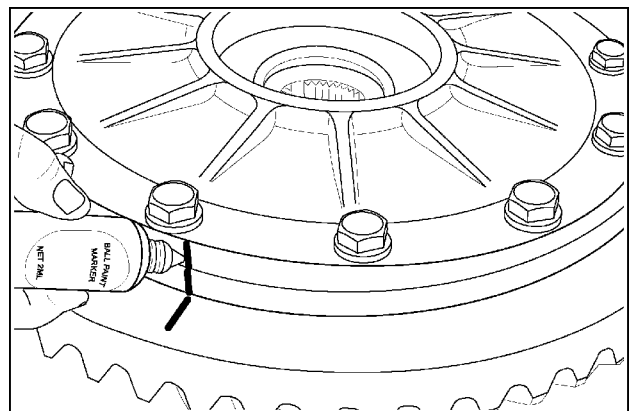
RCPH10FWD001ABJ 60

61. Remove and discard the large seal ring.



RCPH10FWD002ABJ 61

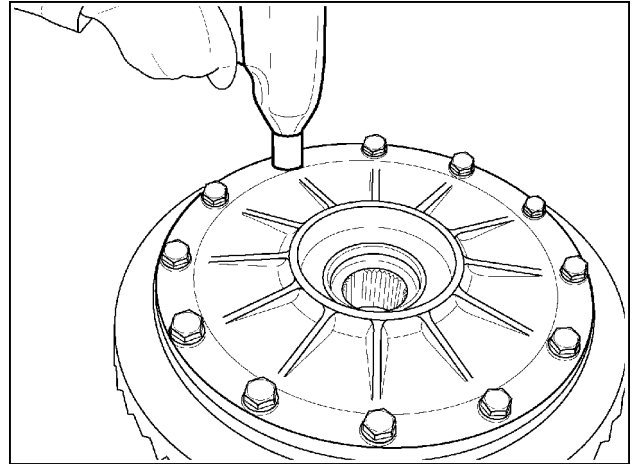
62. Put a mark on the differential case for assembly reference.



RCPH10FWD003ABJ 62

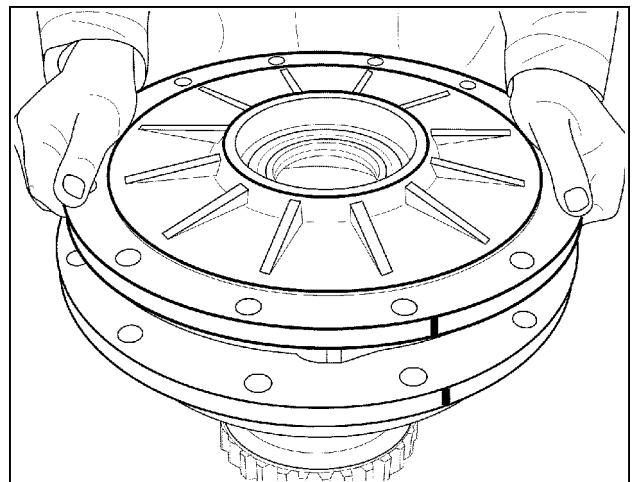
63. Remove and discard the ring gear and cover attaching bolts. Use a brass drift and hammer to tap the ring gear free from the case.

NOTE: The ring gear does not need to be removed unless the case or ring gear is to be replaced.



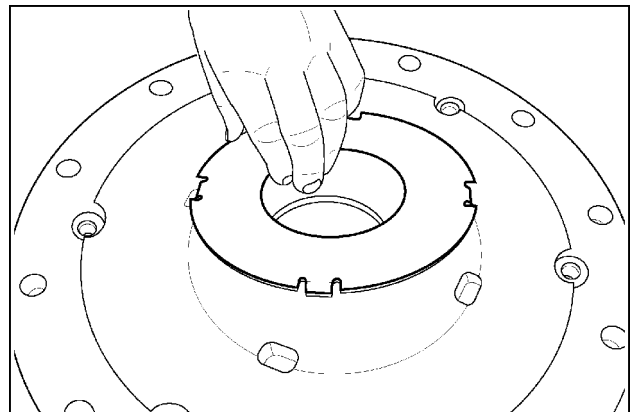
RCPH10FWD004ABJ 63

64. Remove the differential case cover.



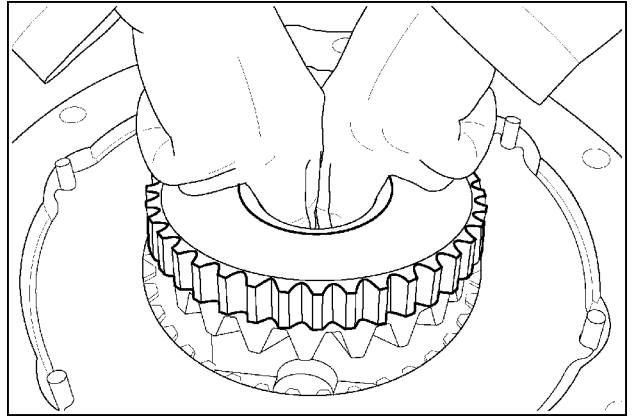
RCPH10FWD005ABJ 64

65. Remove the large thrust washer from the cover.



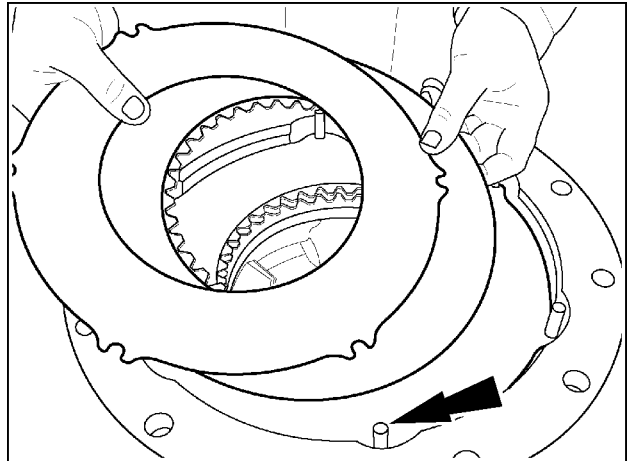
RCPH10FWD006ABJ 65

66. Remove the differential side gear from the case.



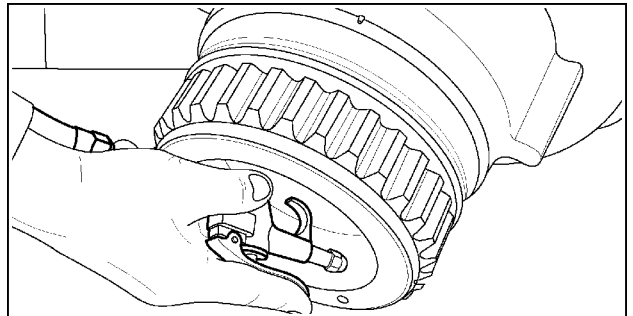
RCPH10FWD007ABJ 66

67. If equipped with differential lock, remove the four steel separator plates and three friction plates from the case. Remove the 6 anti-rotation dowel pins from the case.
If not equipped with differential lock proceed to step 70.



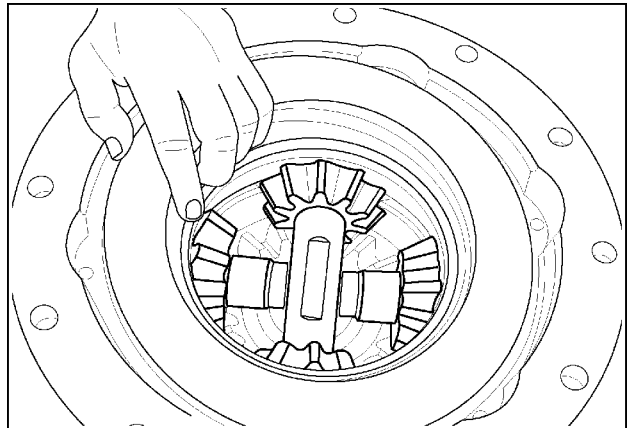
RCPH10FWD008ABJ 67

68. If equipped with differential lock, use a short burst of compressed air in the oil passage hole in the case to move the differential lock piston out of the bore.



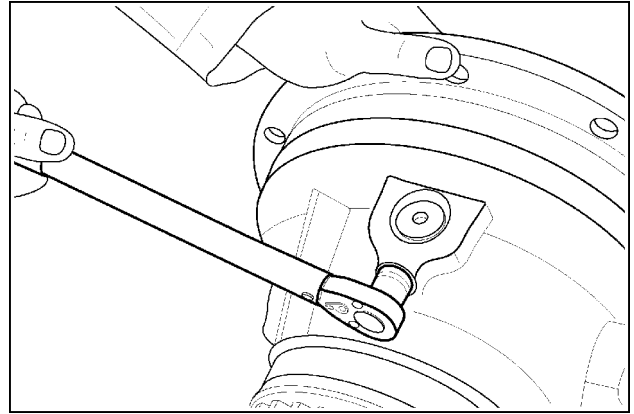
RCPH10FWD009ABJ 68

69. Remove the differential lock piston from the case.



RCPH10FWD010ABJ 69

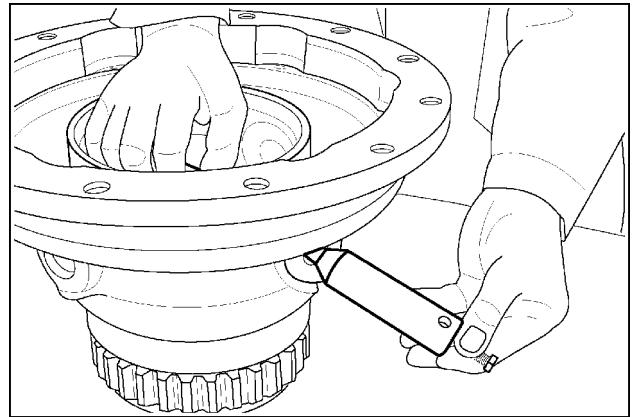
70. Remove the bolts securing the short pinion shafts in the case.



RCPH10FWD011ABJ 70

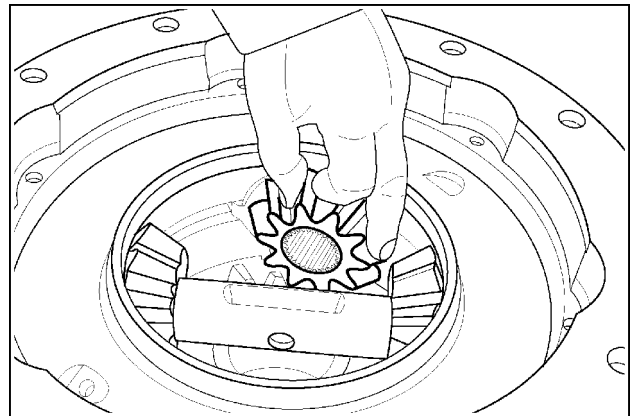
71. Install an M8 x 1.25 bolt into the threaded hole in the end of each short pinion gear shaft. Remove the short shafts and spacer sleeves from the case.

NOTE: There are 28 uncaged needle roller bearings in each of the four pinion gears.



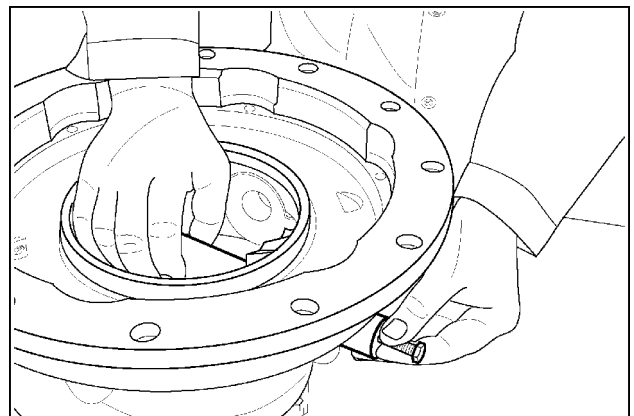
RCPH10FWD012ABJ 71

72. Remove the spider gears for the short shafts from the case.



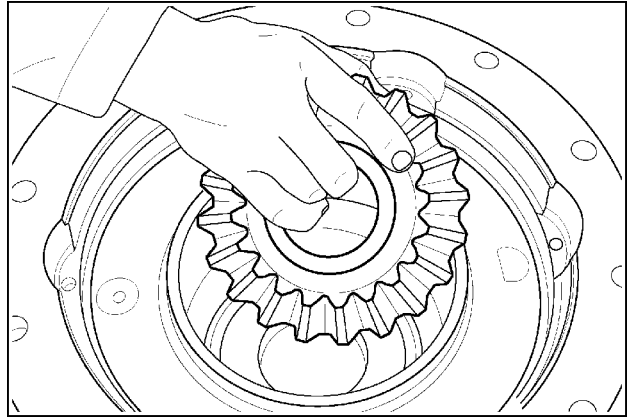
RCPH10FWD013ABJ 72

73. Use the same procedure to remove the long spider gear shaft, spacer and spider gears.



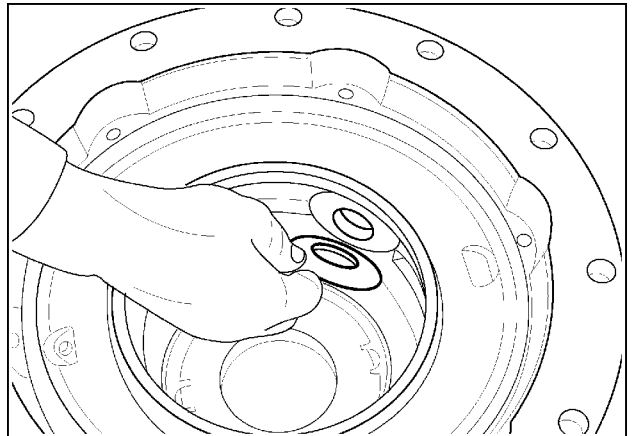
RCPH10FWD014ABJ 73

74. Remove the side gear from the bottom of the case.



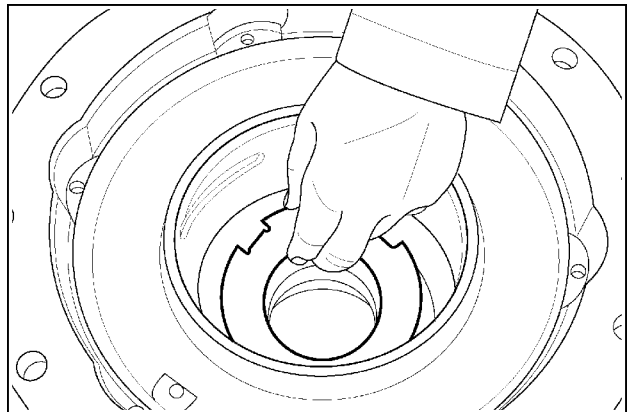
RCPH10FWD015ABJ 74

75. Remove the thrust washers for each spider gear from the case.



RCPH10FWD016ABJ 75

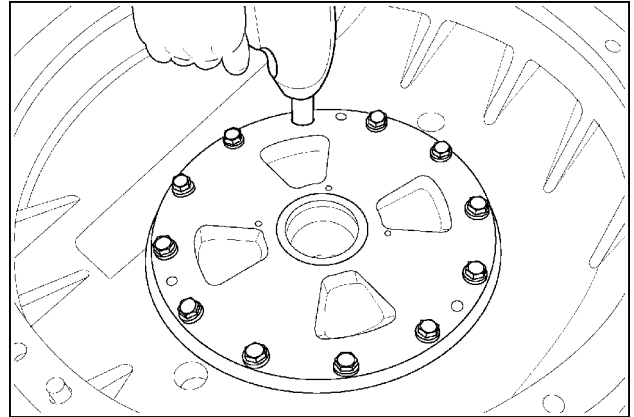
76. Remove the thrust washer for the side gear from the bottom of the case. Clean and inspect all differential parts for damage or wear. Replace any damaged or worn parts found.



RCPH10FWD017ABJ 76

Left hand differential bearing support disassembly

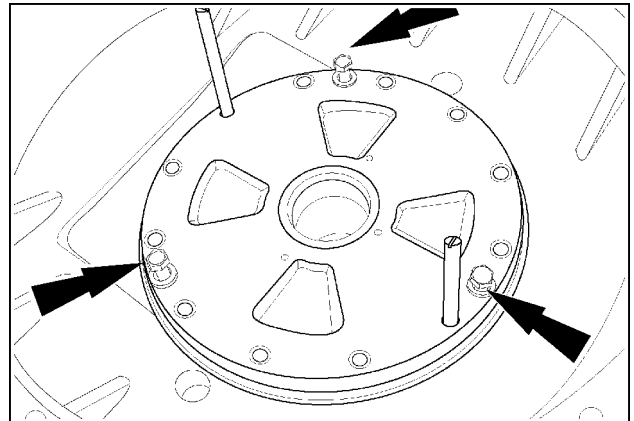
77. If required, rotate the differential housing so the left hand side differential bearing support carrier is on top. Remove the bearing support retaining bolts and washers.



RCPH10FWD018ABJ 77

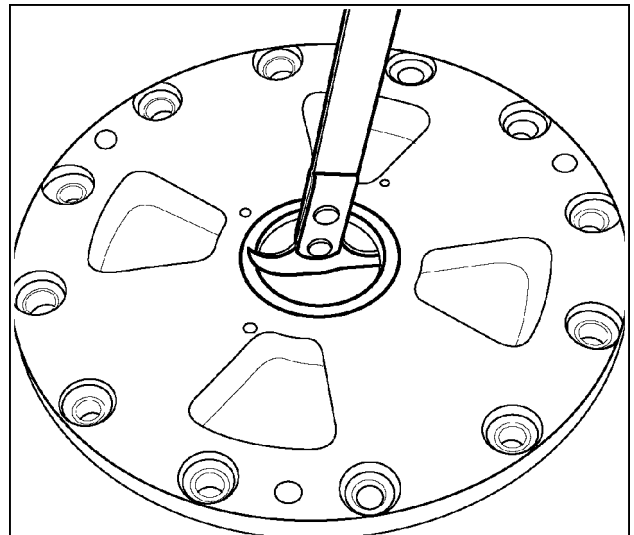
78. Install two CAS2479 guide bolts. Use three of the retaining bolts in the threaded holes provided. Tighten the bolts alternately and evenly to jack the bearing carrier out of the housing. Remove the bearing carrier and shims.

NOTE: Be careful not to damage the shims when removing the bearing support.



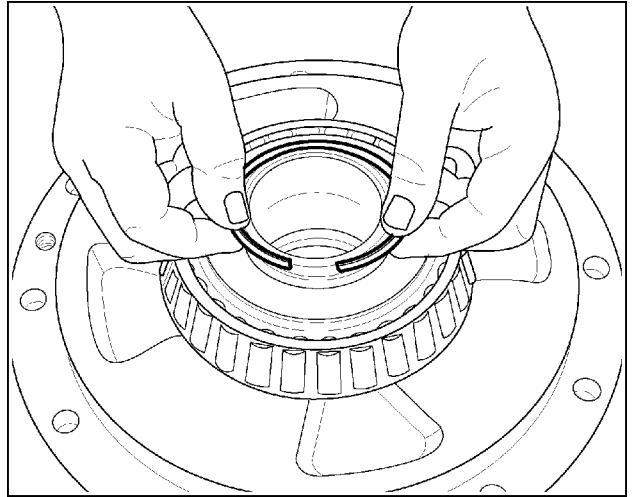
RCPH10FWD019ABJ 78

79. Remove the seal retaining screws and washers. Remove and discard the oil seal.



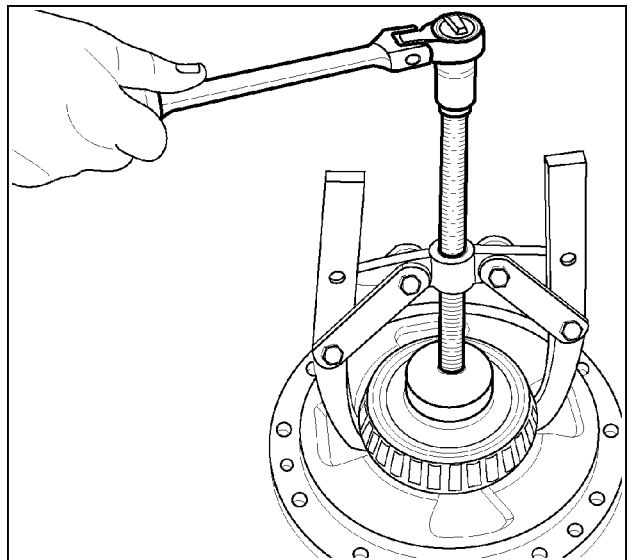
RCPH10FWD020ABJ 79

80. Remove and discard the seal ring.



RCPH10FWD021ABJ 80

81. If required, use a bearing puller and step plate to remove the bearing cone from the hub of the bearing carrier.



RCPH10FWD022ABJ 81

Differential - Assemble - 500 Series axles

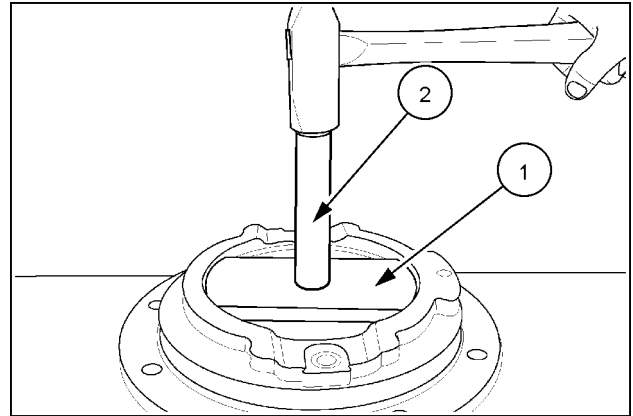
Steiger® 500
Steiger® 540

NA
NA

Pinion carrier assembly

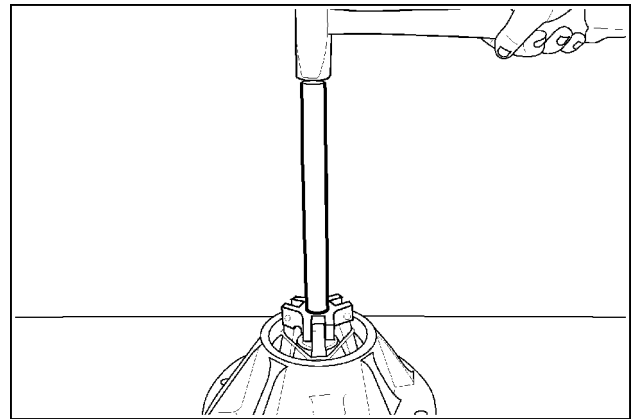
1. Use **CNH299050** bearing cup driver (1) and CAS1716-3 handle (2) to install the inner bearing cup into the carrier housing. Be sure the bearing cup is seated in the bore.

NOTE: Put a light coat of oil around the outside diameter of the bearing cup before installation.



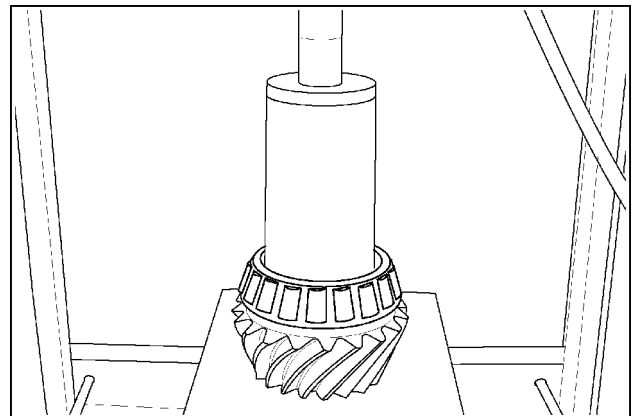
RCPH10FWD023ABJ 1

2. Put a light coat of oil around the outside diameter of the outer pinion bearing cup. Use a universal bearing cup installer to install the outer bearing cup into the carrier.



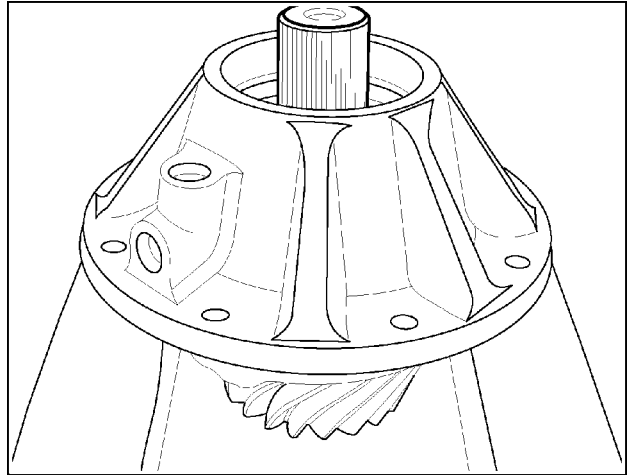
RCPH10FWD024ABJ 2

3. Put a light coat of oil around the inside diameter of the inner pinion bearing cone. Use the **CAS2666** press sleeve and press to install the inner bearing cone on the pinion gear until seated.



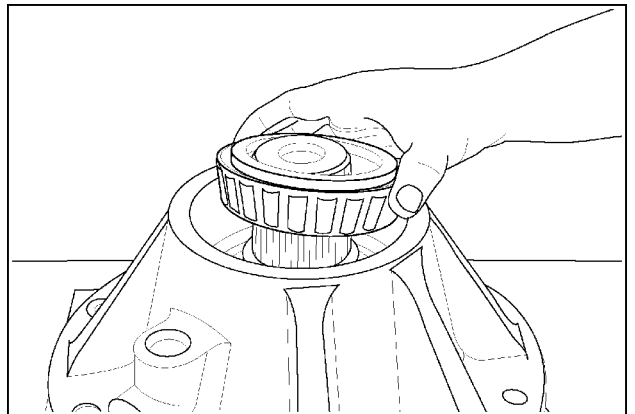
RCPH10FWD025ABJ 3

4. Lubricate inner bearing cone with clean operating oil. Install the bevel pinion gear into the carrier housing.



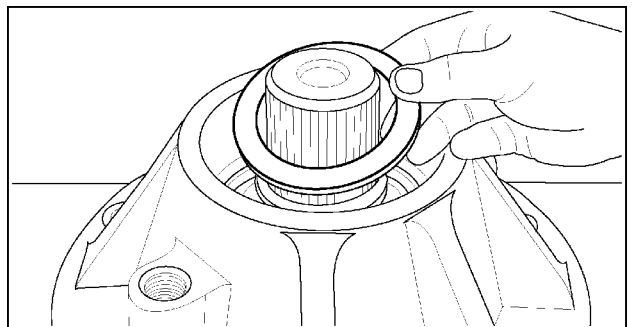
RCPH10FWD026ABJ 4

5. Lubricate the front bearing cone with clean assembly lube. Install the bearing cone on the pinion shaft.



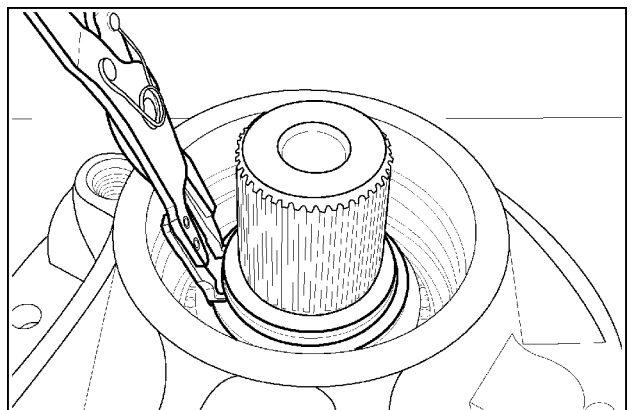
RCPH10FWD027ABJ 5

6. Install the thick spacer ring on the pinion shaft.



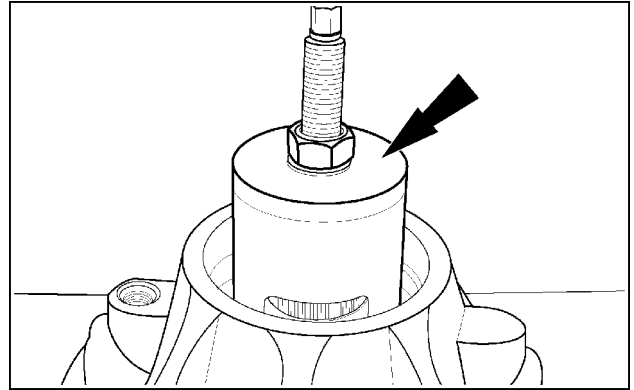
RCPH10FWD028ABJ 6

7. Install a new snap ring on the pinion shaft as far down as possible.



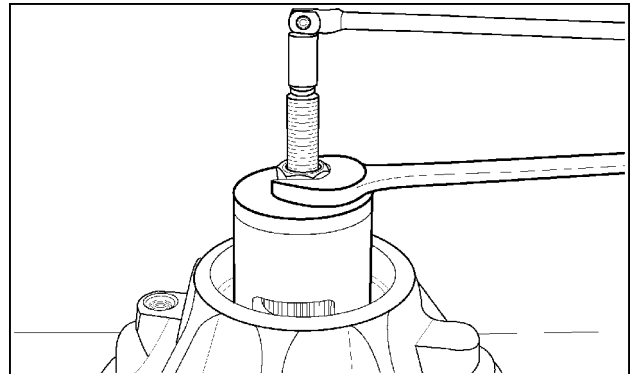
RCPH10FWD029ABJ 7

8. Install and tighten the center bolt of the **CAS2511** pinion bearing compression tool into the end of the pinion shaft. Install the compression sleeve, thrust washer and nut on the center bolt.



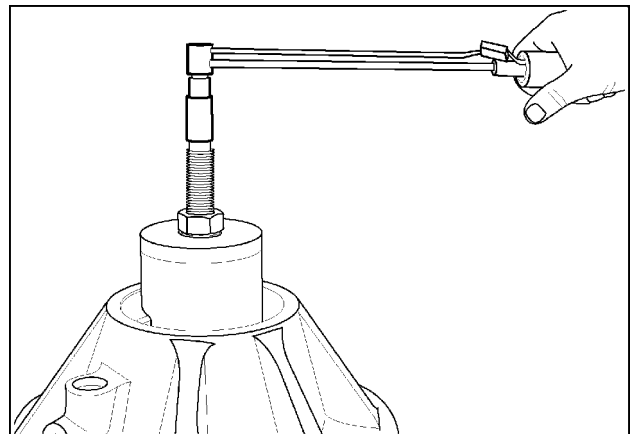
RCPH10FWD030ABJ 8

9. Use one wrench to hold the center bolt and a second wrench to tighten the nut to push the bearing cone on the pinion gear shaft until some resistance is noted when the pinion gear is rotated. Install the snap ring into the groove of the pinion shaft.



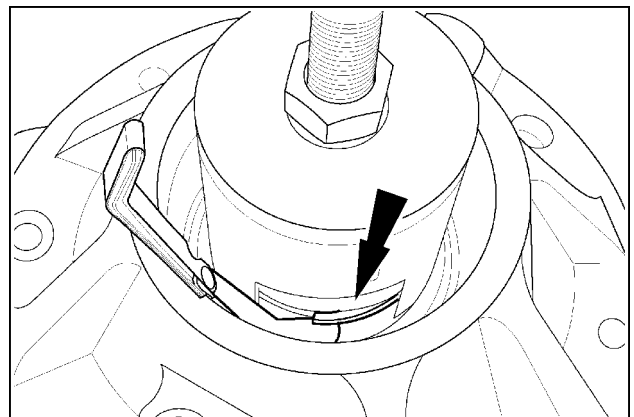
RCPH10FWD962AAJ 9

10. Use a torque wrench on the center bolt to measure rolling torque. Tighten the nut until **19 – 20 N·m (14 – 15 lb ft)** of smooth and continuous rolling torque is measured.



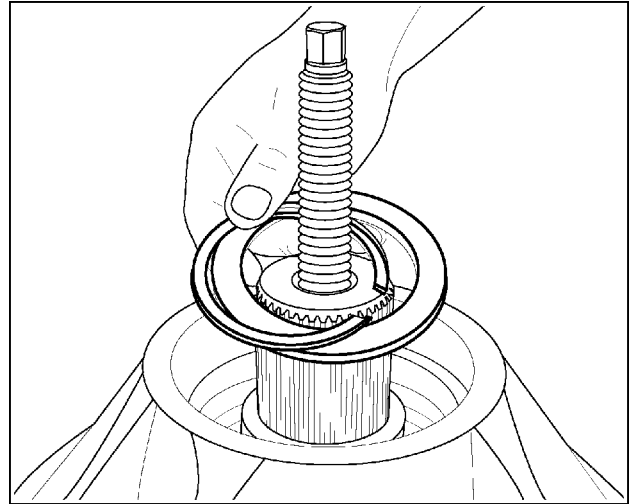
RCPH10FWD031ABJ 10

11. Use an angled feeler gauge to measure and record the distance between the spacer ring and the snap ring. The feeler gauge must be a tight fit.



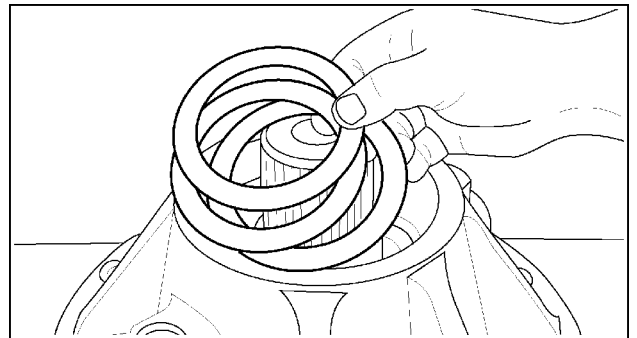
RCPH10FWD032ABJ 11

12. Remove the compression sleeve, snap ring and thick spacer ring.



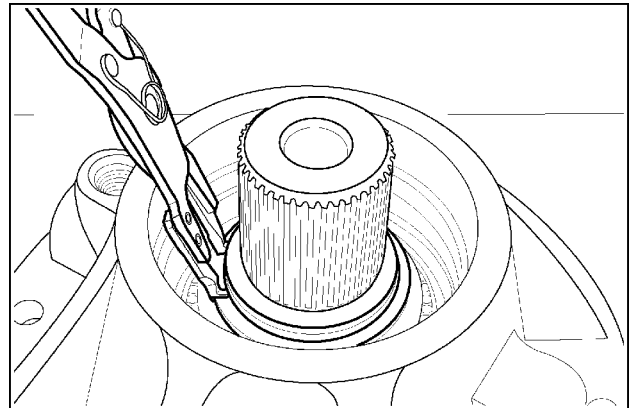
RCPH10FWD033ABJ 12

13. Select a shim combination equal to the distance measured in Step 11. Install the selected shim pack (thickest shim first) and thick spacer ring on the pinion shaft.



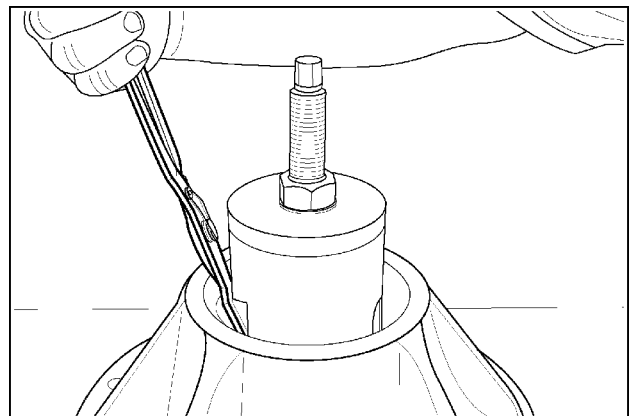
RCPH10FWD034ABJ 13

14. Install the snap ring on the pinion shaft as far down as possible.



RCPH10FWD029ABJ 14

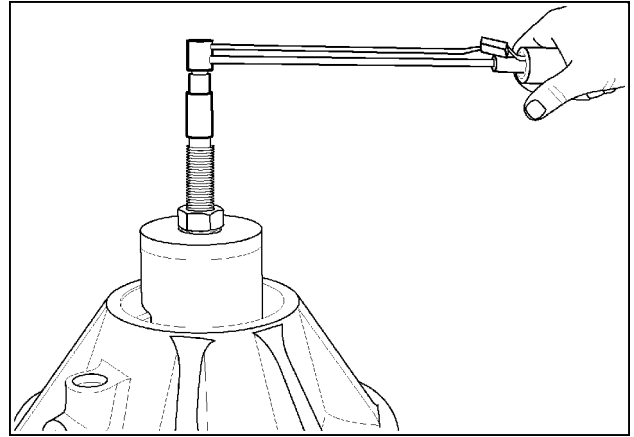
15. Install the compression sleeve, thrust washer and nut on the center bolt. Align the open window of the sleeve with the gap of the snap ring. Tighten the nut on the compression sleeve until the snap ring can be installed in the groove of the shaft. Be sure the snap ring is fully seated in the groove.



RCPH10FWD963AAJ 15

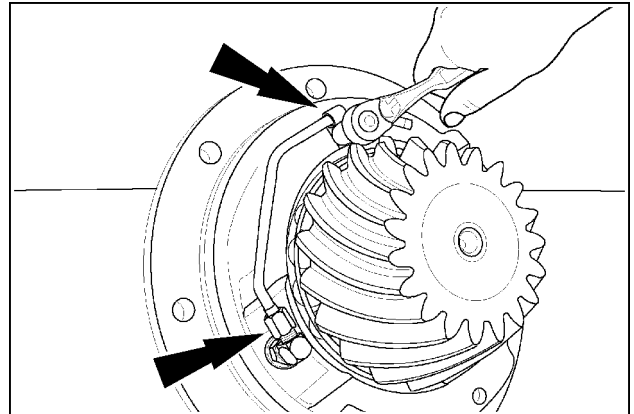
16. Loosen the nut on the center bolt at least two full turns. Strike the head of the center bolt two sharp blows with a heavy hammer to back seat the bearing against the snap ring. Use a torque wrench to check pinion bearing preload. Rolling torque must measure **6 – 20 N·m (4 – 15 lb ft)** with no bearing binding or lockup. If rolling torque is out of tolerance, add or remove shims as needed to correct rolling torque.

NOTE: Adjust used bearings towards the low end of the preload tolerance range.



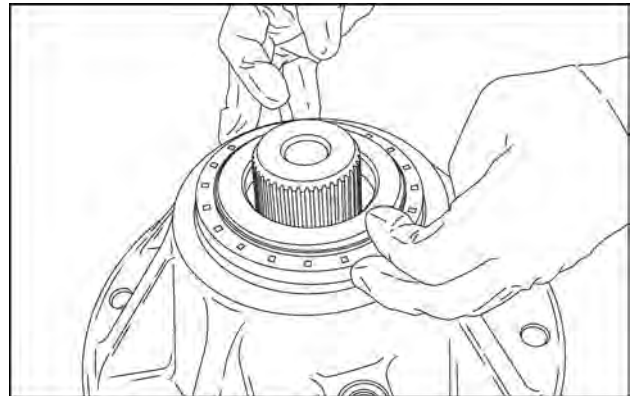
RCPH10FWD031ABJ 16

17. Install the lubrication port fitting, pinion lube tube, retaining clip and bolt. Tighten the bolt to the specified torque. Adjust the tube to direct oil flow at the pinion gear teeth. Allow a minimum of **6 mm (0.24 in)** clearance between the end of the tube and the bevel gear. Tighten the tube fitting and connection securely.



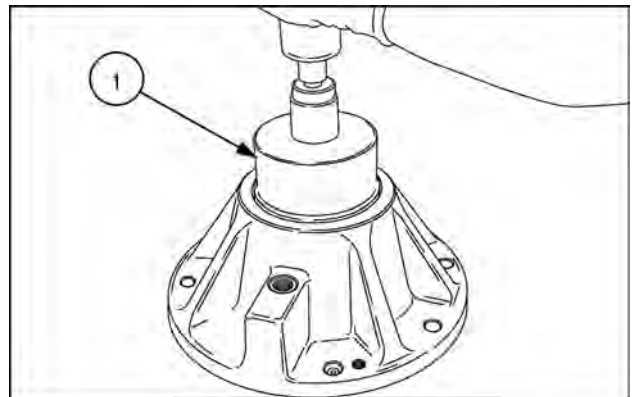
RCPH10FWD960AAJ 17

18. Install the pinion seal over the pinion shaft into the bore of the housing.



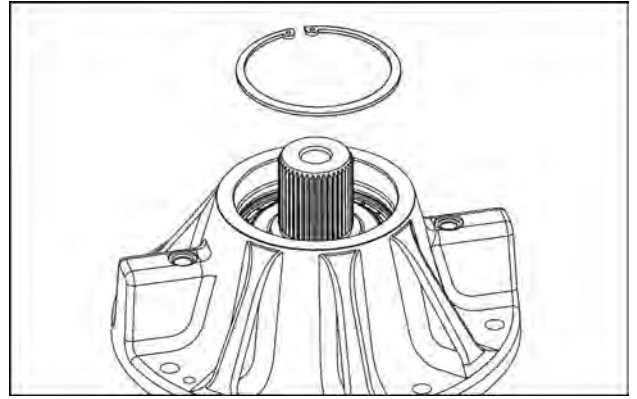
RAIL17TR01392AA 18

19. Use **380003447** pinion seal driver (1) with bolt and washer to draw oil seal down to position.



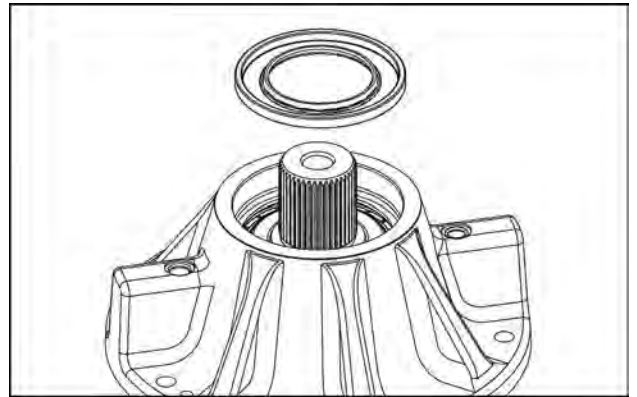
RAIL17TR01393AA 19

20. Install snap ring.



RAIL17TR01399AA 20

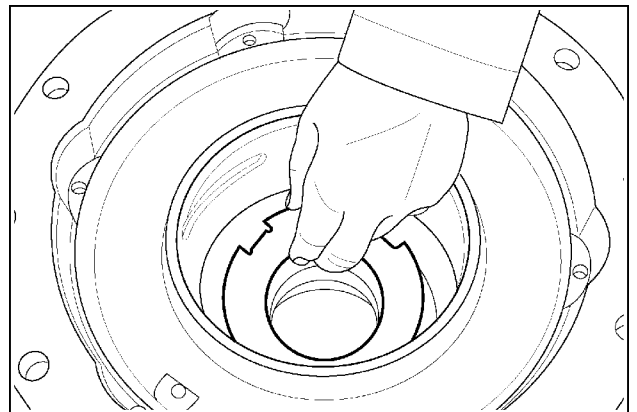
21. Press the dust seal on until it is flush with the housing.



RAIL17TR01398AA 21

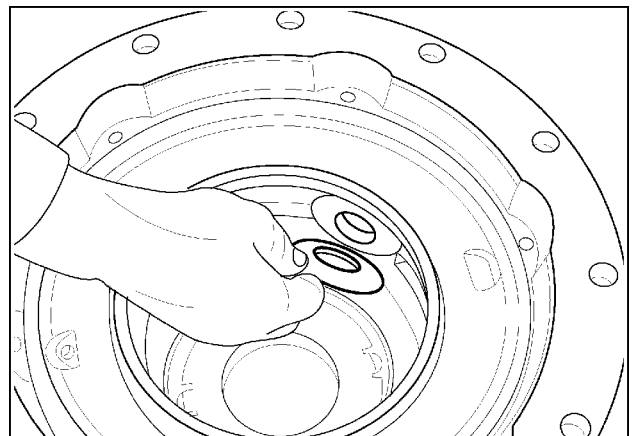
Differential case assembly procedures

22. Lubricate the thrust washer for the case with clean assembly grease. Position the thrust washer tab side down in the bottom of the case.



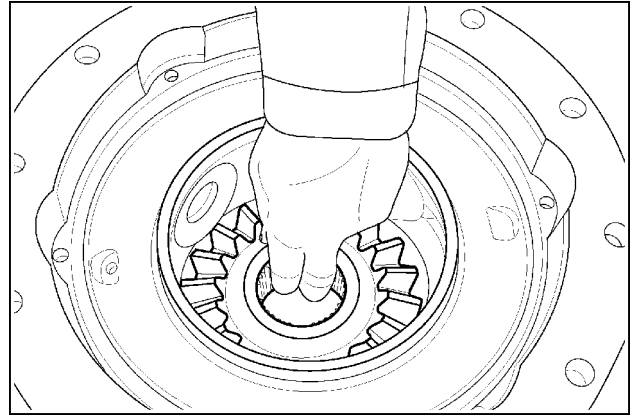
RCPH10FWD017ABJ 22

23. Lubricate each spider gear thrust washer with clean assembly grease. Install each spider gear thrust washer (tab outward) to engage the slot in the case and centered to the hole.



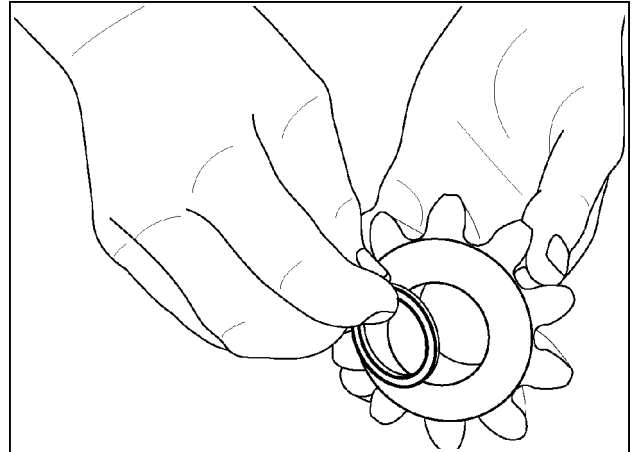
RCPH10FWD016ABJ 23

24. Install the side gear into the bore in the bottom of the case.



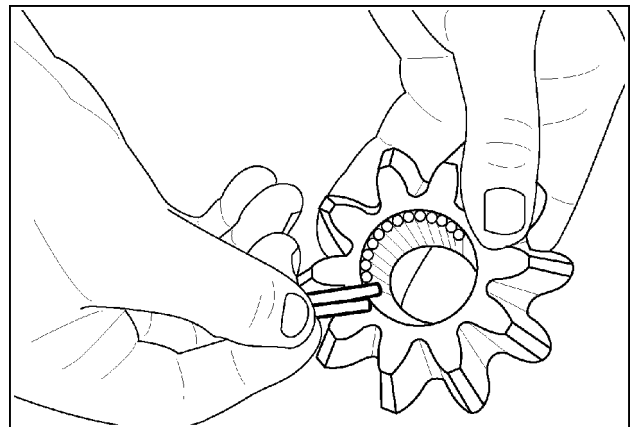
RCPH10FWD037ABJ 24

25. Lubricate the needle bearing slave ring with clean assembly grease. Install the slave ring into the bore of the spider gear.



RCPH10FWD038ABJ 25

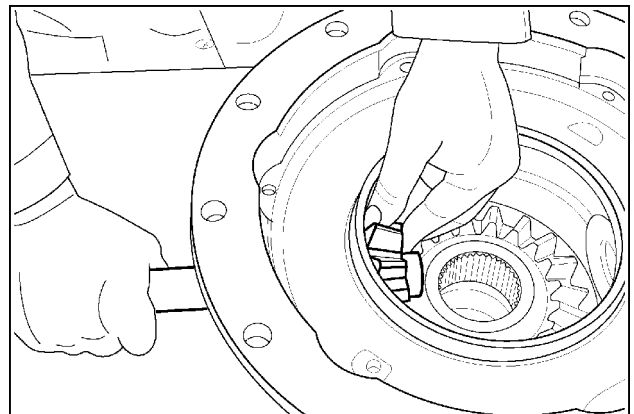
26. Using the slave ring as a needle roller bearing support, use clean assembly grease to install a full complement of 28 needle roller bearings into each spider gear.



RCPH10FWD039ABJ 26

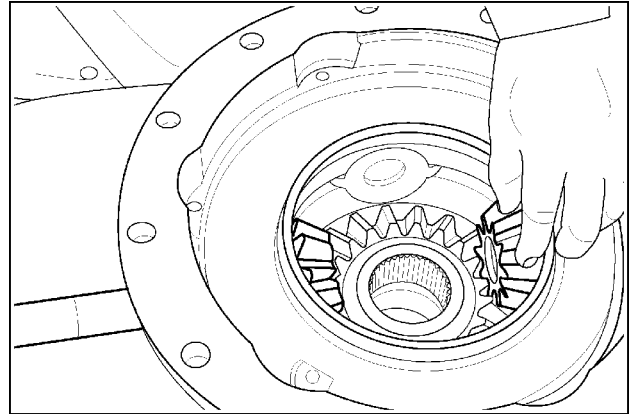
27. Install the first spider gear into the case centered to the hole for the long pin and meshed with the side gear. Push the pin through the case and into the spider gear until the pin is flush with the inner side of the gear.

NOTE: Turn the long pin so that the hole in the center of the pin is horizontal.



RCPH10FWD040ABJ 27

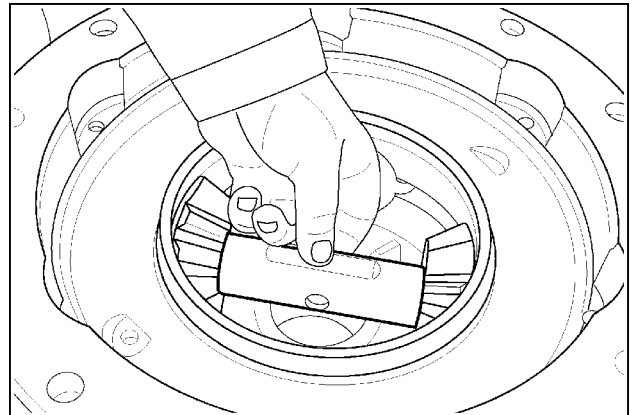
28. Install the opposite side spider gear centered to the case bore and meshed with the side gear.



RCPH10FWD041ABJ 28

29. Install the long spacer sleeve between the two spider gears so that the hole in the center of the sleeve is horizontal. Carefully push the long pin through the spacer sleeve and spider gears until the hole in the pin and spacer sleeve are aligned.

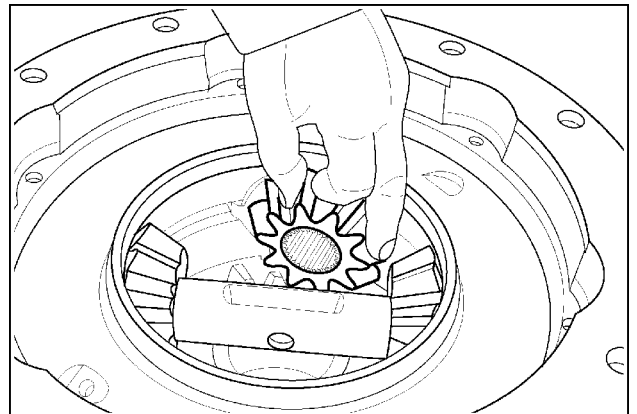
NOTE: Be sure the slave ring and all needle rollers remain in position in each pinion gear. Check the rotation of the pinion gears and bottom side gear. Rotation of the gears must be smooth without lockup



RCPH10FWD042ABJ 29

30. Install the pinion gears for the short pins into the case in the same manner.

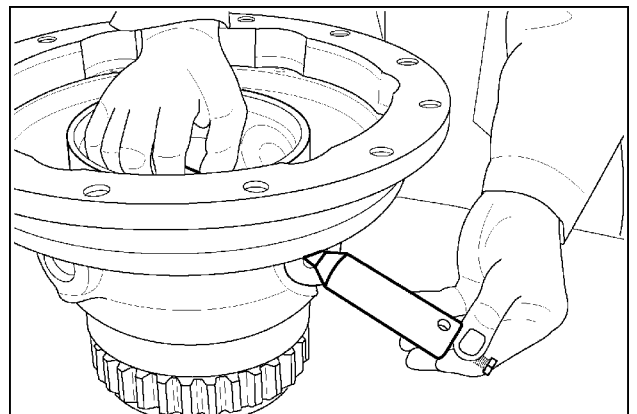
NOTE: The slave ring for each spider gear must be installed on the beveled side of the gear.



RCPH10FWD013ABJ 30

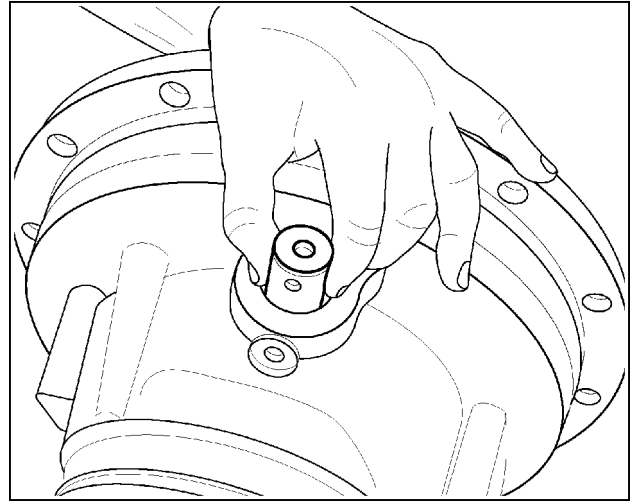
31. Position a short spacer sleeve between the pinion gear and long spacer sleeve. Carefully install the pinion pin and short spacer to engage the hole in the long pin and spacer.

NOTE: The large outside diameter of the spacer sleeve must mate against the ends of the needle rollers. Be sure all needle rollers remained in the gear



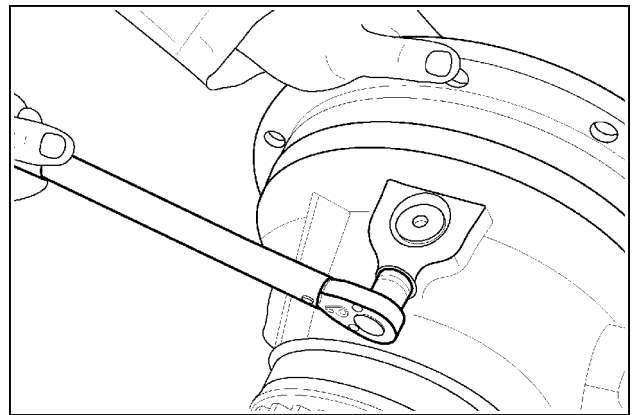
RCPH10FWD012ABJ 31

32. Align the hole in the end of the short pinion pin with the threaded hole in the case. Repeat this procedure for the opposite short pinion shaft.



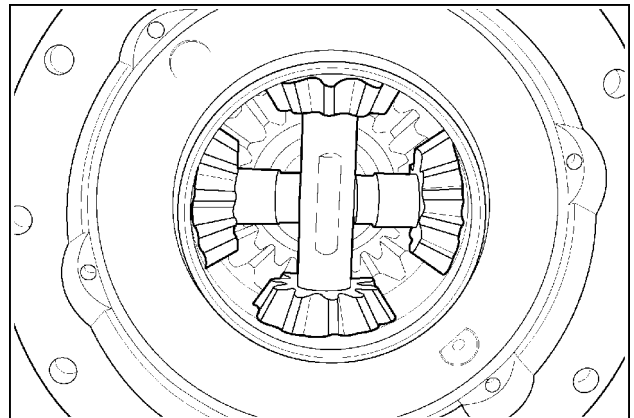
RCPH10FWD043ABJ 32

33. Install the pinion pin retainer bolts. Tighten each bolt to the specified torque.



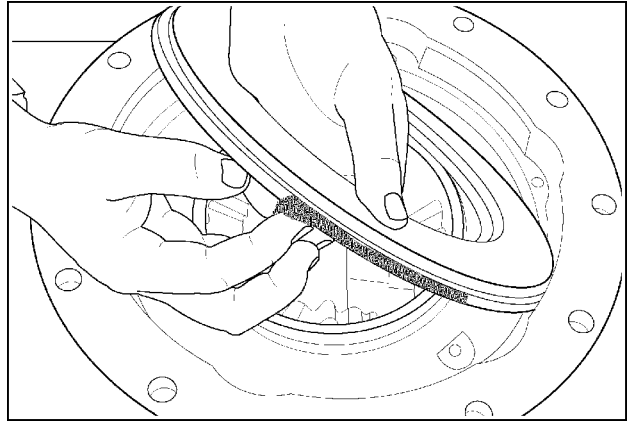
RCPH10FWD011ABJ 33

34. After all the pinion gears and pins have been installed, check the rotation of the differential gears. There must be no lockup during rotation.



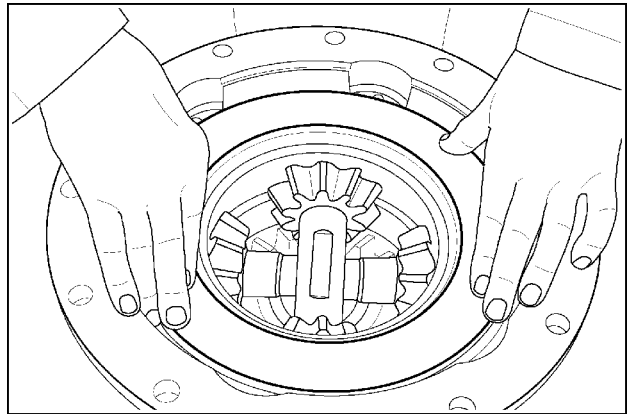
RCPH10FWD044ABJ 34

35. Lubricate the seals of a new piston with clean assembly grease.



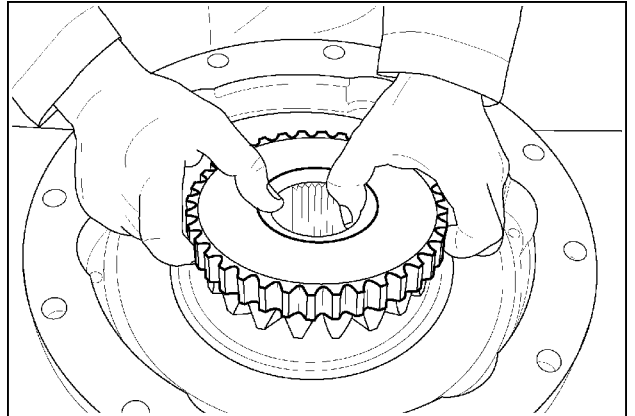
RCPH10FWD045ABJ 35

36. Hand seat the differential lock piston into the bore of the case.



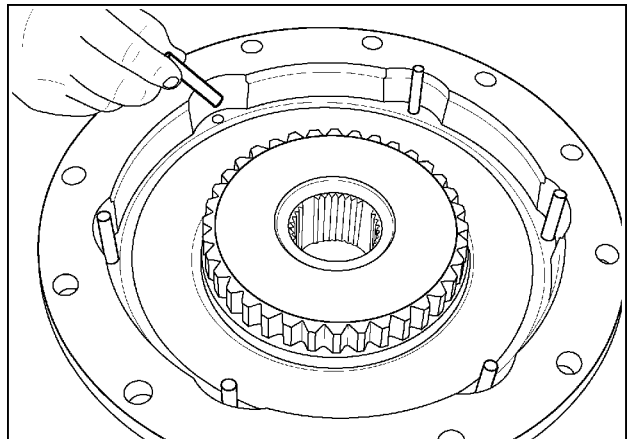
RCPH10FWD046ABJ 36

37. Install the splined side gear on top of the pinion gears so that all gears are in mesh.



RCPH10FWD047ABJ 37

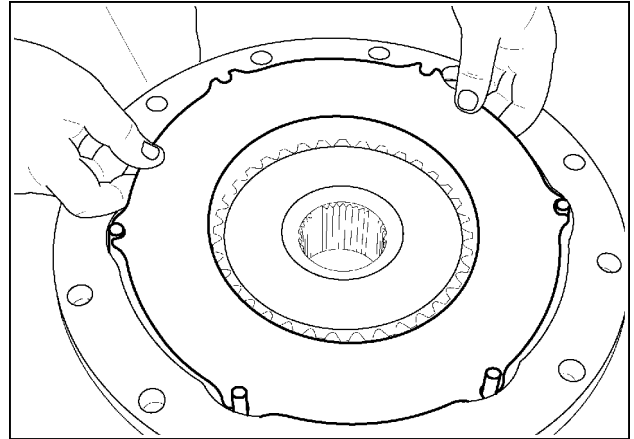
38. Install the six anti-rotation dowel pins into the holes in the case.



RCPH10FWD048ABJ 38

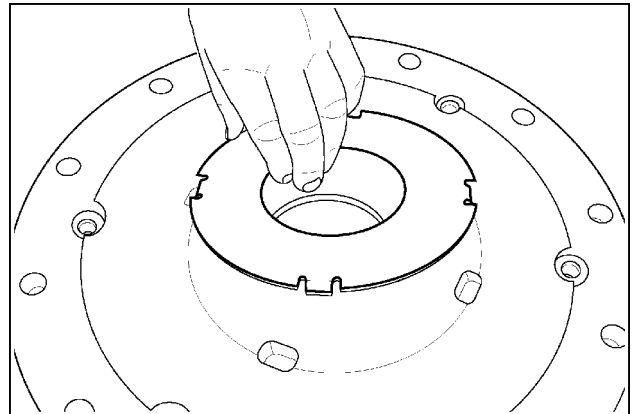
39. Starting with a steel separator plate, alternately install 4 separator plates and 3 friction plates. Be sure the slots in the ears of the separator plates engage the dowel pins.

NOTE: Soak the friction plates in clean operating fluid before installation.



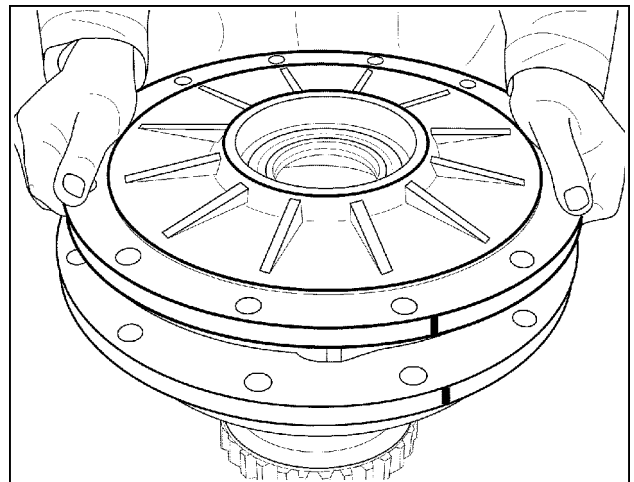
RCPH10FWD049ABJ 39

40. Lubricate the large thrust washer with clean assembly grease. Install the thrust washer into the cover (tab side down).



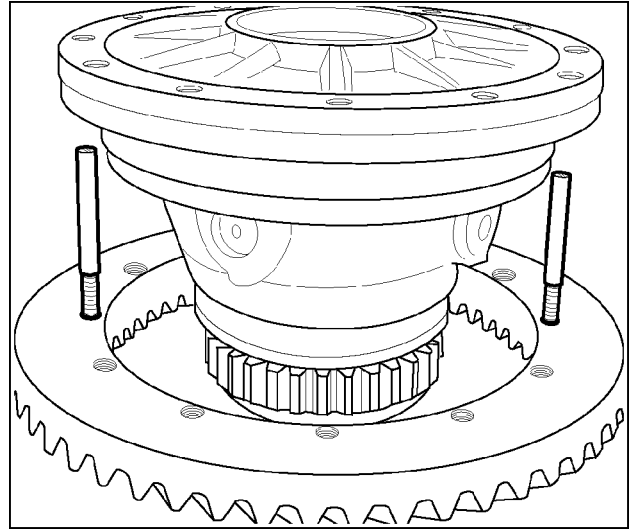
RCPH10FWD006ABJ 40

41. Install the cover on top of the case so that the match marks align.



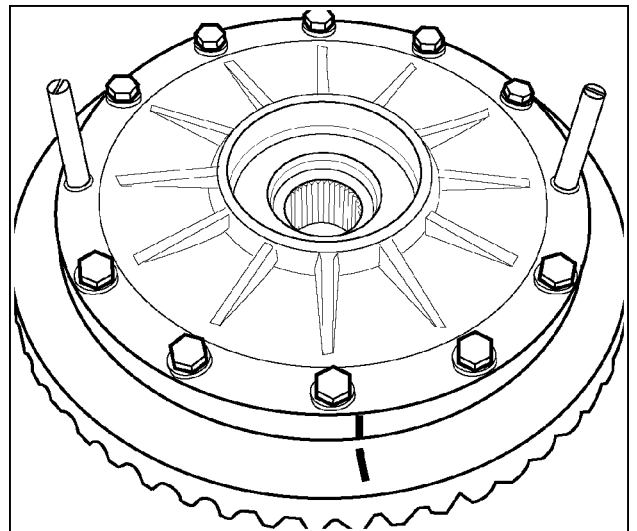
RCPH10FWD005ABJ 41

42. Put a light coat of oil around the inside diameter of the ring gear. Install two of the **CAS2496** alignment studs into opposite holes of the ring gear. Position the differential case over the ring gear.



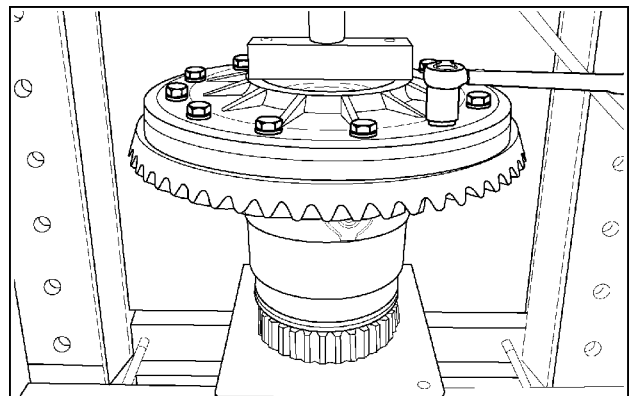
RCPH10FWD050ABJ 42

43. Position the ring gear on the differential case so the match marks align. Install new retaining bolts and washers.



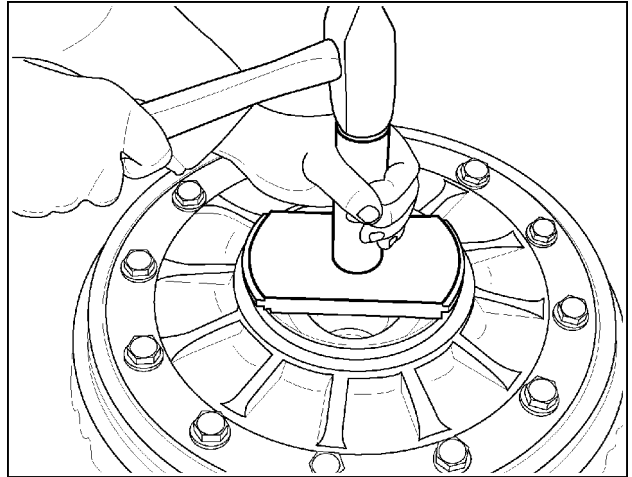
RCPH10FWD051ABJ 43

44. Clamp the differential assembly in a press. Tighten the retaining bolts alternately and evenly in small increments in a star pattern to a final torque of **285 – 319 N·m (210 – 235 lb ft)**.



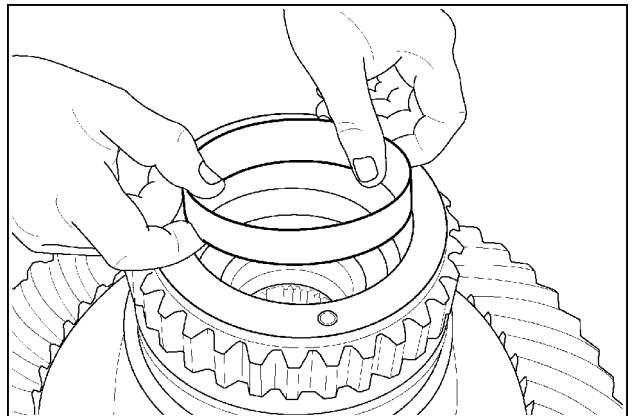
RCPH10FWD052ABJ 44

45. Use the CAS2500 bearing cup installer to install the bearing cup into the cover until fully seated.



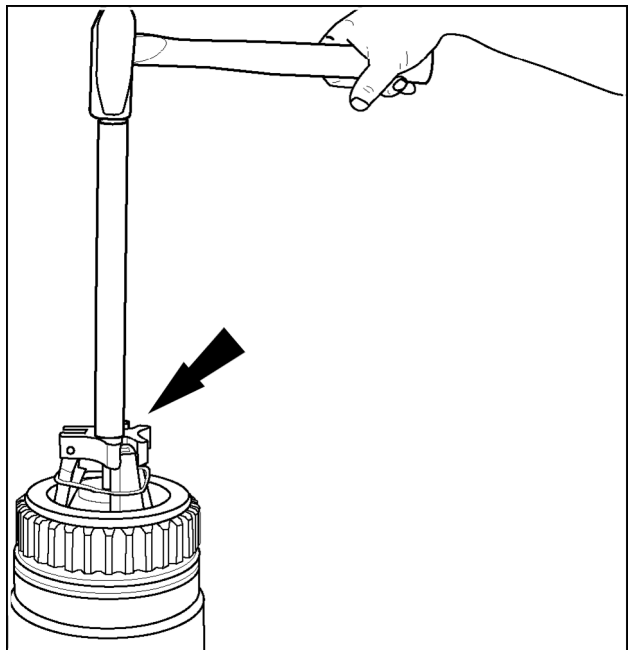
RCPH10FWD053ABJ 45

46. Position the bearing cup into the bore of the right hand case.



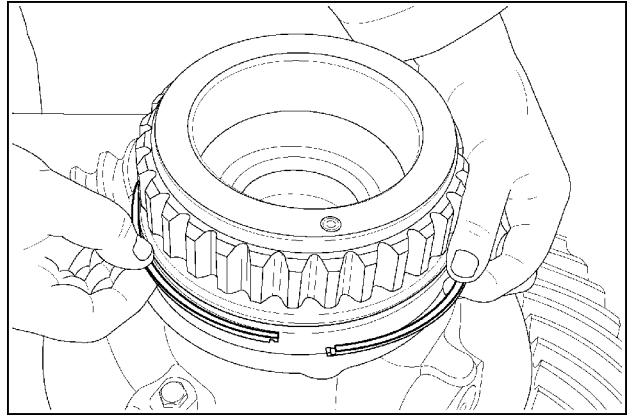
RCPH10FWD054ABJ 46

47. Use the universal bearing cup installer to install the bearing cup until seated.



RCPH10FWD055ABJ 47

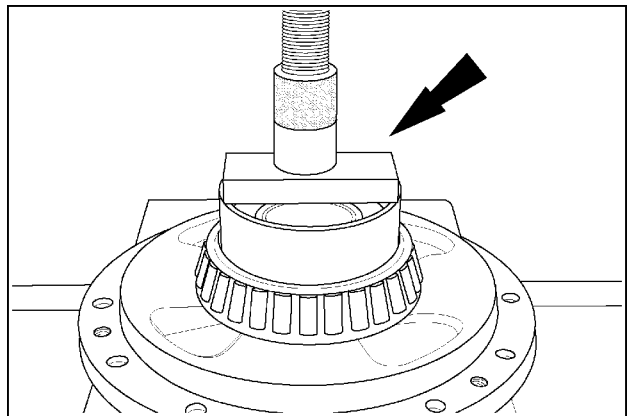
48. Install the Teflon seal ring in the groove of the hub. Lubricate the groove and the seal ring liberally with clean assembly grease. Be sure the ends of the seal ring are connected together.



RCPH10FWD002ABJ 48

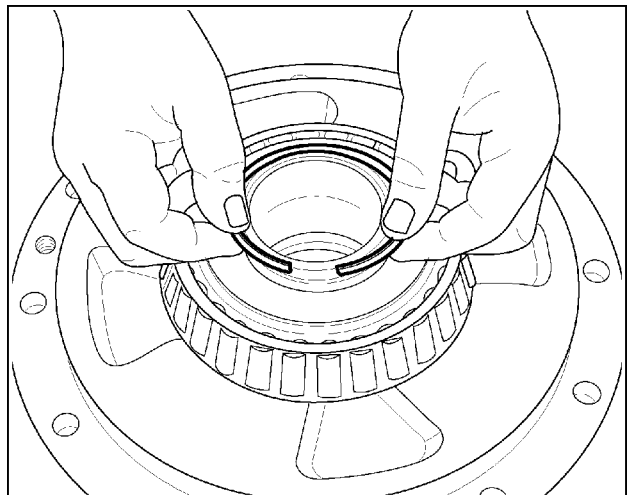
Left hand differential bearing support assembly

49. Use the **CAS2516** bearing installer and press to install the bearing cone until seated.



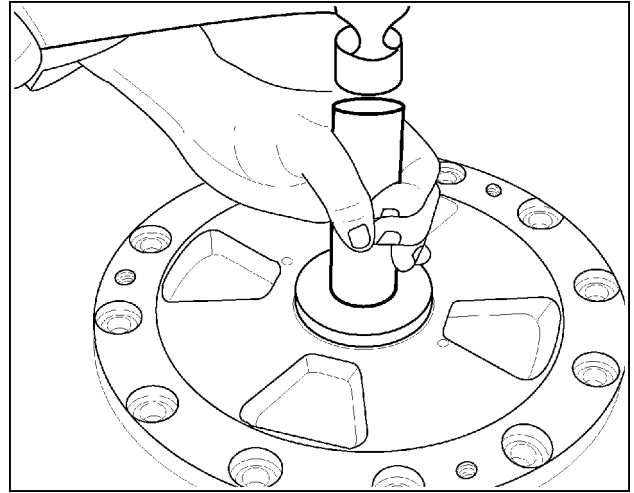
RCPH10FWD126ABJ 49

50. Lubricate and install a new seal ring in the groove of the bearing hub.



RCPH10FWD021ABJ 50

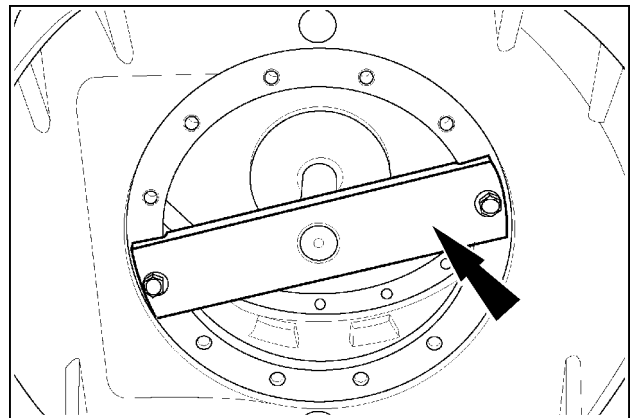
51. Use a seal driver to install a new oil seal into the bearing carrier. Install the seal retaining screws and washers.



RCPH10FWD095ABJ 51

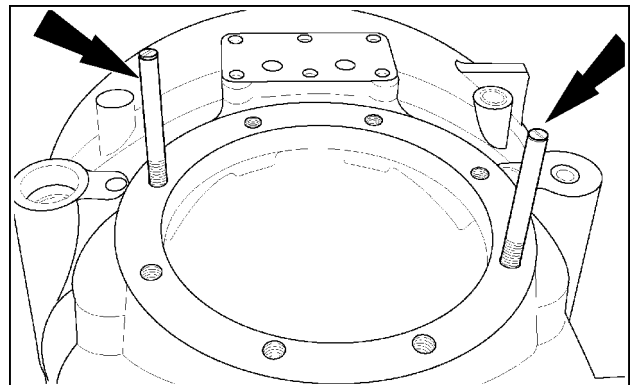
Adjusting bevel pinion gear depth

52. Install the **CAS2506** pinion depth gauge arbor into the bore for the left hand bearing support. Use two of the bearing support retaining bolts and washers. Tighten the bolts to a torque of **47 – 54 N·m (35 – 40 lb ft)**



RCPH10FWD096ABJ 52

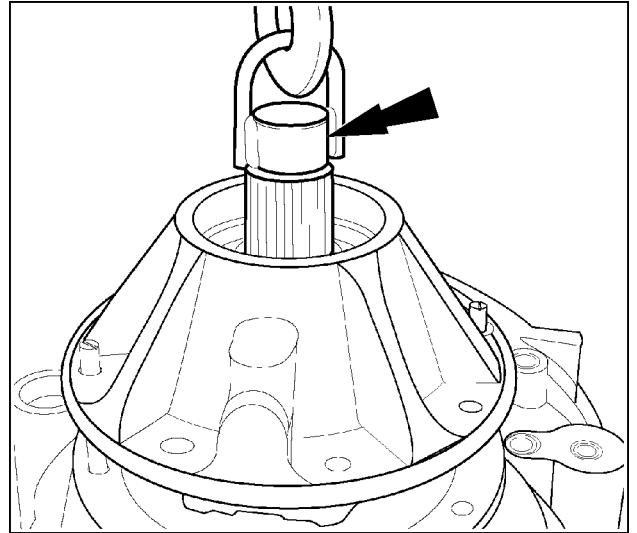
53. Install two of the **CAS2496** alignment studs opposite each other into the mounting flange.



RCPH10FWD097ABJ 53

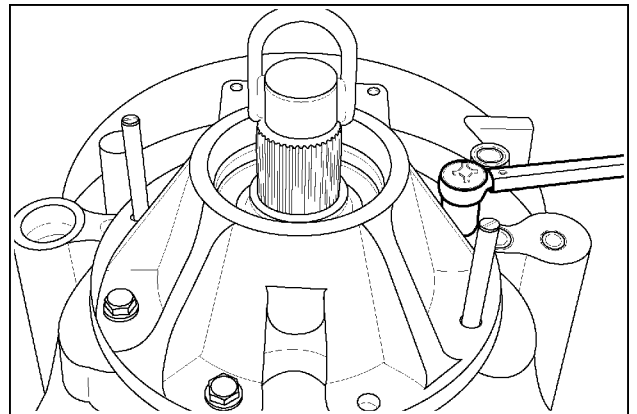
54. Use the CAS2494 lifting eye to install the pinion carrier assembly into the housing.

NOTE: Do not install the shims at this time.



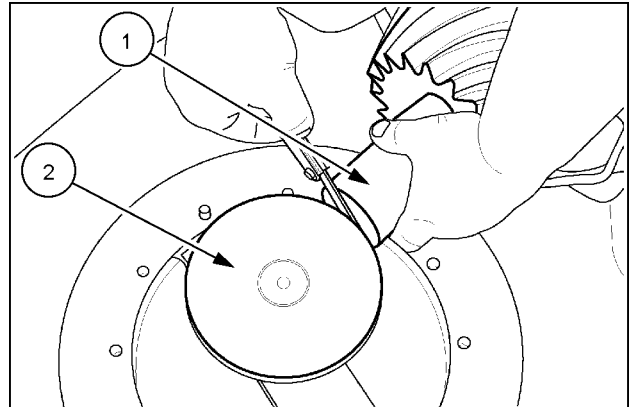
RCPH10FWD081ABJ 54

55. Install four equally spaced carrier assembly retaining bolts and washers. Tighten the bolts to a torque of **89 – 100 N·m (66 – 74 lb ft)**.



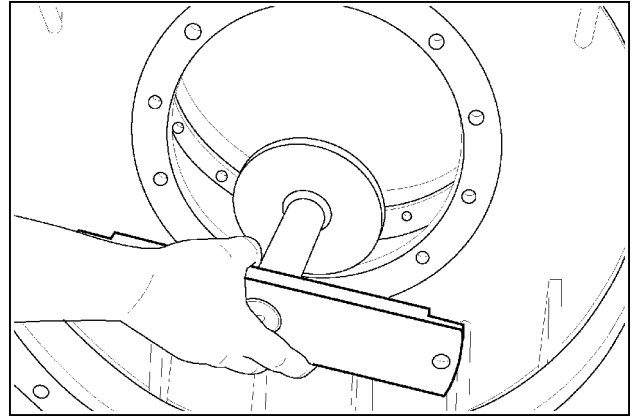
RCPH10FWD098ABJ 55

56. Install the CAS1675-2 gauge block (1) between the pinion and Arbor (2) with the hole end of the gauge block held tightly against the end of the pinion. Use a feeler gauge to measure and record the distance between the end of the gauge block and arbor.



RCPH10FWD099ABJ 56

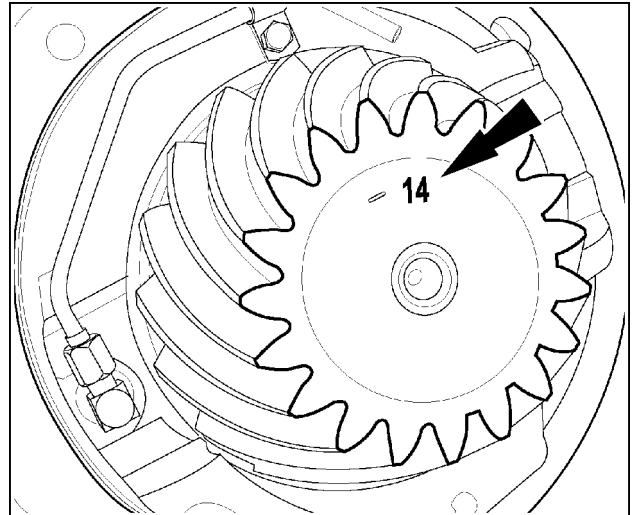
57. Remove the pinion carrier retaining bolts and lift the pinion carrier assembly from the housing. Remove the **CAS2506** arbor.



RCPH10FWD100ABJ 57

58. A correction factor number is etched onto the head end of the pinion. This number will be shown as a plus or minus adjustment in hundredths of a millimeter. Add or subtract this number from the standard nominal pinion depth dimension.

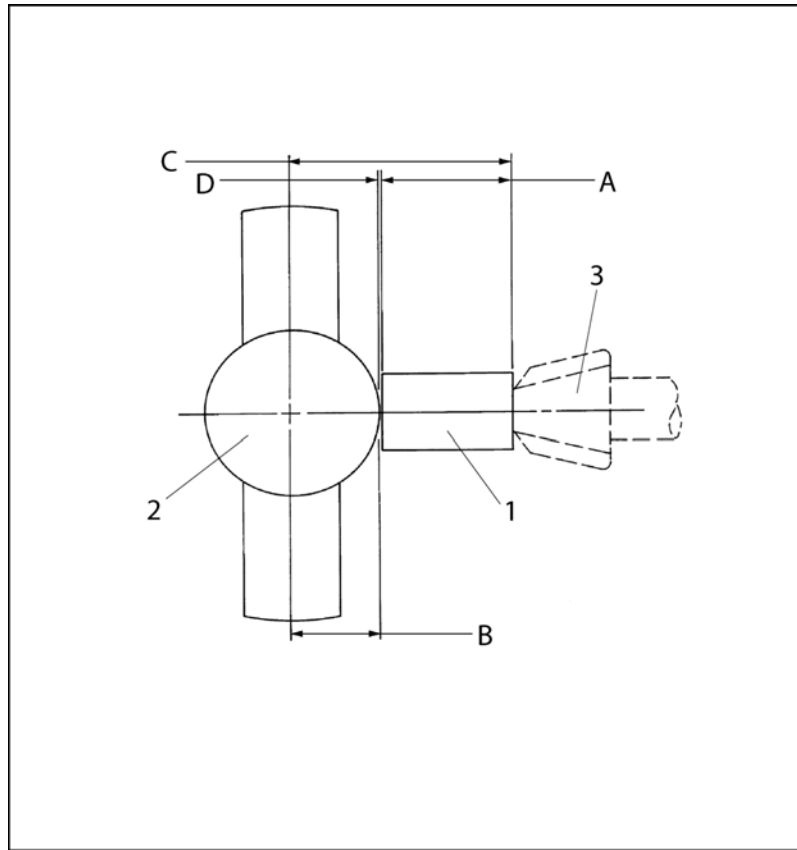
NOTE: The standard nominal mounting distance for the bevel pinion gear is **175.22 mm (6.90 in)** measured from the head end of the pinion gear to the center line of the differential



RCPH10FWD101ABJ 58

59. Select a shim combination that will provide the shim requirement calculated in the next step. Shim requirement should be within **0.03 mm (0.001 in)**.

60. Use the following table and example to calculate the pinion depth shim requirements



RCPH10FWD120FBJ 59

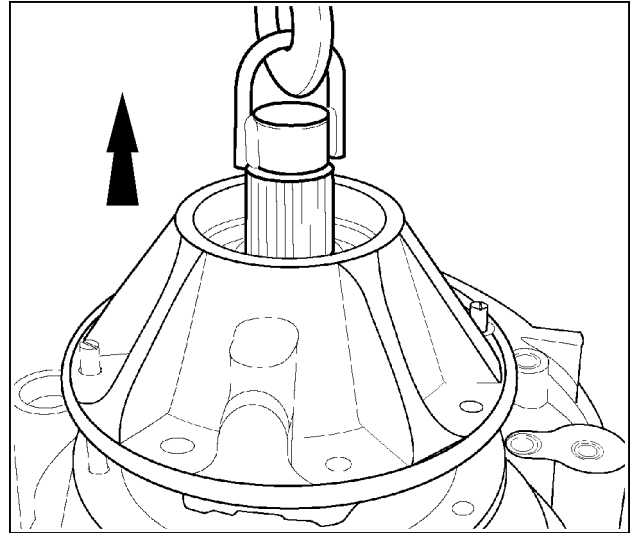
(1) CAS2506 Pinion depth gauge arbor, (2) CAS1675-2 Pinion depth gauge block, (3) Pinion

Item	Metric value	U.S. value
A	97.99 mm	3.858 in
B	75.82 mm	2.985 in
C	174.25 mm	6.860 in
D Gap measurement	.44 mm	0.017 in

Example:

Item	Metric value	U.S. value
Tool constant dimension (A = B)	173.81 mm	6.840 in
Gap measurement (D)	.44 mm	0.017 in
Total measured distance (A + B + D = C)	174.25 mm	6.860 in
Standard nominal pinion depth	175.22 mm	6.898 in
Reading on the pinion	-0.14 mm	0.005 in
Actual nominal pinion depth	175.08 mm	6.892 in
Minus total measured distance	174.25 mm	6.860 in
Shim requirement	0.83 mm	0.032 in

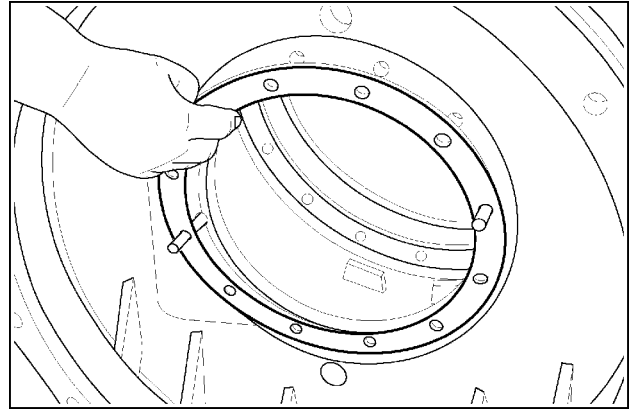
61. After pinion shim placement, remove the pinion carrier assembly.



RCPH10FWD081ABJ 60

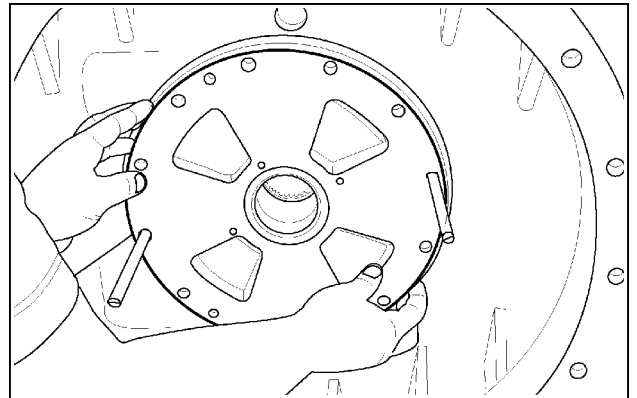
Setting differential carrier bearing preload

62. Install two CAS2479 guide bolts into opposite holes of the left hand side bearing carrier bore. Install the original bearing preload shim pack over the guide bolts so that all holes align.



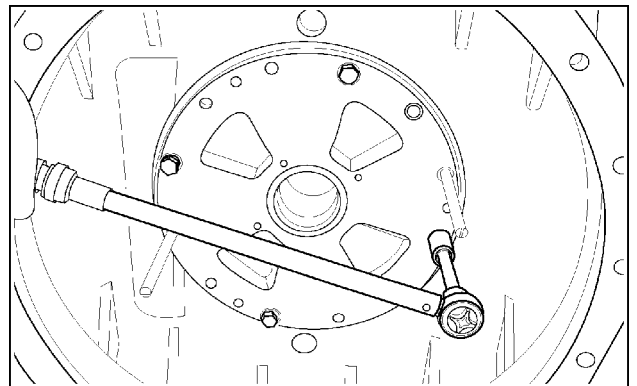
RCPH10FWD104ABJ 61

63. Install the pre-assembled left hand side bearing carrier into the housing.



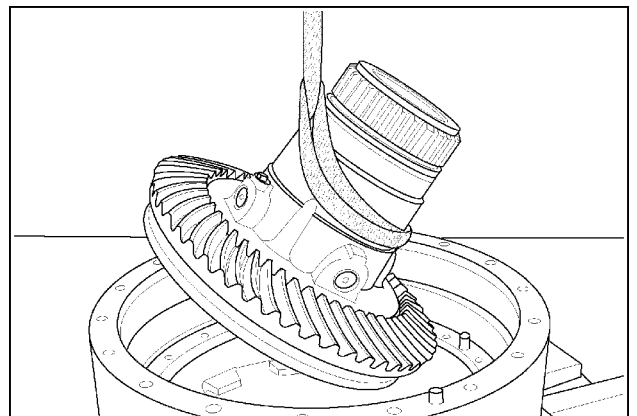
RCPH10FWD105ABJ 62

64. Remove the guide studs and install four equally spaced retaining bolts with washers. Tighten the bolts to the specified torque.



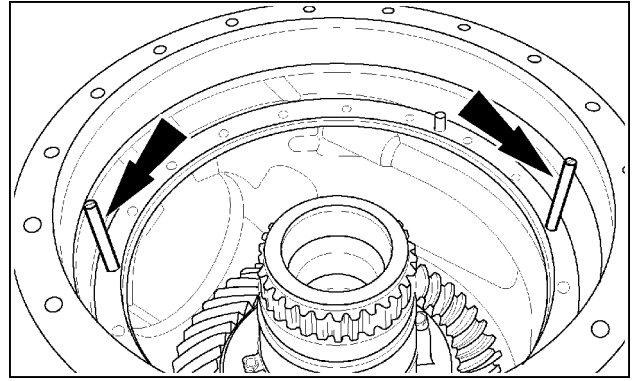
RCPH10FWD106ABJ 63

65. Rotate the differential housing so the right hand side is up. Use a hoist to slowly and carefully install the differential assembly into the housing to engage the left hand side bearing support.



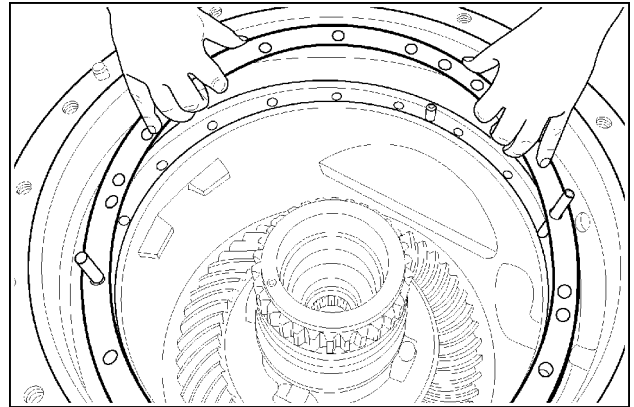
RCPH10FWD107ABJ 64

66. Install two **CAS2675** alignment studs into opposite holes of the housing.



RCPH10FWD108ABJ 65

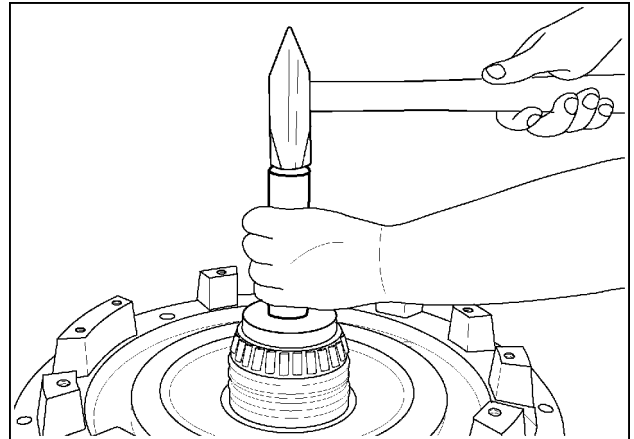
67. Install the original shim pack for the brake carrier and bearing support over the alignment studs so that all holes align.



RCPH10FWD973AAJ 66

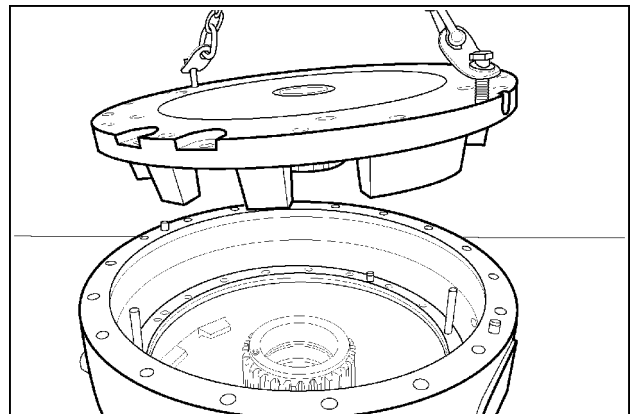
68. If required, Install the bearing cone (large side down) onto the hub of the brake carrier. Use CAS2671 brake carrier bearing cone installer to drive the bearing cone onto the hub until seated.

NOTE: The brake discs and seals are not installed in the brake carrier during the bearing preload procedures.



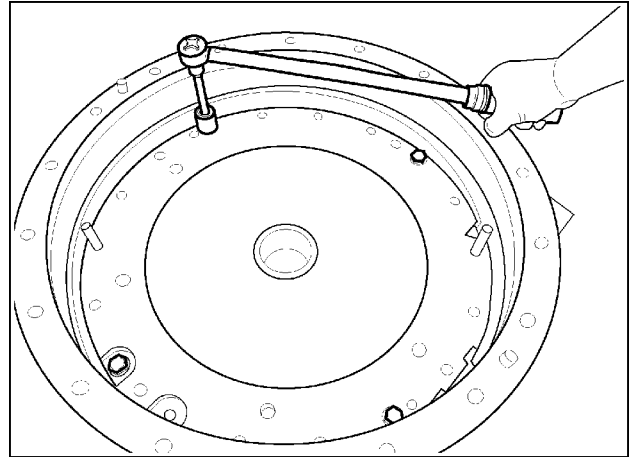
RCPH10FWD056ABJ 67

69. Use a hoist to carefully install the brake carrier into the housing so that the marks, put on during disassembly, align.



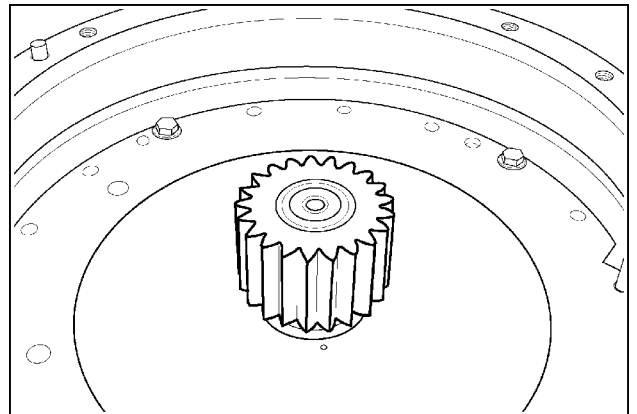
RCPH10FWD075ABJ 68

70. Install four of the carrier retaining bolts with washers 90 degrees from each other. Tighten the bolts evenly to the specified torque.



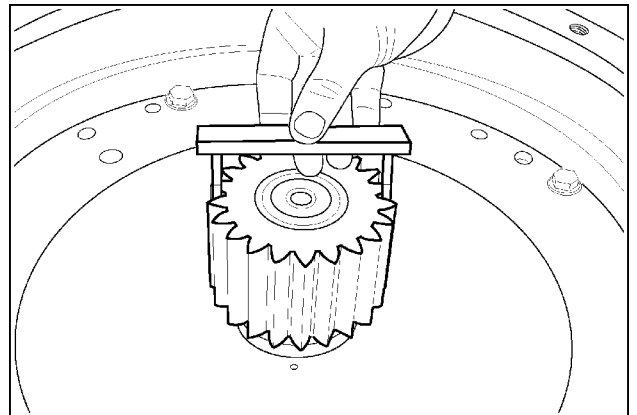
RCPH10FWD109ABJ 69

71. Install the right hand axle sun gear shaft into the differential.



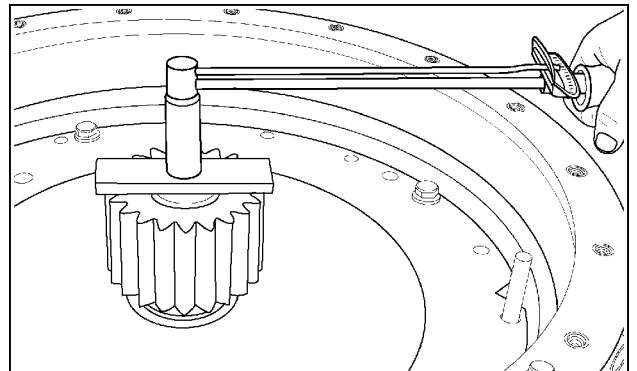
RCPH10FWD110ABJ 70

72. Install the **CAS2674** differential rolling torque adapter over the gear to engage two opposite splines.



RCPH10FWD111ABJ 71

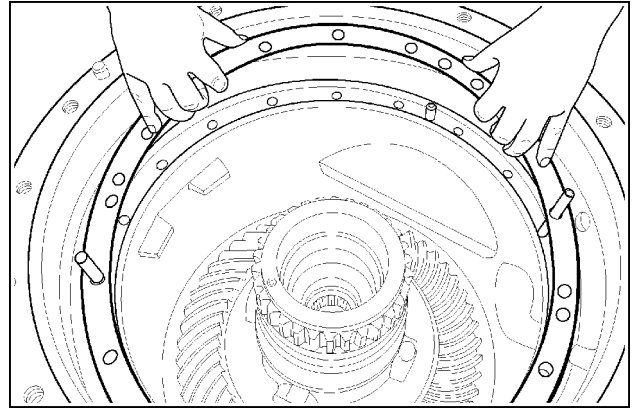
73. Connect a torque wrench to the adapter. Rotate the differential and measure the differential carrier bearing rolling torque. Bearing preload will be correct when **6 – 13 N·m (4 – 10 lb ft)** of smooth and consistent rolling torque is measured on the torque wrench.



RCPH10FWD112ABJ 72

74. If differential bearing preload is out of tolerance, add or remove shims as required from the right hand and/or left hand bearing support shim pack until bearing preload is correct.

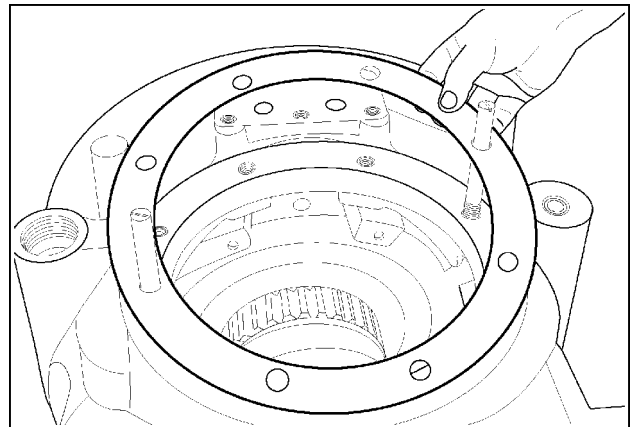
NOTE: Adjust used bearings to the low end of the rolling torque specifications.



RCPH10FWD973AAJ 73

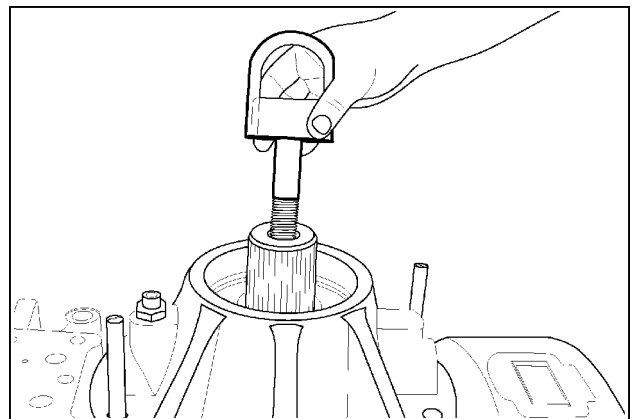
Setting ring/pinion gear backlash

75. After adjusting differential carrier bearing preload correctly, rotate the housing so the pinion carrier will be on top. Install two **CAS2496** alignment studs opposite each other and install the pinion carrier shim pack previously assembled.



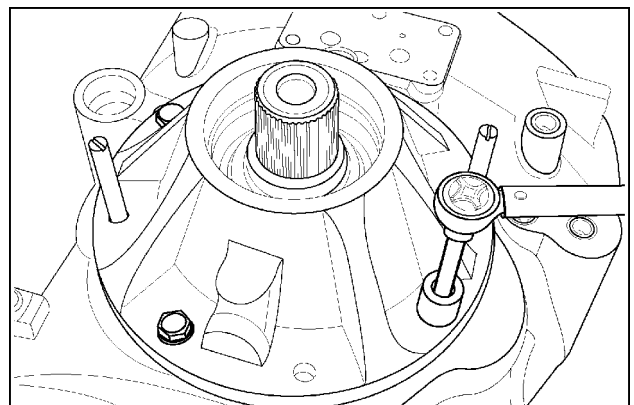
RCPH10FWD959AAJ 74

76. Install the pinion carrier assembly into the housing and remove the lifting eye.



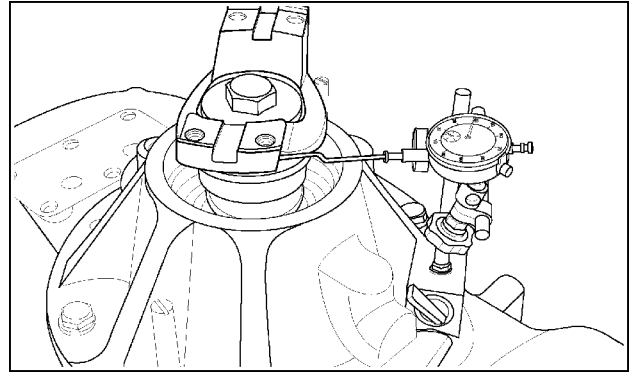
RCPH10FWD113ABJ 75

77. Install four pinion carrier retaining bolts and washers equally spaced. Tighten the four bolts to the specified torque.



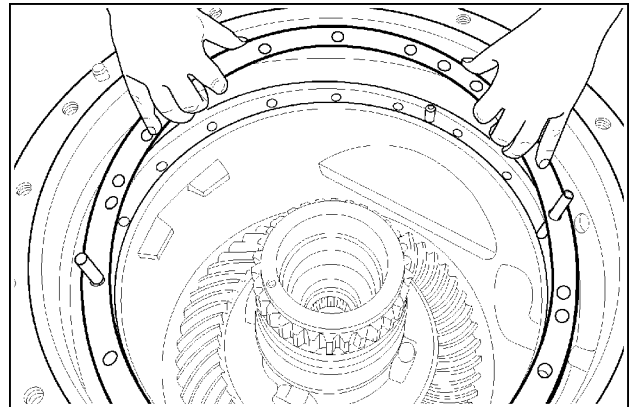
RCPH10FWD114ABJ 76

78. Install the drive yoke on the pinion gear. Use a dial indicator to measure ring/pinion gear backlash. Set the pointer of the dial indicator to contact the outer edge of the drive yoke flange. Rotate the pinion gear in either direction to achieve full contact with the ring gear. Do not move the ring gear. Zero the dial indicator. Rotate the pinion gear in the opposite direction to achieve full contact with the ring gear. Do not move the ring gear. Record the dial indicator reading. Perform this operation two or three times to ensure an accurate measurement. The backlash must be **0.2 – 0.3 mm (0.008 – 0.012 in)**.



RCPH10FWD115ABJ 77

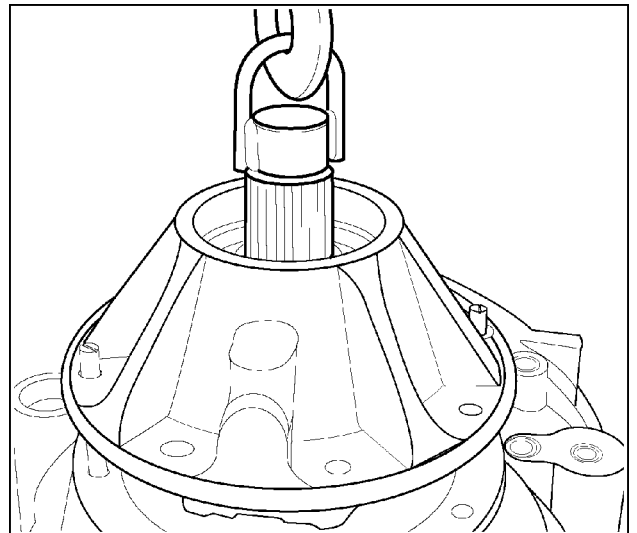
79. If too much backlash was measured, the ring gear must be moved closer to the pinion gear. If too little backlash was measured, the ring gear must be moved away from the pinion gear. To adjust the ring and pinion gear backlash, remove shims from one side of the differential and add the same amount to the other side so that differential carrier bearing preload is maintained. Moving a **0.254 mm (0.010 in)** shim from one side to the other will change the backlash approximately **0.169 mm (0.0067 in)**.



RCPH10FWD973AAJ 78

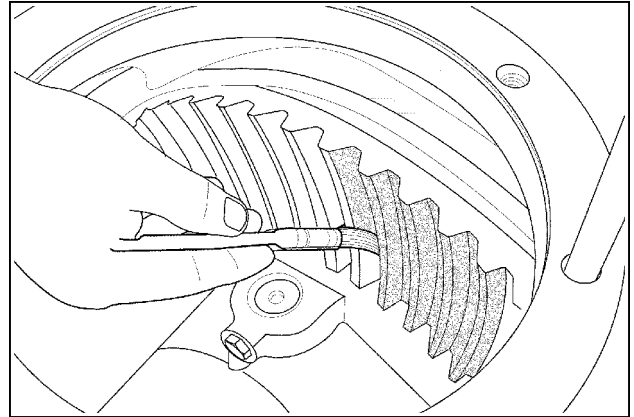
Checking for correct bevel pinion/gear tooth contact

80. After differential bearing preload and ring/pinion gear backlash adjustments have been completed, remove the pinion carrier.



RCPH10FWD081ABJ 79

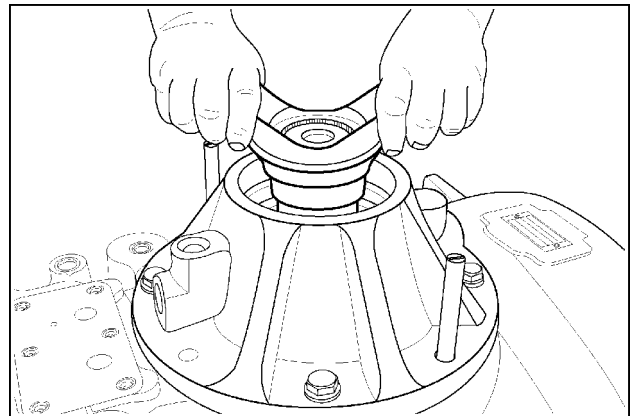
81. Put Prussian Blue or red lead on the convex side of several ring gear teeth.



RCPH10FWD116ABJ 81

82. Reinstall the pinion gear carrier and tighten the retaining bolts to the specified torque. Turn the pinion several revolutions in both directions to determine the tooth contact pattern. Remove the pinion carrier.

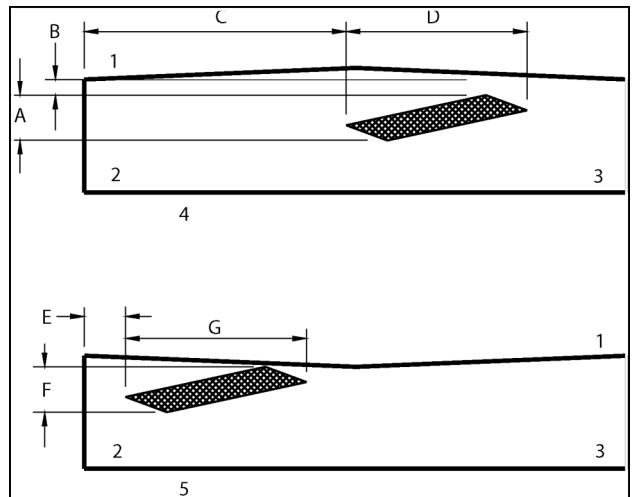
NOTE: See the contact patterns in the following illustrations. The contact pattern of the gear teeth that are shown are approximate shapes. Tooth contact pattern can change from the illustrations.



RCPH10FWD117ABJ 81

83. Inspect the contact pattern of the gear teeth. Compare the contact pattern with the following illustrations and tables, for both the right hand (rear) and the left hand (front) pinion sets, and determine the correct tooth contact pattern.

Right hand (rear) pinion set contact pattern:



RCPH10FWD122FBJ 82

Correct tooth contact pattern: right hand (rear) pinion set

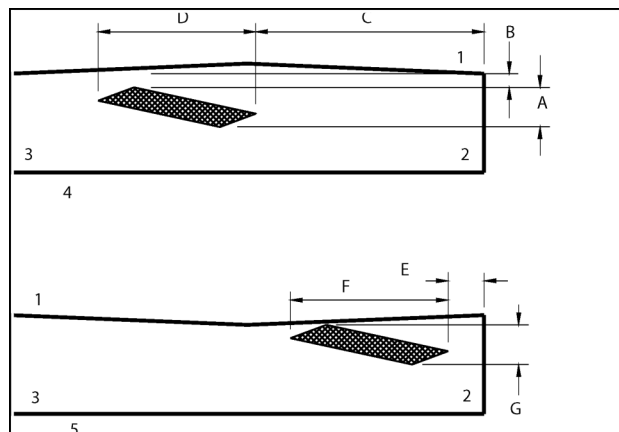
Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	6 – 9 mm	0.236 – 0.354 in
B	3 – 5 mm	0.118 – 0.197 in

Item	Metric value	U.S. value
C	30 – 35 mm	1.181 – 1.378 in
D	35 – 40 mm	1.378 – 1.575 in
E	10 – 15 mm	0.394 – 0.591 in
F	6 – 8 mm	0.236 – 0.315 in
G	35 – 40 mm	1.378 – 1.575 in

Left hand (front) pinion set contact pattern:



RCPH10FWD121FBJ 83

Correct tooth contact pattern: left hand (front) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	5 – 8 mm	0.197 – 0.315 in
B	2 – 4 mm	0.079 – 0.157 in
C	30 – 35 mm	1.181 – 1.378 in
D	40 – 45 mm	1.575 – 1.772 in
E	10 – 15 mm	0.394 – 0.591 in
F	35 – 40 mm	1.378 – 1.575 in
G	6 – 8 mm	0.236 – 0.315 in

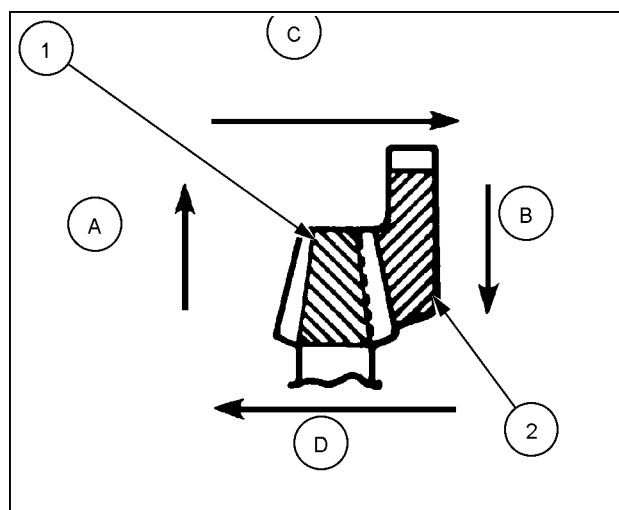
82. Adding or subtracting pinion carrier shims to change pinion depth must be done in small increments until the correct tooth contact pattern is obtained.

(A) Move the Drive Pinion (1) towards the ring gear (2) to move the contact pattern away from the Toe.

(B) Move the drive pinion away from the ring gear to move the contact pattern towards the Toe.

(C) Move the ring gear away from the drive pinion to increase backlash.

(D) Move the ring gear towards the drive pinion to decrease backlash.

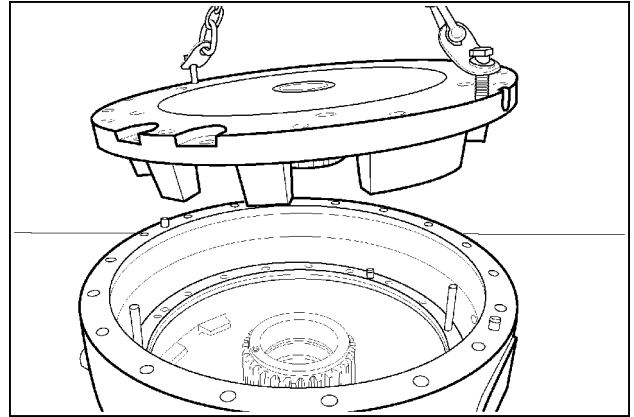


RCPH10FWD123FBJ 84

NOTICE: If differential carrier bearing preload, or ring gear and beveled pinion adjustment is required, do not install the hub seals or brakes at this time. make the proper shim adjustments as described. When adjustments are completed or not required, proceed to the brake carrier assembly procedure.

Right hand brake carrier assembly procedures

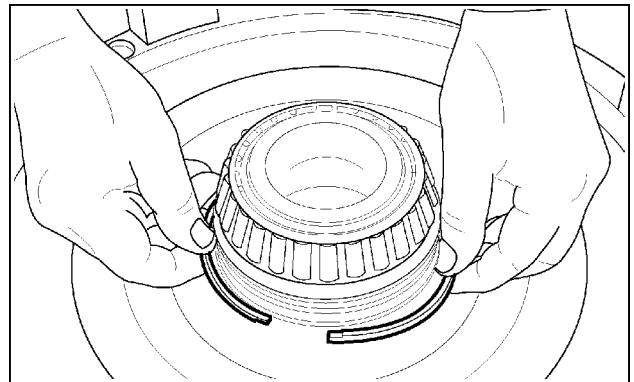
83. After the pinion/gear tooth contact procedure has been completed, remove the brake carrier, with bearing installed, from the differential housing.



RCPH10FWD075ABJ 85

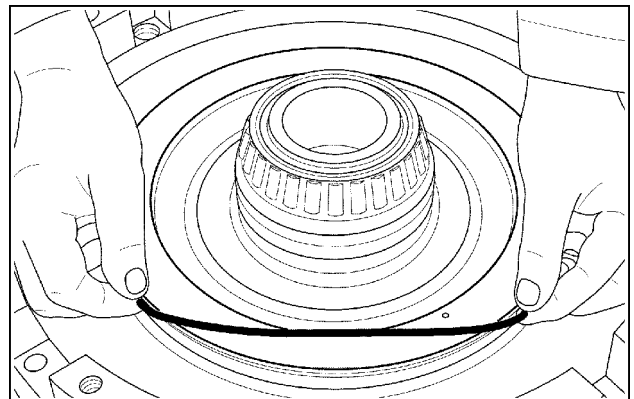
84. Lubricate new hub seal rings liberally with clean grease. Install the two seal rings into the grooves in the hub of the carrier. Be sure the seal ends are lapped together and seals are compressed into the grooves as tightly as possible.

NOTE: Place the ends of each seal ring opposite each other.



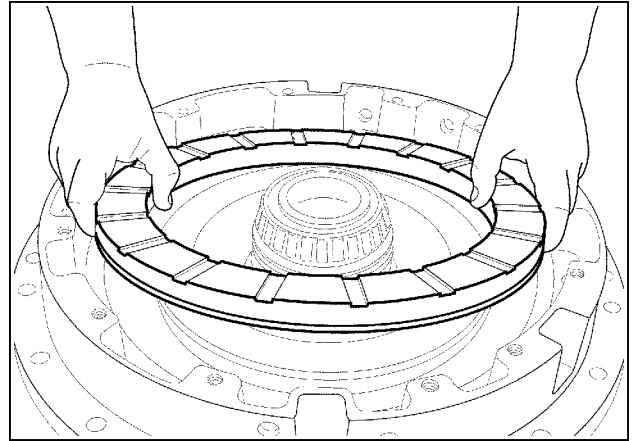
RCPH10FWD057ABJ 86

85. Lubricate a new O-ring for the inside diameter of the service brake piston with clean grease. Install the O-ring in the groove of the carrier. Be sure the O-ring is not twisted.



RCPH10FWD058ABJ 87

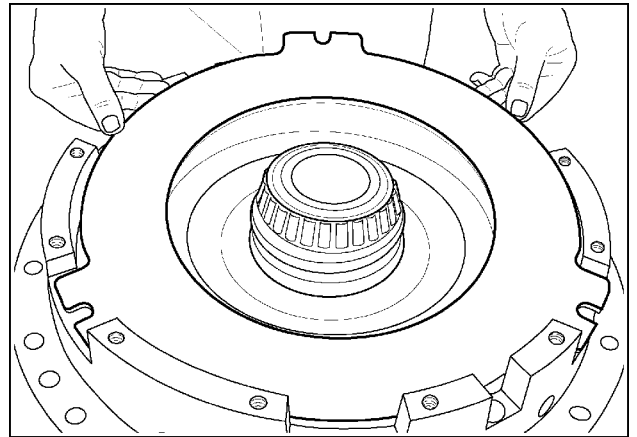
86. Lubricate a new O-ring for the outside diameter of the service brake piston. Install the O-ring in the groove of the piston. Be sure the O-ring is not twisted. Carefully position the piston (flat side up) into the recessed bore of the carrier. Hand seat the piston squarely into the bore.



RCPH10FWD125ABJ 88

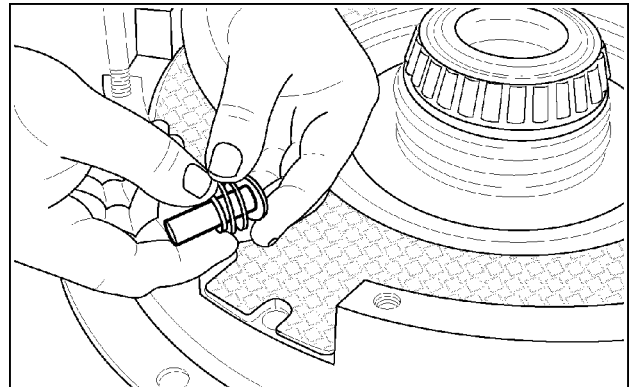
87. Install the brake return plate over the service brake piston aligning the ear tabs with the slots in the support carrier.

NOTE: The brake return plate has holes in the ear tabs.

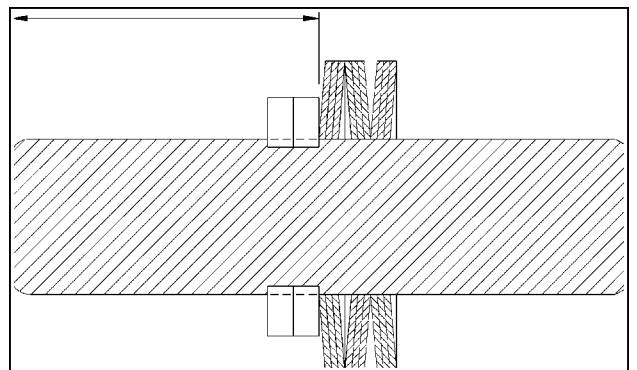


RCPH10FWD986AAJ 89

88. Install the belleville spring washers on the brake adjuster pins. Slide 3 nested washers onto each pinup against the snap rings. Slide 3 nested washers on each pin in the opposing direction followed by 3 more nested washers in an opposing direction for a total of 9 belleville spring washers on each pin.

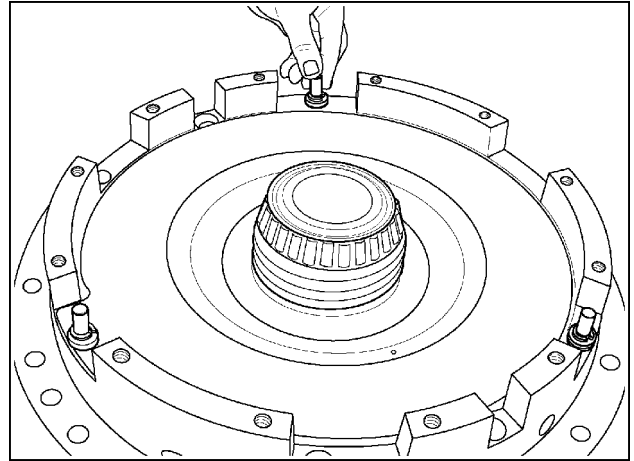


RCPH10FWD059ABJ 90



RCPH10FWD060ABJ 91

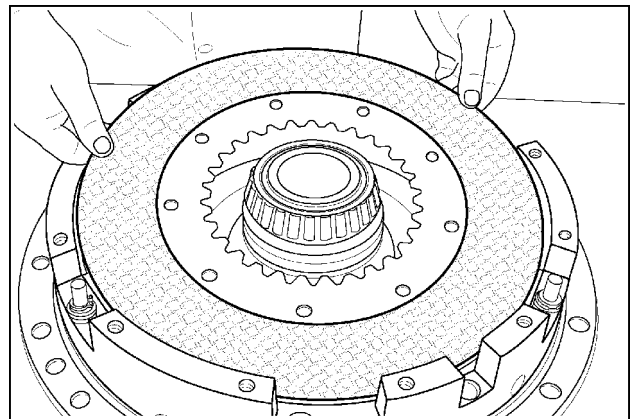
89. Place one pin with washers in each of the holes in the carrier. Be sure the spring washers are seated against the brake return plate and the shorter tapered end of the pin is pointed upwards.



RCPH10FWD061ABJ 92

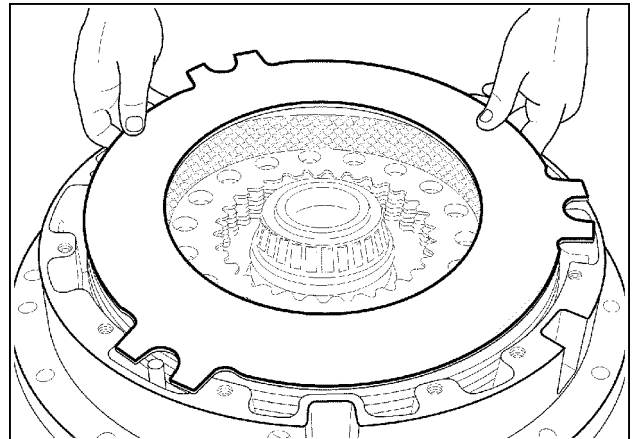
90. Lubricate all friction plates with clean operating fluid. Install the first friction plate over the brake return plate.

NOTE: Align the friction plate oil cross holes.



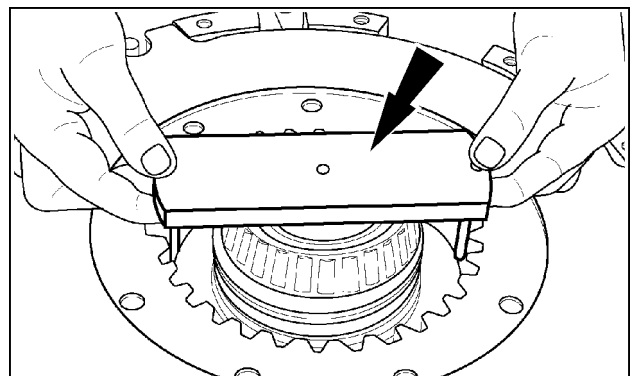
RCPH10FWD984AAJ 93

91. Install a steel separator plate over the first friction plate. Repeat the steps for remaining plates, alternating the friction and separator plates.



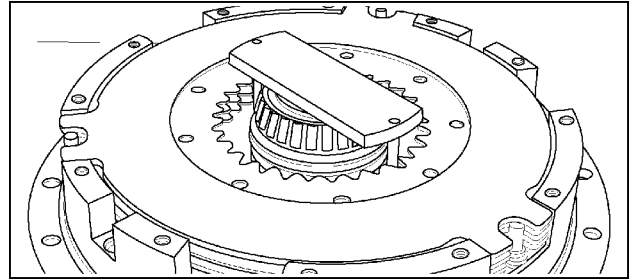
RCPH10FWD127ABJ 94

92. When all the steel separator plates and the friction plates are installed, use the **CAS2505** brake disc alignment tool to align the splines of all the plates.



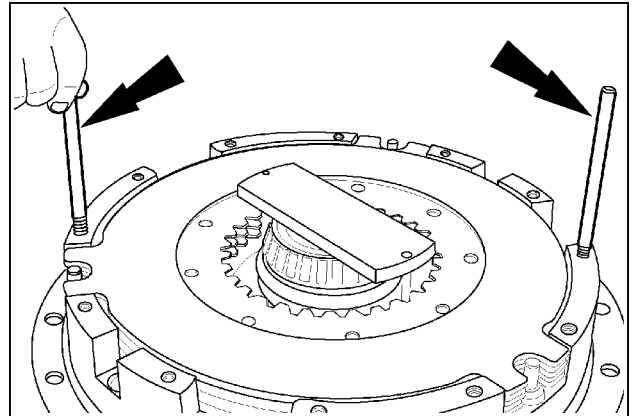
RCPH10FWD063ABJ 95

93. When the brake plates are correctly aligned, the pilot on the bottom of the tool plate must nest in the hub of the carrier as shown.



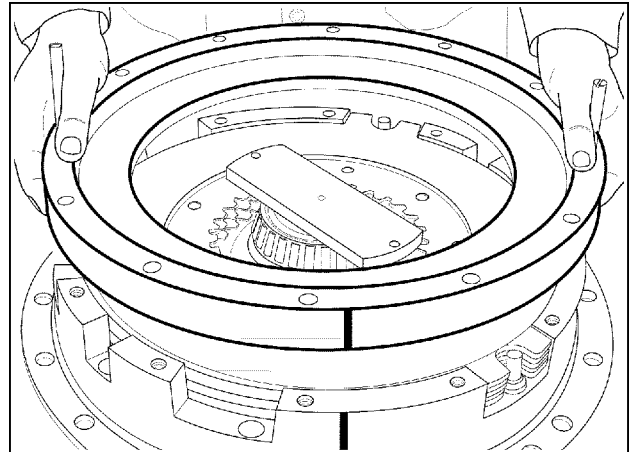
RCPH10FWD064ABJ 96

94. Install the two CAS2479 guide studs into opposite holes of the support carrier.



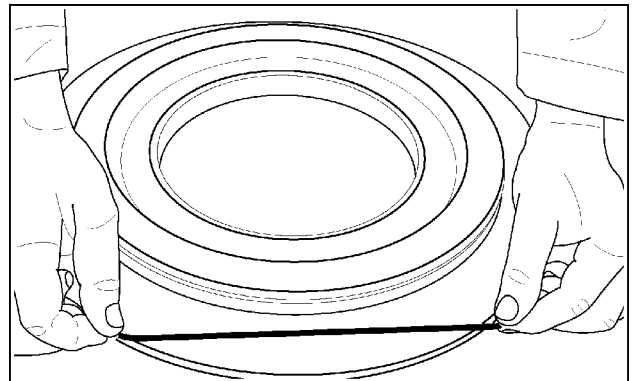
RCPH10FWD065ABJ 97

95. Install the park brake backing plate (recessed side up) over the guide studs so that the assembly match marks align.



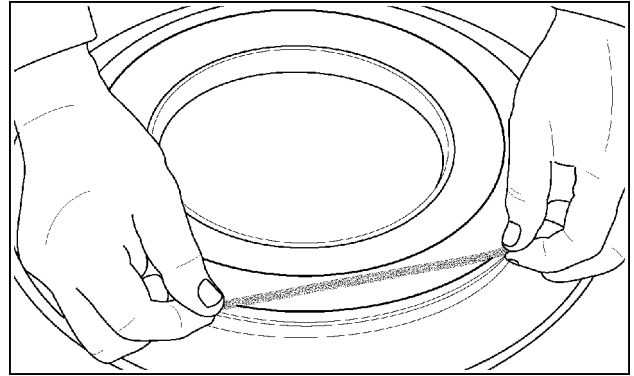
RCPH10FWD066ABJ 98

96. Lubricate and install a new O-ring for the large outside diameter of the park brake piston. Be sure the O-ring is not twisted.



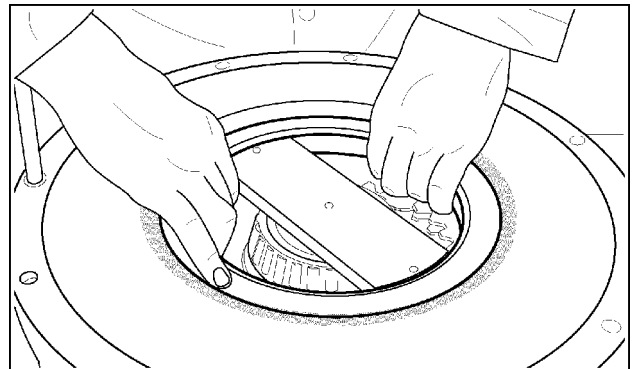
RCPH10FWD067ABJ 99

97. Lubricate and install a new O-ring in the groove of the smaller outside diameter of the piston. Be sure the O-ring is not twisted.



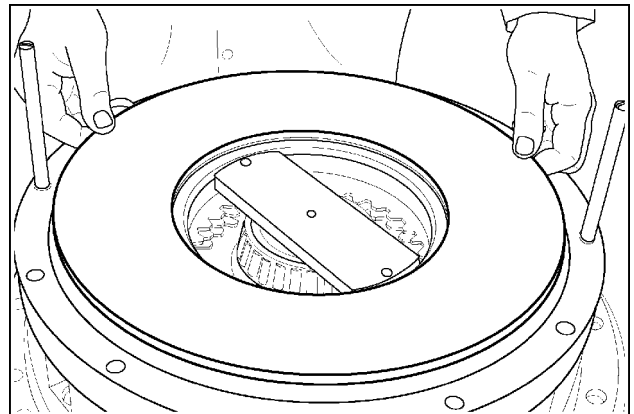
RCPH10FWD068ABJ 100

98. Lubricate the outside and inside diameters of the piston liberally with clean assembly grease. Hand seat the piston squarely into the bore of the backing plate.



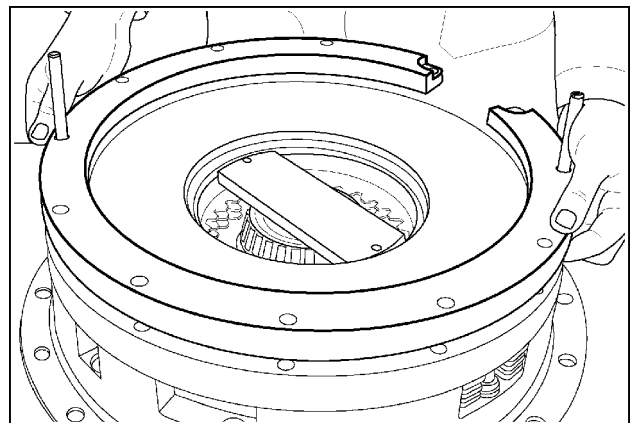
RCPH10FWD069ABJ 101

99. Install the large belleville spring with the cone side down on top of the park brake piston.



RCPH10FWD070ABJ 102

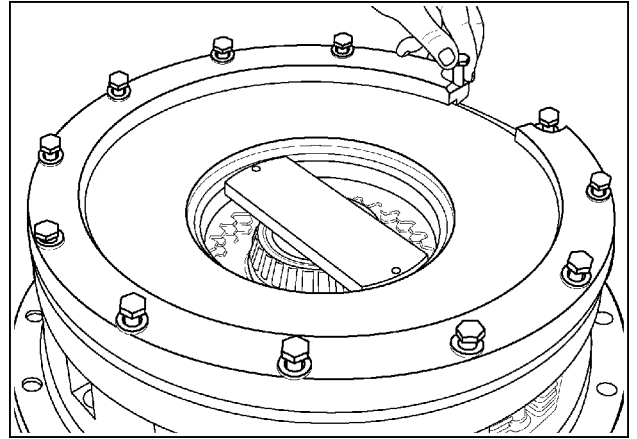
100. Install the retainer ring over the belleville spring.



RCPH10FWD071ABJ 103

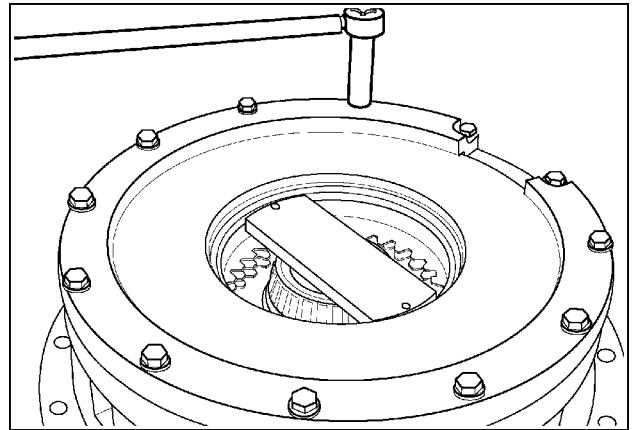
101. Install and hand start the 12 bolts with washers to engage the threads.

NOTE: The two shorter length bolts must be installed in the end holes of the ring.



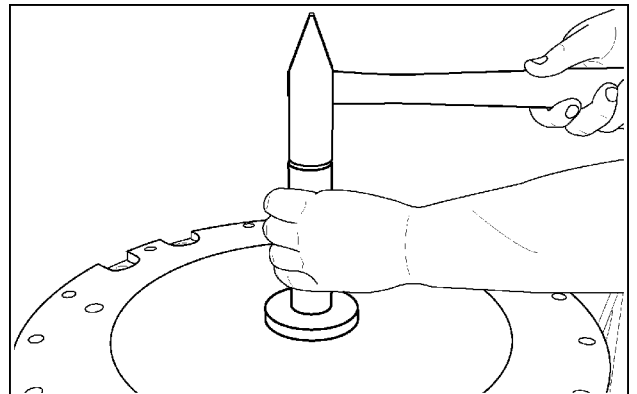
RCPH10FWD072ABJ 104

102. After all bolts have contacted the retainer ring, starting with an end bolt, tighten each bolt in sequence one full turn and repeat until the ring has seated on the backing plate. Tighten the bolts to the specified torque. Remove the Brake Disc Alignment Tool.



RCPH10FWD073ABJ 105

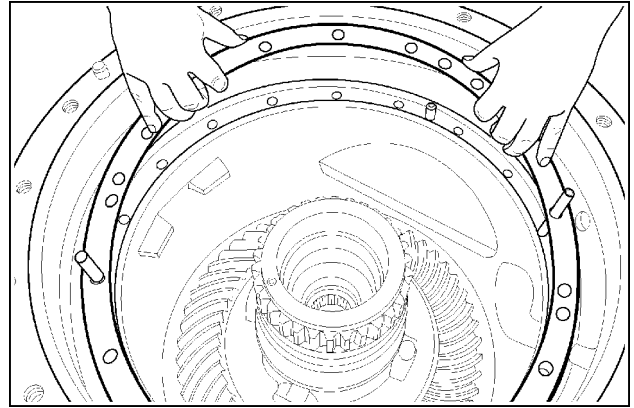
103. Turn the brake carrier assembly over and install the seal in the carrier. Install the seal retaining screws and washers.



RCPH10FWD074ABJ 106

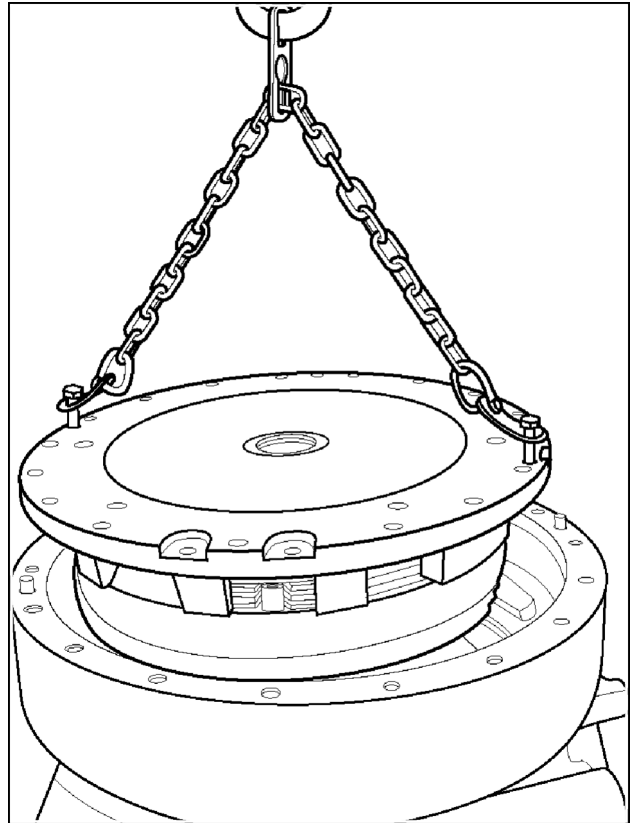
Brake carrier/bearing support installation

106. Using the **CAS2675** guide studs, install the pre-selected shim pack for the brake support carrier so that all holes align.



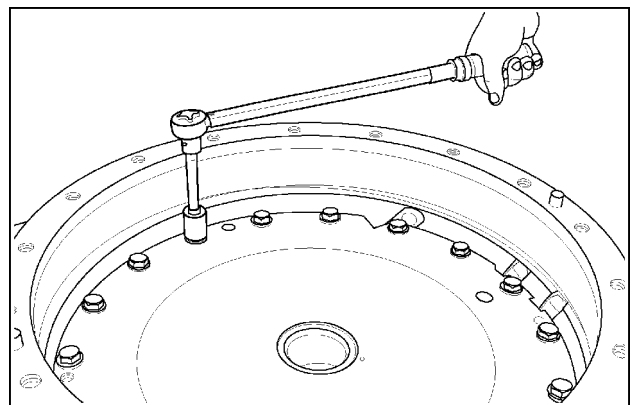
RCPH10FWD973AAJ 107

107. Use a hoist to carefully align and install the brake carrier assembly into the differential housing. Be sure the assembly marks are aligned.



RCPH10FWD972AAJ 108

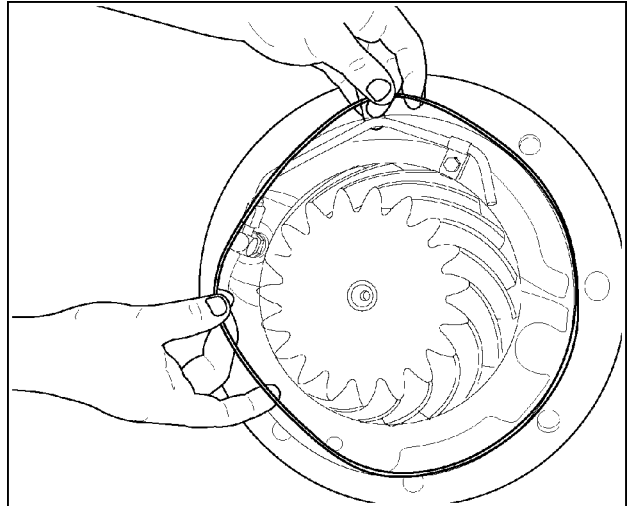
108. Remove the guide studs. Install the brake carrier retaining bolts and washers. Tighten the bolts to the specified torque.



RCPH10FWD078ABJ 109

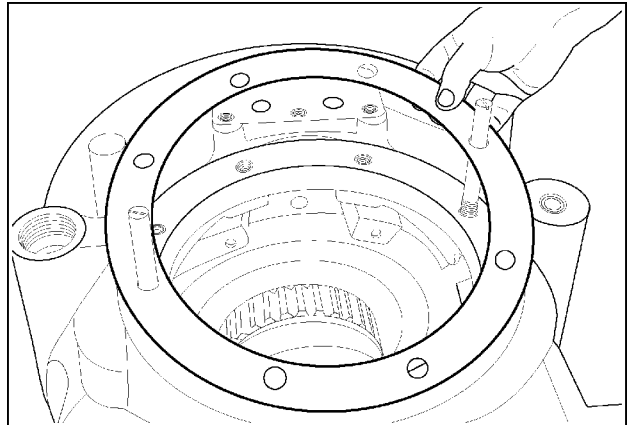
Pinion carrier assembly installation

109. Lubricate and install a new O-ring in the groove around the mounting flange of the pinion carrier. Be sure the O-ring is not twisted.



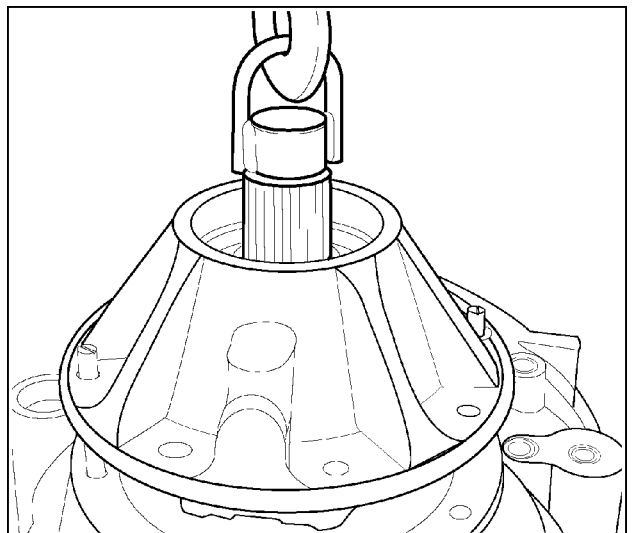
RCPH10FWD079ABJ 110

110. Use two **CAS2496** alignment studs, install the pre-selected pinion carrier shim pack.



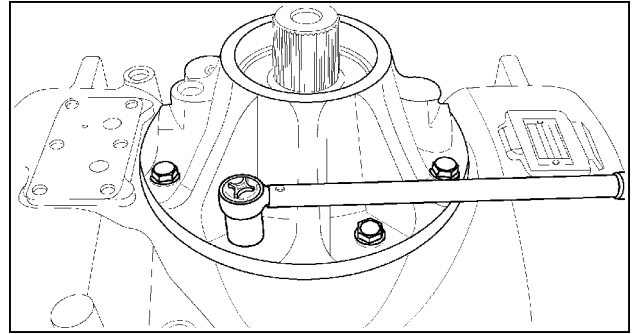
RCPH10FWD959AAJ 111

111. Use the CAS2494 lifting eye to install the pinion carrier assembly into the differential housing. Be sure the assembly marks align.



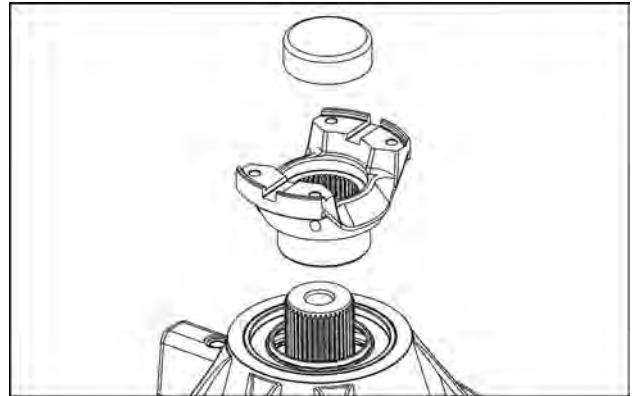
RCPH10FWD081ABJ 112

112. Remove the guide studs and lifting eye, install the pinion carrier retaining bolts and washers. Torque the pinion carrier bolts to **284 – 298 N·m (209 – 220 lb ft)**.
113. Coat the pinion shaft splines with **MOLYKOTE® G-N METAL ASSEMBLY PASTE**.



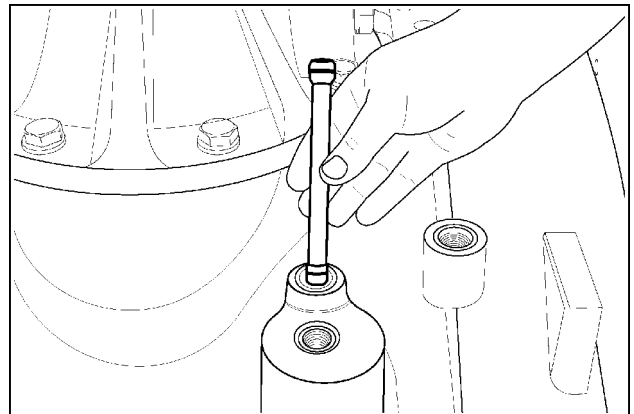
RCPH10FWD082ABJ 113

114. Install the drive yoke and cap. .



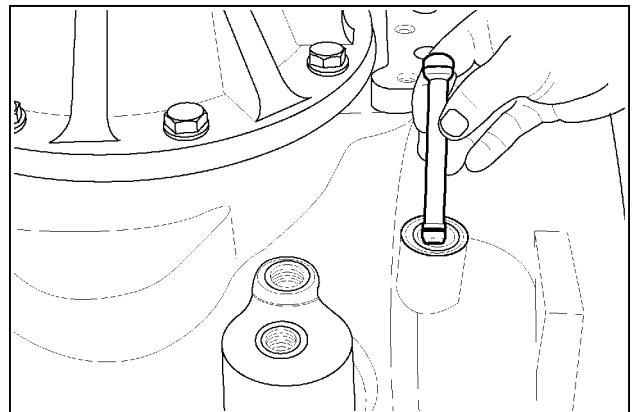
RAIL17TR01400AA 114

115. Lubricate and install new O-rings on the jumper tube (white) for the park brake. Install the jumper tube into the park brake supply port.



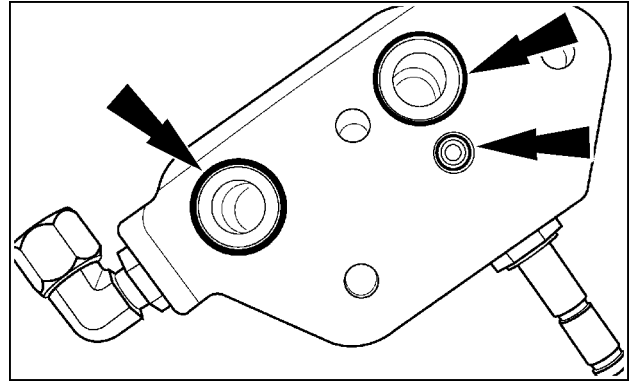
RCPH10FWD083ABJ 115

116. Lubricate and install new O-rings on the jumper tube (white) for the service brake. Install the jumper tube into the service brake supply port.



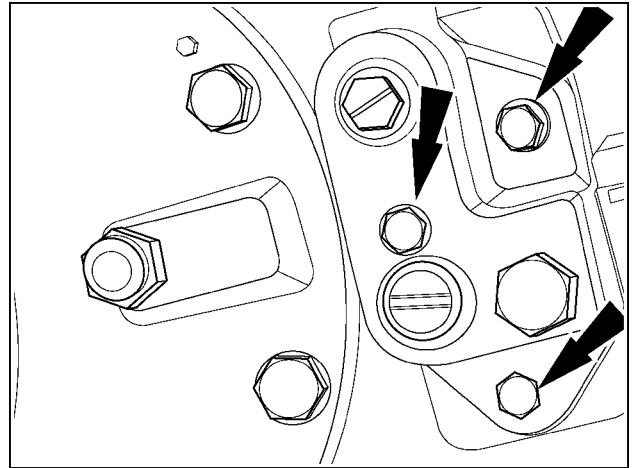
RCPH10FWD084ABJ 116

117. Lubricate and install new O-rings on the port block.



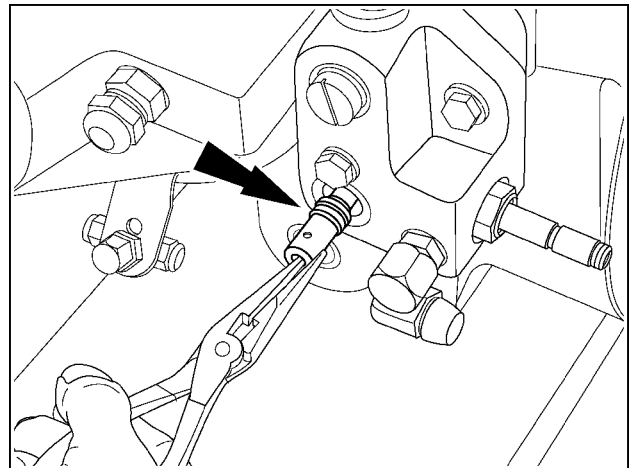
RCPH10FWD085ABJ 117

118. Install the port block on the differential housing. Tighten the retaining bolts to specifications.



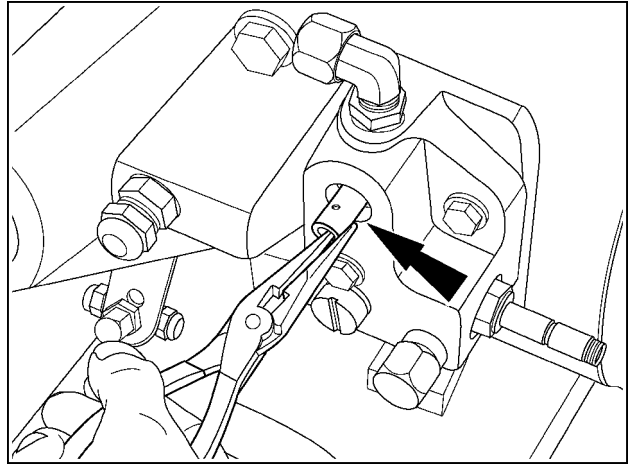
RCPH10FWD950AAJ 118

119. Lubricate and install new O-rings on the jumper tube for the differential lock. Install the jumper tube into the differential lock supply port.



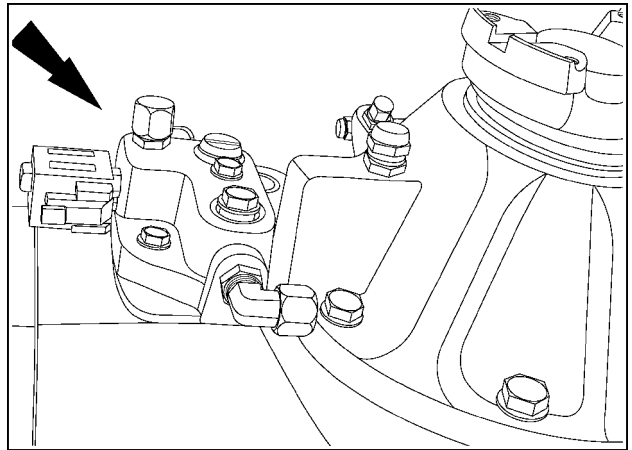
RCPH10FWD949AAJ 119

120. Lubricate and install new O-rings on the jumper tube for the lube supply. Install the jumper tube into the lube supply port.



RCPH10FWD948AAJ 120

121. If equipped, install the Differential Lock Solenoid on to the Port Block.



RCPH10FWD091ABJ 121

Next operation:

Hydraulic service brakes - Test - Brake leak down (33.202) Differential lock - Leakage test (25.102)

Next operation:

Final drive - Install - 500 Series axles (25.310)

Differential - Disassemble - 500 Series Quadtrac® axles

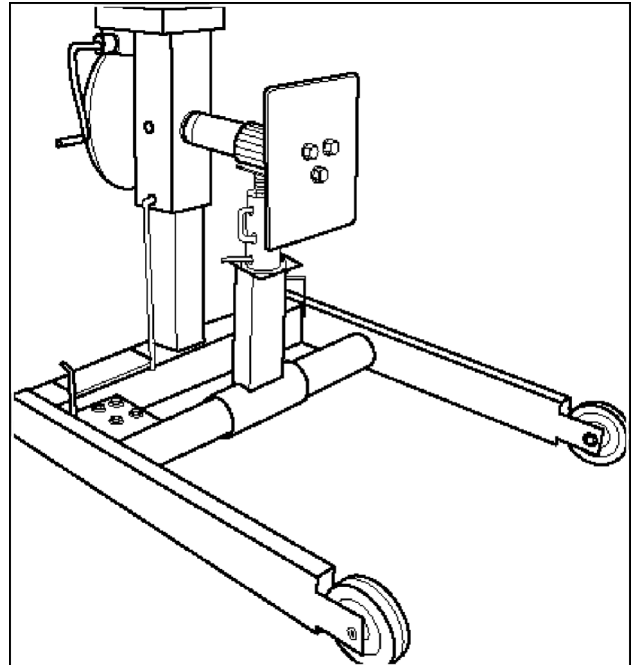
Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA

Prior operation:

Final drive - Remove - 500 Series Quadtrac® axles (25.310)

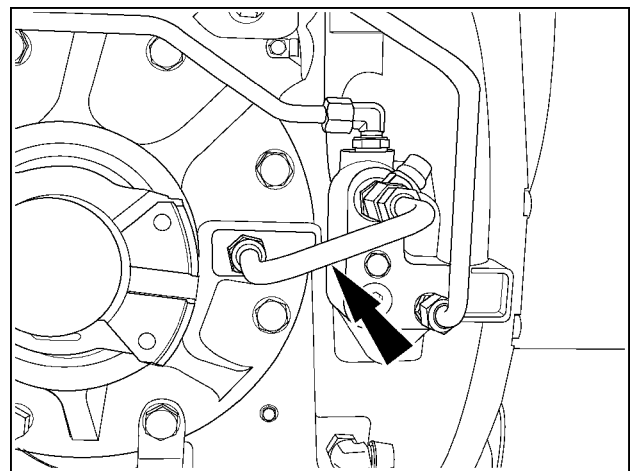
Pinion carrier removal

1. The differential housing must be rotated several times during the disassembly and assembly procedures. If available, the housing should be mounted in a revolver repair stand (1).



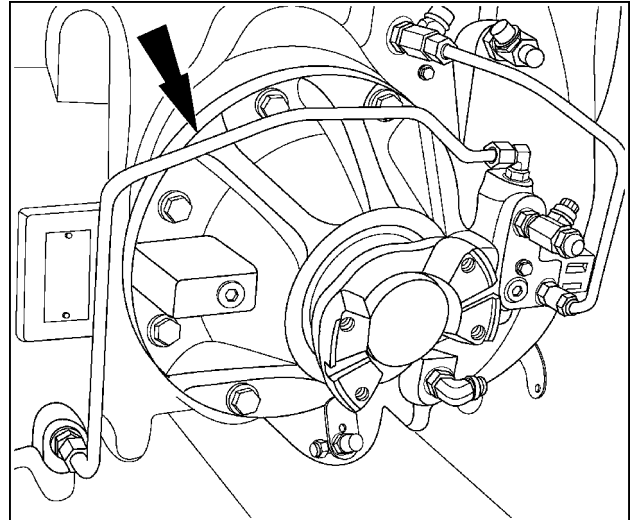
RCPH10FWD941AAJ 1

2. Remove the lube hose from the port block and pinion carrier.



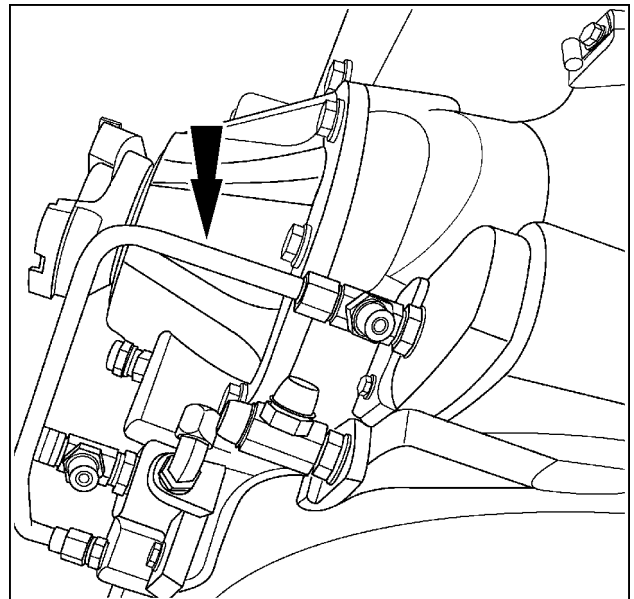
RCPH10FWD942AAJ 2

3. Remove the long tube line from the port block to the differential housing.



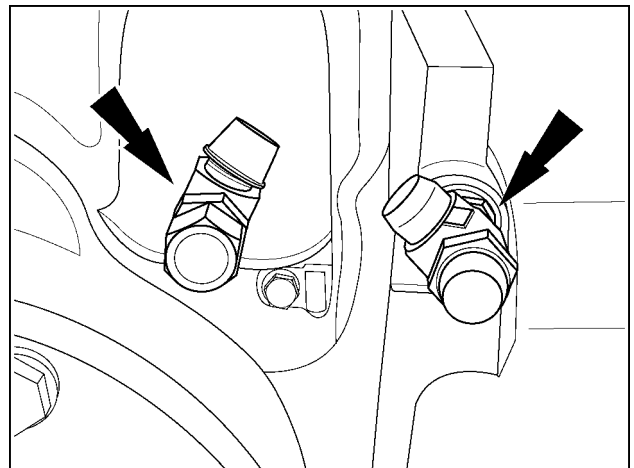
RCPH10FWD943AAJ 3

4. Remove the tube line from the port block to the park brake supply port.



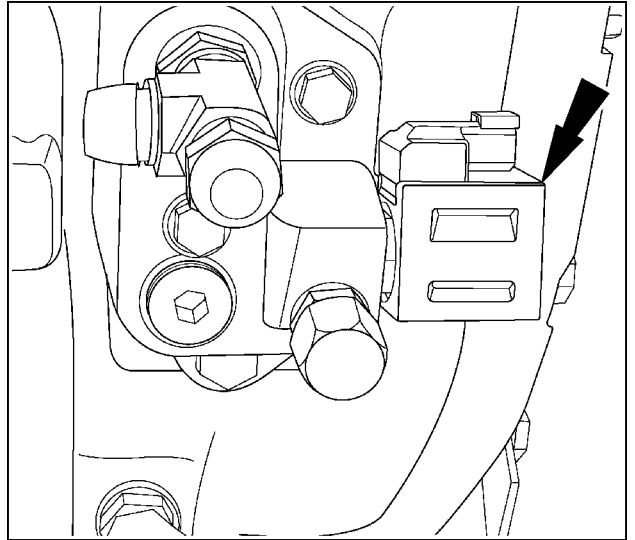
RCPH10FWD944AAJ 4

5. Remove the tee fittings from the park and service brake pressure ports.



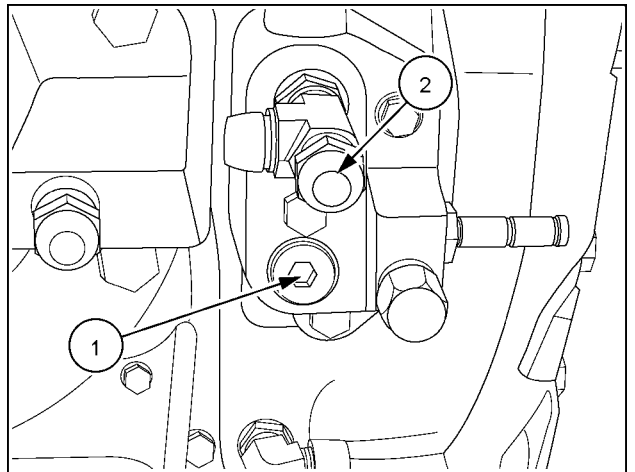
RCPH10FWD945AAJ 5

6. Remove the differential lock solenoid from the port block.



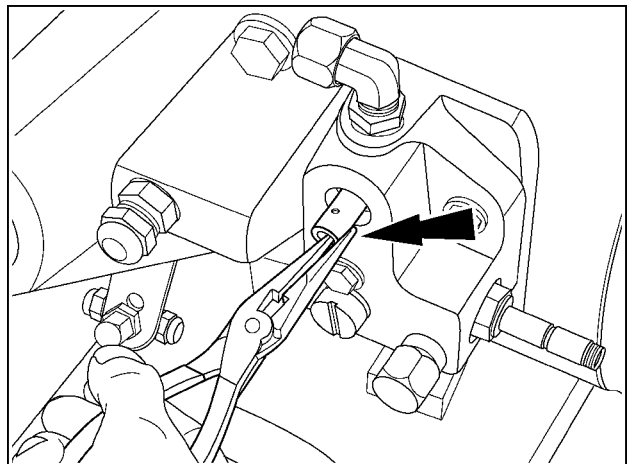
RCPH10FWD946AAJ 6

7. Remove the plug (1) and tee fitting (2) from the port block.



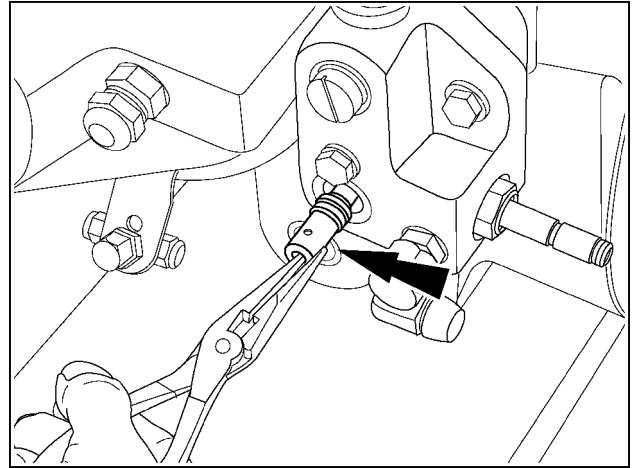
RCPH10FWD947AAJ 7

8. Remove the jumper tube from the lube port. Discard the O-rings.



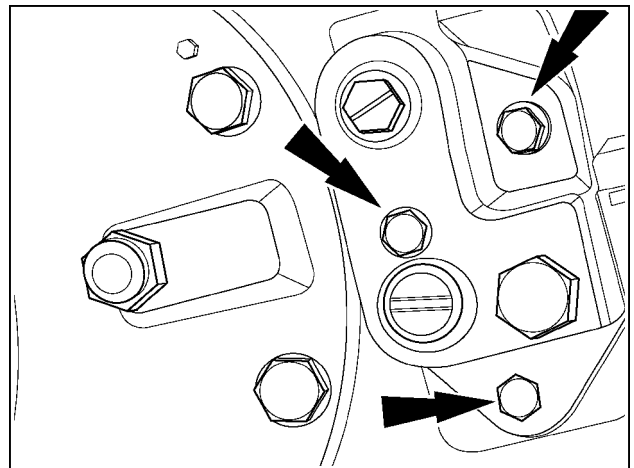
RCPH10FWD948AAJ 8

9. Remove the jumper tube from the differential lock supply port. Discard the O-rings.



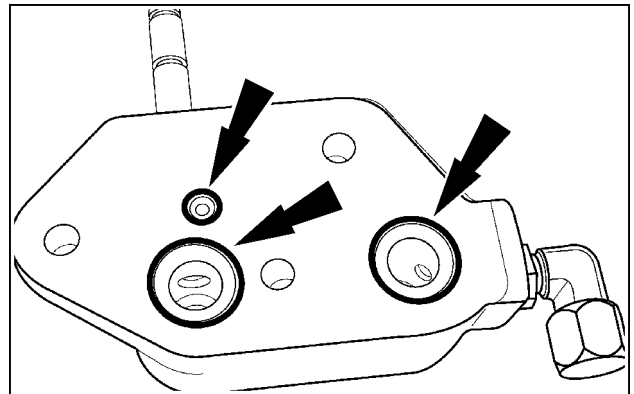
RCPH10FWD949AAJ 9

10. Remove the three bolts securing the port block to the housing. Remove the port block.



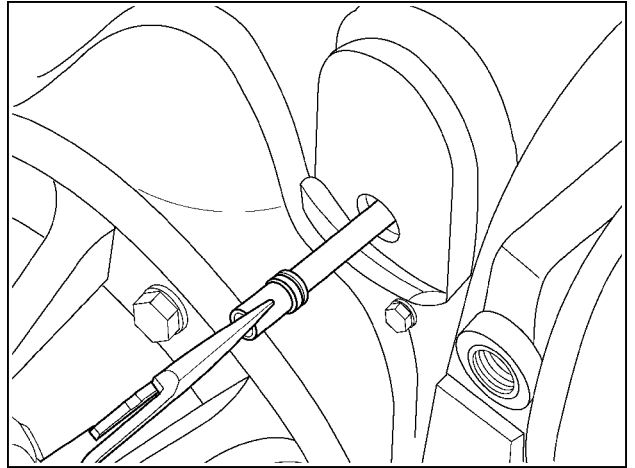
RCPH10FWD950AAJ 10

11. Discard the O-rings from the port block.

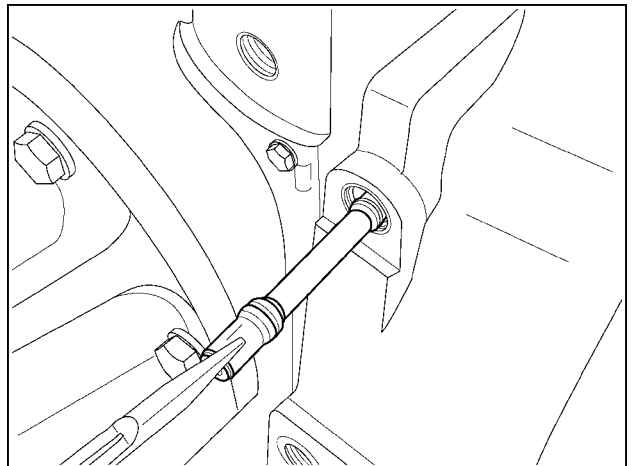


RCPH10FWD951AAJ 11

12. Remove the jumper tube from the park brake supply port. Discard the O-rings.

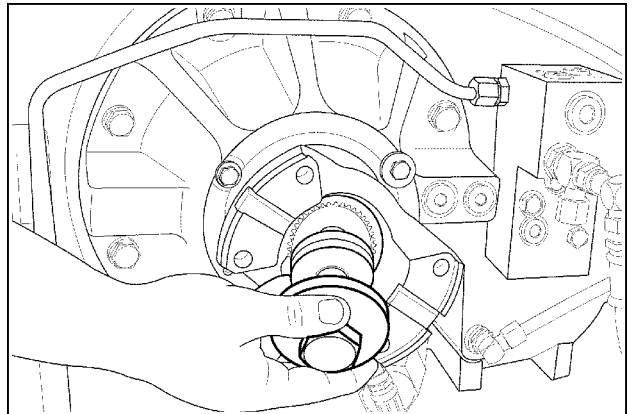


13. Remove the jumper tubes from the brake supply port. Discard the O-rings.

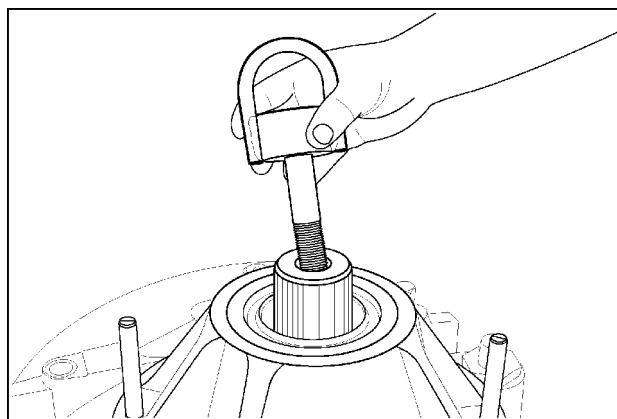


14. If repairing a rear differential, remove the drive yoke retaining bolt, washer, shim pack and O-ring. Retain the shims with the yoke.

NOTE: The front axle drive yoke does not use a retaining bolt. The drive yoke is allowed to slide on the pinion shaft.

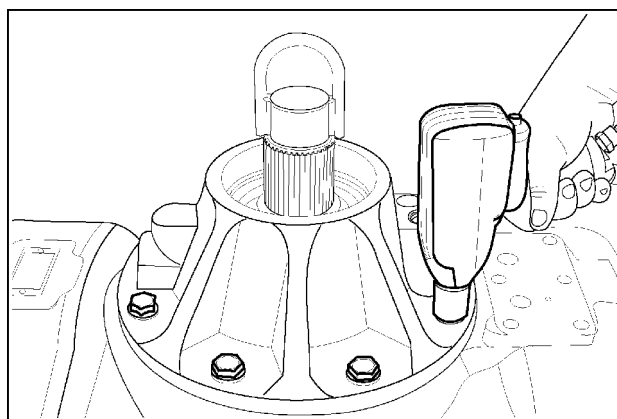


15. Install the CAS2494 lifting eye into the pinion gear.



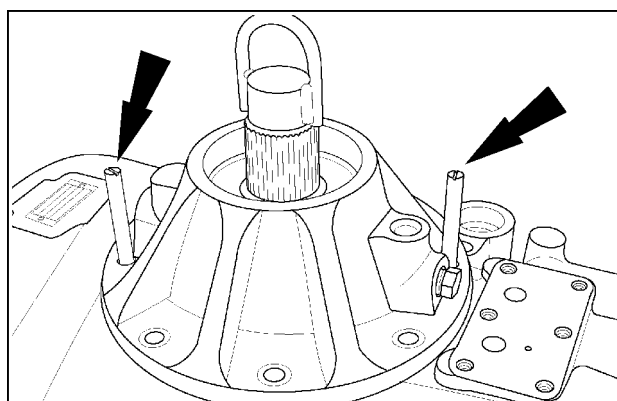
RCPH10FWD955AAJ 15

16. Remove the pinion carrier mounting bolts.



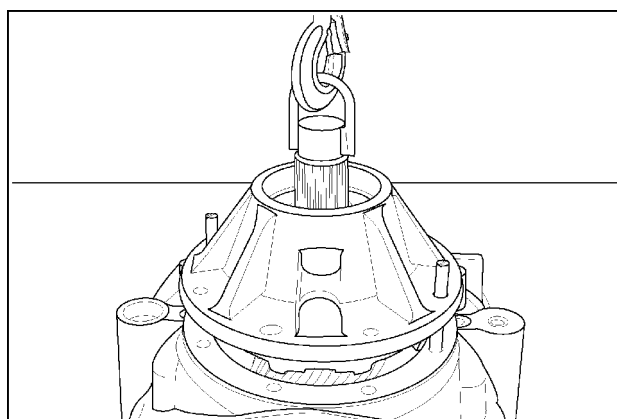
RCPH10FWD956AAJ 16

17. Install two **CAS2496** alignment studs in opposite holes of the pinion carrier.



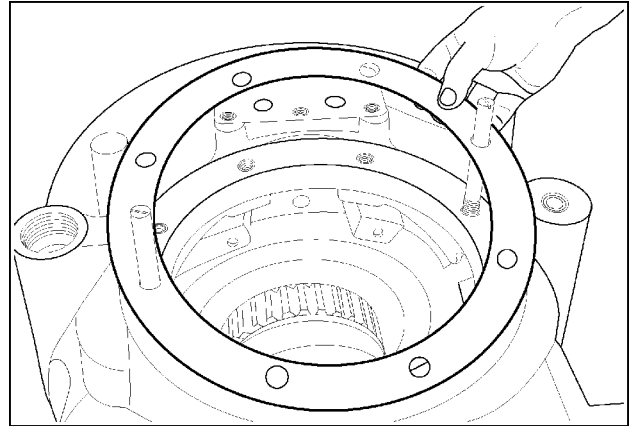
RCPH10FWD957AAJ 17

18. Use a lifting device to remove the pinion carrier from the housing. Be careful not to damage the shim pack.



RCPH10FWD958AAJ 18

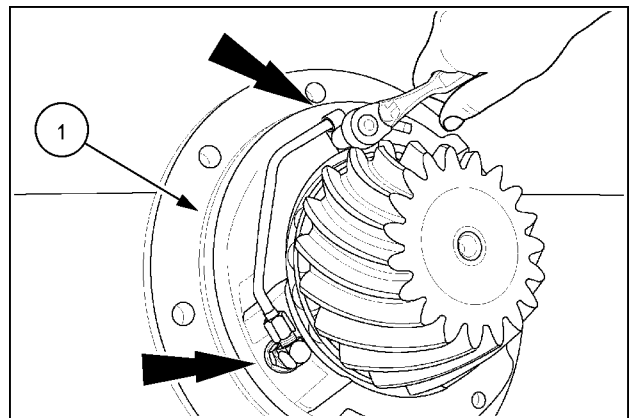
19. Remove and retain the shim pack.



RCPH10FWD959AAJ 19

Pinion carrier assembly

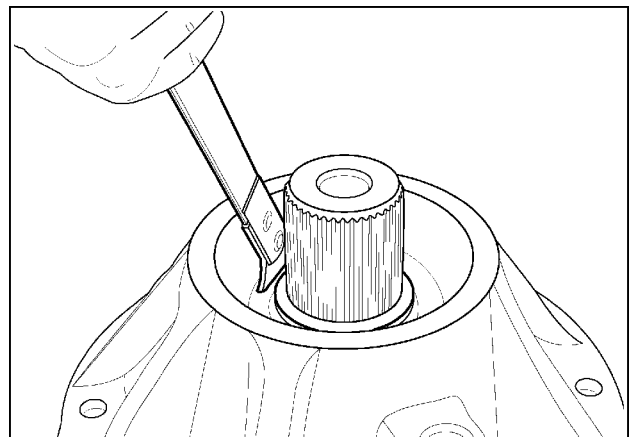
20. Remove the bolt securing the pinion gear lube tube. Disconnect and remove the tube, tube clamp and fitting. Remove and discard the large O-ring (1) from the flange of the housing.



RCPH10FWD960AAJ 20

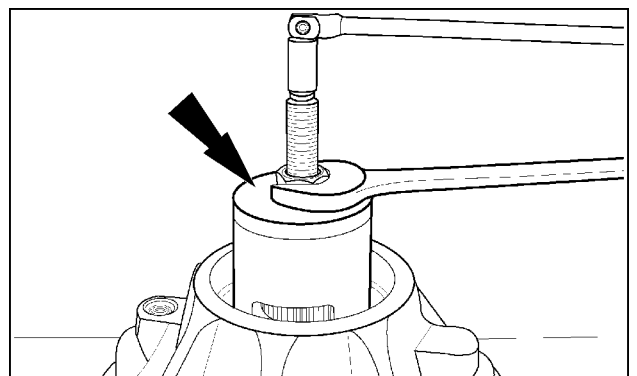
21. Pry the pinion seal from the housing.

NOTE: The rear axle has an oil seal on the pinion shaft. The front axle has an oil seal on the pinion and a dust/grease seal on the outside diameter of the drive yoke.



RCPH10FWD961AAJ 21

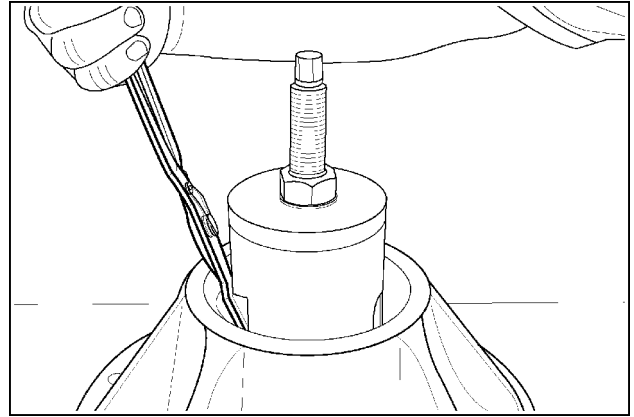
22. Support the pinion carrier on wood blocks on the work surface. Install the **CAS2511** pinion bearing preload compressor. Turn the center bolt tightly into the threaded hole in the pinion gear. Install the thrust washer and nut on the center bolt. Align one window of the compression sleeve with the end gap of the snap ring. Use one wrench to hold the center bolt and a second wrench to tighten the nut to increase the bearing preload and release the pressure against the snap ring.



RCPH10FWD962AAJ 22

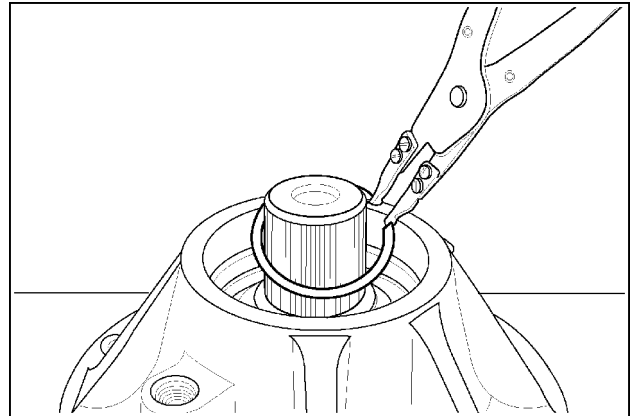
23. Use a Snap Ring Pliers to remove the snap ring from the groove in the pinion shaft.

NOTE: If pinion bearing preload increased noticeably, remove the compression sleeve to remove the large snap ring.



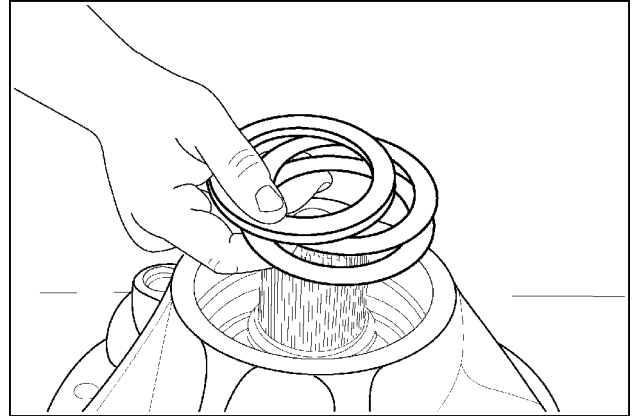
RCPH10FWD963AAJ 23

24. Remove the compression sleeve assembly and snap ring from the pinion shaft.



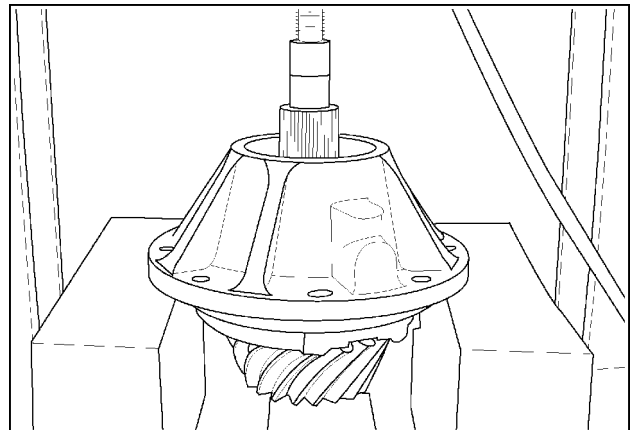
RCPH10FWD964AAJ 24

25. Remove the spacer ring and shim pack. Retain the shims.



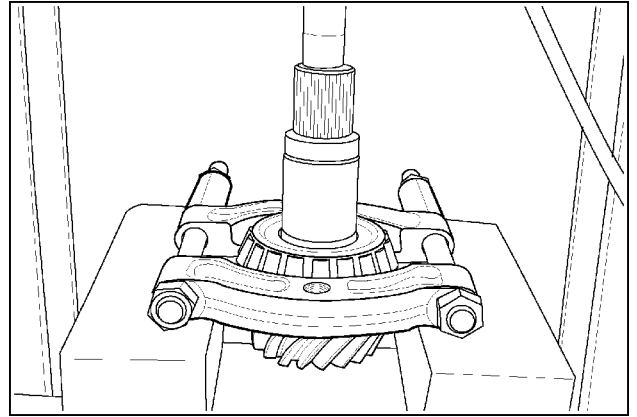
RCPH10FWD965AAJ 25

26. Support the pinion carrier on a press bed. Use the press to push the pinion shaft through the front bearing cone



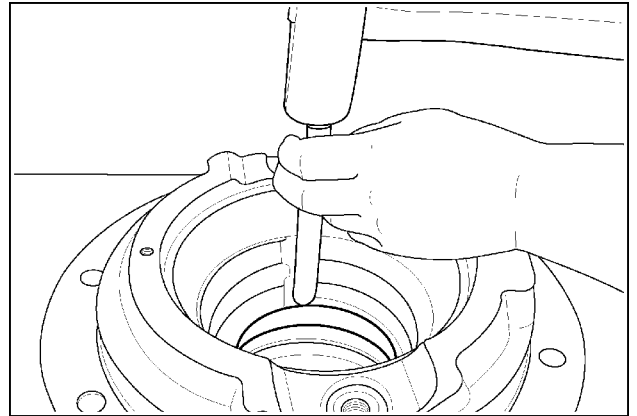
RCPH10FWD966AAJ 26

27. Use a split knife edge puller attachment and press to remove the rear pinion bearing cone.



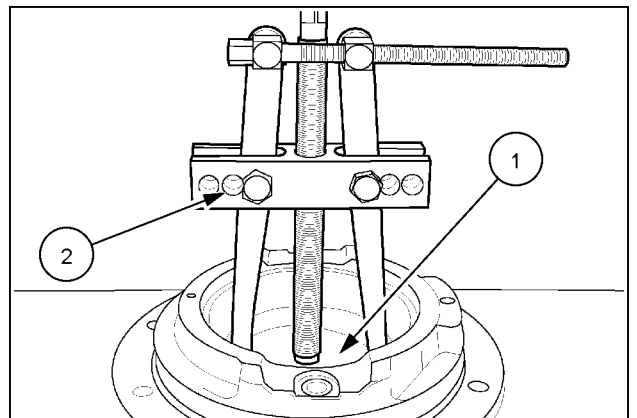
RCPH10FWD967AAJ 27

28. Use a brass drift to remove the outer bearing cup from the carrier housing.



RCPH10FWD968AAJ 28

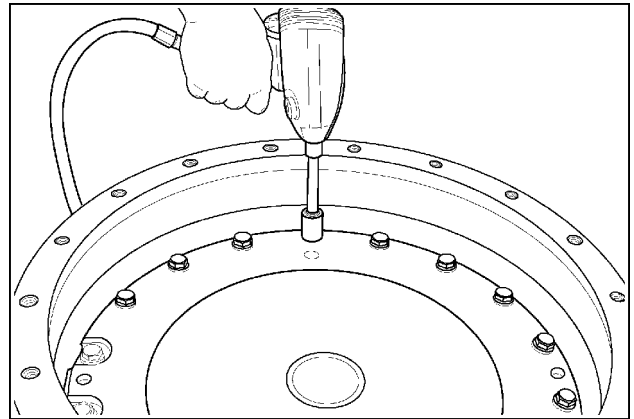
29. Use the **CAS2510** adaptor plate (1) and a bearing puller (2) to remove the inner bearing cup from the carrier housing. Clean and inspect all parts for damage or wear. Replace any damaged or worn parts.



RCPH10FWD969AAJ 29

Brake carrier/bearing support removal

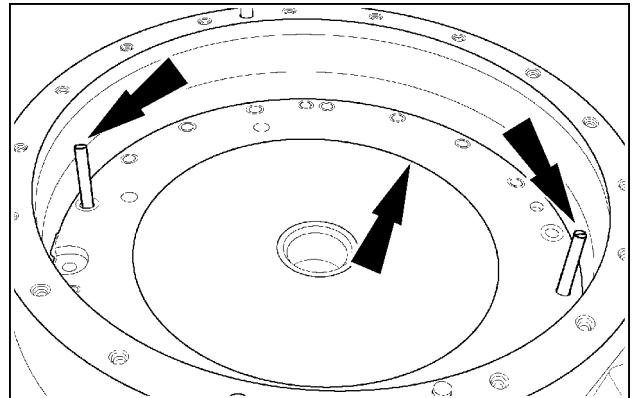
30. Rotate the differential housing so that the brake carrier side is on top. Remove the brake carrier retaining bolts and washers.



RCPH10FWD970AAJ 30

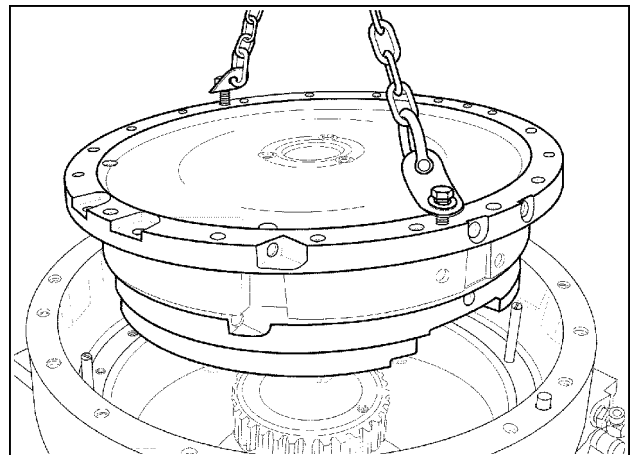
31. Install two **CAS2675** alignment studs opposite each other.

NOTE: Put a mark on the brake carrier and housing for assembly reference.



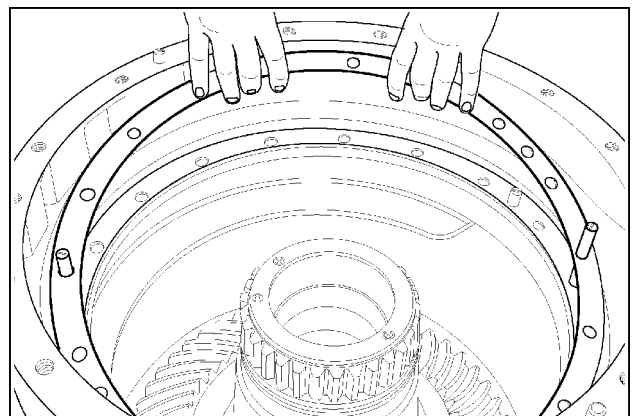
RCPH10FWD971AAJ 31

32. Two threaded holes are provided in the flange of the carrier assembly. Use two of the retainer bolts that were removed to attach a lifting chain and hoist. Use the hoist to slowly and carefully lift the brake carrier assembly out of the housing. Be careful not to bend or damage the preload shims during removal.



RCPH10FWD209ABJ 32

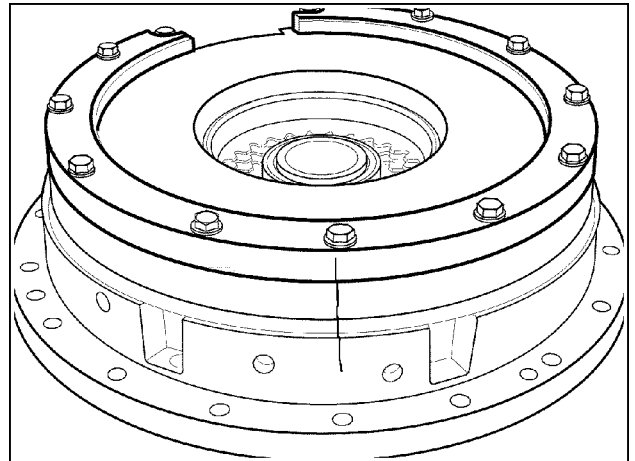
33. Remove and retain the differential bearing preload shims.



RCPH10FWD210ABJ 33

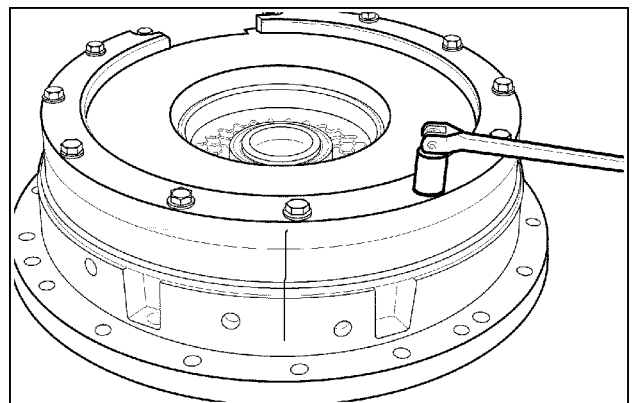
Brake carrier/bearing support disassembly

34. Position the carrier assembly on a sturdy work surface so that the split ring side is on top. Put a mark across the assembly for reference.



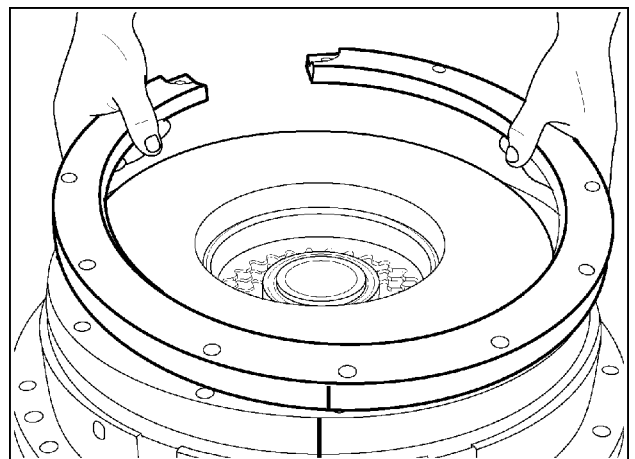
RCPH10FWD211ABJ 34

35. Starting with an end gap bolt, loosen each bolt in sequence one full turn. Repeat until all tension is released against the retaining ring.



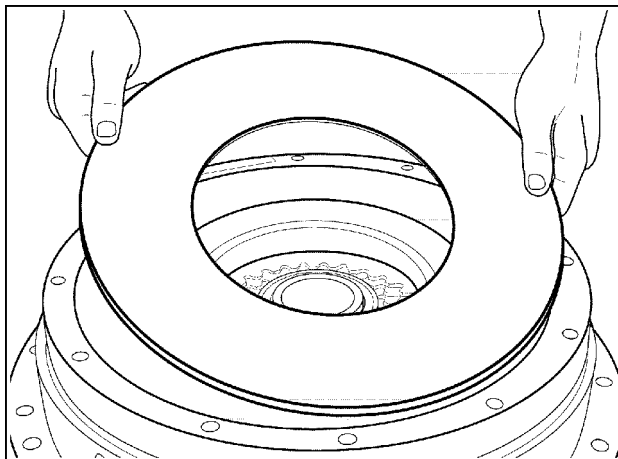
RCPH10FWD212ABJ 35

36. Remove all bolts from the split ring. Remove the split retainer ring.



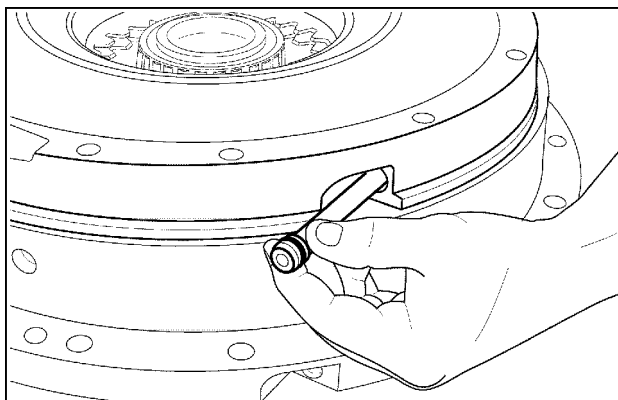
RCPH10FWD213ABJ 36

37. Remove the belleville spring.



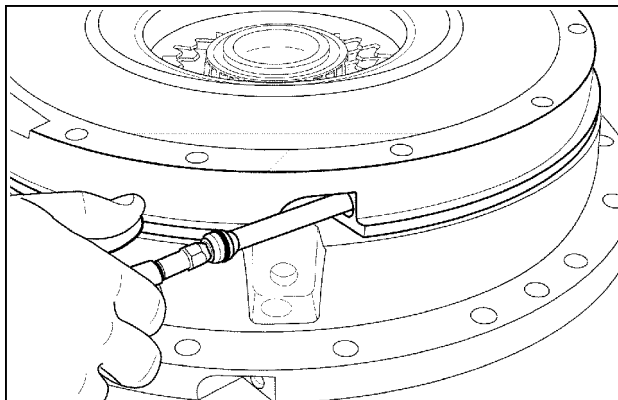
RCPH10FWD214ABJ 37

38. Temporarily install the short jumper tube into the park brake pressure port.



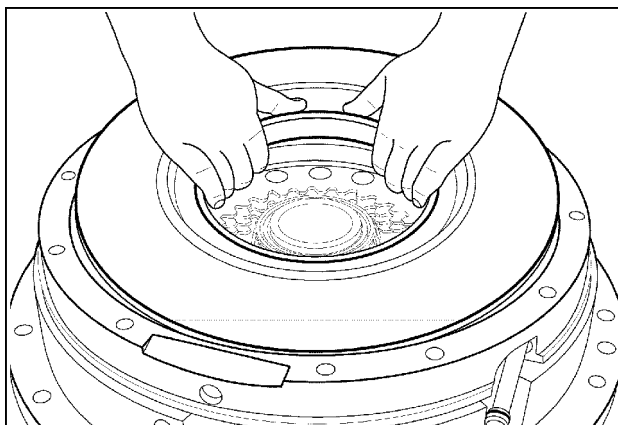
RCPH10FWD215ABJ 38

39. Use a short burst of compressed air to lift the park brake piston out of its bore.



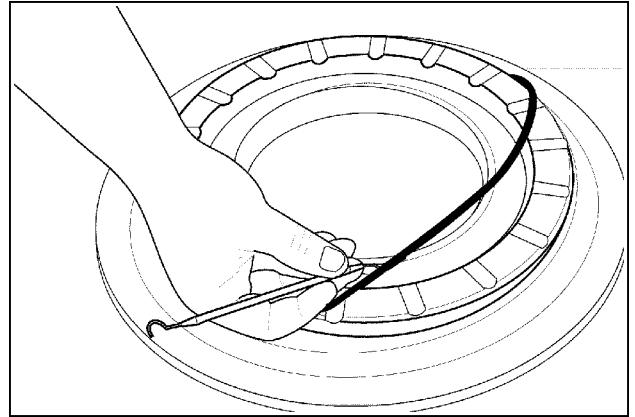
RCPH10FWD216ABJ 39

40. Remove the piston from the backing plate.



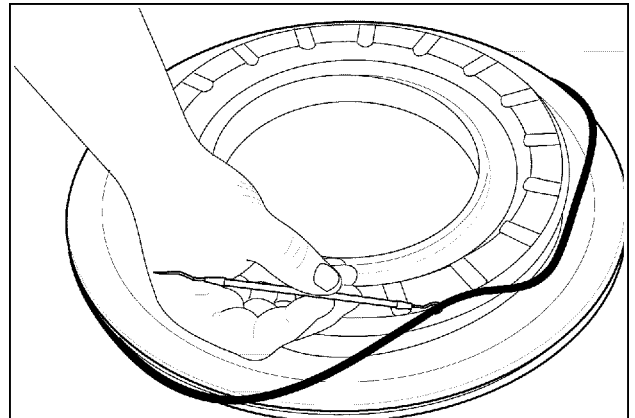
RCPH10FWD217ABJ 40

41. Remove and discard the inner O-ring from the piston.



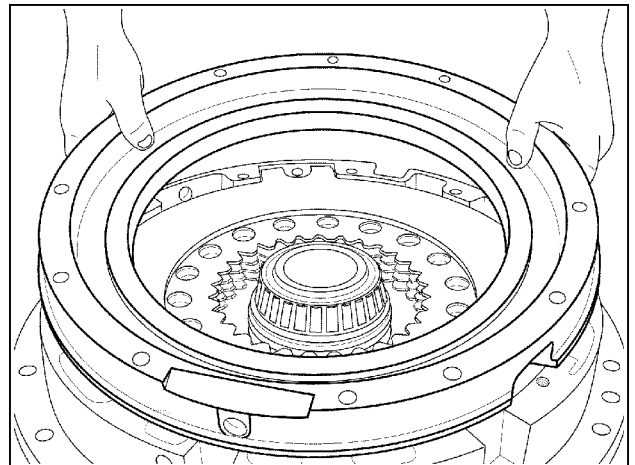
RCPH10FWD218ABJ 41

42. Remove and discard the outer O-ring from the piston.



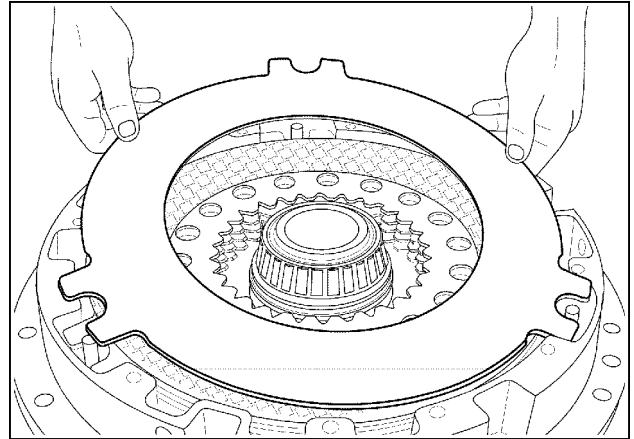
RCPH10FWD219ABJ 42

43. Remove the brake backing plate.



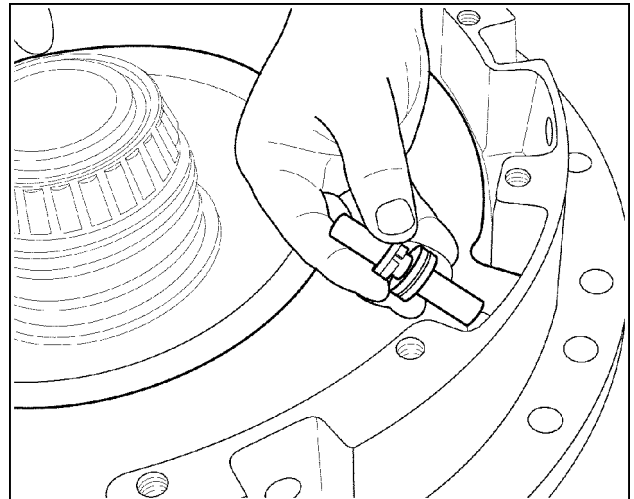
RCPH10FWD220ABJ 43

44. Remove the four brake separator plates and four friction plates from the carrier.



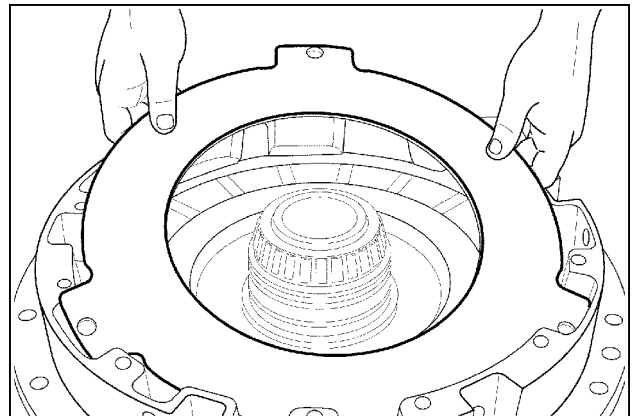
RCPH10FWD221ABJ 44

45. Remove each of the three brake adjuster pins with belleville spring washers.



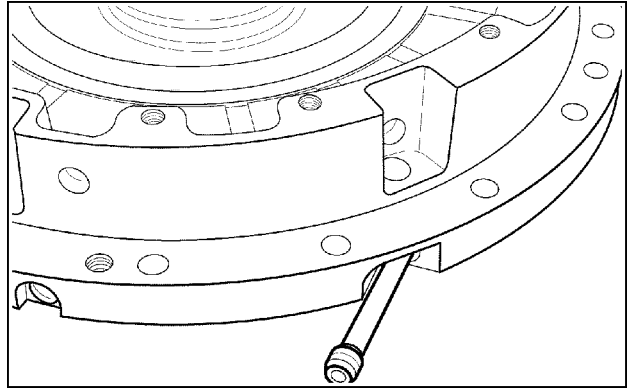
RCPH10FWD222ABJ 45

46. Remove the brake return plate from the carrier.



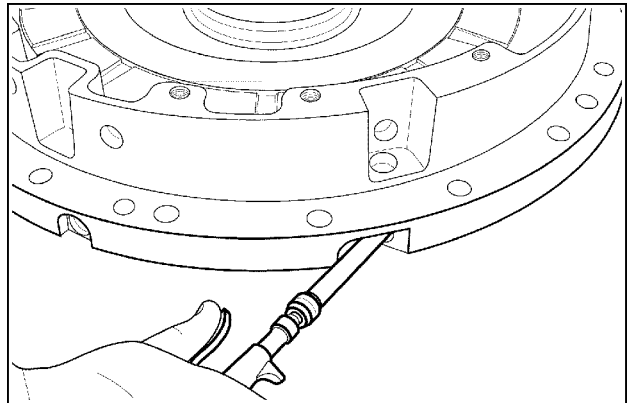
RCPH10FWD223ABJ 46

47. Temporarily install a short jumper tube into the service brake pressure port.



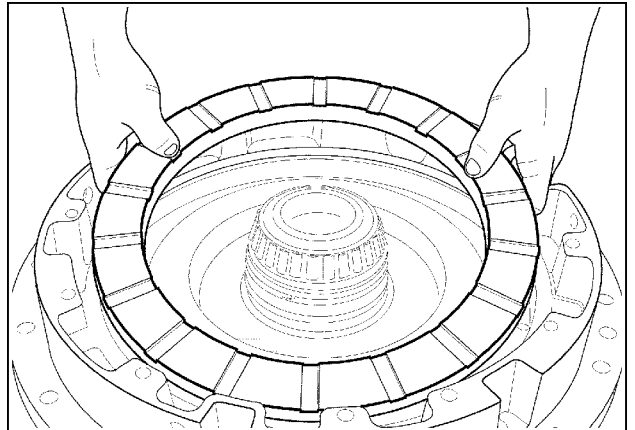
RCPH10FWD224ABJ 47

48. Use a short burst of compressed air to lift the brake piston out of the bore.



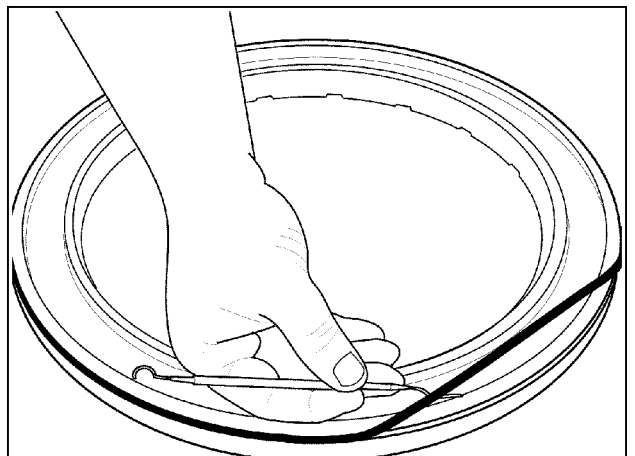
RCPH10FWD225ABJ 48

49. Remove the piston from the carrier.



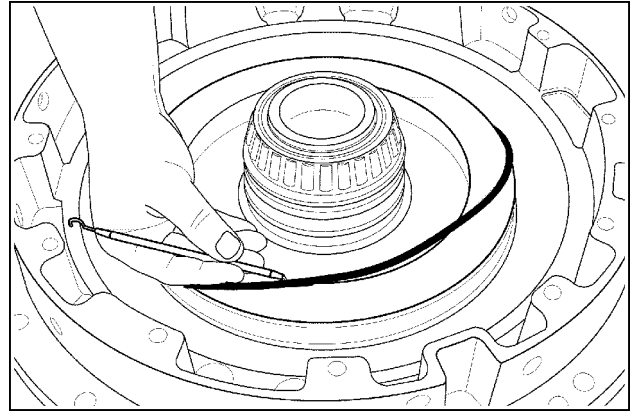
RCPH10FWD226ABJ 49

50. Remove and discard the O-ring from the outside diameter of the piston.



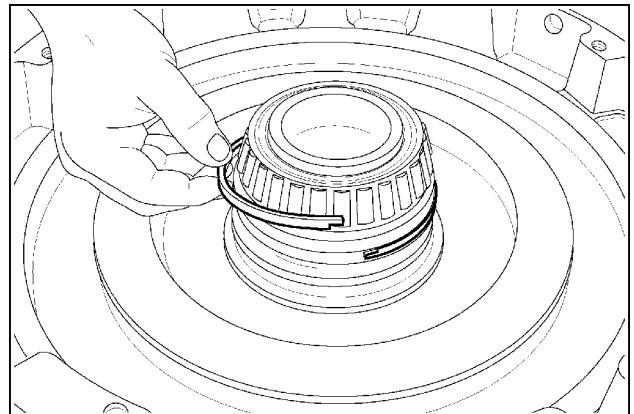
RCPH10FWD227ABJ 50

51. Remove and discard the piston inside diameter O-ring from the carrier.



RCPH10FWD228ABJ 51

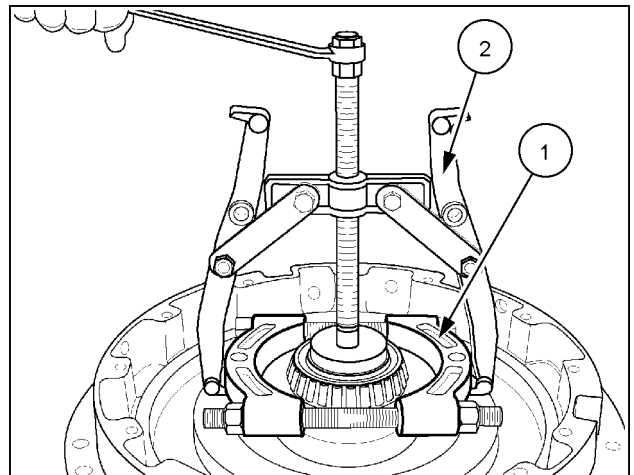
52. Remove and discard the two seal rings from the hub of the carrier.



RCPH10FWD229ABJ 52

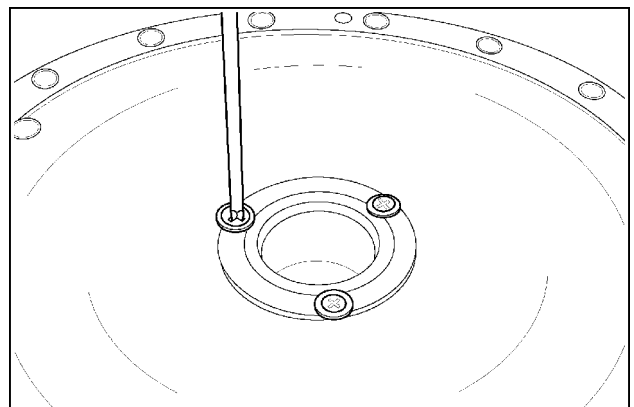
53. If required, use a split knife edge puller attachment (1) and a puller (2) to remove the bearing cone from the hub of the carrier.

NOTE: If possible, place the bearing cup over the bearing cone when removing the bearing.



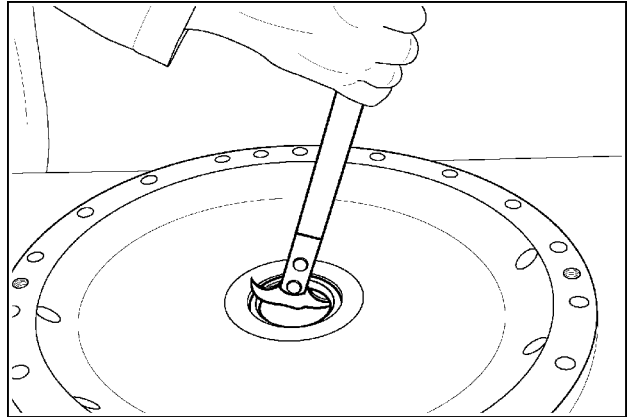
RCPH10FWD230ABJ 53

54. Turn the brake carrier housing so the outer side is on top. Remove the three screws and washers securing the seal.



RCPH10FWD231ABJ 54

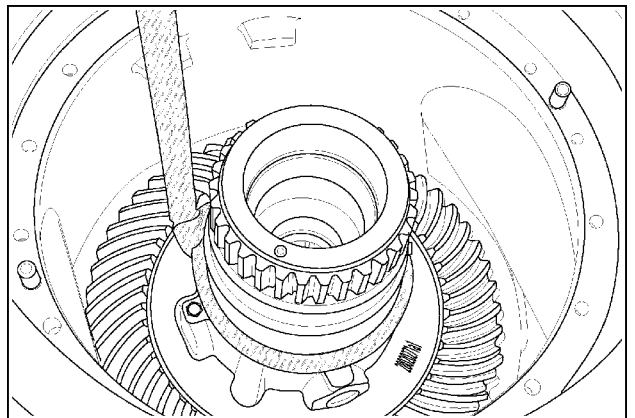
55. Remove and discard the seal. Clean and inspect all brake carrier parts for damage or wear. Replace any damaged or worn parts found



RCPH10FWD994AAJ 55

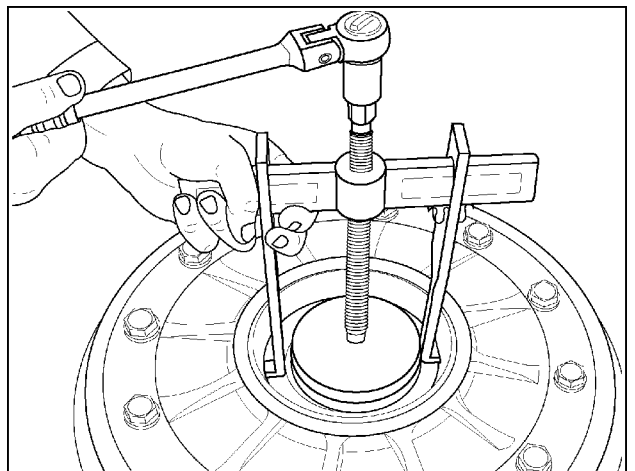
Differential removal and disassembly

56. Position a nylon lifting sling in a choker configuration as low as possible on the differential carrier. Use a hoist to lift the differential from the housing.



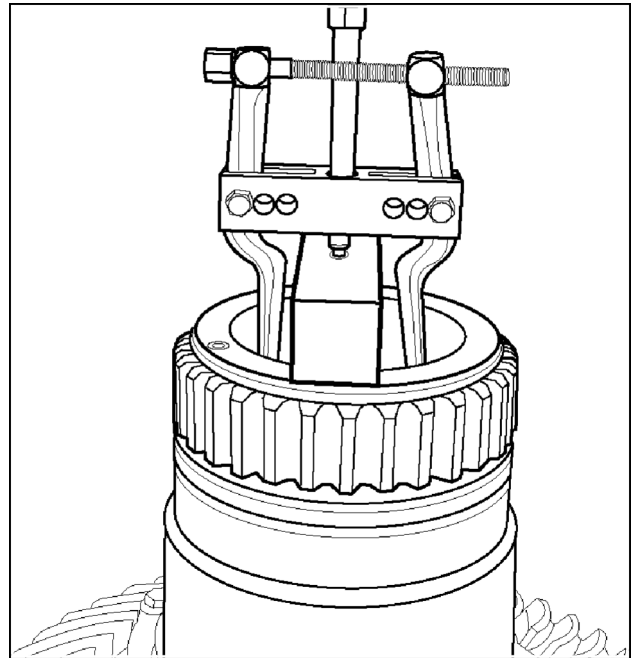
RCPH10FWD998AAJ 56

57. If required, use a bearing puller and step plate to remove the left hand side differential bearing cup.



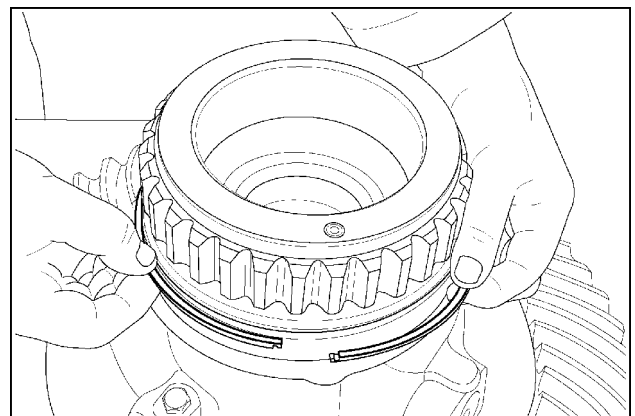
RCPH10FWD999AAJ 57

58. If required, use a bearing puller and step plate to remove the right hand side differential bearing cup.



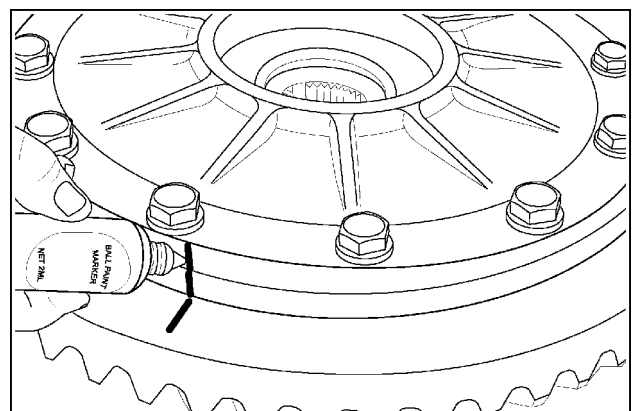
RCPH10FWD001ABJ 58

59. Remove and discard the large seal ring.



RCPH10FWD002ABJ 59

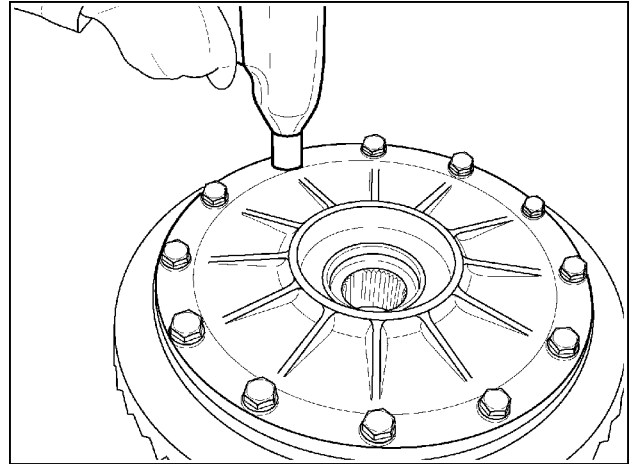
60. Put a mark on the differential case for assembly reference.



RCPH10FWD003ABJ 60

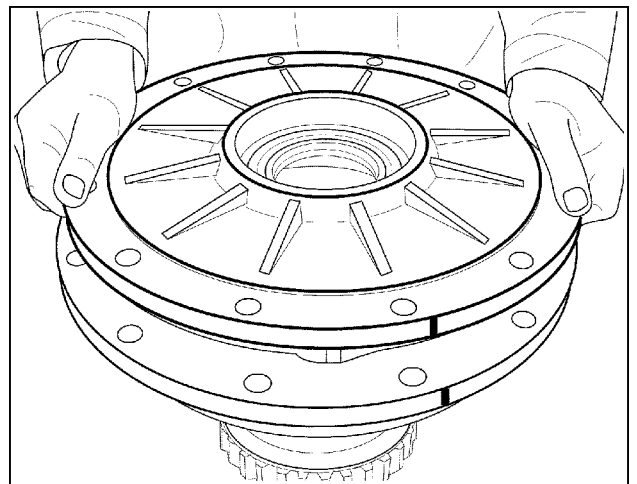
61. Remove and discard the ring gear and cover attaching bolts. Use a brass drift and hammer to tap the ring gear free from the case.

NOTE: The ring gear does not need to be removed unless the case or ring gear is to be replaced.



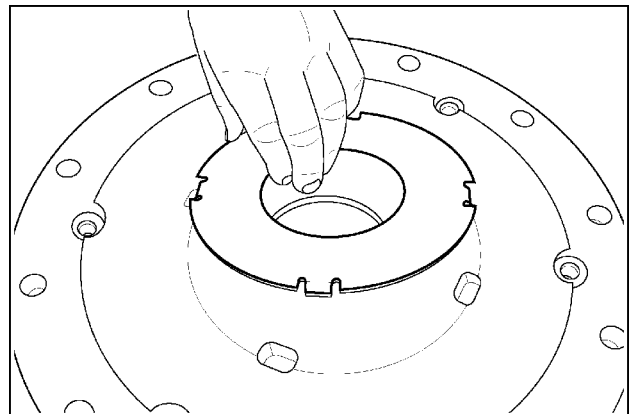
RCPH10FWD004ABJ 61

62. Remove the differential case cover.



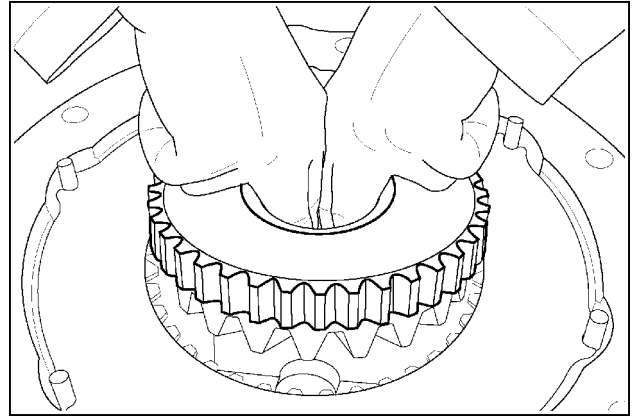
RCPH10FWD005ABJ 62

63. Remove the large thrust washer from the cover.



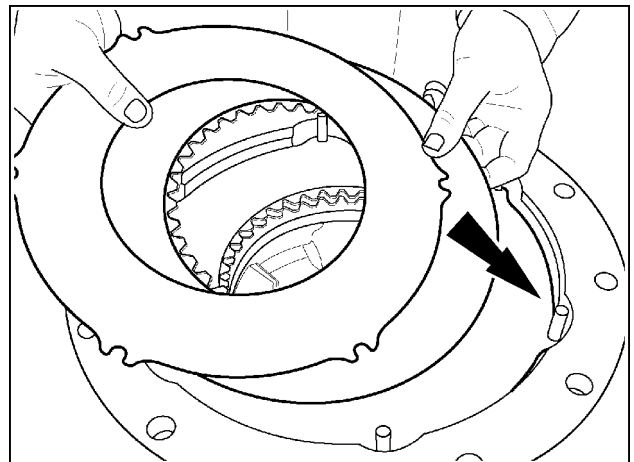
RCPH10FWD006ABJ 63

64. Remove the differential side gear from the case.



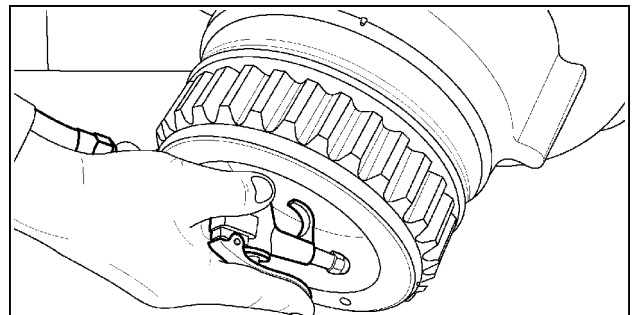
RCPH10FWD007ABJ 64

65. If equipped with differential lock, remove the four steel separator plates and three friction plates from the case. Remove the 6 anti-rotation dowel pins from the case.



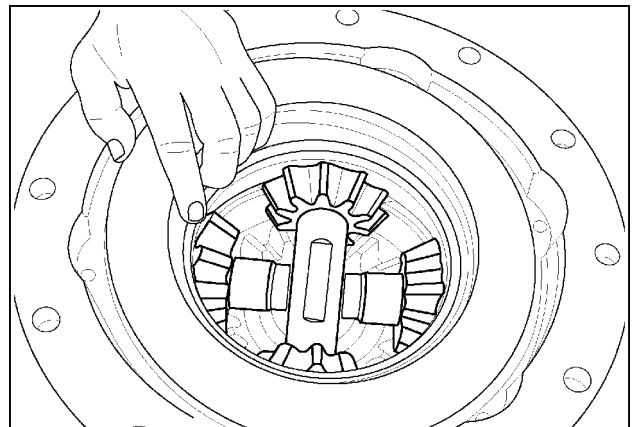
RCPH10FWD008ABJ 65

66. If equipped with differential lock, use a short burst of compressed air in the oil passage hole in the case to move the differential lock piston out of the bore.



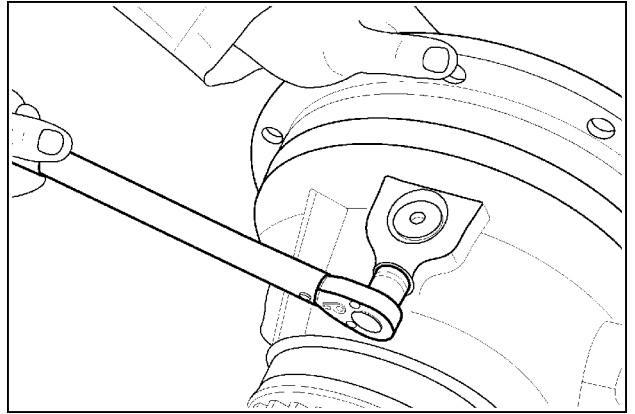
RCPH10FWD009ABJ 66

67. Remove the differential lock piston from the case.



RCPH10FWD010ABJ 67

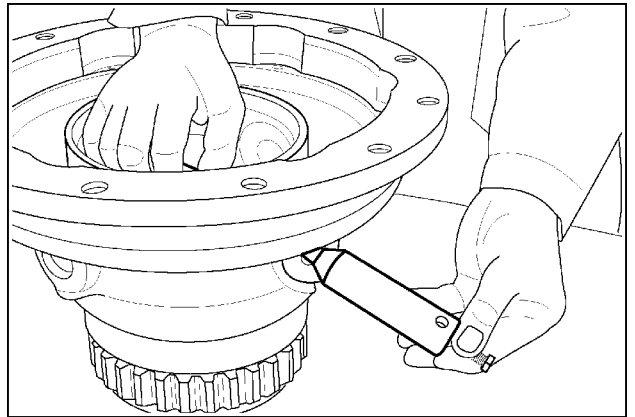
68. Remove the bolts securing the short pinion shafts in the case.



RCPH10FWD011ABJ 68

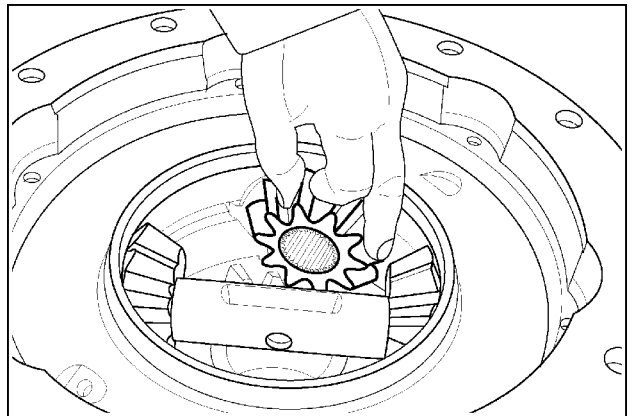
69. Install an M8 x 1.25 bolt into the threaded hole in the end of each short pinion gear shaft. Remove the short shafts and spacer sleeves from the case.

NOTE: There are 28 uncaged needle roller bearings in each of the four pinion gears.



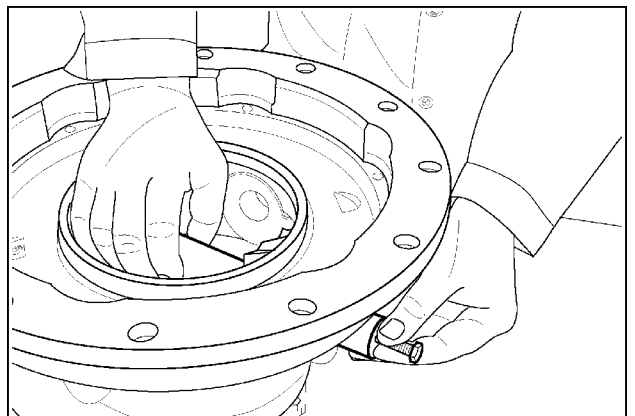
RCPH10FWD012ABJ 69

70. Remove the spider gears for the short shafts from the case.



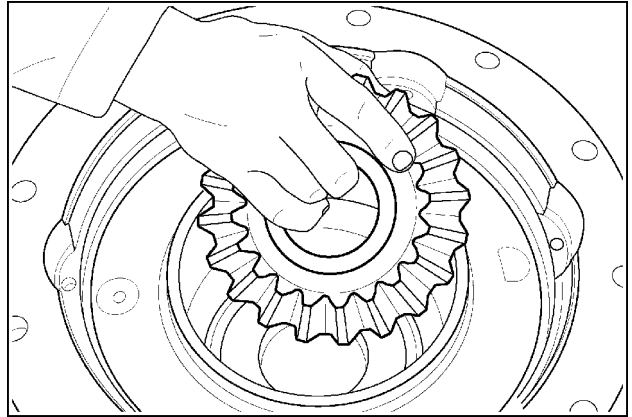
RCPH10FWD013ABJ 70

71. Use the same procedure to remove the long spider gear shaft, spacer and spider gears.



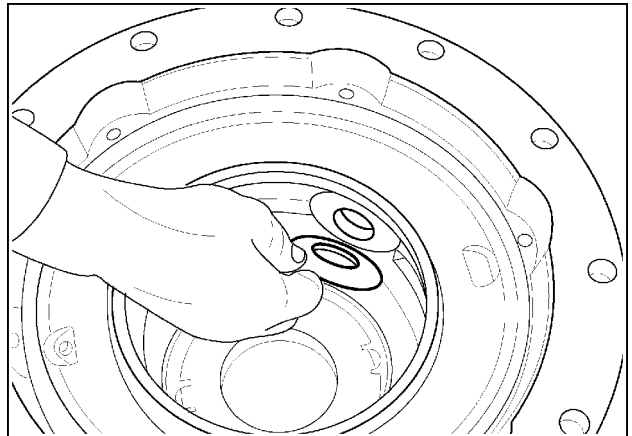
RCPH10FWD014ABJ 71

72. Remove the side gear from the bottom of the case.



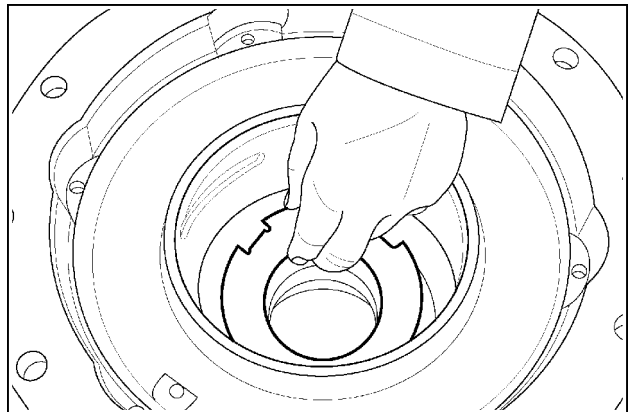
RCPH10FWD015ABJ 72

73. Remove the thrust washers for each spider gear from the case.



RCPH10FWD016ABJ 73

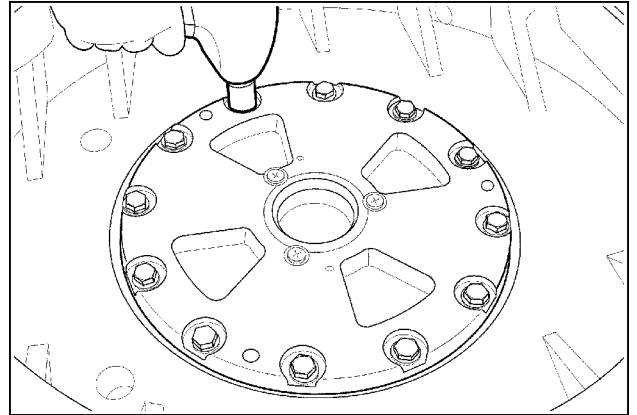
74. Remove the thrust washer for the side gear from the bottom of the case. Clean and inspect all differential parts for damage or wear. Replace any damaged or worn parts found.



RCPH10FWD017ABJ 74

Left hand differential bearing support disassembly

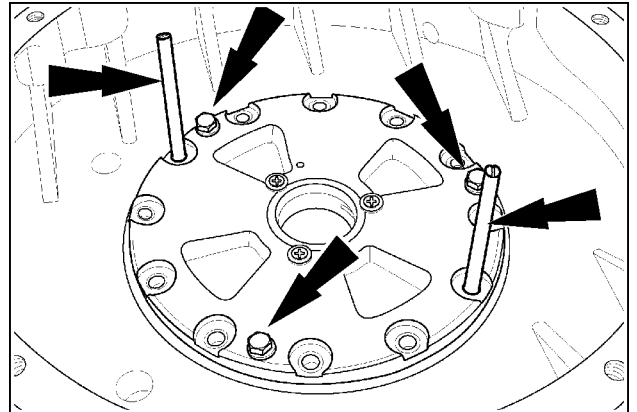
75. If required, rotate the differential housing so the left hand side differential bearing support carrier is on top. Remove the bearing support retaining bolts and washers.



RCPH10FWD232ABJ 75

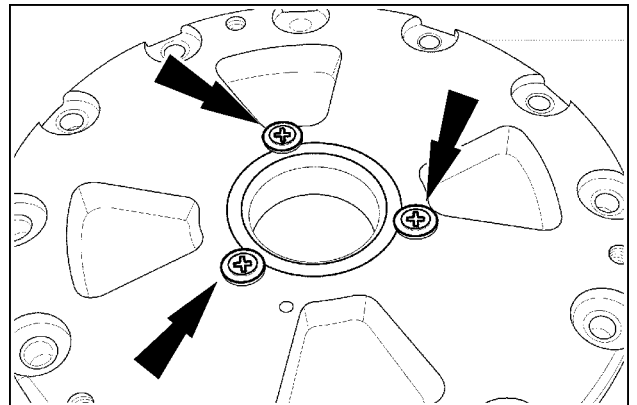
76. Install two CAS1995-6 guide bolts. Use three of the retaining bolts in the threaded holes provided. Tighten the bolts alternately and evenly to jack the bearing carrier out of the housing. Remove the bearing carrier and shims.

NOTE: Be careful not to damage the shims when removing the bearing support.



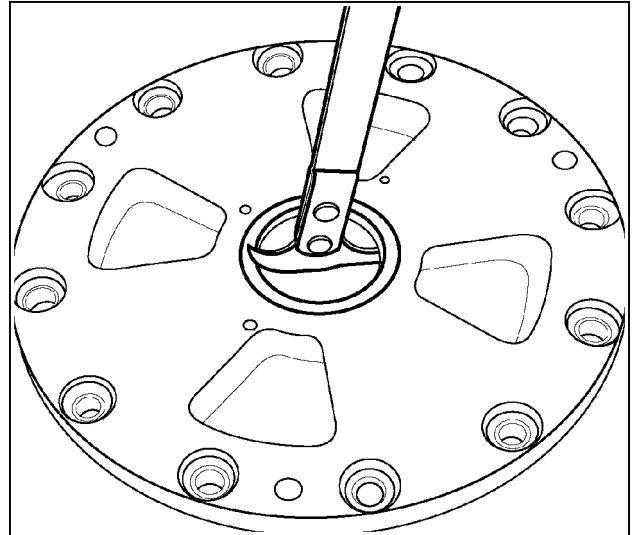
RCPH10FWD233ABJ 76

77. Remove the three screws and washers used to retain the seal.



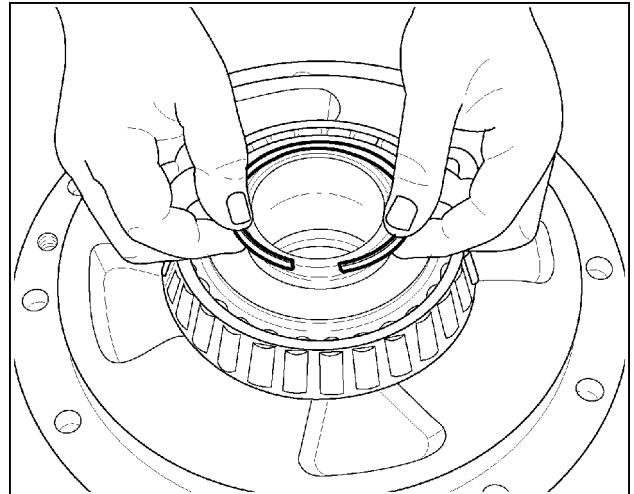
RCPH10FWD234ABJ 77

78. Remove and discard the oil seal.



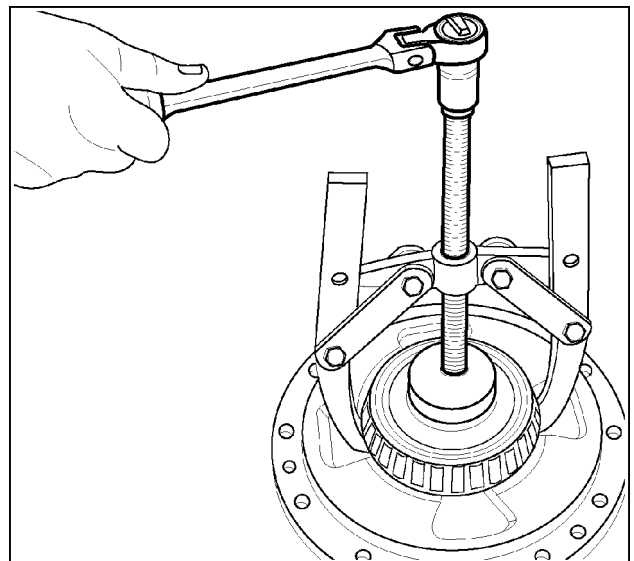
RCPH10FWD020ABJ 78

79. Remove and discard the seal ring.



RCPH10FWD021ABJ 79

80. If required, use a bearing puller and step plate to remove the bearing cone from the hub of the bearing carrier.



RCPH10FWD022ABJ 80

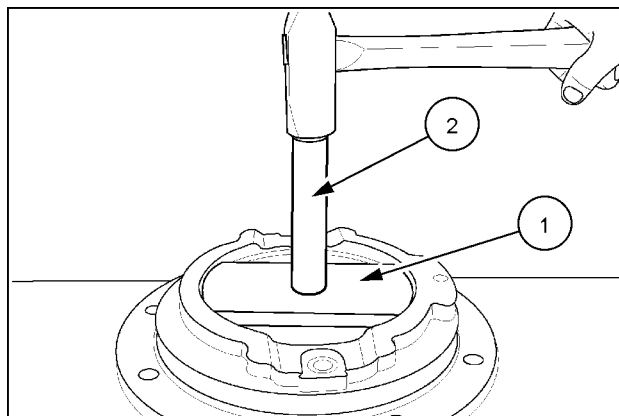
Differential - Assemble - 500 Series Quadtrac® axles

Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA

Pinion carrier assembly

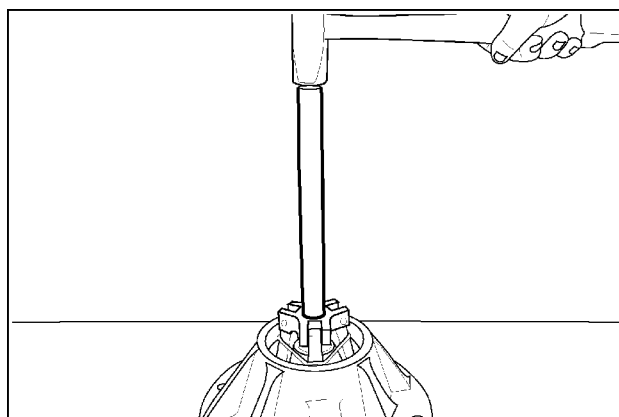
1. Use **CNH299050** bearing cup driver (1) and an appropriate handle (2) to install the inner bearing cup into the carrier housing. Be sure the bearing cup is seated in the bore.

NOTE: Put a light coat of oil around the outside diameter of the bearing cup before installation.



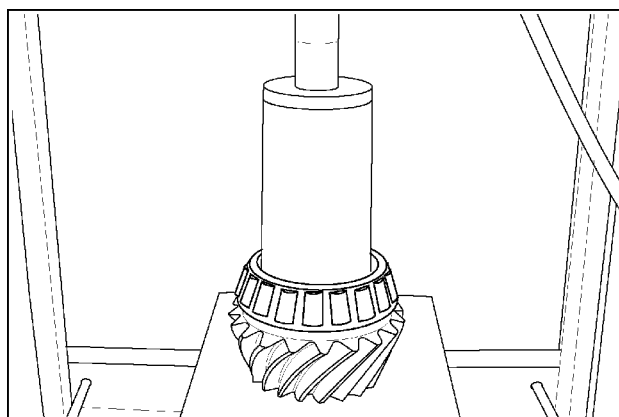
RCPH10FWD023ABJ 1

2. Put a light coat of oil around the outside diameter of the outer pinion bearing cup. Use an universal bearing cup installer to install the outer bearing cup into the carrier.



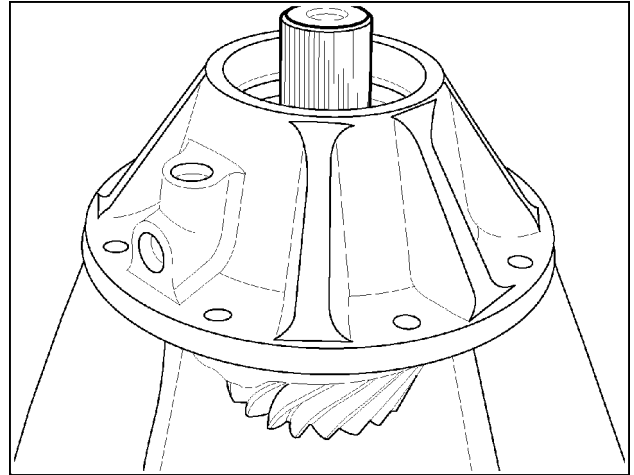
RCPH10FWD024ABJ 2

3. Put a light coat of oil around the inside diameter of the inner pinion bearing cone. Use the **CAS2666** press sleeve and press to install the inner bearing cone on the pinion shaft until seated.



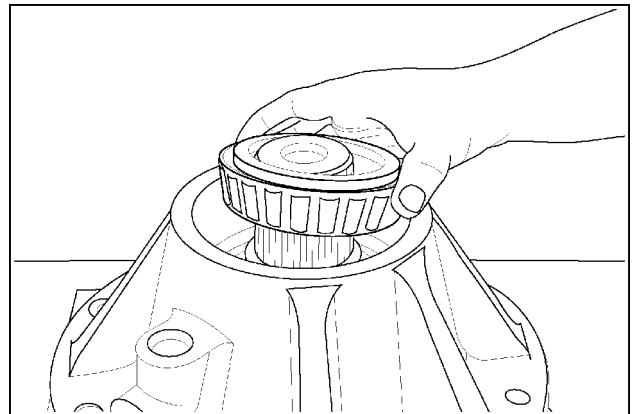
RCPH10FWD025ABJ 3

4. Lubricate the inner bearing cone with clean operating oil. Install the bevel pinion gear into the carrier housing.



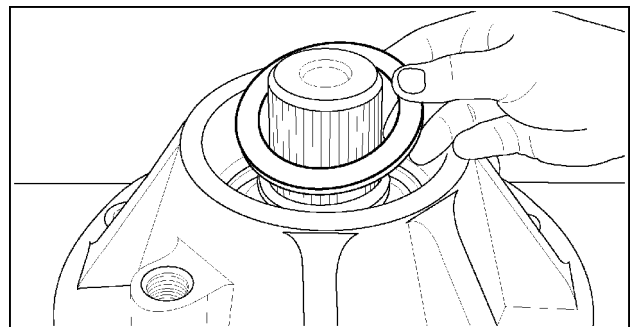
RCPH10FWD026ABJ 4

5. Lubricate the front bearing cone with clean operating oil or assembly grease. Install the bearing cone on the pinion shaft.



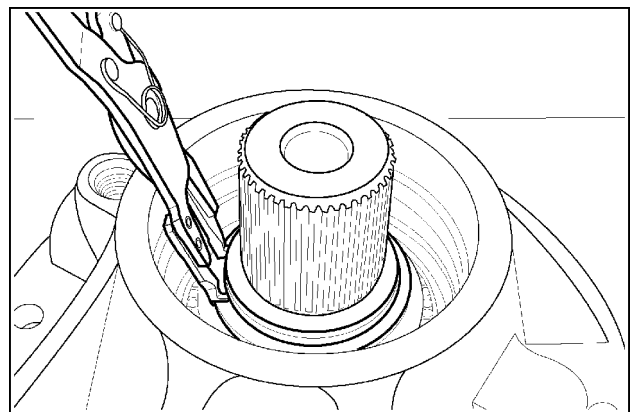
RCPH10FWD027ABJ 5

6. Install the thick spacer ring on the pinion shaft.



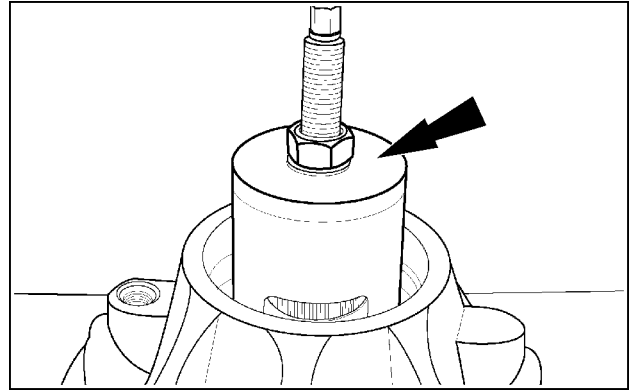
RCPH10FWD028ABJ 6

7. Install a new snap ring on the pinion shaft as far down as possible.



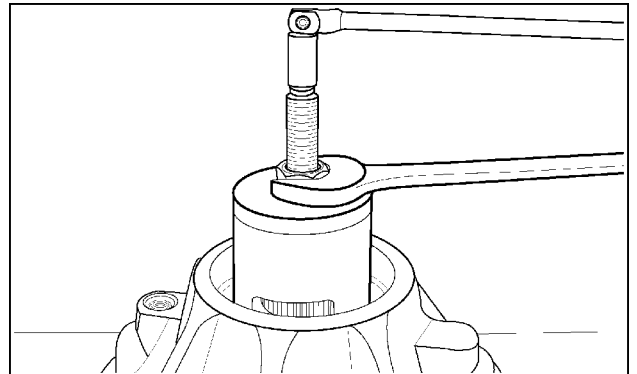
RCPH10FWD029ABJ 7

8. Install and tighten the center bolt of the **CAS2511** pinion bearing compression tool into the end of the pinion shaft. Install the compression sleeve, thrust washer and nut on the center bolt.



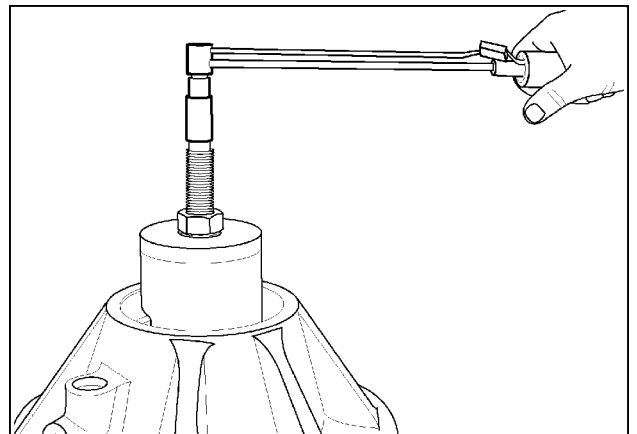
RCPH10FWD030ABJ 8

9. Use one wrench to hold the center bolt and a second wrench to tighten the nut to push the bearing cone on the pinion gear shaft until some resistance is noted when the pinion gear is rotated. Install the snap ring into the groove of the pinion shaft.



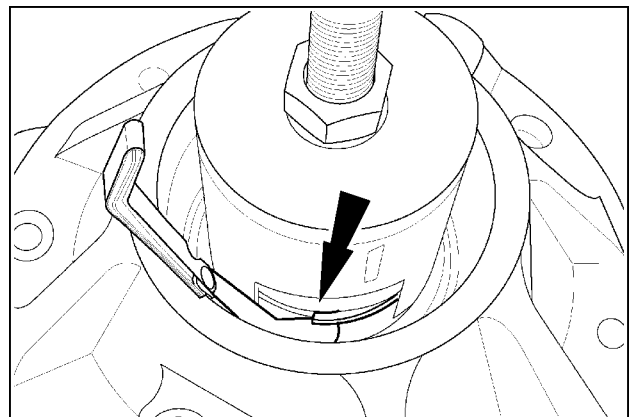
RCPH10FWD962AAJ 9

10. Use a torque wrench on the center bolt to measure rolling torque. Tighten the nut until **19 – 20 N·m (168 – 177 lb in)** of smooth and continuous rolling torque is measured.



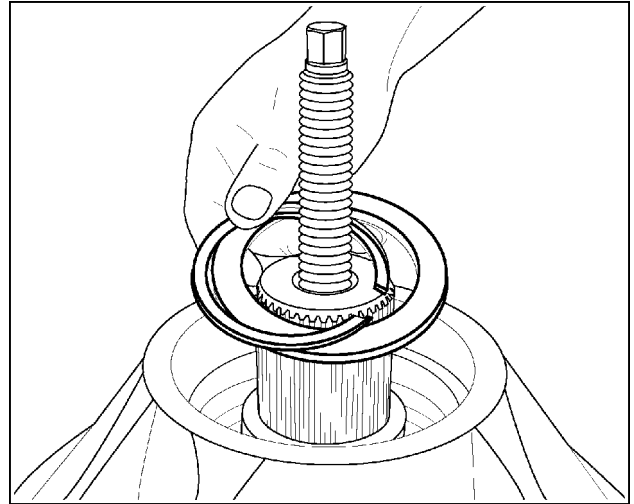
RCPH10FWD031ABJ 10

11. Use an angled feeler gauge to measure and record the distance between the spacer ring and the snap ring. The feeler gauge must be a tight fit.



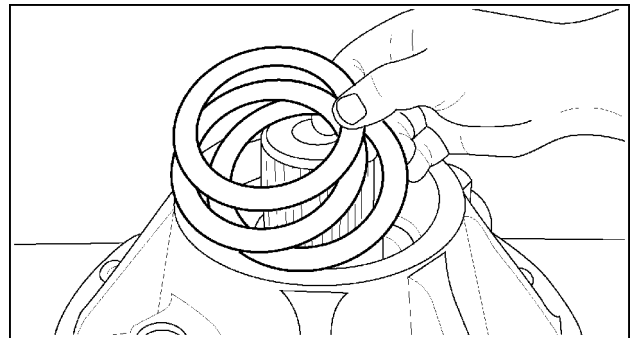
RCPH10FWD032ABJ 11

12. Remove the compression sleeve, snap ring and thick spacer ring.



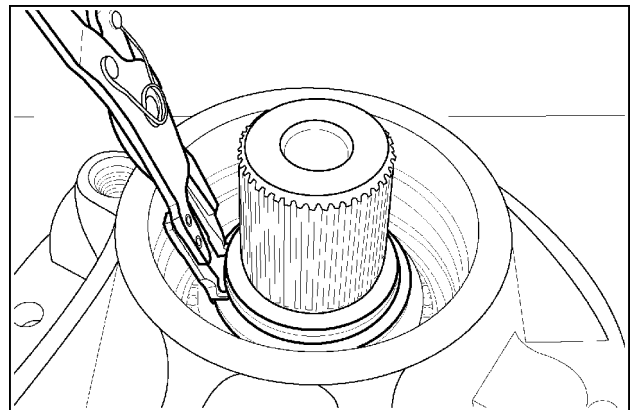
RCPH10FWD033ABJ 12

13. Select a shim combination equal to the distance measured in step 11. Install the selected shim pack (thickest shim first) and thick spacer ring on the pinion shaft.



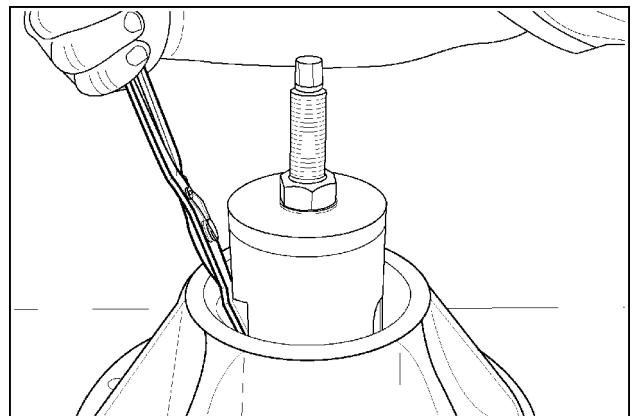
RCPH10FWD034ABJ 13

14. Install the snap ring on the pinion shaft as far down as possible.



RCPH10FWD029ABJ 14

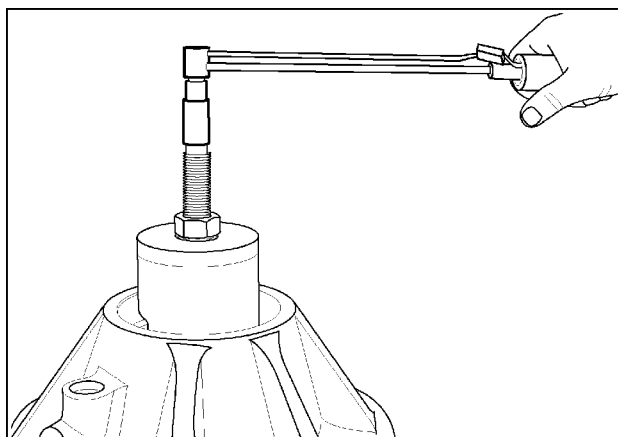
15. Install the compression sleeve, thrust washer and nut on the center bolt. Align the open window of the sleeve with the gap of the snap ring. Tighten the nut on the compression sleeve until the snap ring can be installed in the groove of the shaft. Be sure the snap ring is fully seated in the groove.



RCPH10FWD963AAJ 15

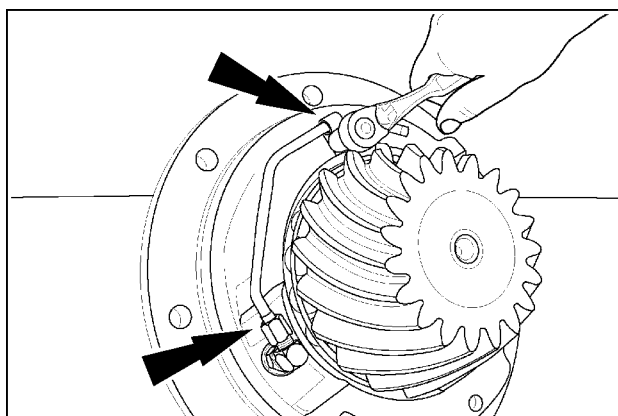
16. Loosen the nut on the center bolt at least two full turns. Strike the head of the center bolt two sharp blows with a heavy hammer to back seat the bearing against the snap ring. Use a torque wrench to check pinion bearing preload. Rolling torque must measure **6 – 20 N·m (53 – 177 lb in)** with no bearing binding or lockup. If rolling torque is out of tolerance, add or remove shims as needed to correct rolling torque.

NOTE: Adjust used bearings towards the low end of the preload tolerance range.



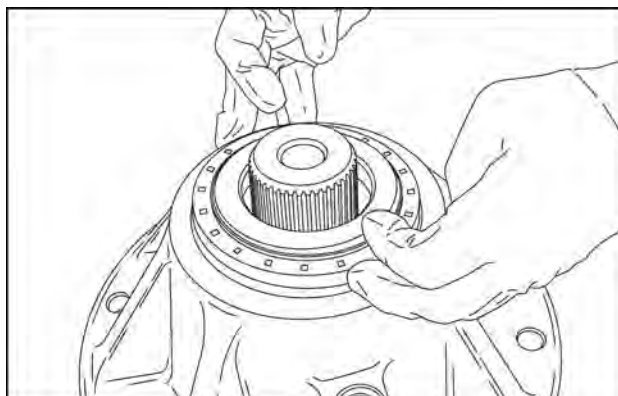
RCPH10FWD031ABJ 16

17. Install the lubrication port fitting, pinion lube tube, retaining clip and bolt. Tighten the bolt to specifications. Adjust the tube to direct oil flow at the pinion gear teeth. Allow a minimum of **6 mm (0.24 in)** clearance between the end of the tube and the bevel gear. Tighten the tube fitting and connection securely.



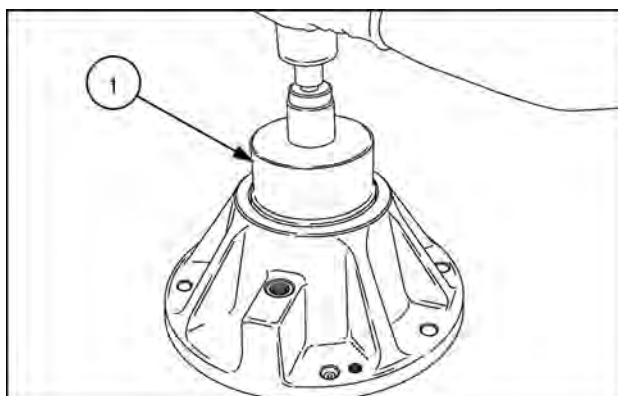
RCPH10FWD960AAJ 17

18. Install the pinion seal over the pinion shaft into the bore of the housing.



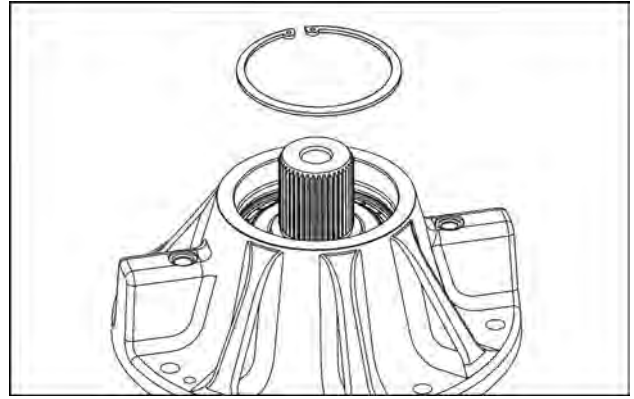
RAIL17TR01392AA 18

19. Use **380003447** pinion seal driver (1) with bolt and washer to draw oil seal down to position.



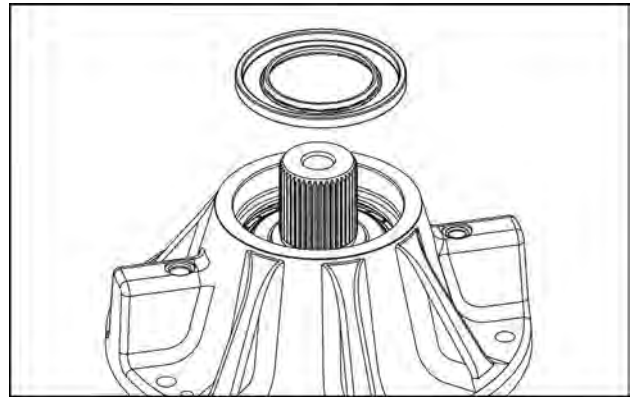
RAIL17TR01393AA 19

20. Install snap ring.



RAIL17TR01399AA 20

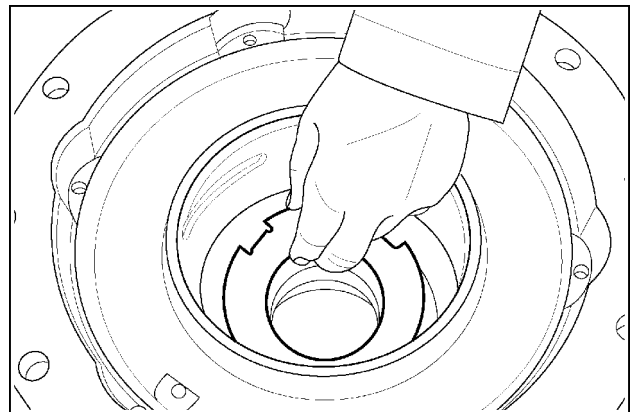
21. Press the dust seal on until it is flush with the housing.



RAIL17TR01398AA 21

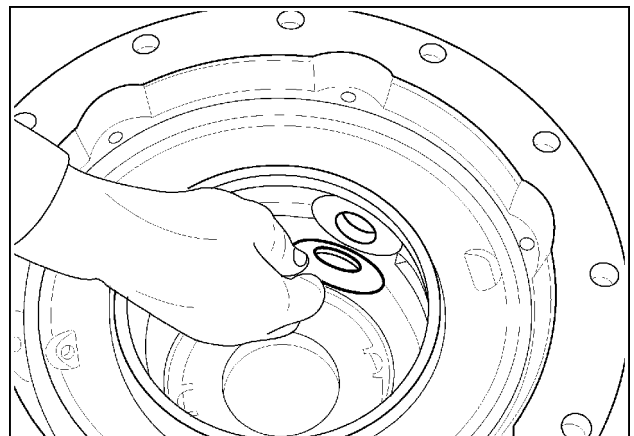
Differential case assembly procedures

22. Lubricate the thrust washer for the case with clean assembly grease. Position the thrust washer tab side down in the bottom of the case.



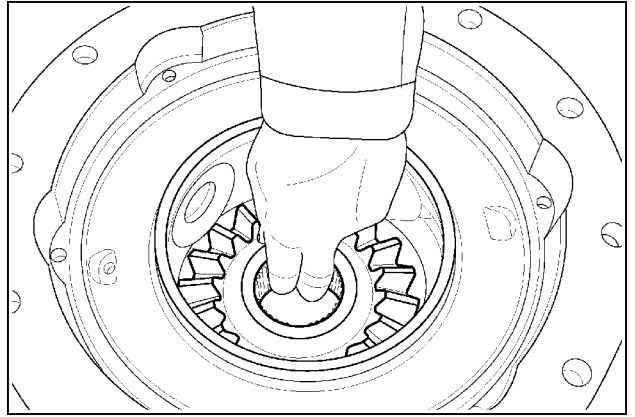
RCPH10FWD017ABJ 22

23. Lubricate each spider gear thrust washer with clean assembly grease. Install each spider gear thrust washer (tab outward) to engage the slot in the case and centered to the hole.



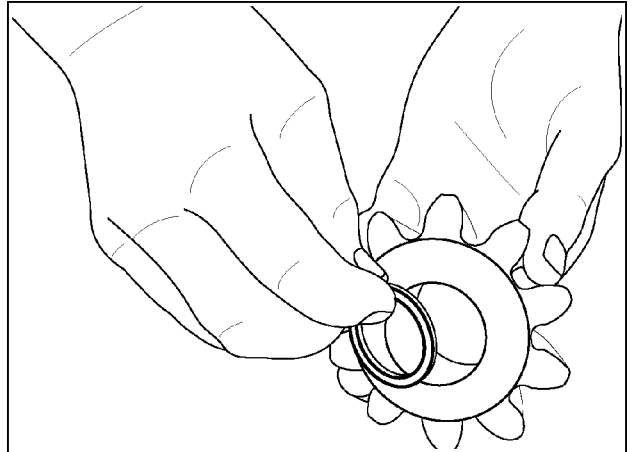
RCPH10FWD016ABJ 23

24. Install the side gear into the bore in the bottom of the case.



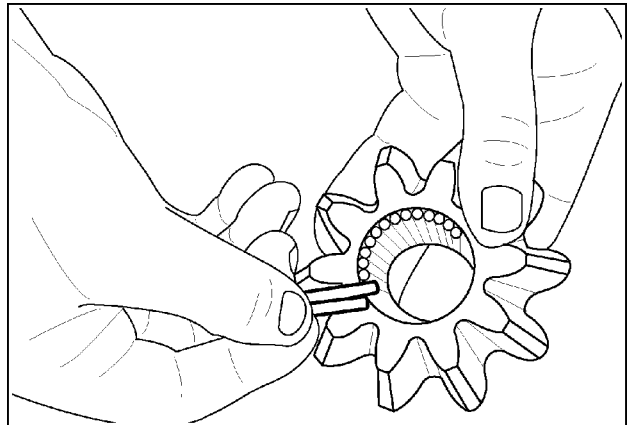
RCPH10FWD037ABJ 24

25. Lubricate the needle bearing slave ring with clean assembly grease. Install the slave ring into the bore of the spider gear.



RCPH10FWD038ABJ 25

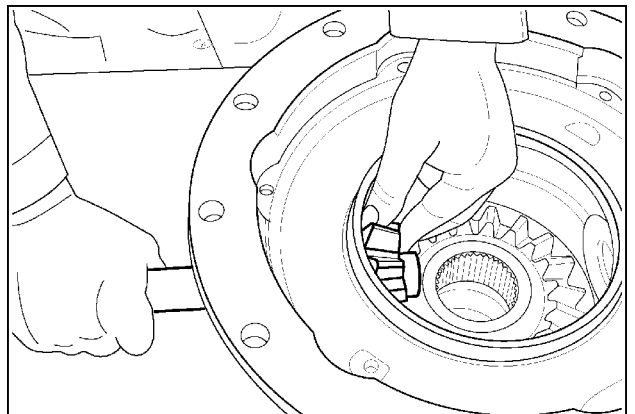
26. Using the slave ring as a needle roller bearing support, use clean assembly grease to install a full complement of 28 needle roller bearings into each spider gear.



RCPH10FWD039ABJ 26

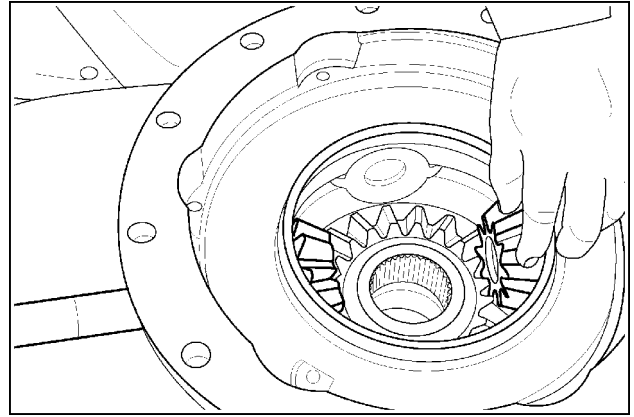
27. Install the first spider gear into the case centered to the hole for the long pin and meshed with the side gear. Push the pin through the case and into the spider gear until the pin is flush with the inner side of the gear.

NOTE: Turn the long pin so that the hole in the center of the pin is horizontal



RCPH10FWD040ABJ 27

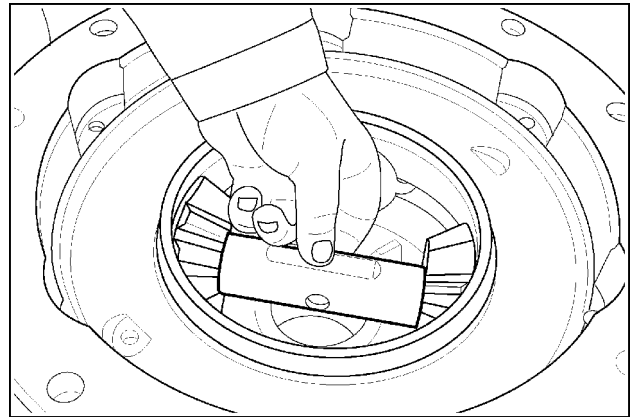
28. Install the opposite side spider gear centered to the case bore and meshed with the side gear.



RCPH10FWD041ABJ 28

29. Install the long spacer sleeve between the two spider gears so that the hole in the center of the sleeve is horizontal. Carefully push the long pin through the spacer sleeve and spider gears until the hole in the pin and spacer sleeve are aligned.

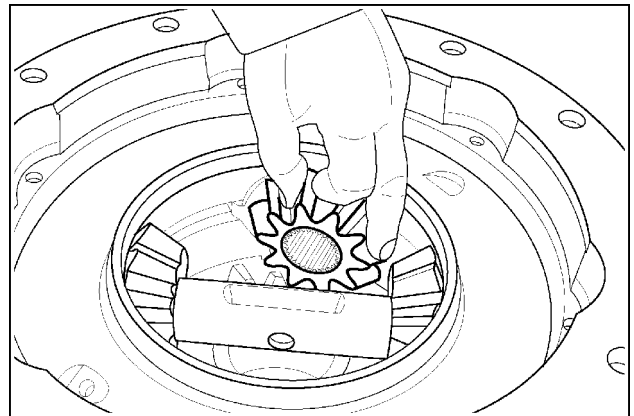
NOTE: Be sure the slave ring and all needle rollers remain in position in each pinion gear. Check the rotation of the pinion gears and bottom side gear. Rotation of the gears must be smooth without lockup.



RCPH10FWD042ABJ 29

30. Install the pinion gears for the short pins into the case in the same manner.

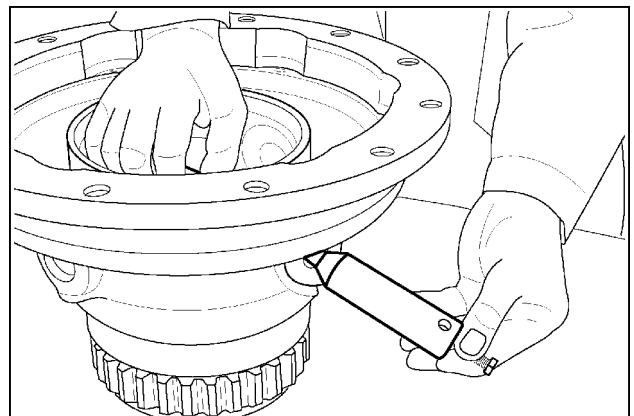
NOTE: The slave ring for each spider gear must be installed on the beveled side of the gear.



RCPH10FWD013ABJ 30

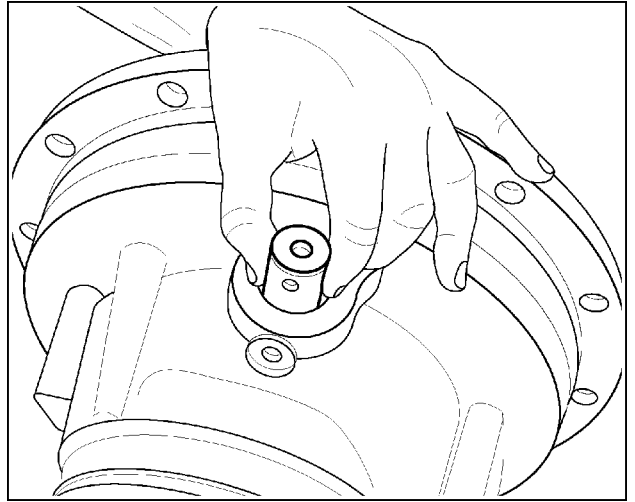
31. Position a short spacer sleeve between the pinion gear and long spacer sleeve. Carefully install the pinion pin and short spacer to engage the hole in the long pin and spacer.

NOTE: The large outside diameter of the spacer sleeve must mate against the ends of the needle rollers. Be sure all needle rollers remained in the gear.



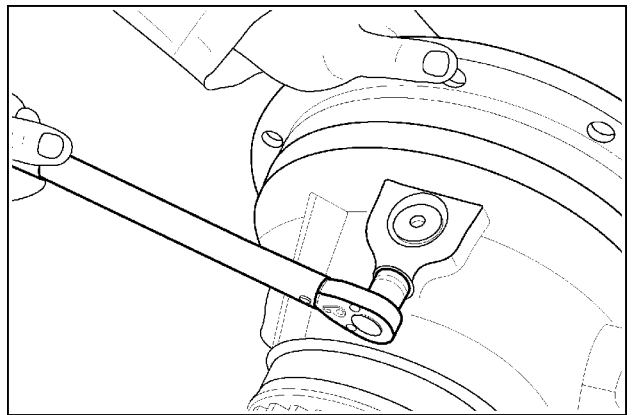
RCPH10FWD012ABJ 31

32. Align the hole in the end of the short pinion pin with the threaded hole in the case. Repeat this procedure for the opposite short pinion shaft.



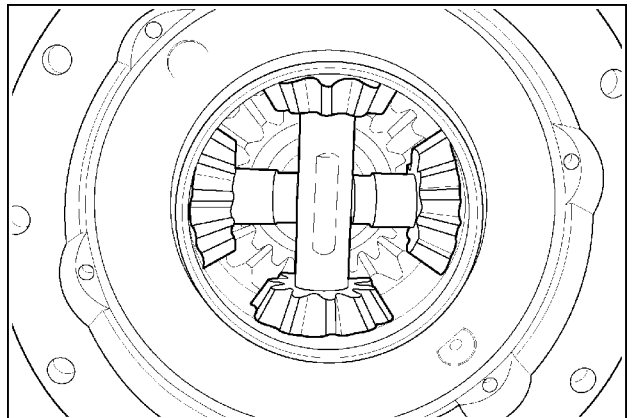
RCPH10FWD043ABJ 32

33. Install the pinion pin retainer bolts. Tighten each bolt to specifications.



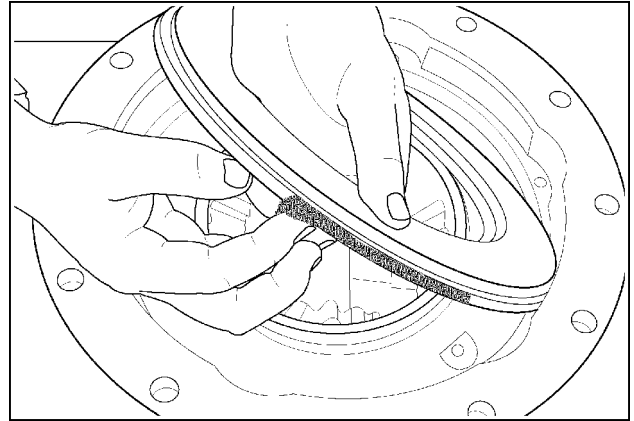
RCPH10FWD011ABJ 33

34. After all the pinion gears and pins have been installed, check the rotation of the differential gears. There must be no lockup during rotation.



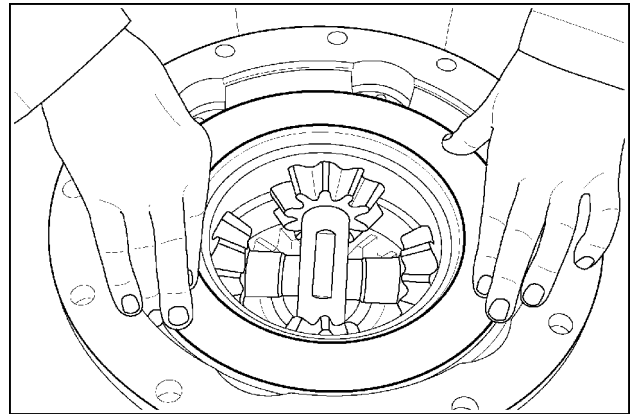
RCPH10FWD044ABJ 34

35. Lubricate the seals of a new piston with clean assembly grease.



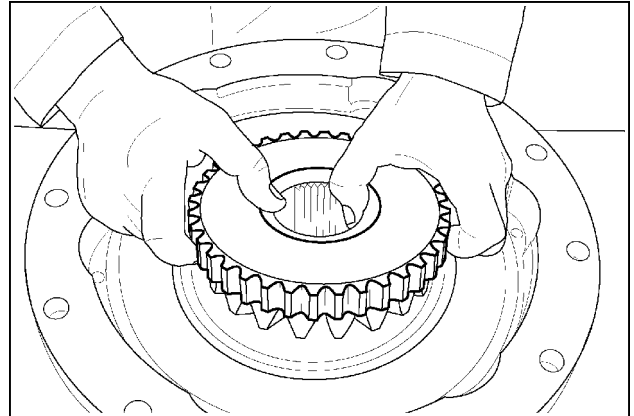
RCPH10FWD045ABJ 35

36. Hand seat the differential lock piston into the bore of the case.



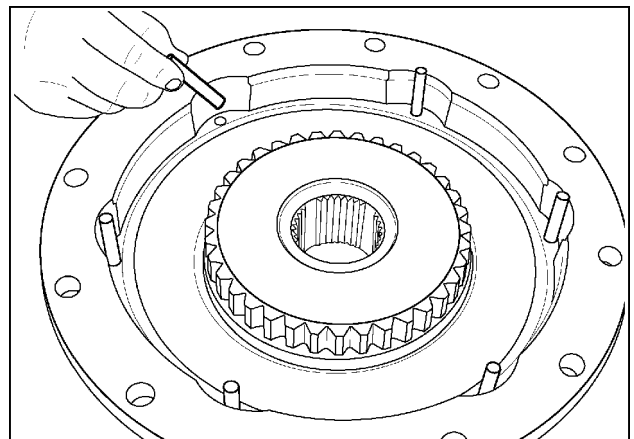
RCPH10FWD046ABJ 36

37. Install the splined side gear on top of the pinion gears so that all gears are in mesh.



RCPH10FWD047ABJ 37

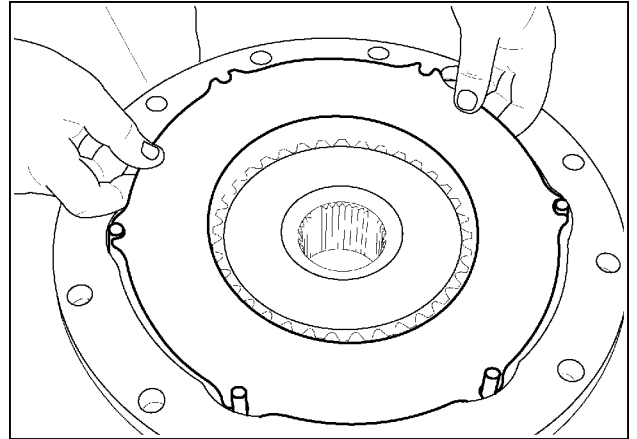
38. Install the six anti-rotation dowel pins into the holes in the case.



RCPH10FWD048ABJ 38

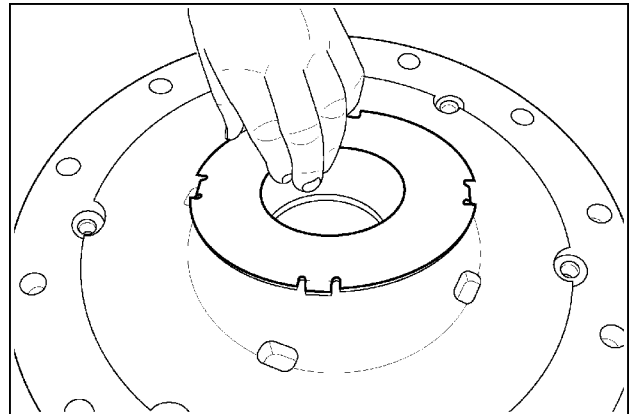
39. Starting with a steel separator plate, alternately install 4 separator plates and 3 friction plates. Be sure the slots in the ears of the separator plates engage the dowel pins.

NOTE: Soak the friction plates in clean operating fluid before installation.



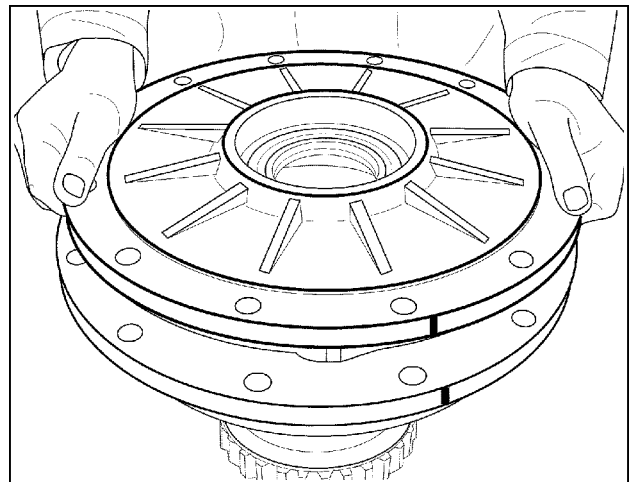
RCPH10FWD049ABJ 39

40. Lubricate the large thrust washer with clean assembly grease. Install the thrust washer into the cover (tab side down).



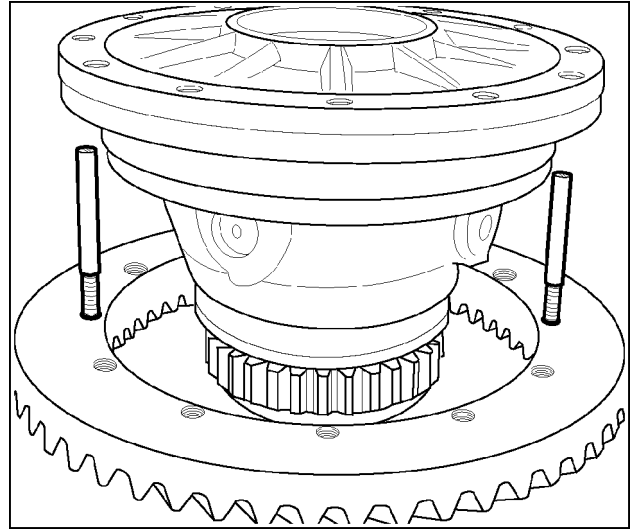
RCPH10FWD006ABJ 40

41. Install the cover on top of the case so that the match marks align.



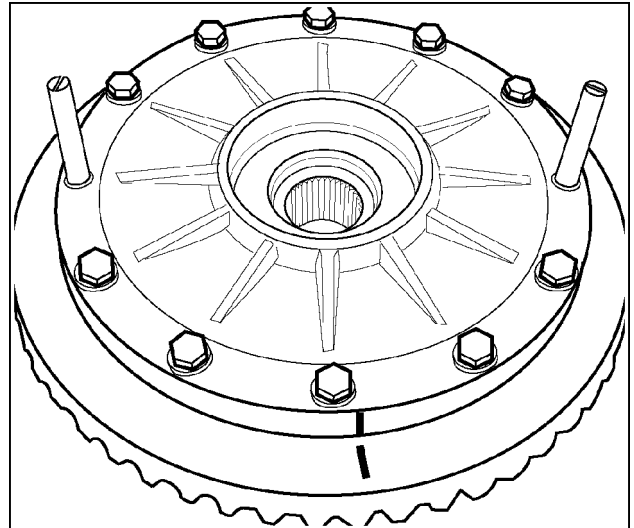
RCPH10FWD005ABJ 41

42. Put a light coat of oil around the inside diameter of the ring gear. Install two of the **CAS2496** alignment studs into opposite holes of the ring gear. Position the differential case over the ring gear.



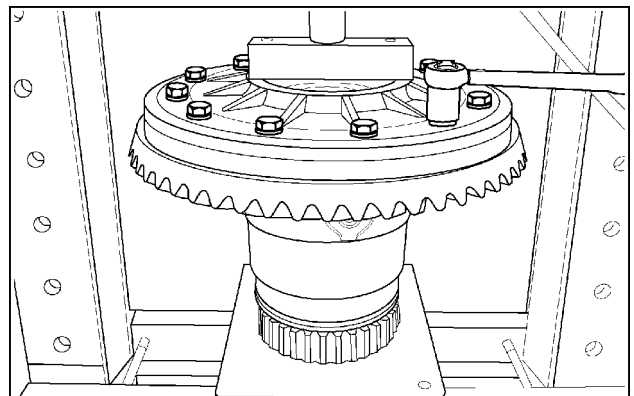
RCPH10FWD050ABJ 42

43. Position the ring gear on the differential case so the match marks align. Install new retaining bolts and washers.



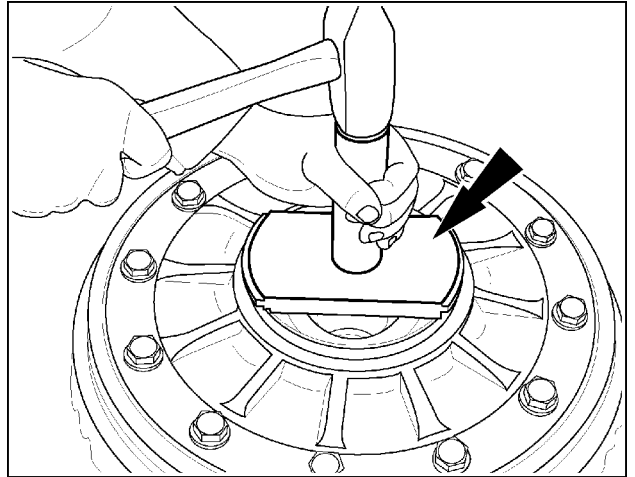
RCPH10FWD051ABJ 43

44. Clamp the differential assembly in a press. Tighten the retaining bolts alternately and evenly in small increments in a star pattern to **297 – 325 N·m (219 – 240 lb ft)**.



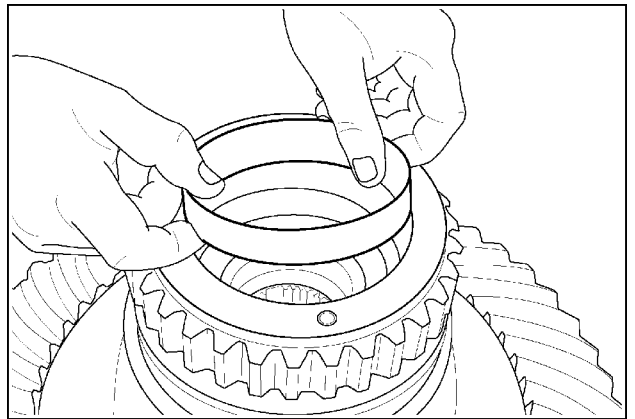
RCPH10FWD052ABJ 44

45. Use an appropriate bearing cup Installer to install the bearing cup into the cover until fully seated.



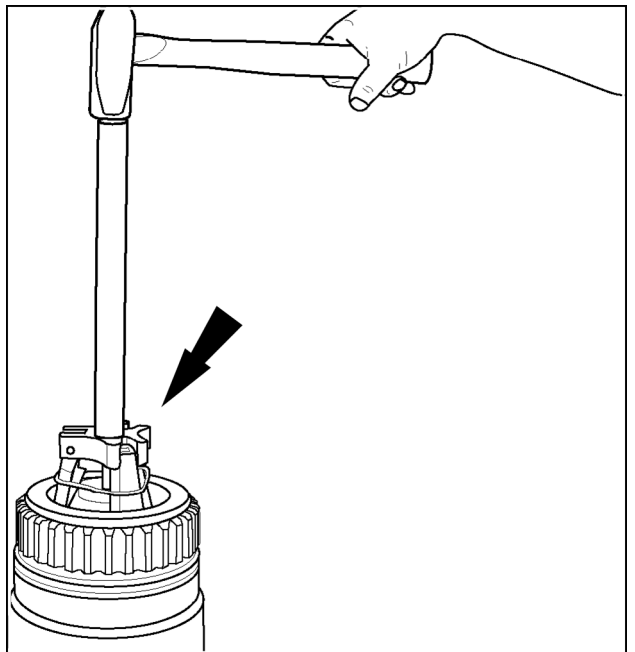
RCPH10FWD053ABJ 45

46. Position the bearing cup into the bore of the right hand case.



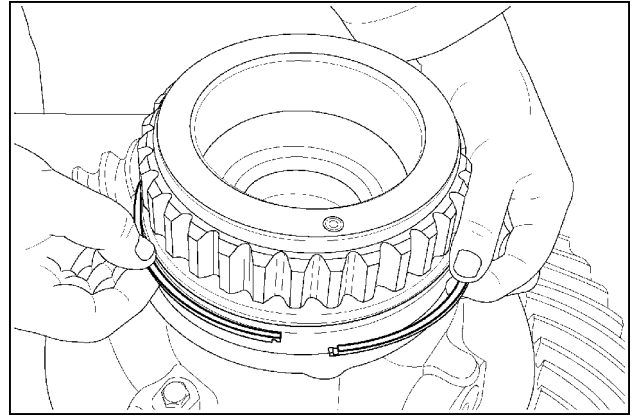
RCPH10FWD054ABJ 46

47. Use a universal bearing cup installer to install the bearing cup until seated.



RCPH10FWD055ABJ 47

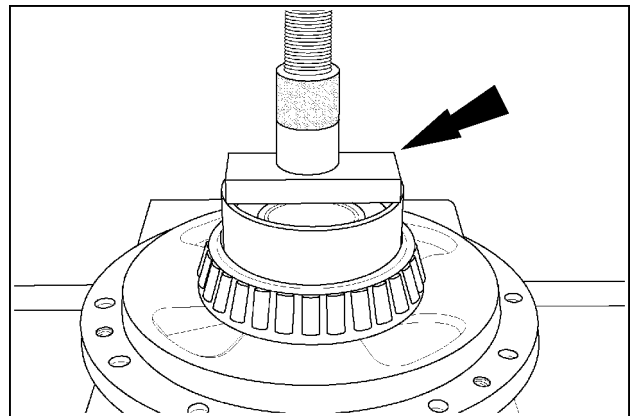
48. Install the Teflon seal ring in the groove of the hub. Lubricate the groove and the seal ring liberally with clean assembly grease. Be sure the ends of the seal ring are connected together.



RCPH10FWD002ABJ 48

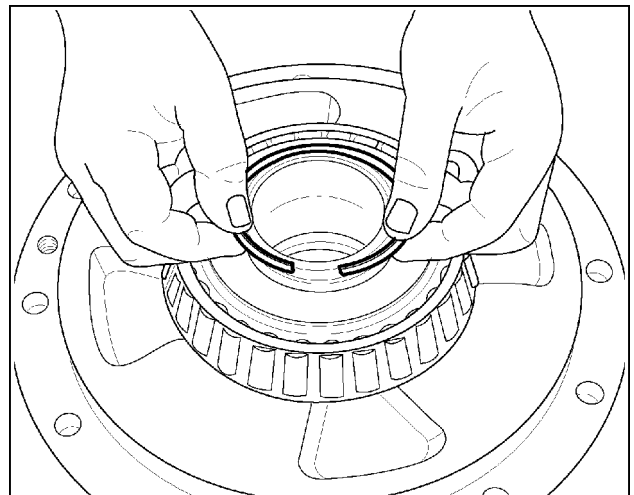
Left hand differential bearing support assembly

49. Use the **CAS2516** bearing installer and press to install the bearing cone until seated.



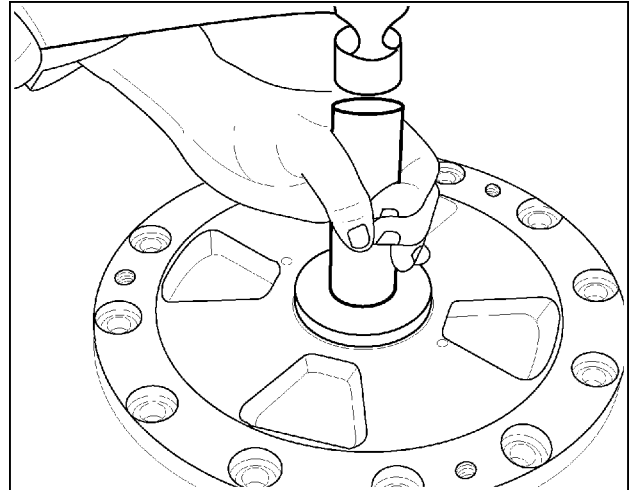
RCPH10FWD126ABJ 49

50. Lubricate and install a new seal ring in the groove of the bearing hub.



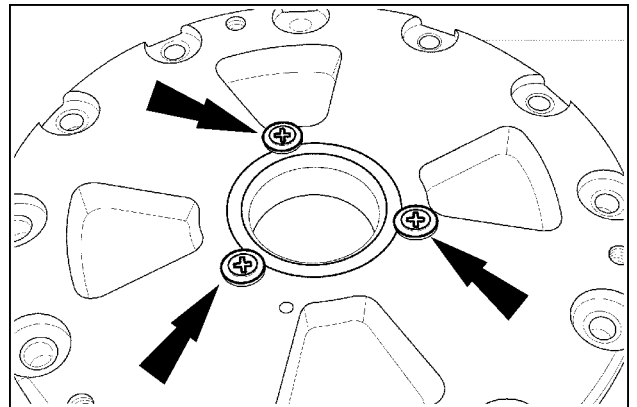
RCPH10FWD021ABJ 50

51. Use a seal driver to install a new oil seal into the bearing carrier.



RCPH10FWD095ABJ 51

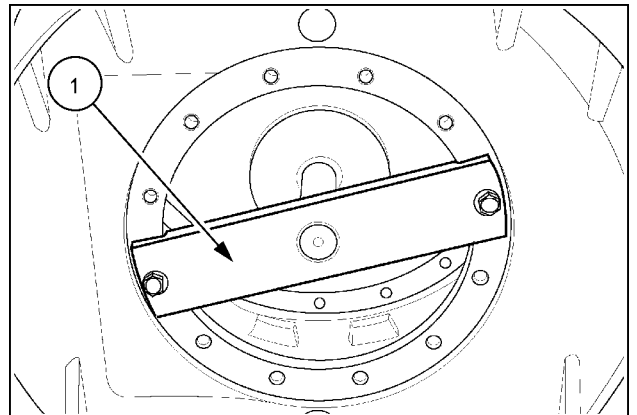
52. Install the 3 seal retainer bolts and washers. Apply thread sealant on the bolt threads.



RCPH10FWD234ABJ 52

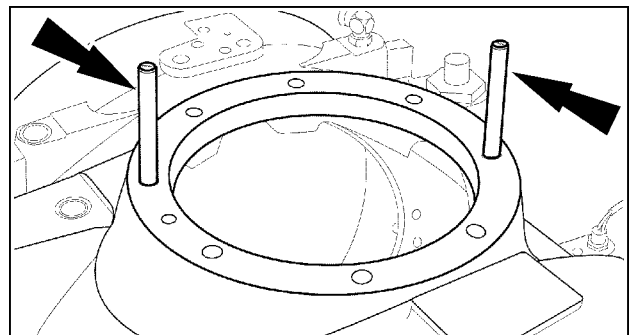
Adjusting bevel pinion gear depth

53. Install the **CAS2506** pinion depth gauge arbor into the bore for the left hand bearing support. Use two of the bearing support retaining bolts and washers. Tighten the bolts to a torque of **47 – 54 N·m (35 – 40 lb ft)**.



RCPH10FWD096ABJ 53

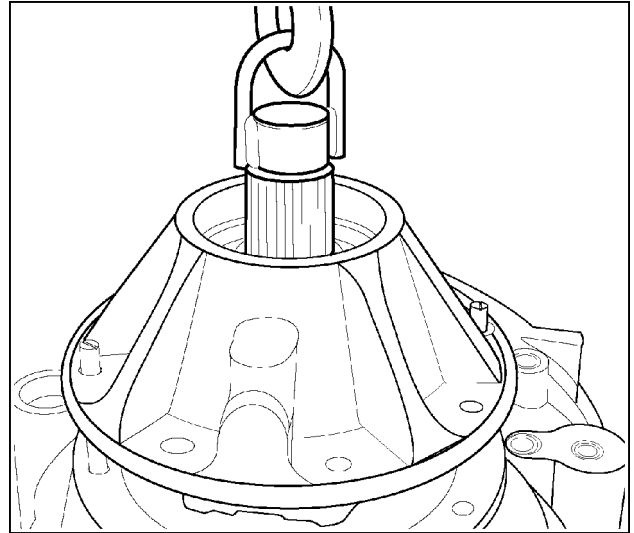
54. Install two of the **CAS2496** alignment studs opposite each other into the mounting flange.



RCPH10FWD235ABJ 54

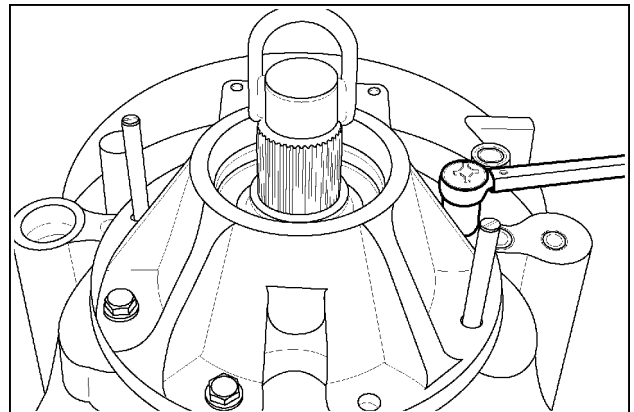
55. Use a lifting eye to install the pinion carrier assembly into the housing.

NOTE: Do not install the shims at this time.



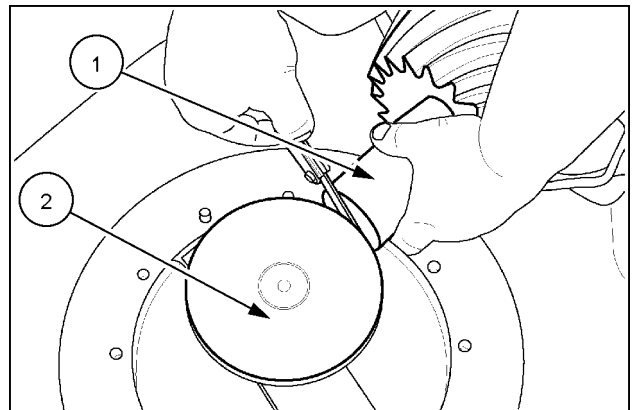
RCPH10FWD081ABJ 55

56. Install four equally spaced carrier assembly retaining bolts and washers. Tighten the bolts to specifications.



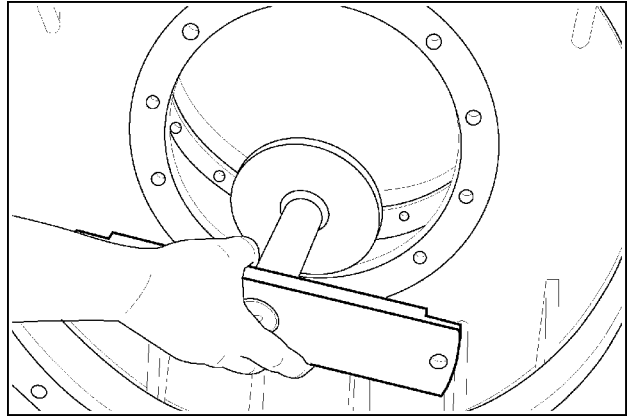
RCPH10FWD098ABJ 56

57. Install a gauge block (1) between the pinion and arbor (2) with the hole end of the gauge block held tightly against the end of the pinion. Use a feeler gauge to measure and record the distance between the end of the gauge block and arbor.



RCPH10FWD099ABJ 57

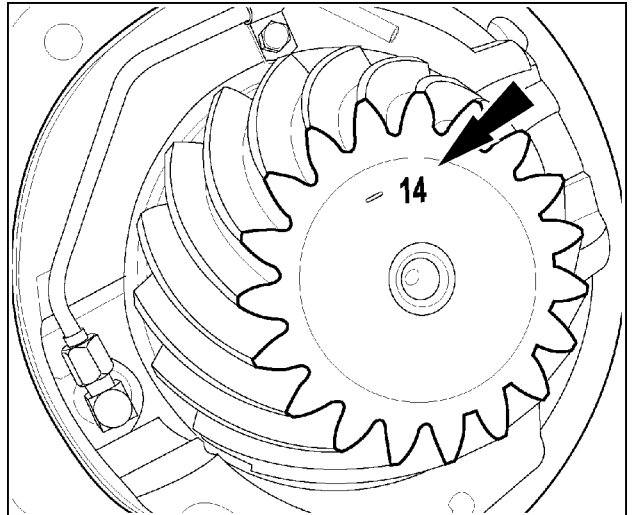
58. Remove the pinion carrier retaining bolts and lift the pinion carrier assembly from the housing. Remove the **CAS2506** arbor.



RCPH10FWD100ABJ 58

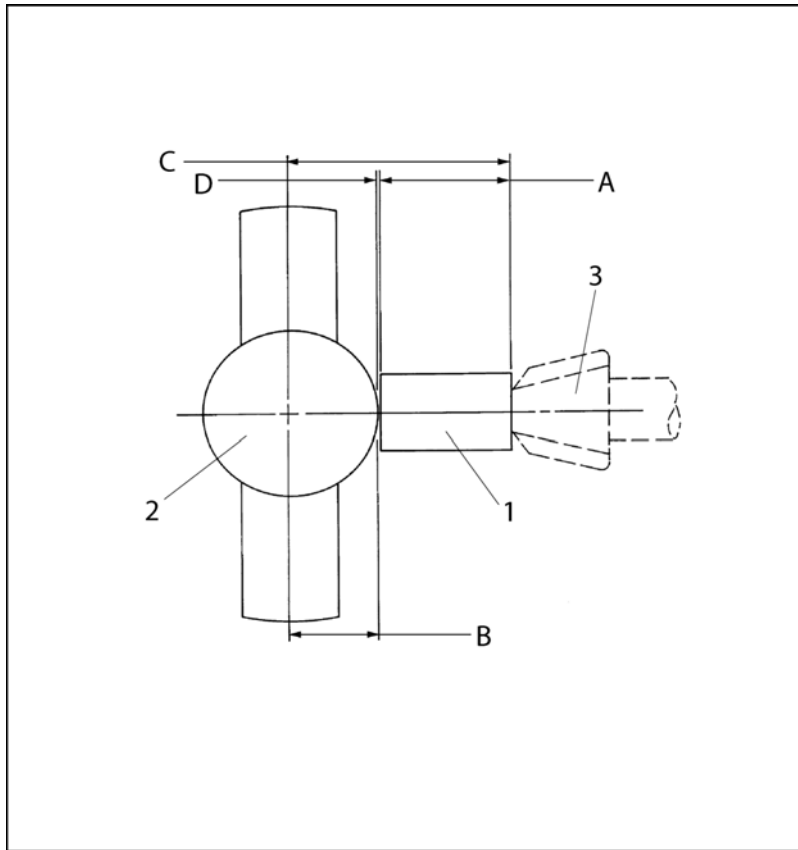
59. A correction factor number is etched onto the head end of the pinion. This number will be shown as a plus or minus adjustment in hundredths of a millimeter. Add or subtract this number from the standard nominal pinion depth dimension.

NOTE: The standard nominal mounting distance for the bevel pinion gear is **175.22 mm (6.90 in)** measured from the head end of the pinion gear to the center line of the differential.



RCPH10FWD101ABJ 59

60. Use the following table and example to calculate the pinion depth shim requirements



RCPH10FWD120FBJ 60

(1) CAS2506 pinion depth gauge arbor, pinion depth gauge block, (3) pinion

Item	Metric value	U.S. value
A	97.99 mm	3.858 in
B	75.82 mm	2.985 in
C	174.25 mm	6.860 in
D	.44 mm	0.017 in
Gap measurement		

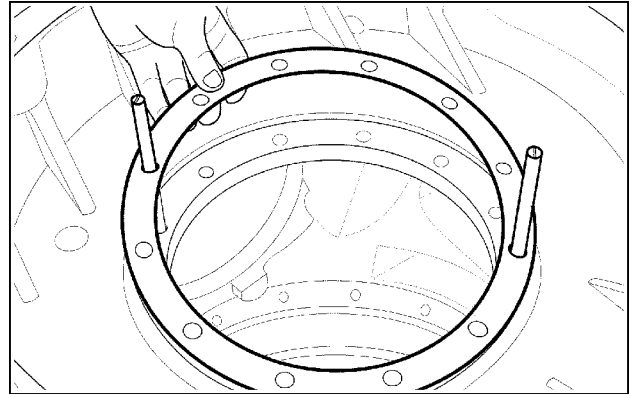
Example:

Item	Metric value	U.S. value
Tool constant dimension (A = B)	173.81 mm	6.840 in
Gap measurement (D)	.44 mm	0.017 in
Total measured distance (A + B + D = C)	174.25 mm	6.860 in
Standard nominal pinion depth	175.22 mm	6.898 in
Reading on the pinion	-0.14 mm	0.005 in
Actual nominal pinion depth	175.08 mm	6.892 in
Minus total measured distance	174.25 mm	6.860 in
Shim requirement	0.83 mm	0.032 in

61. Select a shim combination that will provide the shim requirement calculated in Step 60 within **0.03 mm (0.001 in)**.

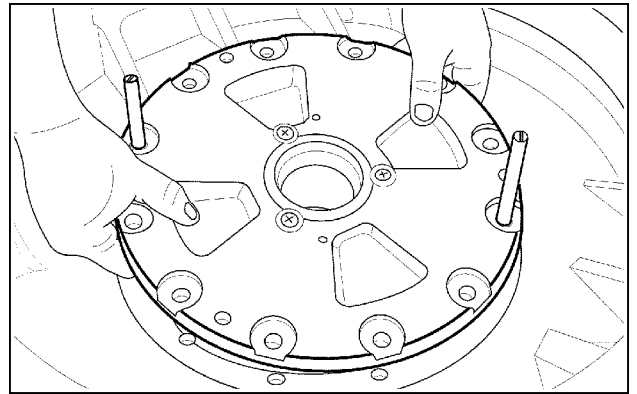
Setting differential carrier bearing preload

62. Install two **CAS2675** guide bolts into opposite holes of the left hand side bearing carrier bore. Install the original bearing preload shim pack over the guide bolts so that all holes align.



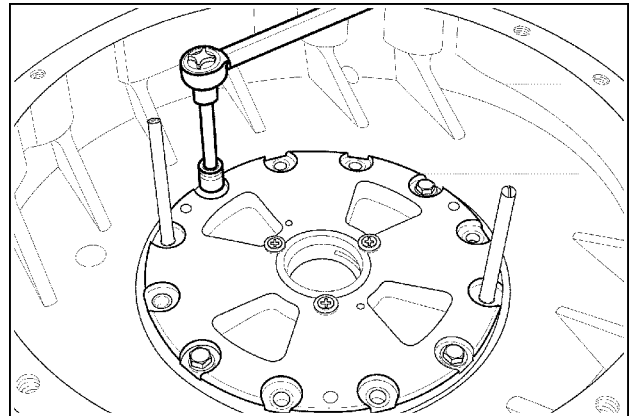
RCPH10FWD236ABJ 61

63. Install the pre-assembled left hand side bearing carrier into the housing.



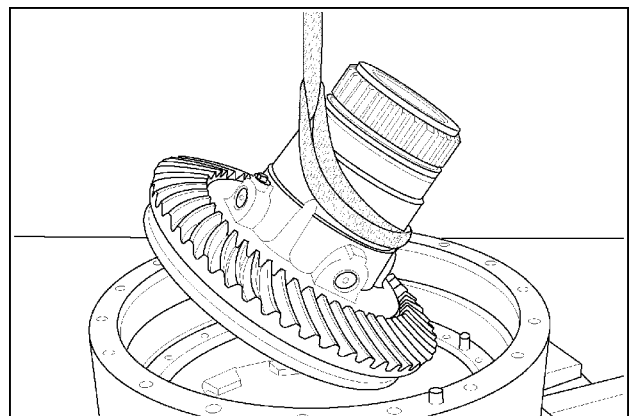
RCPH10FWD237ABJ 62

64. Remove the guide studs and install four equally spaced retaining bolts with washers. Tighten the bolts to specifications.



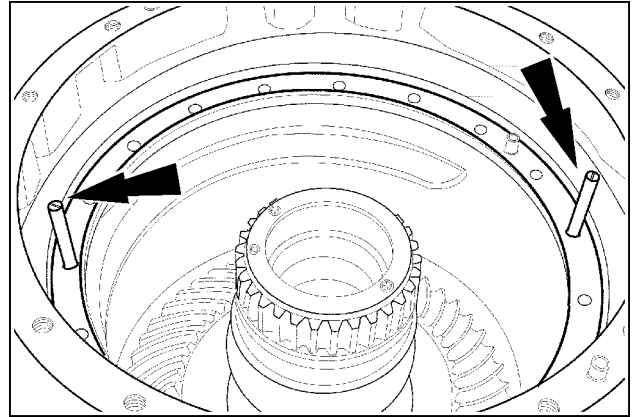
RCPH10FWD238ABJ 63

65. Rotate the differential housing so the right hand side is up. Use a hoist to slowly and carefully install the differential assembly into the housing to engage the left hand side bearing support.



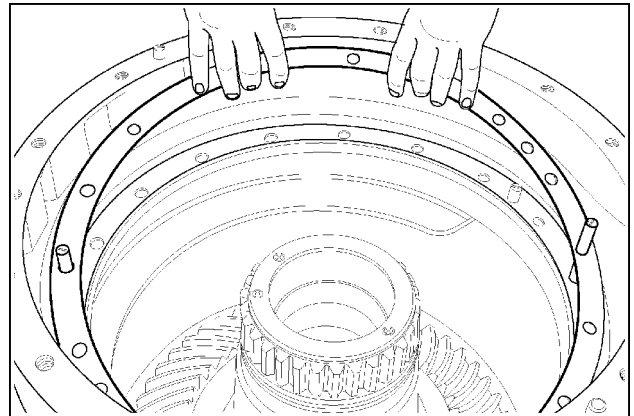
RCPH10FWD107ABJ 64

66. Install two **CAS2675** alignment studs into opposite holes of the housing.



RCPH10FWD239ABJ 65

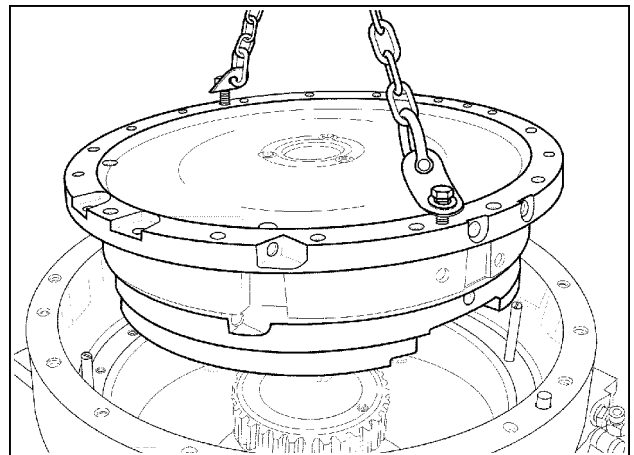
67. Install the original shim pack for the brake carrier and bearing support over the alignment studs so that all holes align.



RCPH10FWD210ABJ 66

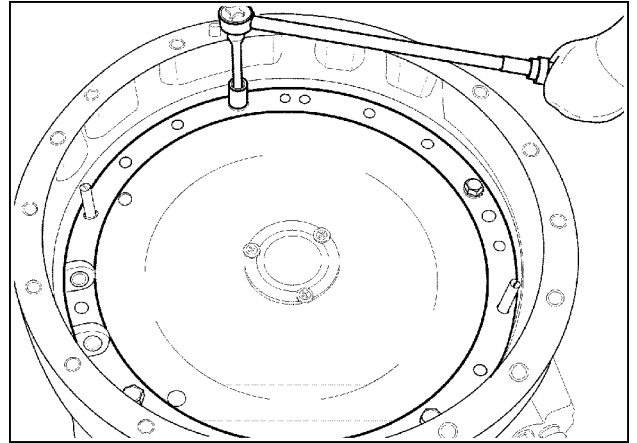
68. Use a hoist to carefully install the brake carrier into the housing so that the marks put on during disassembly, align.

NOTE: The brake discs and seals are not installed in the brake carrier during the bearing preload procedures.



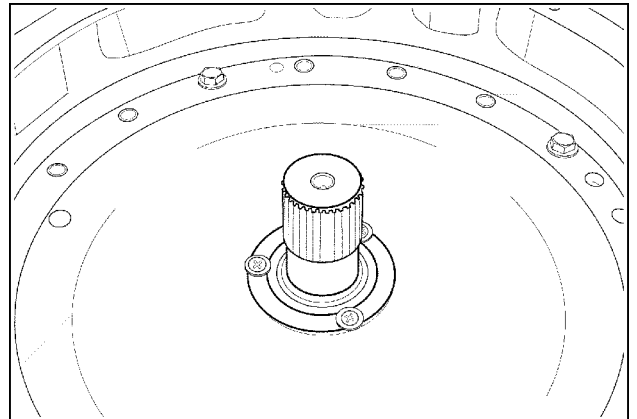
RCPH10FWD209ABJ 67

69. Install four of the carrier retaining bolts with washers 90 degrees from each other. Tighten the bolts evenly to specifications.



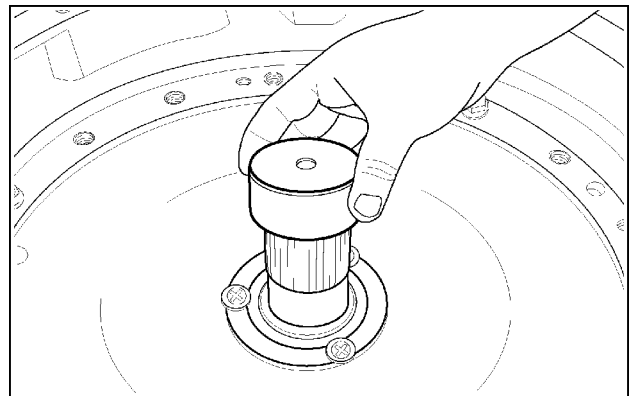
RCPH10FWD240ABJ 68

70. Install the right hand axle stub shaft into the differential.



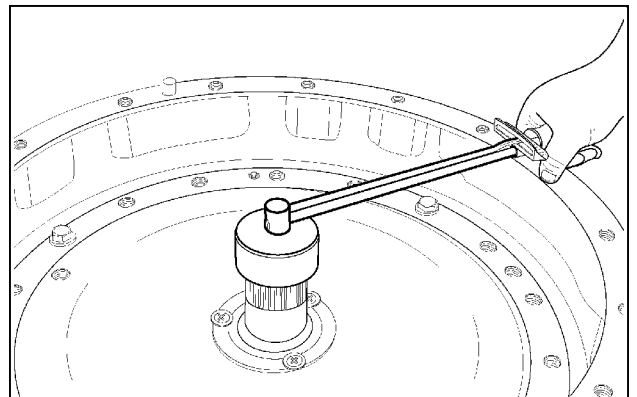
RCPH10FWD241ABJ 69

71. Install the **CAS2508** differential rolling torque adapter over the gear.



RCPH10FWD242ABJ 70

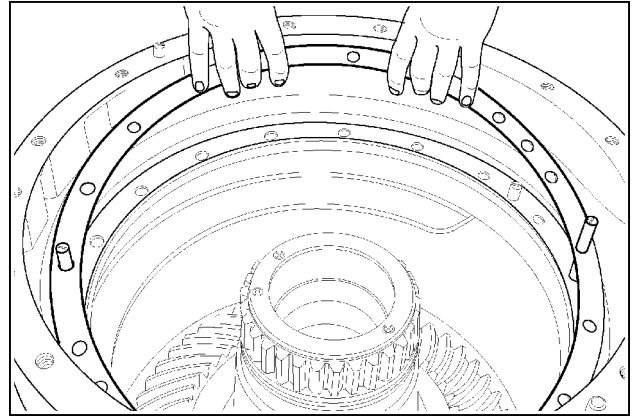
72. Connect a torque wrench to the adapter. Rotate the differential and measure the differential carrier bearing rolling torque. Bearing preload will be correct when **6 – 13 N·m (53 – 115 lb in)** of smooth and consistent rolling torque is measured on the torque wrench.



RCPH10FWD243ABJ 71

73. If differential bearing preload is out of tolerance, add or remove shims as required from the right hand and/or left hand bearing support shim pack until bearing preload is correct.

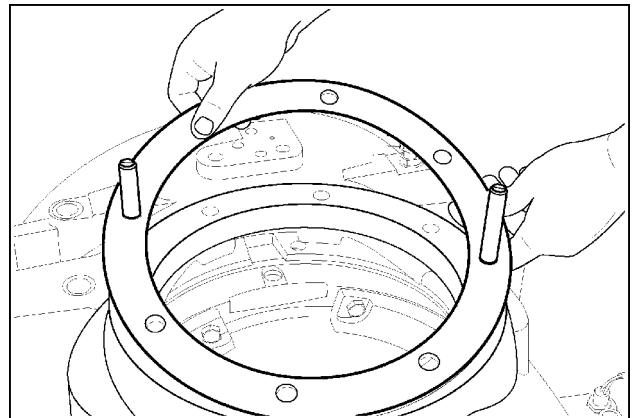
NOTE: Adjust used bearings to the low end of the rolling torque specifications.



RCPH10FWD210ABJ 72

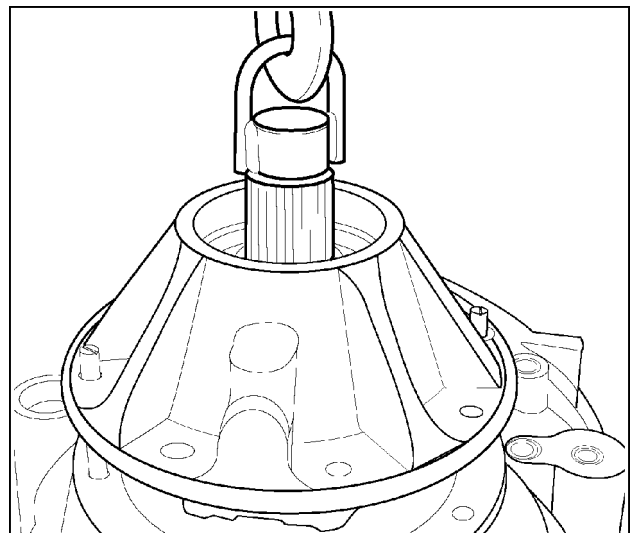
Setting the ring/pinion gear backlash

74. After adjusting differential carrier bearing preload correctly, rotate the housing so the pinion carrier will be on top. Install two **CAS2496** alignment studs opposite each other and install the pinion carrier shim pack calculated in step 60.



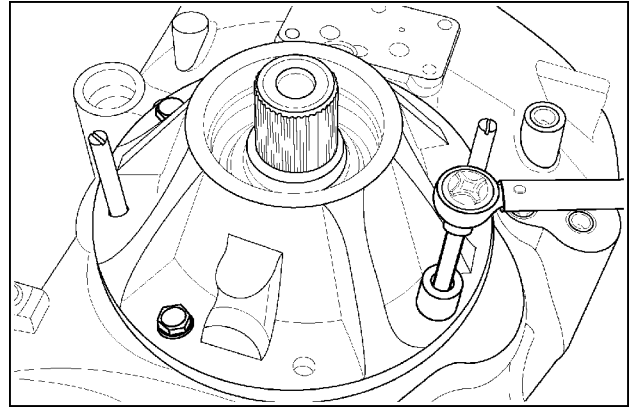
RCPH10FWD244ABJ 73

75. Install the pinion carrier assembly into the housing and remove the lifting eye.



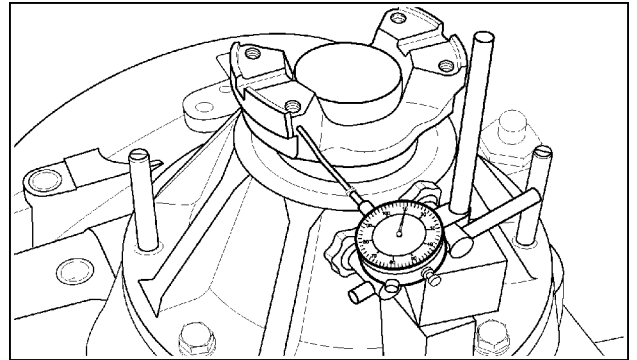
RCPH10FWD245ABJ 74

76. Install four pinion carrier retaining bolts and washers equally spaced. Tighten the four bolts to specifications.



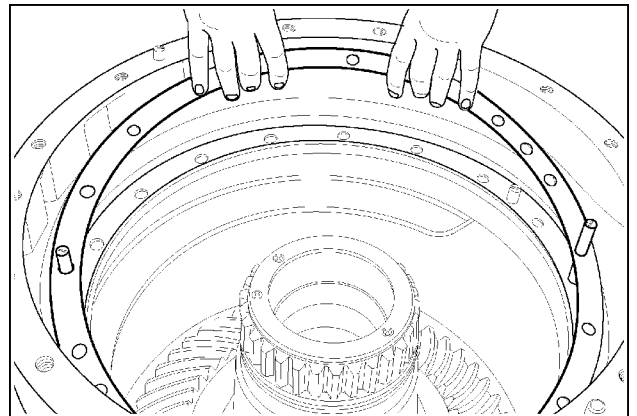
RCPH10FWD114ABJ 75

77. Install the drive yoke on the pinion gear. Use a dial indicator to measure ring/pinion gear backlash. Set the pointer of the dial indicator to contact the outer edge of the drive yoke flange. Rotate the pinion gear in either direction to achieve full contact with the ring gear. Do not move the ring gear. Zero the dial indicator. Rotate the pinion gear in the opposite direction to achieve full contact with the ring gear. Do not move the ring gear. Record the dial indicator reading. Perform this operation two or three times to ensure an accurate measurement. The backlash must be **0.2 – 0.3 mm (0.008 – 0.012 in)**.



RCPH10FWD246ABJ 76

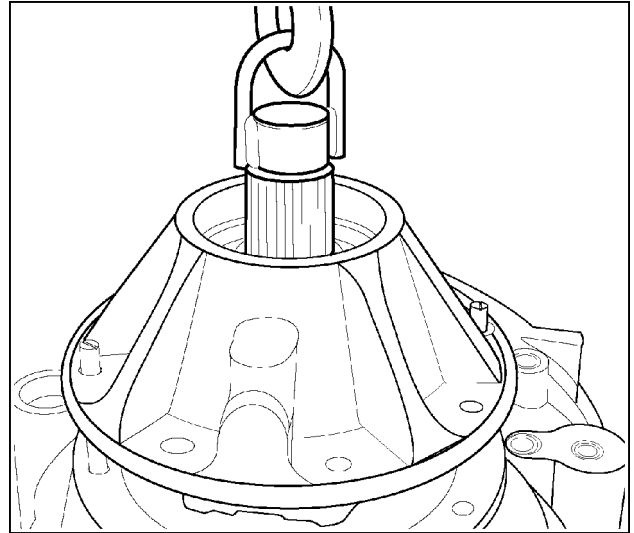
78. If too much backlash was measured, the ring gear must be moved closer to the pinion gear. If too little backlash was measured, the ring gear must be moved away from the pinion gear. To adjust the ring and pinion gear backlash, remove shims from one side of the differential and add the same amount to the other side so that differential carrier bearing preload is maintained. Moving a **0.254 mm (0.010 in)** shim from one side to the other will change the backlash approximately **0.169 mm (0.007 in)**.



RCPH10FWD210ABJ 77

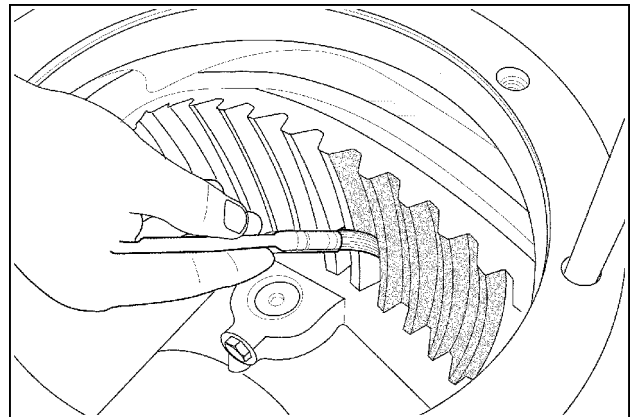
Checking for correct bevel pinion/gear tooth contact

79. After differential bearing preload and ring/pinion gear backlash adjustments have been completed, remove the pinion carrier.



RCPH10FWD081ABJ 78

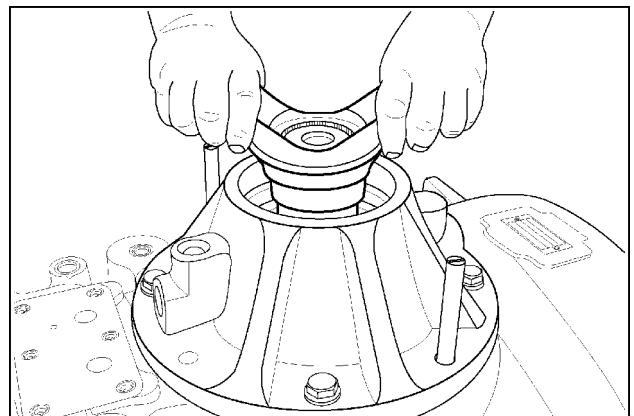
80. Put Prussian Blue or red lead on both sides of several ring gear teeth.



RCPH10FWD116ABJ 79

81. Reinstall the pinion gear carrier and tighten the retaining bolts to the specified torque. Turn the pinion several revolutions in both directions to determine the tooth contact pattern. Remove the pinion carrier.

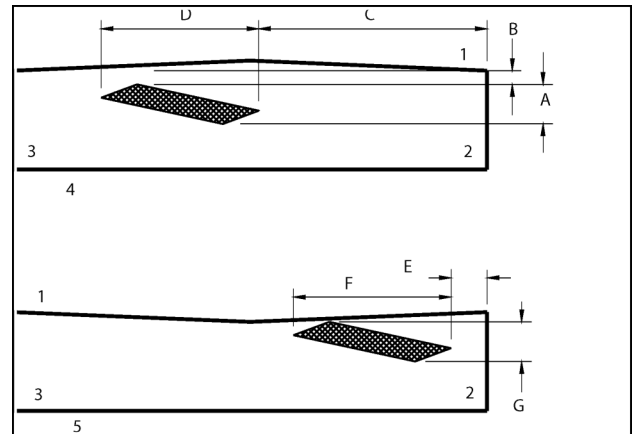
NOTE: See the contact patterns in the following illustrations. The contact pattern of the gear teeth that are shown are approximate shapes. Tooth contact pattern can change from the illustrations.



RCPH10FWD117ABJ 80

Inspect the contact pattern of the gear teeth. Compare the contact pattern with the following illustrations and tables, for both the right hand (rear) and the left hand (front) pinion sets, and determine the correct tooth contact pattern.

Right Hand (rear) Pinion Set Contact Pattern:



RCPH10FWD121FBJ 81

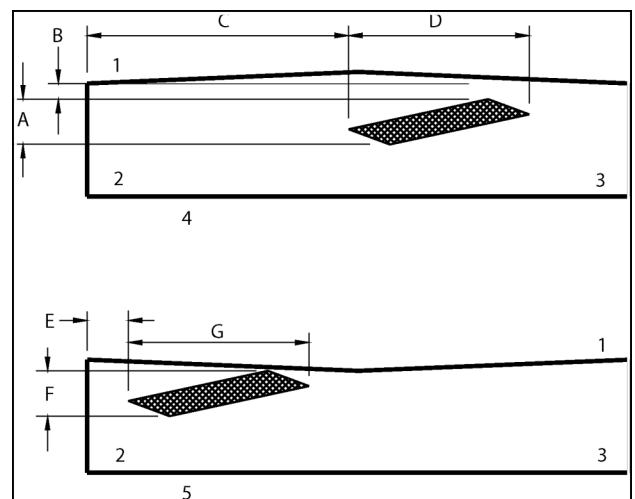
Correct tooth contact pattern: right hand (rear) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	6 – 9 mm	0.236 – 0.354 in
B	3 – 5 mm	0.118 – 0.197 in
C	30 – 35 mm	1.181 – 1.378 in
D	35 – 40 mm	1.378 – 1.575 in
E	10 – 15 mm	0.394 – 0.591 in
F	35 – 40 mm	1.378 – 1.575 in
G	6 – 8 mm	0.236 – 0.315 in

Left hand (front) pinion set contact pattern



RCPH10FWD122FBJ 82

Correct tooth contact pattern: left hand (front) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	5 – 8 mm	0.197 – 0.315 in
B	2 – 4 mm	0.079 – 0.157 in
C	30 – 35 mm	1.181 – 1.378 in
D	40 – 45 mm	1.575 – 1.772 in
E	10 – 15 mm	0.394 – 0.591 in
F	6 – 8 mm	0.236 – 0.315 in
G	35 – 40 mm	1.378 – 1.575 in

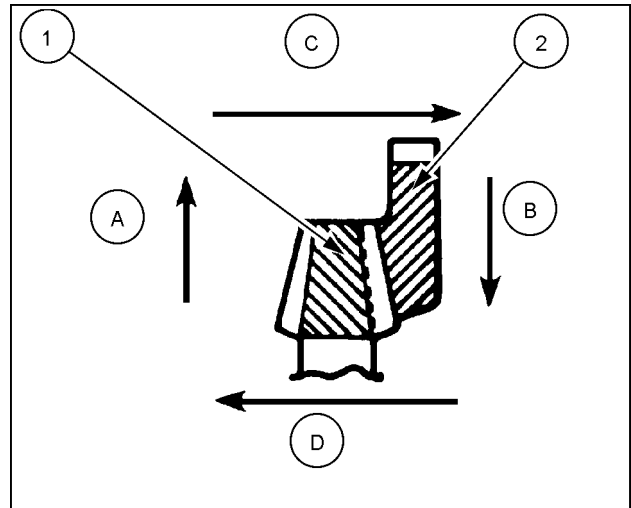
80. Adding or subtracting pinion carrier shims to change pinion depth must be done in small increments until the correct tooth contact pattern is obtained.

(A) Move the drive pinion **(1)** towards the ring gear **(2)** to move the contact pattern away from the Toe.

(B) Move the drive pinion away from the ring gear to move the contact pattern towards the Toe.

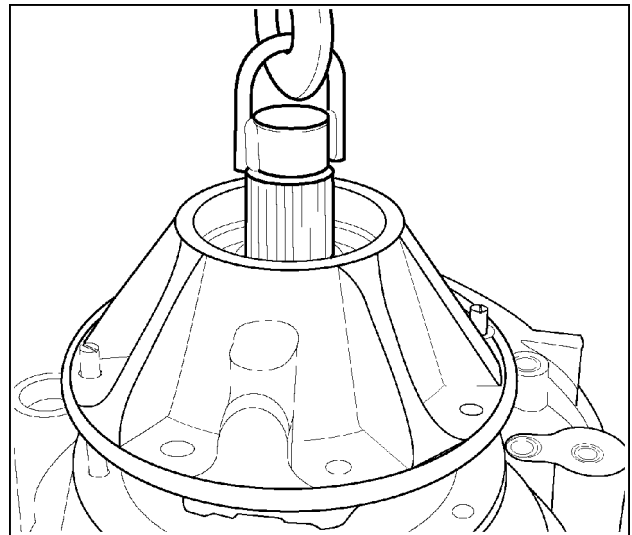
(C) Move the ring gear away from the drive pinion to increase backlash.

(D) Move the ring gear towards the drive pinion to decrease backlash.



RCPH10FWD123FBJ 83

81. Remove the pinion carrier from the housing.

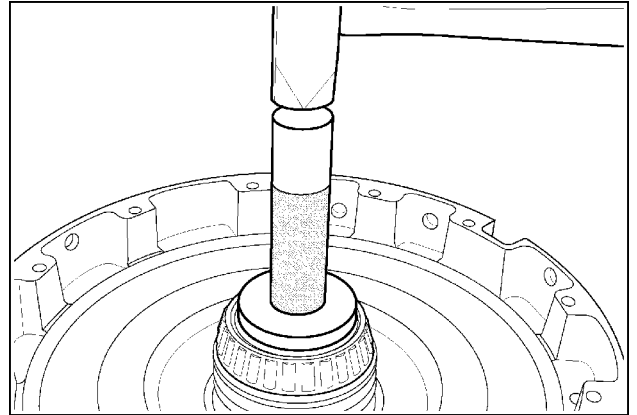


RCPH10FWD081ABJ 84

Right hand brake carrier assembly procedure

82. If removed, install the bearing cone (large side down) on the hub of the carrier. Use a bearing installer and handle to drive the bearing cone on the hub until seated.

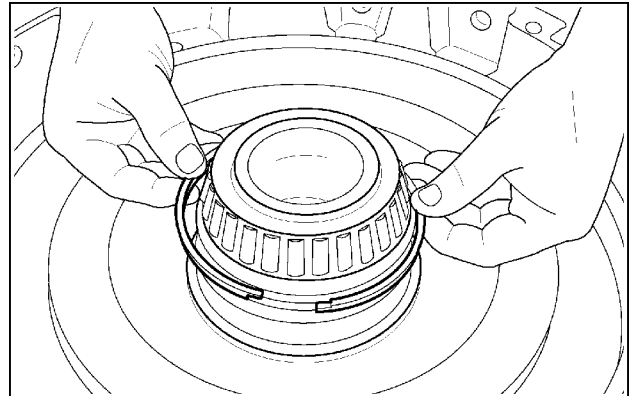
NOTICE: If differential carrier bearing preload, or ring gear and beveled pinion adjustment is required, Do not install the hub seals or brakes at this time. Proceed to step 62. When adjustments are completed or not required, proceed to the next step to complete the brake carrier assembly.



RCPH10FWD247ABJ 85

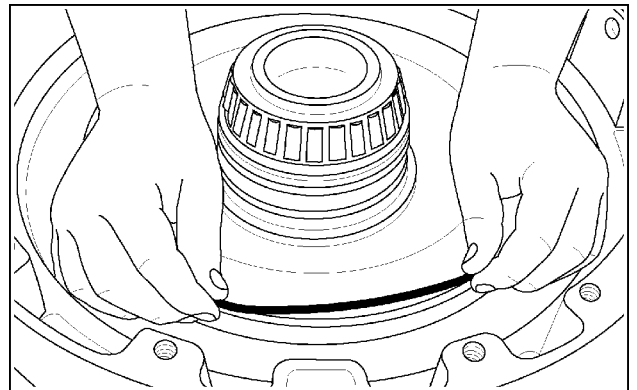
83. Lubricate new hub seal rings liberally with clean grease. Install the two seal rings into the grooves in the hub of the carrier. Be sure the seal ends are lapped together and seals are compressed into the grooves as tightly as possible.

NOTE: Place the ends of each seal ring opposite each other



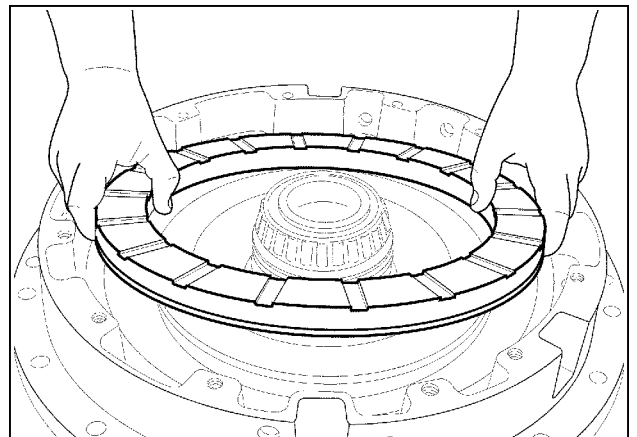
RCPH10FWD248ABJ 86

84. Lubricate a new O-ring for the inside diameter of the service brake piston with clean grease. Install the O-ring in the groove of the carrier. Be sure the O-ring is not twisted.



RCPH10FWD249ABJ 87

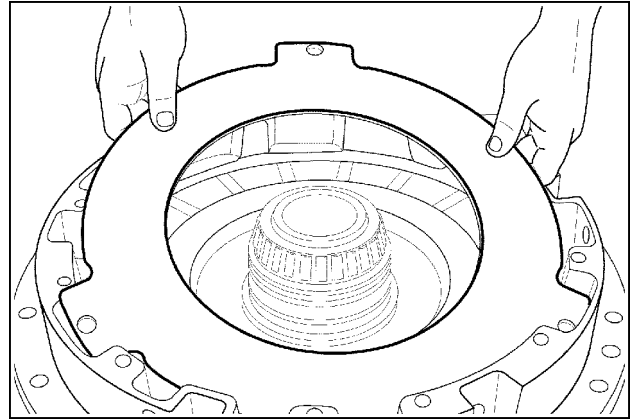
85. Lubricate a new O-ring for the outside diameter of the service brake piston. Install the O-ring in the groove of the piston. Be sure the O-ring is not twisted. Carefully position the piston (flat side up) into the recessed bore of the carrier. Hand seat the piston squarely into the bore.



RCPH10FWD250ABJ 88

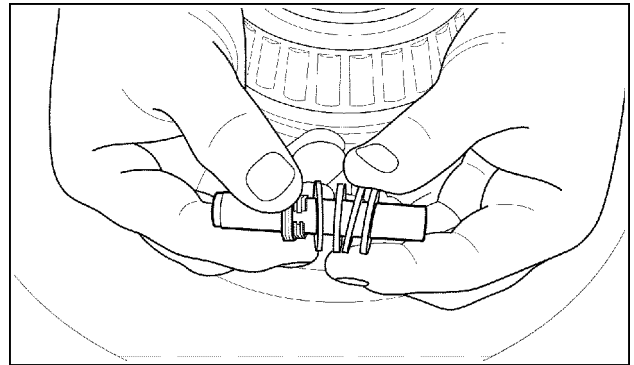
86. Install the brake return plate over the service brake piston aligning the ear tabs with the slots in the support carrier.

NOTE: The brake return plate has holes in the ear tabs.

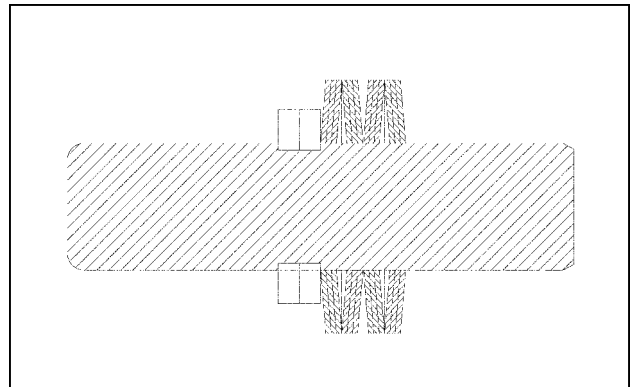


RCPH10FWD223ABJ 89

87. Install the belleville spring washers on the brake adjuster pins. Slide 3 nested washers onto each pinup against the snap rings. Slide 3 nested washers on each pin in the opposing direction followed by 3 more nested washers in an opposing direction for a total of 12 belleville spring washers on each pin.

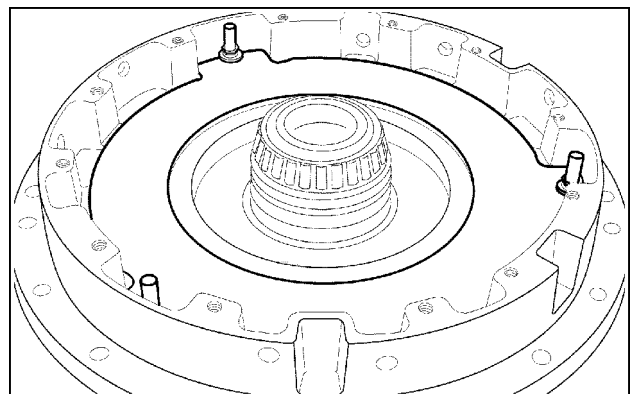


RCPH10FWD251ABJ 90



RCPH10FWD252ABJ 91

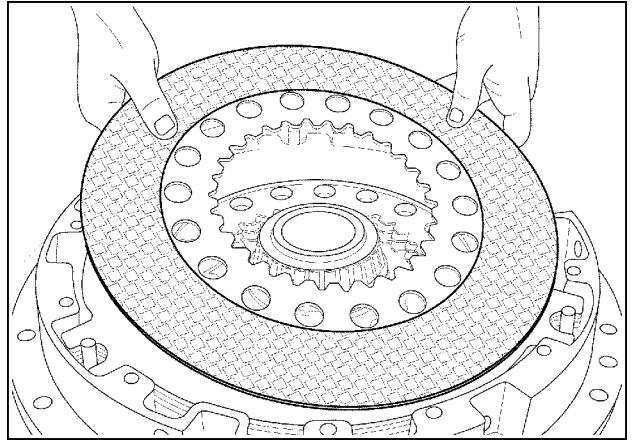
88. Place one pin with washers in each of the holes in the carrier. Be sure the spring washers are seated against the brake return plate and the shorter tapered end of the pin is pointed upwards.



RCPH10FWD253ABJ 92

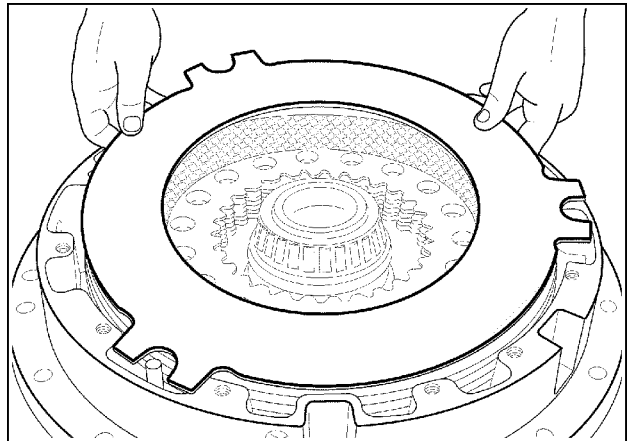
89. Lubricate all friction plates with clean operating fluid.
Install the first friction plate over the brake return plate.

NOTE: Align the friction plate oil cross holes as they are installed.



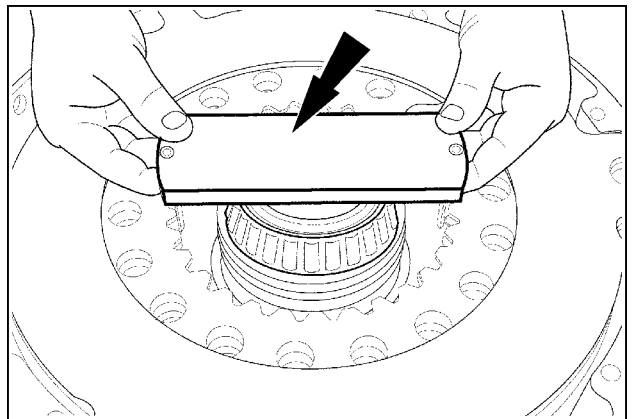
RCPH10FWD254ABJ 93

90. Install a steel separator plate over the first friction plate. Repeat the steps for remaining plates, alternating friction and separator plates.



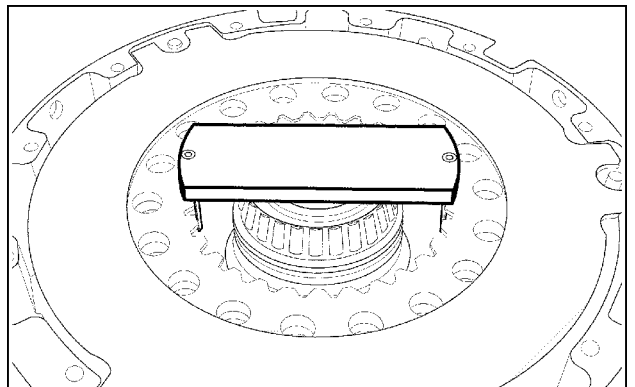
RCPH10FWD255ABJ 94

91. Use the **CAS2505** brake disc alignment tool to align the splines of all brake plates.



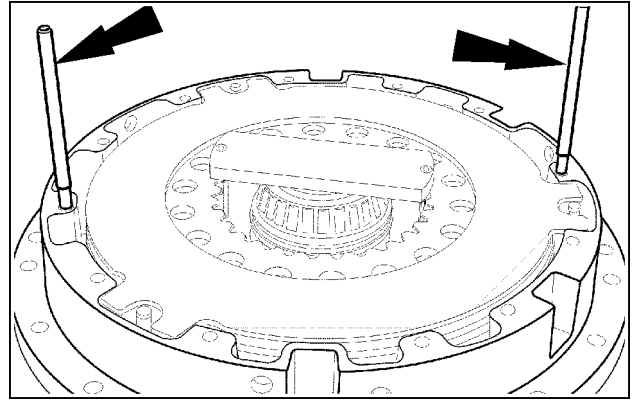
RCPH10FWD256ABJ 95

92. When the brake plates are correctly aligned, the pilot on the bottom of the tool plate must nest in the hub of the carrier as shown.



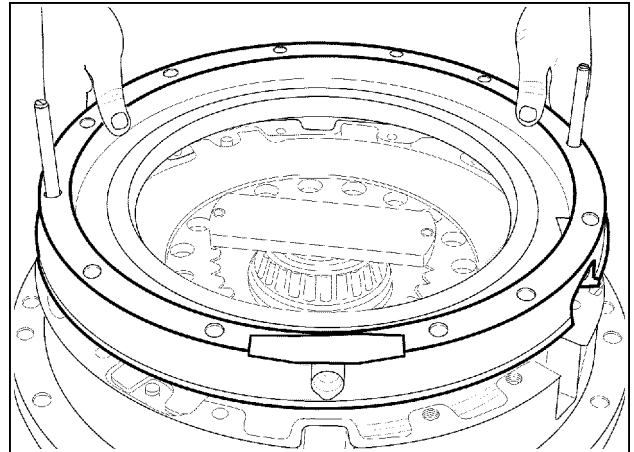
RCPH10FWD257ABJ 96

93. Install the two guide studs into opposite holes of the support carrier.



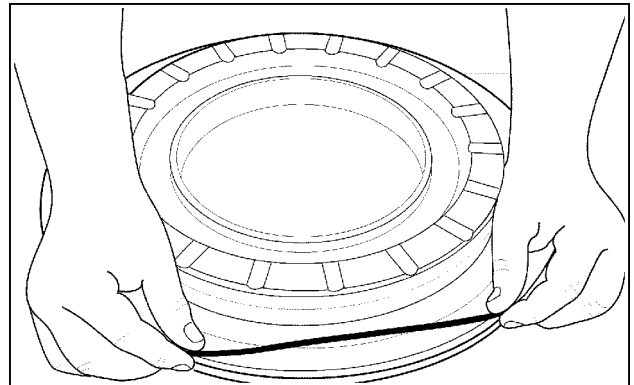
RCPH10FWD258ABJ 97

94. Install the park brake backing plate (recessed side up) over the guide studs so that the assembly match marks align.



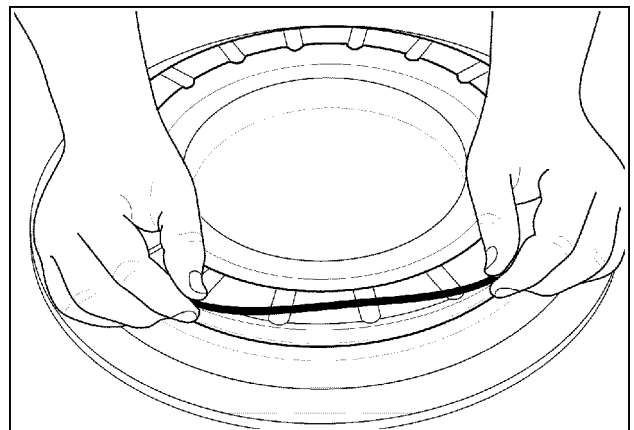
RCPH10FWD258ABJ 98

95. Lubricate and install a new O-ring for the large outside diameter of the park brake piston. Be sure the O-ring is not twisted.



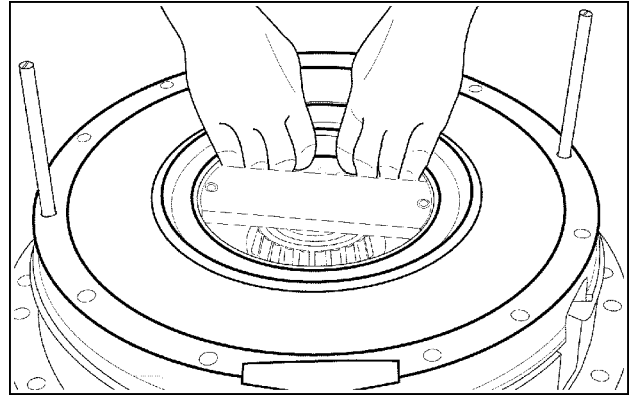
RCPH10FWD260ABJ 99

96. Lubricate and install a new O-ring in the groove of the smaller outside diameter of the piston. Be sure the O-ring is not twisted.



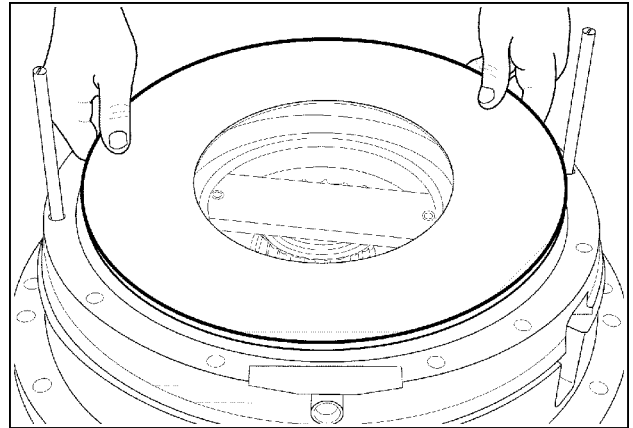
RCPH10FWD261ABJ 100

97. Lubricate the outside diameter and inside diameter of the piston liberally with clean assembly grease. Hand seat the piston squarely into the bore of the backing plate.



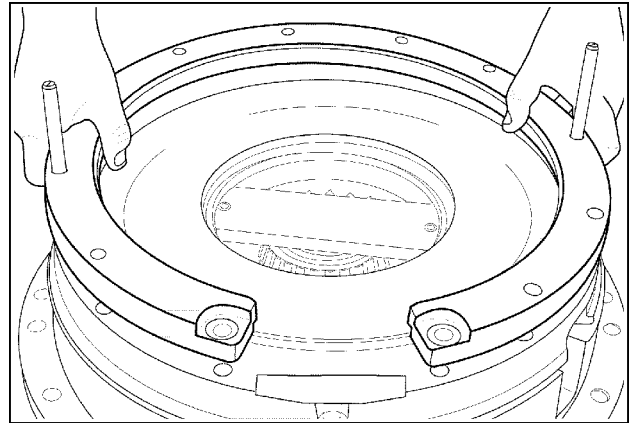
RCPH10FWD262ABJ 101

98. Install the large belleville spring with the cone side down on top of the park brake piston.



RCPH10FWD263ABJ 102

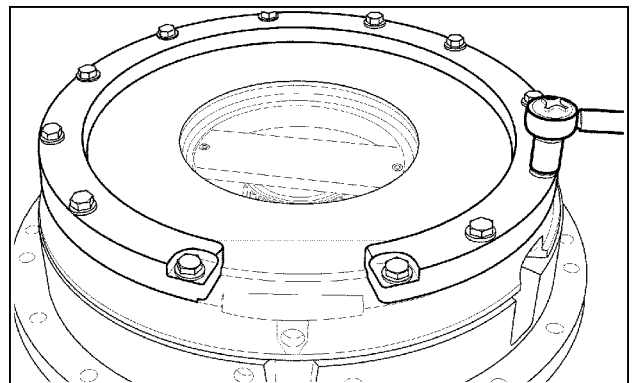
99. Install the retainer ring over the belleville spring.



RCPH10FWD264ABJ 103

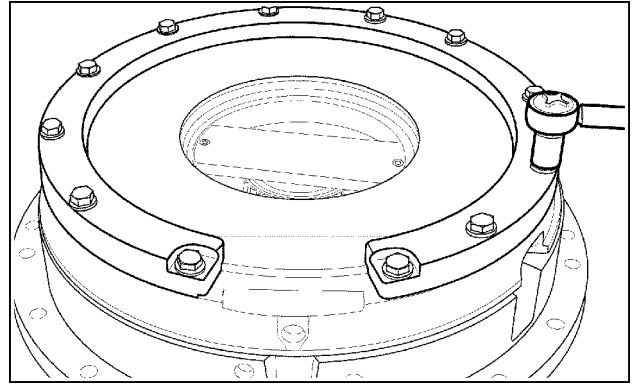
100. Install and hand start the 12 bolts with washers to engage the threads.

NOTE: The two shorter length bolts must be installed in the end holes of the ring.



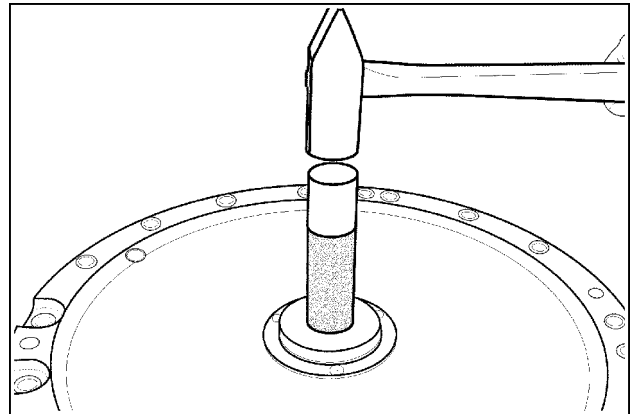
RCPH10FWD265ABJ 104

101. After all bolts have contacted the retainer ring, starting with an end bolt, tighten each bolt in sequence one full turn and repeat until the ring has seated on the backing plate. Tighten the bolts to specifications. Remove the **CAS2505** brake disc alignment tool.



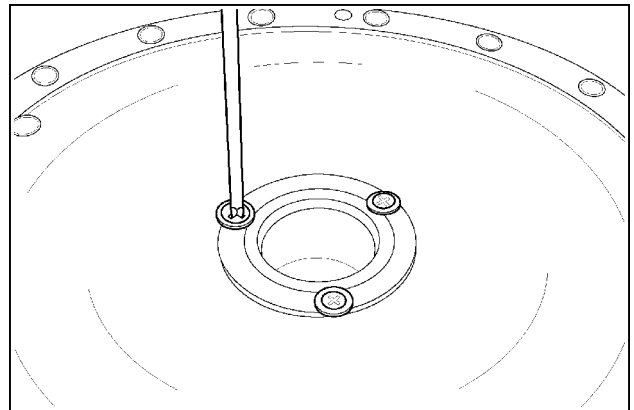
RCPH10FWD265ABJ 105

102. Turn the brake carrier assembly over and install the seal in the carrier.



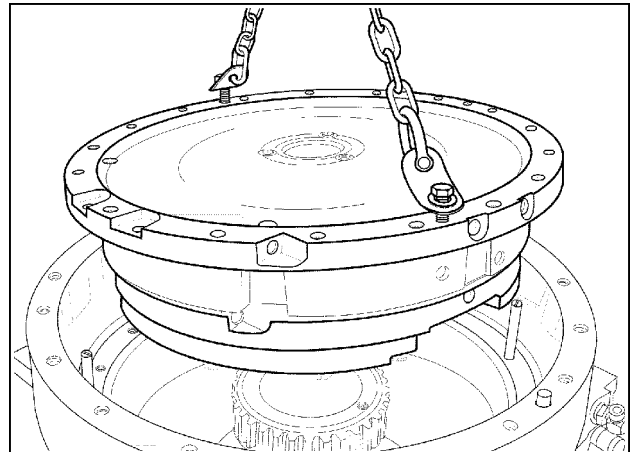
RCPH10FWD266ABJ 106

103. Apply thread lock sealant on the threads of the screws. Install the three seal retaining screws and washers.



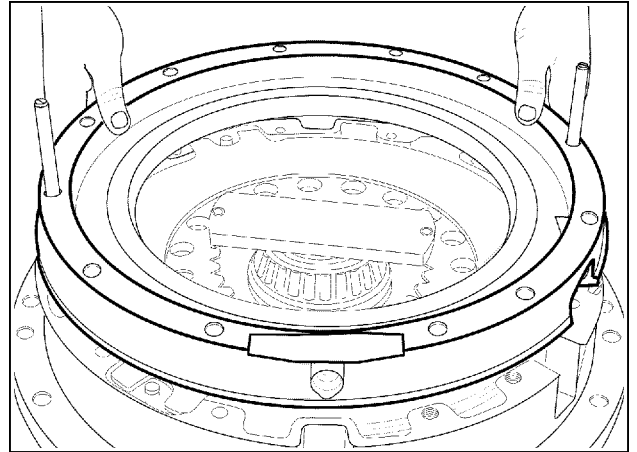
RCPH10FWD231ABJ 107

104. Rotate the differential housing until the right hand side is on top. Remove the brake carrier from the housing.



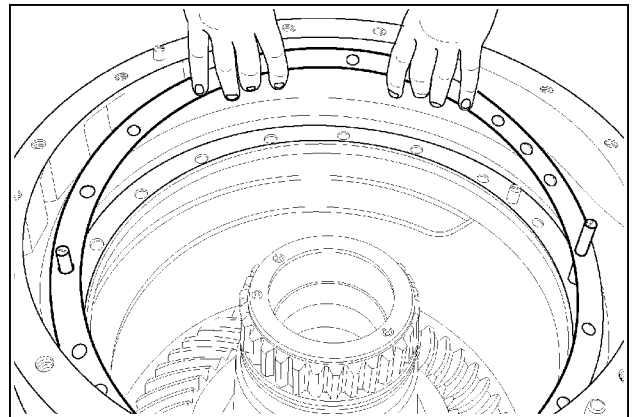
RCPH10FWD209ABJ 108

105. Assemble the brake carrier as described in steps **82** through **103**.



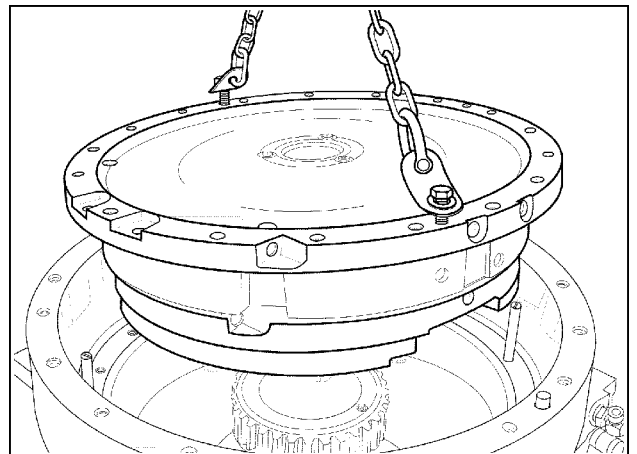
RCPH10FWD259ABJ 109

106. Using the **CAS2675** guide studs, install the pre-selected shim pack for the brake support carrier so that all holes align.



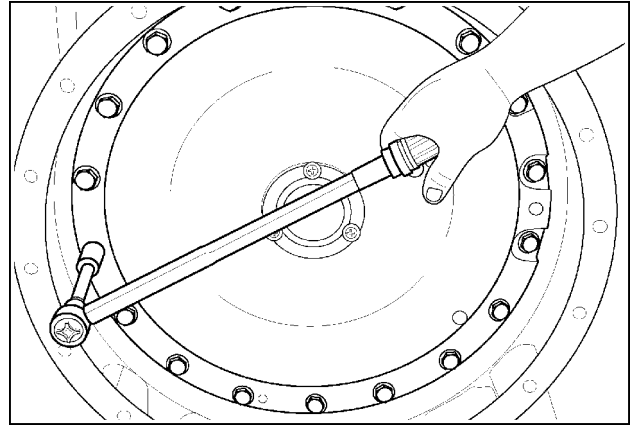
RCPH10FWD210ABJ 110

107. Use a hoist to carefully align and install the brake carrier assembly into the differential housing. Be sure the assembly marks are aligned.



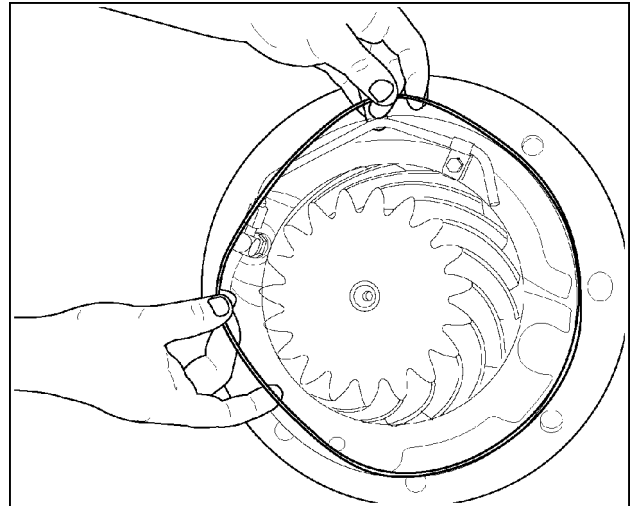
RCPH10FWD209ABJ 111

108. Remove the guide studs. Install the brake carrier retaining bolts and washers. Tighten the bolts to specifications.



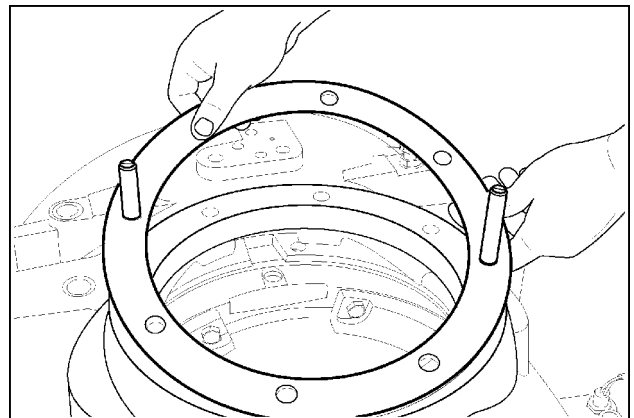
RCPH10FWD267ABJ 112

109. Lubricate and install a new O-ring in the groove around the mounting flange of the pinion carrier. Be sure the O-ring is not twisted.



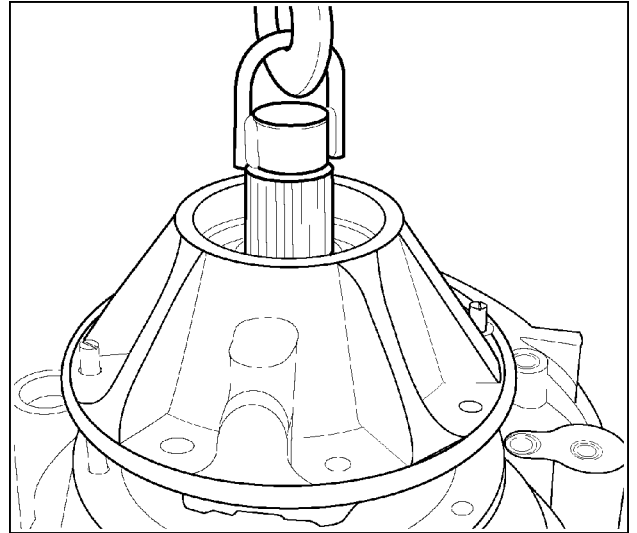
RCPH10FWD079ABJ 113

110. Use two **CAS2496** alignment studs, install the pre-selected pinion carrier shim pack.



RCPH10FWD244ABJ 114

111. Use a lifting eye to install the pinion carrier assembly into the differential housing. Be sure the assembly marks align.
112. Remove the guide studs and the lifting eye.
113. Coat the pinion shaft splines with **MOLYKOTE® G-N METAL ASSEMBLY PASTE**.



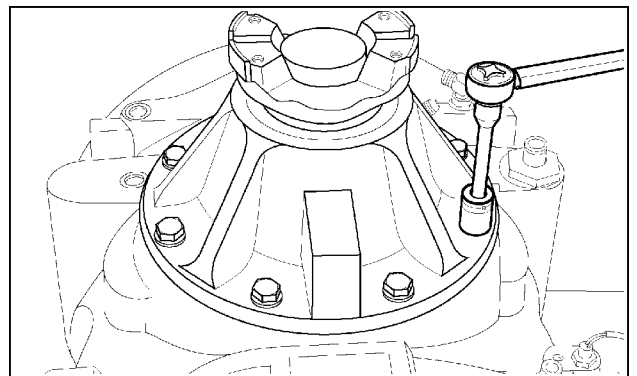
RCPH10FWD081ABJ 115

114. Install the drive yoke and cap. .



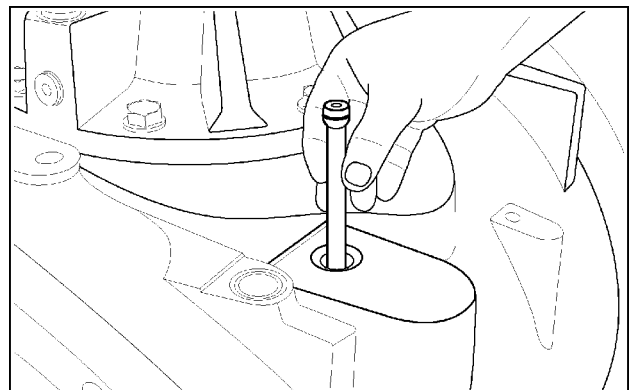
RAIL17TR01400AA 116

115. Torque the pinion carrier bolts to **284 – 298 N·m (209 – 220 lb ft)**.



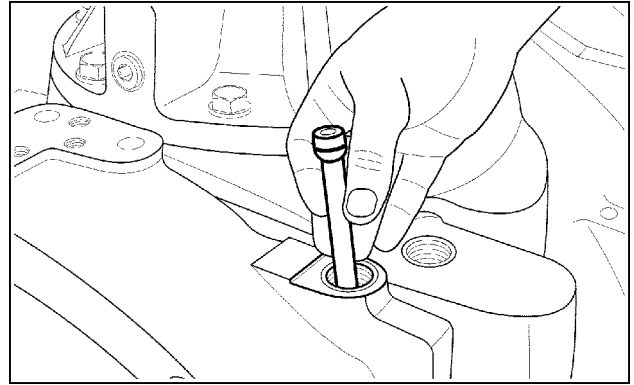
RCPH10FWD268ABJ 117

116. Lubricate and install new O-rings on the jumper tube for the park brake. Install the jumper tube into the park brake supply port.



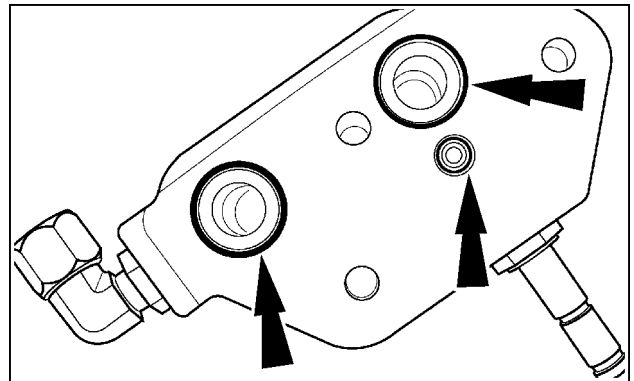
RCPH10FWD269ABJ 118

117. Lubricate and install new O-rings on the jumper tube for the service brake. Install the jumper tube into the service brake supply port.



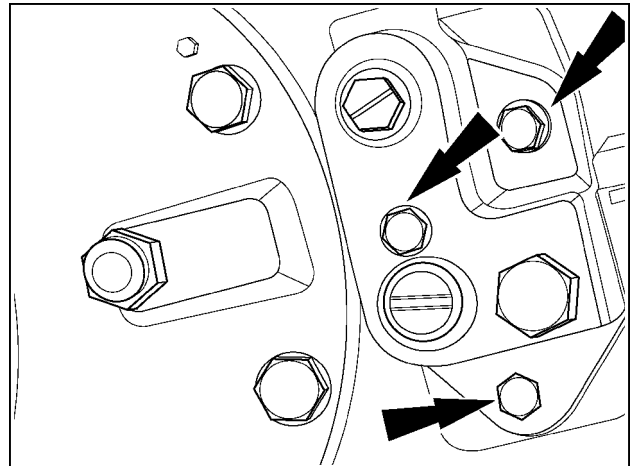
RCPH10FWD270ABJ 119

118. Lubricate and install new O-rings on the port block.



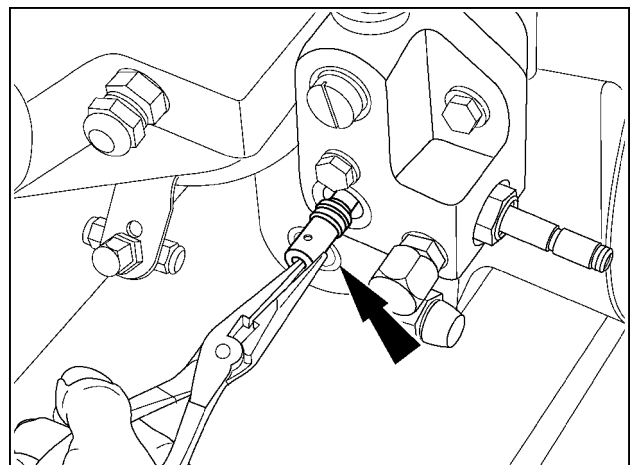
RCPH10FWD271ABJ 120

119. Install the port block on the differential housing. Tighten the retaining bolts to specifications.



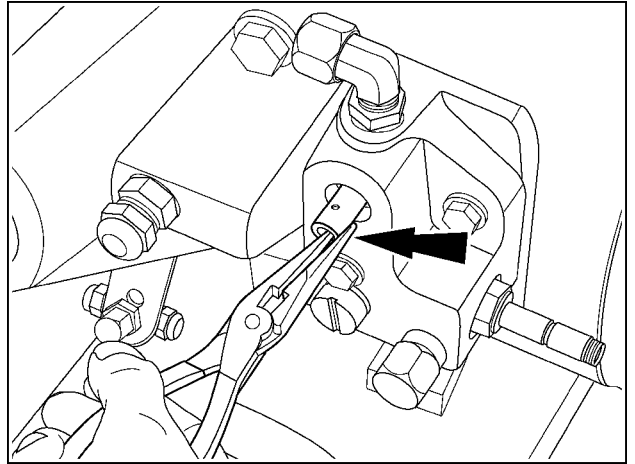
RCPH10FWD950AAJ 121

120. Lubricate and install new O-rings on the jumper tube for the differential lock. Install the jumper tube into the differential lock supply port.



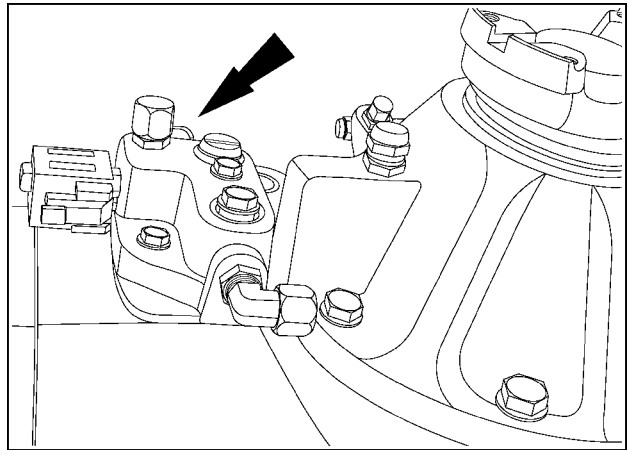
RCPH10FWD949AAJ 122

121. Lubricate and install new O-rings on the jumper tube for the lube supply. Install the jumper tube into the lube supply port.



RCPH10FWD948AAJ 123

122. Install the differential lock solenoid on the port block.



RCPH10FWD091ABJ 124

Next operation:

Hydraulic service brakes - Test - Brake leak down (33.202) Differential lock - Leakage test (25.102)

Next operation:

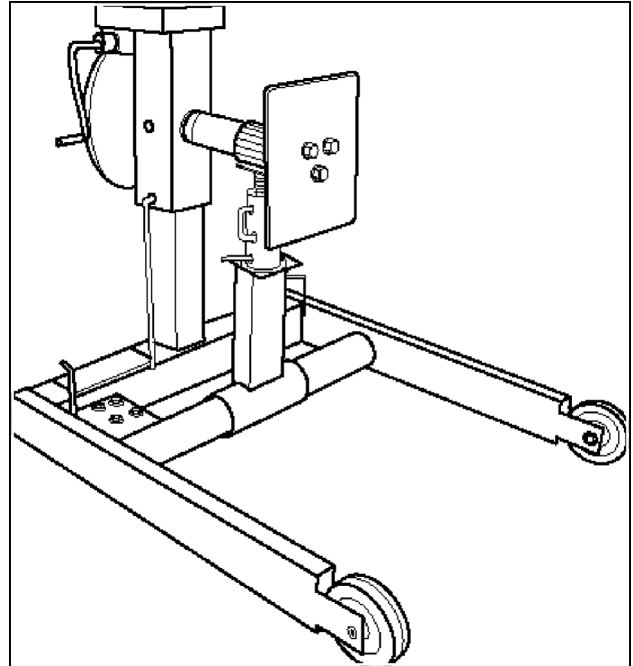
Final drive - Install - 500 Series Quadtrac® axles (25.310)

Differential - Disassemble - 600 Series axles

Steiger® 580	NA
Steiger® 620	NA

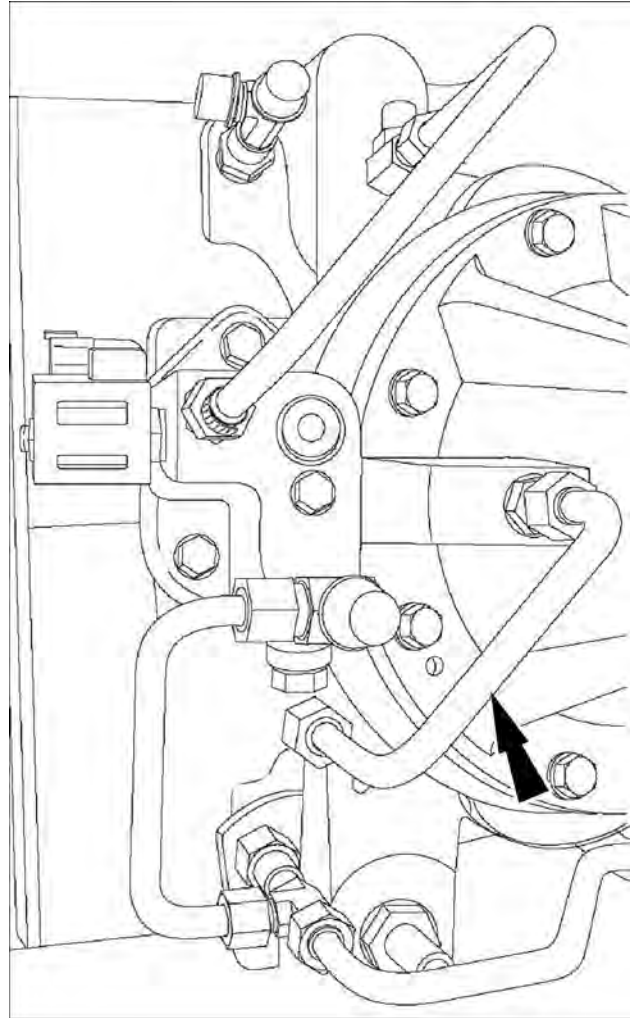
Prior operation:

1. The differential housing must be rotated several times during the disassembly and assembly procedures. If available, the housing should be mounted in a revolver repair stand.



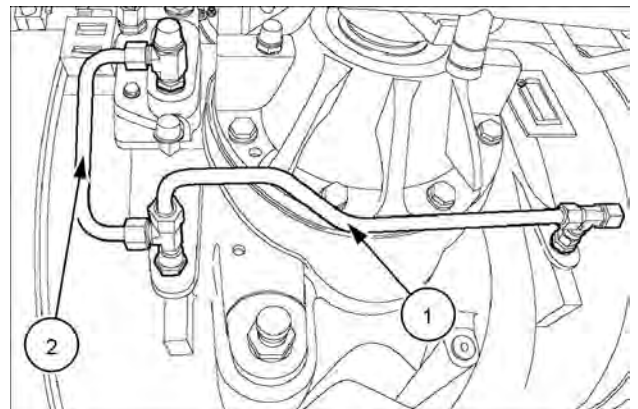
RCPH10FWD941AAJ 1

2. Remove the lube tube from the port block and pinion carrier.



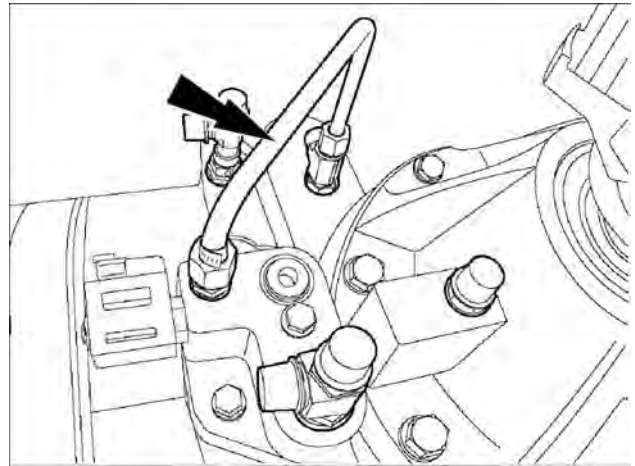
RCPH11FWD345CAC 2

3. Remove the horizontal tube (1) from fittings on differential housing. Remove the tube (2) from the port block to the tee fitting on the differential housing.



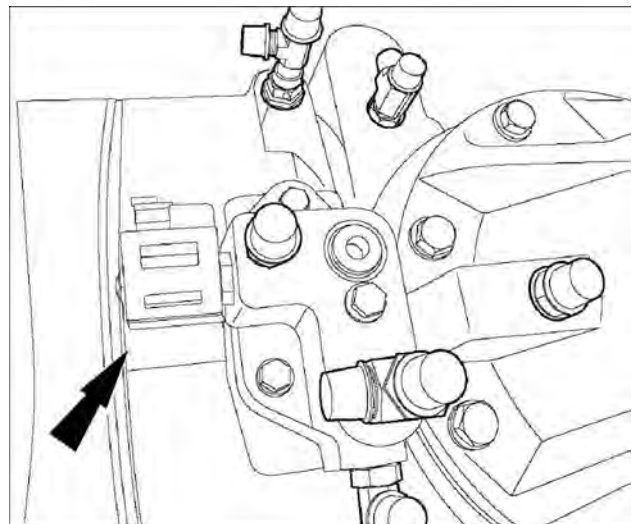
RCPH11FWD346BAC 3

4. Remove the tube line from the port block to the park brake supply port.



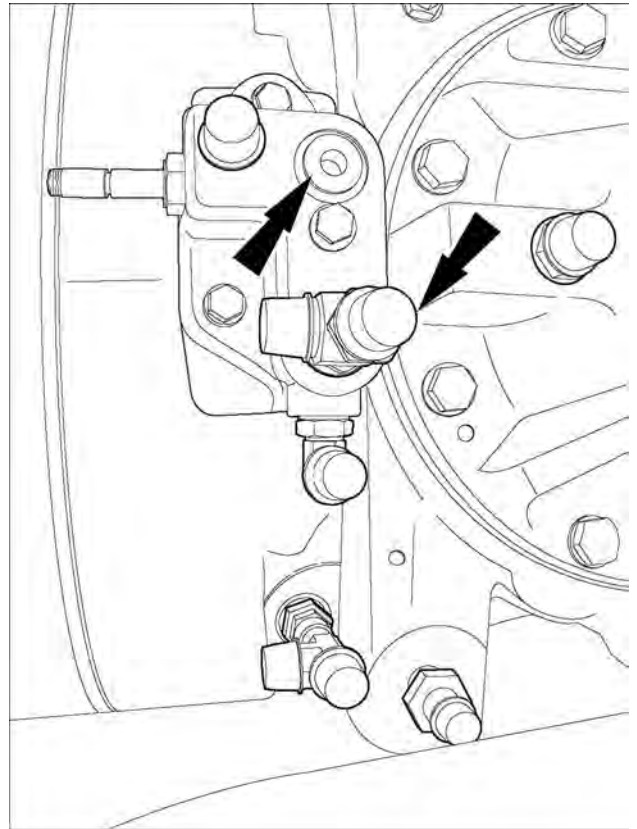
RCPH11FWD347BAC 4

5. If equipped, remove the differential lock solenoid from the port block.



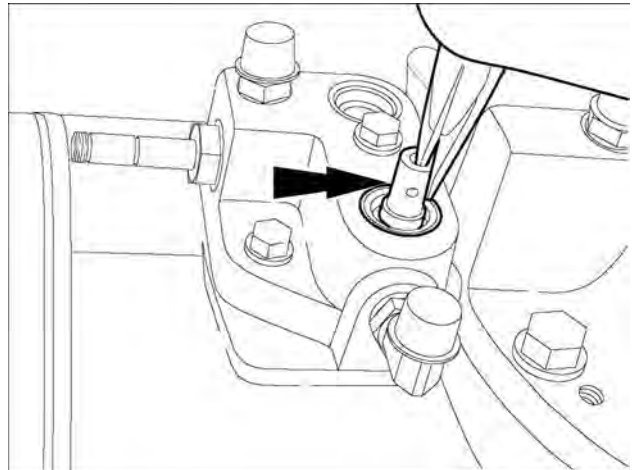
RCPH11FWD348BAC 5

6. Remove the plug **(1)** and tee fitting **(2)** from the port block.



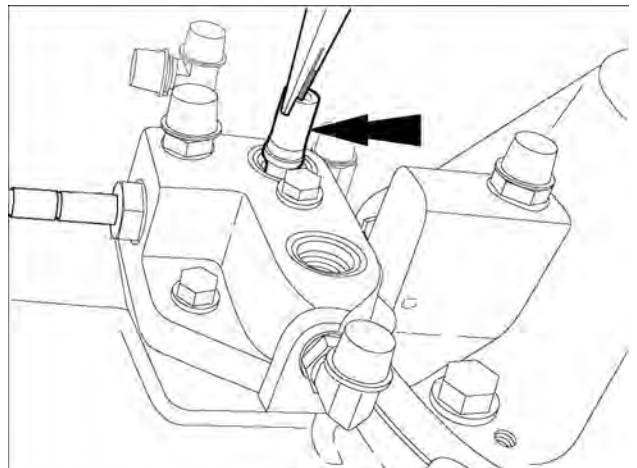
RCPH11FWD349BAC 6

7. Remove the jumper tube from the lube port. Discard the O-rings.



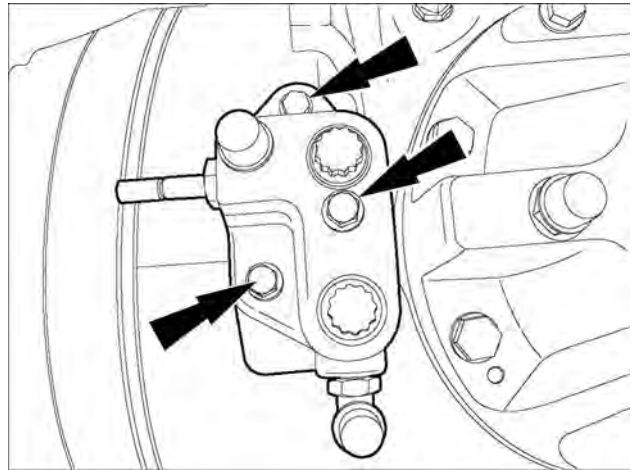
RCPH11FWD350BAC 7

8. Remove the jumper tube from the differential lock supply port. Discard the O-rings.



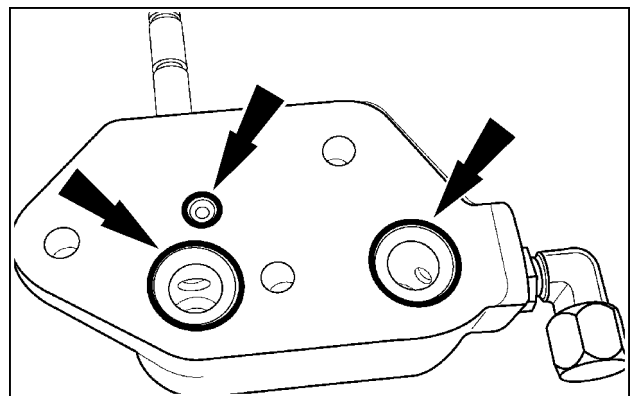
RCPH11FWD351BAC 8

9. Remove the three bolts securing the port block to the housing. Remove the port block.



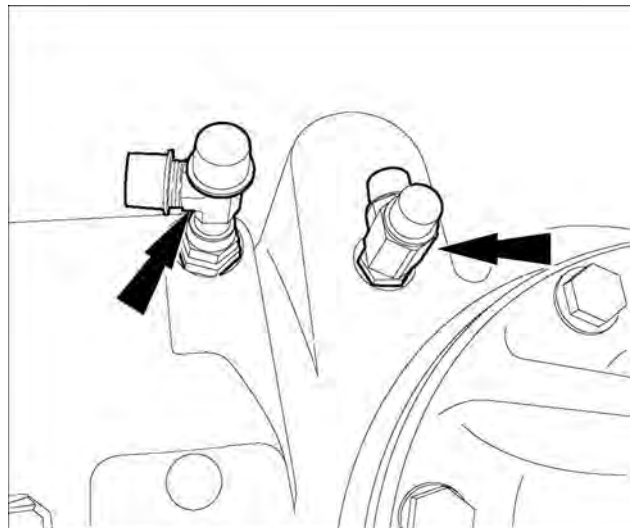
RCPH11FWD352BAC 9

10. Discard the O-rings from the port block.



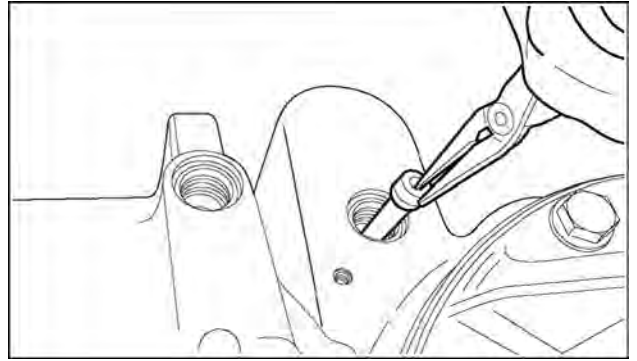
RCPH10FWD951AAJ 10

11. Remove the tee fittings from the service and park brake pressure ports.



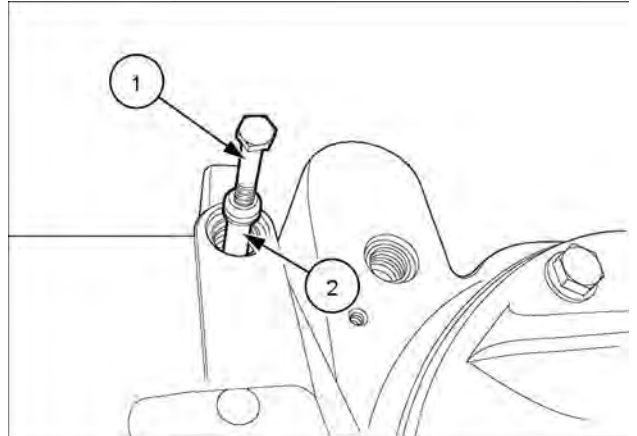
RCPH11FWD353BAC 11

12. Remove the jumper tube from the park brake supply port. Discard the O-rings.



RCPH11FWD355AAC 12

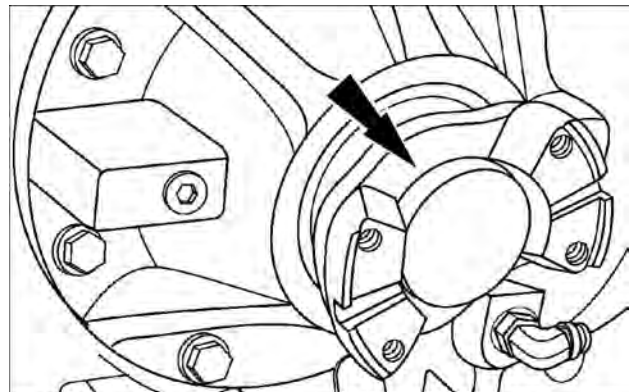
13. Use a M10 X 1.5 bolt (1) threaded into the inner diameter of the service brake supply port jump tube (2) and remove it. Discard the O-rings.



RCPH11FWD354BAC 13

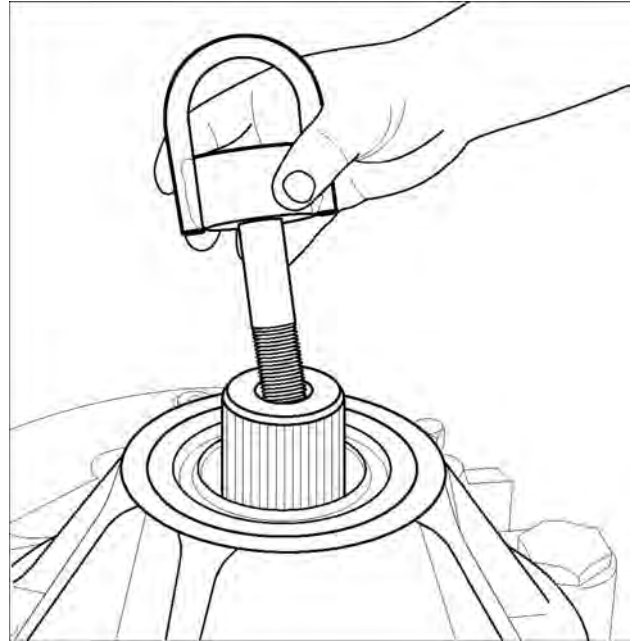
14. Remove the drive yoke.

NOTE: The front axle drive yoke does not use a retaining bolt. The drive yoke is allowed to slide on the pinion shaft.



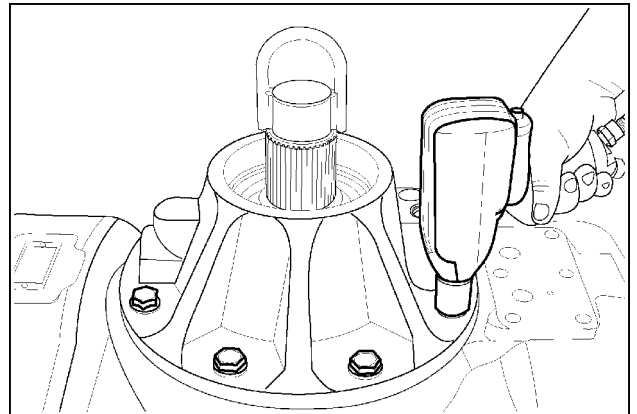
RCPH11FWD360BAC 14

15. Install the CAS2494 lifting eye into the pinion gear.



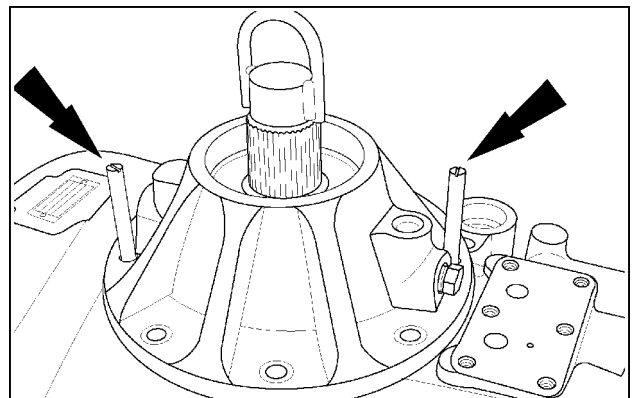
RCPH11FWD363BAC 15

16. Remove the pinion carrier mounting bolts.



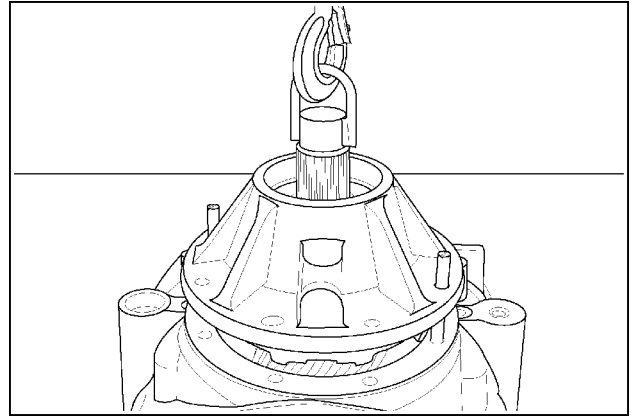
RCPH10FWD956AAJ 16

17. Install two **CAS2496** alignment studs in opposite holes of the pinion carrier.



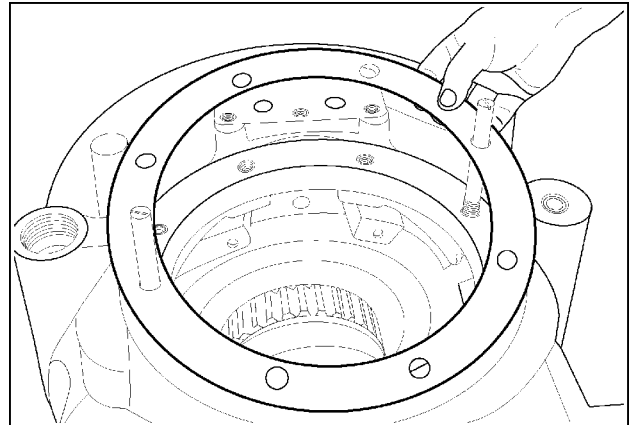
RCPH10FWD957AAJ 17

18. Use a lifting device to remove the pinion carrier from the housing. Be careful not to damage the shim pack.



RCPH10FWD958AAJ 18

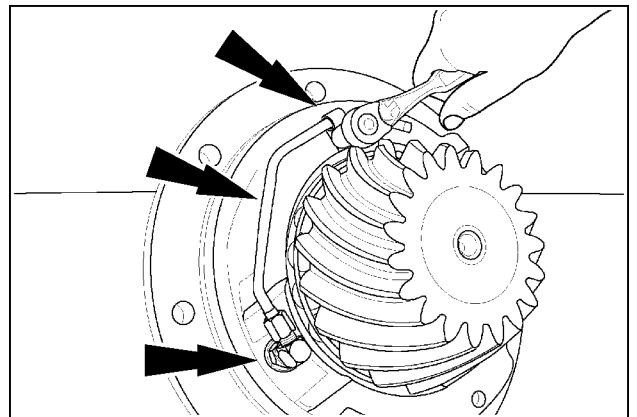
19. Remove and retain the shim pack.



RCPH10FWD959AAJ 19

Pinion carrier disassembly

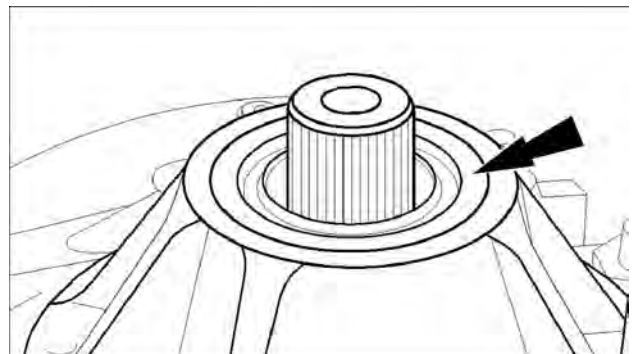
20. Remove the bolt securing the pinion gear lube tube. Disconnect and remove the tube, tube clamp and fitting. Remove and discard the large O-ring from the flange of the housing.



RCPH10FWD960AAJ 20

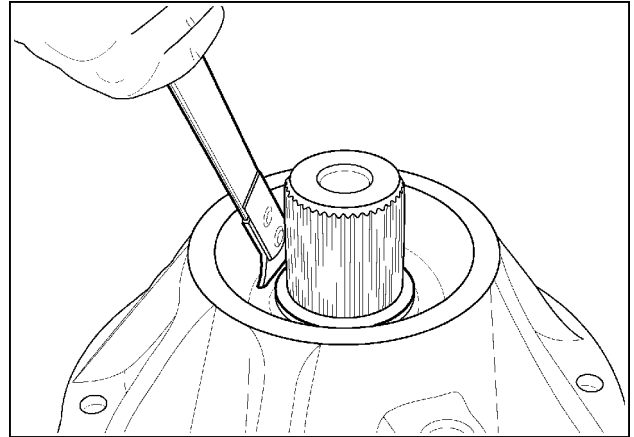
21. Remove the dust/grease seal.

NOTE: The front axle has a dust/grease seal on the outside diameter of the drive yoke and an oil seal on the pinion.



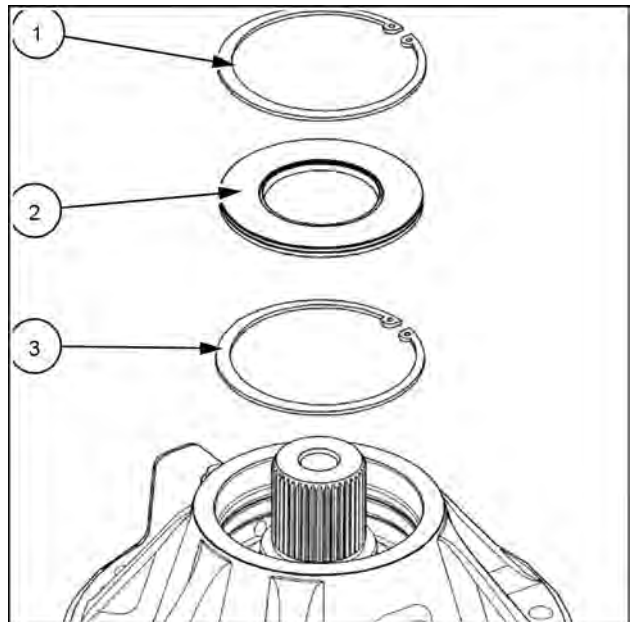
RCPH11FWD361AAC 21

22. Pry the pinion seal from the housing.



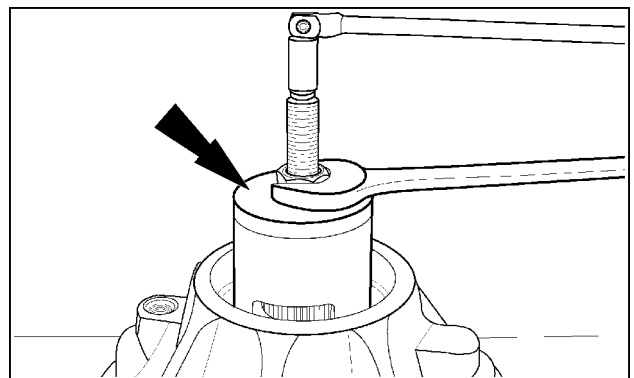
RCPH10FWD961AAJ 22

23. Remove the snap ring (1), seal (2), and snap ring (3) from the inside diameter of the pinion carrier housing.



RCPH10FWD547ABJ 23

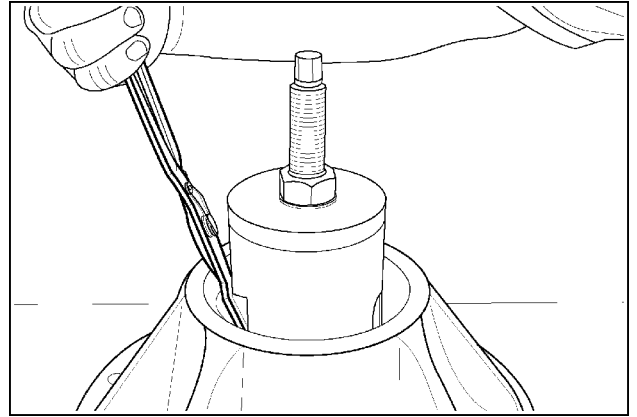
24. Support the pinion carrier on wood blocks on the work surface. Install the **CAS2511** pinion bearing preload compressor. Turn the center bolt tightly into the threaded hole in the pinion gear. Install the thrust washer and nut on the center bolt. Align one window of the compression sleeve with the end gap of the snap ring. Use one wrench to hold the center bolt and a second wrench to tighten the nut to release the pressure against the snap ring.



RCPH10FWD962AAJ 24

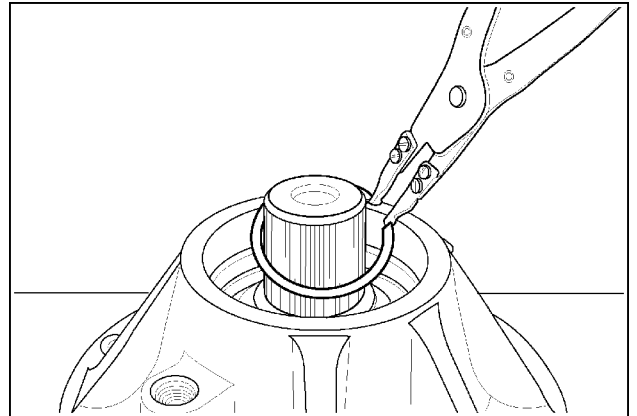
25. Use a snap ring pliers to remove the snap ring from the groove in the pinion shaft.

NOTE: Because of the large diameter of the shaft, it will be necessary to use a flat blade screw driver through the second window of the compression sleeve to work the snap ring from the groove.



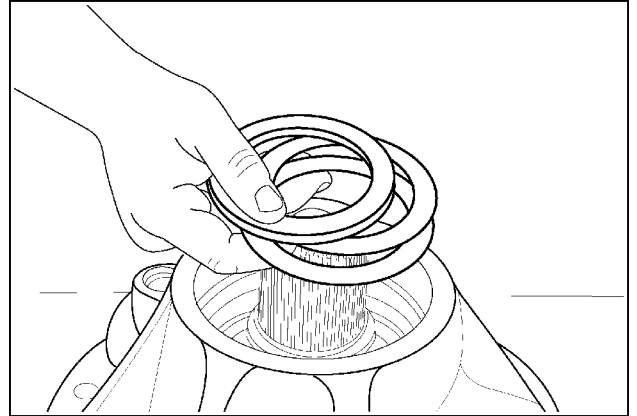
RCPH10FWD963AAJ 25

26. Remove the compression sleeve assembly and snap ring from the pinion gear.



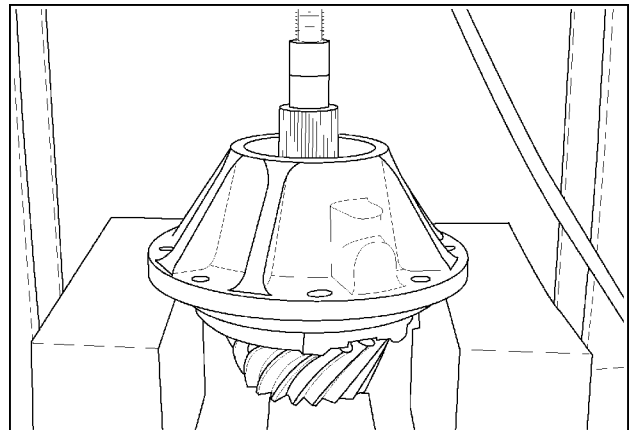
RCPH10FWD964AAJ 26

27. Remove the spacer ring and shim pack. Retain the shims.



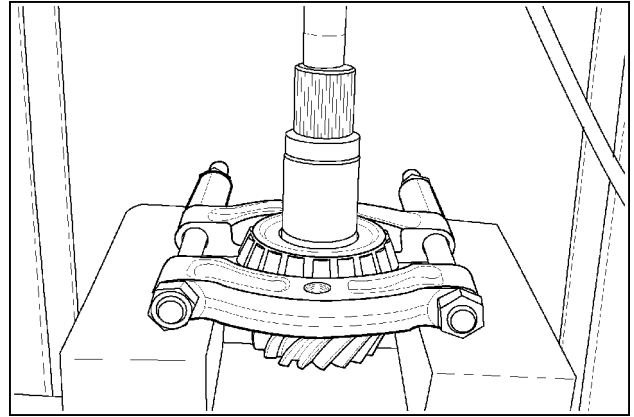
RCPH10FWD965AAJ 27

28. Support the pinion carrier on a press bed. Use the press to push the pinion gear through the front bearing cone. Remove the front bearing from the housing.



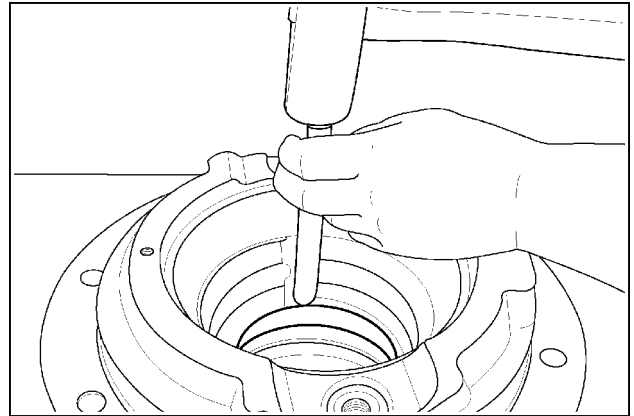
RCPH10FWD966AAJ 28

29. Use a split knife edge puller attachment and press to remove the rear pinion bearing cone.



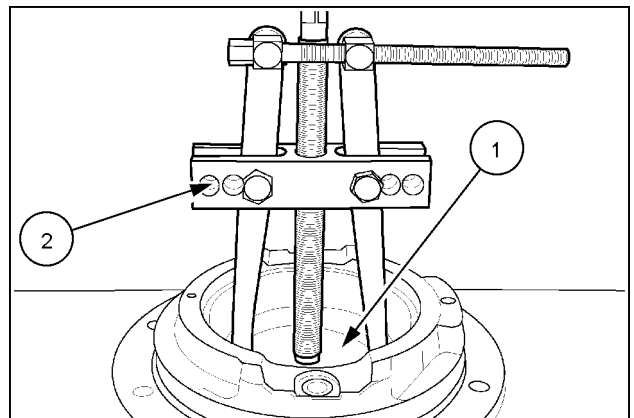
RCPH10FWD967AAJ 29

30. Use a brass drift to remove the outer bearing cup from the carrier housing.



RCPH10FWD968AAJ 30

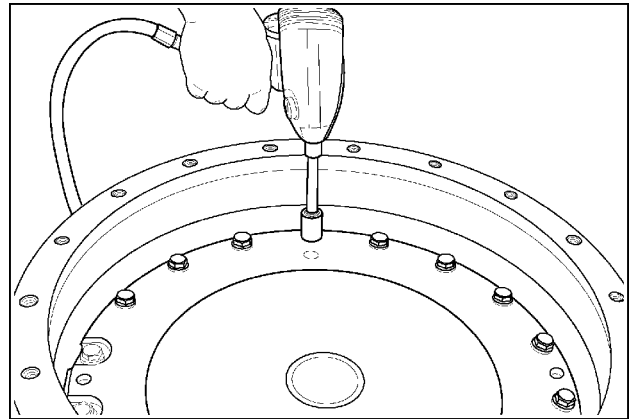
31. Use the **CAS2510** bearing cup remover adaptor plate (1) and a bearing puller (2) to remove the inner bearing cup from the carrier housing. Clean and inspect all parts for damage or wear. Replace any damaged or worn parts.



RCPH10FWD969AAJ 31

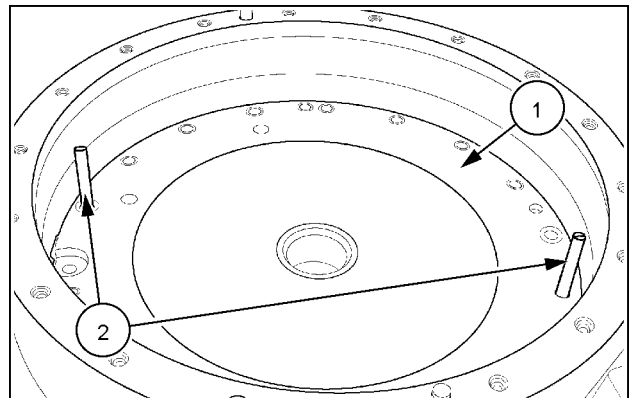
Brake carrier/bearing support removal

32. Rotate the differential housing so that the brake carrier side is on top. Remove the brake carrier retaining bolts and washers.



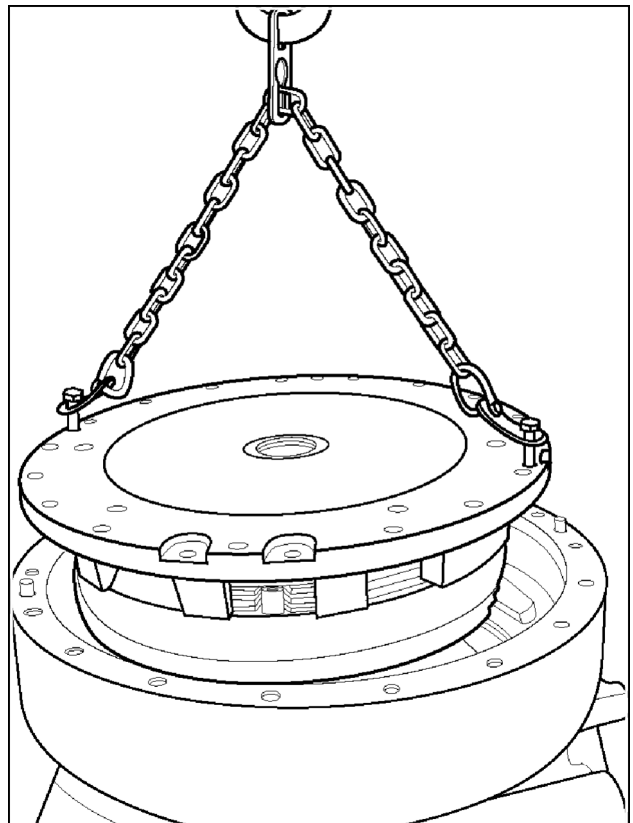
RCPH10FWD970AAJ 32

33. Put a mark (1) on the brake carrier and housing for assembly reference. Install two **CAS2675** alignment studs (2) opposite each other.



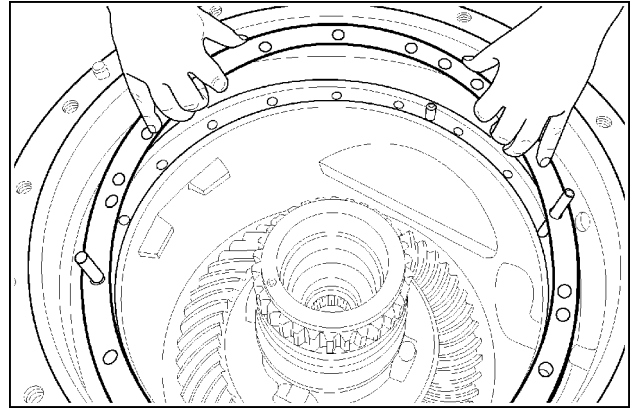
RCPH10FWD971AAJ 33

34. Two threaded holes are provided in the flange of the carrier assembly. Use two of the retainer bolts that were removed to attach a lifting chain and hoist. Use the hoist to slowly and carefully lift the brake carrier assembly out of the housing. Be careful not to bend or damage the preload shims during removal.



RCPH10FWD972AAJ 34

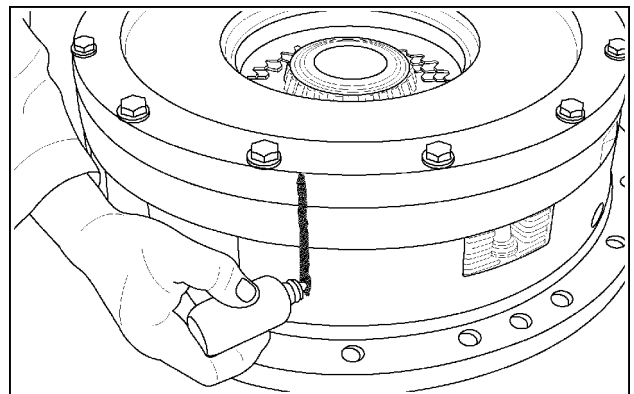
35. Remove and retain the differential bearing preload shims.



RCPH10FWD973AAJ 35

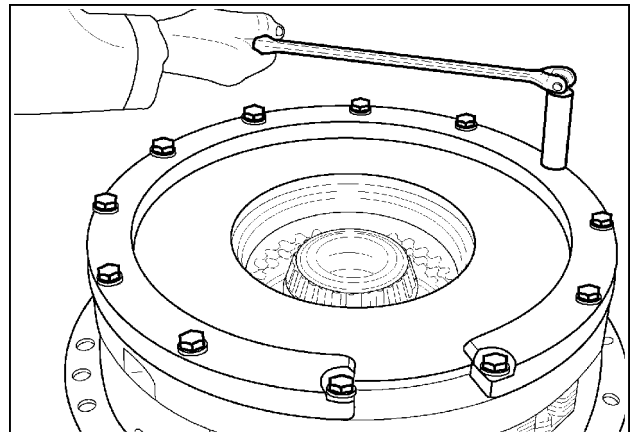
Brake carrier/bearing support disassembly

36. Position the carrier assembly on a sturdy work surface so that the split ring side is on top. Put a mark across the assembly for reference.



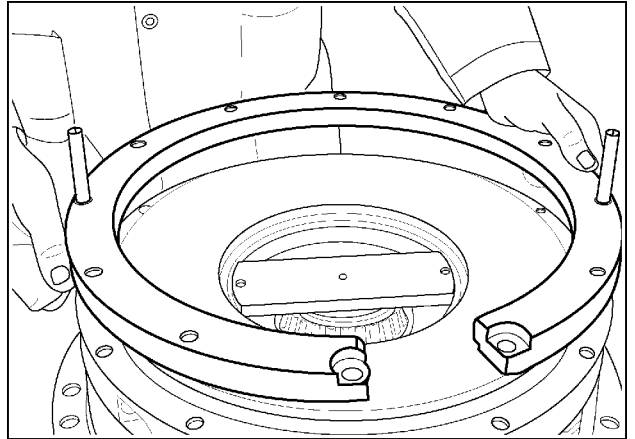
RCPH10FWD974AAJ 36

37. Starting with an end gap bolt, loosen each bolt in sequence one full turn. Repeat until all tension is released against the retaining ring.



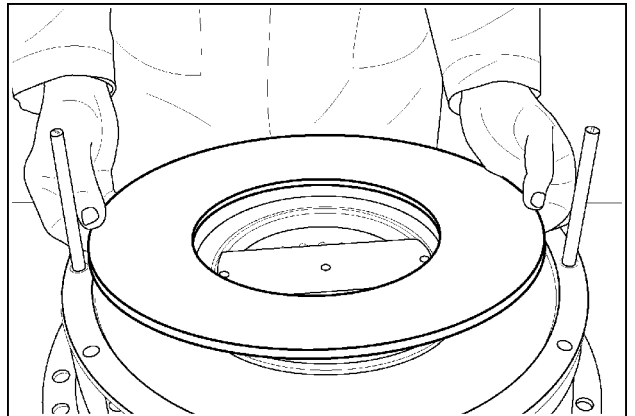
RCPH10FWD975AAJ 37

38. Remove all bolts from the split ring. Remove the split retainer ring.



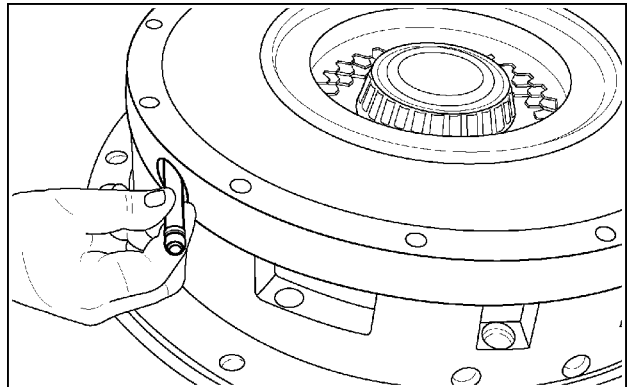
RCPH10FWD976AAJ 38

39. Remove the belleville spring.



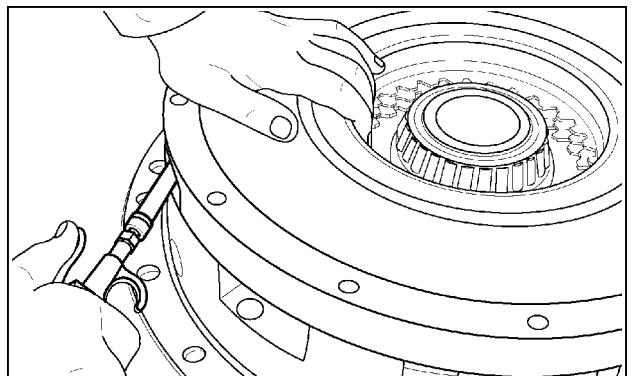
RCPH10FWD977AAJ 39

40. Temporarily install the short jumper tube into the park brake pressure port.



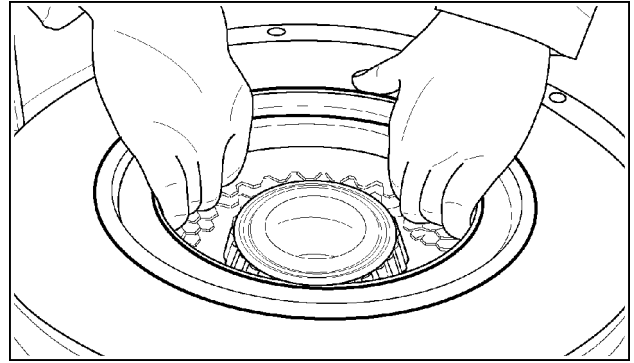
RCPH10FWD978AAJ 40

41. Use a short burst of compressed air to lift the park brake piston out of its bore.



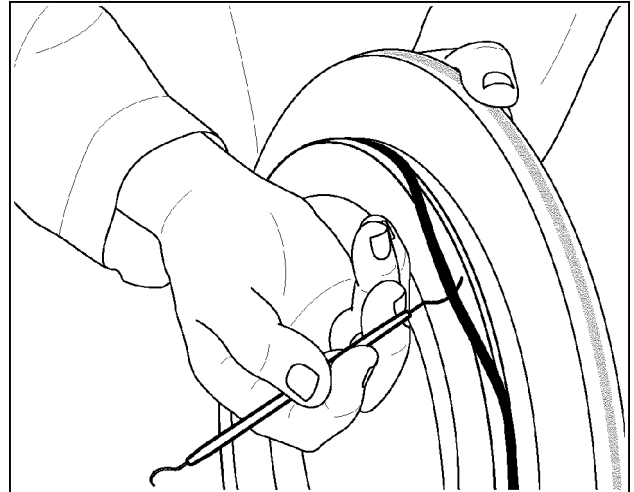
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42. Remove the piston from the backing plate.



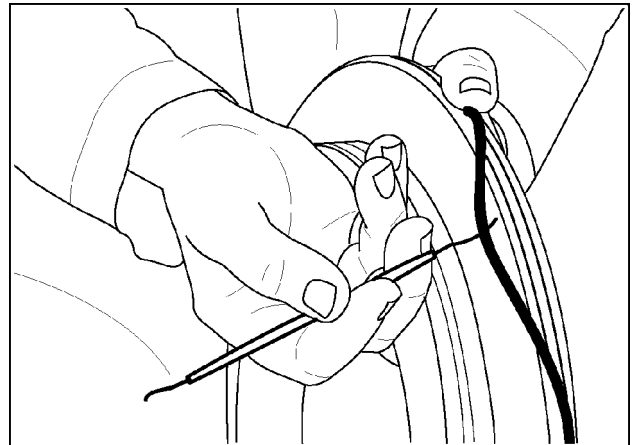
RCPH10FWD980AAJ 42

43. Remove and discard the inner O-ring from the piston.



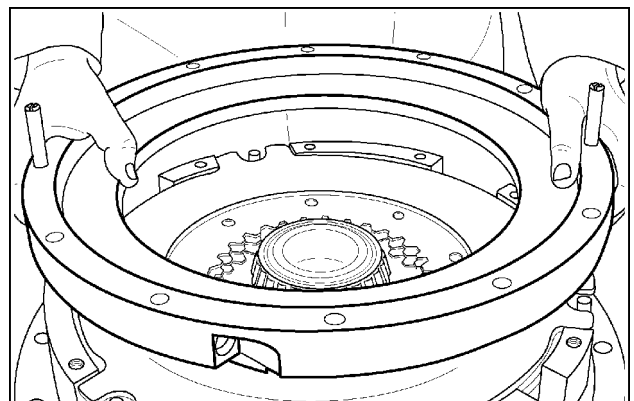
RCPH10FWD981AAJ 43

44. Remove and discard the outer O-ring from the piston.



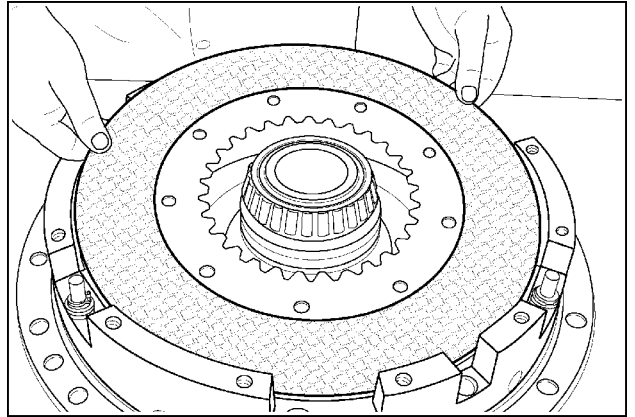
RCPH10FWD982AAJ 44

45. Remove the brake backing plate.



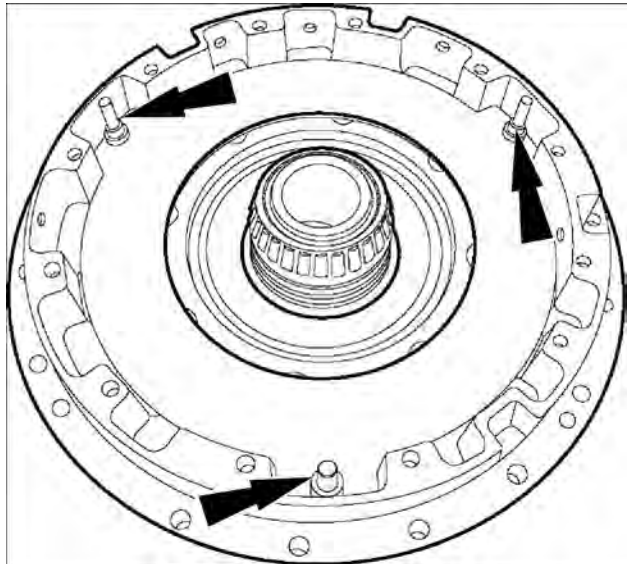
RCPH10FWD983AAJ 45

46. Remove the four brake separator plates and four friction plates from the carrier.



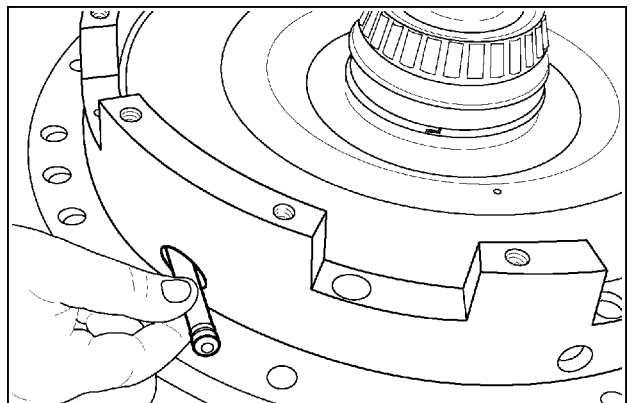
RCPH10FWD984AAJ 46

47. Remove each of the three brake adjuster pins with belleville spring washers.



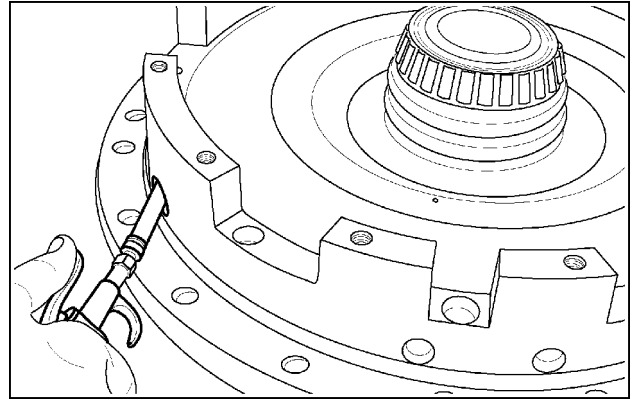
RCPH11FWD340BAC 47

48. Temporarily install a short jumper tube into the service brake pressure port.



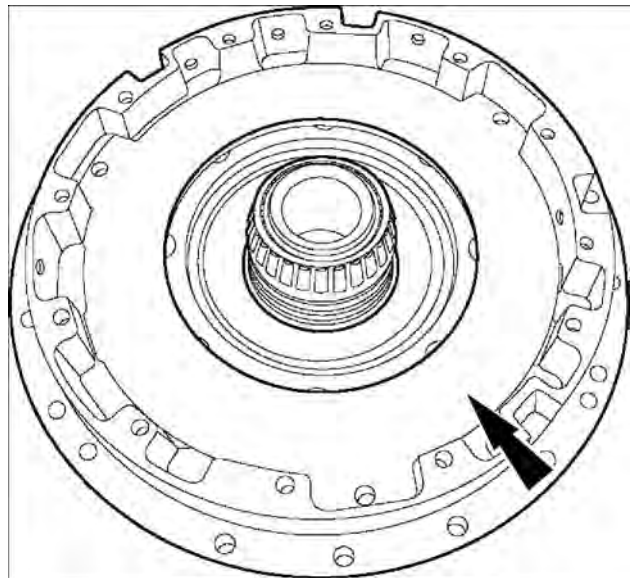
RCPH10FWD987AAJ 48

49. Use a short burst of compressed air to lift the brake piston out of the bore.



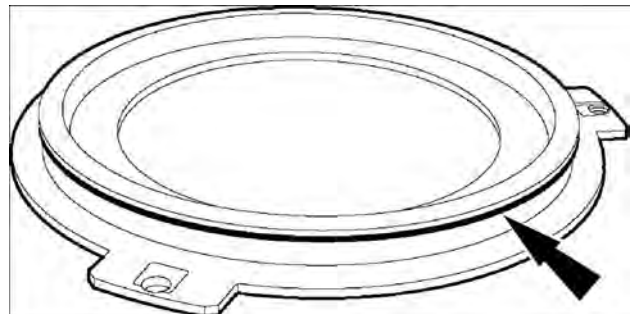
RCPH10FWD988AAJ 49

50. Remove the piston from the carrier.



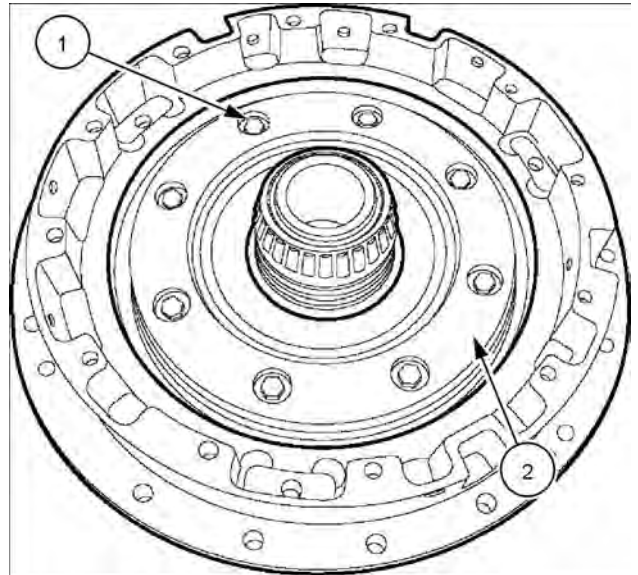
RCPH11FWD339BAC 50

51. Remove and discard the O-ring from the outside diameter of the piston.



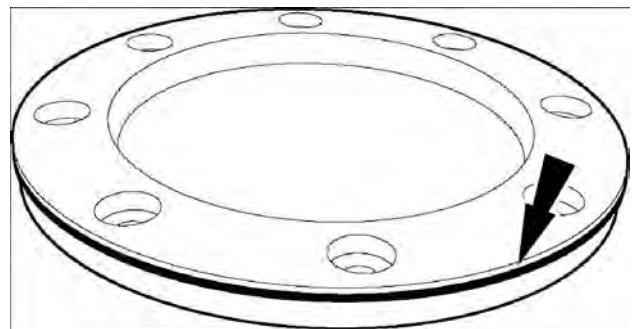
RCPH11FWD338AAC 51

52. Remove the eight bolts (1) and remove the brake insert (2).



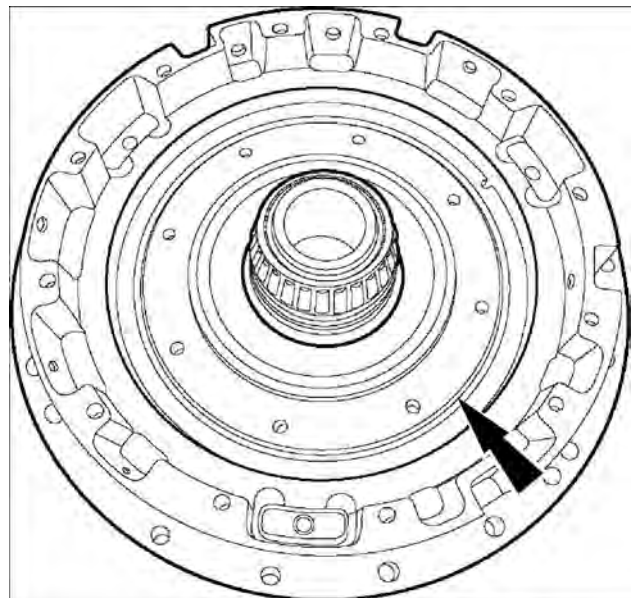
RCPH11FWD337BAC 52

53. Remove and discard the piston inside diameter O-ring from the brake insert.



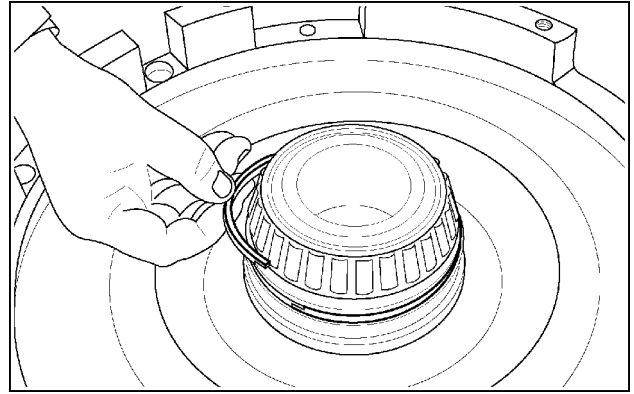
RCPH11FWD336AAC 53

54. Remove and discard the brake insert O-ring from carrier assembly housing.



RCPH11FWD335BAC 54

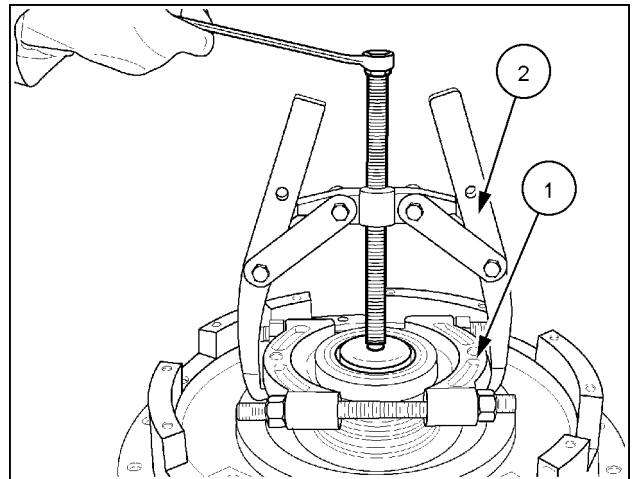
55. Remove and discard the two seal rings from the hub of the carrier.



RCPH10FWD992AAJ 55

56. If required, use a split knife edge puller attachment (1) and a puller (2) to remove the bearing cone from the hub of the carrier.

NOTE: If possible, place the bearing cup over the bearing cone when removing the bearing.



RCPH10FWD993AAJ 56

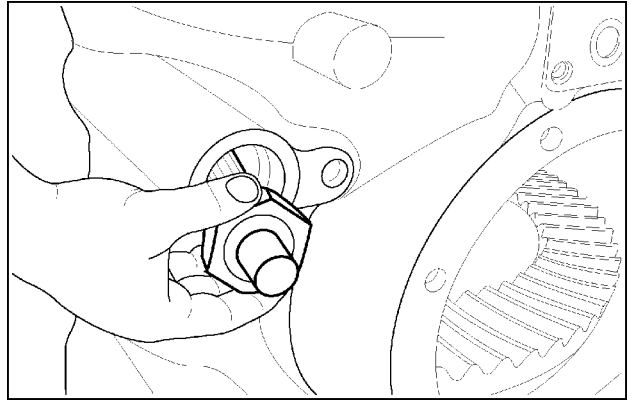
57. Turn the brake carrier housing so the outer side is on top. Remove the seal retaining screws and washers. Remove and discard the seal. Clean and inspect all brake carrier parts for damage or wear. Replace any damaged or worn parts found.



RCPH11FWD362BAC 57

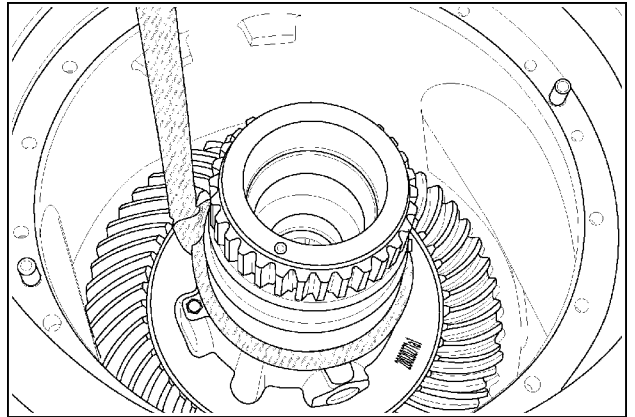
Differential removal and disassembly

58. Remove the lube return mesh screen from the housing.



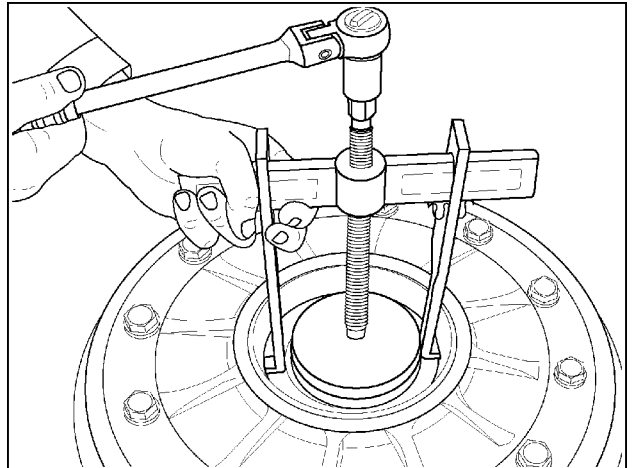
RCPH10FWD995AAJ 58

59. Position a nylon lifting sling in a choker configuration as low as possible on the differential carrier. Use a hoist to lift the differential from the housing.



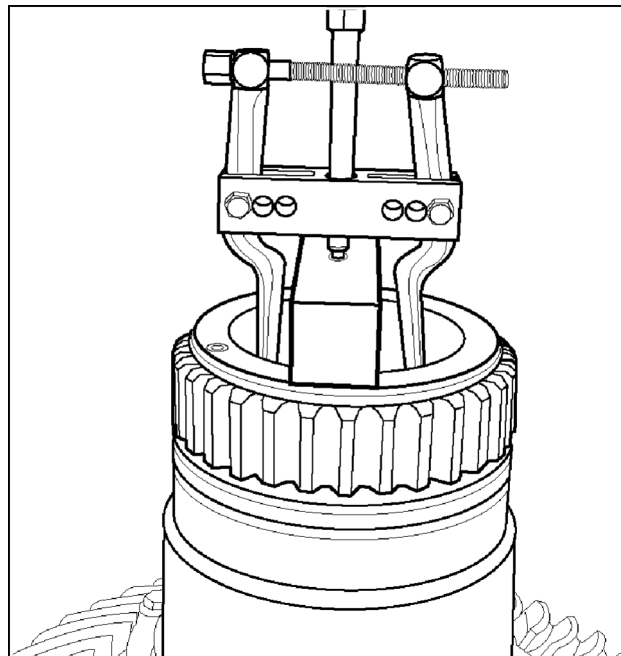
RCPH10FWD998AAJ 59

60. If required, use a bearing puller and step plate to remove the left hand side differential bearing cup.



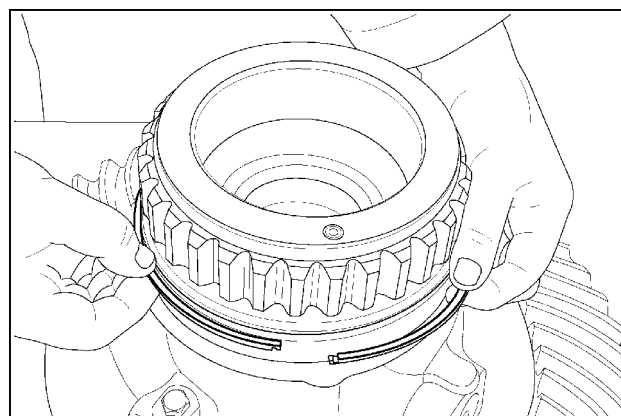
RCPH10FWD999AAJ 60

61. If required, use a bearing puller and step plate to remove the right hand side differential bearing cup.



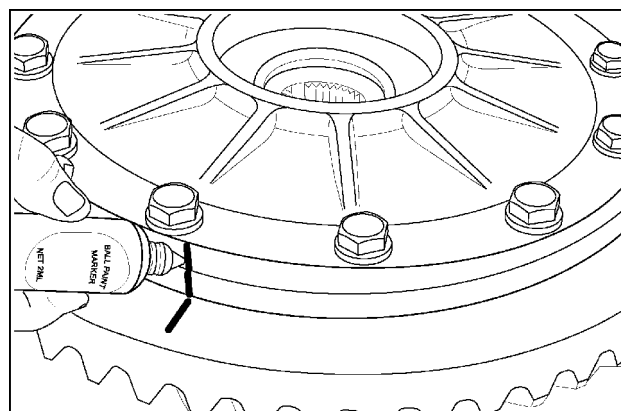
RCPH10FWD001ABJ 61

62. Remove and discard the large seal ring.



RCPH10FWD002ABJ 62

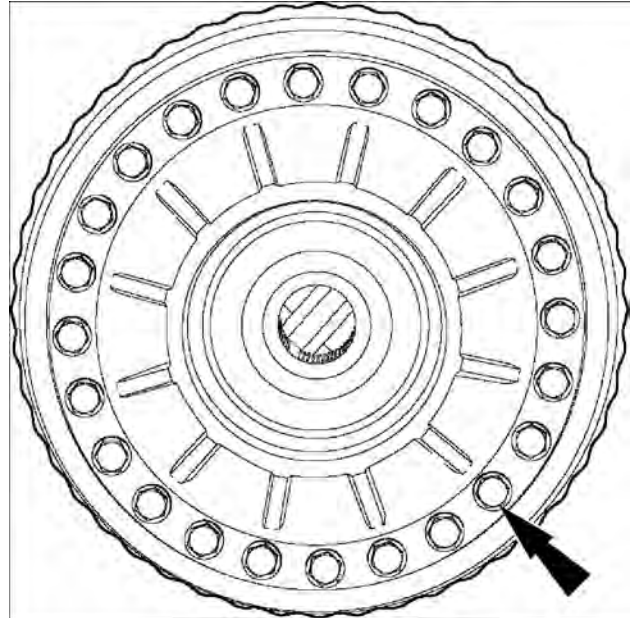
63. Put a mark on the differential case for assembly reference.



RCPH10FWD003ABJ 63

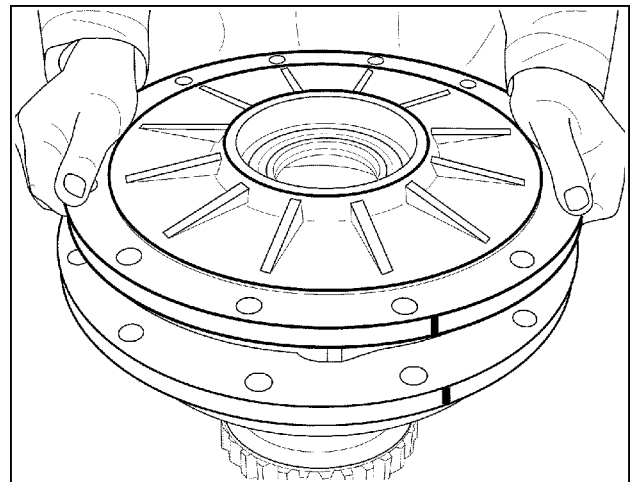
64. Remove and discard the ring gear and cover attaching bolts. Use a brass drift and hammer to tap the ring gear free from the case.

NOTE: The ring gear does not need to be removed unless the case or ring gear is to be replaced.



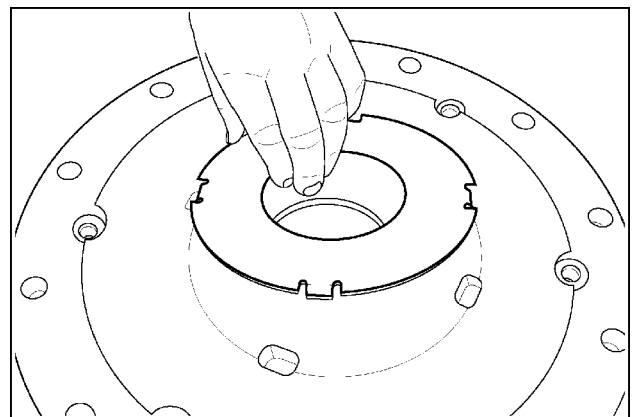
RCPH11FWD331BAC 64

65. Remove the differential case cover.



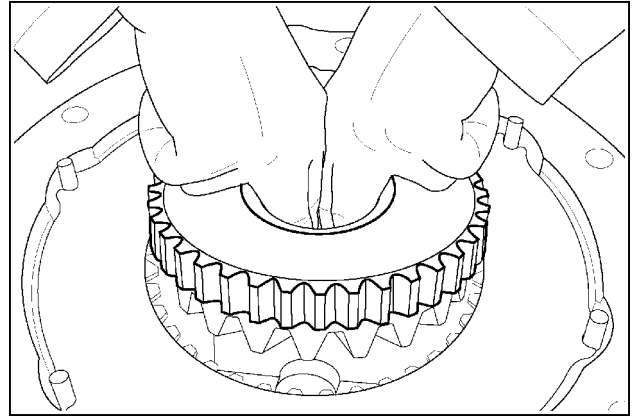
RCPH10FWD005ABJ 65

66. Remove the large thrust washer from the cover.



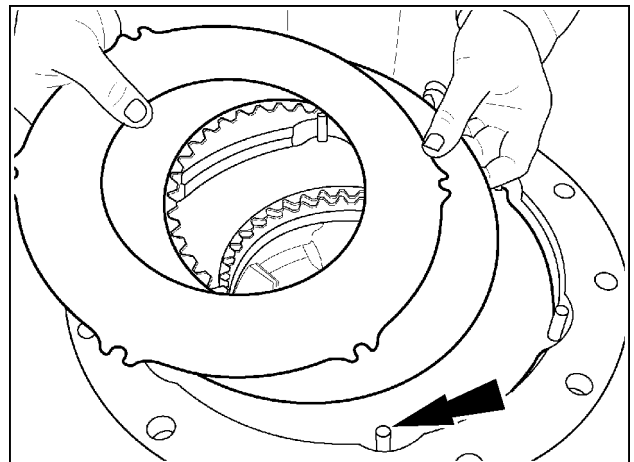
RCPH10FWD006ABJ 66

67. Remove the differential side gear from the case.



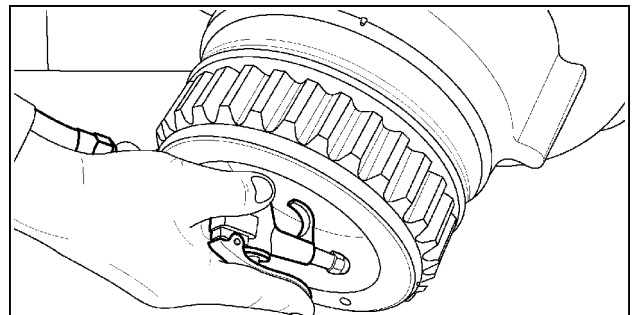
RCPH10FWD007ABJ 67

68. If equipped with differential lock, remove the four steel separator plates and three friction plates from the case. Remove the 6 anti-rotation dowel pins from the case.
If not equipped with differential lock proceed to step 71.



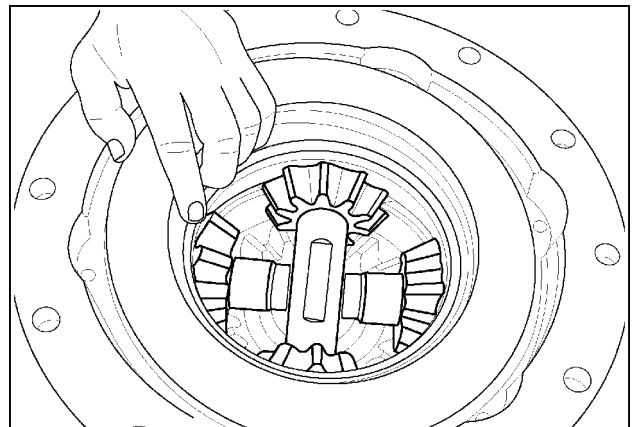
RCPH10FWD008ABJ 68

69. If equipped with differential lock, use a short burst of compressed air in the oil passage hole in the case to move the differential lock piston out of the bore.



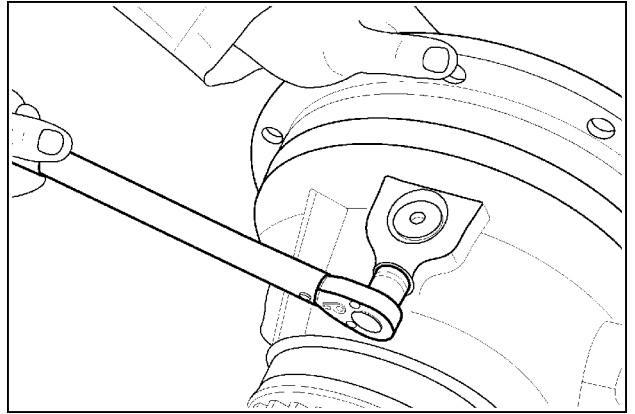
RCPH10FWD009ABJ 69

70. Remove the differential lock piston from the case.



RCPH10FWD010ABJ 70

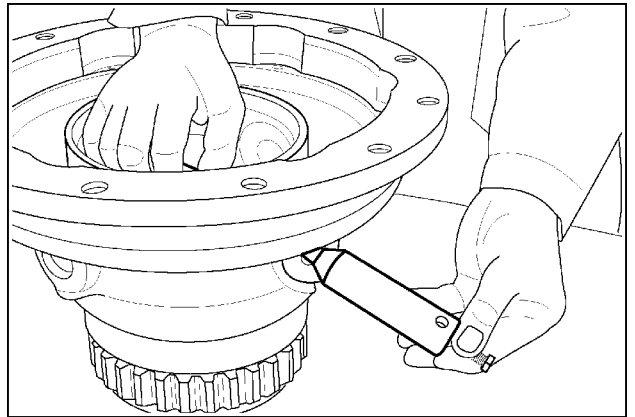
71. Remove the bolts securing the short pinion shafts in the case.



RCPH10FWD011ABJ 71

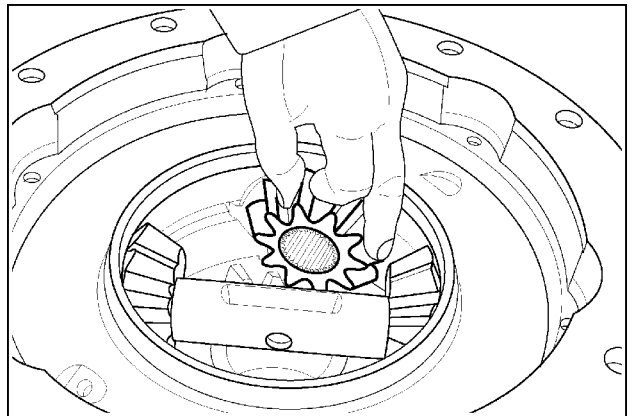
72. Install an M8 x 1.25 bolt into the threaded hole in the end of each short pinion gear shaft. Remove the short shafts and spacer sleeves from the case.

NOTE: There are 28 uncaged needle roller bearings in each of the four pinion gears.



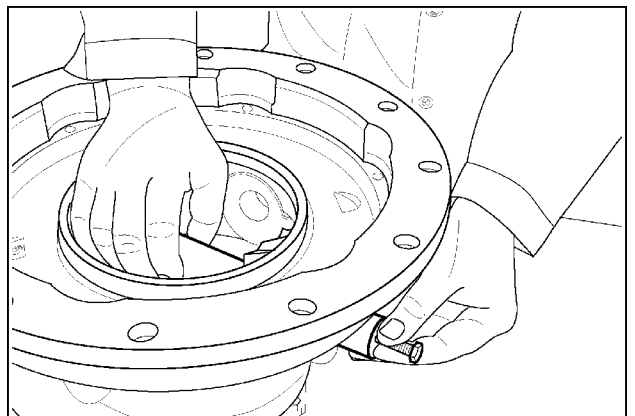
RCPH10FWD012ABJ 72

73. Remove the spider gears for the short shafts from the case.



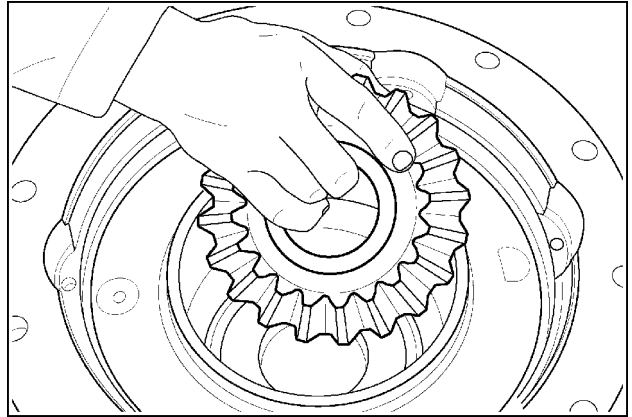
RCPH10FWD013ABJ 73

74. Use the same procedure to remove the long spider gear shaft, spacer and spider gears.



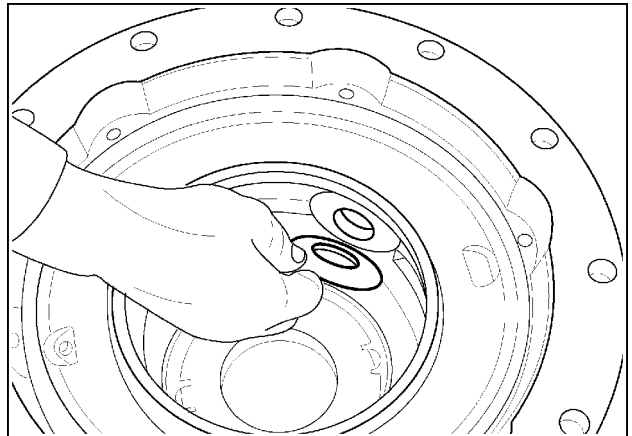
RCPH10FWD014ABJ 74

75. Remove the side gear from the bottom of the case.



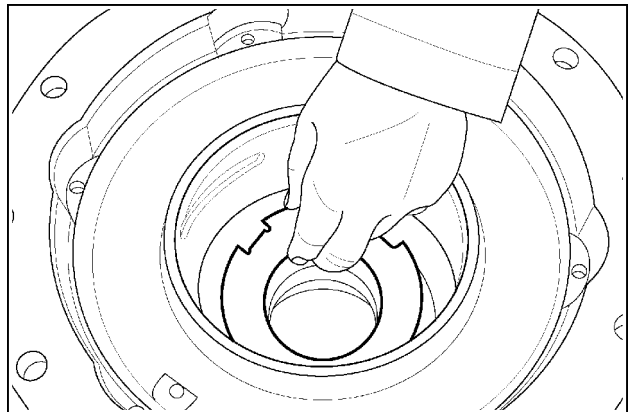
RCPH10FWD015ABJ 75

76. Remove the thrust washers for each spider gear from the case.



RCPH10FWD016ABJ 76

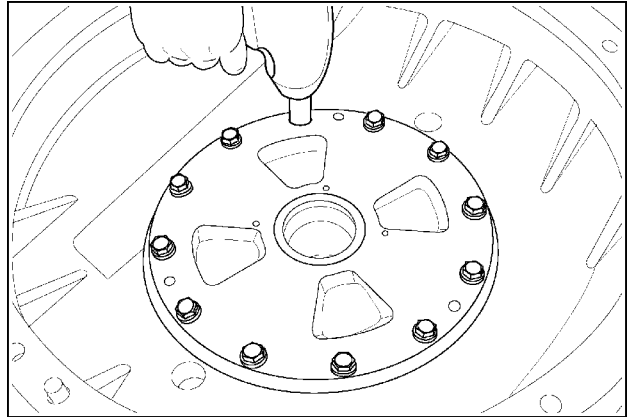
77. Remove the thrust washer for the side gear from the bottom of the case. Clean and inspect all differential parts for damage or wear. Replace any damaged or worn parts found.



RCPH10FWD017ABJ 77

Left hand differential bearing support disassembly

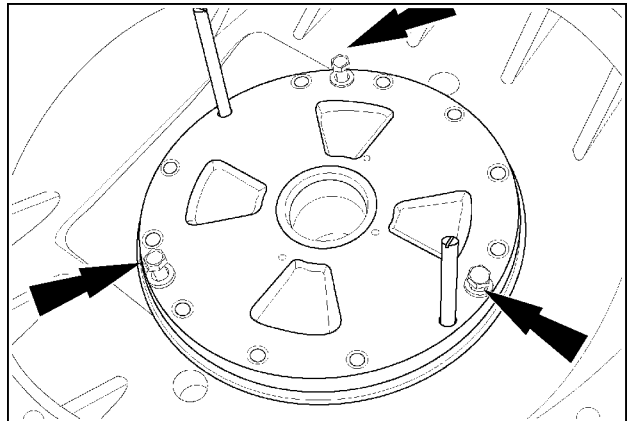
78. If required, rotate the differential housing so the left hand side differential bearing support carrier is on top. Remove the bearing support retaining bolts and washers.



RCPH10FWD018ABJ 78

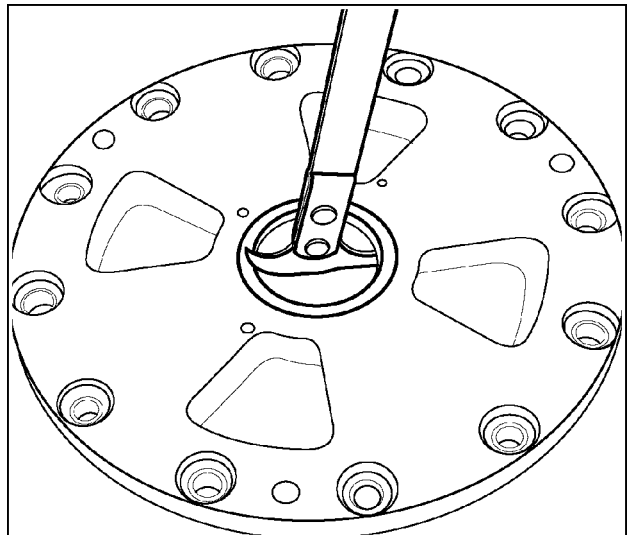
79. Install two CAS2479 guide bolts. Use three of the retaining bolts in the threaded holes provided. Tighten the bolts alternately and evenly to jack the bearing carrier out of the housing. Remove the bearing carrier and shims.

NOTE: Be careful not to damage the shims when removing the bearing support.



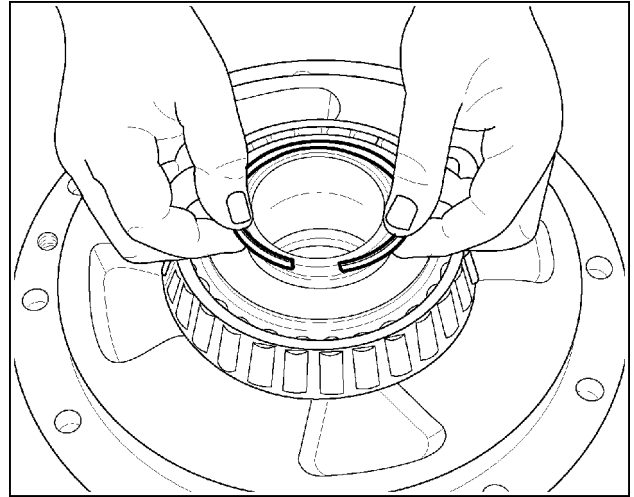
RCPH10FWD019ABJ 79

80. Remove the three seal retaining screws and washers. Remove and discard the oil seal.



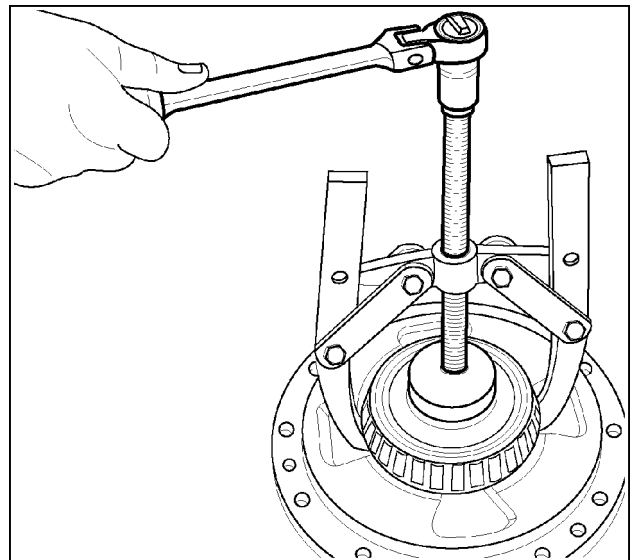
RCPH10FWD020ABJ 80

81. Remove and discard the seal ring.



RCPH10FWD021ABJ 81

82. If required, use a bearing puller and step plate to remove the bearing cone from the hub of the bearing carrier.



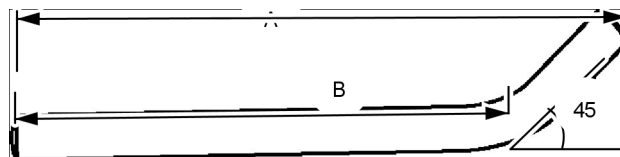
RCPH10FWD022ABJ 82

Differential - Assemble - 600 Series axles

Steiger® 580	NA
Steiger® 620	NA

Dealer made tool

Tool must be fabricated to assist in the shimming of the differential case to the differential housing. Take a **150 mm (6 in)** piece **(A)** of **9.5 mm (0.375 in)** steel rod and put a **45°** bend **115 mm (4.5 in)** **(B)** from the end.

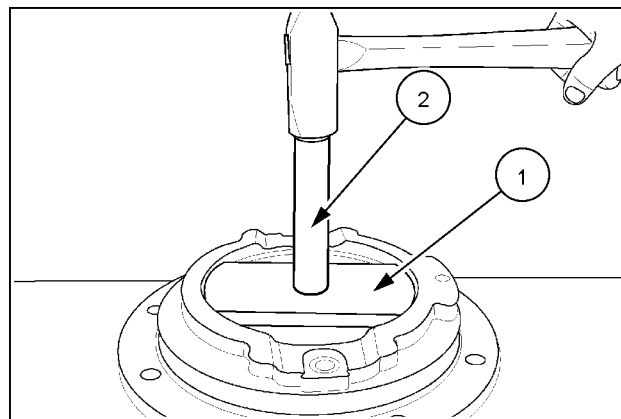


RCPH11FWD366AAC 1

Pinion carrier assembly

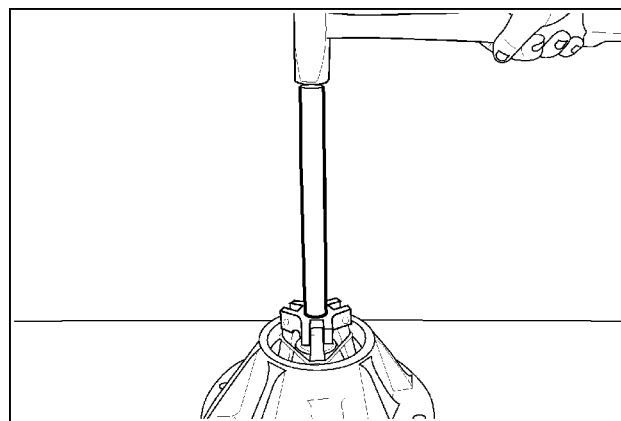
1. Use **CNH299050** bearing cup driver **(1)** and CAS1716-3 handle **(2)** to install the inner bearing cup into the carrier housing. Be sure the bearing cup is seated in the bore.

NOTE: Put a light coat of oil around the outside diameter of the bearing cup before installation.



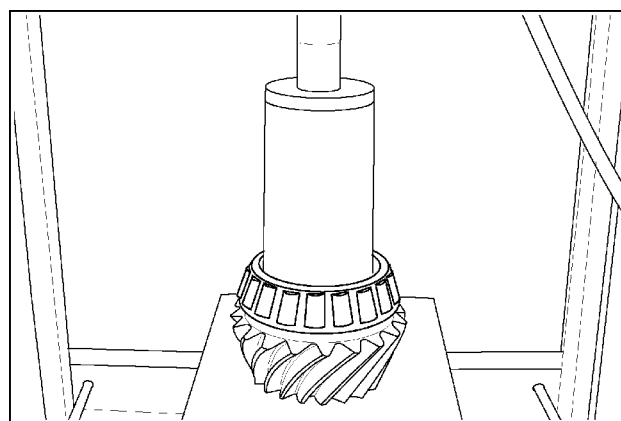
RCPH10FWD023ABJ 2

2. Put a light coat of oil around the outside diameter of the outer pinion bearing cup. Use a universal bearing cup installer to install the outer bearing cup into the carrier.



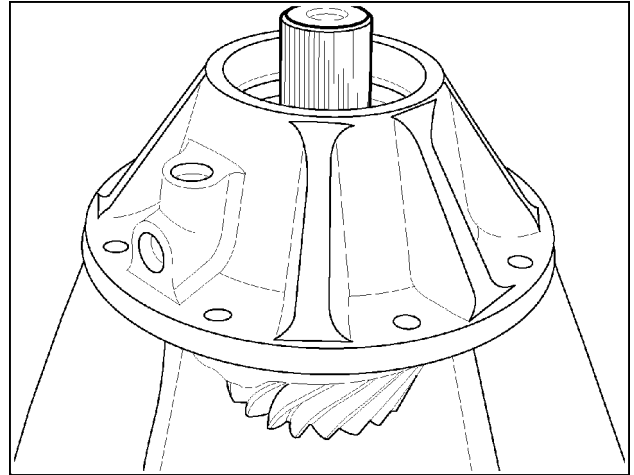
RCPH10FWD024ABJ 3

3. Put a light coat of oil around the inside diameter of the inner pinion bearing cone. Use the **CAS2666** press sleeve and press to install the inner bearing cone on the pinion gear until seated.



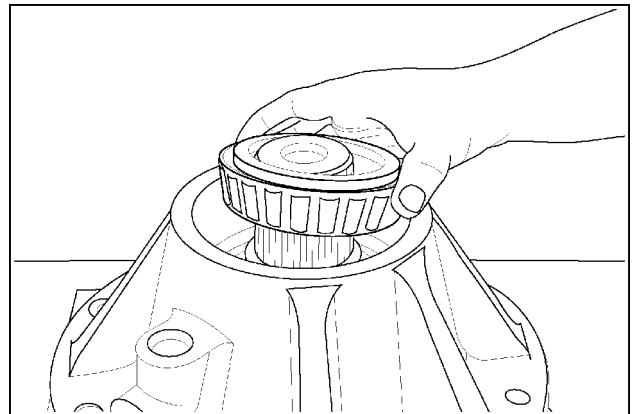
RCPH10FWD025ABJ 4

4. Lubricate inner bearing cone with clean operating oil. Install the bevel pinion gear into the carrier housing.



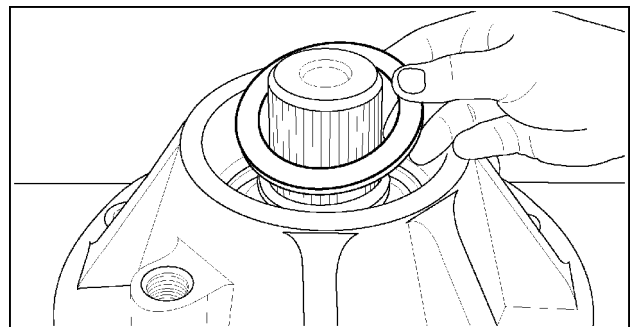
RCPH10FWD026ABJ 5

5. Lubricate the front bearing cone with clean assembly lube. Install the bearing cone on the pinion shaft.



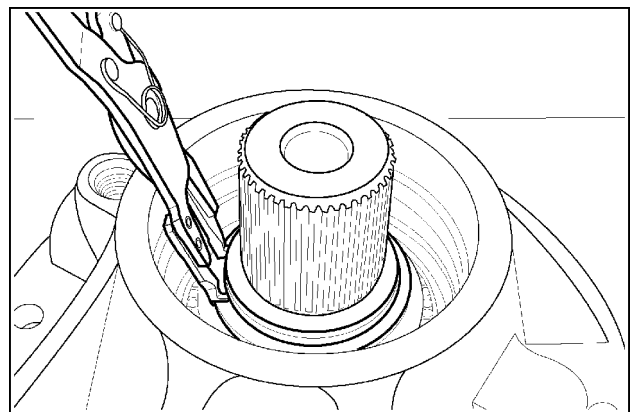
RCPH10FWD027ABJ 6

6. Install the thick spacer ring on the pinion shaft.



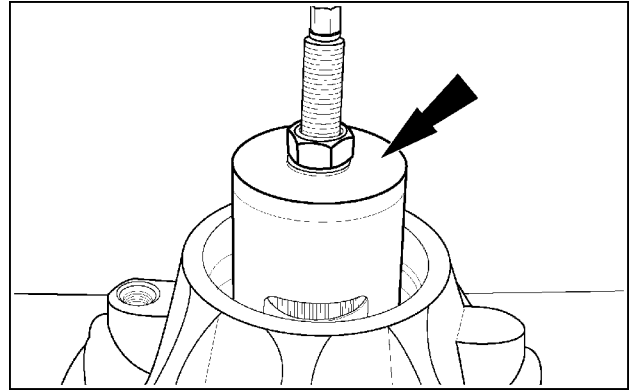
RCPH10FWD028ABJ 7

7. Install a new snap ring on the pinion shaft as far down as possible.



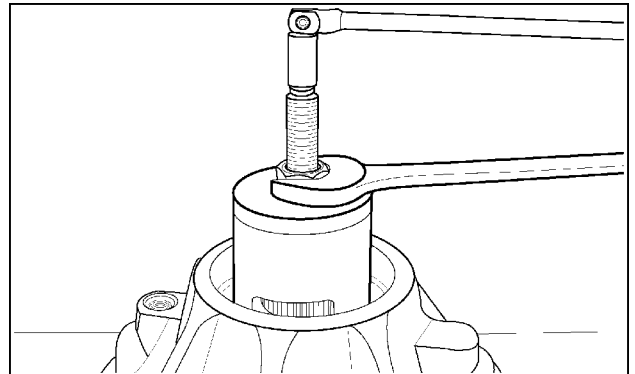
RCPH10FWD029ABJ 8

8. Install and tighten the center bolt of the **CAS2511** pinion bearing compression tool into the end of the pinion shaft. Install the compression sleeve, thrust washer and nut on the center bolt.



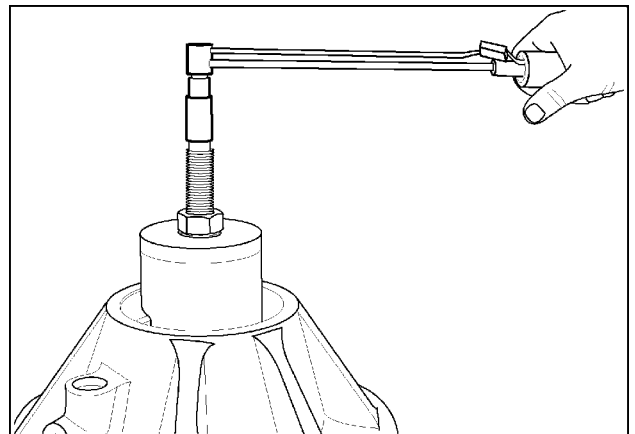
RCPH10FWD030ABJ 9

9. Use one wrench to hold the center bolt and a second wrench to tighten the nut to push the bearing cone on the pinion gear shaft until some resistance is noted when the pinion gear is rotated. Install the snap ring into the groove of the pinion shaft.



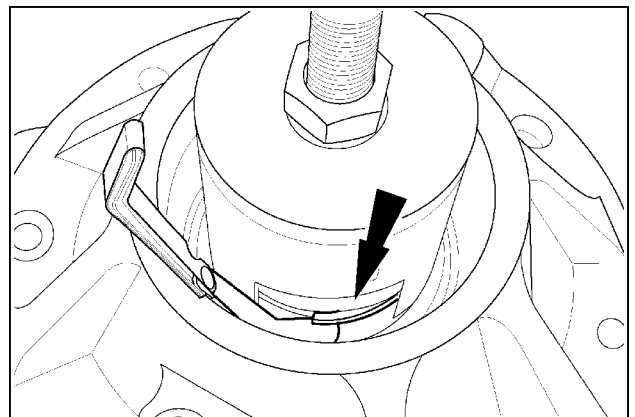
RCPH10FWD962AAJ 10

10. Use a torque wrench on the center bolt to measure rolling torque. Tighten the nut until **19 – 20 N·m (14 – 15 lb ft)** of smooth and continuous rolling torque is measured.



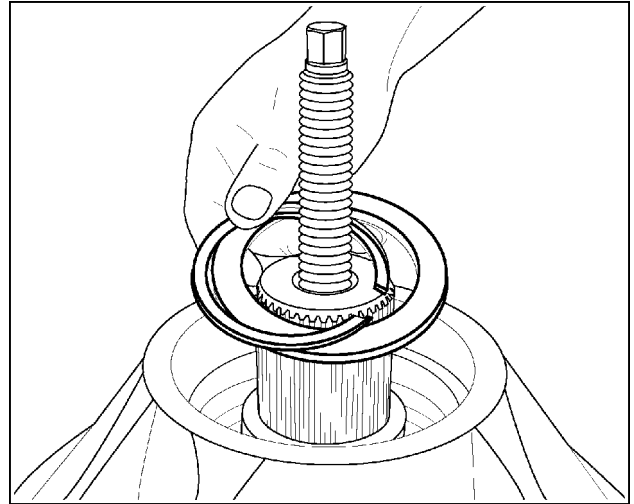
RCPH10FWD031ABJ 11

11. Use an angled feeler gauge to measure and record the distance between the spacer ring and the snap ring. The feeler gauge must be a tight fit.



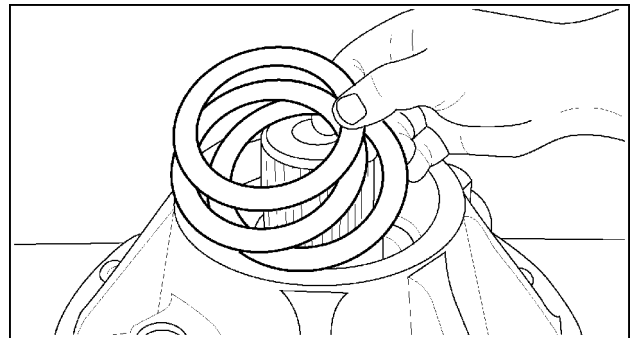
RCPH10FWD032ABJ 12

12. Remove the compression sleeve, snap ring and thick spacer ring.



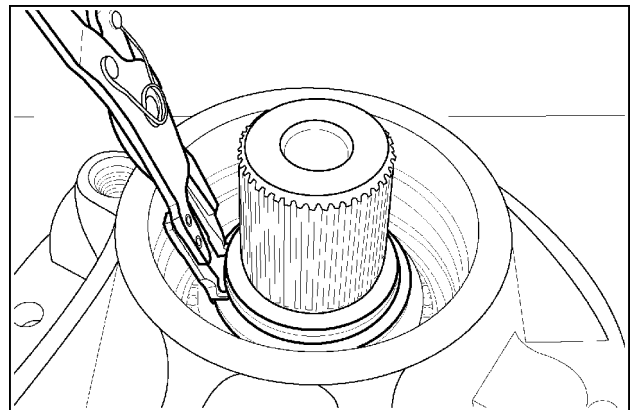
RCPH10FWD033ABJ 13

13. Select a shim combination equal to the distance measured in Step 11. Install the selected shim pack (thickest shim first) and thick spacer ring on the pinion shaft.



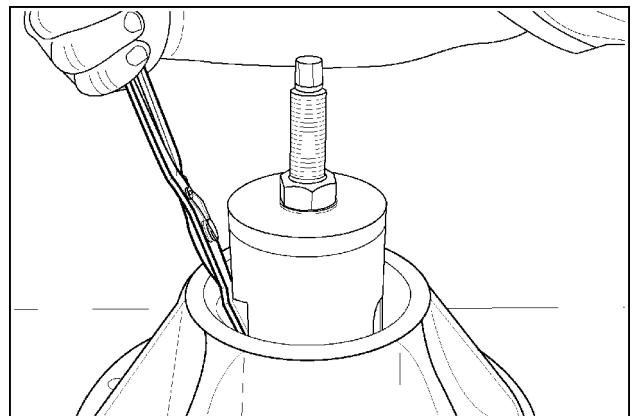
RCPH10FWD034ABJ 14

14. Install the snap ring on the pinion shaft as far down as possible.



RCPH10FWD029ABJ 15

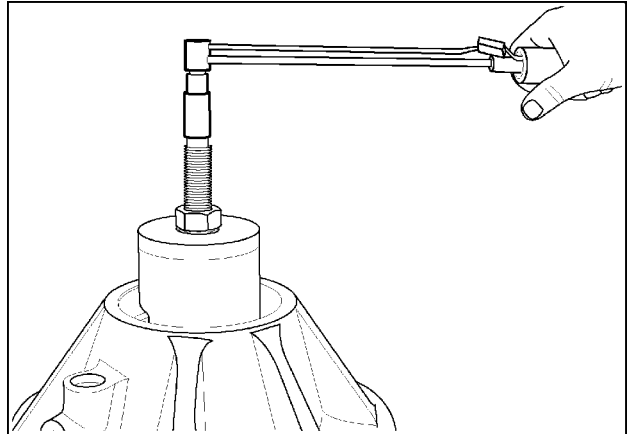
15. Install the compression sleeve, thrust washer and nut on the center bolt. Align the open window of the sleeve with the gap of the snap ring. Tighten the nut on the compression sleeve until the snap ring can be installed in the groove of the shaft. Be sure the snap ring is fully seated in the groove.



RCPH10FWD963AAJ 16

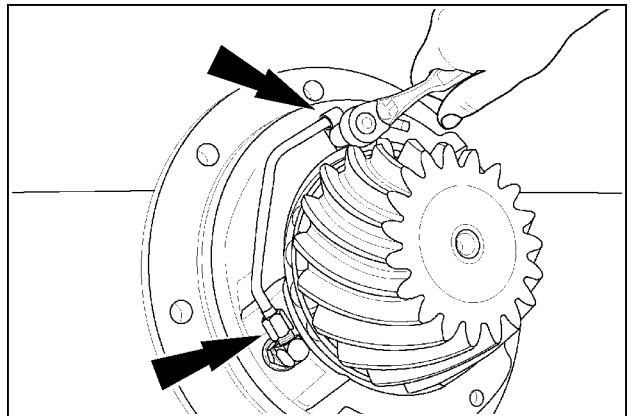
16. Loosen the nut on the center bolt at least two full turns. Strike the head of the center bolt two sharp blows with a heavy hammer to back seat the bearing against the snap ring. Use a torque wrench to check pinion bearing preload. Rolling torque must measure **6 – 20 N·m (4 – 15 lb ft)** with no bearing binding or lockup. If rolling torque is out of tolerance, add or remove shims as needed to correct rolling torque.

NOTE: Adjust used bearings towards the low end of the preload tolerance range.



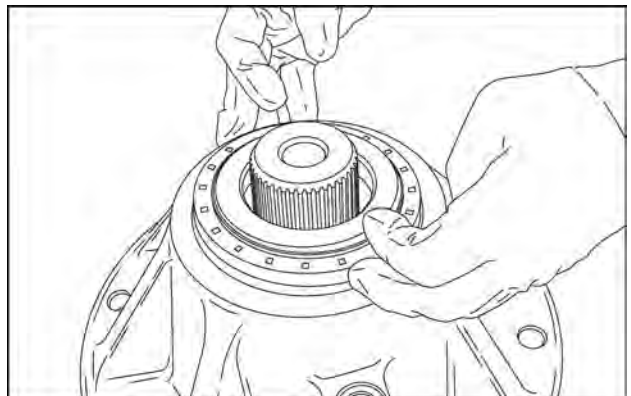
RCPH10FWD031ABJ 17

17. Install the lubrication port fitting, pinion lube tube, retaining clip and bolt. Tighten the bolt to the specified torque. Adjust the tube to direct oil flow at the pinion gear teeth. Allow a minimum of **6 mm (0.24 in)** clearance between the end of the tube and the bevel gear. Tighten the tube fitting and connection securely.



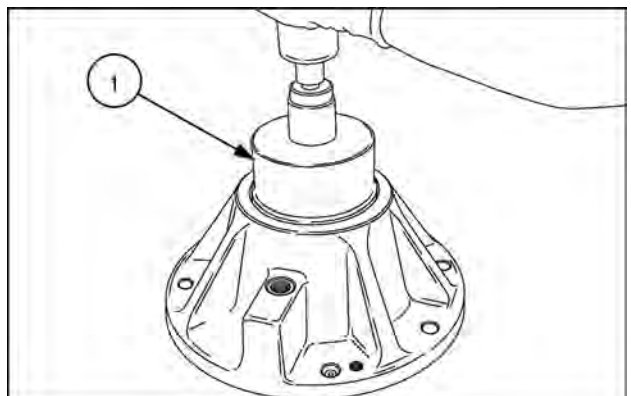
RCPH10FWD960AAJ 18

18. Install the pinion seal over the pinion shaft into the bore of the housing.



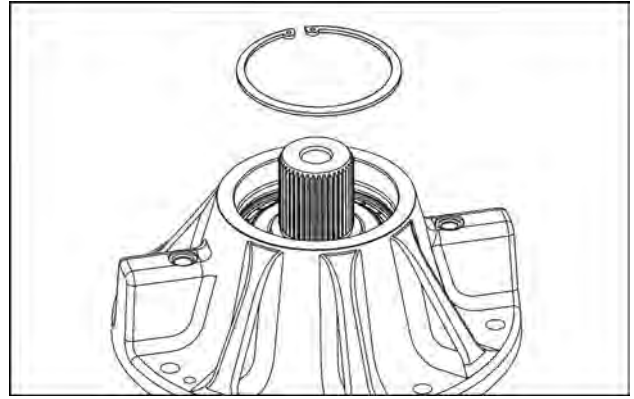
RAIL17TR01392AA 19

19. Use **380003447** pinion seal driver (1) with bolt and washer to draw oil seal down to position.



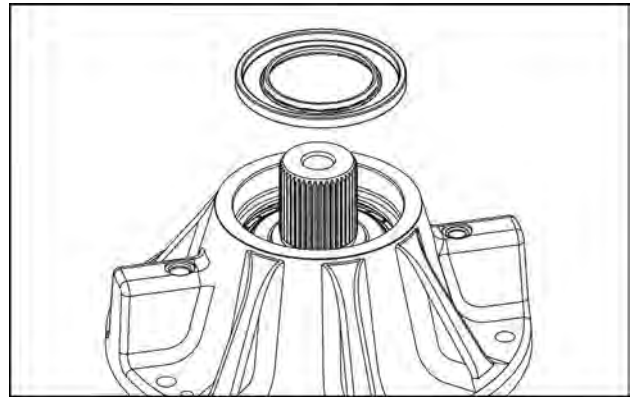
RAIL17TR01393AA 20

20. Install snap ring.



RAIL17TR01399AA 21

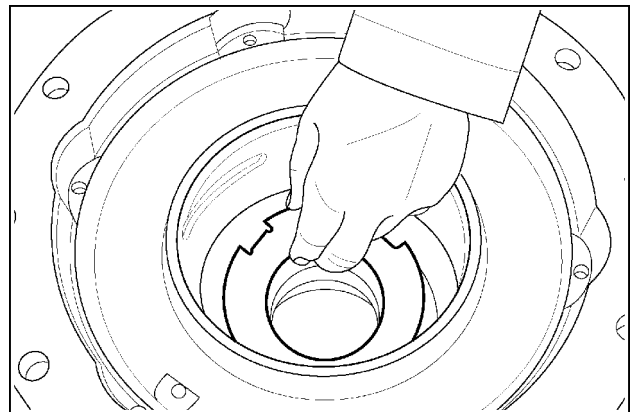
21. Press the dust seal on until it is flush with the housing.



RAIL17TR01398AA 22

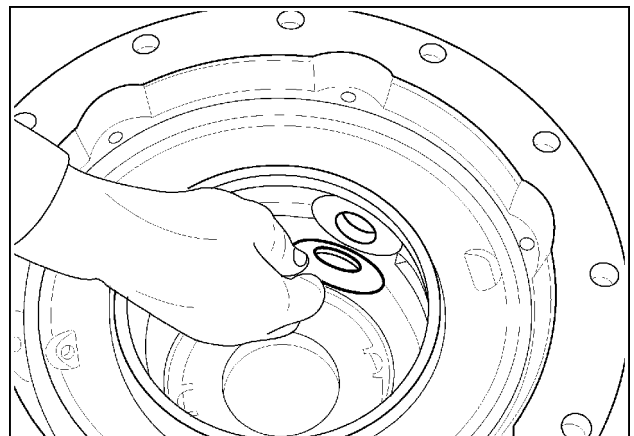
Differential case assembly procedures

22. Lubricate the thrust washer for the case with clean assembly grease. Position the thrust washer tab side down in the bottom of the case.



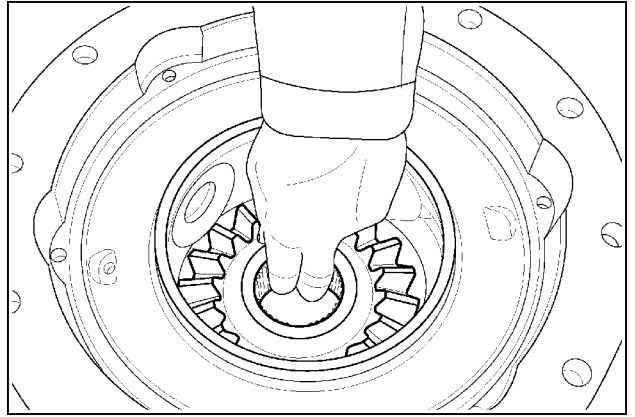
RCPH10FWD017ABJ 23

23. Lubricate each pinion gear thrust washer with clean assembly grease. Install each spider gear thrust washer (tab outward) to engage the slot in the case and centered to the hole.



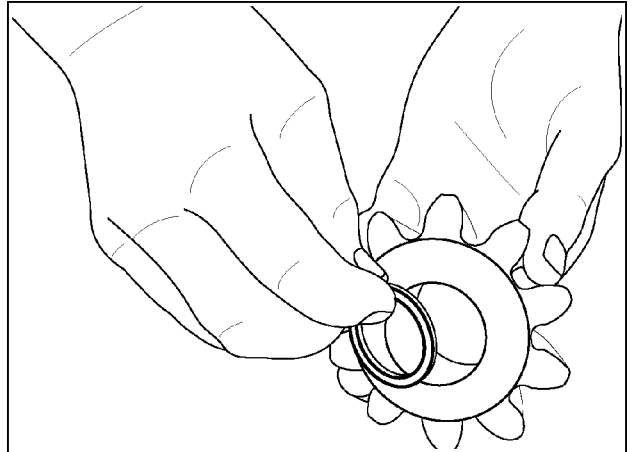
RCPH10FWD016ABJ 24

24. Install the side gear into the bore in the bottom of the case.



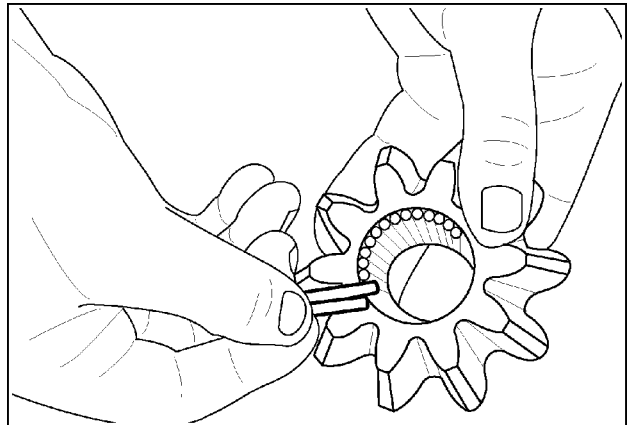
RCPH10FWD037ABJ 25

25. Lubricate the needle bearing thrust ring with clean assembly grease. Install the thrust ring into the bore of the spider gear at the beveled end.



RCPH10FWD038ABJ 26

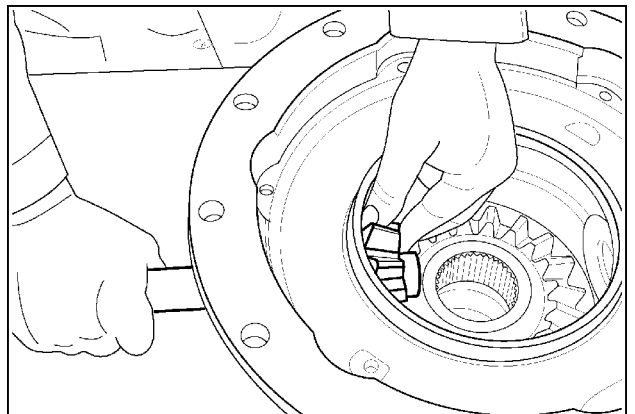
26. Using the thrust ring as a needle roller bearing support, use clean assembly grease to install a full complement of 28 needle roller bearings into each spider gear.



RCPH10FWD039ABJ 27

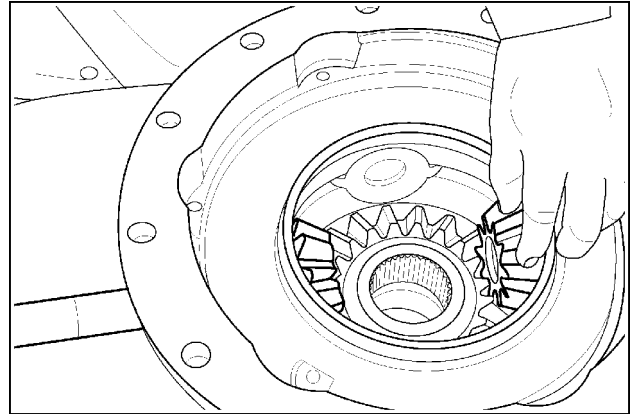
27. Install the first spider gear into the case centered to the hole for the long pin and meshed with the side gear. Push the pin through the case and into the spider gear until the pin is flush with the inner side of the gear.

NOTE: Turn the long pin so that the hole in the center of the pin is horizontal.



RCPH10FWD040ABJ 28

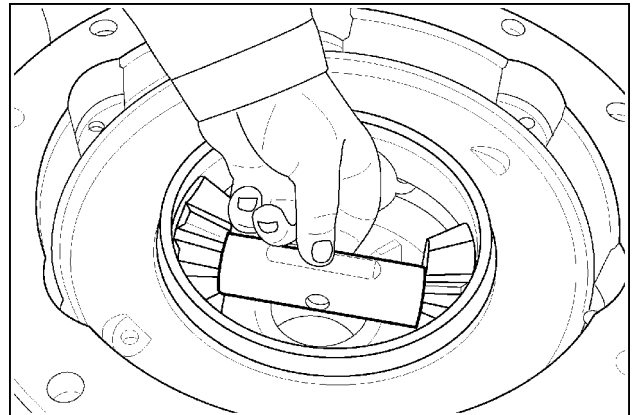
28. Install the opposite side spider gear centered to the case bore and meshed with the side gear.



RCPH10FWD041ABJ 29

29. Install the long spacer sleeve between the two spider gears so that the hole in the center of the sleeve is horizontal. Carefully push the long pin through the spacer sleeve and spider gears until the hole in the pin and spacer sleeve are aligned.

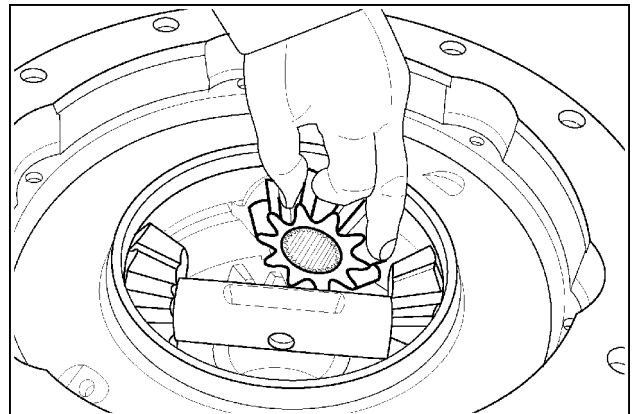
NOTE: Be sure the thrust ring and all needle rollers remain in position in each spider gear. Check the rotation of the spider gears and bottom side gear. Rotation of the gears must be smooth without lockup.



RCPH10FWD042ABJ 30

30. Install the spider gears for the short pins into the case in the same manner.

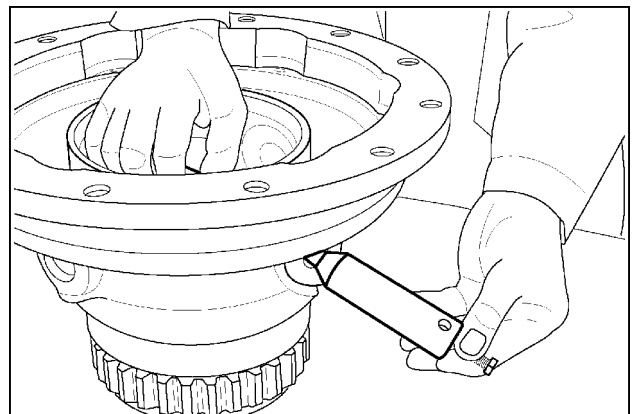
NOTE: The thrust ring for each spider gear must be installed on the beveled side of the gear.



RCPH10FWD013ABJ 31

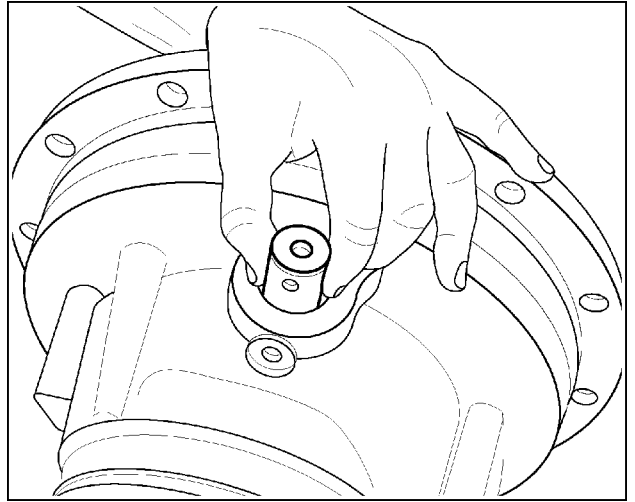
31. Position a short spacer sleeve between the spider gear and long spacer sleeve. Carefully install the pinion pin and short spacer to engage the hole in the long pin and spacer.

NOTE: The large outside diameter of the spacer sleeve must mate against the ends of the needle rollers. Be sure all needle rollers remained in the gear.



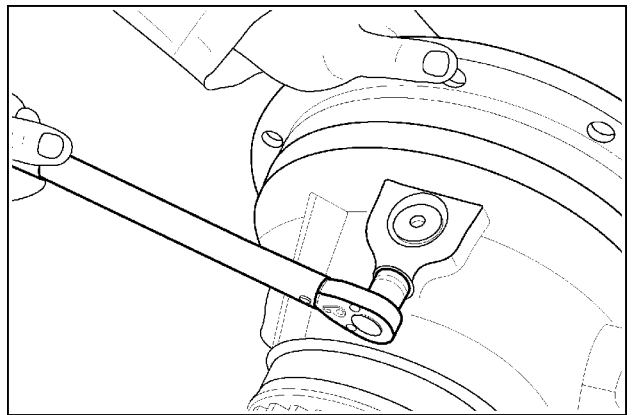
RCPH10FWD012ABJ 32

32. Align the hole in the end of the short pinion pin with the threaded hole in the case. Repeat this procedure for the opposite short pinion shaft.



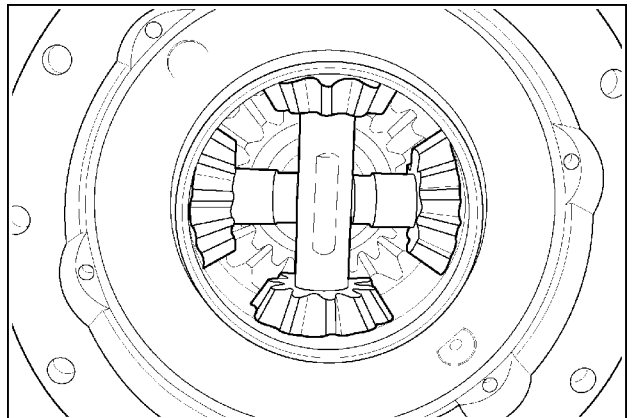
RCPH10FWD043ABJ 33

33. Install the pinion pin retainer bolts. Tighten each bolt to the specified torque.



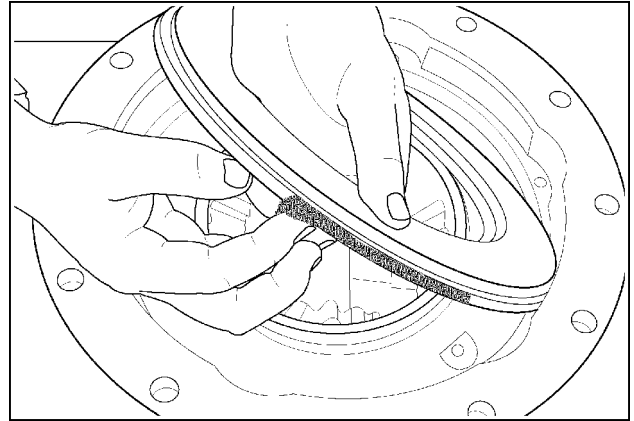
RCPH10FWD011ABJ 34

34. After all the spider gears and pins have been installed, check the rotation of the differential gears. There must be no lockup during rotation. For axles without differential lock go to Step 40 .



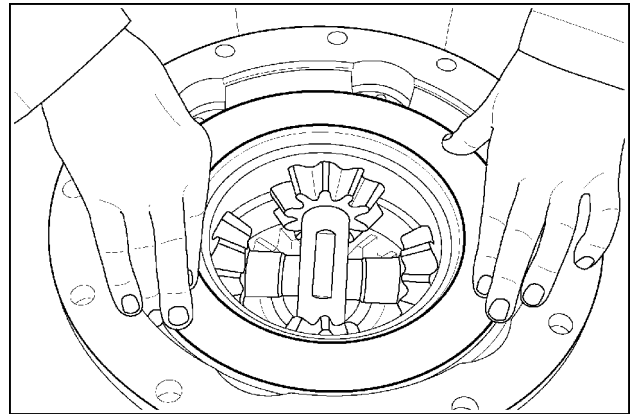
RCPH10FWD044ABJ 35

35. Lubricate the seals of a new piston with clean assembly grease.



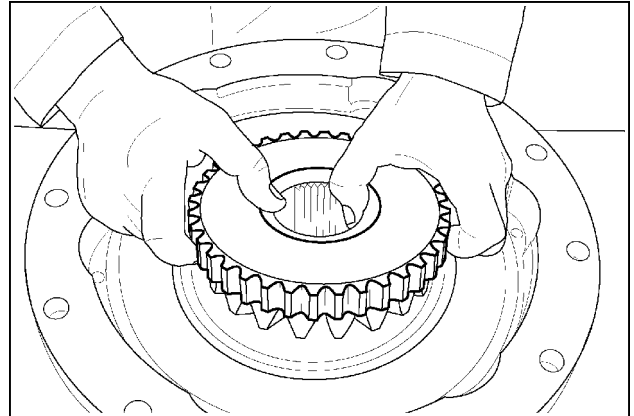
RCPH10FWD045ABJ 36

36. Hand seat the differential lock piston into the bore of the case.



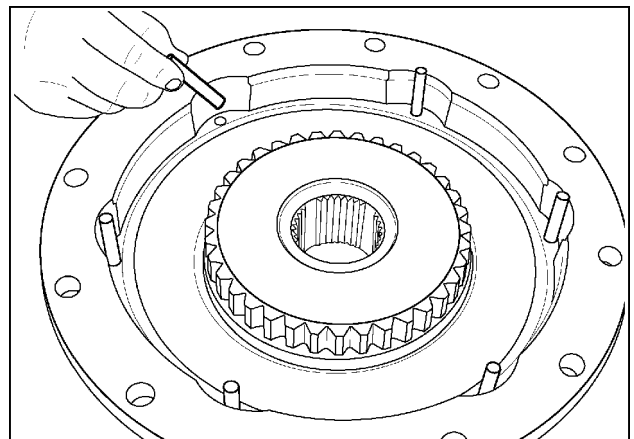
RCPH10FWD046ABJ 37

37. Install the splined side gear on top of the pinion gears so that all gears are in mesh.



RCPH10FWD047ABJ 38

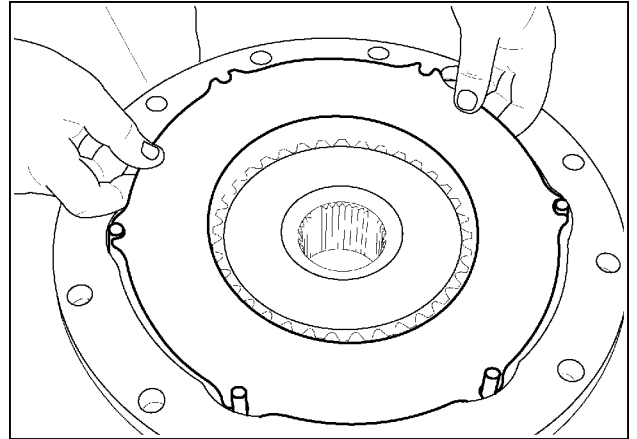
38. Install the six anti-rotation dowel pins into the holes in the case.



RCPH10FWD048ABJ 39

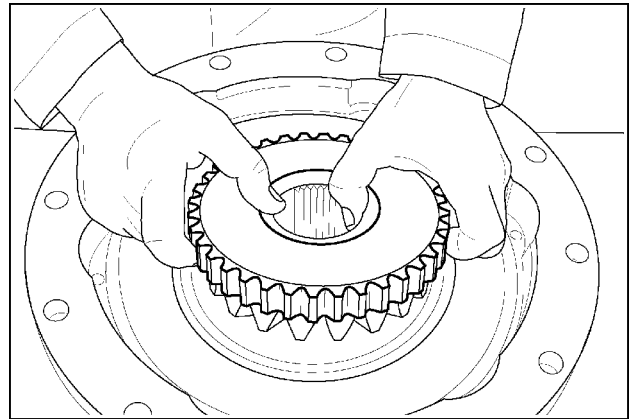
39. Starting with a steel separator plate, alternately install 4 separator plates and 3 friction plates. Be sure the slots in the ears of the separator plates engage the dowel pins. Go to Step 41.

NOTE: Soak the friction plates in clean operating fluid before installation.



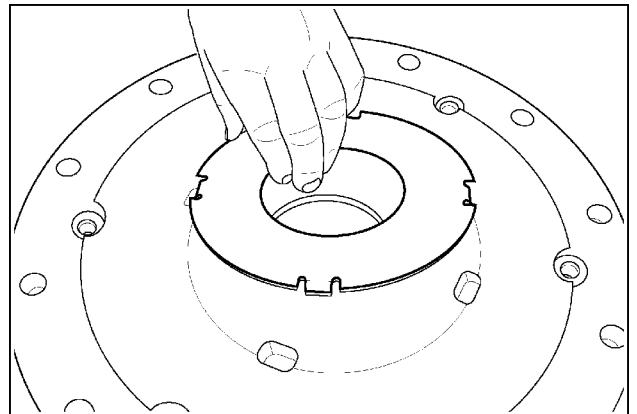
RCPH10FWD049ABJ 40

40. Install the splined side gear on top of the pinion gears so that all gears are in mesh.



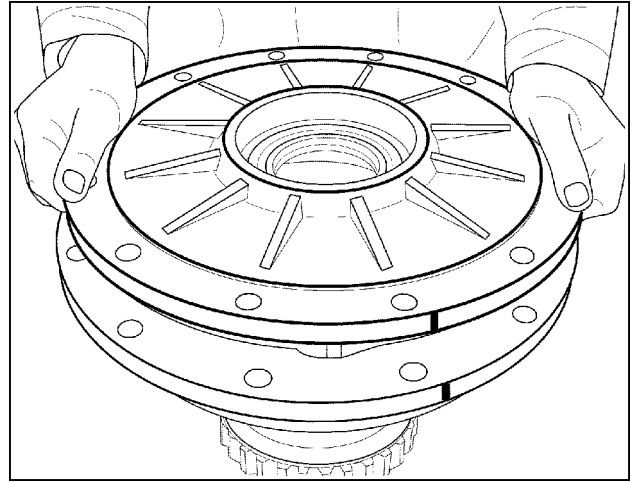
RCPH10FWD047ABJ 41

41. Lubricate the large thrust washer with clean assembly grease. Install the thrust washer into the cover (tab side down).



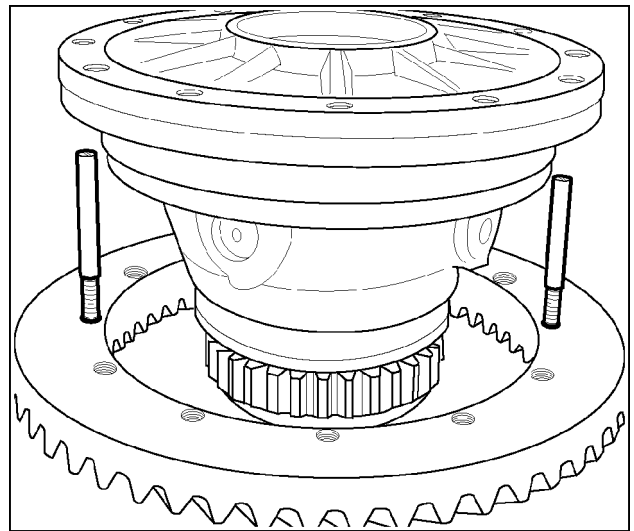
RCPH10FWD006ABJ 42

42. Install the cover on top of the case so that the match marks align.



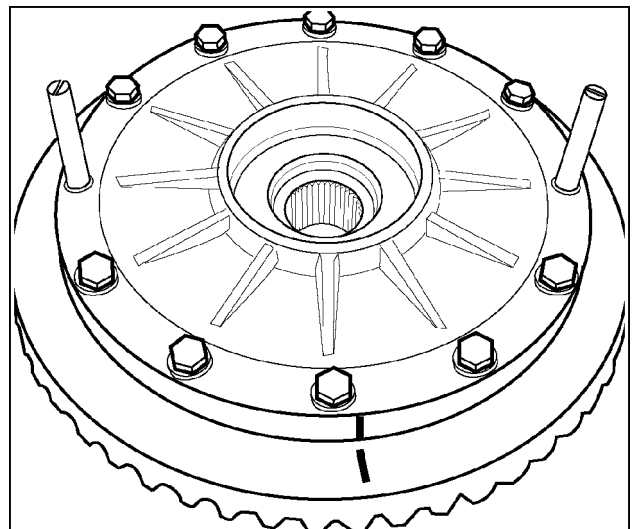
RCPH10FWD005ABJ 43

43. Put a light coat of oil around the inside diameter of the ring gear. Install two of the **CAS2496** alignment studs into opposite holes of the ring gear. Position the differential case over the ring gear.



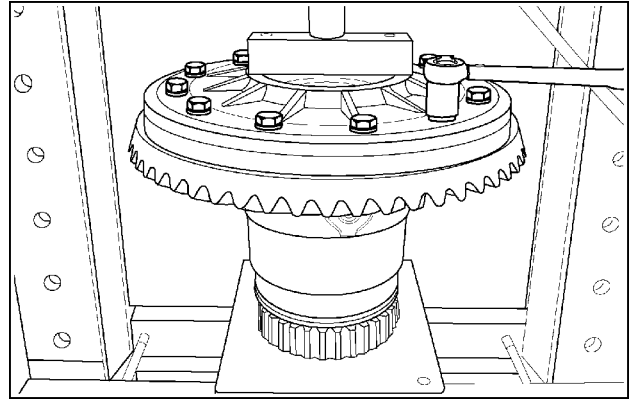
RCPH10FWD0050ABJ 44

44. Position the ring gear on the differential case so the match marks align. Install new retaining bolts and washers.



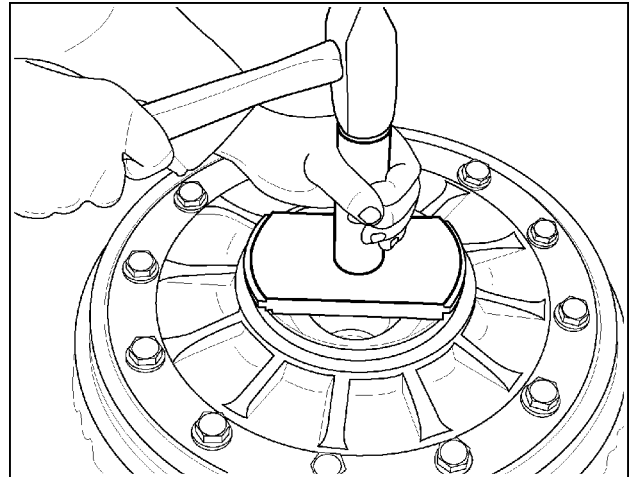
RCPH10FWD0051ABJ 45

45. Clamp the differential assembly in a press. Tighten the retaining bolts alternately and evenly in small increments in a star pattern to a final torque of **285 – 319 N·m (210 – 235 lb ft)**.



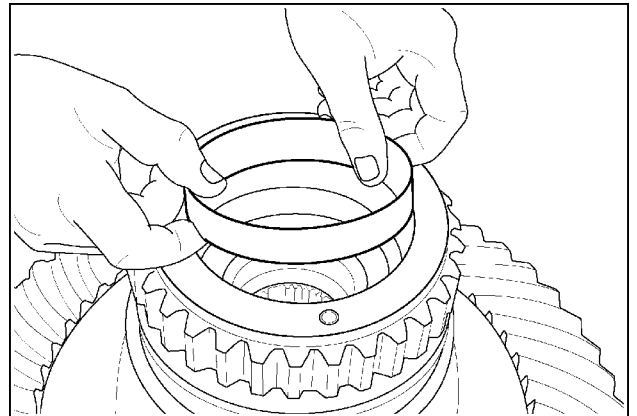
RCPH10FWD052ABJ 46

46. Use the CAS2500 bearing cup installer to install the bearing cup into the cover until fully seated.



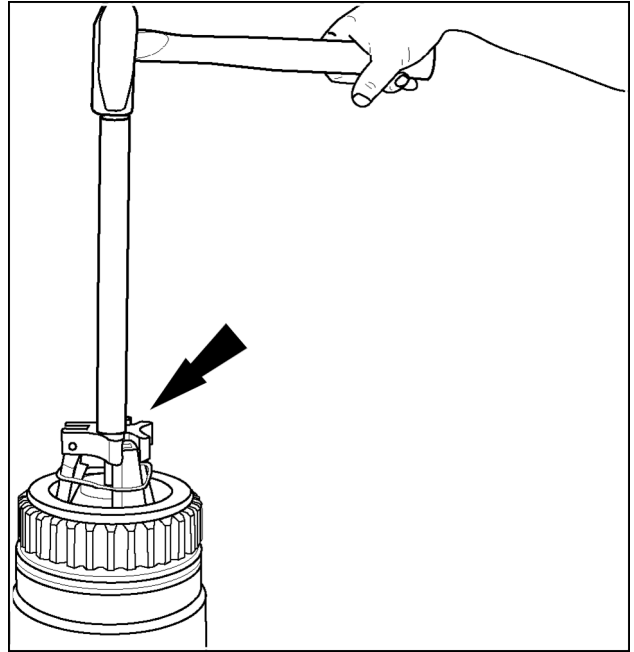
RCPH10FWD053ABJ 47

47. Position the bearing cup into the bore of the right hand case.



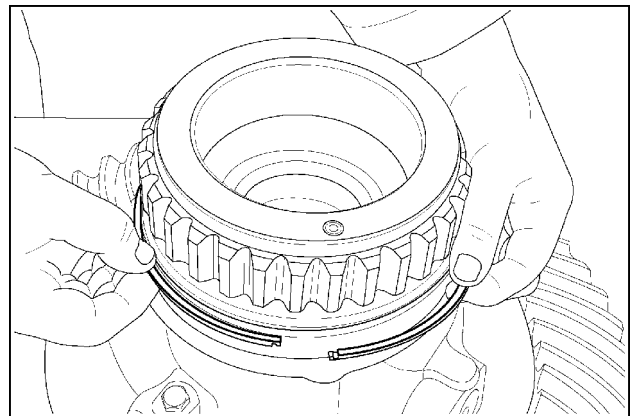
RCPH10FWD054ABJ 48

48. Use the universal bearing cup installer to install the bearing cup until seated.



RCPH10FWD055ABJ 49

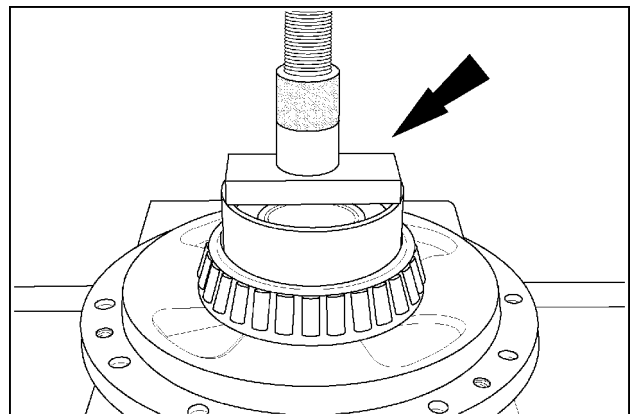
49. Install the Teflon seal ring in the groove of the hub. Lubricate the groove and the seal ring liberally with clean assembly grease. Be sure the ends of the seal ring are connected together.



RCPH10FWD002ABJ 50

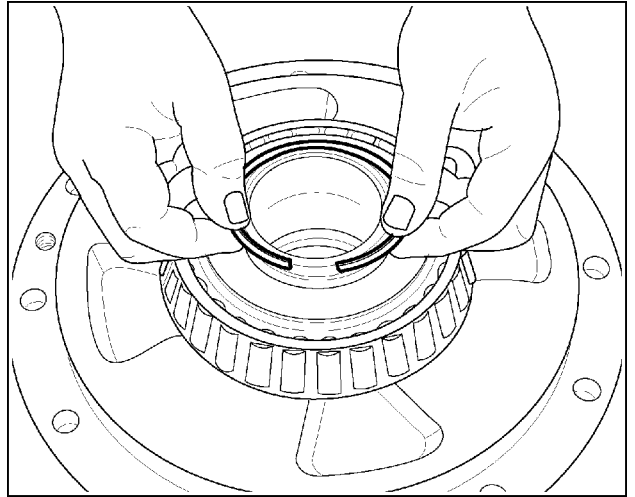
Left hand differential bearing support assembly

50. Use the **CAS2516** bearing installer and press to install the bearing cone until seated.



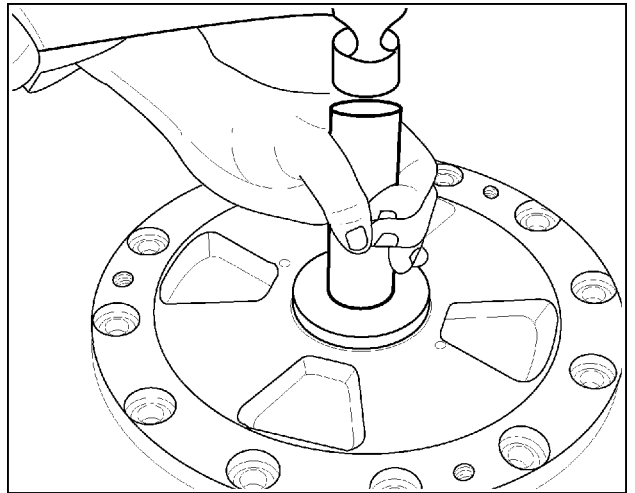
RCPH10FWD126ABJ 51

51. Lubricate and install a new seal ring in the groove of the bearing hub.



RCPH10FWD021ABJ 52

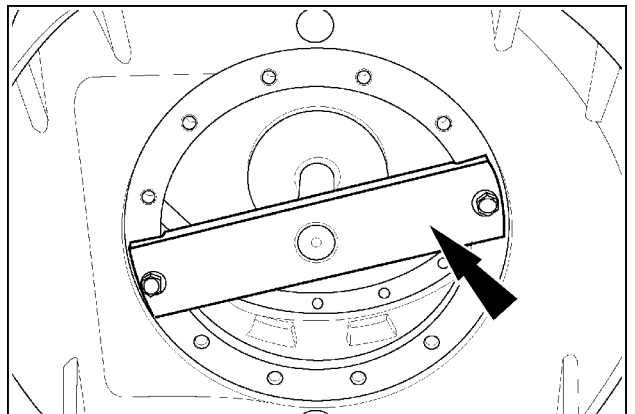
52. Use a seal driver to install a new oil seal into the bearing carrier. Install the seal retaining screws and washers using **LOCTITE® 242®** or equivalent to secure screws. Torque screws to specifications.



RCPH10FWD095ABJ 53

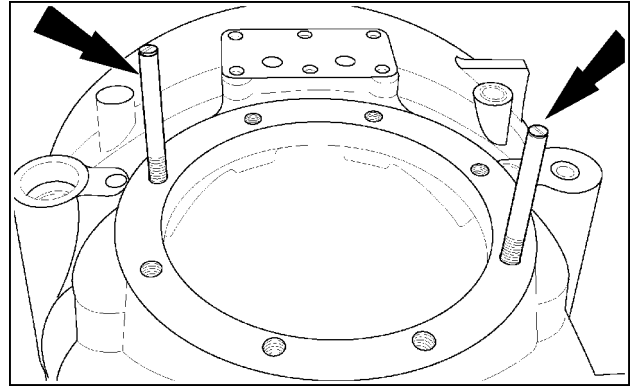
Adjusting bevel pinion gear depth

53. Install the **CAS2506** pinion depth gauge arbor into the bore for the left hand bearing support. Use two of the bearing support retaining bolts and washers. Tighten the bolts to a torque of **47 – 54 N·m (35 – 40 lb ft)**



RCPH10FWD096ABJ 54

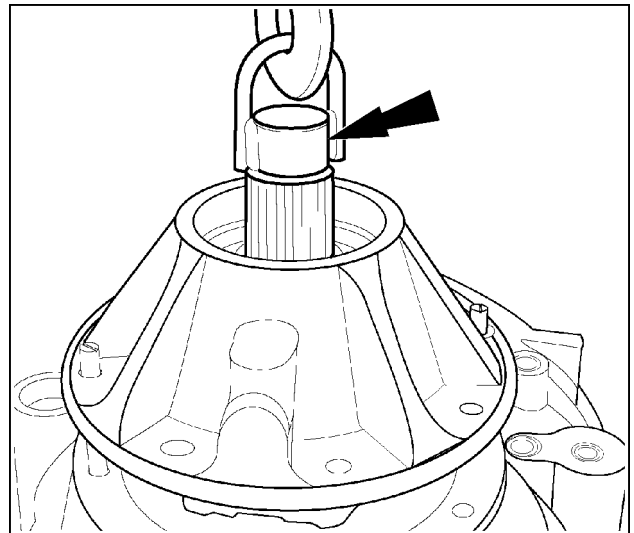
54. Install two of the **CAS2496** alignment studs opposite each other into the mounting flange.



RCPH10FWD097ABJ 55

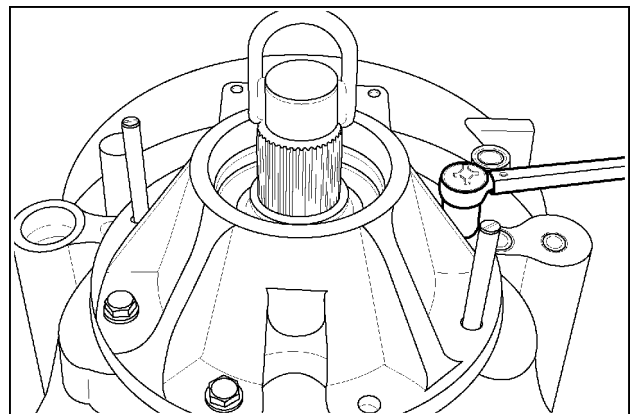
55. Use the CAS2494 lifting eye to install the pinion carrier assembly into the housing.

NOTE: Do not install the shims at this time.



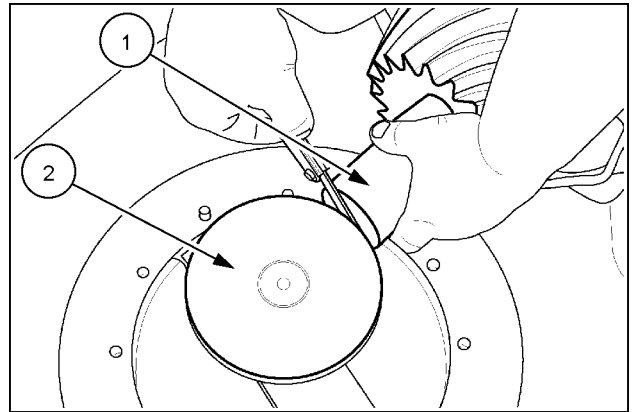
RCPH10FWD081ABJ 56

56. Install four equally spaced carrier assembly retaining bolts and washers. Tighten the bolts to a torque of **89 – 100 N·m (66 – 74 lb ft)**.



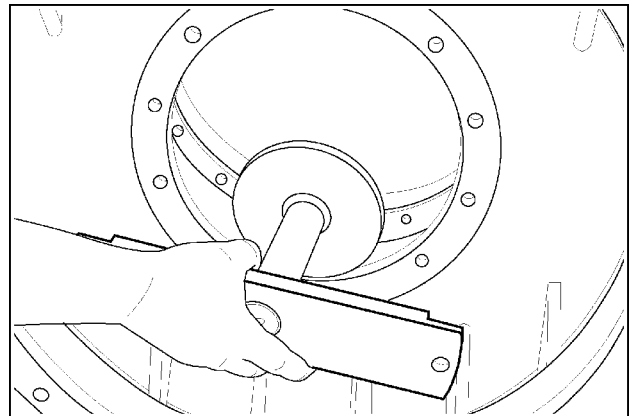
RCPH10FWD098ABJ 57

57. Install the CAS1675-2 gauge block (1) between the pinion and Arbor (2) with the hole end of the gauge block held tightly against the end of the pinion. Use a feeler gauge to measure and record the distance between the end of the gauge block and arbor.



RCPH10FWD099ABJ 58

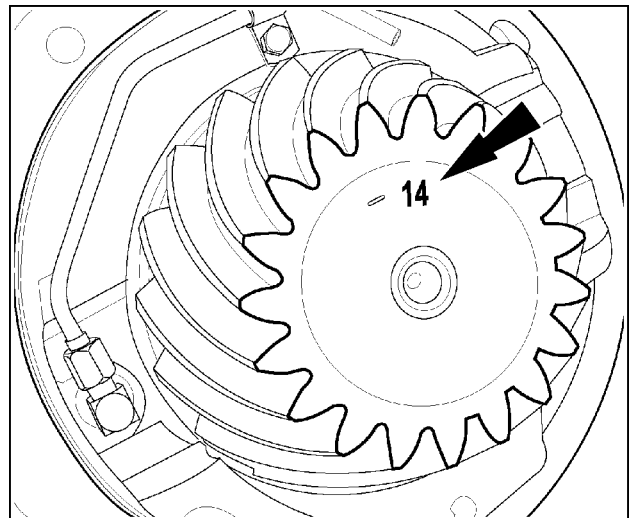
58. Remove the pinion carrier retaining bolts and lift the pinion carrier assembly from the housing. Remove the **CAS2506** arbor.



RCPH10FWD100ABJ 59

59. A correction factor number is etched onto the head end of the pinion. This number will be shown as a plus or minus adjustment in hundredths of a millimeter. Add or subtract this number from the standard nominal pinion depth dimension.

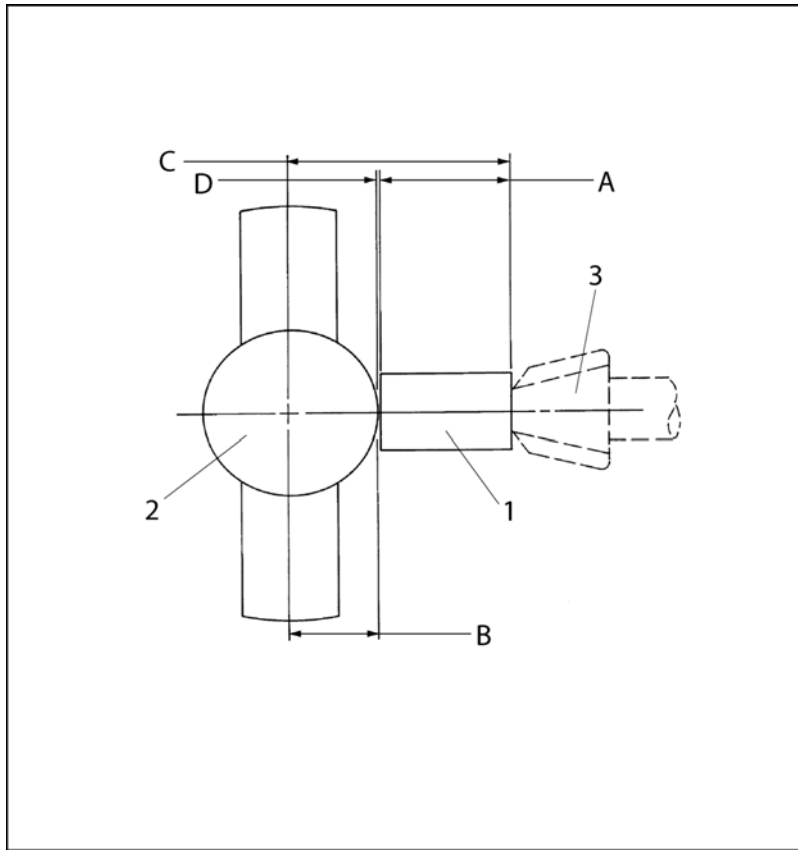
NOTE: The standard nominal mounting distance for the bevel pinion gear is **175.22 mm (6.90 in)** measured from the head end of the pinion gear to the center line of the differential.



RCPH10FWD101ABJ 60

60. Select a shim combination that will provide the shim requirement calculated in the next step. Shim requirement should be within **0.03 mm (0.001 in)**.

61. Use the following table and example to calculate the pinion depth shim requirements.



RCPH10FWD120FBJ 61

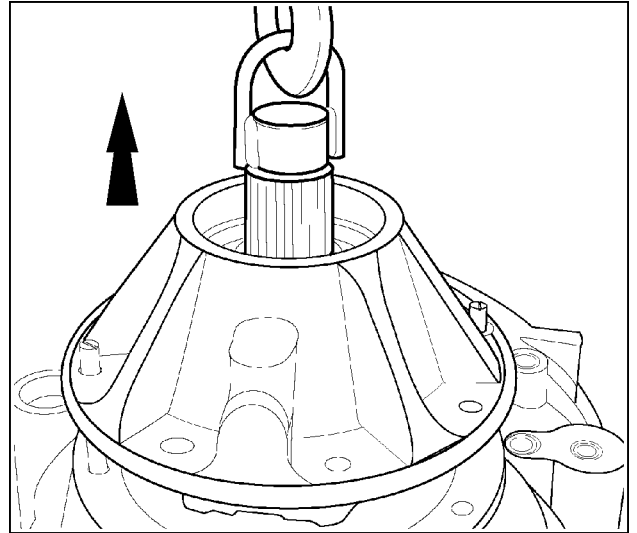
(1) CAS2506 Pinion depth gauge arbor, (2) CAS1675-2 Pinion depth gauge block, (3) Pinion

Item	Metric value	U.S. value
A	97.99 mm	3.858 in
B	75.82 mm	2.985 in
C	174.25 mm	6.860 in
D Gap measurement	0.44 mm	0.017 in

Example:

Item	Metric value	U.S. value
Tool constant dimension (A = B)	173.81 mm	6.840 in
Gap measurement (D)	0.44 mm	0.017 in
Total measured distance (A + B + D = C)	174.25 mm	6.860 in
Standard nominal pinion depth	175.22 mm	6.898 in
Reading on the pinion	-0.14 mm	0.005 in
Actual nominal pinion depth	175.08 mm	6.892 in
Minus total measured distance	174.25 mm	6.860 in
Shim requirement	0.83 mm	0.032 in

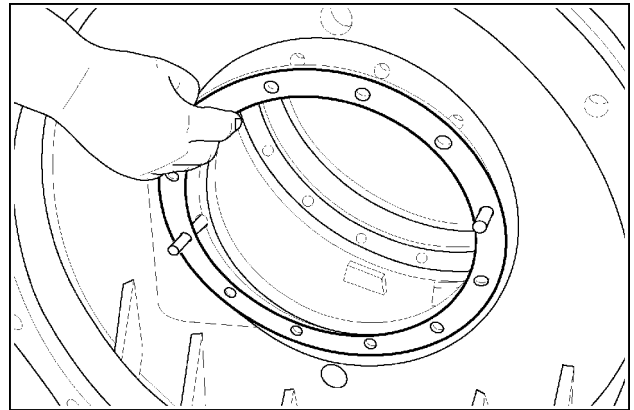
62. After pinion shim placement, remove the pinion carrier assembly.



RCPH10FWD081ABJ 62

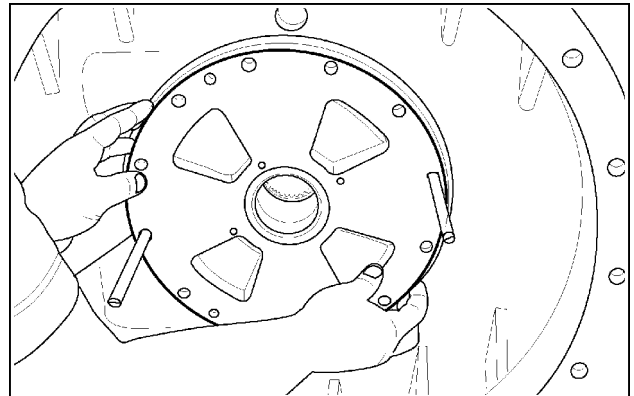
Setting differential carrier bearing preload

63. Install two CAS2479 guide bolts into opposite holes of the left hand side bearing carrier bore. Install the original bearing preload shim pack over the guide bolts so that all holes align.



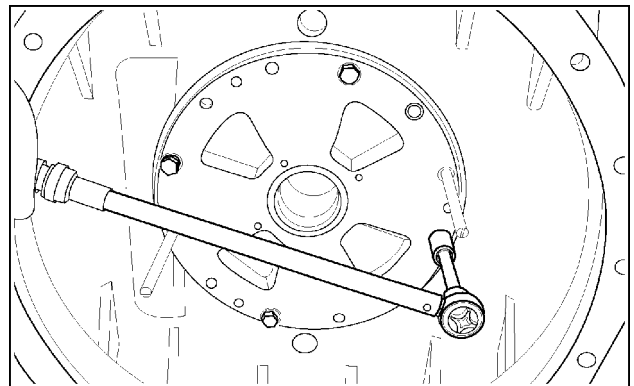
RCPH10FWD104ABJ 63

64. Install the pre-assembled left hand side bearing carrier into the housing.



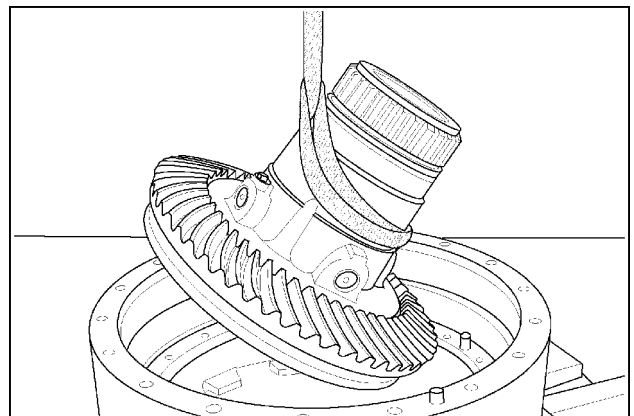
RCPH10FWD105ABJ 64

65. Install four equally spaced retaining bolts with washers. Tighten the bolts to the specified torque. Remove the guide studs.



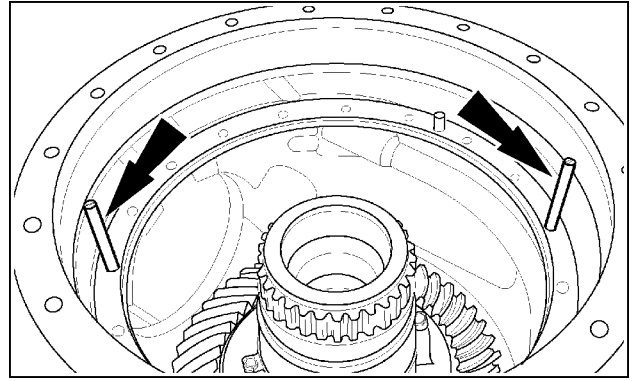
RCPH10FWD106ABJ 65

66. Rotate the differential housing so the right hand side is up. Use a hoist to slowly and carefully install the differential assembly into the housing to engage the left hand side bearing support.



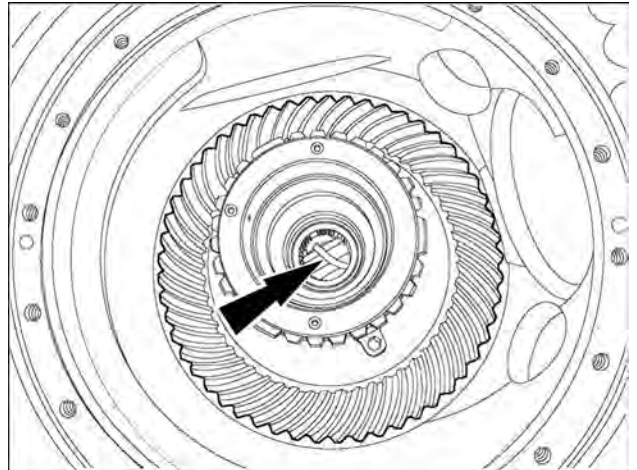
RCPH10FWD107ABJ 66

67. Install two **CAS2675** alignment studs into opposite holes of the housing.



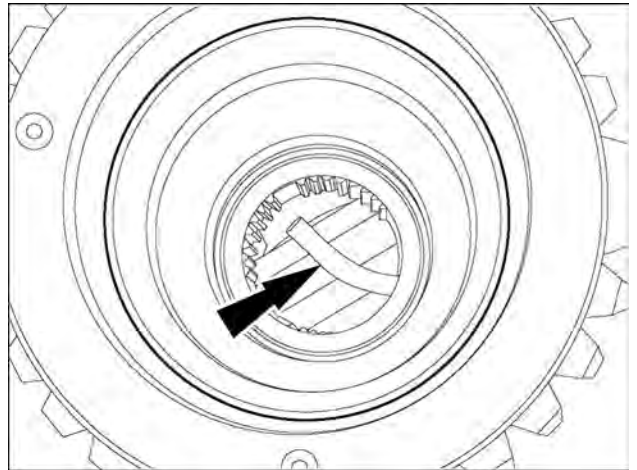
RCPH10FWD108ABJ 67

68. Install the dealer fabricated pin into pinion gears to stop pinion from rotating while shimming the differential carrier to housing bearings. Install with the long end of the pin, down, between the gears.



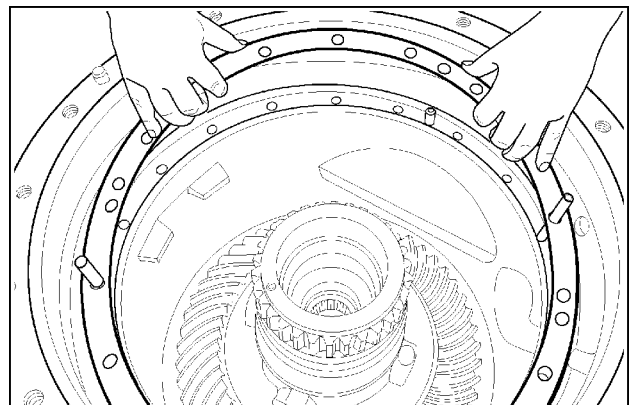
RCPH11FWD368BAC 68

Detail of pin location.



RCPH11FWD369BAC 69

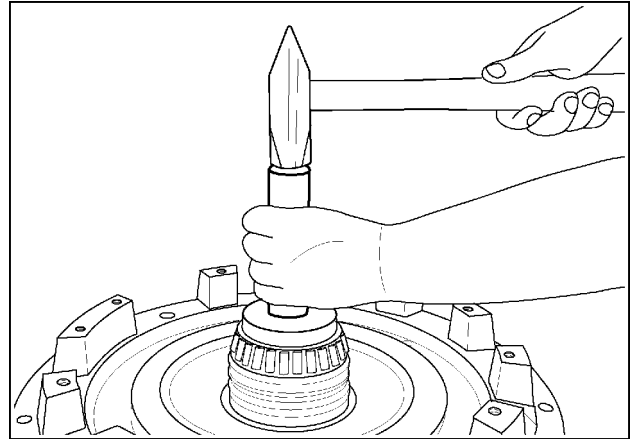
69. Install the original shim pack for the brake carrier and bearing support over the alignment studs so that all holes align.



RCPH10FWD973AAJ 70

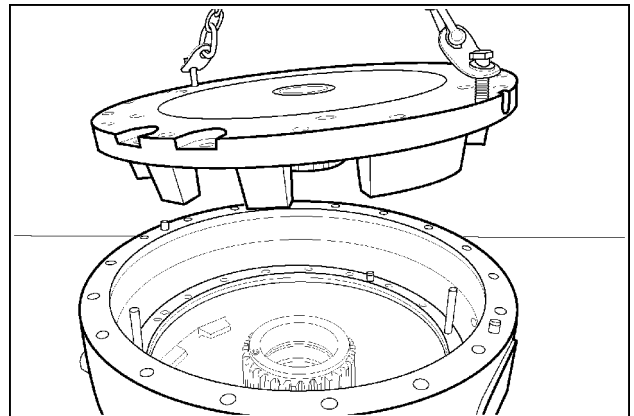
70. Install the bearing cone (large side down) onto the hub of the brake carrier. Use CAS2671 brake carrier bearing cone installer to drive the bearing cone onto the hub until seated.

NOTE: The brake discs and seals are not installed in the brake carrier during the bearing preload procedures.



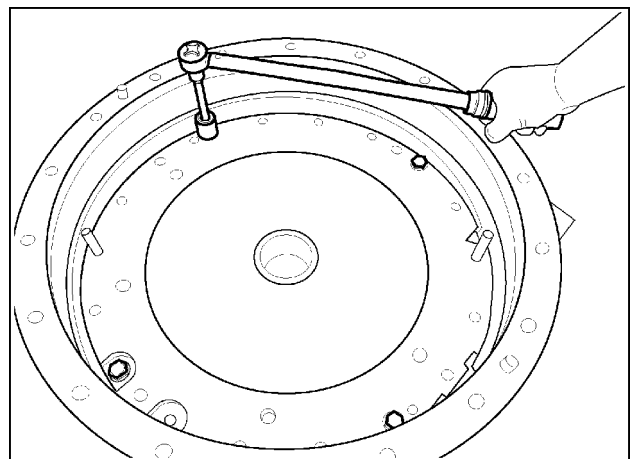
RCPH10FWD056ABJ 71

71. Use a hoist to carefully install the brake carrier into the housing so that the marks, put on during disassembly, align.



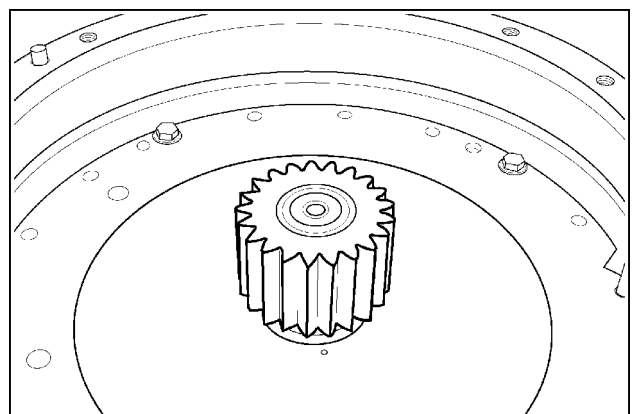
RCPH10FWD075ABJ 72

72. Install four of the carrier retaining bolts with washers 90 degrees from each other. Tighten the bolts evenly to the specified torque.



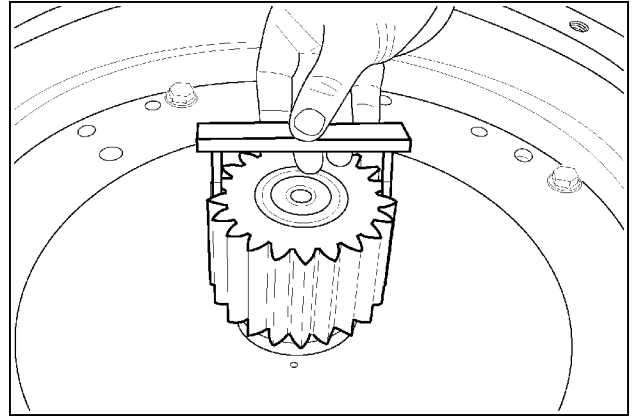
RCPH10FWD109ABJ 73

73. Install the right hand axle sun gear shaft into the differential.



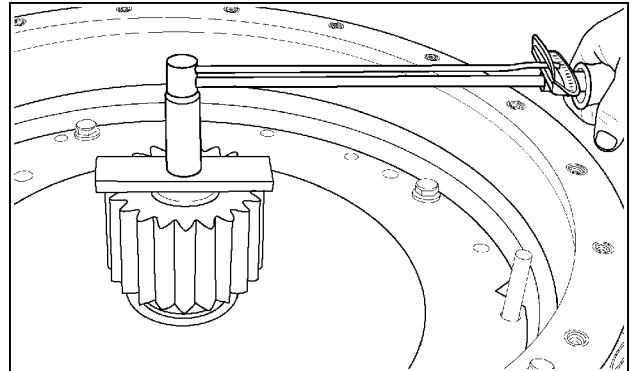
RCPH10FWD110ABJ 74

74. Install the **CAS2674** differential rolling torque adapter over the gear to engage two opposite splines.



RCPH10FWD111ABJ 75

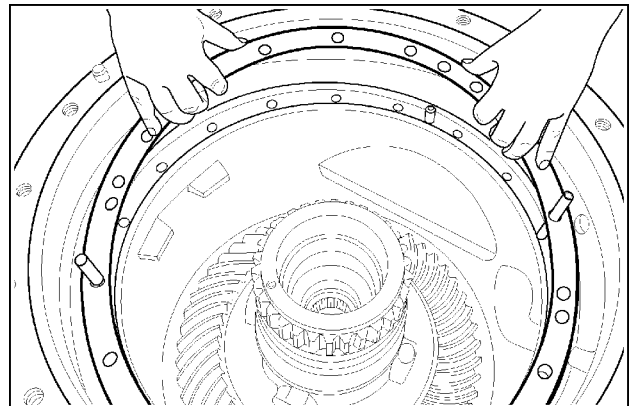
75. Connect a torque wrench to the adapter. Rotate the differential and measure the differential carrier bearing rolling torque. Bearing preload will be correct when **6 – 13 N·m (4 – 10 lb ft)** of smooth and consistent rolling torque is measured on the torque wrench.



RCPH10FWD112ABJ 76

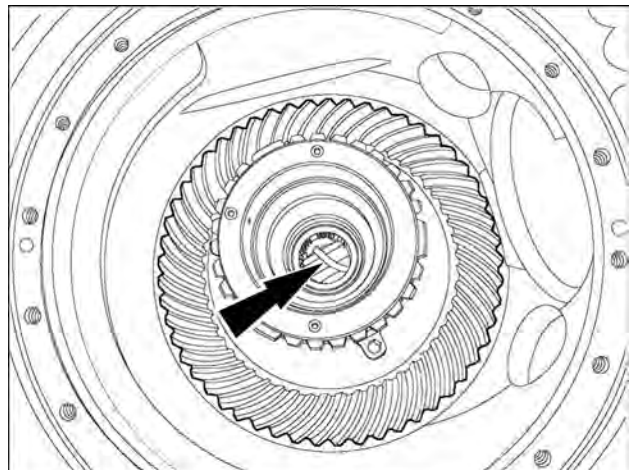
If differential bearing preload is out of tolerance, add or remove shims as required from the right hand and/or left hand bearing support shim pack until bearing preload is correct.

NOTE: Adjust used bearings to the low end of the rolling torque specifications.



RCPH10FWD973AAJ 77

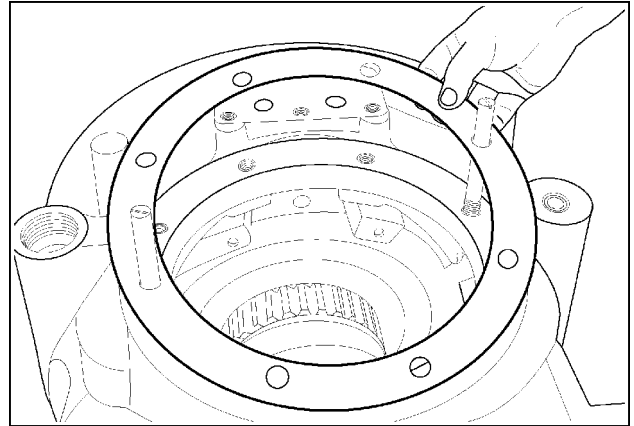
ATTENTION: Differential locking pin **MUST** be removed at this time.



RCPH11FWD368BAC 78

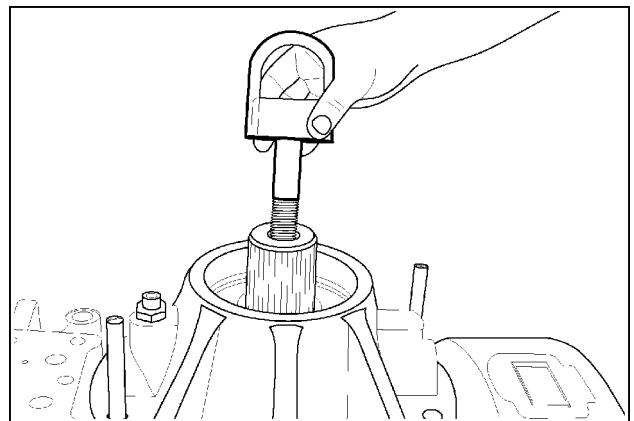
Setting ring/pinion gear backlash

76. After adjusting differential carrier bearing preload correctly, rotate the housing so the pinion carrier will be on top. Install two **CAS2496** alignment studs opposite each other and install the pinion carrier shim pack previously assembled.



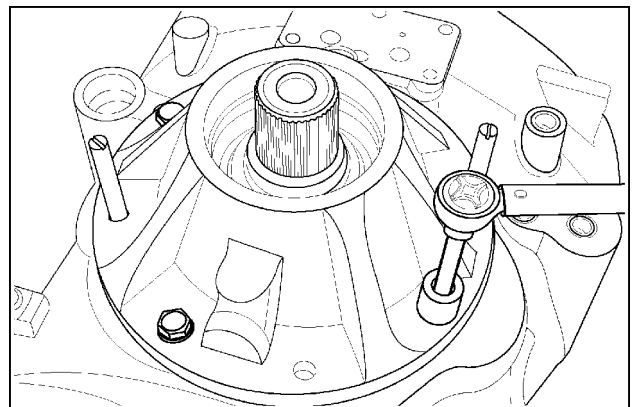
RCPH10FWD959AAJ 79

77. Install the pinion carrier assembly into the housing and remove the lifting eye.



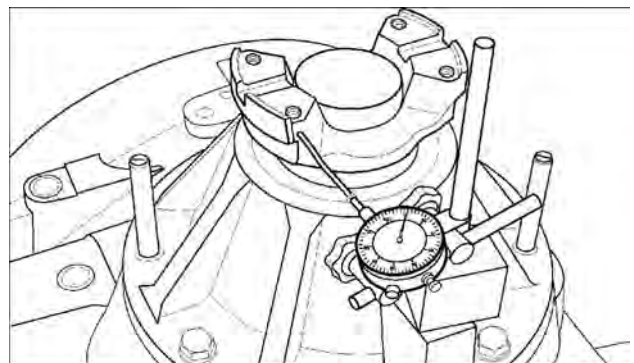
RCPH10FWD113ABJ 80

78. Install four pinion carrier retaining bolts and washers equally spaced. Tighten the four bolts to the specified torque.



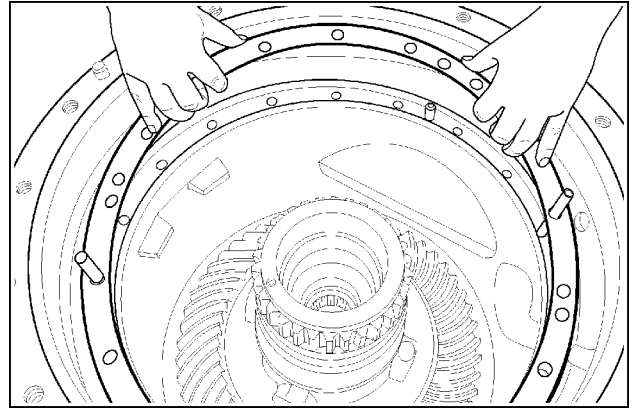
RCPH10FWD114ABJ 81

79. Install the drive yoke on the pinion gear. Use a dial indicator to measure ring/pinion gear backlash. Set the pointer of the dial indicator to contact the outer edge of the drive yoke flange. Rotate the pinion gear in either direction to achieve full contact with the ring gear. Do not move the ring gear. Zero the dial indicator. Rotate the pinion gear in the opposite direction to achieve full contact with the ring gear. Do not move the ring gear. Record the dial indicator reading. Perform this operation two or three times to ensure an accurate measurement. The backlash must be **0.2 – 0.3 mm (0.008 – 0.012 in)**.



RCPH11FWD367AAC 82

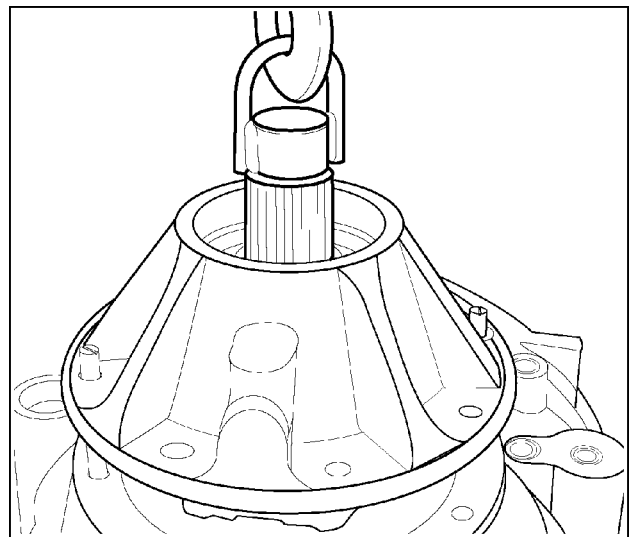
80. If too much backlash was measured, the ring gear must be moved closer to the pinion gear. If too little backlash was measured, the ring gear must be moved away from the pinion gear.
To adjust the ring and pinion gear backlash, remove shims from one side of the differential and add the same amount to the other side so that differential carrier bearing preload is maintained. Moving a **0.254 mm (0.010 in)** shim from one side to the other will change the backlash approximately **0.169 mm (0.0067 in)**.



RCPH10FWD973AAJ 83

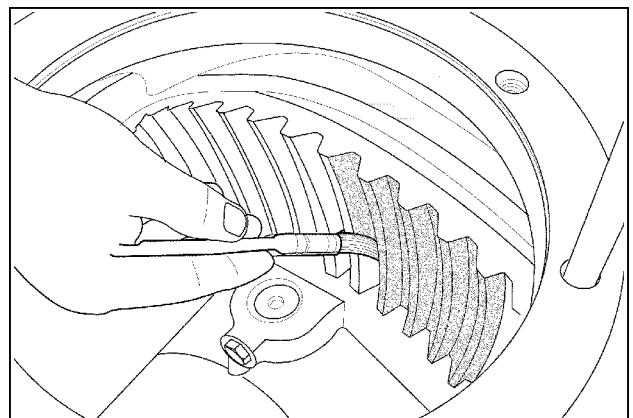
Checking for correct bevel pinion/gear tooth contact

81. After differential bearing preload and ring/pinion gear backlash adjustments have been completed, remove the pinion carrier.



RCPH10FWD081ABJ 84

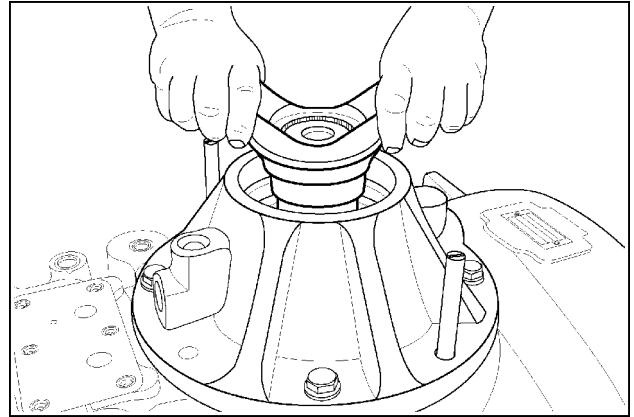
82. Put Prussian Blue or red lead on the convex side of several ring gear teeth.



RCPH10FWD116ABJ 85

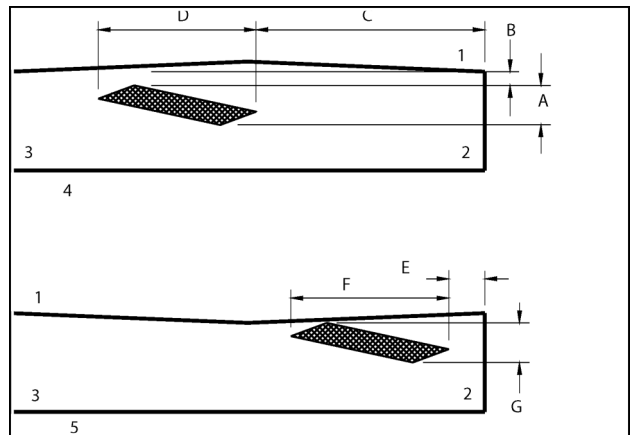
83. Reinstall the pinion gear carrier and tighten the retaining bolts to the specified torque. Turn the pinion several revolutions in both directions to determine the tooth contact pattern. Remove the pinion carrier.

NOTE: See the contact patterns in the following illustrations. The contact pattern of the gear teeth that are shown are approximate shapes. Tooth contact pattern can change from the illustrations.



RCPH10FWD117ABJ 86

84. Inspect the contact pattern of the gear teeth. Compare the contact pattern with the following illustrations and tables, for the left hand (front) pinion sets, and determine the correct tooth contact pattern.
Left hand (front) pinion set contact pattern:



RCPH10FWD121FBJ 87

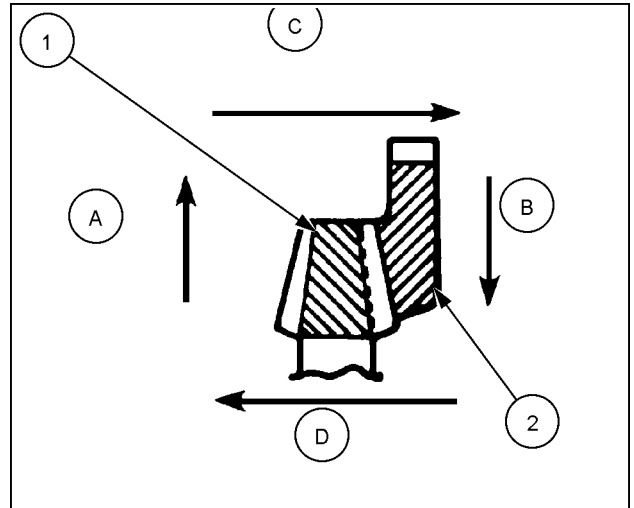
Correct tooth contact pattern: left hand (front) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	5 – 8 mm	0.197 – 0.315 in
B	2 – 4 mm	0.079 – 0.157 in
C	30 – 35 mm	1.181 – 1.378 in
D	40 – 45 mm	1.575 – 1.772 in
E	10 – 15 mm	0.394 – 0.591 in
F	35 – 40 mm	1.378 – 1.575 in
G	6 – 8 mm	0.236 – 0.315 in

85. Adding or subtracting pinion carrier shims to change pinion depth must be done in small increments until the correct tooth contact pattern is obtained.
- (A) Move the Drive Pinion (1) towards the ring gear (2) to move the contact pattern away from the Toe.
 - (B) Move the drive pinion away from the ring gear to move the contact pattern towards the Toe.
 - (C) Move the ring gear away from the drive pinion to increase backlash.
 - (D) Move the ring gear towards the drive pinion to decrease backlash.

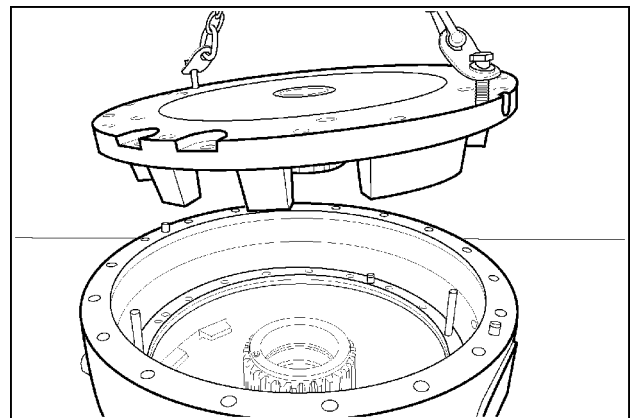


RCPH10FWD123FBJ 88

NOTICE: If differential carrier bearing preload, or ring gear and beveled pinion adjustment is required, do not install the hub seals or brakes at this time. make the proper shim adjustments as described. When adjustments are completed or not required, proceed to the brake carrier assembly procedure.

Right hand brake carrier assembly procedures

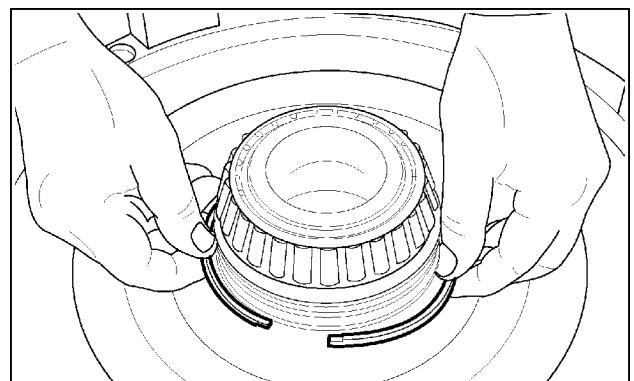
86. After the pinion/gear tooth contact procedure has been completed, remove the brake carrier, with bearing installed, from the differential housing.



RCPH10FWD075ABJ 89

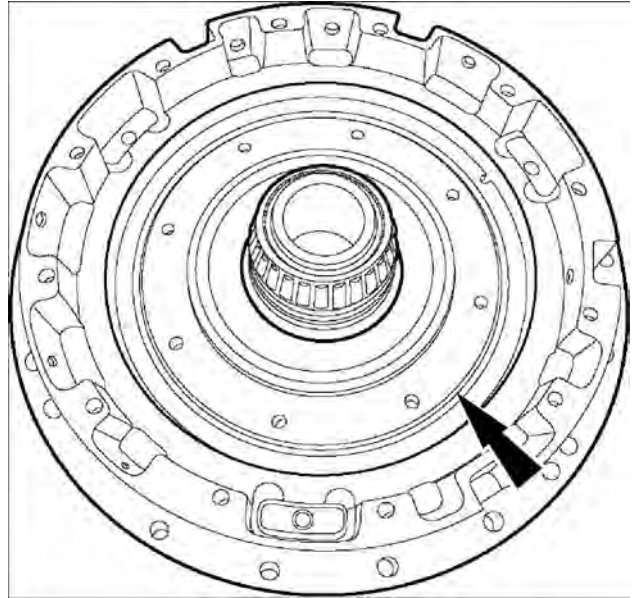
87. Lubricate new hub seal rings liberally with clean grease. Install the two seal rings into the grooves in the hub of the carrier. Be sure the seal ends are lapped together and seals are compressed into the grooves as tightly as possible.

NOTE: Place the ends of each seal ring opposite each other.



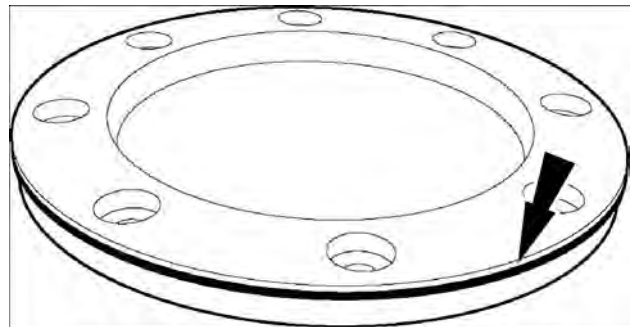
RCPH10FWD057ABJ 90

88. Lubricate a new O-ring for the service brake insert with clean grease. Install the O-ring in the groove in the carrier. Be sure the O-ring is not twisted.



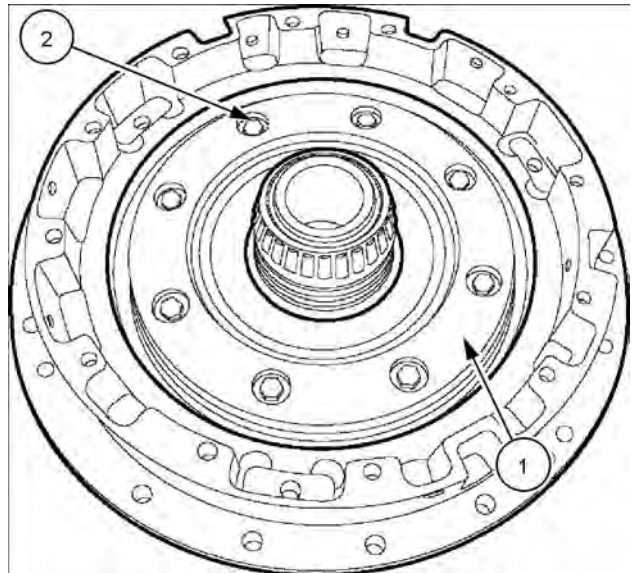
RCPH11FWD335BAC 91

89. Lubricate a new O-ring for the inside diameter of the service brake piston with clean grease. Install the O-ring in the groove of the brake insert. Be sure the O-ring is not twisted.



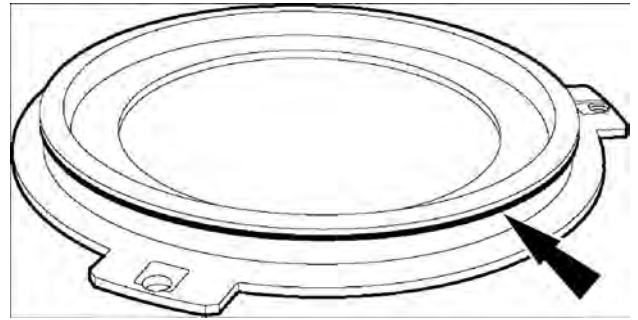
RCPH11FWD336AAC 92

90. Set brake insert into the carrier. Install the eight bolts to secure the brake insert to the carrier. Tighten the bolts to the specified torque.



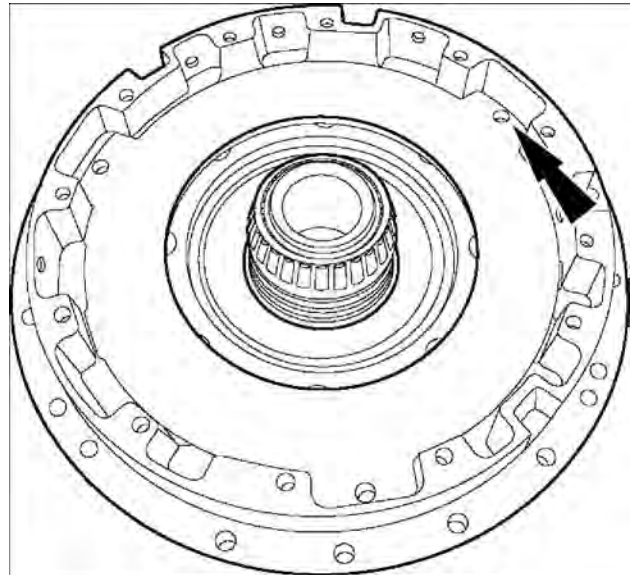
RCPH11FWD337BAC 93

91. Lubricate a new O-ring for the outside diameter of the service brake piston. Install the O-ring in the groove of the piston. Be sure the O-ring is not twisted.



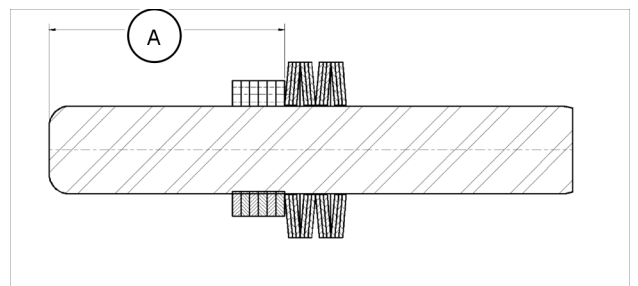
RCPH11FWD338AAC 94

92. Install the service brake piston into the recessed bore of the carrier with the flat side up, aligning the ear tabs with the slots in the support carrier.



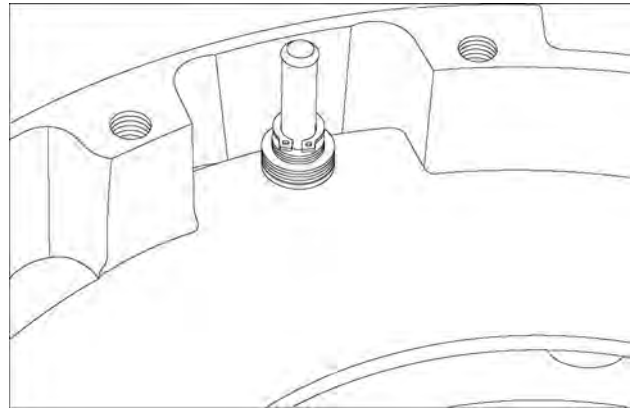
RCPH11FWD339BAC 95

93. Install six retaining snap rings on each of the service brake adjuster pins. Install the first one **38 mm (1.5 in)** from the rounded end of each pin. See measurement **(A)** in illustration. Install the belleville spring washers on the brake adjuster pins. Slide 3 nested washers onto each pin up against the snap rings. Slide 3 nested washers on each pin in the opposing direction followed by 3 more nested washers in an opposing direction. Install 3 more washers in an opposing direction for a total of 12 belleville spring washers on each pin. See illustration.

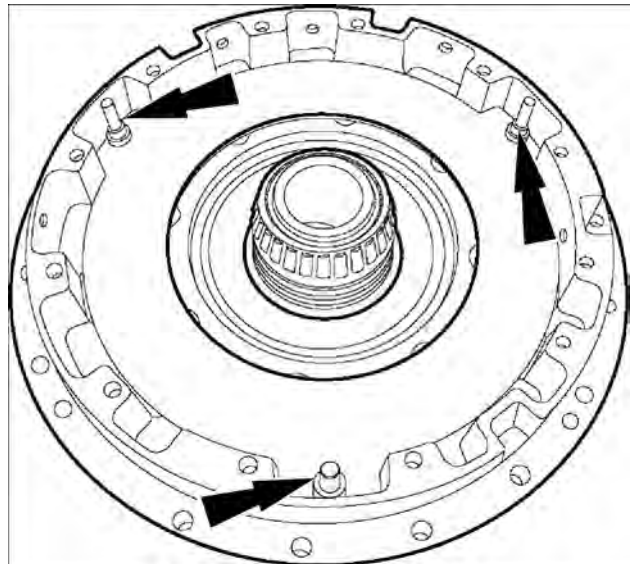


RCPH11FWD329AAC 96

94. Place one pin with washers in each of the holes in the service brake piston. Be sure the spring washers are seated against the brake piston and the retaining snap ring side is pointed upwards.

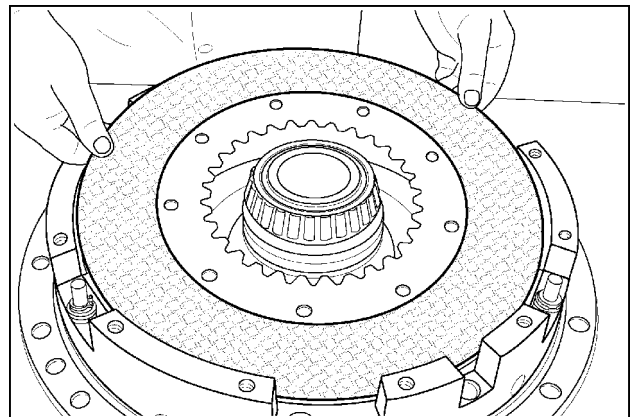


RCPH11FWD341BAC 97



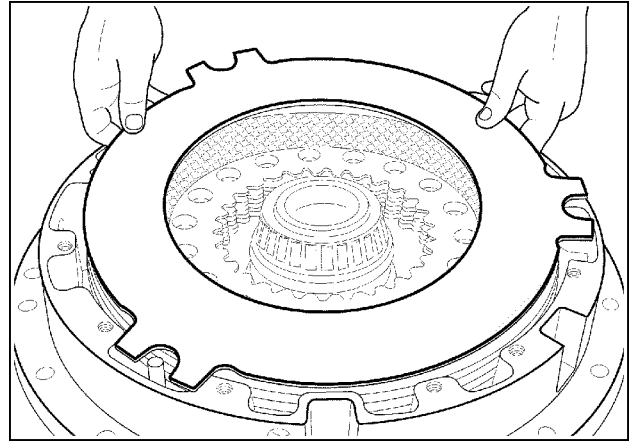
RCPH11FWD340BAC 98

95. Lubricate all friction plates with clean operating fluid. Install the first friction plate over the brake piston.



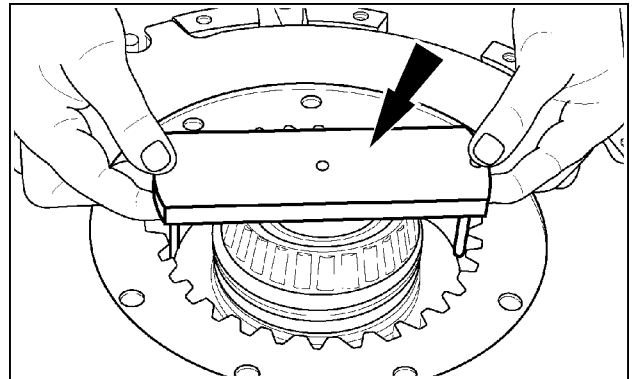
RCPH10FWD984AAJ 99

96. Install a steel separator plate over the first friction plate. Repeat the steps for remaining plates, alternating the friction and separator plates.



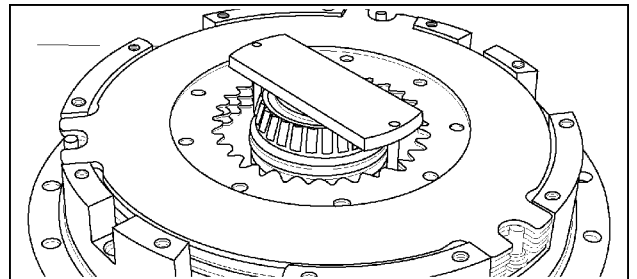
RCPH10FWD127ABJ 100

97. When all the steel separator plates and the friction plates are installed, use the **CAS2505** brake disc alignment tool to align the splines of all the plates.



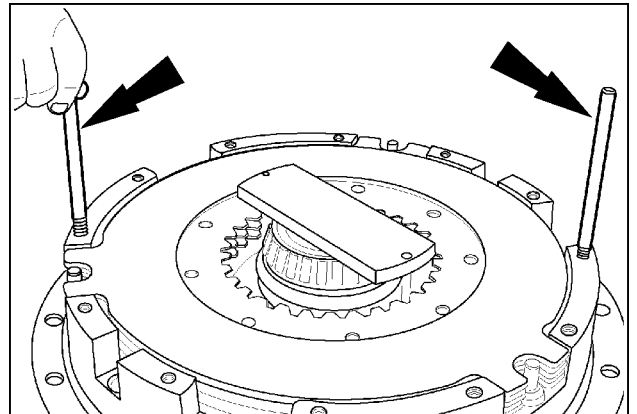
RCPH10FWD063ABJ 101

98. When the brake plates are correctly aligned, the pilot on the bottom of the tool plate must nest in the hub of the carrier as shown.



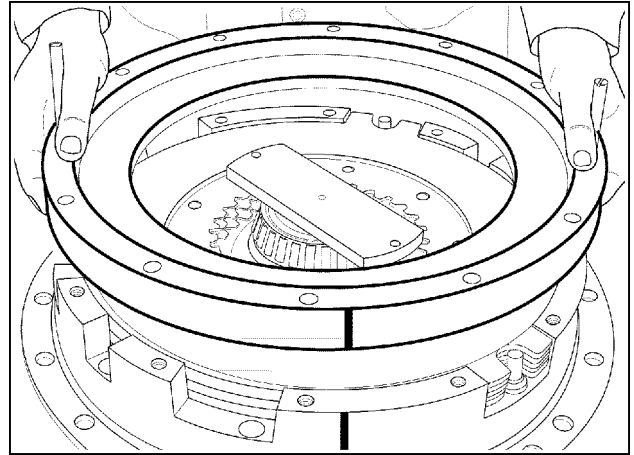
RCPH10FWD064ABJ 102

99. Install the two CAS2479 guide studs into opposite holes of the support carrier.



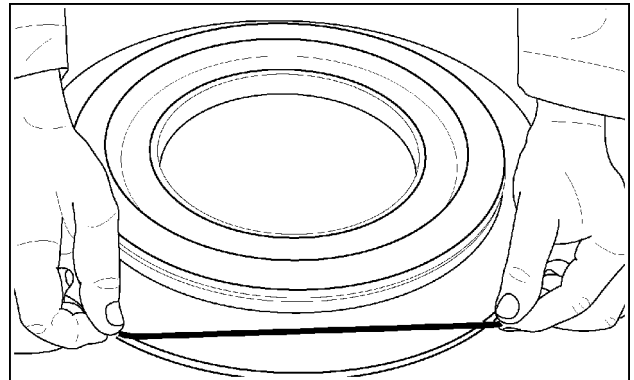
RCPH10FWD065ABJ 103

100. Install the park brake backing plate (recessed side up) over the guide studs so that the assembly match marks align.



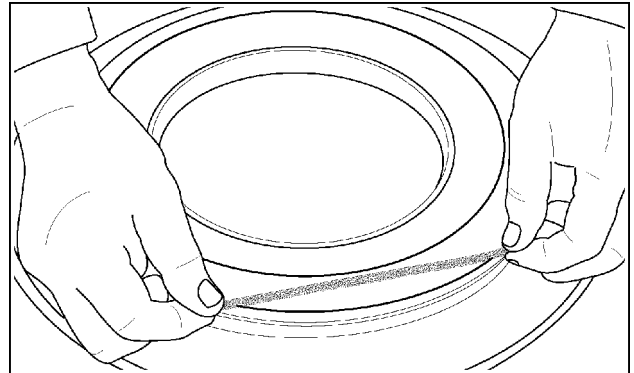
RCPH10FWD066ABJ 104

101. Lubricate and install a new O-ring for the large outside diameter of the park brake piston. Be sure the O-ring is not twisted.



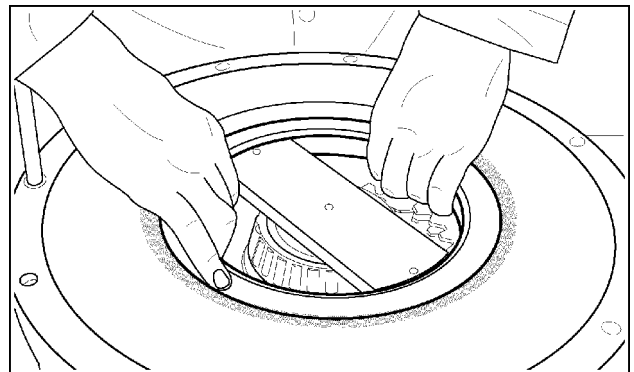
RCPH10FWD067ABJ 105

102. Lubricate and install a new O-ring in the groove of the smaller outside diameter of the piston. Be sure the O-ring is not twisted.



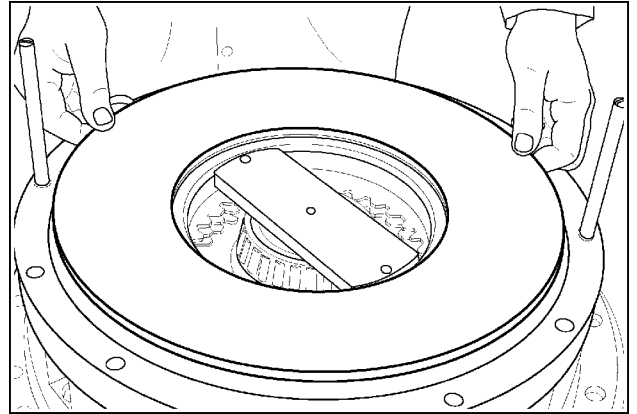
RCPH10FWD068ABJ 106

103. Lubricate the outside and inside diameters of the piston liberally with clean assembly grease. Hand seat the piston squarely into the bore of the backing plate.



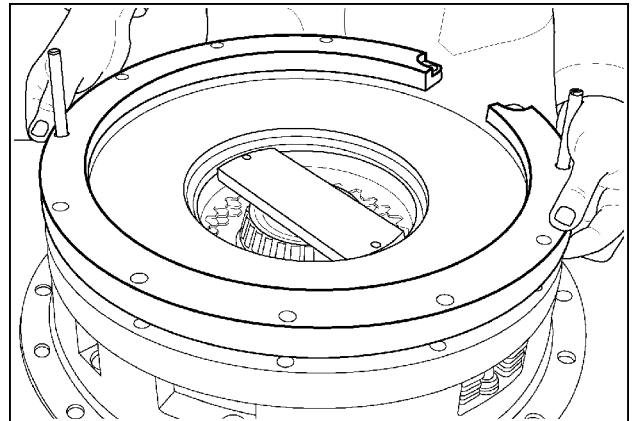
RCPH10FWD069ABJ 107

104. Install the large belleville spring with the cone side down on top of the park brake piston.



RCPH10FWD070ABJ 108

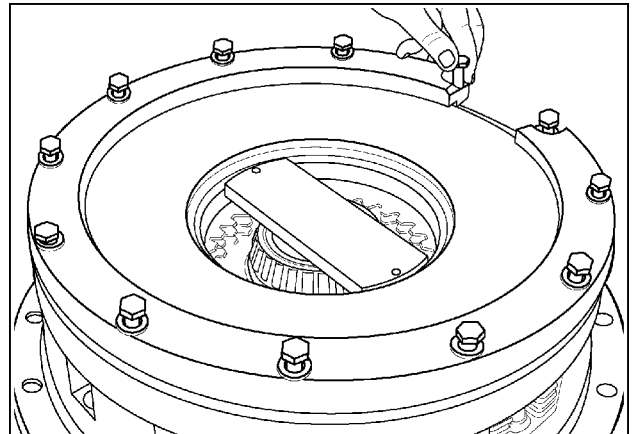
105. Install the retainer ring over the belleville spring.



RCPH10FWD071ABJ 109

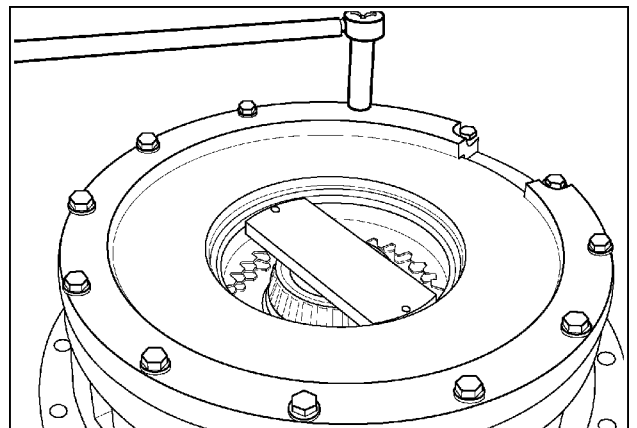
106. Install and hand start the 12 bolts with washers to engage the threads.

NOTE: The two shorter length bolts must be installed in the end holes of the ring.



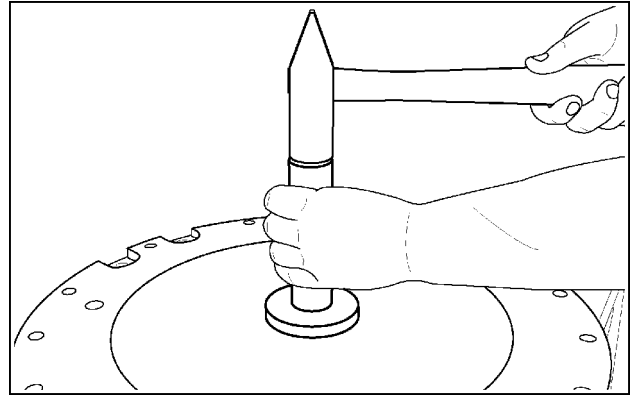
RCPH10FWD072ABJ 110

107. After all bolts have contacted the retainer ring, starting with an end bolt, tighten each bolt in sequence one full turn and repeat until the ring has seated on the backing plate. Tighten the bolts to the specified torque. Remove the Brake Disc Alignment Tool.



RCPH10FWD073ABJ 111

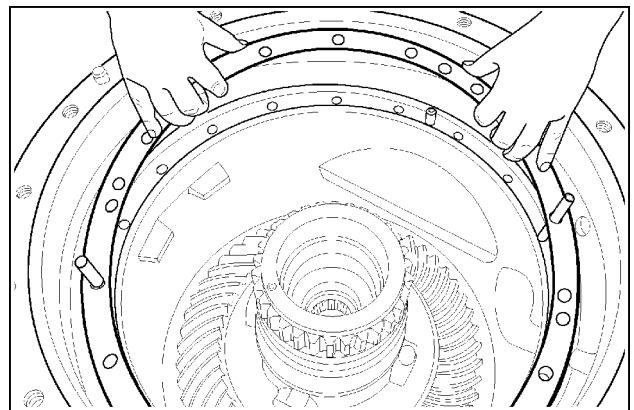
108. Turn the brake carrier assembly over and install the seal in the carrier. Install the seal retaining screws and washers using **LOCTITE® 242®** or equivalent to secure screws.
Torque screws to specified torque.



RCPH10FWD074ABJ 112

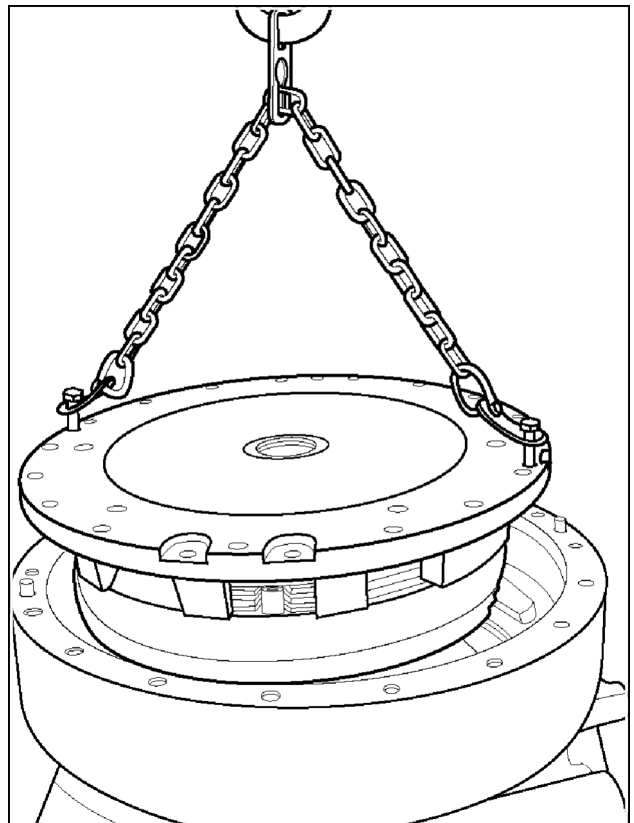
Brake carrier/bearing support installation

109. Using the **CAS2675** guide studs, install the pre-selected shim pack for the brake support carrier so that all holes align.



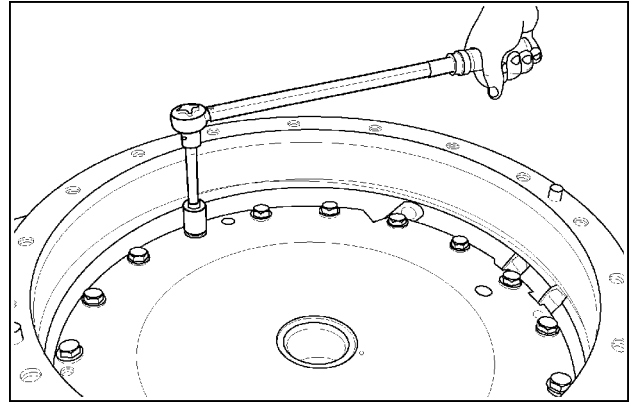
RCPH10FWD973AAJ 113

110. Use a hoist to carefully align and install the brake carrier assembly into the differential housing. Be sure the assembly marks are aligned.



RCPH10FWD972AAJ 114

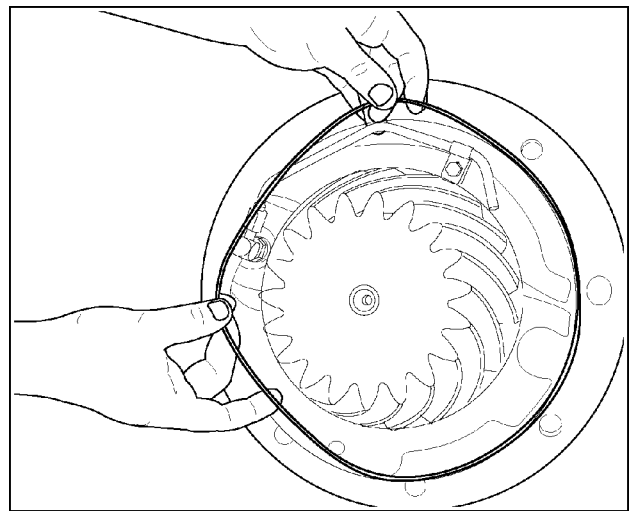
111. Remove the guide studs. Install the brake carrier retaining bolts and washers. Torque the bolts to the specified torque.



RCPH10FWD078ABJ 115

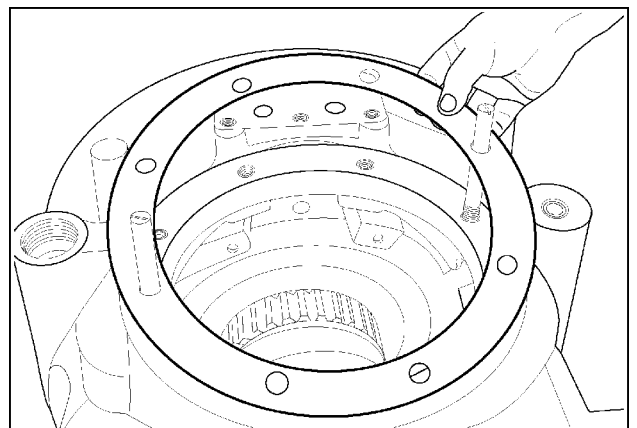
Pinion carrier assembly installation

112. Lubricate and install a new O-ring in the groove around the mounting flange of the pinion carrier. Be sure the O-ring is not twisted.



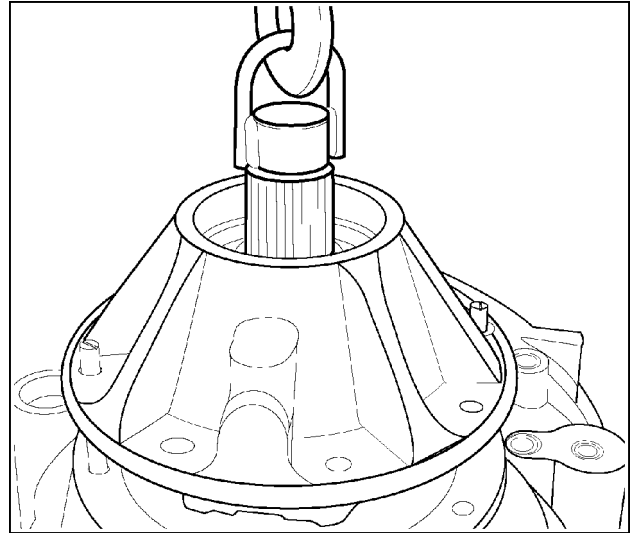
RCPH10FWD079ABJ 116

113. Use two **CAS2496** alignment studs, install the pre-selected pinion carrier shim pack.



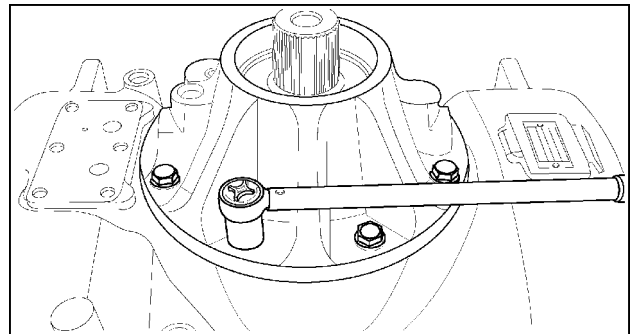
RCPH10FWD959AAJ 117

114. Use the CAS2494 lifting eye to install the pinion carrier assembly into the differential housing. Be sure the assembly marks align.



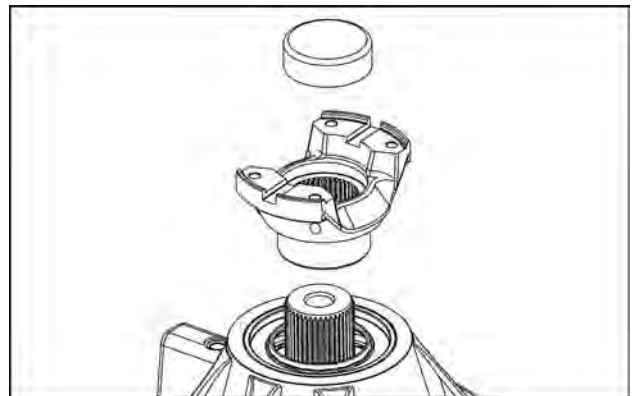
RCPH10FWD081ABJ 118

115. Remove the guide studs and lifting eye, install the pinion carrier retaining bolts and washers. Torque the pinion carrier bolts to **284 – 298 N·m (209 – 220 lb ft)**.
116. Coat the pinion shaft splines with **MOLYKOTE® G-N METAL ASSEMBLY PASTE**.



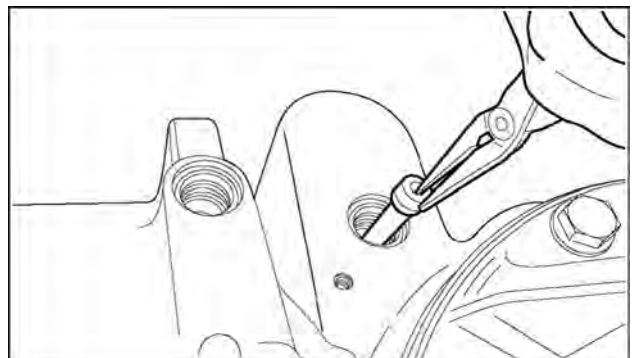
RCPH10FWD082ABJ 119

117. Install the drive yoke and cap. .



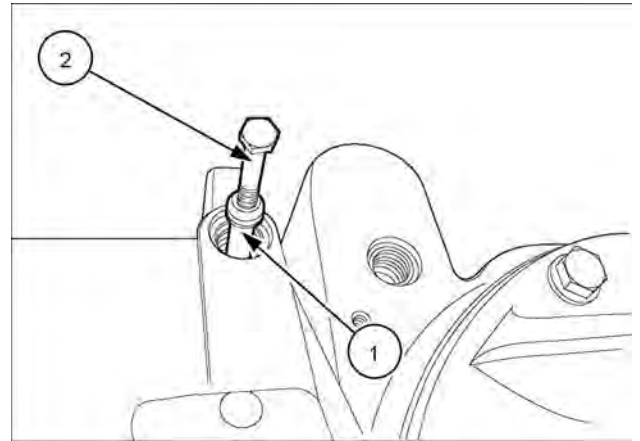
RAIL17TR01400AA 120

118. Lubricate and install new O-rings on the jumper tube for the park brake. Install the jumper tube into the park brake supply port.



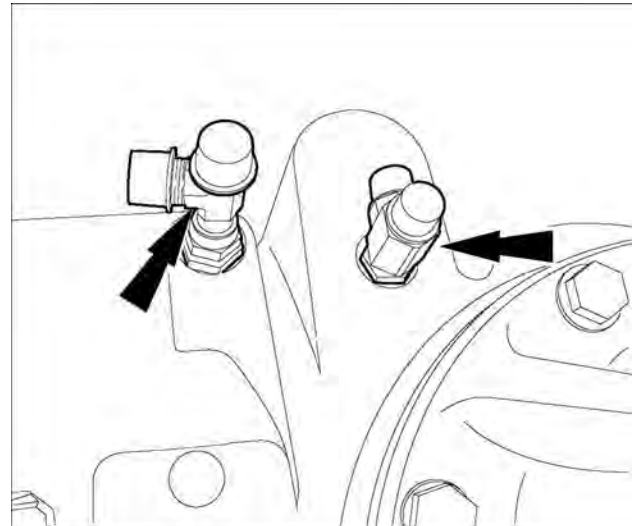
RCPH11FWD355AAC 121

119. Lubricate and install new O-rings on the jumper tube for the service brake. Install the jumper tube **(1)** into the service brake supply port using a M10 X 1.5 bolt **(2)** in the threaded end of the jump tube. Remove bolt.



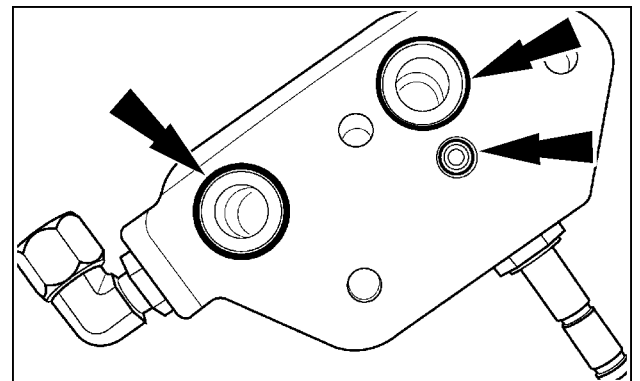
RCPH11FWD354BAC 122

120. Install the tee fittings removed during disassembly.



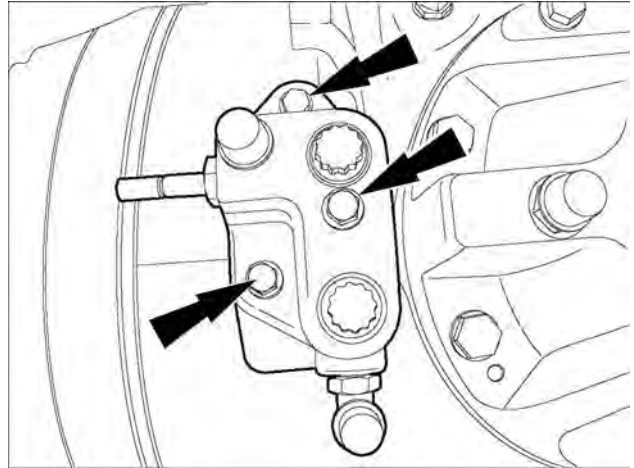
RCPH11FWD353BAC 123

121. Lubricate and install new O-rings on the port block.



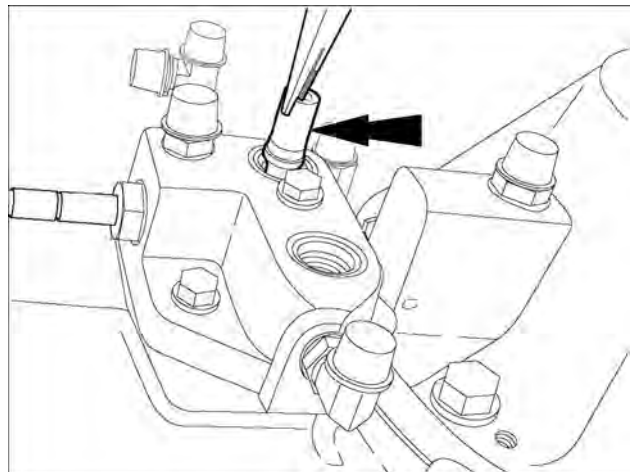
RCPH10FWD085ABJ 124

122. Install the port block on the differential housing. Tighten the retaining bolts to specifications.



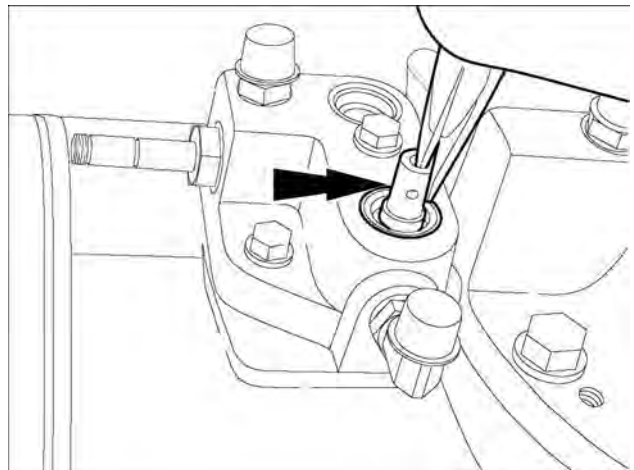
RCPH11FWD352BAC 125

123. Lubricate and install new O-rings on the jumper tube for the differential lock. Install the jumper tube into the differential lock supply port.



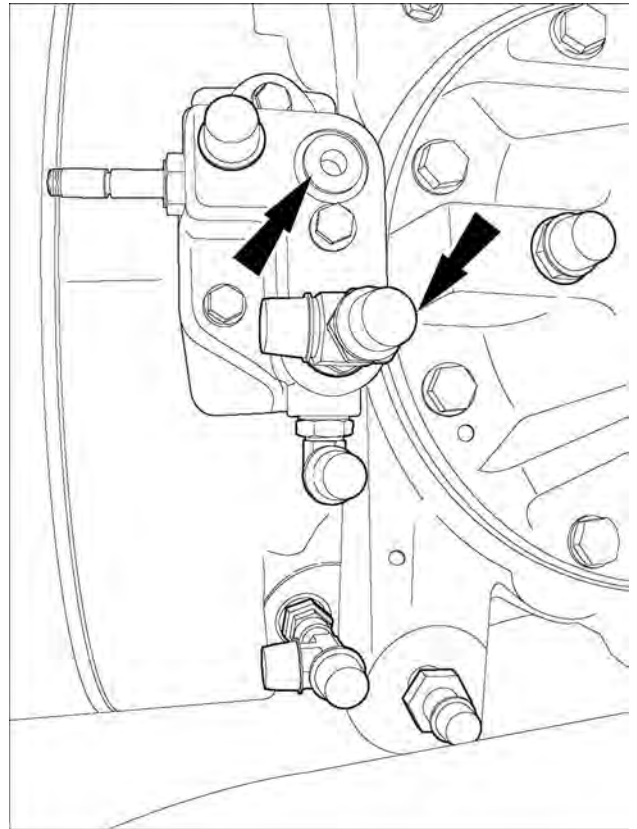
RCPH11FWD351BAC 126

124. Lubricate and install new O-rings on the jumper tube for the lube supply. Install the jumper tube into the lube supply port.



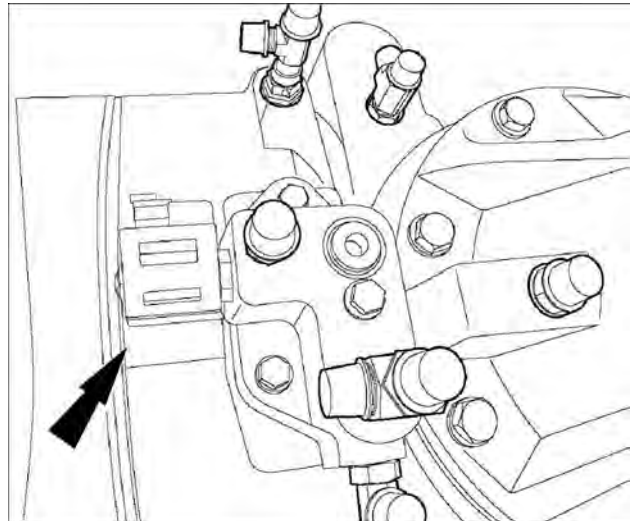
RCPH11FWD350BAC 127

125. Install the plug and fitting removed during disassembly.



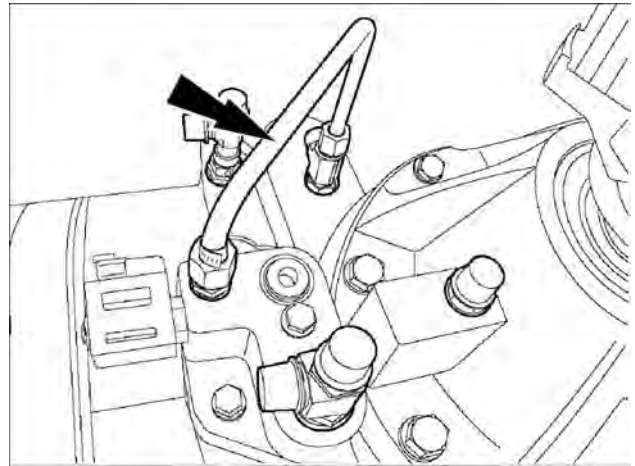
RCPH11FWD349BAC 128

126. If equipped, install the Differential Lock Solenoid on to the Port Block.



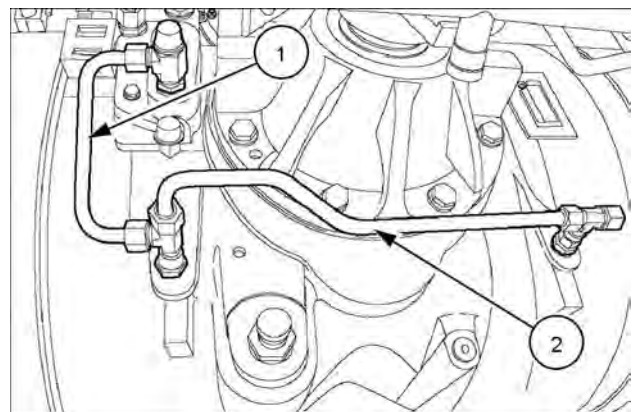
RCPH11FWD348BAC 129

127. Install the tube line from the port block to the park brake supply port.



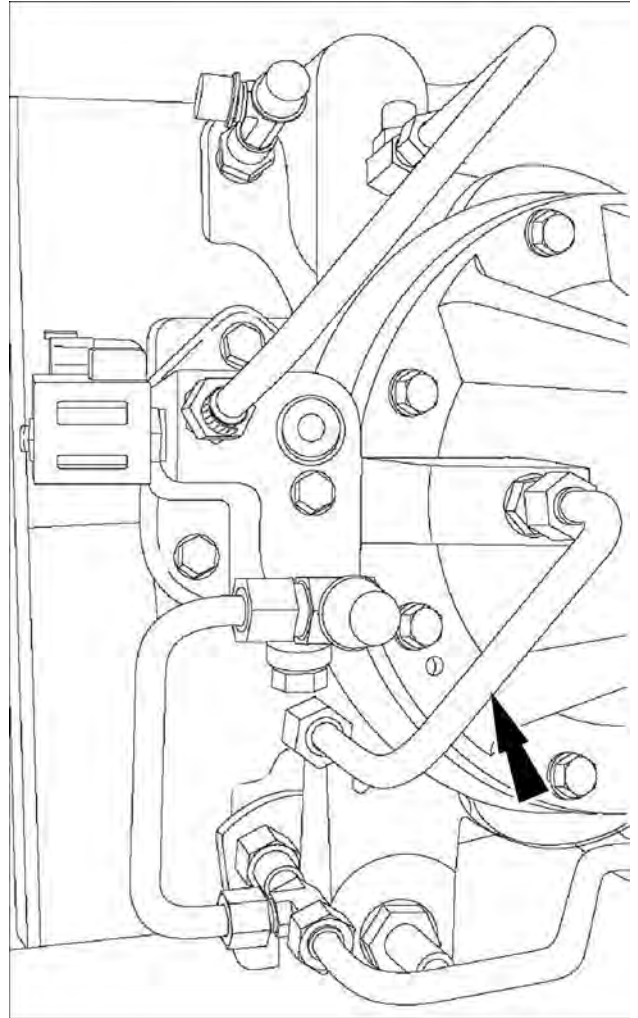
RCPH11FWD347BAC 130

128. Install the tube (1) from the port block to the tee fitting on the differential housing. Install the horizontal tube (2) to the fittings on the differential housing.



RCPH11FWD346BAC 131

129. Install the lube tube from the port block to the pinion carrier.



RCPH11FWD345CAC 132

Next operation:

Hydraulic service brakes - Test - Brake leak down (33.202) Differential lock - Leakage test (25.102)

Next operation:

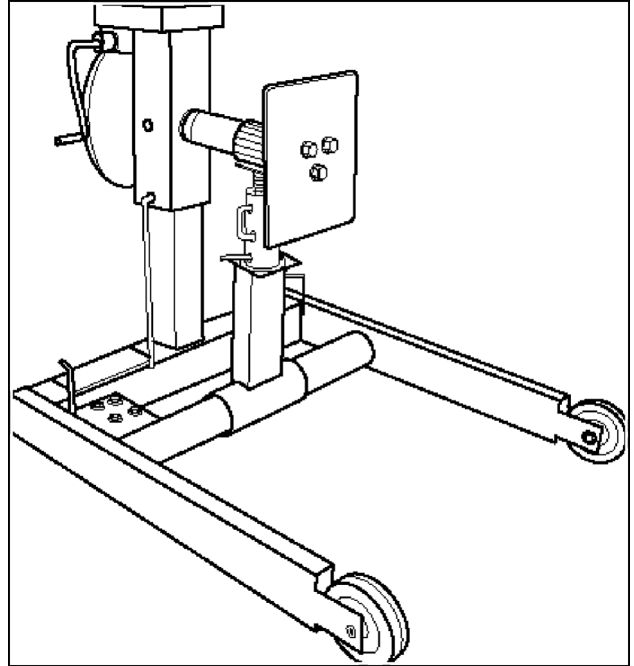
Final drive - Install - 600 Series axles - wheeled (25.310)

Differential - Disassemble - 600 Series Quadtrac® axles

Steiger® 580 Quadtrac®	NA
Steiger® 620 Quadtrac®	NA

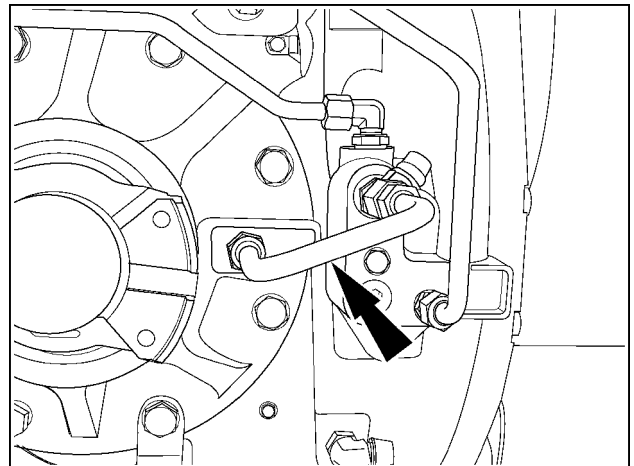
Pinion carrier removal

1. The differential housing must be rotated several times during the disassembly and assembly procedures. If available, the housing should be mounted in a revolver repair stand (1).



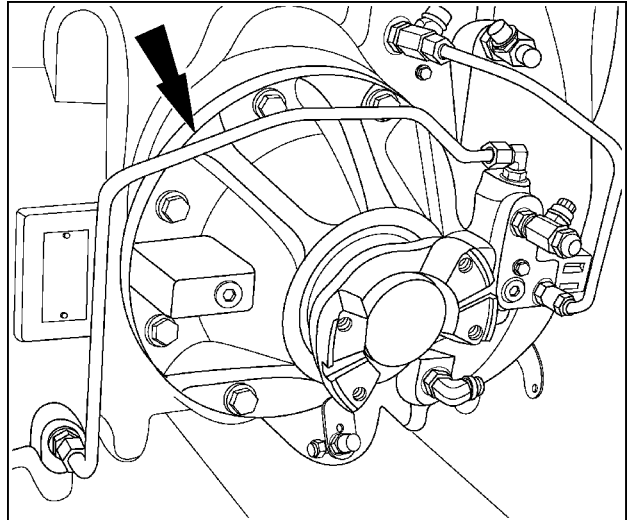
RCPH10FWD941AAJ 1

2. Remove the lube hose from the port block and pinion carrier.



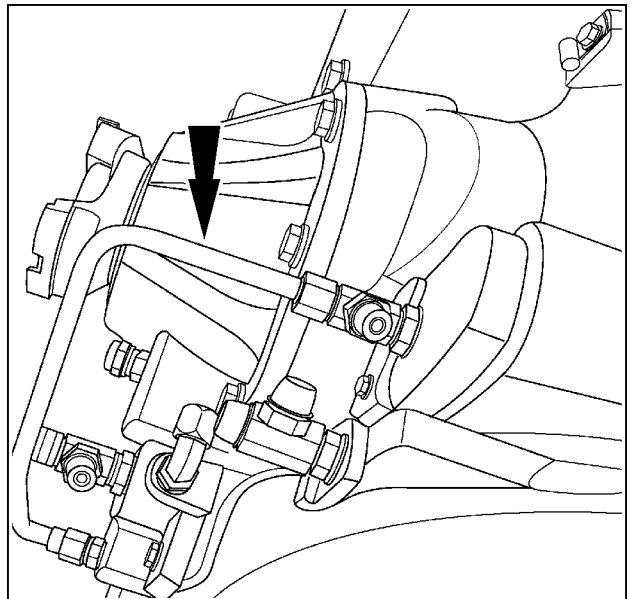
RCPH10FWD942AAJ 2

3. Remove the long tube line from the port block to the differential housing.



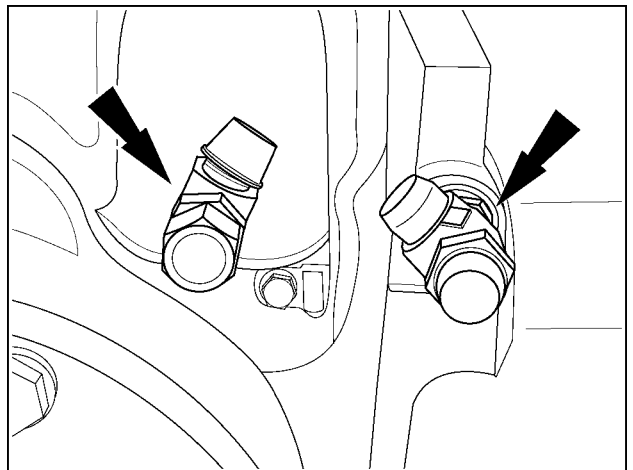
RCPH10FWD943AAJ 3

4. Remove the tube line from the port block to the park brake supply port.



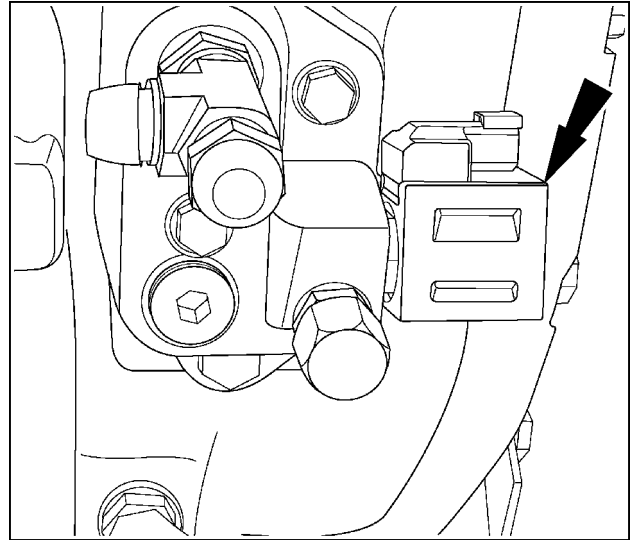
RCPH10FWD944AAJ 4

5. Remove the tee fittings from the park and service brake pressure ports.



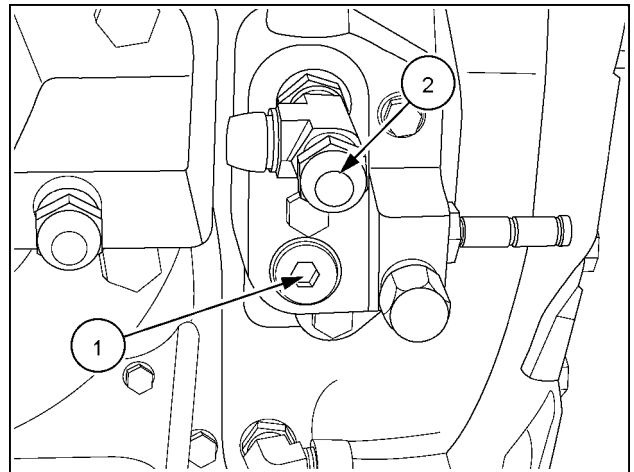
RCPH10FWD945AAJ 5

6. Remove the differential lock solenoid from the port block.



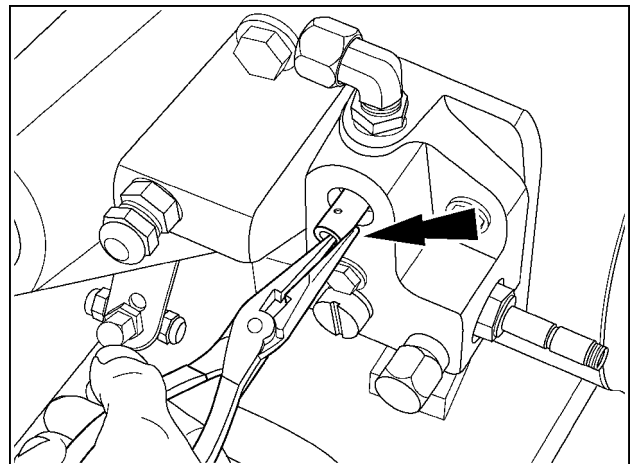
RCPH10FWD946AAJ 6

7. Remove the plug (1) and tee fitting (2) from the port block.



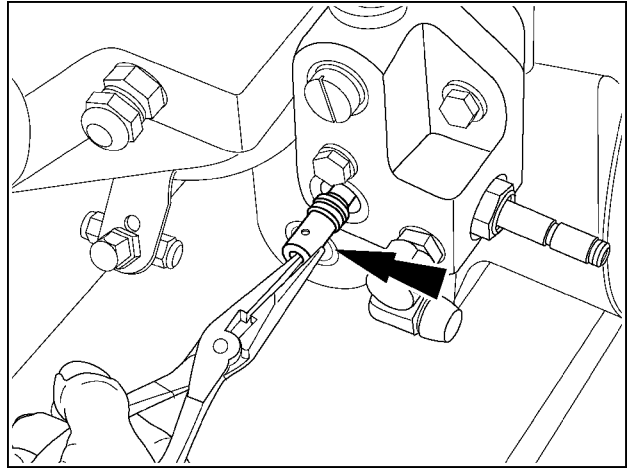
RCPH10FWD947AAJ 7

8. Remove the jumper tube from the lube port. Discard the O-rings.



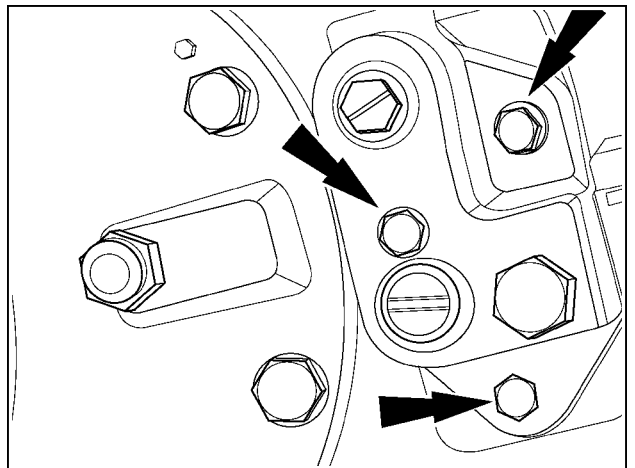
RCPH10FWD948AAJ 8

9. Remove the jumper tube from the differential lock supply port. Discard the O-rings.



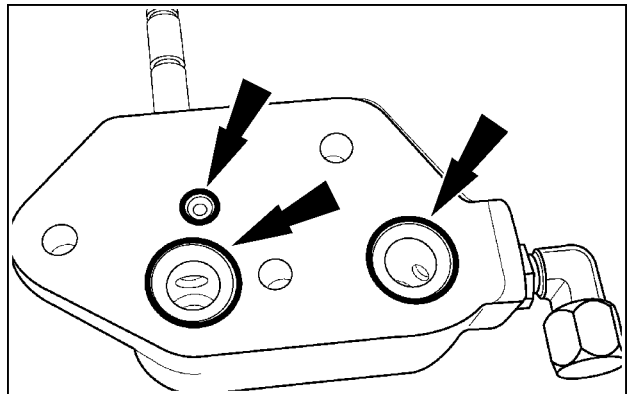
RCPH10FWD949AAJ 9

10. Remove the three bolts securing the port block to the housing. Remove the port block.



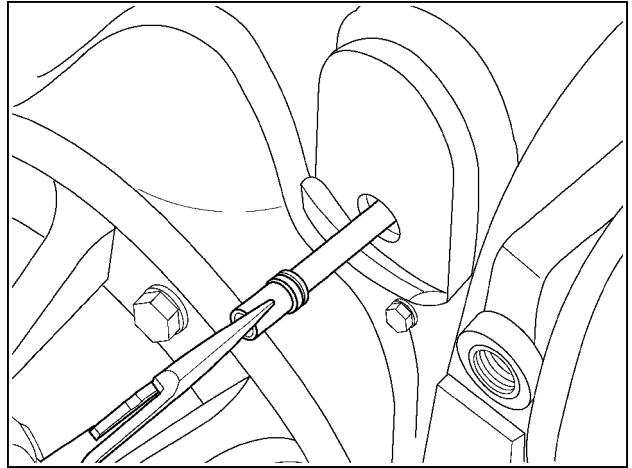
RCPH10FWD950AAJ 10

11. Discard the O-rings from the port block.



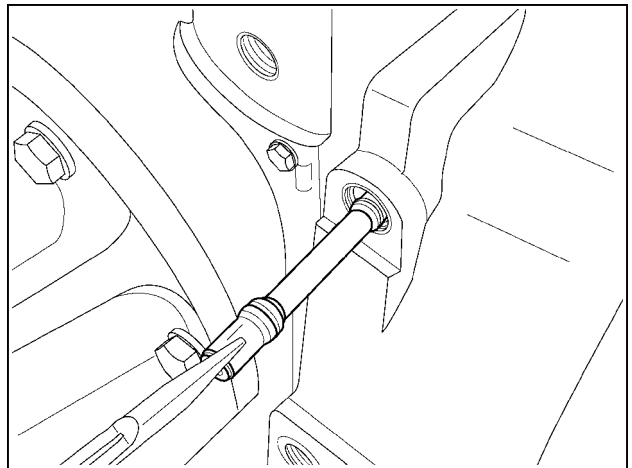
RCPH10FWD951AAJ 11

12. Remove the jumper tube from the park brake supply port. Discard the O-rings.



RCPH10FWD952AAJ 12

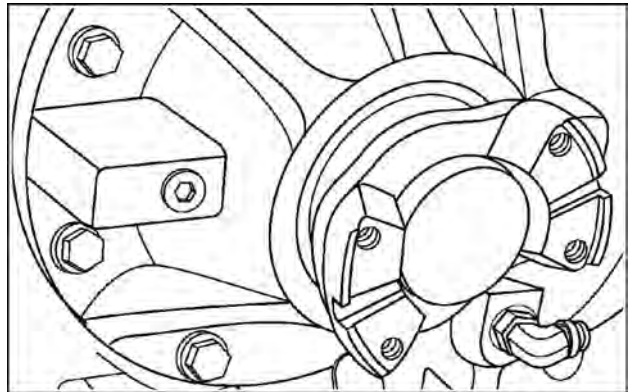
13. Remove the jumper tubes from the brake supply port. Discard the O-rings.



RCPH10FWD953AAJ 13

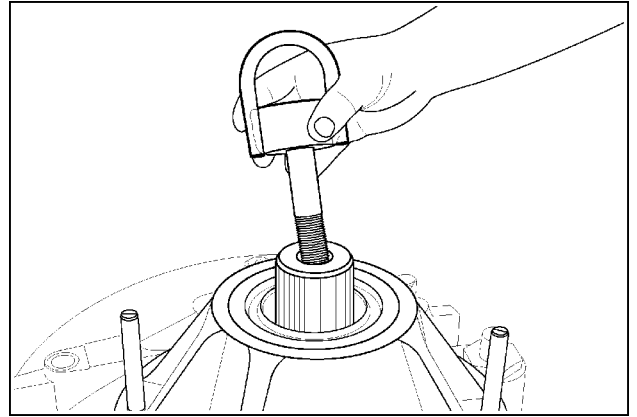
14. Remove the drive yoke.

NOTE: The front axle drive yoke does not use a retaining bolt. The drive yoke is allowed to slide on the pinion shaft.



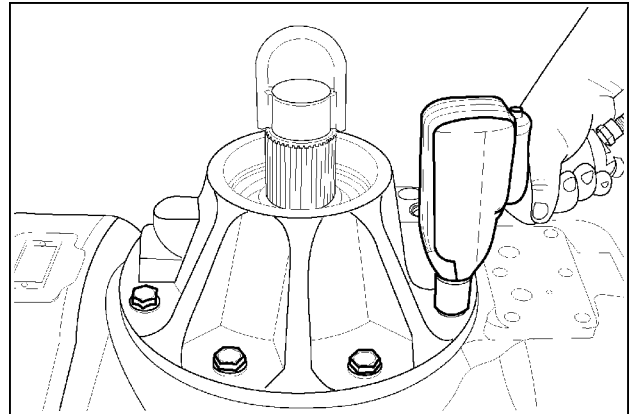
RCPH11FWD360BAC 14

15. Install the CAS2494 lifting eye into the pinion gear.



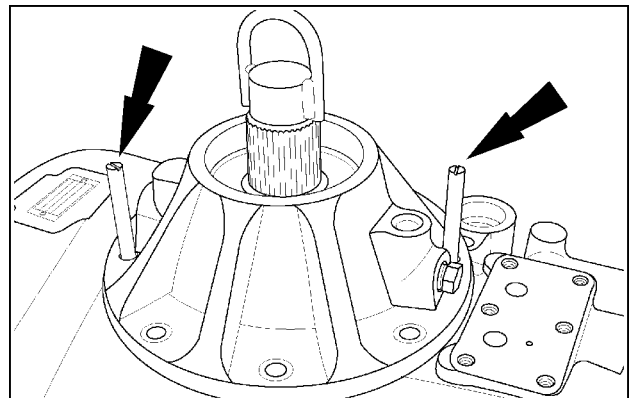
RCPH10FWD955AAJ 15

16. Remove the pinion carrier mounting bolts.



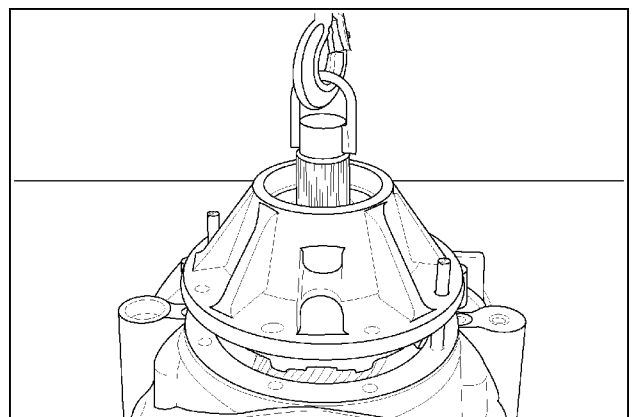
RCPH10FWD956AAJ 16

17. Install two **CAS2496** alignment studs in opposite holes of the pinion carrier.



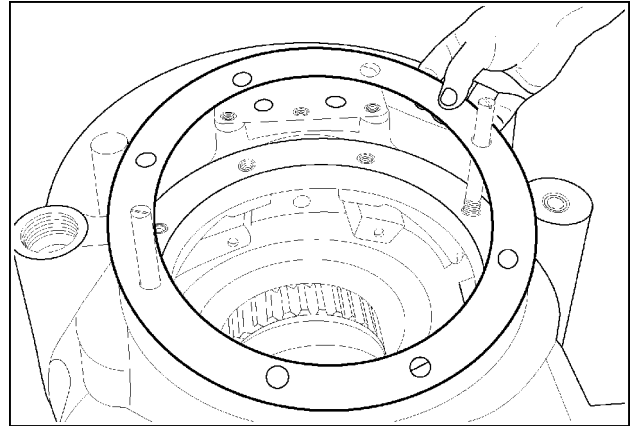
RCPH10FWD957AAJ 17

18. Use a lifting device to remove the pinion carrier from the housing. Be careful not to damage the shim pack.



RCPH10FWD958AAJ 18

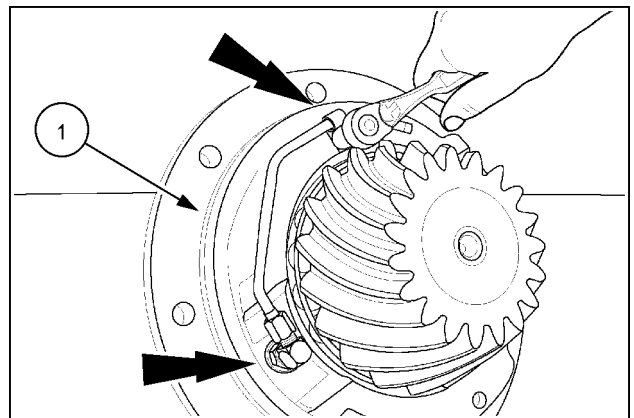
19. Remove and retain the shim pack.



RCPH10FWD959AAJ 19

Pinion carrier assembly

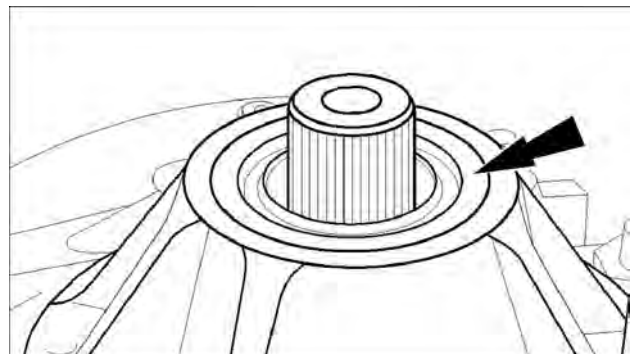
20. Remove the bolt securing the pinion gear lube tube. Disconnect and remove the tube, tube clamp and fitting. Remove and discard the large O-ring (1) from the flange of the housing.



RCPH10FWD960AAJ 20

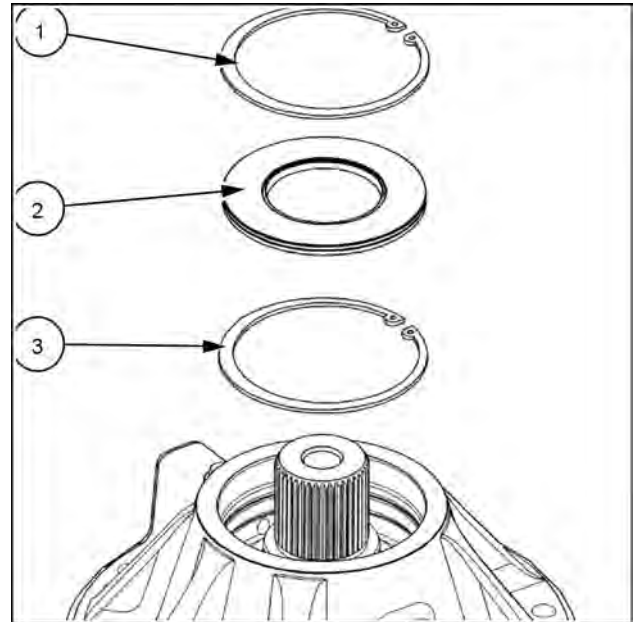
21. Remove the dust/grease seal.

NOTE: The front axle has a dust/grease seal on the outside diameter of the drive yoke and an oil seal on the pinion.



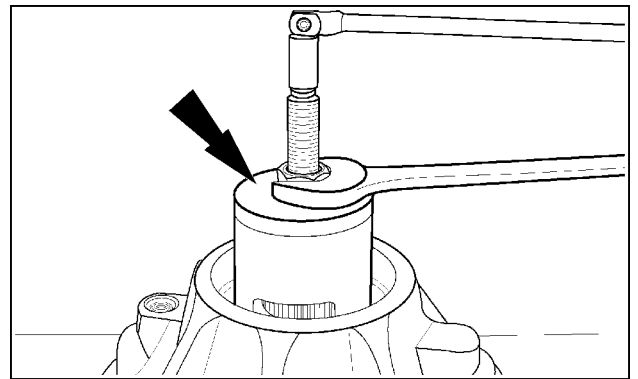
RCPH11FWD361AAC 21

22. Remove the snap ring (1), seal (2), and snap ring (3) from the inside diameter of the pinion carrier housing.



RCPH10FWD547ABJ 22

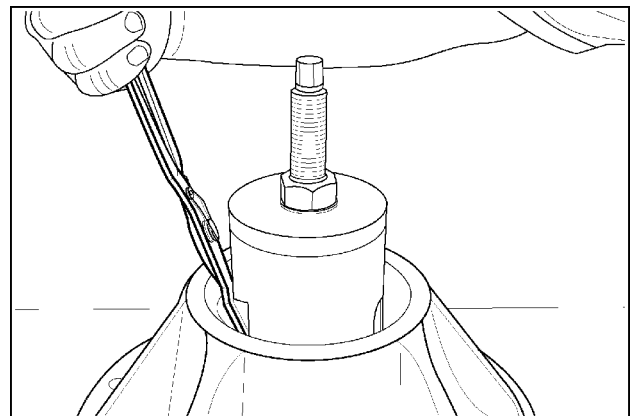
23. Support the pinion carrier on wood blocks on the work surface. Install the **CAS2511** pinion bearing preload compressor. Turn the center bolt tight into the threaded hole in the pinion gear. Install the thrust washer and nut on the center bolt. Align one window of the compression sleeve with the end gap of the snap ring. Use one wrench to hold the center bolt and a second wrench to tighten the nut to increase the bearing preload and release the pressure against the snap ring.



RCPH10FWD962AAJ 23

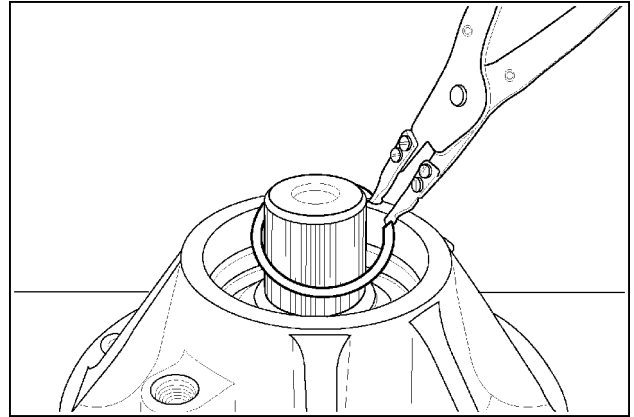
24. Use a Snap Ring Pliers to remove the snap ring from the groove in the pinion shaft.

NOTE: If pinion bearing preload increased noticeably, remove the compression sleeve to remove the large snap ring.



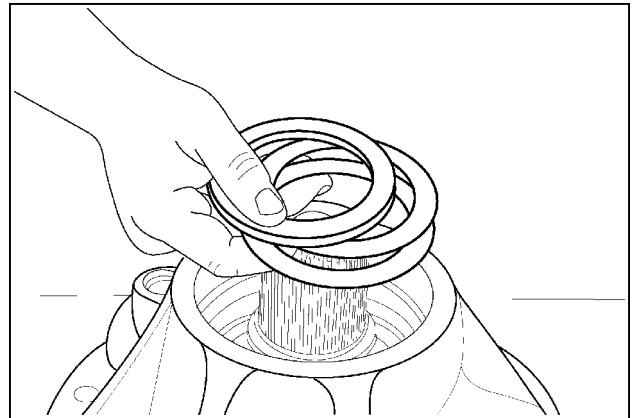
RCPH10FWD963AAJ 24

25. Remove the compression sleeve assembly and snap ring from the pinion shaft.



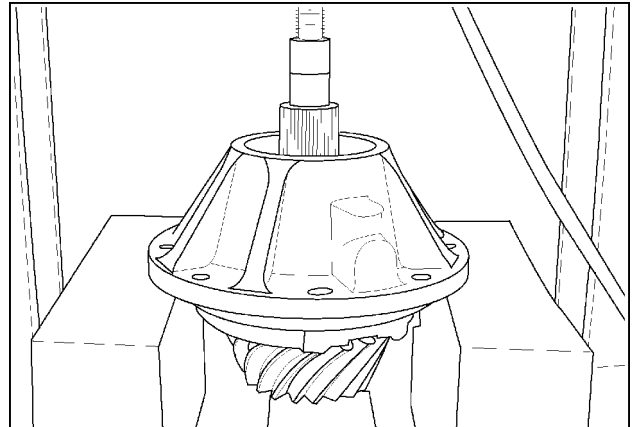
RCPH10FWD964AAJ 25

26. Remove the spacer ring and shim pack. Retain the shims.



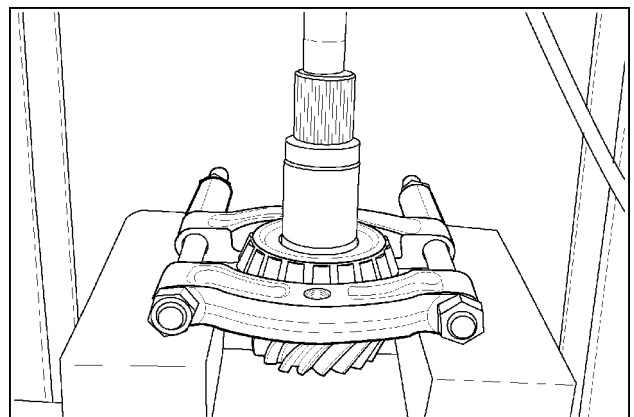
RCPH10FWD965AAJ 26

27. Support the pinion carrier on a press bed. Use the press to push the pinion shaft through the front bearing cone.



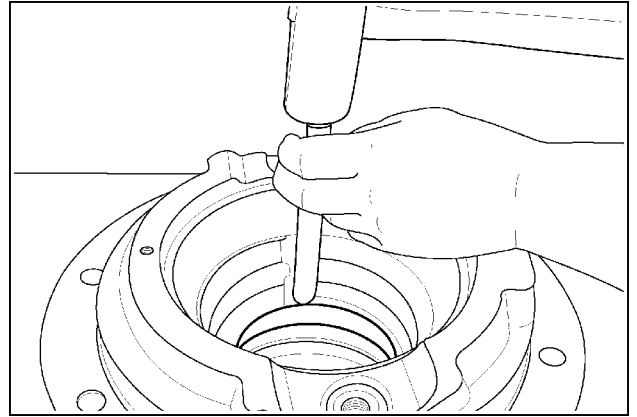
RCPH10FWD966AAJ 27

28. Use a split knife edge puller attachment and press to remove the rear pinion bearing cone.



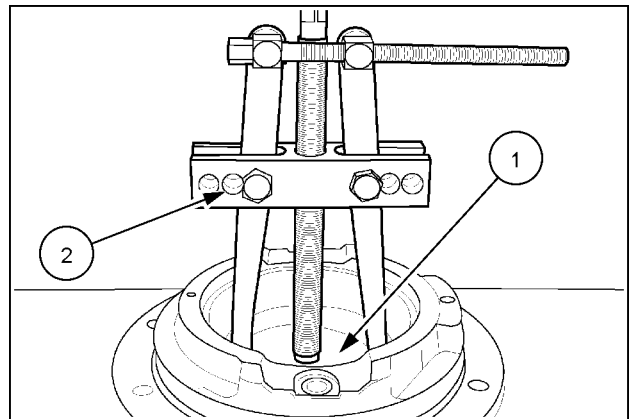
RCPH10FWD967AAJ 28

29. Use a brass drift to remove the outer bearing cup from the carrier housing.



RCPH10FWD968AAJ 29

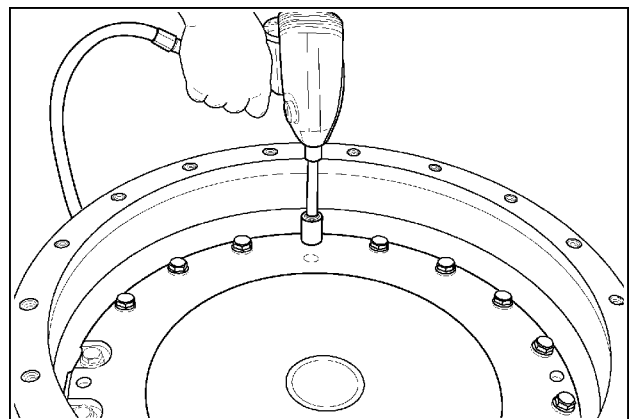
30. Use the **CAS2510** adaptor plate (1) and a bearing puller (2) to remove the inner bearing cup from the carrier housing. Clean and inspect all parts for damage or wear. Replace any damaged or worn parts.



RCPH10FWD969AAJ 30

Brake carrier/bearing support removal

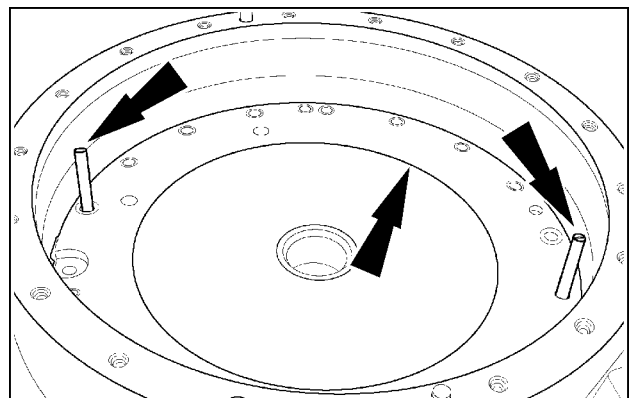
31. Rotate the differential housing so that the brake carrier side is on top. Remove the brake carrier retaining bolts and washers.



RCPH10FWD970AAJ 31

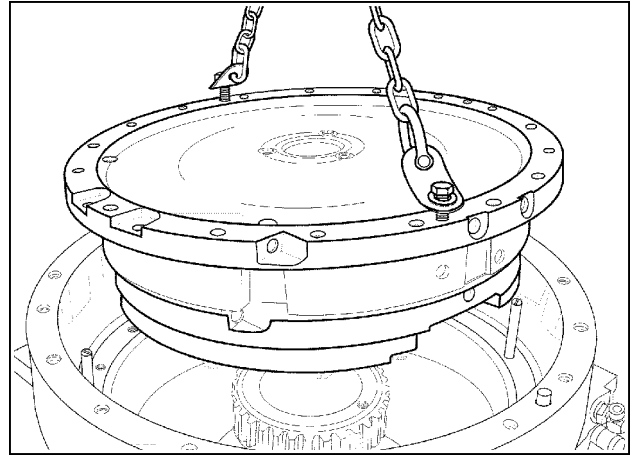
32. Install two **CAS2675** alignment studs opposite each other.

NOTE: Put a mark on the brake carrier and housing for assembly reference.



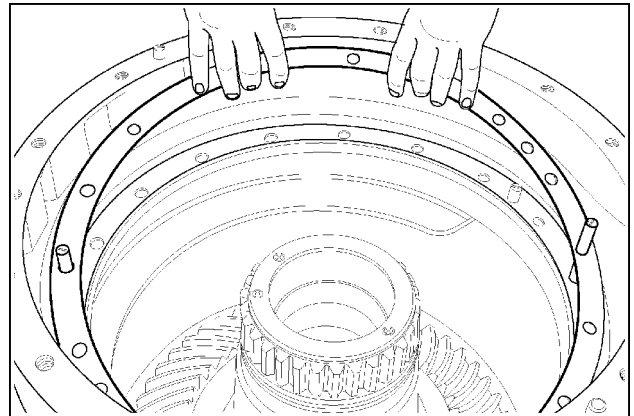
RCPH10FWD971AAJ 32

33. Two threaded holes are provided in the flange of the carrier assembly. Use two of the retainer bolts that were removed to attach a lifting chain and hoist. Use the hoist to slowly and carefully lift the brake carrier assembly out of the housing. Be careful not to bend or damage the preload shims during removal.



RCPH10FWD209ABJ 33

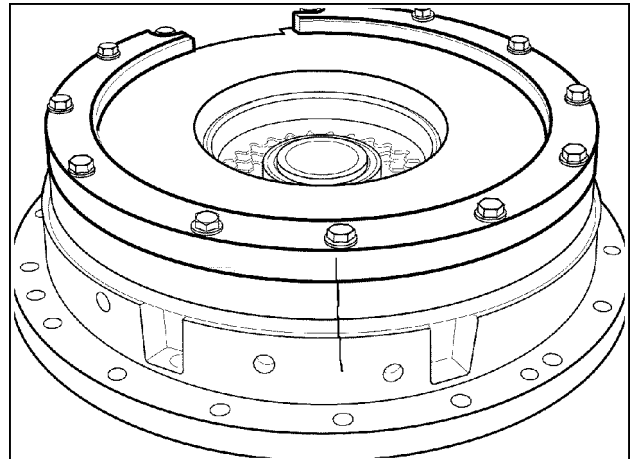
34. Remove and retain the differential bearing preload shims.



RCPH10FWD210ABJ 34

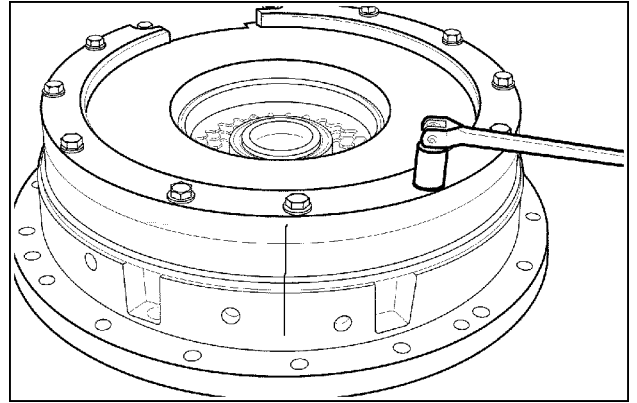
Brake carrier/bearing support disassembly

35. Position the carrier assembly on a sturdy work surface so that the split ring side is on top. Put a mark across the assembly for reference.



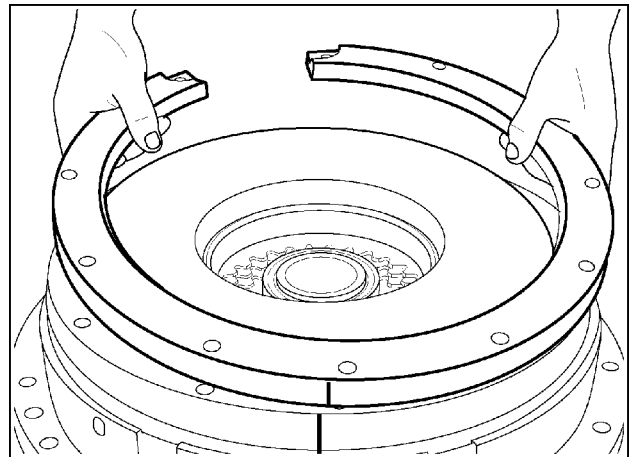
RCPH10FWD211ABJ 35

36. Starting with an end gap bolt, loosen each bolt in sequence one full turn. Repeat until all tension is released against the retaining ring.



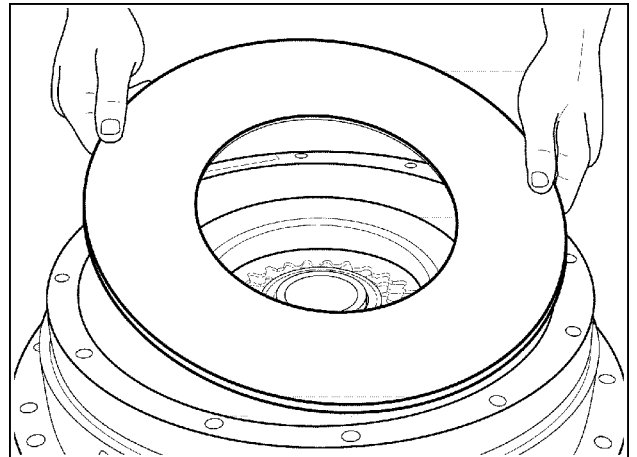
RCPH10FWD212ABJ 36

37. Remove all bolts from the split ring. Remove the split retainer ring.



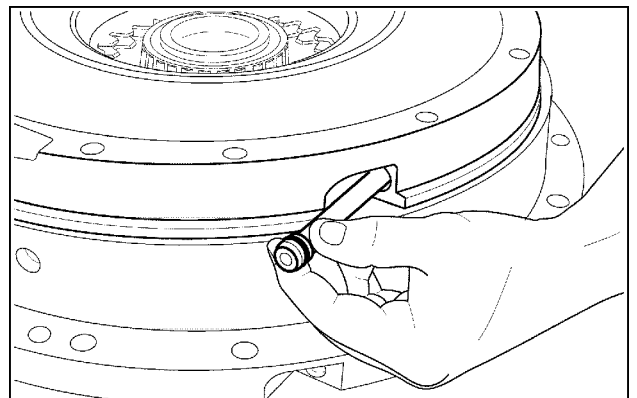
RCPH10FWD213ABJ 37

38. Remove the belleville spring.



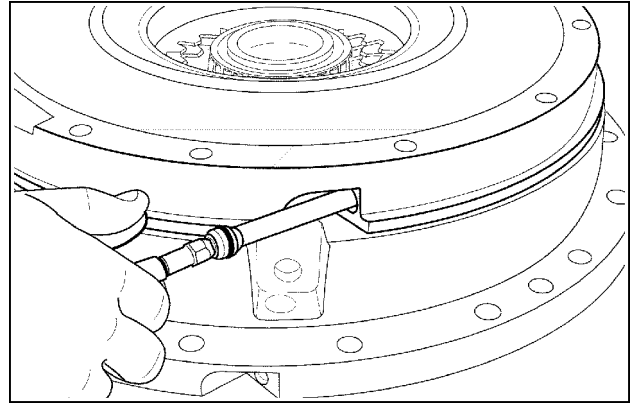
RCPH10FWD214ABJ 38

39. Temporarily install the short jumper tube into the park brake pressure port.



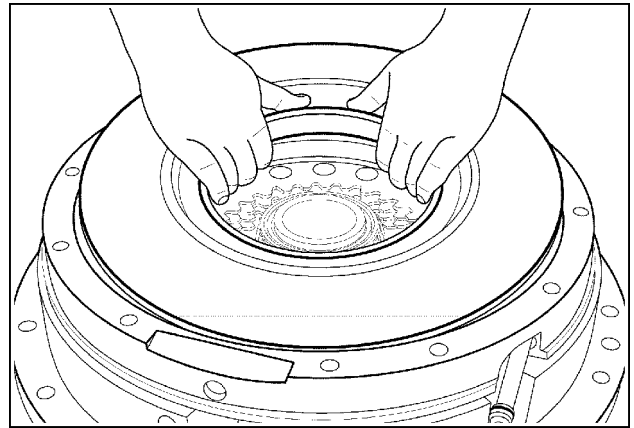
RCPH10FWD215ABJ 39

40. Use a short burst of compressed air to lift the park brake piston out of its bore.



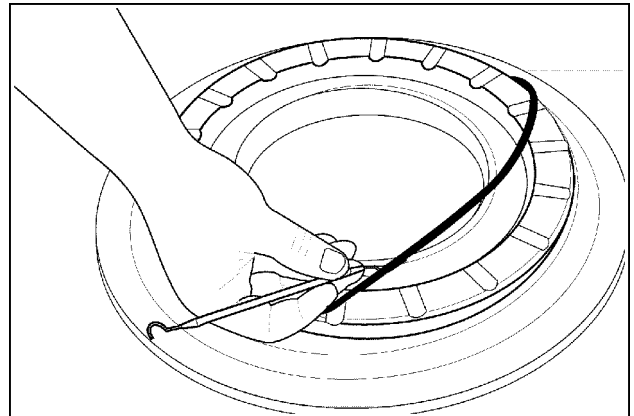
RCPH10FWD216ABJ 40

41. Remove the piston from the backing plate.



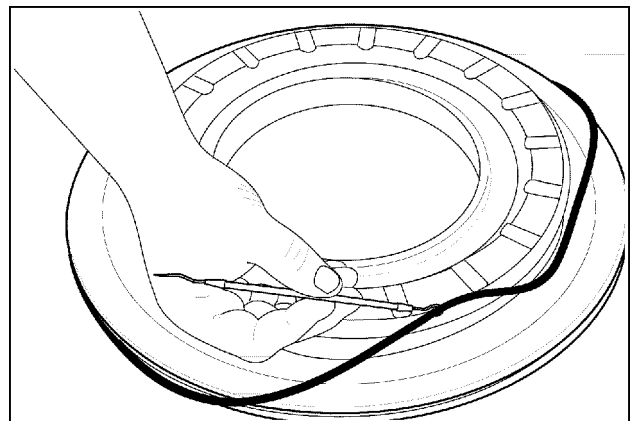
RCPH10FWD217ABJ 41

42. Remove and discard the inner O-ring from the piston.



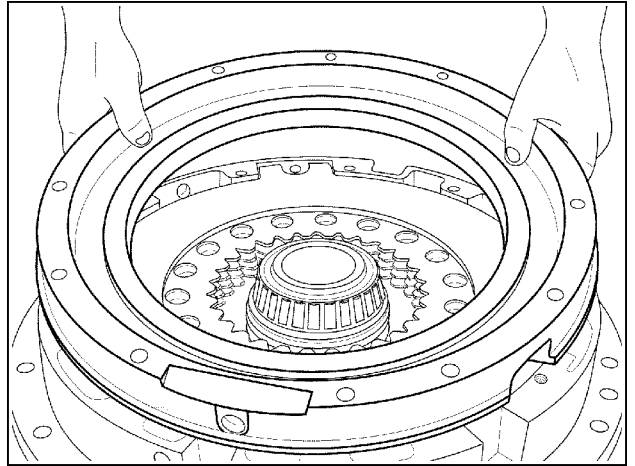
RCPH10FWD218ABJ 42

43. Remove and discard the outer O-ring from the piston.



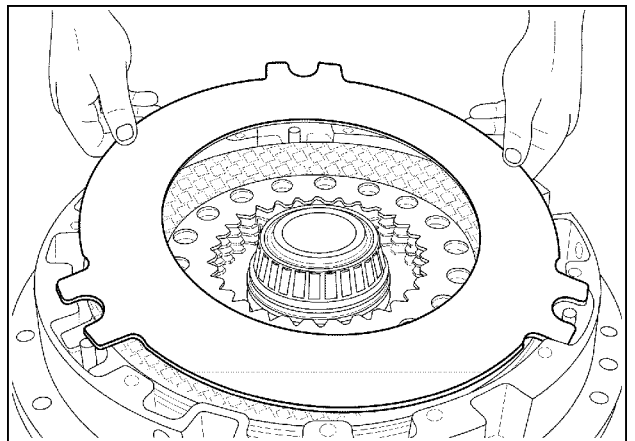
RCPH10FWD219ABJ 43

44. Remove the brake backing plate.



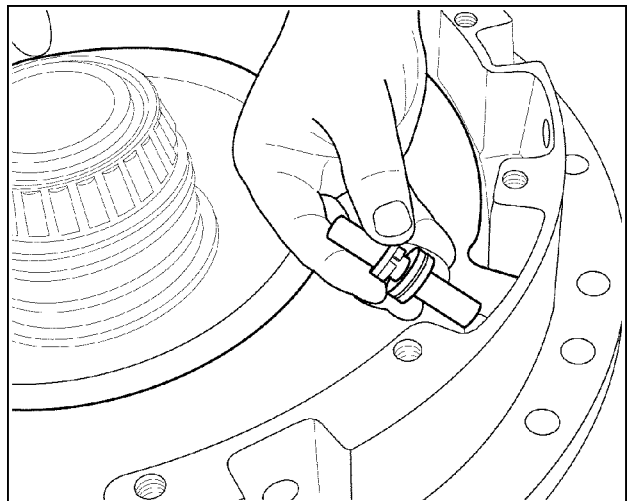
RCPH10FWD220ABJ 44

45. Remove the four brake separator plates and four friction plates from the carrier.



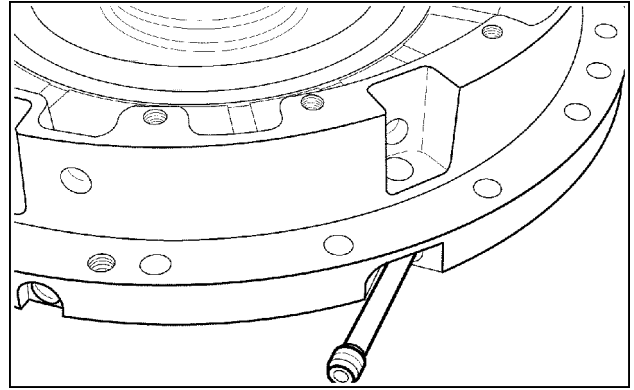
RCPH10FWD221ABJ 45

46. Remove each of the three brake adjuster pins with belleville spring washers.



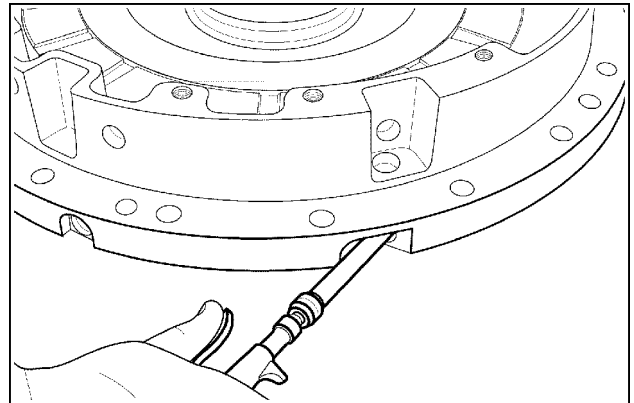
RCPH10FWD222ABJ 46

47. Temporarily install a short jumper tube into the service brake pressure port.



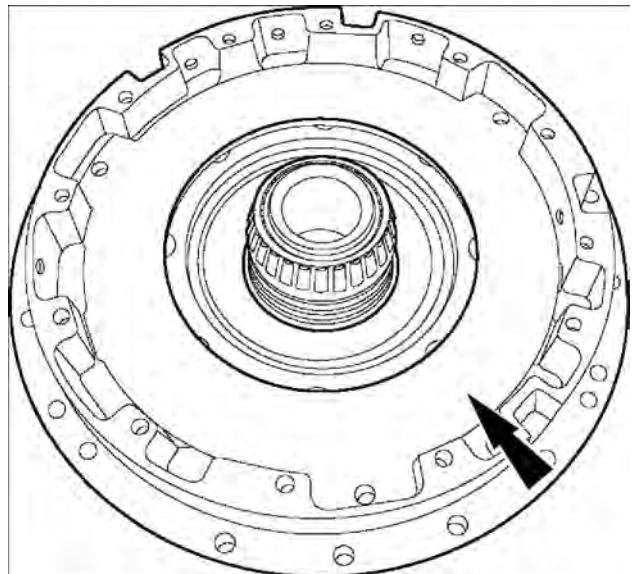
RCPH10FWD224ABJ 47

48. Use a short burst of compressed air to lift the brake piston out of the bore.



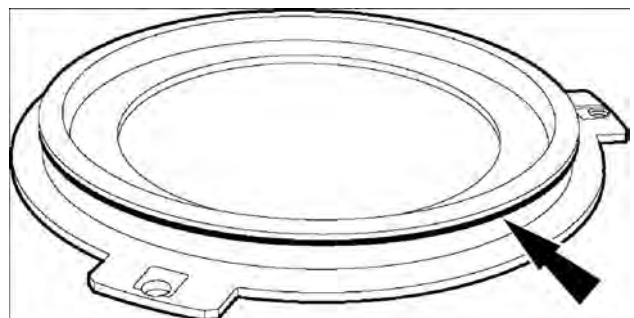
RCPH10FWD225ABJ 48

49. Remove the piston from the carrier.



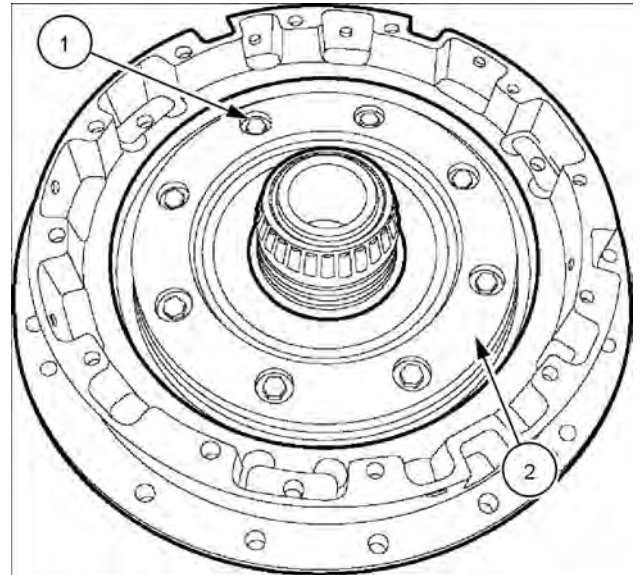
RCPH11FWD339BAC 49

50. Remove and discard the O-ring from the outside diameter of the piston.



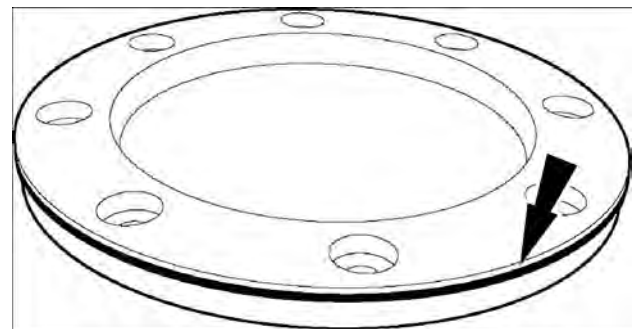
RCPH11FWD338AAC 50

51. Remove the eight bolts (1) and remove the brake insert (2).



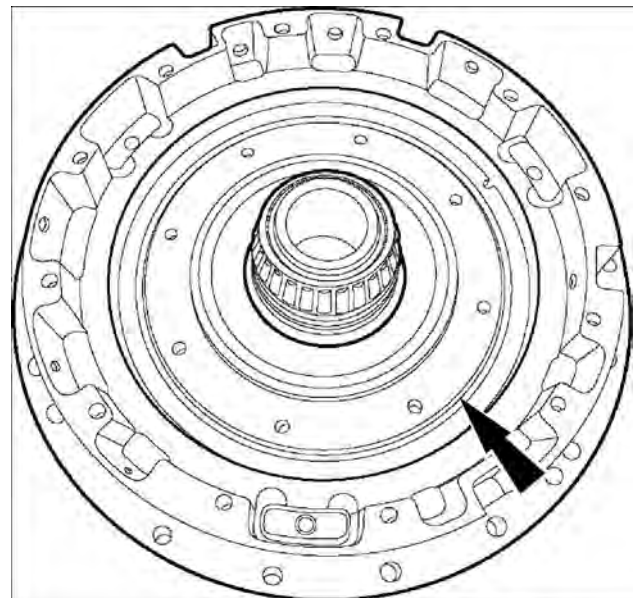
RCPH11FWD337BAC 51

52. Remove and discard the piston inside diameter O-ring from the brake insert.



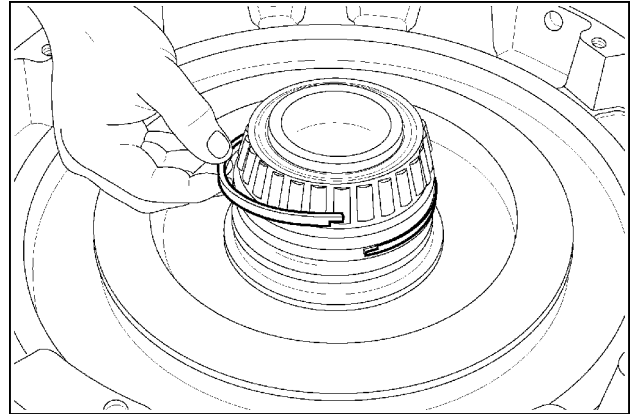
RCPH11FWD336AAC 52

53. Remove and discard the brake insert O-ring from carrier assembly housing.



RCPH11FWD335BAC 53

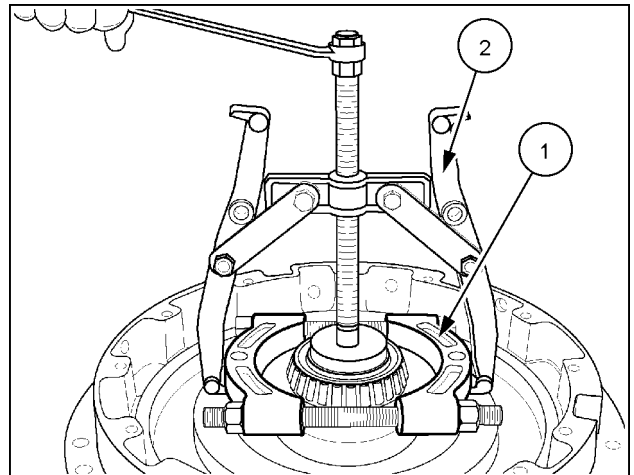
54. Remove and discard the two seal rings from the hub of the carrier.



RCPH10FWD229ABJ 54

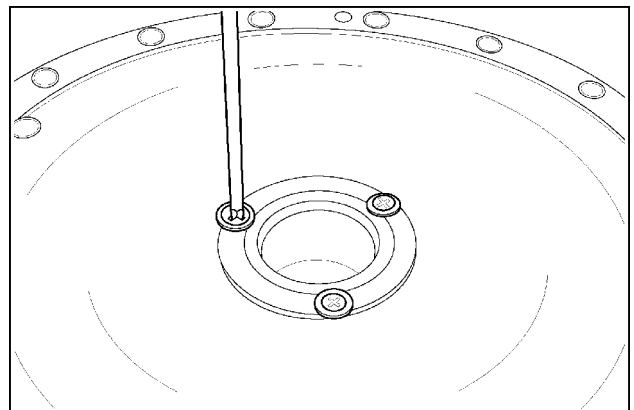
55. If required, use a split knife edge puller attachment (1) and a puller (2) to remove the bearing cone from the hub of the carrier.

NOTE: If possible, place the bearing cup over the bearing cone when removing the bearing.



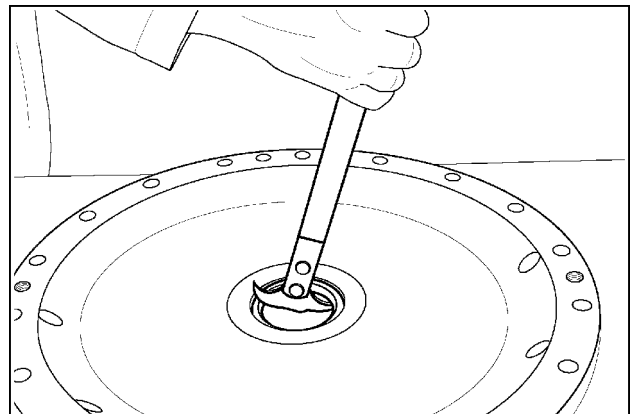
RCPH10FWD230ABJ 55

56. Turn the brake carrier housing so the outer side is on top. Remove the three screws and washers securing the seal.



RCPH10FWD231ABJ 56

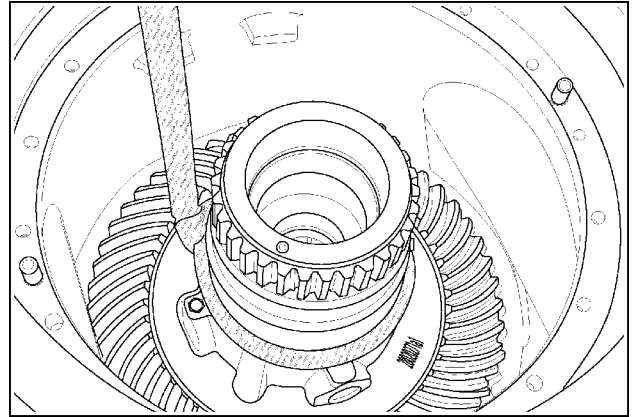
57. Remove and discard the seal. Clean and inspect all brake carrier parts for damage or wear. Replace any damaged or worn parts found



RCPH10FWD994AAJ 57

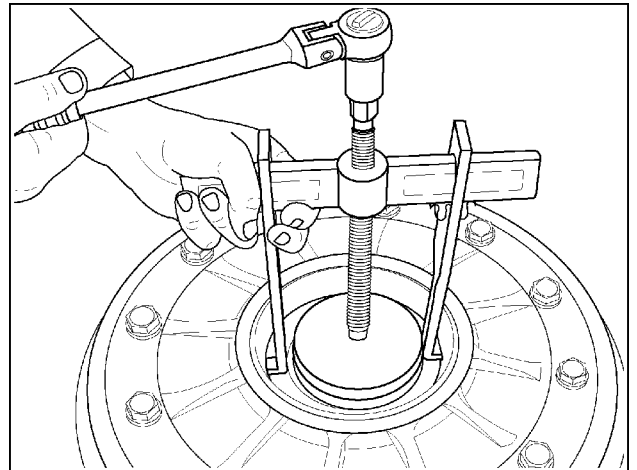
Differential removal and disassembly

58. Position a nylon lifting sling in a choker configuration as low as possible on the differential carrier. Use a hoist to lift the differential from the housing.



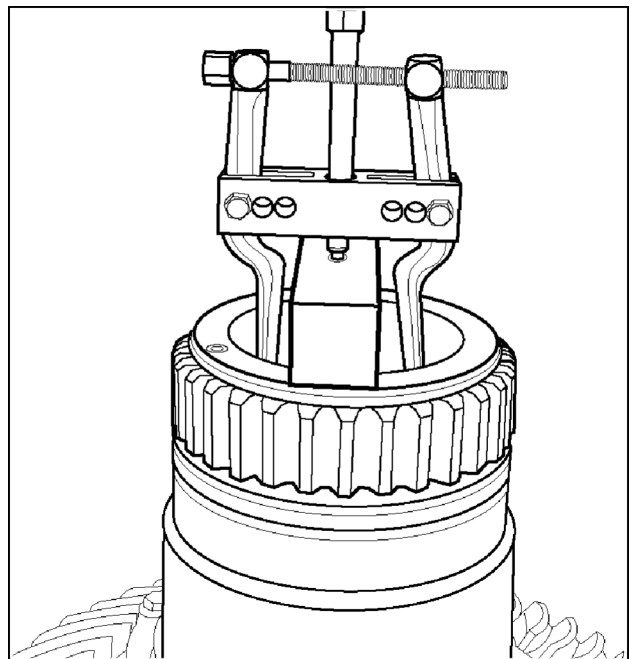
RCPH10FWD998AAJ 58

59. If required, use a bearing puller and step plate to remove the left hand side differential bearing cup.



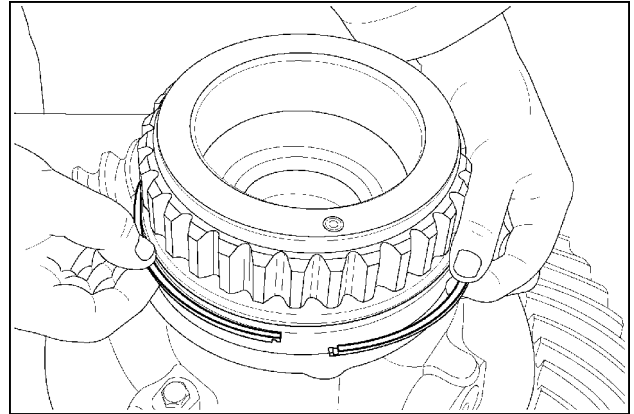
RCPH10FWD999AAJ 59

60. If required, use a bearing puller and step plate to remove the right hand side differential bearing cup.



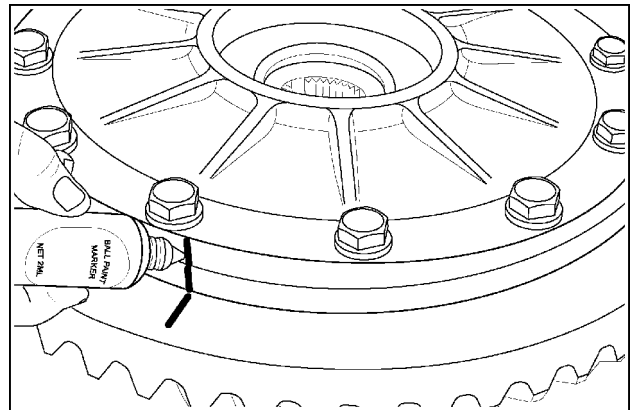
RCPH10FWD001ABJ 60

61. Remove and discard the large seal ring.



RCPH10FWD002ABJ 61

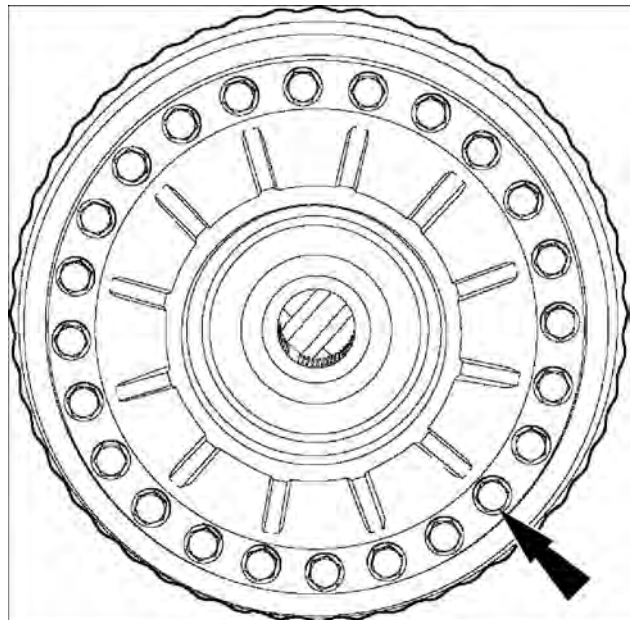
62. Put a mark on the differential case for assembly reference.



RCPH10FWD003ABJ 62

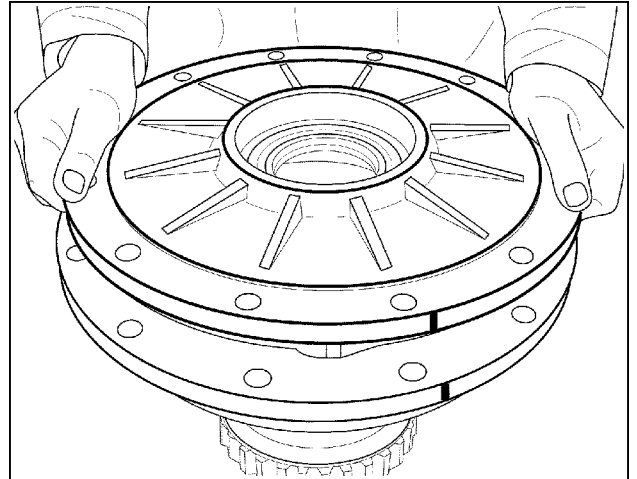
63. Remove and discard the ring gear and cover attaching bolts. Use a brass drift and hammer to tap the ring gear free from the case.

NOTE: The ring gear does not need to be removed unless the case or ring gear is to be replaced.



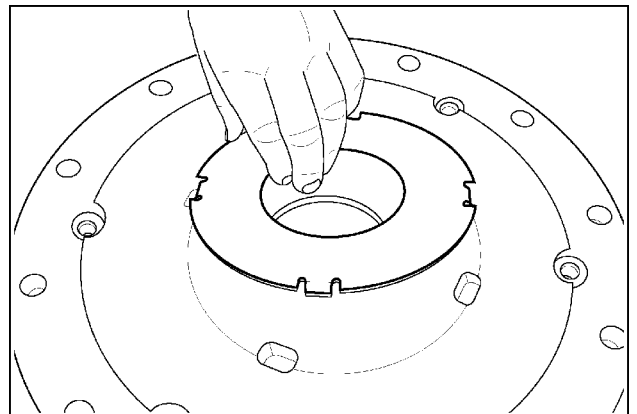
RCPH11FWD331BAC 63

64. Remove the differential case cover.



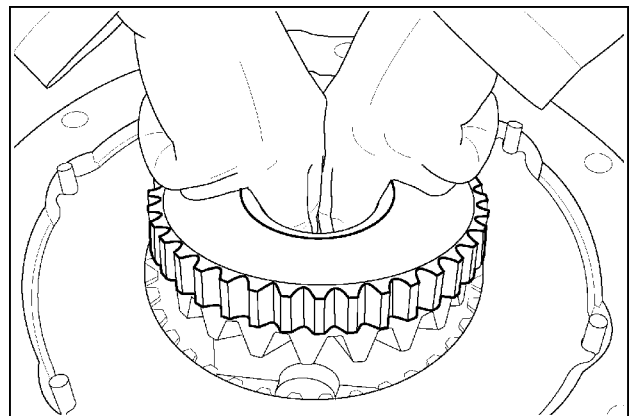
RCPH10FWD005ABJ 64

65. Remove the large thrust washer from the cover.



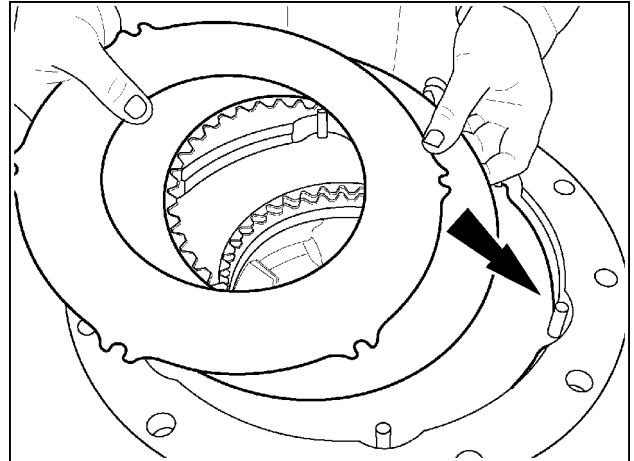
RCPH10FWD006ABJ 65

66. Remove the differential side gear from the case.



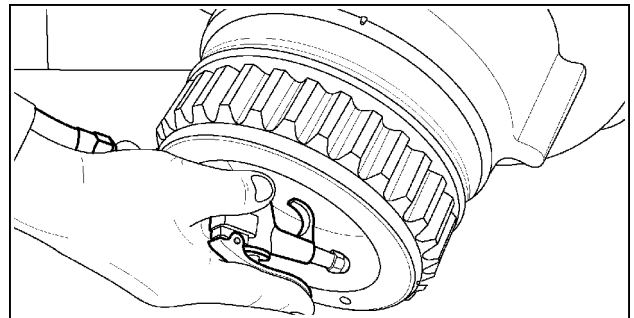
RCPH10FWD007ABJ 66

67. If equipped with differential lock, remove the four steel separator plates and three friction plates from the case. Remove the 6 anti-rotation dowel pins from the case.



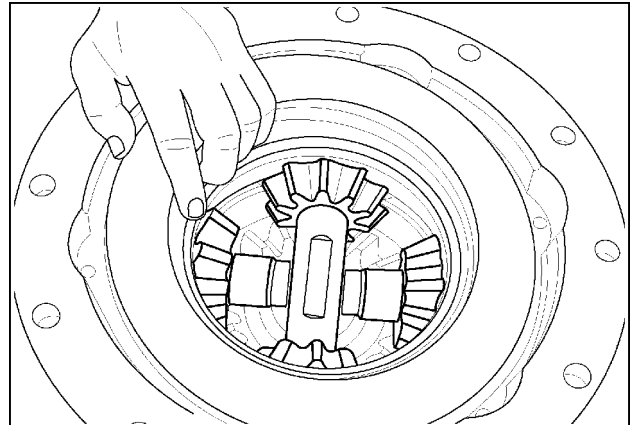
RCPH10FWD008ABJ 67

68. If equipped with differential lock, use a short burst of compressed air in the oil passage hole in the case to move the differential lock piston out of the bore.



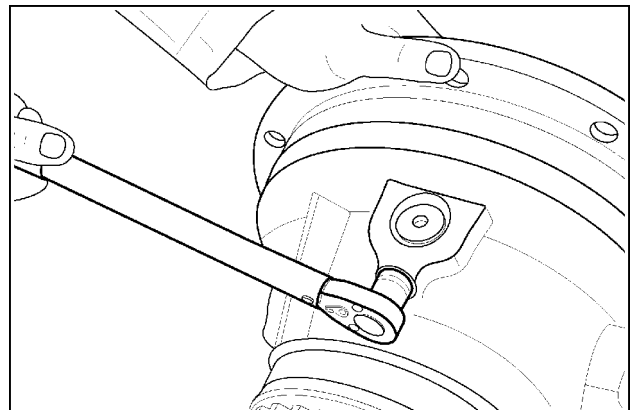
RCPH10FWD009ABJ 68

69. Remove the differential lock piston from the case.



RCPH10FWD010ABJ 69

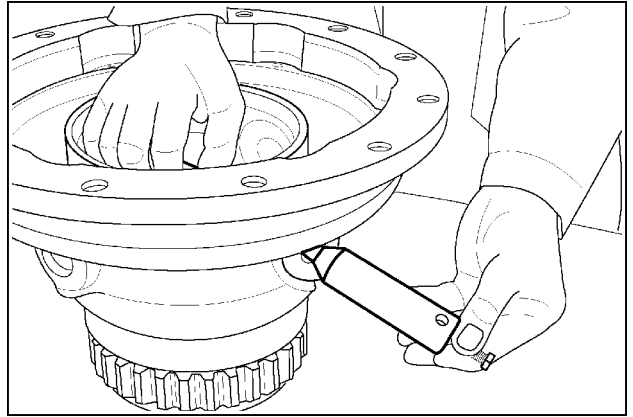
70. Remove the bolts securing the short pinion shafts in the case.



RCPH10FWD011ABJ 70

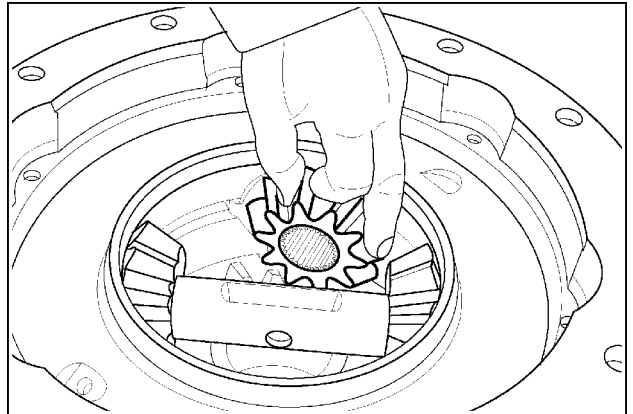
71. Install an M8 x 1.25 bolt into the threaded hole in the end of each short pinion gear shaft. Remove the short shafts and spacer sleeves from the case.

NOTE: There are 28 uncaged needle roller bearings in each of the four pinion gears.



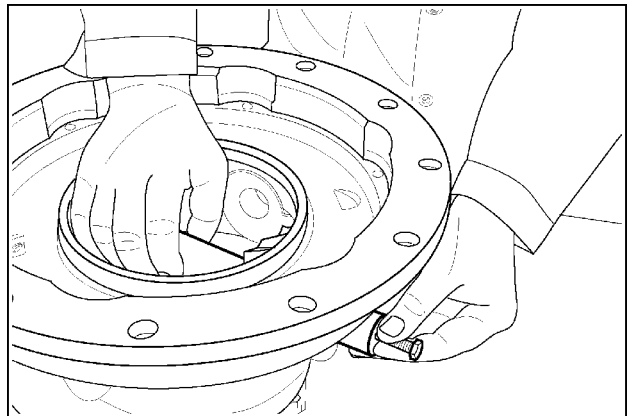
RCPH10FWD012ABJ 71

72. Remove the spider gears for the short shafts from the case.



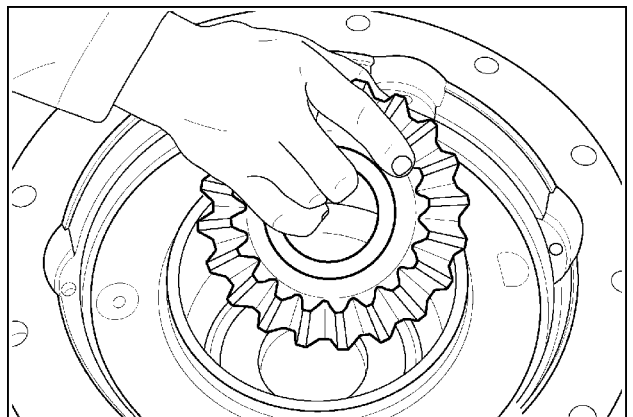
RCPH10FWD013ABJ 72

73. Use the same procedure to remove the long spider gear shaft, spacer and spider gears.



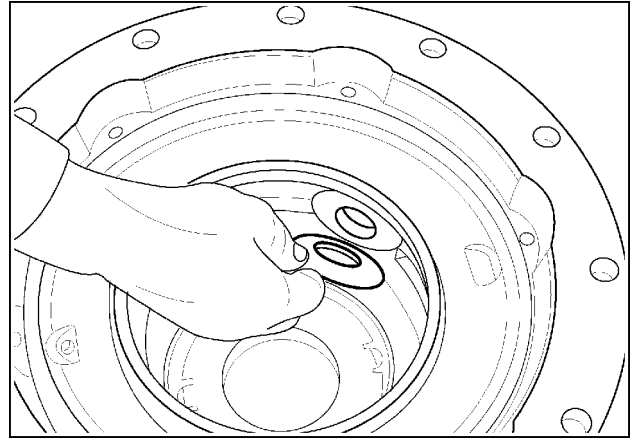
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74. Remove the side gear from the bottom of the case.



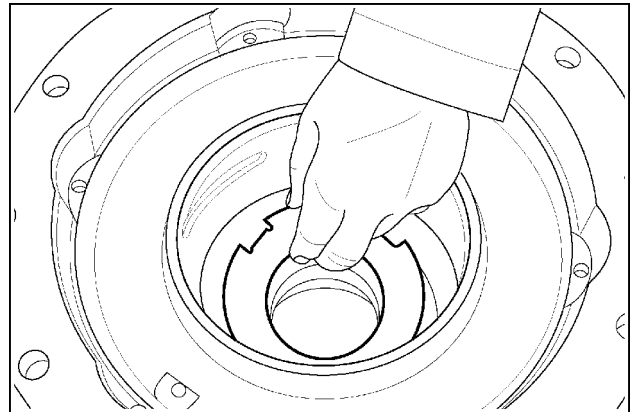
RCPH10FWD015ABJ 74

75. Remove the thrust washers for each spider gear from the case.



RCPH10FWD016ABJ 75

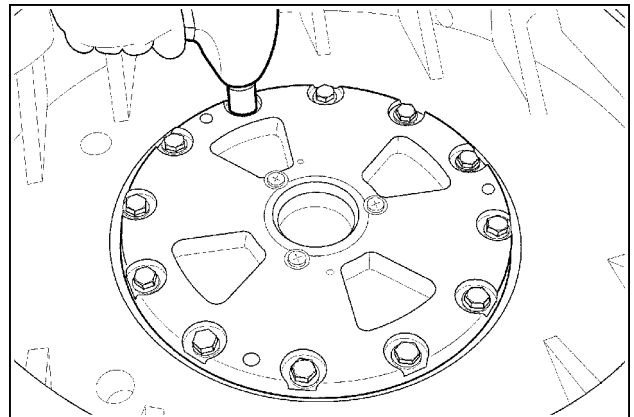
76. Remove the thrust washer for the side gear from the bottom of the case. Clean and inspect all differential parts for damage or wear. Replace any damaged or worn parts found.



RCPH10FWD017ABJ 76

Left hand differential bearing support disassembly

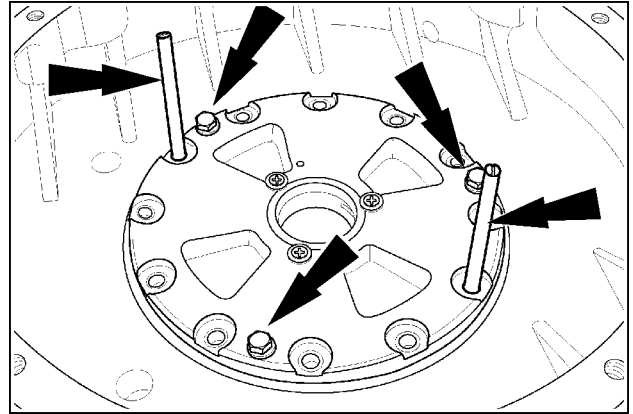
77. If required, rotate the differential housing so the left hand side differential bearing support carrier is on top. Remove the bearing support retaining bolts and washers.



RCPH10FWD232ABJ 77

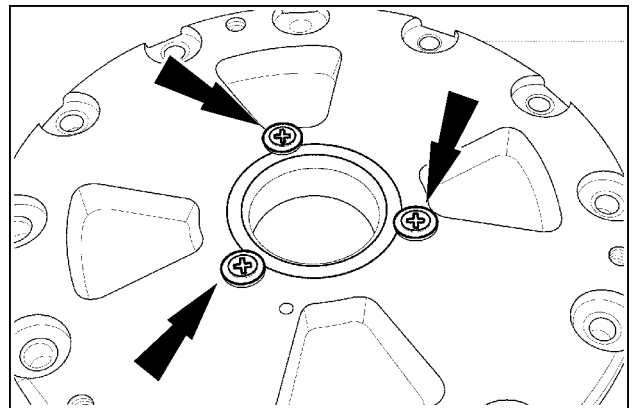
78. Install two CAS1995-6 guide bolts. Use three of the retaining bolts in the threaded holes provided. Tighten the bolts alternately and evenly to jack the bearing carrier out of the housing. Remove the bearing carrier and shims.

NOTE: Be careful not to damage the shims when removing the bearing support.



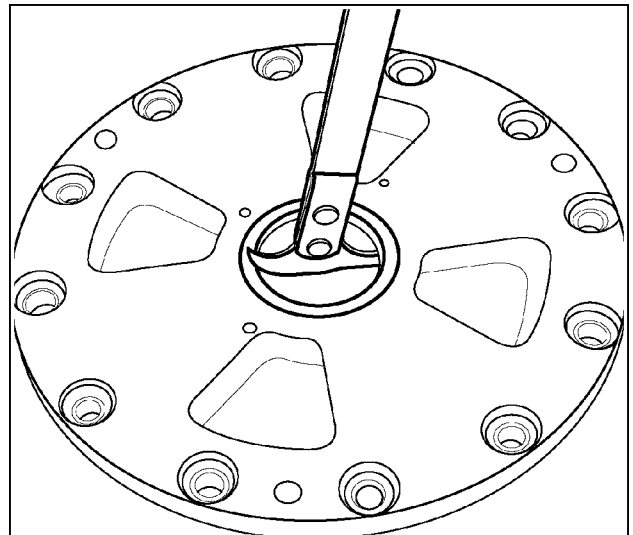
RCPH10FWD233ABJ 78

79. Remove the three screws and washers used to retain the seal.



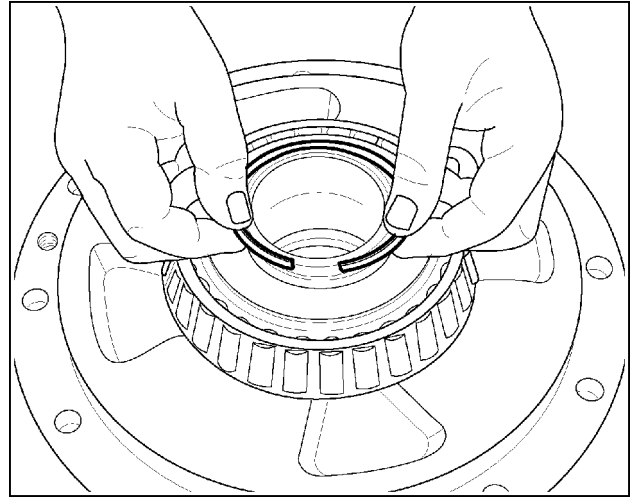
RCPH10FWD234ABJ 79

80. Remove and discard the oil seal.



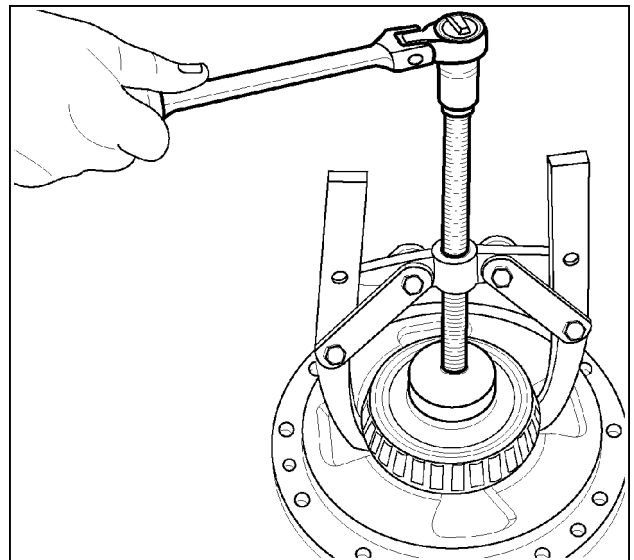
RCPH10FWD020ABJ 80

81. Remove and discard the seal ring.



RCPH10FWD021ABJ 81

82. If required, use a bearing puller and step plate to remove the bearing cone from the hub of the bearing carrier.



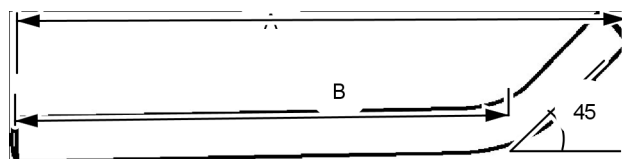
RCPH10FWD022ABJ 82

Differential - Assemble - 600 Series Quadtrac® axles

Steiger® 580 Quadtrac®	NA
Steiger® 620 Quadtrac®	NA

Dealer made tool

Tool must be fabricated to assist in the shimming of the differential case to the differential housing. Take a **150 mm (6 in)** piece **(A)** of **9.5 mm (0.375 in)** steel rod and put a **45°** bend **115 mm (4.5 in)** **(B)** from the end.

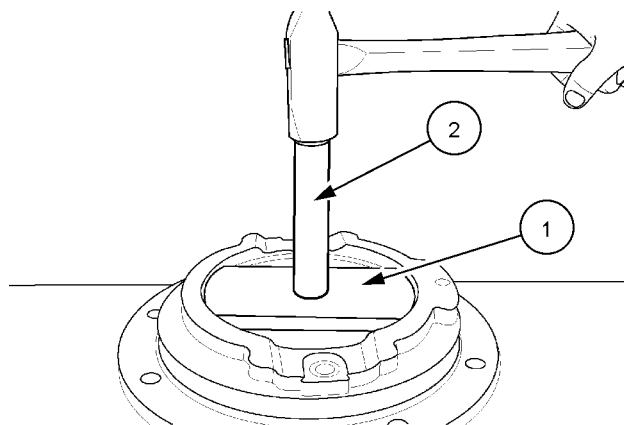


RCPH11FWD366AAC 1

Pinion carrier assembly

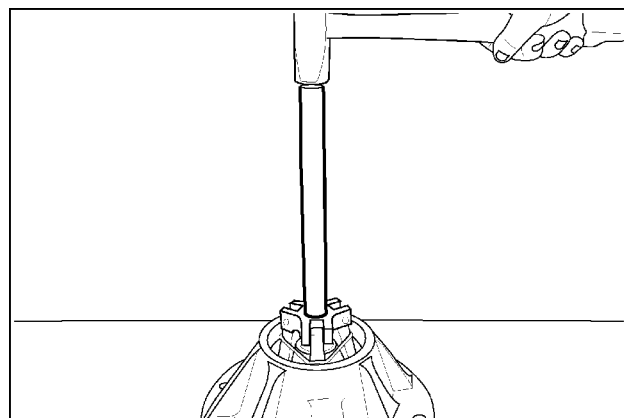
1. Use **CNH299050** bearing cup driver **(1)** and an appropriate handle **(2)** to install the inner bearing cup into the carrier housing. Be sure the bearing cup is seated in the bore.

NOTE: Put a light coat of oil around the outside diameter of the bearing cup before installation.



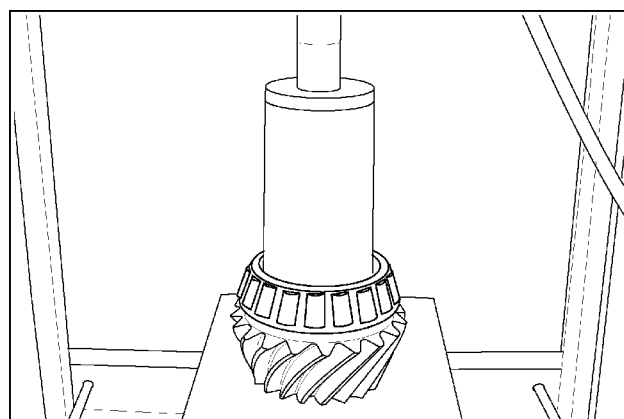
RCPH10FWD023ABJ 2

2. Put a light coat of oil around the outside diameter of the outer pinion bearing cup. Use an universal bearing cup installer to install the outer bearing cup into the carrier.



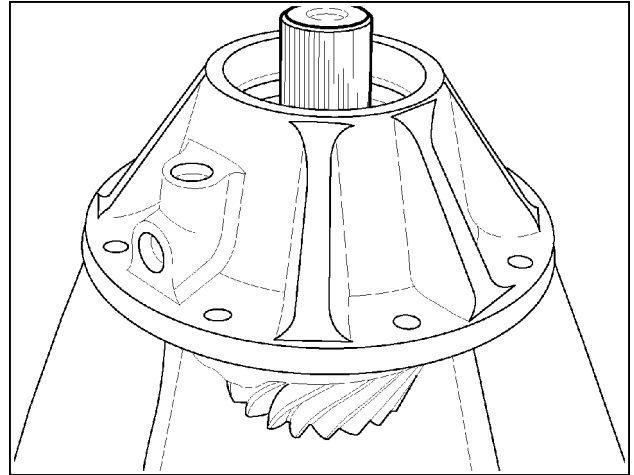
RCPH10FWD024ABJ 3

3. Put a light coat of oil around the inside diameter of the inner pinion bearing cone. Use the **CAS2666** press sleeve and press to install the inner bearing cone on the pinion shaft until seated.



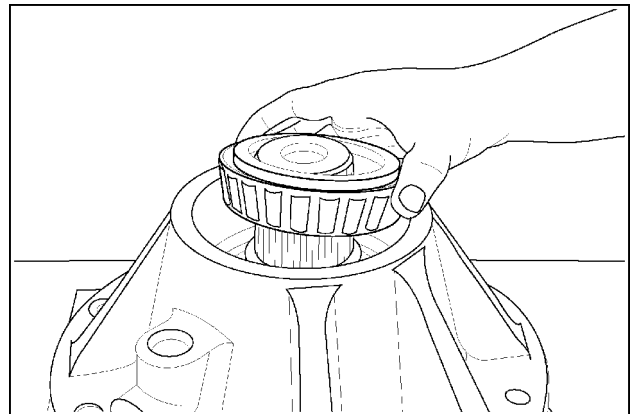
RCPH10FWD025ABJ 4

4. Lubricate the inner bearing cone with clean operating oil. Install the bevel pinion gear into the carrier housing.



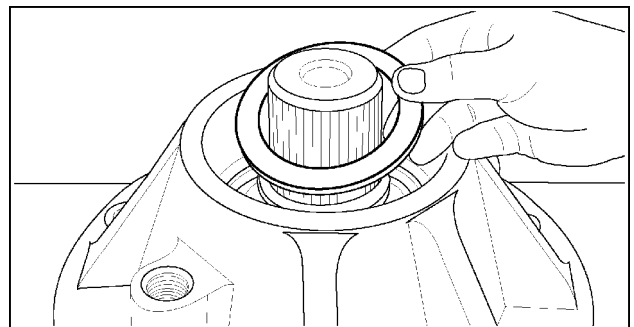
RCPH10FWD026ABJ 5

5. Lubricate the front bearing cone with clean operating oil or assembly grease. Install the bearing cone on the pinion shaft.



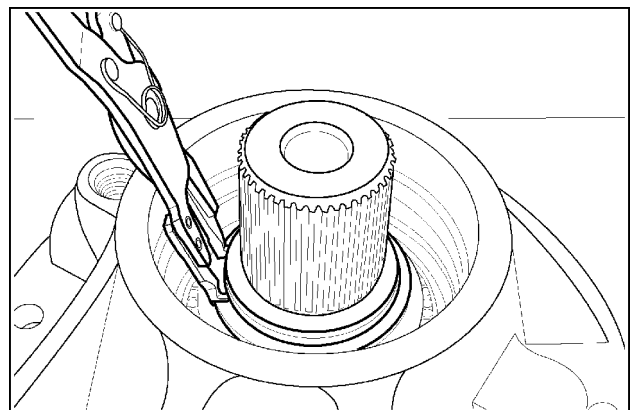
RCPH10FWD027ABJ 6

6. Install the thick spacer ring on the pinion shaft.



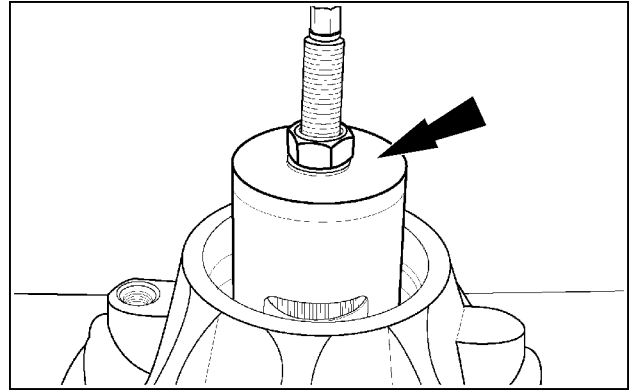
RCPH10FWD028ABJ 7

7. Install a new snap ring on the pinion shaft as far down as possible.



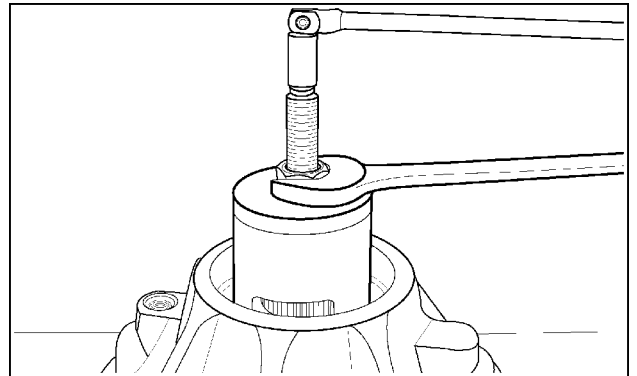
RCPH10FWD029ABJ 8

8. Install and tighten the center bolt of the **CAS2511** pinion bearing compression tool into the end of the pinion shaft. Install the compression sleeve, thrust washer and nut on the center bolt.



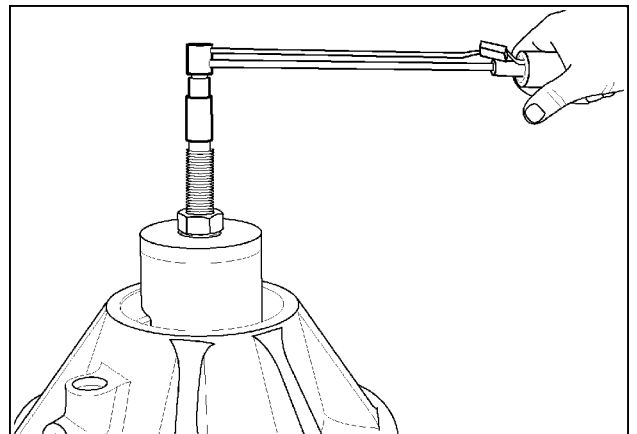
RCPH10FWD030ABJ 9

9. Use one wrench to hold the center bolt and a second wrench to tighten the nut to push the bearing cone on the pinion gear shaft until some resistance is noted when the pinion gear is rotated. Install the snap ring into the groove of the pinion shaft.



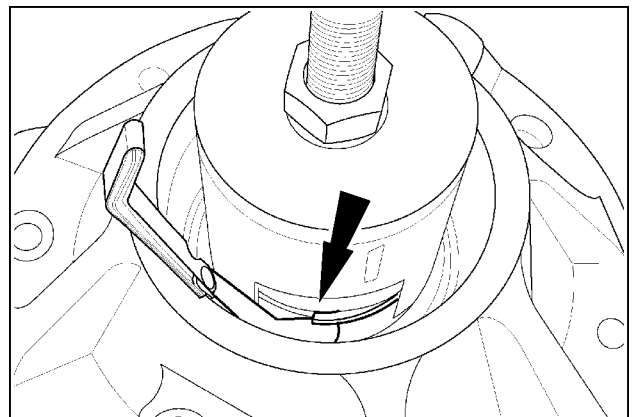
RCPH10FWD962AAJ 10

10. Use a torque wrench on the center bolt to measure rolling torque. Tighten the nut until **19 – 20 N·m (168 – 177 lb in)** of smooth and continuous rolling torque is measured.



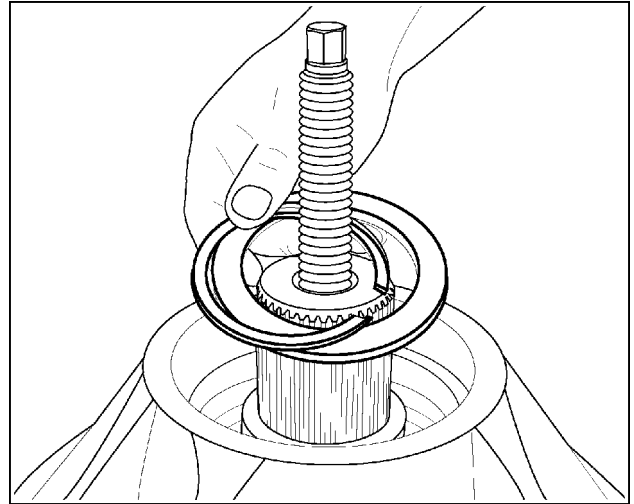
RCPH10FWD031ABJ 11

11. Use an angled feeler gauge to measure and record the distance between the spacer ring and the snap ring. The feeler gauge must be a tight fit.



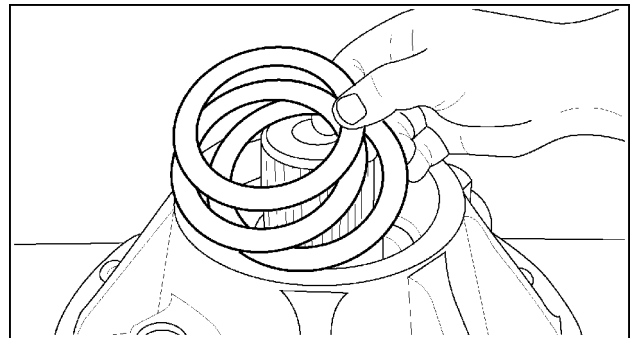
RCPH10FWD032ABJ 12

12. Remove the compression sleeve, snap ring and thick spacer ring.



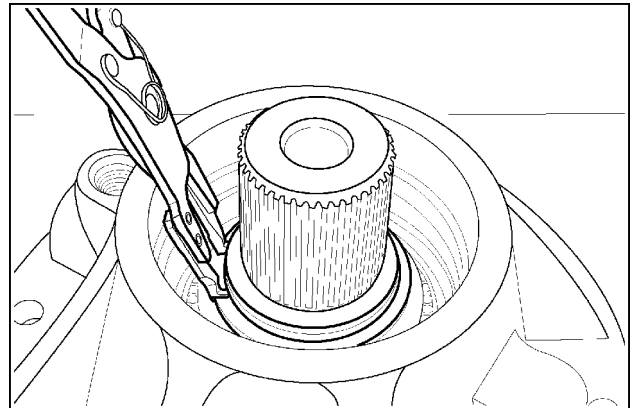
RCPH10FWD033ABJ 13

13. Select a shim combination equal to the distance measured in step 11. Install the selected shim pack (thickest shim first) and thick spacer ring on the pinion shaft.



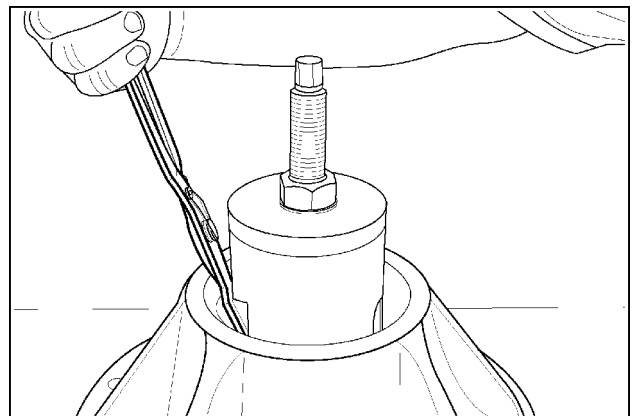
RCPH10FWD034ABJ 14

14. Install the snap ring on the pinion shaft as far down as possible.



RCPH10FWD029ABJ 15

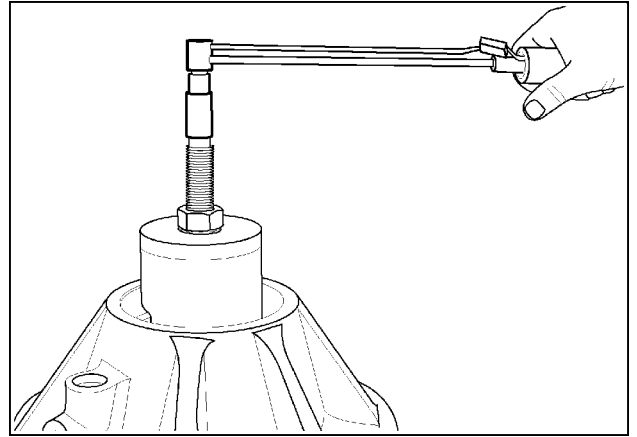
15. Install the compression sleeve, thrust washer and nut on the center bolt. Align the open window of the sleeve with the gap of the snap ring. Tighten the nut on the compression sleeve until the snap ring can be installed in the groove of the shaft. Be sure the snap ring is fully seated in the groove.



RCPH10FWD963AAJ 16

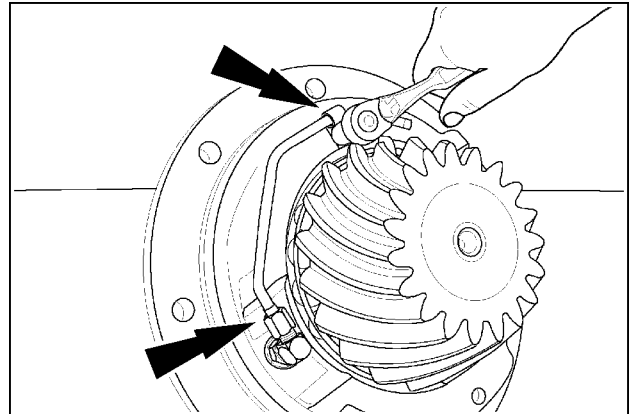
16. Loosen the nut on the center bolt at least two full turns. Strike the head of the center bolt two sharp blows with a heavy hammer to back seat the bearing against the snap ring. Use a torque wrench to check pinion bearing preload. Rolling torque must measure **6 – 20 N·m (53 – 177 lb in)** with no bearing binding or lockup. If rolling torque is out of tolerance, add or remove shims as needed to correct rolling torque.

NOTE: Adjust used bearings towards the low end of the preload tolerance range.



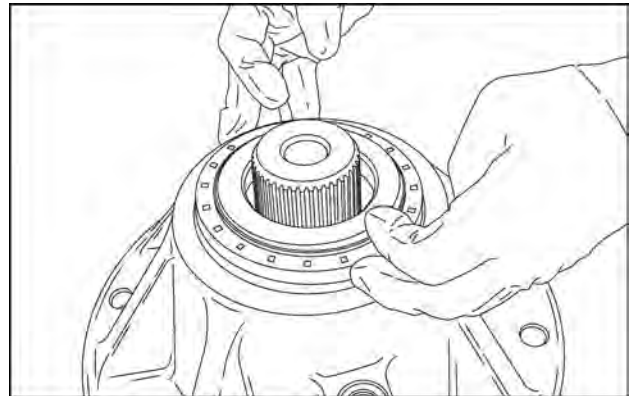
RCPH10FWD031ABJ 17

17. Install the lubrication port fitting, pinion lube tube, retaining clip and bolt. Tighten the bolt to specifications. Adjust the tube to direct oil flow at the pinion gear teeth. Allow a minimum of **6 mm (0.24 in)** clearance between the end of the tube and the bevel gear. Tighten the tube fitting and connection securely.



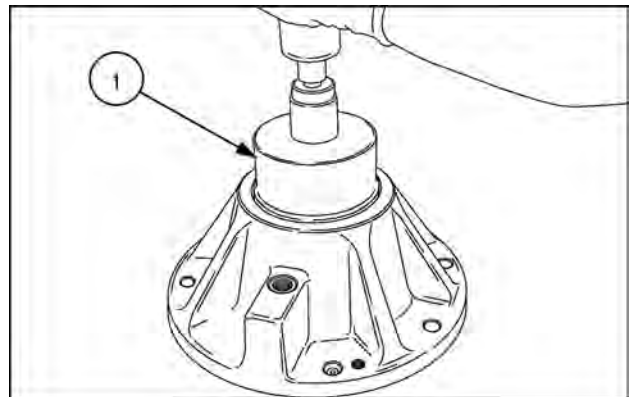
RCPH10FWD960AAJ 18

18. Install the pinion seal over the pinion shaft into the bore of the housing.



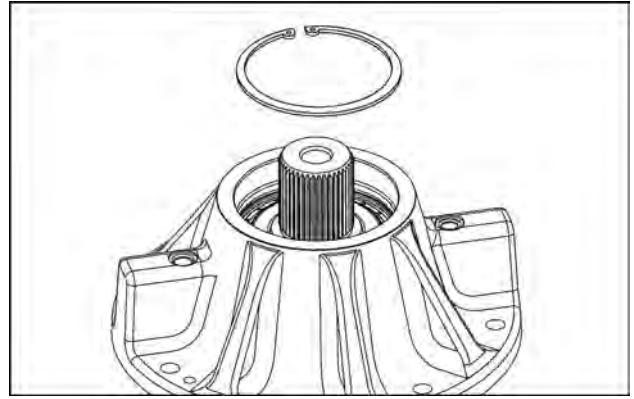
RAIL17TR01392AA 19

19. Use **380003447** pinion seal driver (1) with bolt and washer to draw oil seal down to position.



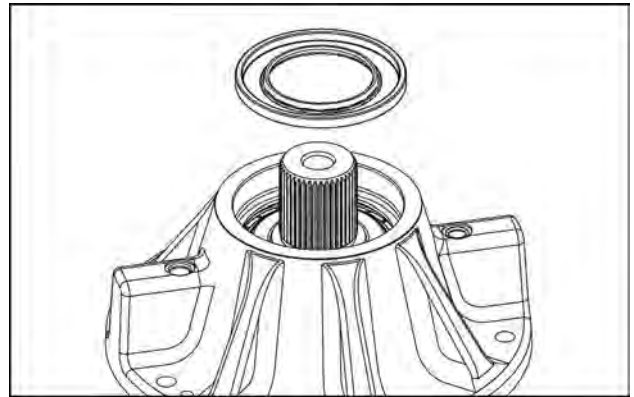
RAIL17TR01393AA 20

20. Install snap ring.



RAIL17TR01399AA 21

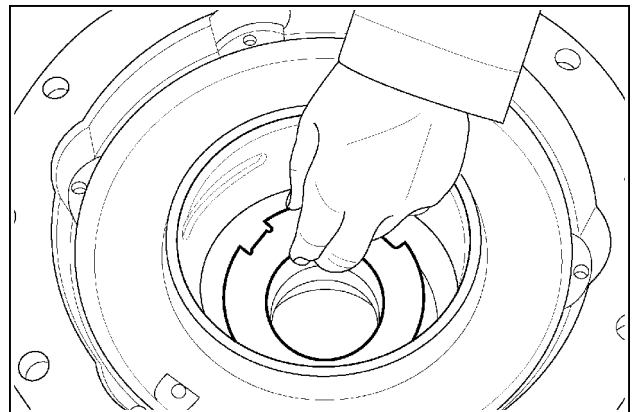
21. Press the dust seal on until it is flush with the housing.



RAIL17TR01398AA 22

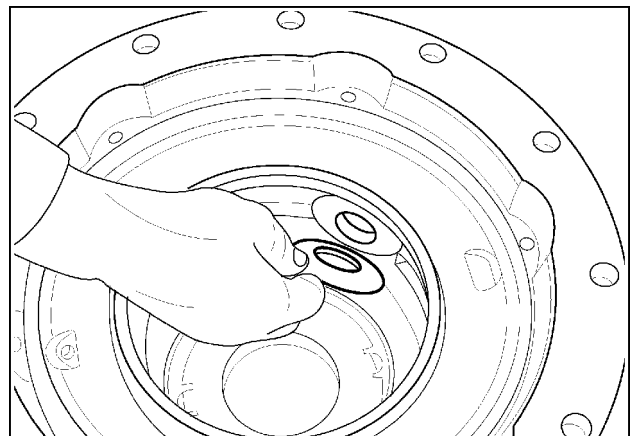
Differential case assembly procedures

22. Lubricate the thrust washer for the case with clean assembly grease. Position the thrust washer tab side down in the bottom of the case.



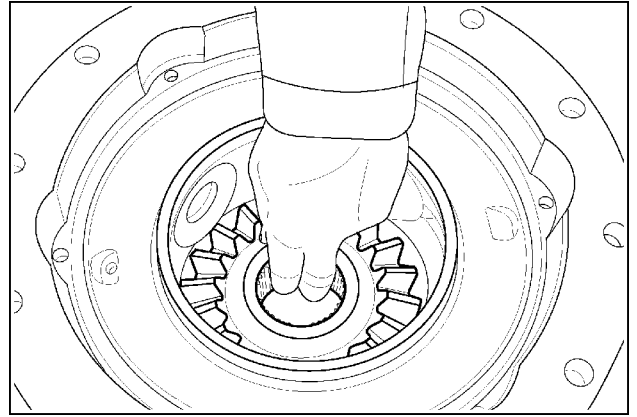
RCPH10FWD017ABJ 23

23. Lubricate each spider gear thrust washer with clean assembly grease. Install each spider gear thrust washer (tab outward) to engage the slot in the case and centered to the hole.



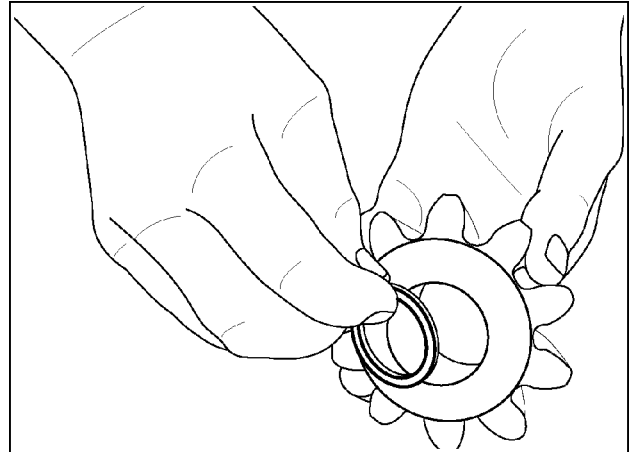
RCPH10FWD016ABJ 24

24. Install the side gear into the bore in the bottom of the case.



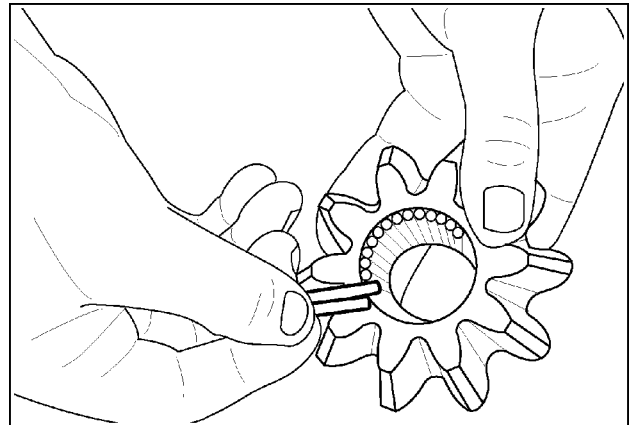
RCPH10FWD037ABJ 25

25. Lubricate the needle bearing slave ring with clean assembly grease. Install the slave ring into the bore of the spider gear.



RCPH10FWD038ABJ 26

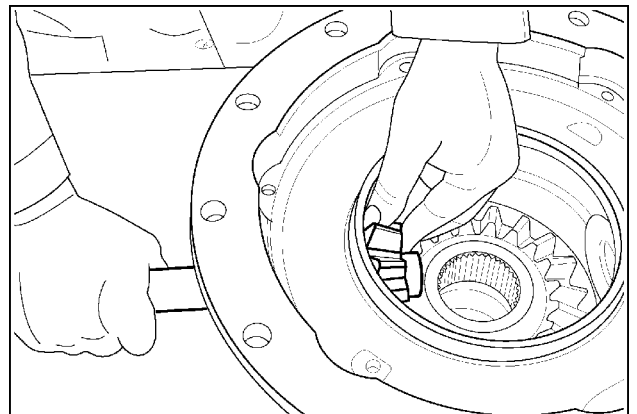
26. Using the slave ring as a needle roller bearing support, use clean assembly grease to install a full complement of 28 needle roller bearings into each spider gear.



RCPH10FWD039ABJ 27

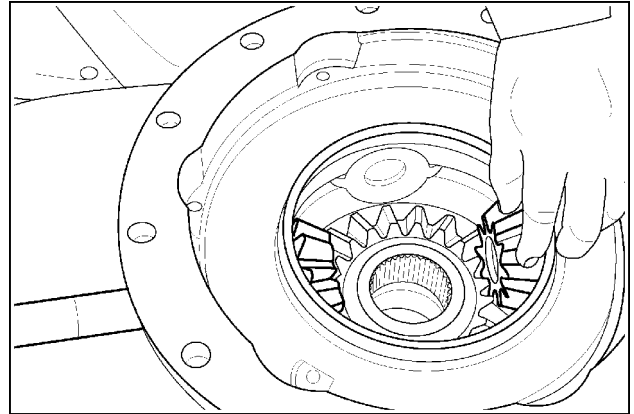
27. Install the first spider gear into the case centered to the hole for the long pin and meshed with the side gear. Push the pin through the case and into the spider gear until the pin is flush with the inner side of the gear.

NOTE: Turn the long pin so that the hole in the center of the pin is horizontal



RCPH10FWD040ABJ 28

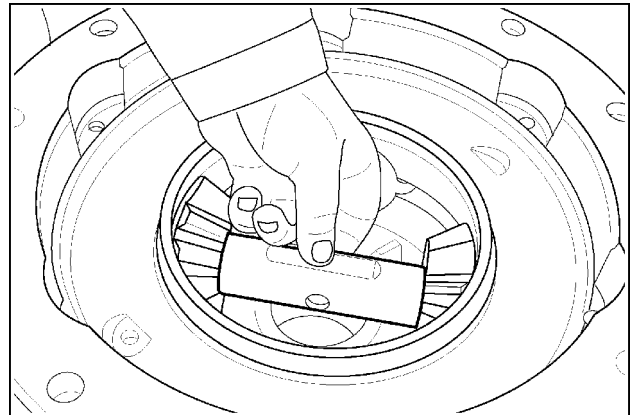
28. Install the opposite side spider gear centered to the case bore and meshed with the side gear.



RCPH10FWD041ABJ 29

29. Install the long spacer sleeve between the two spider gears so that the hole in the center of the sleeve is horizontal. Carefully push the long pin through the spacer sleeve and spider gears until the hole in the pin and spacer sleeve are aligned.

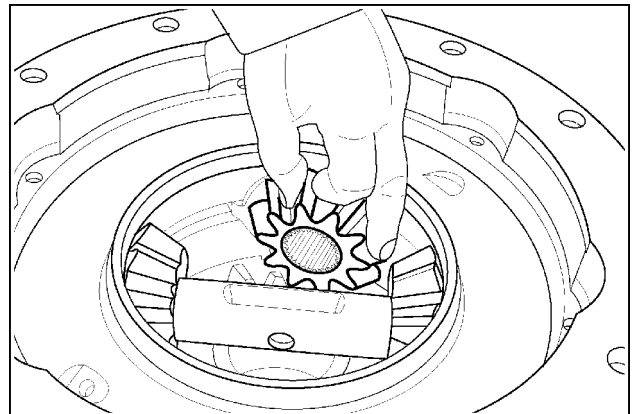
NOTE: Be sure the slave ring and all needle rollers remain in position in each pinion gear. Check the rotation of the pinion gears and bottom side gear. Rotation of the gears must be smooth without lockup.



RCPH10FWD042ABJ 30

30. Install the pinion gears for the short pins into the case in the same manner.

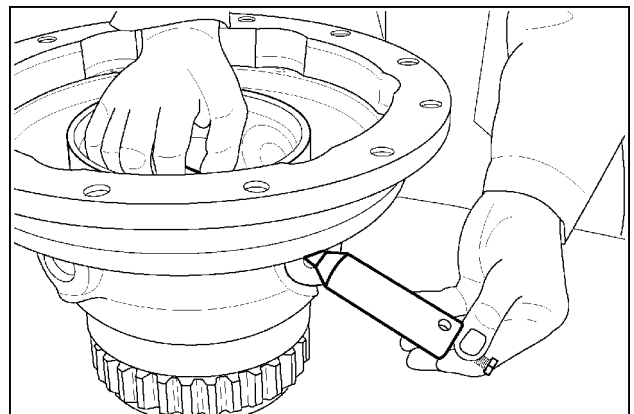
NOTE: The slave ring for each spider gear must be installed on the beveled side of the gear.



RCPH10FWD013ABJ 31

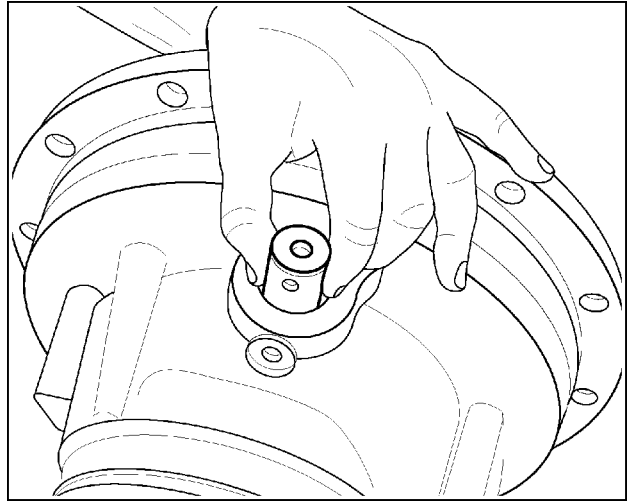
31. Position a short spacer sleeve between the pinion gear and long spacer sleeve. Carefully install the pinion pin and short spacer to engage the hole in the long pin and spacer.

NOTE: The large outside diameter of the spacer sleeve must mate against the ends of the needle rollers. Be sure all needle rollers remained in the gear.



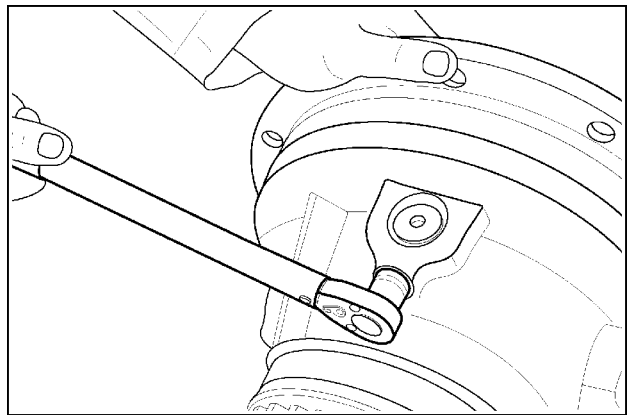
RCPH10FWD012ABJ 32

32. Align the hole in the end of the short pinion pin with the threaded hole in the case. Repeat this procedure for the opposite short pinion shaft.



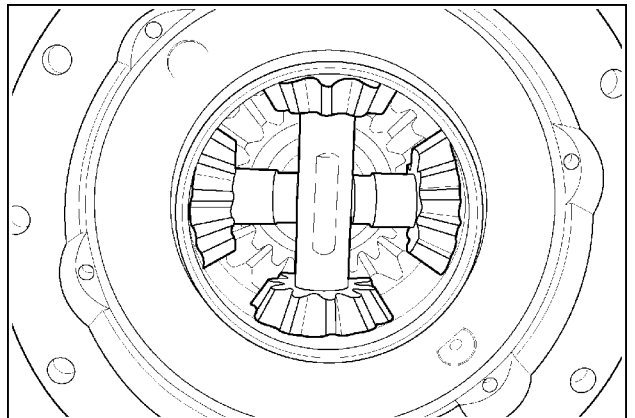
RCPH10FWD043ABJ 33

33. Install the pinion pin retainer bolts. Tighten each bolt to specifications.



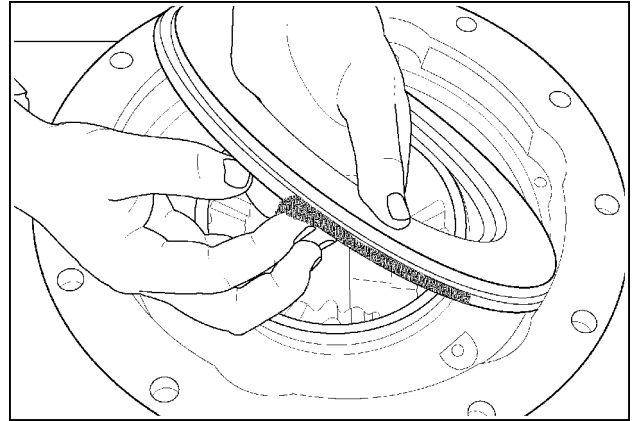
RCPH10FWD011ABJ 34

34. After all the pinion gears and pins have been installed, check the rotation of the differential gears. There must be no lockup during rotation.



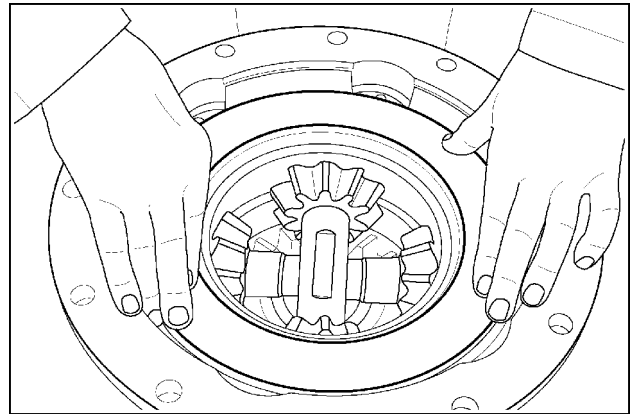
RCPH10FWD044ABJ 35

35. Lubricate the seals of a new piston with clean assembly grease.



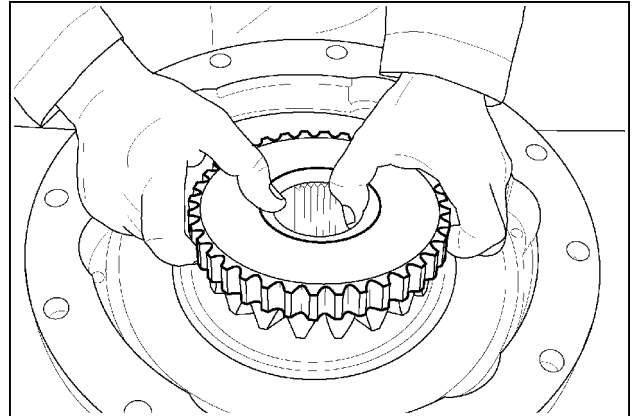
RCPH10FWD045ABJ 36

36. Hand seat the differential lock piston into the bore of the case.



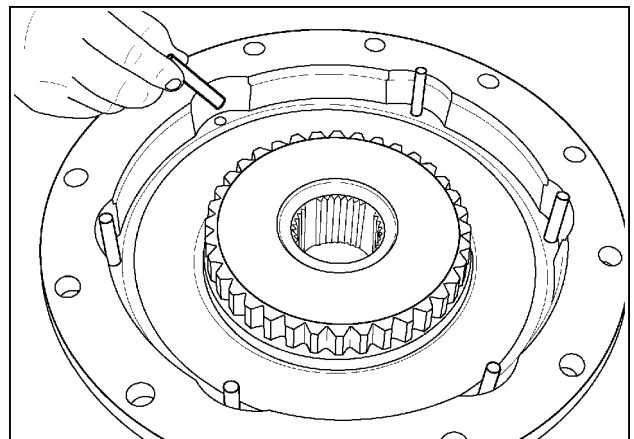
RCPH10FWD046ABJ 37

37. Install the splined side gear on top of the pinion gears so that all gears are in mesh.



RCPH10FWD047ABJ 38

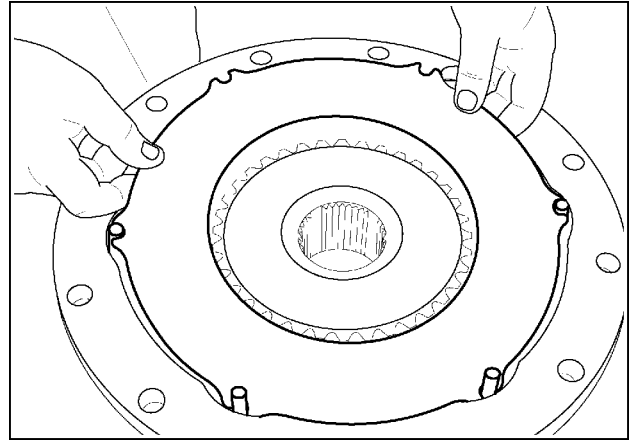
38. Install the six anti-rotation dowel pins into the holes in the case.



RCPH10FWD048ABJ 39

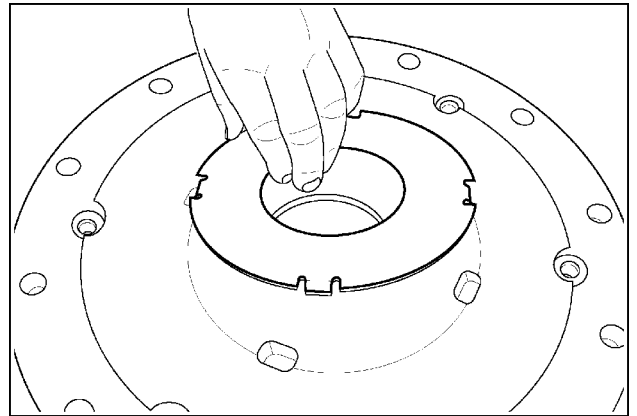
39. Starting with a steel separator plate, alternately install 4 separator plates and 3 friction plates. Be sure the slots in the ears of the separator plates engage the dowel pins.

NOTE: Soak the friction plates in clean operating fluid before installation.



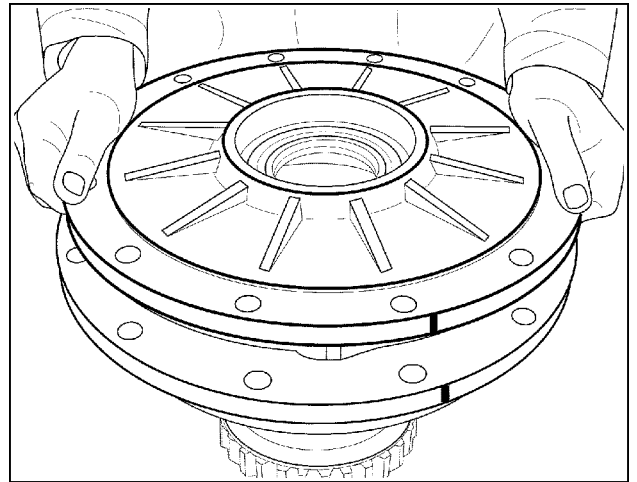
RCPH10FWD049ABJ 40

40. Lubricate the large thrust washer with clean assembly grease. Install the thrust washer into the cover (tab side down).



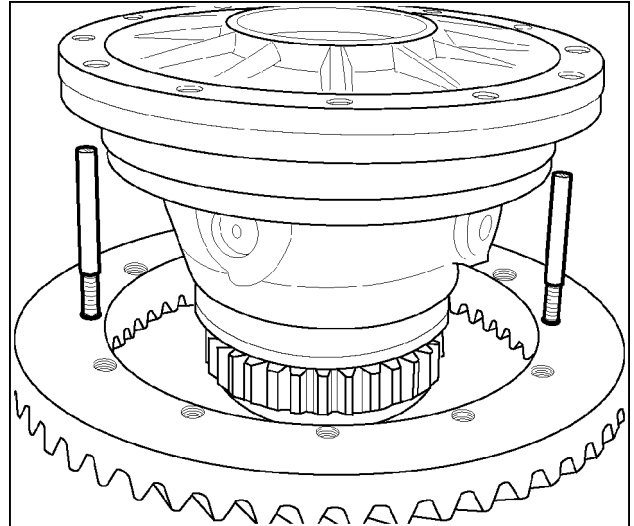
RCPH10FWD006ABJ 41

41. Install the cover on top of the case so that the match marks align.



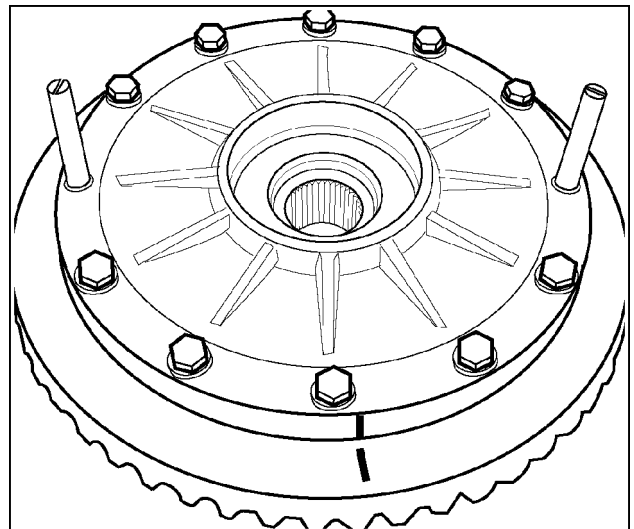
RCPH10FWD005ABJ 42

42. Put a light coat of oil around the inside diameter of the ring gear. Install two of the **CAS2496** alignment studs into opposite holes of the ring gear. Position the differential case over the ring gear.



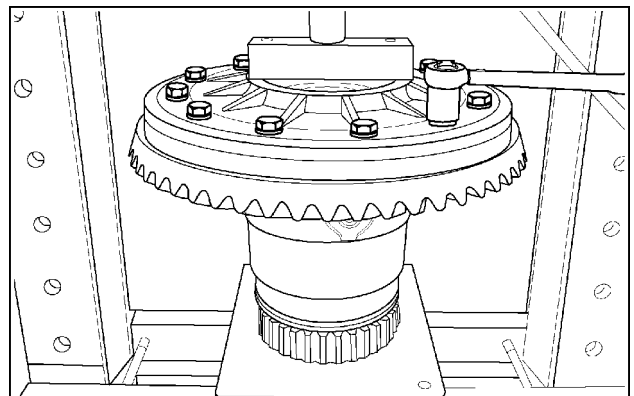
RCPH10FWD050ABJ 43

43. Position the ring gear on the differential case so the match marks align. Install new retaining bolts and washers.



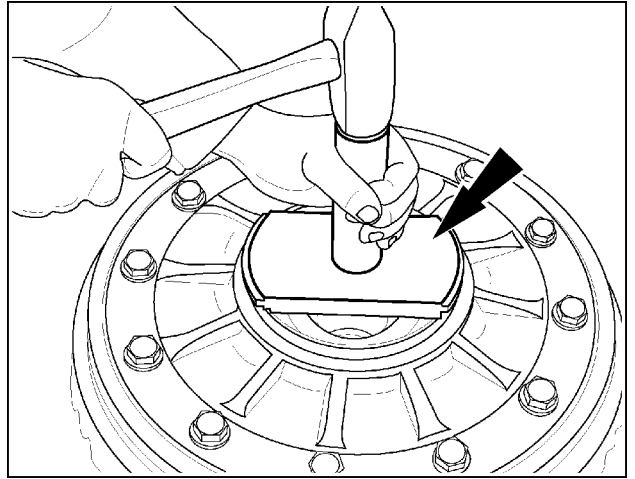
RCPH10FWD051ABJ 44

44. Clamp the differential assembly in a press. Tighten the retaining bolts alternately and evenly in small increments in a star pattern to **297 – 325 N·m (219 – 240 lb ft)**.



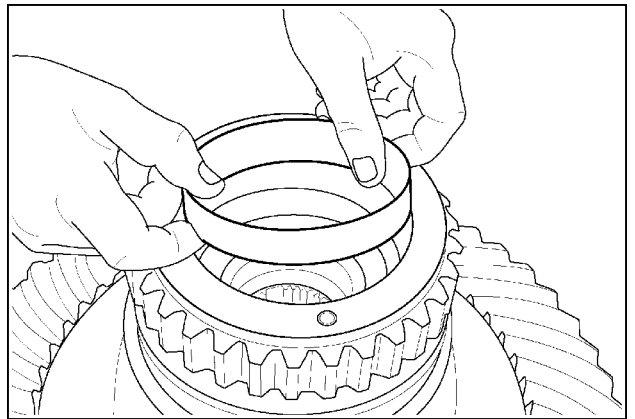
RCPH10FWD052ABJ 45

45. Use an appropriate bearing cup Installer to install the bearing cup into the cover until fully seated.



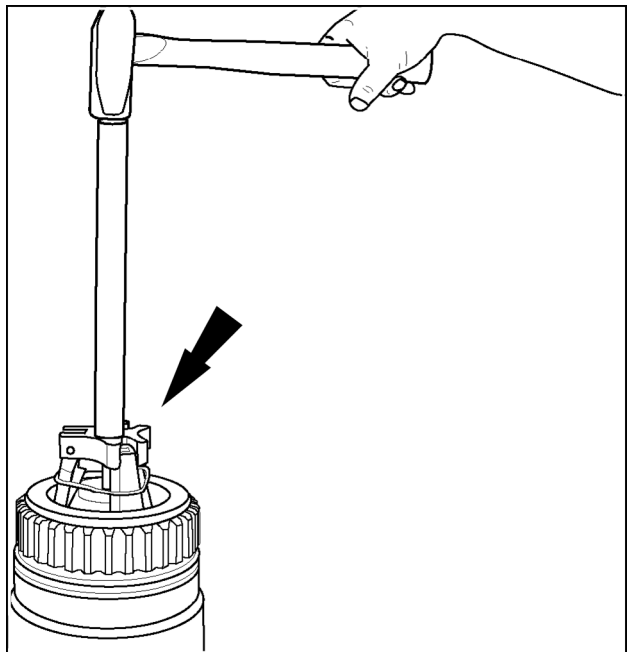
RCPH10FWD053ABJ 46

46. Position the bearing cup into the bore of the right hand case.



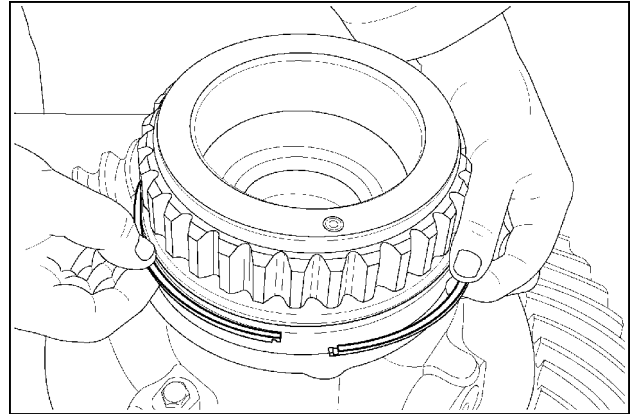
RCPH10FWD054ABJ 47

47. Use a universal bearing cup installer to install the bearing cup until seated.



RCPH10FWD055ABJ 48

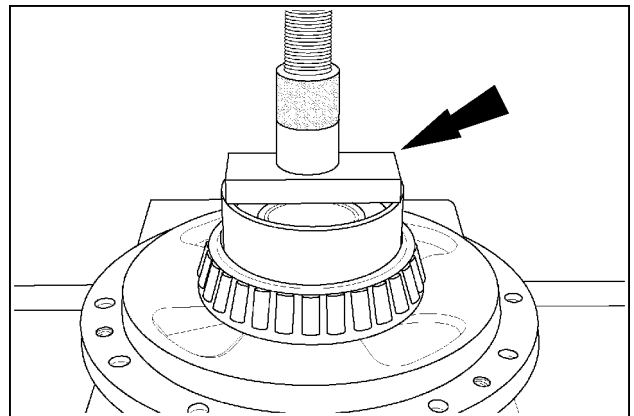
48. Install the Teflon seal ring in the groove of the hub. Lubricate the groove and the seal ring liberally with clean assembly grease. Be sure the ends of the seal ring are connected together.



RCPH10FWD002ABJ 49

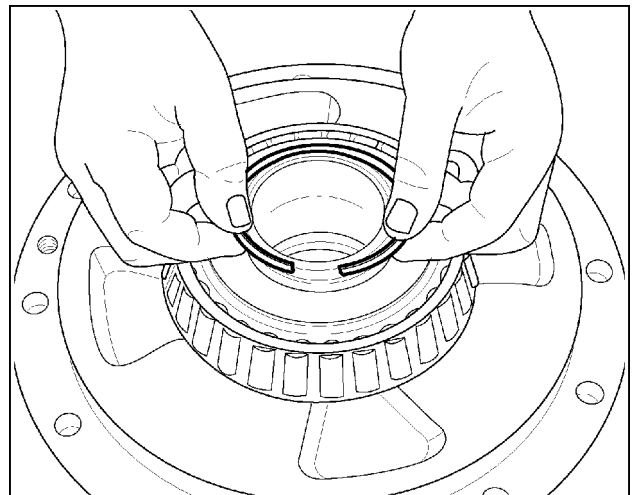
Left hand differential bearing support assembly

49. Use the **CAS2516** bearing installer and press to install the bearing cone until seated.



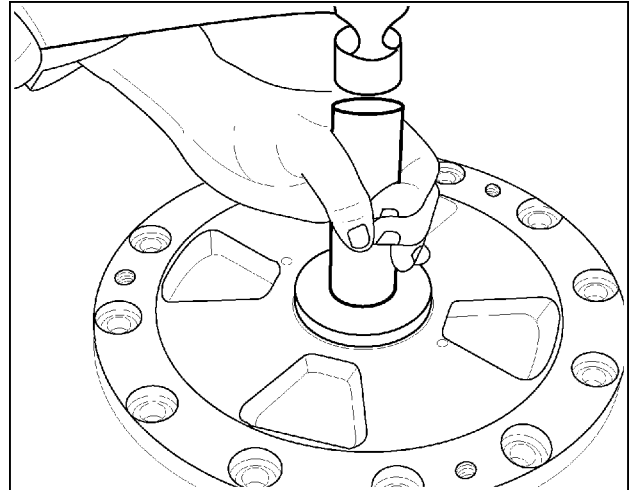
RCPH10FWD126ABJ 50

50. Lubricate and install a new seal ring in the groove of the bearing hub.



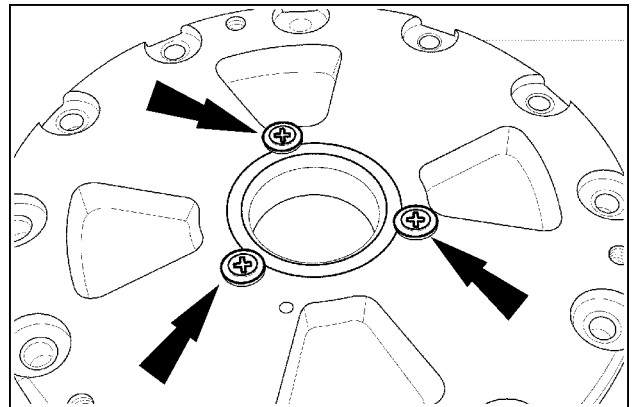
RCPH10FWD021ABJ 51

51. Use a seal driver to install a new oil seal into the bearing carrier.



RCPH10FWD095ABJ 52

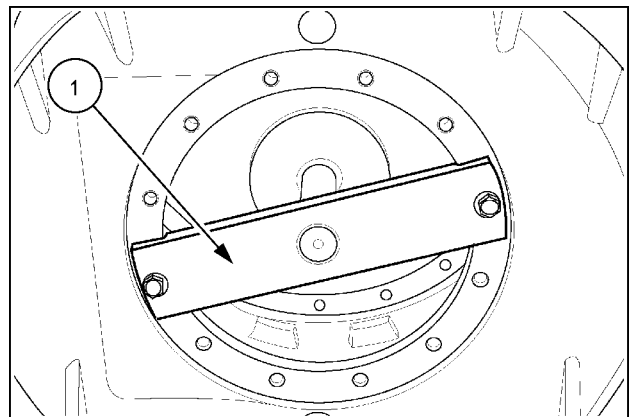
52. Install the 3 seal retainer bolts and washers. Apply thread sealant on the bolt threads.



RCPH10FWD234ABJ 53

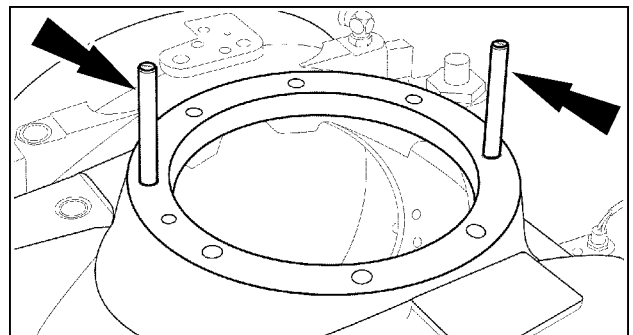
Adjusting bevel pinion gear depth

53. Install the **CAS2506** pinion depth gauge arbor into the bore for the left hand bearing support. Use two of the bearing support retaining bolts and washers. Tighten the bolts to a torque of **47 – 54 N·m (35 – 40 lb ft)**.



RCPH10FWD096ABJ 54

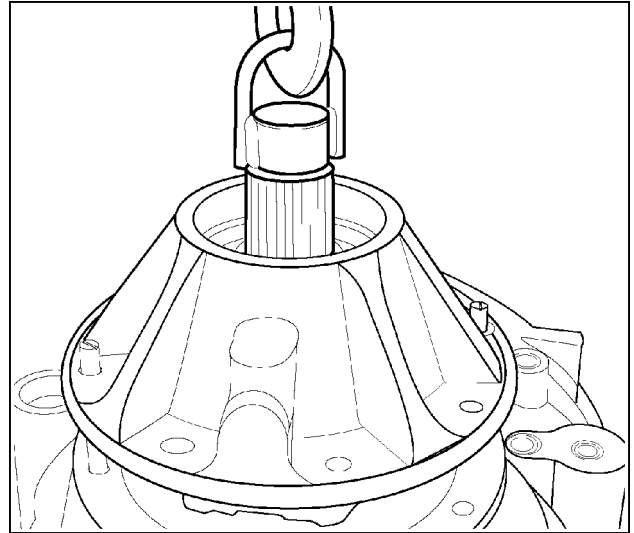
54. Install two of the **CAS2496** alignment studs opposite each other into the mounting flange.



RCPH10FWD235ABJ 55

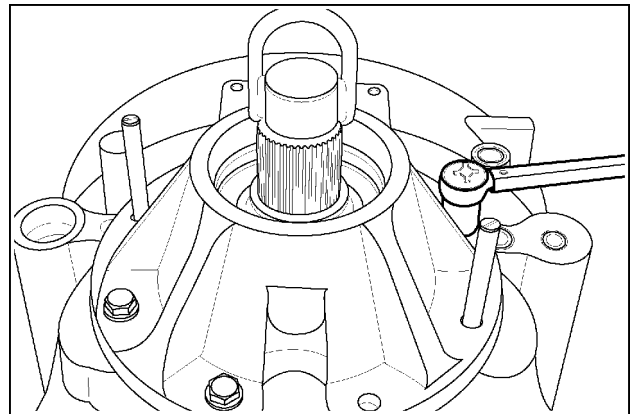
55. Use a lifting eye to install the pinion carrier assembly into the housing.

NOTE: Do not install the shims at this time.



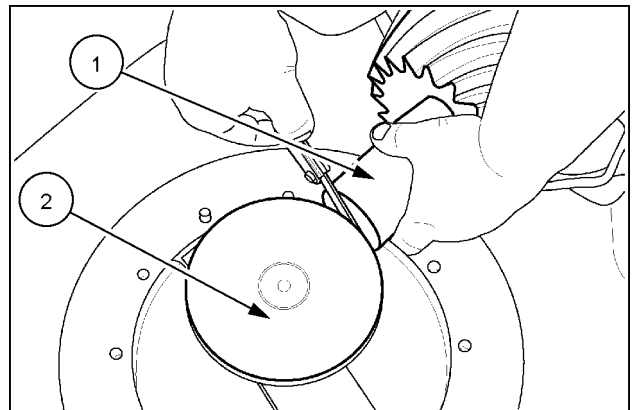
RCPH10FWD081ABJ 56

56. Install four equally spaced carrier assembly retaining bolts and washers. Tighten the bolts to specifications.



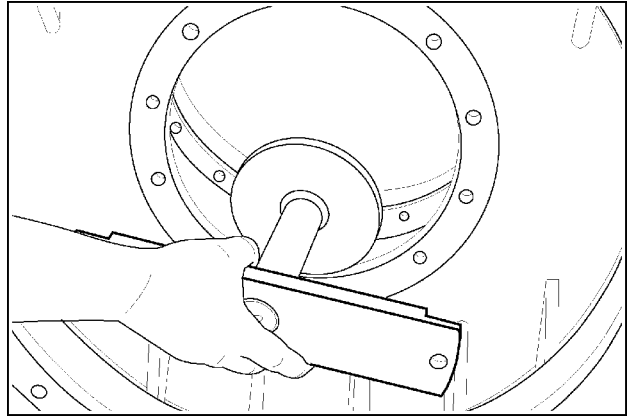
RCPH10FWD098ABJ 57

57. Install a gauge block (1) between the pinion and arbor (2) with the hole end of the gauge block held tightly against the end of the pinion. Use a feeler gauge to measure and record the distance between the end of the gauge block and arbor.



RCPH10FWD099ABJ 58

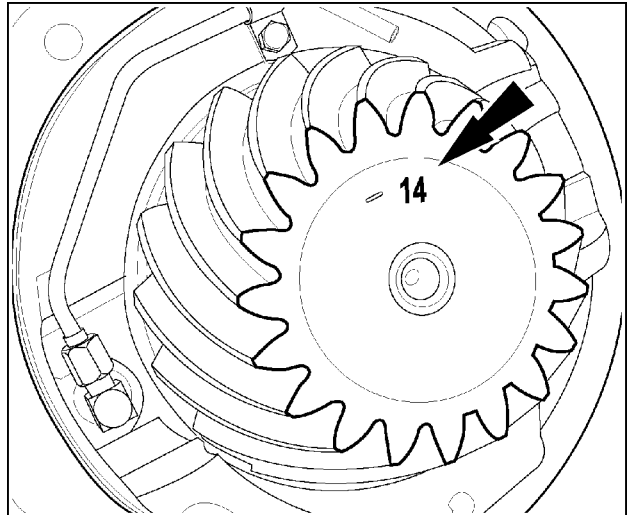
58. Remove the pinion carrier retaining bolts and lift the pinion carrier assembly from the housing. Remove the **CAS2506** arbor.



RCPH10FWD100ABJ 59

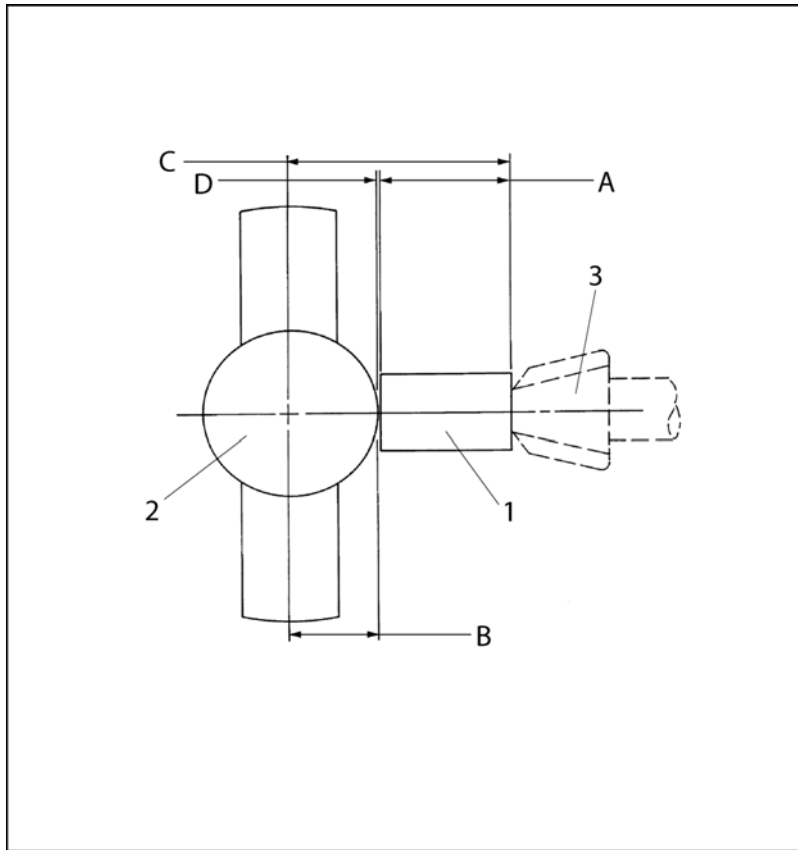
59. A correction factor number is etched onto the head end of the pinion. This number will be shown as a plus or minus adjustment in hundredths of a millimeter. Add or subtract this number from the standard nominal pinion depth dimension.

NOTE: The standard nominal mounting distance for the bevel pinion gear is **175.22 mm (6.90 in)** measured from the head end of the pinion gear to the center line of the differential.



RCPH10FWD101ABJ 60

60. Use the following table and example to calculate the pinion depth shim requirements



RCPH10FWD120FBJ 61

(1) CAS2506 pinion depth gauge arbor, (2) pinion depth gauge block, (3) pinion

Item	Metric value	U.S. value
A	97.99 mm	3.858 in
B	75.82 mm	2.985 in
C	174.25 mm	6.860 in
D	.44 mm	0.017 in
Gap measurement		

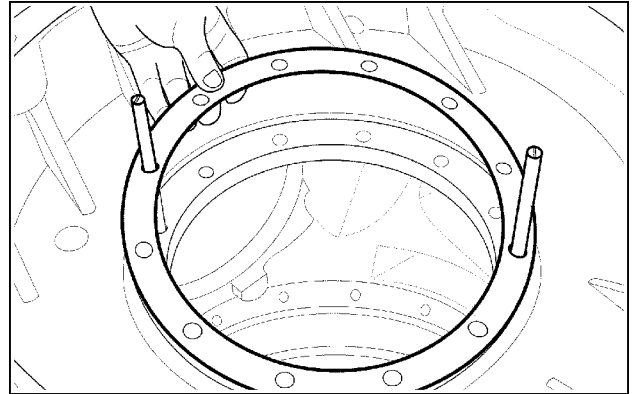
Example:

Item	Metric value	U.S. value
Tool constant dimension (A = B)	173.81 mm	6.840 in
Gap measurement (D)	.44 mm	0.017 in
Total measured distance (A + B + D = C)	174.25 mm	6.860 in
Standard nominal pinion depth	175.22 mm	6.9 in
Reading on the pinion	-0.14 mm	0.005 in
Actual nominal pinion depth	175.08 mm	6.892 in
Minus total measured distance	174.25 mm	6.860 in
Shim requirement	0.83 mm	0.032 in

61. Select a shim combination that will provide the shim requirement calculated in Step 60 within **0.03 mm (0.001 in)**.

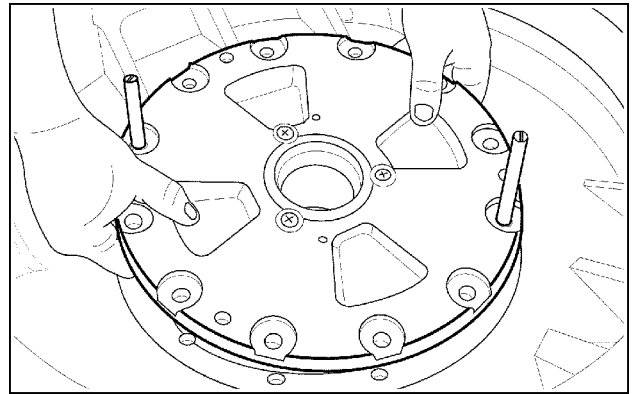
Setting differential carrier bearing preload

62. Install two **CAS2675** guide bolts into opposite holes of the left hand side bearing carrier bore. Install the original bearing preload shim pack over the guide bolts so that all holes align.



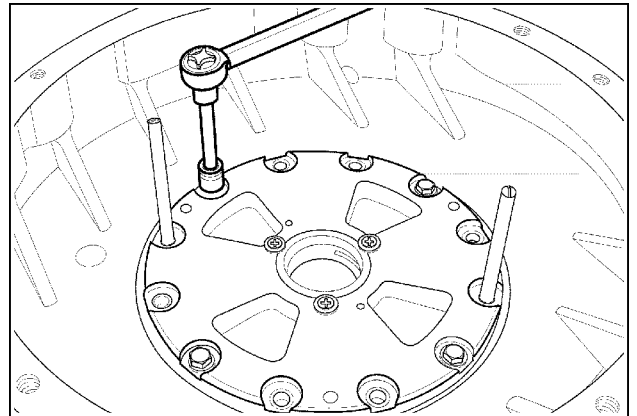
RCPH10FWD236ABJ 62

63. Install the pre-assembled left hand side bearing carrier into the housing.



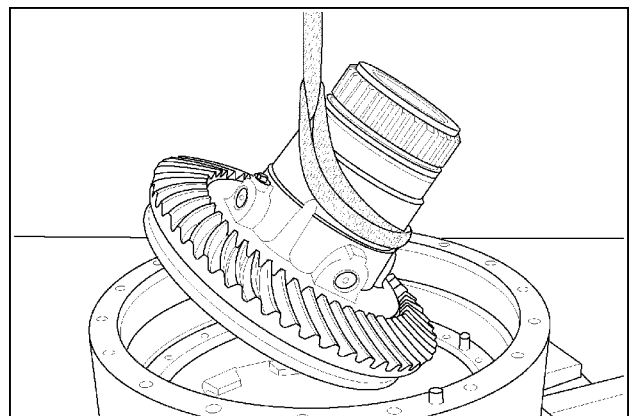
RCPH10FWD237ABJ 63

64. Remove the guide studs and install four equally spaced retaining bolts with washers. Tighten the bolts to specifications.



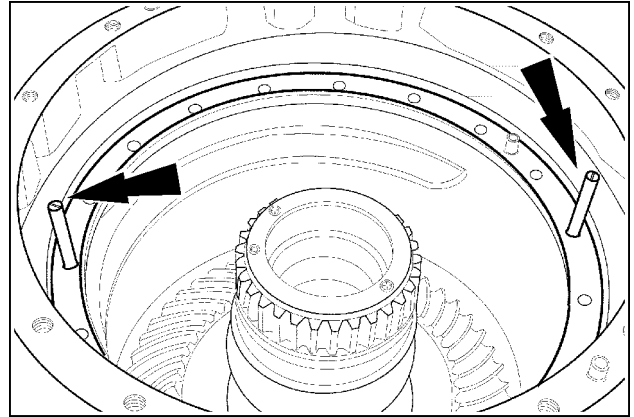
RCPH10FWD238ABJ 64

65. Rotate the differential housing so the right hand side is up. Use a hoist to slowly and carefully install the differential assembly into the housing to engage the left hand side bearing support.



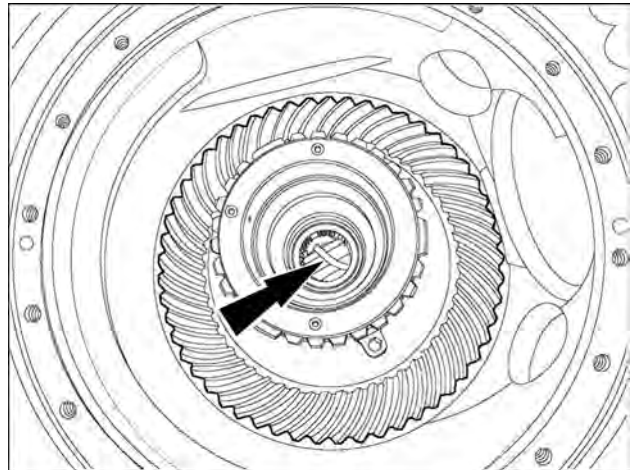
RCPH10FWD107ABJ 65

66. Install two **CAS2675** alignment studs into opposite holes of the housing.

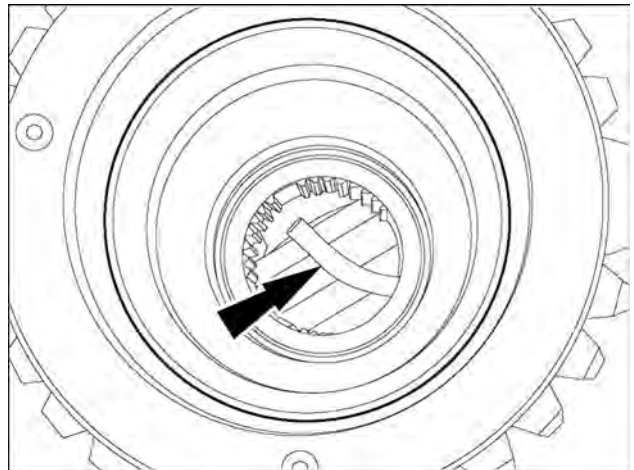


RCPH10FWD239ABJ 66

67. Install the dealer fabricated pin into pinion gears to stop pinion from rotating while shimming the differential carrier to housing bearings. Install with the long end of the pin, down, between the gears.

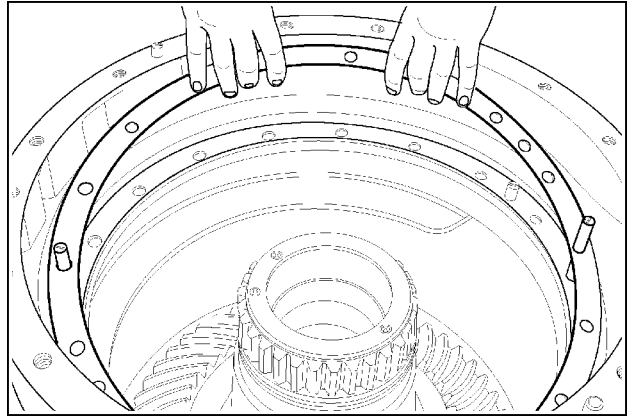


RCPH11FWD368BAC 67



RCPH11FWD369BAC 68

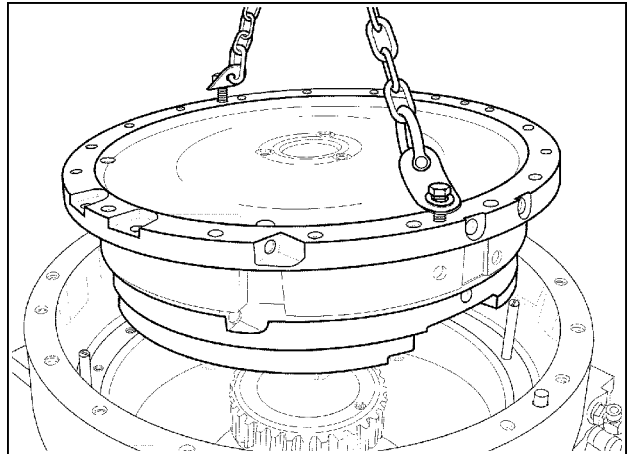
68. Install the original shim pack for the brake carrier and bearing support over the alignment studs so that all holes align.



RCPH10FWD210ABJ 69

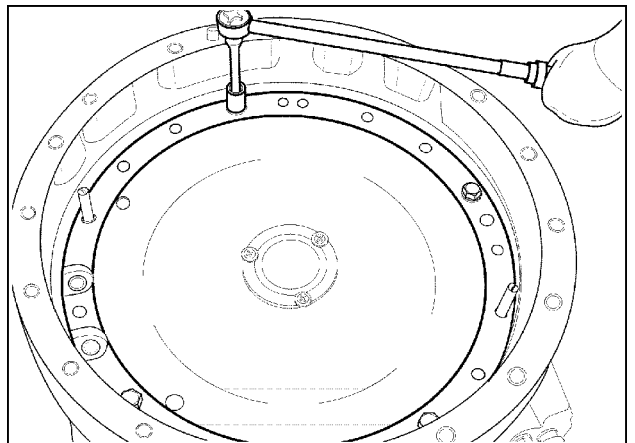
69. Use a hoist to carefully install the brake carrier into the housing so that the marks put on during disassembly, align.

NOTE: The brake discs and seals are not installed in the brake carrier during the bearing preload procedures.



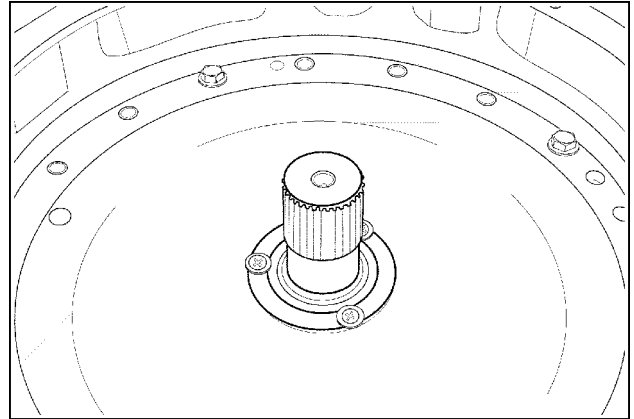
RCPH10FWD209ABJ 70

70. Install four of the carrier retaining bolts with washers 90 degrees from each other. Tighten the bolts evenly to specifications.



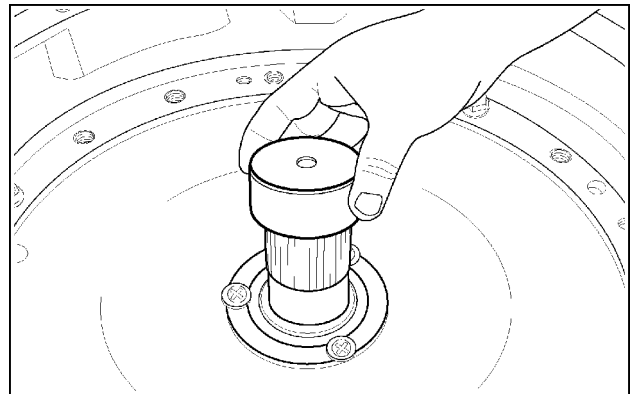
RCPH10FWD240ABJ 71

71. Install the right hand axle stub shaft into the differential.



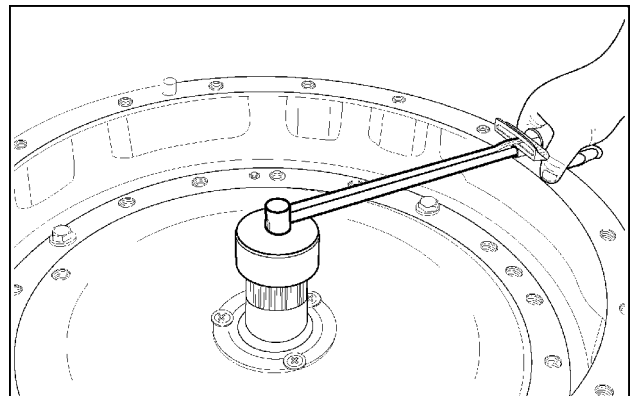
RCPH10FWD241ABJ 72

72. Install the **CAS2508** differential rolling torque adapter over the gear.



RCPH10FWD242ABJ 73

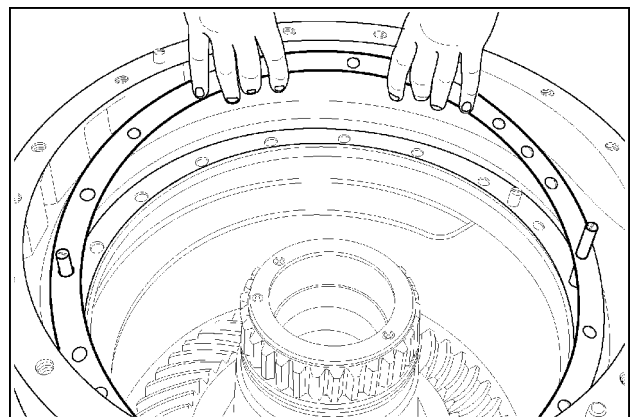
73. Connect a torque wrench to the adapter. Rotate the differential and measure the differential carrier bearing rolling torque. Bearing preload will be correct when **6 – 13 N·m (53 – 115 lb in)** of smooth and consistent rolling torque is measured on the torque wrench.



RCPH10FWD243ABJ 74

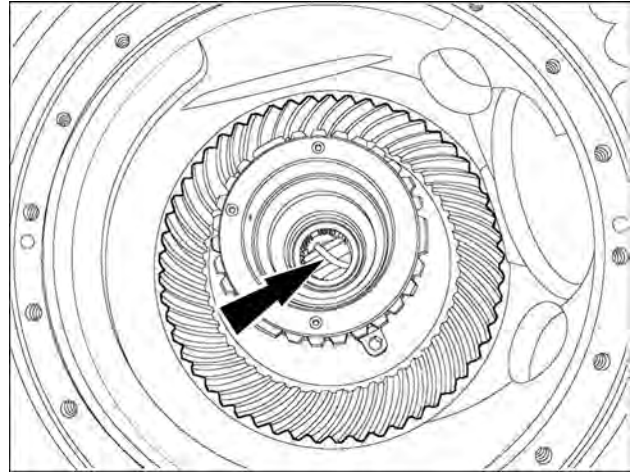
74. If differential bearing preload is out of tolerance, add or remove shims as required from the right hand and/or left hand bearing support shim pack until bearing preload is correct.

NOTE: Adjust used bearings to the low end of the rolling torque specifications.



RCPH10FWD210ABJ 75

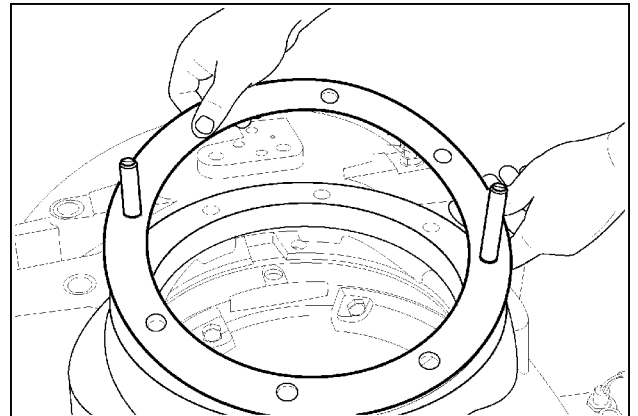
ATTENTION: Differential locking pin **MUST** be removed at this time.



RCPH11FWD368BAC 76

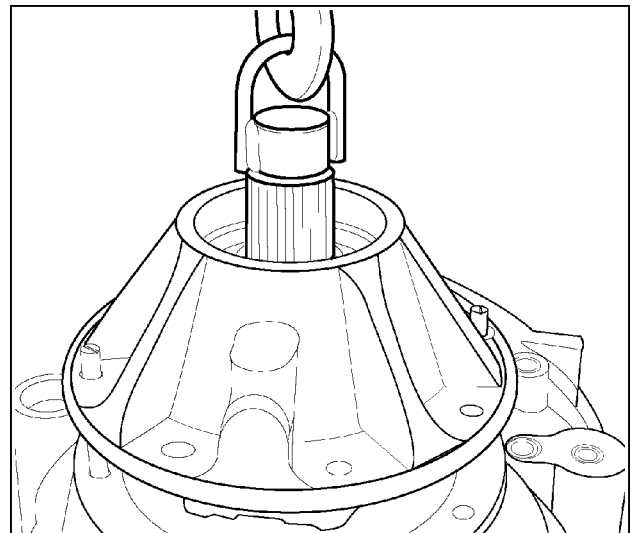
Setting the ring/pinion gear backlash

75. After adjusting differential carrier bearing preload correctly, rotate the housing so the pinion carrier will be on top. Install two **CAS2496** alignment studs opposite each other and install the pinion carrier shim pack calculated in step 60.



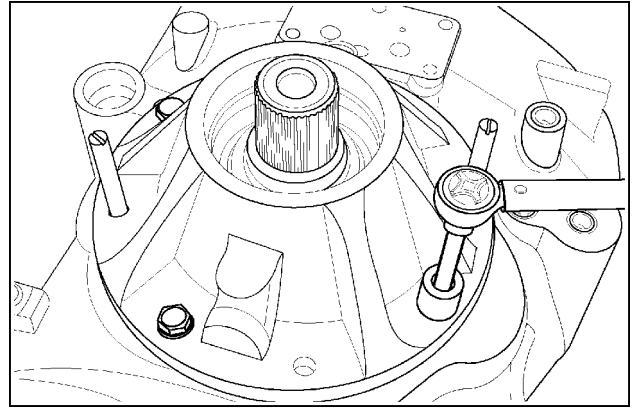
RCPH10FWD244ABJ 77

76. Install the pinion carrier assembly into the housing and remove the lifting eye.



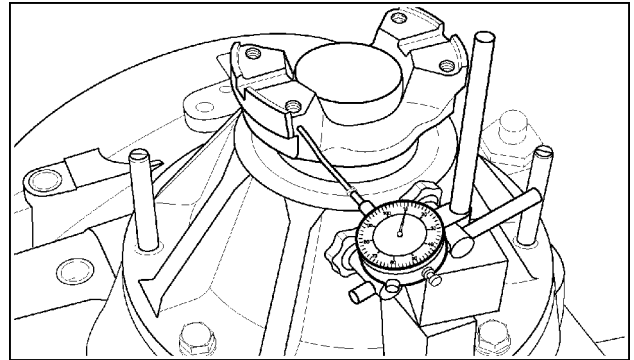
RCPH10FWD245ABJ 78

77. Install four pinion carrier retaining bolts and washers equally spaced. Tighten the four bolts to specifications.



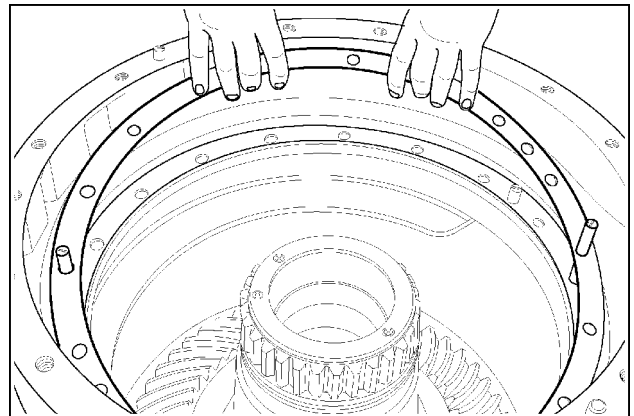
RCPH10FWD114ABJ 79

78. Install the drive yoke on the pinion gear. Use a dial indicator to measure ring/pinion gear backlash. Set the pointer of the dial indicator to contact the outer edge of the drive yoke flange. Rotate the pinion gear in either direction to achieve full contact with the ring gear. Do not move the ring gear. Zero the dial indicator. Rotate the pinion gear in the opposite direction to achieve full contact with the ring gear. Do not move the ring gear. Record the dial indicator reading. Perform this operation two or three times to ensure an accurate measurement. The backlash must be **0.2 – 0.3 mm (0.008 – 0.012 in)**.



RCPH10FWD246ABJ 80

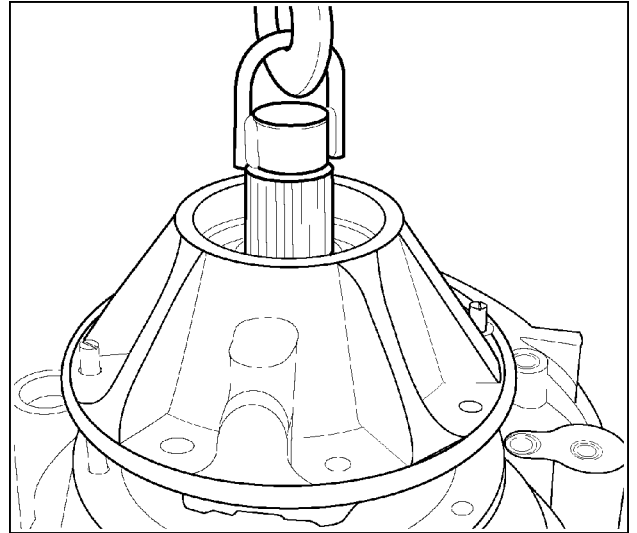
79. If too much backlash was measured, the ring gear must be moved closer to the pinion gear. If too little backlash was measured, the ring gear must be moved away from the pinion gear. To adjust the ring and pinion gear backlash, remove shims from one side of the differential and add the same amount to the other side so that differential carrier bearing preload is maintained. Moving a **0.254 mm (0.010 in)** shim from one side to the other will change the backlash approximately **0.169 mm (0.007 in)**.



RCPH10FWD210ABJ 81

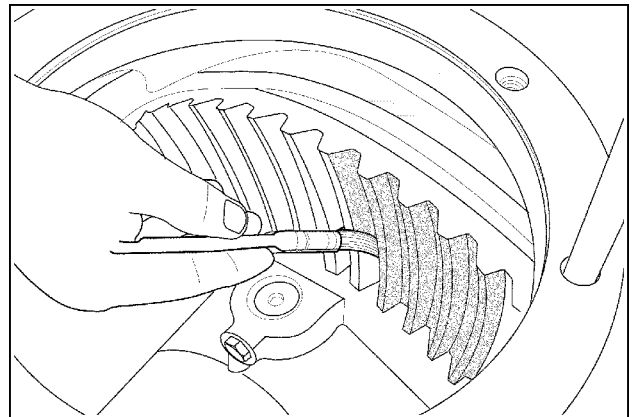
Checking for correct bevel pinion/gear tooth contact

80. After differential bearing preload and ring/pinion gear backlash adjustments have been completed, remove the pinion carrier.



RCPH10FWD081ABJ 82

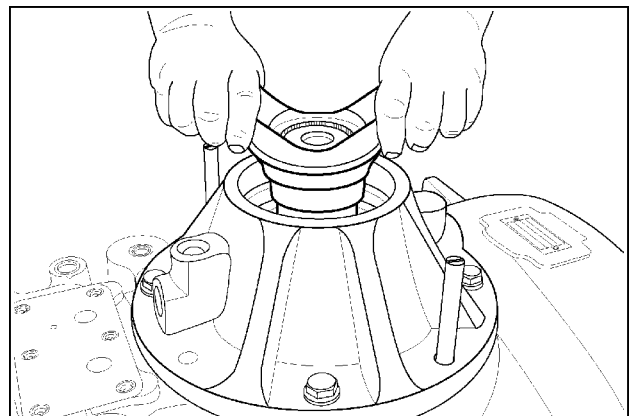
81. Put Prussian Blue or red lead on both sides of several ring gear teeth.



RCPH10FWD116ABJ 83

82. Reinstall the pinion gear carrier and tighten the retaining bolts to the specified torque. Turn the pinion several revolutions in both directions to determine the tooth contact pattern. Remove the pinion carrier.

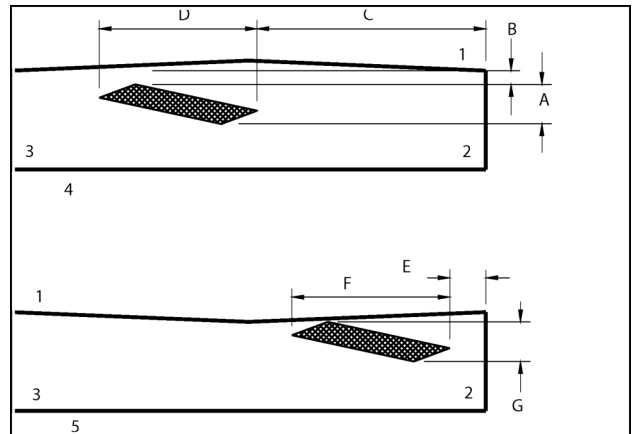
NOTE: See the contact patterns in the following illustrations. The contact pattern of the gear teeth that are shown are approximate shapes. Tooth contact pattern can change from the illustrations.



RCPH10FWD117ABJ 84

Inspect the contact pattern of the gear teeth. Compare the contact pattern with the following illustrations and tables, for both the right hand (rear) and the left hand (front) pinion sets, and determine the correct tooth contact pattern.

Right Hand (rear) Pinion Set Contact Pattern:



RCPH10FWD121FBJ 85

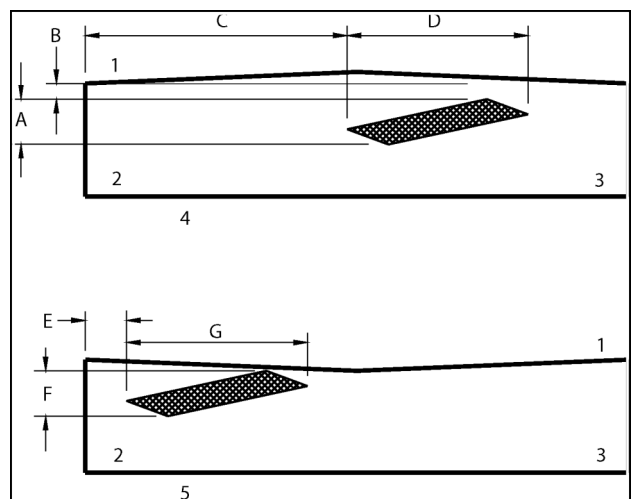
Correct tooth contact pattern: right hand (rear) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	6 – 9 mm	0.236 – 0.354 in
B	3 – 5 mm	0.118 – 0.197 in
C	30 – 35 mm	1.181 – 1.378 in
D	35 – 40 mm	1.378 – 1.575 in
E	10 – 15 mm	0.394 – 0.591 in
F	35 – 40 mm	1.378 – 1.575 in
G	6 – 8 mm	0.236 – 0.315 in

Left hand (front) pinion set contact pattern



RCPH10FWD122FBJ 86

Correct tooth contact pattern: left hand (front) pinion set

Item	Description
1	Gear top
2	Gear toe
3	Gear heel
4	Coast side
5	Drive side

Values

Item	Metric value	U.S. value
A	5 – 8 mm	0.197 – 0.315 in
B	2 – 4 mm	0.079 – 0.157 in
C	30 – 35 mm	1.181 – 1.378 in
D	40 – 45 mm	1.575 – 1.772 in
E	10 – 15 mm	0.394 – 0.591 in
F	6 – 8 mm	0.236 – 0.315 in
G	35 – 40 mm	1.378 – 1.575 in

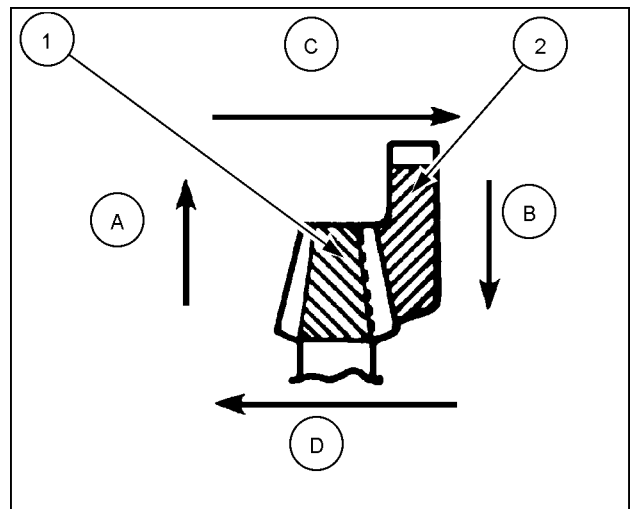
83. Adding or subtracting pinion carrier shims to change pinion depth must be done in small increments until the correct tooth contact pattern is obtained.

(A) Move the drive pinion **(1)** towards the ring gear **(2)** to move the contact pattern away from the Toe.

(B) Move the drive pinion away from the ring gear to move the contact pattern towards the Toe.

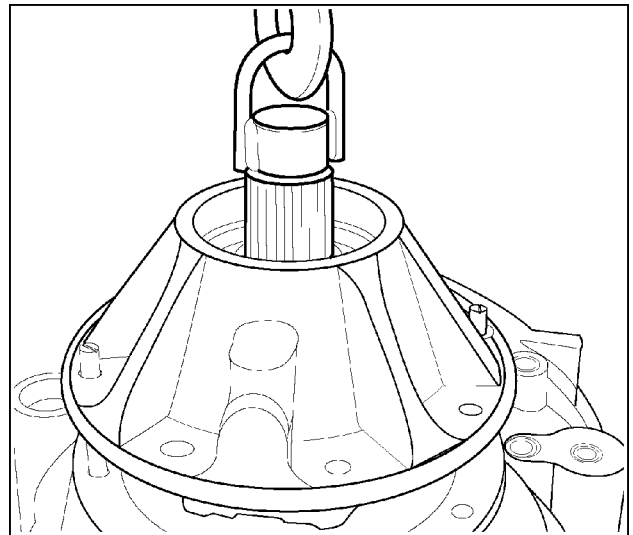
(C) Move the ring gear away from the drive pinion to increase backlash.

(D) Move the ring gear towards the drive pinion to decrease backlash.



RCPH10FWD123FBJ 87

84. Remove the pinion carrier from the housing.

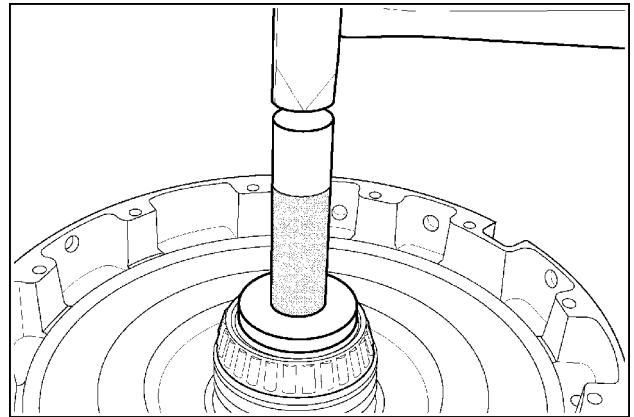


RCPH10FWD081ABJ 88

Right hand brake carrier assembly procedure

85. If removed, install the bearing cone (large side down) on the hub of the carrier. Use an appropriate bearing installer and handle to drive the bearing cone on the hub until seated.

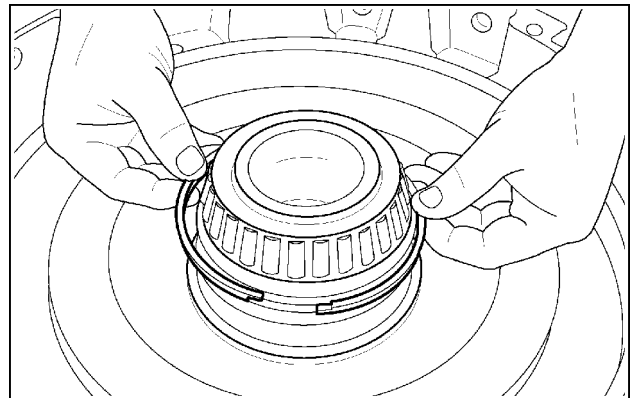
NOTICE: If differential carrier bearing preload, or ring gear and beveled pinion adjustment is required, Do not install the hub seals or brakes at this time. Proceed to step 62. When adjustments are completed or not required, proceed to the next step to complete the brake carrier assembly.



RCPH10FWD247ABJ 89

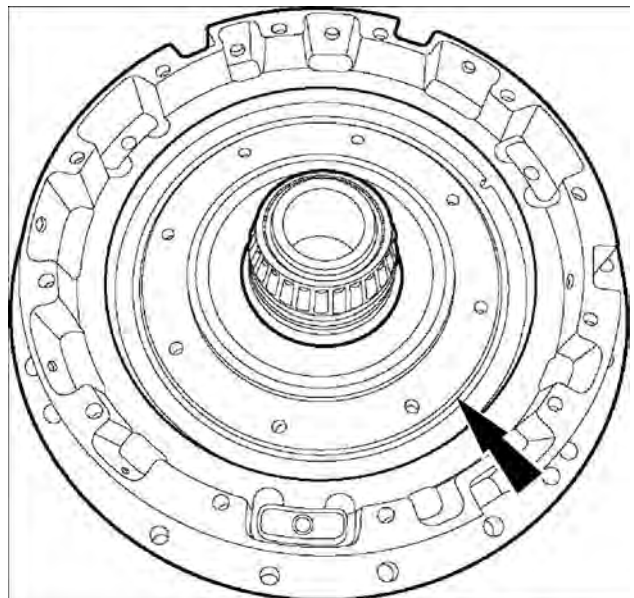
86. Lubricate new hub seal rings liberally with clean grease. Install the two seal rings into the grooves in the hub of the carrier. Be sure the seal ends are lapped together and seals are compressed into the grooves as tightly as possible.

NOTE: Place the ends of each seal ring opposite each other



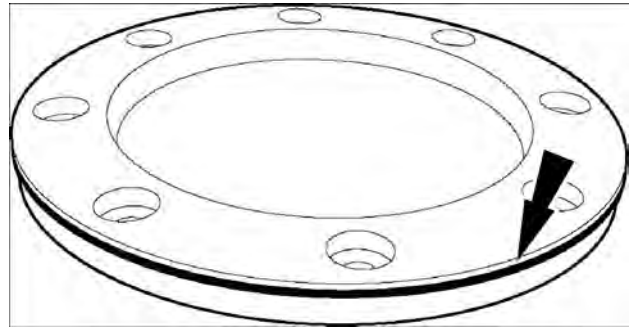
RCPH10FWD248ABJ 90

87. Lubricate a new O-ring for the service brake insert with clean grease. Install the O-ring in the groove in the carrier. Be sure the O-ring is not twisted.



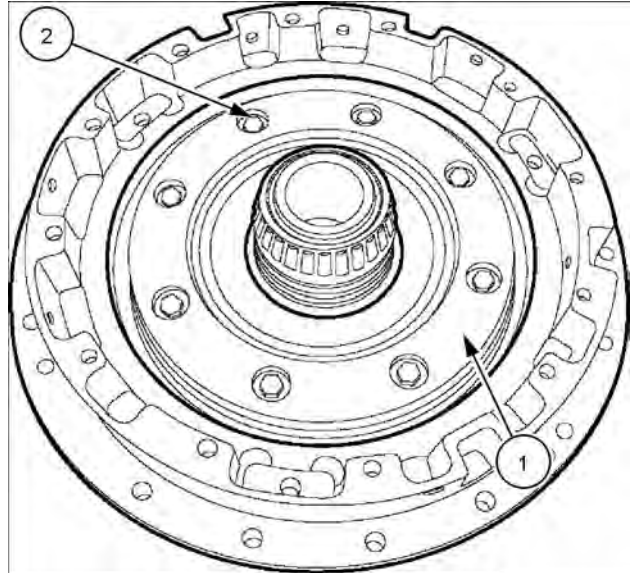
RCPH11FWD335BAC 91

88. Lubricate a new O-ring for the inside diameter of the service brake piston with clean grease. Install the O-ring in the groove of the brake insert. Be sure the O-ring is not twisted.



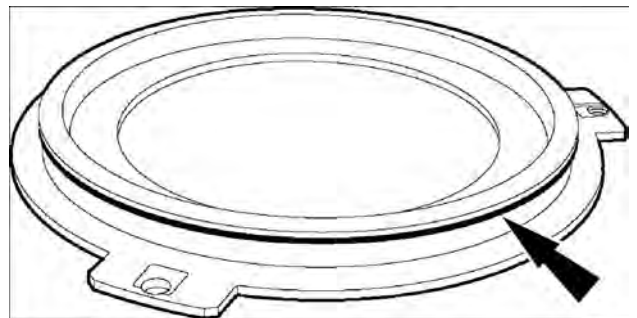
RCPH11FWD336AAC 92

89. Set brake insert into the carrier. Install the eight bolts to secure the brake insert to the carrier. Tighten the bolts to the specified torque.



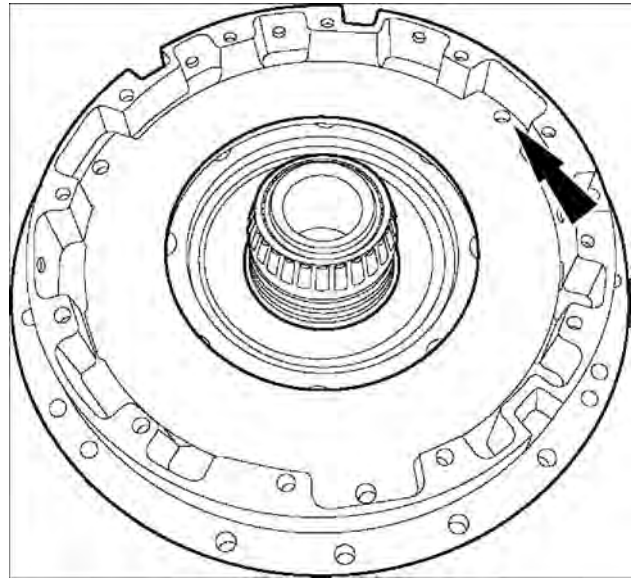
RCPH11FWD337BAC 93

90. Lubricate a new O-ring for the outside diameter of the service brake piston. Install the O-ring in the groove of the piston. Be sure the O-ring is not twisted.



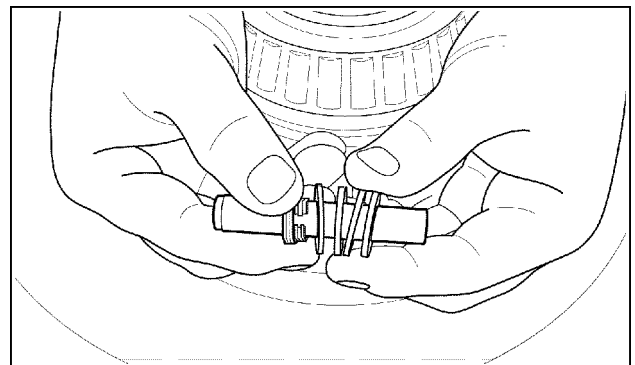
RCPH11FWD338AAC 94

91. Install the service brake piston into the recessed bore of the carrier with the flat side up, aligning the ear tabs with the slots in the support carrier.

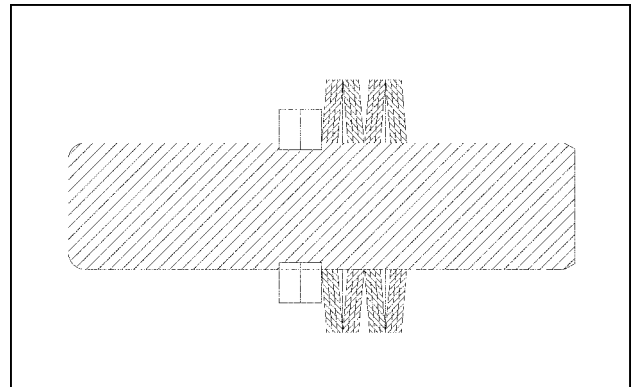


RCPH11FWD339BAC 95

92. Install the belleville spring washers on the brake adjuster pins. Slide 3 nested washers onto each pinup against the snap rings. Slide 3 nested washers on each pin in the opposing direction followed by 3 more nested washers in an opposing direction for a total of 12 belleville spring washers on each pin.

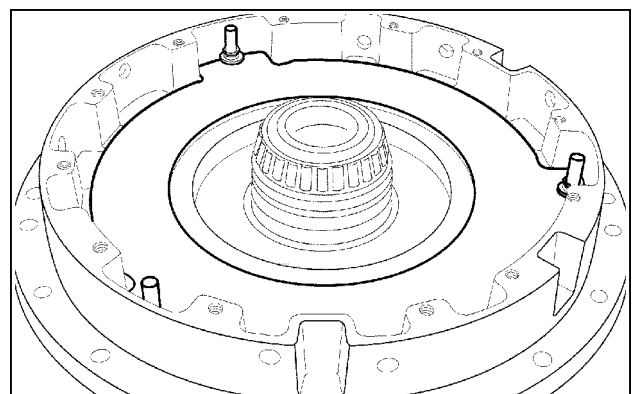


RCPH10FWD251ABJ 96



RCPH10FWD252ABJ 97

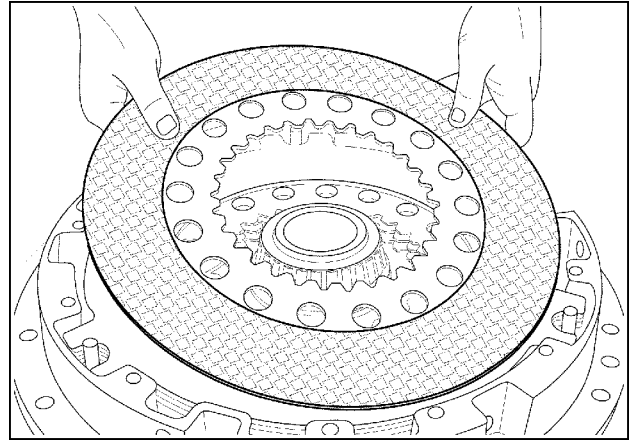
93. Place one pin with washers in each of the holes in the carrier. Be sure the spring washers are seated against the brake return plate and the shorter tapered end of the pin is pointed upwards.



RCPH10FWD253ABJ 98

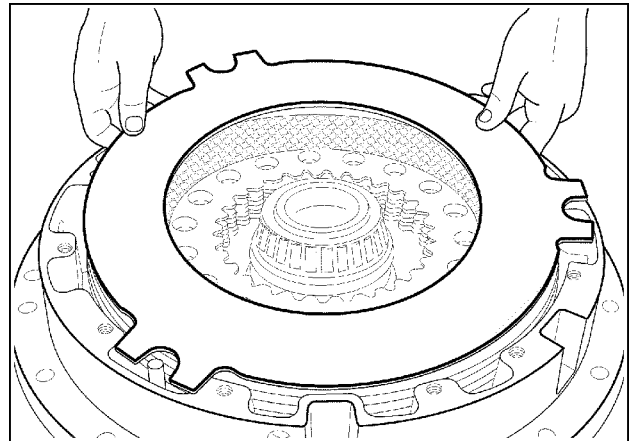
94. Lubricate all friction plates with clean operating fluid.
Install the first friction plate over the brake return plate.

NOTE: Align the friction plate oil cross holes as they are installed.



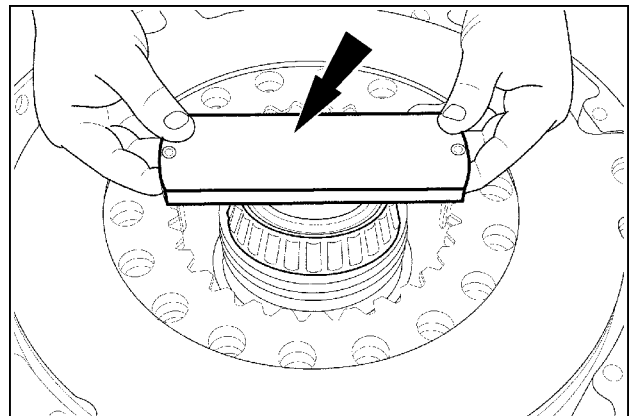
RCPH10FWD254ABJ 99

95. Install a steel separator plate over the first friction plate. Repeat the steps for remaining plates, alternating friction and separator plates.



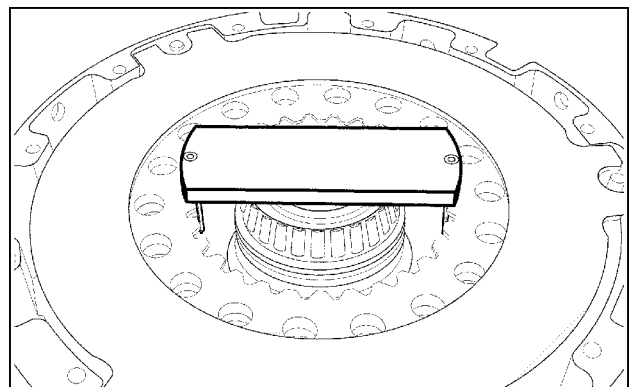
RCPH10FWD255ABJ 100

96. Use the **CAS2505** brake disc alignment tool to align the splines of all brake plates.



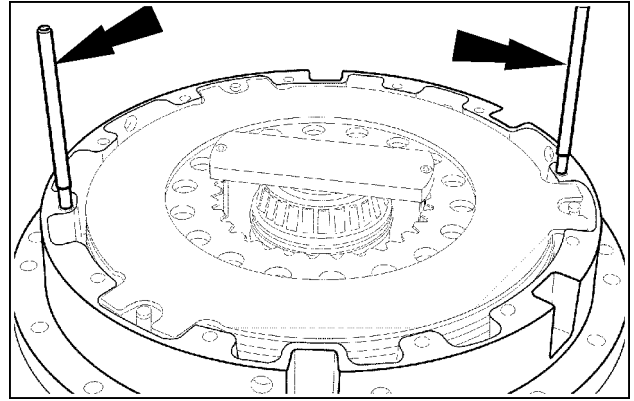
RCPH10FWD256ABJ 101

97. When the brake plates are correctly aligned, the pilot on the bottom of the tool plate must nest in the hub of the carrier as shown.



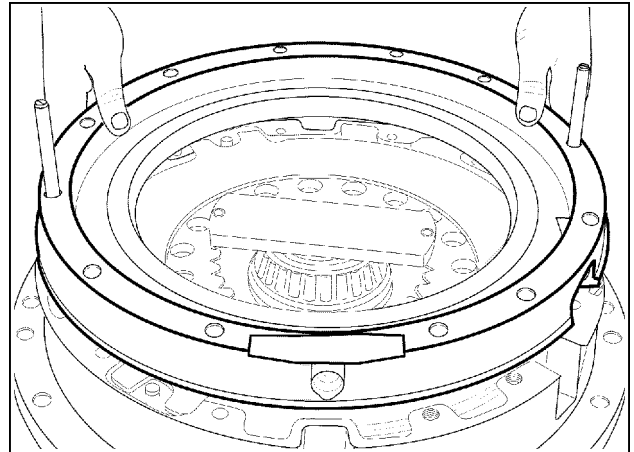
RCPH10FWD257ABJ 102

98. Install the two guide studs into opposite holes of the support carrier.



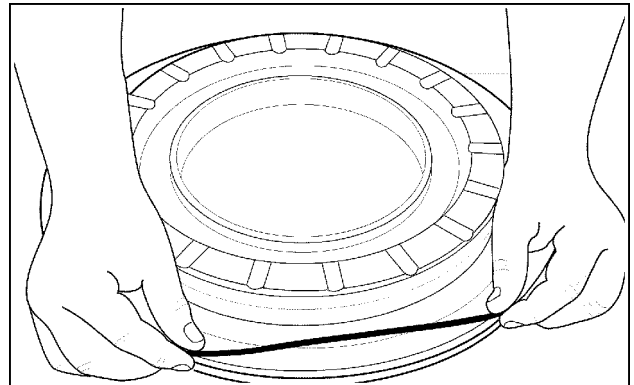
RCPH10FWD258ABJ 103

99. Install the park brake backing plate (recessed side up) over the guide studs so that the assembly match marks align.



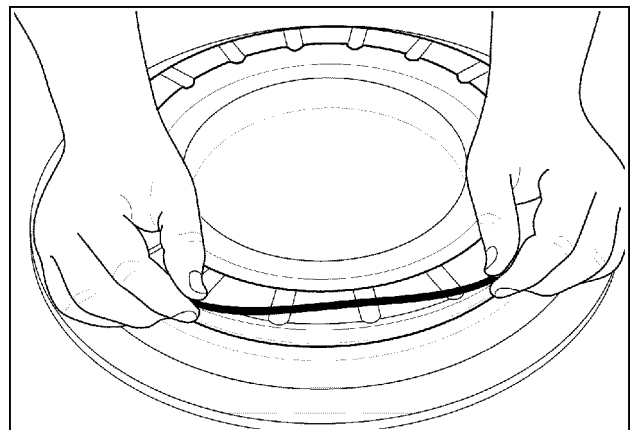
RCPH10FWD259ABJ 104

100. Lubricate and install a new O-ring for the large outside diameter of the park brake piston. Be sure the O-ring is not twisted.



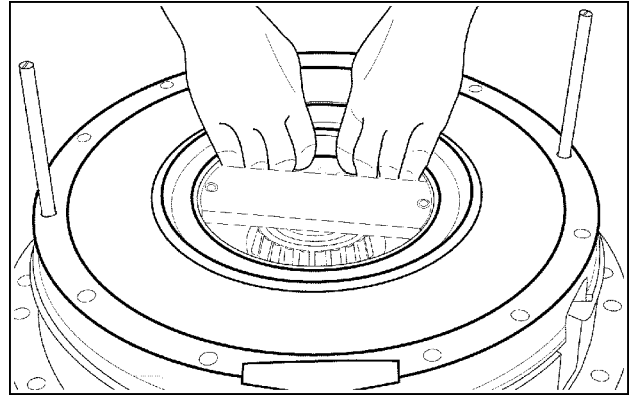
RCPH10FWD260ABJ 105

101. Lubricate and install a new O-ring in the groove of the smaller outside diameter of the piston. Be sure the O-ring is not twisted.



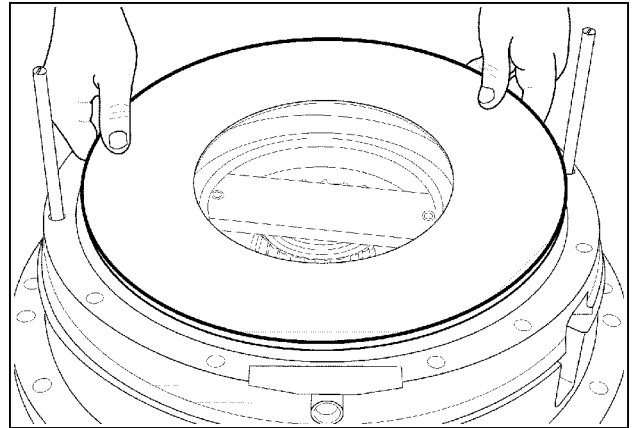
RCPH10FWD261ABJ 106

102. Lubricate the outside diameter and inside diameter of the piston liberally with clean assembly grease. Hand seat the piston squarely into the bore of the backing plate.



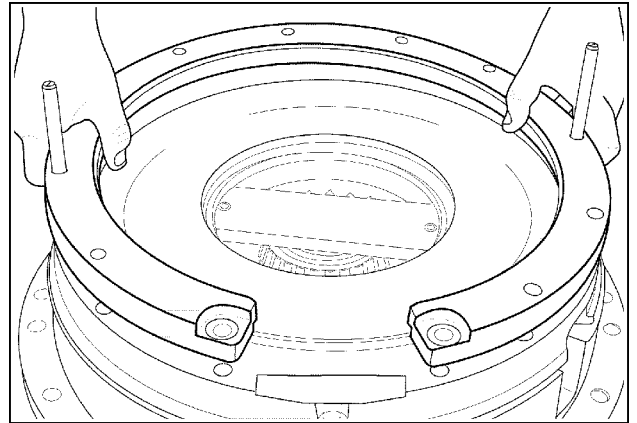
RCPH10FWD262ABJ 107

103. Install the large belleville spring with the cone side down on top of the park brake piston.



RCPH10FWD263ABJ 108

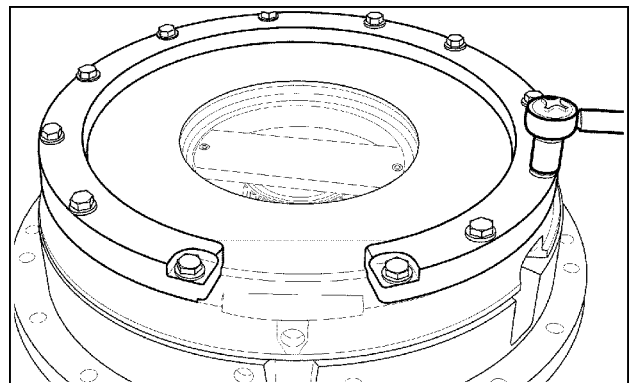
104. Install the retainer ring over the belleville spring.



RCPH10FWD264ABJ 109

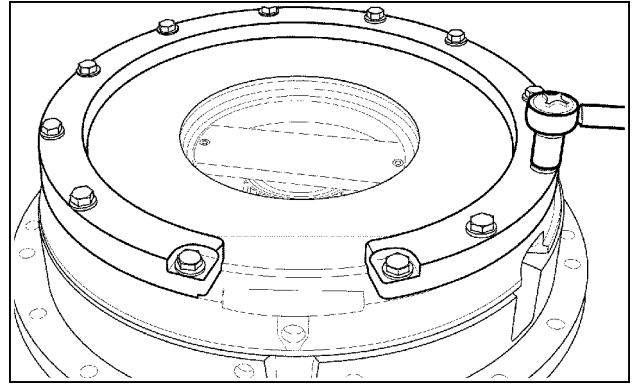
105. Install and hand start the 12 bolts with washers to engage the threads.

NOTE: The two shorter length bolts must be installed in the end holes of the ring.



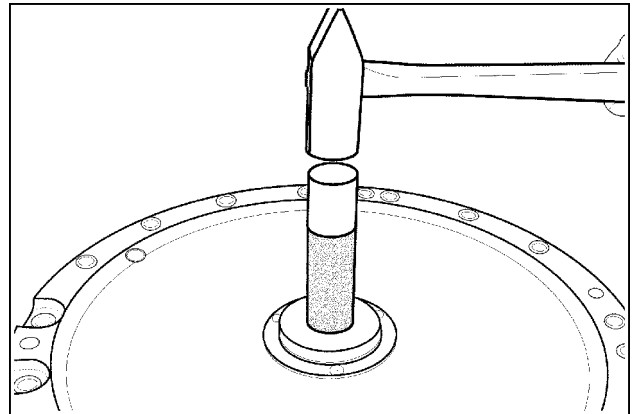
RCPH10FWD265ABJ 110

106. After all bolts have contacted the retainer ring, starting with an end bolt, tighten each bolt in sequence one full turn and repeat until the ring has seated on the backing plate. Tighten the bolts to specifications. Remove the **CAS2505** brake disc alignment tool.



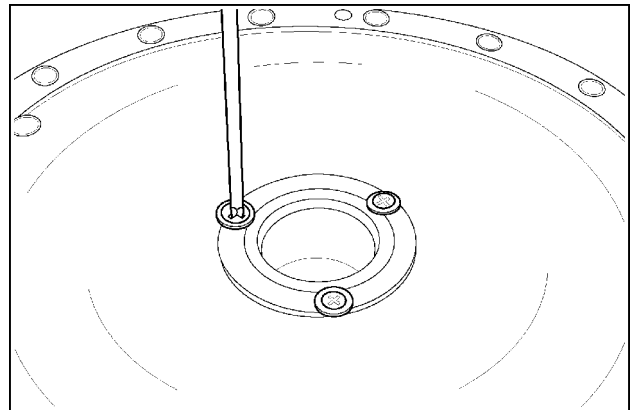
RCPH10FWD265ABJ 111

107. Turn the brake carrier assembly over and install the seal in the carrier.



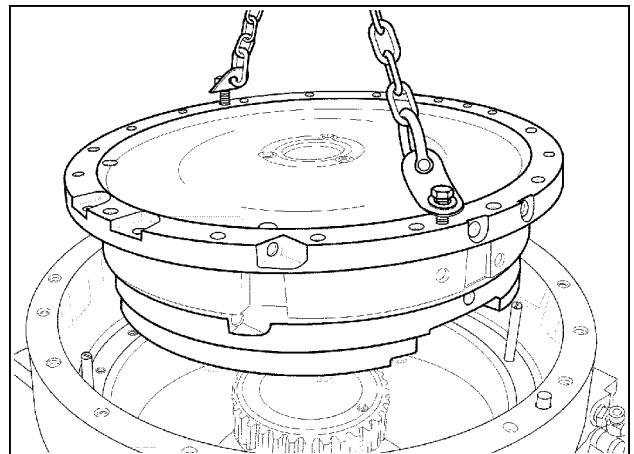
RCPH10FWD266ABJ 112

108. Apply thread lock sealant on the threads of the screws. Install the three seal retaining screws and washers.



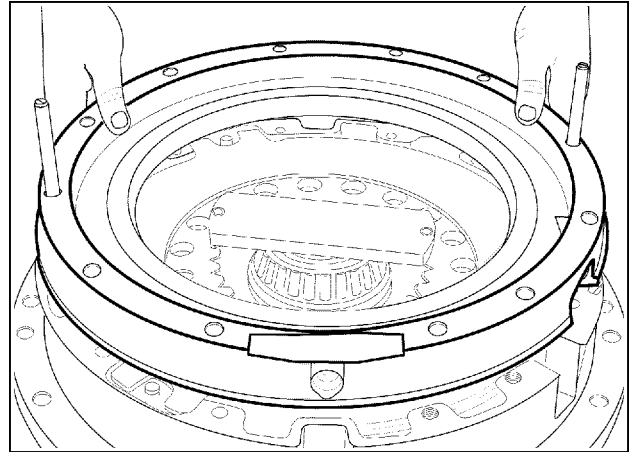
RCPH10FWD231ABJ 113

109. Rotate the differential housing until the right hand side is on top. Remove the brake carrier from the housing.



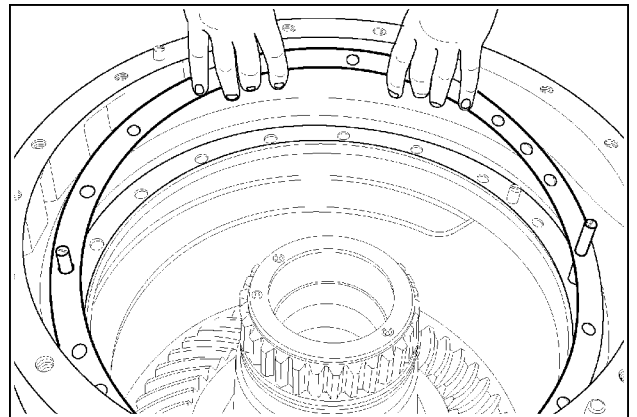
RCPH10FWD209ABJ 114

110. Assemble the brake carrier as described in steps **85** through **108**.



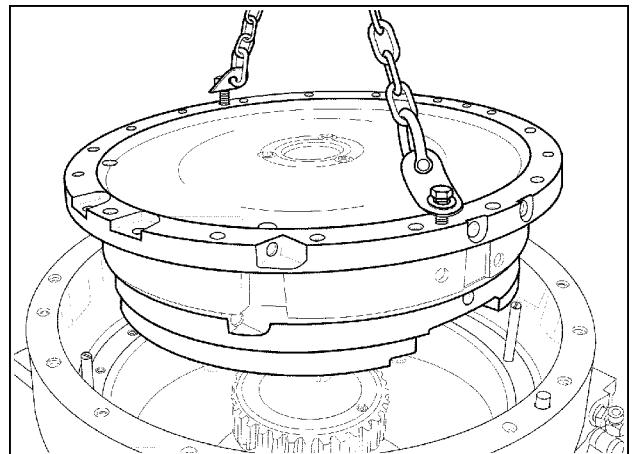
RCPH10FWD259ABJ 115

111. Using the **CAS2675** guide studs, install the pre-selected shim pack for the brake support carrier so that all holes align.



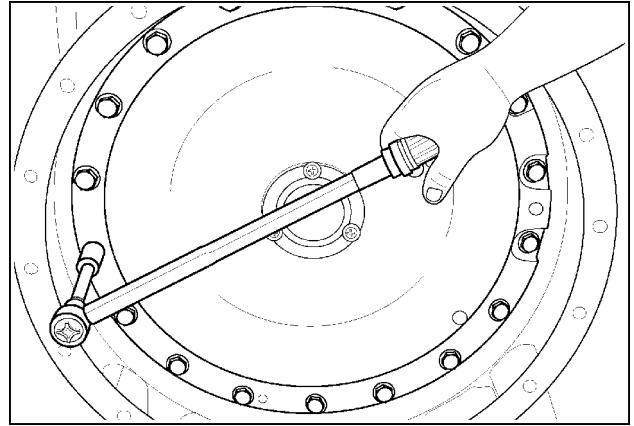
RCPH10FWD210ABJ 116

112. Use a hoist to carefully align and install the brake carrier assembly into the differential housing. Be sure the assembly marks are aligned.



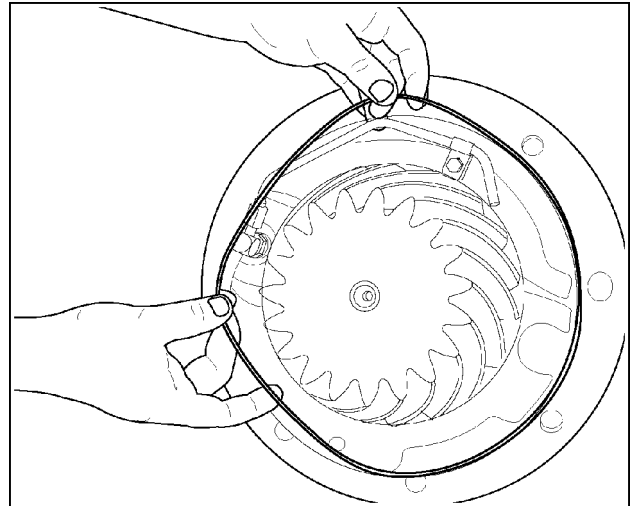
RCPH10FWD209ABJ 117

113. Remove the guide studs. Install the brake carrier retaining bolts and washers. Tighten the bolts to specifications.



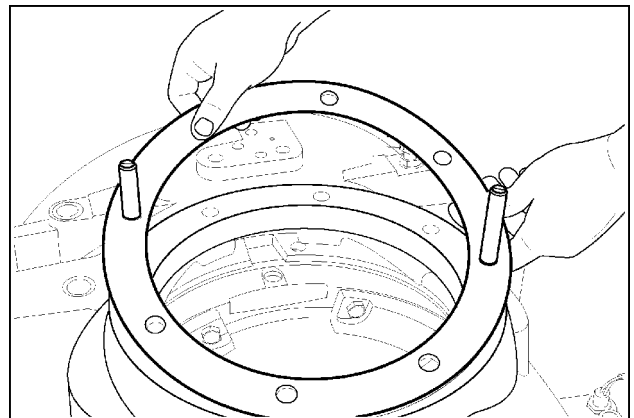
RCPH10FWD267ABJ 118

114. Lubricate and install a new O-ring in the groove around the mounting flange of the pinion carrier. Be sure the O-ring is not twisted.



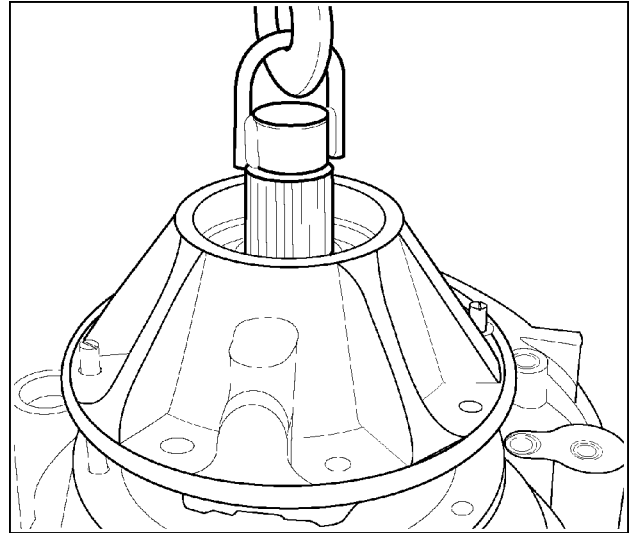
RCPH10FWD079ABJ 119

115. Use two **CAS2496** alignment studs, install the pre-selected pinion carrier shim pack.



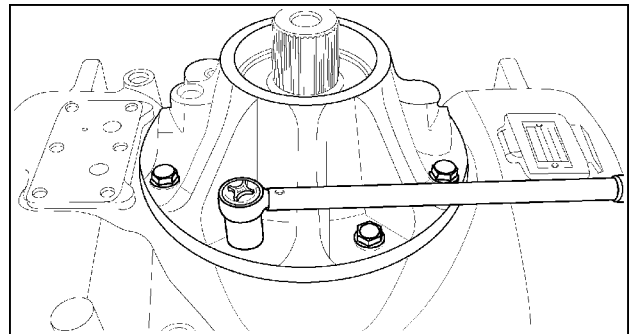
RCPH10FWD244ABJ 120

116. Use a lifting eye to install the pinion carrier assembly into the differential housing. Be sure the assembly marks align.



RCPH10FWD081ABJ 121

117. Remove the guide studs and lifting eye, install the pinion carrier retaining bolts and washers. Torque the pinion carrier bolts to **284 – 298 N·m (209 – 220 lb ft)**.
118. Coat the pinion shaft splines with **MOLYKOTE® G-N METAL ASSEMBLY PASTE**.



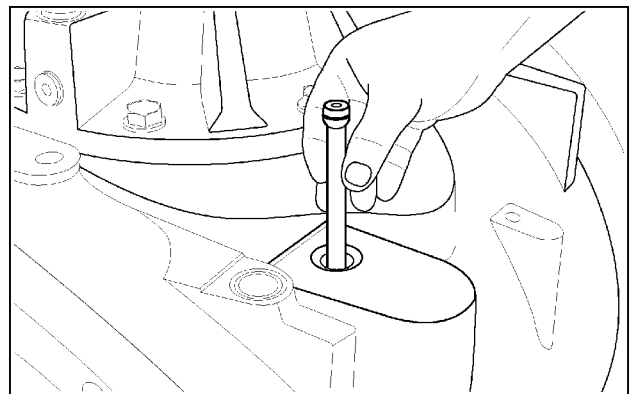
RCPH10FWD082ABJ 122

119. Install the drive yoke and cap. .



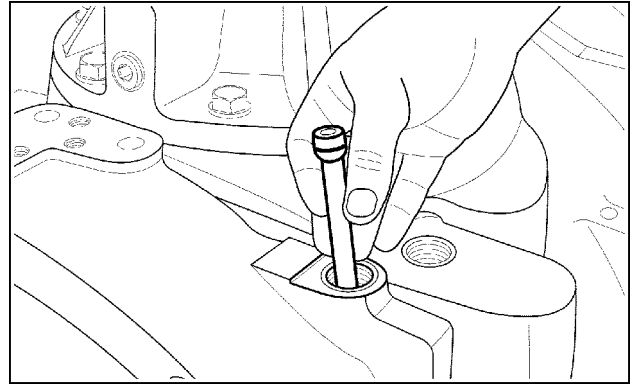
RAIL17TR01400AA 123

120. Lubricate and install new O-rings on the jumper tube for the park brake. Install the jumper tube into the park brake supply port.



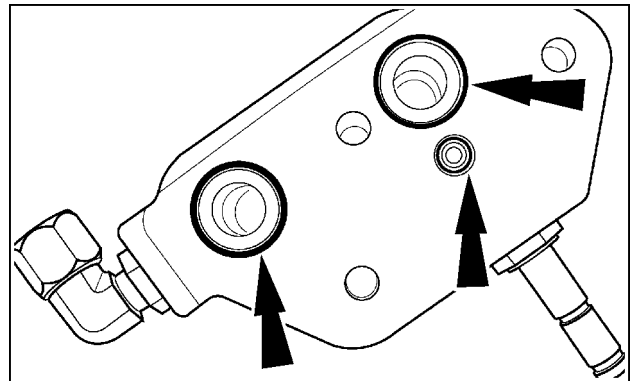
RCPH10FWD269ABJ 124

121. Lubricate and install new O-rings on the jumper tube for the service brake. Install the jumper tube into the service brake supply port.



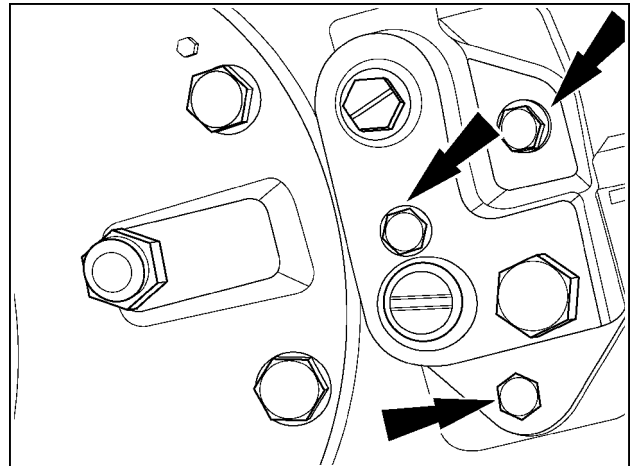
RCPH10FWD270ABJ 125

122. Lubricate and install new O-rings on the port block.



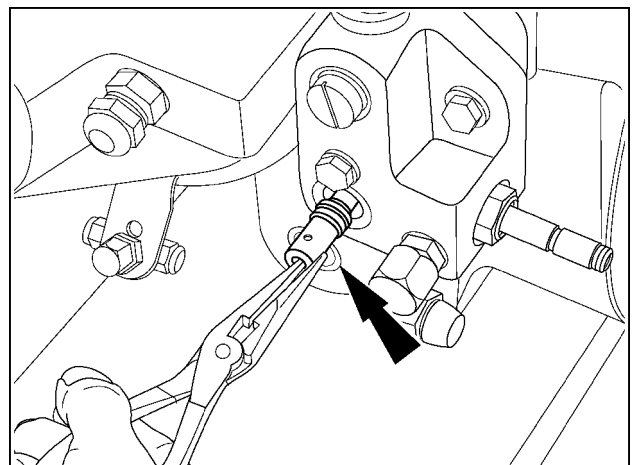
RCPH10FWD271ABJ 126

123. Install the port block on the differential housing. Tighten the retaining bolts to specifications.



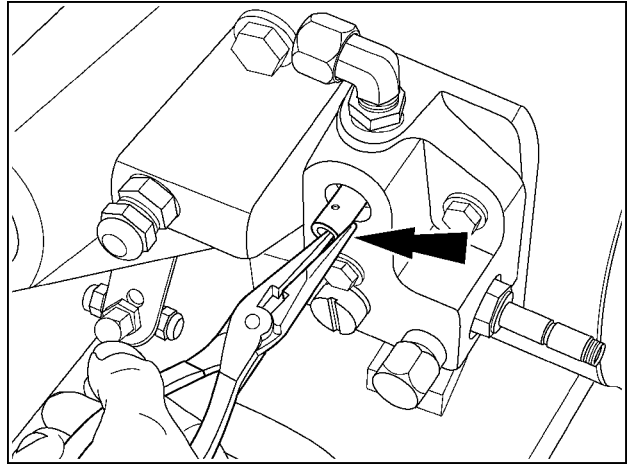
RCPH10FWD950AAJ 127

124. Lubricate and install new O-rings on the jumper tube for the differential lock. Install the jumper tube into the differential lock supply port.



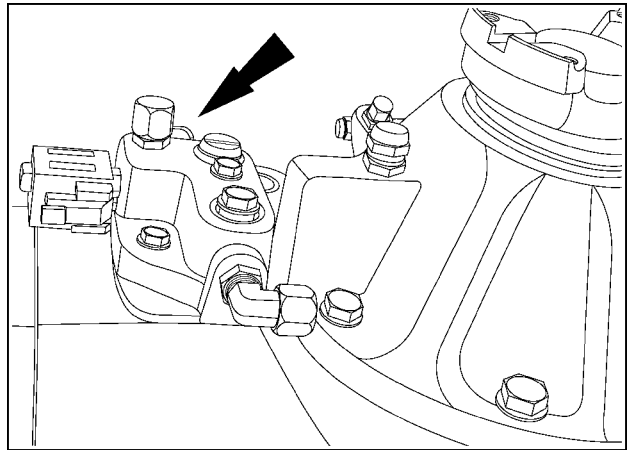
RCPH10FWD949AAJ 128

125. Lubricate and install new O-rings on the jumper tube for the lube supply. Install the jumper tube into the lube supply port.



RCPH10FWD948AAJ 129

126. Install the differential lock solenoid on the port block.



RCPH10FWD091ABJ 130

Next operation:

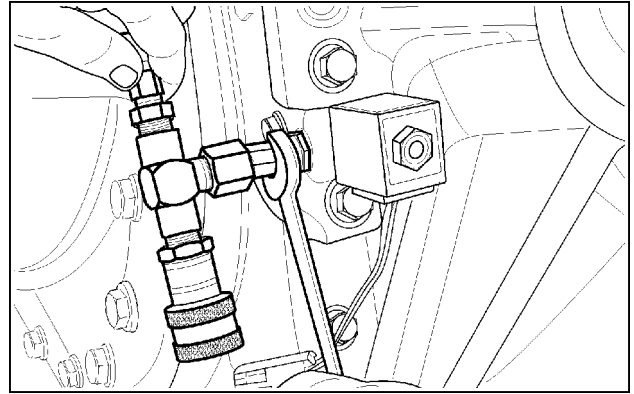
Hydraulic service brakes - Test - Brake leak down (33.202) Differential lock - Leakage test (25.102)

Next operation:

Final drive - Install - 600 Series Quadtrac® axles (25.310)

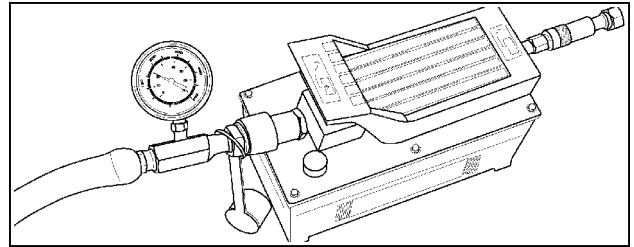
Differential lock - Leakage test

1. Connect the Test Coupler Assembly to the differential lock port fitting.



RCPH10FWD436ABJ 1

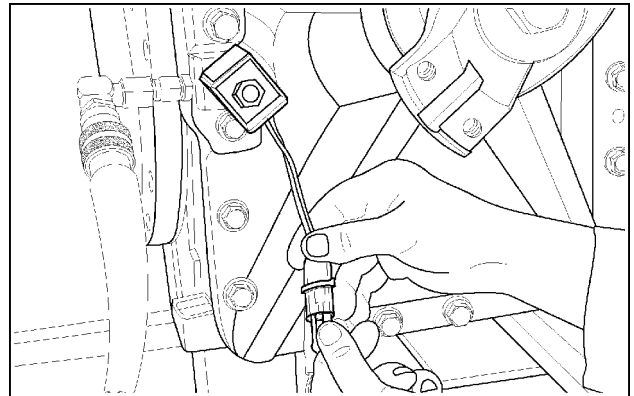
2. Connect the Air/Hydraulic Pump to the test coupler. Operate the pump slowly until **20 bar (290 psi)** is indicated on the pressure gauge. Pressure should rise instantly and hold.



RCPH10FWD089ABJ 2

NOTE: If pressure *idi* not rise instantly and hold, remove the solenoid valve and inspect the O-rings for damage. If the O-rings do not correct the problem, replace the solenoid.

3. Connect 12 Volt DC battery power and ground to the solenoid connector to energize the solenoid.



RCPH10FWD437ABJ 3

4. Operate the pump to pressurize the differential lock circuit **10 – 11 bar (145 – 160 psi)**. Release the pressure and repeat 2 or 3 times to purge air from the circuit. Operate the pump until **19 – 20 bar (276 – 290 psi)** is indicated on the gauge. A constant input supply pressure of **19 – 20 bar (276 – 290 psi)** is required to maintain pressure. If full pressure cannot be reached, inspect the short jumper tube O-ring seals or the differential piston and seal rings. Disconnect the battery power and test coupler.

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(*) See content for specific models



Front axle system - 25

Final drives - 310

Steiger® 370 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 370 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Quadtrac® CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Quadtrac® Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT,



TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Rowtrac™ CVT, TIER
4B [JEEZ00000FF314001 -], Steiger® 500 Rowtrac™ Powershift, TIER 4B
[JEEZ00000FF314001 -], Steiger® 540 CVT, TIER 4B [JEEZ00000FF314001 -
], Steiger® 540 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger®
540 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® CVT,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® CVT, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Powershift, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 620 Powershift, TIER
4B [JEEZ00000FF314001 -], Steiger® 620 Powershift, scraper, TIER 4B
[JEEZ00000FF314001 -], Steiger® 620 Quadtrac® Powershift, TIER 4B
[JEEZ00000FF314001 -]



Contents

Front axle system - 25

Final drives - 310

SERVICE

Final drive

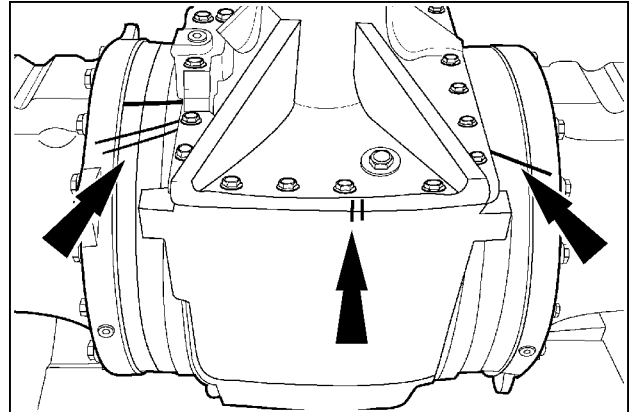
Remove - 400 Series bar axles (*)	3
Disassemble - 400 Series bar axles (*)	5
Replace - 425 bar axle, outer seal (*)	13
Assemble - 400 Series bar axles (*)	17
Install - 400 Series bar axles (*)	28
Remove - 500 Series axles (*)	31
Disassemble - 500 Series axles (*)	33
Assemble - 500 Series axles (*)	40
Install - 500 Series axles (*)	51
Remove - 500 Series Quadtrac® axles (*)	53
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Assemble - 600 Series Quadtrac® axles (*)	118
Install - 600 Series Quadtrac® axles (*)	129

(*) See content for specific models

Final drive - Remove - 400 Series bar axles

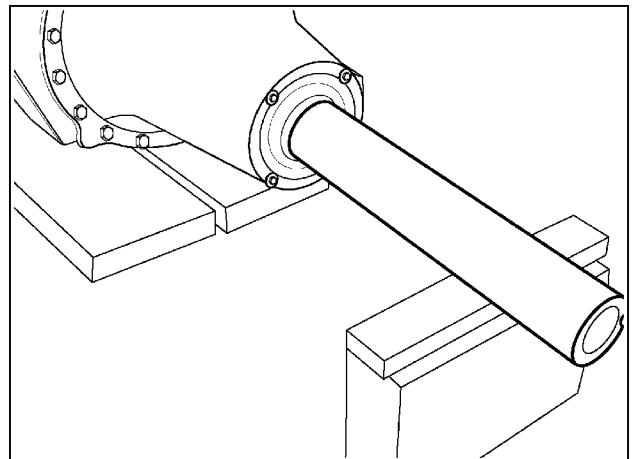
Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

1. Position the axle assembly (pinion carrier up) on short heavy boards (planking). Put assembly reference marks across each final drive housing and center housing.



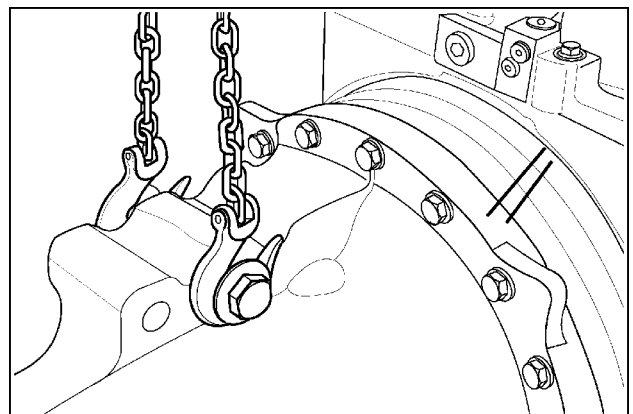
RCPH10FWD283FBJ 1

2. Put blocking under one final drive axle to keep the axle assembly level when the opposite final drive housing is removed.



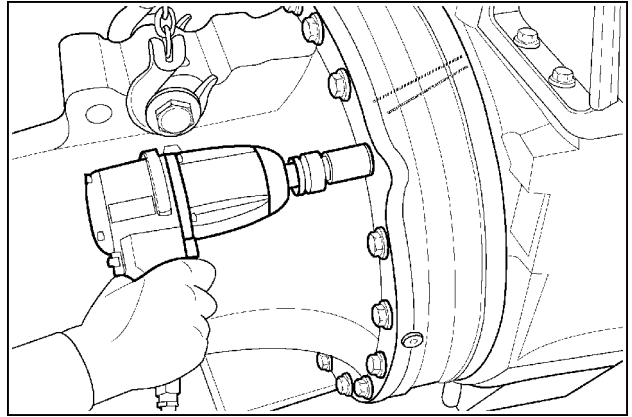
RCPH10FWD284FBJ 2

3. Connect an overhead hoist to the axle final drive housing. Take-up the weight of the housing.



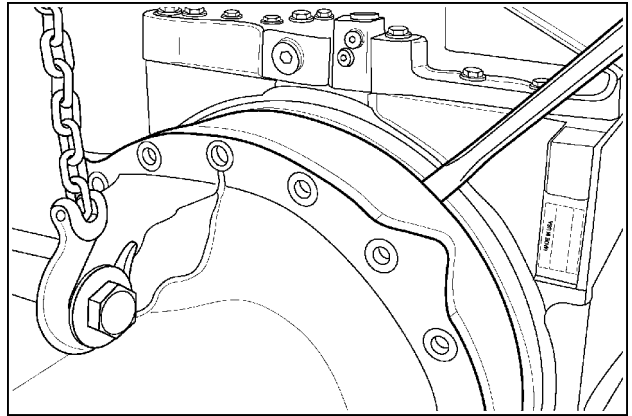
RCPH10FWD285FBJ 3

4. Remove the bolts securing the axle housing and stationary ring gear to the differential housing.



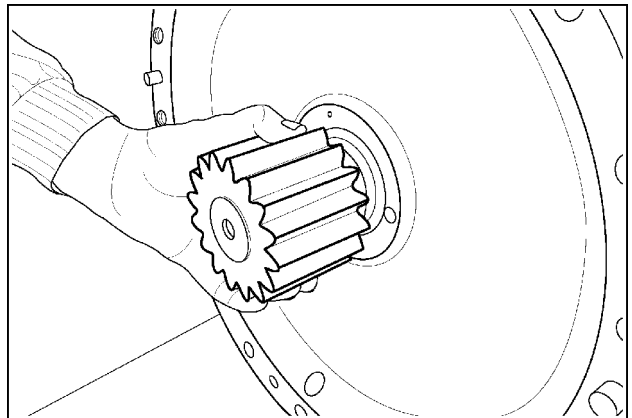
RCPH10FWD286FBJ 4

5. Use the hoist to lift and release the final drive housing a small amount several times to weaken the sealant bond. Use a pry bar between the stationary ring gear and differential housing to pry the ring gear out of the dowel pins. If necessary, repeat steps 3 through 5 to remove the opposite side final drive.



RCPH10FWD287FBJ 5

6. Remove the sun gear and short axle assembly from the differential housing.

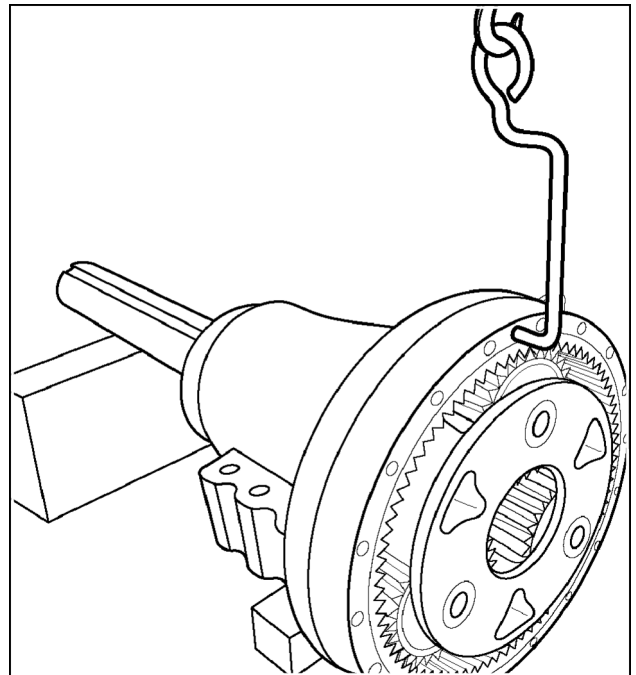


RCPH10FWD288FBJ 6

Final drive - Disassemble - 400 Series bar axles

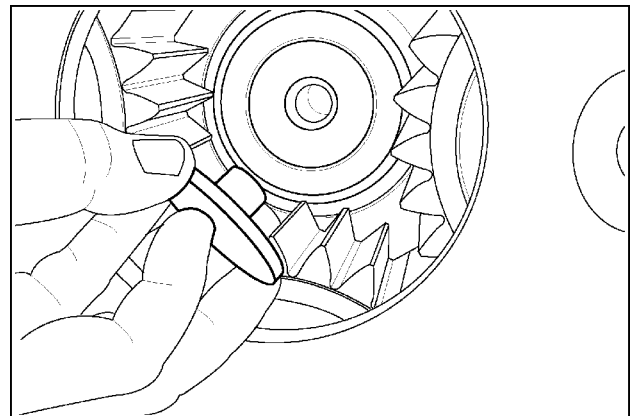
Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

1. Use the CNH299075 lifting hook to remove the stationary ring gear from the axle housing.



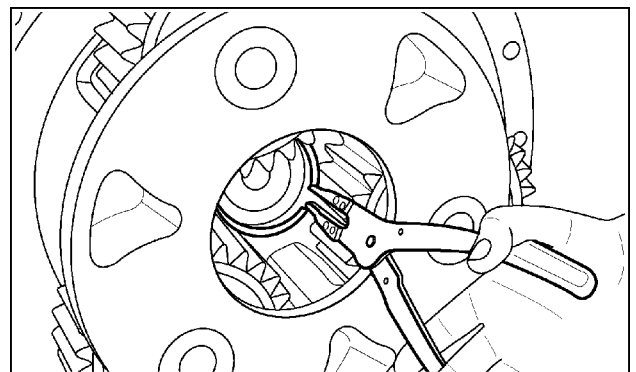
RCPH10FWD289FBJ 1

2. Remove the nylon thrust button from the end of the axle shaft.



RCPH10FWD290FBJ 2

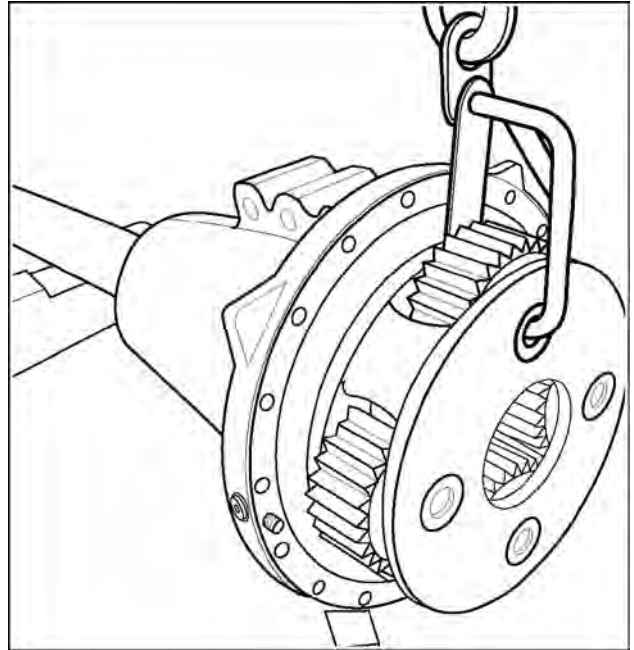
3. Remove the snap ring securing the planetary carrier assembly to the axle.



RCPH10FWD291FBJ 3

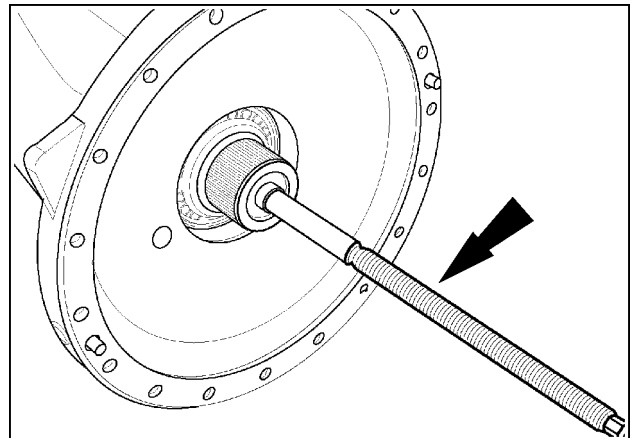
4. Use the **CAS2676** planetary carrier lifting hook to remove the planetary assembly from the housing.

NOTICE: Be sure the retaining strap is positioned behind the gear to prevent the lifting fixture from pulling out of the planetary gear shaft.



RCPH10FWD292FBJ 4

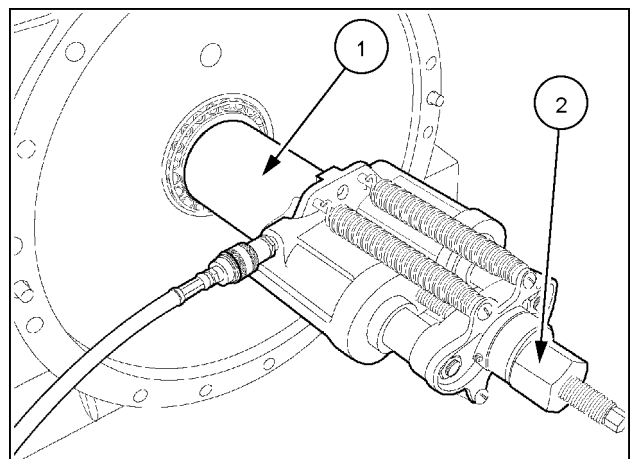
5. Install the **CAS2666** puller screw and spacer washer tightly into the end of the axle shaft.



RCPH10FWD293FBJ 5

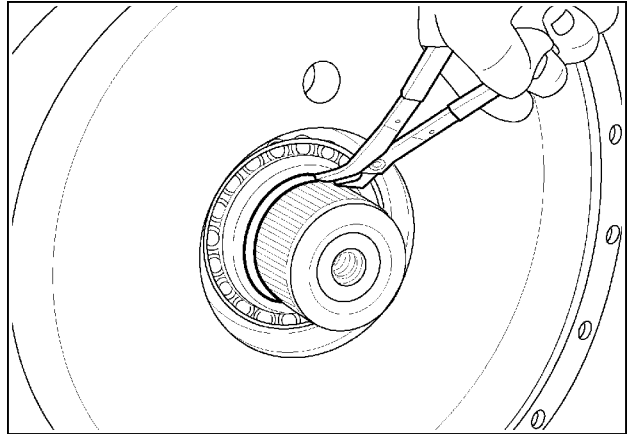
6. Install the **CAS2666** spacer sleeve (1) (or suitable spacer sleeve) over the axle and against the bearing cone. Install a twin ram over the puller screw and install the nut (2) on the puller screw. Hand tighten the nut to hold the spacer centered against the bearing. Use the hydraulic ram to press the bearing onto the axle shaft while rotating the ram back and forth until there is a noticeably tighter bearing preload. Remove the ram, spacer tube and puller screw.

NOTE: The bearing is back seated against the snap ring.



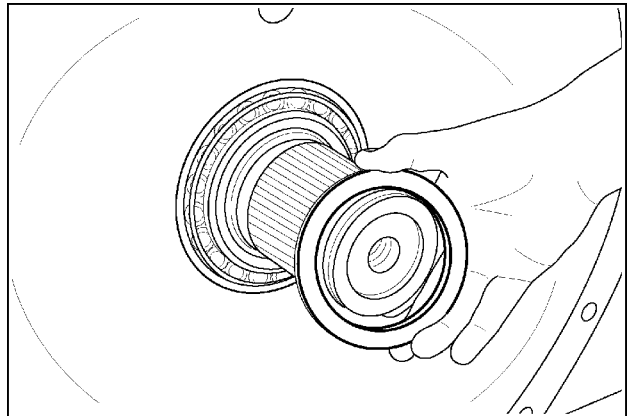
RCPH10FWD894AAJ 6

7. Remove the snap ring from the groove of the axle.



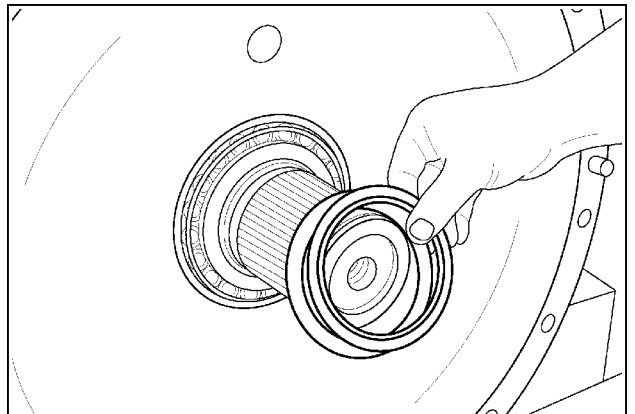
RCPH10FWD294FBJ 7

8. Remove the thrust ring from the axle shaft.



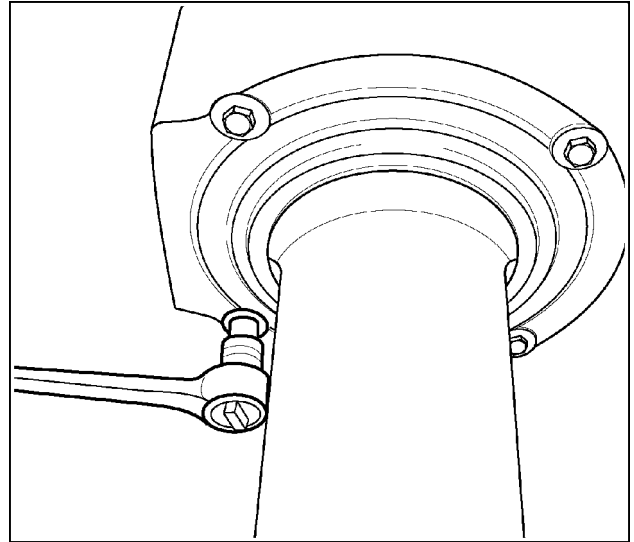
RCPH10FWD896AAJ 8

9. Remove and retain the shims from the axle shaft.



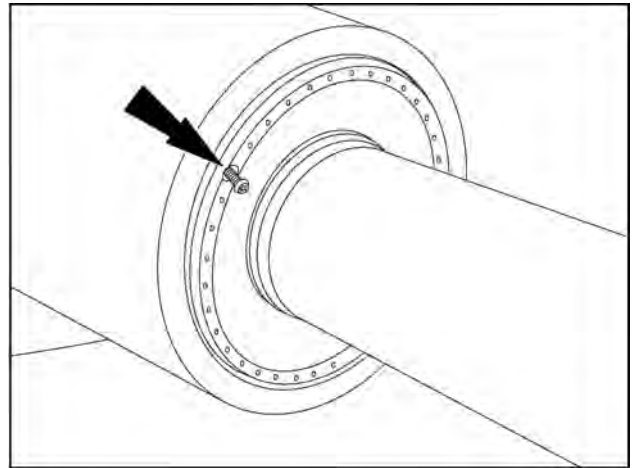
RCPH10FWD897AAJ 9

10. For the 450 series axles, remove the axle outer oil seal retaining bolts and washers.



RCPH10FWD295FBJ 10

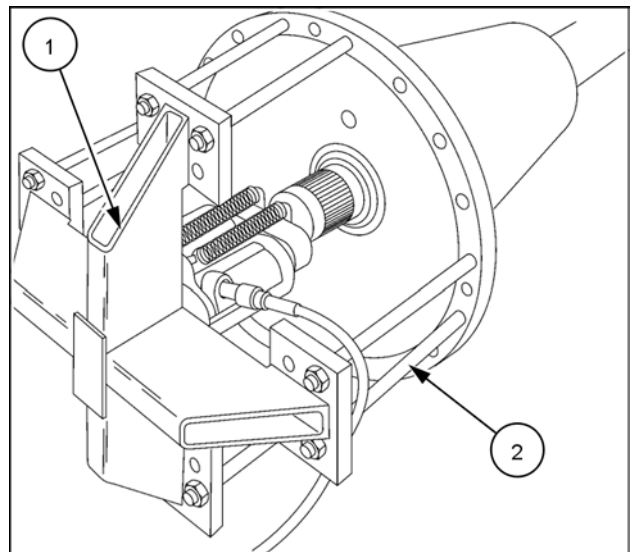
For the 425 series axles, drill a hole, install a screw to pry against and remove the oil seal from the final drive housing.



RAIL12TR2340AA 11

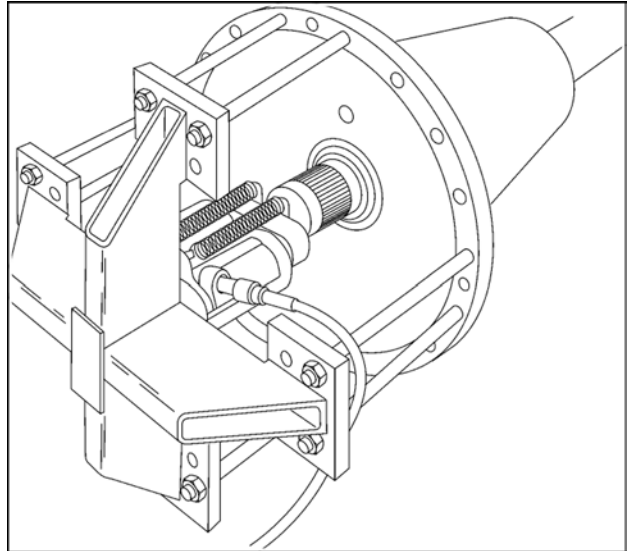
11. Install the **380002851** axle shaft remover bridge (1) securely on the axle housing in the location shown. Tighten the eight attaching bolts (2) tightly on the axle housing and puller bridge.

NOTICE: It will require **45.36 t (100000 lb)** or more to press out the axle. For this reason the puller bridge must be attached parallel with the axle mounting pads as shown.



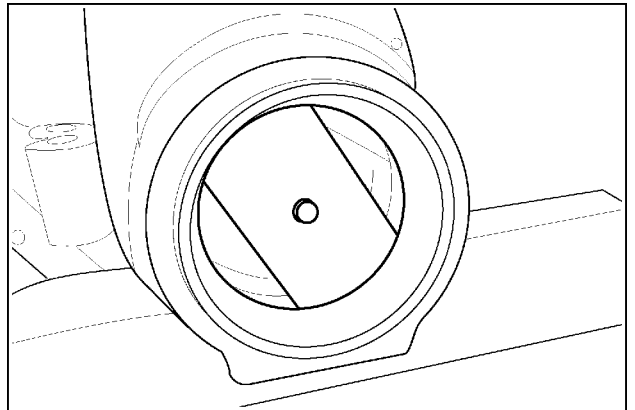
RCPH11FWD219BAM 12

12. Install the hydraulic ram between the puller bridge and the end of the axle. Press the axle through the inner bearing cone. Remove the axle from the housing. Discard the outer seal. Remove the puller bridge and ram.



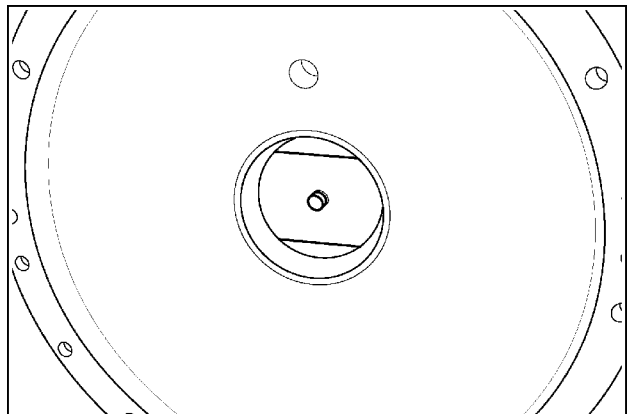
RCPH11FWD219BAM 13

13. Use **CAS2663 CNH299049** bearing driver and CAS2405 long driver handle to remove the outer bearing cup from the housing.



RCPH10FWD900AAJ 14

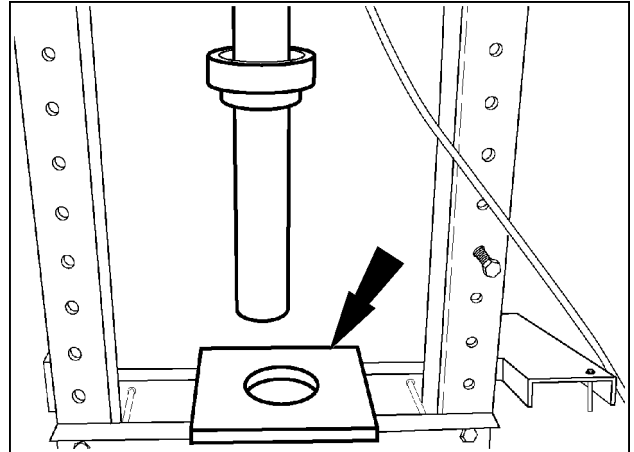
14. Use the appropriate size bearing driver and CAS2405 long driver handle to remove the inner bearing cup from the housing.



RCPH10FWD901AAJ 15

15. To remove the axle outer bearing, oil seal and bushing, place an appropriate sized press plate on a press bed. Install the **380002920** lifting eye into the threaded hole in the end of the axle shaft. Use a lifting device to place the axle on the press plate so that the oil seal is resting on the press plate.

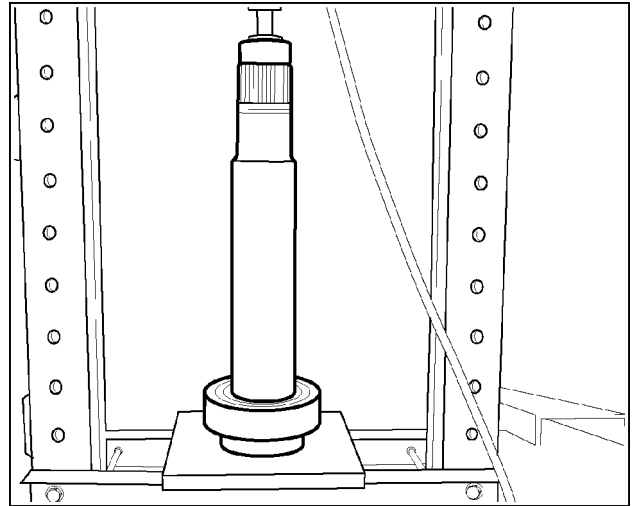
NOTE: If possible, place the bearing cup over the cone before pressing.



RCPH10FWD902AAJ 16

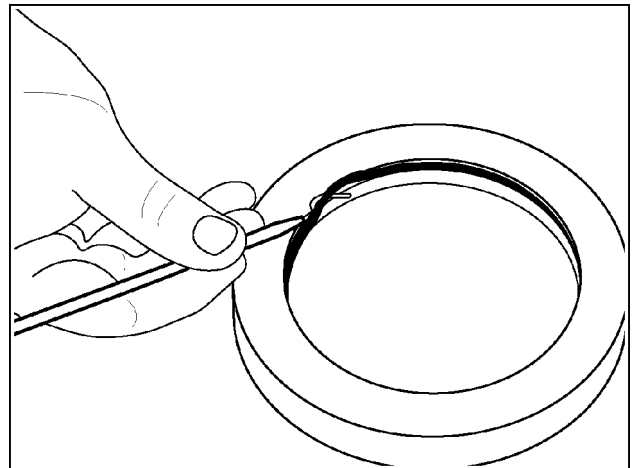
16. Use the press to remove the outer axle bearing cone, oil seal, and bushing.

NOTE: Place a heavy wood block under the press bed for the axle to drop on.



RCPH10FWD903AAJ 17

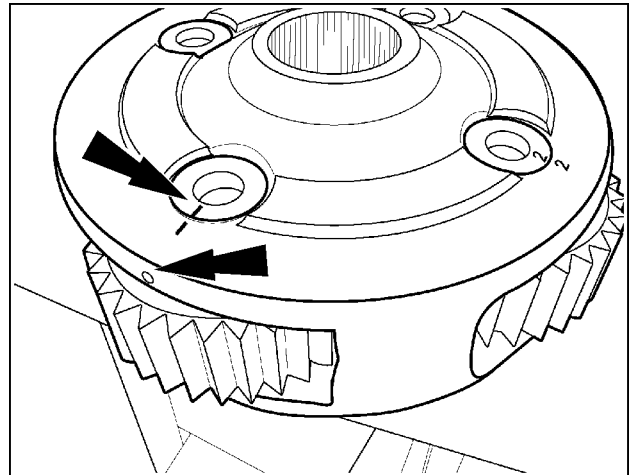
17. Remove and discard the O-ring from the seal (wear) ring.



RCPH10FWD904AAJ 18

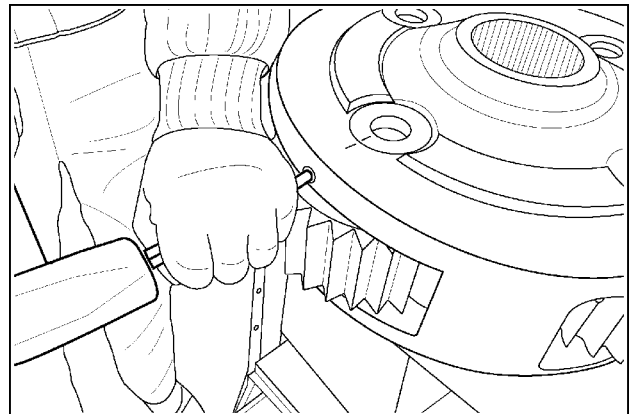
Planetary carrier disassembly

18. If the gears are to be reused, mark each gear and the carrier so that the gears and pins are assembled in their original location in the gear carrier.



RCPH10FWD297FBJ 19

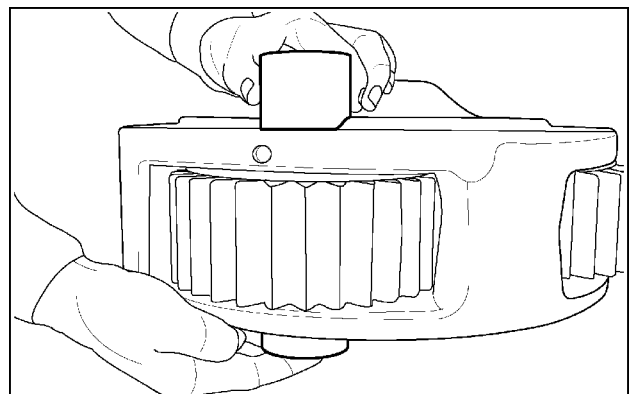
19. Drive the spring pin into the center of the gear shaft.



RCPH10FWD298FBJ 20

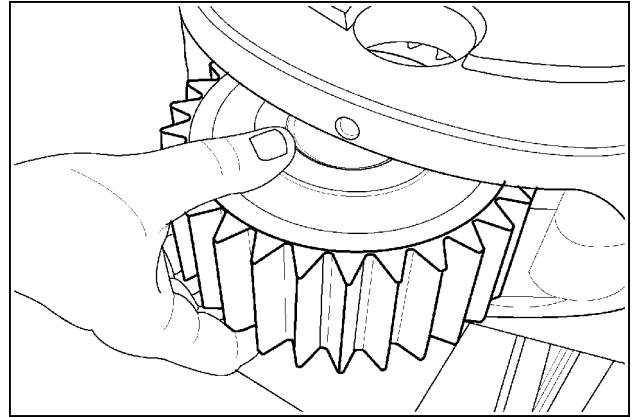
20. Use the **CAS2729** pilot sleeve to push the gear shaft out and retain to the needle roller bearings in the gear.

NOTE: There is a double row of uncaged needle roller bearings in each gear.



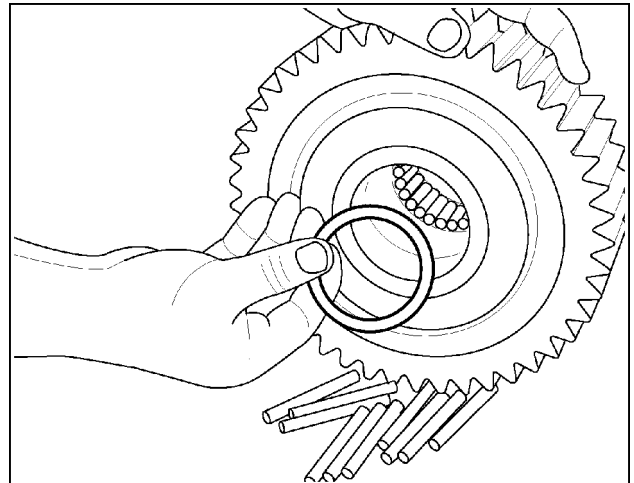
RCPH10FWD299FBJ 21

21. Carefully remove the planetary gear assembly with thrust washers from the carrier.



RCPH10FWD300FBJ 22

22. Remove the needle roller bearings and separator ring from within the gear. Repeat steps 18 through 22 for each remaining planet gear. Clean and inspect all final drive gears, bearings and other parts for too much wear or other damage. Replace all worn or damaged parts. Repeat steps 1 through 22 to disassemble the opposite side final drive.

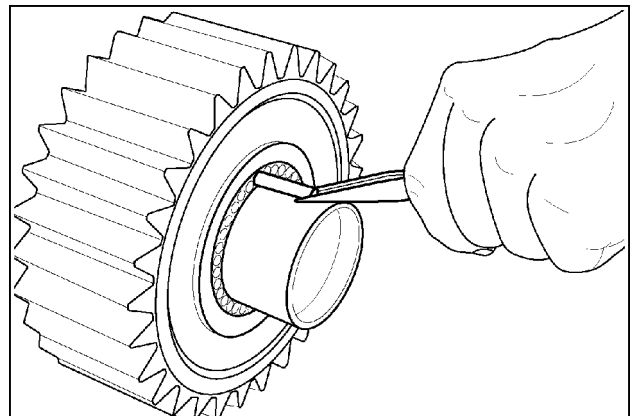


RCPH10FWD915AAJ 23

Planetary carrier assembly

23. Lubricate the needle roller bearings with clean grease or petroleum jelly and load 33 bearings on one side of the gear.

NOTE: Use the **CAS2729** pilot sleeve to hold the first row of needle bearings in place.



RCPH10FWD301FBJ 24

Final drive - Replace - 425 bar axle, outer seal

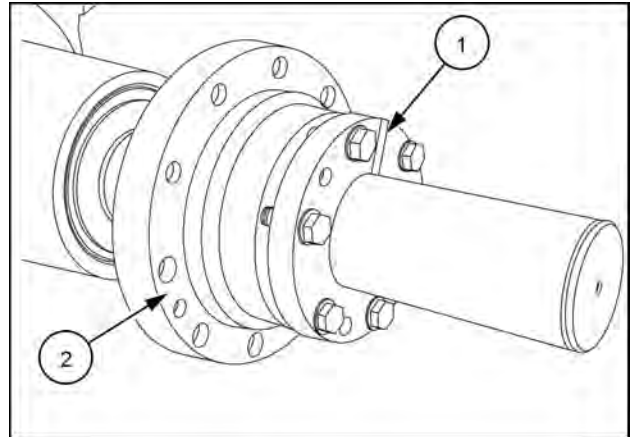
Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

Prior operation:

Frame - Raise - Tractor jacking points (39.100)

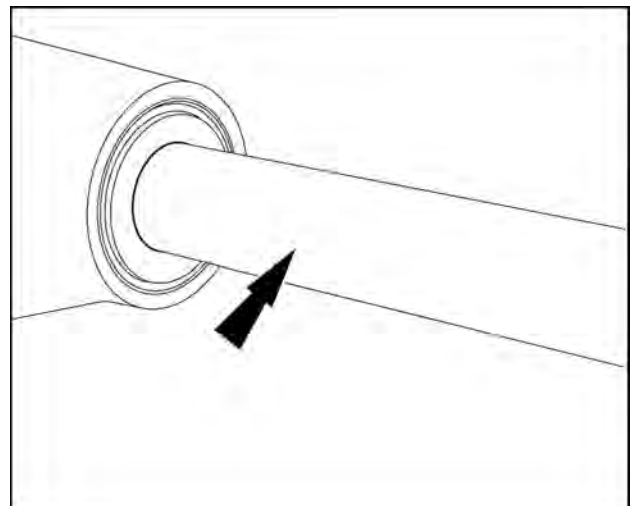
1. Remove the wheel and tire.
2. Drain enough oil from the final drive of the axle to below the bottom of the seal bore.
3. Separate the tapered bushing (1) from the wheel hub (2). Remove both from the axle.

NOTE: The tapered bushing will be used to drive the 380003282 seal installation tool and seal.



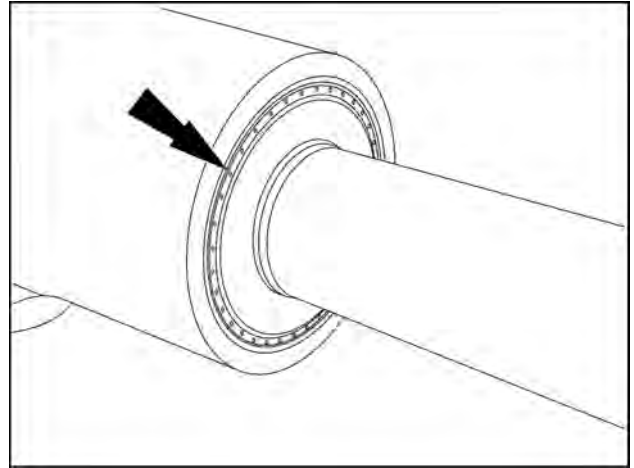
RAIL12TR2336AA 1

4. Clean the surface of the axle to allow the tapered bushing to easily slide along the axle.



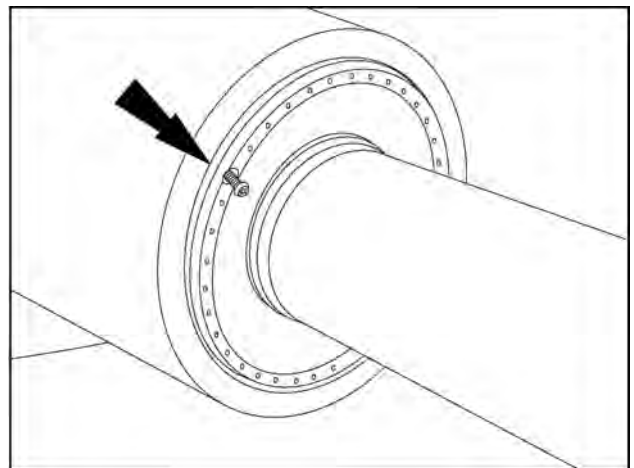
RAIL12TR2338AA 2

5. Drill a hole and install a screw into the seal for a pry point.



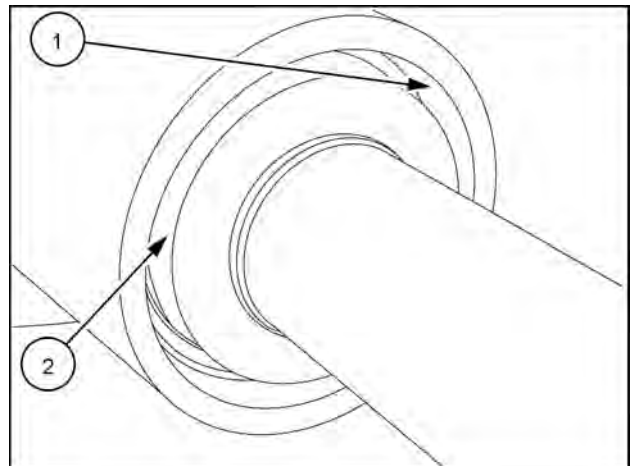
RAIL12TR2339AA 3

6. Pry out and remove the seal.



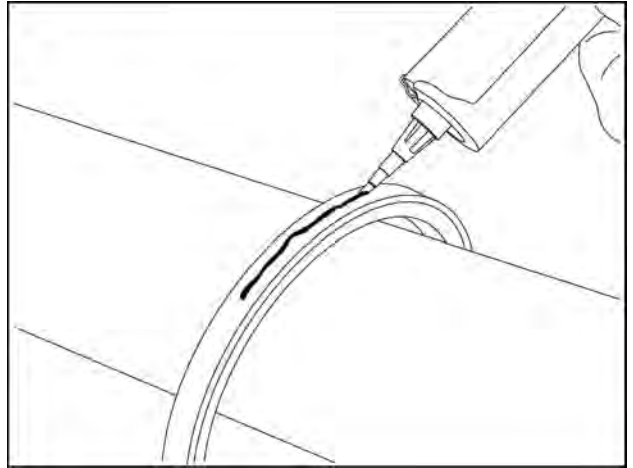
RAIL12TR2340AA 4

7. Clean all sealant from the housing (1) where the outer diameter of the seal sits. Make sure the bushing (2) where the inner diameter of the seal makes contact is clean and not damaged.



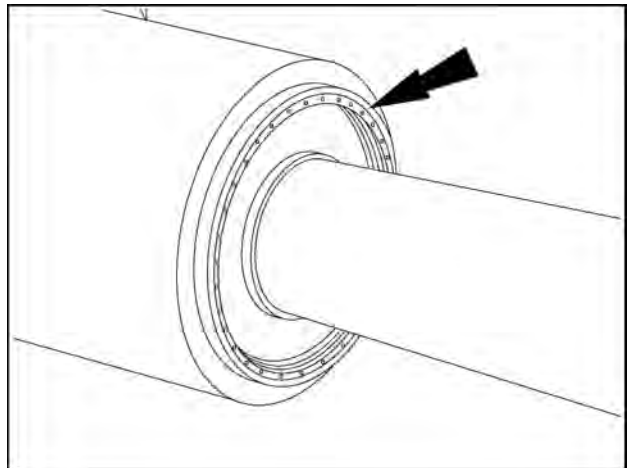
RAIL12TR2341AA 5

8. Fill the inner two grooves of a new axle seal approximately half full with clean grease. Apply **LOCTITE® 515™** sealant around the outside diameter of the new seal.



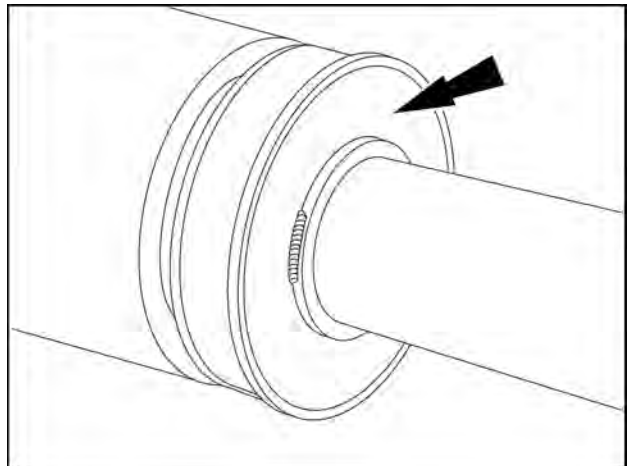
RAIL12TR2342AA 6

9. Install the seal over the axle shaft and align squarely to the bore of the axle housing.



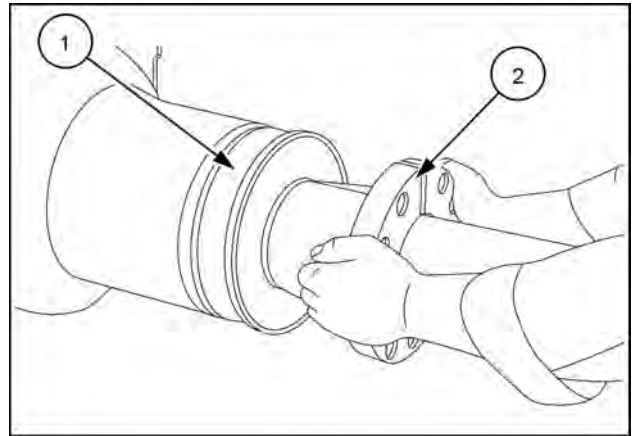
RAIL12TR2343AA 7

10. Slide the **380003282** axle seal installation tool on to the axle up against the new seal.



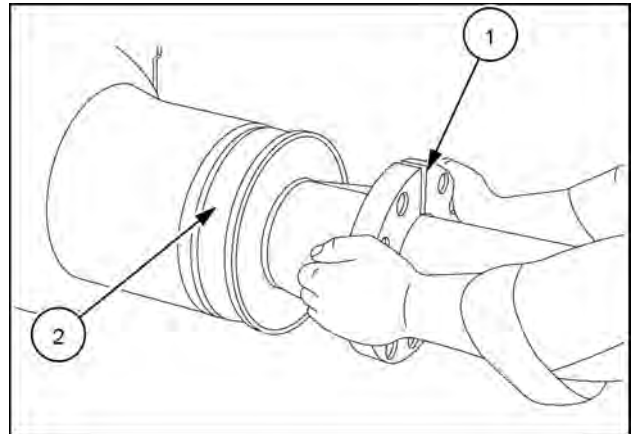
RAIL12TR2344AA 8

11. Use the **380003282** axle seal installer (**1**) and the tapered split bushing (**2**), as shown, to install the seal to the correct depth in the housing.



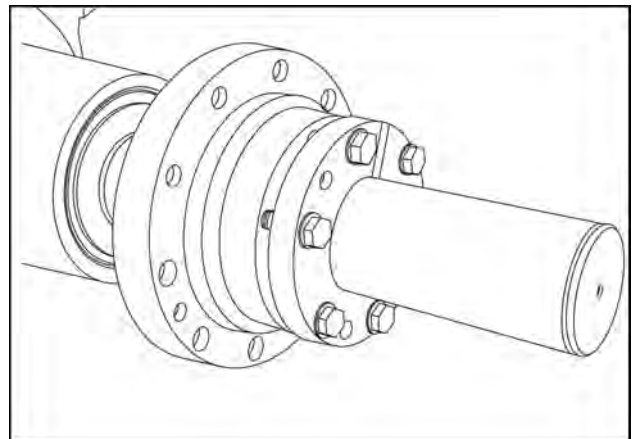
RAIL12TR2345AA 9

12. Remove the tapered split bushing (**1**) and **380003282** seal installation tool (**2**) from the axle.



RAIL12TR2345AA 10

13. Install the wheel and tapered bushing at the proper width and tighten.



RAIL12TR2336AA 11

14. Install the wheel and tire. Remove the jack stand. Drive the tractor. Stop, shut off the engine and check the seal for any leak. Top off the hydraulic system as necessary.

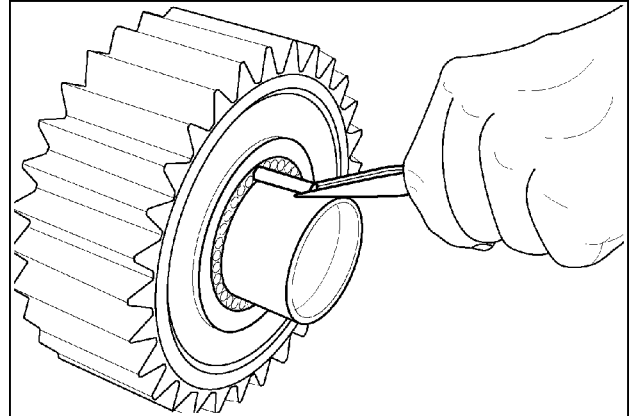
Final drive - Assemble - 400 Series bar axles

Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

Planetary carrier assembly

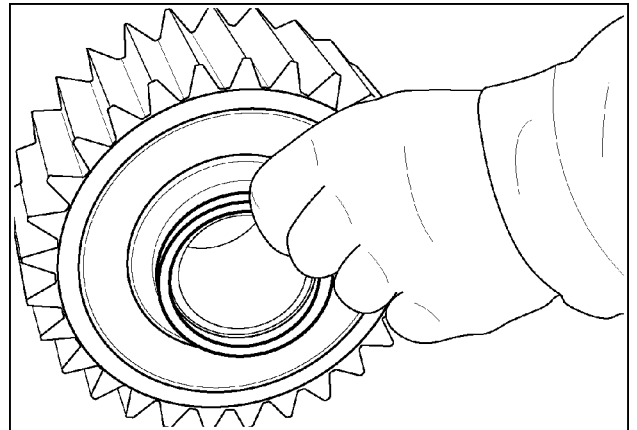
1. Lubricate the needle roller bearings with clean grease or petroleum jelly and load 33 bearings on one side of the gear.

NOTE: Use the **CAS2729** pilot sleeve to hold the first row of needle bearings in place.



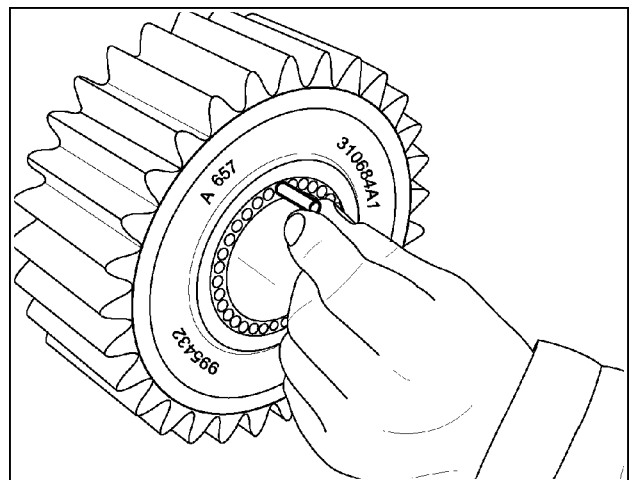
RCPH10FWD301FBJ 1

2. Install the separator ring into the gear.



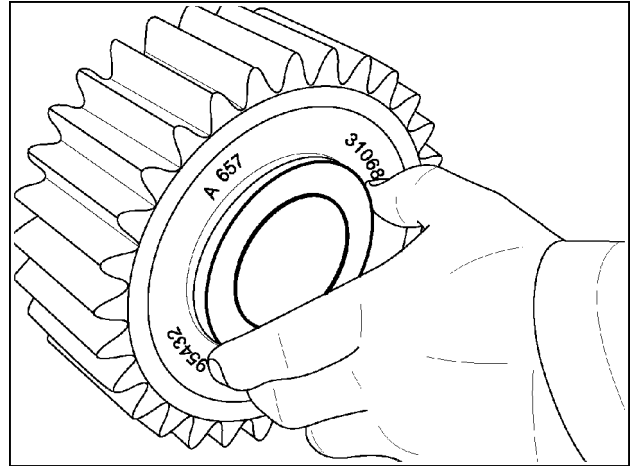
RCPH10FWD302FBJ 2

3. Push the **CAS2729** pilot sleeve into the gear to hold all the roller bearings in place and load the remaining 33 needle roller bearings into the gear.



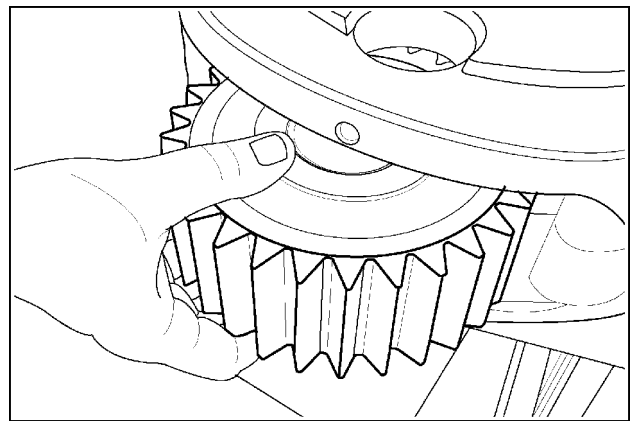
RCPH10FWD303FBJ 3

4. Lubricate the thrust washers with clean grease or petroleum jelly. Install one thrust washer on each side of the gear. Adjust the pilot sleeve to engage the thrust washers to hold them in place.



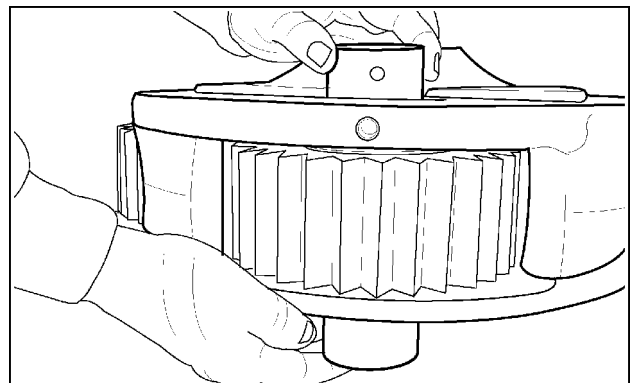
RCPH10FWD304FBJ 4

5. Carefully put the planet gear into its original position in the gear carrier while holding the pilot sleeve in place.



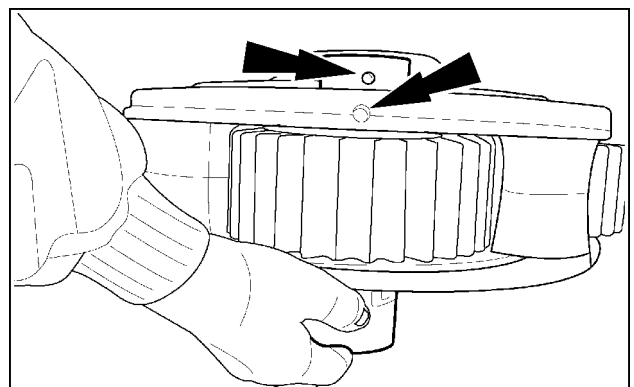
RCPH10FWD305FBJ 5

6. While maintaining tension on the pilot sleeve from the bottom, align the gear and carefully push the gear shaft through the thrust washer and bearings.



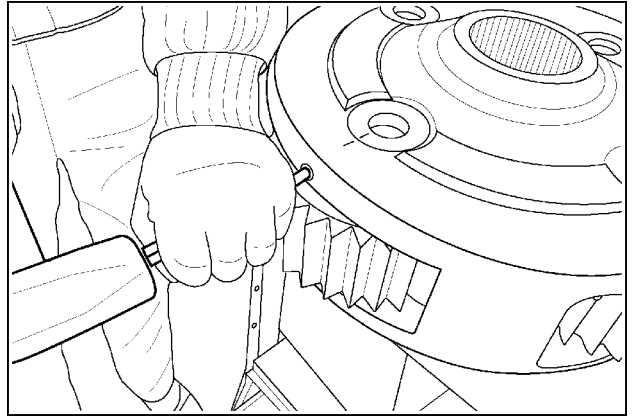
RCPH10FWD306FBJ 6

7. Align the holes in the end of the gear shaft with the hole in the gear carrier.



RCPH10FWD307FBJ 7

8. Install a new spring pin into the gear shaft until the pin is midway into the gear shaft. Repeat steps 1 through 8 for each planet gear assembly installation.



RCPH10FWD298FBJ 8

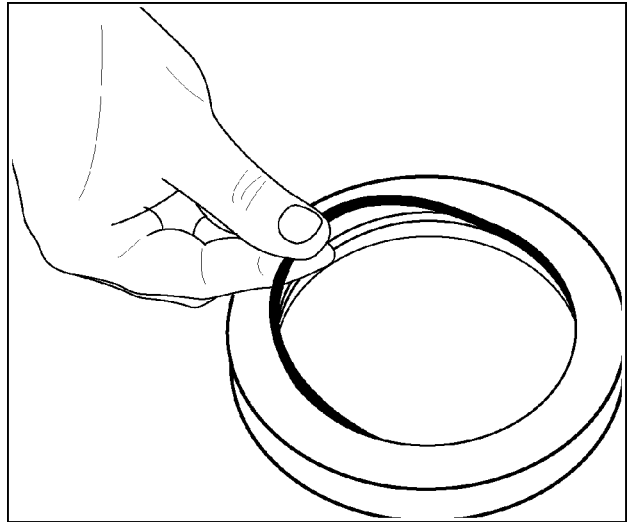
Final drive housing assembly

⚠ CAUTION

Hot area!
Use care when working near hot components. Wear protective gloves.
Failure to comply could result in minor or moderate injury.

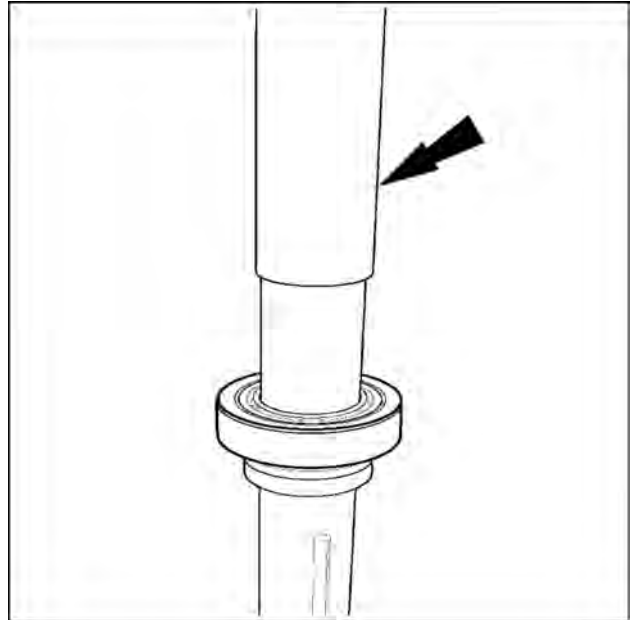
C0034A

9. Lubricate and install a new O-ring into the groove of the inside diameter of the axle oil seal.



RCPH10FWD921AAJ 9

10. Install the bushing onto the axle shaft. Use a suitable driver anvil to drive the bushing until it is fully seated on the flange.

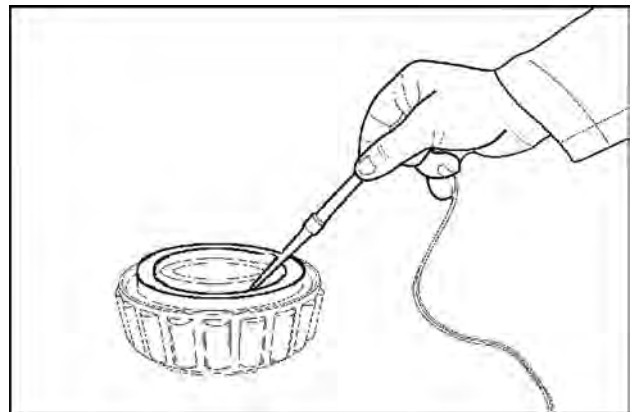


RCPH10FWD331ABJ 10

11. Use a bearing oven to heat the bearing to **110 °C (230 °F)**. to heat the outer axle bearing cone. Use a heat probe to monitor the temperature of the bearing race.

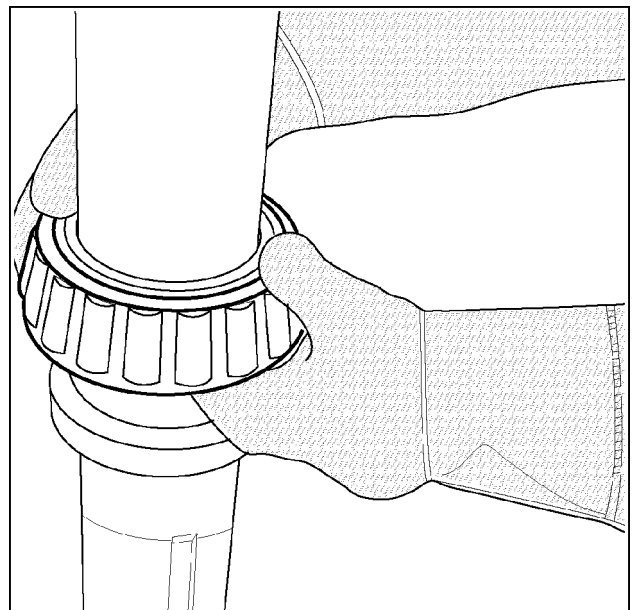
NOTICE: The heater assembly must be placed on a concrete floor or steel work surface.

NOTE: DO NOT heat the bearing to more than **120 °C (248 °F)**.



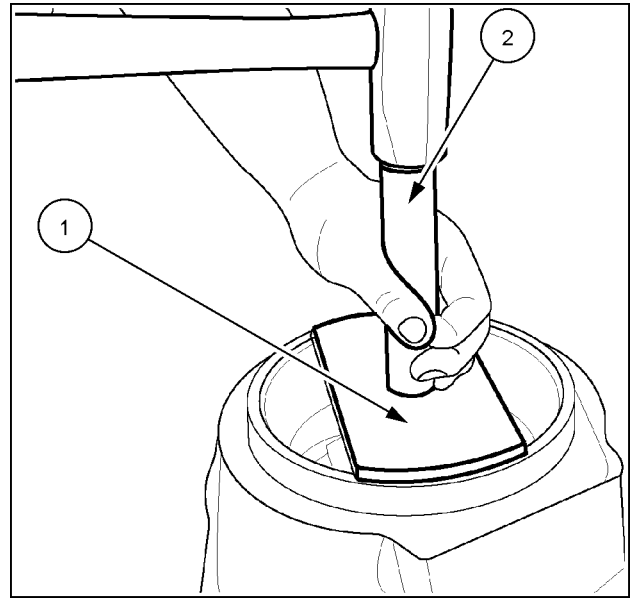
RAIL12TR2262AA 11

12. Install the heated bearing cone on the axle shaft (large side down) against the bushing.



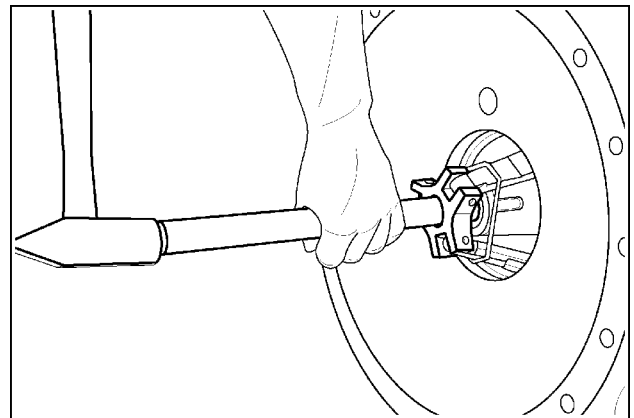
RCPH10FWD924AAJ 12

13. Put a light film of anti-sieze compound around the outside diameter of the outer bearing cup. Use the **CAS2501** bearing cup installer (1) and a short handle (2) to install the bearing cup into the final drive housing until the cup is seated.



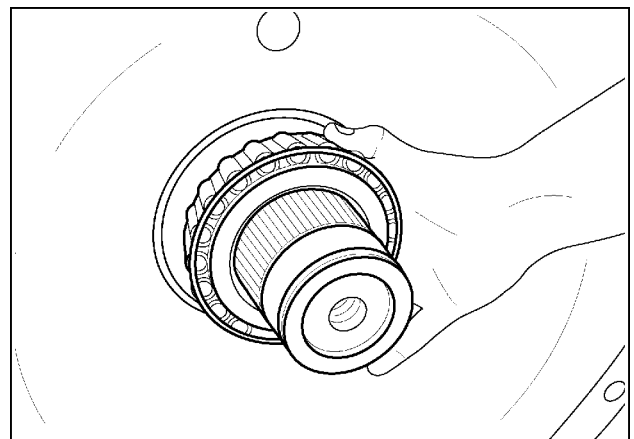
RCPH10FWD926AAJ 13

14. Put a light coat of anti-sieze compound around the outside diameter of the inner bearing cup. Use a universal bearing cup installer to install the bearing cup into the housing until the cup is seated.



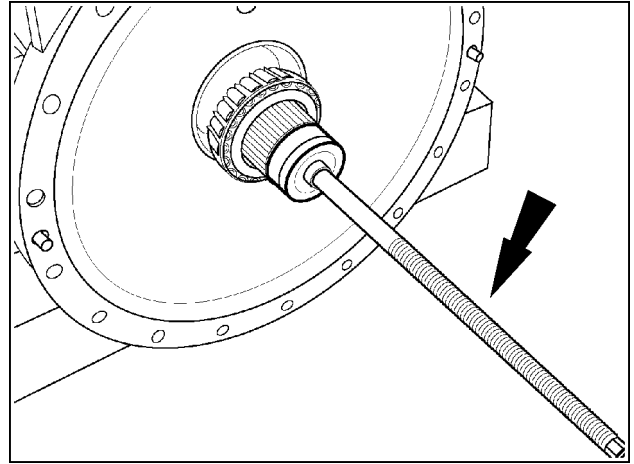
RCPH10FWD308FBJ 14

15. Lubricate the outer axle bearing cup with clean oil. Install the axle shaft assembly into the trumpet housing. Apply a light coat of clean oil to the inside diameter of the inner axle bearing cone and position the bearing on the axle shaft.



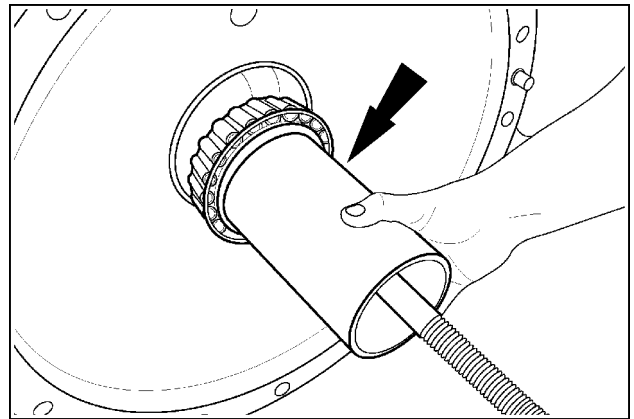
RCPH10FWD928AAJ 15

16. Install the **CAS2666** puller screw with washer tightly into the end of the axle shaft.



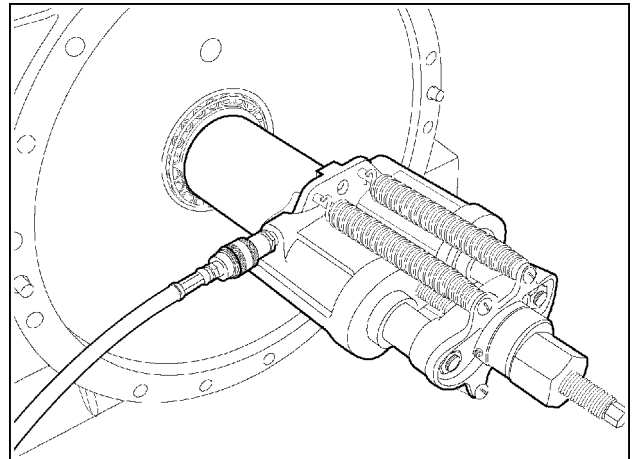
RCPH10FWD893AAJ 16

17. Install the **CAS2666** spacer sleeve (or suitable spacer sleeve) over the axle and against the bearing cone.



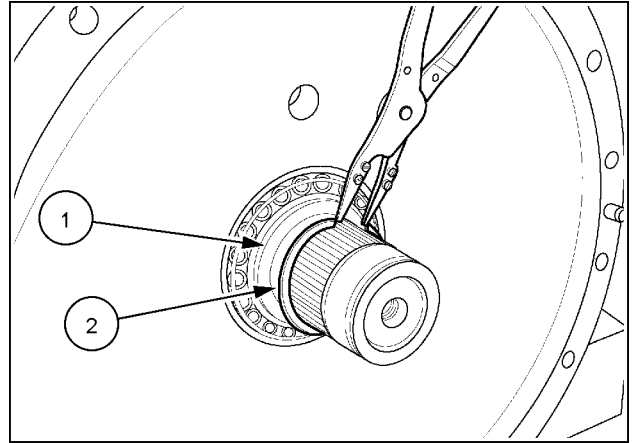
RCPH10FWD929AAJ 17

18. Install the hydraulic twin ram as described in the disassembly procedure. Press the inner bearing cone onto the axle shaft while rotating the ram back and forth by hand until there is a noticeably tight preload on the axle bearings. Remove the hydraulic ram and puller screw.



RCPH10FWD894AAJ 18

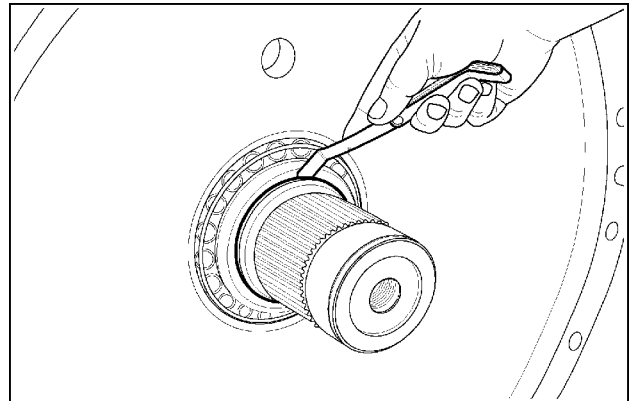
19. Temporarily install the thrust ring (1) and new retaining ring (2) on the axle. Be sure the snap ring is against the outer side of the groove and fully seated.



RCPH10FWD895AAJ 19

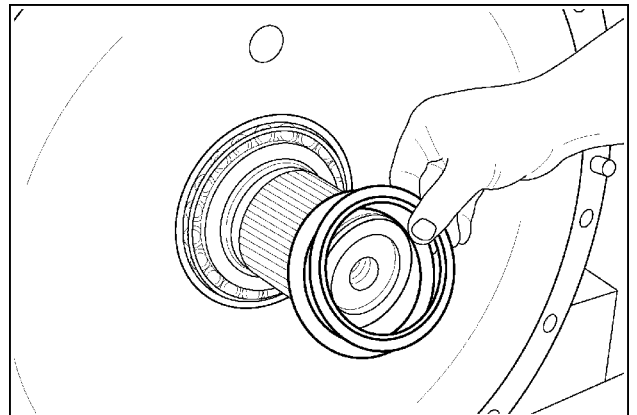
20. Use a thickness gauge to measure and record the distance between the thrust ring and the snap ring in at least two locations.

NOTE: The thickness gauge must fit as tight as possible when measuring.



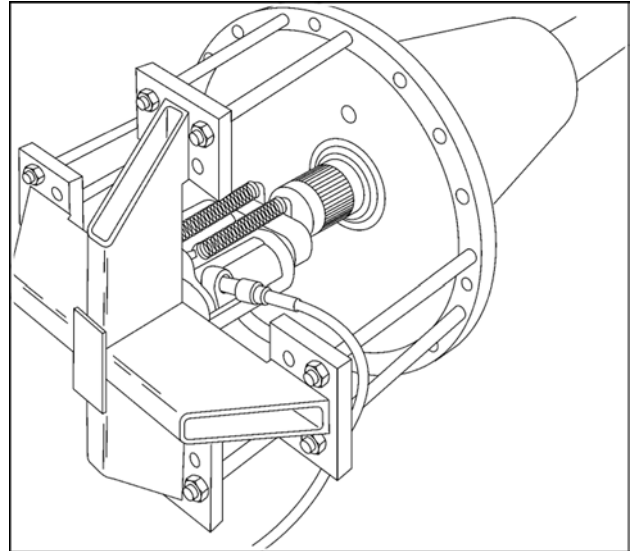
RCPH10FWD930AAJ 20

21. Remove the snap ring and thrust ring. Select a shim combination equal to the distance measured in step 20 within **0.025 mm (0.001 in)**. Install the shim pack, thrust ring and retaining ring on the axle. Be sure the thickest shim is placed next to the bearing and the retaining ring is fully seated in the groove.



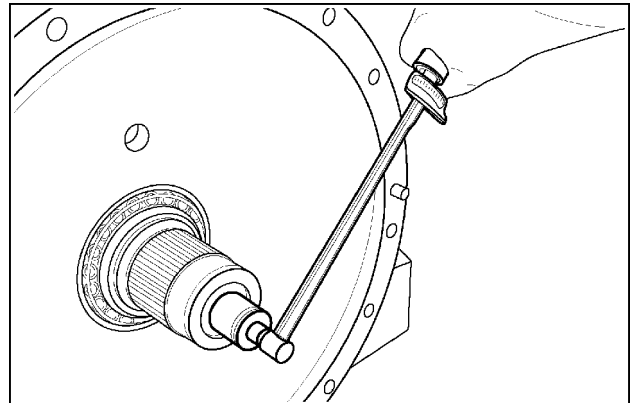
RCPH10FWD931AAJ 21

22. Install the **380002851** axle shaft remover bridge and twin ram onto the housing. Press on the axle until **14000 – 24500 kPa (2031 – 3553 psi)** is shown on the pressure gauge to back seat the bearing against the retaining ring.



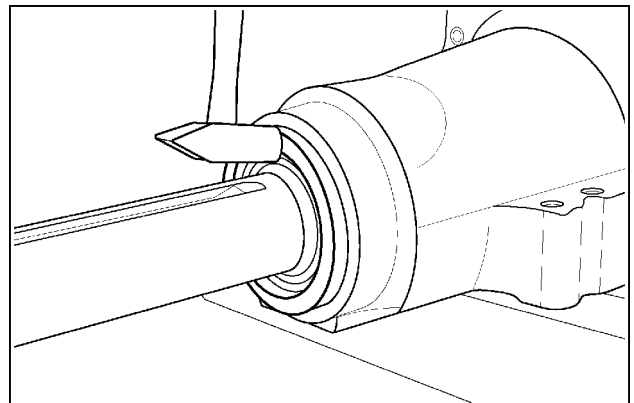
RCPH11FWD219BAM 22

23. Install the **CAS2666** axle shaft rolling torque screw into the end of the axle shaft. Check the axle rolling torque. Rolling torque should be **20 – 27 N·m (177 – 239 lb in)** for new bearings. Adjust rolling torque for used bearings **10 – 14 N·m (89 – 124 lb in)**. The rolling torque can be adjusted by adding or subtracting shims. Changing the shim combination thickness by **0.025 mm (0.001 in)** will change the rolling torque approximately **3 N·m (30 lb in)**. Repeat Steps 20 through 23 until axle rolling torque is within specifications.



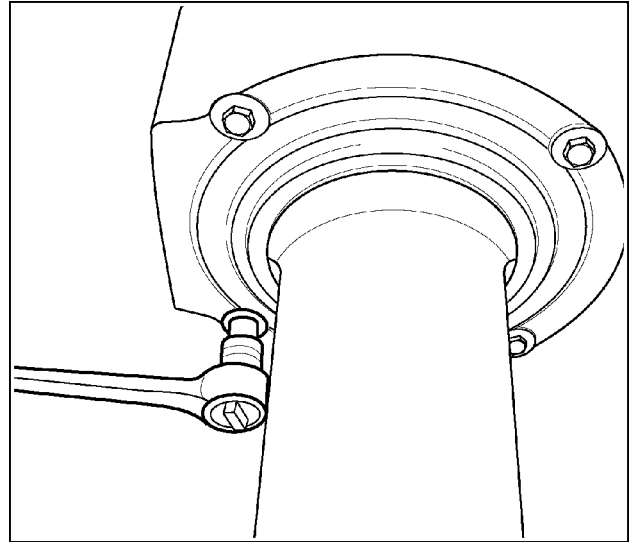
RCPH10FWD933AAJ 23

24. For the 450 series axles: Position the seal squarely into the bore of the housing. Use **CAS2507** axle seal installer and hammer to tap the seal squarely into the housing until seated.



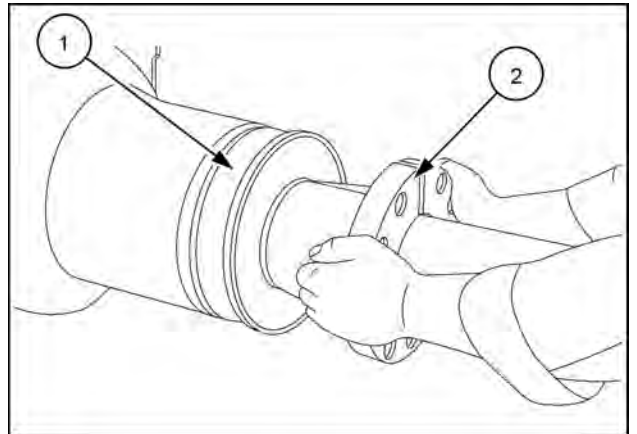
RCPH10FWD309FBJ 24

25. For the 450 series axles: Install the outer oil seal, retaining screws and flat washers.



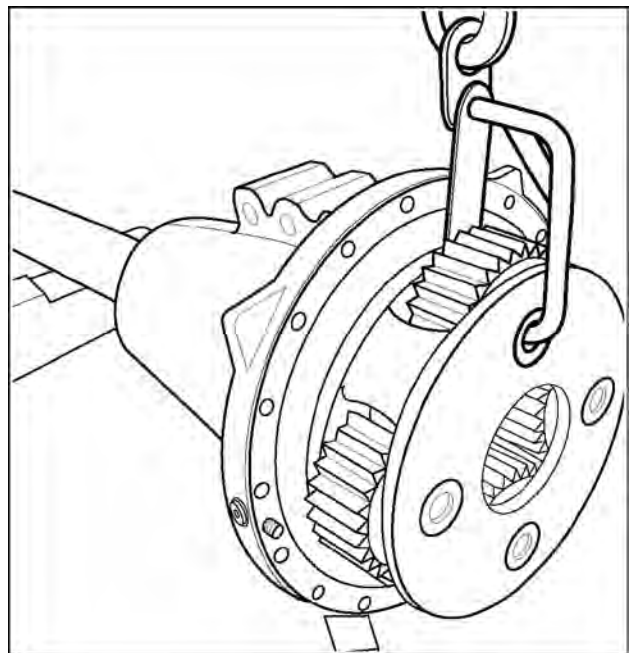
RCPH10FWD295FBJ 25

For the 425 series axles: Fill the inner two grooves of a new axle seal approximately half full with clean grease. Apply **LOCTITE® 515™** sealant around the outside diameter of the new seal. Install the seal over the axle shaft and align squarely to the bore of the axle housing. Use the **380003282** axle seal installer (1) and the tapered split bushing (2) to install the seal to the correct depth in the housing.



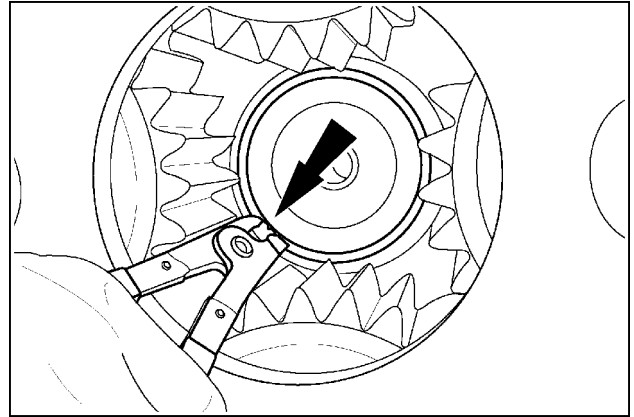
RAIL12TR2345AA 26

26. Coat the splines of the axle shaft with anti-sieze compound. Use the **CAS2676** planetary lifting hook to install the planetary carrier assembly on the axle shaft.



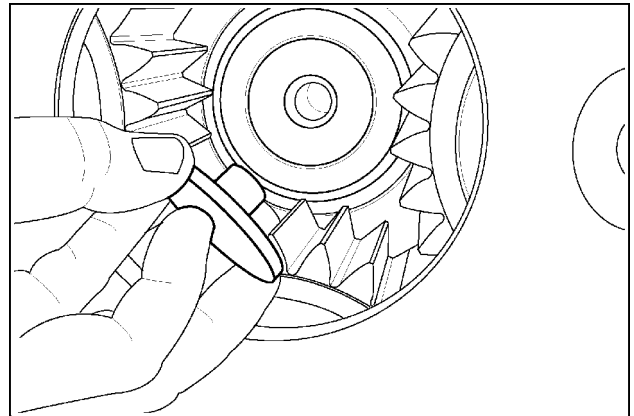
RCPH10FWD292FBJ 27

27. Install the planetary carrier retaining ring in the groove on the end of the axle shaft.



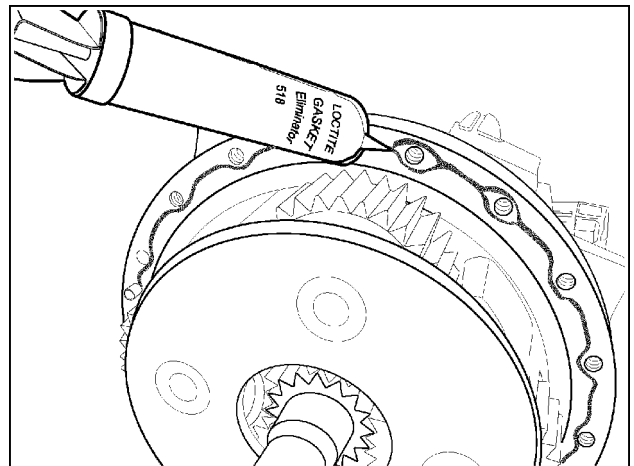
RCPH10FWD310FBJ 28

28. Install a new nylon thrust insert in the counter-bore on the end of the axle shaft. Retain the insert with clean grease.



RCPH10FWD290FBJ 29

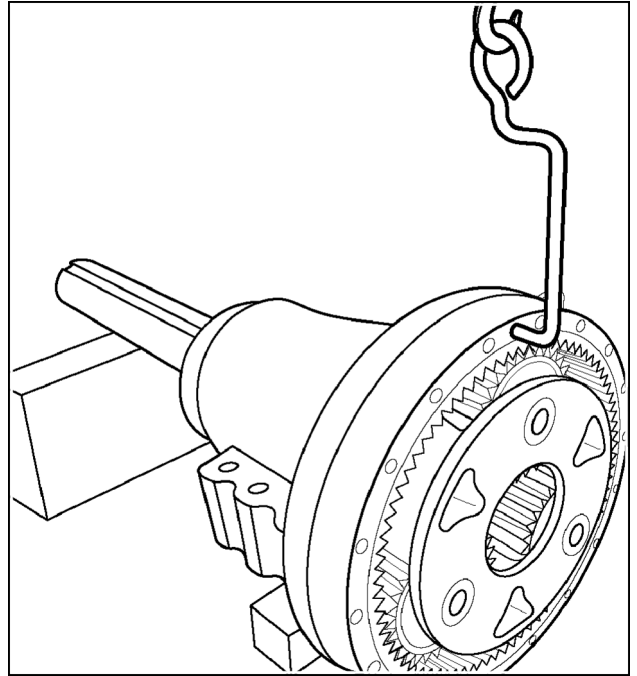
29. Clean the mating surface of the final drive housing of all residual sealant. Apply a **3 mm (0.118 in)** bead of anaerobic sealant (or equivalent) around the mounting surface of the axle housing.



RCPH10FWD311FBJ 30

30. Carefully align and install the stationary ring gear on the housing so the dowel pin holes and match marks made at disassembly will align.

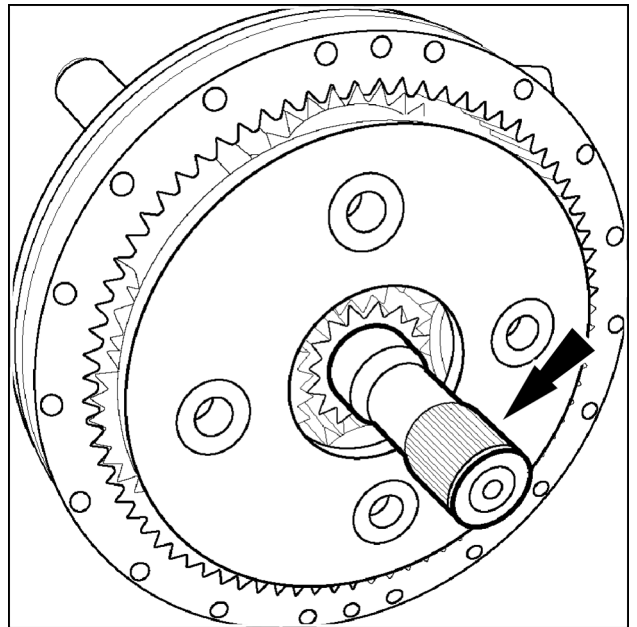
NOTE: Repeat steps 1 through 29 to assemble the opposite side final drive.



RCPH10FWD289FBJ 31

31. Install the short axle sun gear into the planetary carrier.

NOTE: The larger short axle must be installed on the right hand (brake carrier) side of the differential



RCPH10FWD312FBJ 32

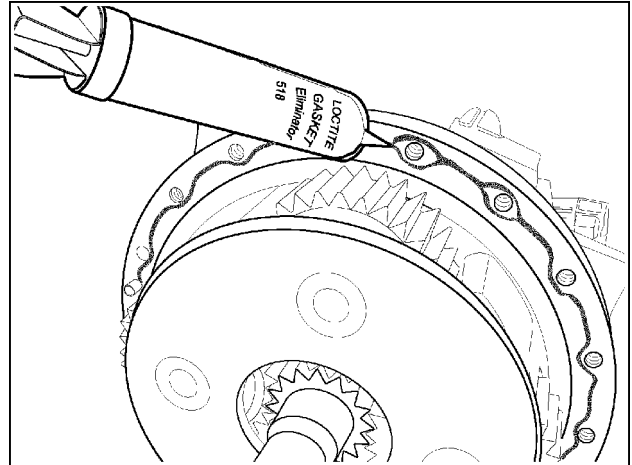
Next operation:

Final drive - Install - 400 Series bar axles (25.310)

Final drive - Install - 400 Series bar axles

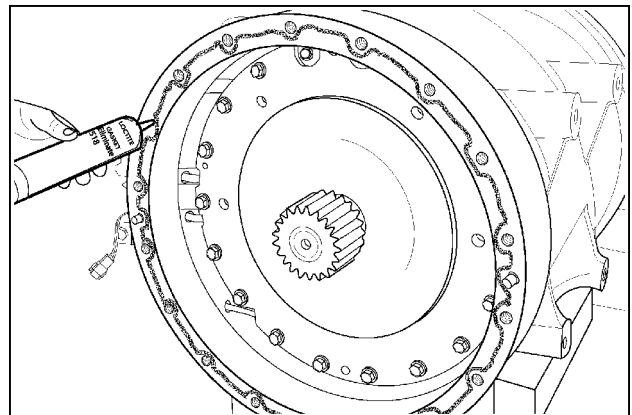
Steiger® 370	NA
Steiger® 420	NA
Steiger® 470	NA

1. Put a **3 mm (0.12 in)** bead of anaerobic sealant around the mating flange of the final drive housing.



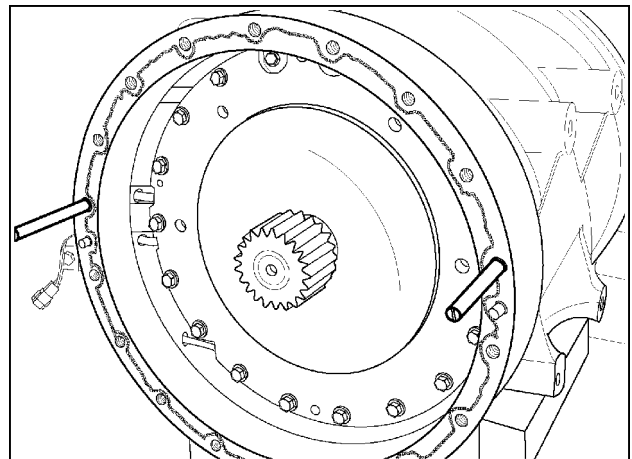
RCPH10FWD311FBJ 1

2. Put a **3 mm (0.12 in)** bead of anaerobic sealant around the mating flange of the differential housing.



RCPH10FWD906AAJ 2

3. Install two **CAS2496** alignment studs horizontally opposite each other in the differential housing.

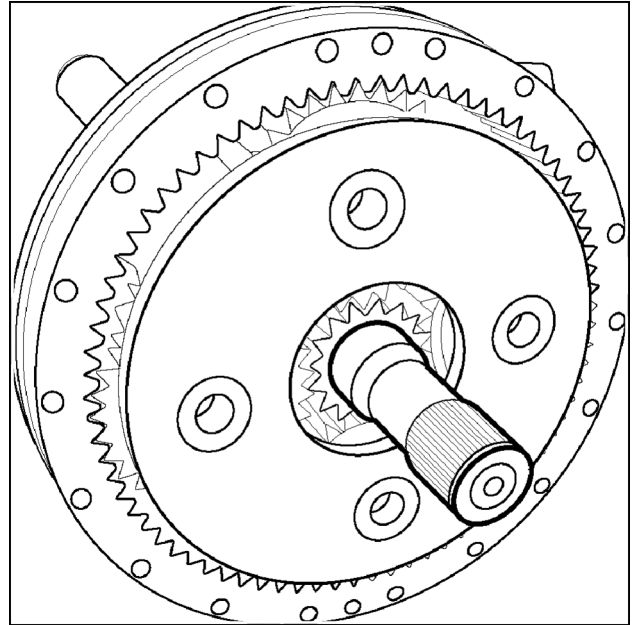


RCPH10FWD907AAJ 3

4. If not previously installed, install the short axle sun gear into the planetary carrier. Install the stationary ring gear on the planetary carrier so that the assembly match marks align and the dowel pins engage the ring gear.

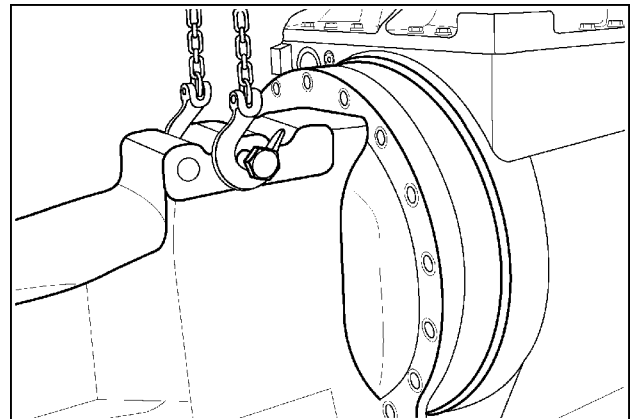
NOTICE: The longer of the two short axles must be installed on the right hand (brake carrier) side of the differential housing.

NOTE: The short axles can be installed in the differential first or the planetary carrier first, which ever is preferred. However the final drive will be easier to install if the sun gear is installed in the planetary carrier first.



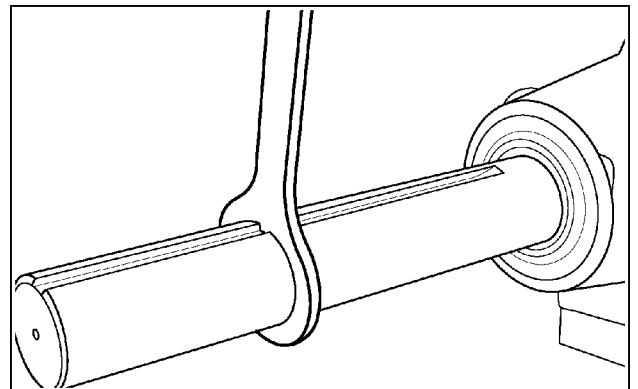
RCPH10FWD312FBJ 4

5. Lift and align the final drive housing with the differential housing so the assembly marks on the differential housing and final drive housing align and the housing will engage the alignment studs.



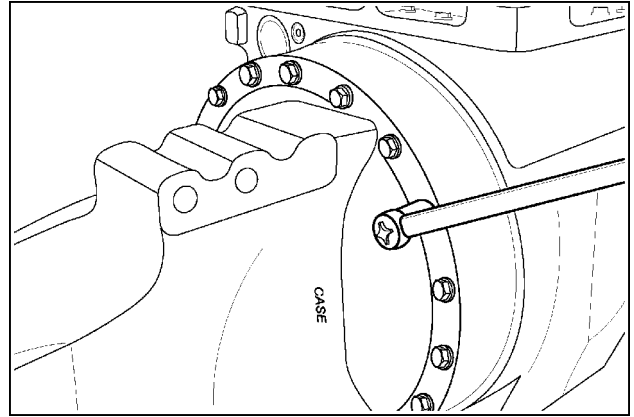
RCPH10FWD313FBJ 5

6. Use the **CAS2748** wrench to rotate the axle back and forth to mesh the short axle and differential gears and push the housing up to the differential housing as far as possible.



RCPH10FWD314FBJ 6

7. Install the final drive housing retaining bolts with washers. Tighten the bolts alternately from side to side to pull the final drive onto the dowel pins. Tighten the bolts to specifications. Repeat the above procedures for the opposite side final drive.

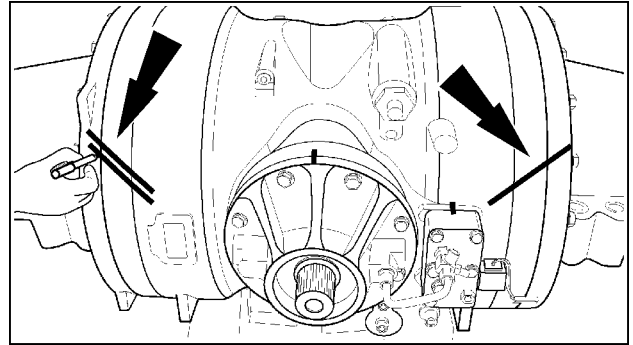


RCPH10FWD315FBJ 7

Final drive - Remove - 500 Series axles

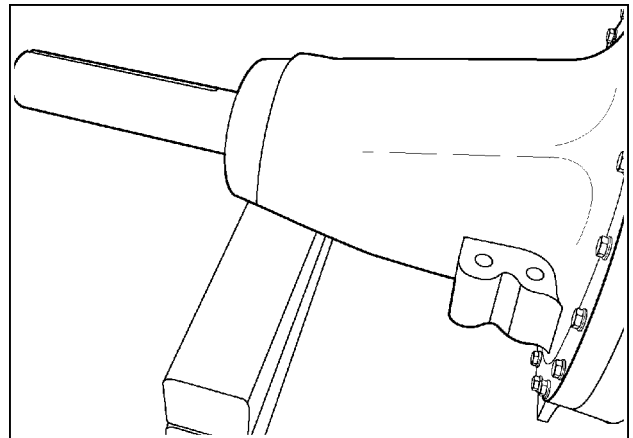
Steiger® 500	NA
Steiger® 540	NA

1. Position the axle assembly on a clean shop floor. Put assembly reference marks across each final drive housing to the differential housing.



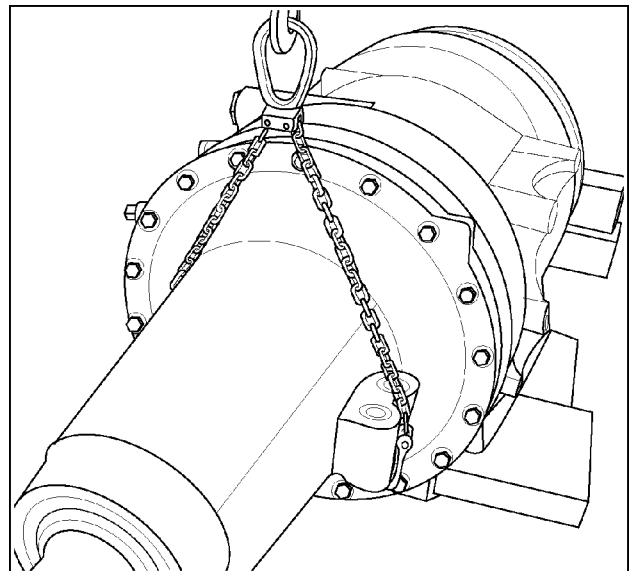
RCPH10FWD884AAJ 1

2. Put blocking under one final drive housing to keep the axle assembly level when the opposite final drive housing is removed.



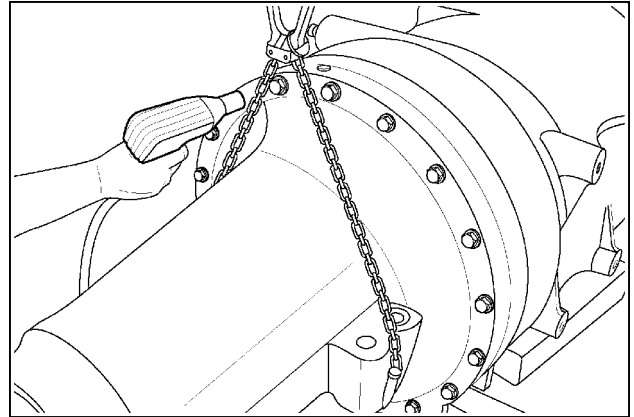
RCPH10FWD885AAJ 2

3. Connect an overhead hoist to the axle trumpet housing. Take-up the weight of the housing.



RCPH10FWD886AAJ 3

4. Remove the 18 bolts securing the trumpet housing and stationary ring gear to the differential housing.



RCPH10FWD887AAJ 4

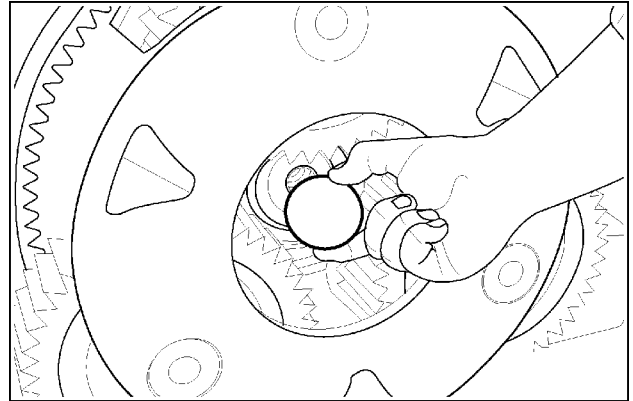
5. Use the hoist to lift and release the trumpet housing a small amount several times to weaken the sealant bond. Use a pry bar between the stationary ring gear and differential housing to pry the ring gear out of the dowel pins. Repeat **3, 4, 5** remove the opposite side final drive.

NOTE: The stationary ring gear must be removed with the trumpet housing.

Final drive - Disassemble - 500 Series axles

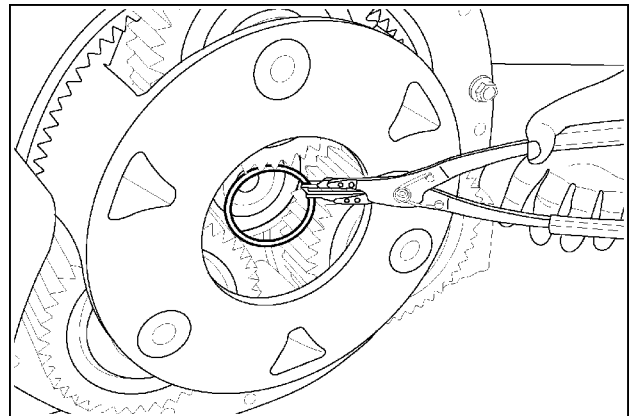
Steiger® 500	NA
Steiger® 540	NA

1. Remove the nylon thrust button from the end of the axle shaft.



RCPH10FWD889AAJ 1

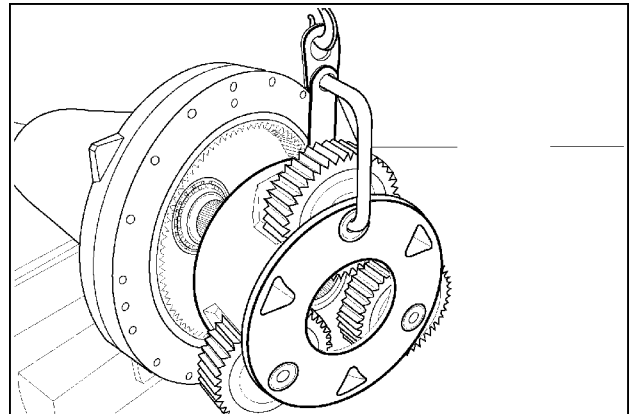
2. Remove the snap ring securing the planetary carrier assembly to the axle.



RCPH10FWD890AAJ 2

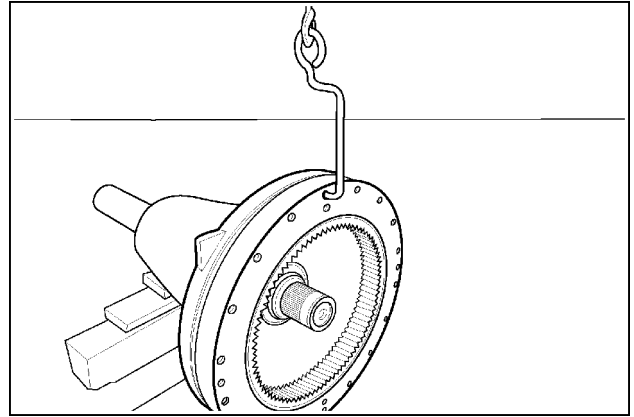
3. Use the **CAS2676** planetary carrier lifting hook to remove the planetary assembly from the housing.

NOTICE: Be sure the retaining strap is positioned behind the gear to prevent the lifting fixture from pulling out of the pinion gear shaft.



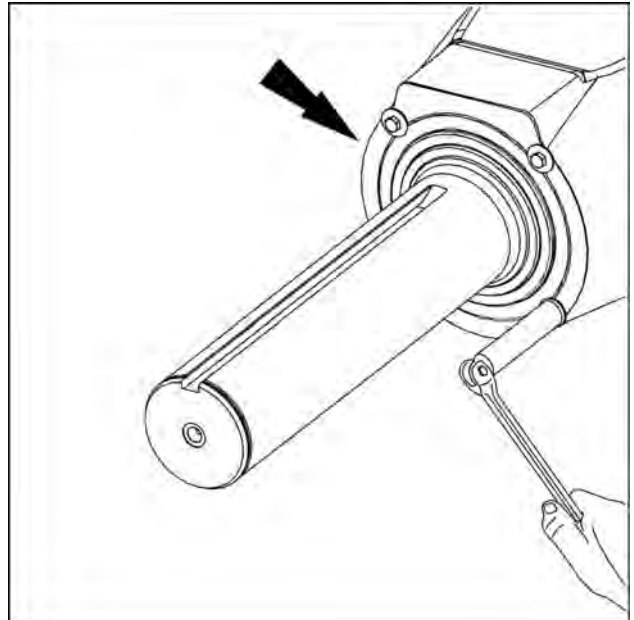
RCPH10FWD891AAJ 3

4. Use the CNH299075 lifting hook to remove the stationary ring gear from the axle housing.



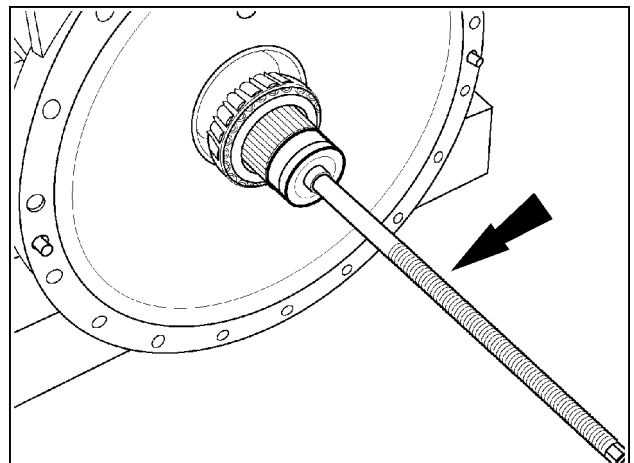
RCPH10FWD892AAJ 4

5. Remove the oil seal and the retaining screws and washers from the final drive housing.



RCPH10FWD546ABJ 5

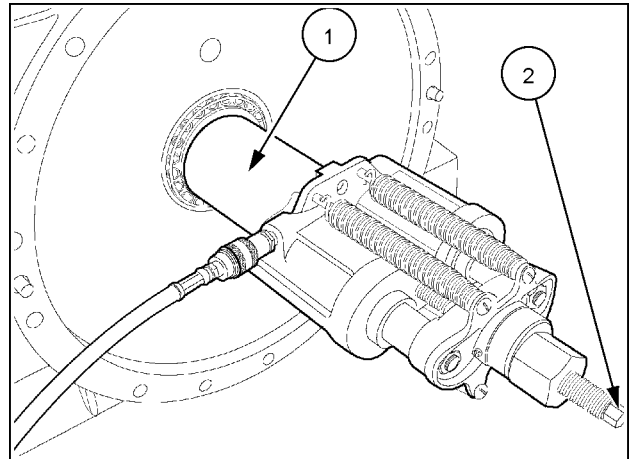
6. Install the **CAS2666** puller screw and spacer washer tightly into the end of the axle shaft.



RCPH10FWD893AAJ 6

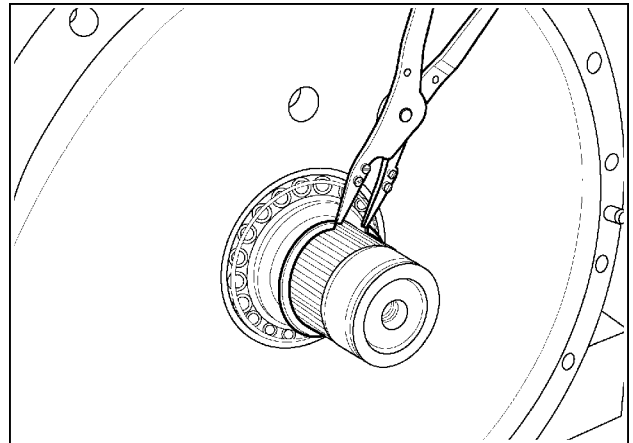
7. Install the **CAS2666** bearing installer tube (1) over the axle and against the bearing cone. Install a twin ram over the puller screw and install the nut (2) on the puller screw. Hand tighten the nut to hold the spacer centered against the bearing. Use the hydraulic ram to press the bearing onto the axle shaft while rotating the ram back and forth until there is a noticeably tighter bearing preload. Remove the ram, spacer tube and puller screw.

NOTE: The bearing is back seated against the snap ring.



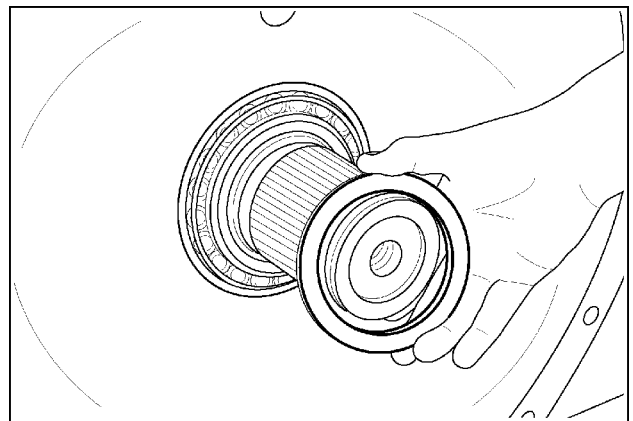
RCPH10FWD894AAJ 7

8. Use a snap ring pliers to remove the snap ring from the groove of the axle.



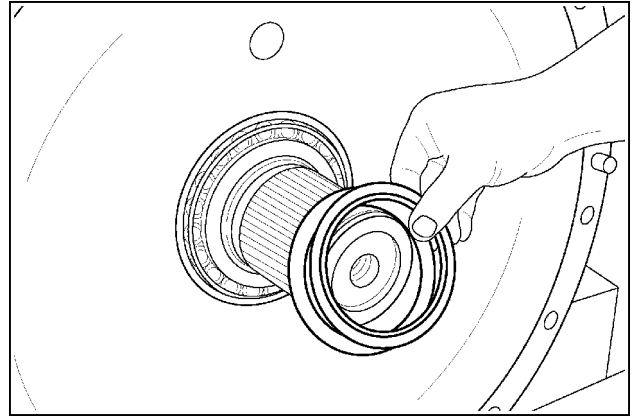
RCPH10FWD895AAJ 8

9. Remove the thrust ring from the axle shaft.



RCPH10FWD896AAJ 9

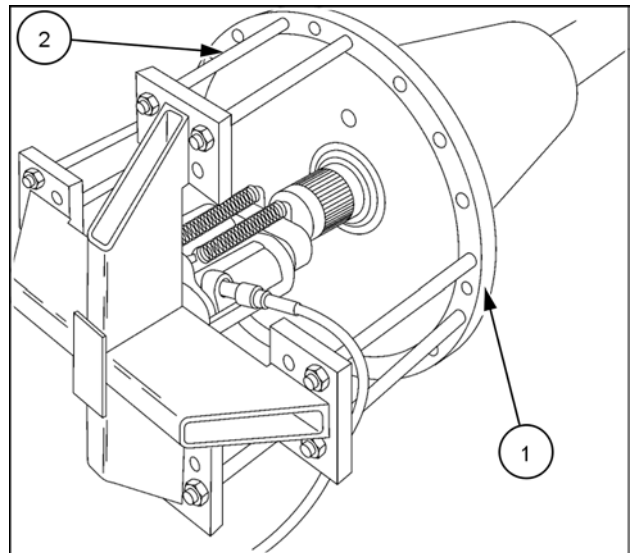
10. Remove and retain the shims from the axle shaft.



RCPH10FWD897AAJ 10

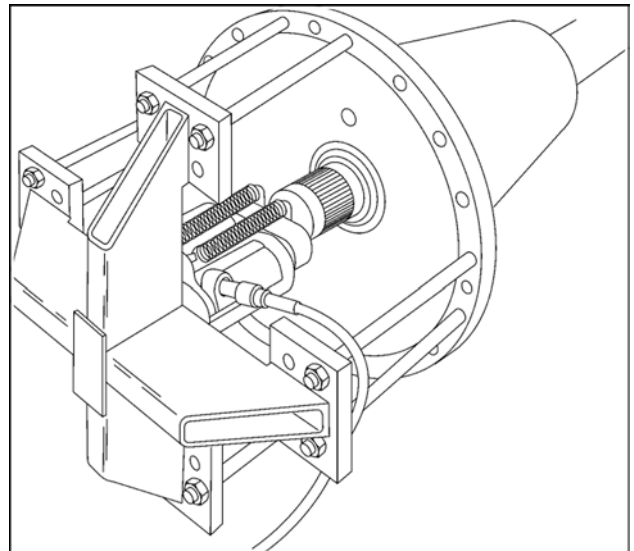
11. Install the **380002851** axle shaft remover bridge (1) securely on the axle housing in the location shown. Tighten the eight attaching bolts (2) tightly on the axle housing and puller bridge.

NOTICE: It will require **45.36 t (100000 lb)** or more to press out the axle. For this reason the puller bridge must be attached parallel with the axle mounting pads as shown.



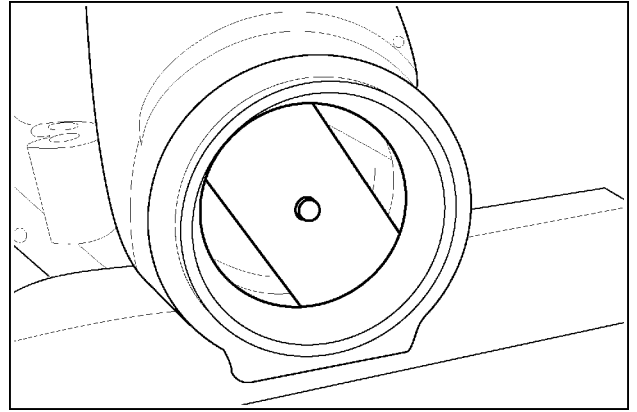
RCPH11FWD219BAM 11

12. Install the hydraulic ram between the puller bridge and the end of the axle. Press the axle through the inner bearing cone. Remove the axle from the housing. Discard the outer seal.



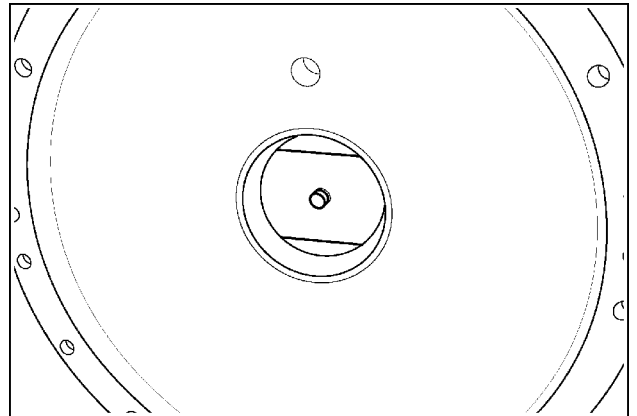
RCPH11FWD219BAM 12

13. Use **CAS2663** bearing driver and CAS2405 long bearing driver handle to remove the outer bearing cup from the housing.



RCPH10FWD900AAJ 13

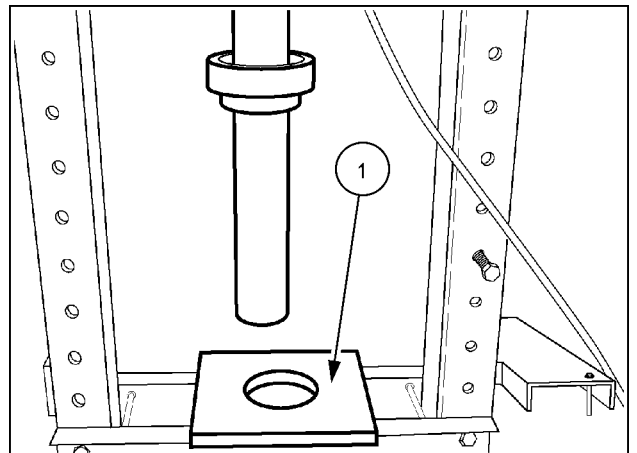
14. Use the appropriate size bearing driver and CAS2405 long bearing driver handle to remove the inner bearing cup from the housing.



RCPH10FWD901AAJ 14

15. To remove the axle outer bearing and seal wear ring, place the **CAS2668** axle outer bearing removal press plate (1) on a press bed. Install the appropriate size lifting eye into the threaded hole in the end of the axle shaft. Use a lifting eye to place the axle on the press bed so that the seal ring is resting on the press plate.

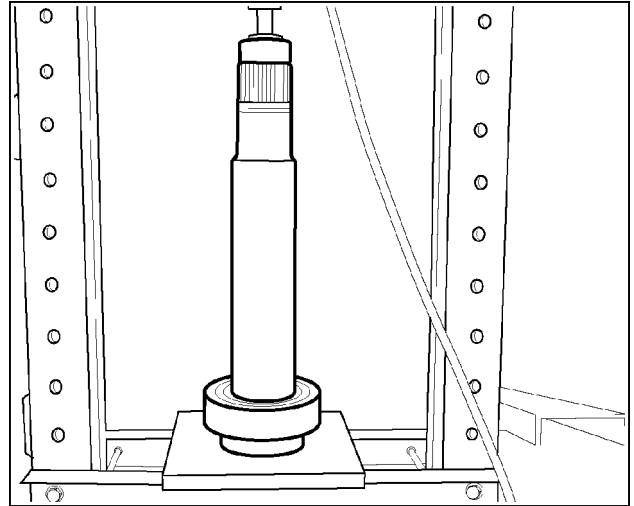
NOTE: If possible, place the bearing cup over the cone before pressing.



RCPH10FWD902AAJ 15

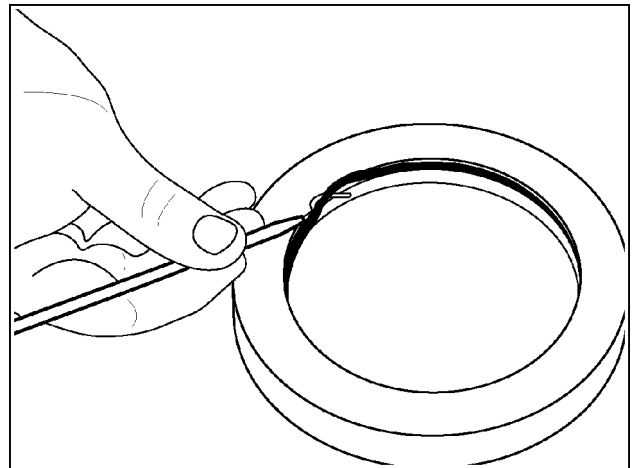
16. Use the press to remove the outer axle bearing cone and seal wear ring.

NOTE: Place a heavy wood block under the press bed for the axle to fall on.



RCPH10FWD903AAJ 16

17. Remove and discard the O-ring from the seal wear ring.

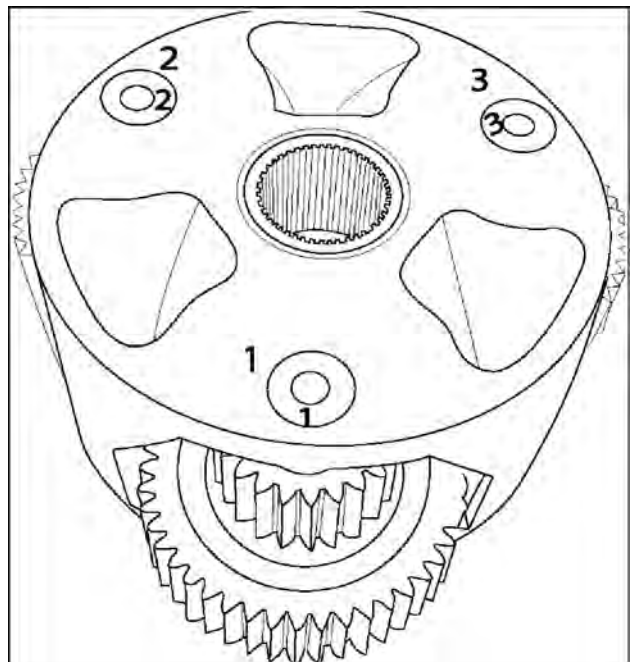


RCPH10FWD904AAJ 17

Planetary carrier disassembly

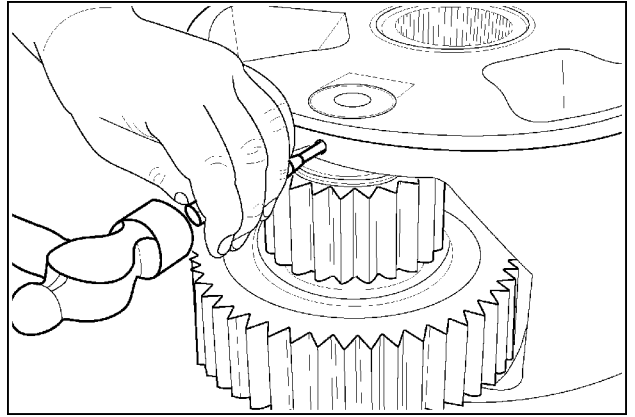
18. If the gears are to be reused, mark each gear and the carrier so that the gears and pins are assembled in their original location in the gear carrier.

NOTE: The planetary carrier may be a four planet gear arrangement. Repair procedures will be the same as a three planet gear carrier



RCPH10FWD911AAJ 18

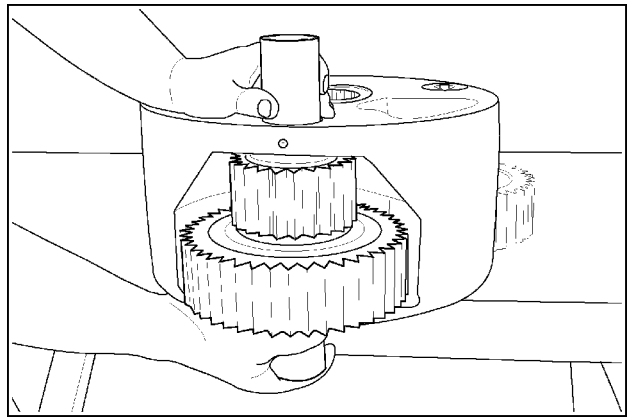
19. Drive the spring pin into the center of the gear shaft.



RCPH10FWD912AAJ 19

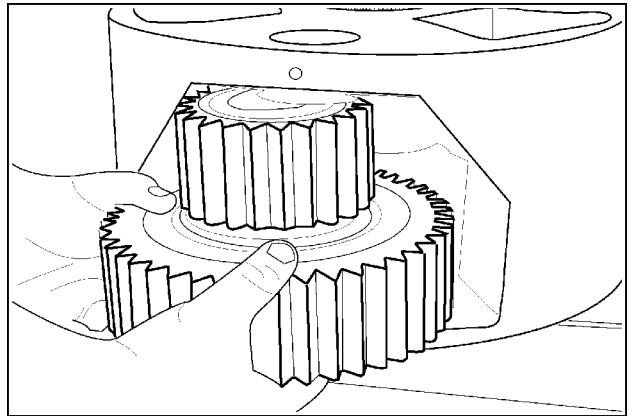
20. Use the **CNH299048** pilot sleeve to push the gear shaft out and retain the needle roller bearings in the gear.

NOTE: There is a double row of non caged needle roller bearings in each gear.



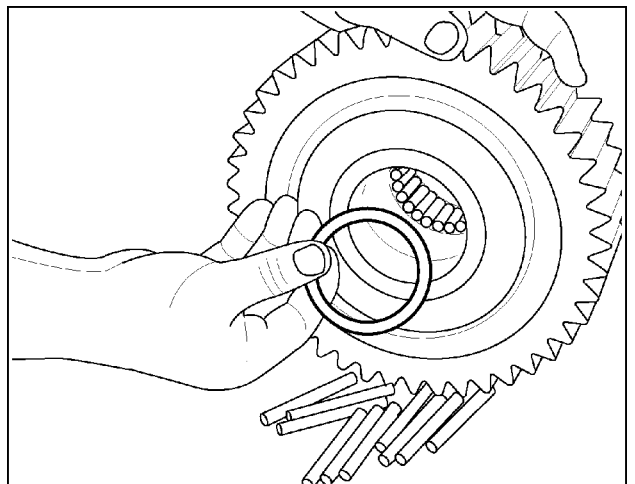
RCPH10FWD913AAJ 20

21. Carefully remove the planetary gear assembly with thrust washers from the carrier.



RCPH10FWD914AAJ 21

22. Remove the needle roller bearings and separator ring from within the gear.
Repeat **17** through **21** for each remaining planet gear.
Clean and inspect all final drive gears, bearings and other parts for too much wear or other damage. Replace all worn or damaged parts.
Repeat **1** through **21** to disassemble the opposite side final drive.



RCPH10FWD915AAJ 22

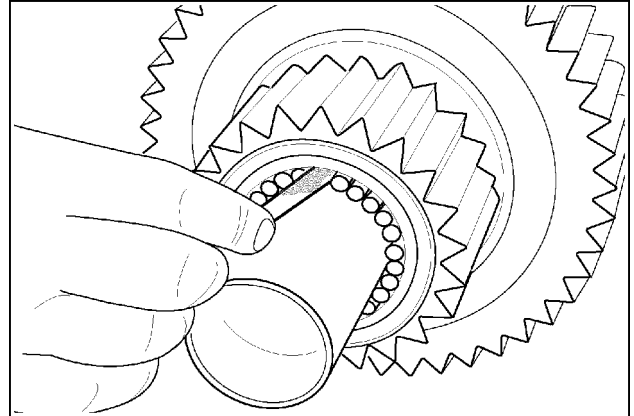
Final drive - Assemble - 500 Series axles

Steiger® 500	NA
Steiger® 540	NA

Planetary carrier assembly

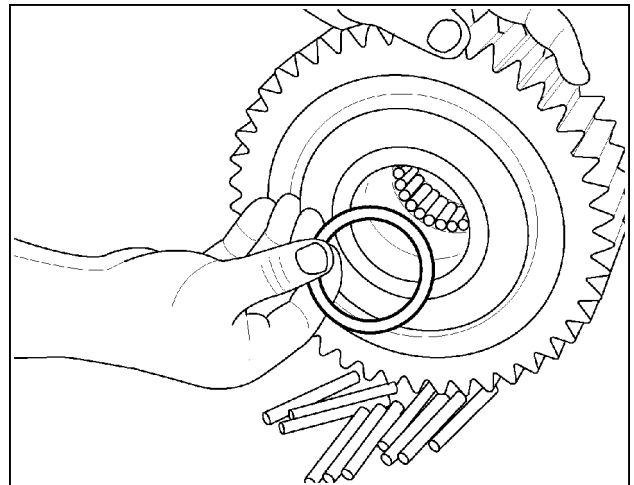
1. Lubricate the needle roller bearings with clean grease or petroleum jelly and load 29 bearings on one side of the gear.

NOTE: Use the **CNH299048** pilot sleeve to hold the first row of needle bearings in place.



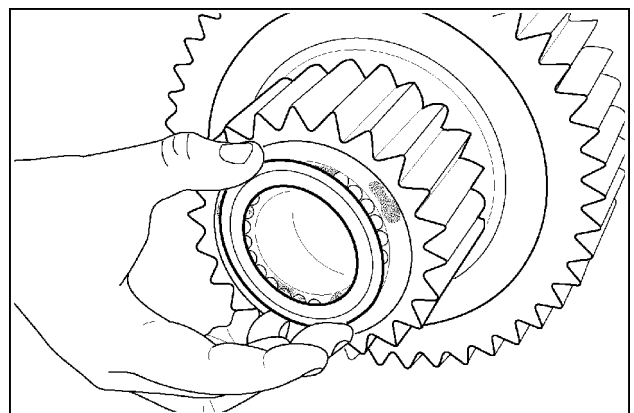
RCPH10FWD916AAJ 1

2. Install the separator ring and load the remaining 29 needle roller bearings into the gear. Push the pilot sleeve into the gear to hold all the roller bearings in place.



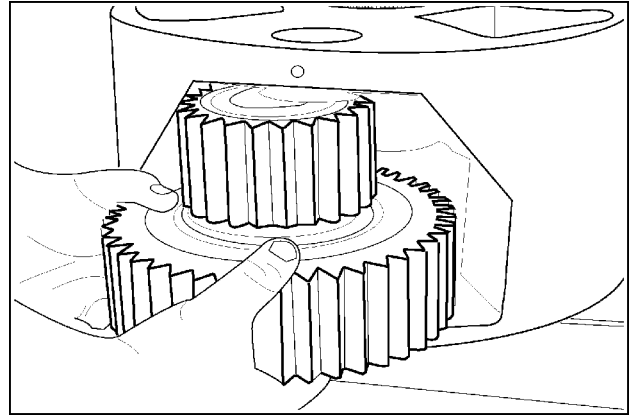
RCPH10FWD915AAJ 2

3. Lubricate the thrust washers with clean grease or petroleum jelly. Install one thrust washer on each side of the gear. Adjust the pilot sleeve to engage the thrust washers to hold them in place.



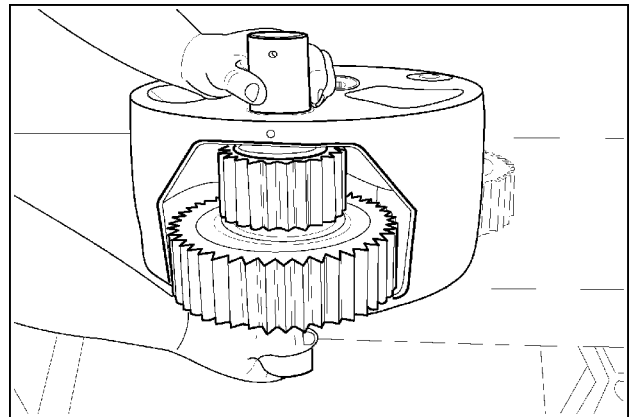
RCPH10FWD917AAJ 3

4. Carefully put the planet gear into its original position in the gear carrier while holding the pilot sleeve in place.



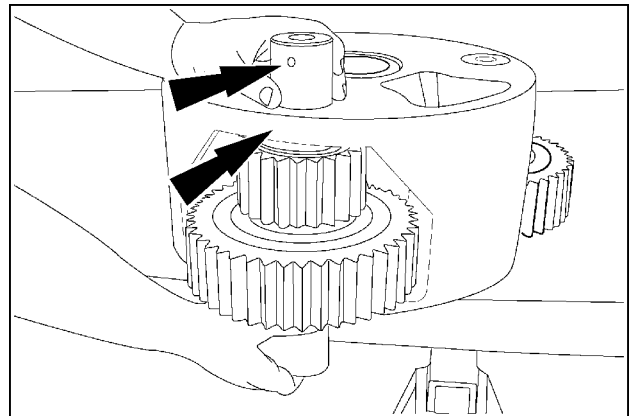
RCPH10FWD914AAJ 4

5. While maintaining tension on the pilot sleeve from the bottom, align the gear and carefully push the gear shaft through the thrust washer and bearings.



RCPH10FWD918AAJ 5

6. While holding tension on the pilot sleeve, install the gear shaft into the carrier. Align the holes in the end of the gear shaft with the spring pin hole in the gear carrier.

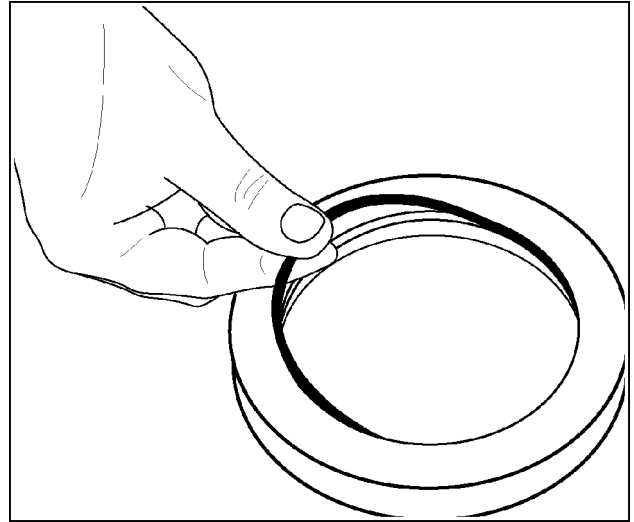


RCPH10FWD919AAJ 6

7. Install a NEW spring pin into the gear shaft until the end of the pin is flush or slightly below the edge of the carrier housing.
Repeat Steps 1 through 7 for each planet gear assembly installation.

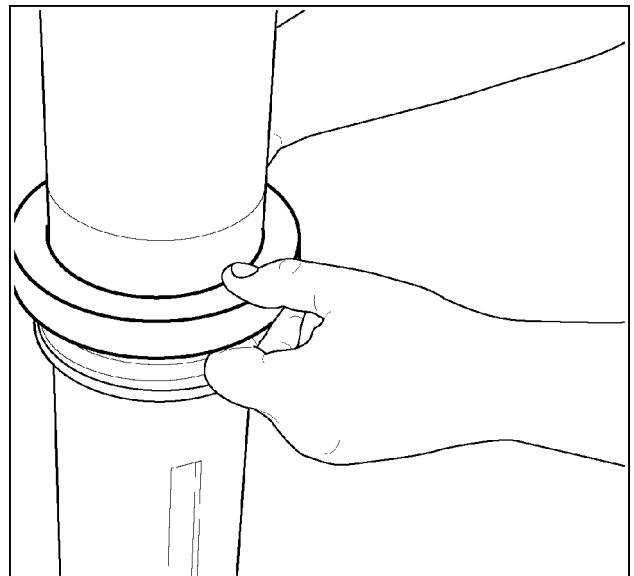
Final drive housing assembly

8. Lubricate and install a new O-ring into the groove in the inside diameter of the axle seal wear ring.



RCPH10FWD921AAJ 7

9. Install the axle seal wear ring on the axle shaft (flat side up) until the seal ring is seated on the flange of the axle.



RCPH10FWD922AAJ 8

10. **CAUTION**

Burn hazard!
Always wear heat-resistant protective gloves when handling heated parts.
Failure to comply could result in minor or moderate injury.

C0047A

Use a bearing oven to heat the bearing to **110 °C (230 °F)** to heat the outer axle bearing cone. Use a heat probe to monitor the temperature of the bearing race.

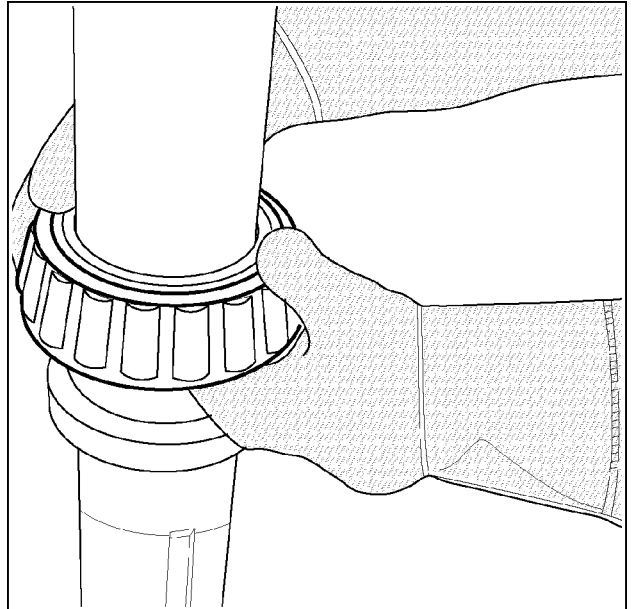
NOTICE: The heater assembly must be placed on a concrete floor or steel work surface.

NOTE: DO NOT heat the bearing to more than **120 °C (248 °F)**.



RAIL12TR2262AA 9

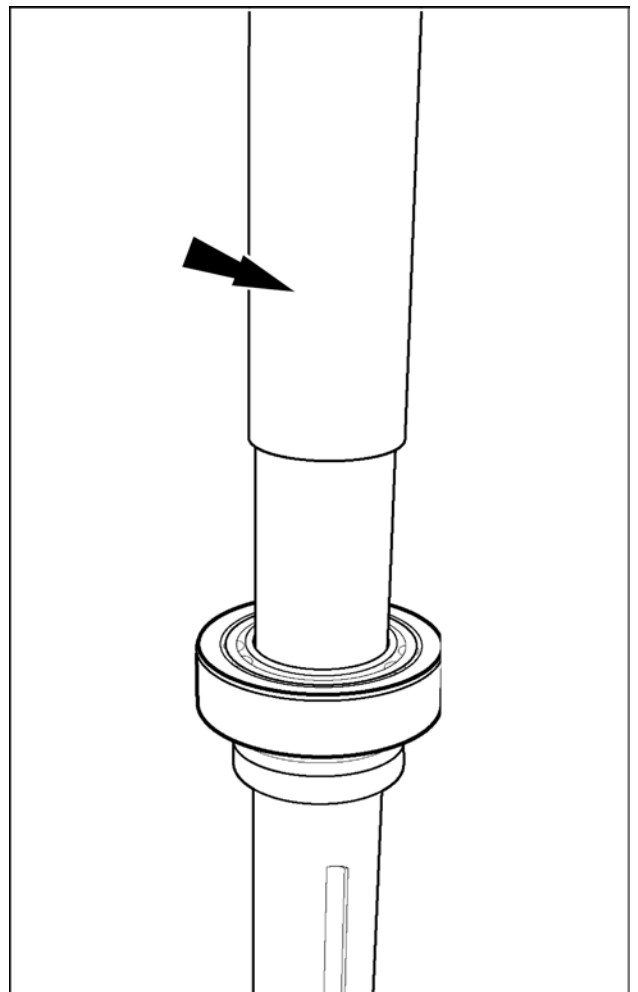
11. Install the heated bearing cone on the axle shaft (large side down) against the seal wear ring.



RCPH10FWD924AAJ 10

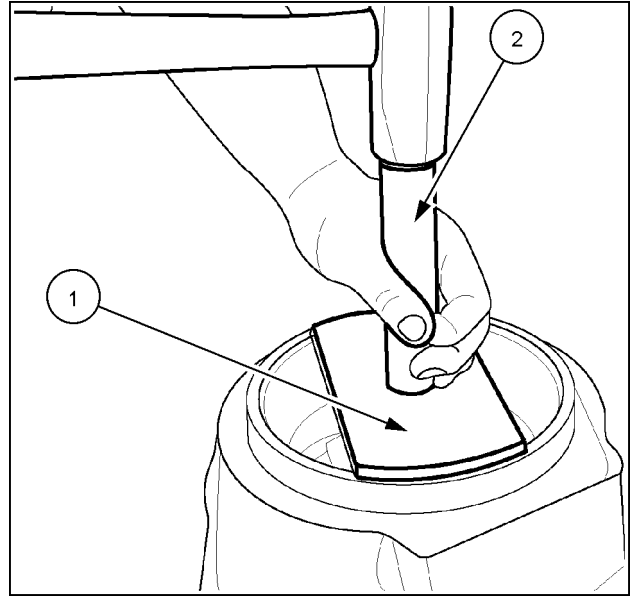
If the bearing cone did not seat against the seal ring (or if a bearing heater was not available), temporarily install the cup over the cone. Use the **CAS2514-2** bearing driver and heavy sledge hammer to drive the bearing cone and seal ring on until fully seated against the flange of the axle.

NOTE: If required, the wheel hub and bushing maybe used as a support stand to hold the axle in a vertical position.



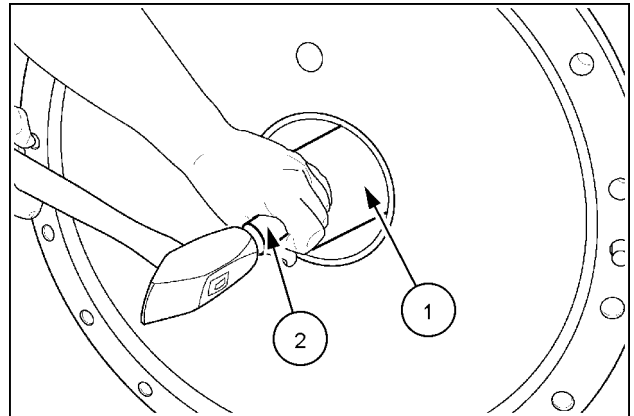
RCPH11FWD221BAM 11

12. Put a light coat of anti-sieze compound around the outside diameter of the outer bearing cup. Use the **CAS2501** bearing cup installer (1) and **380001108** short handle (2) to install the bearing cup into the trumpet housing until the cup is seated.



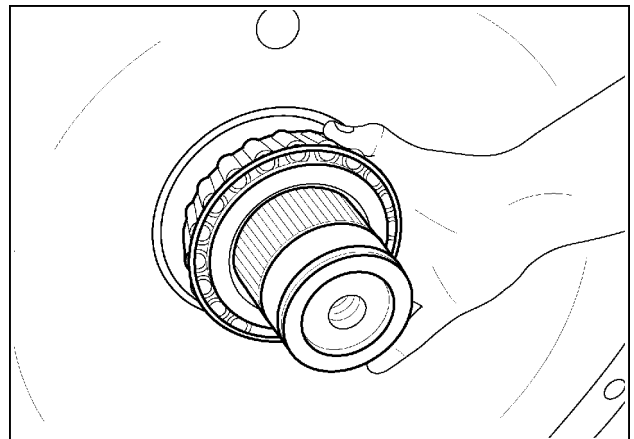
RCPH10FWD926AAJ 12

13. Put a light coat of anti-sieze compound around the outside diameter of the inner bearing cup. Use the **CAS2663** bearing cup installer (1) and CNH299077 short handle (2) to install the bearing cup into the housing until the cup is seated.



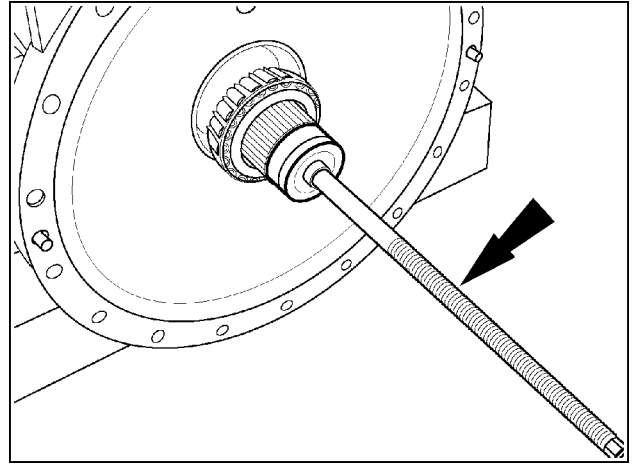
RCPH10FWD927AAJ 13

14. Lubricate the outer axle bearing cone with clean oil. Install the axle shaft assembly into the trumpet housing. Apply a light coat of clean oil to the inside diameter of the inner axle bearing cone and position the bearing on the axle shaft.



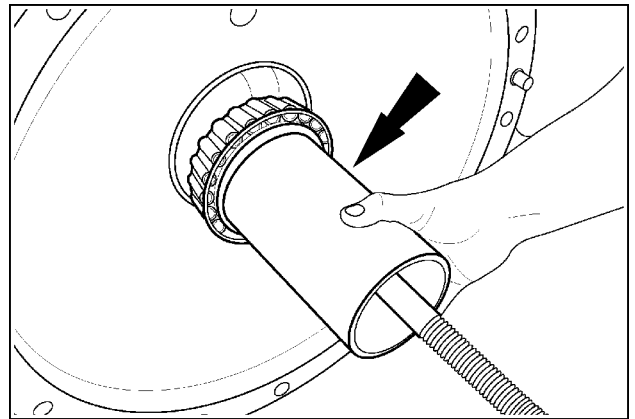
RCPH10FWD928AAJ 14

15. Install the **CAS2666** puller screw with washer tightly into the end of the axle shaft.



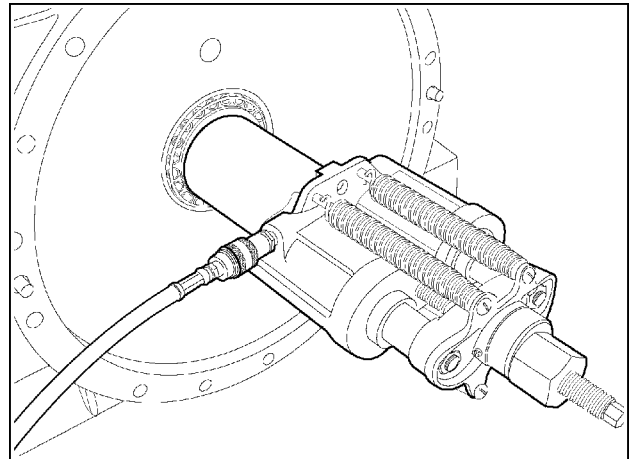
RCPH10FWD893AAJ 15

16. Install the **CAS2666** spacer sleeve over the axle and against the bearing cone.



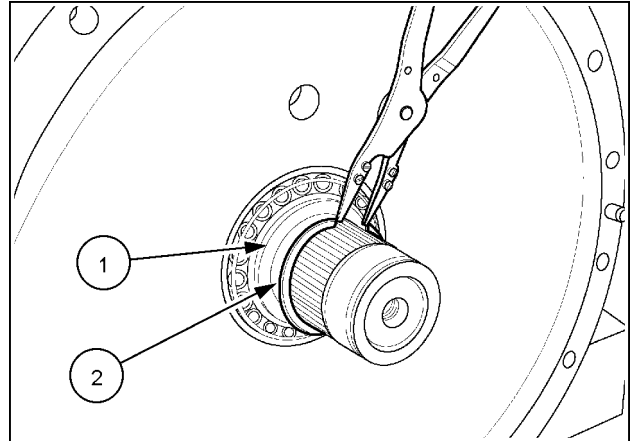
RCPH10FWD929AAJ 16

17. Install the twin ram. Press the inner bearing cone onto the axle shaft while rotating the ram back and forth by hand until there is a noticeably tight preload on the axle bearings. Remove the hydraulic ram and puller screw.



RCPH10FWD894AAJ 17

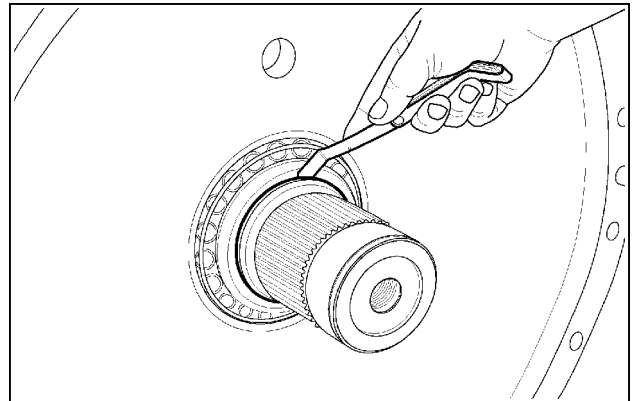
18. Temporarily install the thrust ring (1) and new retaining ring (2) on the axle. Be sure the snap ring is against the far side of the groove and fully seated.



RCPH10FWD895AAJ 18

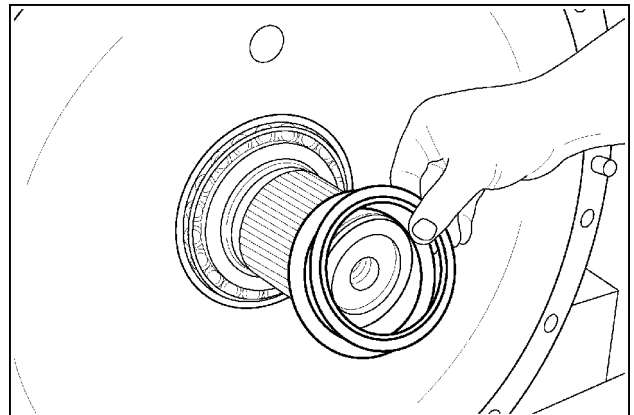
19. Use a thickness gauge to measure and record the distance between the thrust ring and the snap ring in at least two locations.

NOTE: The thickness gauge must fit as tight as possible when measuring.



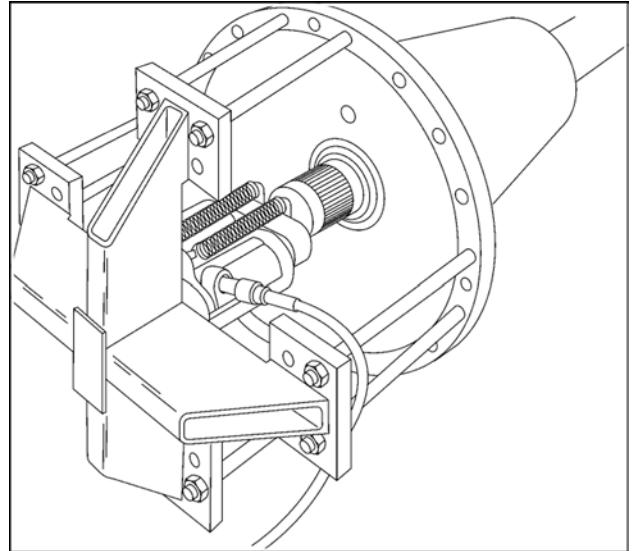
RCPH10FWD930AAJ 19

20. Remove the snap ring and thrust ring. Select a shim combination equal to the distance measured in the previous step within **0.025 mm (0.001 in)**. Install the shim pack, thrust ring and retaining ring on the axle. Be sure the thickest shim is placed next to the bearing and the retaining ring is fully seated in the groove.



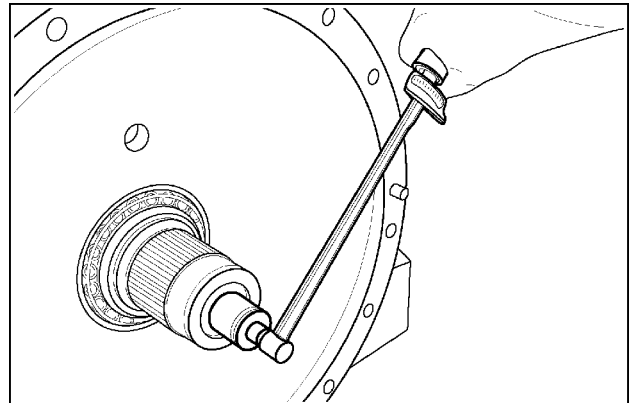
RCPH10FWD931AAJ 20

21. Install the **380002851** axle shaft remover bridge and a **45.36 t (100000 lb)** twin ram onto the trumpet housing. Press on the axle until **13790 – 24132 kPa (2000 – 3500 psi)** is shown on the pressure gauge to back seat the bearing against the retaining ring.



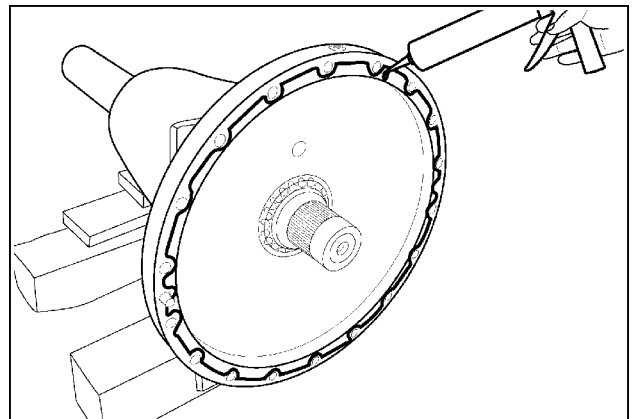
RCPH11FWD219BAM 21

22. Install the **CAS2666** axle shaft rolling torque screw into the end of the axle shaft. Check the axle rolling torque. Rolling torque should be **20 – 27 N·m (15 – 20 lb ft)** for new bearings. Adjust rolling torque for used bearings **10 – 14 N·m (7 – 10 lb ft)**. The rolling torque can be adjusted by adding or subtracting shims. Changing the shim combination thickness by **0.025 mm (0.001 in)** will change the rolling torque approximately **3.3 N·m (2.4 lb ft)**. Repeat Steps 17 through 22 until axle rolling torque is within specifications.



RCPH10FWD933AAJ 22

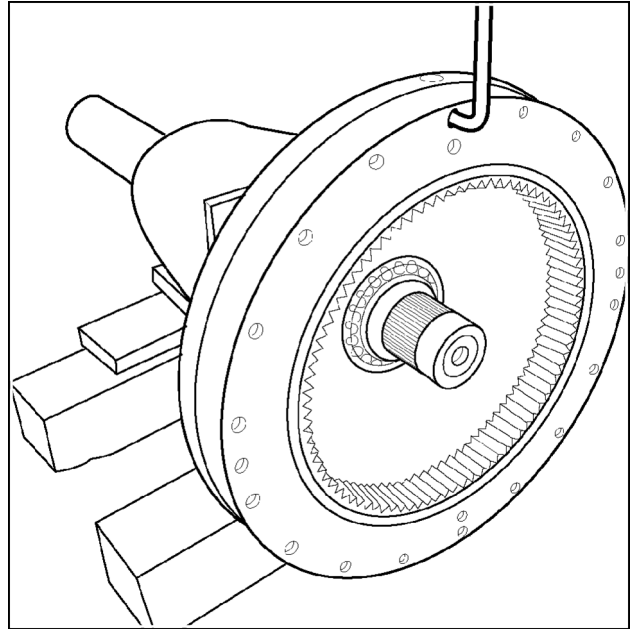
23. Clean the mating surface of the trumpet housing of all residual sealant. Apply a **3 mm (0.1 in)** bead of anaerobic sealant around the mounting surface of the trumpet housing.



RCPH10FWD934AAJ 23

24. Use the CNH299075 lifting hook to carefully align and install the stationary ring gear on the housing so the dowel pin holes will align.

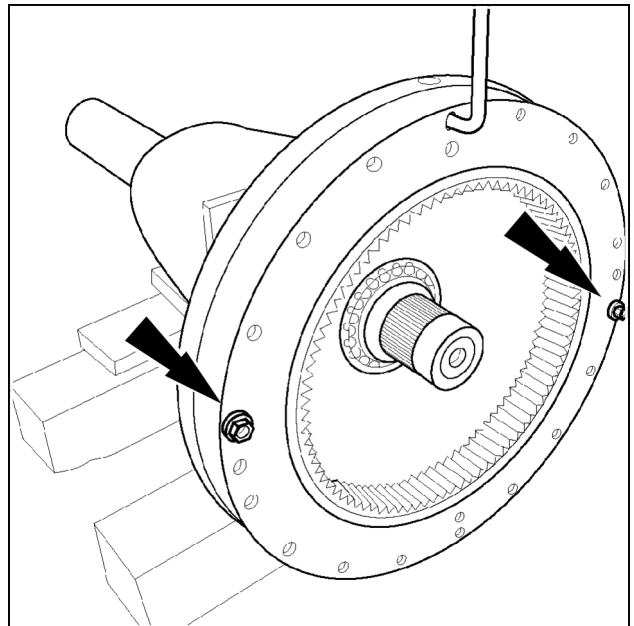
NOTE: The lifting hook must be placed mid way between the two dowel pin holes in the ring gear.



RCPH10FWD935AAJ 24

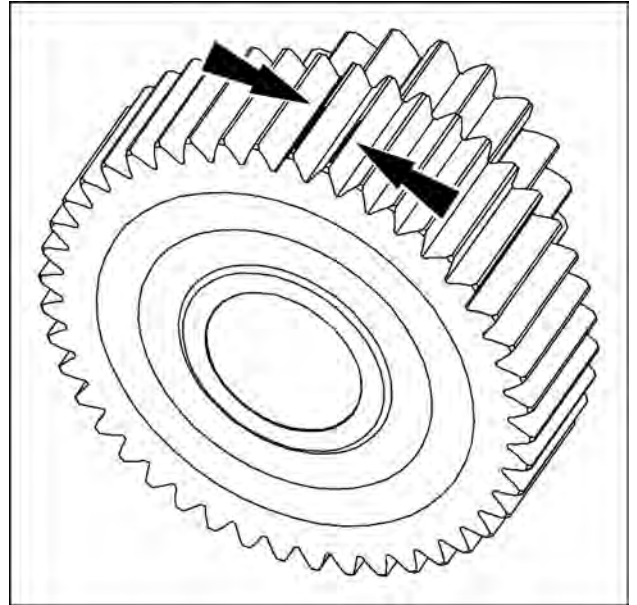
25. Use two common hardware bolts and nuts to temporarily secure the ring gear to the axle housing.

NOTE: Use as short a bolt as possible with the nut installed on the planetary carrier side.



RCPH10FWD936AAJ 25

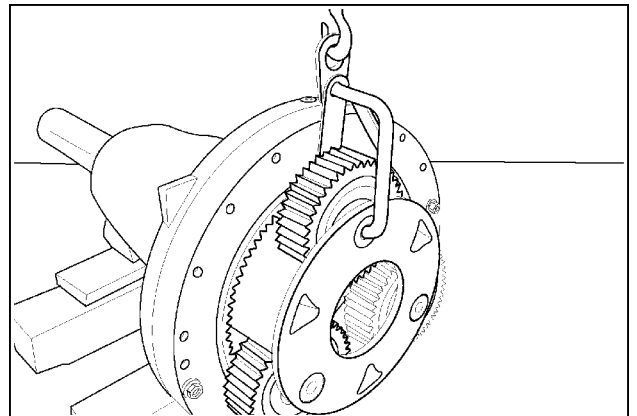
26. On each large planetary gear, there are light scribe lines on the tips of two consecutive gear teeth. The lines vary in length, but are always found on the side farthest from the small gear. The gap between the two teeth must point to the center of the axle. Use a dye marker or paint stick to mark the sides of the teeth that have the timing marks.



RCPH10FWD937AAJ 26

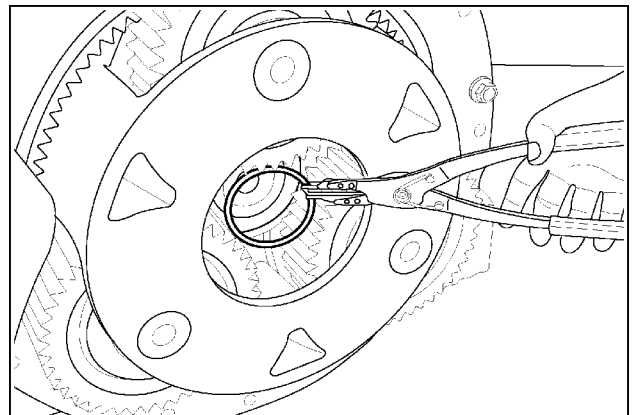
27. Coat the splines of the axle shaft with anti-sieze compound. Use the **CAS2676** planetary lifting hook to install the planetary carrier assembly on the axle shaft. When installing the planetary carrier, turn each gear so that the timed teeth point to the center of the axle.

NOTE: If the planetary gears are not timed, the short axle sun gear will not engage the planetary gears.



RCPH10FWD938AAJ 27

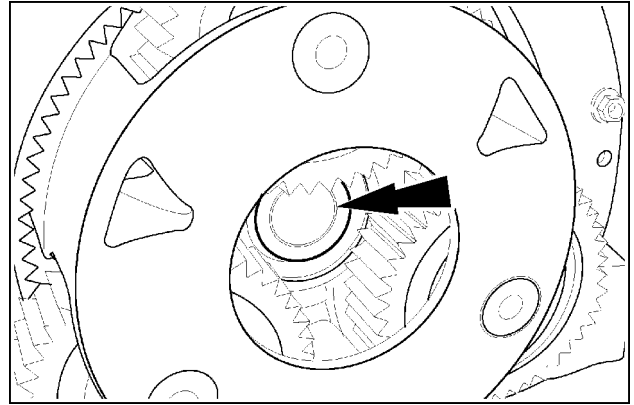
28. Install the planetary carrier retaining ring in the groove on the end of the axle shaft.



RCPH10FWD890AAJ 28

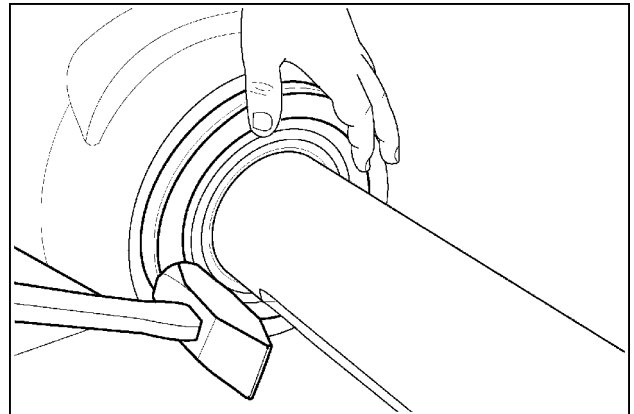
29. Install a new nylon thrust insert in the counter-bore on the end of the axle shaft. Retain the insert with clean grease. Install the short axle sun gear into the planetary gears so that every 7th tooth on the sun gear will be in the root between the two marked teeth of each planet gear.

NOTE: The short axle sun gear will not engage the planetary gears unless the gears are *TIMED* as described. The short axles now must be installed into the planetary carrier first



RCPH10FWD939AAJ 29

30. Fill the inner two grooves of a new axle seal approximately half full with clean gun grease. Apply **LOCTITE® 515™** sealant around the outside diameter of the new seal. Install the seal over the axle shaft and align squarely to the bore of the axle housing. Use **CAS2507** axle seal Installer and hammer to install the seal the correct depth into the housing. Secure the seal with retaining bolts and washers. Repeat Steps 1 through 30 to assemble the opposite side final drive.



RCPH10FWD940AAJ 30

Next operation:

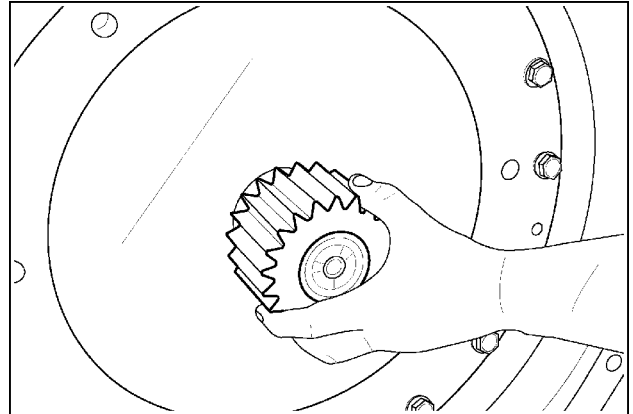
Final drive - Install - 500 Series axles (25.310)

Final drive - Install - 500 Series axles

Steiger® 500	NA
Steiger® 540	NA

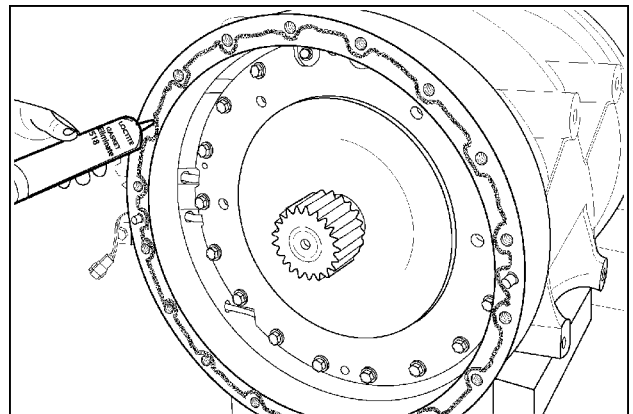
1. Install the short axle sun gear shafts into the left hand and right hand sides of the differential. The longer of the two shafts must be installed in the brake carrier (right hand) side.

NOTE: The sun gear now requires timing.



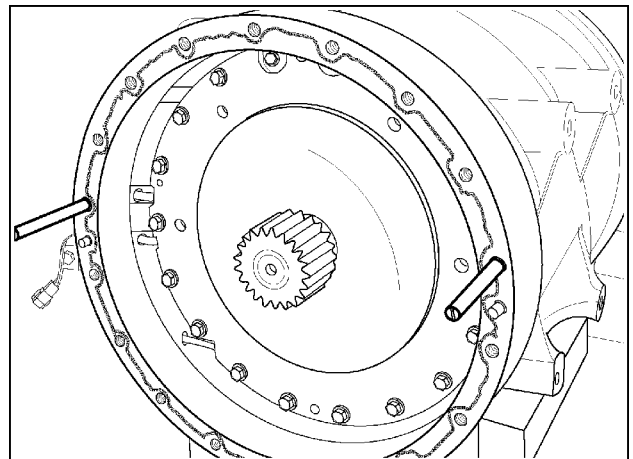
RCPH10FWD905AAJ 1

2. Put a **3 mm (0.1 in)** of anaerobic sealant around the mating flange of the differential housing.



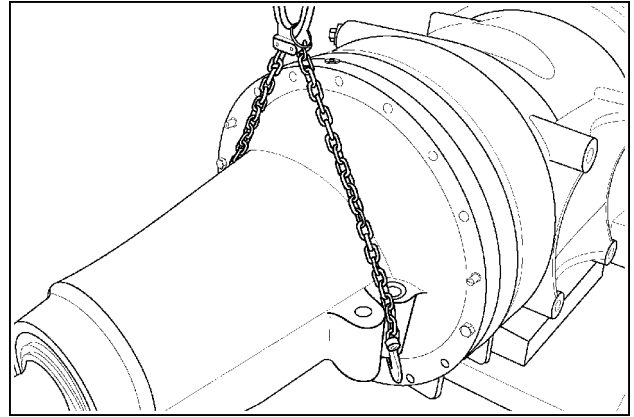
RCPH10FWD906AAJ 2

3. Install two **CAS2496** alignment studs horizontally opposite each other in the differential housing.



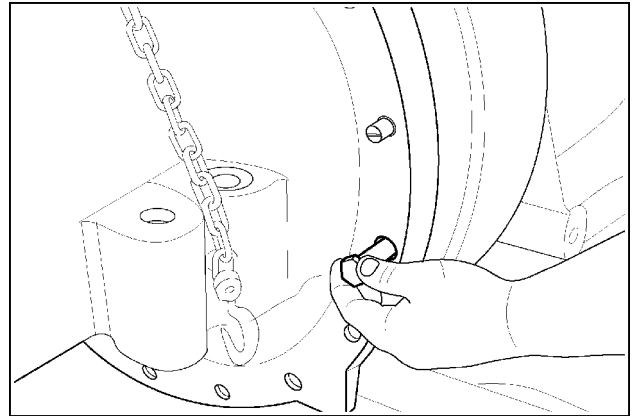
RCPH10FWD907AAJ 3

4. Lift and align the final drive housing with the differential housing so the short axle shaft will engage the differential and the assembly marks on the differential housing and final drive housing align and the housing will engage the alignment studs.



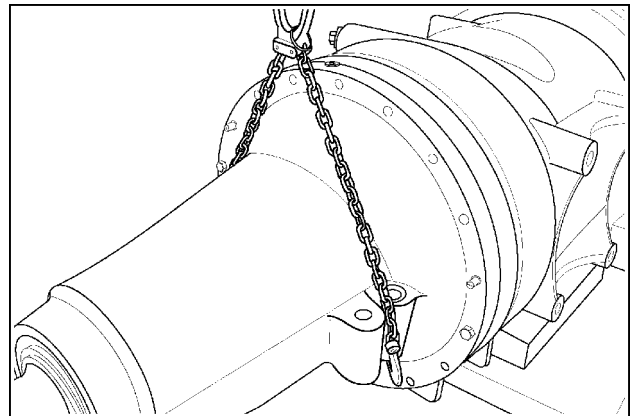
RCPH10FWD908AAJ 4

5. After the final drive housing has engaged the alignment studs, remove the two bolts and nuts that were temporarily installed to retain the stationary ring gear.



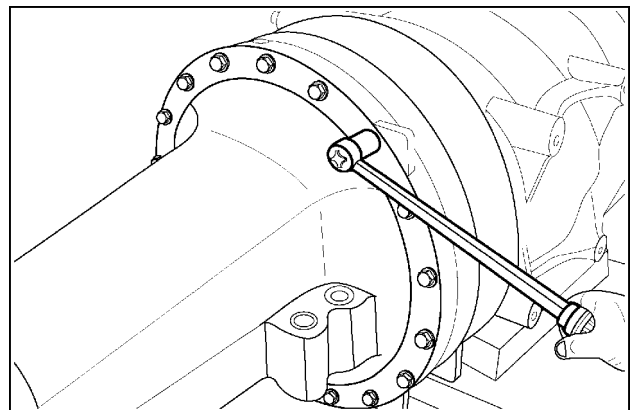
RCPH10FWD909AAJ 5

6. Rotate the axle back and forth to mesh the planet gears and stationary ring gear and push the housing up to the differential housing as far as possible.



RCPH10FWD908AAJ 6

7. Install the 18 final drive housing retaining bolts with washers. Tighten the bolts alternately from side to side to pull the final drive onto the dowel pins. Tighten the bolts to the specified torque. Repeat step 1 through step 7 for the opposite side final drive.



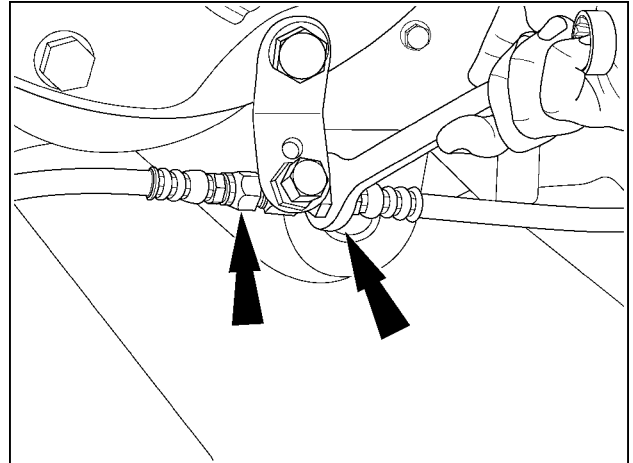
RCPH10FWD910AAJ 7

Final drive - Remove - 500 Series Quadtrac® axles

Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA

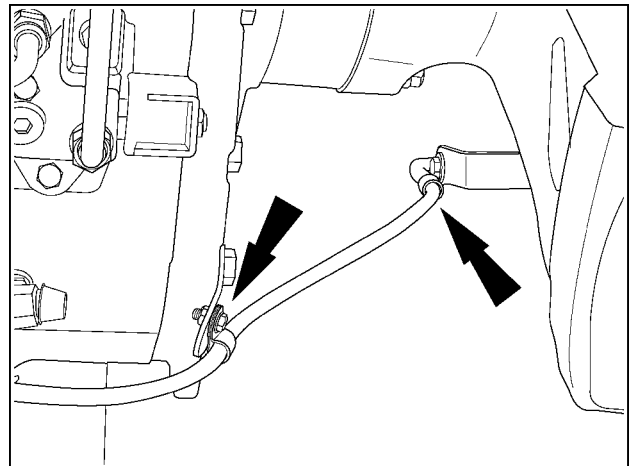
1. Position the axle assembly on a clean shop floor with access to an overhead hoist. Disconnect both track tension pressure hoses at the tee fitting in the center housing.

NOTE: Cap the hoses and plug the ports.



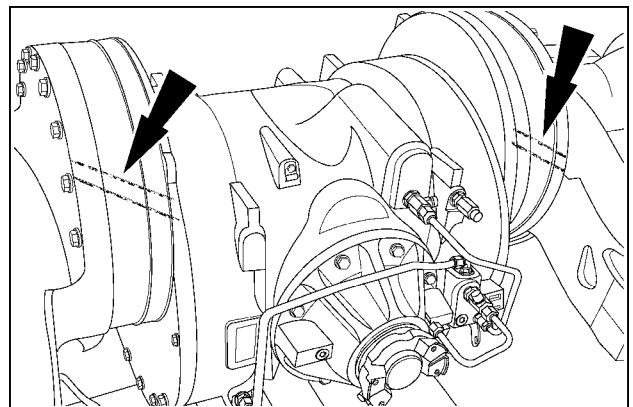
RCPH10FWD132ABJ 1

2. Remove the "P" clamps and hose from the brackets on each side.



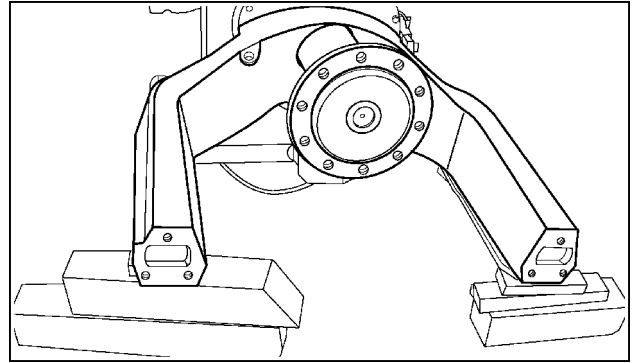
RCPH10FWD133ABJ 2

3. Position the axle assembly on short heavy boards (planking). Put assembly reference marks across each final drive housing and center housing.



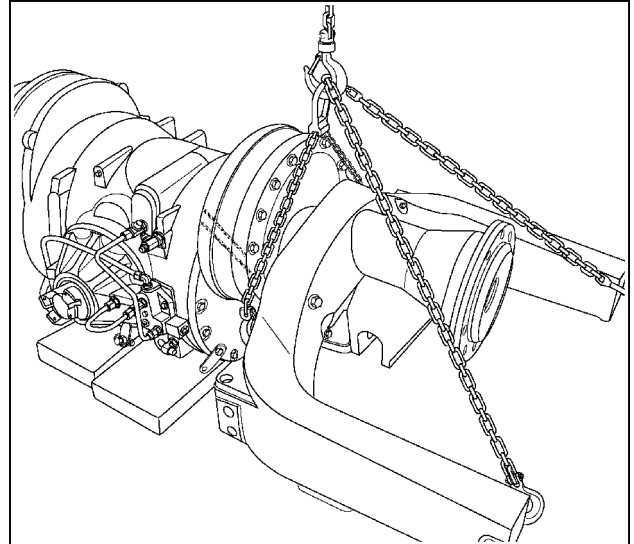
RCPH10FWD134ABJ 3

4. Put blocking under one final drive housing to keep the axle assembly level when the opposite final drive housing is removed.



RCPH10FWD135ABJ 4

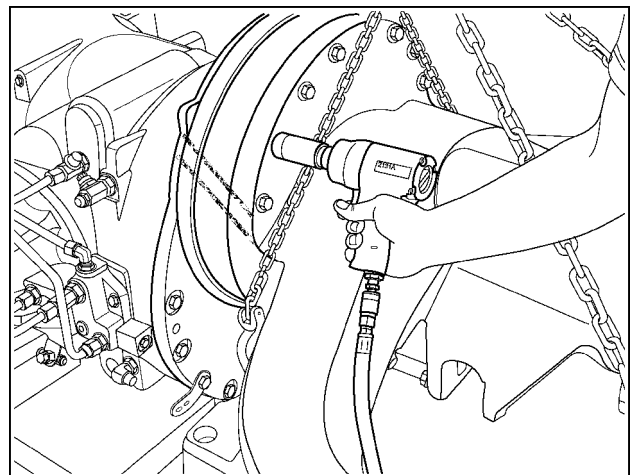
5. Connect an overhead hoist to the final drive housing. Take-up the weight of the housing.



RCPH10FWD136ABJ 5

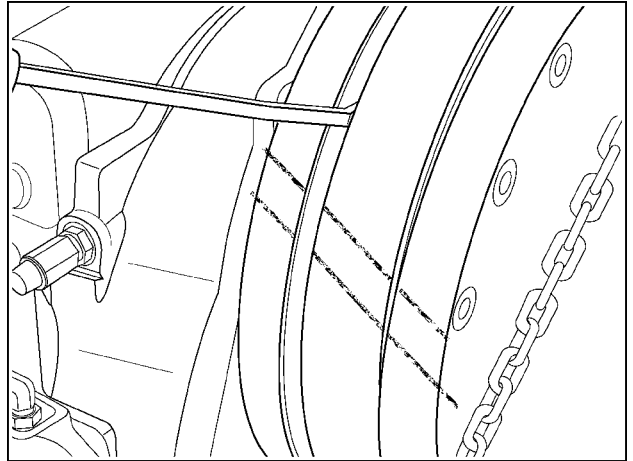
6. Remove the bolts securing the final drive housing and stationary ring gear to the offset housing.

NOTE: There are three different length bolts used to secure the final drive housing to the offset housing. Record bolt orientation during removal for reassembly.



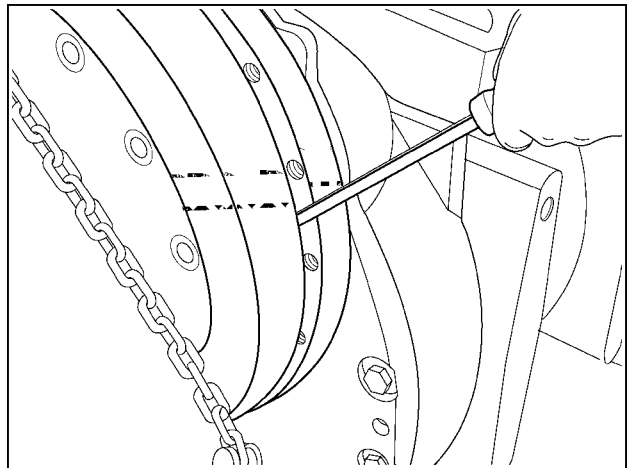
RCPH10FWD137ABJ 6

7. Use the hoist to lift and release the final drive housing a small amount several times to weaken the sealant bond. Use a pry bar between the stationary ring gear and differential housing to pry the ring gear out of the dowel pins.



RCPH10FWD138ABJ 7

8. Repeat step 5 through 7 to remove the opposite side final drive.

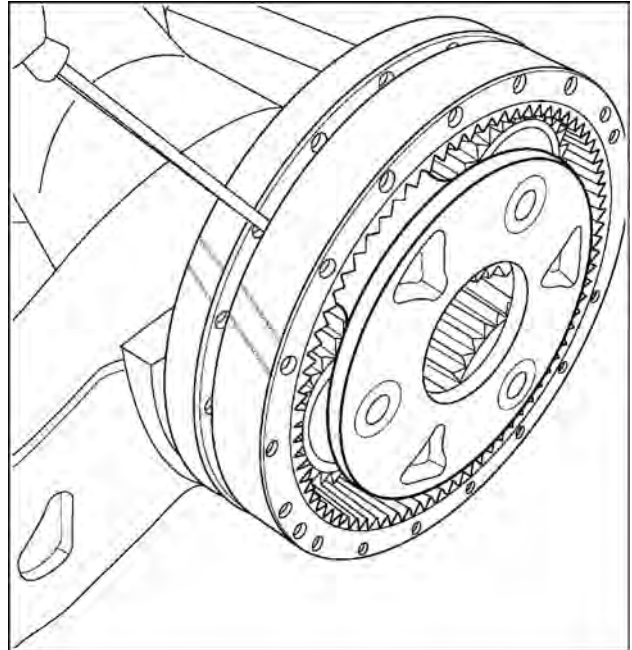


RCPH10FWD139ABJ 8

Final drive - Disassemble - 500 Series Quadtrac® axles

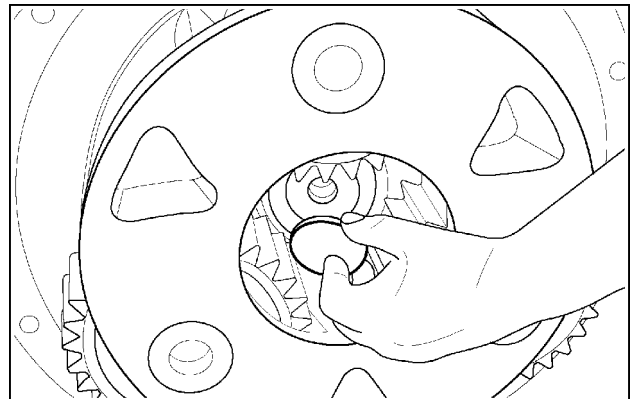
Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA

1. Remove the stationary ring gear from the axle housing.



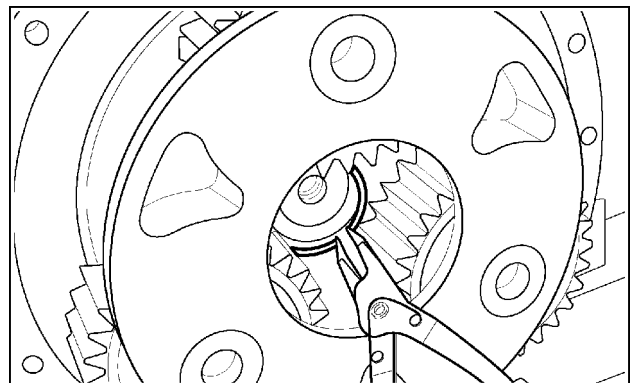
RCPH10FWD140ABJ 1

2. Remove the nylon thrust button from the end of the axle shaft.



RCPH10FWD141ABJ 2

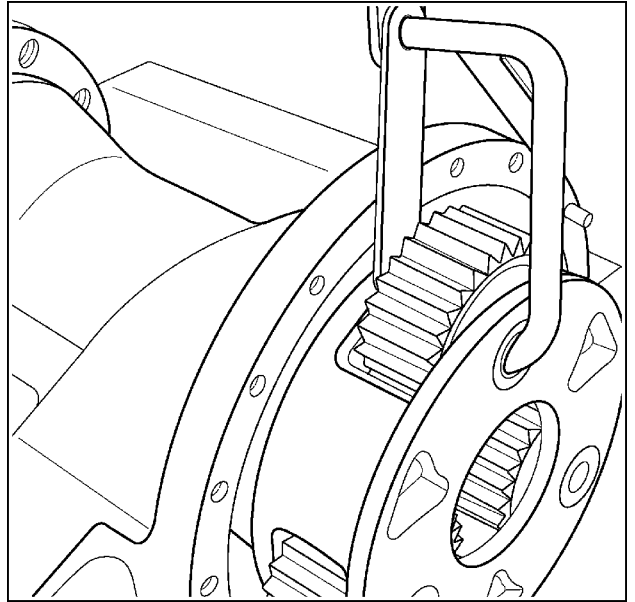
3. Remove the snap ring securing the planetary carrier assembly to the axle.



RCPH10FWD142ABJ 3

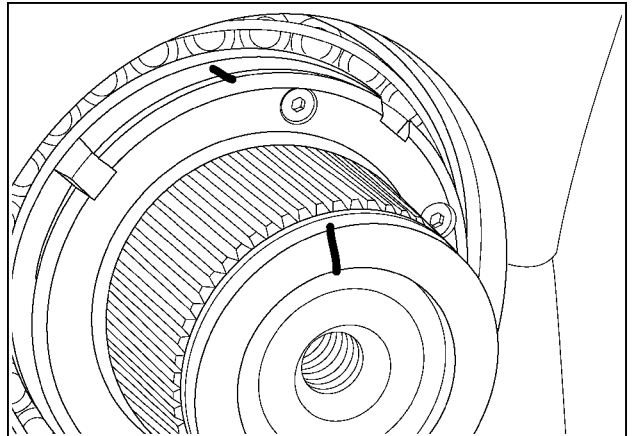
4. Use the **CAS2676** planetary carrier lifting hook to remove the planetary assembly from the housing.

NOTICE: Be sure the retaining strap is positioned behind the gear to prevent the lifting fixture from pulling out of the pinion gear shaft.



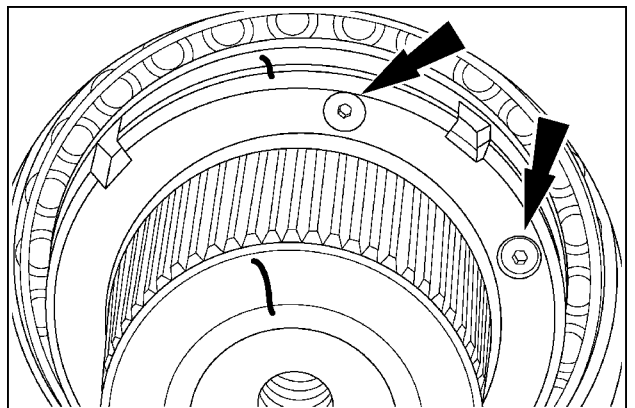
RCPH10FWD143ABJ 4

5. Use a dye marker to indicate lock nut orientation on the axle shaft.



RCPH10FWD144ABJ 5

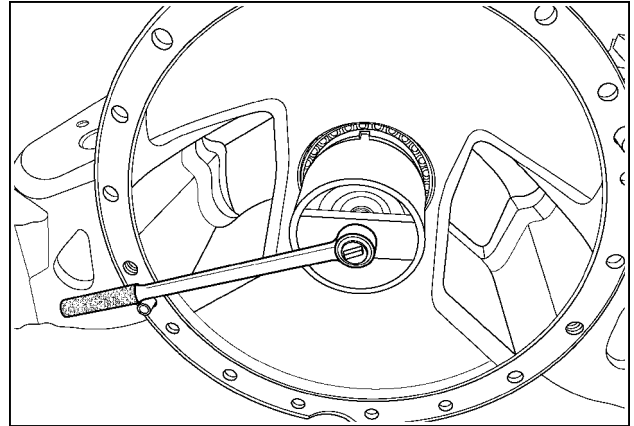
6. Loosen the two set screws on the lock nut.



RCPH10FWD145ABJ 6

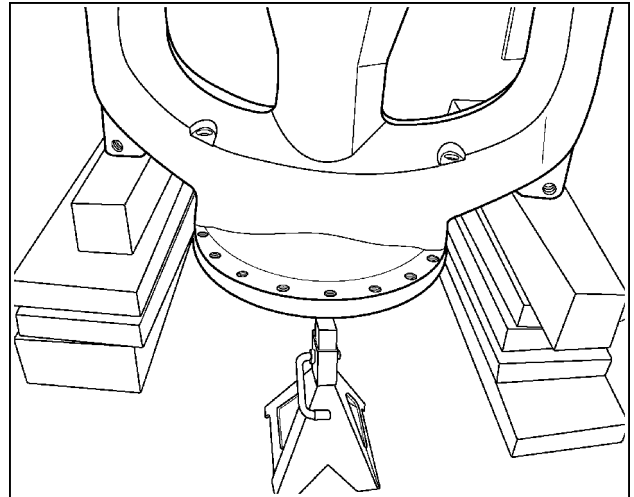
7. Use the **380002570** spanner wrench to loosen the lock nut two complete turns.

NOTE: The number of complete turns required to remove the nut must be counted and recorded for proper installation.



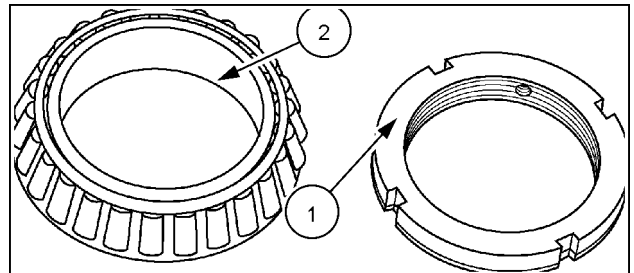
RCPH10FWD146ABJ 7

8. Lift the final drive assembly to an upward position to rest on planking as shown.



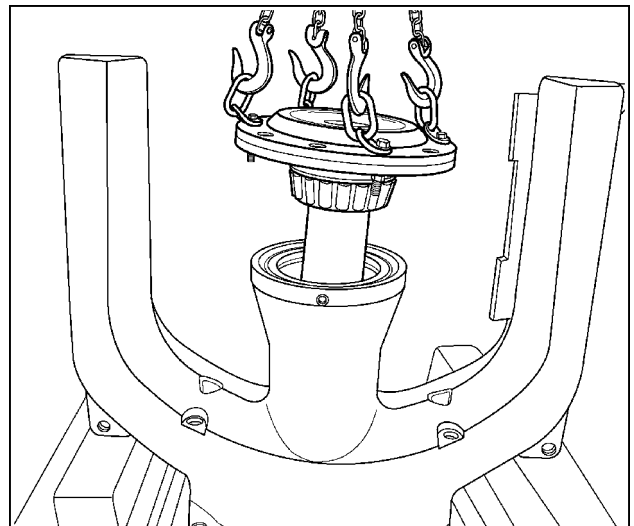
RCPH10FWD147ABJ 8

9. Remove the lock nut (1) and the inner bearing cone (2) from the axle.



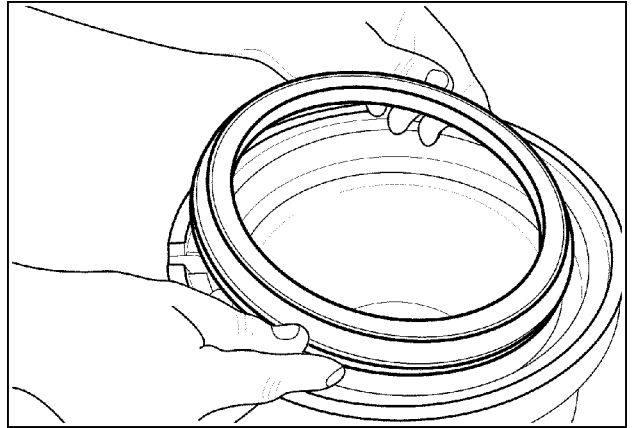
RCPH10FWD148ABJ 9

10. Use a hoist to lift the axle shaft from the housing.



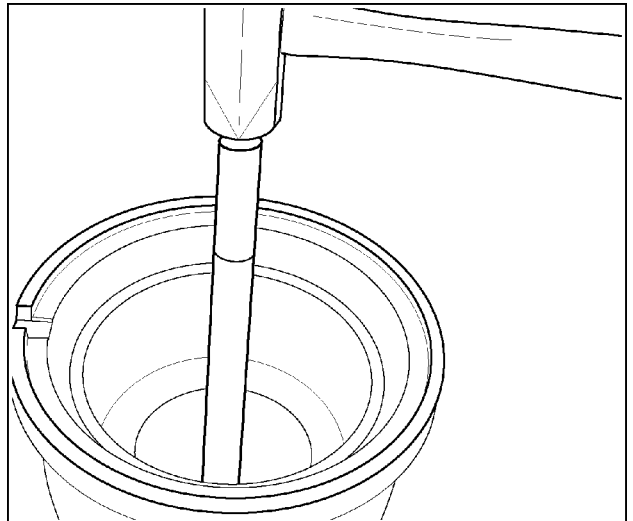
RCPH10FWD149ABJ 10

11. Remove the inner face seal from the axle housing.



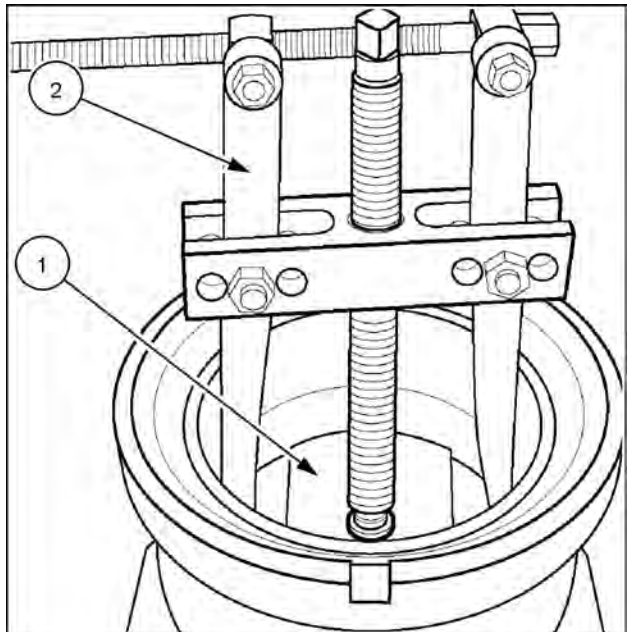
RCPH10FWD150ABJ 11

12. Use **CAS2739** bearing driver and CAS2405 long bearing driver handle to remove the inner bearing cup from the housing.



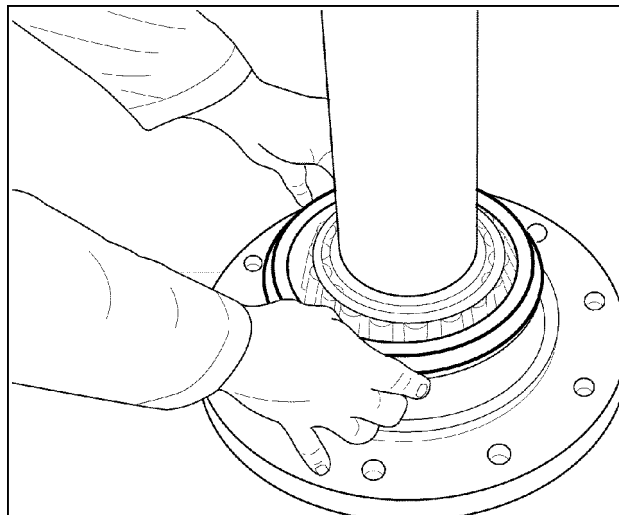
RCPH10FWD151ABJ 12

13. Use CAS2667 plate **(1)** and a bearing puller **(2)** to remove the outer bearing cup from the housing.



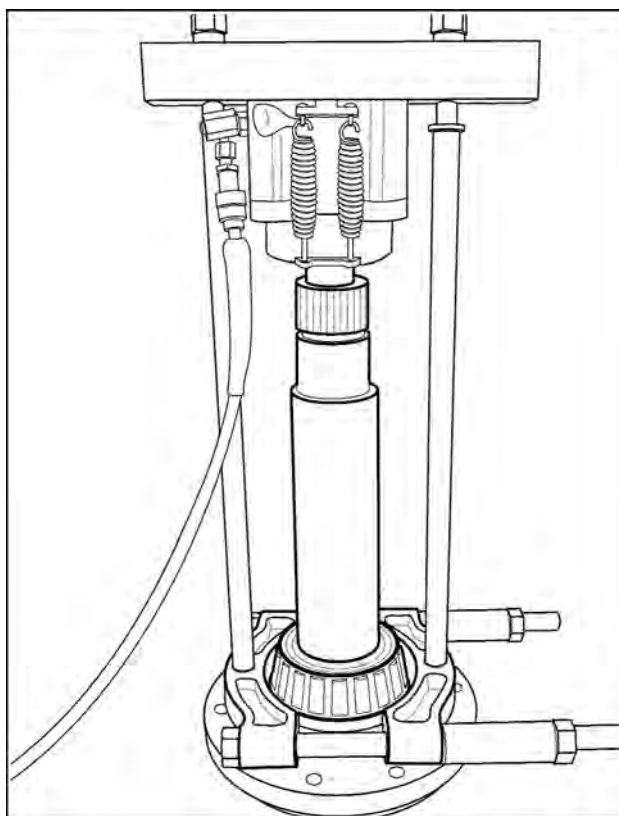
RCPH10FWD152ABJ 13

14. Remove the outer face seal from the axle shaft.



RCPH10FWD153ABJ 14

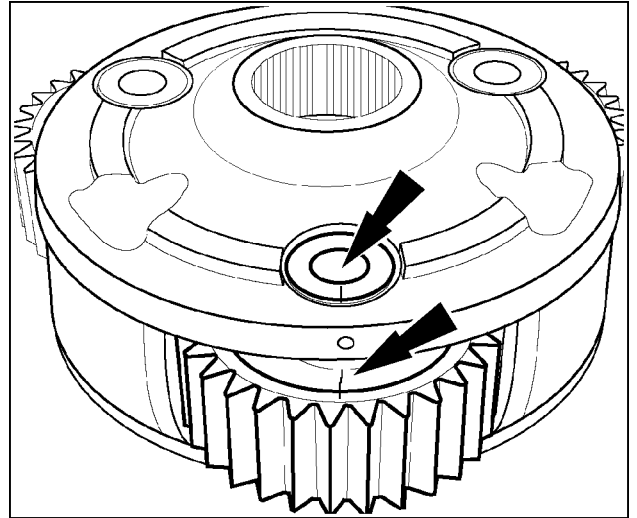
15. Use a bearing puller and 30 ton ram to remove the outer bearing cone.



RCPH10FWD154ABJ 15

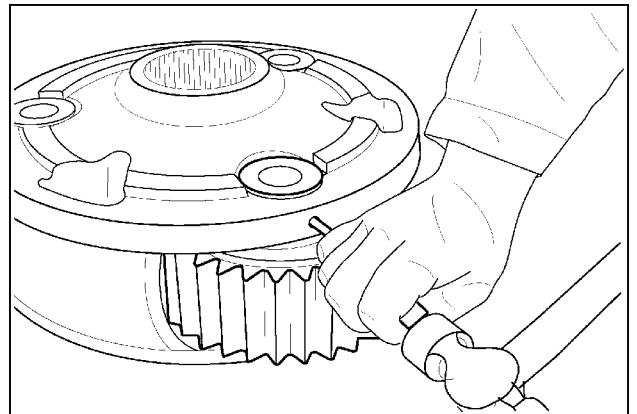
Planetary carrier disassembly

16. If the gears are to be reused, mark each gear and the carrier so that the gears and pins are assembled in their original location in the gear carrier.



RCPH10FWD155ABJ 16

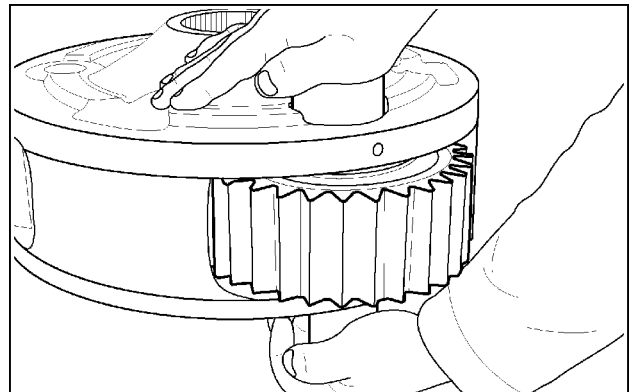
17. Drive the spring pin into the center of the gear shaft.



RCPH10FWD156ABJ 17

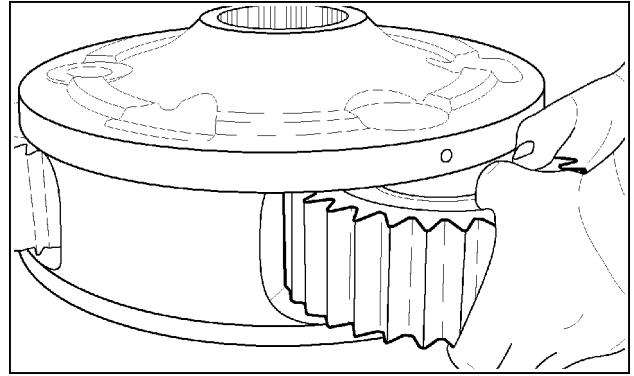
18. Use the **CAS2729** pilot sleeve to push the gear shaft out and retain the needle roller bearings in the gear.

NOTE: There is a double row of uncaged needle roller bearings in each gear



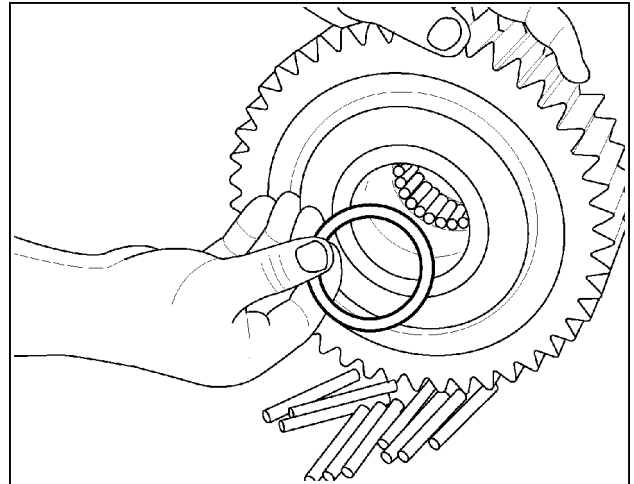
RCPH10FWD157ABJ 18

19. Carefully remove the planetary gear assembly with thrust washers from the carrier.



RCPH10FWD158ABJ 19

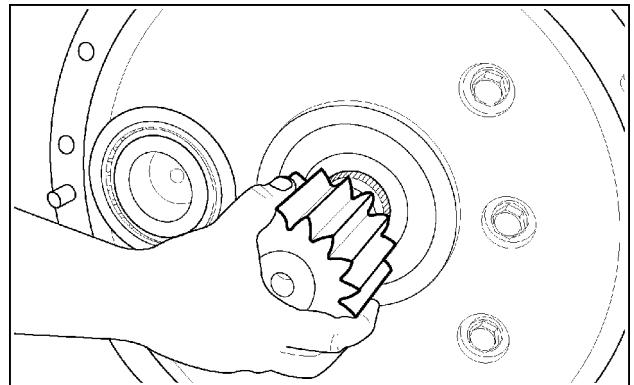
20. Remove the needle roller bearings and separator ring from within the gear. Repeat steps **16** through **20** for each remaining planet gear. Clean and inspect all final drive gears, bearings and other parts for too much wear or other damage. Replace all worn or damaged parts. Repeat Steps **1** through **20** to disassemble the opposite side final drive.



RCPH10FWD159ABJ 20

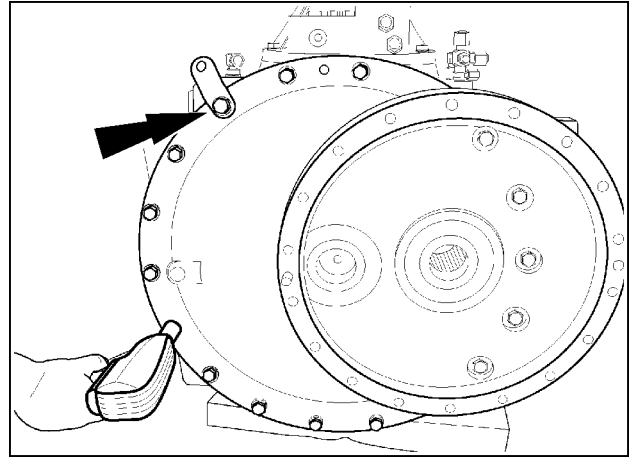
Final drive offset housing disassembly

21. Remove the sun gear from the housing.



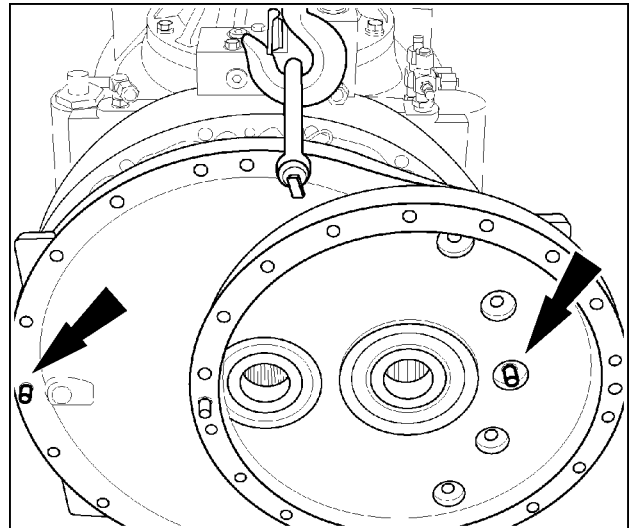
RCPH10FWD160ABJ 21

22. Mark the location of the clamp bracket. Remove the bolts securing the offset housing to the center housing.



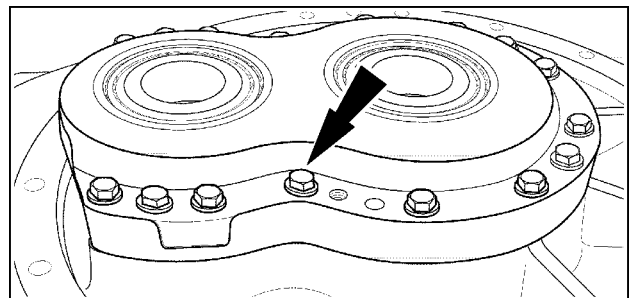
RCPH10FWD161ABJ 22

23. Install two **CAS2496** alignment studs in the locations shown. Separate the offset housing from the center housing dowel pins. Install a clevis and pin arrangement on the housing as shown. Use a hoist to remove the housing.



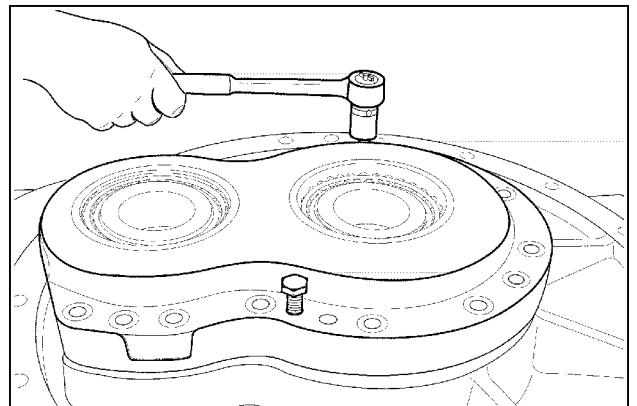
RCPH10FWD162ABJ 23

24. Remove the reduction gear cover mounting bolts.



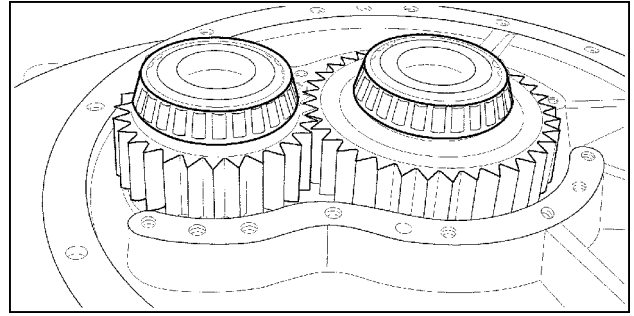
RCPH10FWD163ABJ 24

25. Install two **CAS2738** push screws into the threaded holes provided. Tighten the screws alternately and evenly to jack the cover from the dowel pins.



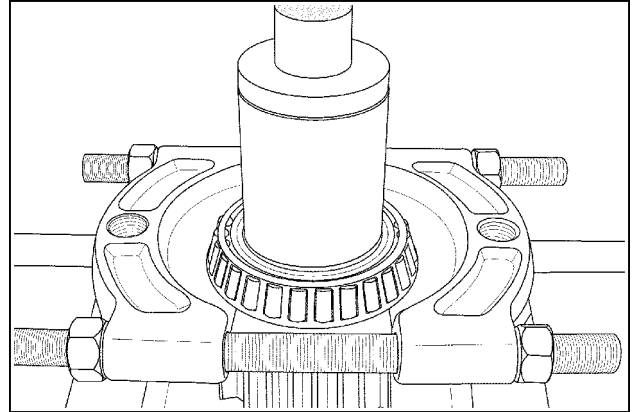
RCPH10FWD164ABJ 25

26. Mark the top side of each gear assembly for reference.
Remove the gears from the housing.



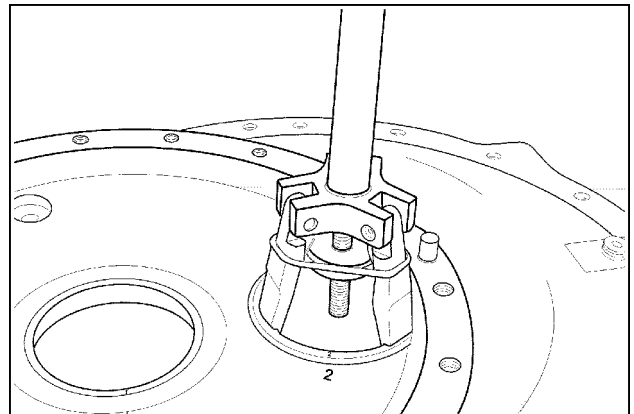
RCPH10FWD165ABJ 26

27. Use a split flange type bearing puller and **89 mm (3.5 in)** press sleeve to press the bearing cones from each side of the gears requiring bearing or gear replacement.



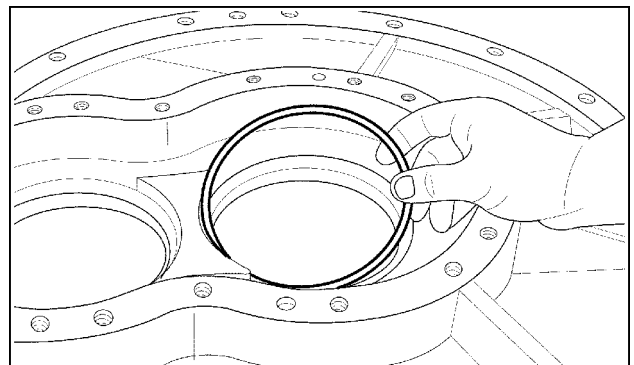
RCPH10FWD166ABJ 27

28. Mark the location of the bearing cups in the housing and gear cover. Use a bearing cup remover/installer to remove the two bearing cups and shims from the housing.



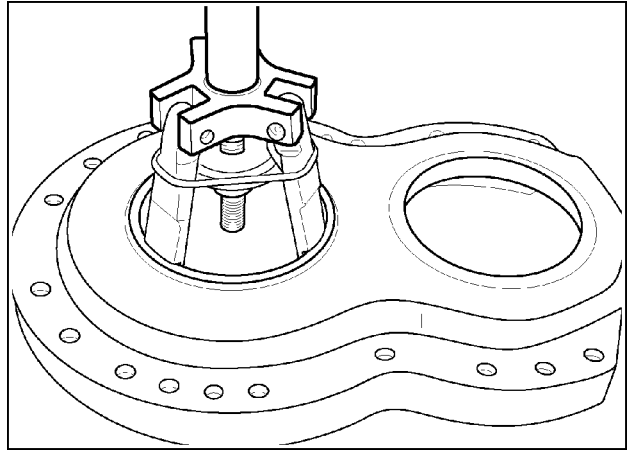
RCPH10FWD167ABJ 28

29. Retain the bearing preload shims with each bearing cup.



RCPH10FWD168ABJ 29

30. Repeat step **28** to remove the bearing cups from the cover. Clean and inspect all parts.



RCPH10FWD169ABJ 30

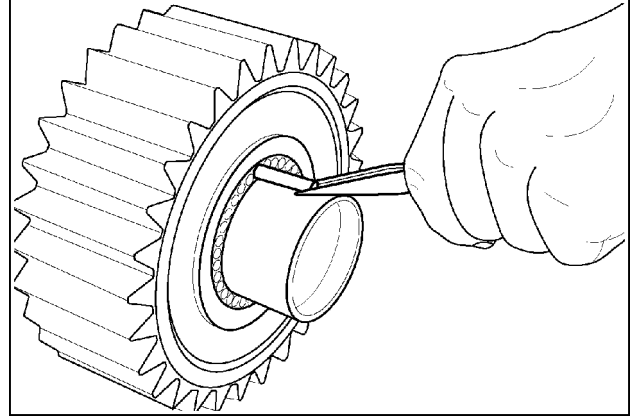
Final drive - Assemble - 500 Series Quadtrac® axles

Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA

Planetary carrier assembly

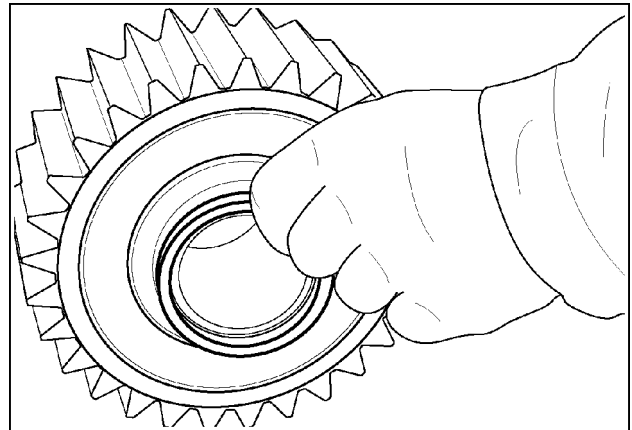
1. Lubricate the needle roller bearings with clean grease or petroleum jelly and load 29 bearings on one side of the gear.

NOTE: Use the **CAS2729** pilot sleeve to hold the first row of needle bearings in place.



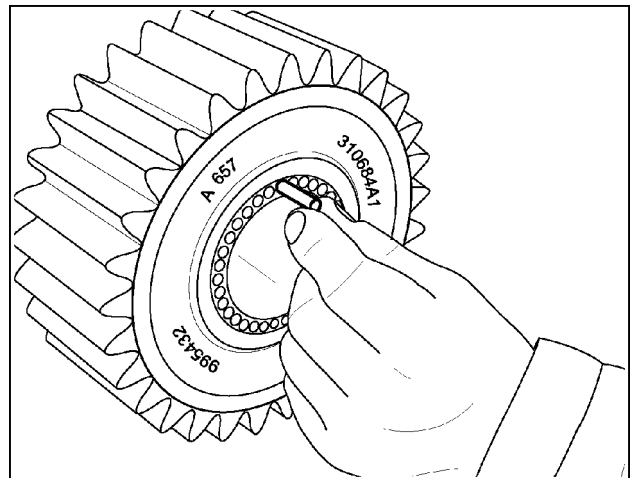
RCPH10FWD172ABJ 1

2. Install the separator ring into the gear.



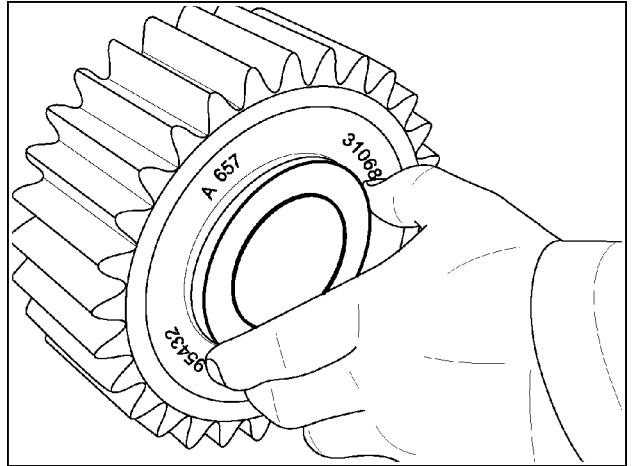
RCPH10FWD173ABJ 2

3. Push the **CAS2729** pilot sleeve into the gear to hold all the roller bearings in place and load the remaining 29 needle roller bearings into the gear.



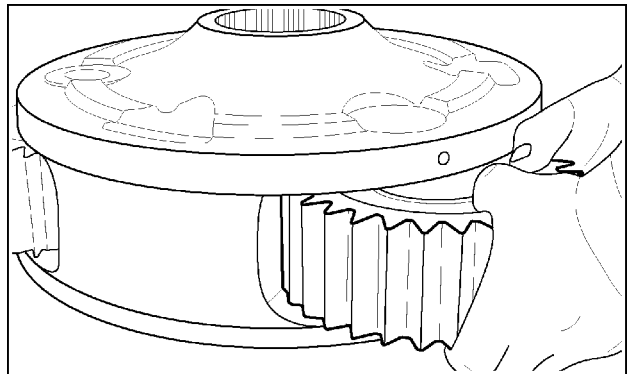
RCPH10FWD174ABJ 3

4. Lubricate the thrust washers with clean grease or petroleum jelly. Install one thrust washer on each side of the gear. Adjust the pilot sleeve to engage the thrust washers to hold them in place.



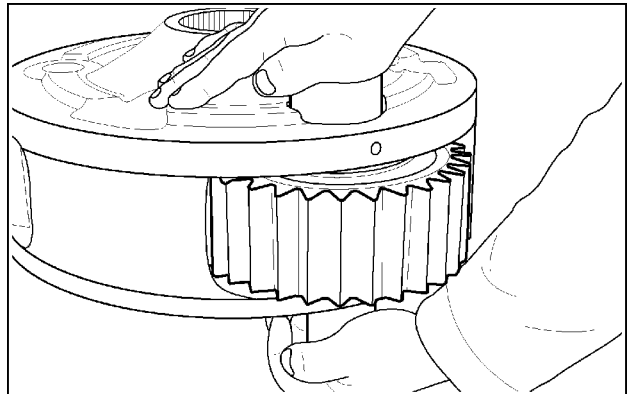
RCPH10FWD175ABJ 4

5. Carefully put the planet gear into its original position in the gear carrier while holding the pilot sleeve in place.



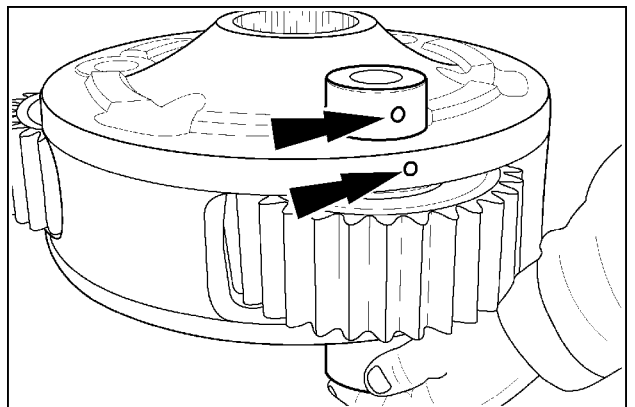
RCPH10FWD158ABJ 5

6. While maintaining tension on the pilot sleeve from the bottom, align the gear and carefully push the gear shaft through the thrust washer and bearings.



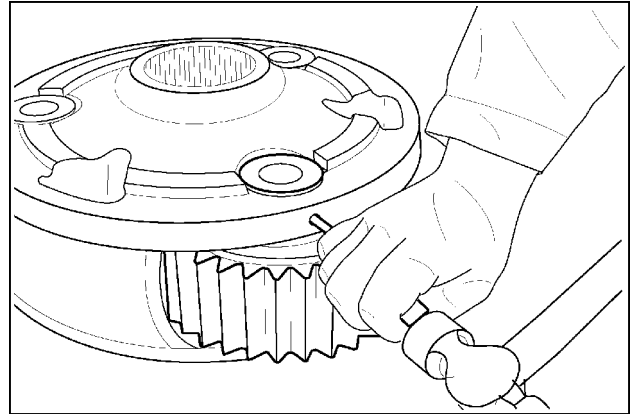
RCPH10FWD157ABJ 6

7. While holding tension on the pilot sleeve, install the gear shaft into the carrier. Align the holes in the end of the gear shaft with the spring pin hole in the gear carrier.



RCPH10FWD176ABJ 7

8. Install a new spring pin into the gear shaft until the end of the pin is flush or slightly below the edge of the carrier housing. Repeat steps 1 through 8 for each planet gear assembly installation.



RCPH10FWD156ABJ 8

Final drive housing assembly

⚠ CAUTION

Hot area!

Use care when working near hot components. Wear protective gloves.

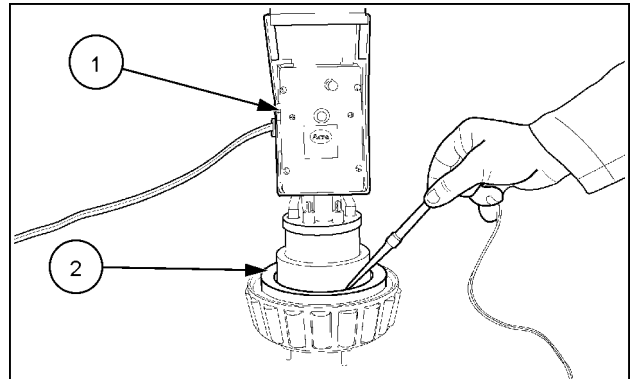
Failure to comply could result in minor or moderate injury.

C0034A

9. Use a gear and bearing heater (1) and **CAS2692** adapter (2) to heat the outer axle bearing cone. Use a heat probe to monitor the temperature of the bearing race.

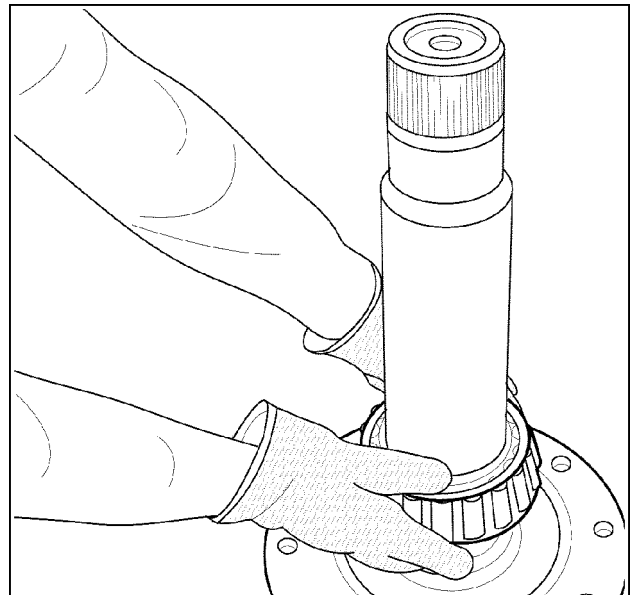
NOTICE: The heater assembly must be placed on a concrete floor or steel work surface.

NOTE: Do not heat the bearing to more than **120 °C (248 °F)**. Average heating time is 10 to 12 minutes.



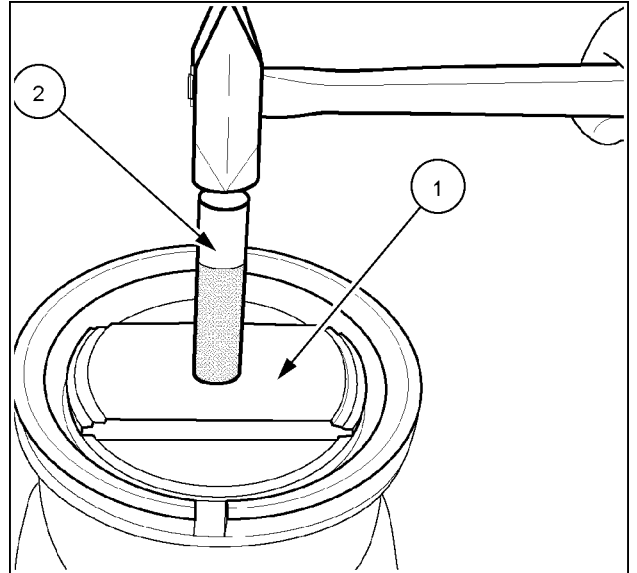
RCPH10FWD923AAJ 9

10. Install the heated bearing cone on the axle shaft (large side down) against the flange.



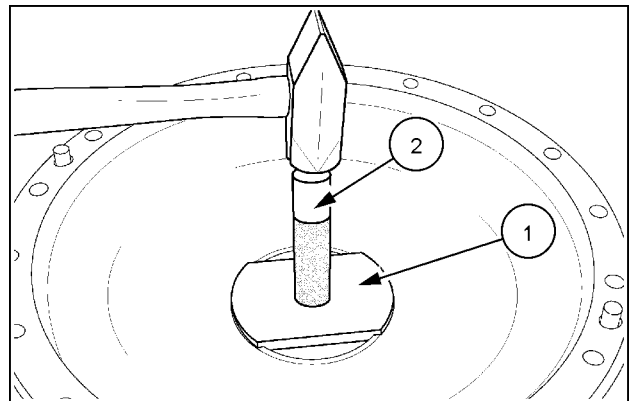
RCPH10FWD177ABJ 10

11. Put a light coat of anti-sieze compound around the outside diameter of the outer bearing cup. Use the **CAS2501** bearing cup installer (1) and a short driver handle (2) to install the bearing cup into the final drive housing until the cup is seated.



RCPH10FWD178ABJ 11

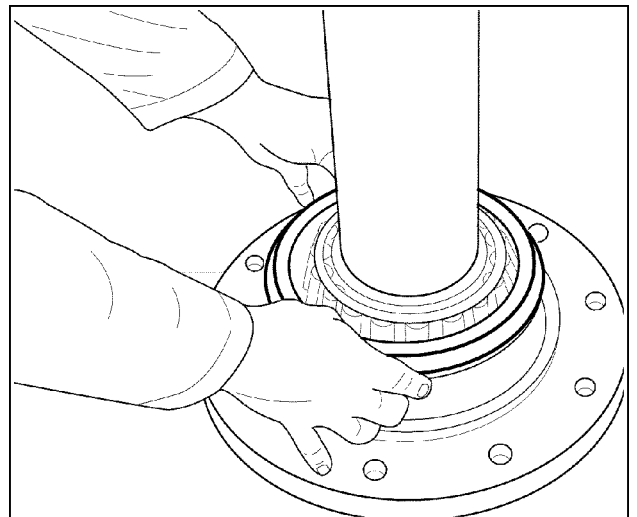
12. Put a light coat of anti-sieze compound around the outside diameter of the inner bearing cup. Use a suitable bearing cup installer (1) and short driver handle (2) to install the bearing cup into the housing until the cup is seated.



RCPH10FWD179ABJ 12

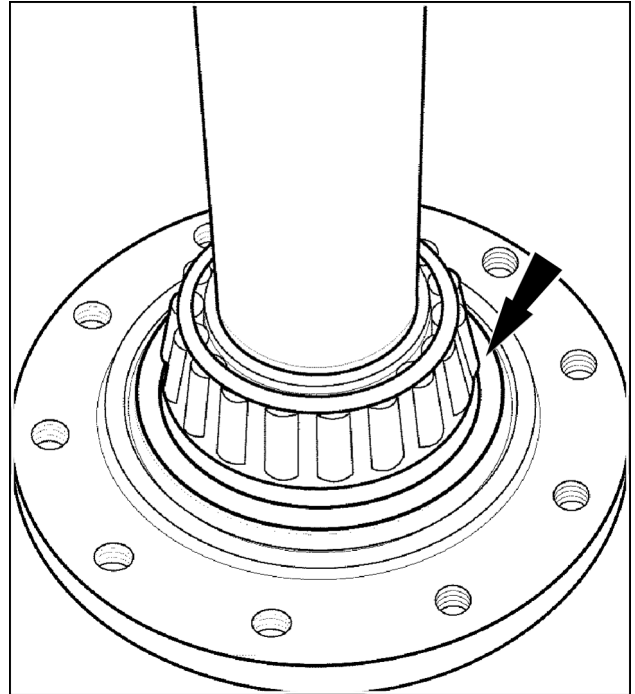
13. Install the outer face seal over the axle bearing into the bore of the hub.

NOTICE: The rubber belleville washer of the seal **MUST** be clean and dry. There must be no oil residue on the rubber.



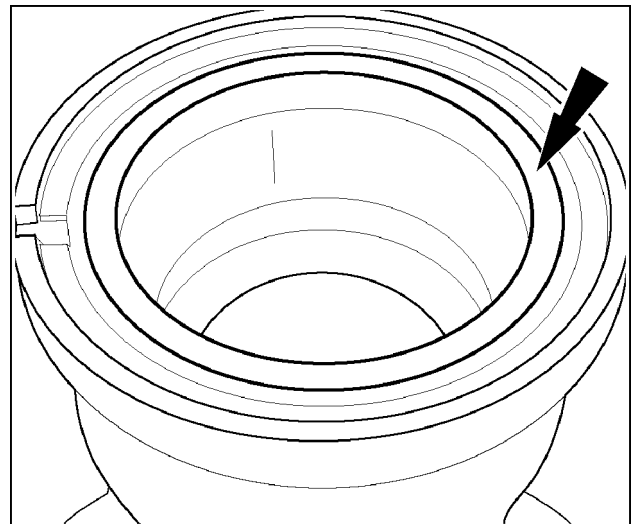
RCPH10FWD153ABJ 13

14. Seat the seal assembly squarely in the bore of the hub as shown. Put a light film of clean **CASE IH AKCELA HY-TRAN® ULTRACTION** oil on the steel face of the seal.



RCPH10FWD180ABJ 14

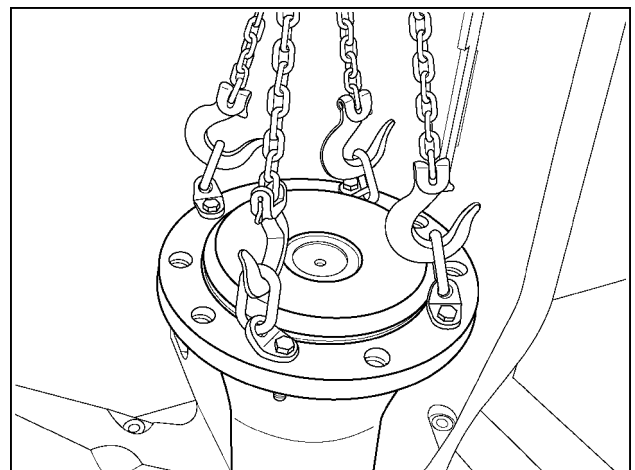
15. In the same manner as described in steps **13** and **14**, install the inner face seal in the housing. Lubricate the steel face of the seal with a light film of clean **CASE IH AKCELA HY-TRAN® ULTRACTION** oil.



RCPH10FWD181ABJ 15

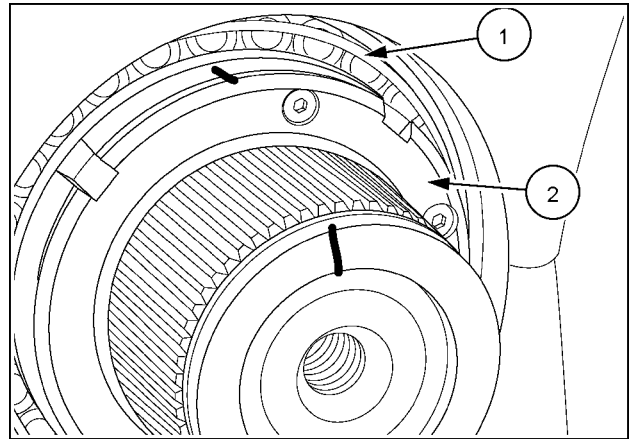
16. Lubricate the outer bearing cone and cup lightly with clean operating fluid. Carefully lift and lower the axle shaft squarely into the final drive housing until the bearing cone is seated in the bearing cup.

NOTE: If installing new bearings and seals, go to next step. If the seal is being replaced but the old bearing is being reused, proceed to step **18**.



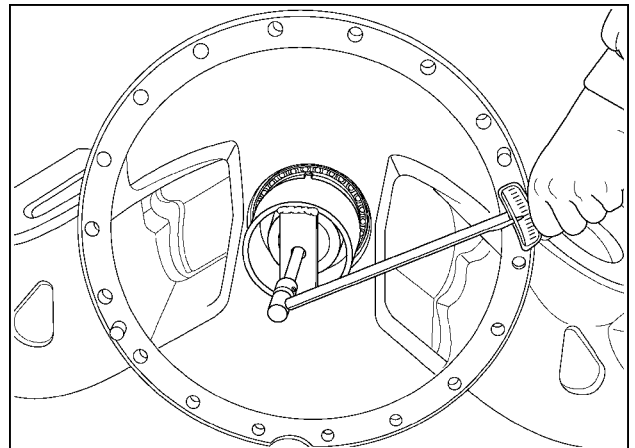
RCPH10FWD182ABJ 16

17. Install the inner bearing cone **(1)** and lock nut **(2)** on the axle shaft.



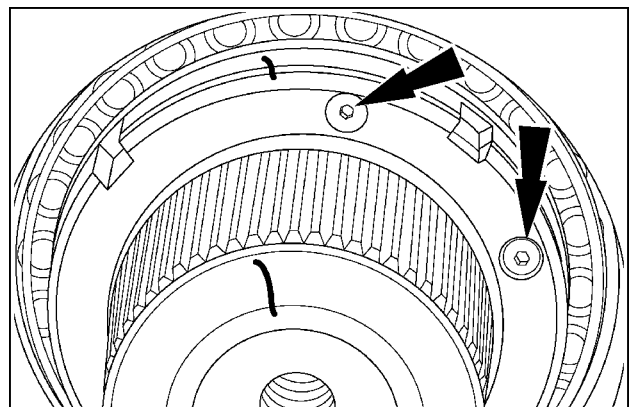
RCPH10FWD144ABJ 17

18. Use the **380002906** spanner wrench and torque wrench to tighten the lock nut to a rolling torque of **27 – 38 N·m (239 – 336 lb in)**.



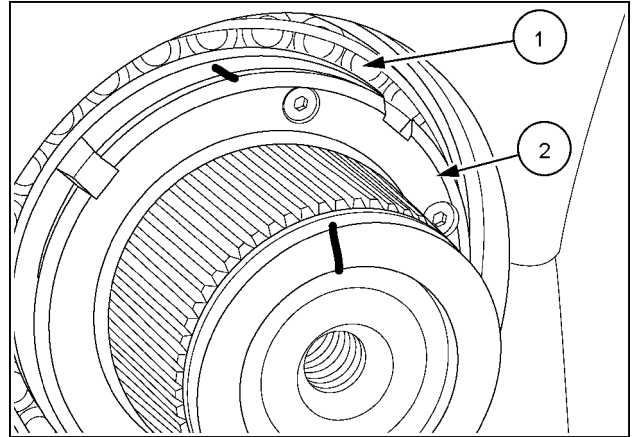
RCPH10FWD183ABJ 18

19. Tighten the two set screws to a torque of **4 – 8 N·m (35 – 71 lb in)**.



RCPH10FWD145ABJ 19

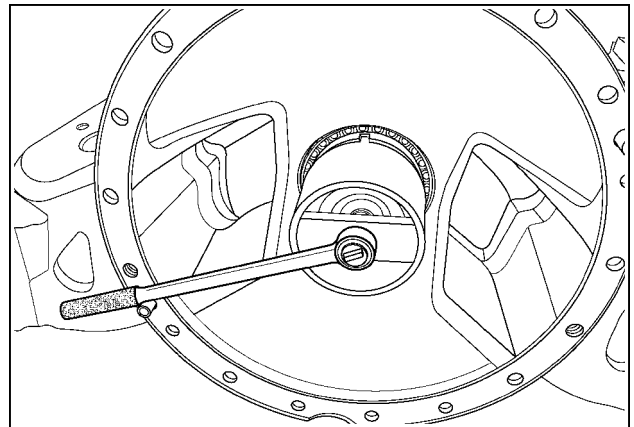
20. Install the inner bearing cone (1) and lock nut (2) on the axle shaft.



RCPH10FWD144ABJ 20

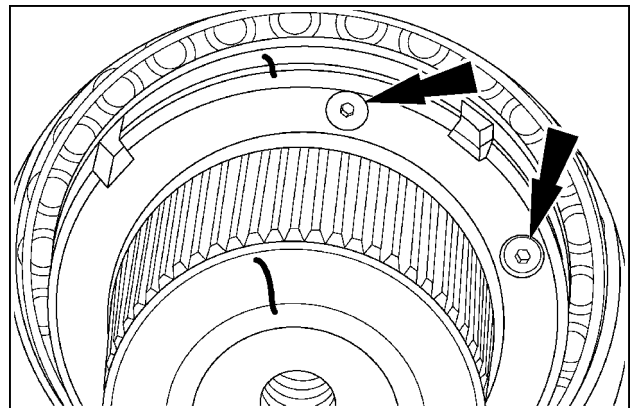
21. Use the **380002906** spanner wrench to tighten the lock nut the same number of complete turns that were required for removal. Align the marks on the shaft and nut to obtain original bearing setting.

NOTE: The bearing may not be tight.



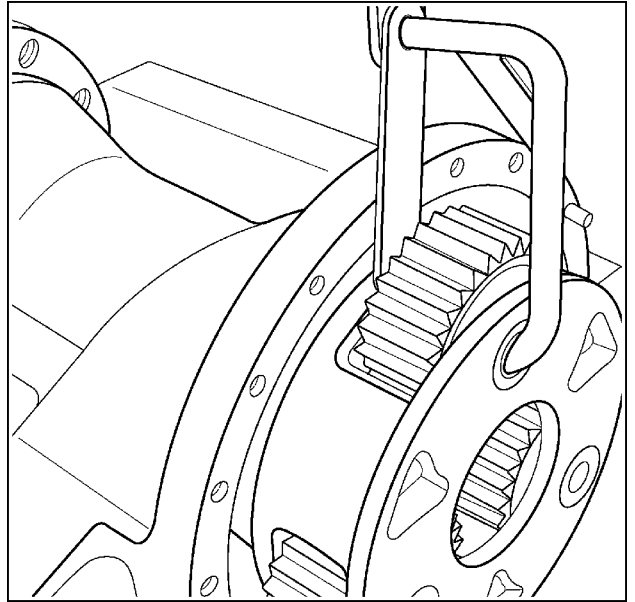
RCPH10FWD146ABJ 21

22. Tighten the lock nut set screws to a torque of **4 – 8 N·m (35 – 71 lb in)**.



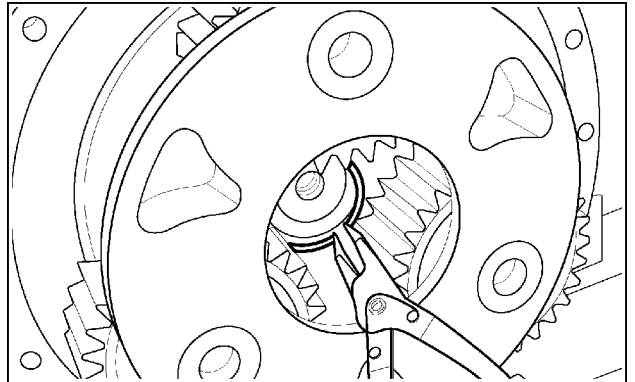
RCPH10FWD145ABJ 22

23. Coat the splines of the axle shaft with anti-sieze compound. Use the **CAS2676** Planetary Lifting Hook to install the planetary carrier assembly on the axle shaft.



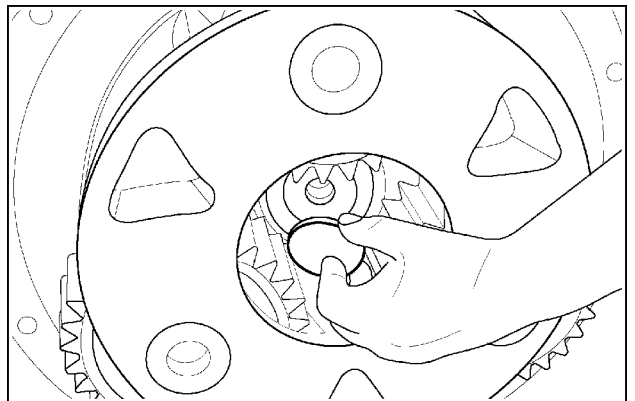
RCPH10FWD143ABJ 23

24. Install the planetary carrier retaining ring in the groove on the end of the axle shaft.



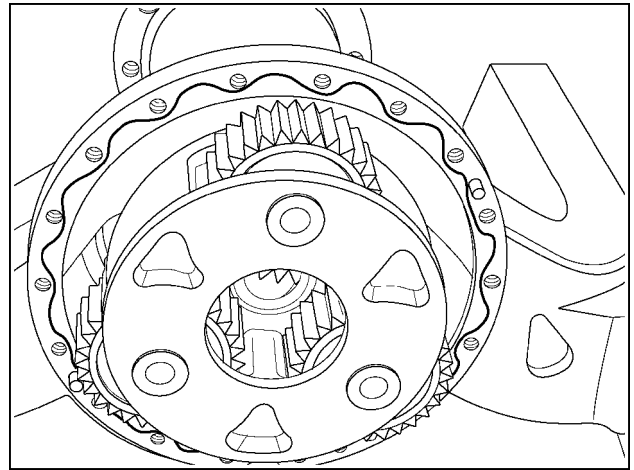
RCPH10FWD142ABJ 24

25. Install a new nylon thrust insert in the counter-bore on the end of the axle shaft. Retain the insert with clean grease.



RCPH10FWD141ABJ 25

26. Clean the mating surface of the final drive housing of all residual sealant. Apply a **3 mm (0.12 in)** bead of anaerobic sealant around the mounting surface of the axle housing.



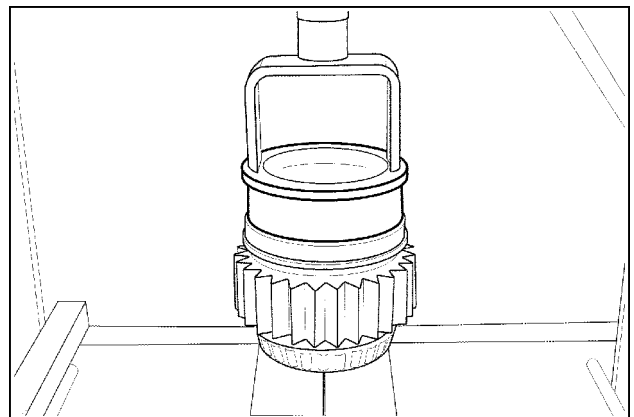
RCPH10FWD184ABJ 26

27. Carefully align and install the stationary ring gear on the housing so the dowel pin holes will align.

NOTE: Repeat Steps 9 through 27 to assemble the opposite side final drive.

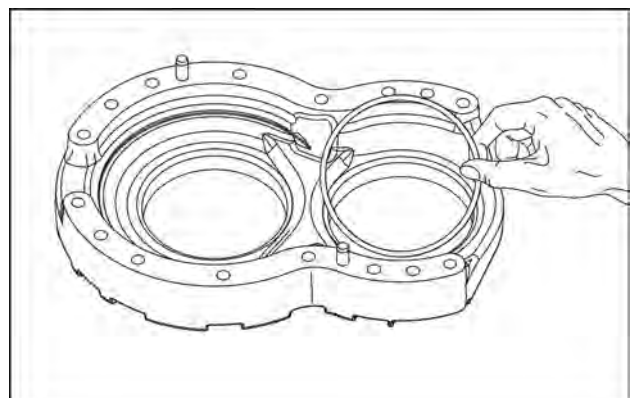
Offset housing assembly

28. Place the bearing cup over each bearing cone that is to be replaced on the gear shafts. Use the **CAS2673** pinion seal installer and press to install the bearing cones on the gear shafts.



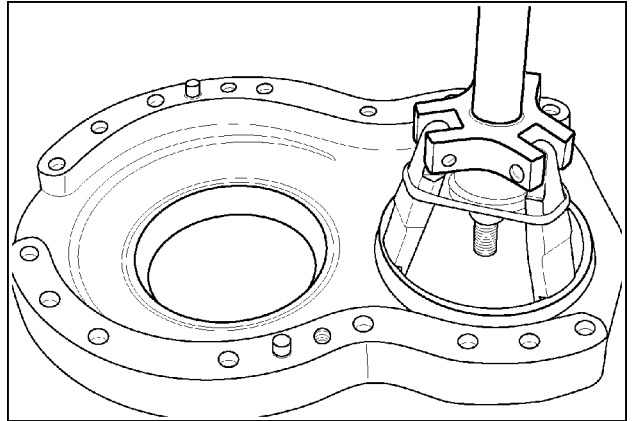
RCPH10FWD186ABJ 27

29. Install the bearing preload shims into their original location in the cover. One shim is required for each bearing.



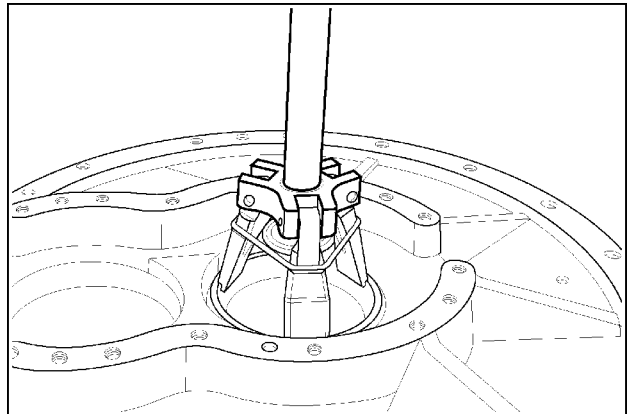
RAIL17TR00578AA 28

30. Use a bearing cup installer to install both bearing cups in the cover.



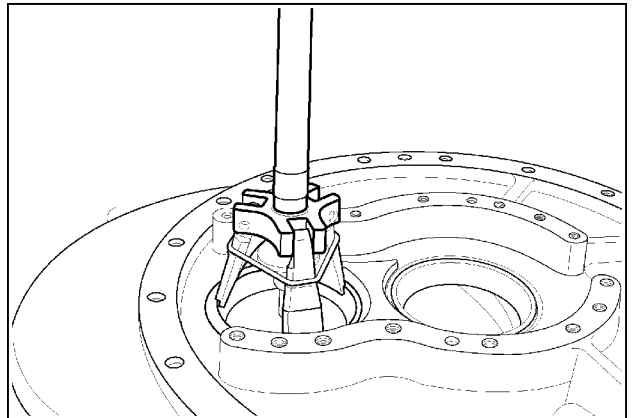
RCPH10FWD187ABJ 29

31. Use a bearing cup installer to seat the bearing cup in the bore of the housing.



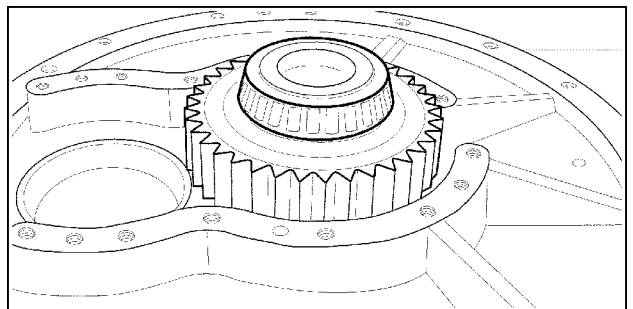
RCPH10FWD188ABJ 30

32. Install the remaining bearing cup in the housing.



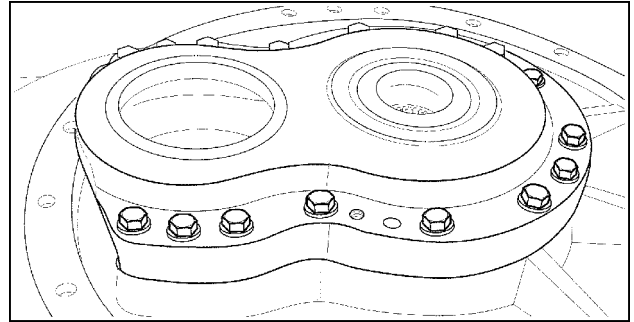
RCPH10FWD189ABJ 31

33. Install the 36 tooth gear assembly in the housing.



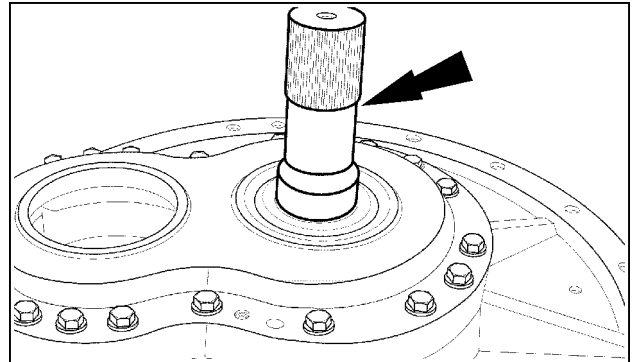
RCPH10FWD190ABJ 32

34. Align and install the gear cover. Torque the bolts to **90 – 100 N·m (66 – 74 lb ft)**.



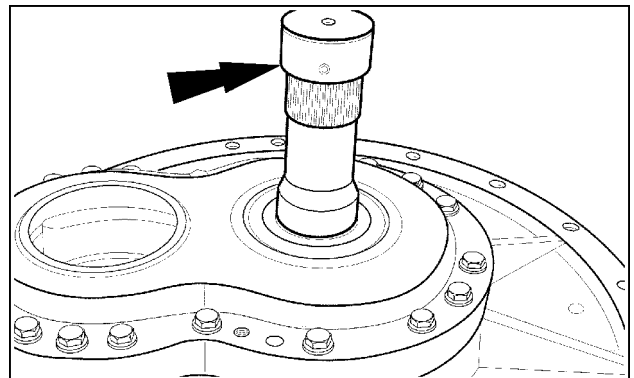
RCPH10FWD191ABJ 33

35. Install one of the short differential axle shafts into the gear.



RCPH10FWD192ABJ 34

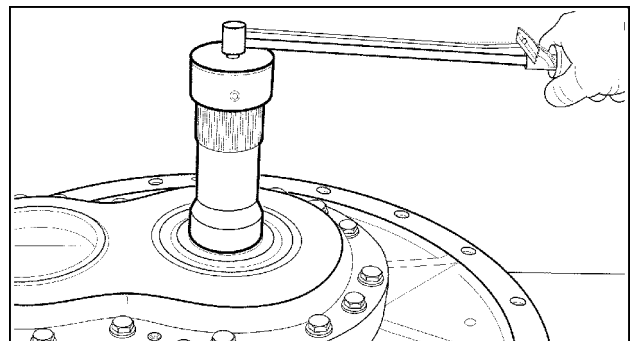
36. Install the **CAS2508** rolling torque Adaptor on the short shaft and tighten the set screw.



RCPH10FWD193ABJ 35

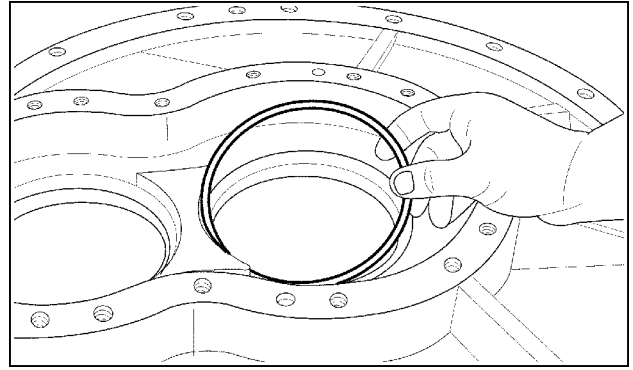
37. Use a torque wrench to measure the bearing rolling torque. Rolling torque should be **5 – 8 N·m (44 – 71 lb in)**.

NOTE: Rolling torque must be established for each individual gear.



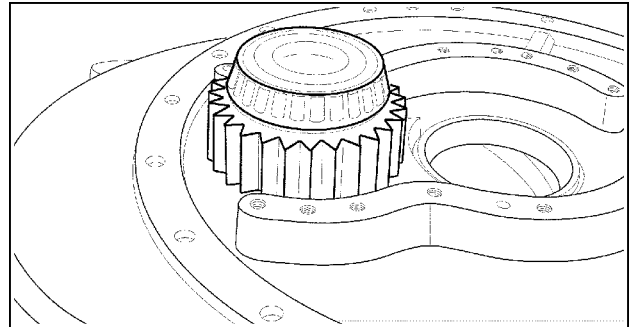
RCPH10FWD194ABJ 36

38. If rolling torque is not within tolerance, remove the cover, gear and bearing cup from the housing and add or remove selective shims as required. Reassemble and check rolling torque.



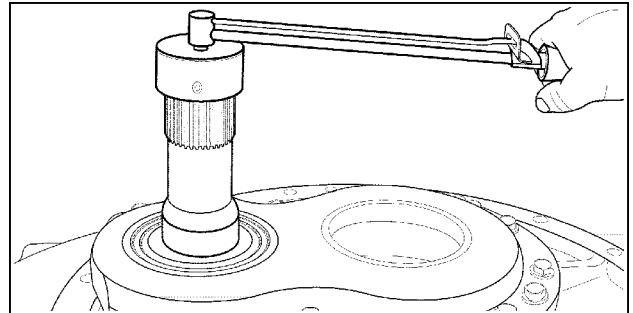
RCPH10FWD168ABJ 37

39. After the rolling torque has been adjusted for the 36 tooth gear, remove the cover and gear. Install the 27 tooth gear assembly.



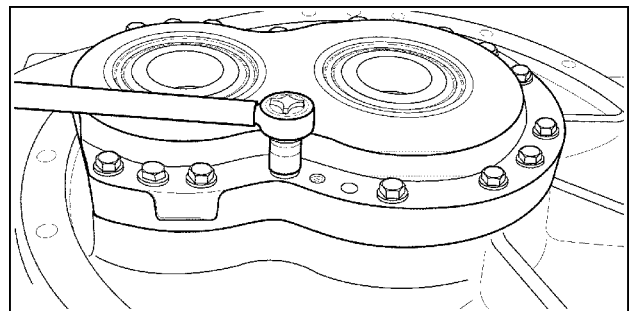
RCPH10FWD195ABJ 38

40. Repeat steps 35 through 39 as required to set bearing rolling torque



RCPH10FWD196ABJ 39

41. After the correct rolling torque for the 27 tooth gear has been established, remove the cover and install the 36 tooth gear assembly. Install the cover and torque the bolts to **90 – 100 N·m (66 – 74 lb ft)**.



RCPH10FWD197ABJ 40

42. Install the short shaft and torque adapter into one of the two gears to measure the total rolling torque for both gears. Total rolling torque should be **10 – 15 N·m (89 – 133 lb in)** when measured at the small gear and **12 – 20 N·m (106 – 177 lb in)** at the large gear.

NOTE: Perform steps 28 through 42 for the opposite side offset housing.

Next operation:

Final drive - Install - 500 Series Quadtrac® axles (25.310)

Final drive - Install - 500 Series Quadtrac® axles

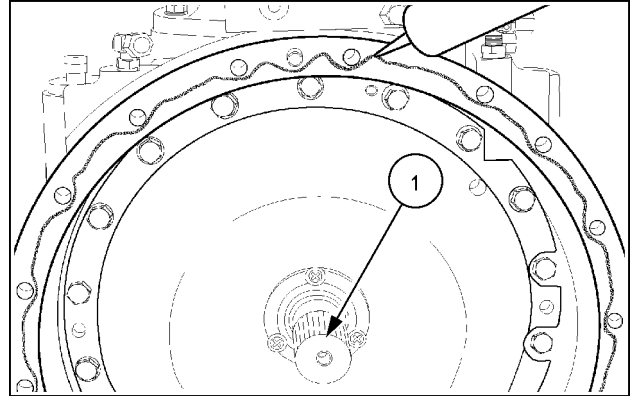
Steiger® 470 Quadtrac®	NA
Steiger® 500 Quadtrac®	NA
Steiger® 540 Quadtrac®	NA

Offset housing installation

1. Install the short axle stub shafts (1) into the left hand and right hand sides of the differential. The longer of the two shafts must be installed in the brake carrier (right hand) side.

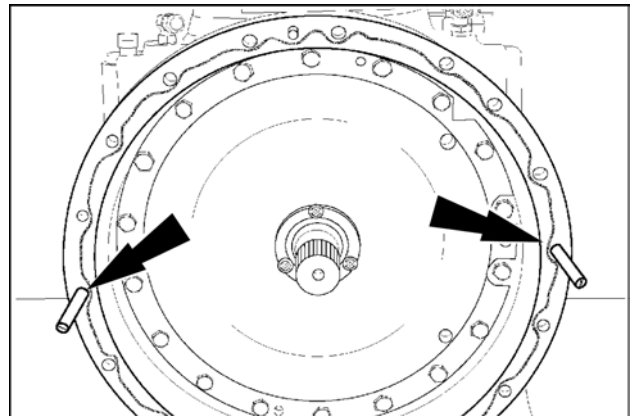
Put a **3 mm (0.12 in)** bead of anaerobic sealant (or equivalent) around the mating flange of the differential housing.

NOTICE: Be sure the machined surface of the stub shafts mate with the seals. If the stub shafts are installed backwards the machined surface will not mate with the seal.



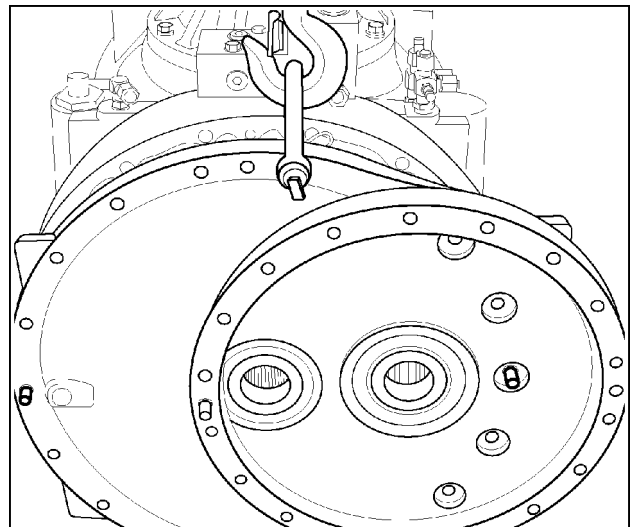
RCPH10FWD198ABJ 1

2. Install two **CAS2496** alignment studs horizontally opposite each other in the differential housing.



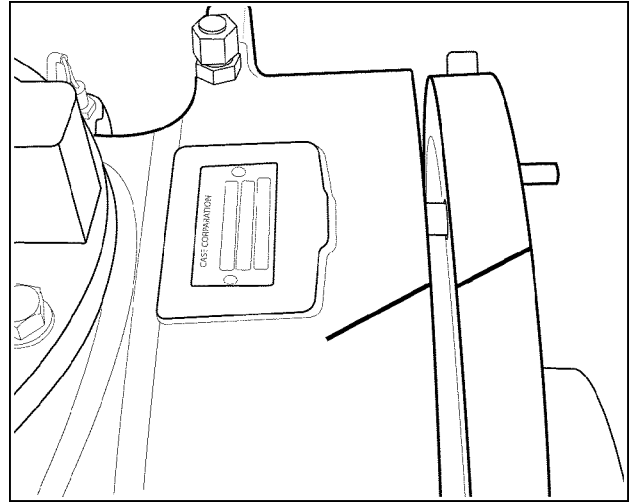
RCPH10FWD199ABJ 2

3. Lift and align the offset housing with the differential housing so the assembly marks on the differential housing and offset housing align and the housing will be supported on the alignment studs. Remove the lifting device.



RCPH10FWD162ABJ 3

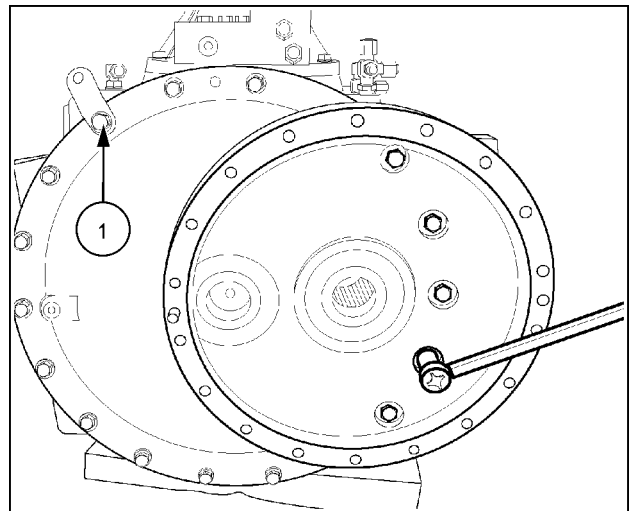
4. Push the offset housing onto the dowel pins.



RCPH10FWD200ABJ 4

5. Install the offset housing mounting bolts. Tighten the bolts alternately and evenly to **284 – 298 N·m (209 – 220 lb ft)**. Be sure the clamp bracket (1) is installed in the right location.

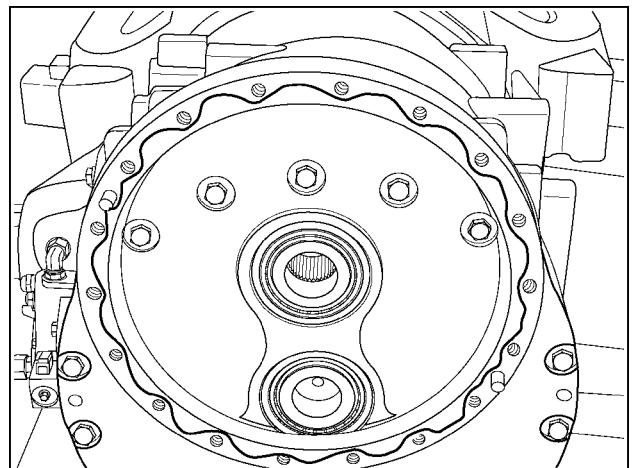
NOTE: Repeat steps 1 through 5 for the opposite side offset housing installation.



RCPH10FWD201ABJ 5

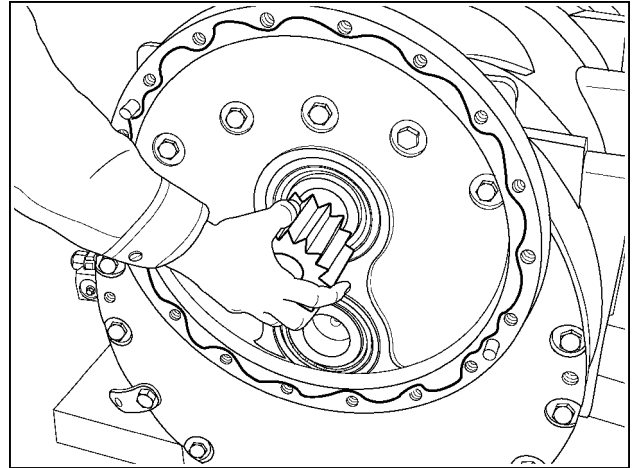
Final drive installation

6. Put a **3 mm (0.12 in)** bead of sealant (or equivalent) around the mating flange of the offset housing.



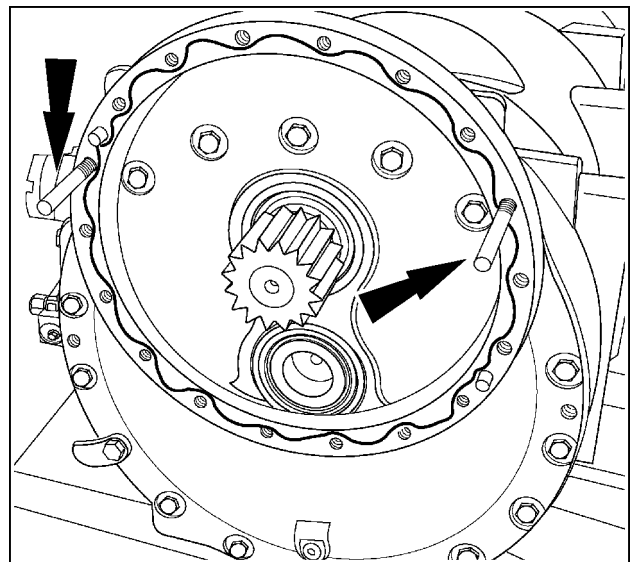
RCPH10FWD202ABJ 6

7. Install the sun gear into the housing.



RCPH10FWD203ABJ 7

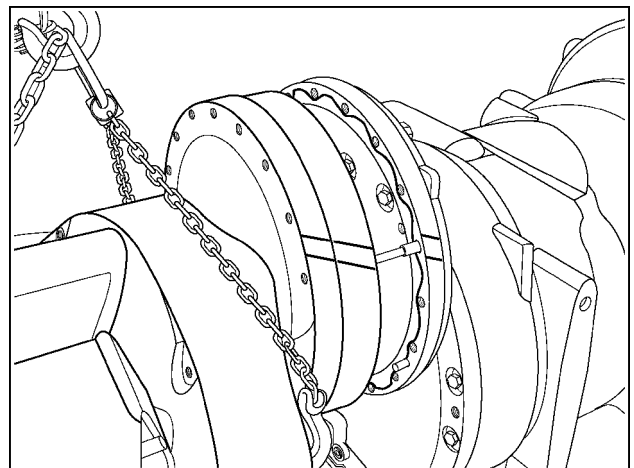
8. Install two **CAS2496** alignment studs into the offset housing horizontally opposite each other.



RCPH10FWD204ABJ 8

9. Lift and align the final drive assembly to the offset housing so the assembly marks align and the housing will engage the alignment studs.

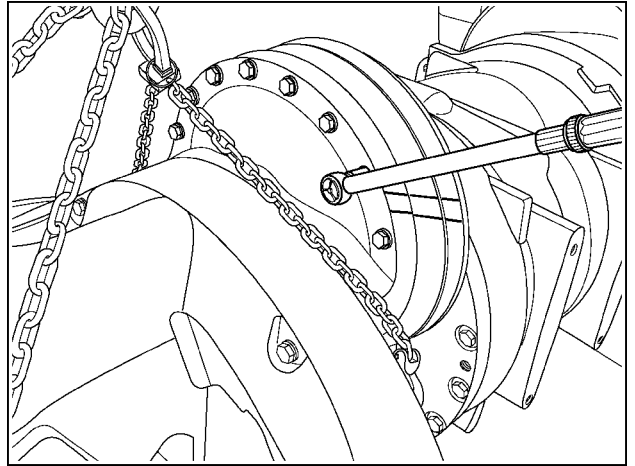
NOTE: It may be necessary to rock the wheel hub back and forth to mesh the planetary gears and sun gear.



RCPH10FWD205ABJ 9

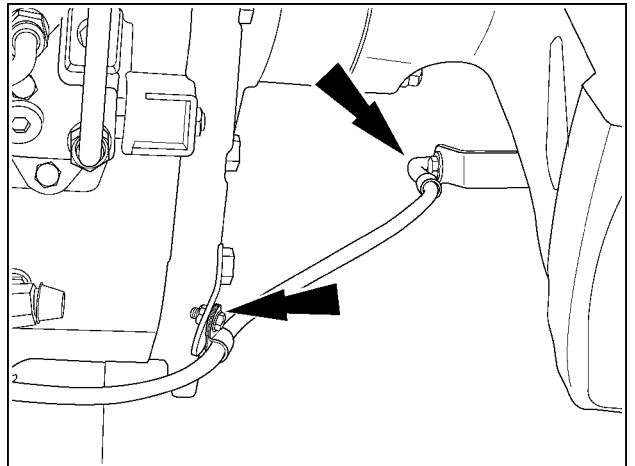
10. Install the final drive mounting bolts and washers. Tighten the bolts alternately and evenly to **284 – 298 N·m (209 – 220 lb ft)**.

NOTE: Repeat steps 6 through 10 for the opposite side final drive installation.



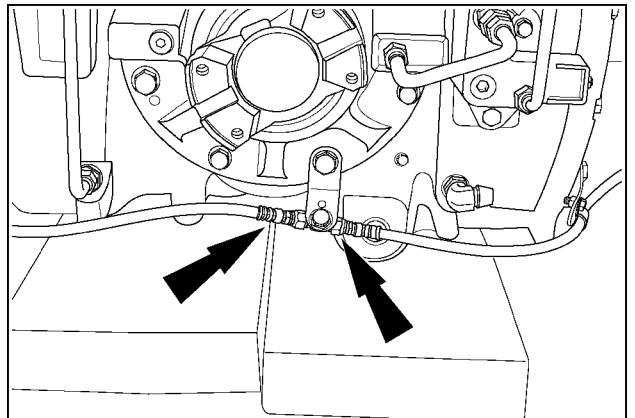
RCPH10FWD206ABJ 10

11. Install the “P” clamps and track tension pressure hose to the bracket on each final drive.



RCPH10FWD133ABJ 11

12. Connect both track tension pressure hoses to the tee fitting located on the center housing bracket.



RCPH10FWD207ABJ 12

Next operation:

Differential lock - Leakage test (25.102) Hydraulic service brakes - Test - Brake leak down (33.202)

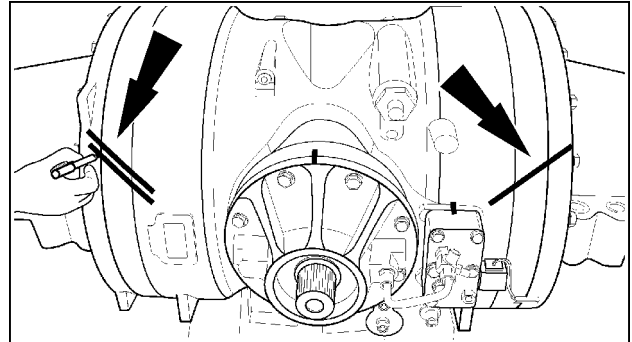
Final drive - Remove - 600 Series axles - wheeled

Steiger® 580	NA
Steiger® 620	NA

Prior operation:

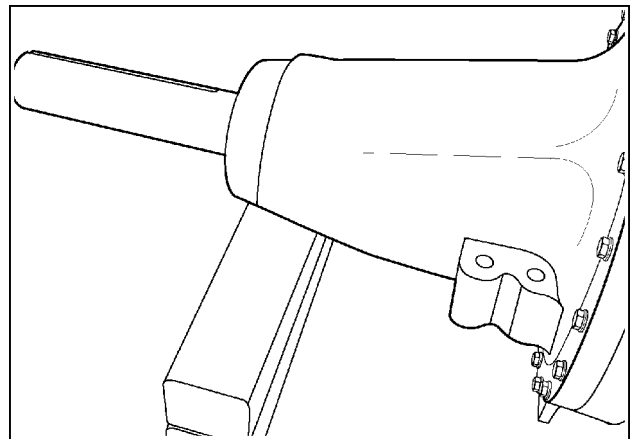
Powered front axle - Remove - High power frame wheeled tractors (25.100)

1. Position the axle assembly on a clean shop floor. Put assembly reference marks across each final drive housing to the differential housing.



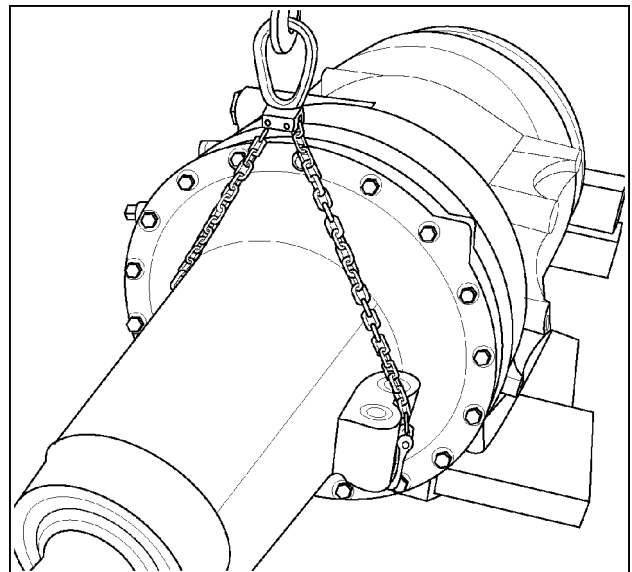
RCPH10FWD884AAJ 1

2. Put blocking under one final drive housing to keep the axle assembly level when the opposite final drive housing is removed.



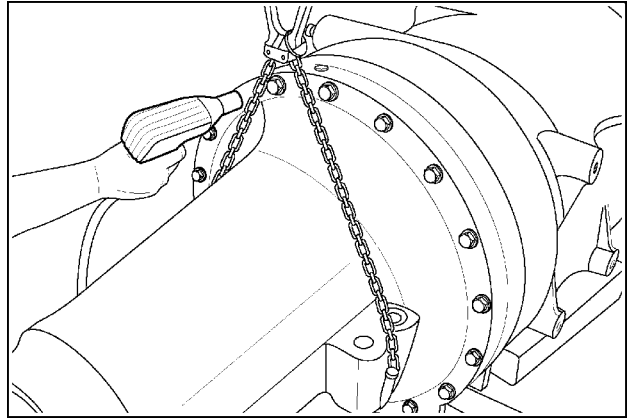
RCPH10FWD885AAJ 2

3. Connect an overhead hoist to the axle trumpet housing. Take-up the weight of the housing.



RCPH10FWD886AAJ 3

4. Remove the 18 bolts securing the trumpet housing and stationary ring gear to the differential housing.



RCPH10FWD887AAJ 4

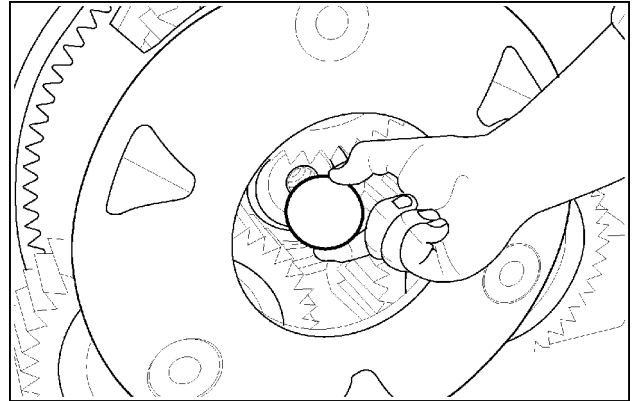
5. Use the hoist to lift and release the trumpet housing a small amount several times to weaken the sealant bond. Use a pry bar between the stationary ring gear and differential housing to pry the ring gear out of the dowel pins. Repeat **3, 4, 5** remove the opposite side final drive.

NOTE: The stationary ring gear must be removed with the trumpet housing.

Final drive - Disassemble - 600 Series axles - wheeled

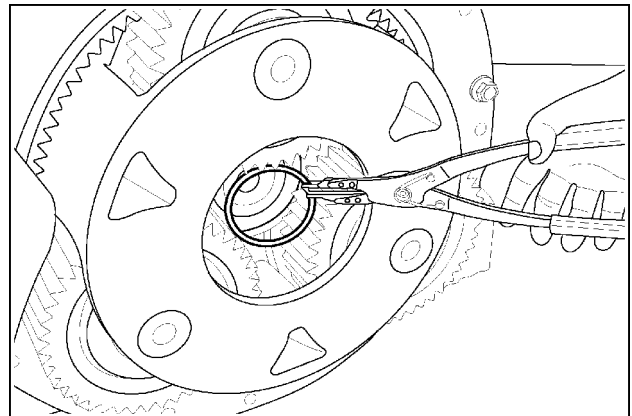
Steiger® 580	NA
Steiger® 620	NA

1. Remove the nylon thrust button from the end of the axle shaft.



RCPH10FWD889AAJ 1

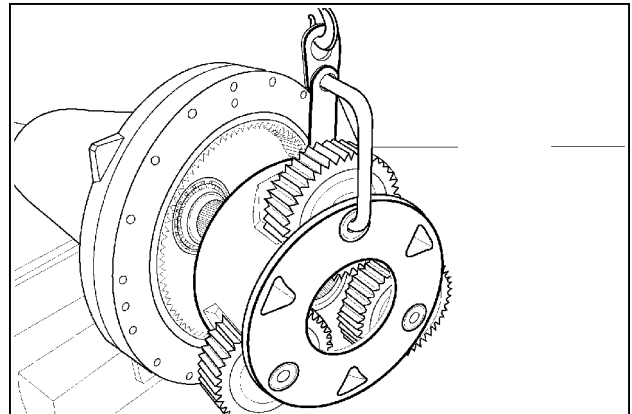
2. Remove the snap ring securing the planetary carrier assembly to the axle.



RCPH10FWD890AAJ 2

3. Use the **CAS2676** planetary carrier lifting hook to remove the planetary assembly from the housing.

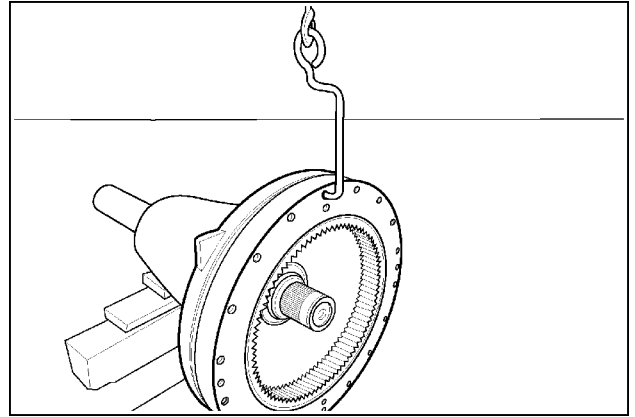
NOTICE: Be sure the retaining strap is positioned behind the gear to prevent the lifting fixture from pulling out of the pinion gear shaft.



RCPH10FWD891AAJ 3

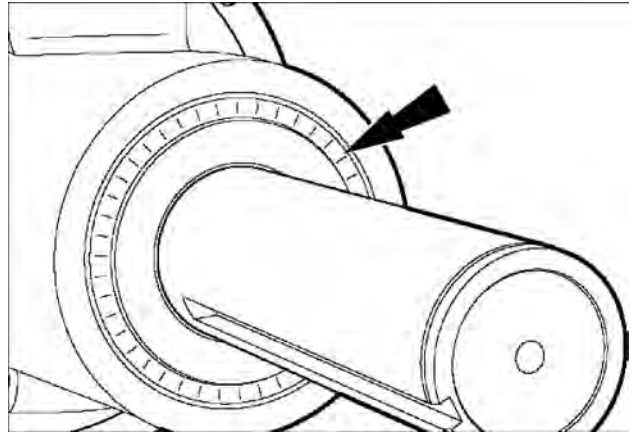
4. Use the CNH299075 lifting hook to remove the stationary ring gear from the axle housing.

NOTE: Use a pry bar between the trumpet housing and the stationary ring gear to pry the ring gear off the dowel pins.



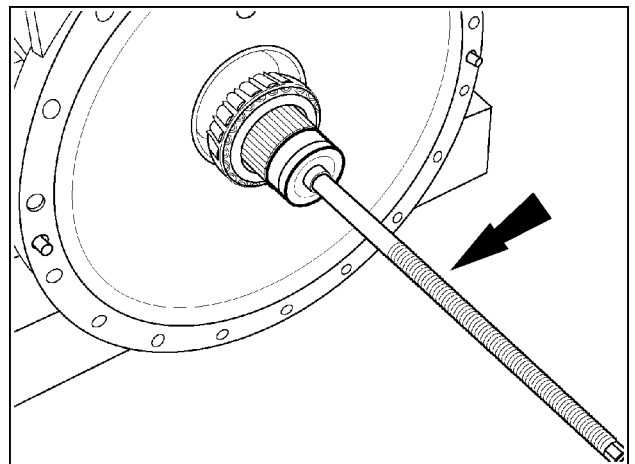
RCPH10FWD892AAJ 4

5. Remove the oil seal from the final drive housing.



RCPH11FWD344BAC 5

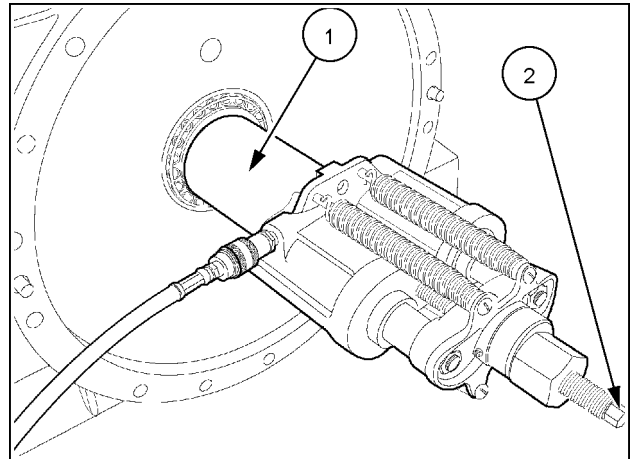
6. Install the **CAS2666** puller screw and spacer washer tightly into the end of the axle shaft.



RCPH10FWD893AAJ 6

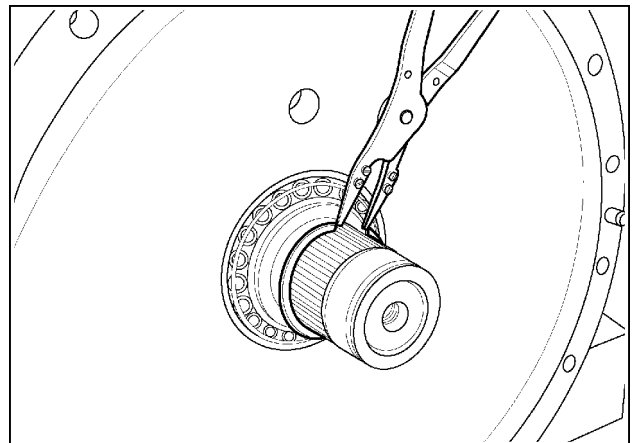
7. Install the **CAS2666** bearing installer tube (1) over the axle and against the bearing cone. Install a twin ram over the puller screw and install the nut (2) on the puller screw. Hand tighten the nut to hold the spacer centered against the bearing. Use the hydraulic ram to press the bearing onto the axle shaft while rotating the ram back and forth until there is a noticeably tighter bearing preload. Remove the ram, spacer tube and puller screw.

NOTE: The bearing is back seated against the snap ring.



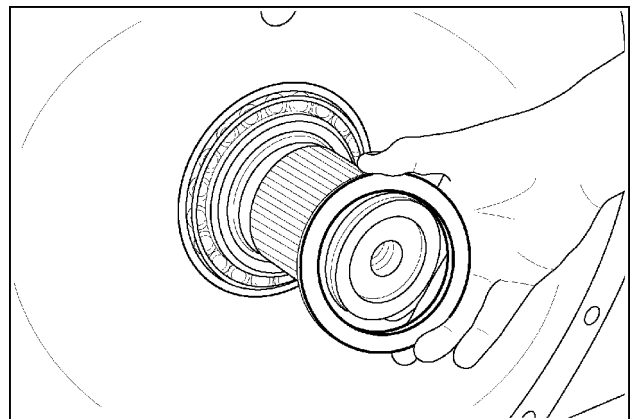
RCPH10FWD894AAJ 7

8. Use a snap ring pliers to remove the snap ring from the groove of the axle.



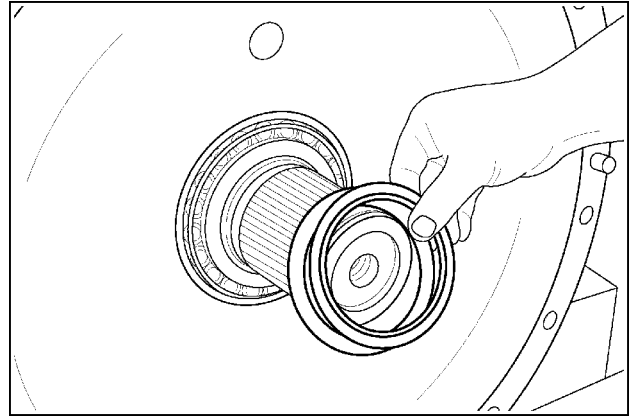
RCPH10FWD895AAJ 8

9. Remove the thrust ring from the axle shaft.



RCPH10FWD896AAJ 9

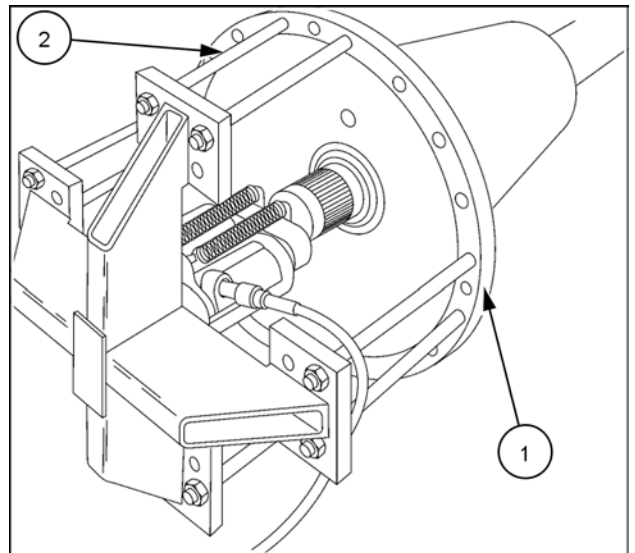
10. Remove and retain the shims from the axle shaft.



RCPH10FWD897AAJ 10

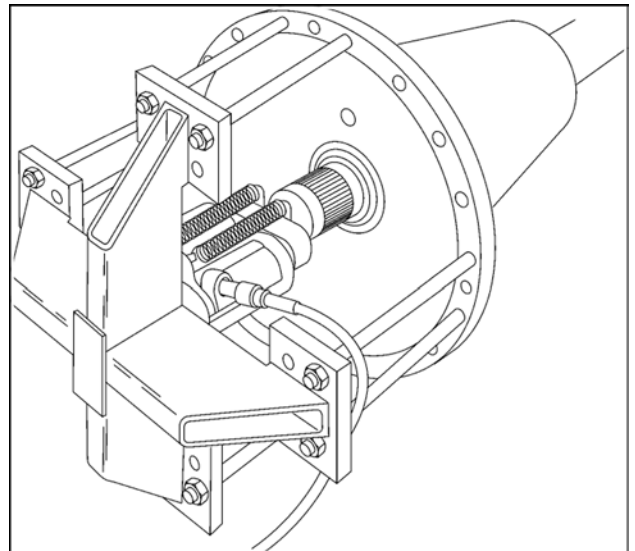
11. Install the **380002851** axle shaft remover bridge (1) securely on the axle housing in the location shown. Tighten the eight attaching bolts (2) tightly on the axle housing and puller bridge.

NOTICE: It will require **45.36 t (100000 lb)** or more to press out the axle. For this reason the puller bridge must be attached parallel with the axle mounting pads as shown.



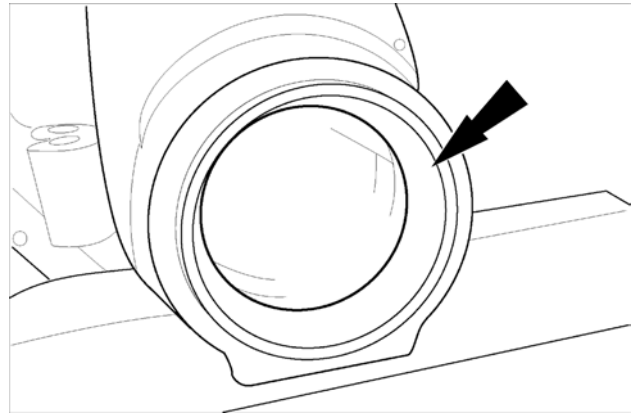
RCPH11FWD219BAM 11

12. Install the hydraulic ram between the puller bridge and the end of the axle. Press the axle through the inner bearing cone. Remove the axle from the housing. Discard the outer seal.



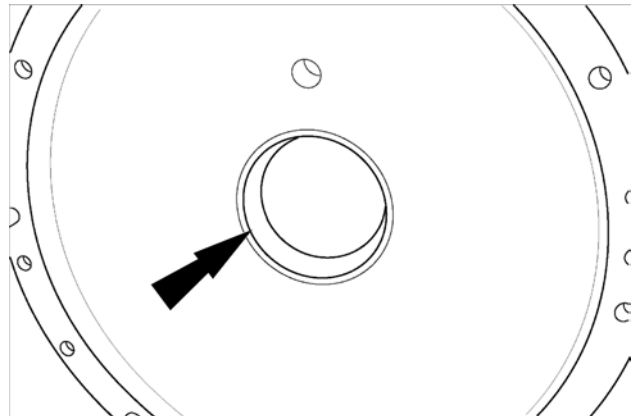
RCPH11FWD219BAM 12

13. Use a three jaw puller and a slide hammer to remove the outer bearing cup from the housing.



RCPH11FWD328BAC 13

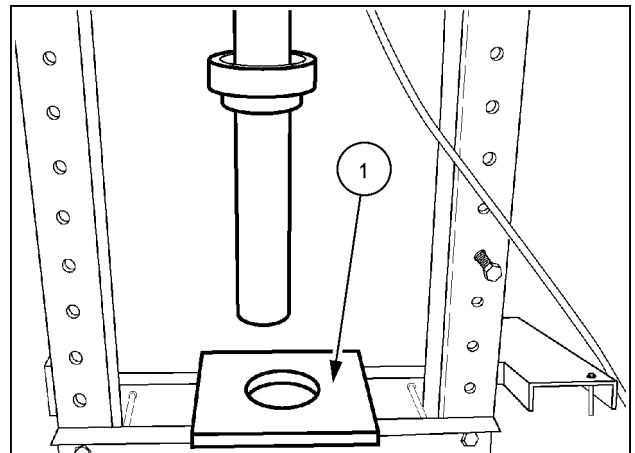
14. Use a three jaw puller and a slide hammer to remove the inner bearing cup from the housing.



RCPH11FWD327BAC 14

15. To remove the axle outer bearing and seal wear ring, place a suitable plate (1) on a press bed. Install the **380002920** lifting eye into the threaded hole in the end of the axle shaft. Use a lifting device to place the axle on the press bed so that the seal ring is resting on the press plate.

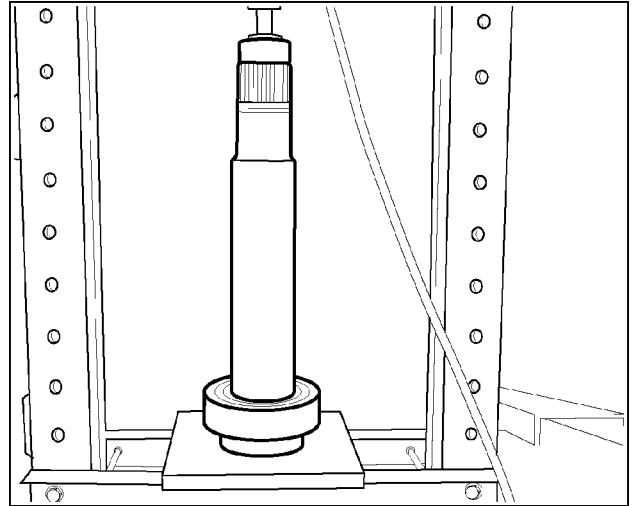
NOTE: If possible, place the bearing cup over the cone before pressing.



RCPH10FWD902AAJ 15

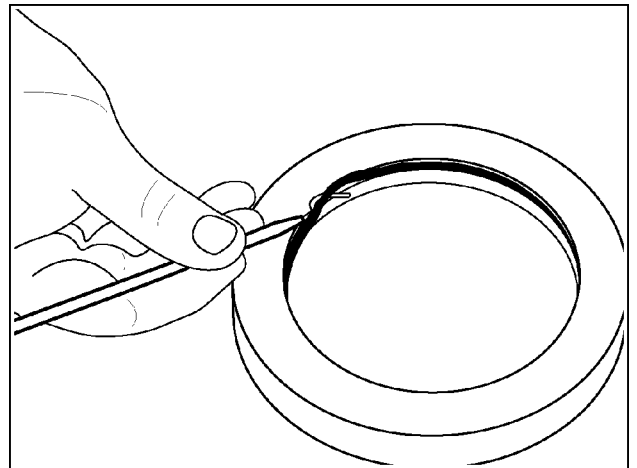
16. Use the press to remove the outer axle bearing cone and seal wear ring.

NOTE: Place a heavy wood block under the press bed for the axle to fall on.



RCPH10FWD903AAJ 16

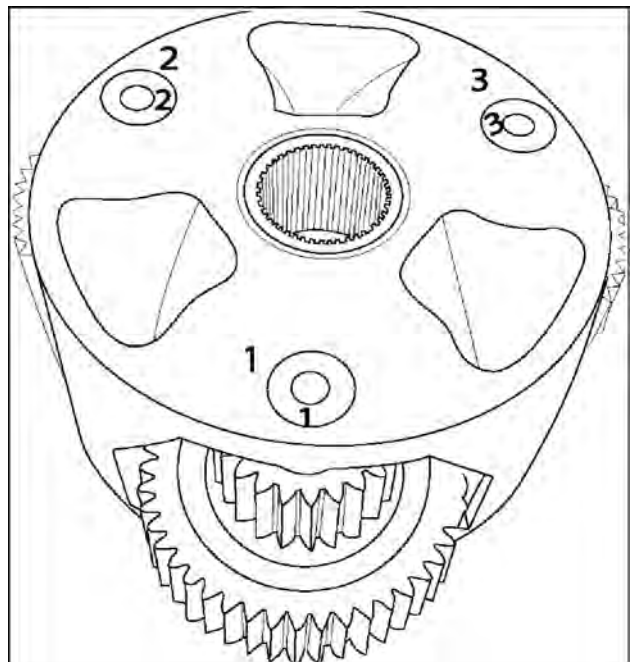
17. Remove and discard the O-ring from the seal wear ring.



RCPH10FWD904AAJ 17

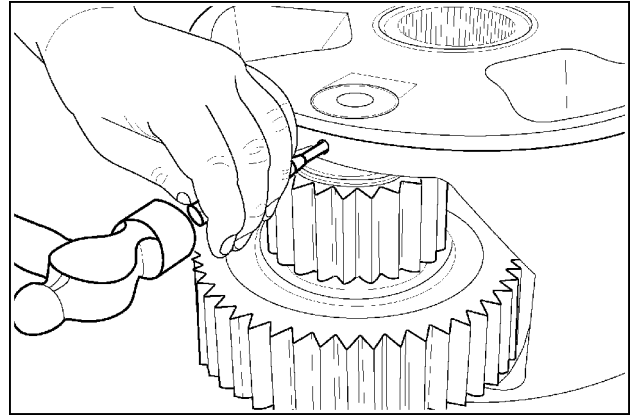
Planetary carrier disassembly

18. If the gears are to be reused, mark each gear and the carrier so that the gears and pins are assembled in their original location in the gear carrier.



RCPH10FWD911AAJ 18

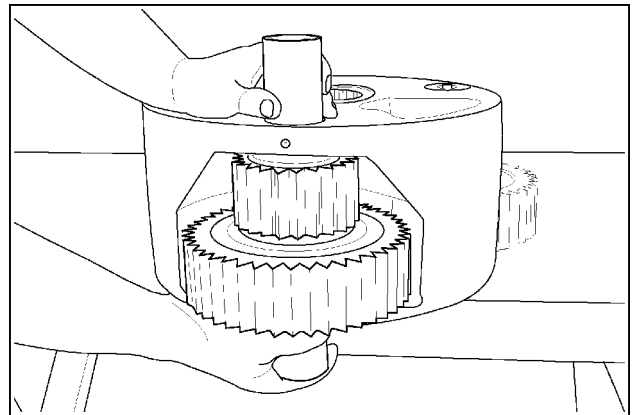
19. Drive the spring pin into the center of the gear shaft.



RCPH10FWD912AAJ 19

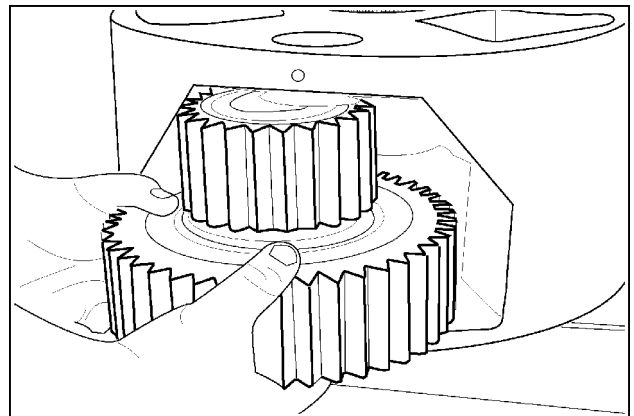
20. Use the **CNH299048** pilot sleeve to push the gear shaft out and retain the needle roller bearings in the gear.

NOTE: There is a double row of non caged needle roller bearings in each gear.



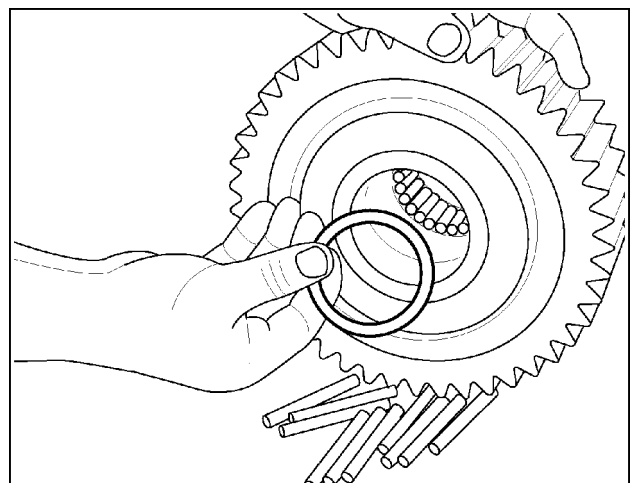
RCPH10FWD913AAJ 20

21. Carefully remove the planetary gear assembly with thrust washers from the carrier.



RCPH10FWD914AAJ 21

22. Remove the needle roller bearings and separator ring from within the gear.
Repeat **18** through **22** for each remaining planet gear.
Clean and inspect all final drive gears, bearings and other parts for too much wear or other damage. Replace all worn or damaged parts.
Repeat **1** through **22** to disassemble the opposite side final drive.



RCPH10FWD915AAJ 22

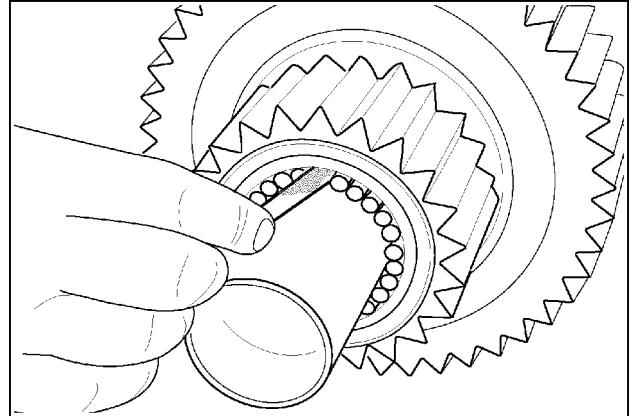
Final drive - Assemble - 600 Series axles - wheeled

Steiger® 580	NA
Steiger® 620	NA

Planetary carrier assembly

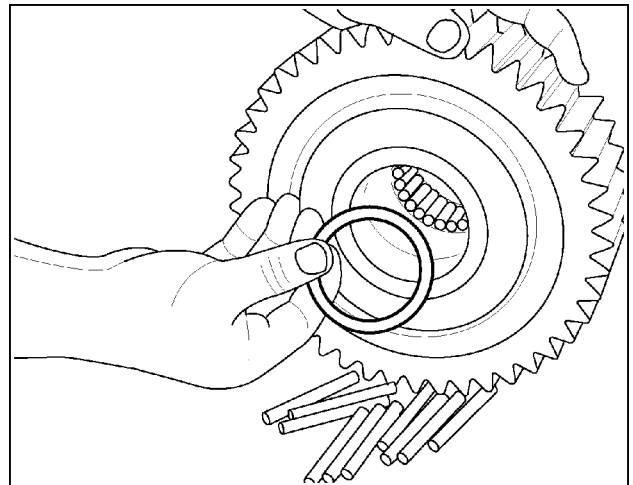
1. Lubricate the needle roller bearings with clean grease or petroleum jelly and load 29 bearings on one side of the gear.

NOTE: Use the **CNH299048** pilot sleeve to hold the first row of needle bearings in place.



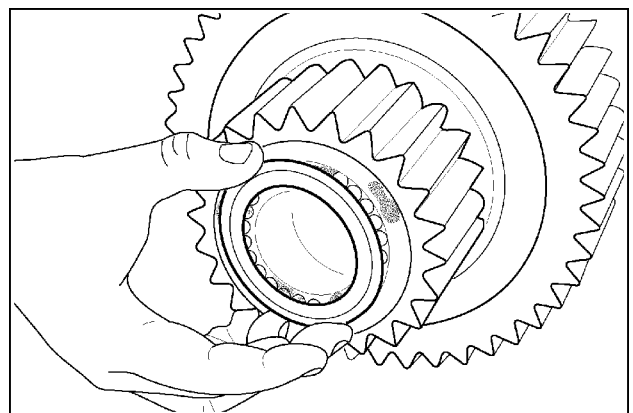
RCPH10FWD916AAJ 1

2. Install the separator ring and load the remaining 29 needle roller bearings into the gear. Push the pilot sleeve into the gear to hold all the roller bearings in place.



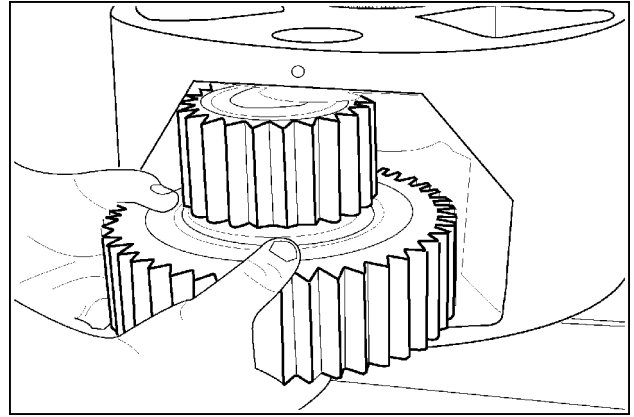
RCPH10FWD915AAJ 2

3. Lubricate the thrust washers with clean grease or petroleum jelly. Install one thrust washer on each side of the gear. Adjust the pilot sleeve to engage the thrust washers to hold them in place.



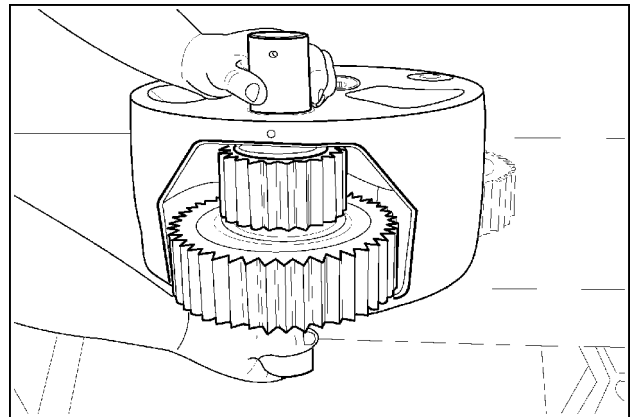
RCPH10FWD917AAJ 3

4. Carefully put the planet gear into its original position in the gear carrier while holding the pilot sleeve in place.



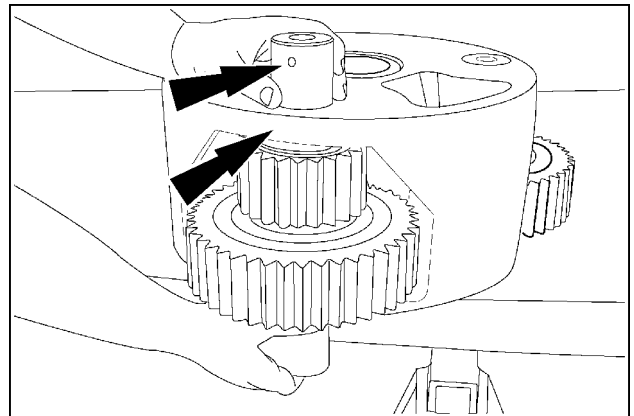
RCPH10FWD914AAJ 4

5. While maintaining tension on the pilot sleeve from the bottom, align the gear and carefully push the gear shaft through the thrust washer and bearings.



RCPH10FWD918AAJ 5

6. While holding tension on the pilot sleeve, install the gear shaft into the carrier. Align the holes in the end of the gear shaft with the spring pin hole in the gear carrier.

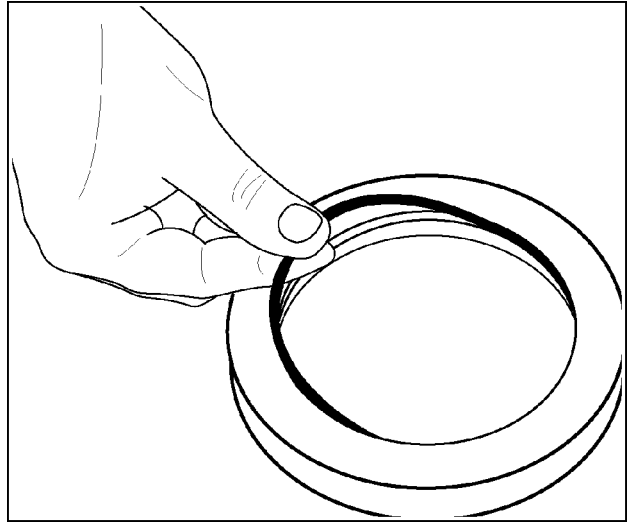


RCPH10FWD919AAJ 6

7. Install a NEW spring pin into the gear shaft until the end of the pin is flush or slightly below the edge of the carrier housing.
Repeat Steps 1 through 7 for each planet gear assembly installation.

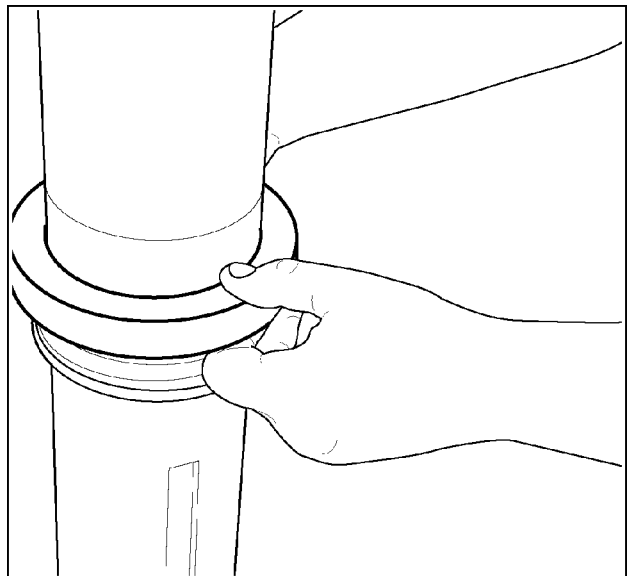
Final drive housing assembly

8. Lubricate and install a new O-ring into the groove in the inside diameter of the axle seal wear ring.



RCPH10FWD921AAJ 7

9. Coat the inside diameter of the axle seal wear ring below the O-ring with **LOCTITE® 515™** or equivalent. Install the axle seal wear ring on the axle shaft with the O-ring side toward the top until the seal ring is seated on the flange of the axle.



RCPH10FWD922AAJ 8

10. **⚠ CAUTION**

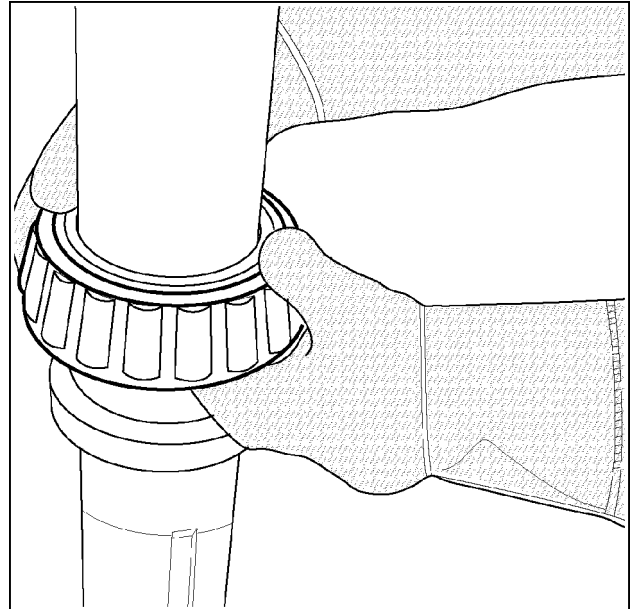
Burn hazard!
Always wear heat-resistant protective gloves
when handling heated parts.
Failure to comply could result in minor or moderate injury.

C0047A

Use a bearing heater to heat the outer axle bearing cone. Use a heat probe to monitor the temperature of the bearing race.

NOTE: DO NOT heat the bearing to more than **120 °C (248 °F)**. Average heating time is 10 to 12 minutes

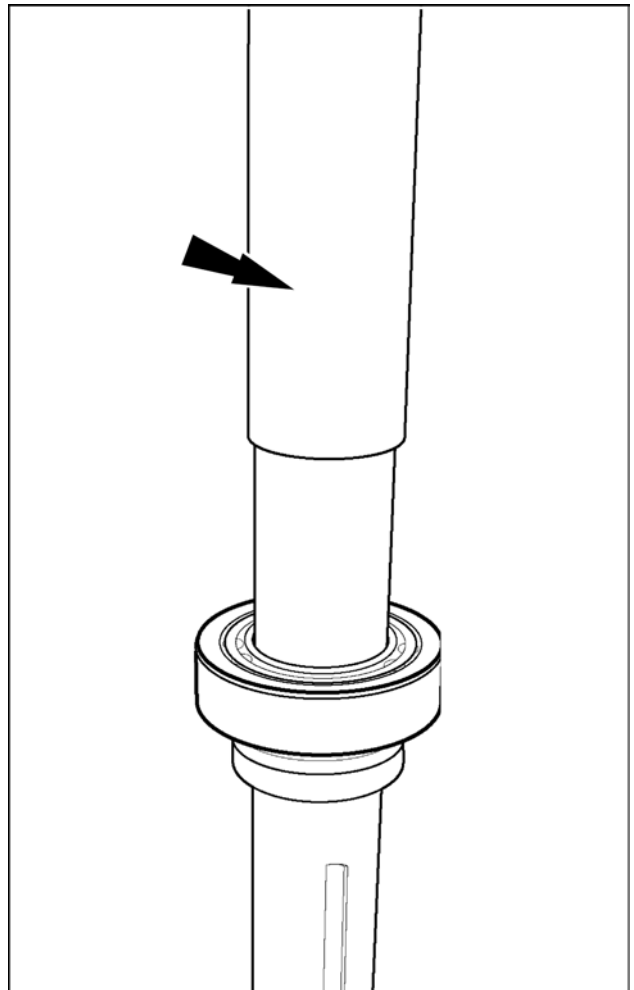
11. Install the heated bearing cone on the axle shaft (large side down) against the seal wear ring.



RCPH10FWD924AAJ 9

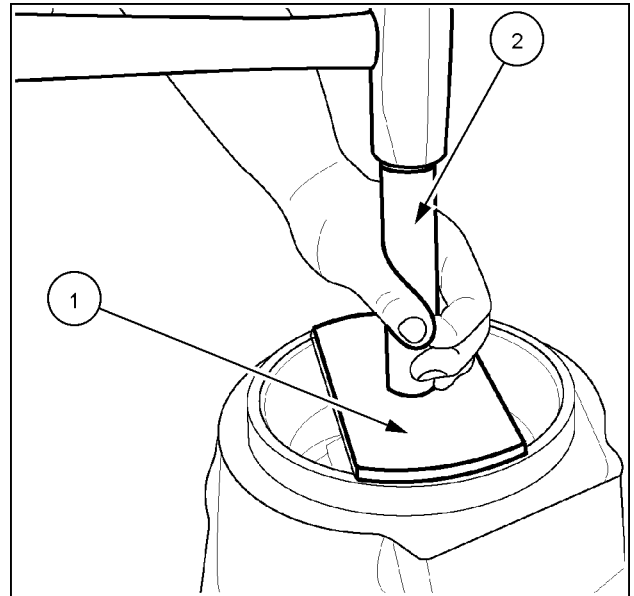
If the bearing cone did not seat against the seal ring (or if a bearing heater was not available), temporarily install the cup over the cone. Use a suitable driver and heavy sledge hammer to drive the bearing cone and seal ring on until fully seated against the flange of the axle.

NOTE: If required, the wheel hub and bushing maybe used as a support stand to hold the axle in a vertical position.



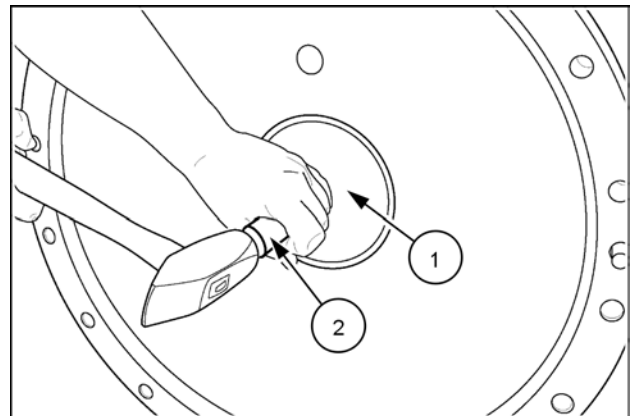
RCPH11FWD221BAM 10

12. Put a light coat of **LOCTITE® ANTI-SEIZE** compound around the outside diameter of the outer bearing cup. Use the appropriate size bearing cup installer (1) and **380001108** short handle (2) to install the bearing cup into the trumpet housing until the cup is seated.



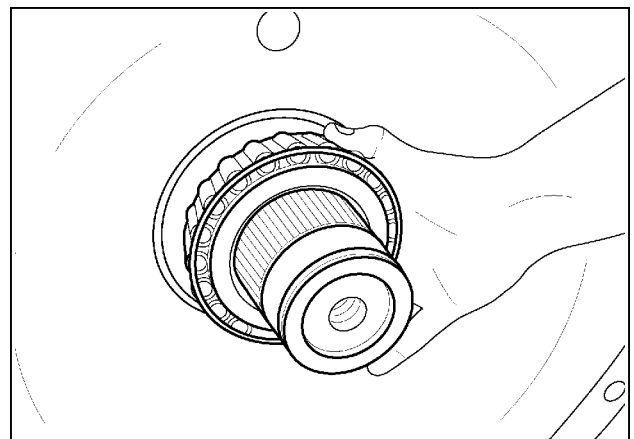
RCPH10FWD926AAJ 11

13. Put a light coat of **LOCTITE® ANTI-SEIZE** compound around the outside diameter of the inner bearing cup. Use the **CAS2501** bearing cup installer (1) and a suitable driver (2) to install the bearing cup into the housing until the cup is seated.



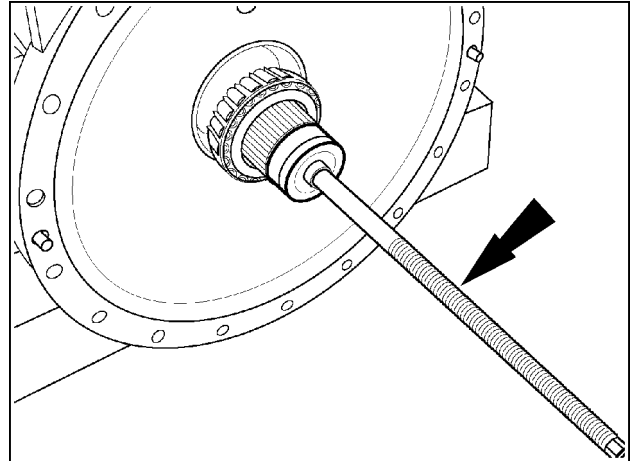
RCPH11FWD330BAC 12

14. Lubricate the outer axle bearing cone with clean oil. Install the axle shaft assembly into the trumpet housing. Apply a light coat of clean oil to the inside diameter of the inner axle bearing cone and position the bearing on the axle shaft.



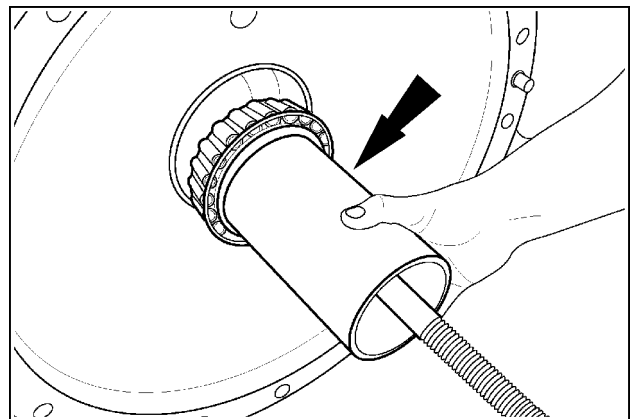
RCPH10FWD928AAJ 13

15. Install the **CAS2666 CNH299024** puller screw with washer tightly into the end of the axle shaft.



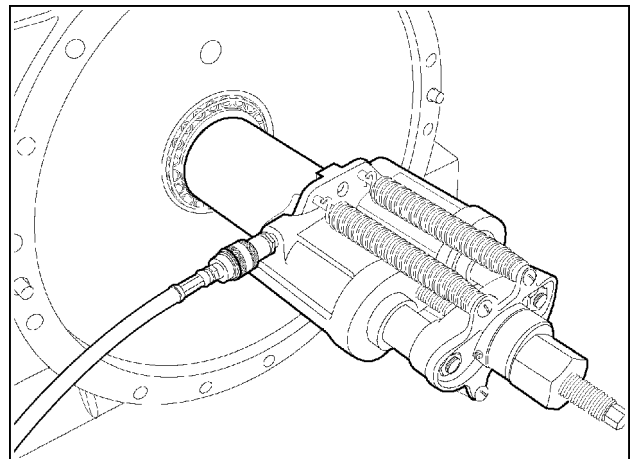
RCPH10FWD893AAJ 14

16. Install the **CAS2666** spacer sleeve over the axle and against the bearing cone.



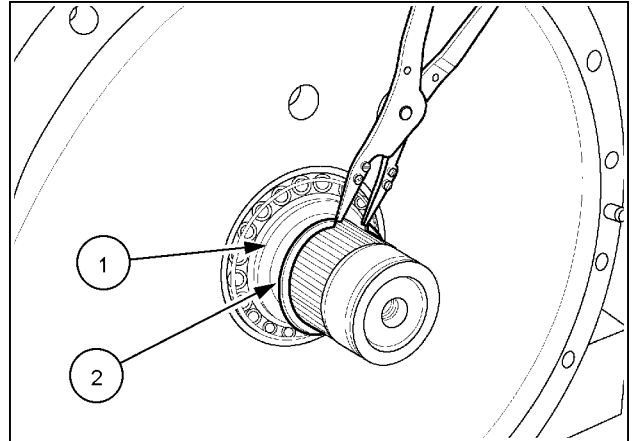
RCPH10FWD929AAJ 15

17. Install the twin ram. Press the inner bearing cone onto the axle shaft while rotating the ram back and forth by hand until there is a noticeably tight preload on the axle bearings. Remove the hydraulic ram and puller screw.



RCPH10FWD894AAJ 16

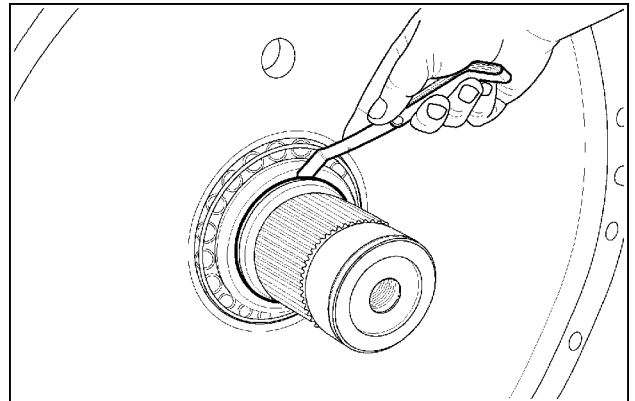
18. Temporarily install the thrust ring (1) and new retaining ring (2) on the axle. Be sure the snap ring is against the far side of the groove and fully seated.



RCPH10FWD895AAJ 17

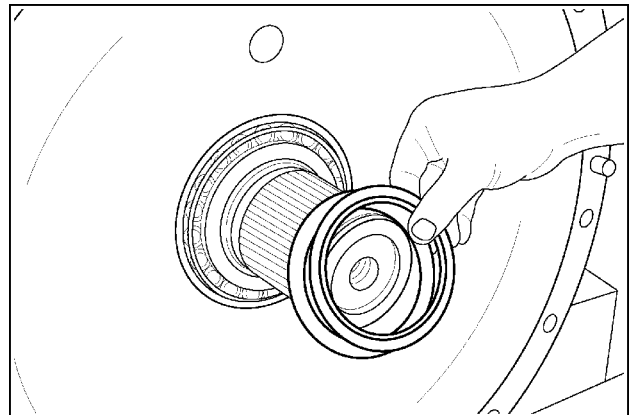
19. Use a thickness gauge to measure and record the distance between the thrust ring and the snap ring in at least two locations.

NOTE: The thickness gauge must fit as tight as possible when measuring.



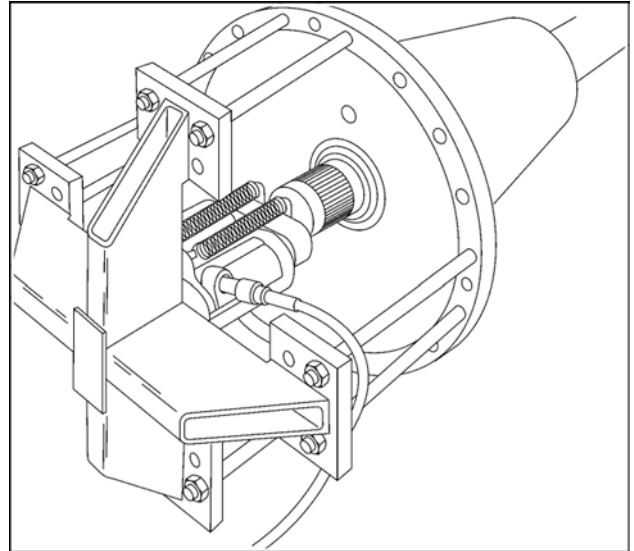
RCPH10FWD930AAJ 18

20. Remove the snap ring and thrust ring. Select a shim combination equal to the distance measured in the previous step within **0.025 mm (0.001 in)**. Install the shim pack, thrust ring and retaining ring on the axle. Be sure the thickest shim is placed next to the bearing and the retaining ring is fully seated in the groove.



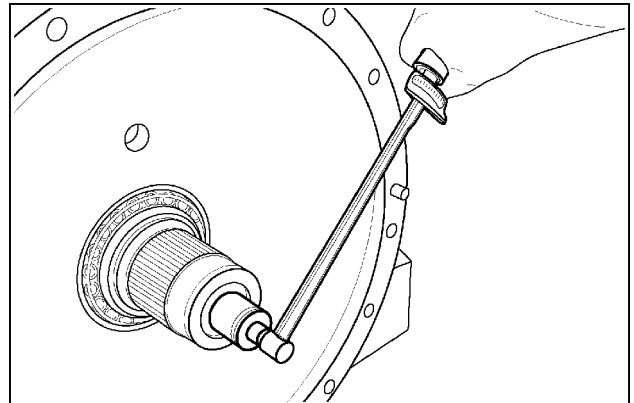
RCPH10FWD931AAJ 19

21. Install the **380002851** axle shaft remover bridge and a **45.36 t (100000 lb)** twin ram onto the trumpet housing. Press on the axle until **13790 – 24132 kPa (2000 – 3500 psi)** is shown on the pressure gauge to back seat the bearing against the retaining ring.



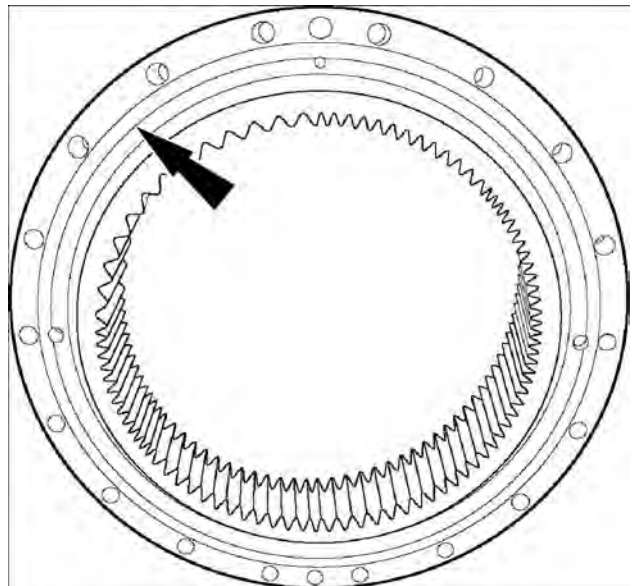
RCPH11FWD219BAM 20

22. Install the **CAS2666** axle shaft rolling torque screw into the end of the axle shaft. Check the axle rolling torque. Rolling torque should be **14 – 31 N·m (10 – 23 lb ft)** for new bearings. Adjust rolling torque for used bearings **8 – 15 N·m (6 – 11 lb ft)**. The rolling torque can be adjusted by adding or subtracting shims. Changing the shim combination thickness by **0.025 mm (0.001 in)** will change the rolling torque approximately **3.3 N·m (2.4 lb ft)**. Repeat Steps 17 through 22 until axle rolling torque is within specifications.



RCPH10FWD933AAJ 21

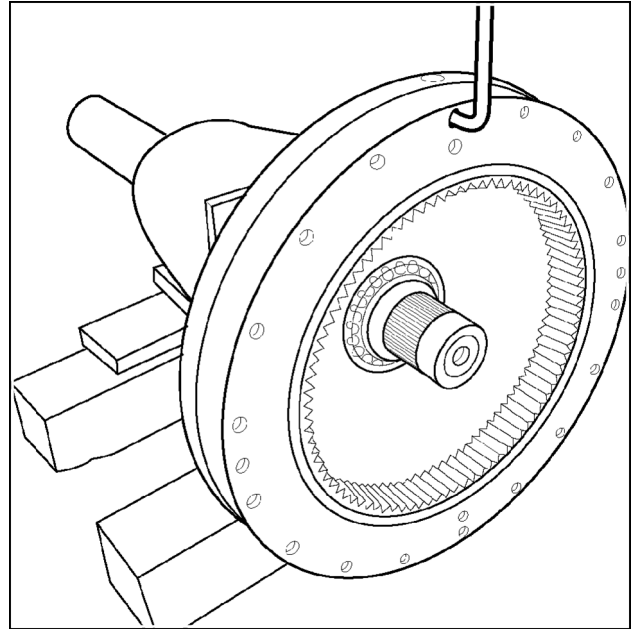
23. Clean the mating surface of the trumpet housing. Lubricate the O-ring with clean grease or petroleum jelly and assemble to one side of the ring gear.



RCPH11FWD342BAC 22

24. Use the CNH299075 lifting hook to carefully align and install the stationary ring gear on the housing so the dowel pin holes will align.

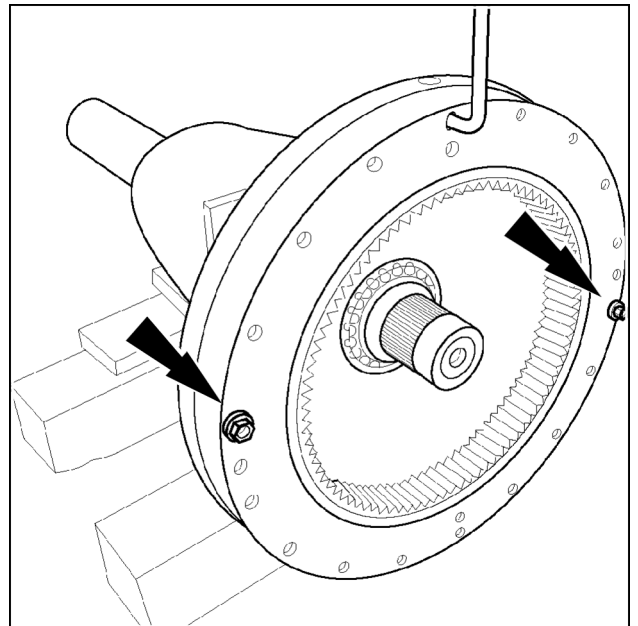
NOTE: The lifting hook must be placed mid way between the two dowel pin holes in the ring gear.



RCPH10FWD935AAJ 23

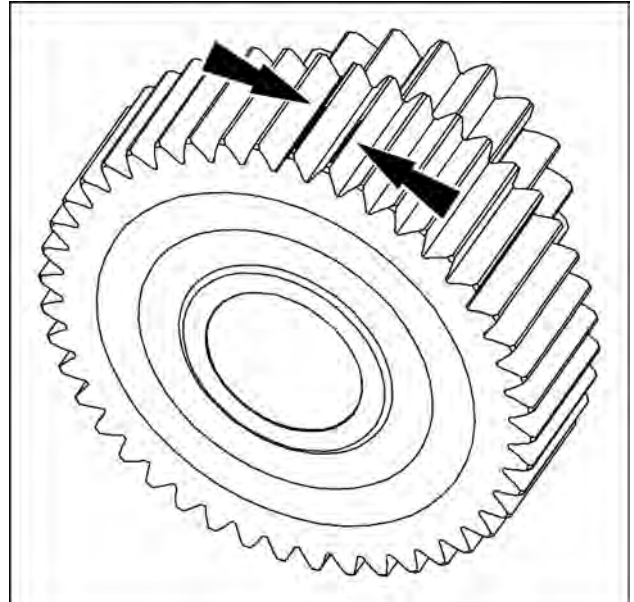
25. Use two common hardware bolts and nuts to temporarily secure the ring gear to the axle housing.

NOTE: Use as short a bolt as possible with the nut installed on the planetary carrier side.



RCPH10FWD936AAJ 24

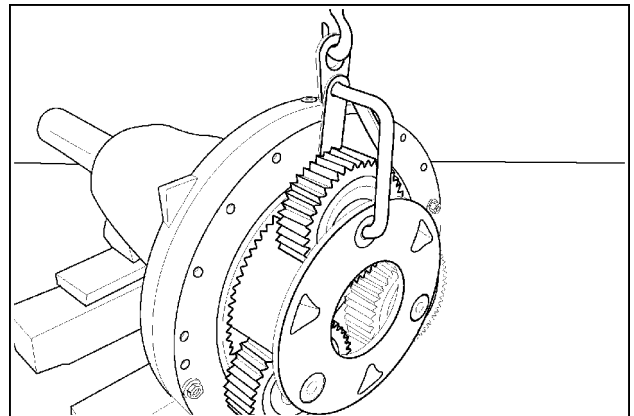
26. On each large planetary gear, there are light scribe lines on the tips of two consecutive gear teeth. The lines vary in length, but are always found on the side farthest from the small gear. The gap between the two teeth must point to the center of the axle. Use a dye marker or paint stick to mark the sides of the teeth that have the timing marks.



RCPH10FWD937AAJ 25

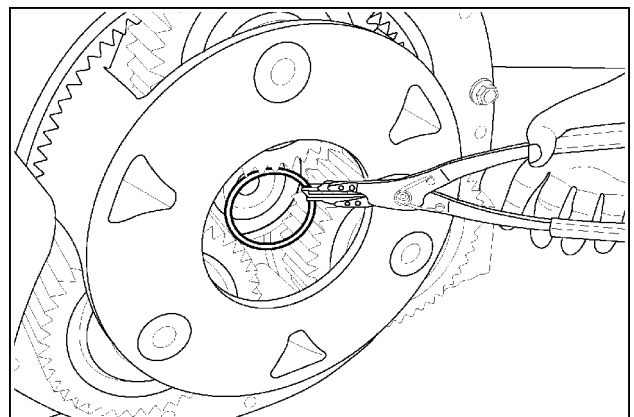
27. Coat the splines of the axle shaft with antisieze compound. Use the **CAS2676** planetary lifting hook to install the planetary carrier assembly on the axle shaft. When installing the planetary carrier, turn each gear so that the timed teeth point to the center of the axle.

NOTE: If the planetary gears are not timed, the short axle sun gear will not engage the planetary gears.



RCPH10FWD938AAJ 26

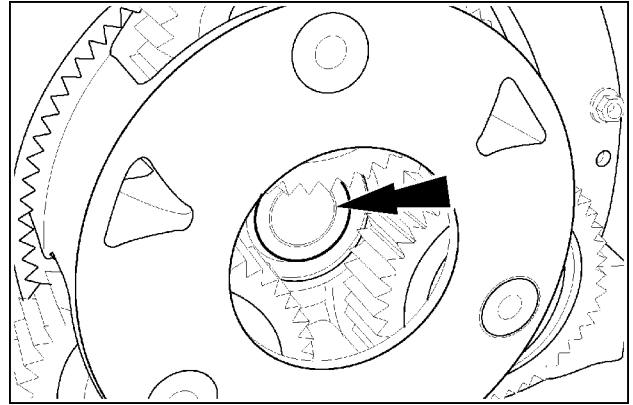
28. Install the planetary carrier retaining ring in the groove on the end of the axle shaft.



RCPH10FWD890AAJ 27

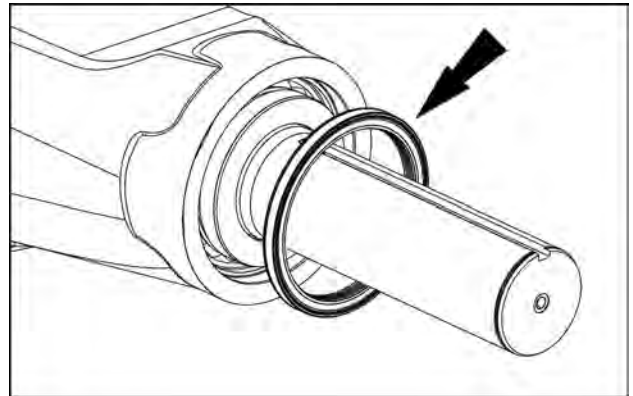
29. Install a new nylon thrust insert in the counter-bore on the end of the axle shaft. Retain the insert with clean grease. Install the short axle sun gear into the planetary gears so that every 7th tooth on the sun gear will be in the root between the two marked teeth of each planet gear.

NOTE: The short axle sun gear will not engage the planetary gears unless the gears are *TIMED* as described. The short axles now must be installed into the planetary carrier first



RCPH10FWD939AAJ 28

30. Fill the inner two grooves of a new axle seal approximately half full with clean gun grease. Apply sealant around the outside diameter of the new seal. Install the seal over the axle shaft and align squarely to the bore of the axle housing. Place seal installer **380003323** against the seal and use the wheel hub wedge as a slide hammer to drive the seal in place. Repeat Steps 1 through 30 to assemble the opposite side final drive.



RAIL17TR01656AA 29

Next operation:

Final drive - Install - 600 Series axles - wheeled (25.310)

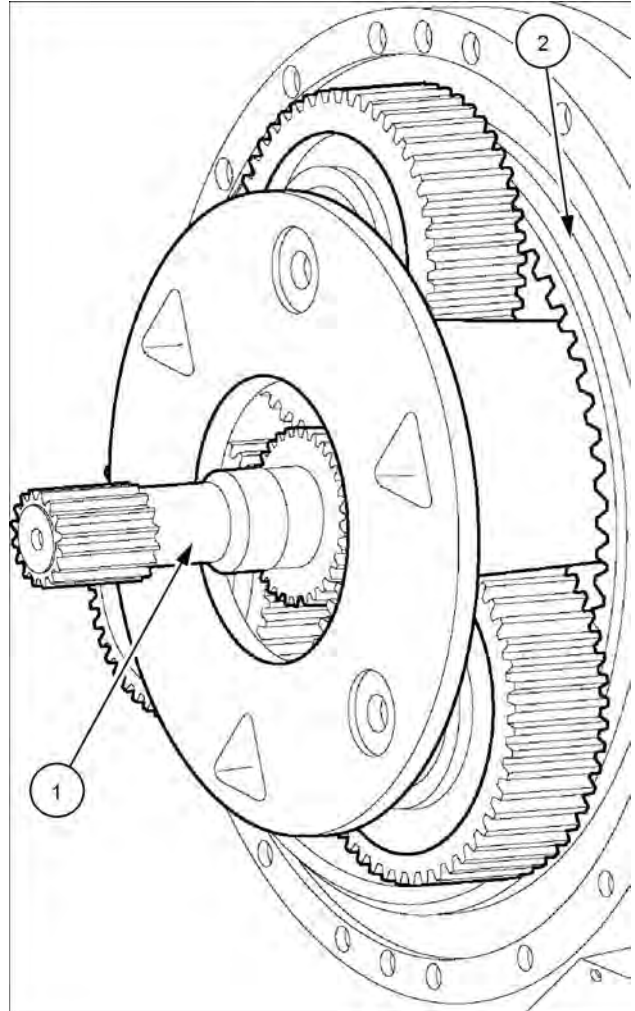
Final drive - Install - 600 Series axles - wheeled

Steiger® 580
Steiger® 620

NA
NA

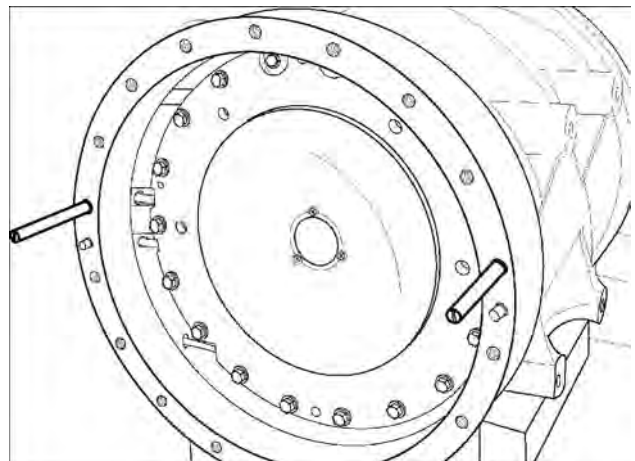
1. Install the short axle sun gear shaft (1) into the left hand or right hand side of the planetary carriers. The longer of the two shafts must be installed in the brake carrier (right hand) side.
Lubricate O-ring (2) with petroleum jelly and install on to ring gear.

NOTE: The planetary gears must have their timing marks turned toward the center of the axle. If the planetary gears are not timed, the short axle sun gear will not engage the planetary gears.



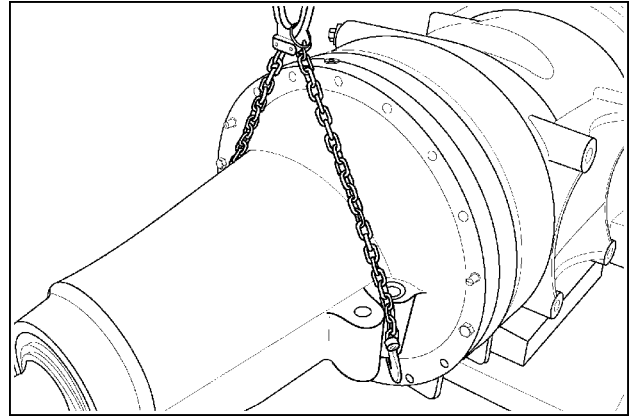
RCPH11FWD343CAC 1

2. Install two 20 mm alignment studs horizontally opposite each other in the differential housing.



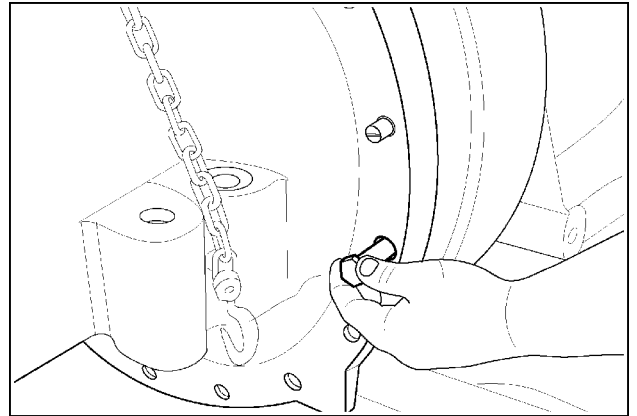
RCPH11FWD356BAC 2

3. Lift and align the final drive housing with the differential housing so the short axle shaft will engage the differential and the assembly marks on the differential housing and final drive housing align and the housing will engage the alignment studs.



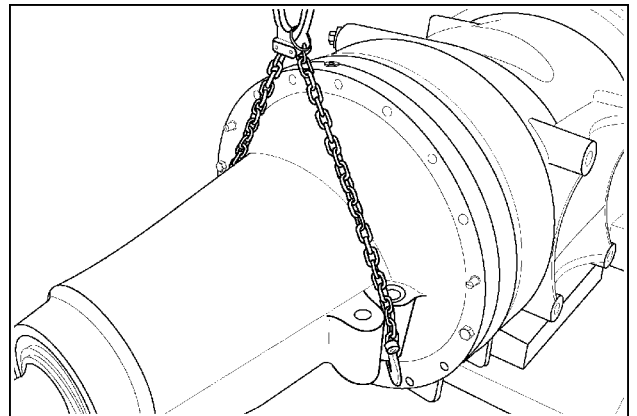
RCPH10FWD908AAJ 3

4. After the final drive housing has engaged the alignment studs, remove the two bolts and nuts that were temporarily installed to retain the stationary ring gear.



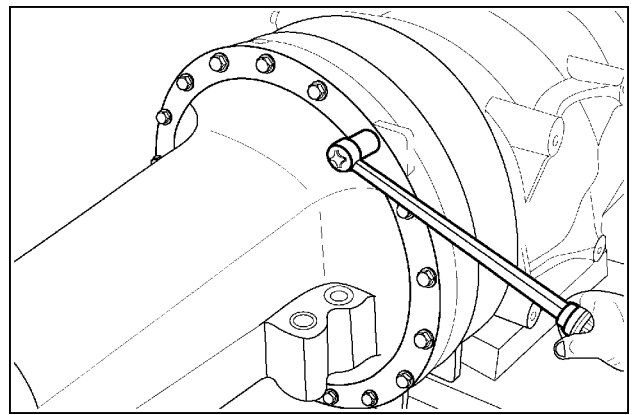
RCPH10FWD909AAJ 4

5. Rotate the axle back and forth to mesh the splined end of the sun gear shaft and the side gears in the differential housing. Push the housing up to the differential housing as far as possible.



RCPH10FWD908AAJ 5

6. Install the 18 final drive housing retaining bolts with washers. Tighten the bolts alternately from side to side to pull the final drive onto the dowel pins. Tighten the bolts to the specified torque. Repeat step 1 through step 6 for the opposite side final drive.



RCPH10FWD910AAJ 6

Next operation:

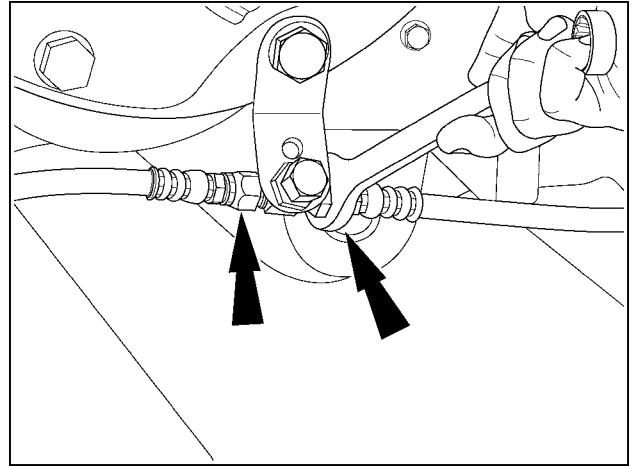
Powered front axle - Install - High power frame wheeled tractors (25.100)

Final drive - Remove - 600 Series Quadtrac® axles

Steiger® 580 Quadtrac®	NA
Steiger® 620 Quadtrac®	NA

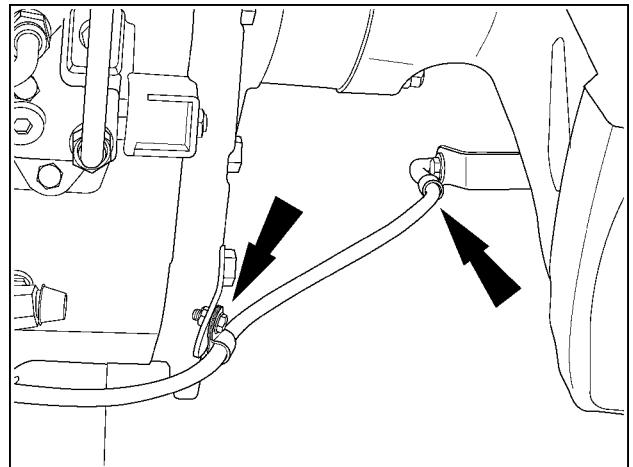
1. Position the axle assembly on a clean shop floor with access to an overhead hoist. Disconnect both track tension pressure hoses at the tee fitting in the center housing.

NOTE: Cap the hoses and plug the ports.



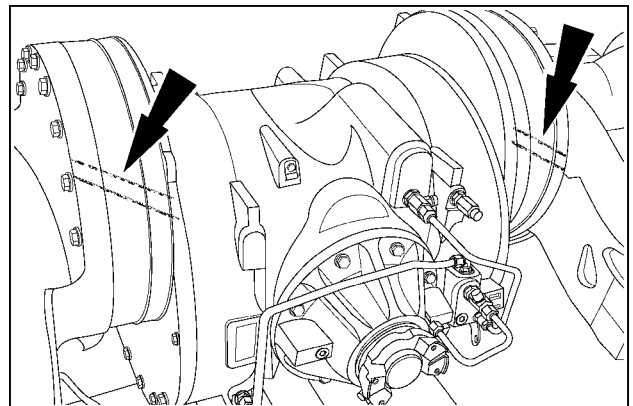
RCPH10FWD132ABJ 1

2. Remove the “P” clamps and hose from the brackets on each side.



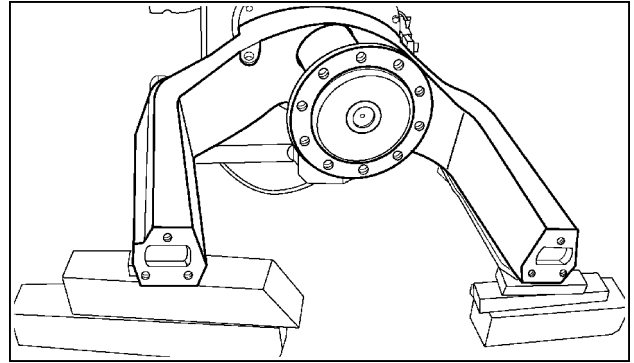
RCPH10FWD133ABJ 2

3. Position the axle assembly on short heavy boards (planking). Put assembly reference marks across each final drive housing and center housing.



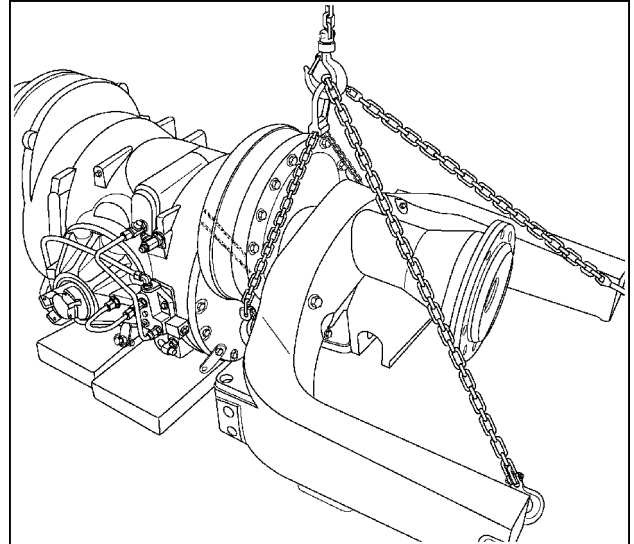
RCPH10FWD134ABJ 3

4. Put blocking under one final drive housing to keep the axle assembly level when the opposite final drive housing is removed.



RCPH10FWD135ABJ 4

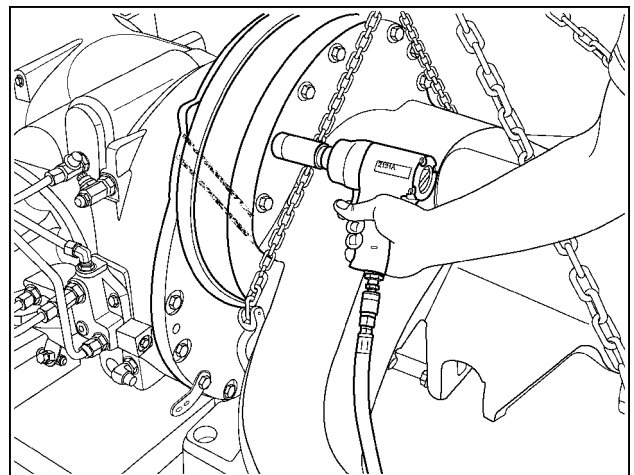
5. Connect an overhead hoist to the final drive housing. Take-up the weight of the housing.



RCPH10FWD136ABJ 5

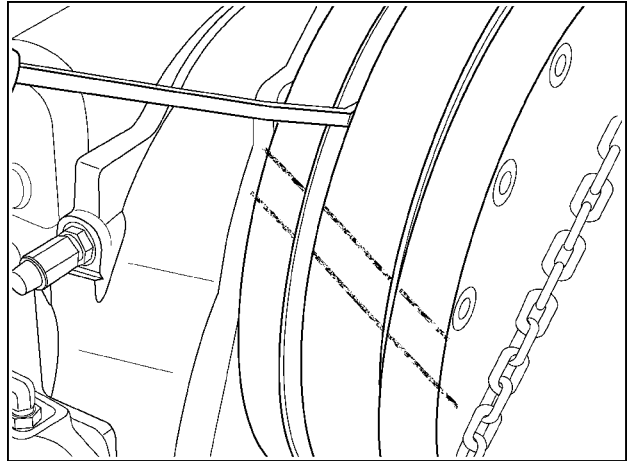
6. Remove the bolts securing the final drive housing and stationary ring gear to the offset housing.

NOTE: There are three different length bolts used to secure the final drive housing to the offset housing. Record bolt orientation during removal for reassembly.



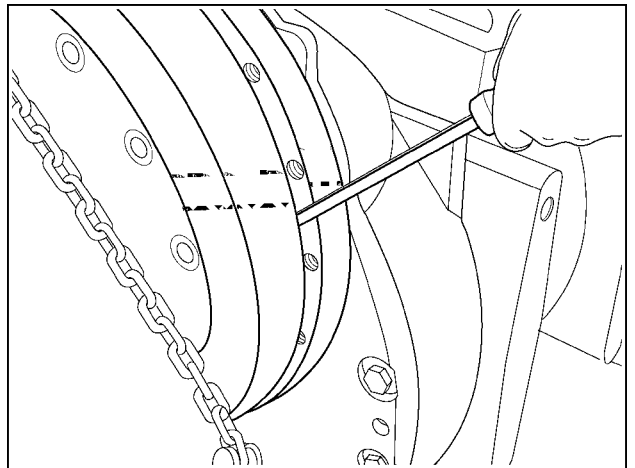
RCPH10FWD137ABJ 6

7. Use the hoist to lift and release the final drive housing a small amount several times to weaken the sealant bond. Use a pry bar between the stationary ring gear and differential housing to pry the ring gear out of the dowel pins.



RCPH10FWD138ABJ 7

8. Repeat step 5 through 7 to remove the opposite side final drive.



RCPH10FWD139ABJ 8

Next operation:

Final drive - Disassemble - 600 Series Quadtrac® axles (25.310)

Final drive - Disassemble - 600 Series Quadtrac® axles

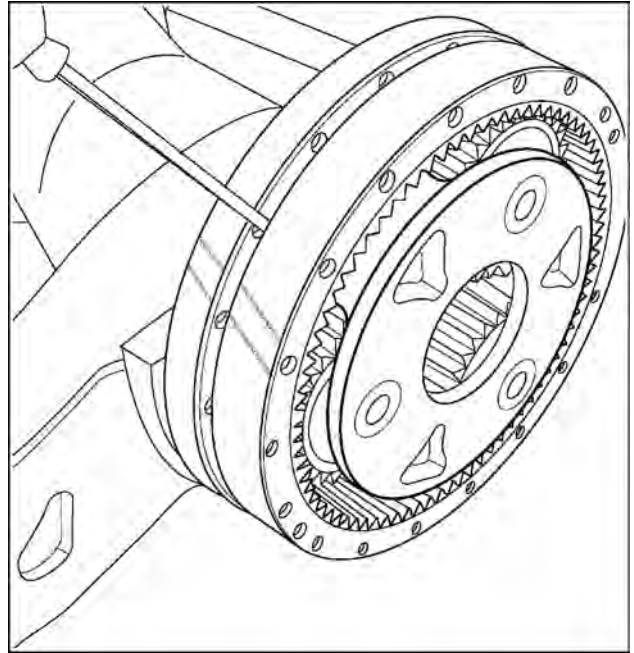
Steiger® 580 Quadtrac®

NA

Steiger® 620 Quadtrac®

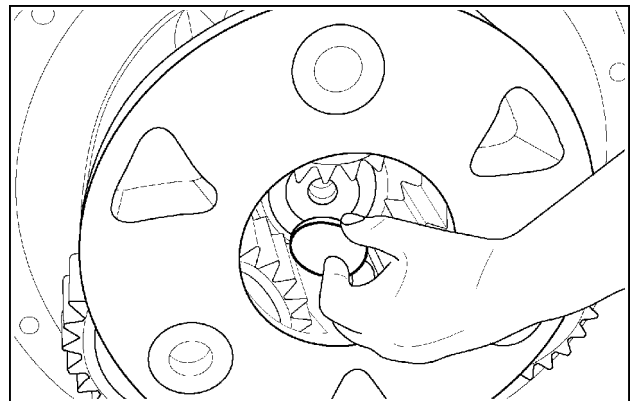
NA

1. Remove the stationary ring gear from the axle housing with lifting hook **58-272**.



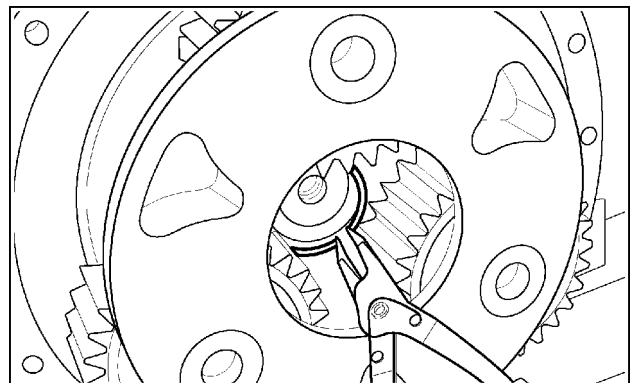
RCPH10FWD140ABJ 1

2. Remove the nylon thrust button from the end of the axle shaft.



RCPH10FWD141ABJ 2

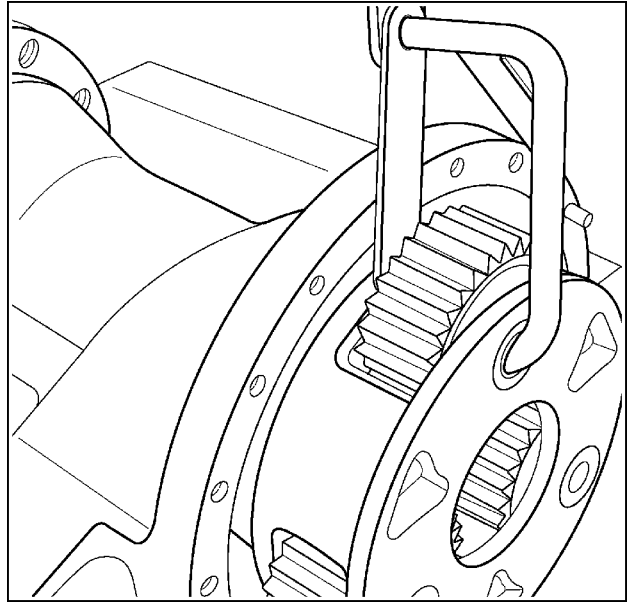
3. Remove the snap ring securing the planetary carrier assembly to the axle.



RCPH10FWD142ABJ 3

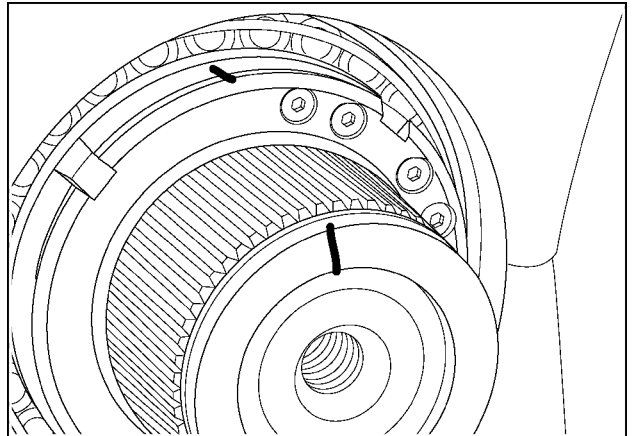
4. Use the **CAS2676** planetary carrier lifting hook to remove the planetary assembly from the housing.

NOTICE: Be sure the retaining strap is positioned behind the gear to prevent the lifting fixture from pulling out of the pinion gear shaft.



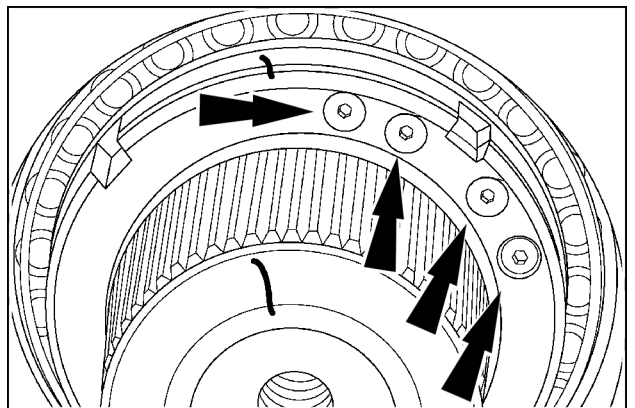
RCPH10FWD143ABJ 4

5. Use a dye marker to indicate lock nut orientation on the axle shaft.



RCPH11FWD298BAM 5

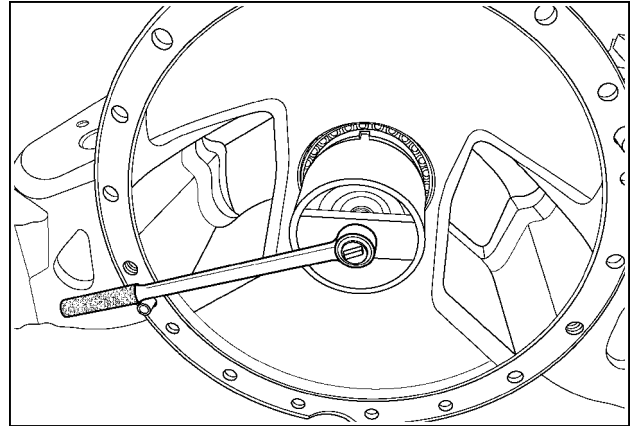
6. Loosen the four set screws on the lock nut.



RCPH11FWD299BAM 6

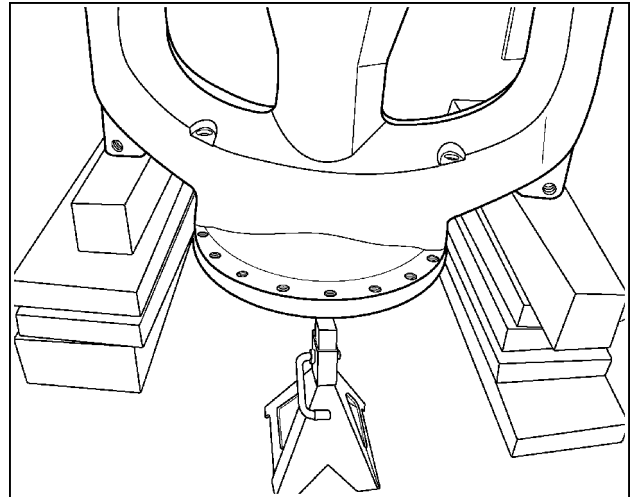
7. Use the **380002906** spanner wrench to loosen the lock nut two complete turns.

NOTE: The number of complete turns required to remove the nut must be counted and recorded for proper installation.



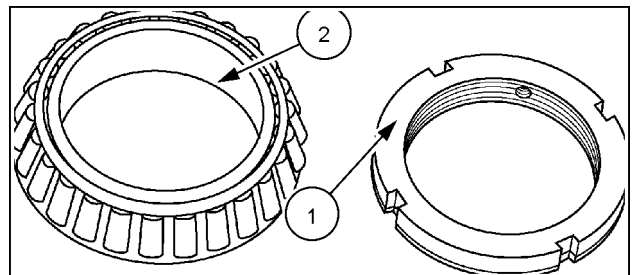
RCPH10FWD146ABJ 7

8. Lift the final drive assembly to an upward position to rest on planking as shown.



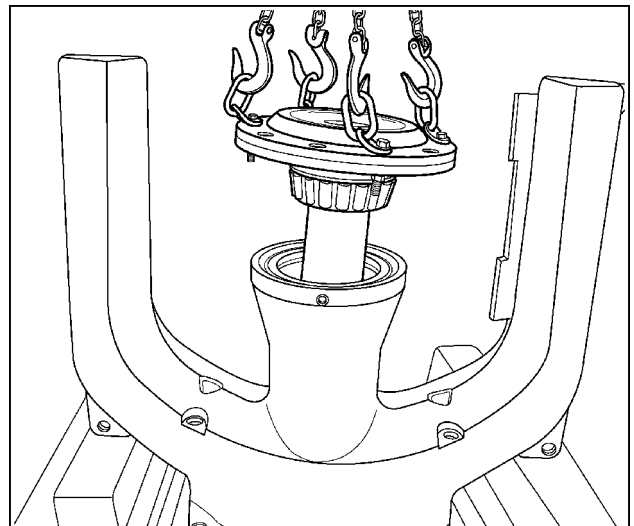
RCPH10FWD147ABJ 8

9. Remove the lock nut (1) and the inner bearing cone (2) from the axle.



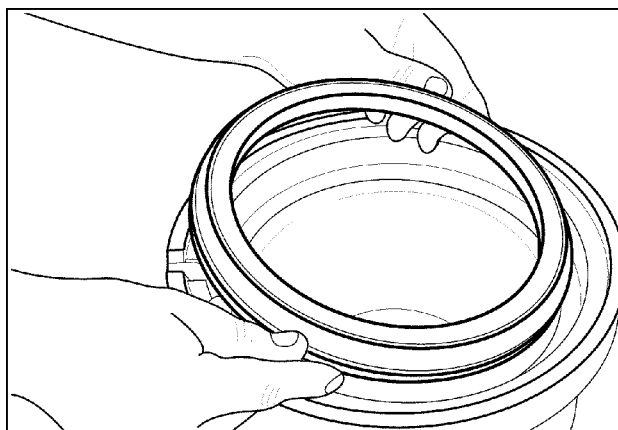
RCPH10FWD148ABJ 9

10. Use a hoist to lift the axle shaft from the housing.



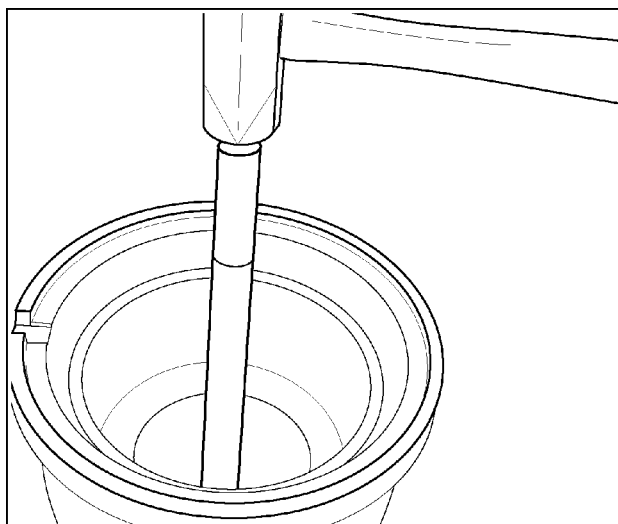
RCPH10FWD149ABJ 10

11. Remove the inner face seal from the axle housing.



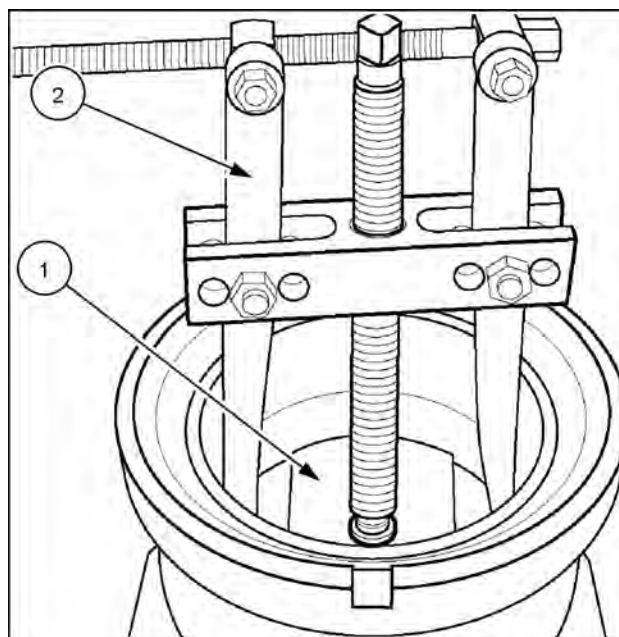
RCPH10FWD150ABJ 11

12. Use **CAS2739** bearing driver and CAS2405 long bearing driver handle to remove the inner bearing cup from the housing.



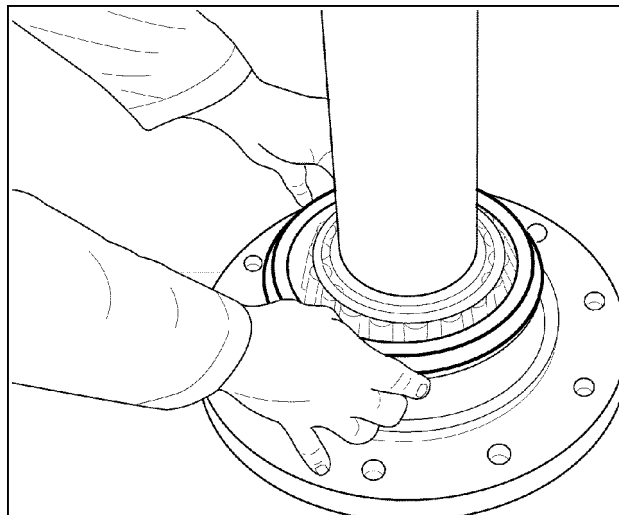
RCPH10FWD151ABJ 12

13. Use CAS2667 plate **(1)** and a bearing puller **(2)** to remove the outer bearing cup from the housing.



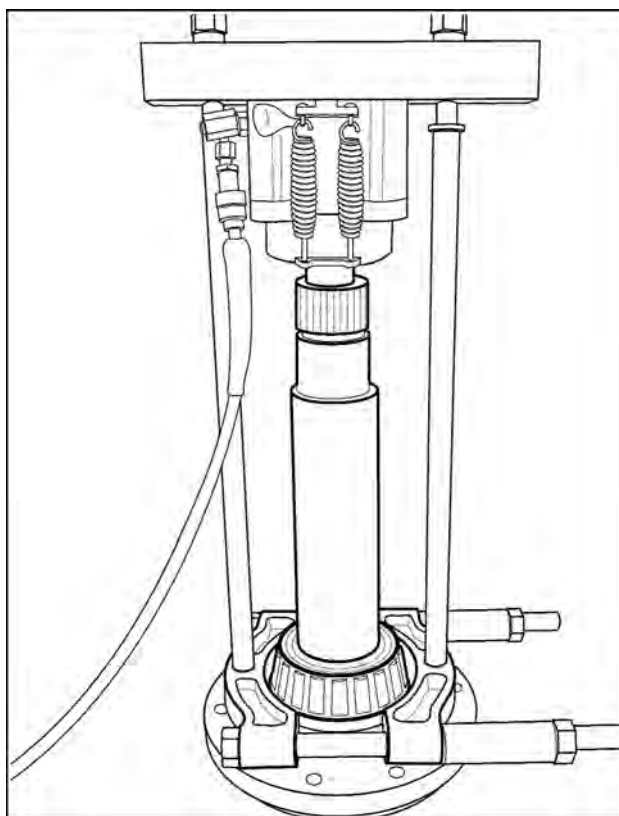
RCPH10FWD152ABJ 13

14. Remove the outer face seal from the axle shaft.



RCPH10FWD153ABJ 14

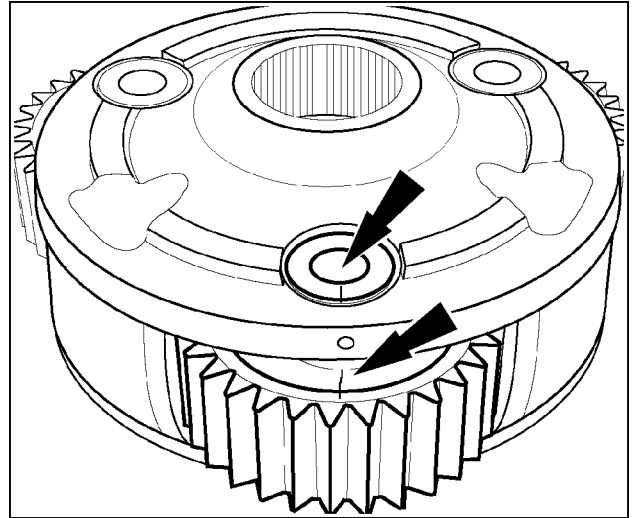
15. Use a bearing puller and 30 ton ram to remove the outer bearing cone.



RCPH10FWD154ABJ 15

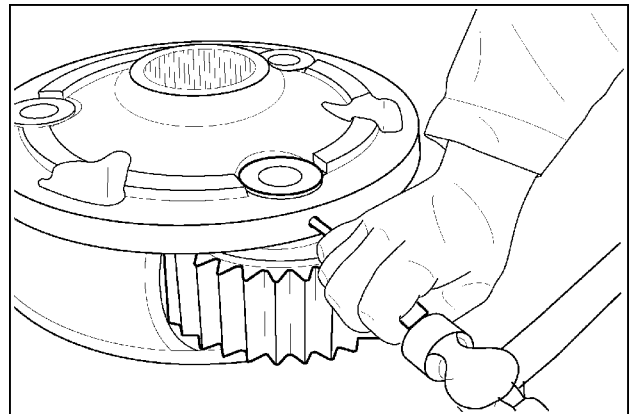
Planetary carrier disassembly

16. If the gears are to be reused, mark each gear and the carrier so that the gears and pins are assembled in their original location in the gear carrier.



RCPH10FWD155ABJ 16

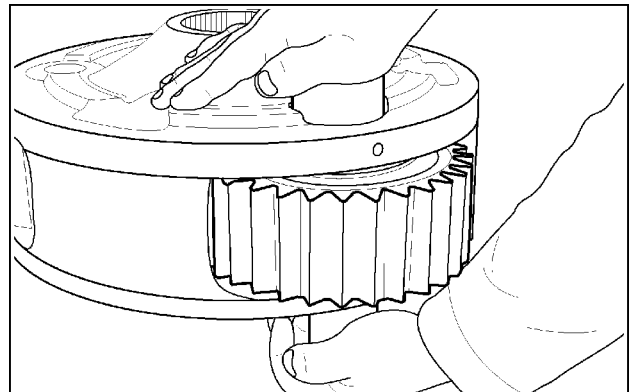
17. Drive the spring pin into the center of the gear shaft.



RCPH10FWD156ABJ 17

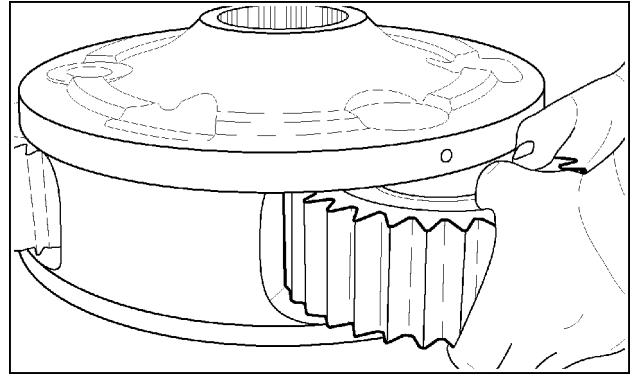
18. Use the **CAS2729** pilot sleeve to push the gear shaft out and retain the needle roller bearings in the gear.

NOTE: There is a double row of uncaged needle roller bearings in each gear



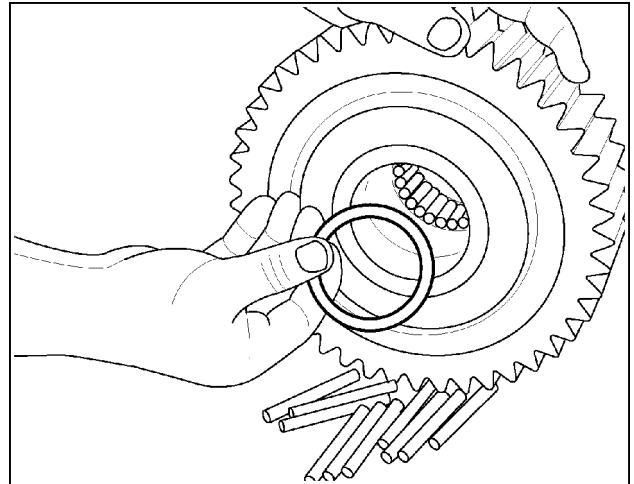
RCPH10FWD157ABJ 18

19. Carefully remove the planetary gear assembly with thrust washers from the carrier.



RCPH10FWD158ABJ 19

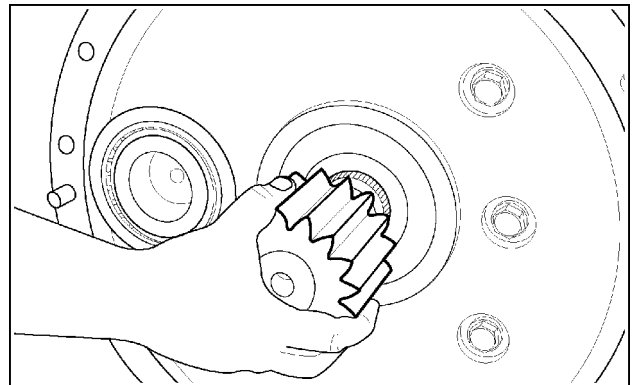
20. Remove the needle roller bearings and separator ring from within the gear. Repeat steps **16** through **20** for each remaining planet gear. Clean and inspect all final drive gears, bearings and other parts for too much wear or other damage. Replace all worn or damaged parts. Repeat Steps **1** through **20** to disassemble the opposite side final drive.



RCPH10FWD159ABJ 20

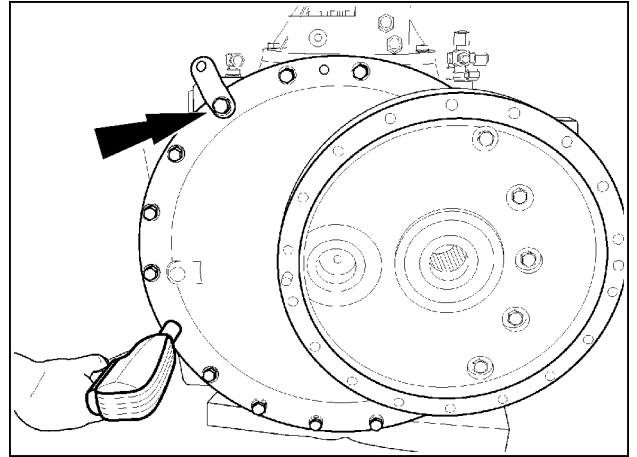
Final drive offset housing disassembly

21. Remove the sun gear from the housing.



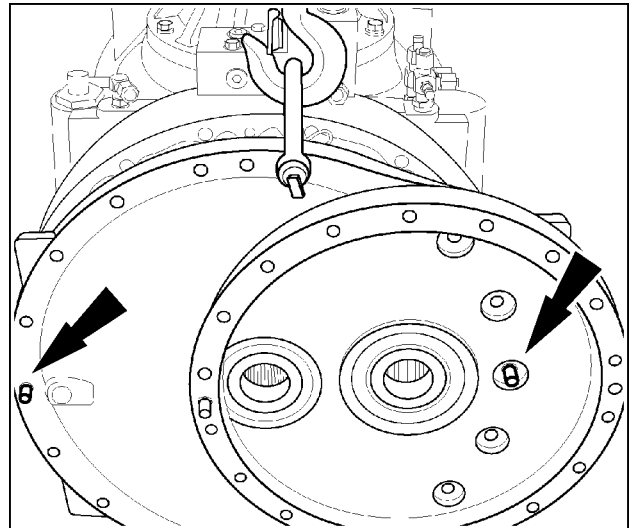
RCPH10FWD160ABJ 21

22. Mark the location of the clamp bracket. Remove the bolts securing the offset housing to the center housing.



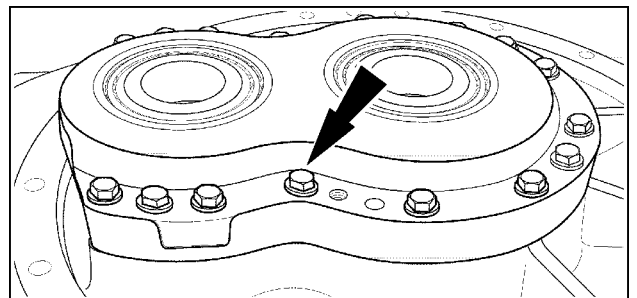
RCPH10FWD161ABJ 22

23. Install two **CAS2496** alignment studs in the locations shown. Separate the offset housing from the center housing dowel pins. Install a clevis and pin arrangement on the housing as shown. Use a hoist to remove the housing.



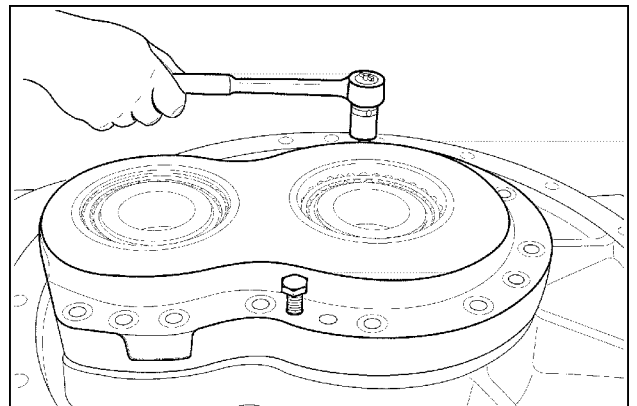
RCPH10FWD162ABJ 23

24. Remove the reduction gear cover mounting bolts.



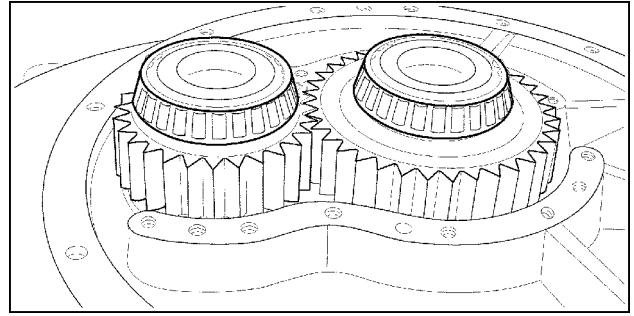
RCPH10FWD163ABJ 24

25. Install two **CAS2738** push screws into the threaded holes provided. Tighten the screws alternately and evenly to jack the cover from the dowel pins.



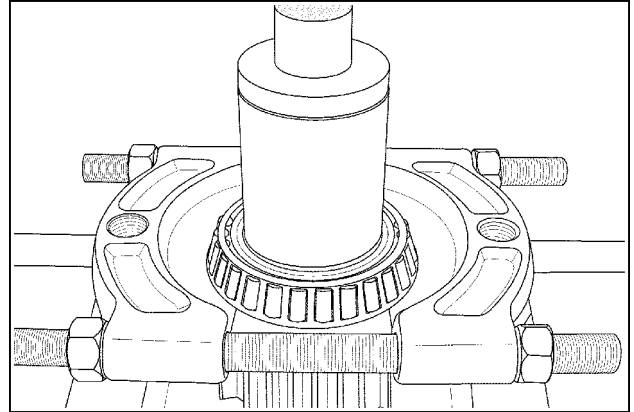
RCPH10FWD164ABJ 25

26. Mark the top side of each gear assembly for reference.
Remove the gears from the housing.



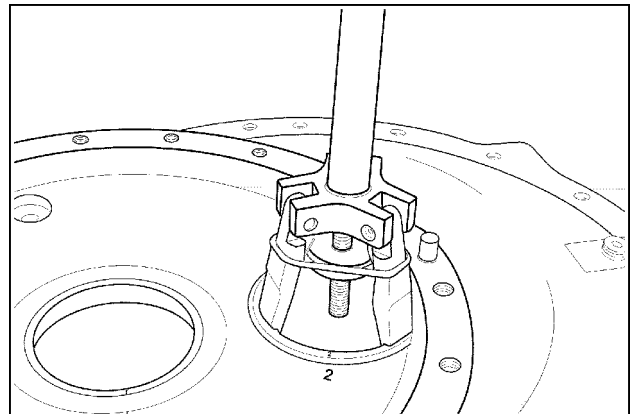
RCPH10FWD165ABJ 26

27. Use a split flange type bearing puller and **89 mm (3.5 in)** press sleeve to press the bearing cones from each side of the gears requiring bearing or gear replacement.



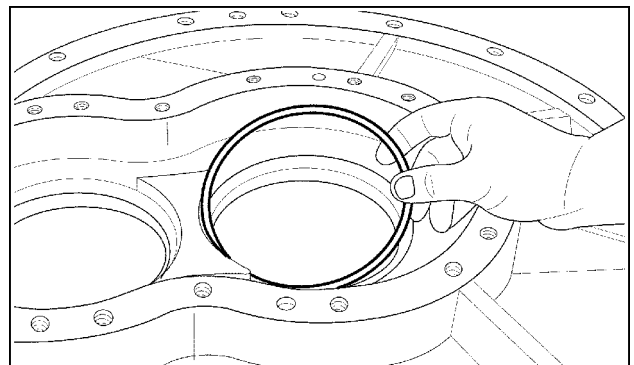
RCPH10FWD166ABJ 27

28. Mark the location of the bearing cups in the housing and gear cover. Use a bearing cup remover/installer to remove the two bearing cups and shims from the housing.



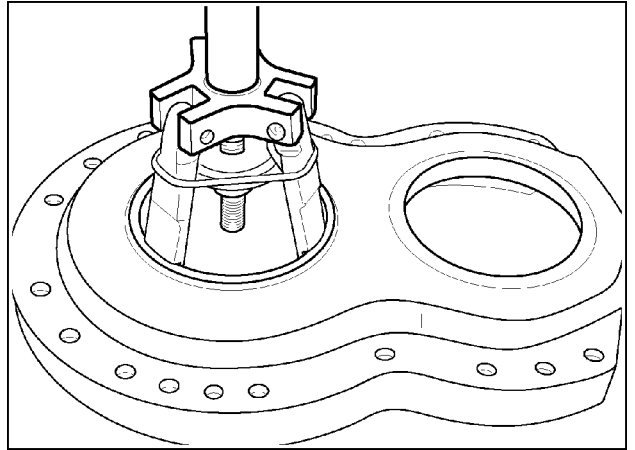
RCPH10FWD167ABJ 28

29. Retain the bearing preload shims with each bearing cup.



RCPH10FWD168ABJ 29

30. Repeat step **28** to remove the bearing cups from the cover. Clean and inspect all parts.



RCPH10FWD169ABJ 30

Final drive - Assemble - 600 Series Quadtrac® axles

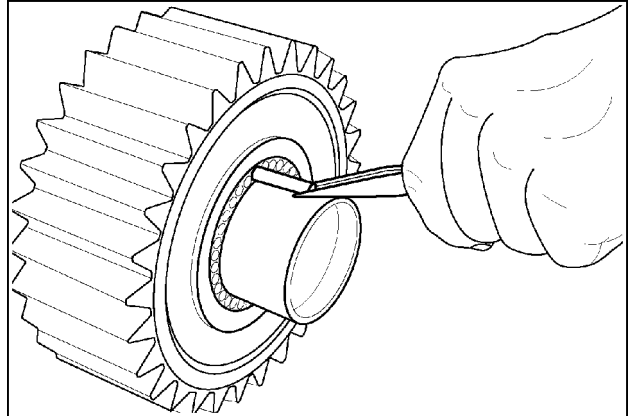
Steiger® 580 Quadtrac®	NA
Steiger® 620 Quadtrac®	NA

NA
NA

Planetary carrier assembly

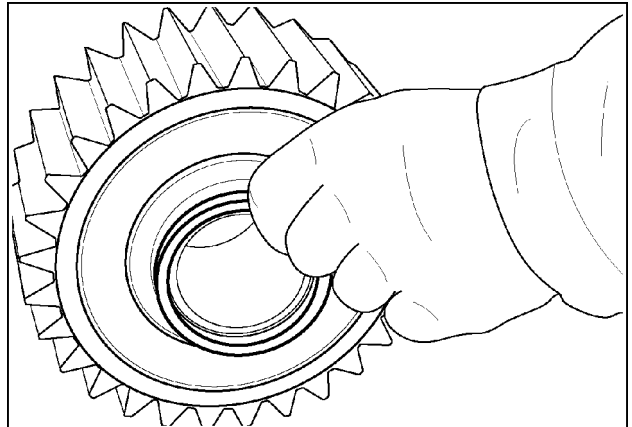
1. Lubricate the needle roller bearings with clean grease or petroleum jelly and load 29 bearings on one side of the gear.

NOTE: Use the **CAS2729** pilot sleeve to hold the first row of needle bearings in place.



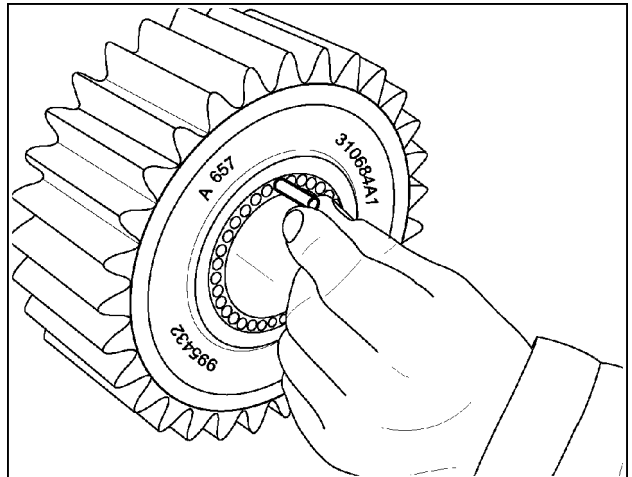
RCPH10FWD172ABJ 1

2. Install the separator ring into the gear.



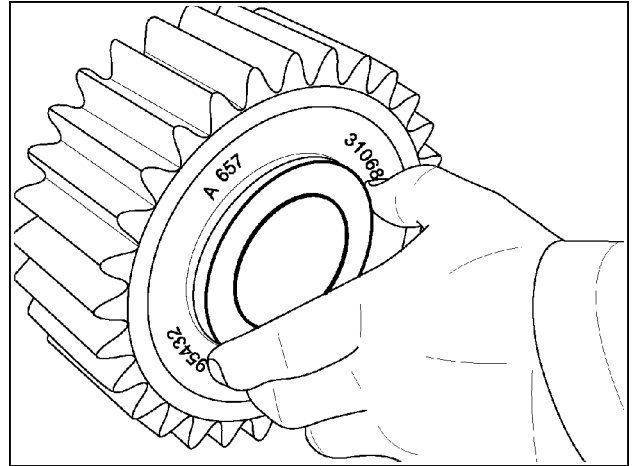
RCPH10FWD173ABJ 2

3. Push the **CAS2729** pilot sleeve into the gear to hold all the roller bearings in place and load the remaining 29 needle roller bearings into the gear.



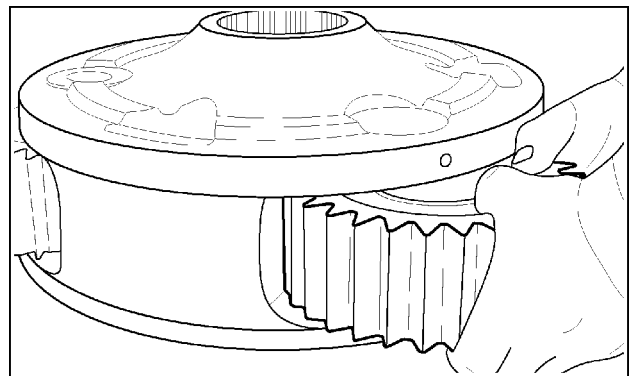
RCPH10FWD174ABJ 3

4. Lubricate the thrust washers with clean grease or petroleum jelly. Install one thrust washer on each side of the gear. Adjust the pilot sleeve to engage the thrust washers to hold them in place.



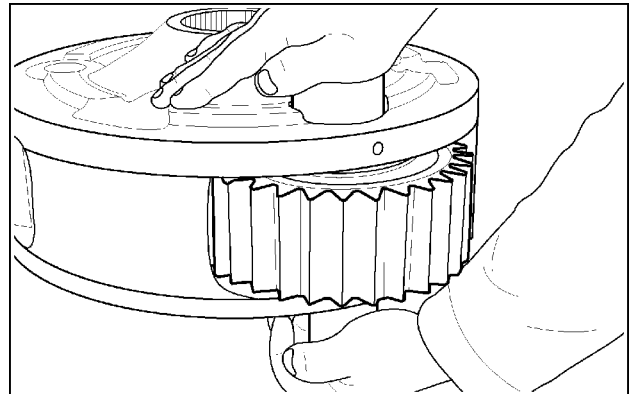
RCPH10FWD175ABJ 4

5. Carefully put the planet gear into its original position in the gear carrier while holding the pilot sleeve in place.



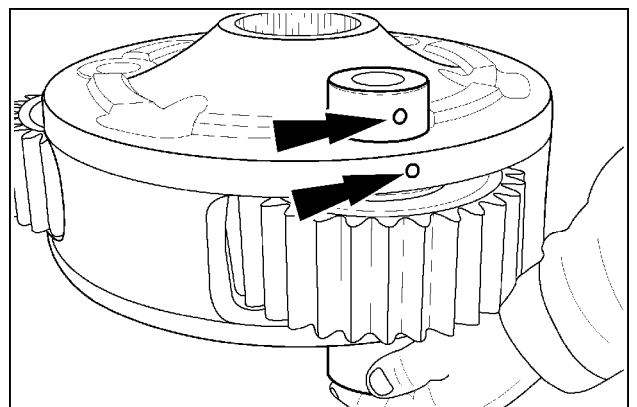
RCPH10FWD158ABJ 5

6. While maintaining tension on the pilot sleeve from the bottom, align the gear and carefully push the gear shaft through the thrust washer and bearings.



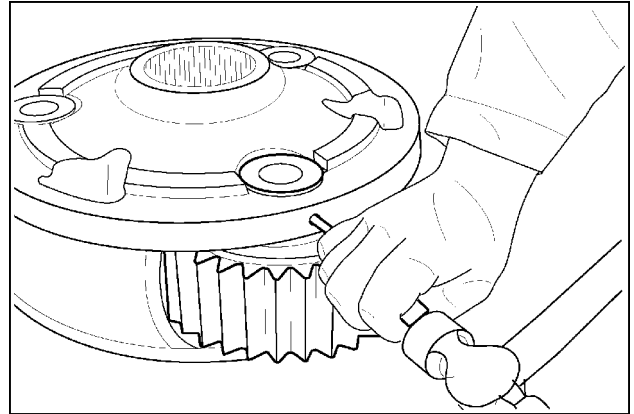
RCPH10FWD157ABJ 6

7. While holding tension on the pilot sleeve, install the gear shaft into the carrier. Align the holes in the end of the gear shaft with the spring pin hole in the gear carrier.



RCPH10FWD176ABJ 7

8. Install a new spring pin into the gear shaft until the end of the pin is flush or slightly below the edge of the carrier housing. Repeat steps 1 through 8 for each planet gear assembly installation.



RCPH10FWD156ABJ 8

Final drive housing assembly

⚠ CAUTION

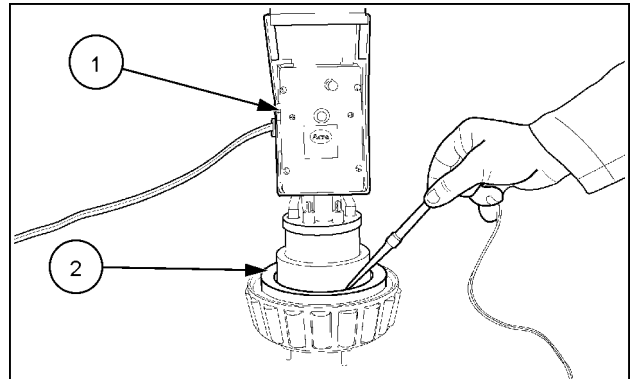
Hot area!
Use care when working near hot components. Wear protective gloves.
Failure to comply could result in minor or moderate injury.

C0034A

9. Use CNH299134 gear/bearing heater (1) and CAS2692 adapter (2) to heat the outer axle bearing cone. Use a heat probe to monitor the temperature of the bearing race.

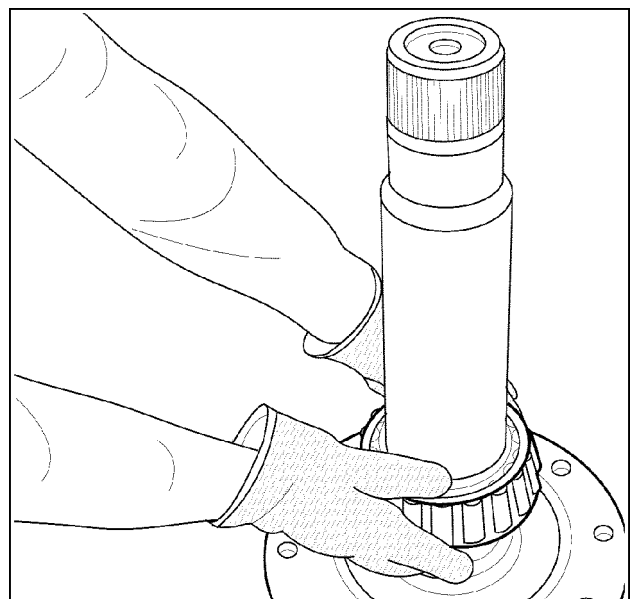
NOTICE: The heater assembly must be placed on a concrete floor or steel work surface.

NOTE: Do not heat the bearing to more than **120 °C (248 °F)**. Average heating time is 10 to 12 minutes.



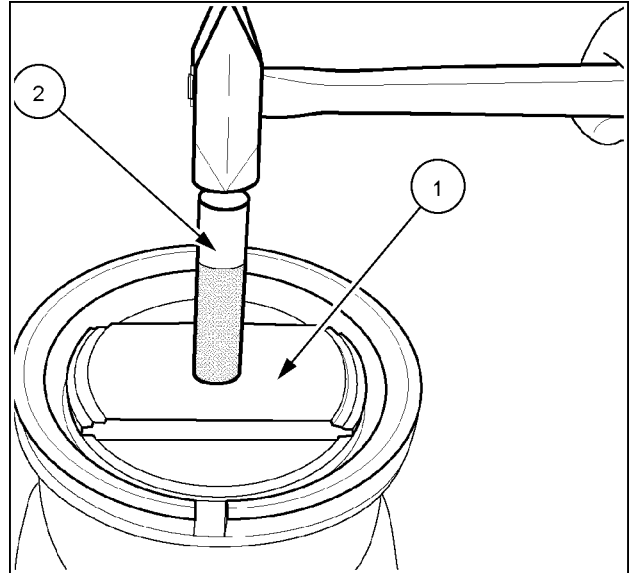
RCPH10FWD923AAJ 9

10. Install the heated bearing cone on the axle shaft (large side down) against the flange.



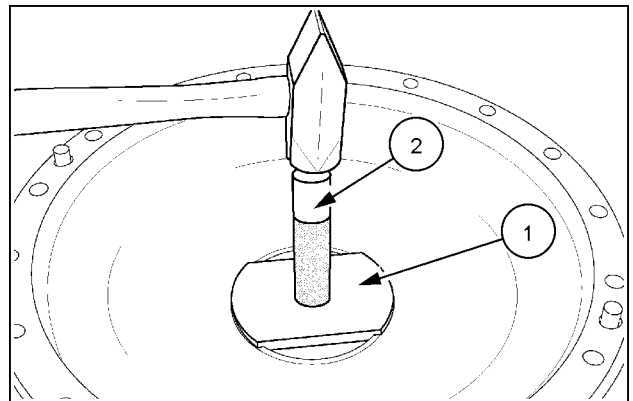
RCPH10FWD177ABJ 10

11. Put a light coat of anti-sieze compound around the outside diameter of the outer bearing cup. Use the **CAS2501** bearing cup installer (1) and CNH299077 short handle (2) to install the bearing cup into the final drive housing until the cup is seated.



RCPH10FWD178ABJ 11

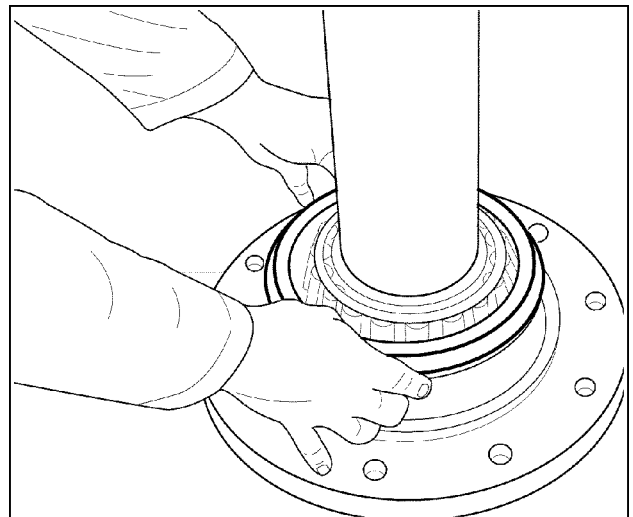
12. Put a light coat of anti-sieze compound around the outside diameter of the inner bearing cup. Use the **CAS2667** bearing cup installer (1) and CNH299077 short handle (2) to install the bearing cup into the housing until the cup is seated.



RCPH10FWD179ABJ 12

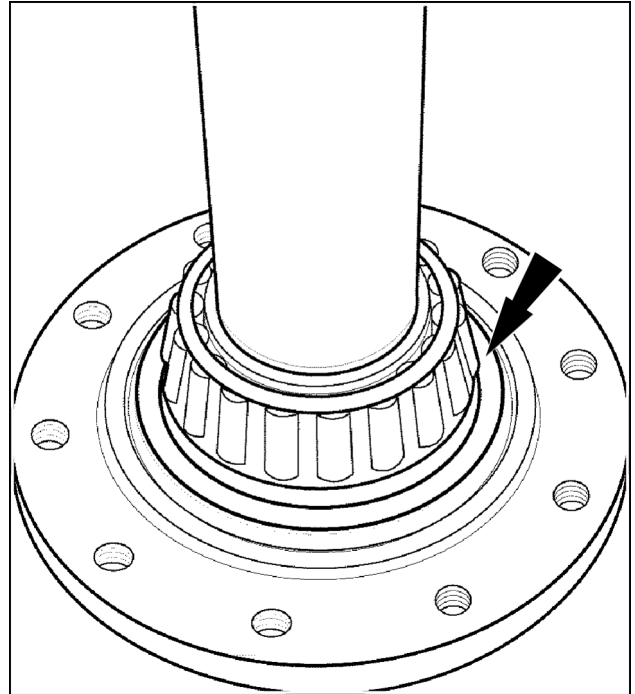
13. Install the outer face seal over the axle bearing into the bore of the hub.

NOTICE: The rubber belleville washer of the seal **MUST** be clean and dry. There must be no oil residue on the rubber.



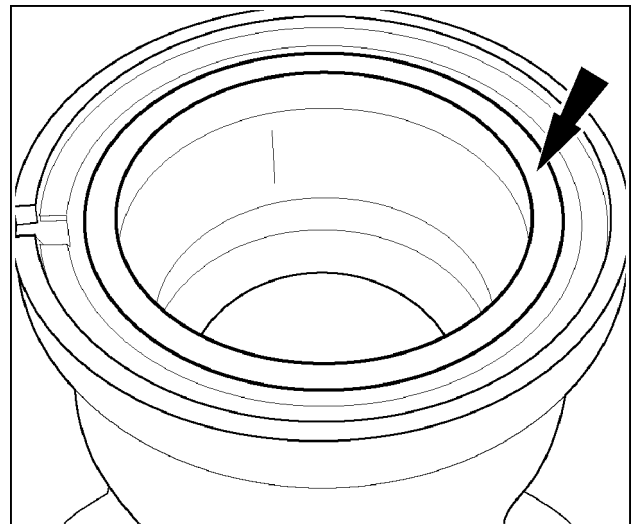
RCPH10FWD153ABJ 13

14. Seat the seal assembly squarely in the bore of the hub as shown. Put a light film of clean **CASE IH AKCELA HY-TRAN® ULTRACTION** oil on the steel face of the seal.



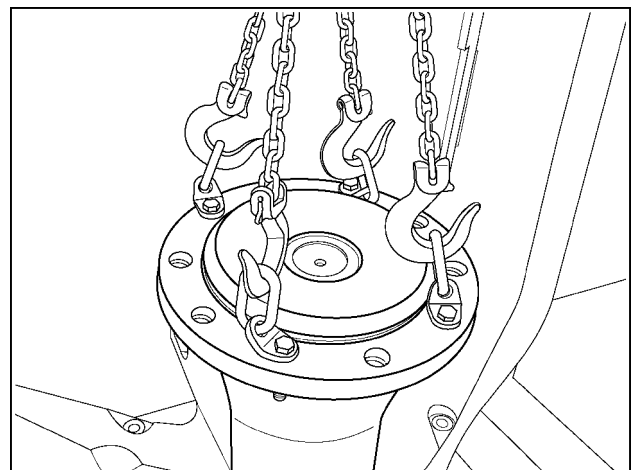
RCPH10FWD180ABJ 14

15. In the same manner as described in steps **13** and **14**, install the inner face seal in the housing. Lubricate the steel face of the seal with a light film of clean **CASE IH AKCELA HY-TRAN® ULTRACTION** oil.



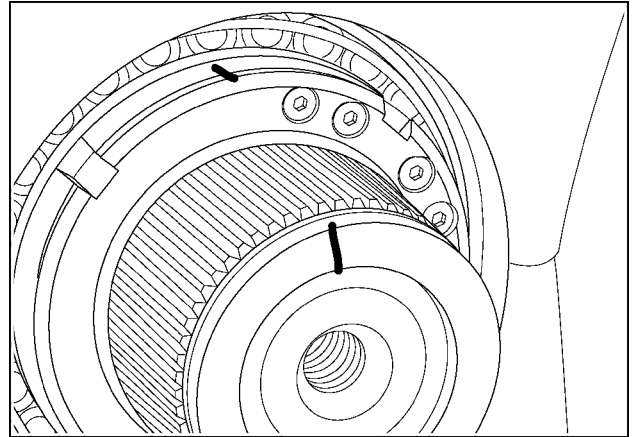
RCPH10FWD181ABJ 15

16. Lubricate the outer bearing cone and cup lightly with clean operating fluid. Carefully lift and lower the axle shaft squarely into the final drive housing until the bearing cone is seated in the bearing cup. From the bottom side of final drive housing, install the inner cone and locking nut. Turn the locking nut approximately eleven turns to secure the axle into the housing.



RCPH10FWD182ABJ 16

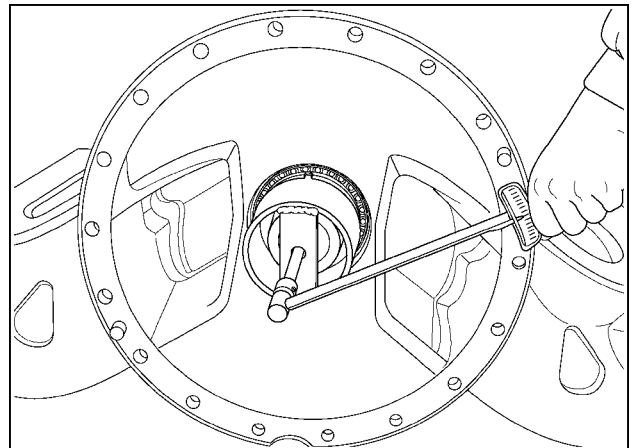
17. Turn the housing on its side to access the inner bearing locking nut.



RCPH11FWD298BAM 17

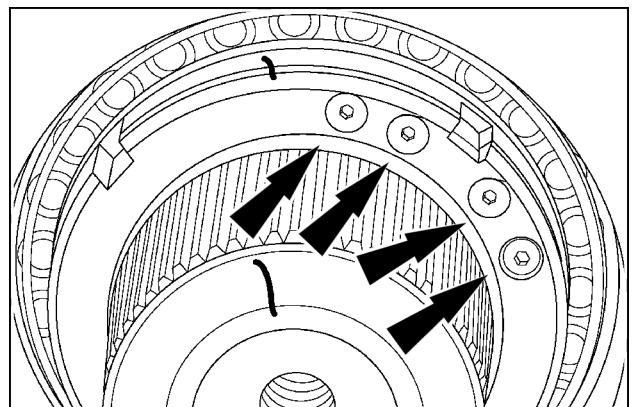
18. Use the **380002906** spanner wrench and torque wrench to tighten the lock nut to a rolling torque of **27 – 38 N·m (240 – 340 lb in)**.

NOTE: If old bearing is being used, torque to the low side of the rolling torque.



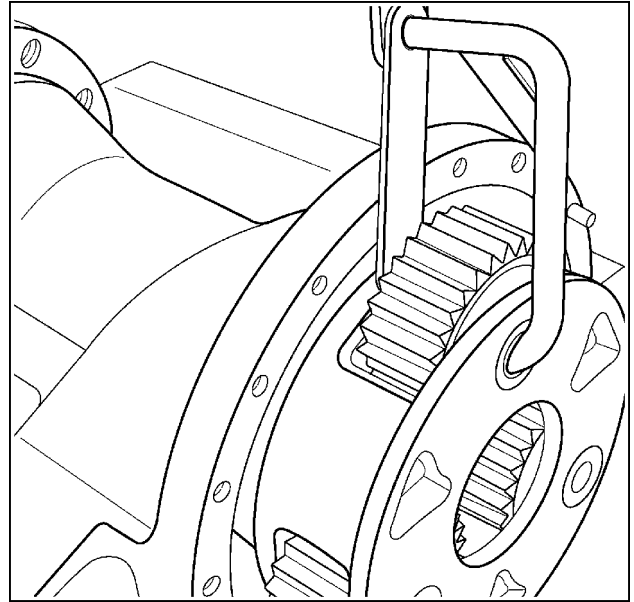
RCPH10FWD183ABJ 18

19. Tighten the four set screws to a torque of **32.5 – 43.9 N·m (24 – 32.4 lb ft)**.



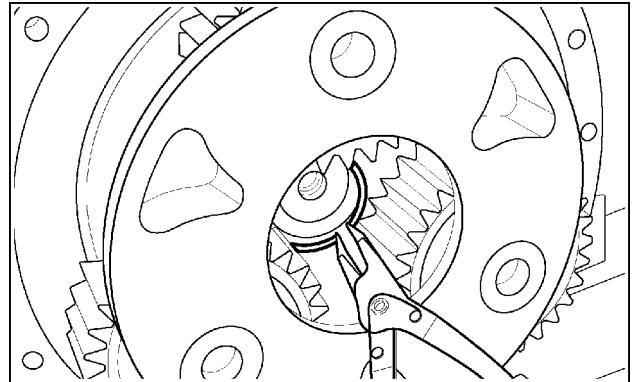
RCPH11FWD299BAM 19

20. Coat the splines of the axle shaft with anti-sieze compound. Use the **CAS2676** Planetary Lifting Hook to install the planetary carrier assembly on the axle shaft.



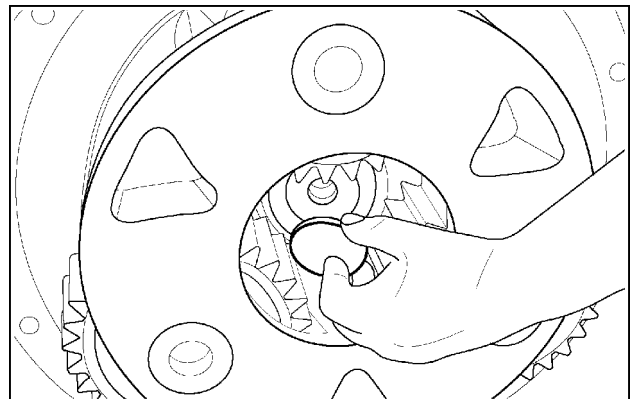
RCPH10FWD143ABJ 20

21. Install the planetary carrier retaining ring in the groove on the end of the axle shaft.



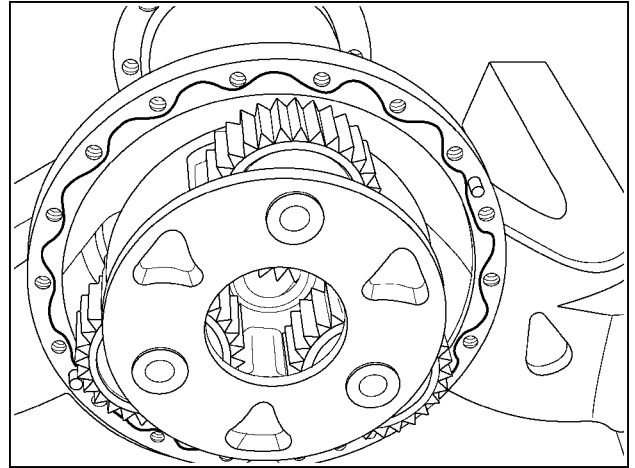
RCPH10FWD142ABJ 21

22. Install a new nylon thrust insert in the counter-bore on the end of the axle shaft. Retain the insert with clean grease.



RCPH10FWD141ABJ 22

23. Clean the mating surface of the final drive housing of all residual sealant. Apply a **3 mm (0.12 in)** bead of anaerobic sealant around the mounting surface of the axle housing.



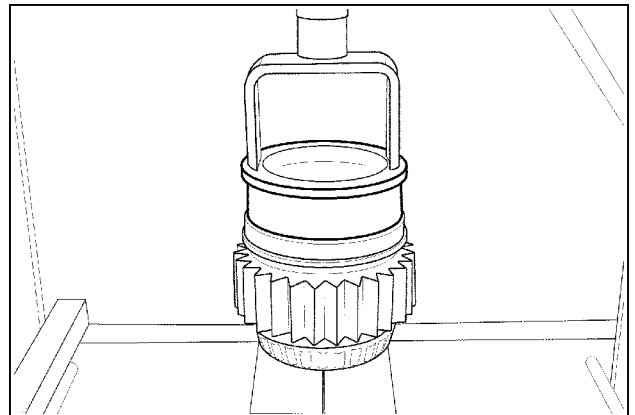
RCPH10FWD184ABJ 23

24. Carefully align and install the stationary ring gear on the housing so the dowel pin holes will align.

NOTE: Repeat Steps 9 through 24 to assemble the opposite side final drive.

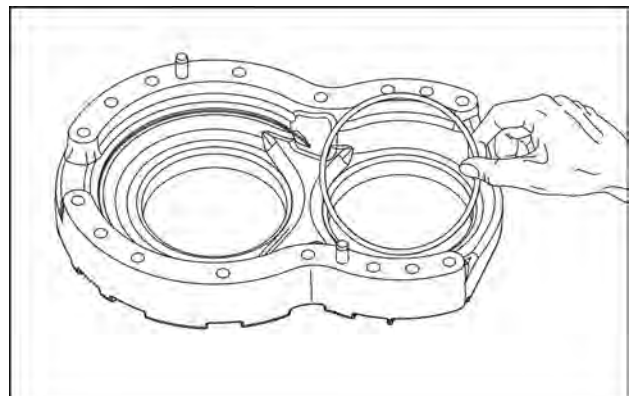
Offset housing assembly

25. Place the bearing cup over each bearing cone that is to be replaced on the gear shafts. Use the **CAS2673** pinion seal installer and press to install the bearing cones on the gear shafts.



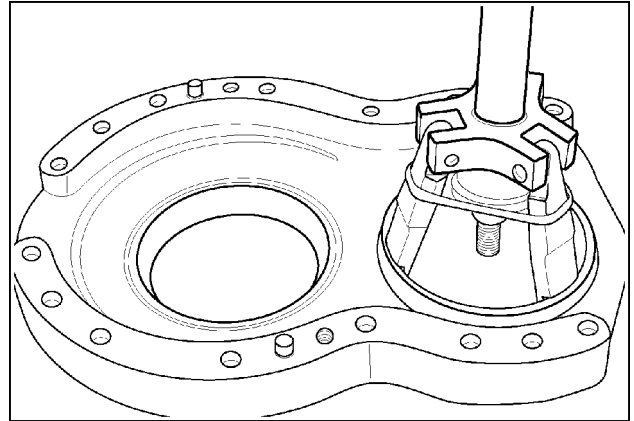
RCPH10FWD186ABJ 24

26. Install the bearing preload shims into their original location in the cover. One shim is required for each bearing.



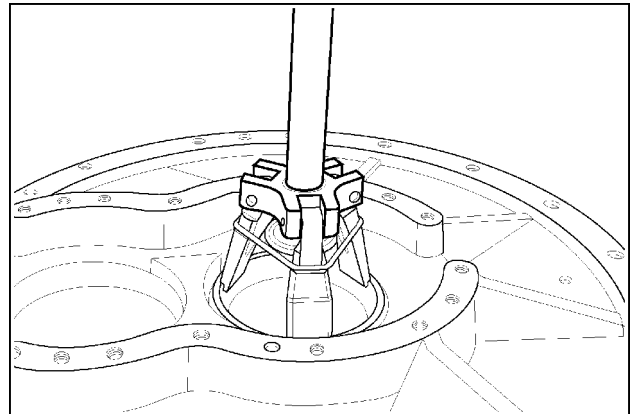
RAIL17TR00578AA 25

27. Use a bearing cup installer to install both bearing cups in the cover.



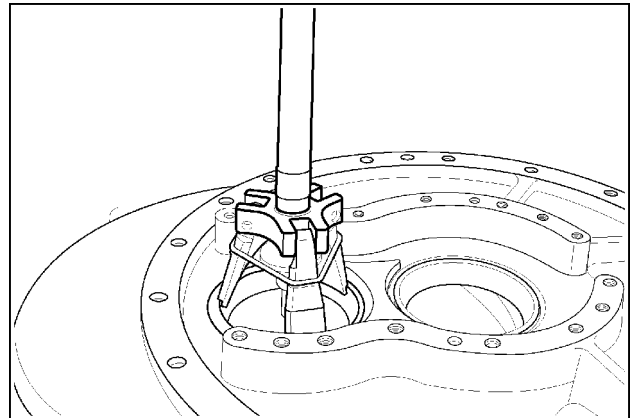
RCPH10FWD187ABJ 26

28. Use a bearing cup installer to seat the bearing cup in the bore of the housing.



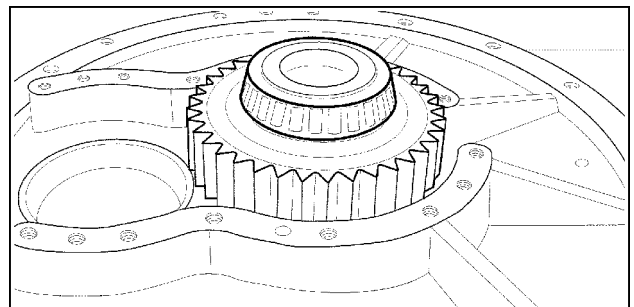
RCPH10FWD188ABJ 27

29. Install the remaining bearing cup in the housing.



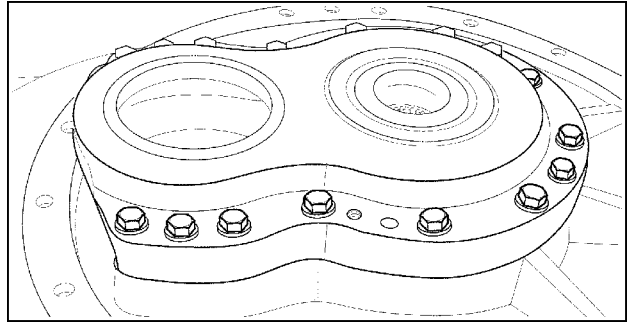
RCPH10FWD189ABJ 28

30. Install the 36 tooth gear assembly in the housing.



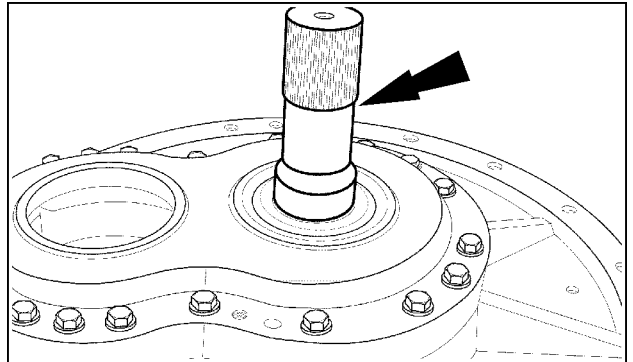
RCPH10FWD190ABJ 29

31. Align and install the gear cover. Torque the bolts to **90 – 100 N·m (66 – 74 lb ft)**.



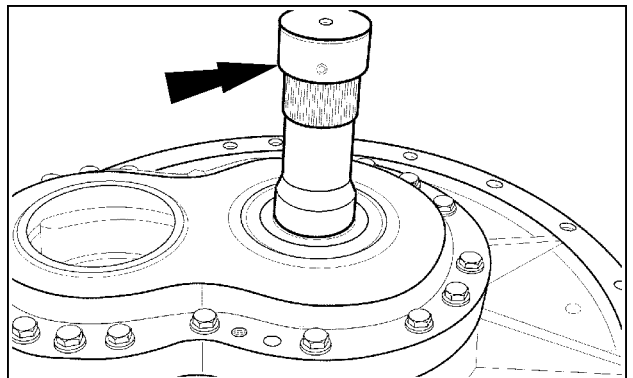
RCPH10FWD191ABJ 30

32. Install one of the short differential axle shafts into the gear.



RCPH10FWD192ABJ 31

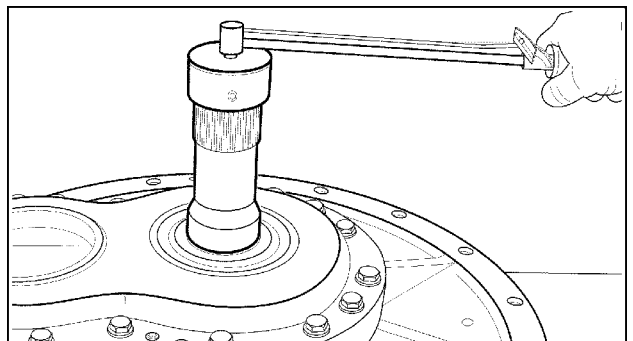
33. Install the **CAS2508** rolling torque Adaptor on the short shaft and tighten the set screw.



RCPH10FWD193ABJ 32

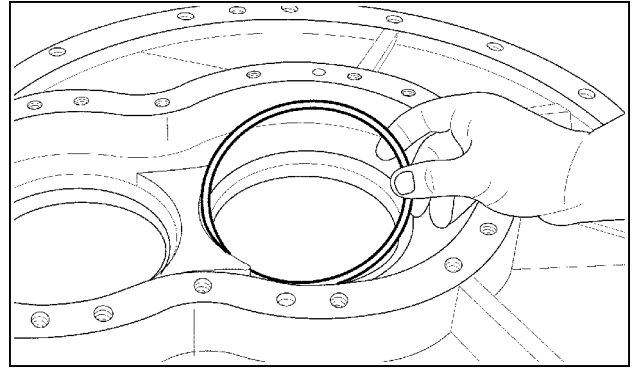
34. Use a torque wrench to measure the bearing rolling torque. Rolling torque should be **5 – 8 N·m (44 – 71 lb in)**.

NOTE: Rolling torque must be established for each individual gear.



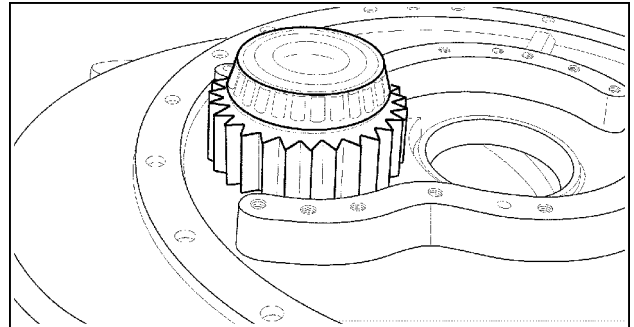
RCPH10FWD194ABJ 33

35. If rolling torque is not within tolerance, remove the cover, gear and bearing cup from the housing and add or remove selective shims as required. Reassemble and check rolling torque.



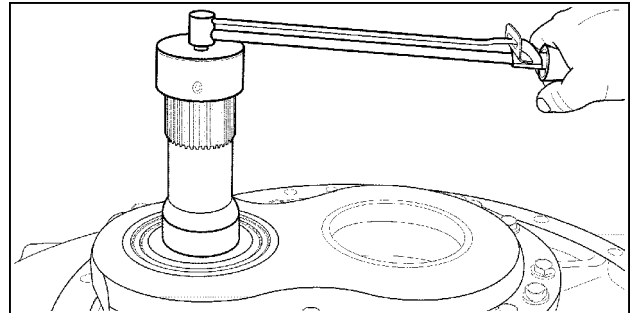
RCPH10FWD168ABJ 34

36. After the rolling torque has been adjusted for the 36 tooth gear, remove the cover and gear. Install the 27 tooth gear assembly.



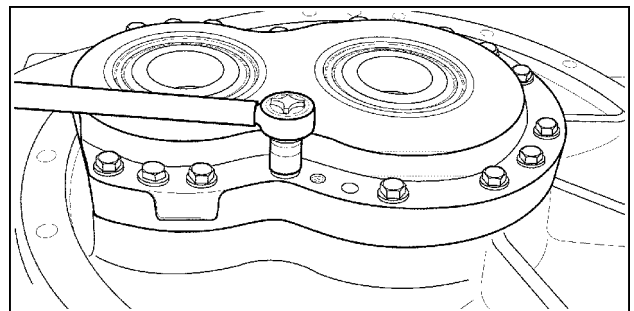
RCPH10FWD195ABJ 35

37. Repeat steps 32 through 36 as required to set bearing rolling torque



RCPH10FWD196ABJ 36

38. After the correct rolling torque for the 27 tooth gear has been established, remove the cover and install the 36 tooth gear assembly. Install the cover and torque the bolts to **90 – 100 N·m (66 – 74 lb ft)**.



RCPH10FWD197ABJ 37

39. Install the short shaft and torque adapter into one of the two gears to measure the total rolling torque for both gears. Total rolling torque should be **10 – 15 N·m (89 – 133 lb in)** when measured at the small gear and **12 – 20 N·m (106 – 177 lb in)** at the large gear.

NOTE: Perform steps 25 through 39 for the opposite side offset housing.

Next operation:
Final drive - Install - 600 Series Quadtrac® axles (25.310)

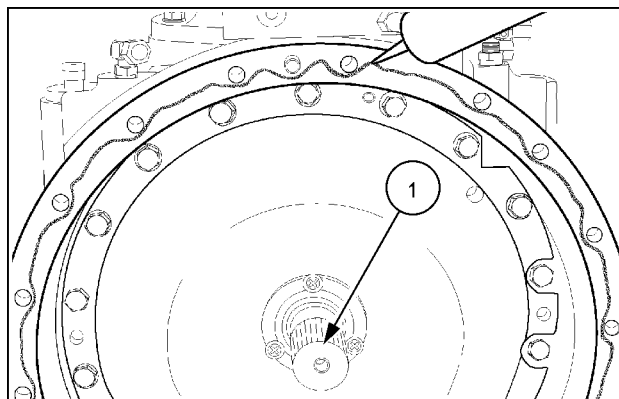
Final drive - Install - 600 Series Quadtrac® axles

Steiger® 580 Quadtrac®	NA
Steiger® 620 Quadtrac®	NA

Offset housing installation

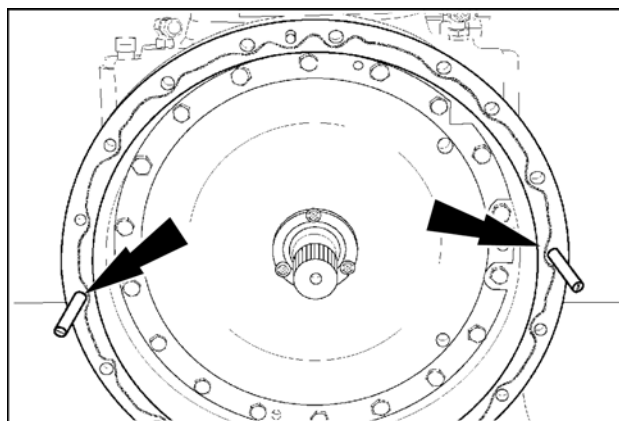
1. Install the short axle stub shafts (1) into the left hand and right hand sides of the differential. The longer of the two shafts must be installed in the brake carrier (right hand) side.
Put a **3 mm (0.12 in)** bead of anaerobic sealant (or equivalent) around the mating flange of the differential housing.

NOTICE: Be sure the machined surface of the stub shafts mate with the seals. If the stub shafts are installed backwards the machined surface will not mate with the seal.



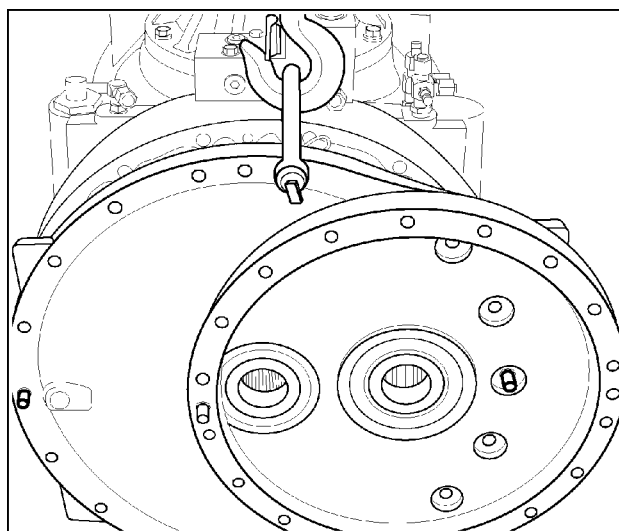
RCPH10FWD198ABJ 1

2. Install two **CAS2496** alignment studs horizontally opposite each other in the differential housing.



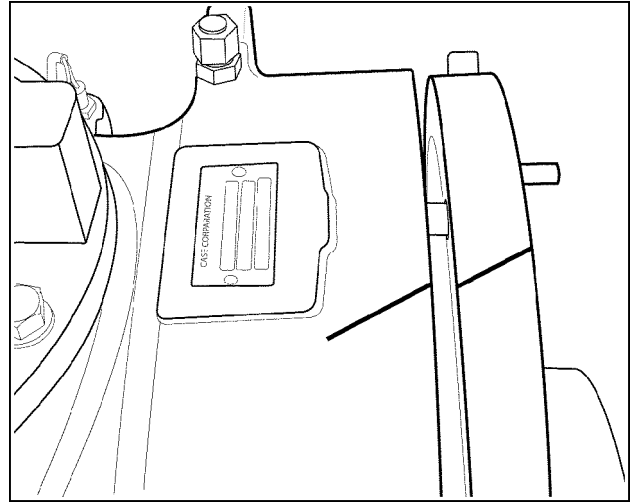
RCPH10FWD199ABJ 2

3. Lift and align the offset housing with the differential housing so the assembly marks on the differential housing and offset housing align and the housing will be supported on the alignment studs. Remove the lifting device.



RCPH10FWD162ABJ 3

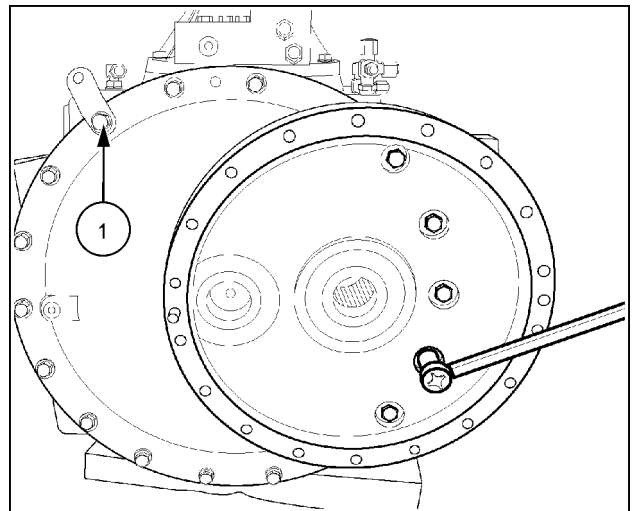
4. Push the offset housing onto the dowel pins.



RCPH10FWD200ABJ 4

5. Install the offset housing mounting bolts. Tighten the bolts alternately and evenly to **284 – 298 N·m (209 – 220 lb ft)**. Be sure the clamp bracket (1) is installed in the right location.

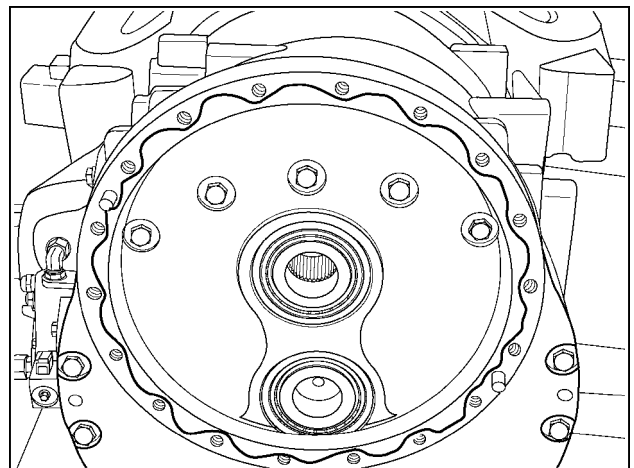
NOTE: Repeat steps 1 through 5 for the opposite side offset housing installation.



RCPH10FWD201ABJ 5

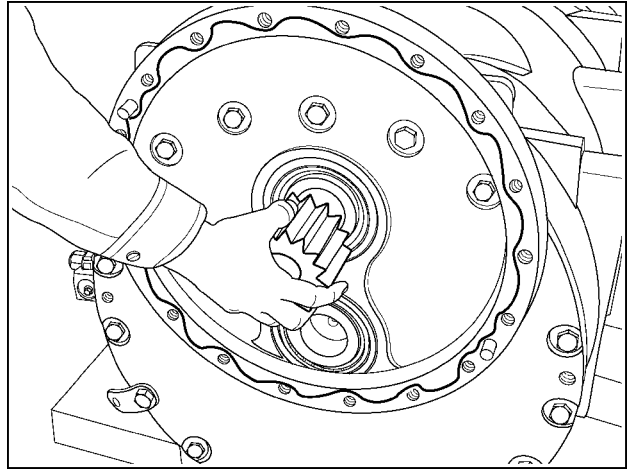
Final drive installation

6. Put a **3 mm (0.12 in)** bead of sealant (or equivalent) around the mating flange of the offset housing.



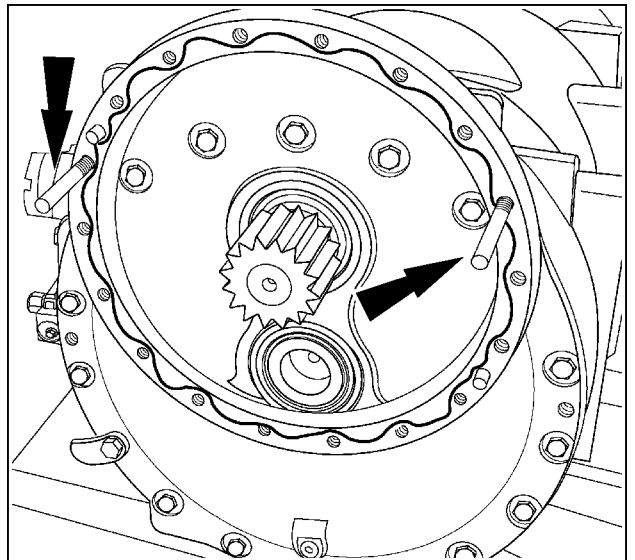
RCPH10FWD202ABJ 6

7. Install the sun gear into the housing.



RCPH10FWD203ABJ 7

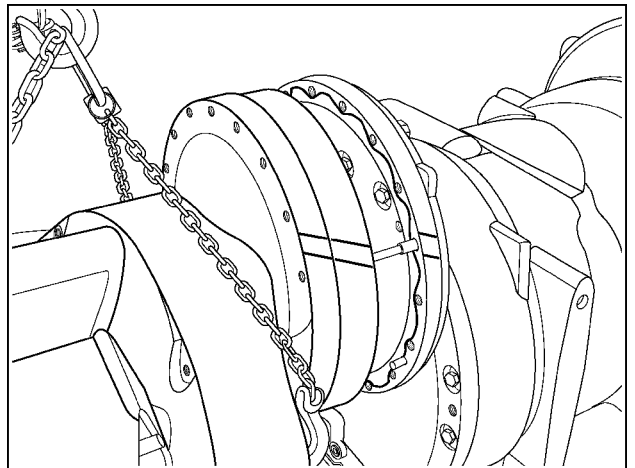
8. Install two **CAS2496** alignment studs into the offset housing horizontally opposite each other.



RCPH10FWD204ABJ 8

9. Lift and align the final drive assembly to the offset housing so the assembly marks align and the housing will engage the alignment studs.

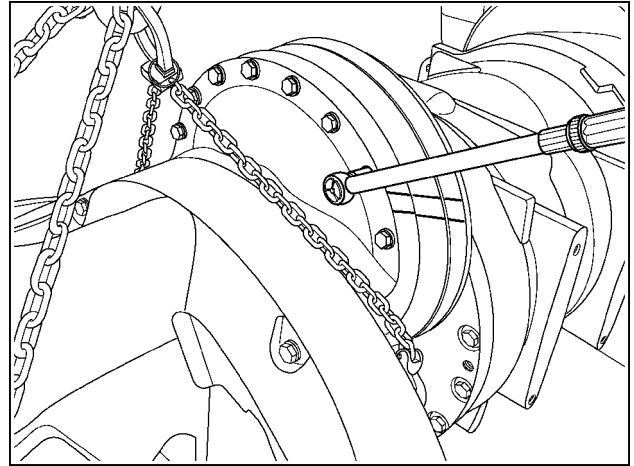
NOTE: It may be necessary to rock the wheel hub back and forth to mesh the planetary gears and sun gear.



RCPH10FWD205ABJ 9

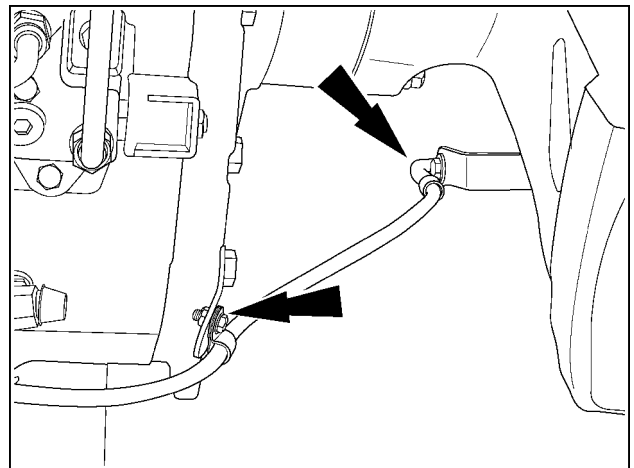
10. Install the final drive mounting bolts and washers. Tighten the bolts alternately and evenly to **284 – 298 N·m (209 – 220 lb ft)**.

NOTE: Repeat steps 6 through 10 for the opposite side final drive installation.



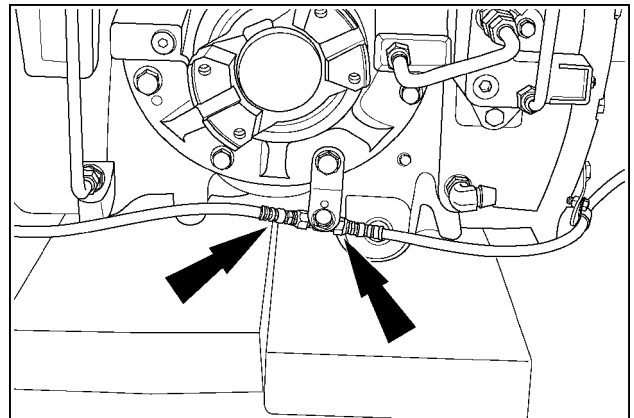
RCPH10FWD206ABJ 10

11. Install the “P” clamps and track tension pressure hose to the bracket on each final drive.



RCPH10FWD133ABJ 11

12. Connect both track tension pressure hoses to the tee fitting located on the center housing bracket.



RCPH10FWD207ABJ 12

Next operation:

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(*) See content for specific models



Front axle system - 25

Front axle track yoke assembly - 500

Steiger® 370 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 370 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 420 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Quadtrac® CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Quadtrac® Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Rowtrac™ CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 470 Rowtrac™ Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 CVT, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Powershift, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT,



TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® CVT, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 500 Rowtrac™ CVT, TIER
4B [JEEZ00000FF314001 -], Steiger® 500 Rowtrac™ Powershift, TIER 4B
[JEEZ00000FF314001 -], Steiger® 540 CVT, TIER 4B [JEEZ00000FF314001 -
], Steiger® 540 CVT, scraper, TIER 4B [JEEZ00000FF314001 -], Steiger®
540 Powershift, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® CVT,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® CVT, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 540 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Powershift, scraper,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Quadtrac® Powershift,
TIER 4B [JEEZ00000FF314001 -], Steiger® 580 Quadtrac® Powershift,
scraper, TIER 4B [JEEZ00000FF314001 -], Steiger® 620 Powershift, TIER
4B [JEEZ00000FF314001 -], Steiger® 620 Powershift, scraper, TIER 4B
[JEEZ00000FF314001 -], Steiger® 620 Quadtrac® Powershift, TIER 4B
[JEEZ00000FF314001 -]



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(*) See content for specific models

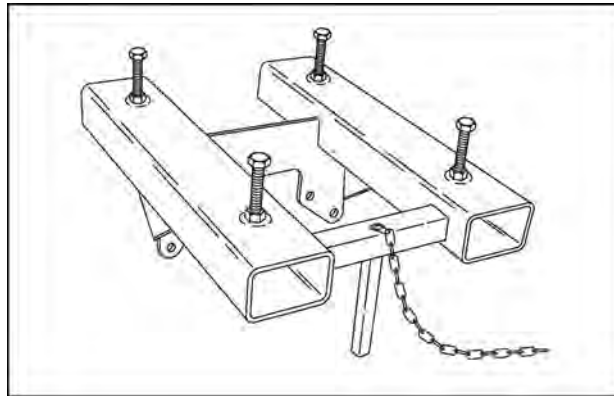
Front axle track yoke assembly - Torque - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

Item	Metric value	U.S. value
Yoke to differential extension housing bolts	845 – 950 N·m	623 – 701 lb ft
Extension housing to yoke bolts for 3048 mm (120 in) spacing	762 – 1031 N·m	562 – 760 lb ft
Yoke arm extension bolts	845 – 950 N·m	623 – 701 lb ft
Hub with flanged shaft housing bolts	251 – 280 N·m	185 – 207 lb ft
Nuts on M24 studs	845 – 950 N·m	623 – 701 lb ft
Nuts for M24 studs for 2235 mm (88 in) spacing	762 – 1031 N·m	562 – 760 lb ft
Input gear bearing carrier bolts	101 – 113 N·m	74 – 83 lb ft
Output gear bearing carrier bolts	101 – 113 N·m	74 – 83 lb ft
Driveshaft mounting bolts	115 – 129 N·m	85 – 95 lb ft

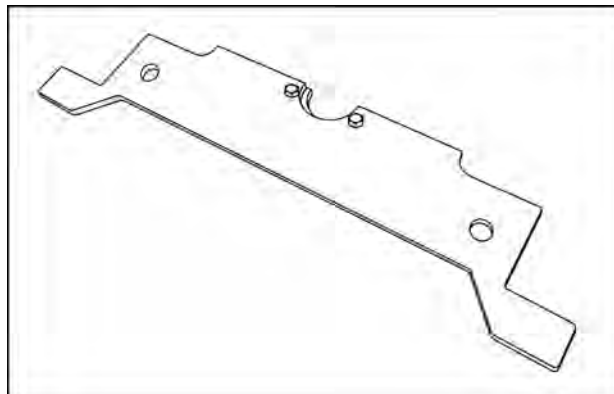
Front axle track yoke assembly - Special tools - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA



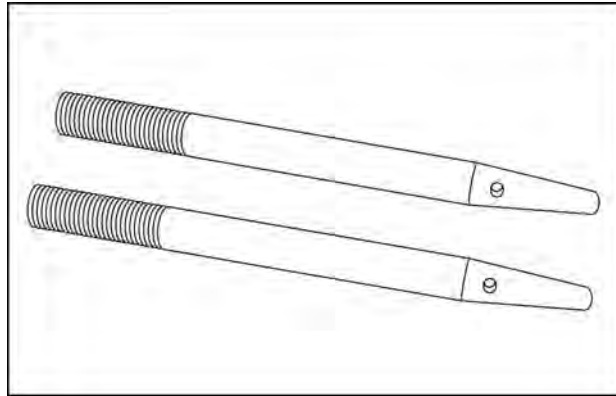
1

380003324 Upbox Lift Frame



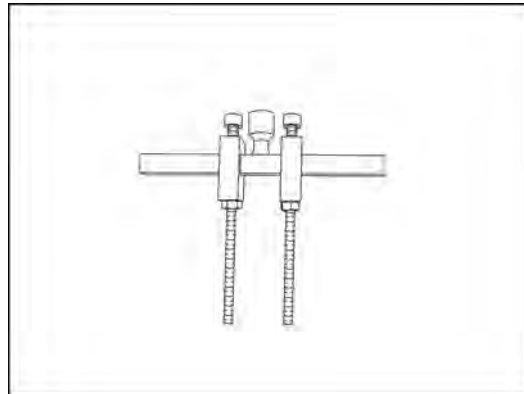
2

380003327 Axle shaft holding bar



3

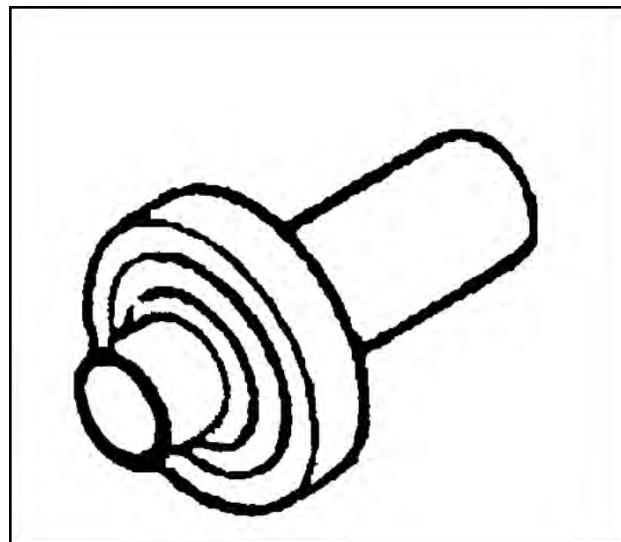
380003328 Alignment Dowels (Set of 2)



RAIL12TR02579AA

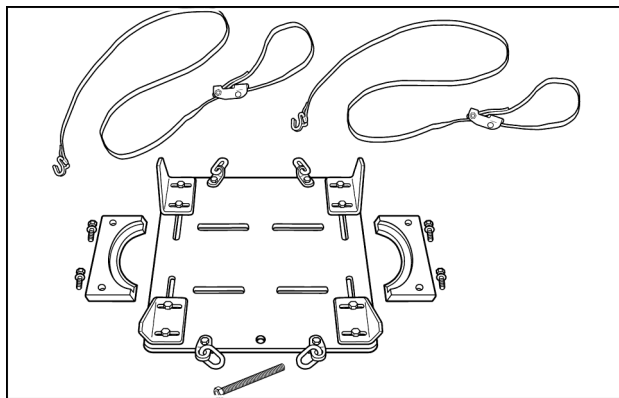
4

380003339 Small universal rolling torque tool



5

380003348 Upbox Input Gear Seal Installer

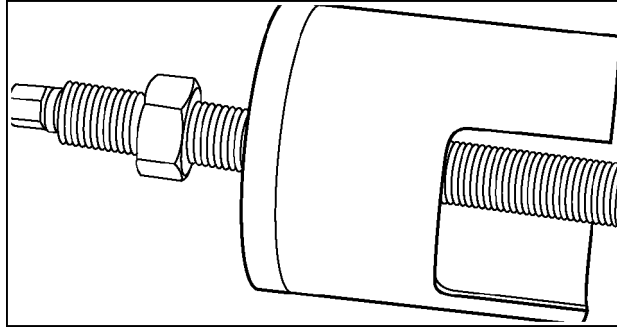


6

CAS2694 Axle handler adapter

Track yoke final drive assembly - Special tools - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA



1
380003349 Upbox final drive bearing compressor

Front axle track yoke assembly - Remove - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

Prior operation:

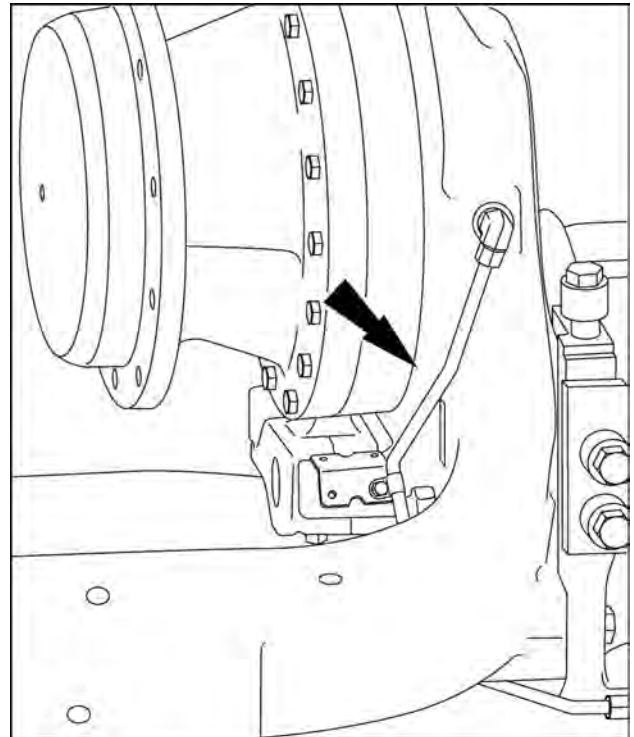
Track frame - Remove - Rowtrac™ models (48.130)

Prior operation:

Sprocket - Remove - Rowtrac™ models (48.130)

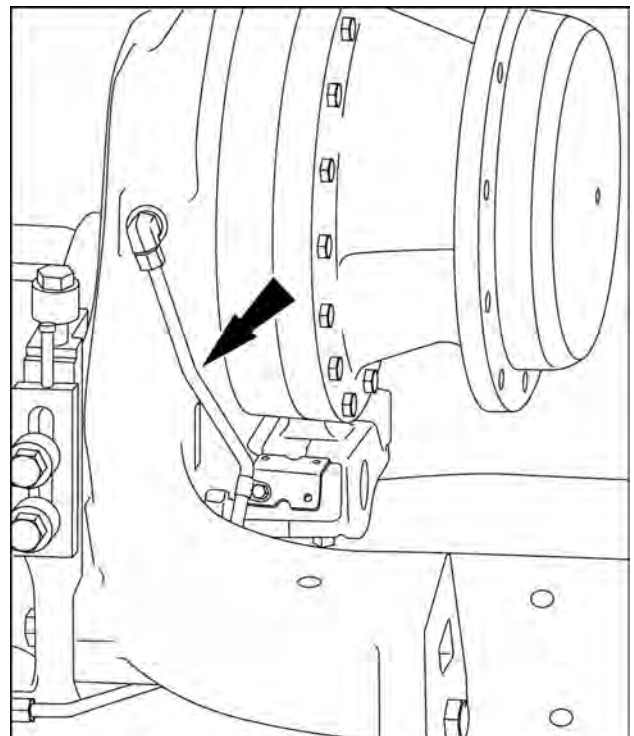
1. Remove the upbox lubrication supply tube.

NOTE: Cap and plug all disconnected hoses, lines and fittings.



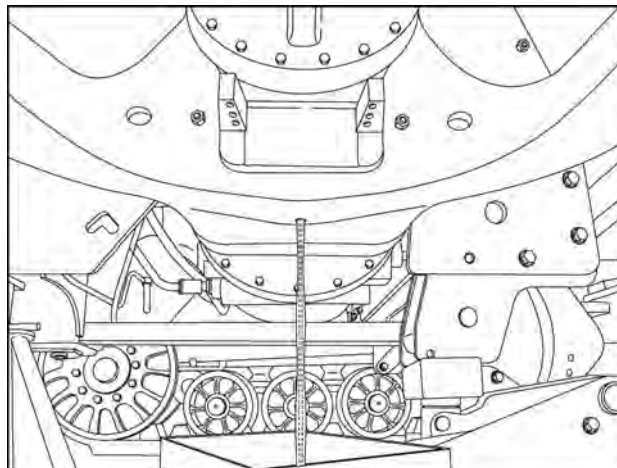
RAIL13TR00558AA 1

2. Remove the upbox lubrication return tube.



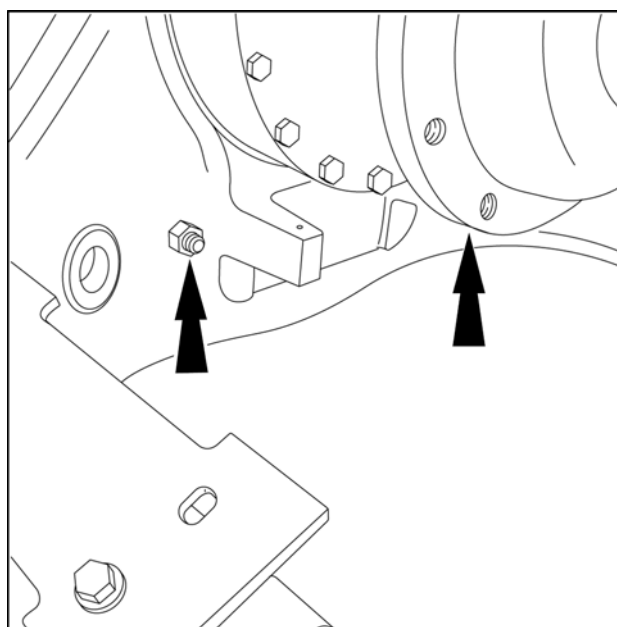
RAIL13TR00557AA 2

3. In a suitable container, drain the upbox/yoke assembly and reinstall the drain plug.



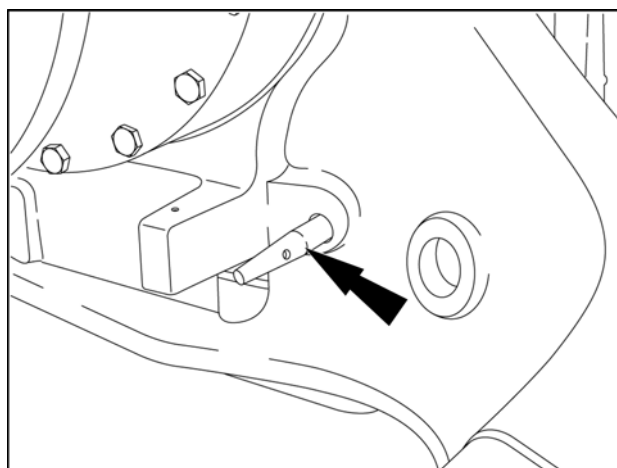
RAIL12TR02714AA 3

4. Remove the two nuts and the studs.



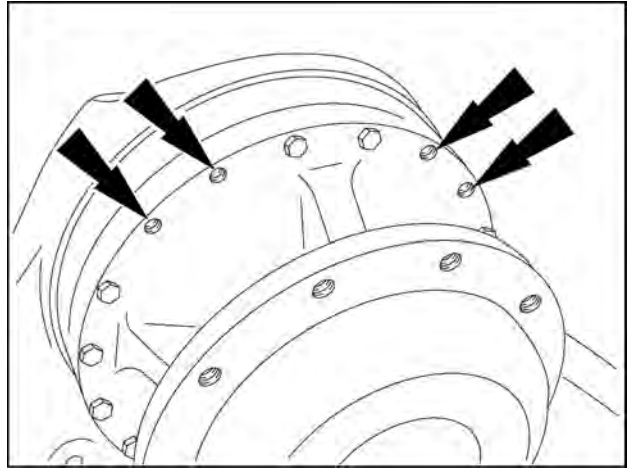
RAIL12TR01592AA 4

5. Install the two **380003328** alignment dowels.



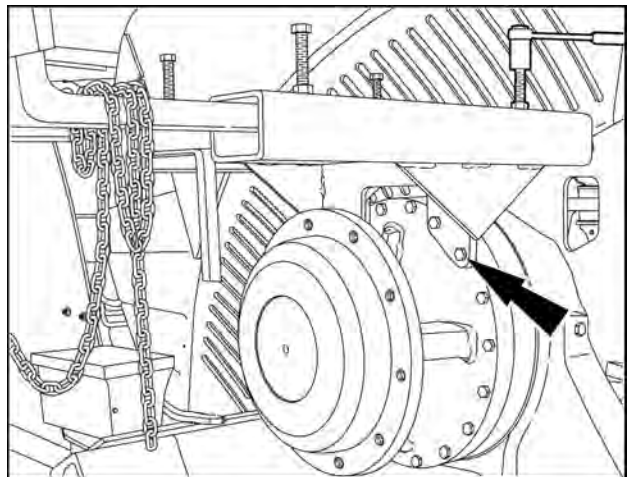
RAIL12TR01618AA 5

6. Remove the four bolts, as shown, to attach the lifting fixture to the upbox/yoke assembly.



RAIL12TR01593AA 6

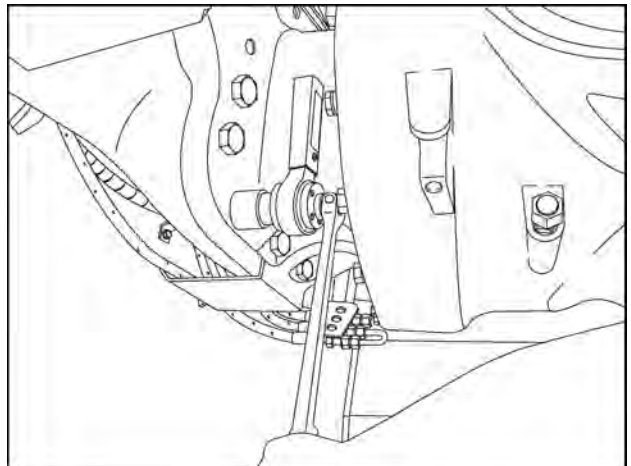
7. Use a fork truck to position the **380003324** lifting frame and bolt the lifting frame to the upbox/yoke assembly using the correct length bolts.



RAIL12TR01594AA 7

8. Working from underneath, use a torque multiplier and breaker bar to loosen the mounting bolts (or nuts) securing the upbox/yoke assembly to the differential housing extension. Remove the bolts.

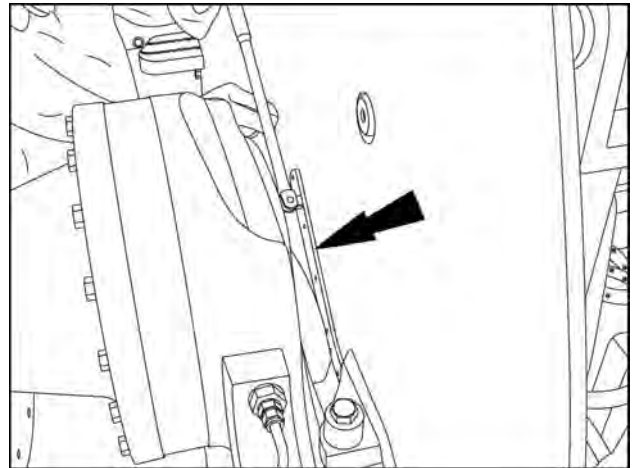
NOTE: When working on the front axle in may be necessary to move the air conditioner dryer and bracket out of the way at the left front inside of the frame.



RAIL12TR02982AA 8

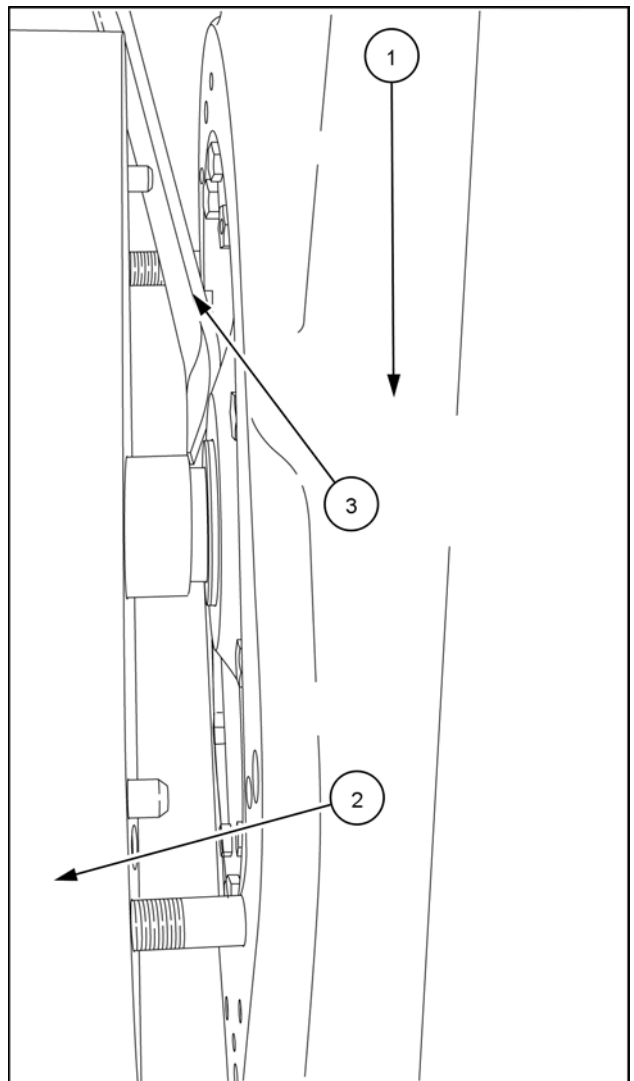
For the 2032 mm (80 in) spacing

9. Remove two top inner mounting bolts securing the upbox assembly to the center section extension as shown.
10. Loosen and remove the two outer upper mounting bolts.



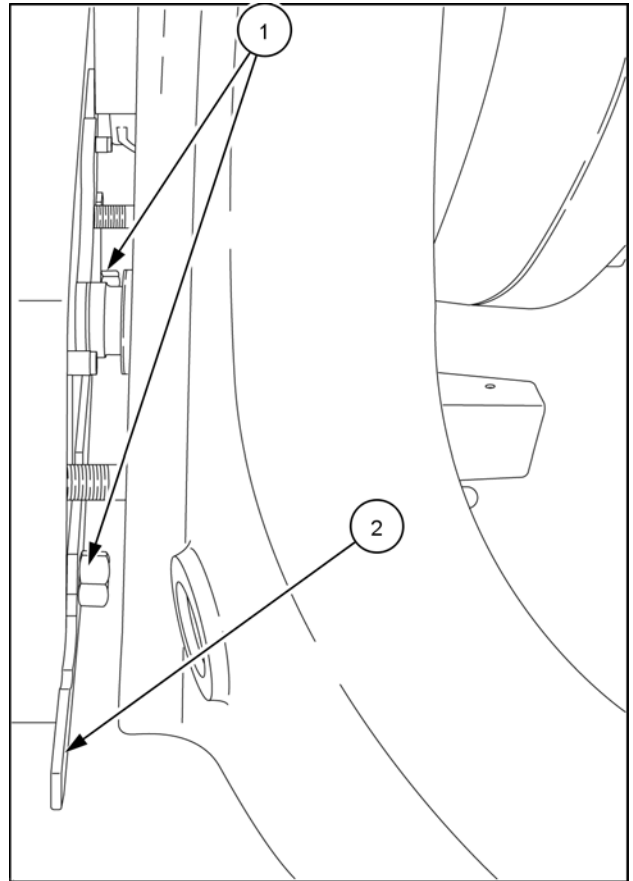
RAIL12TR02710AA 9

11. Separate the upbox/yoke assembly (1) approximately **38 mm (1.5 in)** from the center section extension (2). Use a pry bar (3) to keep the shaft in position in the differential.



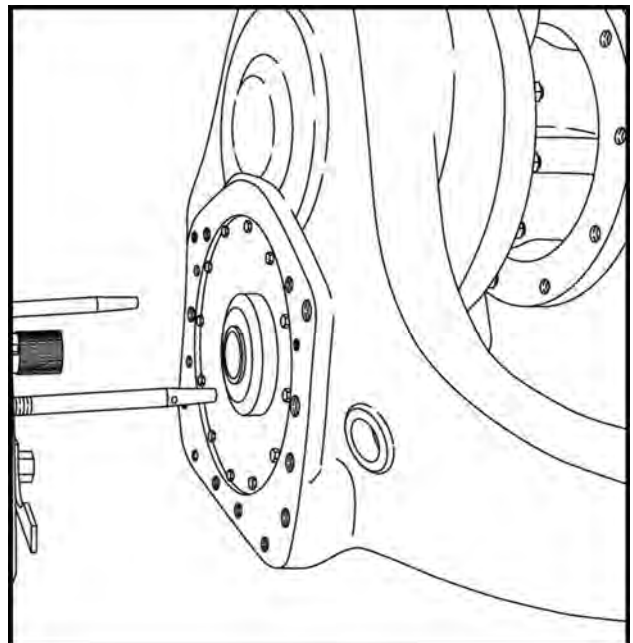
RAIL12TR01597AA 10

12. Use three washers on each of two mounting bolts (1) and install, from the inside, in the bolt holes below the alignment dowels.
13. Install the **380003327** shaft holding fixture (2) and hold in place with two nuts. This will secure the shaft in place.



RAIL12TR01596AA 11

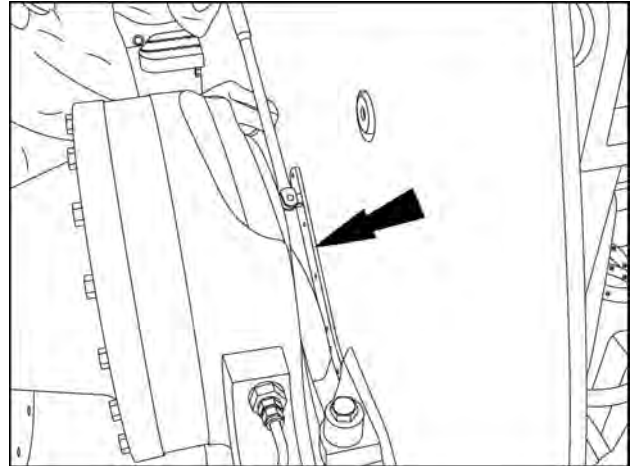
14. Remove the upbox/yoke assembly from the center section extension.



RAIL12TR01724AA 12

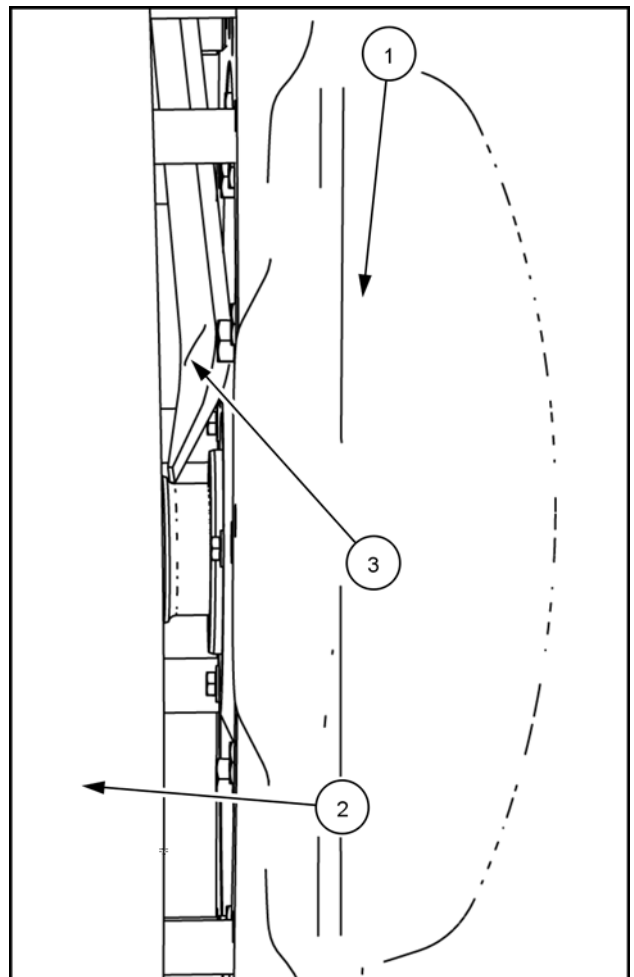
For the 2235 mm (88 in) spacing

15. Remove top nuts securing the upbox assembly to the center section extension as shown.



RAIL12TR02710AA 13

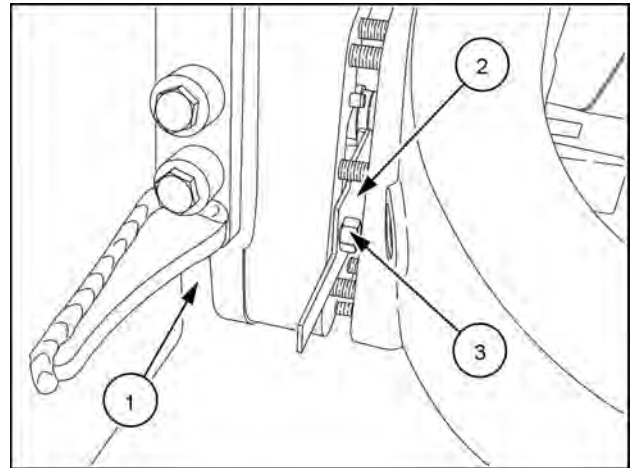
16. Separate the upbox/yoke assembly (1) approximately **38 mm (1.5 in)** from the center section extension (2). Use a pry bar (3) to keep the shaft in position in the differential.



RAIL13TR00642AA 14

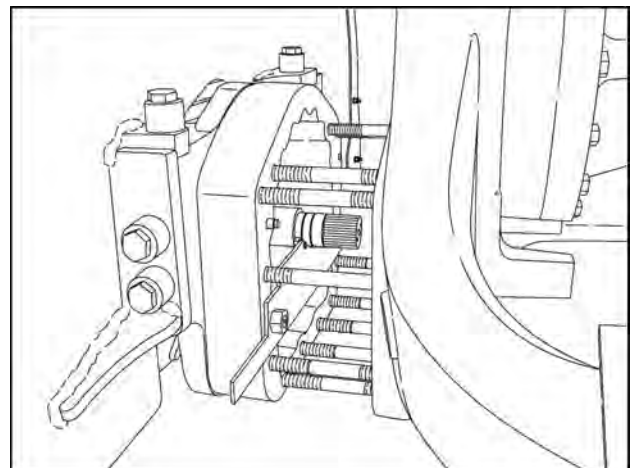
17. Unscrew the two studs that are located in the first threaded holes below the dowel pin holes.

18. Slide the loose studs to the inside of the differential extension casting and assemble two M24 nuts **(1)** on to the studs.
19. Install the **380003327** shaft holding fixture **(2)** and hold in place with two nuts **(3)**. This will secure the spacer and the shaft in place.



RAIL12TR01615AA 15

20. Remove the upbox/yoke assembly from the center section.

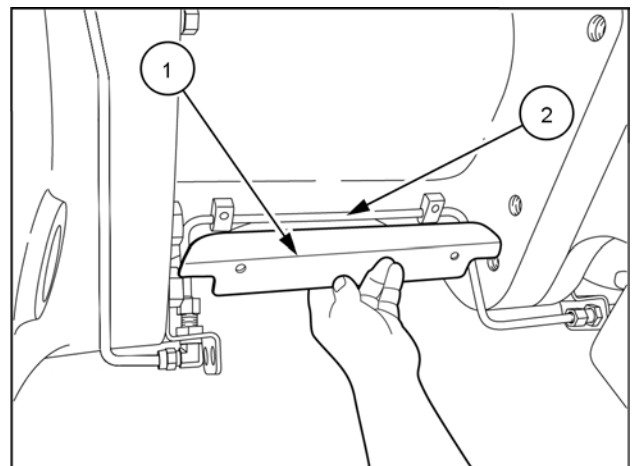


RAIL12TR01612AA 16

For the 3048 mm (120 in) spacing

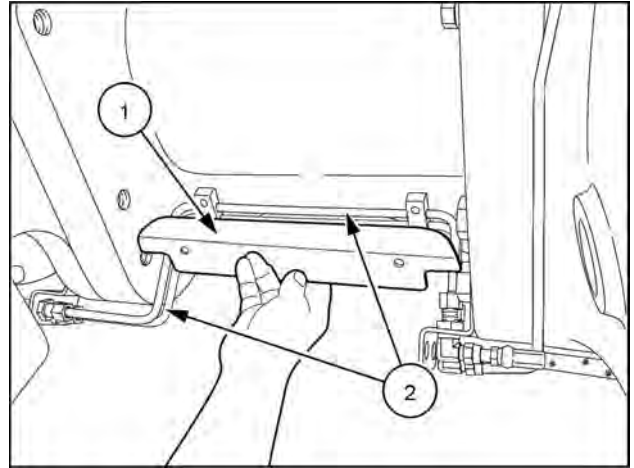
21. Remove the guard **(1)** for the lubrication return tube from the extension housing.
22. Disconnect and remove the lubrication return tube **(2)** from the extension housing.

NOTE: Plug and cap all disconnected hoses, tubes and fittings.



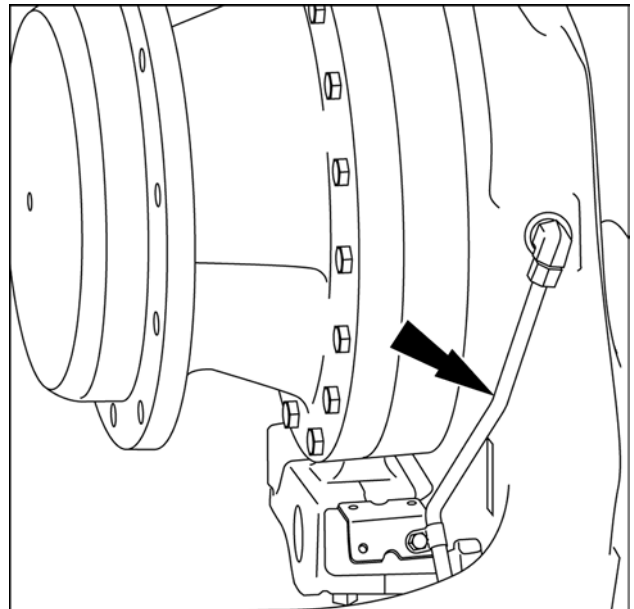
RAIL12TR03337AA 17

23. Remove the guard **(1)** for the track tension cylinder and the lubrication inlet tube from the extension housing.
24. Disconnect and remove the lubrication inlet and the tension cylinder tubes **(2)** from the extension housing.



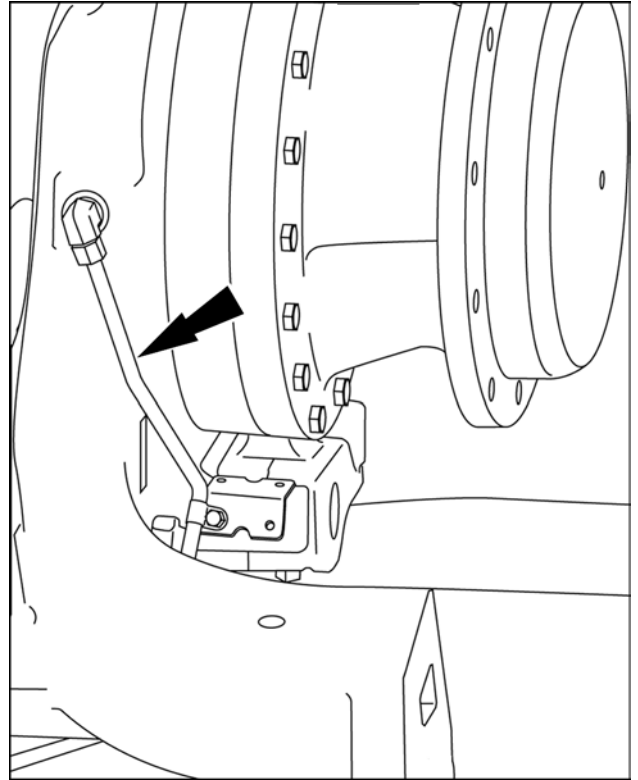
RAIL12TR03334AA 18

25. Remove the lubrication outlet tube.



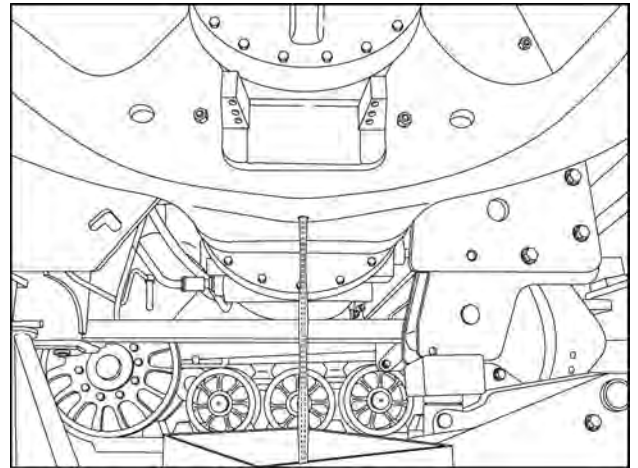
RAIL13TR00358AA 19

26. Remove the lubrication inlet tube.



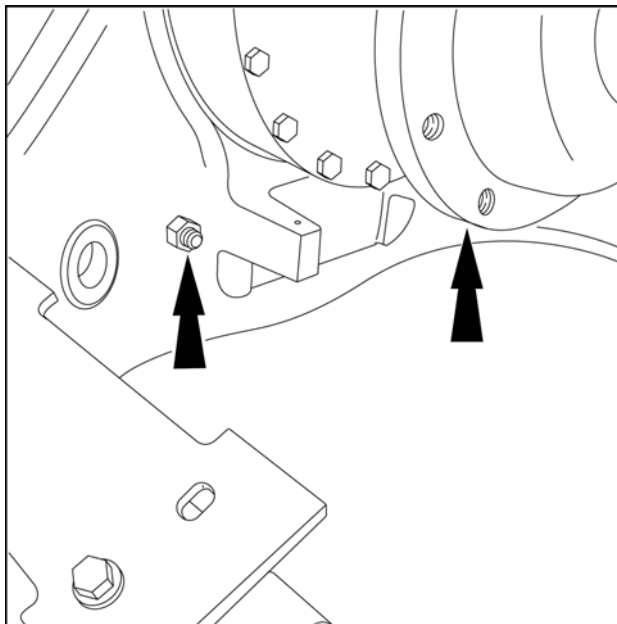
RAIL13TR00357AA 20

27. In a suitable container, drain the upbox/yoke assembly and reinstall the drain plug.



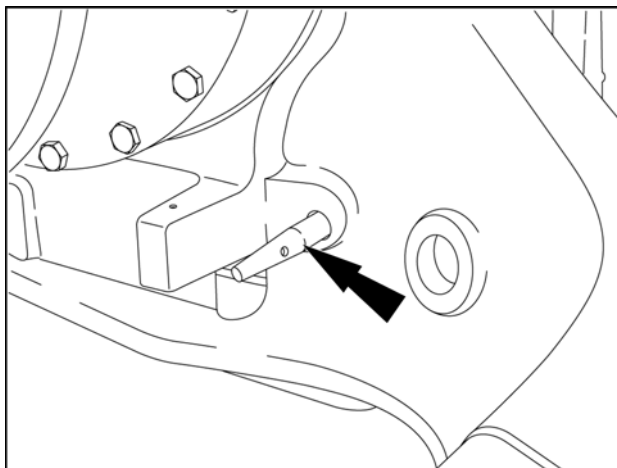
RAIL12TR02714AA 21

28. Remove the two nuts and the studs.



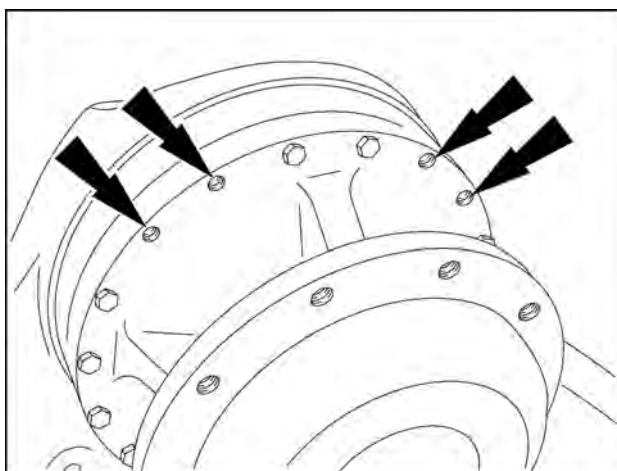
RAIL12TR01592AA 22

29. Install the two **380003328** alignment dowels.



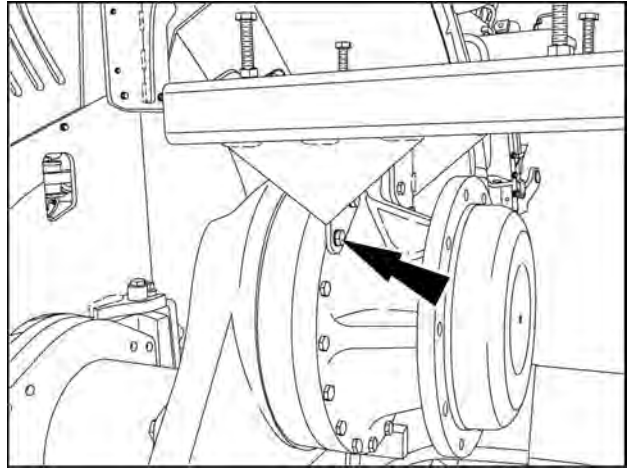
RAIL12TR01618AA 23

30. Remove the four bolts, as shown, to attach the lifting fixture to the upbox/yoke assembly.



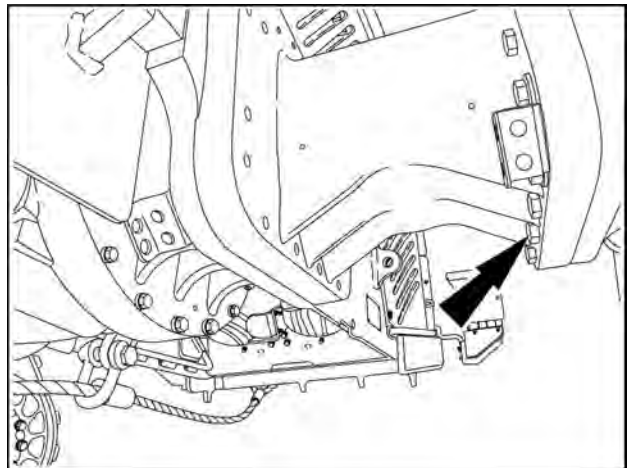
RAIL12TR01593AA 24

31. Use a fork truck to position the **380003324** lifting frame and bolt the lifting frame to the upbox/yoke assembly using the correct length bolts.



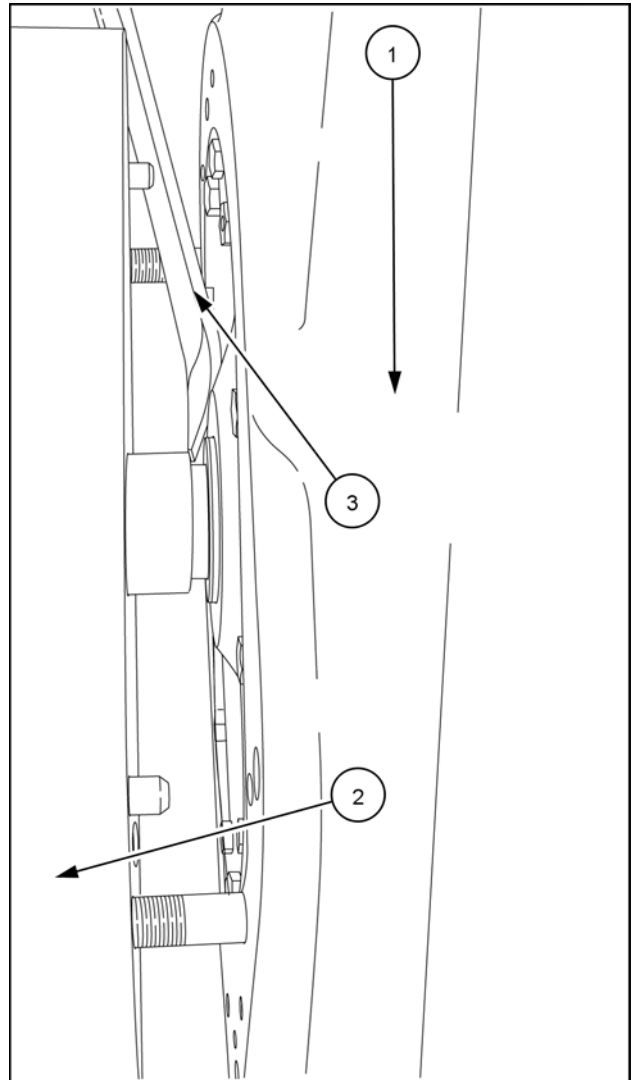
RAIL12TR01634AA 25

32. With the upbox/yoke assembly supported with the fork tuck, remove the mounting bolts.



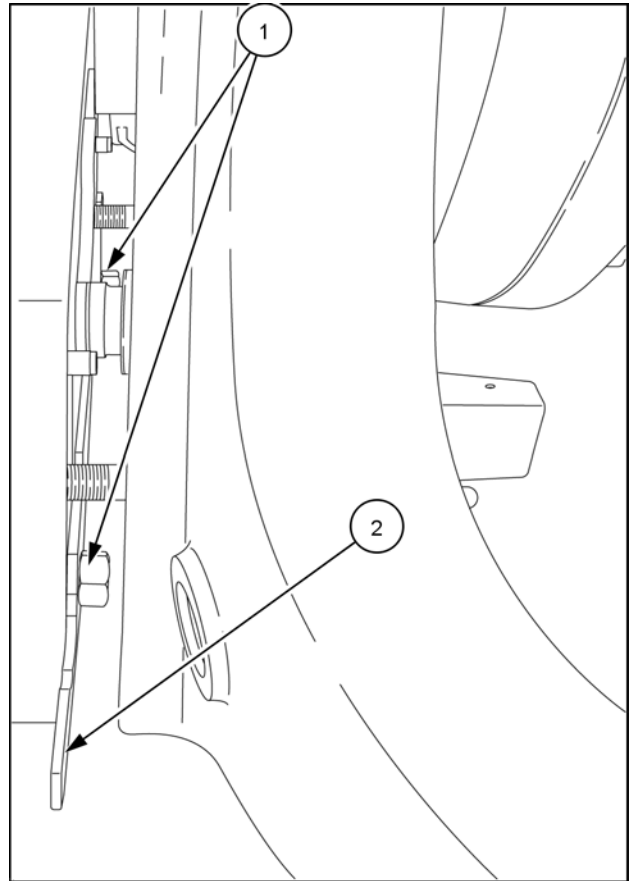
RAIL12TR03339AA 26

33. Separate the upbox/yoke assembly (1) approximately **38 mm (1.5 in)** from the center section extension (2). Use a pry bar (3) to keep the shaft in position in the differential.



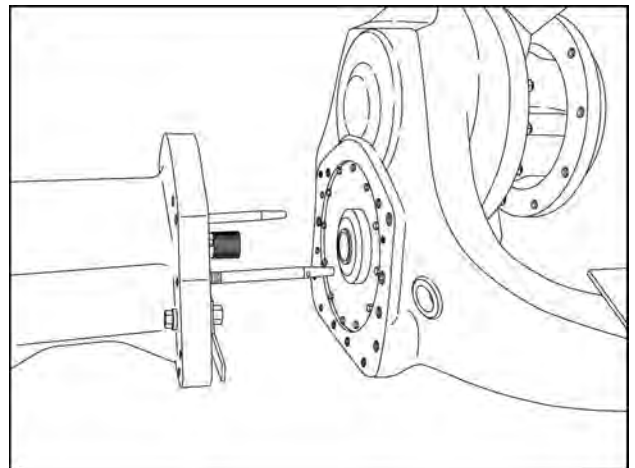
RAIL12TR01597AA 27

34. Use three washers on each of two mounting bolts (1) and install, from the inside, in the bolt holes below the alignment dowels.
35. Install the **380003327** shaft holding fixture (2) and hold in place with two nuts. This will secure the shaft in place.



RAIL12TR01596AA 28

36. Remove the upbox/yoke assembly from the spacer extension.

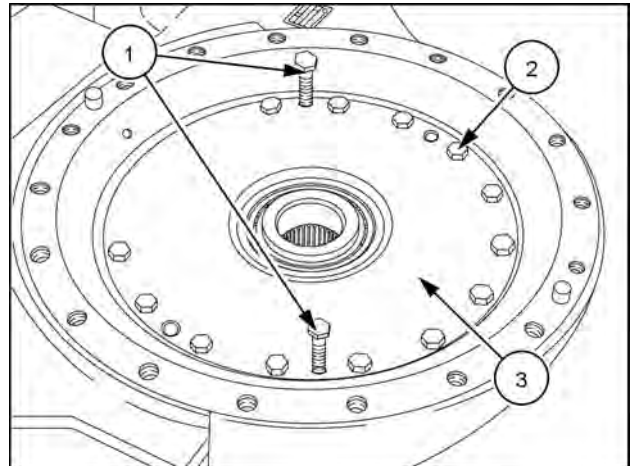


RAIL12TR01598AA 29

Front axle track yoke assembly - Disassemble - Rowtrac™ axles

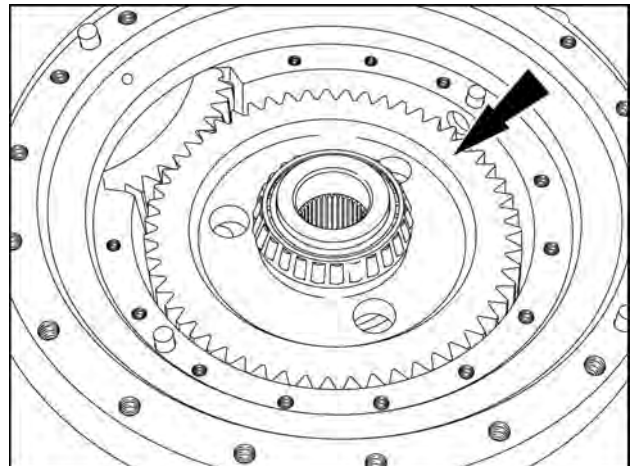
Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

1. Install two M12 x 1.75 bolts **(1)** in the two threaded holes in the output bearing carrier as shown.
2. Remove the output bearing carrier mounting bolts **(2)**.
3. Tighten the two M12 x 1.75 bolts **(1)** and remove the bearing carrier **(3)** from the upbox/yoke assembly.



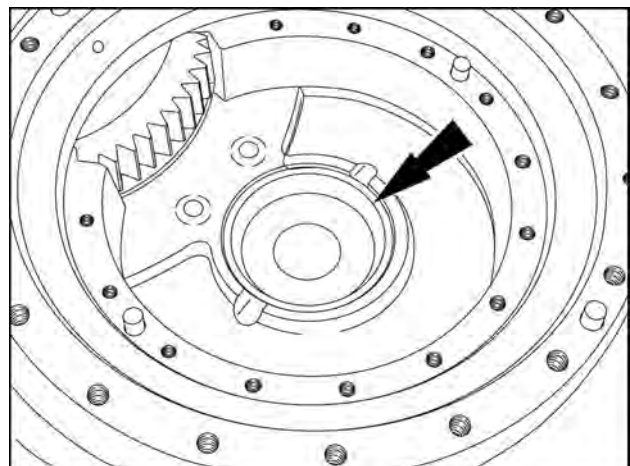
RAIL12TR03049AA 1

4. Remove the output gear from the upbox/yoke assembly.



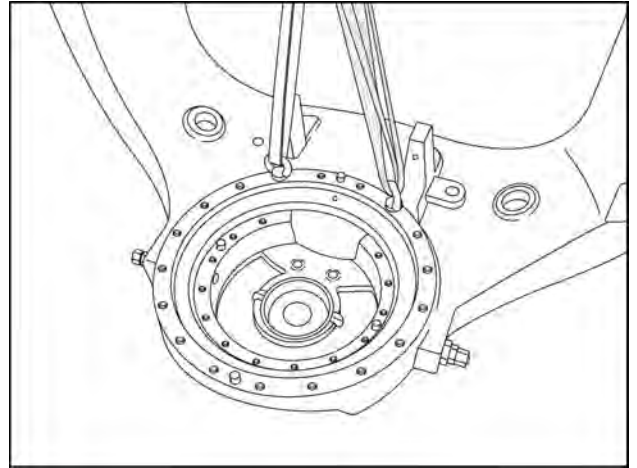
RAIL12TR03050AA 2

5. Remove the bearing cup from the upbox/yoke assembly housing.



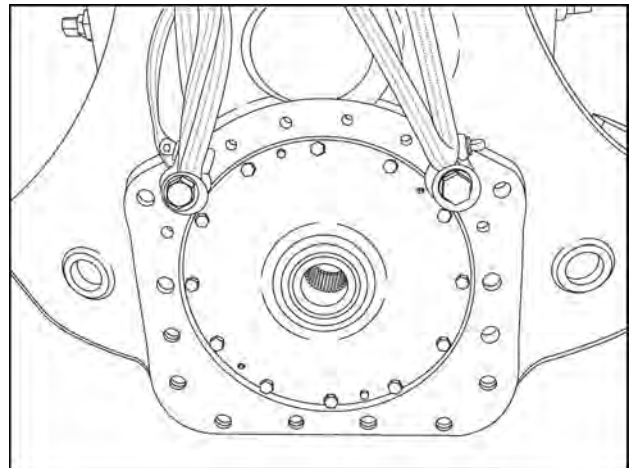
RAIL12TR03051AA 3

6. Install two lifting eyelets and straps as shown.
7. Lift the upbox/yoke assembly, stand upright and remove the lifting straps and eyelets.



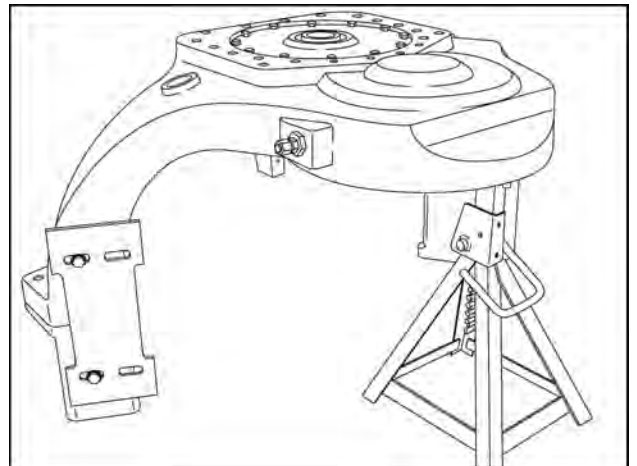
RAIL12TR03052AA 4

8. Install eyelets and lifting straps to the input side of the upbox/yoke assembly.



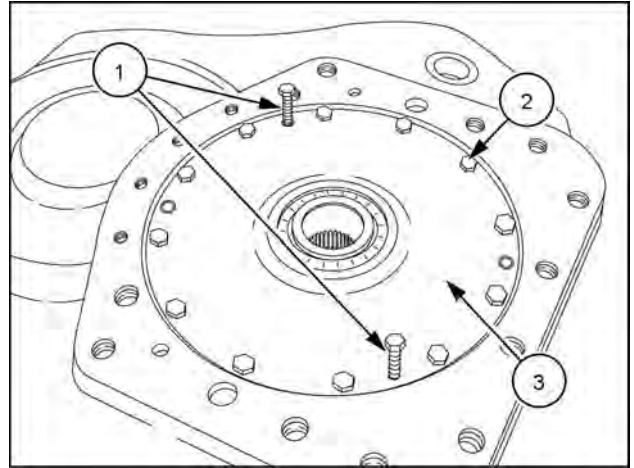
RAIL12TR03053AA 5

9. Pick up and set on yoke and jack stand.



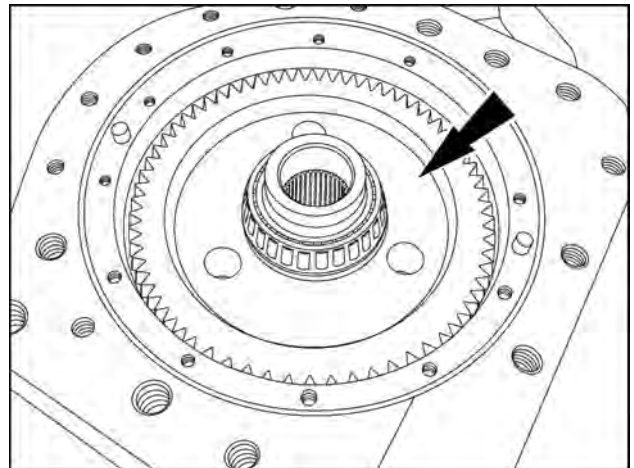
RAIL12TR03054AA 6

10. Install two M12 x 1.75 bolts **(1)** in the two threaded holes in the input bearing carrier as shown.
11. Remove the input bearing carrier mounting bolts **(2)**.
12. Tighten the two M12 x 1.75 bolts and remove the bearing carrier from the upbox/yoke assembly.



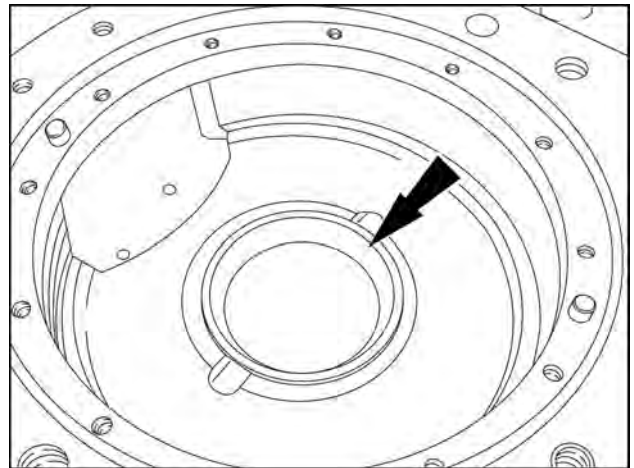
RAIL12TR03055AA 7

13. Remove the input gear.



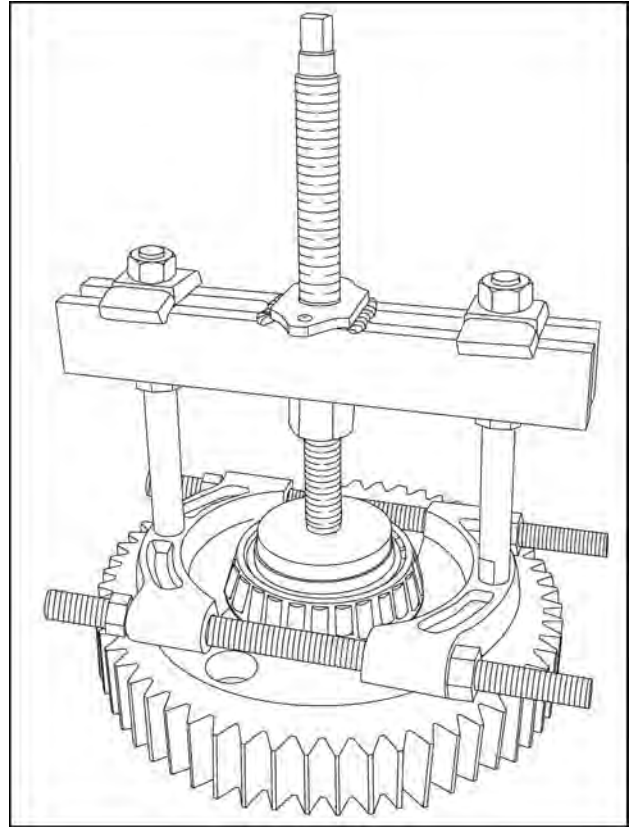
RAIL12TR03056AA 8

14. Remove the input gear bearing cup from the upbox/yoke assembly housing.



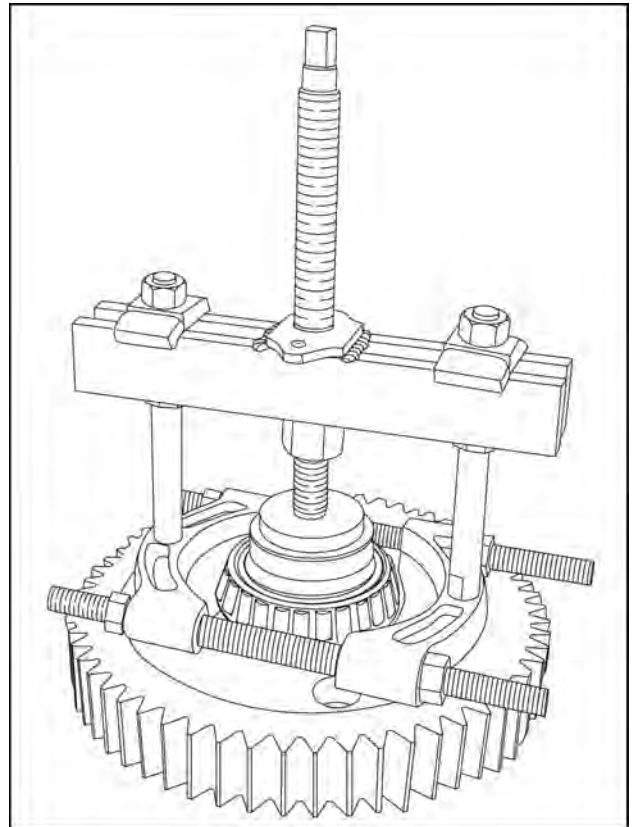
RAIL12TR03057AA 9

15. Using the appropriate size split bearing puller, remove the both bearings from the output gear.



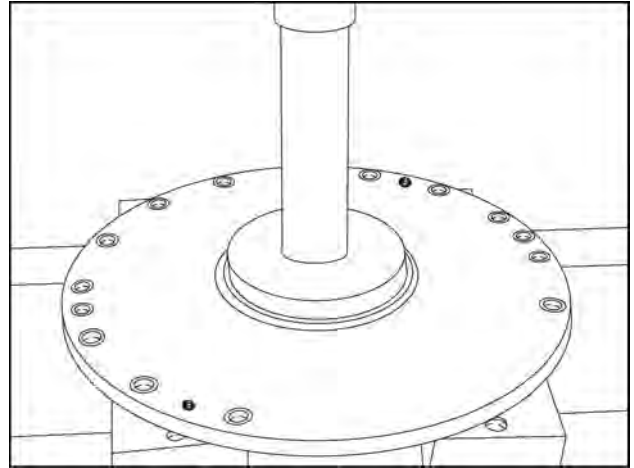
RAIL12TR03058AA 10

16. Using the appropriate size split bearing puller, remove the both bearings from the input gear.



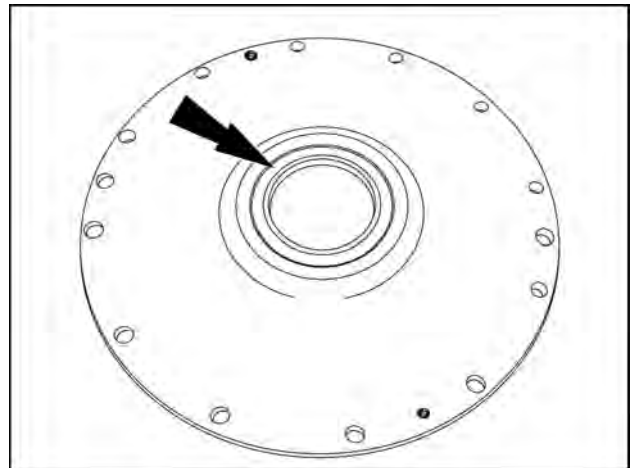
RAIL12TR03061AA 11

17. In a press, press out the bearing cup from the output bearing carrier and remove the shims.



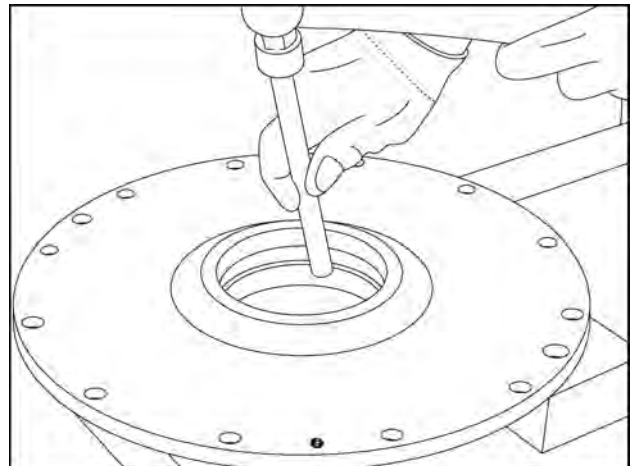
RAIL12TR03060AA 12

18. Remove the oil seal from the input bearing carrier.



RAIL12TR03065AA 13

19. Use a brass punch an remove the input bearing carrier cup and shims.

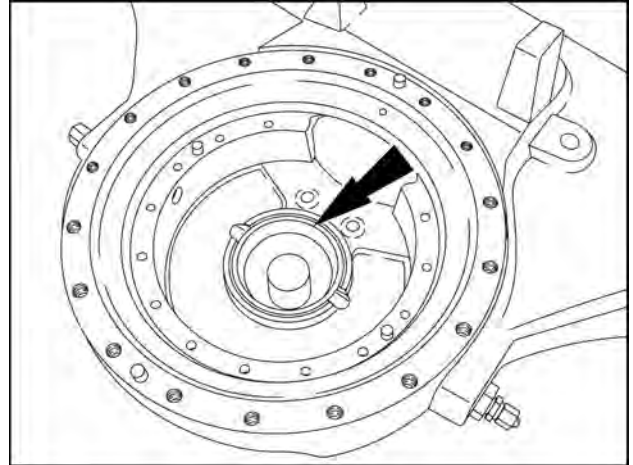


RAIL12TR03066AA 14

Front axle track yoke assembly - Assemble - Rowtrac™ axles

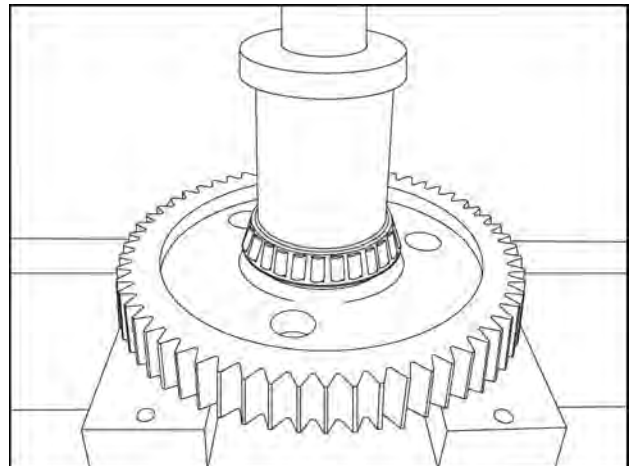
Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

1. Rotate the upbox/yoke assembly and set the inboard side on the floor.
2. Use the appropriate size driver and install the inner bearing cup for output gear.



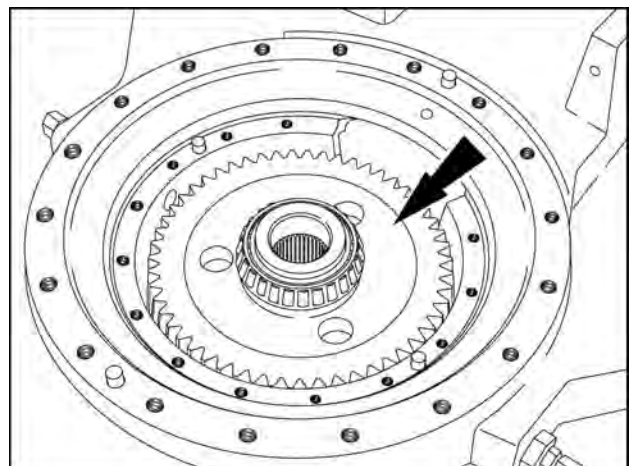
RAIL12TR03067AA 1

3. In a hydraulic press, press the bearings on to the output gear with the appropriate driver.



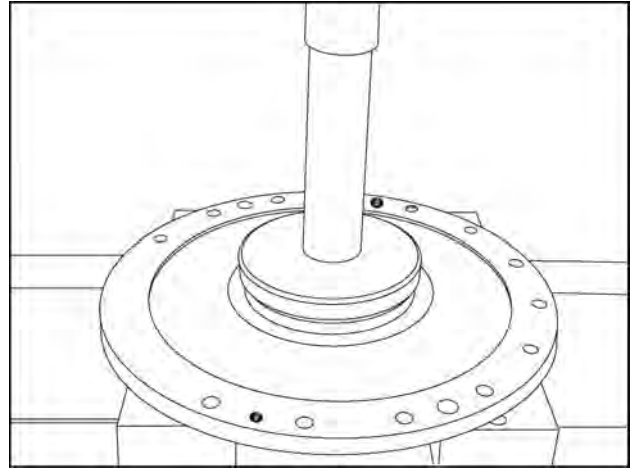
RAIL12TR03082AA 2

4. Set the output gear into place in the housing.



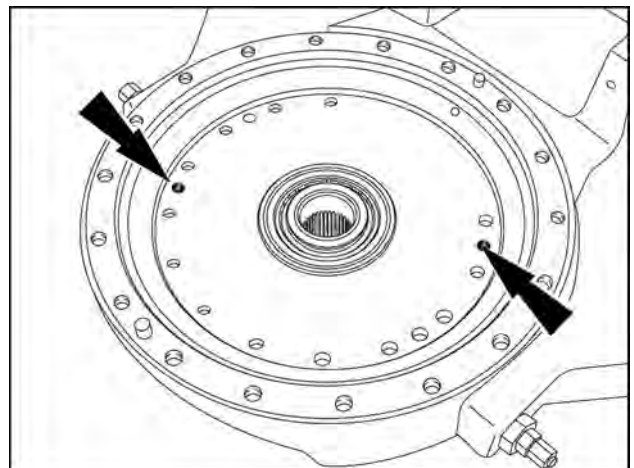
RAIL12TR03070AA 3

5. Press the bearing cup into the output bearing carrier, without any shims.



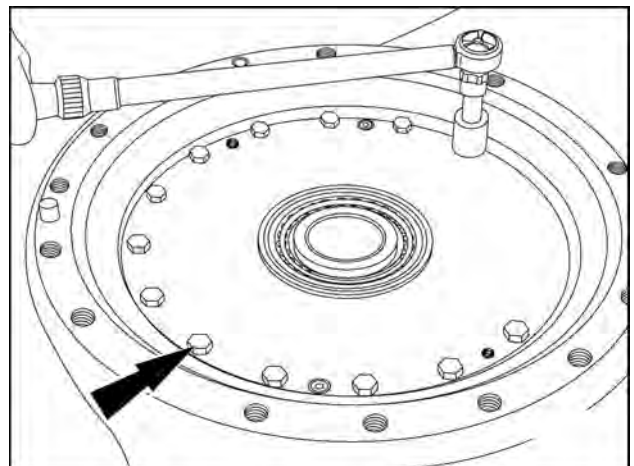
RAIL12TR03071AA 4

6. Set the bearing carrier in position on the dowel pins.



RAIL12TR03072AA 5

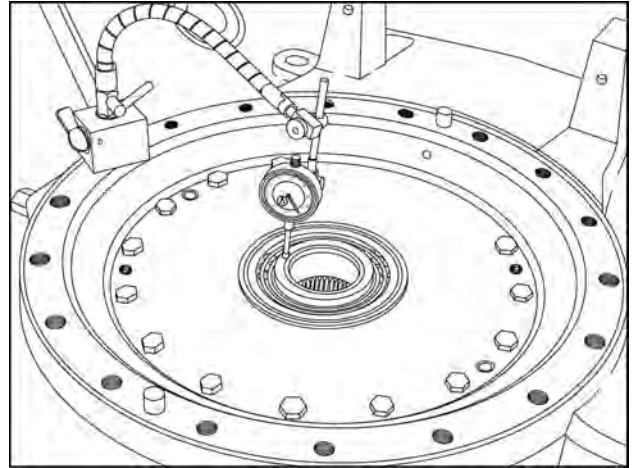
7. Assemble the mounting bolts and torque to **101 – 113 N·m (74 – 83 lb ft)**.



RAIL12TR03073AA 6

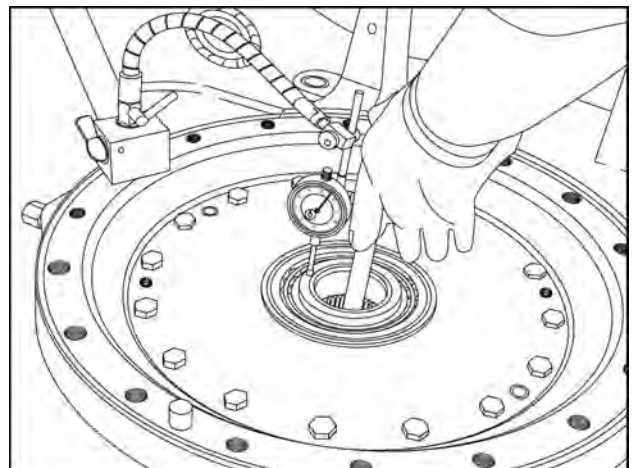
8. Rotate the output gear several times to seat the bearings in the bearing cups.

9. Setup a height indicator on the housing to the output gear as shown.



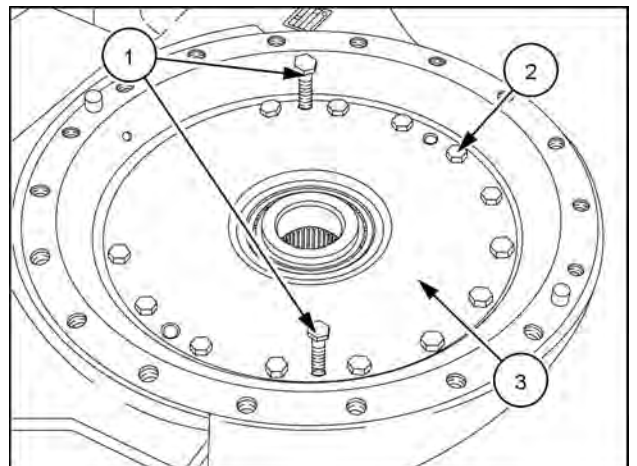
RAIL12TR03074AA 7

10. Use a rolling wedge pry bar to pry up the output gear and obtain the shim pack reading. Write it down.
11. Remove the height indicator.



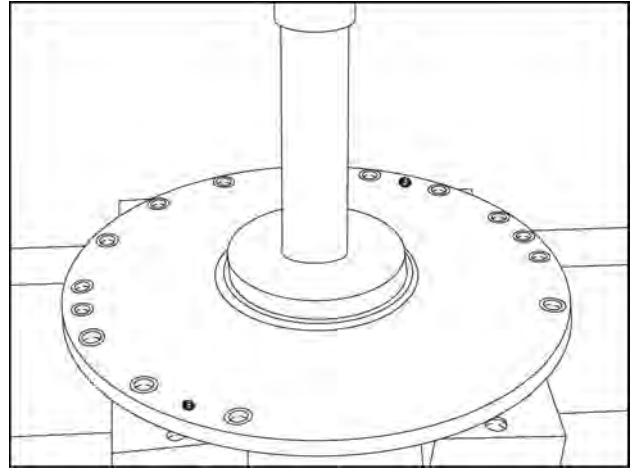
RAIL12TR03075AA 8

12. Install two M12 x 1.75 bolts (1) in the two threaded holes in the output bearing carrier as shown.
13. Remove the output bearing carrier mounting bolts (2).
14. Tighten the two M12 x 1.75 bolts (1) and remove the bearing carrier (3) from the upbox/yoke assembly.



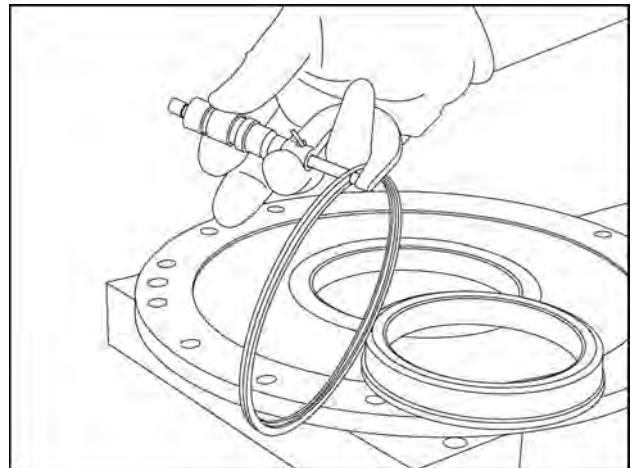
RAIL12TR03049AA 9

15. In a press, remove the bearing cup from the output gear bearing carrier.



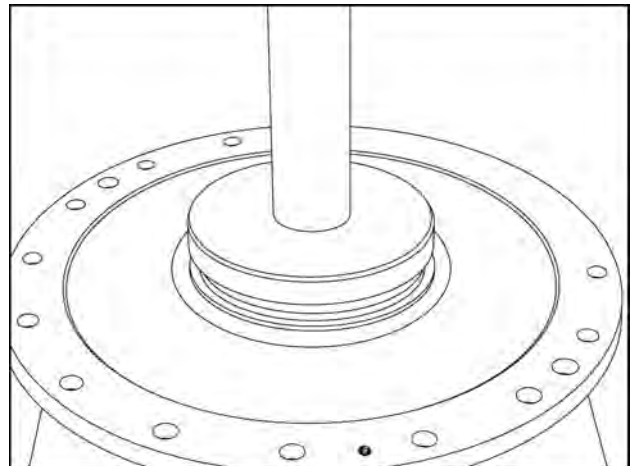
RAIL12TR03060AA 10

16. Take the reading measured in step **10** and add **0.13 – 0.22 mm (0.005 – 0.009 in)** to preload the output gear.
17. Measure the shim pack.



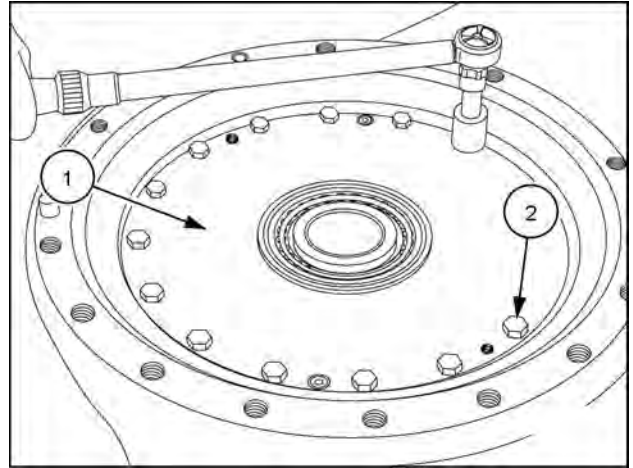
RAIL12TR03077AA 11

18. Flip the output gear bearing carrier and assemble the shims on the bearing cup.
19. Press the bearing cup into the bearing carrier.



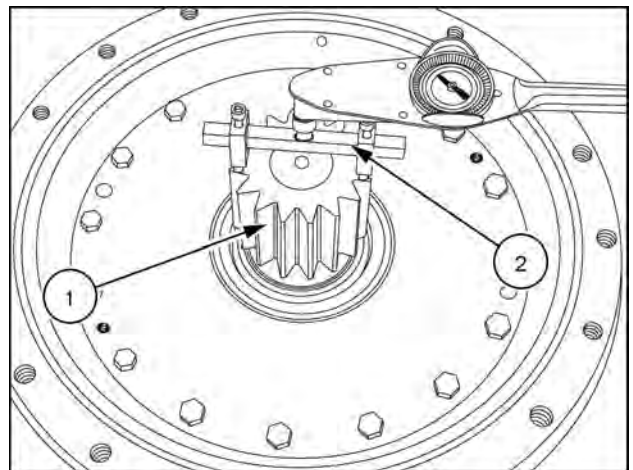
RAIL12TR03078AA 12

20. Reassemble the cover on to the upbox/yoke assembly with the mounting bolts and torque to **101 – 113 N·m (74 – 83 lb ft)**.



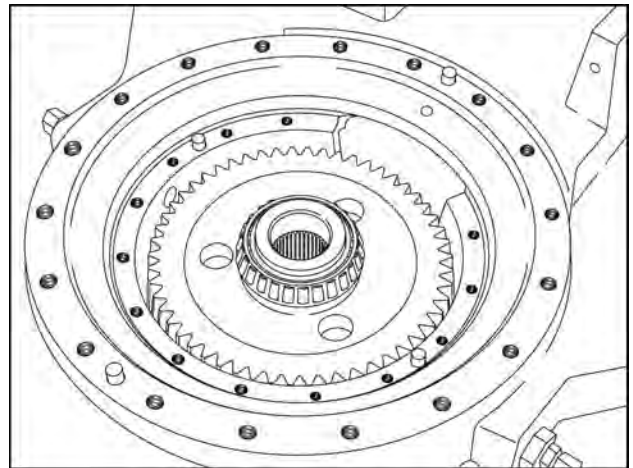
RAIL12TR03073AA 13

21. Insert the sun shaft **(1)** into the output gear.
22. Assemble the special tool **380003339 (2)** on the sun gear as shown.
23. Check the rolling torque of the output gear.
The rolling torque must be between **2.84 – 7.34 N·m (25.14 – 64.964 lb in)**.
If the rolling torque is not within specifications repeat steps **12** through **23**. Remove or add shims (within the specifications) as needed until the rolling torque is within specifications. Then go to the next step.



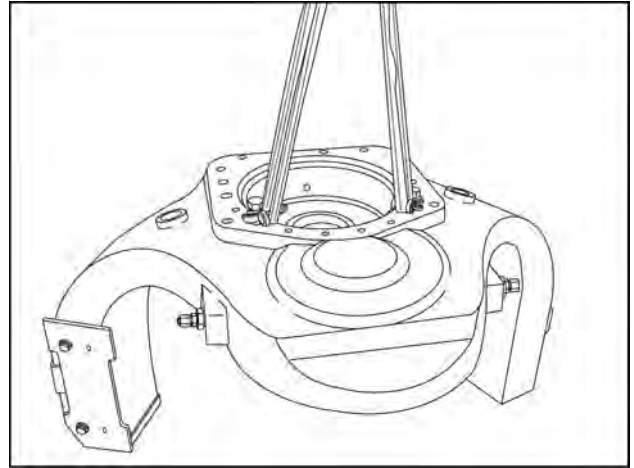
RAIL12TR03079AA 14

24. Remove the sun shaft, the bearing carrier and the output gear from the housing.



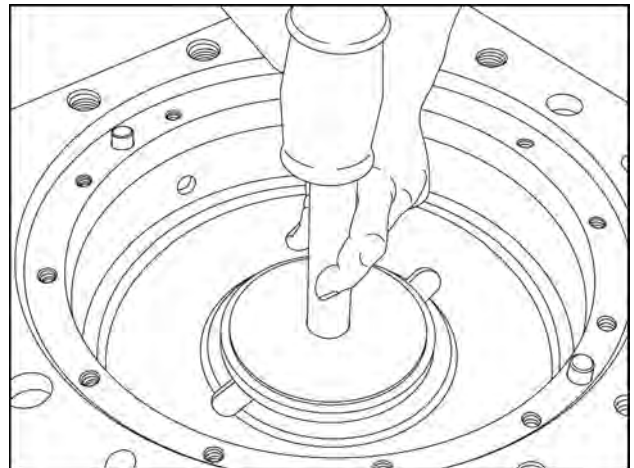
RAIL12TR03070AA 15

25. Attach the lifting straps and rotate the upbox/yoke assembly housing. Stand the housing on the yoke arms and a jack stand.



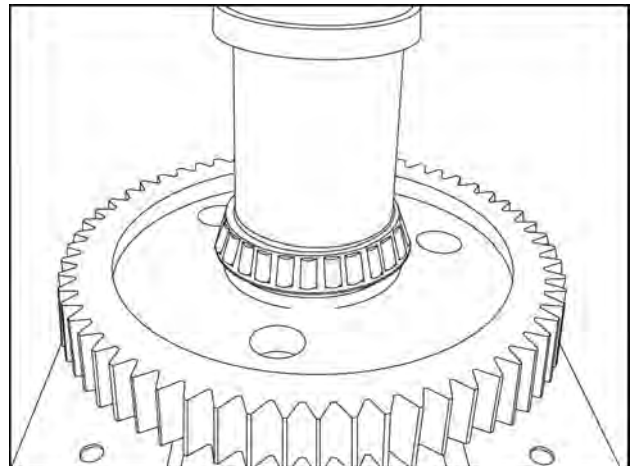
RAIL12TR03080AA 16

26. Use the appropriate size driver and install the inner bearing cup for the input gear.



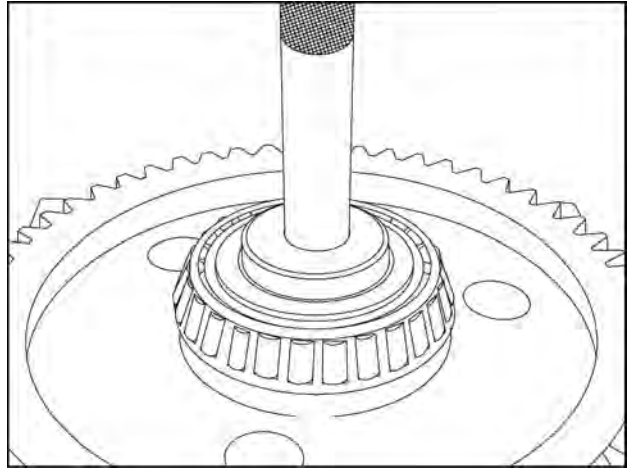
RAIL12TR03081AA 17

27. In a hydraulic press, press the bearings on to the input gear with the appropriate size driver.



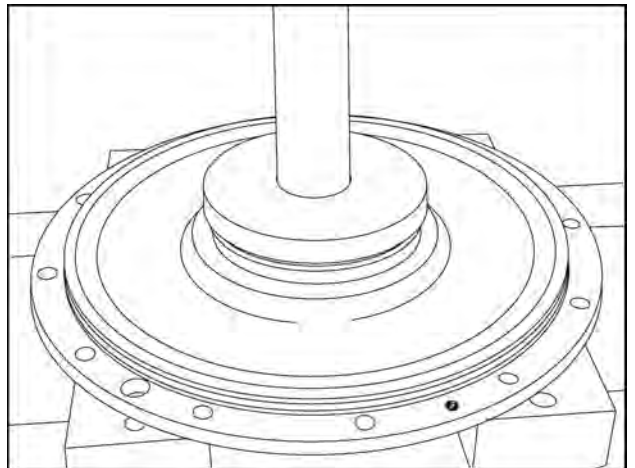
RAIL12TR03083AA 18

28. With the appropriate size driver, press the inner diameter cover into the outboard side of the input gear.



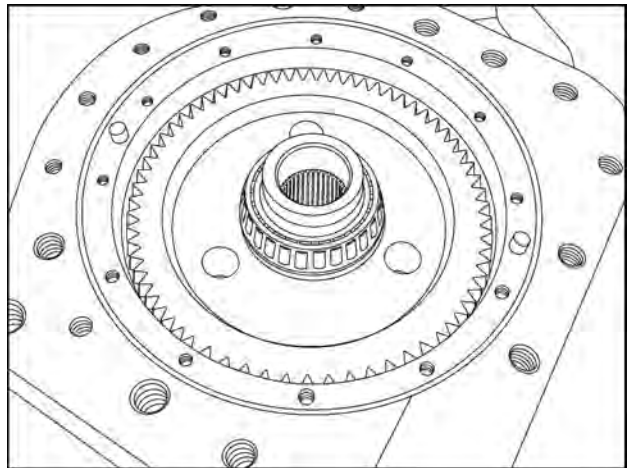
RAIL12TR03084AA 19

29. Press the bearing cup into the input bearing carrier cover, without any shims.



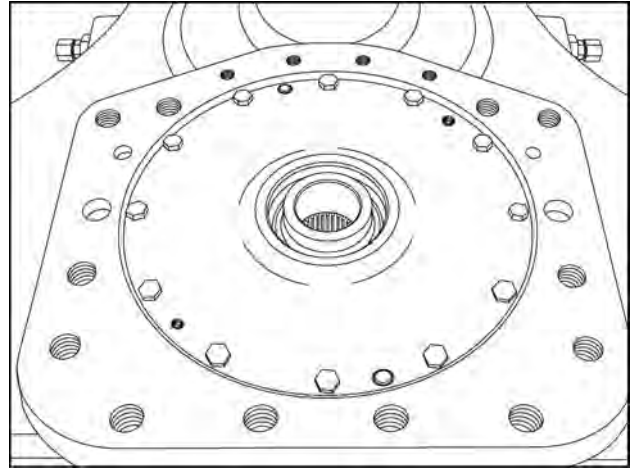
RAIL12TR03085AA 20

30. Set the input gear into place in the housing.



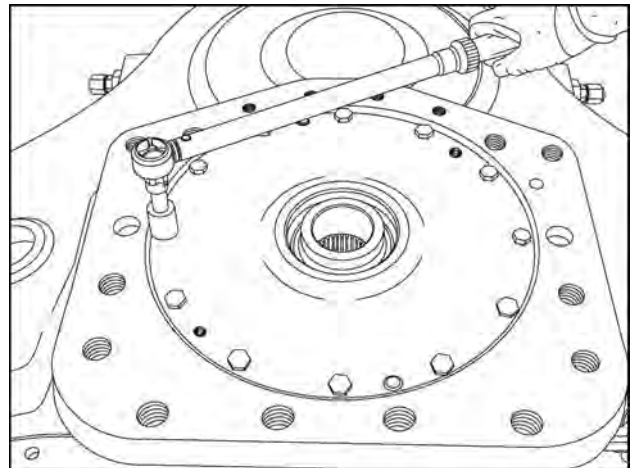
RAIL12TR03056AA 21

31. Set the bearing carrier in position on the dowel pins and assemble the mounting bolts.



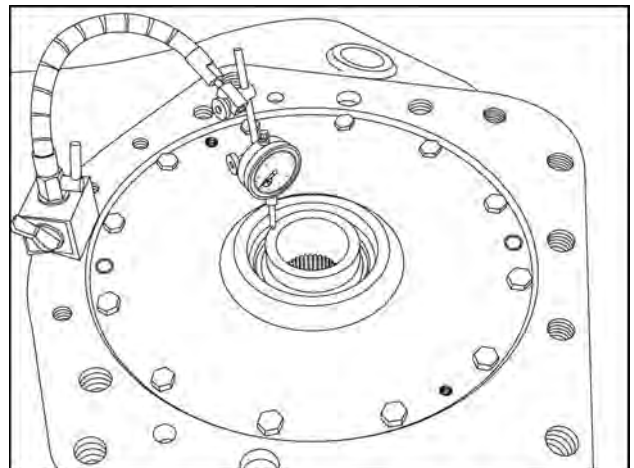
RAIL12TR03086AA 22

32. Torque the mounting bolts to **101 – 113 N·m (75 – 83 lb ft)**.



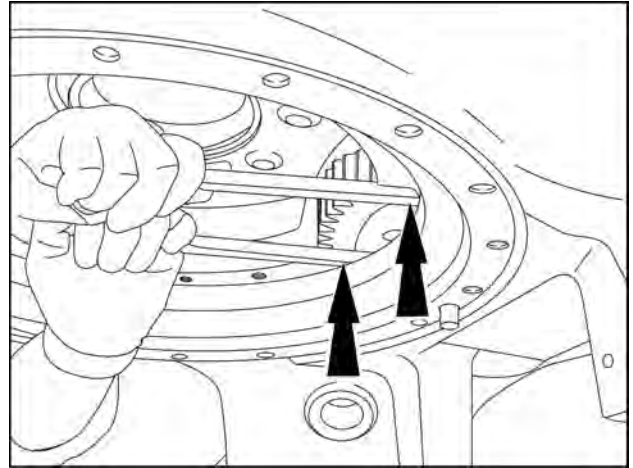
RAIL12TR03087AA 23

33. Rotate the input gear several times to seat the bearings in the bearing cups.
34. Setup a height indicator on the housing to the input gear as shown.



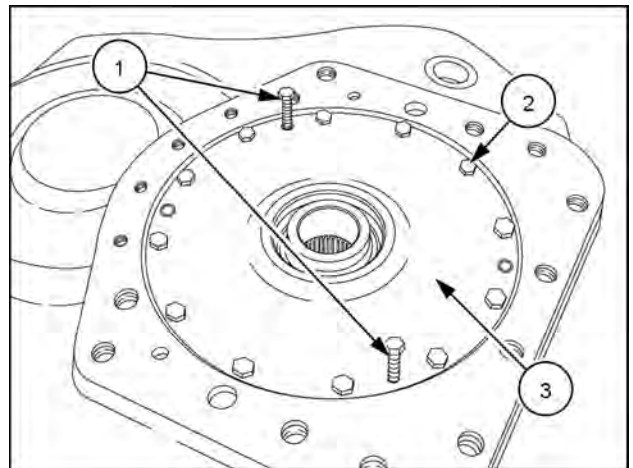
RAIL12TR03088AA 24

35. Use two pry bars to pry up the input gear and obtain the shim pack reading. Write it down.



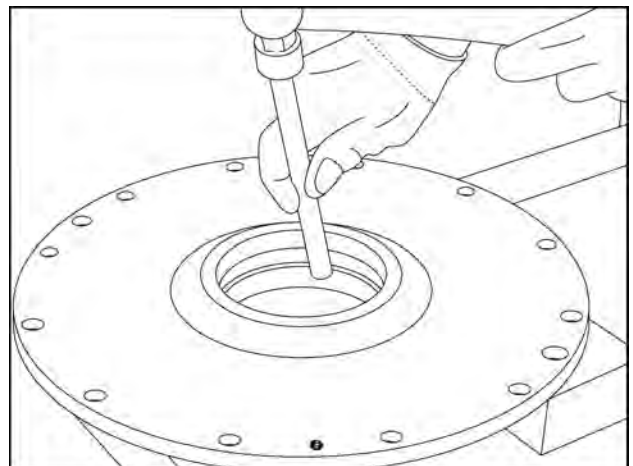
RAIL12TR03089AA 25

36. Remove the height indicator.
37. Install two M12 x 1.75 bolts **(1)** in the two threaded holes in the output bearing carrier as shown.
38. Remove the input bearing carrier mounting bolts **(2)**.
39. Tighten the two M12 x 1.75 bolts **(1)** and remove the bearing carrier **(3)** from the upbox/yoke assembly.



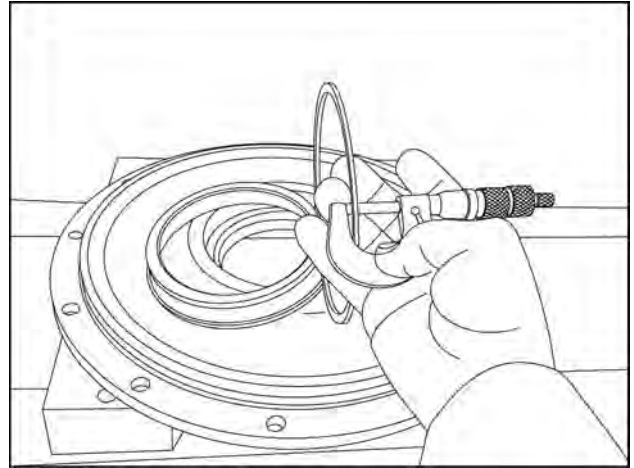
RAIL12TR03342AA 26

40. Use a brass punch and carefully remove the bearing cup from the input gear bearing carrier.



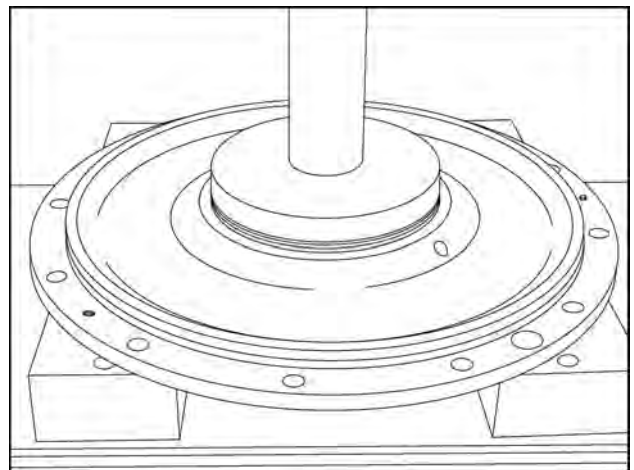
RAIL12TR03066AA 27

41. Take the reading measured in step **35** and add **0.05 – 0.12 mm (0.002 – 0.005 in)** to preload the output gear.



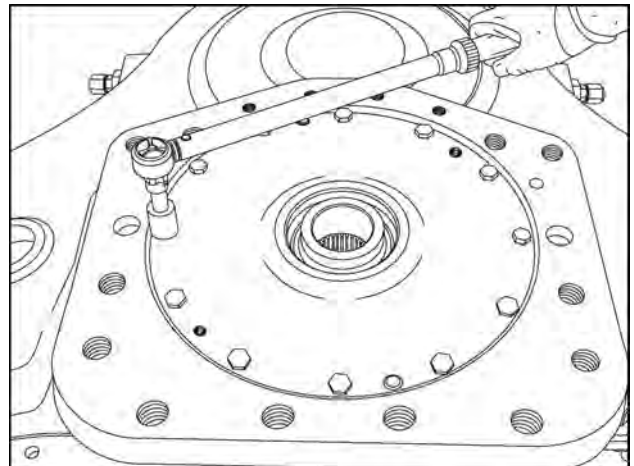
RAIL12TR03090AA 28

42. Flip the input gear bearing carrier and assemble the shims on the bearing cup.
43. Press the bearing cup, with the shim pack, into the bearing carrier.



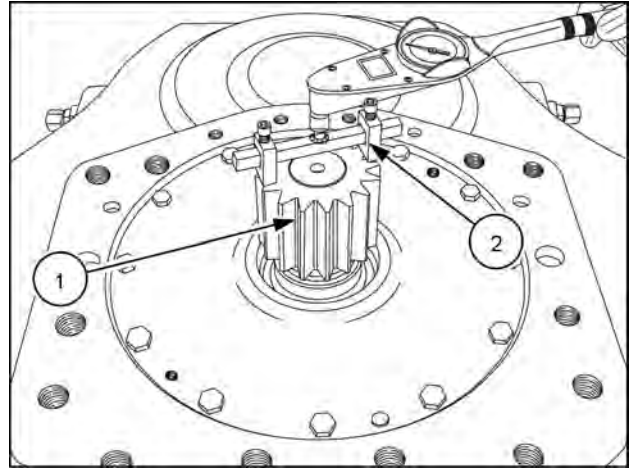
RAIL12TR03091AA 29

44. Reassemble the cover on to the upbox/yoke assembly with the mounting bolts and torque to **101 – 113 N·m (74 – 83 lb ft)**.



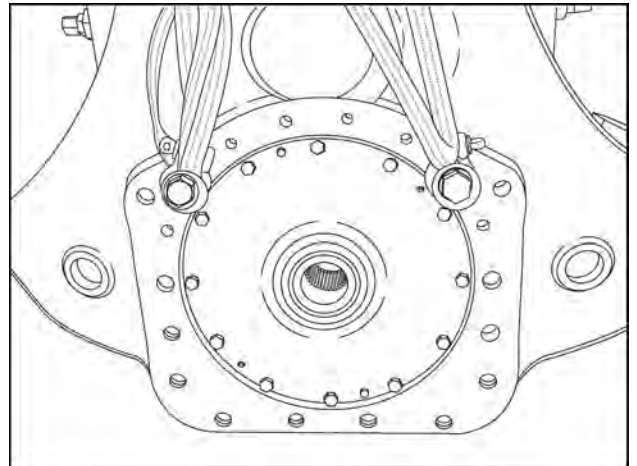
RAIL12TR03087AA 30

45. Insert the sun shaft (1) into the output gear.
46. Assemble the special tool 380003339 (2) on the sun gear as shown.
47. Check the rolling torque.
The rolling torque must be between **2.84 – 7.34 N·m**
(**25.14 – 64.964 lb in**).



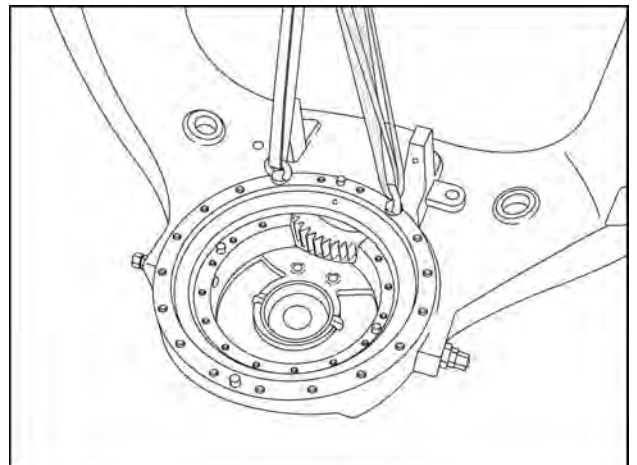
RAIL12TR03092AA 31

48. If the rolling torque is not within specifications, repeat steps 37 through 47. Remove or add shims (within the specifications) as needed until the rolling torque is within specifications. Then go to the next step.
49. Attach lifting straps and rotate the upbox/yoke assembly housing.



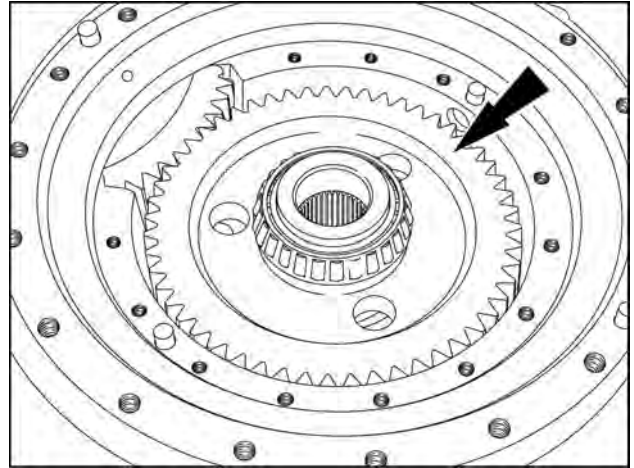
RAIL12TR03053AA 32

50. Set two boards on the floor to keep the input gear off the floor and set the upbox/yoke assembly down with the yoke arms facing up.



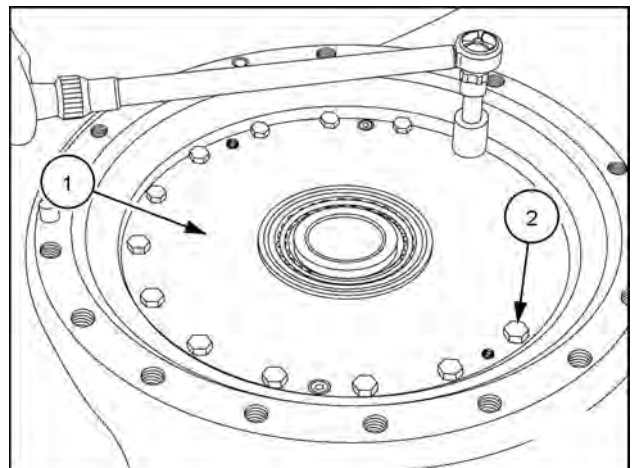
RAIL13TR00344AA 33

51. Install the output gear.



RAIL12TR03050AA 34

52. Assemble the output carrier (1) and secure with the mounting bolts (2).
53. Torque the mounting bolts to **101 – 113 N·m (74 – 83 lb ft)**.

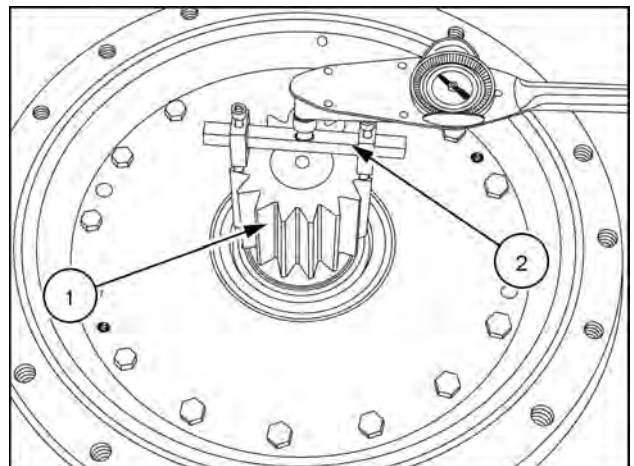


RAIL12TR03073AA 35

54. Insert the sun shaft (1) into the output gear.
55. Assemble the special tool **380003339 (2)** on the sun gear as shown.
56. Check the rolling torque.
When rotating both gears with the output gear as the driver the rolling torque must be **4.41 – 12.99 N·m (39 – 115 lb in)**.

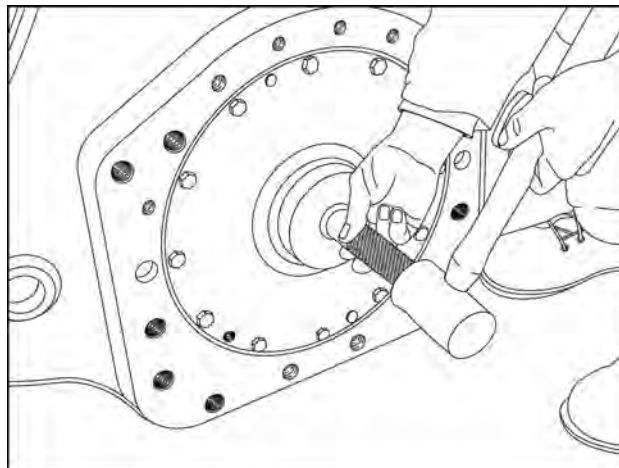
NOTE: If checking the rolling torque through both gears using the input gear as the driver the rolling torque must be **4.75 – 14.24 N·m (42 – 126 lb in)**.

57. Redo the shimming process as necessary to obtain the correct specifications.



RAIL12TR03079AA 36

58. Use the lifting straps and set the upbox/yoke assembly on the yoke arms.
59. Use the special tool seal driver **380003348** and install the seal into the input cover.



RAIL12TR03093AA 37

Next operation:

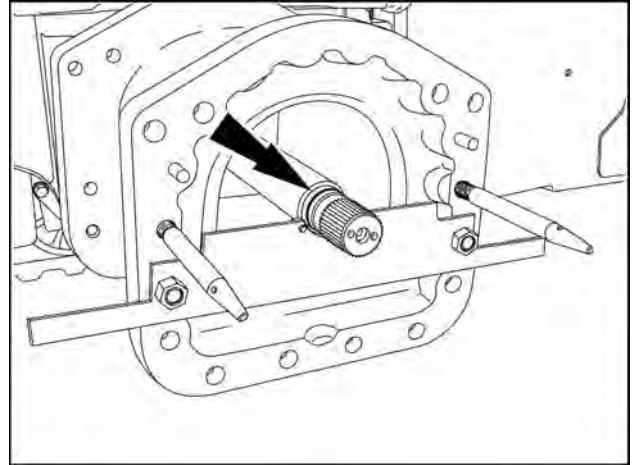
Front axle track yoke assembly - Install - Rowtrac™ axles (25.500)

Front axle track yoke assembly - Install - Rowtrac™ axles

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

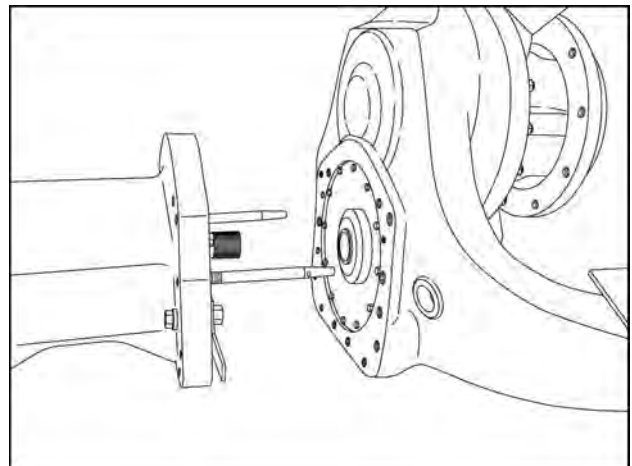
For 3048 mm (120 in) tread width spacing

1. Lightly grease a new O-ring and assemble on to the shaft.



RAIL12TR01870AA 1

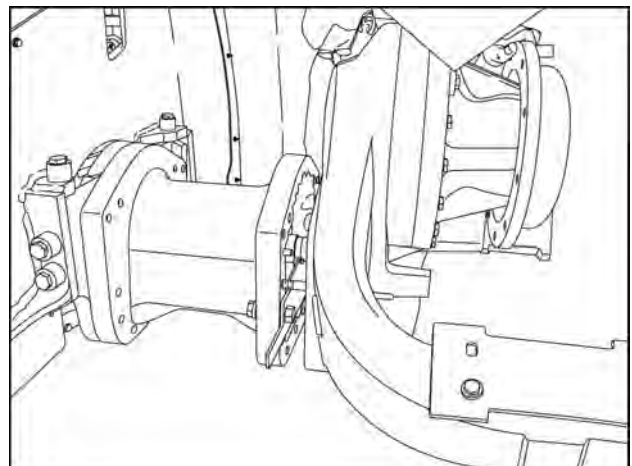
2. Using the **380003324** upbox lift frame fork truck, pick up the upbox/yoke assembly and align with the guide pins.



RAIL12TR01598AA 2

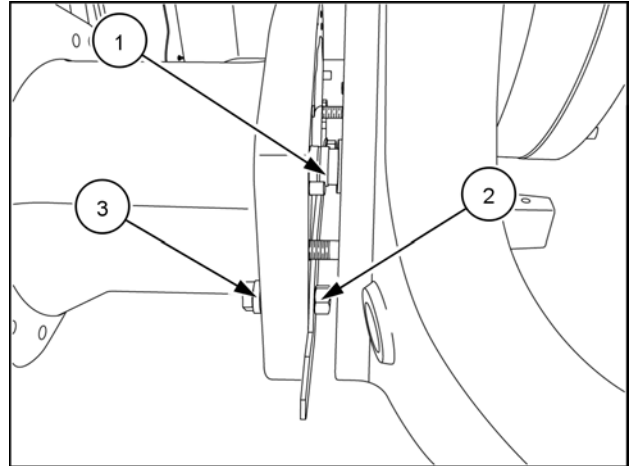
3. With the help of an assistant align the spline on the shaft with the gear in the upbox/yoke assembly. Have the assistant slightly rotate the flanged hub, back and forth, to align the input gear spline with the splined end of the shaft.

NOTE: Be careful not to dislodge the O-ring or damage the splines.



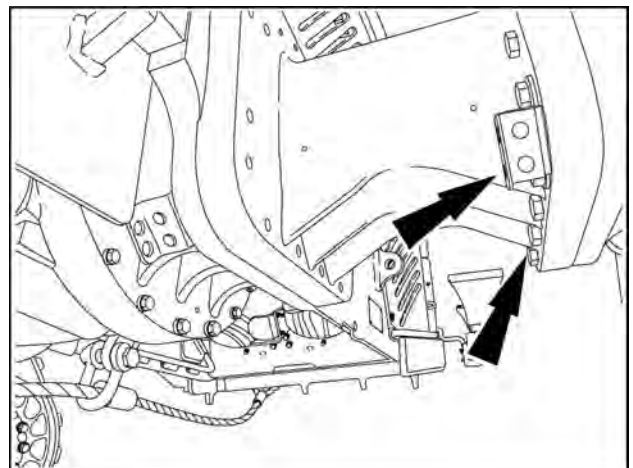
RAIL12TR01630AA 3

4. Move the upbox/yoke assembly close enough to engage the spline and have enough space to remove the nuts securing the shaft holding fixture.
5. Remove the nuts and the fixture. Remove the washers from the bolts.



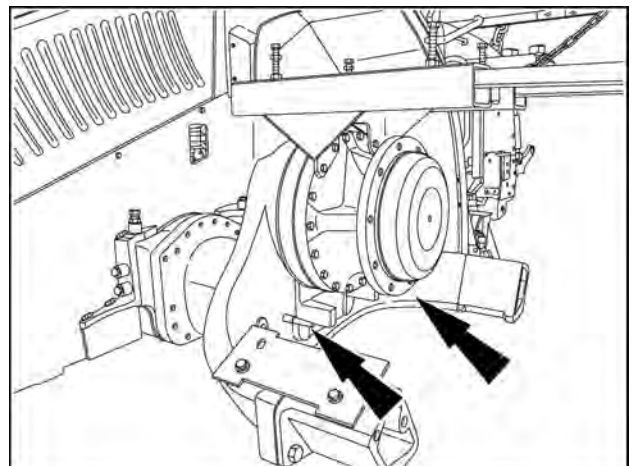
RAIL12TR01631AA 4

6. Install the mounting bolts and assemble the hydraulic line support brackets to the lower two corners.
7. Torque the bolts to **845 – 950 N·m (623 – 701 lb ft)**.



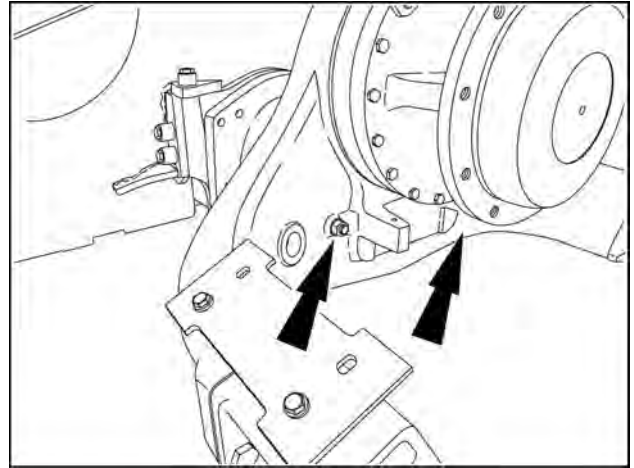
RAIL12TR03339AA 5

8. Remove the alignment dowels.



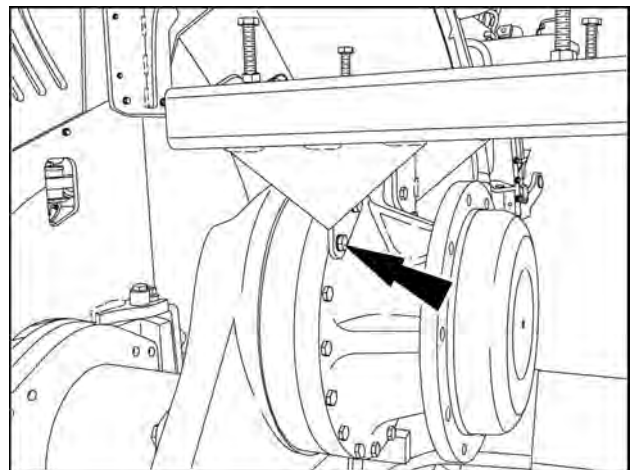
RAIL12TR01901AA 6

9. Put **LOCTITE® 242®** on the inside thread of the two studs and install into spacer.
10. Assemble the nuts to the studs and torque to **845 – 950 N·m (623 – 701 lb ft)**.



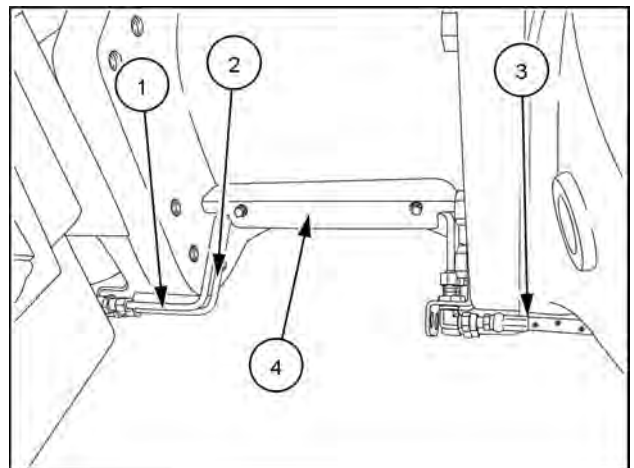
RAIL12TR01633AA 7

11. Remove the lifting frame.
12. Install the original bolts and torque to **251 – 280 N·m (185 – 207 lb ft)**.



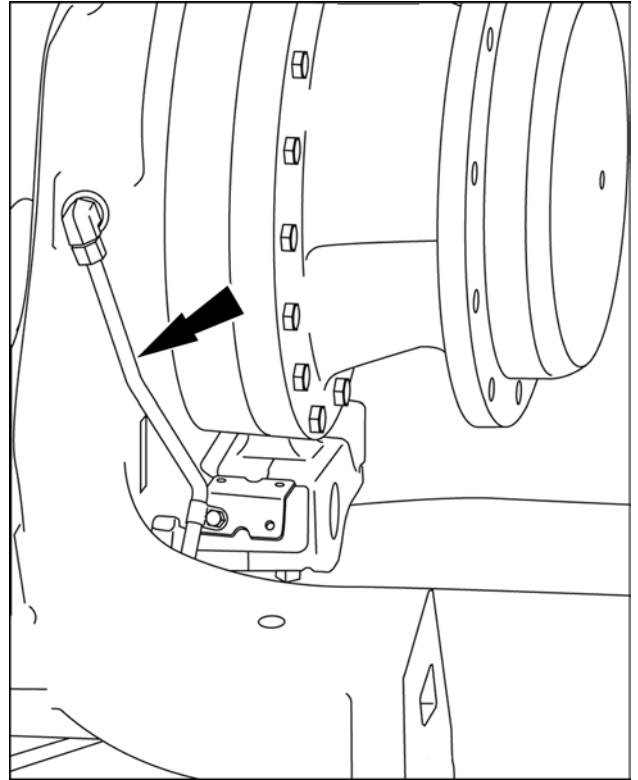
RAIL12TR01634AA 8

13. Assemble the lubrication supply tube **(1)** and the hydraulic tensioner tube **(2)** to the bracket fittings.
14. Connect the hydraulic tensioner hose **(3)** to the bracket fitting.
15. Secure the guard **(4)** with the original bolts.



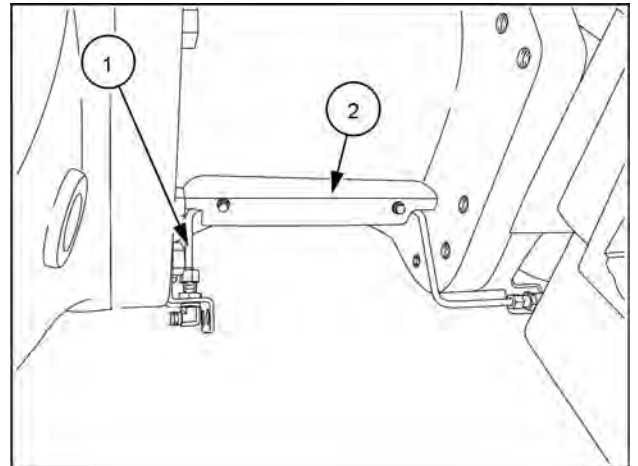
RAIL12TR03335AA 9

16. Install the lubrication inlet tube.
17. Tighten all the connections.



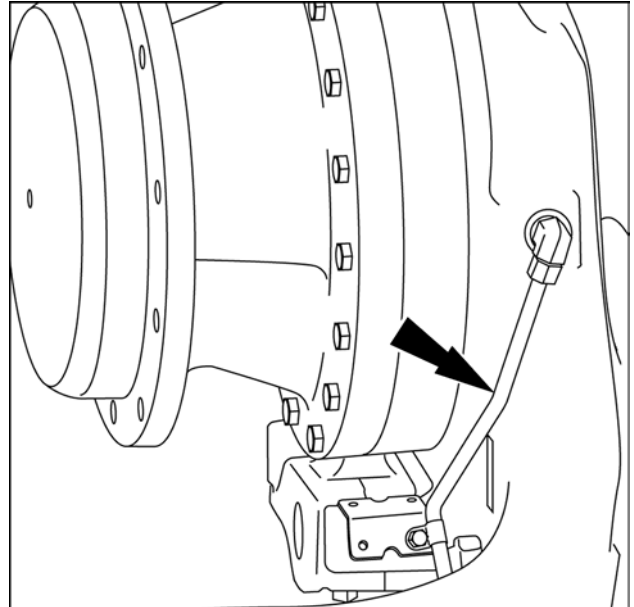
RAIL13TR00357AA 10

18. Assemble the lubrication return tube **(1)** to the bracket fittings.
19. Secure the guard **(2)** with the original bolts.



RAIL13TR00359AA 11

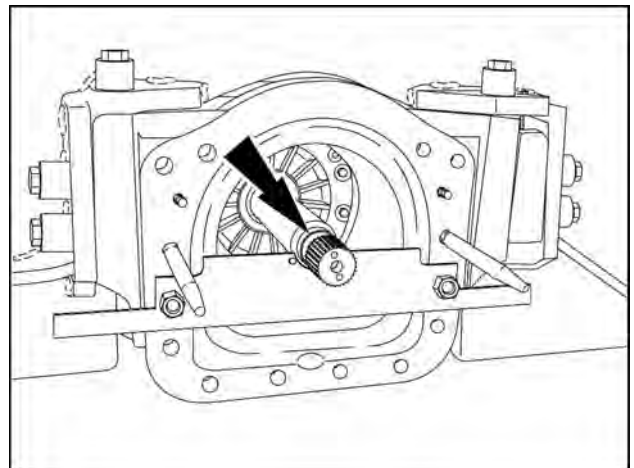
20. Install the lubrication outlet tube.



RAIL13TR00358AA 12

For the 2032 mm (80 in) tread width spacing

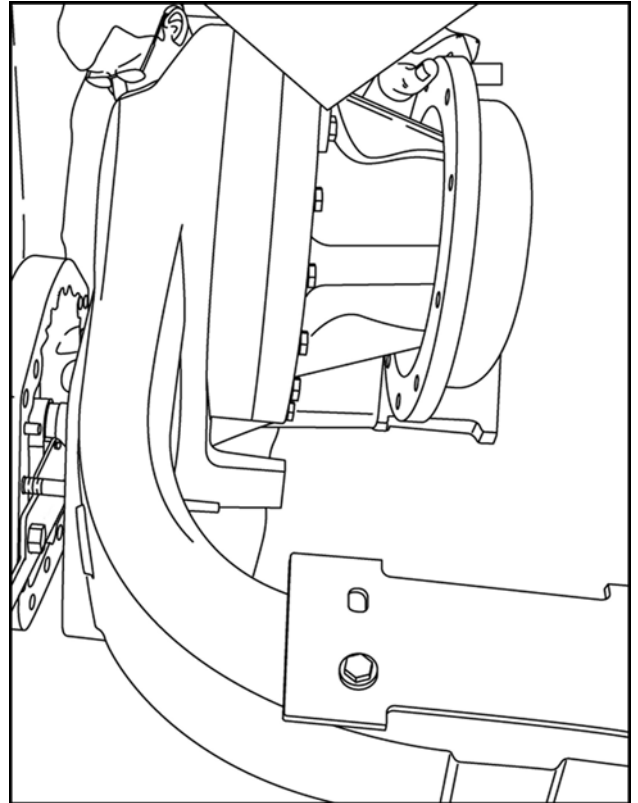
21. Lightly grease a new O-ring and assemble on to the shaft.



RAIL12TR01599AA 13

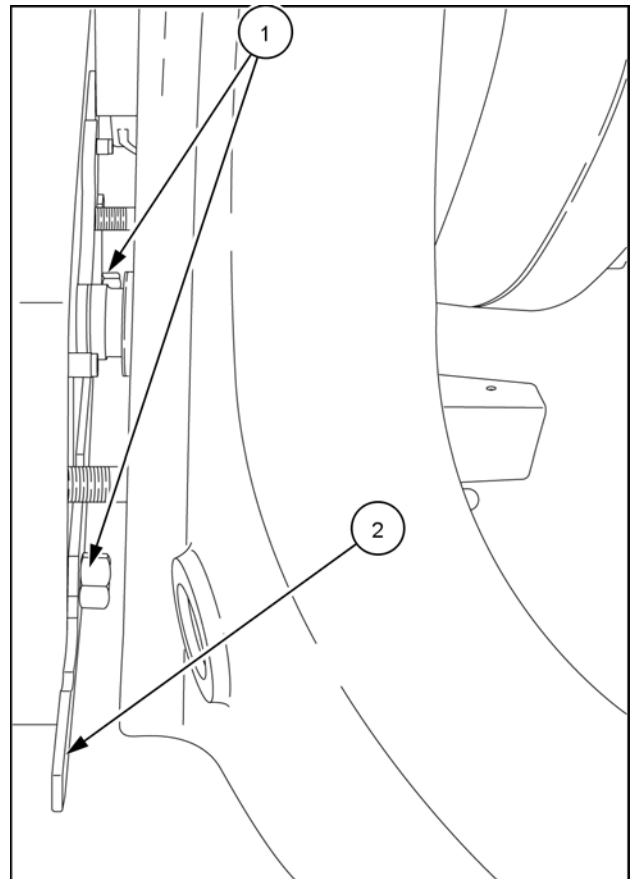
22. With the help of an assistant align the spline on the shaft with the gear in the upbox/yoke assembly. Have the assistant slightly rotate the flanged hub, back and forth, to align the input gear spline with the splined end of the shaft.

NOTE: Be careful not to dislodge the O-ring or damage the splines.



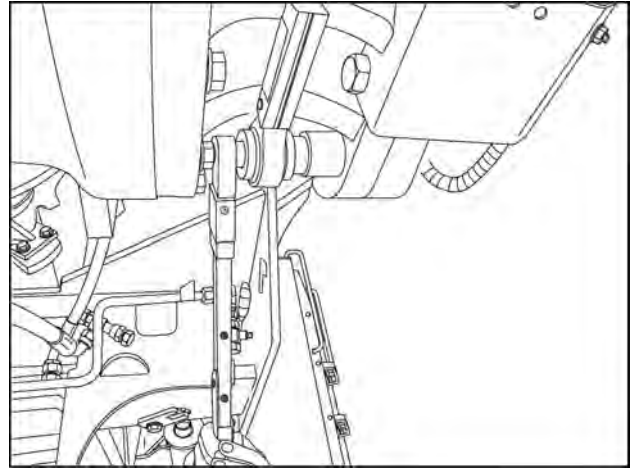
RAIL13TR00360AA 14

23. Remove the two nuts securing the **380003327** axle shaft holding fixture (1) and remove the fixture (2).
24. Remove the washers from the two bolts.



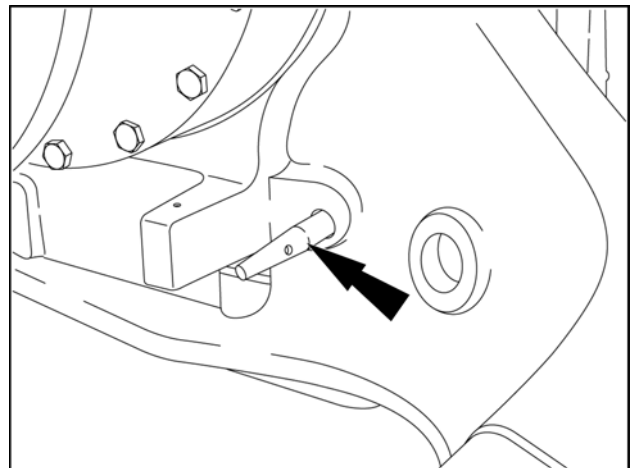
RAIL12TR01596AA 15

25. Install all the mounting bolts.
26. Using a torque multiplier and torque wrench, torque the bolts to **845 – 950 N·m (623 – 701 lb ft)**



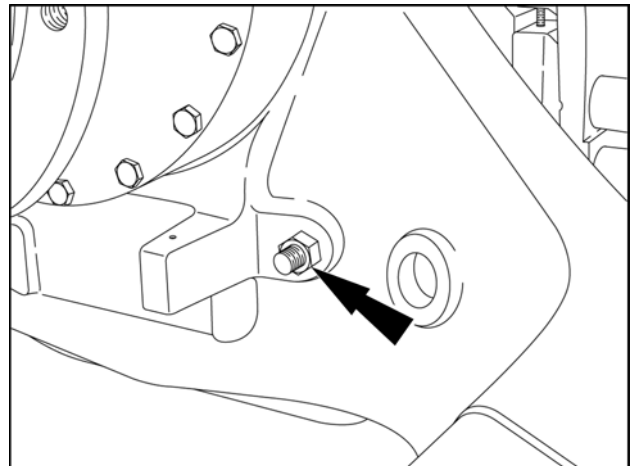
RAIL12TR03274AA 16

27. Remove the alignment dowels.



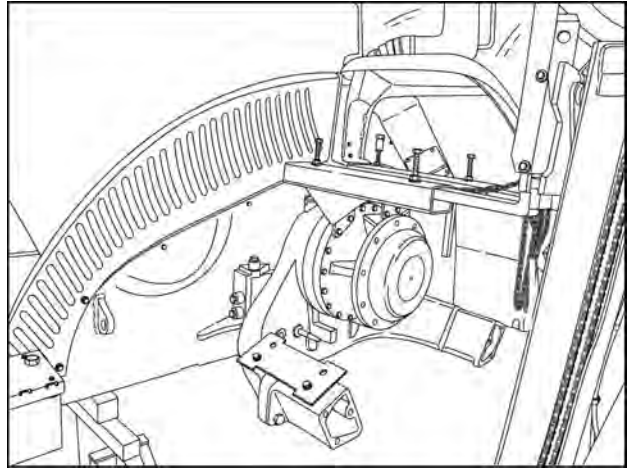
RAIL12TR01618AA 17

28. Put **LOCTITE® 242®** on the inside thread of the two studs and install through the upbox/yoke assembly.
29. Assemble the nuts to the studs and torque to **845 – 950 N·m (623 – 701 lb ft)**.



RAIL12TR01619AA 18

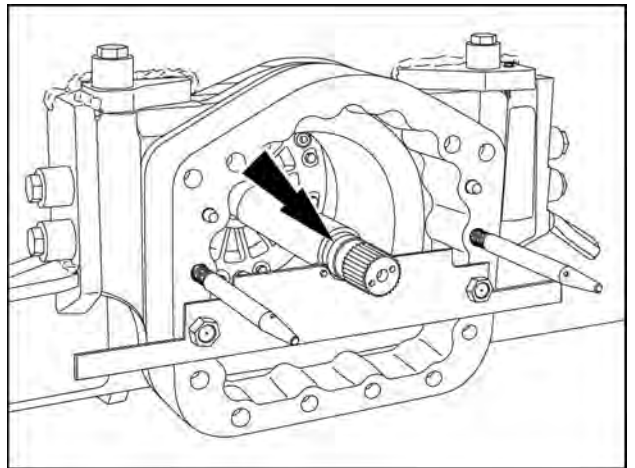
30. Remove the lifting frame.
31. Install the original bolts and torque to **251 – 280 N·m**
(**185 – 207 lb ft**).



RAIL12TR01595AA 19

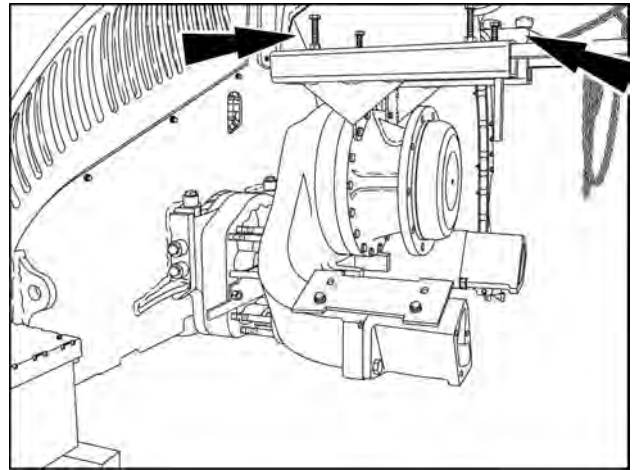
For the 2235 mm (88 in) tread width spacing

32. Lightly grease new O-ring and assemble on to the shaft.

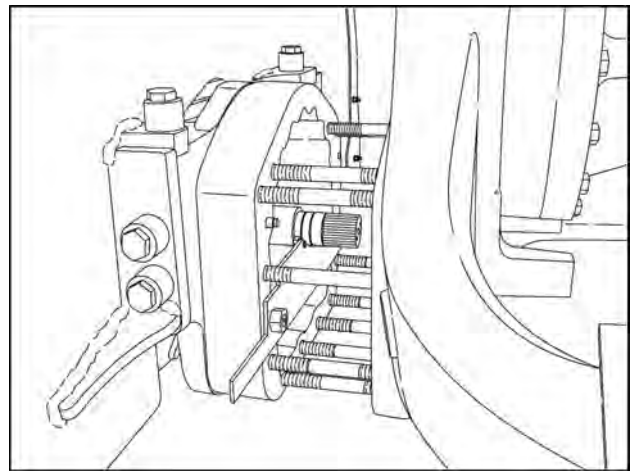


RAIL12TR01609AA 20

33. Pick up the upbox/yoke assembly with the fork truck and line up with the spacer. Use the bolts on top of the lifting fixture for rotation adjustment.



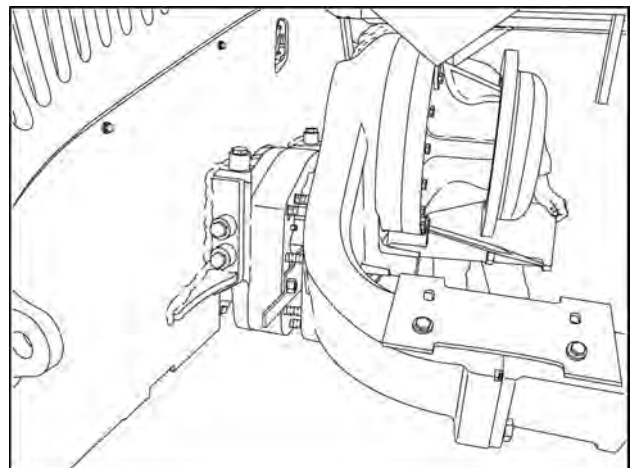
RAIL12TR01613AA 21



RAIL12TR01612AA 22

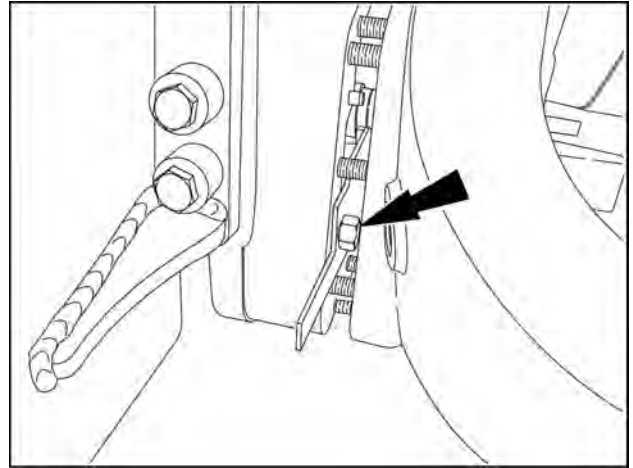
34. With the help of an assistant align the spline on the shaft with the gear in the upbox/yoke assembly. Have the assistant slightly rotate the flanged hub, back and forth, to align the input gear spline with the splined end of the shaft. Leave enough space to remove the shaft holding fixture.

NOTE: Be careful not to dislodge the O-ring or damage the splines.



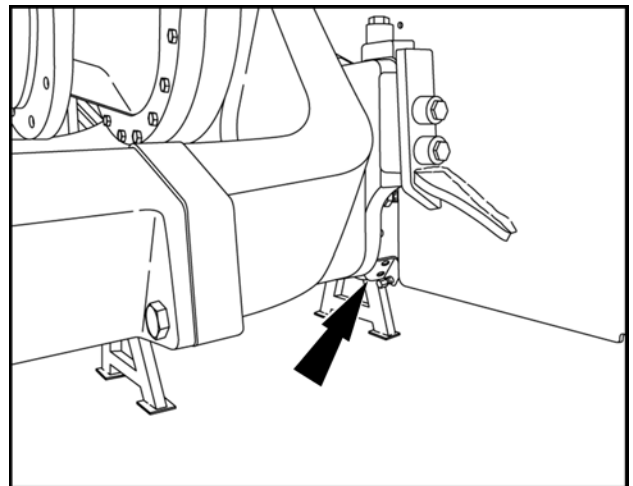
RAIL12TR01614AA 23

35. Remove the nuts from both ends of the studs securing the shaft holding fixture and remove the fixture.
36. Put **LOCTITE® 242®** on the outside end of the studs and assemble into the upbox/yoke assembly.



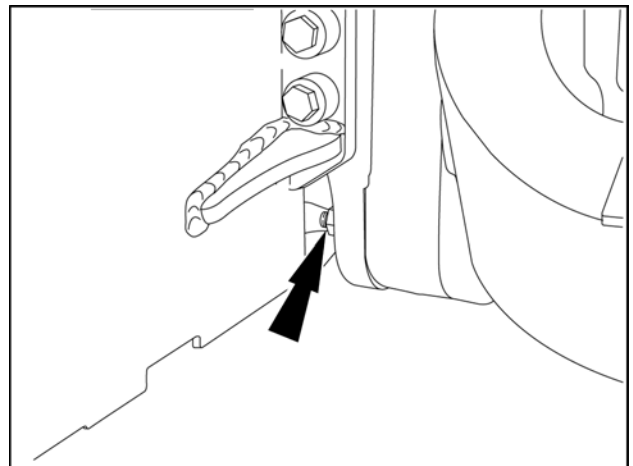
RAIL12TR01615AA 24

37. Finish mating the housings and assemble the front and rear (shown) hydraulic hose brackets.



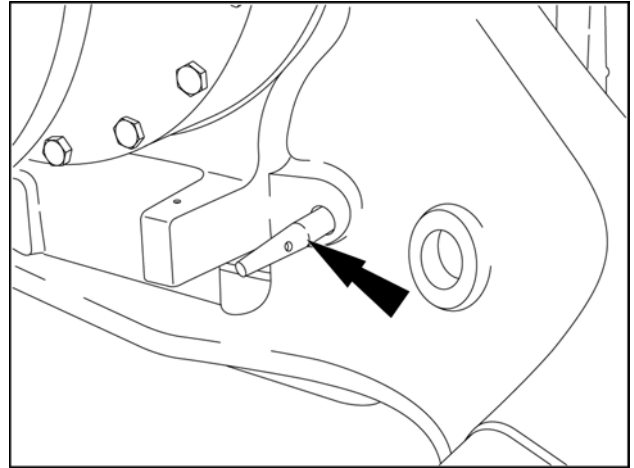
RAIL12TR01617AA 25

38. Assemble the nuts to the studs and torque the nuts to **845 – 950 N·m (623 – 701 lb ft)** using a torque wrench and a torque multiplier.



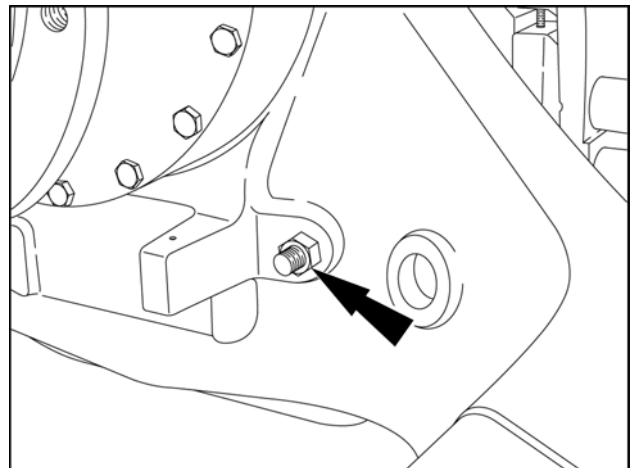
RAIL12TR01616AA 26

39. Remove the alignment dowels.



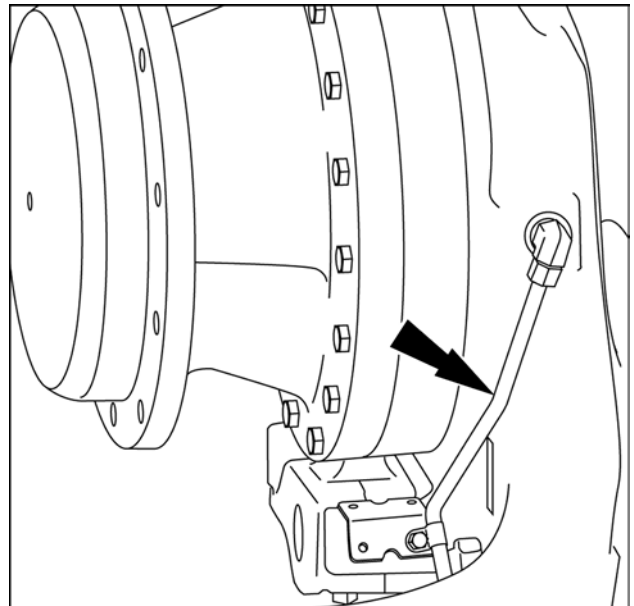
RAIL12TR01618AA 27

40. Put **LOCTITE® 242®** on the inside thread of the two studs and install through the upbox/yoke assembly.
41. Assemble the nuts to the studs and torque to **845 – 950 N·m (623 – 701 lb ft)**.



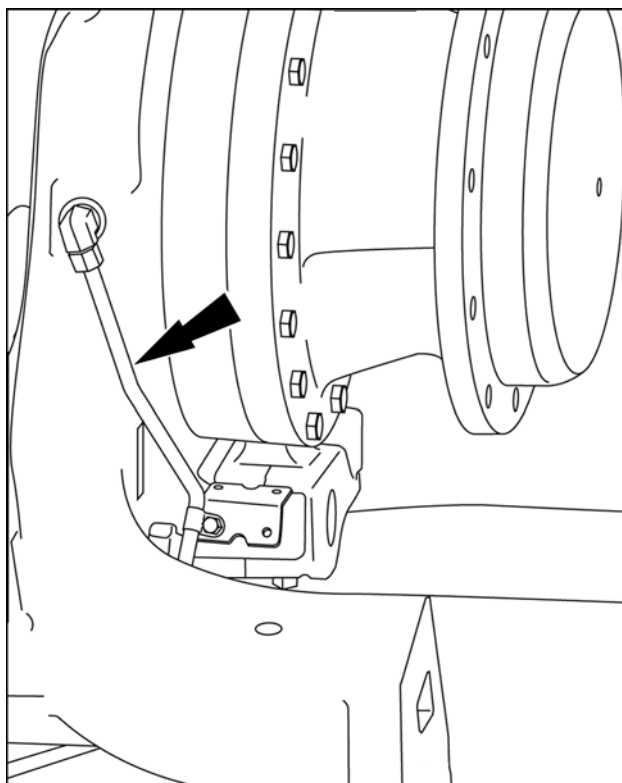
RAIL12TR01619AA 28

42. Install the lubrication supply tube.



RAIL13TR00358AA 29

43. Install the lubrication return tube.



RAIL13TR00357AA 30

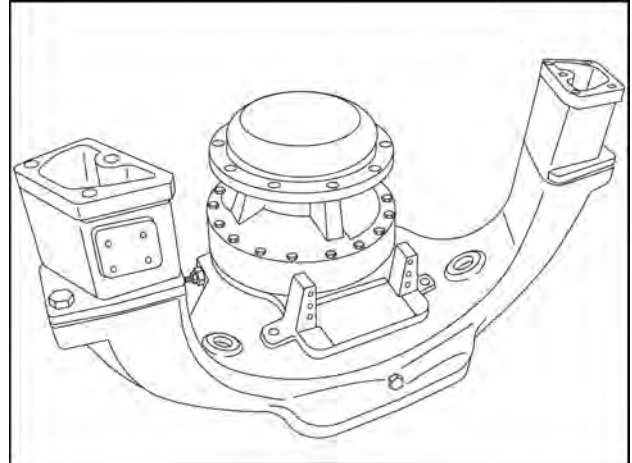
Track yoke final drive assembly - Remove - Rowtrac™ axes

Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

Prior operation:

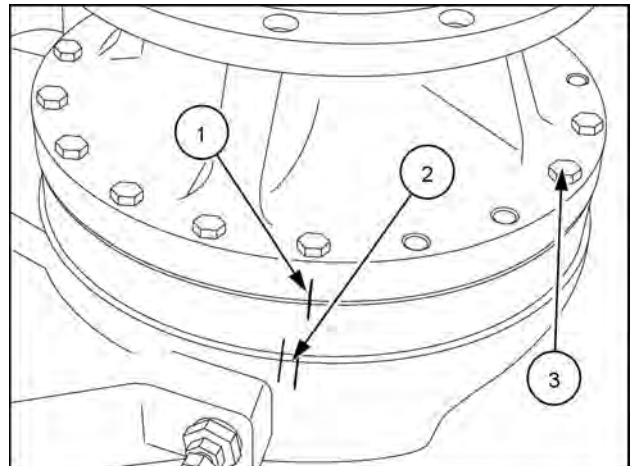
Front axle track yoke assembly - Remove - Rowtrac™ axes (25.500)

1. Set upbox assembly on the floor with the final drive assembly facing up.



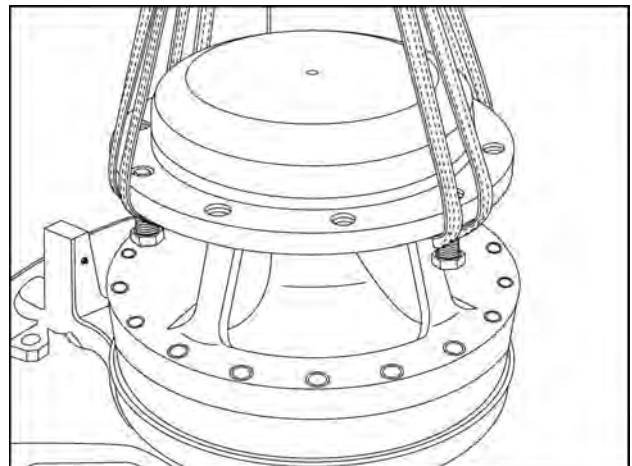
RAIL12TR02998AA 1

2. Mark the hub to ring gear (1) and the ring gear to the up-box housing (2) location as shown. Remove the bolts (3) securing the hub assembly to the upbox assembly.



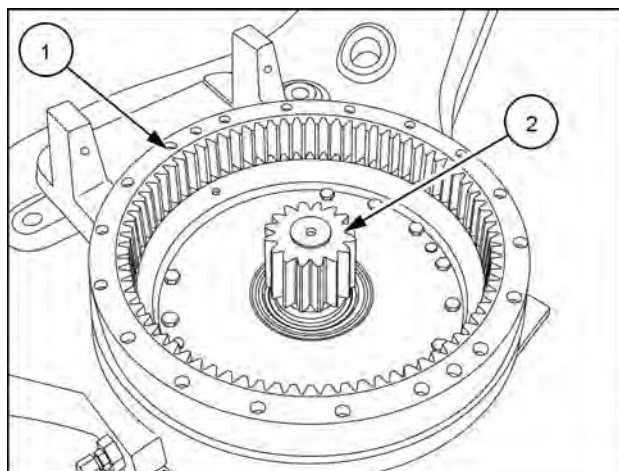
RAIL12TR02999AA 2

3. Remove the hub assembly from the upbox housing.



RAIL12TR03000AA 3

4. Remove the ring **(1)** and the sun **(2)** gears.

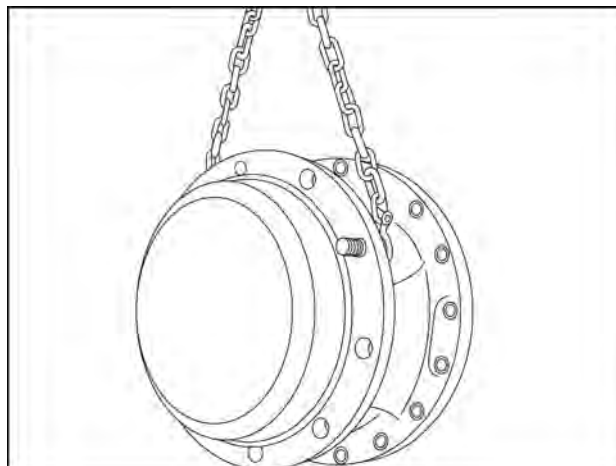


RAIL12TR03001AA 4

Track yoke final drive assembly - Disassemble - Rowtrac™ axles

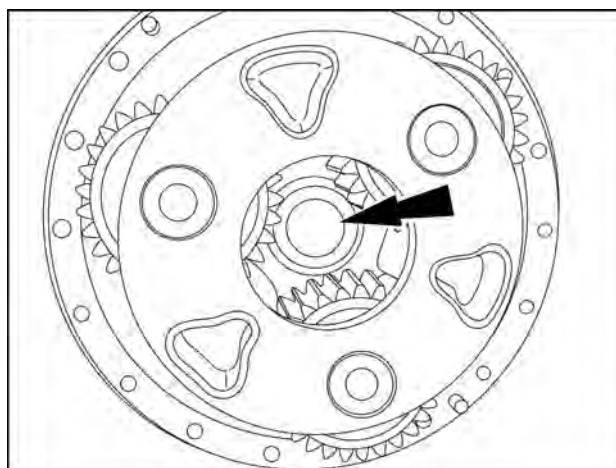
Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

1. Rotate the hub assembly and set down on the work surface with the planetary facing up.



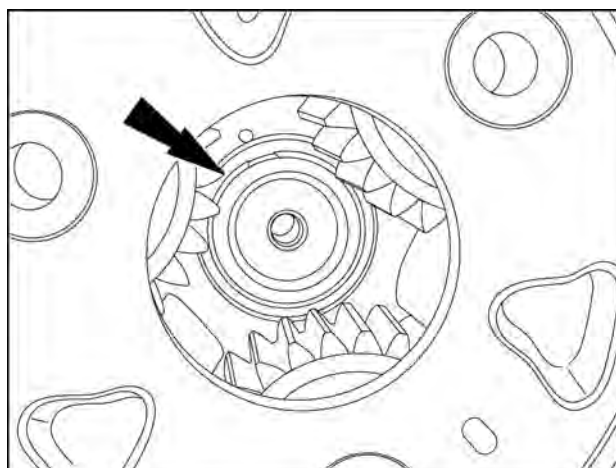
RAIL12TR03003AA 1

2. Remove the wear insert.



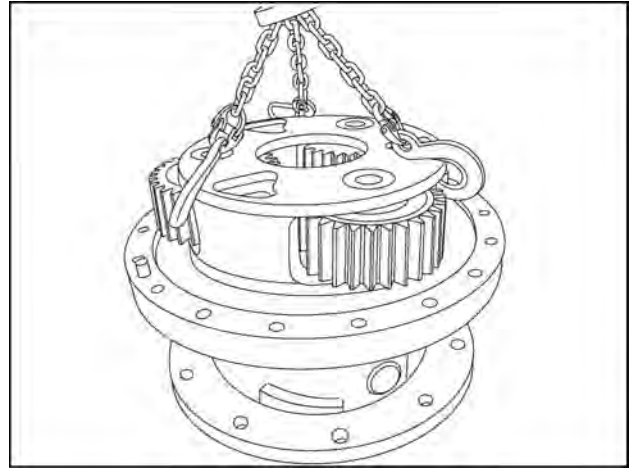
RAIL12TR03004AA 2

3. Remove the planetary retaining snap ring.



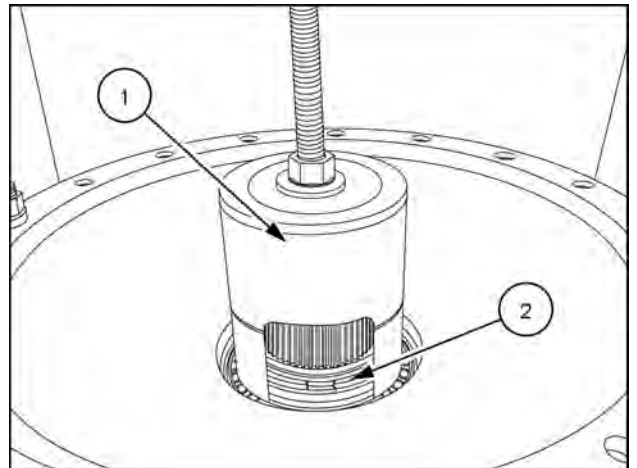
RAIL12TR03005AA 3

4. Remove the planetary from the shaft.



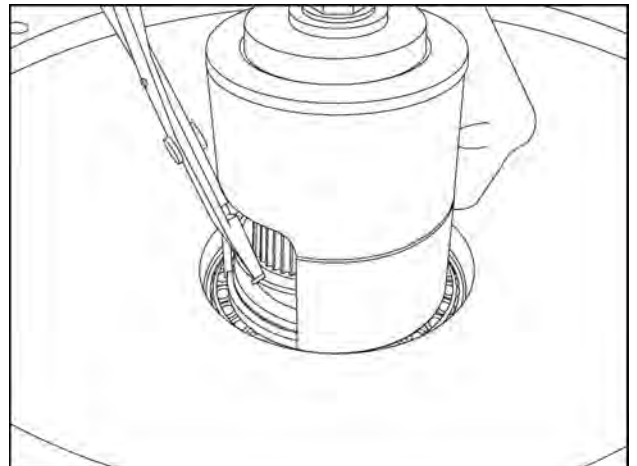
RAIL12TR03037AA 4

5. Use special tool **380003349** to compress the bearings to allow the snap ring to be removed.



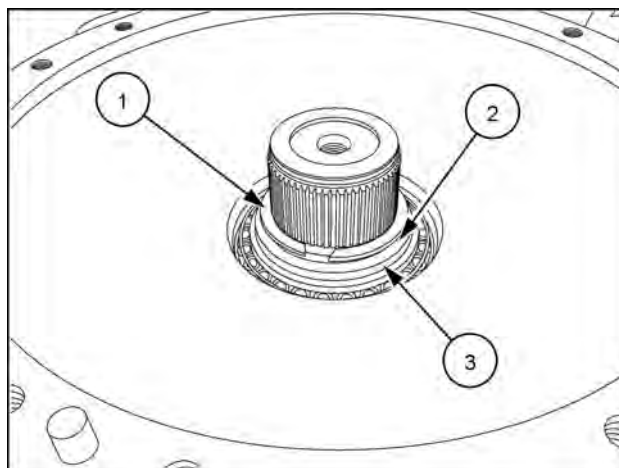
RAIL12TR03018AA 5

6. Remove the snap ring from the snap ring groove.



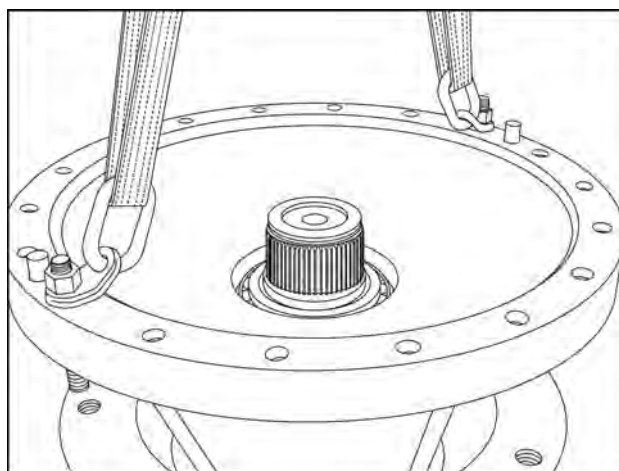
RAIL12TR03025AA 6

7. Remove the special tool, the snap ring (1), the thrust ring (2) and the shims (3) from the shaft.



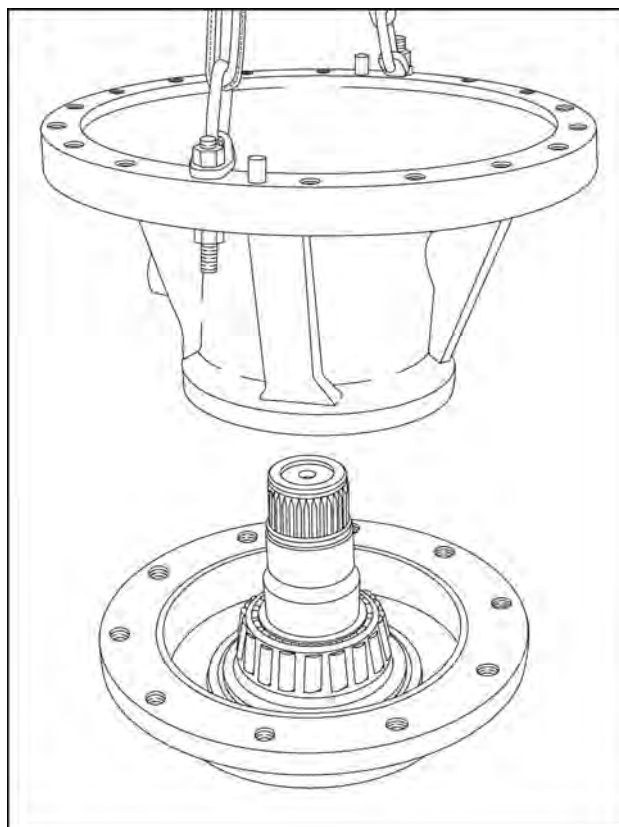
RAIL12TR03026AA 7

8. Attach lifting eyelets and strap to a hoist.



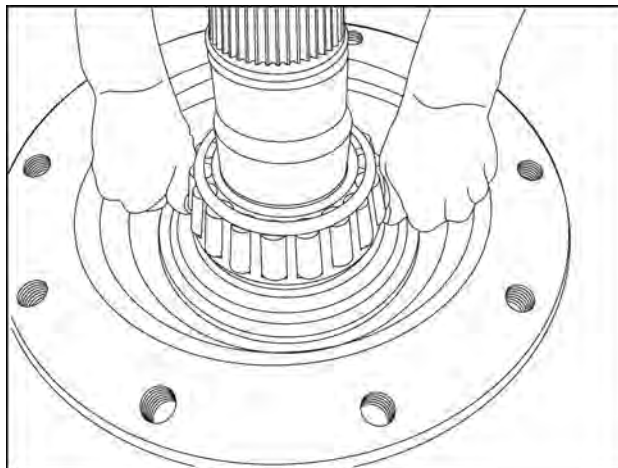
RAIL12TR03027AA 8

9. Lift the hub assembly off the flanged shaft assembly, removing the bearing at the same time.



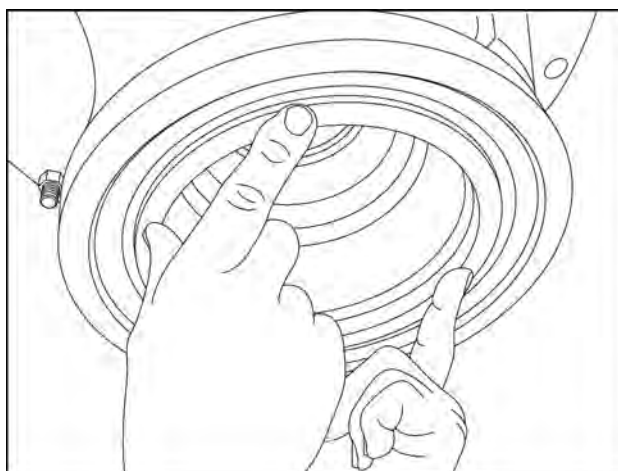
RAIL12TR03099AA 9

10. Remove the half of the face seal from the flanged shaft assembly.



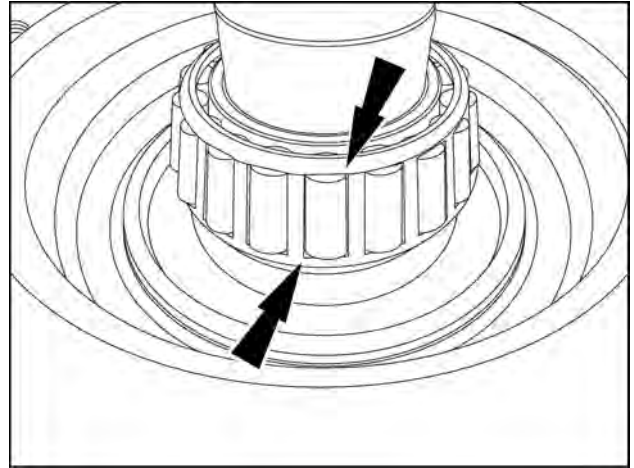
RAIL12TR03031AA 10

11. Remove the half of the face seal from the hub assembly.

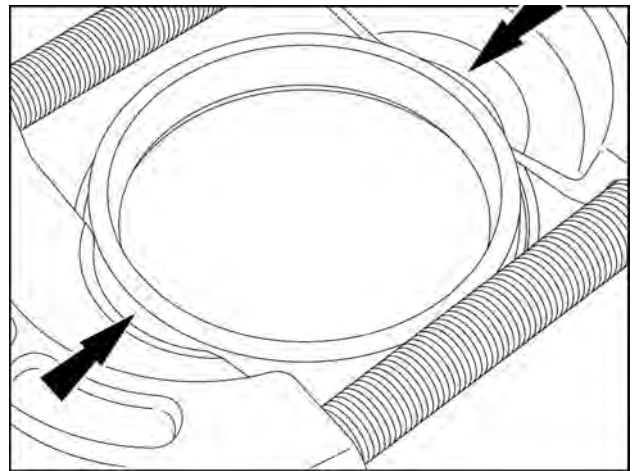


RAIL12TR03033AA 11

12. To remove the inner bearing, cut the bearing cage and remove the tapered roller bearings. Use a split bearing puller under the lip of the cone to remove the cone as shown in the example below.

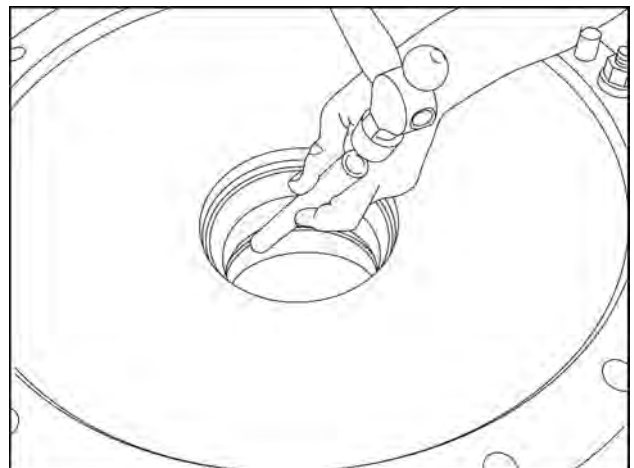


RAIL12TR03007AA 12



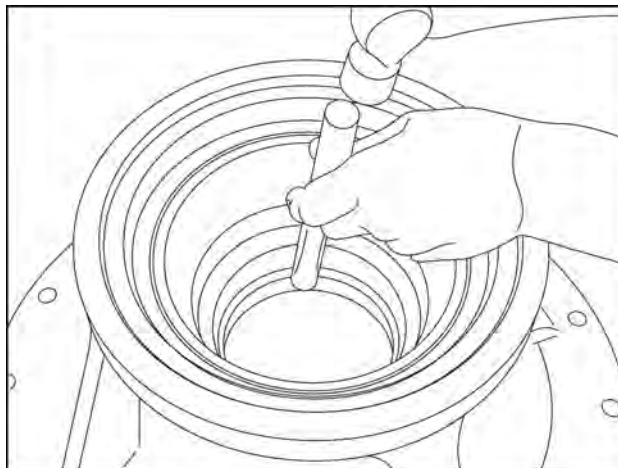
RAIL12TR03006AA 13

13. Use a brass punch and hammer to remove the outer bearing cup.



RAIL12TR03009AA 14

14. Flip the hub **180°**. Use a brass punch and hammer to remove the inner bearing cup.

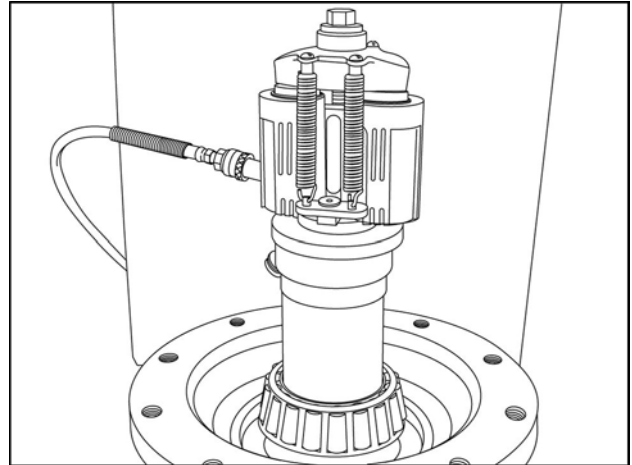


RAIL12TR03012AA 15

Track yoke final drive assembly - Assemble - Rowtrac™ axles

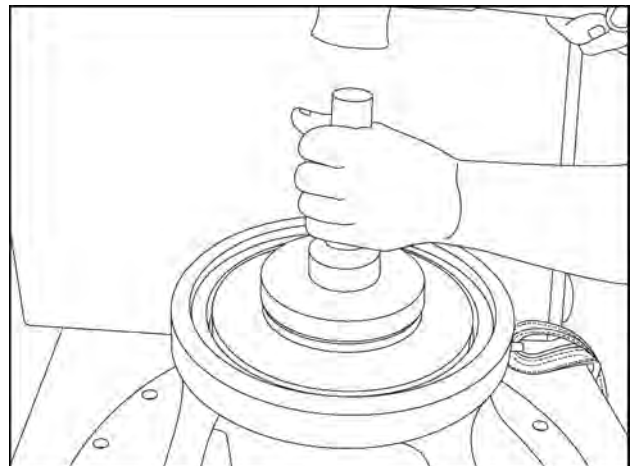
Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

1. Use the appropriate size cylinder and a hydraulic power unit to press the new bearing cone on to the flange shaft.



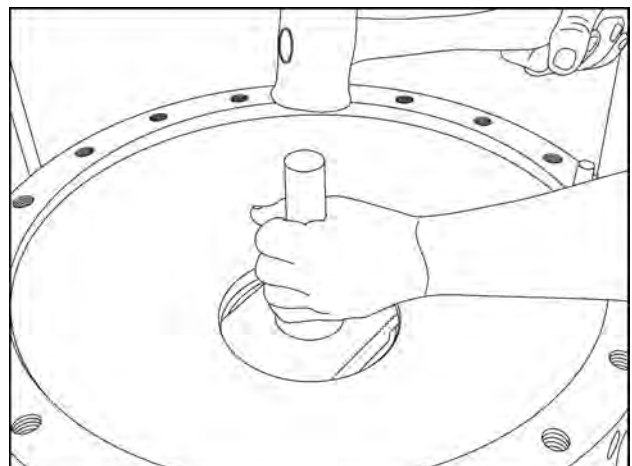
RAIL12TR03008AA 1

2. Use the appropriate size cup driver and assemble the outer bearing cup into the housing.



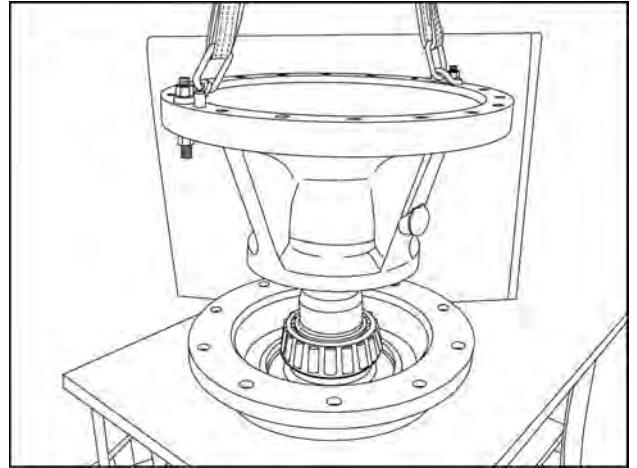
RAIL12TR03011AA 2

3. Rotate the hub 180°. Use the appropriate size cup driver and assemble the inner bearing cup into the housing.



RAIL12TR03010AA 3

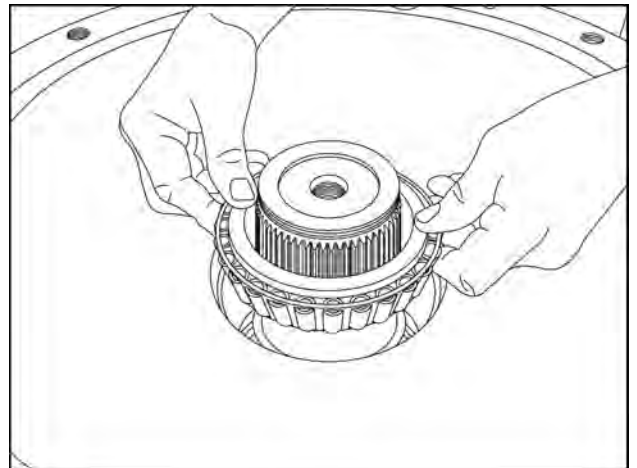
4. Assemble lifting eyelets and straps to the housing and an overhead crane. Set the housing onto the shaft and bearing. Remove the lifting devices.



RAIL12TR03013AA 4

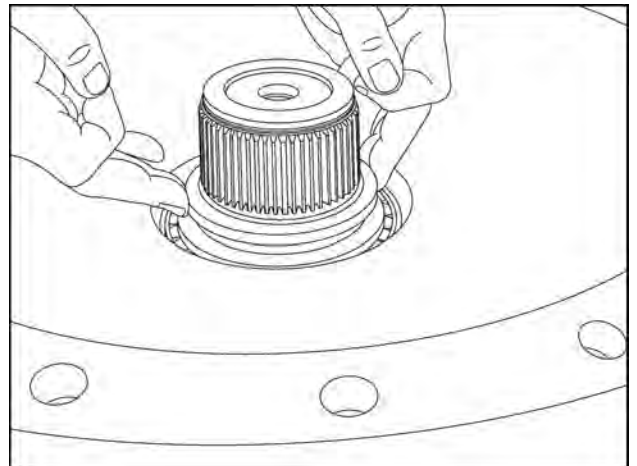
5. Assemble the inner bearing onto the shaft.

NOTE: It may be necessary to press the bearing on to the shaft.



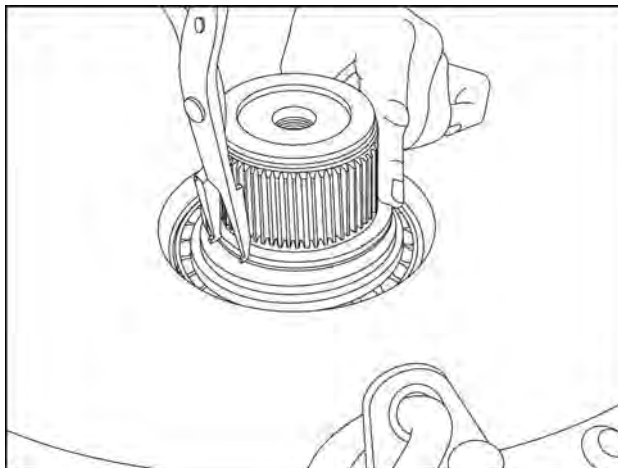
RAIL12TR03014AA 5

6. Assemble the thrust ring onto the shaft.



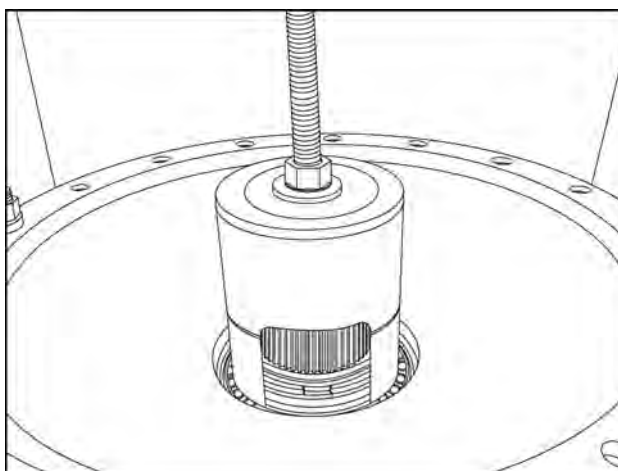
RAIL12TR03016AA 6

7. Assemble the snap ring into place on the shaft.



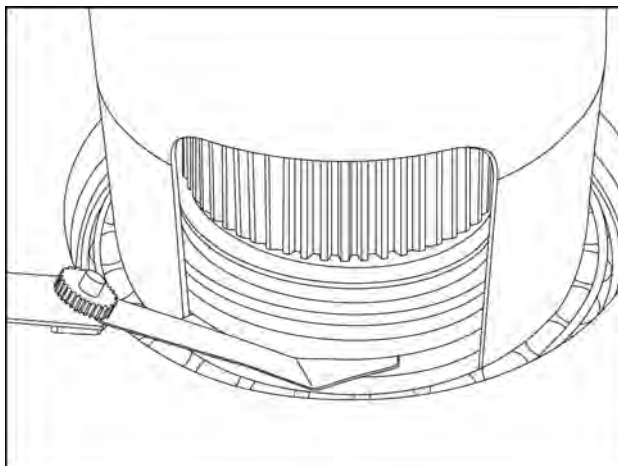
RAIL12TR03017AA 7

8. Use special tool **380003349** to secure the bearing in place. Tighten until there is no end play in the bearings – just snug.



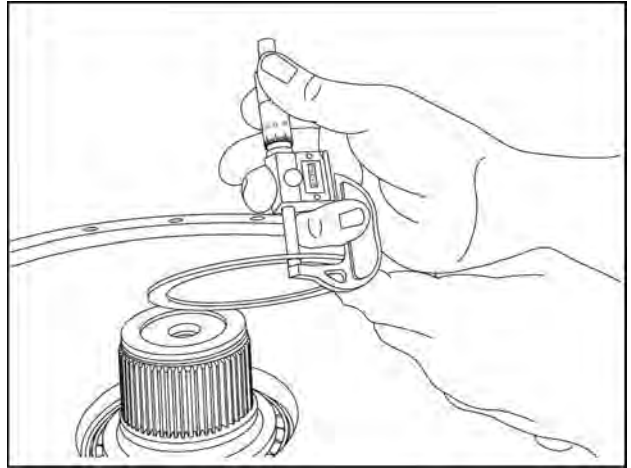
RAIL12TR03018AA 8

9. Take a measurement with a feeler gauge between the bearing cone and the thrust ring at the front, and the rear of the tool windows. Average these two measurements.



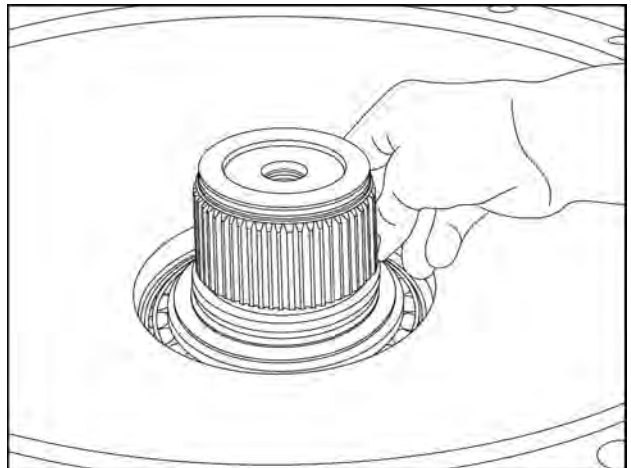
RAIL12TR03019AA 9

10. Remove the special tool, the snap ring and the thrust ring. Obtain the correct shim pack and add **0.076 – 0.152 mm (0.0030 – 0.0060 in)** of shims to preload the bearings.



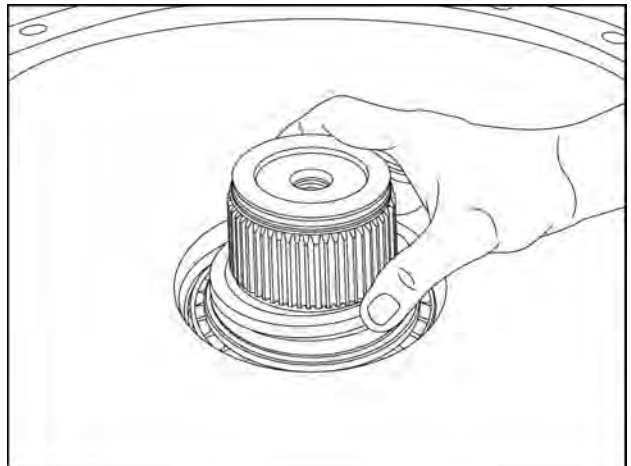
RAIL12TR03020AA 10

11. Assemble the shim pack onto the shaft.



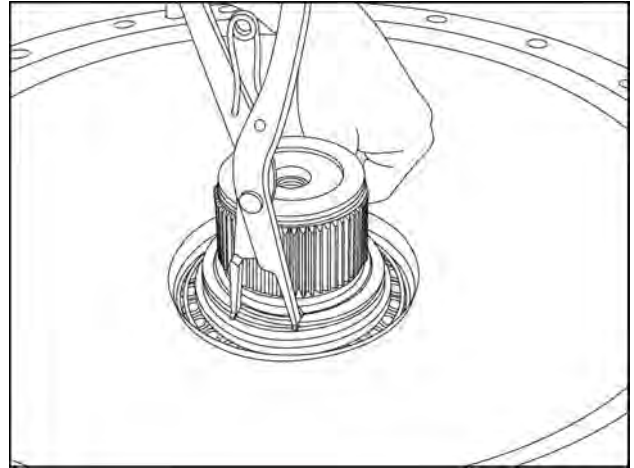
RAIL12TR03021AA 11

12. Assemble the thrust ring onto the shaft.



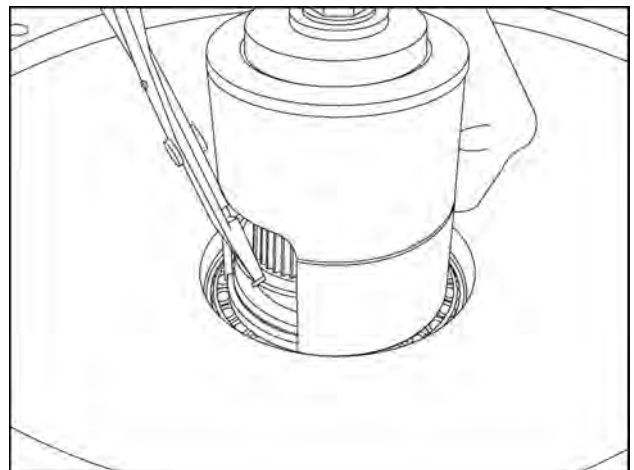
RAIL12TR03022AA 12

13. Assemble the snap ring onto the shaft.



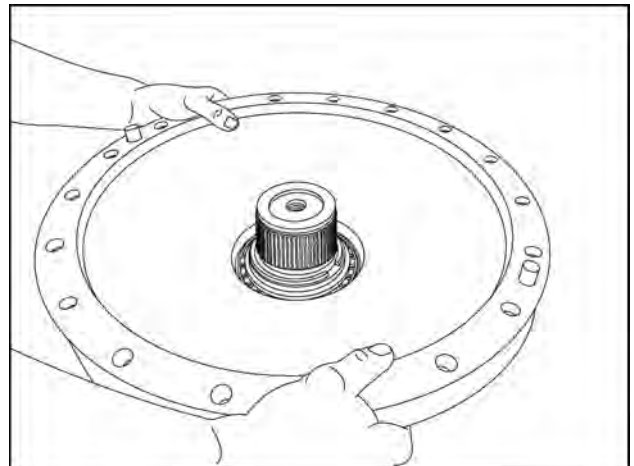
RAIL12TR03023AA 13

14. Use the special tool **380003349** to compress the bearings and assemble the snap ring into the snap ring groove.



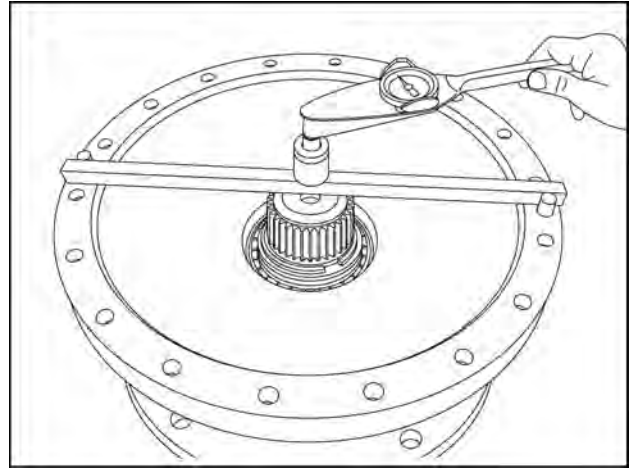
RAIL12TR03025AA 14

15. Remove the special tool and rotate the hub three revolutions in each direction.



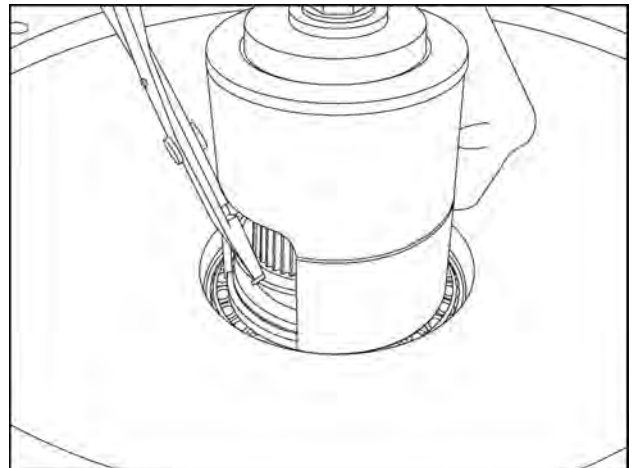
RAIL12TR03036AA 15

16. Check the rolling torque. The rolling torque must be between **9.3 – 21 N·m (82.3 – 185.9 lb in)**.



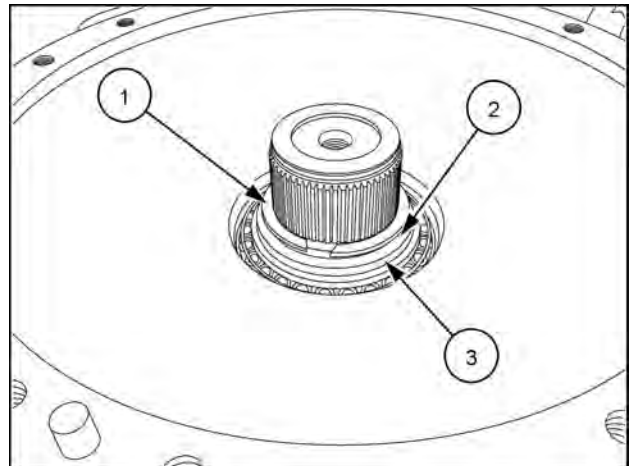
RAIL12TR03024AA 16

17. Use the special tool **380003349** to compress the bearings and remove the snap ring from the snap ring groove.



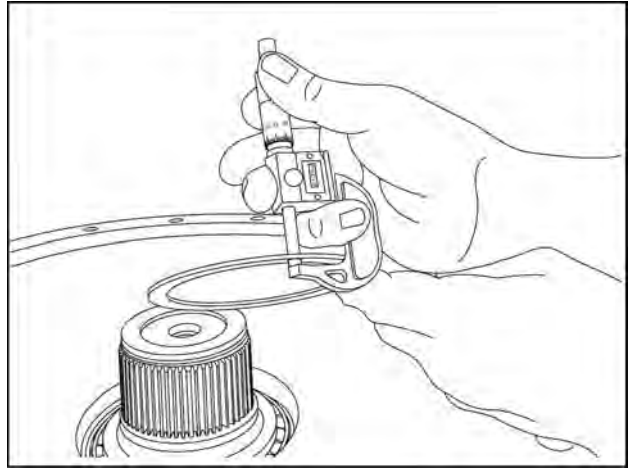
RAIL12TR03025AA 17

18. Remove the snap ring (1), the thrust ring (2) and the shims (3) from the shaft.



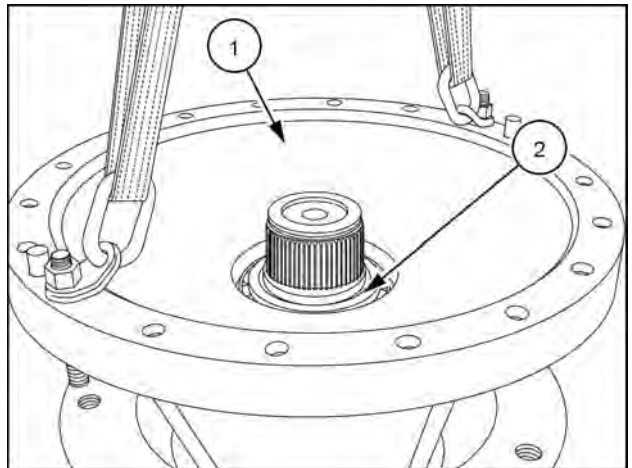
RAIL12TR03026AA 18

19. If the rolling torque is not within specifications go back to Step 9 and adjust the shimming until within specifications.
If the rolling torque is within specifications proceed to the next step.



RAIL12TR03020AA 19

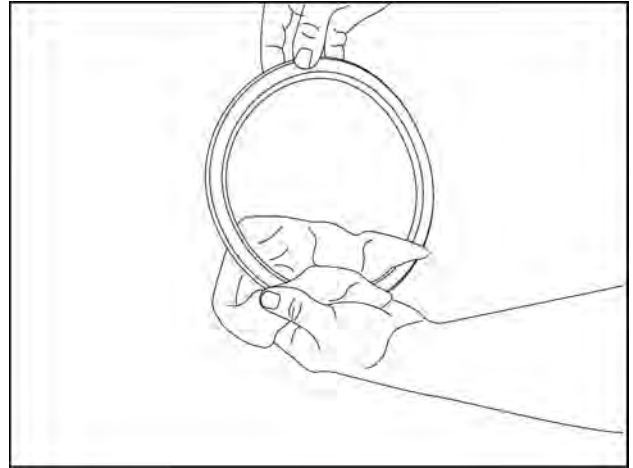
20. Attach the lifting eyelets and straps to the hub assembly. Remove the hub and bearing from the shaft.



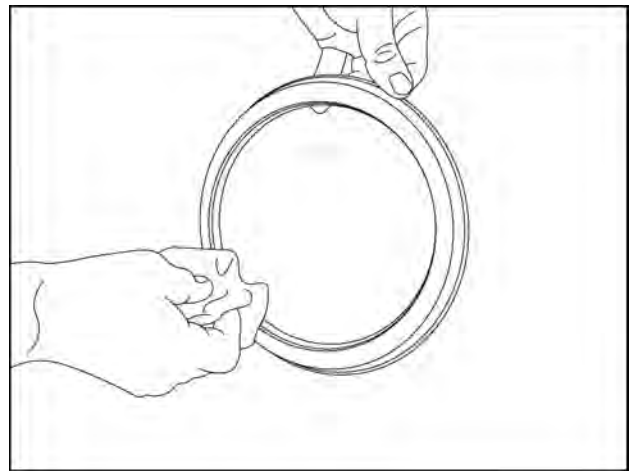
RAIL12TR03027AA 20

NOTE: Care should be taken at all times when handling metal face seals. The seal rings are made of extremely hard iron alloy. As a result, these rings are very brittle and must be handled with care. Never place the seal halves face down on any hard or abrasive surface.

21. Flood the rubber load ring and metal face seal with denatured alcohol and wipe with a lint free clean cloth.



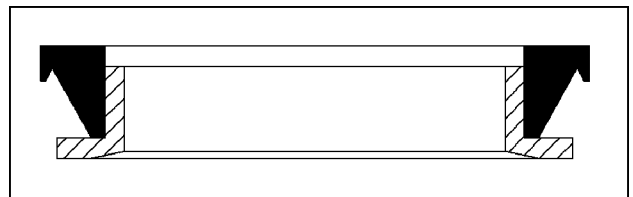
RAIL12TR03028AA 21



RAIL12TR03029AA 22

22. Assemble the load ring on the face seal as shown. The lip of the load ring is against the back side of the face seal.

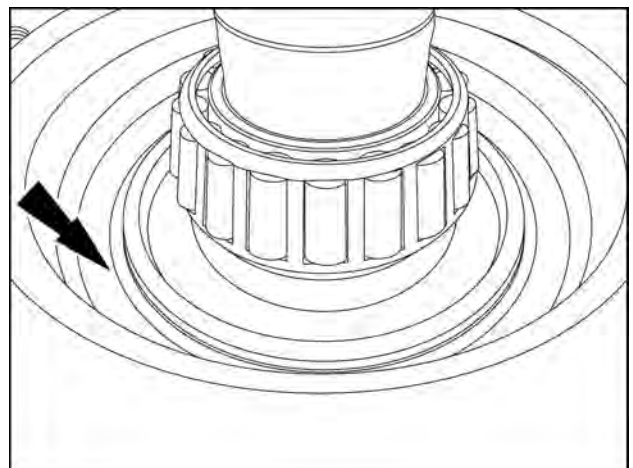
NOTE: The load ring and seal ring must be moist with alcohol when assembling.



RCPH10FWD192AAC 23

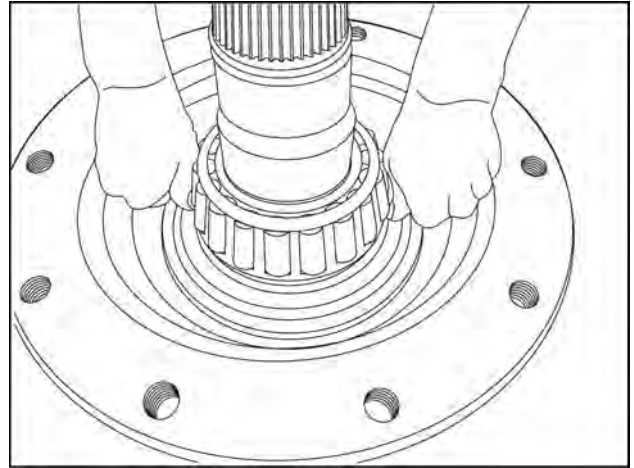
23. Flood the flanged shaft area where the rubber load ring and metal face seal be located and wipe with a lint free clean cloth.

NOTE: Be sure there is no alcohol standing or puddled in the bottom of the seal cup before installing the seal assembly.



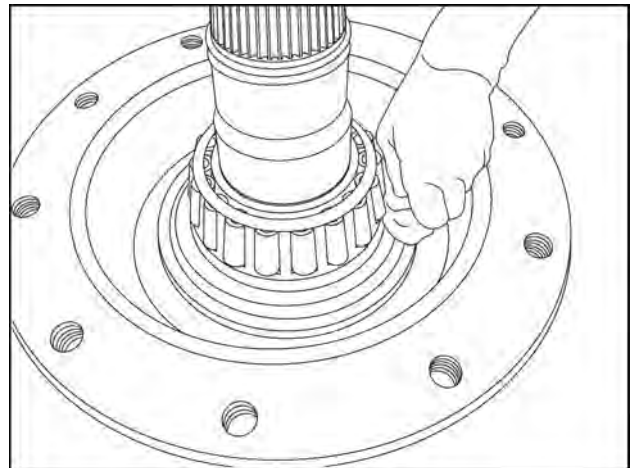
RAIL12TR03007AA 24

24. Assemble the seal assembly into the seal cup area.



RAIL12TR03031AA 25

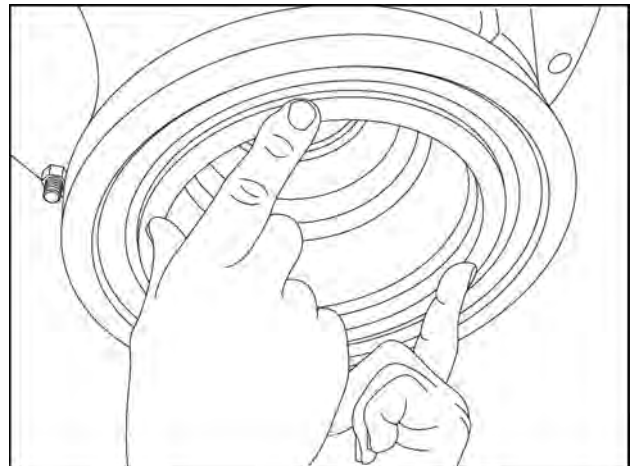
25. Wipe the metal face seal surface with denatured alcohol and a lint free clean cloth.



RAIL12TR03032AA 26

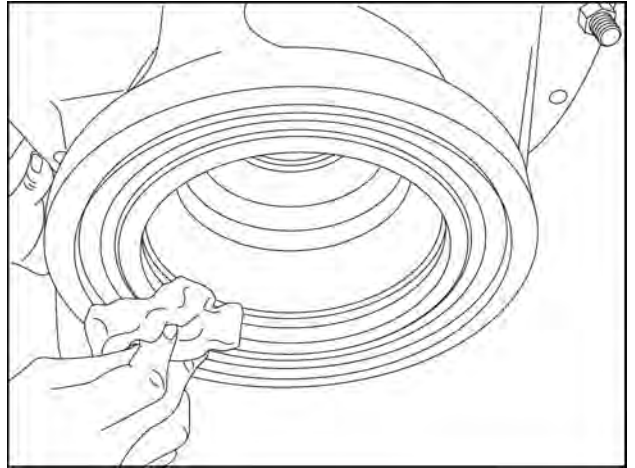
26. Flood the hub area where the rubber load ring and metal face seal be located and wipe with a lint free clean cloth. Install the seal assembly in to the hub assembly.

NOTE: Be sure there is no alcohol standing or puddled in the bottom of the seal cup before installing the seal assembly.



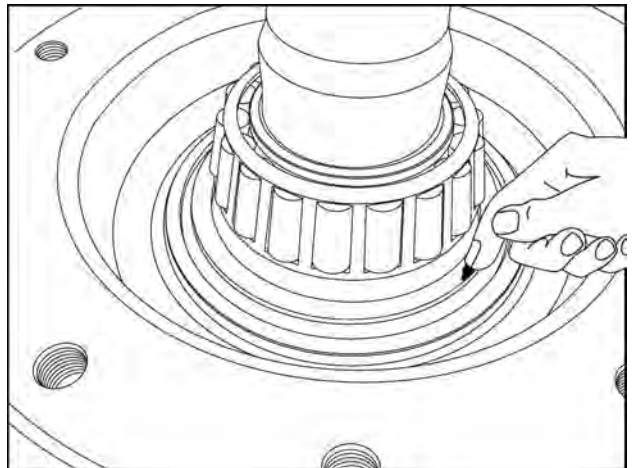
RAIL12TR03033AA 27

27. Wipe the metal face seal surface with denatured alcohol and a lint free clean cloth.



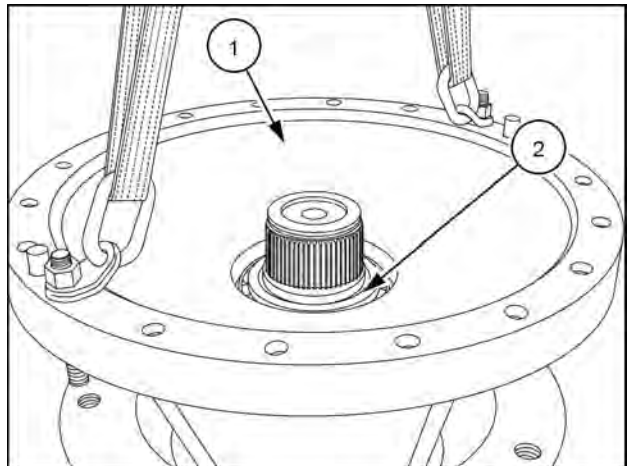
RAIL12TR03034AA 28

28. Apply a thin coat of oil on the face seal.



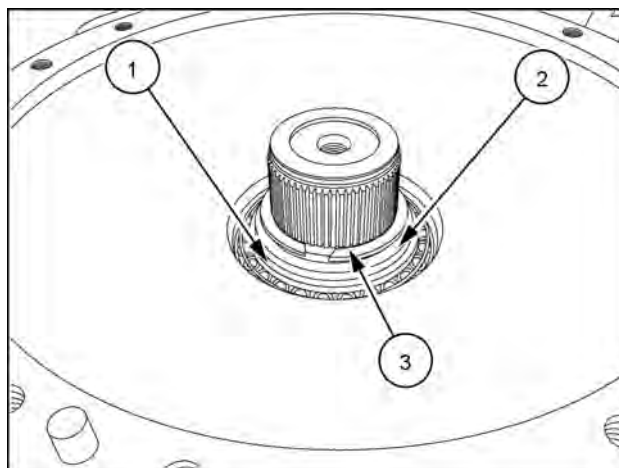
RAIL13TR00494AA 29

29. Set hub **(1)** assembly down onto the output side bearing and face seal. Assemble the input side bearing **(2)** on to the shaft.



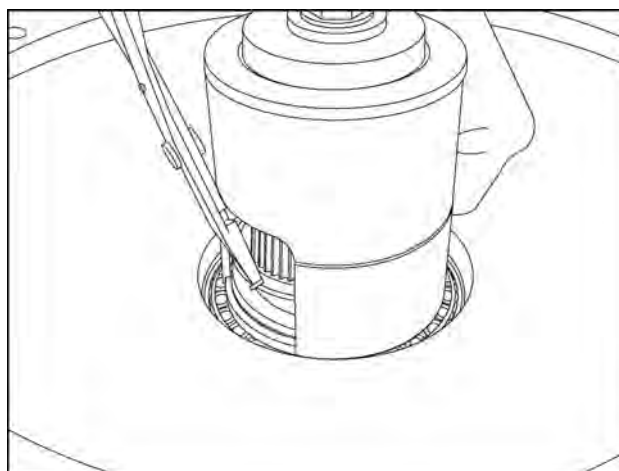
RAIL12TR03027AA 30

30. Assemble the predetermined shims (1), the thrust ring (2) and the snap ring (3) to the shaft.



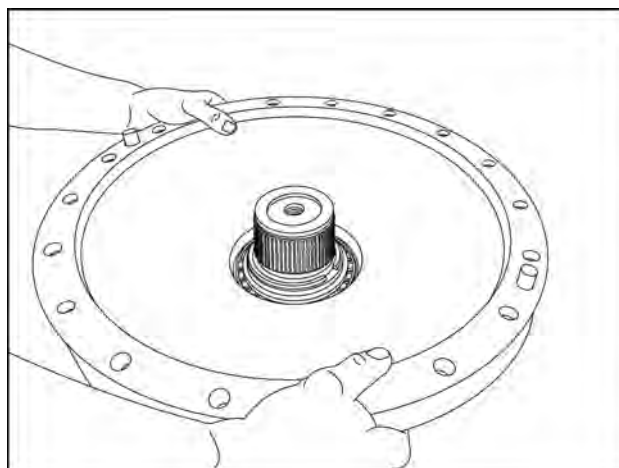
RAIL12TR03026AA 31

31. Install special tool **380003349** to compress the bearings and assemble the snap ring into the snap ring groove.



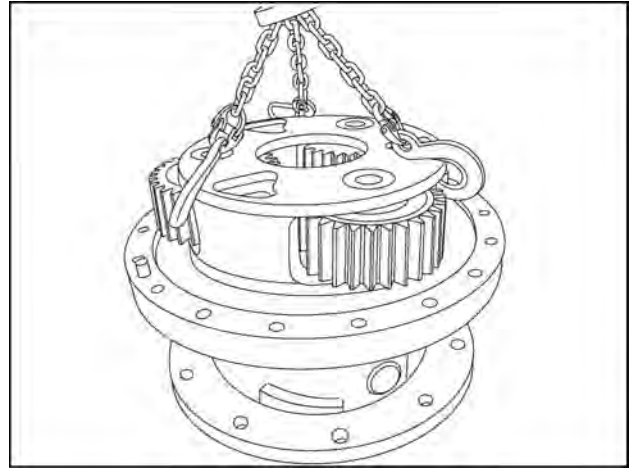
RAIL12TR03025AA 32

32. Rotate the hub assembly three rotations in each direction on the flange shaft assembly.



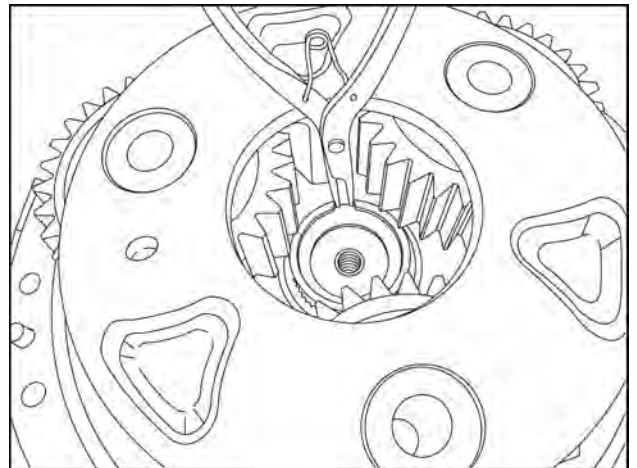
RAIL12TR03036AA 33

33. Set the planetary assembly in place on the flange shaft.



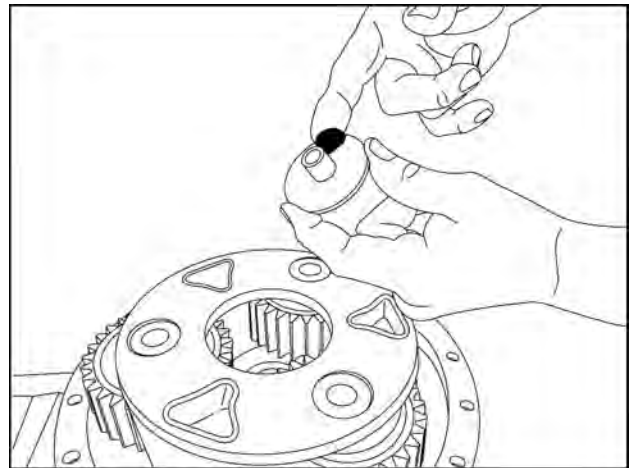
RAIL12TR03037AA 34

34. Assemble the snap ring into the snap ring groove on the shaft to secure the planetary assembly.



RAIL12TR03038AA 35

35. Use petroleum jelly on the wear insert to secure the insert in place and assemble into the end of the flange shaft.

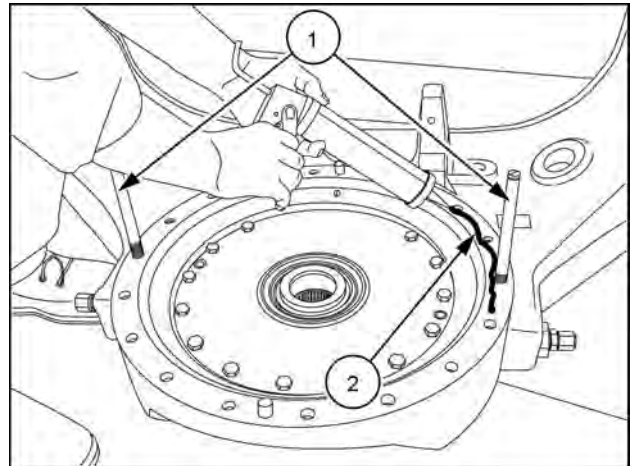


RAIL12TR03040AA 36

Track yoke final drive assembly - Install - Rowtrac™ axles

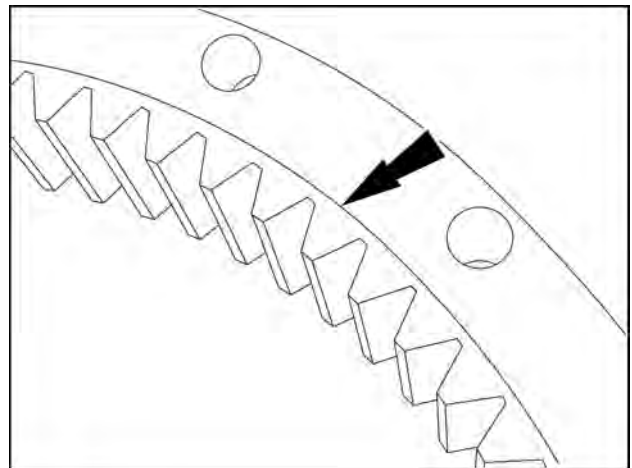
Steiger® 420 Rowtrac™	NA
Steiger® 470 Rowtrac™	NA
Steiger® 500 Rowtrac™	NA

1. Clean the mating surfaces of the upbox housing, both sides of the ring gear and the hub housing.
2. Install two guide pins (1) and put a bead of **LOCTITE® 515™** (2) on the inside of the hub mounting holes as shown.



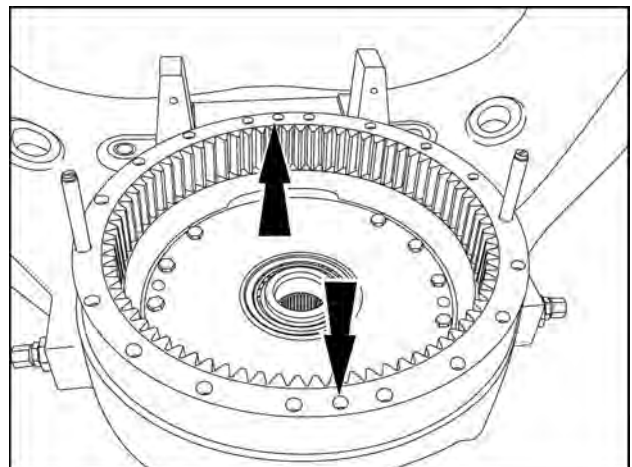
RAIL12TR03042AA 1

3. Pick up the ring gear with the gear set back facing up as shown.



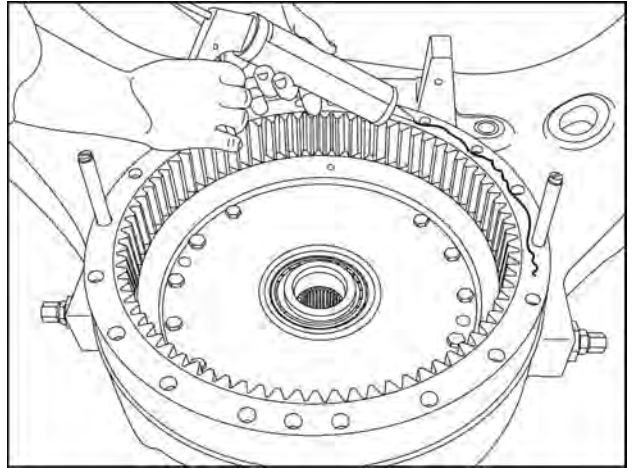
RAIL12TR03039AA 2

4. Set the ring gear on the guide pins, in the correct rotation so the dowel pin holes in the ring gear line up with the dowel pins.



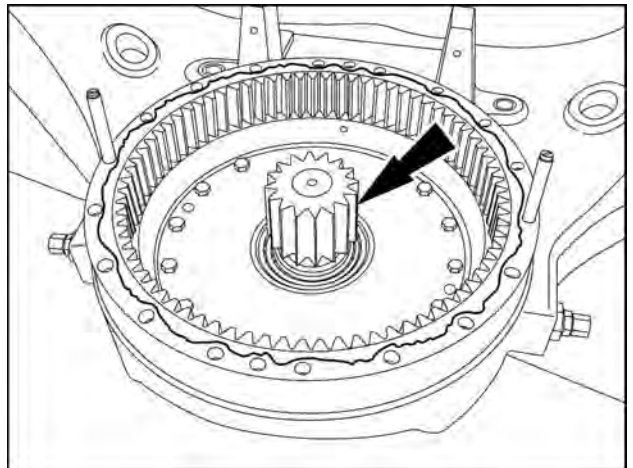
RAIL12TR03043AA 3

5. Put a bead of **LOCTITE® 515™** on the inside of the hub mounting holes as shown.



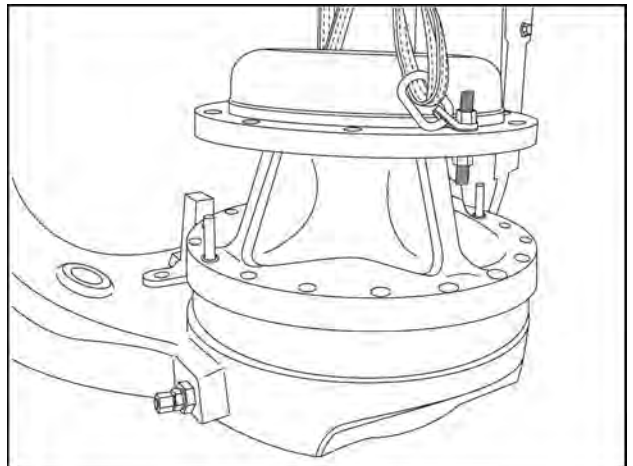
RAIL12TR03044AA 4

6. Assemble the sun gear in place in the output gear.



RAIL12TR03045AA 5

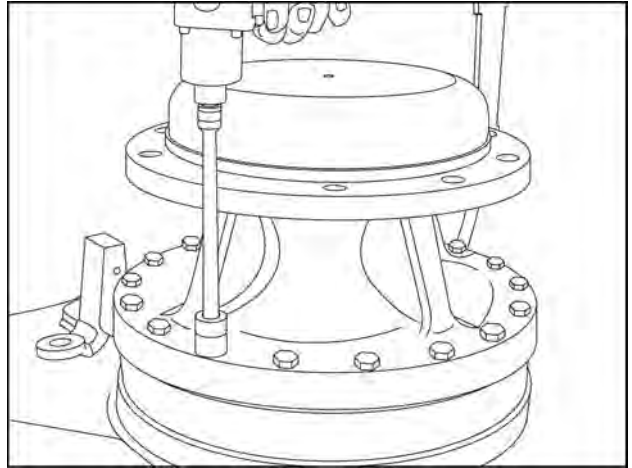
7. Assemble the hub and flanged shaft assembly on to the upbox with the ring and sun gear.



RAIL12TR03046AA 6

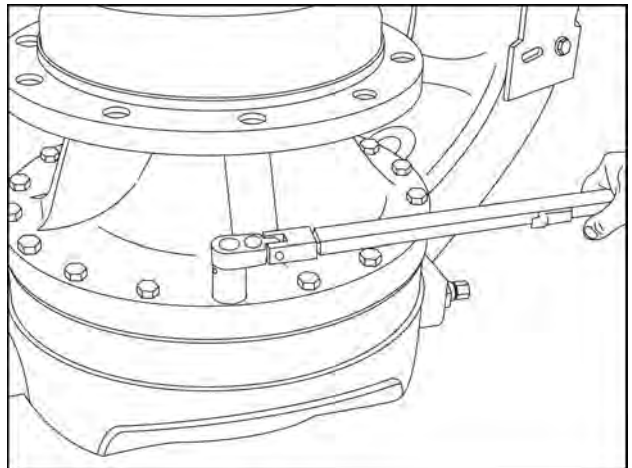
NOTE: Rotate the flanged hub to align the planetary gears with the ring and sun gears.

8. Remove the two guide pins, install and tighten the mounting bolts.



RAIL12TR03047AA 7

9. Torque the mounting bolts to **251 – 280 N·m (185 – 207 lb ft)**.



RAIL12TR03048AA 8

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(*) See content for specific models



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