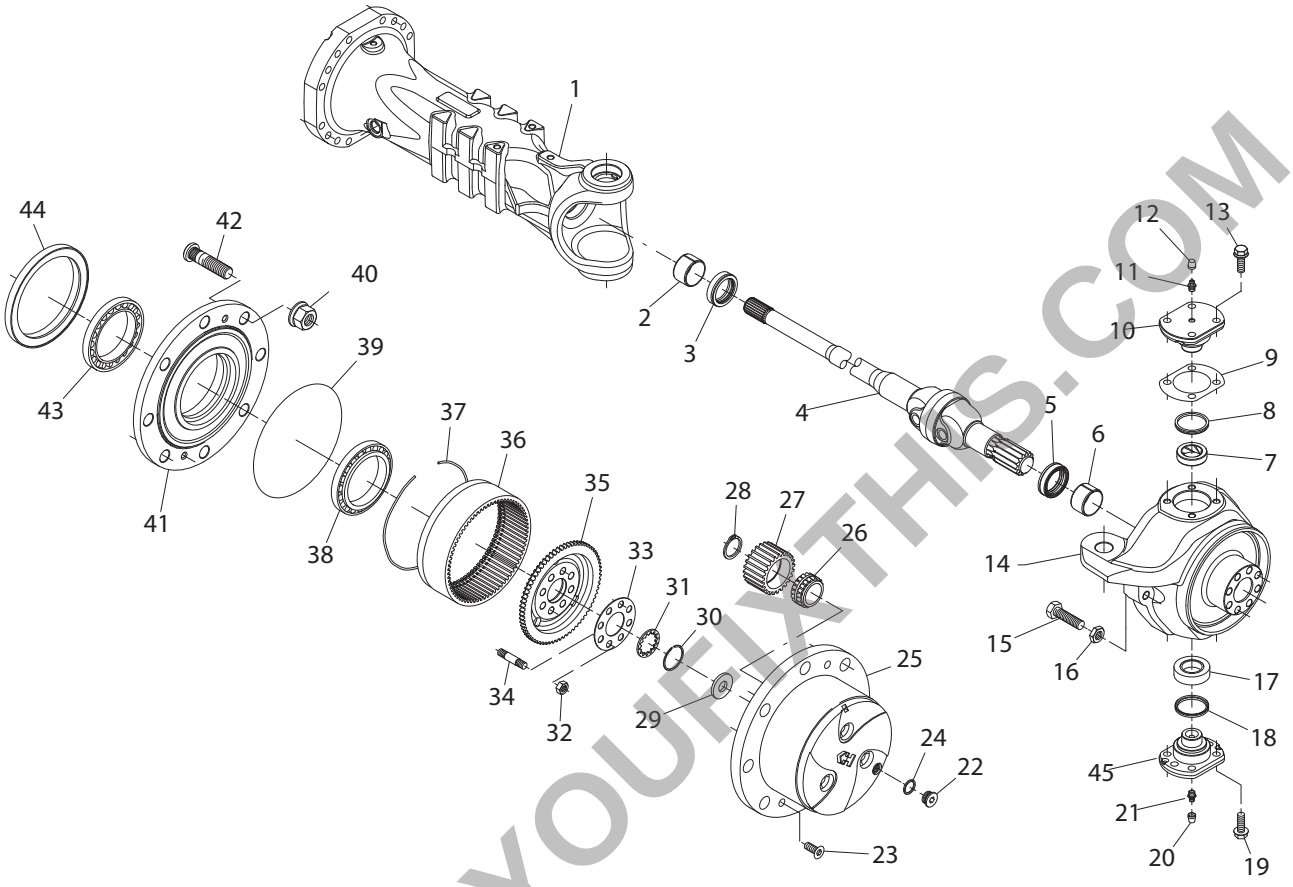
PLANETARY REDUCTION 1:6 AND THE STEERING CASE

EXPLODED VIEW



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TORQUE SPECIFICATIONS

COARSE PITCH

SIZE OF BOLT	TYPE OF BOLT					
	8.8	8.8 + Loctite 270	10.9	10.9 + Loctite 270	12.9	12.9 + Loctite 270
M6 x 1 mm	9,5 – 10,5 N·m	10,5 – 11,5 N·m	14,3 – 15,7 N·m	15,2 – 16,8 N·m	16,2 – 17,8 N·m	18,1 – 20 N·m
M8 x 1,25 mm	23,8 – 26,2 N·m	25,6 – 28,4 N·m	34,2 – 37,8 N·m	36,7 – 40,5 N·m	39 – 43 N·m	43,7 – 48,3 N·m
M10 x 1,5 mm	48 – 53 N·m	52 – 58 N·m	68 – 75 N·m	73 – 81 N·m	80 – 88 N·m	88 – 97 N·m
M12 x 1,75 mm	82 – 91 N·m	90 – 100 N·m	116 – 128 N·m	126 – 139 N·m	139 – 153 N·m	152 – 168 N·m
M14 x 2 mm	129 – 143 N·m	143 – 158 N·m	182 – 202 N·m	200 – 221 N·m	221 – 244 N·m	238 – 263 N·m
M16 x 2 mm	200 – 221 N·m	219 – 242 N·m	283 – 312 N·m	309 – 341 N·m	337 – 373 N·m	371 – 410 N·m
M18 x 2,5 mm	276 – 305 N·m	299 – 331 N·m	390 – 431 N·m	428 – 473 N·m	466 – 515 N·m	509 – 562 N·m
M20 x 2,5 mm	390 – 431 N·m	428 – 473 N·m	553 – 611 N·m	603 – 667 N·m	660 – 730 N·m	722 – 798 N·m
M22 x 2,5 mm	523 – 578 N·m	575 – 635 N·m	746 – 824 N·m	817 – 903 N·m	893 – 987 N·m	974 – 1076 N·m
M24 x 3 mm	675 – 746 N·m	732 – 809 N·m	950 – 1050 N·m	1040 – 1150 N·m	1140 – 1260 N·m	1240 – 1370 N·m
M27 x 3 mm	998 – 1103 N·m	1088 – 1202 N·m	1411 – 1559 N·m	1539 – 1701 N·m	1710 – 1890 N·m	1838 – 2032 N·m
M30 x 3,5 mm	1378 – 1523 N·m	1473 – 1628 N·m	1914 – 2115 N·m	2085 – 2305 N·m	2280 – 2520 N·m	2494 – 2757 N·m

FINE PITCH

SIZE OF BOLT	TYPE OF BOLT					
	8.8	8.8 + Loctite 270	10.9	10.9 + Loctite 270	12.9	12.9 + Loctite 270
M8 x 1 mm	25,7 – 28,3 N·m	27,5 – 30,5 N·m	36,2 – 39,8 N·m	40 – 44 N·m	42,8 – 47,2 N·m	47,5 – 52,5 N·m
M10 x 1,25 mm	49,4 – 54,6 N·m	55,2 – 61 N·m	71,5 – 78,5 N·m	78 – 86 N·m	86 – 94 N·m	93 – 103 N·m
M12 x 1,25 mm	90 – 100 N·m	98 – 109 N·m	128 – 142 N·m	139 – 154 N·m	152 – 168 N·m	166 – 184 N·m
M12 x 1,5 mm	86 – 95 N·m	94 – 104 N·m	120 – 132 N·m	133 – 147 N·m	143 – 158 N·m	159 – 175 N·m
M14 x 1,5 mm	143 – 158 N·m	157 – 173 N·m	200 – 222 N·m	219 – 242 N·m	238 – 263 N·m	261 – 289 N·m
M16 x 1,5 mm	214 – 236 N·m	233 – 257 N·m	302 – 334 N·m	333 – 368 N·m	361 – 399 N·m	394 – 436 N·m
M18 x 1,5 mm	312 – 345 N·m	342 – 378 N·m	442 – 489 N·m	485 – 536 N·m	527 – 583 N·m	580 – 641 N·m
M20 x 1,5 mm	437 – 483 N·m	475 – 525 N·m	613 – 677 N·m	674 – 745 N·m	736 – 814 N·m	808 – 893 N·m
M22 x 1,5 mm	581 – 642 N·m	637 – 704 N·m	822 – 908 N·m	903 – 998 N·m	998 – 1103 N·m	1078 – 1191 N·m
M24 x 2 mm	741 – 819 N·m	808 – 893 N·m	1045 – 1155 N·m	1140 – 1260 N·m	1235 – 1365 N·m	1363 – 1507 N·m
M27 x 2 mm	1083 – 1197 N·m	1178 – 1302 N·m	1520 – 1680 N·m	1672 – 1848 N·m	1834 – 2027 N·m	2000 – 2210 N·m
M30 x 2 mm	1511 – 1670 N·m	1648 – 1822 N·m	2138 – 2363 N·m	2332 – 2577 N·m	2565 – 2835 N·m	2788 – 3082 N·m

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DISASSEMBLY

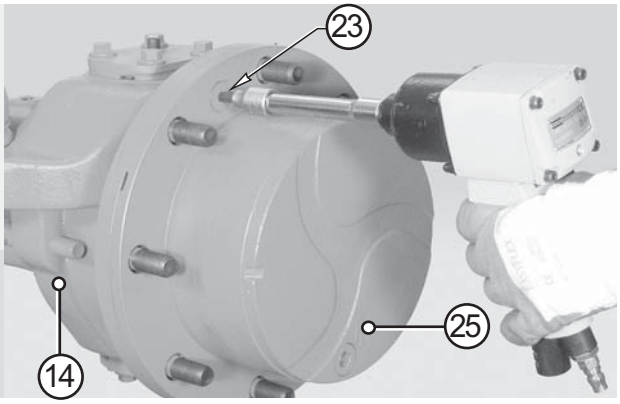


FIGURE 1: Remove the capscrews (23) from the planetary carrier cover (25).
Disconnect the steering bars from the steering case (14).

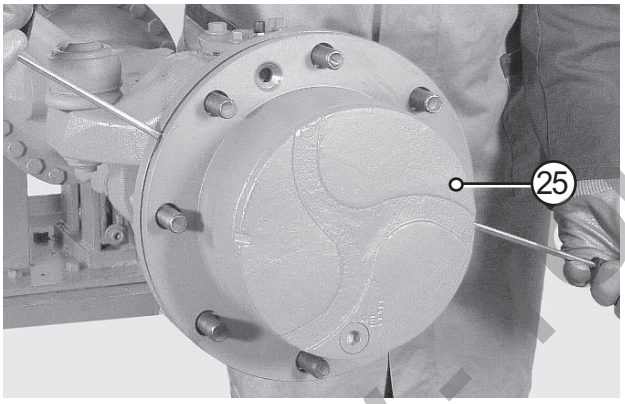


FIGURE 2: Disjoint the planetary carrier cover (25) from the steering case by alternatively forcing a screwdriver into the appropriate slots.

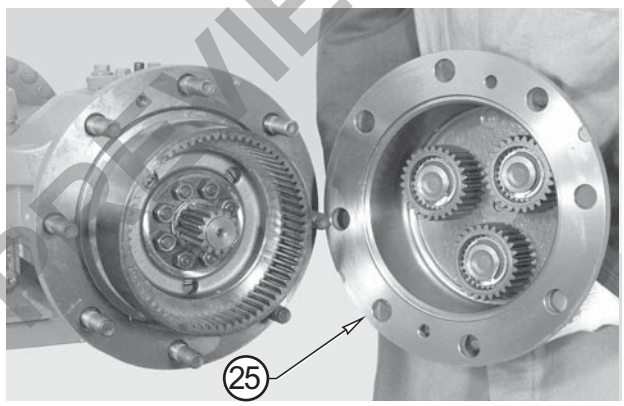


FIGURE 3: Remove the complete planetary carrier cover (25).

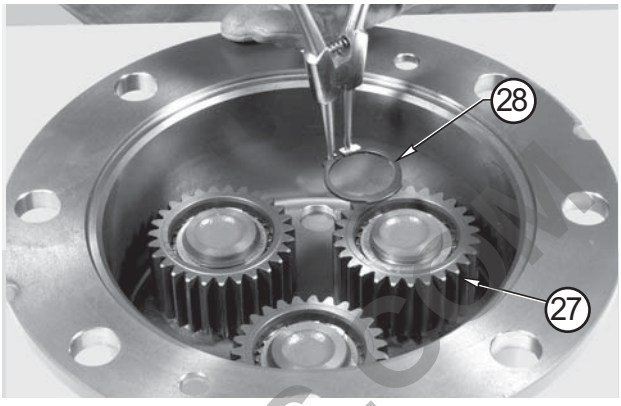


FIGURE 4: Remove the snap ring (28) of the planetary gears (27).

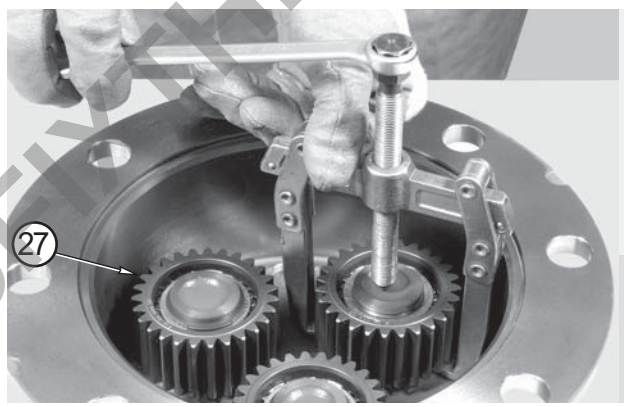


FIGURE 5: Remove the planetary gears (27).

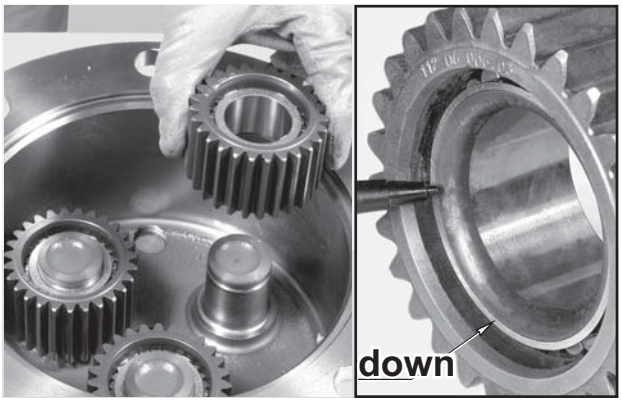


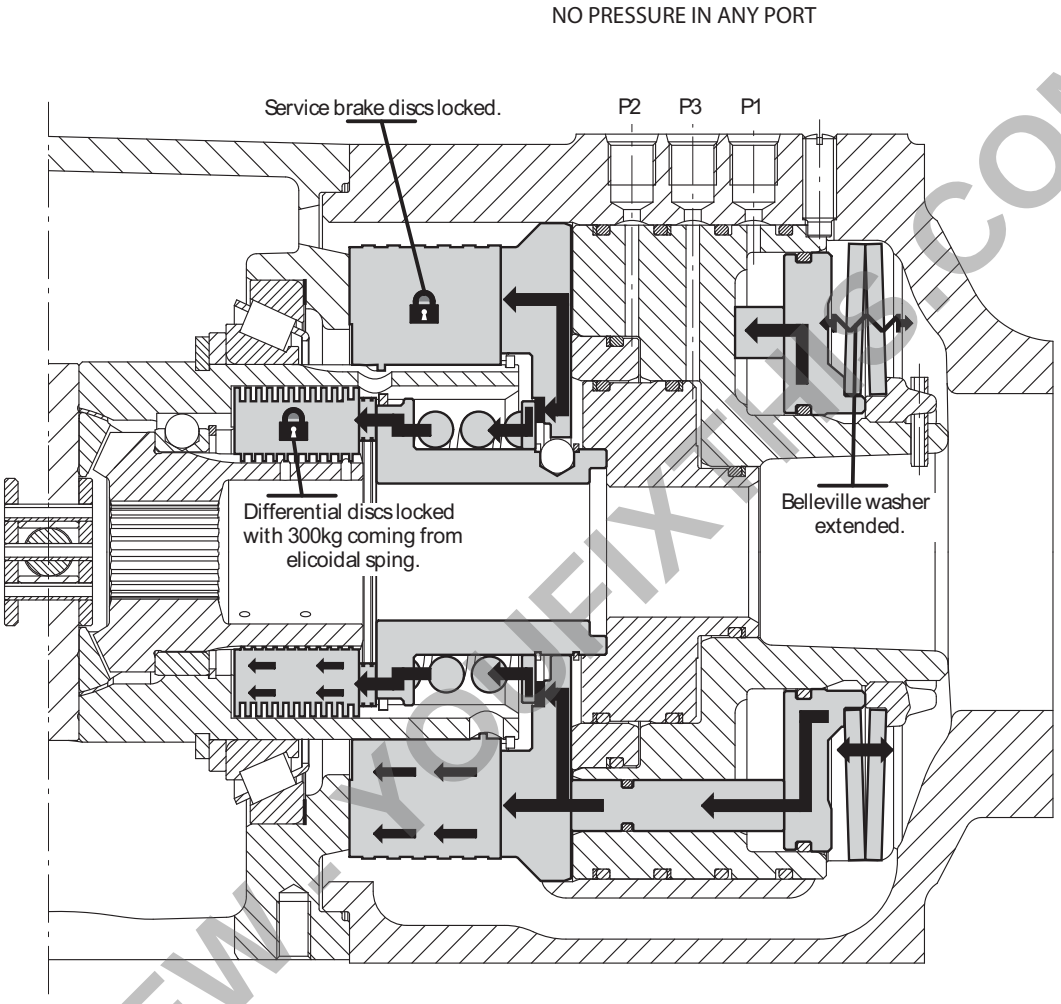
FIGURE 6: Write down the direction of the assembly of planetary gears.

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BRAKE WORKING CONDITIONS

SAHR BRAKE A PPLIED



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CONVERSION TABLES

UNITS OF PRESSURE

1 ATM=1 BAR=10^5 PA=14.4 PSI

UNIT OF WEIGHT

	N	daN	kN	kg	lbs
1N	1	0,1	0,001	0,102	0,225
1daN	10	1	0,01	1,02	2,25
1kN	1000	100	1	102	225
1kg	9,81	0,981	0,00981	1	2,205

UNITS OF TORQUE

	N·m	daN·m	kN·m	kg·m	lb·in
1N·m	1	0,1	0,001	0,102	8,854
1daN·m	10	1	0,01	1,02	88,54
1kN·m	1000	100	1	102	8854
1kg·m	9,81	0,981	0,00981	1	86,8
1 lb·in	0,1129	0,01129	0,0001129	0,01152	1

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ADJUSTMENT AND CHECKS

UNIT	OPERATION	FREQUENCY	SERVICE BRAKE CIRCUIT
Negative brake	Adjustment	Every 1000 hours*	Only for mineral oil use e.g. ATF Dexron II. Make sure that master cylinder seals are suitable for mineral oil.
Service brake	Adjustment	Every 500 hours	
Wheel nuts	Tightening	Every 200 hours	

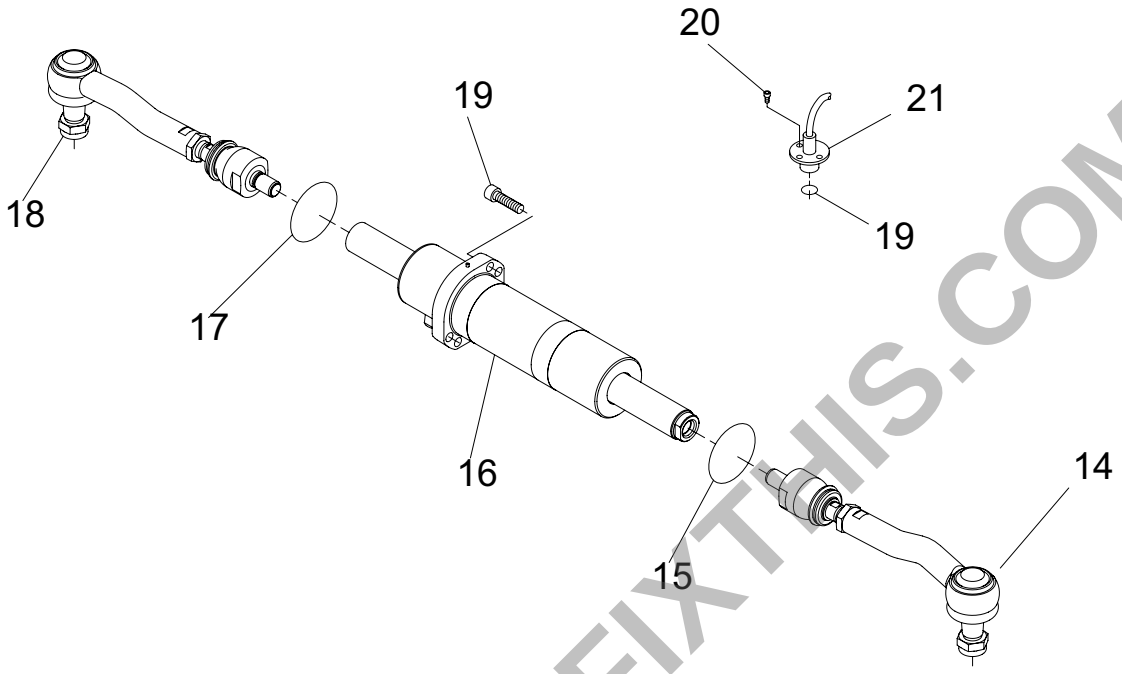
* Initially after 100 working hours

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STEERING CYLINDER

EXPLODED VIEW



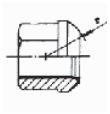
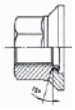
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TORQUE SPECIFICATIONS

WHEEL NUT TIGHTENING TORQUES

Wheel nut tightening torques recommended from rim's O.E.M. with reference to the quality of the rim's material.

WHEEL NUT TIGHTENING TORQUES				
CHARACTERISTICS	ILLUSTRATION	WHEEL STUD THREAD	RECOMMENDED WHEEL NUTS TORQUE	
			RIM MATERIAL QUALITY	
			ST 37	**ST 52
WHEEL NUTS WITH INTEGRATED SPHERICAL COLLAR		M18X1,5 mm	330 N·m	460 N·m
		M20X1,5 mm	490 N·m	630 N·m
		M22X1,5 mm	630 N·m	740 N·m
FLAT COLLAR WHEEL NUTS WITH SEPARATE SPHERICAL LOCK WASHER		M18X1,5 mm	270 N·m	360 N·m
		M20X1,5 mm	360 N·m	450 N·m
		M22X1,5 mm	460 N·m	550 N·m
WHEEL NUTS WITH INTEGRATE SEAT CAPTIVE WASHER		M18X1,5 mm	260 N·m	360 N·m
		M20X1,5 mm	350 N·m	500 N·m
		M22X1,5 mm	450 N·m	650 N·m

****RIM'S MATERIAL ST 52 IS RECOMMENDED BY DANA ON AXLE APPLICATION. IT IS THE OPTIMUM MATERIAL FOR TIGHTENING THE RIM TO THE HUB.**

NOTE:

The wheel nut tightening torque takes into consideration not only the nut + stud characteristics, but also the quality of the rim material.

THE DANA OFFICIAL TIGHTENING TORQUE TABLE, THAT IS INCLUDE ON EACH MAINTENANCE SERVICE MANUAL, SHOWS THE TORQUE FIGURE RELATED TO THE BOLT CHARACTERISTIC ONLY .		
DANA OFFICIAL TIGHTENING TORQUE TABLE		
NUT MATERIAL QUALITY 8.8 & 10.9	STUD MATERIAL QUALITY 10.9	*ALLOW TIGHT TORQUE
M18 x 1,5 mm	M18 x 1,5 N·m	442 ÷ 489 N·m
M20 x 1,5 mm	M20 x 1,5 N·m	613 ÷ 677 N·m
M22 x 1,5 mm	M22 x 1,5 N·m	822 ÷ 908 N·m

***THE TORQUE FIGURE ON NUT AND STUD COUPLING MUST BE RELATED ON STUD MATERIAL QUALITY (DANA AXLE ARE 10.9 ONLY).**

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ASSEMBLY

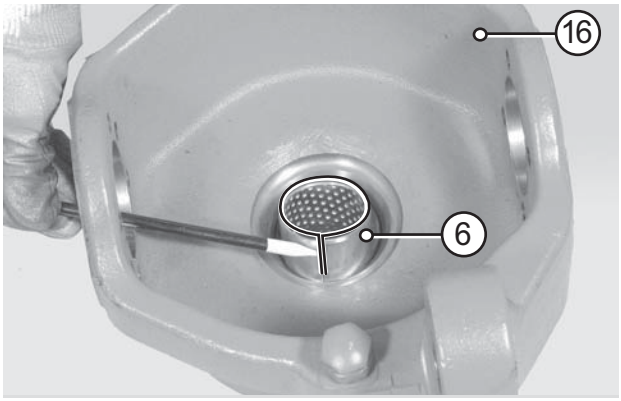


FIGURE 33: Lubricate the bushing (6) and the seat of the steering case (14).
Install the bushing (6), using tool T1 (See drawing T1 p. 33).

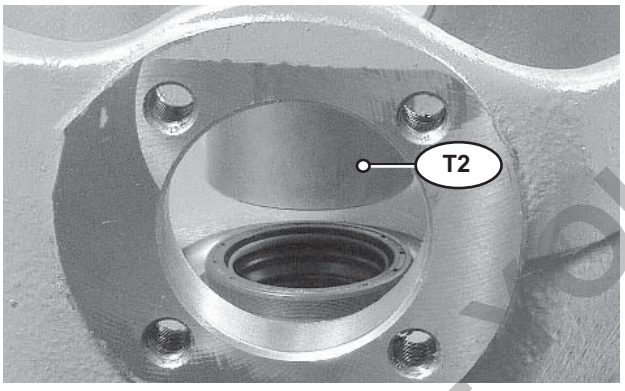


FIGURE 34: Lubricate the outer surface of the sealing ring (5); fit them into their seat using tool T2 (See drawing T2 p. 34).

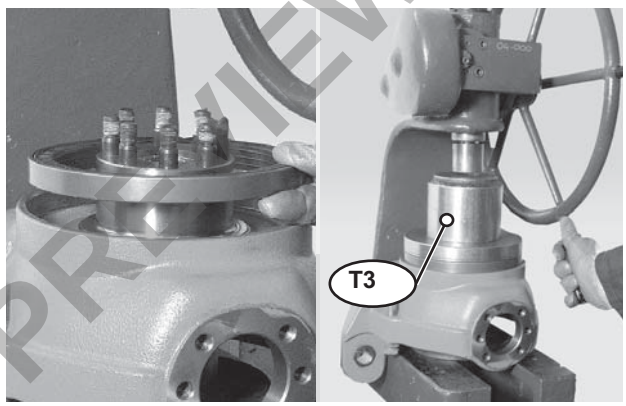


FIGURE 35: Using special tool T3 (See drawing T3 p. 35) apply a repositionable jointing compound for seals to the outer surface of the sealing ring (44).
Position the sealing ring (44) in the steering case (14).

NOTE:

Check that the ring (44) is correctly oriented.

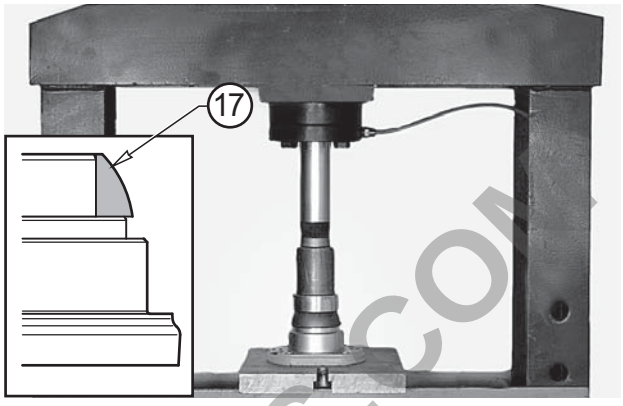


FIGURE 36: If the bottom articulation pin (17) has been extracted, position the pin under a press and fit the ball cover (20).

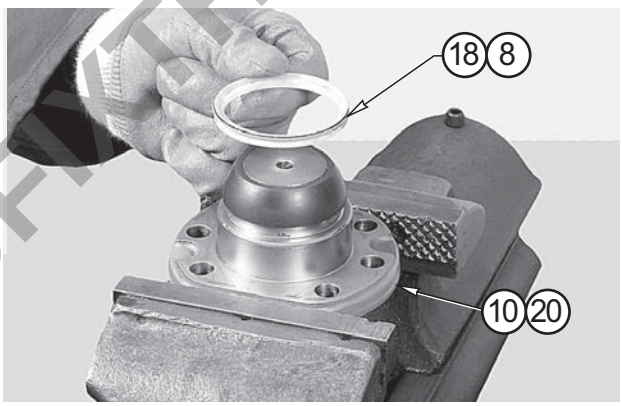


FIGURE 37: Fit the front sealing rings (18)(8) onto the articulation pins (4) and (6).

NOTE:

Carefully check that the rings are properly oriented (18) (8).

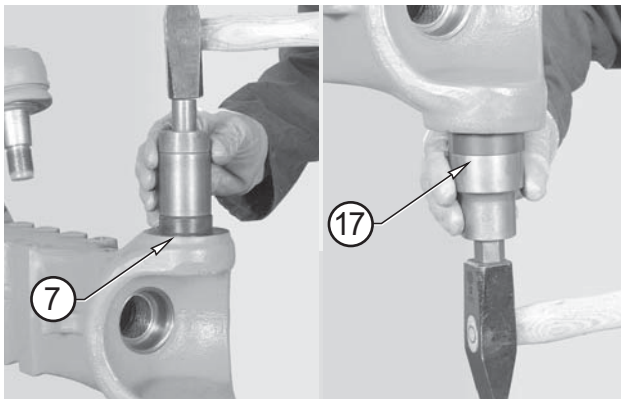
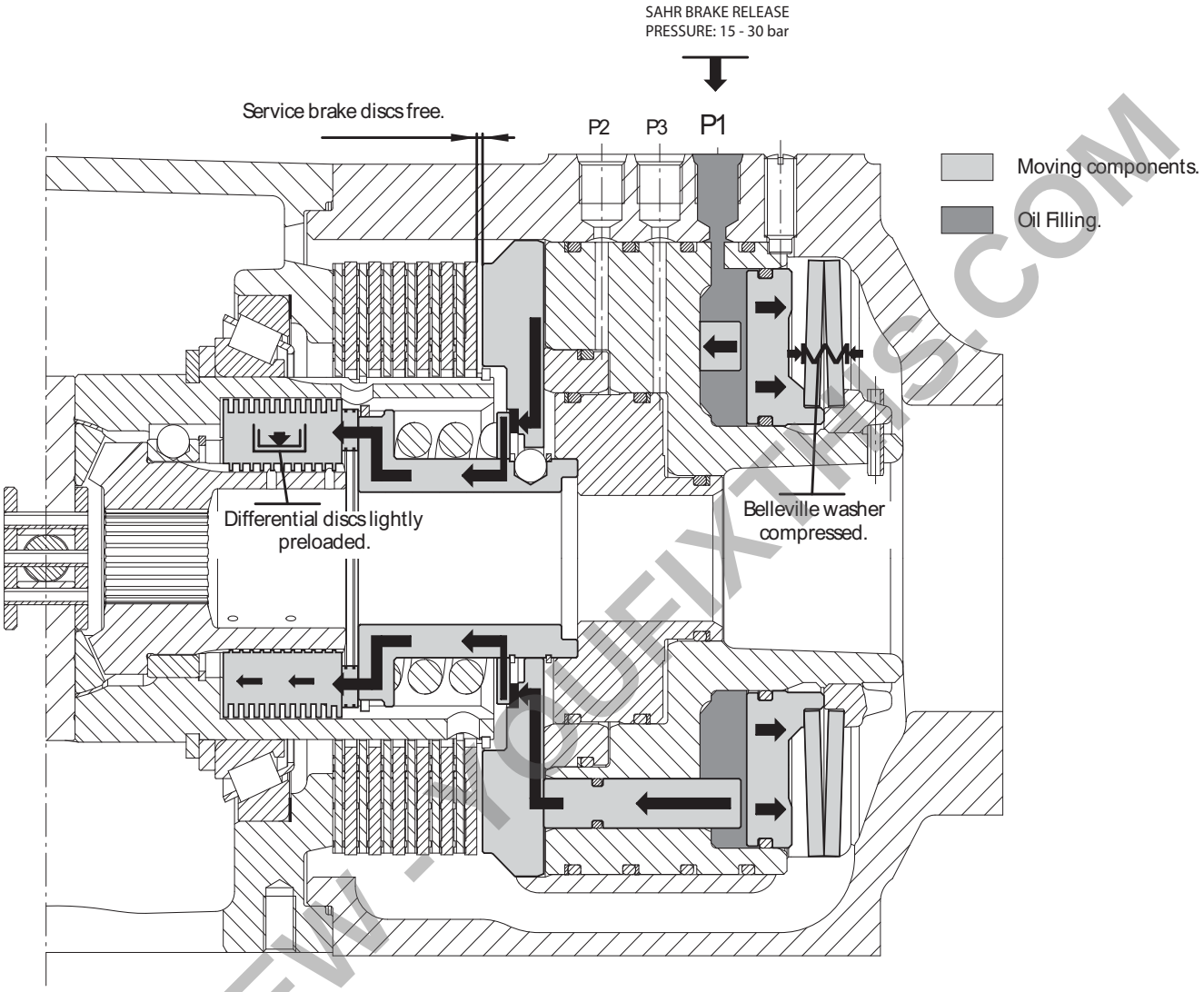


FIGURE 38: Lubricate the top bushing (7) or the bottom ball bushing (17) and fit them into the fulcrum holes of the arm.

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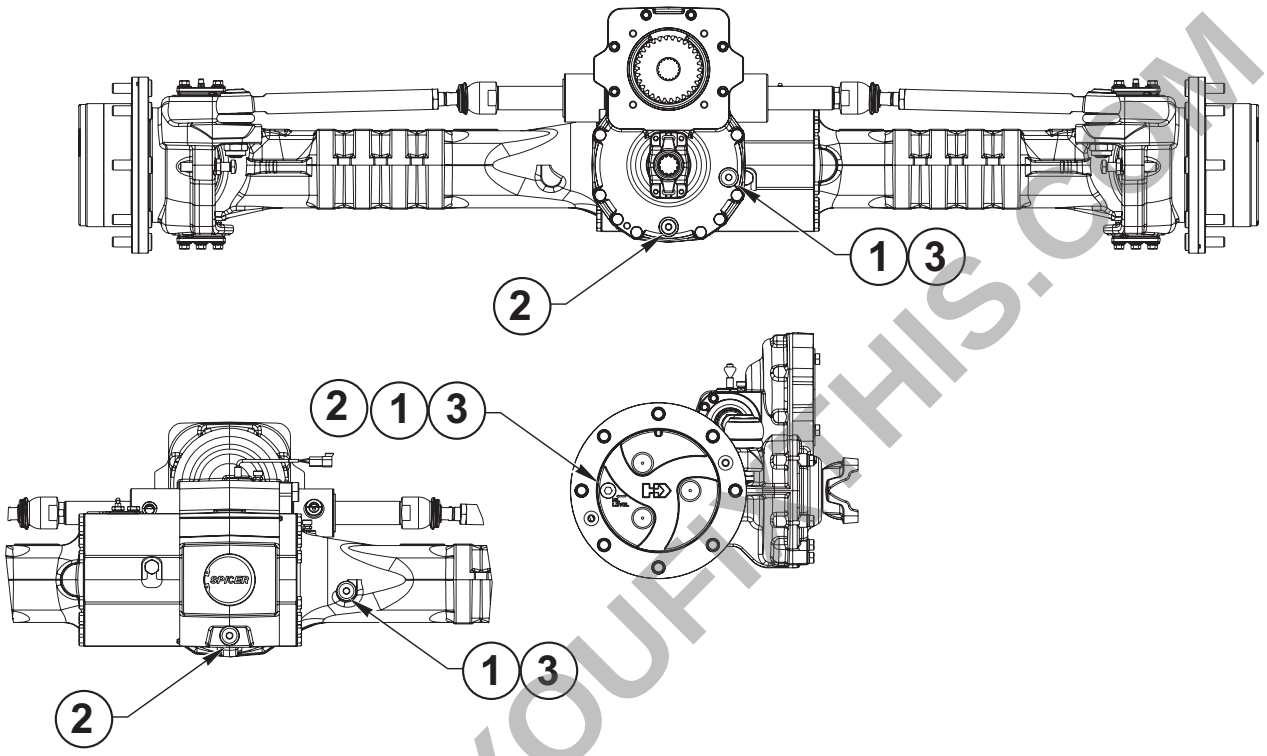


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MAINTENANCE

MAINTENANCE POINTS



1 - Oil filling plug
2 - Oil draining plug
3 - Check level plug

MAINTENANCE INTERVALS

OPERATION		FREQUENCY	LUBRICANTS
Check levels	Differential	Monthly	SAE85W90 (API GL4 - MIL L-2105)
	Planetary reduction	Every 200 hours	With additives for oil-bath brakes
Oil change	Differential	Every 1000/1200 hrs *	
	Planetary Reduction	Every 1000/1200 hrs *	
	Planetary reduction w/brakes	Every 500/600 hrs	

Recommended to set axle's oil changes according to the machine maintenance intervals
*If working in severe duty conditions half intervals should be used
***** Initially after 100 working hours

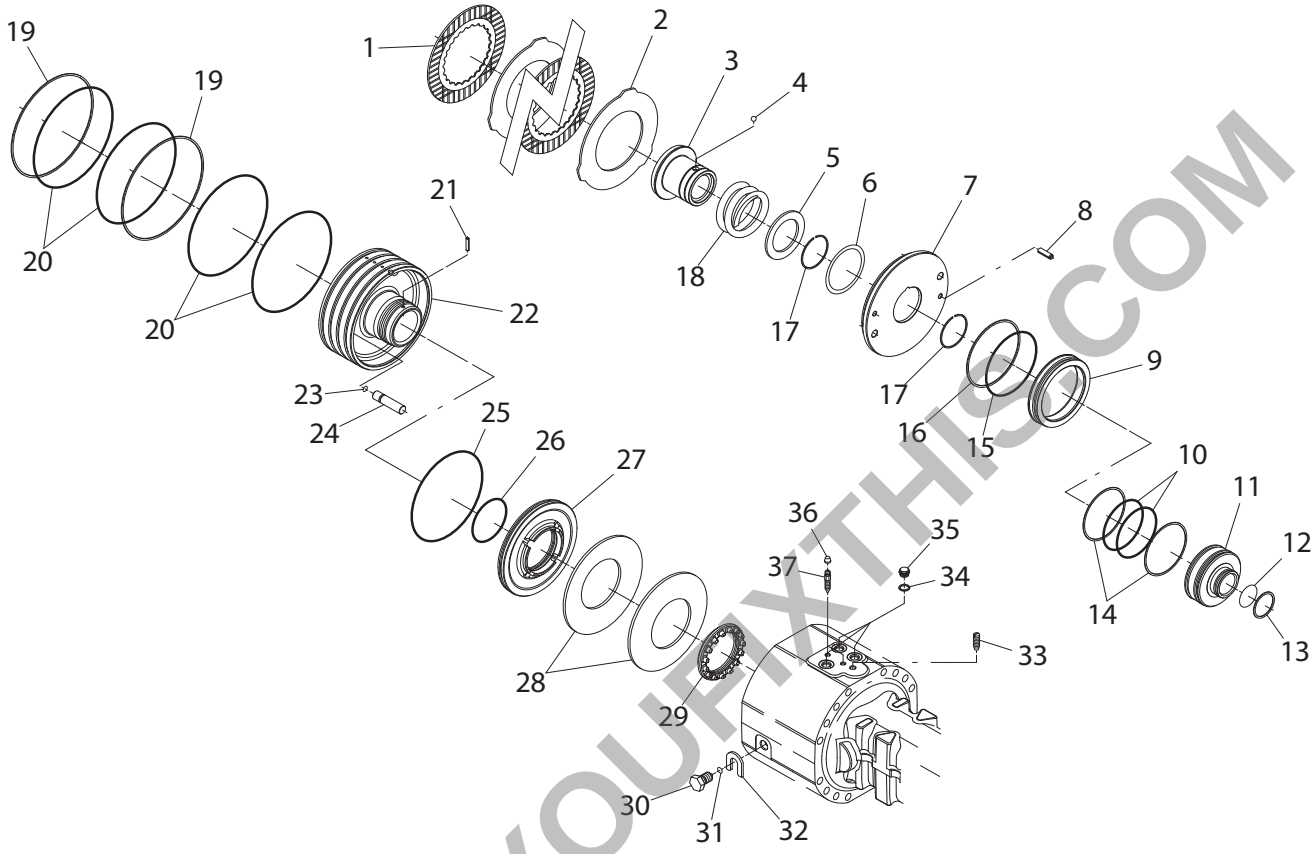
OPERATION	MEMBER	CONDITIONS	FREQUENCY	LUBRICANTS
Greasing	Articulations	Normal work	Monthly	MOLIKOTE
		Severe duty	Weekly	

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