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REPAIR INSTRUCTIONS

SNOWBLOWER VEHICLE

F90 STI

Sommario

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1. INSTRUCTIONS FOR MAINTENANCE OPERATORS

The following instructions are provided to the operators on SNOWBLOWER VEHICLE F90 STI in order to assure a correct procedure for maintenance and repairing operations on the vehicle f90 and its disassembled parts.

Before operating, read carefully the safety prescription at the point 2)

- ✓ before operating, verify the integrity of all the operation tools.
- ✓ where specific tools or instruments are recommended, do not use other kind of common tools instead;
- ✓ before parts and components are revised or repaired, these must be externally accurately washed;
- ✓ tighten screws and nuts at the prescribed tightening values. If not otherwise indicated, threads and screw cuttings must always be cleaned and grease must be removed before tightening;
- ✓ when disassembling parts, all screws, nuts, washers, and rings must be accurately placed in order in boxes;
- ✓ when mounting back component parts, always substitute old gaskets, retaining and lock rings, spring rings, self-locking nuts, spring washers and split pins with new ones;
- ✓ before the mounting operation: paper gaskets must be greased and (retaining) rings with inside spring must be fitted with grease;
- ✓ when filling up or substituting fluids in reservoirs and circuits, use only the products indicated in the Lubrication Chart.

2. SAFETY PRESCRIPTIONS

Read and remember all the following safety precautions and warnings before performing any repair or maintenance operation:

- ✓ Before starting any operations, make sure that the whole accident prevention equipment is good condition.
- ✓ operators should wear cloths and shoes as safety norms recommend and, when necessary, protective glasses, gloves, apron and helmet;
- ✓ when the unit to repair is lifted up, make sure that it is safely prompted on supporting blocks/brackets;
- ✓ after moving the vehicle with engine running, change carefully the environment air;
- ✓ all electrical instruments, plugs and cables must follow the safety norms;
- ✓ during the operation remove the spark plugs or the battery to avoid casual engine starting;
- ✓ if the engine has been operating, allow engine and all mechanic parts to cool before operate on them;
- ✓ during operations with running engine, care has to be taken not to touch the flywheel with any hard or metal tool or part. This can be very dangerous for operator.

3. SCREWS TIGHTENING TORQUE

If not otherwise indicated, screws must be tightened according to the torque values of the following table:

How to find out the right tightening value:

1) Read class (8-10-12) on screw head
2) Measure screw diameter
3) Search diameter in the first column
4) In the column of screw class, read the torque value corresponding to diameter
5)

Example: 

Diameter = 14 mm;

DIAMETER (mm)	THREAD (mm)	COUPLING TORQUE (Kgm)		
		Class 8	Class 10	Class 12
4	0,70	0,37	0,52	0,62
5	0,80	0,72	1,01	1,22
6	1,00	1,23	1,73	2,08
7	1,00	2,02	2,84	3,40
8	1,00	3,21	4,52	5,43
8	1,25	3,02	4,25	5,10
9	1,25	3,88	5,45	6,55
10	1,00	5,82	8,19	9,82
10	1,50	5,36	7,54	9,05
12	1,50	9,45	13,30	15,90
12	1,75	9,09	12,80	15,30
14	1,50	14,50	20,40	24,40
14	2,00	13,80	19,40	23,30
16	1,50	22,00	30,90	37,10
16	2,00	21,00	29,50	35,40
18	1,50	28,70	40,40	48,40
18	2,50	26,30	37,00	44,40
20	1,50	39,50	55,60	66,70
20	2,50	36,60	51,50	61,80
22	1,50	47,00	66,10	79,30
22	2,50	44,40	62,40	74,90
24	2,00	60,40	84,90	102,00
24	3,00	56,90	80,00	96,00

4. VEHICLE CLEANING

5.3.1 External cleaning

Once the doors and windows are closed and the engine is off, the vehicle can be washed with water or with a steam jet.
If the washing is performed under conditions of extreme cold weather the latches and the hinges of the main gates should be thoroughly dried and when necessary can be used antifreeze.
For painted parts cleaning, it is suggested not to use gasoline.

5.3.2 Internal cleaning

For internal cleaning can be used fresh water with brush and sponge.
Note that all the electrical parts are water repellent but not waterproof. Therefore, the use of water or steam can cause serious damage, short-circuiting or rust.
The performance and the duration of rusted electrical contacts may be compromised.

5.3.3 Engine washing

When washing the engine, the air filter must be protected, to prevent infiltration of water as well as the engine control unit should not be sprayed with water under pressure.

4. LIST OF THE REPAIR SECTIONS

SECTION 1 – BRAKE SYSTEM REPAIR
SECTION 2 – STEERING SYSTEM REPAIR
SECTION 3 – HYDROSTATIC SYSTEM REPAIR
SECTION 4 – AXLES REPAIR
SECTION 5 – TANSFER REDUCER REPAIR
SECTION 6 – TWO SPEED BACK GEAR REPAIR
SECTION 7 – SNOBLOWER HYDRAULIC SYSTEM REPAIR

SECTION 1
BRAKES SYSTEM REPAIR

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1.3 BLEEDING THE SERVICE BRAKE 6
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1.6 BRAKE CALIPER DEMOUNTING 8

1.1 GENERALITY

The braking system includes:

SERVICE BRAKE

Foot operated, air-on hydraulic type, acting on all wheels, with two independent circuits; front and rear axle allowing to be operated also as emergency brake.

PARKING BRAKE

The parking brake acts on a disk mounted on the reduction shaft.

The cables are pneumatically controlled through a distributor and a springbrake cylinder. This cylinder can brake automatically in case of sudden air pressure stop.

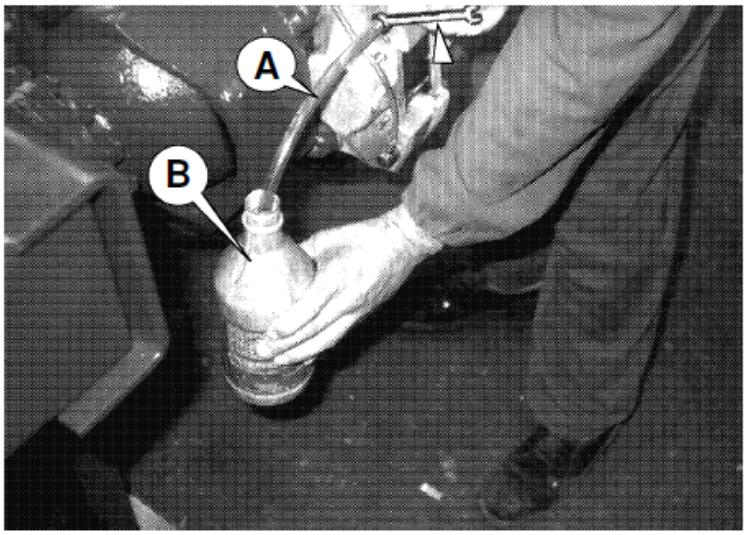
1.2 TROUBLE SHOOTING

PROBLEM	CAUSE	REMEDY
Braking irregular on front and rear axle	-disk/brake pads worn - brake pads dirty *brake pads burnt for the following causes:* - the brake cylinder seize - air intake stop in one or more sections of the brake system - leak of brake fluid from brake calipers cylinders - brake fluid low boiling point due to: a) yearly brake fluid substitution not made b) presence of some water in the brake fluid c) wrong type of brake fluid - presence of air in the hydraulic system	- brake overhauling - look for cause, clean or substitute brake pads *brake overhauling at:* - substitute brake calipers - check air compressor efficiency or check systems for leaks of air or brake fluid - substitute brake calipers - substitute fluid with proper one - bleed air
Irregular braking and wheels stop	- master cylinder and power booster blocked - brake cylinder seize	-substitute power booster - substitute brake calipers
Brake make noise	- excessive brake pads Wear	- replace the brake pads
Excessive or irregular brake pedal run	- excessive disk/brake pads wear - brake fluid low boiling point due to: a) yearly brake fluid substitution not made b) presence of some water in the brake cylinders c) wrong type of brake fluid	- replace the brake pads - substitute fluid with a proper one

	- calipers washers worn	- substitute washers
Presence of air in the hydraulic system	-brake fluid leaks in washers, joints, hoses - low brake fluid	- substitute faulty parts and bleed hydraulic system - restore fluid level
Parking brake not engaging	-spring-brake cylinder fault - cables not calibrated	-substitute cylinder - adjust cables and mechanical parts
Parking brake not releasing	- spring-brake cylinder fault - fault in air pressure system due to: a) protection valve fault b) pressure regulating valve fault c) air compressor fault - brake caliper washers worn	substitute cylinder - substitute faulty element - substitute brake calipers

1.3 BLEEDING THE SERVICE BRAKE

1. Push the bleeding hose (**A**) on the end of the bleeder screw. Put the second end of the bleeding hose into a vessel (**B**) partially filled with brake fluid

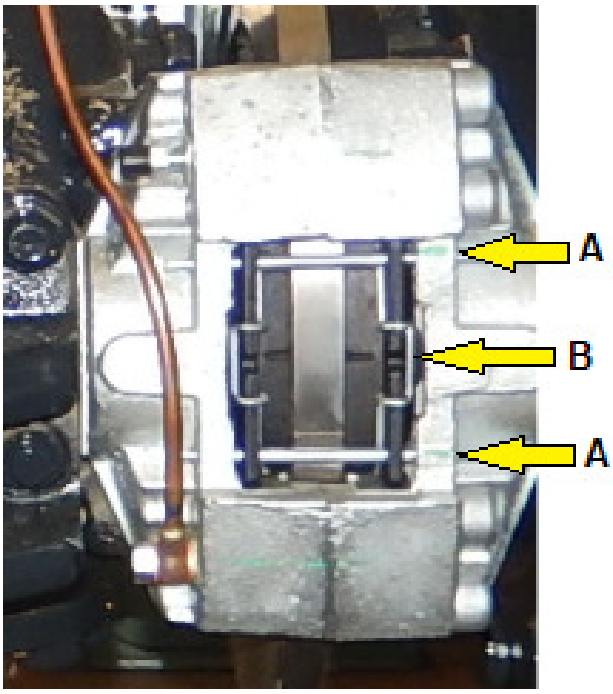


2. Repeatedly actuate the brake pedal
3. Press down brake pedal to stop and keeping pressed, open the bleeder screw of one turn.
   This operation let air out of the hydraulic system lines
4. Close the bleeder screw
5. Repeatedly actuate the brake pedal subsequently until a pressure has again built up in the system;
6. Repeat this operation until the brake fluid emerges from the bleeding hose free from air bubbles;
7. In the same way bleed the brake caliper of each wheel.

NOTE!: The brake fluid outcoming from the system must not be used again.

1.4 BRAKE PADS CHECK AND REPLACEMENT

1. Lift the vehicle until the wheels can turn freely;
2. Remove the wheels locking nuts and remove the wheel from hubs;
3. By means of a punch remove the retaining pins A and extract the clips B



4. Slide out the pads

1.5 BRAKE MAINTENANCE

Check the brake pads state and tightness.

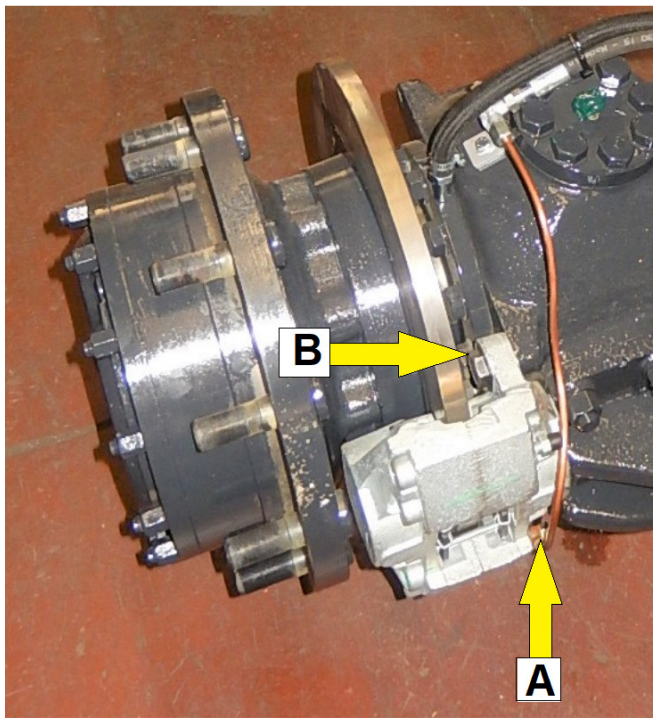
Replace the brake pads when:

- brake pads are covered with grease or oil;
- the pad thickness is inferior to **2 mm.**;
- Check the brake calipers The protective covers must not be damaged or present trace of brake fluid. Otherwise, replace calipers with new ones;
- Check the brake disks They must be without marks.

If the pads are worn, replace them, if not reinstall the old ones operating the above instruction in reverse.

1.6 BRAKE CALIPER DEMOUNTING

2. Disconnect the lines **A**
3. Remove screws **B**
4. Remove the caliper from its support.



5. To reinstall, repeat the instruction in reverse.

NOTE!: The flexible hoses for brake fluid must always be in good state. Replace the damaged hoses.

SECTION 2
STEERING SYSTEM REPAIR

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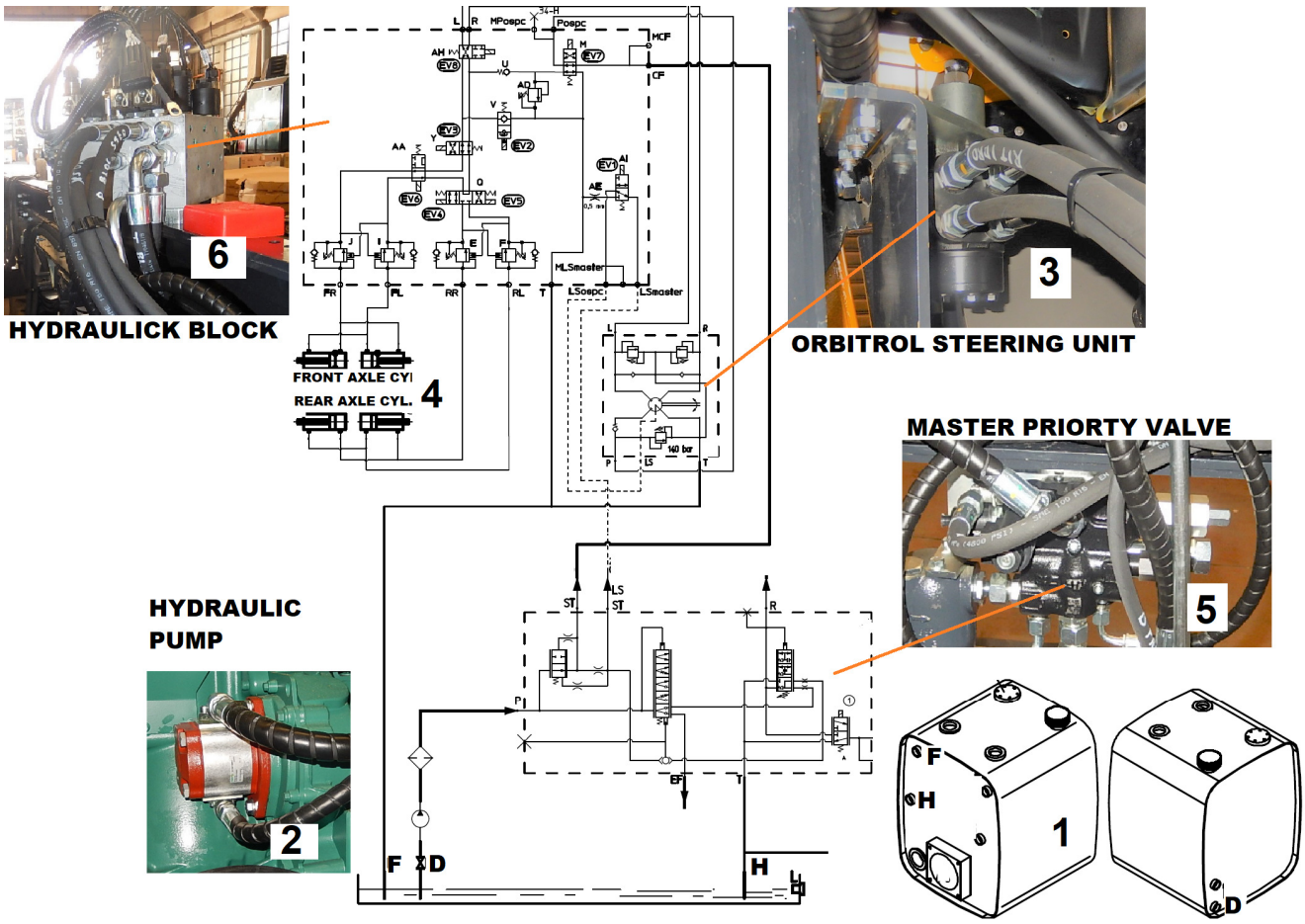
2.7 STEERING CYLINDER ASSEMBLY 9

2.1 GENERALITY

Steering system is controlled by an hydraulic control ORBITROL STEERING UNIT.

The steering unit is powered by a pump installed on the engine.

The Master riority Valve allows the distribution to th steering unit and the steering hydraulic block



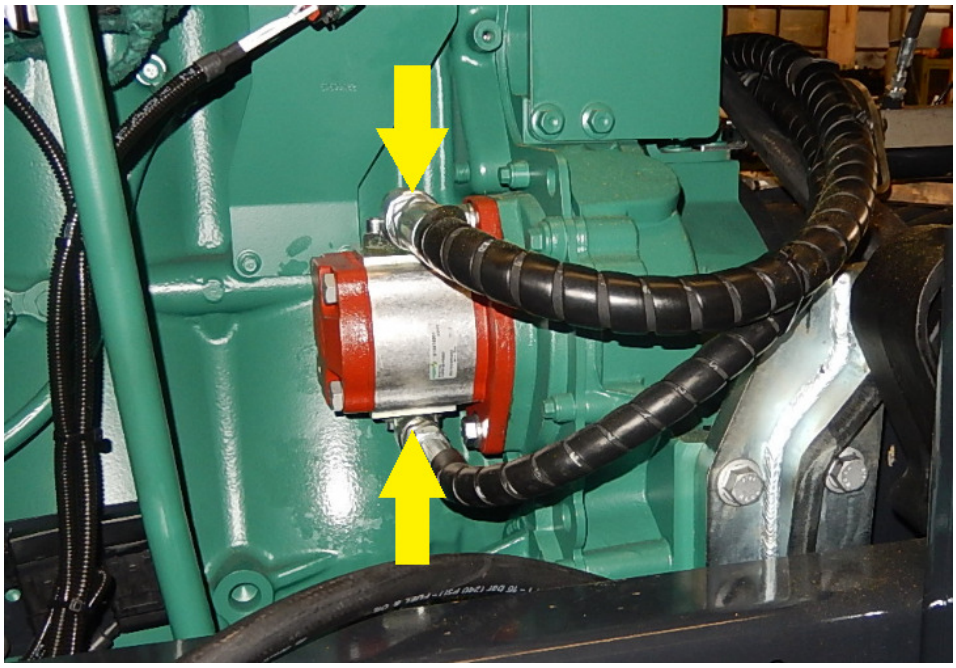
The steering system is composed by:

1. Oil tank;
2. Hydraulic pump;
3. Steering unit ORBITROL;
4. Steering cylinders
5. Master priority valve (for whole hydraulic system)
6. Steering hydraulic block for distribution.

2.2 TROUBLE SHOOTING

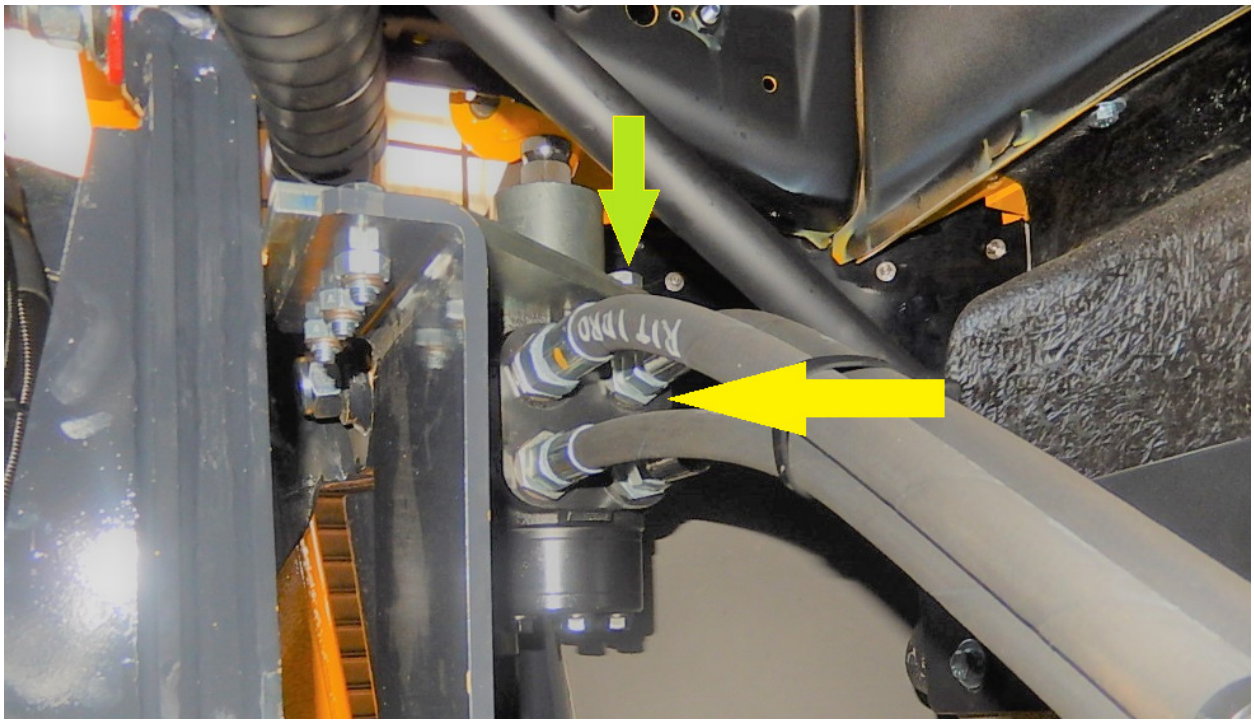
FAULT	CAUSE	REMEDY
Steering hard to perform	-tyres low pressure -hydraulic oil low level -air bubbles on the hydraulic circuit -hydraulic pump failure - Orbitrol failure	-inflate the tyre -refill the hydraulic tank -purge the system -replace the powersteering pump -replace the Orbitrol unit
Wheels loose the alignment frequently	-leaks from the system	-replace the damaged hoses or the cylinders gaskets - align the wheel (vehicle aligns the wheel automatically at every change of steering mode)

2.3 STEERING PUMP REPLACEMENT



1. Close the tap valve on the hydraulic oil tank
2. Remove the inlet and outlet hoses on the pump (yellow arrows);
3. Unscrew the two screws fo pump fixing;
4. Mount the new pump following the instructions in reverse, repace the pump seal.
5. Open again the tap valve on oil tank

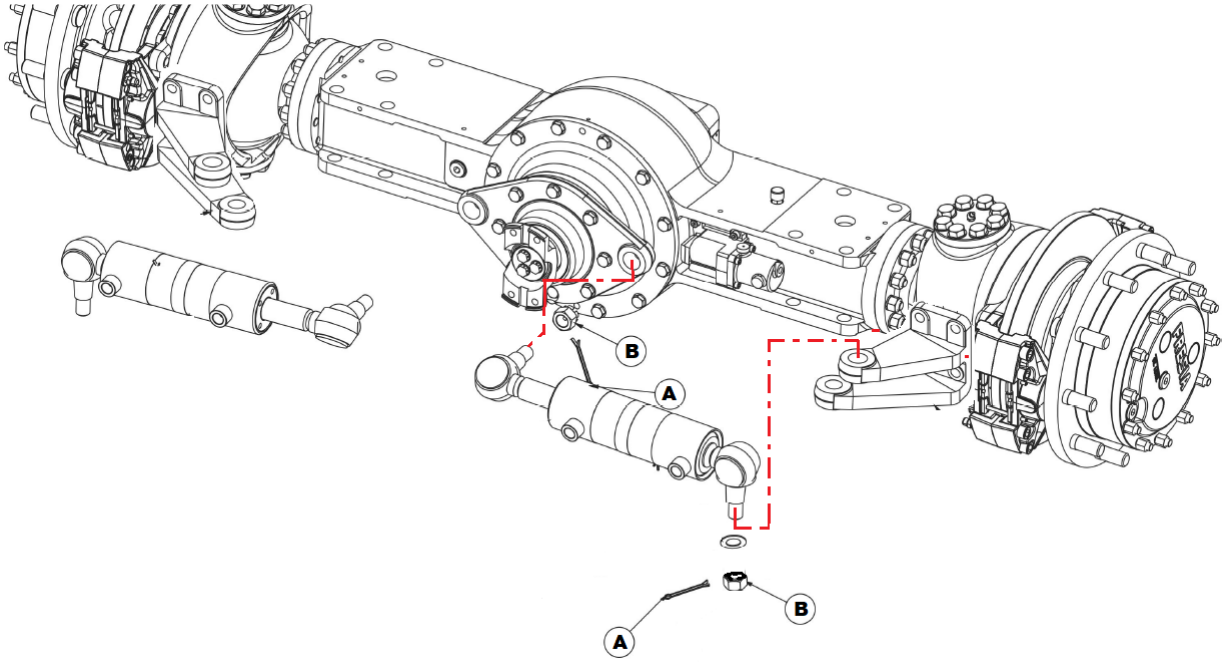
2.4 ORBITROL STEERING UNIT REPLACEMENT



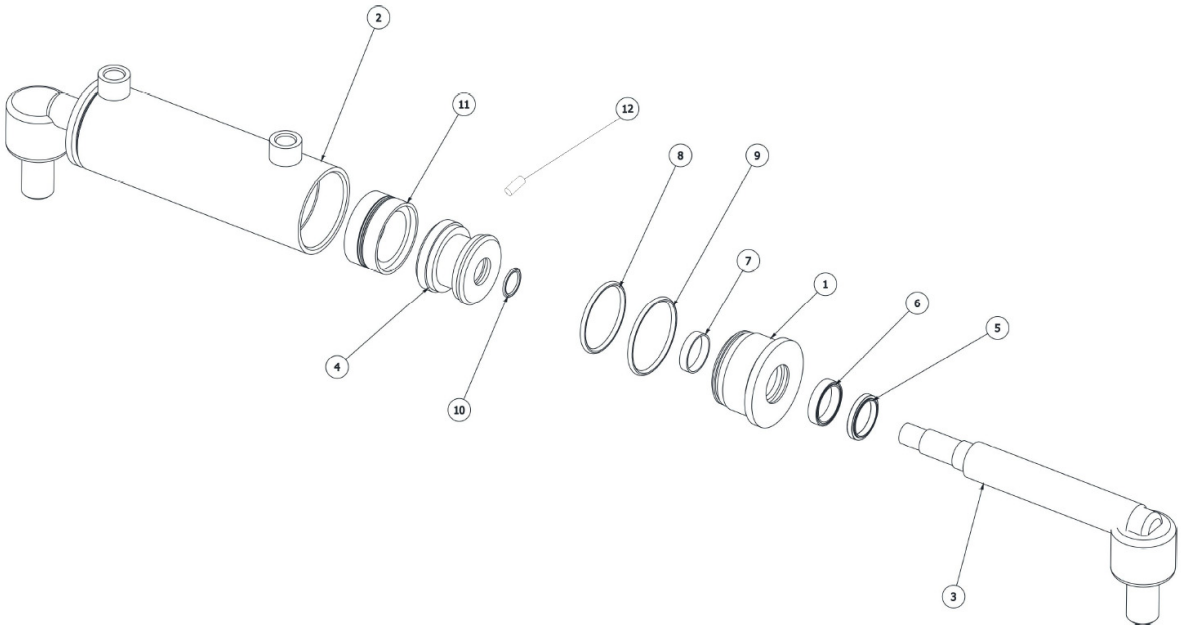
1. Put a container under the Orbitrol unit;
2. Disconnect the four hoses connected to the unit – yellow arrow (PUT A MARK TO REMEMBER THEIR RIGHT POSITION)
3. Unscrew the four screws fixing the unit to its bracket (green arrow)
4. Install the new unit following the upper instruction in reverse.
5. Check the oil level into the hydraulic tank

2.5 STEERING CYLINDER REPLACEMENT

1) Disconnect the two hoses connected to the cylinder (PUT A MARK TO REMEMBER THEIR RIGHT POSITION)
2) Remove the split pins under the steering head and unloose the nuts;
3) Lift the cylinder as he steering heads lide out fron their seats
4) Install the new cylinder performing the upper instructions in reverse;
5) Check the oil level into the hydraulic tank



2.6 STEERING CYLINDER DISASSEMBLY



1. Position the cylinder on a bech vise with soft jaws.
2. Unscrew the head plate (1);
3. Slide out the rod (3) and all its gaskets from the canne;
4. Unscrew the pin (2) to release the piston (4) from the rod;
5. Extract the gaskets either from the piston or from the head plate;
6. Clean carefully all the parts and preform the following verifies:

Canne:

Check that no scratches are present in the internal part;

Rod:

a) Check that no scratches are present on the rod surface;

b) Check the condition of the rod thred;

c) Check that the steering head has not the conicity worn and consequently a clearance.

If necessary, replace

Gaskets kit:

All the gaskets must be in perfect condition. If they are not, provide for the replacement.

IMPORTANT! We suggest to change the gasket kit everytime the cylinder is disassembled.

2.7 STEERING CYLINDER ASSEMBLY

1. Position the cylinder on a bech vise with soft jaws.
2. Moist, with oil, the piston the head plate and the rodn the gasket seats.
3. Insert the gaskets (6) and (7) in the head plate.
4. Insert the dust scraper (5) in its seat on the top and push it with a fingher along the perimeter, to allow it a perfect adhesion. BE CAREFULL NOT TO WASTE THE SCRAPER
5. Mount the two OR rings 8 and 9;
6. Insert the rod into the head plate, BE CAREFULL NOT TO DAMAGE THE GASKETS
7. Insrt on the piston (4) the OR ring 10 and the gasket 11
8. fix the piston on the rod by the pin 12 BE CAREFULL NOT TO DAMAGE THE GASKETS
9. Remove the rod from the bench vise ans put on the canne.
10. Moist all the internal part of the canne with oil
11. Insert into the canne the assembled rod BE CAREFULL NOT TO DAMAGE THE GASKETS
12. Screw the head plate on the canne.
13. Perform a test, fulling the cylinder with pressurized oil (10 bar) Check that no leak is present.

SECTION 3
HYDROSTATIC SYSTEM REPAIR

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3.1 GENERALITY

The hydrostatic system gives the power for the vehicle motion. It is composed by:

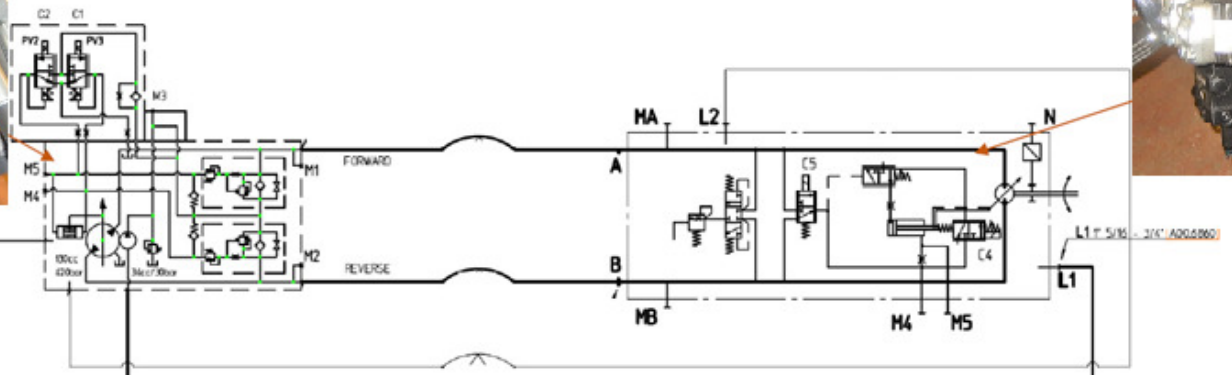
1) Oil tank in common with the hydraulic system
2) Heat exchanger (for oil cooling)
3) Hydrostatic pump mounted on two speed back gear
4) Hydrostatic motor mounted on transfer

3

PUMP

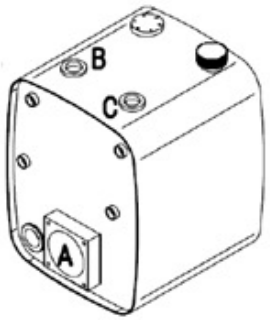
MOTOR

4



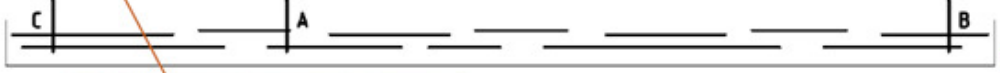
EXCHANGER

2



ONE WAY VALVE

FILTER

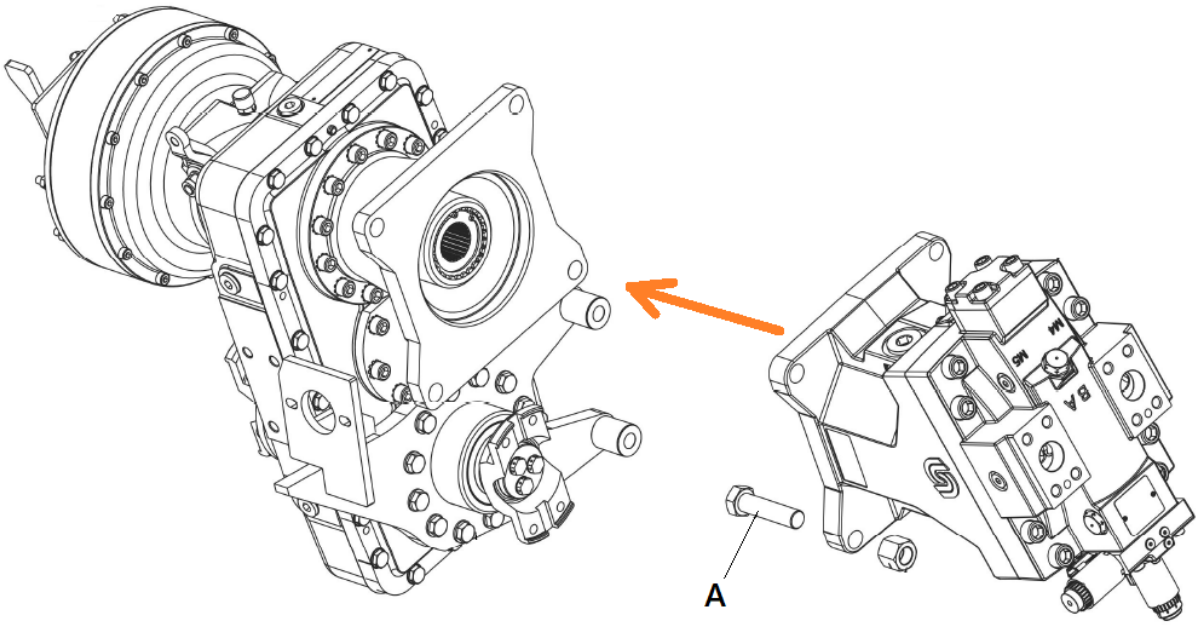


OIL TANK

1

3.2 HYDROSTATIC MOTOR DISASSEMBLY

1. Disconnect all the hydraulic hoses on the motor.
2. Unscrew the bolts A to slide out the motor from its support

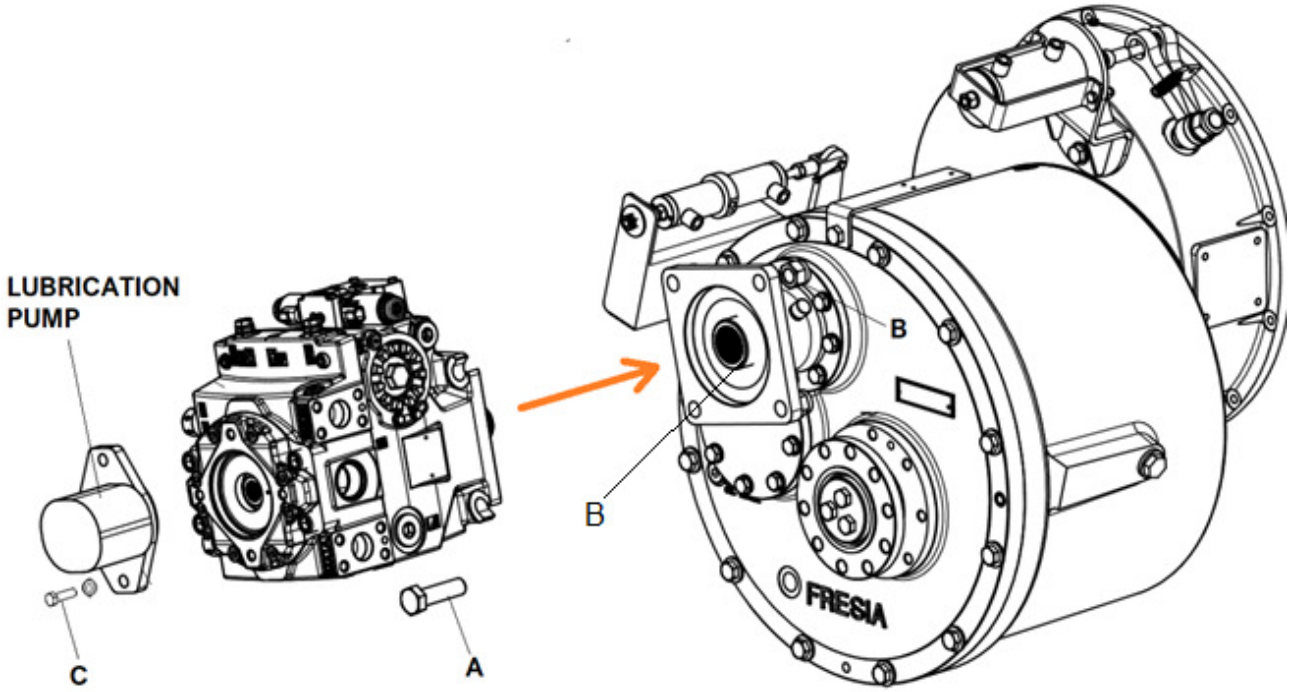


To reassemble:

3. Insert the motor shaft into the internal sleeve on the motor support
4. Tighten the bolts A.

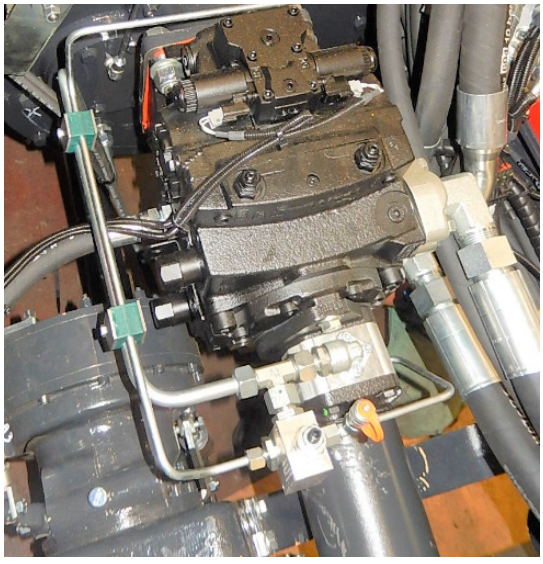
3.3 HYDROSTATIC PUMP DISASSEMBLY

1. Disconnect all the hydraulic hoses on the pump
2. Remove the lubrication pipes
3. Unscrew the bolts A to slide out the pump from the pump support
4. Remove the bolts C to disconnect the lubrcation pump from the hydrstatic pump



To reassemble:

5. Insert the motor shaft into the internal sleeve B on the motor support
6. Tighten the bolts A.



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AXLES REPAIR

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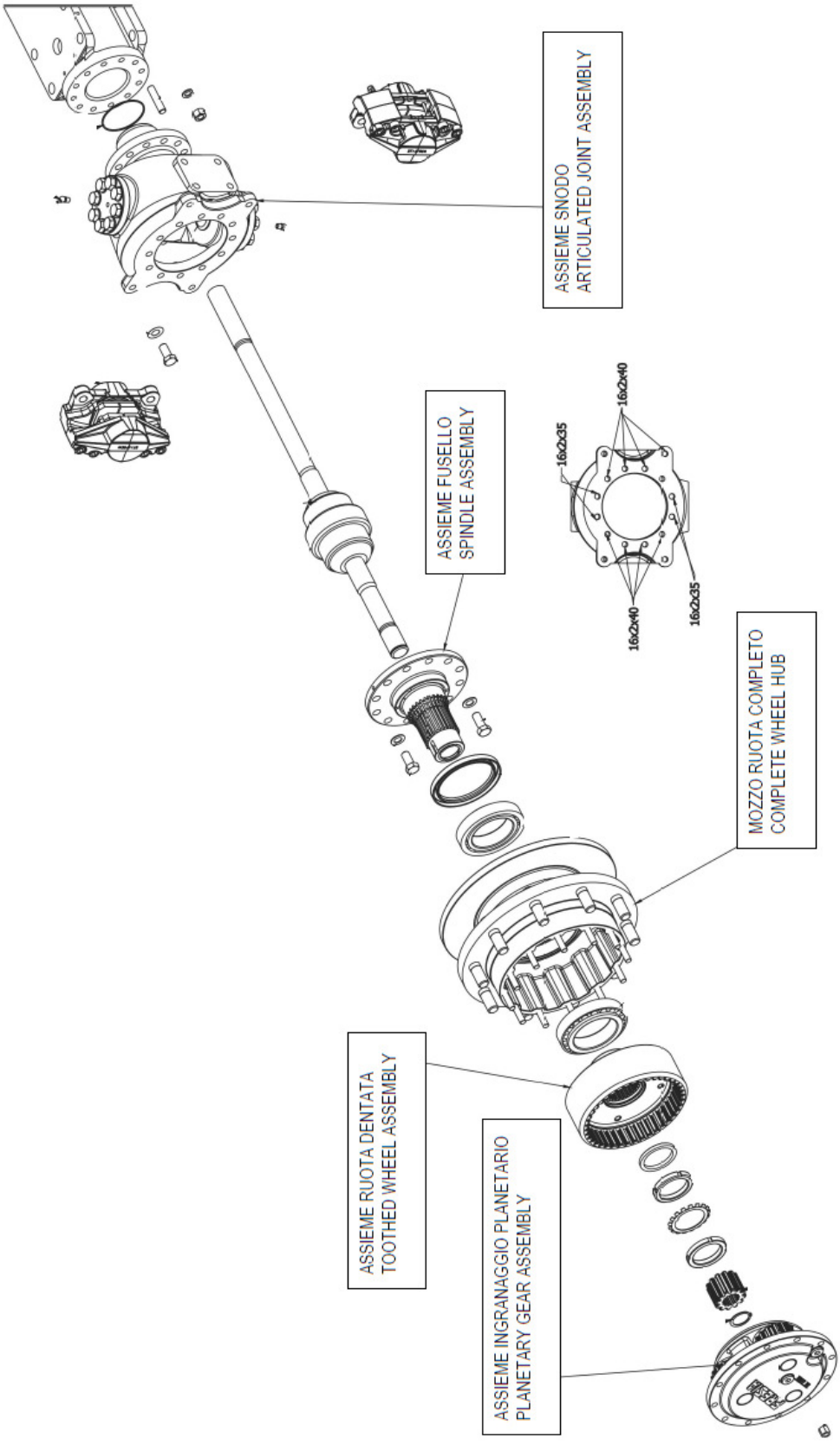
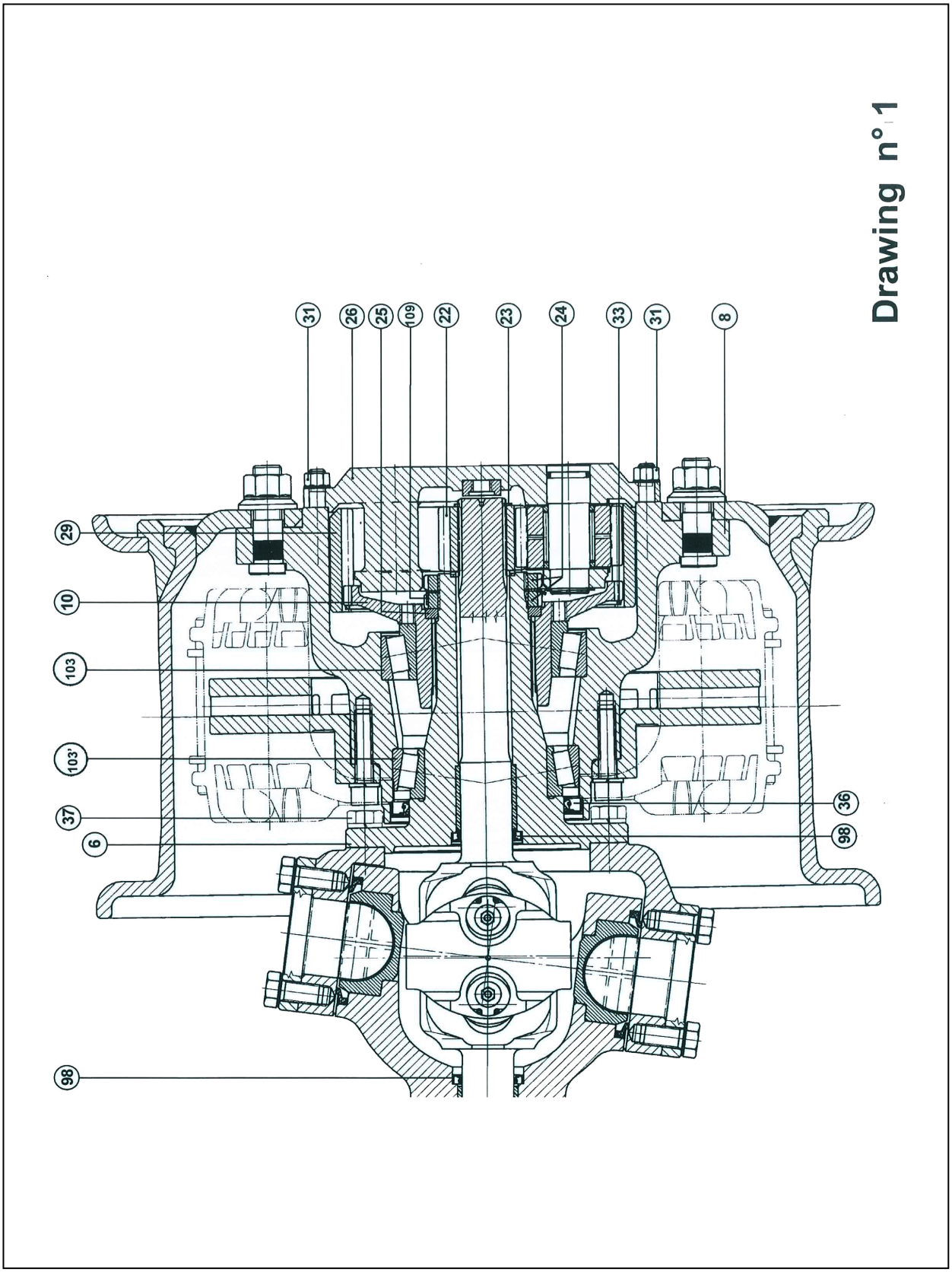
4.1 FRONT and REAR AXLE LAY OUT




Drawing n° 1
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6
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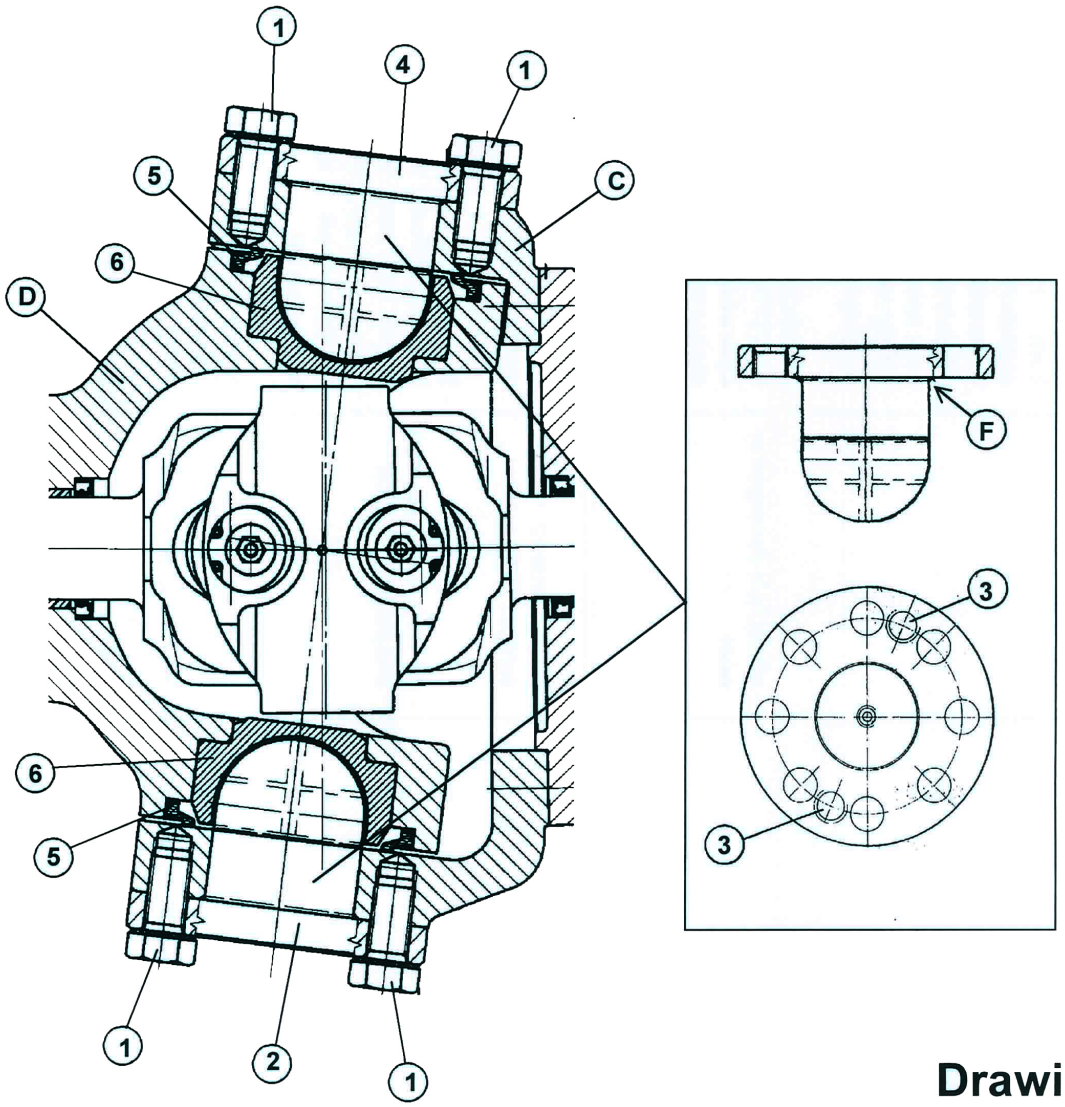
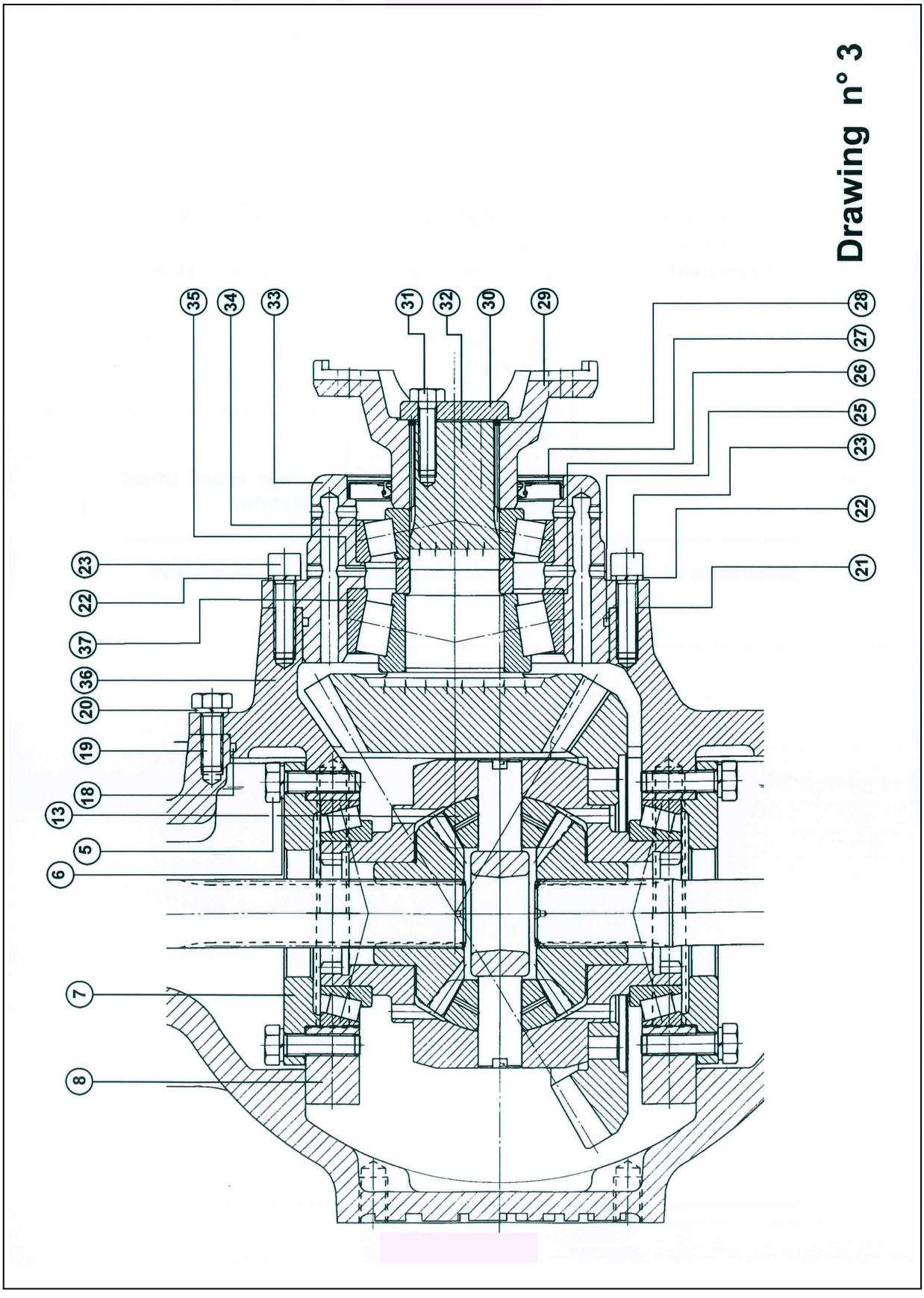
36
98



Drawing n° 2


Drawing n° 3
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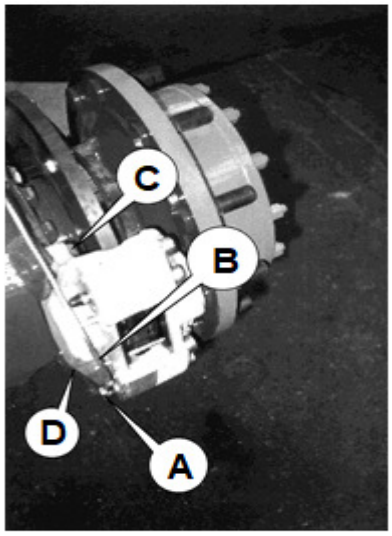
4.2 TROUBLE SHOOTING

FAULT	CAUSE	REMEDY
wheel hubs noisy	Wheel hub bearing not adjusted	Make the hub disassembling operation from 1 to 6 (see disassembly procedure) and in the operation 8 loose one of two nuts #24, then proceed with hub assembly starting from operation 15 to 27.Finally restore the proper oil level (operation 29)
	Wheel hub damaged or worn	Substitute the bearings in the hub #103 #103'
	Fault caused by oil scraper #36	Substitute the oil scraper #36. Disassemble the hub
hub oil leak	Oil leak between the hub and planetary holder	Follow the hub disassembly procedure from 1 to 3. Mount the hub back following instructin from 25 to 27
wheel hub oscillation	Wheel hub bearings not adjusted	Disassembly operations from 1 to 6 and in the operation 8. Loose one of two nuts #24, then proceed with hub assembly starting from operation 15 to 27.Finally restore proper oil level (operation 29)
wheel oscillation	-Worn out bronze seat nr. 6	-Remove thicknesses of position F
	Seats nº 6 damaged or worn	-Follow all steering joint disassembly and assembly operations and replace the seats #6
the locking does not engage	-the electrovalve does not send air to the differential locking	-check the electric system electrovalve
	-locking sleeve damaged or worn	-replace the sliding sleeeve
	-locking fork damaged	-replace differential locking
the locking does not disengage	-locking sleeve damaged	-replace the sliding sleeve
	- axle shaft is bent	-replace the axle shaft
the axle does not draft	-axle shaft damaged	-replace axle shaft
oil leak between axle and joint	-inner oil seal #98	-follow all the operations of axle shaft disassem bly and follow all operations of axle shaft assembly
	-outside oil seal #98	-follow the operations from 1) to 8) of the steering joint disassembly and follow the operations a), b), c) and d) of axle

		shaft assembly referred to the spindle side oil seal. Follow all the operations of steering joint assembly.
noisy differential	-adjust pinion bearings -replace pinion bearings -replace crown bearings -replace crown wheel and pinion	-pinion bearings not adjusted -pinion bearings are damaged -crown bearings are damaged -crown wheel and pinion worn
pinion leaks oil	-replace oil seal #27	-oil seal #27 damaged

4.3 PLANETARY GEAR AND WHEEL HUB DISASSEMBLY (REF TO DWG. 1)

1. Drain oil from the planetary gear as indicated in the "Use and maintenance manual";
2. Unscrew the nuts #31;
3. Remove the whole planetary holder #26;
4. Remove with proper pliers the seal ring #23;
5. Draw out the central pin #22;
6. With a screwdriver lift the tooth of safety ring #109 from nut #24;
7. Remove the brake calipers (following picture):
    a. Remove the joint A from both caliper;
    b. Disconnect the lines B;
    c. Remove screws C and D and Remove the calipers from their support.

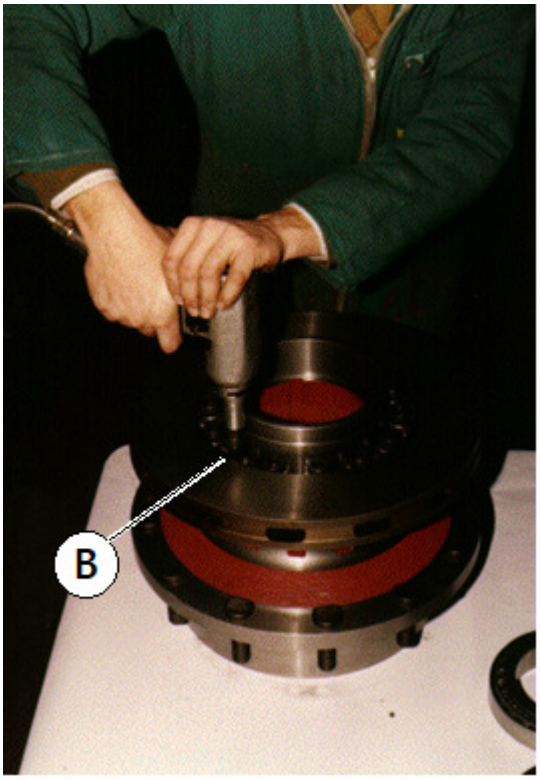


8. Loose the nuts #24;
9. Remove the sprocket wheel shoulder ring #10.
   (The sprocket wheel #29 will come out as well as the bearing #103,#103');
10. Remove the hub #8;
11. Remove inner bearing #103,#103';
12. Loose the screws #37;
13. Draw out the pin #6.

4.4 BRAKE DISK DISASSEMBLY

After the removing of the planetary gear and the wheel hub, proceed as follows:

1. Place the wheel hub on a bench as shown in figure;



2. Unscrew the screws B;
3. Remove the brake disk;
4. For brake disk assembly, do the same operations in reverse.

4.4 PLANETARY GEAR AND WHEEL HUB ASSEMBLY (REF TO DWG. 1)

1. Place the hub #8 on a bench;
2. Insert the outside ring of bearing #103,#103' in the hub;
3. Make sure that the ring is tight in its position;
4. Turn the hub of 180 degrees.
   Repeat the operation 2) and 3) for the other ring of bearing #103,#103';
5. Place the other side of bearing #103,#103' on the internal side of the vehicle.
   (Bringing the inner side of the bearings at about 110 degrees, the assembly of the hub will be facilitate);
6. Insert the oil scraper #36. Make sure that it is properly positioned and tight;
7. Insert the hub #8 on the spindle #6.
8. Be careful not to damage the scraper #36;
9. Make sure that the inner bearing ring #103 is properly positioned into the hub;
10. Place the sprocket wheel #29 on a bench, with the part with the safety ring to the top;
11. Place the sprocket rim #10 in the sprocket wheel #29;
12. Place the safety ring #33 on the sprocket wheel #29;
13. Heat the inner side of bearing ring #103 up to about 110 degrees Centigrade.
    Mount it on the sprocket rim #10 and make sure it is tight;
14. Place the sprocket rim #10 on the pin #6;
15. Insert ring #25 between the sprocket rim #10 and the pin #6;
16. Place one of the two nuts #24 on the spindle #6 and tighten;
17. Make sure it is well adjusted on the sprocket rim #10;
18. Tighten the nut again, and repeat the operation 16);
19. Test the hub rotation turning it manually.
20. At this point loose the nut of 1/8 of a turn;
21. Insert the safety ring #109 and fold a ring tooth securing it on the nut #24;
22. Put on the thread of the other nut #24 some LOCTITE 510;
23. Tighten the nut #24 strongly and fold a tooth of the safety ring #109;
    Place the central pin #22;
24. Mount the seal ring #23 on the axle shaft;

25. Clean accurately the hub #8 outside border and put some LOCTITE 510 on it;
26. Place the whole planetary gear holder #26 into the sprocket wheel #26;
27. Tighten bolts #31;
28. Mount the brake calipers;
29. Restore the proper oil level as indicated in the Use & maintenance manual.

4.5 STEERING JOINT DISASSEMBLY (REF. TO DWG. 2)

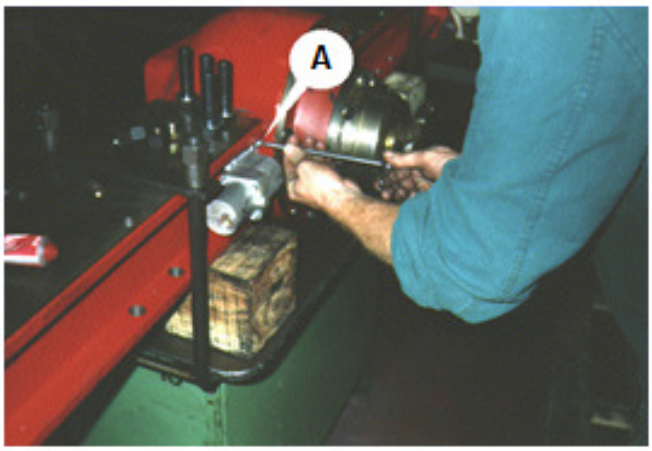
1. To remove the cylinder rod, take cotter pin out, then unscrew nut;
2. Follow the planetary gear and wheel hub disassembly instructions from points 1 to 5;
3. Remove the flexible hose from braking system;
4. Remove the screws above and beneath the steering joint;
5. Take pin #2 out through the two thread holes #3;
6. Take pin #4 out through the thread holes #3;
7. Slide the whole hub/joint part C, taking care that the axle does not go out of the axle case;
8. Remove gaskets #5;
9. Remove seat #6.

4.6 STEERING JOINT ASSEMBLY (REF TO DWG. 2)

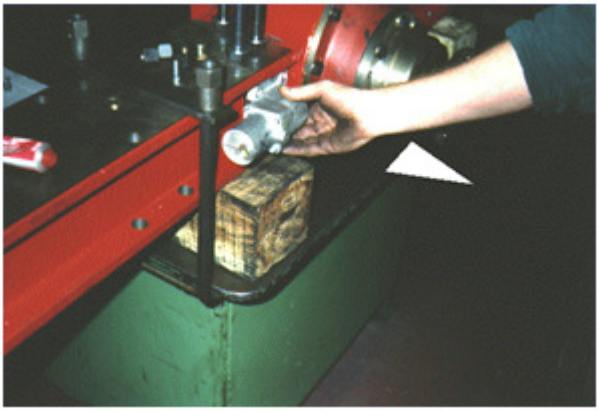
1. Insert the seats #6 on joint D;
2. Place gasket #5;
3. Bring the joint support C in position on joint D, pulling the axle shaft inside the hub, taking care of not breaking the outside oil seal #98;
4. Insert pins #2 and #4.
5. Fix pins with the four screws #1;
6. Check with a lever that the joint support and the joint have no play;
7. Should any play be found, add spacers at pins #2 and #4 (add spacers in position F).
8. To insert the spacers, make the operations described at points 4) and 5) of the steering joint disassembly instructions; When no play is left, turn the joint manually.
9. The rotation must be done with some difficulty;
10. Tighten the screws #1.
11. Place the central pin #22;
12. Mount the seal ring #23 on the axle shaft;
13. Clean accurately the hub #8 outside border and put some LOCTITE 510 on it;
14. Place the whole planetary gear holder #26 into the sprocket wheel #29;
15. Tighten screws #31;
16. Restore proper oil level as indicated in "Operating, Maintenance and Service Manual".
17. Replace the flexible hose from braking system;
18. Bleed the service brake as shown in the "Brake System: Shop Repair Manual".

4.7 DIFFERENTIAL LOCK DISASSEMBLY

1. Remove the air pipe from differential lock;
2. Loose the screws A



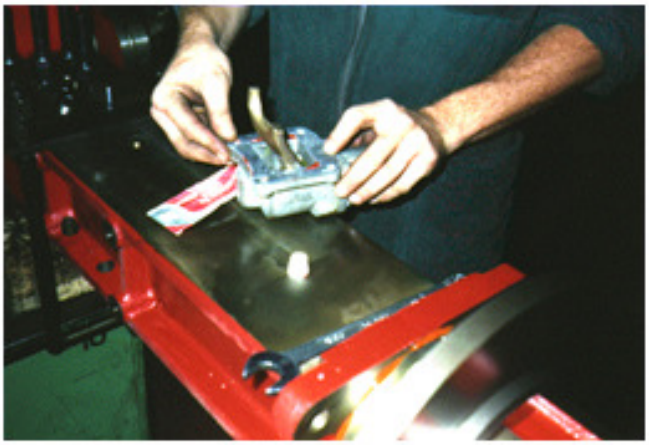
3. Pull the differential lock out as shown;



4.8 DIFFERENTIAL LOCK ASSEMBLY

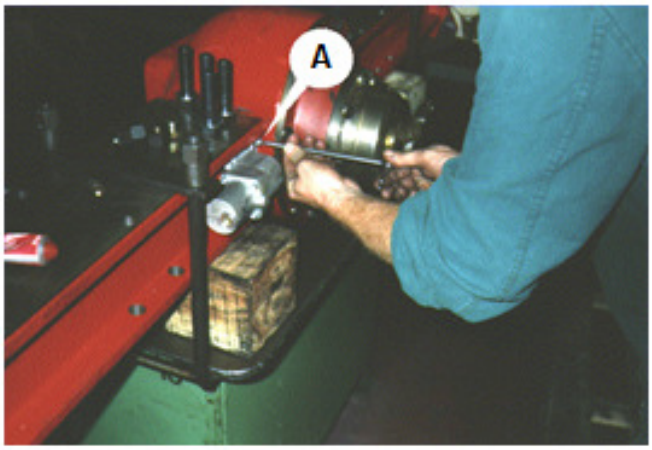
1. The parts necessary for the assembly are listed below:
   a) differential lock body;
   b) seals KIT;
   c) screws;
   d) seal paste (LOCTITE 510);
   e) wrench;

2. Spread some seal paste on the bottom surface where you are going to place the differential lock;
3. Put the seal around the differential lock (Pict. 2.6);



4. Position the differential lock body checking that the locking devicefork enter the groove in the sliding sleeve;

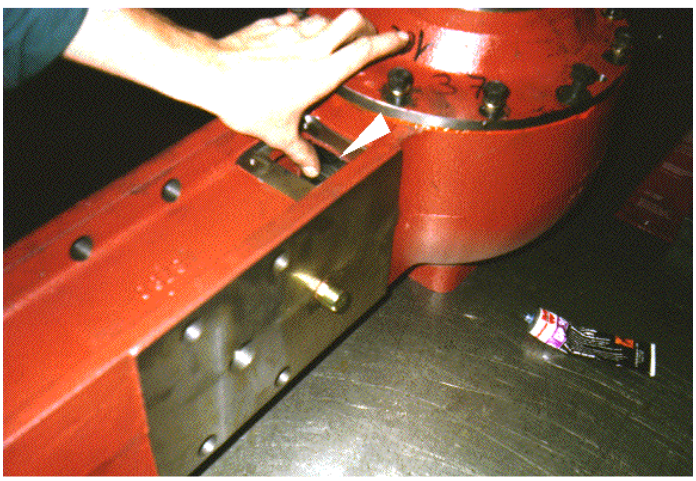
5. Tighten the differential lock screws A (nº 4 screws) on the axle



4.9 AXLE SHAFT REPLACEMENT

1. Remove the steering joint
2. When replacing the axle shaft on differential lock side, remove the differential lock
3. Pull the axle shaft out taking care of removing all axle shaft parts from inside the axle;
4. Slide the axle shaft

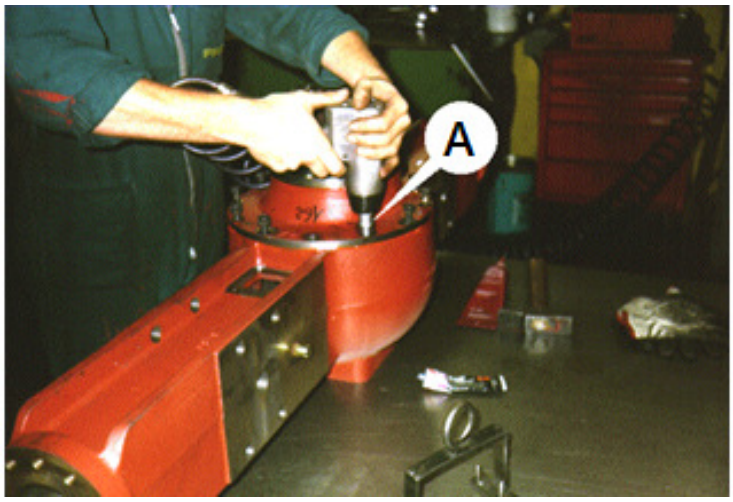
WARNING!: When replacing the axle shaft on the differential lock side the locking collar must be pushed into the differential box through the opening as in figure.



5. Mount the steering joint back. If it has been replaced the axle shaft on differential lock side

4.10 DISASSEMBLY OF DIFFERENTIAL BOX FROM AXLE

1. Pull both axle shafts out
2. Take the propeller shaft away from axle;
3. Loose the 4 screws A in figure



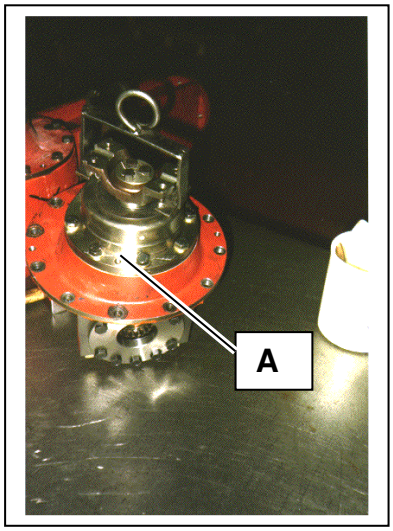
4. Pull the differential box out from axle.

4.11 ASSEMBLY OF DIFFERENTIAL BOX ON AXLE

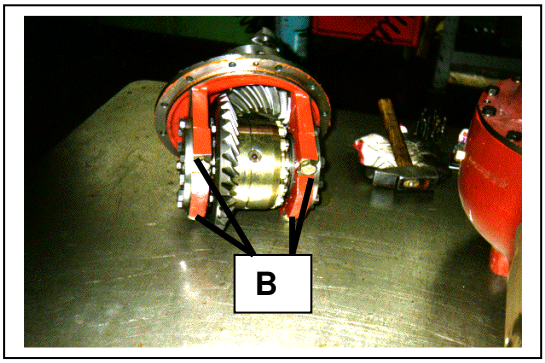
1. Place the differential box on axle;
2. Tighten screws A as shown in previous figure;
3. Assembly the axle shafts;
4. Place the propeller shaft back on the axle.

4.12 DIFFERENTIAL BODY DISASSEMBLY (Drawing nº 3)

1. Put the differential body on a working table;
2. Cut the iron wire connecting the screws #31;
3. Remove the screws #31;
4. Take the flange #29 out;
5. Remove screws #23;
6. Insert two screws into the holes A (following figure) to pull the pinion group out;



7. Place the pinion body on a large tube with the pinion point facing downwards. With a hammer strike gently and repeatedly on the pinion to push it out;
8. Remove the oil seal #27;
9. With proper tool, remove the bearing #34;
10. Turn the pinion support and remove the bearing #37 (use proper tool);
11. Remove the O-ring #25;
12. Put the differential on a working table with the clamping side of the pinion body facing downwards;
13. Remove the screws #5 from both flanges #7;
14. Remove the 4 screws B



15. With a rubber hammer, strike gently on the two clamps #8 and take them out;
16. Remove the two covers #7;
17. Pull the differential crown part out;
18. Place the differential crown part on a working table with the crown facing upwards;
19. Remove the screws #10';
20. Remove the crown from the differential.

4.13 DIFFERENTIAL BODY ASSEMBLY (Drawing nº 3)

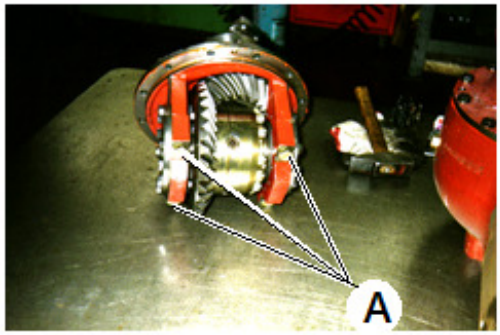
1. Clean accurately the pinion support #33;
2. Place the pinion support on a table with the large bearing hole facing upwards;
3. Insert with a striker the outside ring of bearing #37 into the pinion support. Check that it is well positioned;
4. Turn the pinion support of 180 degrees and insert with a striker the outside ring of bearing #34 into the pinion support checking that it is well positioned;
5. Place the pinion #32 on a working table with the shaft facing upwards;
6. Heat with proper device the inner ring of bearing #37 at 110 degrees centigrade. Insert it into the pinion and check it is well positioned;
7. Insert the pinion support #33 on the pinion #32;
8. Place 0,2 mm of adjusting shims #26;
9. Place the spacer #35;
10. Heat with proper device the inner ring of bearing #34. Insert it into the pinion and check it is well positioned against the spacer #35;

11. Mount the flage #29;
12. Place the cover #30 on the flange and tie the three screws #31;
13. Place this group into a vice with alu calipers;
14. Place a comparator on the flange and move the flange with a lever.
15. The comparator should mark a play of 0,1 to 0,3 mm.
16. Should the play range be less or more than this value, add/remove adjusting shims #26;

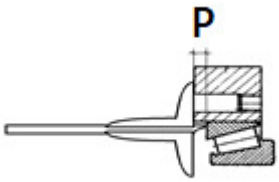
EXAMPLE!: Comparator signs 0,005 mm of play. Add shims #26 for a thickness of 0,05 to 0,25 mm.

NOTE!: It is advisable to always add shims to reach the medium tolerance (in the example above therefore it is advisable to add 0,15 mm of thickness).

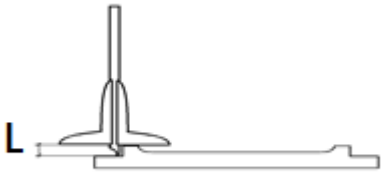
17. If the play registered is not correct, remove the screws #31, remove the cover #30 and flange #29.
18. Then pull out the inner ring of bearing #34, the spacer #35 and then add or remove the shims;
19. When the play registered is correct, remove the screws #31, remove the cover #30 and flange #29;
20. Insert on the crown holder the oil seal #27 and grease it on the boarders;
21. Insert the flange #29;
22. Grease and insert the O-ring #28;
23. Insert the cover #30 and tighten the screws #31;
24. Put iron wire in the screws #31 holes;
25. Grease and insert the O-ring #25 in its place;
26. Put the differential on a working table with the crown attachment facing upwards;
27. Insert the crown on the differential and tighten the screws #10';
28. Heat with proper device the inner ring of bearing #9 at 110 degrees centigrade.
    Insert it in the differential checking that it is well positioned;
29. Turn the crown differential group of 180 degrees and repeat the operation 28) for the other bearing;
30. Place the differential support #36 on a working table leaning on the pinion attachment side;
31. Insert the outside rings #9 on bearings #9;
32. Place the crown differential group - bearings in its proper support;
33. Insert the clamps #8 on the bearings;
34. Tighten the four screws A.



35. Measure with a depth gage the distance between the point where the cover #7 touches the clamp #8 and the bearing #9. Note this measure, that will be named as P);

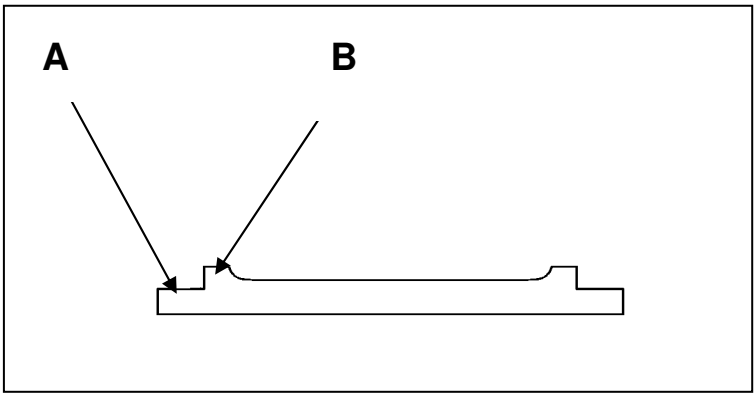


36. Measure with a depth gage the thickness of the cover #7 stop. Note this measure that will be named as L;



37. Calculate the difference between these two measures (P - L) whichwill be named as X;

If the resulting X value is negative, adjusting shims will be placed on the surface A of cover #7 for a total value equal to X.

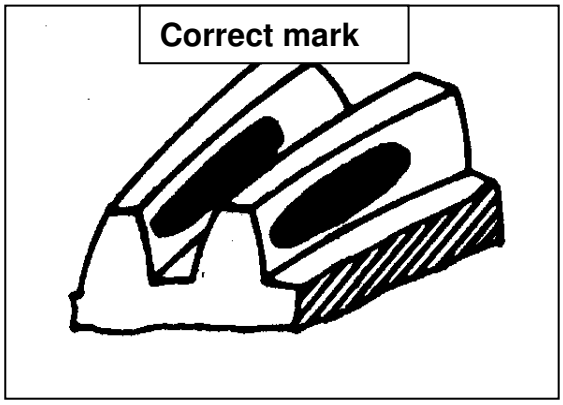


If the resulting X value is positive, adjusting shims will be placed on the surface B of cover #7 (Pict. 2.18) for a total value equal to X.

38. Repeat the operations 35), 36) and 37) for the other cover;

39. Insert the pinion group (pre-assembled) into its seal and tightenscrews #23;

40. Examination of the contact print:
    Instructions:
    Spread some dark blue on the crown teeth, then turn the crown more times onward and backward. The contact is correct if the mark on the teeth is similar to that shown;

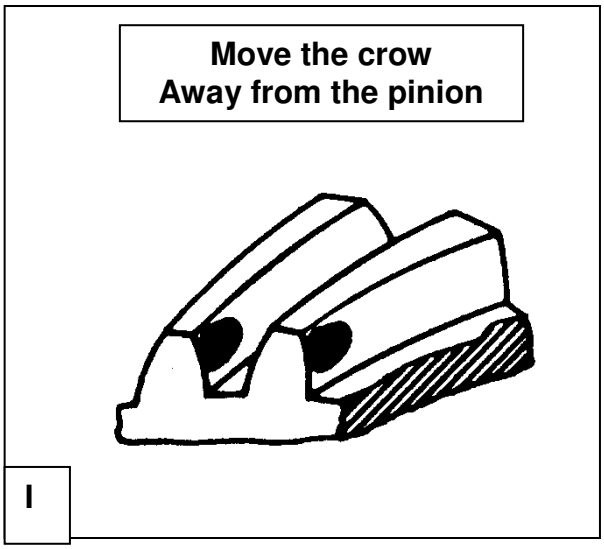


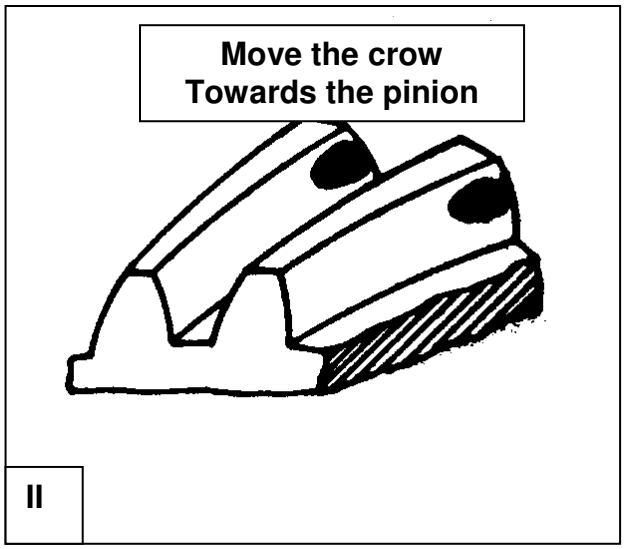
It is important to consider this examination in two aspects:

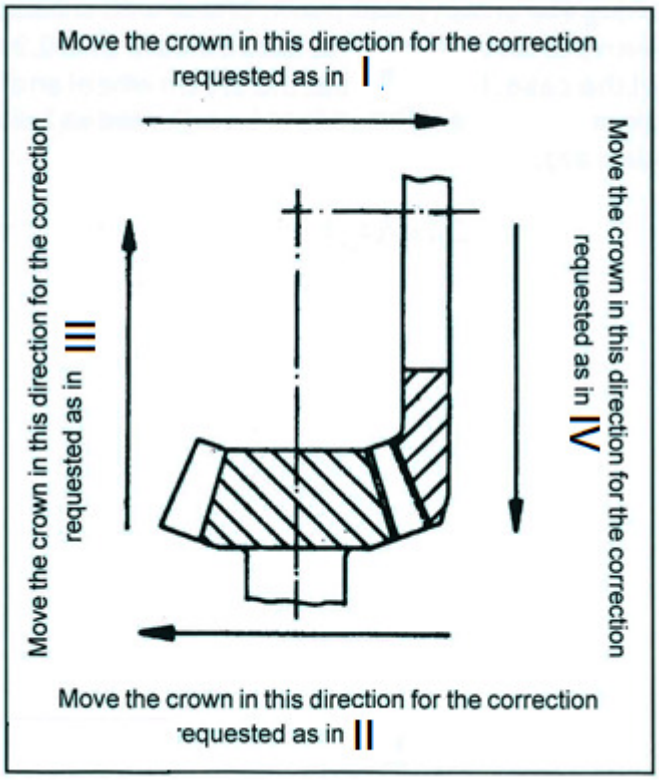
- Look at lenght of the mark.
- Look at the mark position in tooth height (profile mark).

The two aspects must be considered separately.
The length of mark relates to the crown movements and the profile mark relates to the pinion movements.

Length of mark:
If the contact is as shown in Pict. I and Pict. II, you should act as follows.

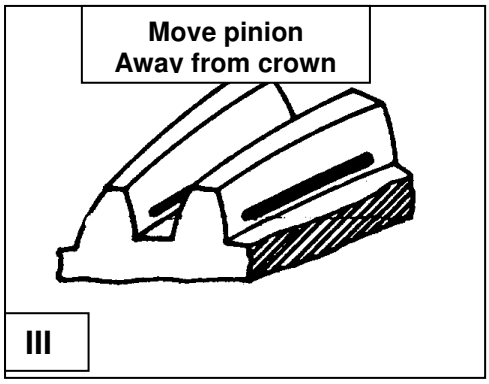


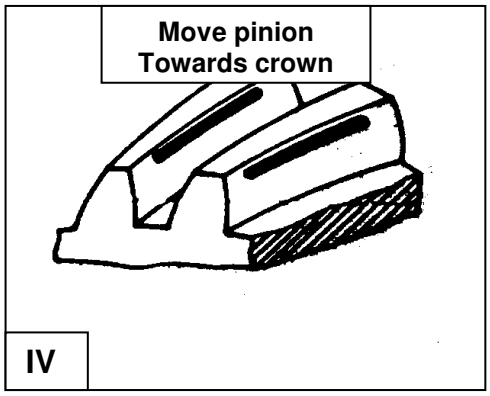




To move the crown from one side to the other, it is necessary to place some shims on the cover #7 surface B then repeat on the opposite side the same operations 35), 36) and 37).

Profile mark:
If the contact mark is as that shown in Pict. III and Pict. IV, it is necessary to move the pinion as indicated above.





To move the pinion backwards, remove screws #23 and place shims on the pinion holder bearing surface #33 and on the differential support #36.
To move the pinion onwards, disassemble the pinion holder group as indicated before, and place shims between pinion #32 and bearing #37;

41. After checking the crown teeth mark, check with a comparator that the play between pinion and crown is between 0,2 and 0,3 mm. If this is not the case, it means that the crown wheel and the pinion group is not correctly regulated, and it needs to be adjusted as before by repeating the operation 40);

42. Grease and insert the O-ring #18 in its seat on the differential support.

SECTION 5
TRANSFER REDUCER REPAIR

Sommario

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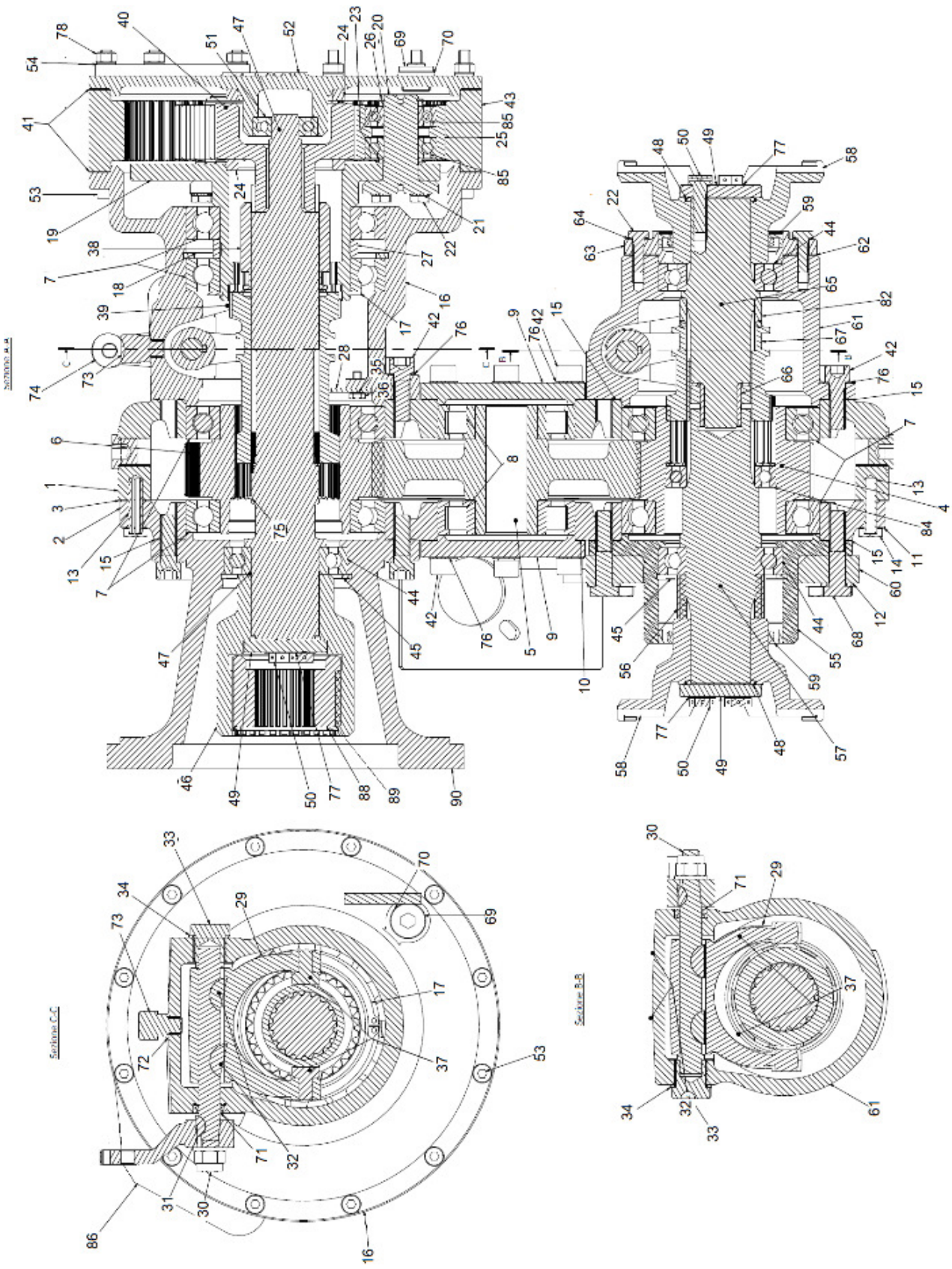
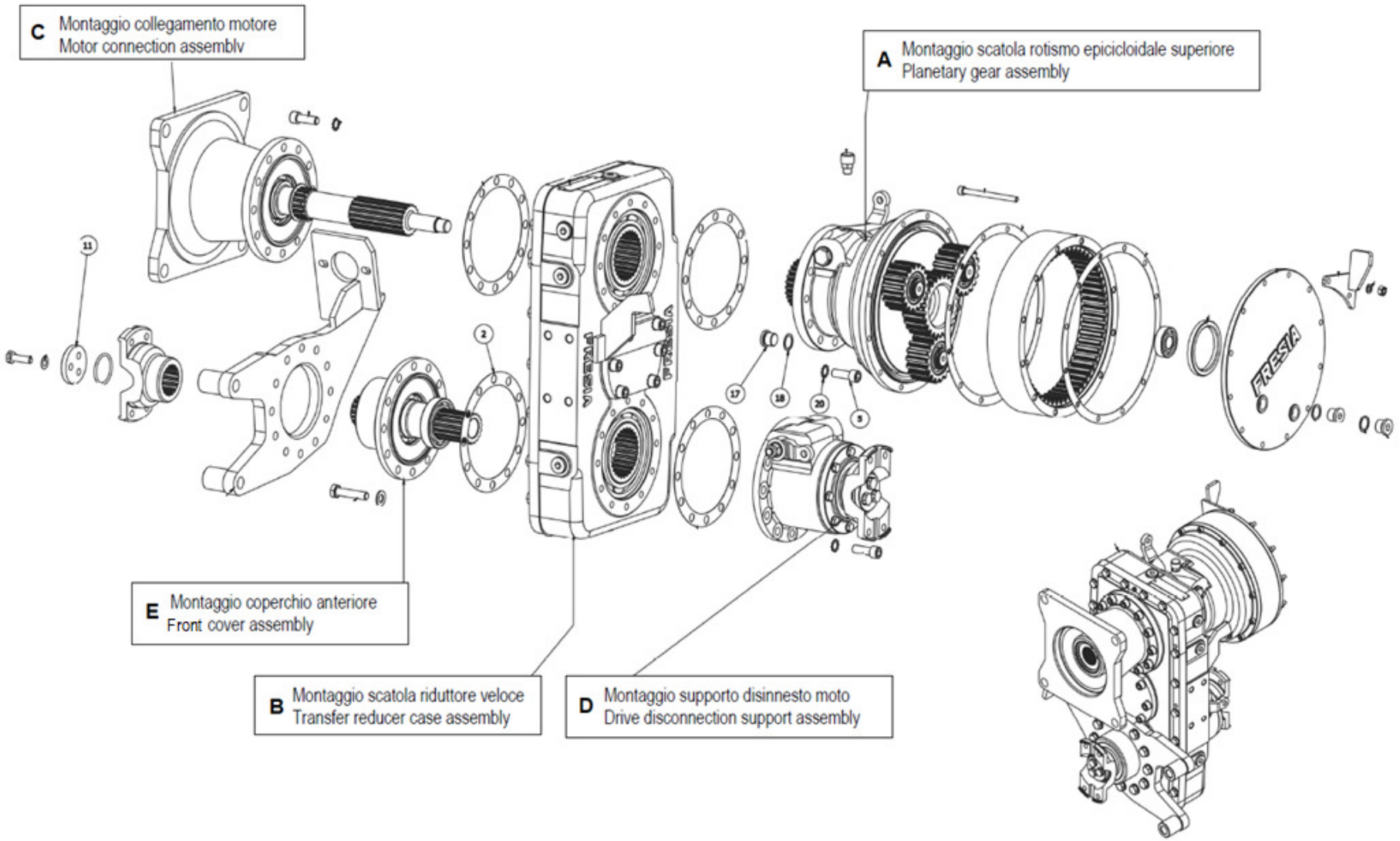
5.1 GENERALITY

The transfer reducer transmits the power of the hydrostatic motor to the front and to the rear axle. The mechanical reduction takes place by means of an upper epicyclic gear, on the opposite side of the hydrostatic motor. The motion passes from the upper gear to the central gear (idle), which transmits it to the lower part. Rear-wheel drive can be cut off. The parking brake is installed at the exit of the front shaft

5.2 TRANSFER DRAWINGS



ITEM	Q.TY	DESCRIPTION
1	1	TRANSFER HALF CASE
2	1	COVER
3	1	PAPER GASKET
4	1	THIRD GEAR
5	1	CENTAL GEAR Z=28
6	1	DRIVE GEAR Z=27
7	6	RADIAL BEARING 6019
8	2	BEARING CYLINDRIC NJ 309 ECP
9	2	CENTAL COVER
10	2	PAPER GASKET
11	22	CONIC WASHER
12	14	WAVE WASHER D.12
13	2	ELASTIC PIN 10X40
14	22	SCREW 10X1,5X40
15	4	PAPER GASKET
16	1	UPPER PLANETARY GEAR CASE
17	1	SEEGER RING E95
18	1	SEEGER RING I 145
19	1	FUSE
20	3	PIN
21	12	SCHNORR WASHER D.8
22	20	SCREW 8X1,25X25
23	6	SPACER
24	2	SHIM
25	3	SATELITE GEAR
26	3	SEEGER RING E25
27	1	SPACER
28	1	PLATE
29	2	FORK
30	2	SHAFT
31	2	SPLINE
32	4	SPLINE
33	2	BUSHING
34	2	THICKNESS
35	2	WASHER SCHNORR D.6
36	2	6x1x16 Vite TE TF 8G ZN/ZG
37	4	SCREW 6X1X16
38	1	SECONDARY SYNCHRONZER
39	1	FIRST SYNCHRONIZER
40	1	PLANETARY GEAR
41	2	PAPER GASKET FOR INTERNAL GEAR
42	51	ALLEN SCREW 12X1,75X35
43	1	INTERNAL TOOTHED CROWN
44	3	BEARING 6210
45	2	SEEGER RING E90
46	1	SLEEVE
47	1	FIRST SHAFT
48	2	OR RING 42,86X3,53
49	3	WASHER SCHNORR D.6
50	9	SCREW
51	1	BEARING
52	1	COVER
53	12	ALLEN SCREW 8X1,25X100
54	13	PLANE WASHER
55	1	REAR COVER
56	1	SPACER
57	1	REAR SHAFT
58	2	FORK C6
59	2	OIL SEAL 70X90X10
60	1	PARKING BRAKE SUPPORT
61	1	DRIVING DISCONNECTION SUPPORT
62	1	PAPER GASKET
63	1	COVER
64	8	WAVE WASHER D.8
65	1	FRONT OUTPUT SHAFT
66	1	BUSHING
67	1	SYNCHRONIZER
68	12	SCREW 12X1,75X55
69	10	PLUG
70	10	WASHER D.20
71	2	OIL SEAL 16X24X15
72	1	WASHER
73	1	BREATHER PLUG
74	1	SCREW 6X1X16
75	1	SEEGER RING
76	51	SCHNORR WASHER
77	9	WAVE WASHER
78	12	NUT D.8
82	1	THICKNE SS RING
83	1	CONTROL LEVER
84	1	BEARING 6010
85	6	BEARING 6205
86	1	CYLINDER SUPPORT
88	1	INTERNAL SLEEVE FOR PUMP
89	1	SEEGER RING
90	1	MOTOR SUPPORT


C Montaggio collegamento motore
Motor connection assemblv
A Montaggio scatola rotismo epicicloidale superiore
Planetary gear assembly
E Montaggio coperchio anteriore
Front cover assembly
B Montaggio scatola riduttore veloce
Transfer reducer case assembly
D Montaggio supporto disinnesto moto
Drive disconnection support assembly
FRESIA

5.3 TRANSFER UNISTALLING FROM THE VEHICLE

To proceed for transfer repair, it is necessary to remove it from the vehicle
Move the vehicle over an inspection pit.

DANGER – USE PROPER LIFTING EQUIPMENT

- Empty the transfer from oil
- Remove the hydrostatic motor
- Remove the parking brake from its support
- Remove the cylinders for change the speed and rear axle disconnection
- Tie accurately the transmission shafts, before disconnecting them from the transfer
- Unscrew the bolts which fix the transfer to the chassis.

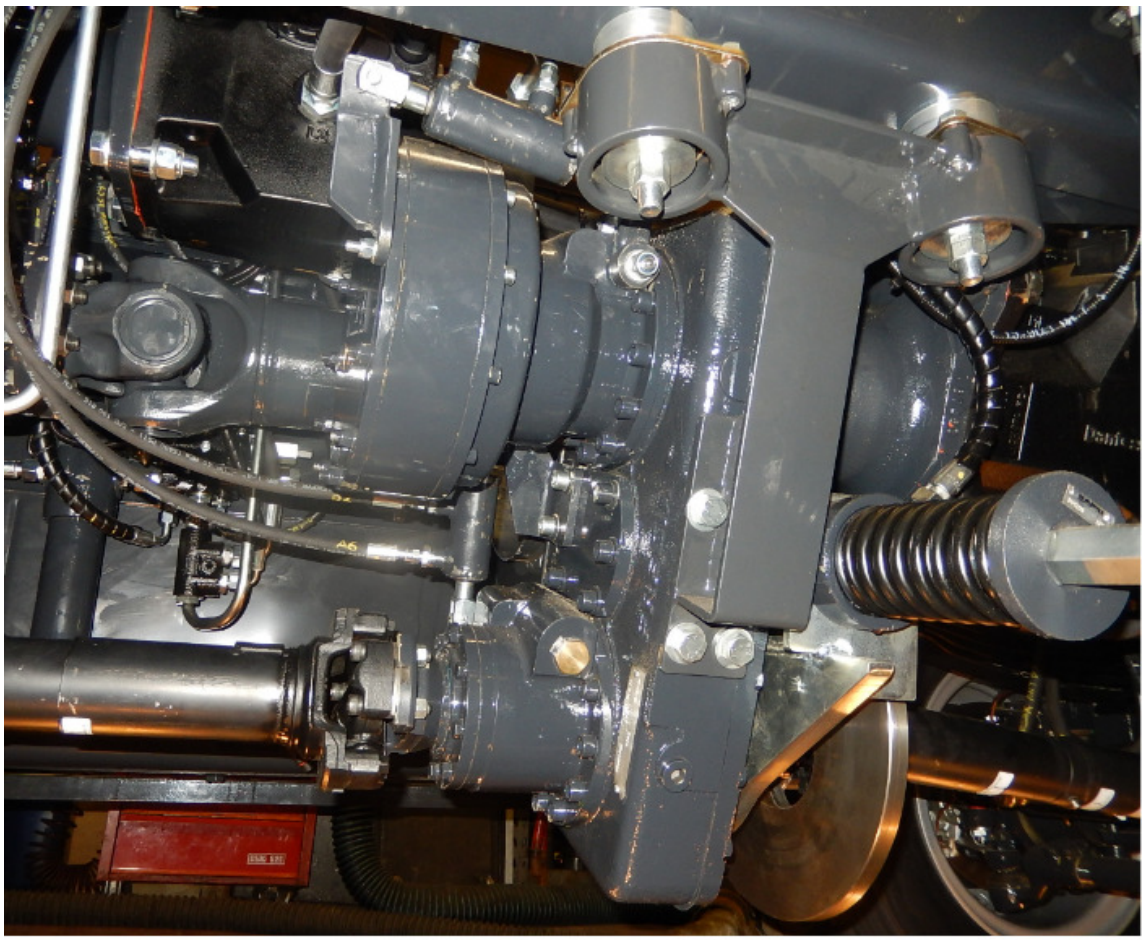
WARNING! USE A HOIST TO LIFT THE TRANSFER.

- Remove the brackets from the group

5.4 TRANSFER REVISION

WARNING – follow carefully the instruction reported below:

- Do not use generic tool where specific one are requested;
- Clean the components before proceeding with the repair;
- Where not differently indicated, use the torque reported on the table at the beginning of the manual;
- At the reassembly, always use new gaskets, elastic rings, split pins and washers;
- Before installing the paper gaskets, it is necessary to lubricate them;
- Fill the group with recommended oil or equivalent

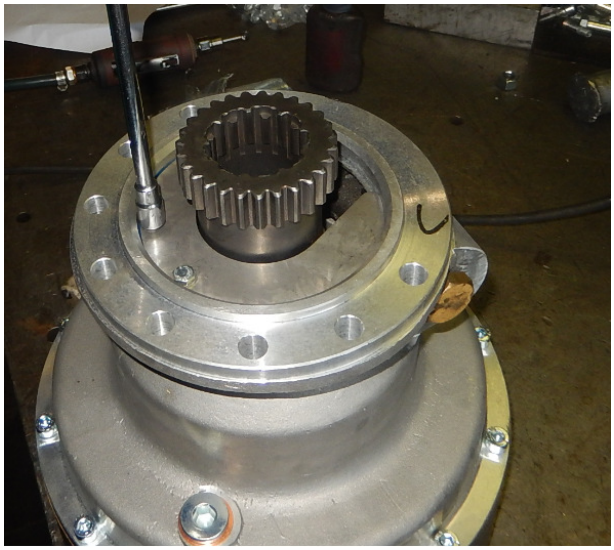


5.5 TRANSFER DISASSEMBLY

5.5.1 PLANETARY GEAR REMOVING FROM THE TRANSFER (A)

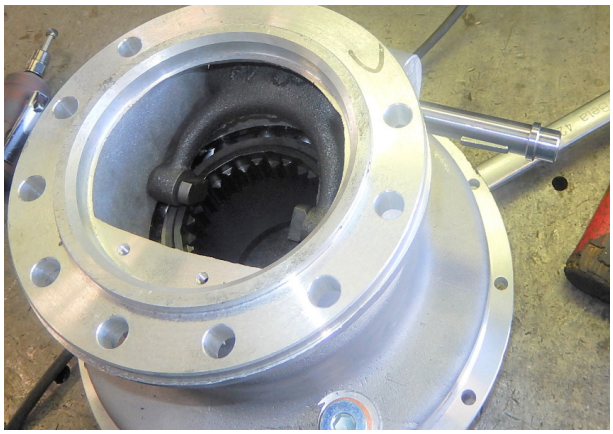
Remove the screws connecting the planetary gear to the case. (use a proper hoist)

Put the group on the bench with the cover in the lower part

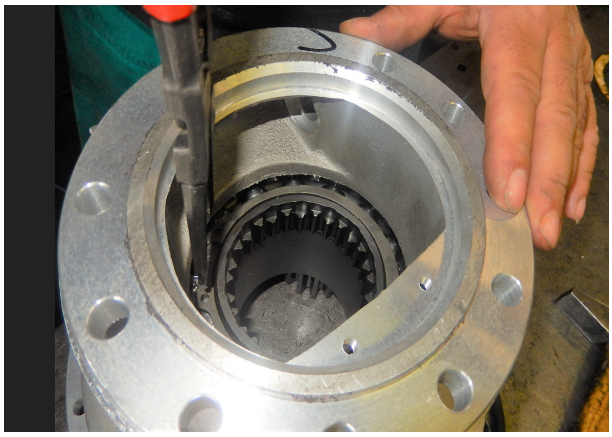


Remove the oil protection

Remove the oil seal from the fork shaft

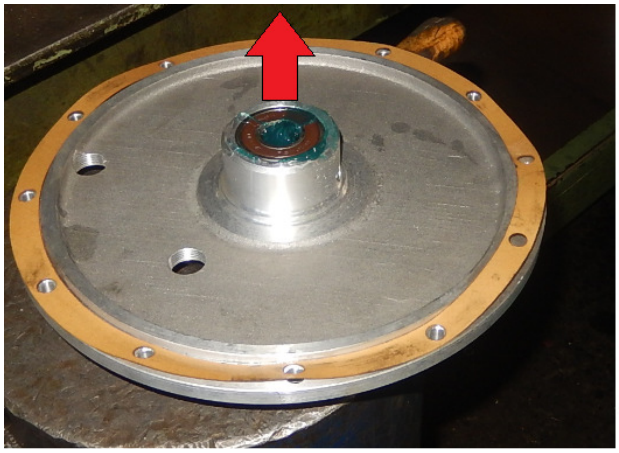


Slide out the toothed sleeve and the fork shaft



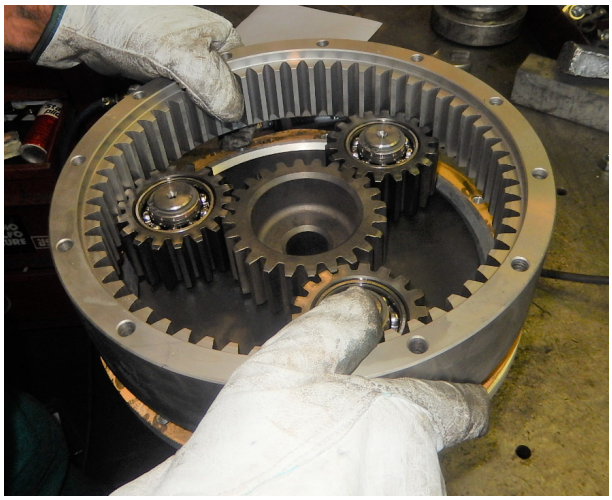
Extract the elestic ring E95 which fixes the bearing. (use the proper pliers)

Rotate the group and unscrew the cover bolts



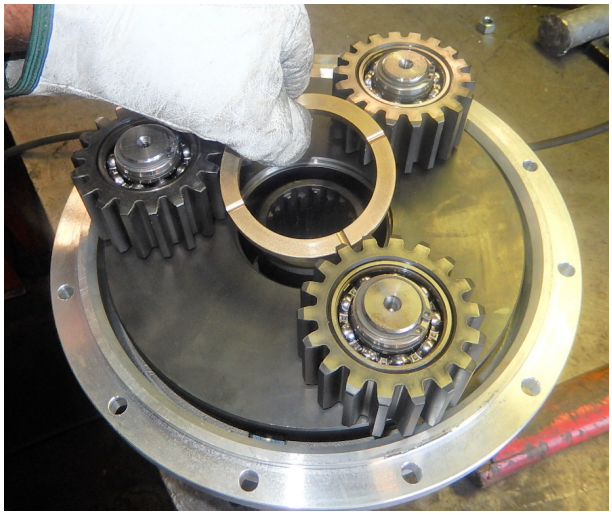
Remove the cover and extract the bearing in the center

Remove the shim on the solar gear

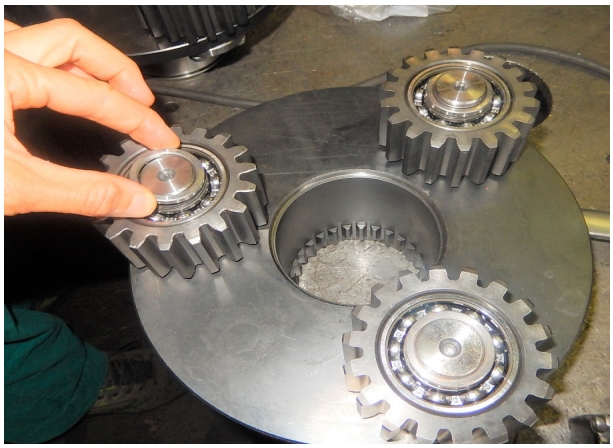


Extract the internal toothed wheel

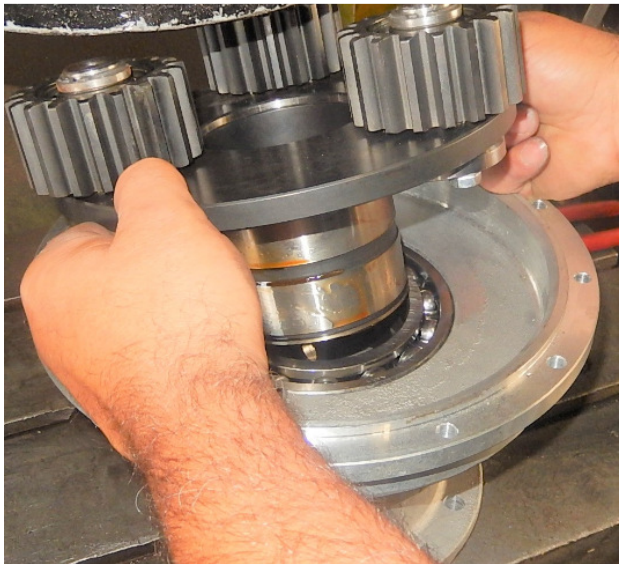
Remove the solar gear



Remove the other shim



Remove the satelite shims



Extract the planetary holder

Heat the bearings with a termic gun to estract them easily

Remove the elastic rings fixing the satelites to the pins

Remove the other shims.

Remove the pins

Remove the plastic ring of the bearing and the bearing from the case.

5.5.2 HYDROSTATIC MOTOR SUPPORT DISASSEMBLY (C)

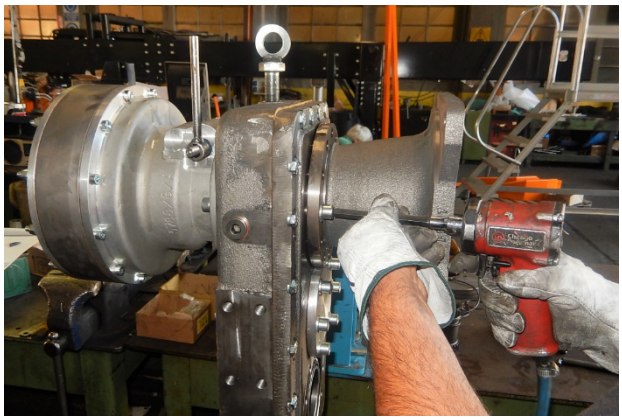
Remove the elastic ring I72 #89 for intenal sleeve fixing

Extract the internal sleeve #88

Put the support on a bench and extract the elastic ring I90 #45

Remove the three screws fixing the external sleeve #46 to the shaft. Extract the external sleeve

Remove the bearing 6210



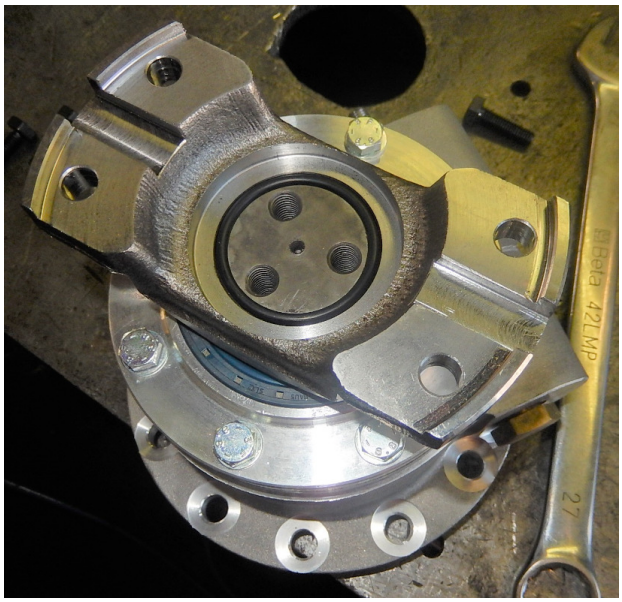
Disconnect the motor support from the case

Extract the primary shaft

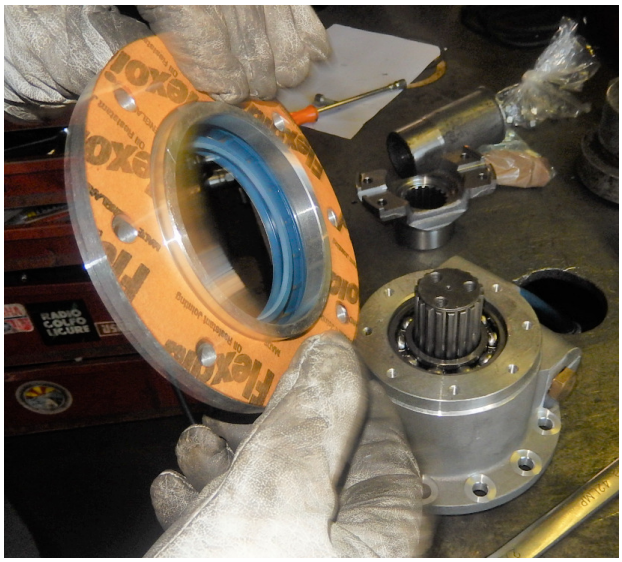
Remove the elastic ring #75 from the shaft

5.5.3 – REAR TRACTION DISCONNECTION DISASSEMBLY (D)

Disconnect the group frn the case. Unscrew the allen bolts

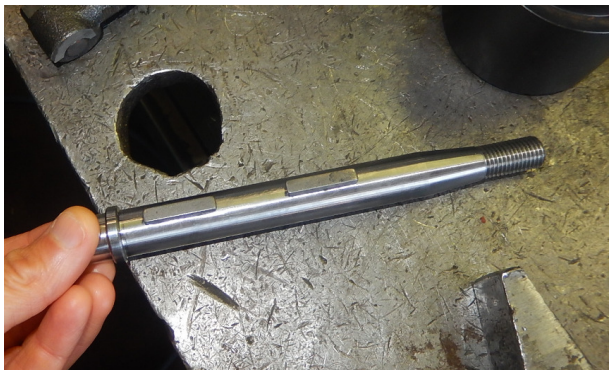


Remove the washer and the fork C6, extract the OR ring.

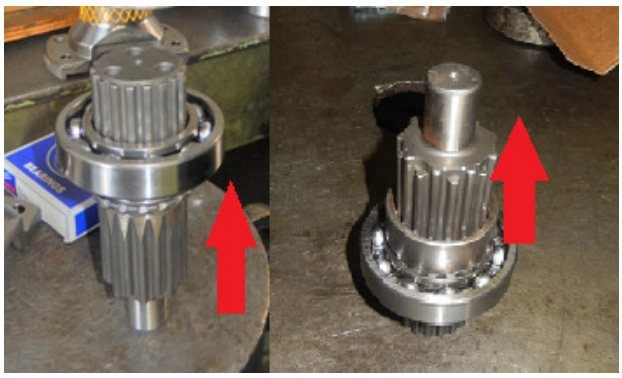


Remove the cover #63 and extract the oil seal

Rotate the case to slide out the shaft



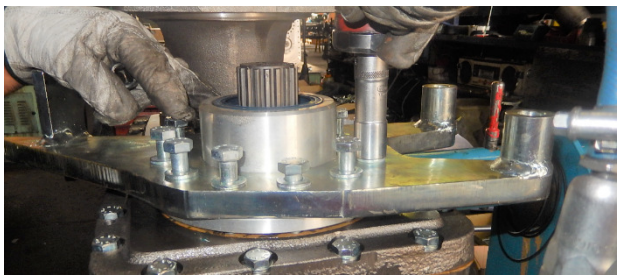
Remove the toothed sleeve, the fork shaft and the fork



Disassemble the bearing 6210 and the spacer from the shaft

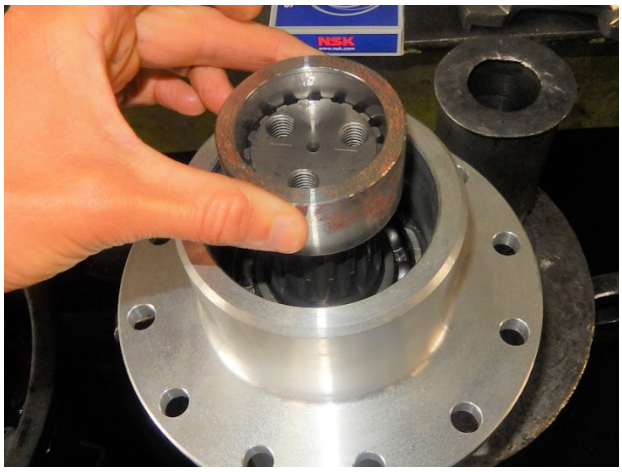
5.5.4 – FRONT COVER AND PARKING BRAKE CYLINDER SUPPORT DISASSEMBLY (E)

Remove the washer and the fork 6C #58 (remove the three screws) Extract the OR ring

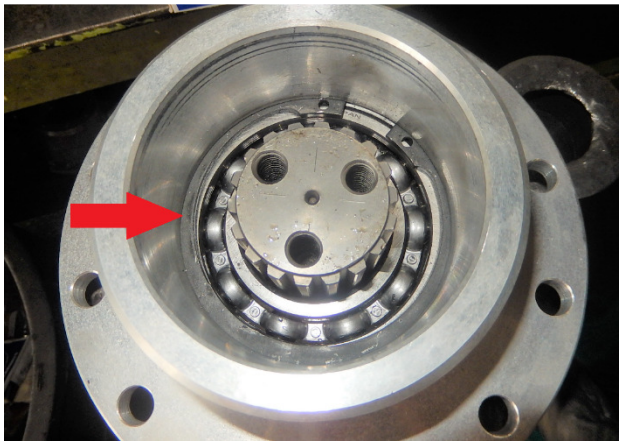


Disinstall the parking brake cylinder support

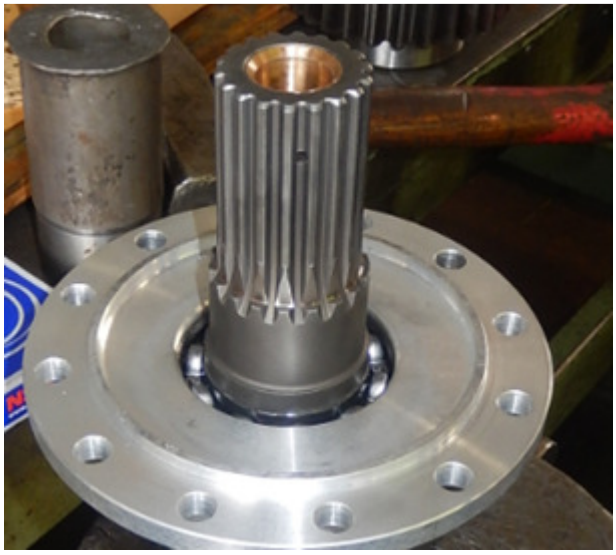
Extract the oil seal from the case



Slide out the spacer ring



By a means of proper pliers, extract the elastic ring I90 #45

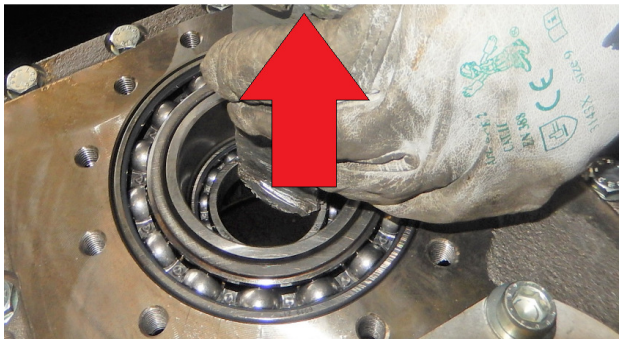


Rotate the group and extract the bronze bushing from the shaft.

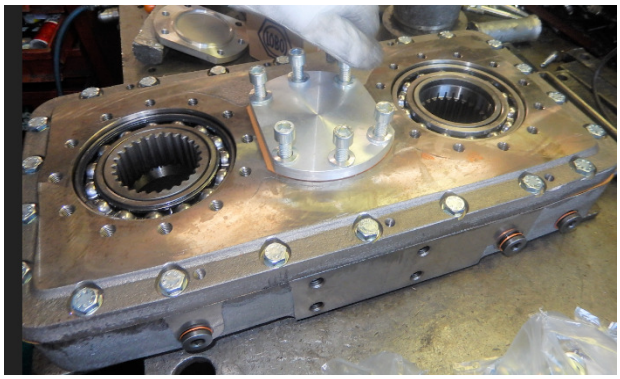
5.5.5. TRANSFER CASE DISASSEMBLY (C)

Remove the back central cover from the case

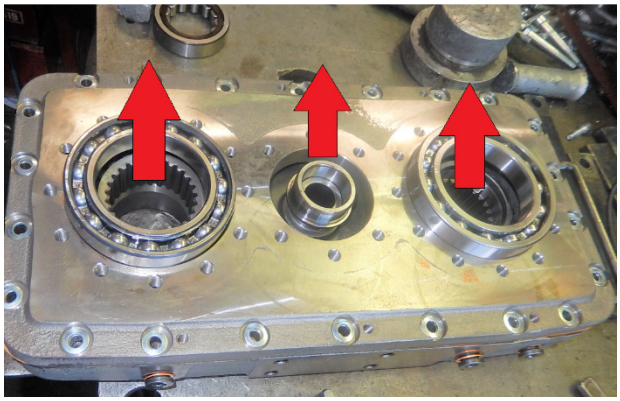
Put the case on a bench with the cover in the upper part



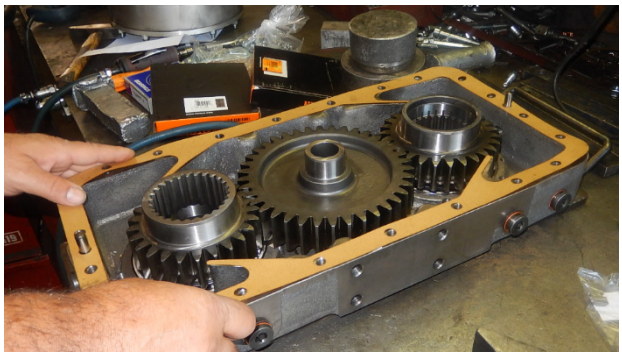
Extract the bearing 6010 from the lower gear



Remove lateral cover

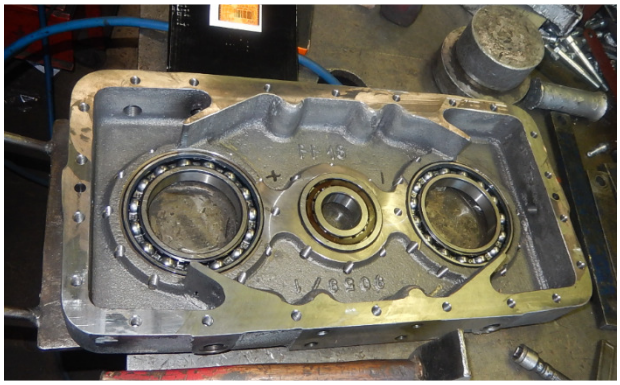


Extract the bearings (nr. two 6019 #7 sand the central NJ309 ECP #8)



Unscrew the perimetral bolts and remove the case cover

Remove the three gear from the case



Extract the bearings

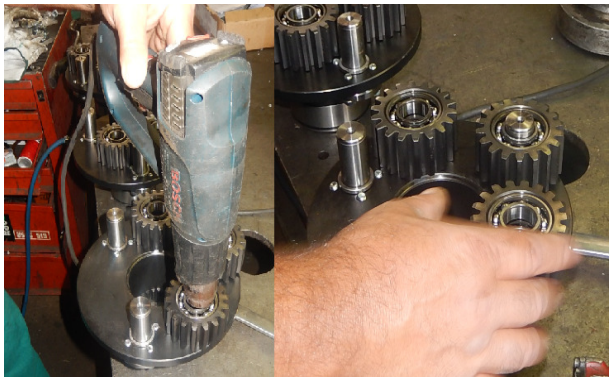
5.6 TRANSFER ASSEMBLY

5.6.1 – PLANETARY GEAR ASSEMBLY

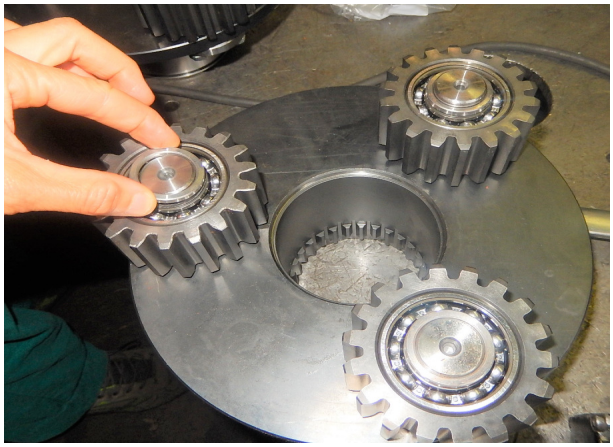
Insert the three pins #20 into the holder #19.
Fix with screws d.8 and schnorr washers

Rotate the holder case an insert the shim #23

Plant the bearing 6205 into the satelites #25, slightly beat with an hammer



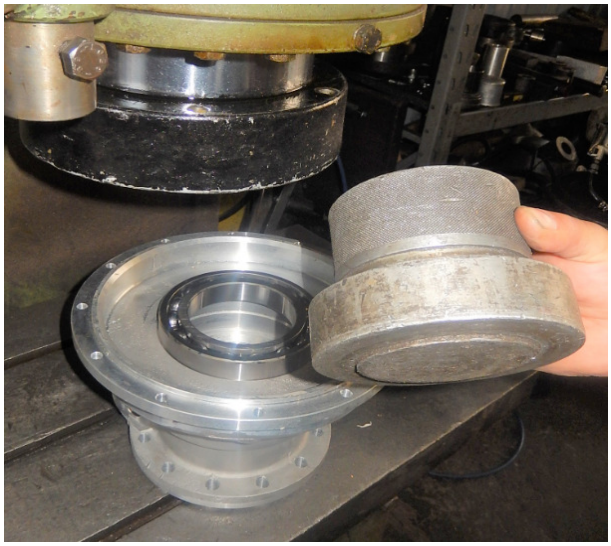
Heat the bearings internal part by a means of a thermic gun. Insert the bearings into the pins



Put the shim on the opposite side

By a means of a proper pliers put the elastic ring E25 #26 in the proper seat.

IMPORTANT!: MAKE SURE THAT THE SATELITES ROTATE EASILY



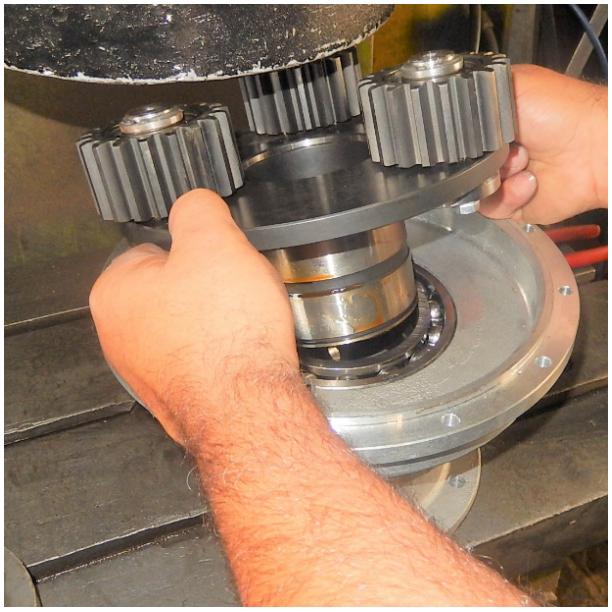
Put the case under a press and position the first bearing 6019 #7

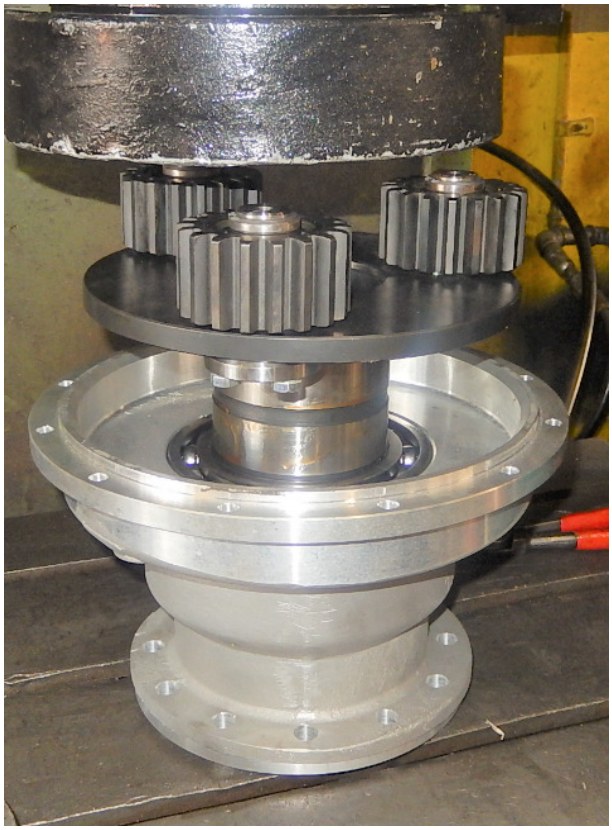
By the pliers, insert the elastic ring I145 #18 to fix the bearing

By a means of the proper beater, insert the bearing in the bottom of the case

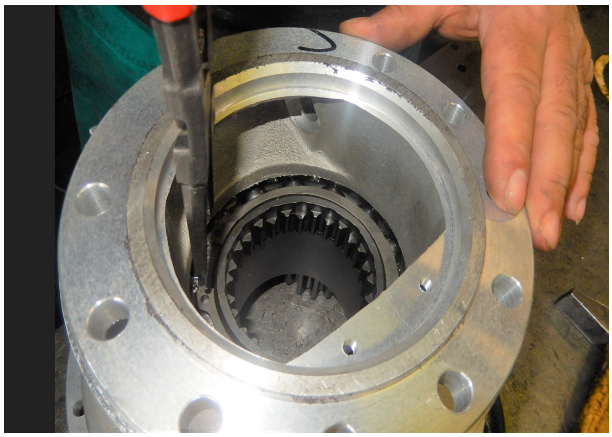
Insert the spacer #27

Plant the second bearing 6019.

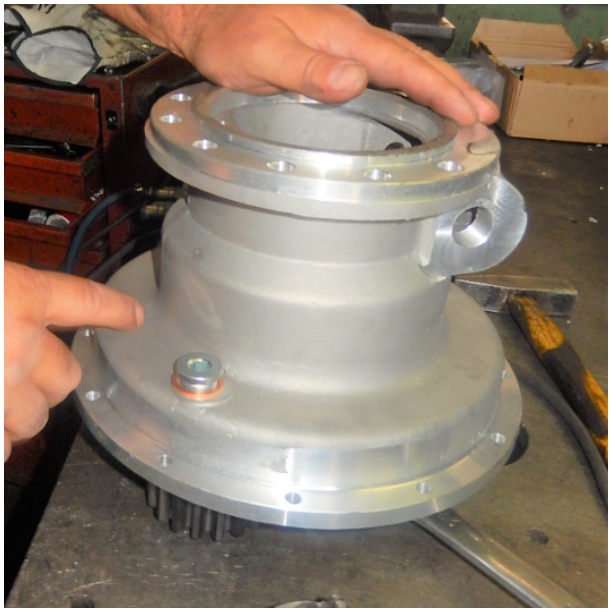




Insert the planetary group into the case by a means of the press



Rotate the group and insert the elastic ring E95 for fixing. (use the proper pliers)

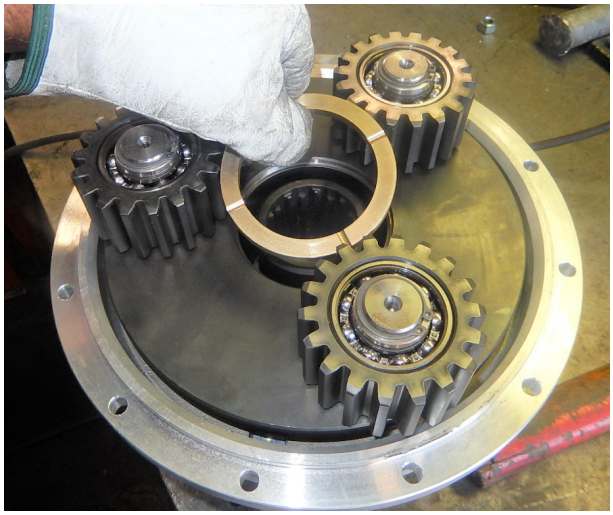


Put the plug #69-70 and copper washer

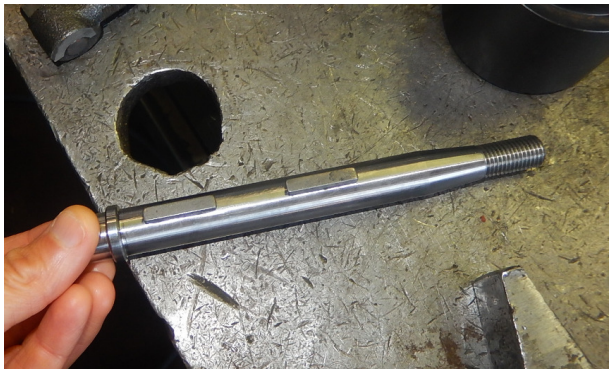
Insert the splines #32 into the shaft #30 slide in the shaft in the case and in the fork

Screw the bushing plug (chck eventually the need of thickness)

Put the sliding element #37 in the fork



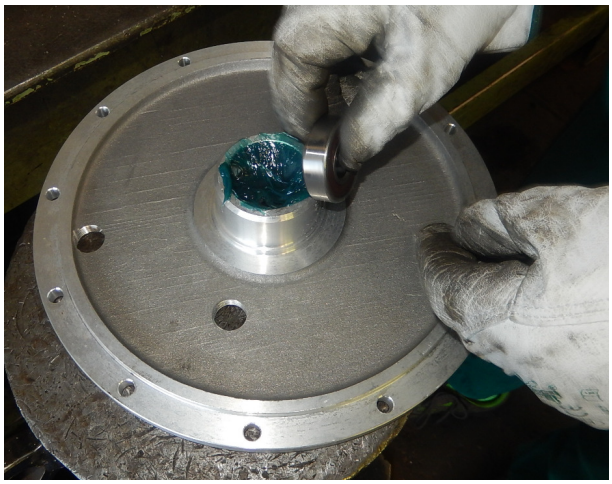
Rotate the group and insert a central shim



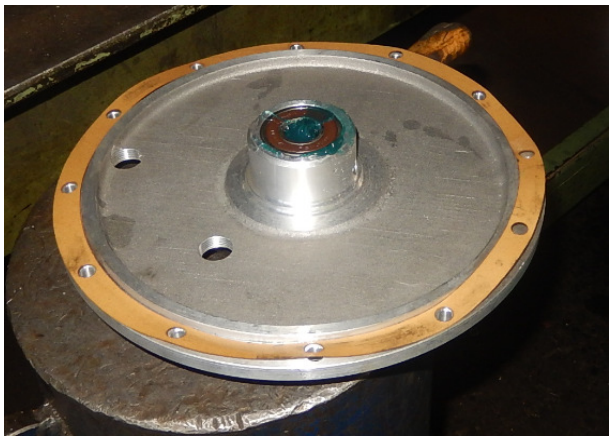
Position the solar gear #40

Lubricate the paper gasket and put it in the edge

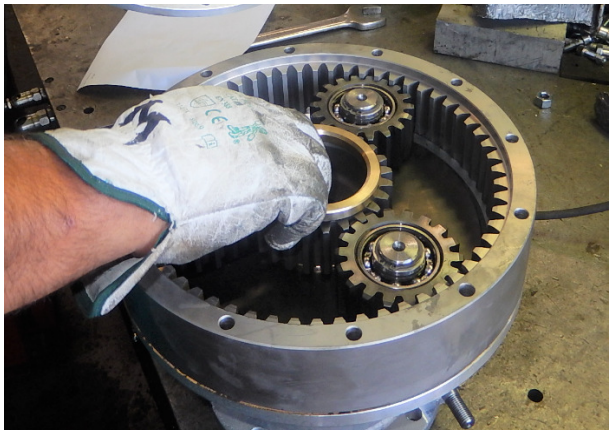
Insert the internal toothed wheel #43 on the satelites



Grease the seat of the bearing #51 in the cover and put in the bearing (if necessary beat slightly with an hammer)

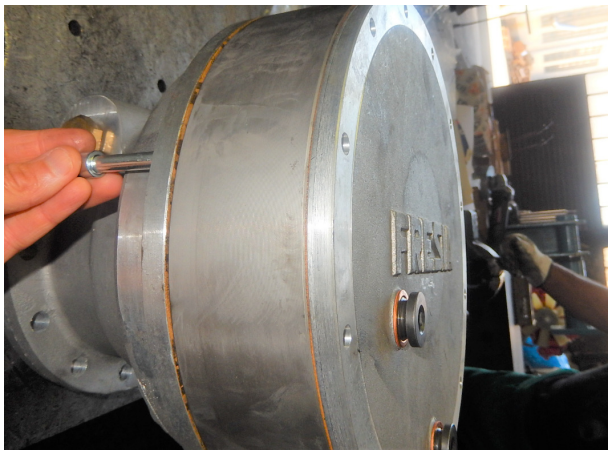


Put the paper gasket #41 on the edge



Position the shim on the solar gear

Screw the cover on the group and install the oil plugs with copper washers.

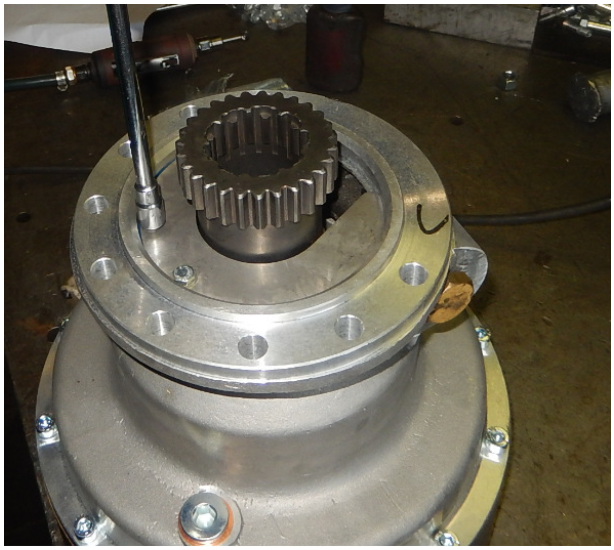


Inset the allen screws 10x1,5x100 for fixing

Tighten the nuts on plane washers

Rotate the planetary group and insert the toothed sleeve #39 into the sliding elements of the fork

Insert the oil seal # 71 on the fork shaft

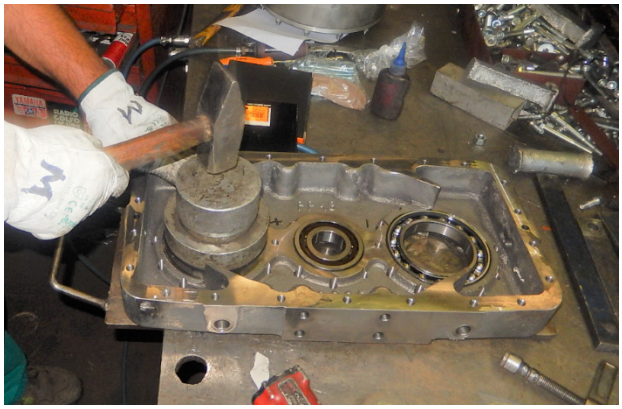


Screw the oil protection with screws 6x1x16 and schnorr washers d.6

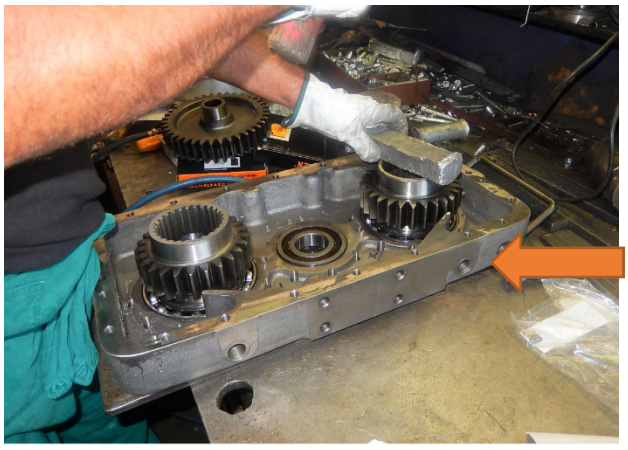
Spread the Loctite MEDIUM on the oil protection carter seat

5.6.2 CASE ASSEMBLY (B)

Put the case on the bench on a proper support which simulates the covers height.



By a beater, plant the bearings 6019 and l'NJ309CP into their seats

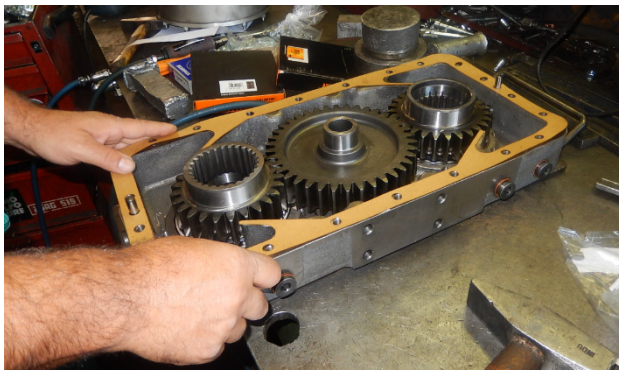


Plant the gears into the bearing (make sure that the groove is in the correct side). Use carefully beater not to damage the teeth.

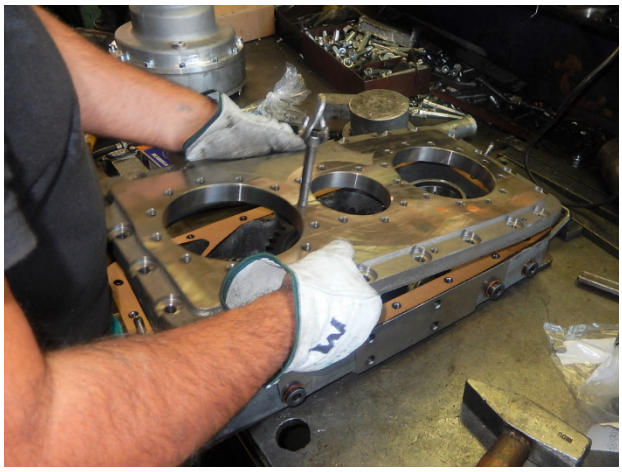
IMPORTANT!

THE GEAR WITH 27 TEETH MUST BE PUT IN THE UPPER PART (THE SIDE WITH NR. 2 OIL PLUGS)

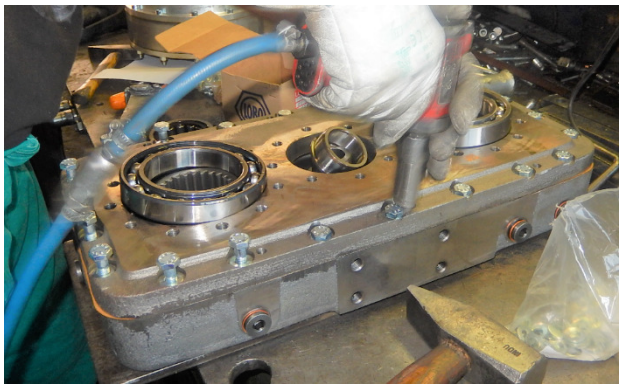
Plant the ring of the roller bearing (central) on the central gear



Position the paper gasket (lubricate it) on the edge of the case



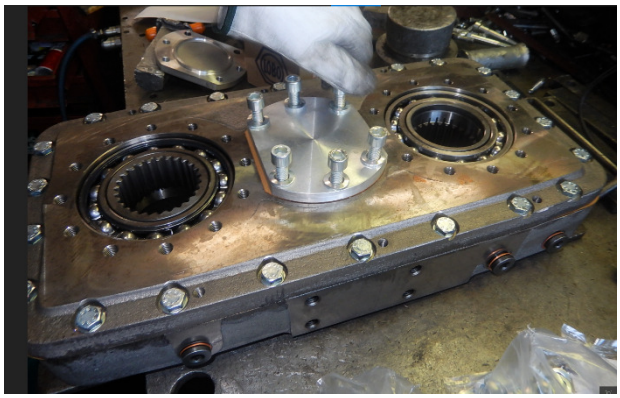
Put the cover on the case



Screw the perimetral bolts

Plant the remaining bearings in the holes

Beat slightly by an hammer



Mount the central covers on the case. Put the paper gasket between (lubricate it). Use allen bolts 12x1,75x35 + schnorr washer

Assemble the planetary gear on the assembled case (screws 12x1,75x35 + schnorr washers)

Put the breather #73 on the case with washer #72

Insert the primary axle #47 into the case

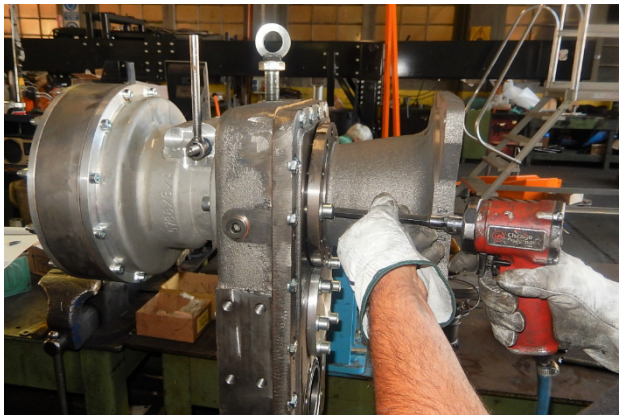
Spread some grease on the primary shaft and install the elastic E50 in its seat

5.6.3 MOTOR SUPPORT ASSEMBLY

Plant the bearing 6210 into the support.

Insert the elastic ring I90 to fix the bearing (use the proper pliers)

Rotate the support and position the paper gasket (lubricate it)



Install the motor support on the case (screws 12x1,75x35 + conic washers)

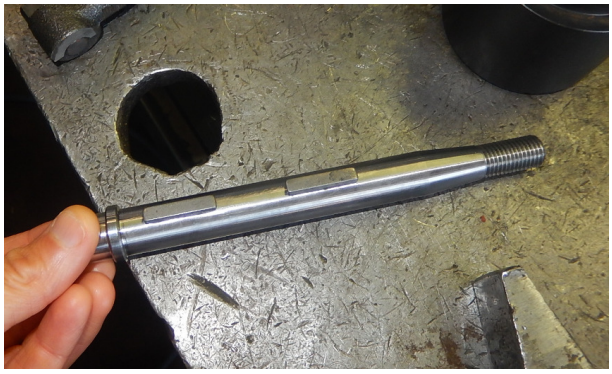
Insert the external ring #46 for entrainment and fix it with the three holes washer (screws 10X1,5X35 10.9)

Insert the intern entrainment sleeve #88

Insert the elastic ring #89

5.6.4 ASSEMBLAGGIO SUPPORTO DISINNESTO MOTO (D)

Insert the sliding elements into the fork



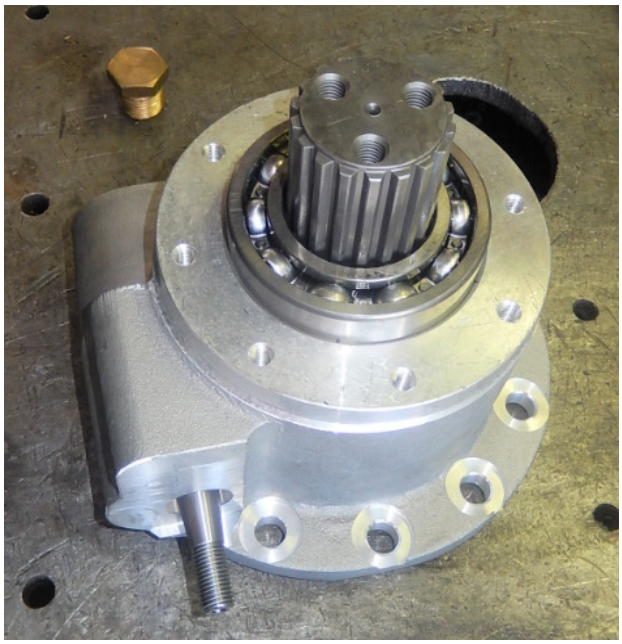
Insert the splines into the fork shaft

Install the fork and the toothed sleeve. Insert the fork shaft into the case and into the fork.

Plant the bearing 6210 #44 sull'albero di uscita anteriore

Insert the spacer ring #82

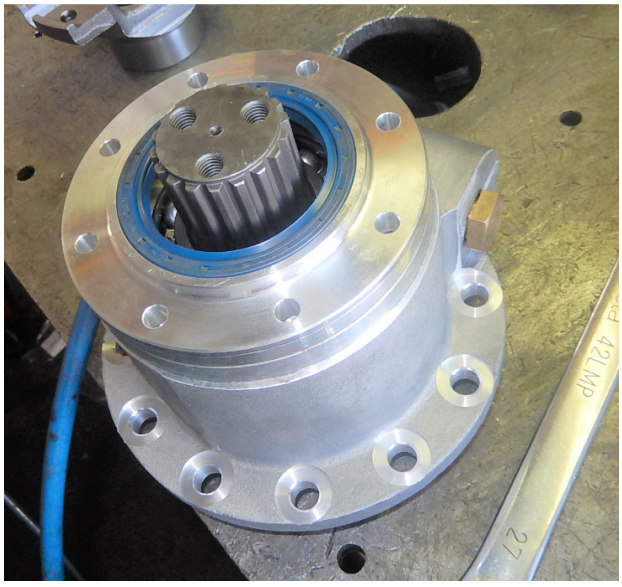
Rotate the case on the shaft



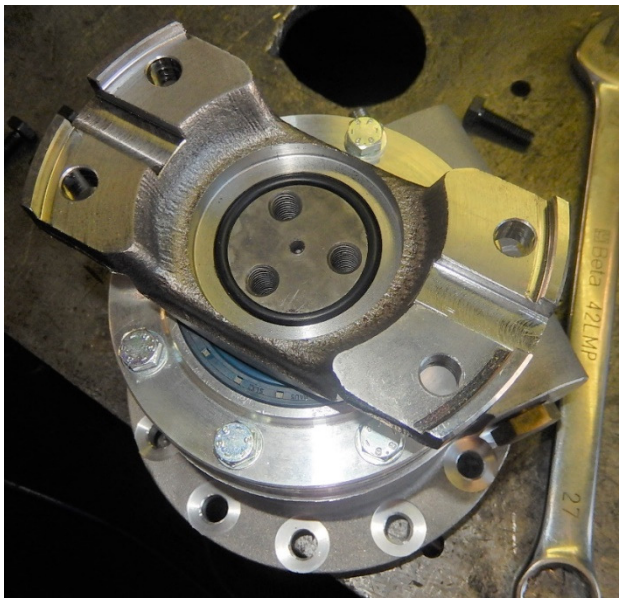
Rotate the case as in figure

Beat slightly on the bearing by a proper punch plant the shaft and the bearing

Position the paper gasket under the cover (lubricate it)



Insert the oil seal 70x90x10 #59 into the cover. Be careful not o damage it



Insert the fork C6 #58 on the shaft

Position the OR ring

Fix the three holes washer with the nr. 3 screws 10x1,5x35 10.9

(to install the rear axle disconnection group on the case wait to have assembled the front output cover (5.6.5)

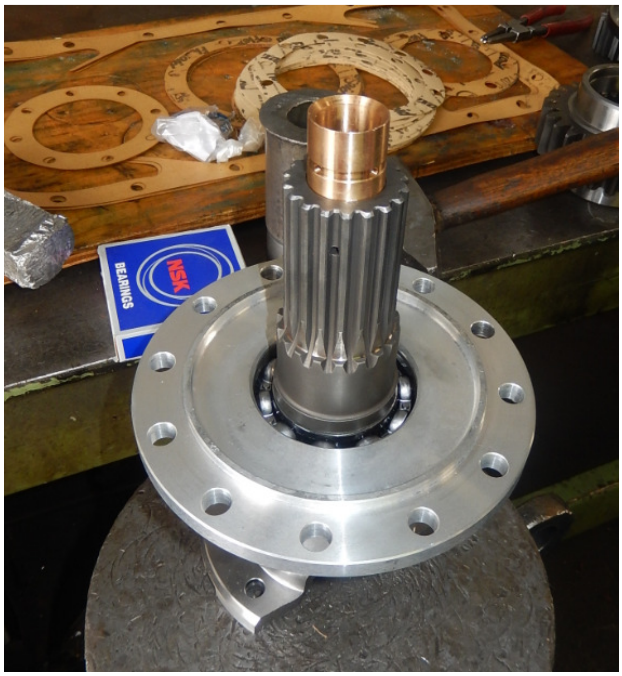
5.6.5 FRONT OUTPUT COVER ASSEMBLY (E)

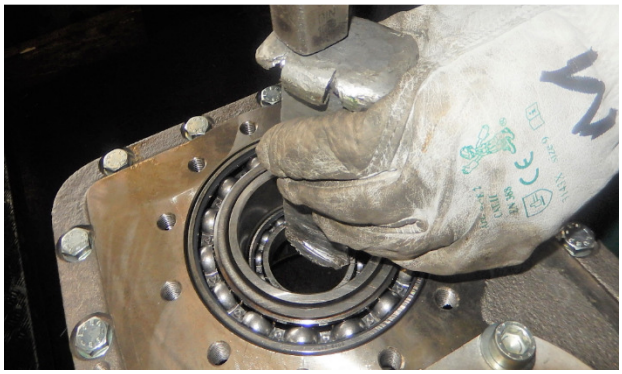
Plant the bearing 6210 #44 in the bottom of the cover

Insert the spacer ring #82

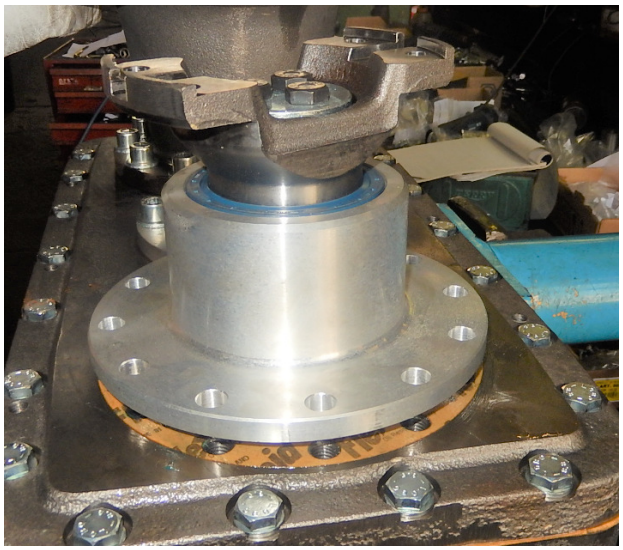
Plant the oil seal 70x90x10 #59, beat slightly not to damage it.

Plant the bronze bushing #66 on the shaft

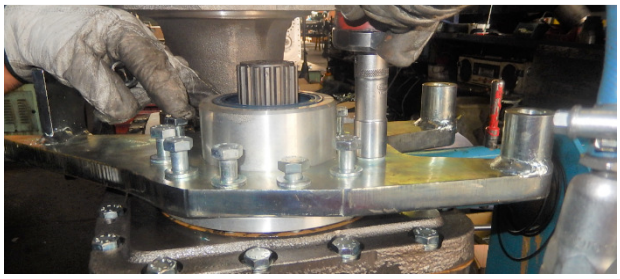




Put the assembled case with te cover into the upper part. Insert the bearing 6010 #84 into the gear (z=25)

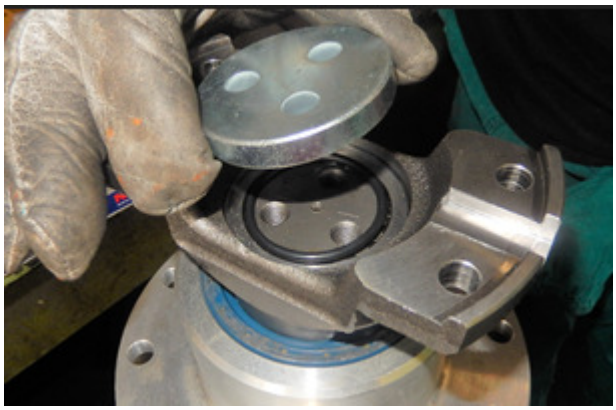


Put the assembly of the output shaft on the case. Lubricate the paper gasket and put it between .



Mount the brake cylinder support #60 (screws 12x1,75x55+with wave washer)

Insert the fork on the output shaft C6



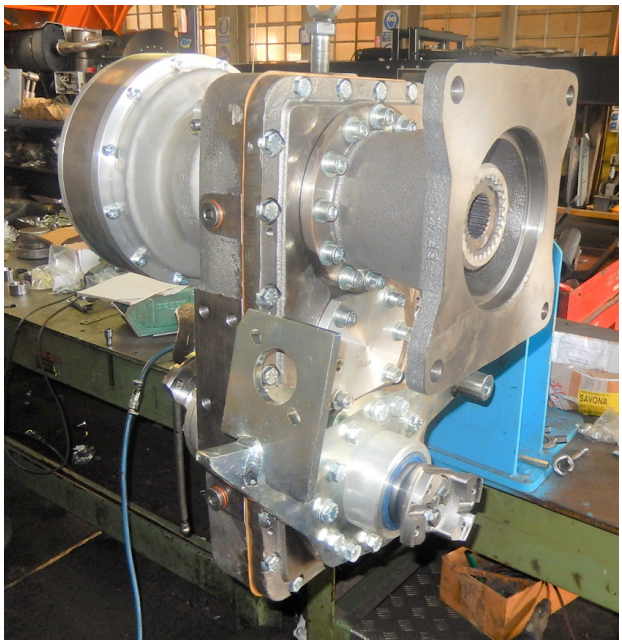
Insert the OR ring under the three holes washer

Tighten the screws 10x1,5x35 10.9

Rotate the case and insert the paper gasket (lubricate it

5.7 TRANSFER REINSTALLING ON CHASSIS

Install the rear axle disconnection group on the case. (Tighten the screws 12x1,75x35 + conic washer)



Put the oil plugs with copper washers on the transfer.

(PICTURE OF THE TRANSFER ASSEMBLY)

- Reinstall the brackets on the transfer
- Mount the parking brake cylinder
- Put the transfer under the vehicle
- Lift the transfer at the height of the chassis and fix the brackets
- Connect the transfer shaft to front and rear axles
- Mount the hydrostatic motor on its support
- **OIL REFILLING**
  At the end of the transfer mounting operation, refill the group with new oil

Use oil TUTELA W90/ M-DA o equivalent

SECTION 6
TWO SPEED BACK GEAR

Sommario

6.1 GENERALITY 3
6.2 LAYOUT DRAWING 4
6.3 REMOVING THE TWO SPEED BACK GEAR FROM THE VEHICLE 5
6.4 TWO SPEED BACK GEAR DISASSEMBLY 6
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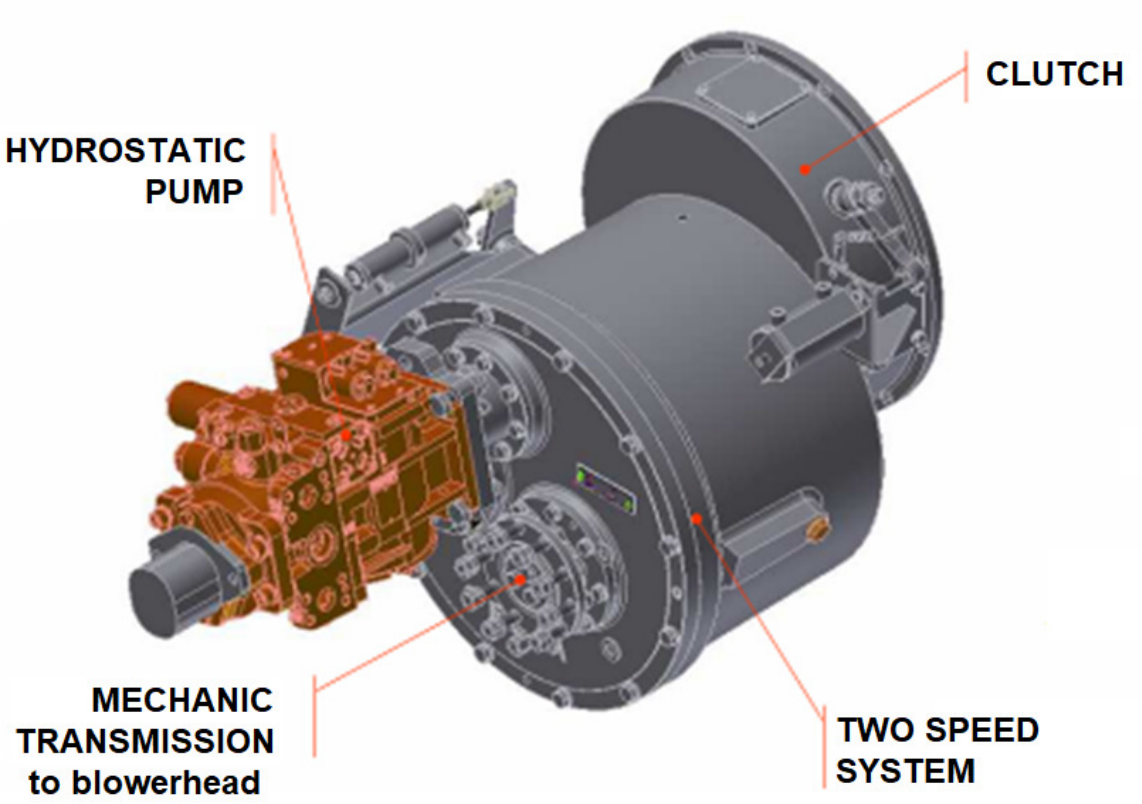
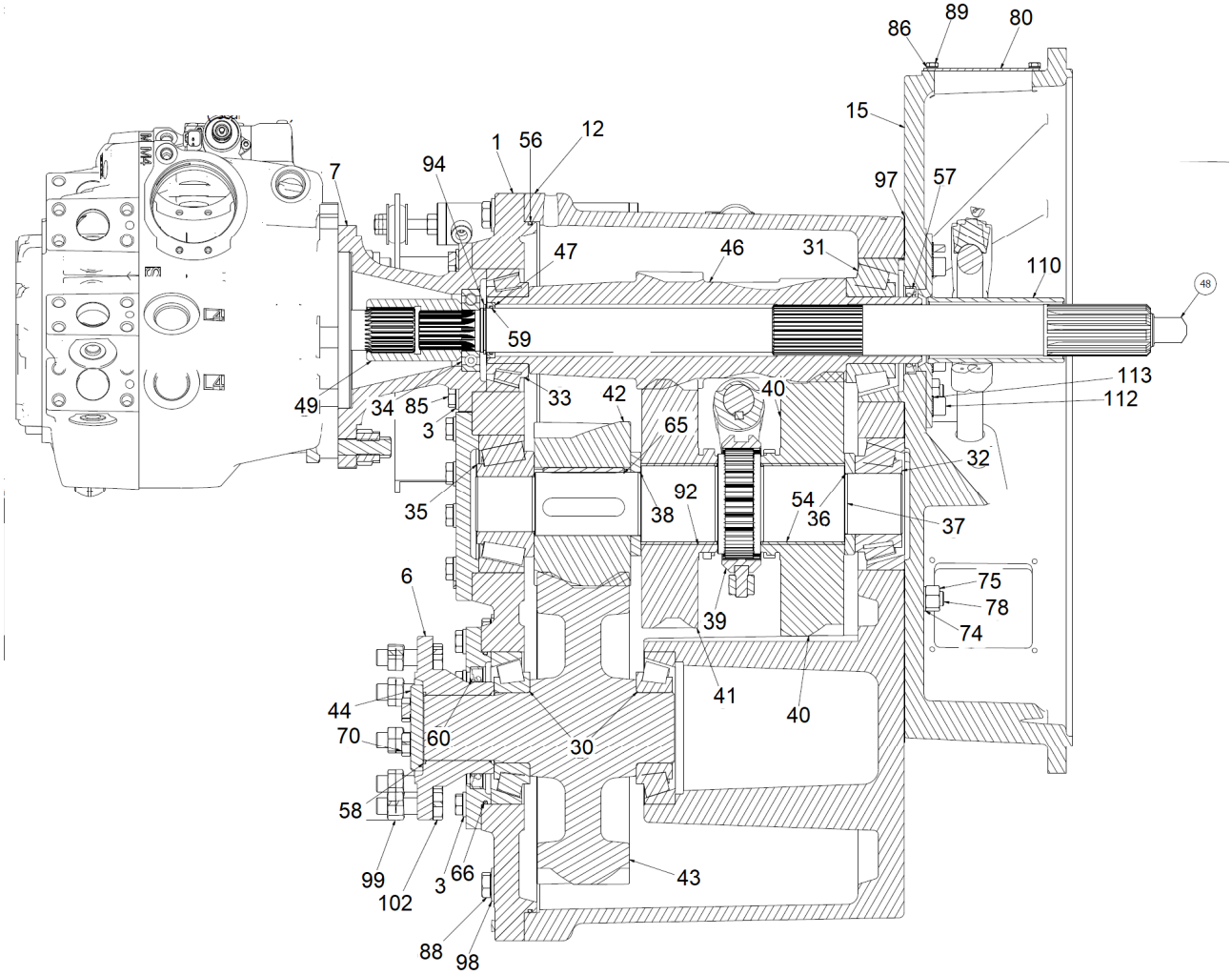
6.6 REINSTALLING THE TWO SPEED BACK GEAR ON THE VEHICLE 20

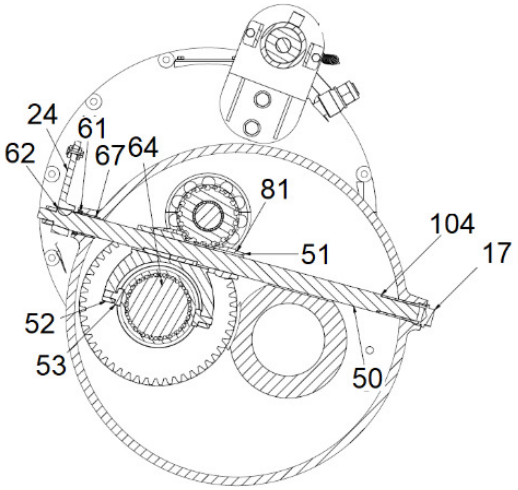
6.1 GENERALITY

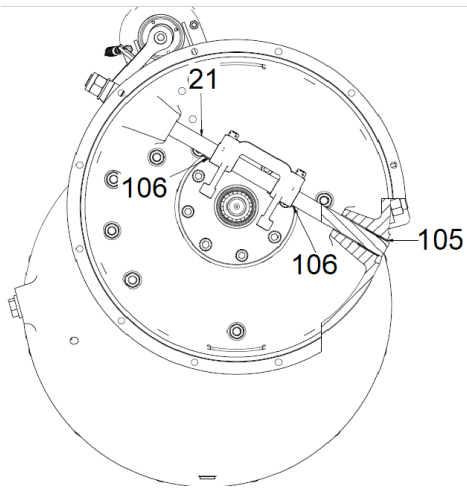
The two speed back gear transmit the motion from the engine to the BLOWERHEAD through a shaft system. It allows the change of speed normal and fast.



6.2 LAYOUT DRAWING







6.3 REMOVING THE TWO SPEED BACK GEAR FROM THE VEHICLE

Move the vehicle on an inspection pit

DANGER –Use an appropriate lifting system.

- Empty the group of oil
- Remove the hydrostatic pump
- Remove all the hydraulic connections
- Disconnect the transmission shaft from the gear (tie it with a rope)
- Hook the group with a rope.
- Remove the screws fixing the group on the engine.
- Low the group on a pallet to be movable by forklift

6.4 TWO SPEED BACK GEAR DISASSEMBLY

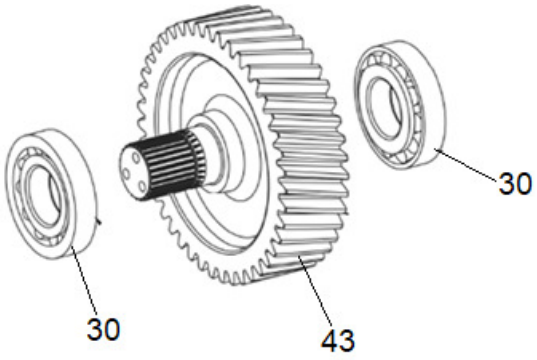
1. Put the group on the ground with the cover on the upper part. Remove the pump support (7)

2. Remove the elastic ring (94) with the proper pliers and OR ring (47).

3. Remove the output flange (6), help yourself with an extractor.

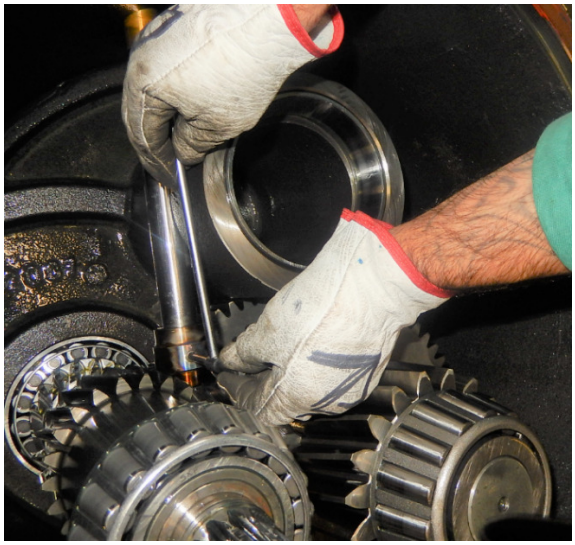
4. Unloose the screws of the cover and remove it.

5. Use a proper hoist to lift up the gears from the case. Remove before the gear in figure.



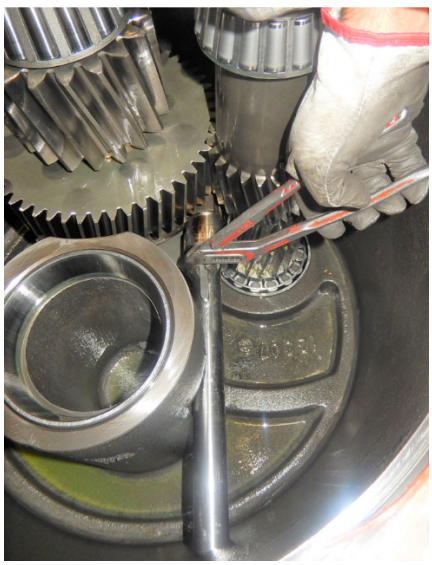
6. Remove the shaft for speed change

7. The shaft may result blocked. Heat the fixing sleeve (51) with a blowpipe to remove the fixing pin (81)



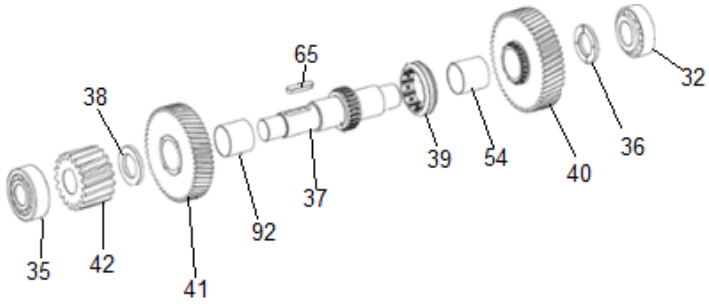
8. Beat on the shaft (50) with an hammer to extract it from the case and from the fork

9. If necessary use a multigrip pliers to unlock the sleeve

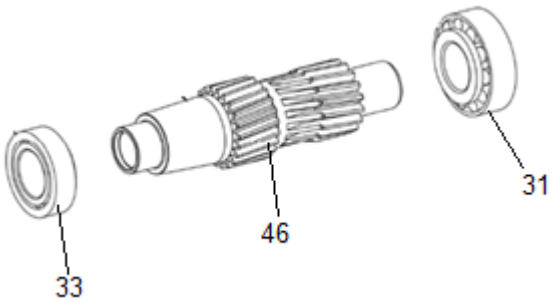


10. Extract the shaft completely

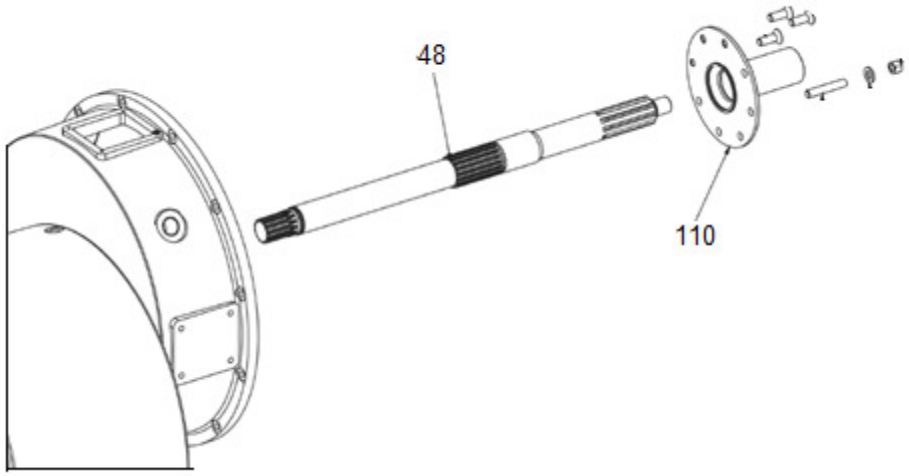
11. Lift up the two speed gears group



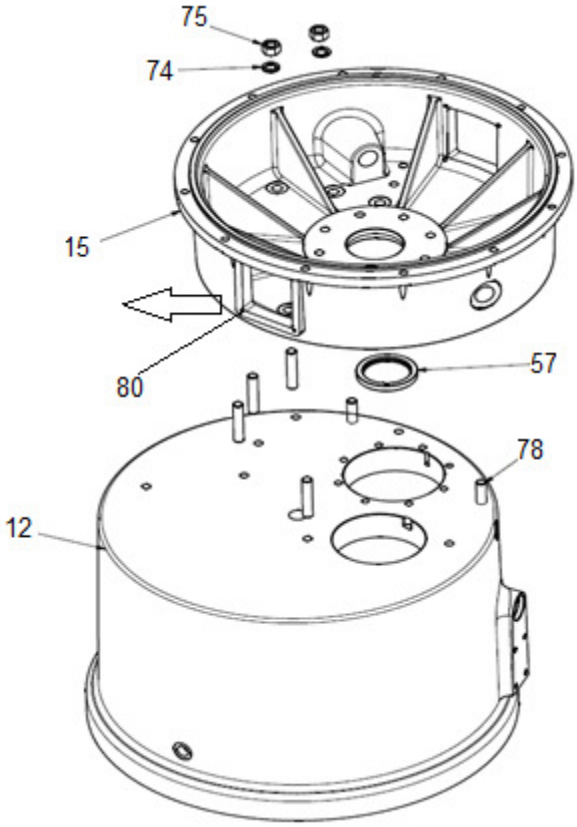
12. Remove the last gear group



13. Remove driving shaft (48) unfixing the support (110)



14. Disassemble the housing. Unscrew the stud bolts 78 and separate the two cases (15) and (12). Remove the seal (57) and the cover (80)



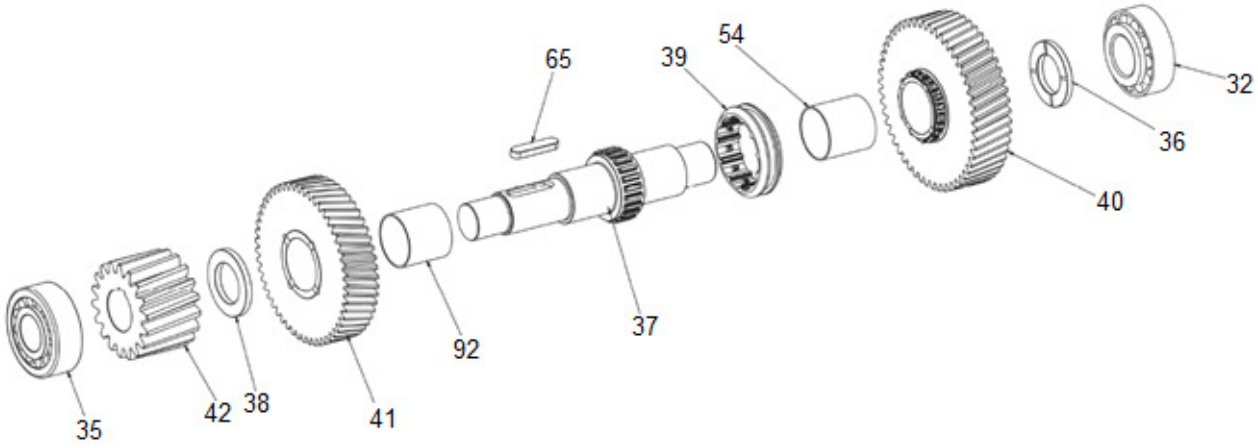
6.5 TWO SPEED BACK GEAR ASSEMBLY

Before proceeding for the assembly, all the parts must be cleaned.

Replace the bolts and the seals which are damaged.

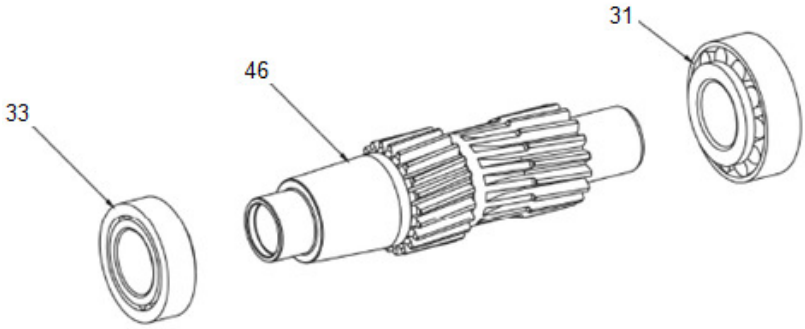
TWO SPEED SHAFT ASSEMBLY

1. Plant the bushings (29) into the shaft (9)
2. Begin on installing the 1st speed gear (12) on the shaft
3. Put the shim (8) and plant the bearing (5) after having heated it with proper tool.
4. Overturn the assembly and slide in the sleeve (11)
5. Insert the 2nd speed gear
6. Follow inserting the shim.
7. Put the spline (25) into its seat, heat the pinion and the bearing and plat them on the shaft



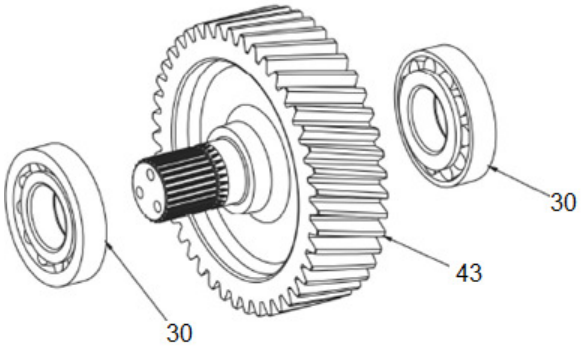
DRIVING GEAR ASSEMBLY

1. Put the shaft on a bench
2. Heat the bearing (6) and (4) and plant them on the shaft (16)



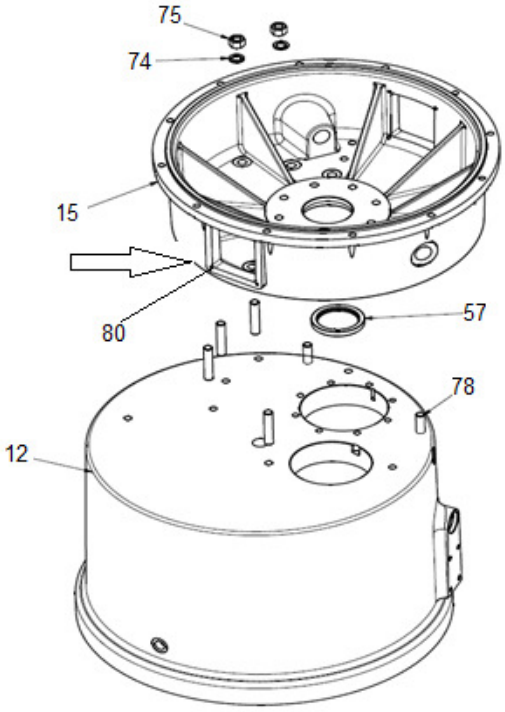
OUTPUT GEAR ASSEMBLY

1. Put the shaft on a bench
2. Heat the bearings (3) and plant them on the shaft (15)



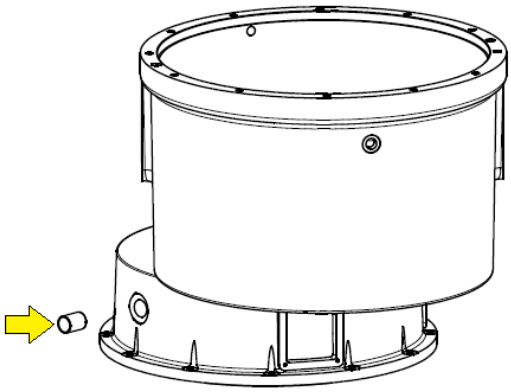
CASE PREPARATION

1. Put the two speed back gear case (12) on the bench with the opening downward
2. Insert the Oil retainer (57) into its seal on the end bell (15)
3. Insert the stud bolts (78) into the
4. Spread a layer of Loctite paste on the coupling surface and low down the bell on the case
5. Put grower washers (74) on the stud bolt and tighten the nuts. (75)

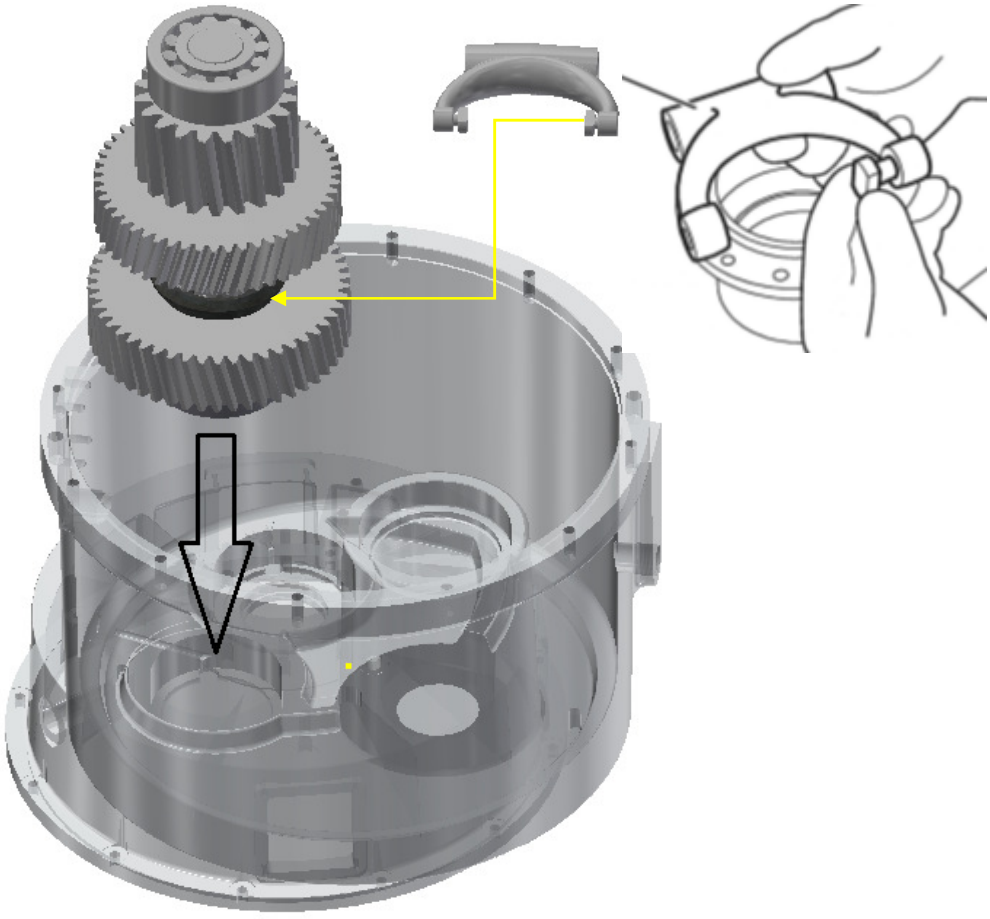


TWO SPEED BACK GEAR WHOLE ASSEMBLY

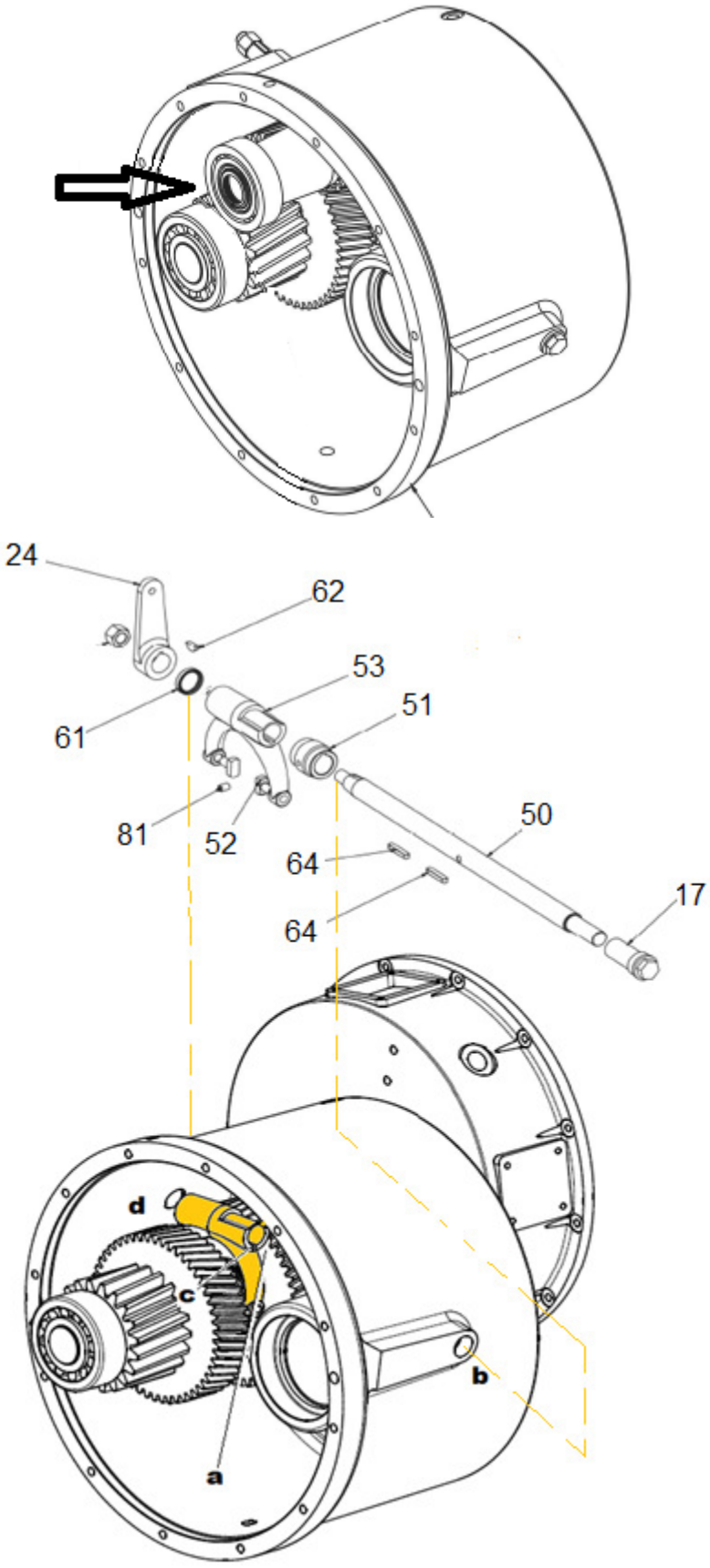
1. Overturn the case ;
2. Plant the Teflon bushing (105);



3. Insert the seat of the lower bearing (speed control shaft assembly) into the case al low down the whole assembly;
4. Place temporarily the fork and sliding element on the selector sleeve;



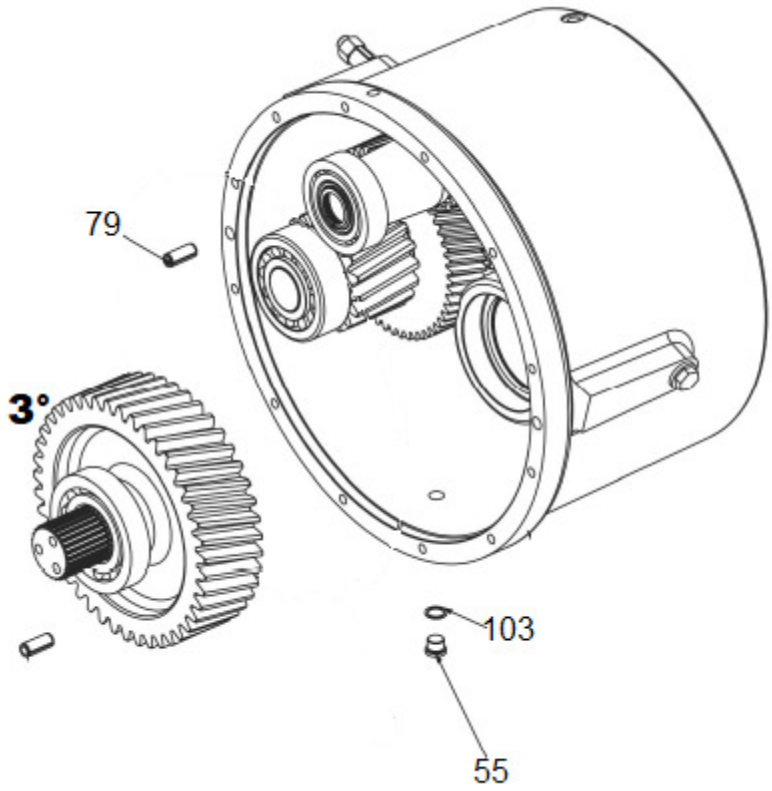
5. Low down in the case also the second gear assembly as indicated in the following figure;



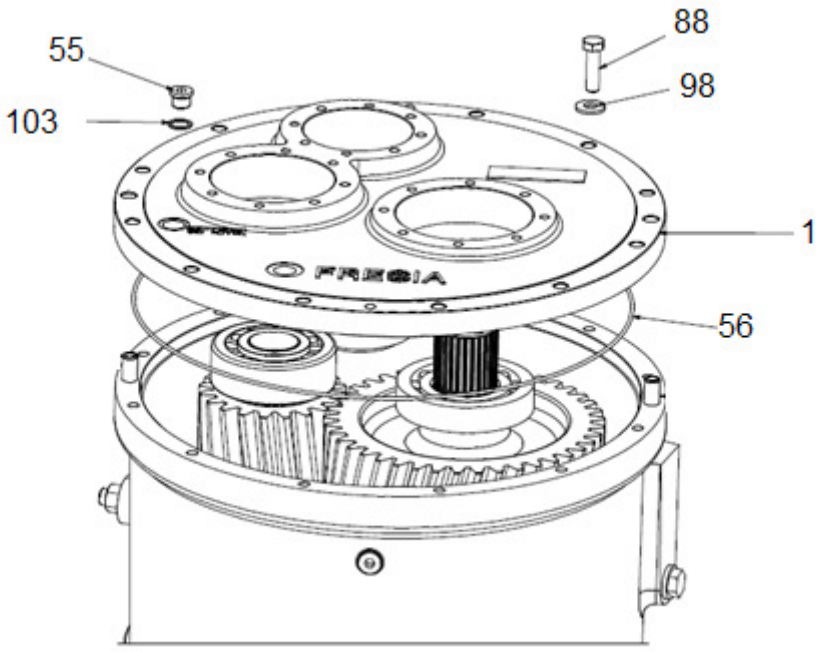
6. Put the spacer sleeve (51) on the side of the fork (64) into their seats;
7. Left the shaft enter the spacer (51) and the fork (53). Fix it with the pin (81);

IMPORTANT: Insert the oil seal 61 in d) from outside.

8. Mount the lever (24) with its key. Tighten the nut;
9. Insert the remaining gear assembly into the case;
10. Plant the elastic pins (79) in the proper holes (on the case);
11. Screw the plug (55) and the washer (103) in the base of the case;

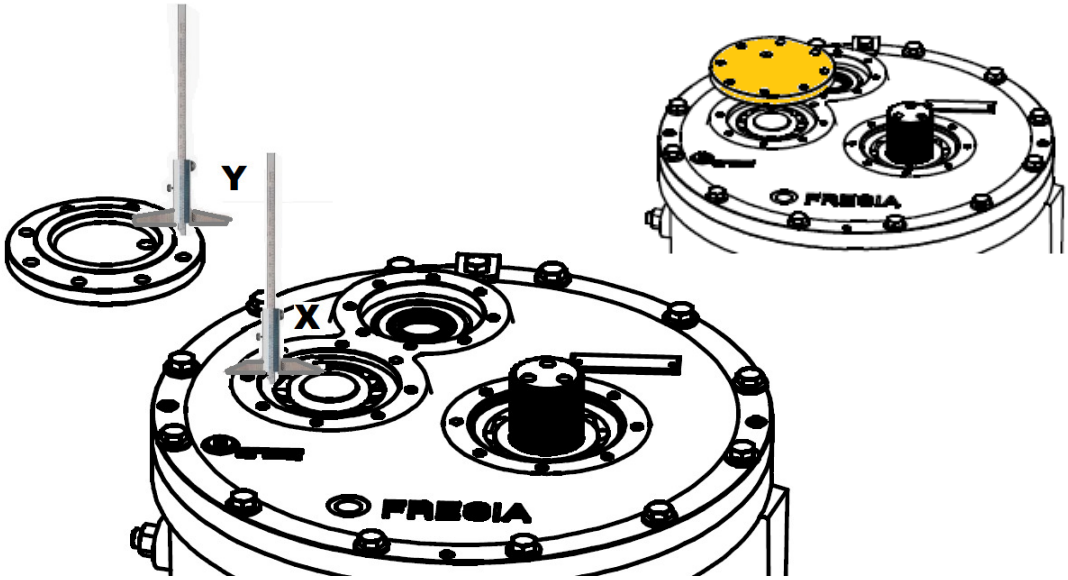


12. Lubricate the seat of the OR ring (56) on the cover (1);
13. Center the cover on the case by a means of the elastic pins ;
14. Put the washers and the screws (88-98) and tighten them;
15. Screw the oil plug (55) and the washer (103);



16. By means of a depth gauge, measure the distance between the cover top and the external ring of the roller bearing and sign it (X value)

17. By means of a depth gauge, measure the distance between the cover internal shoulder and the cover (yellow color), and sign it (Y value)



18. Proceed with the operation X – Y; the result of this operation must be positive and must lay between 0,08 and 0,1 mm; should the result be different, follow these steps:

- If the result is positive, > 0,1 insert as many packings on the external ring of the taper roller bearings as it's necessary to bring this distance between 0,08 and 0,1 mm.
- If the result is < 0,08 mm, place as many packings under cover as it's necessary to bring the distance between 0,08 and 0,1 mm

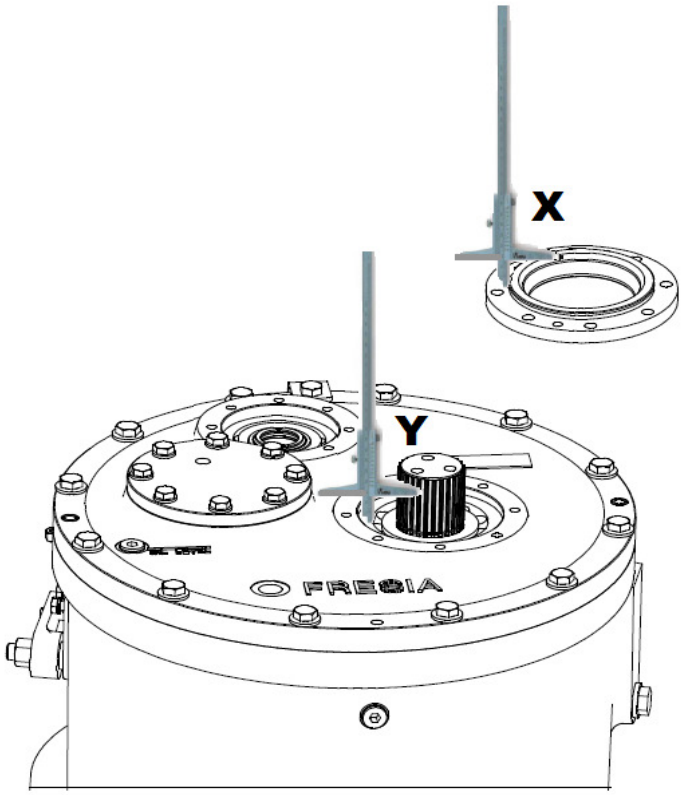
19. Mount the cover with proper screws and washers;

20. By means of a depth gauge, measure the distance between the flange cover top and the external ring of the roller bearing and sign it (X value);

21. By means of a depth gauge, measure the distance between the cover internal shoulder (OR ring side) and the cover and sign it (Y value);

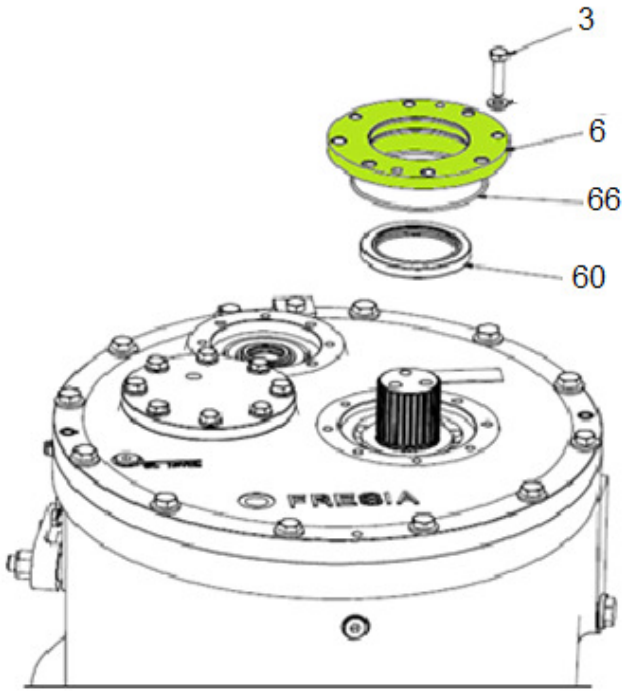
22. Proceed with the operation X – Y; the result of this operation must be positive and must lay between 0,08 and 0,1 mm; should the result be different, follow these steps:

    - If the result is positive, > 0,1,insert as many packings on the external ring of the taper roller bearings as it's necessary to bring this distance between 0,08 and 0,1 mm.
    - If the result is < 0,08 mm, place as many packings under the flange cover as it's necessary to bring the distance between 0,08 and 0,1 mm

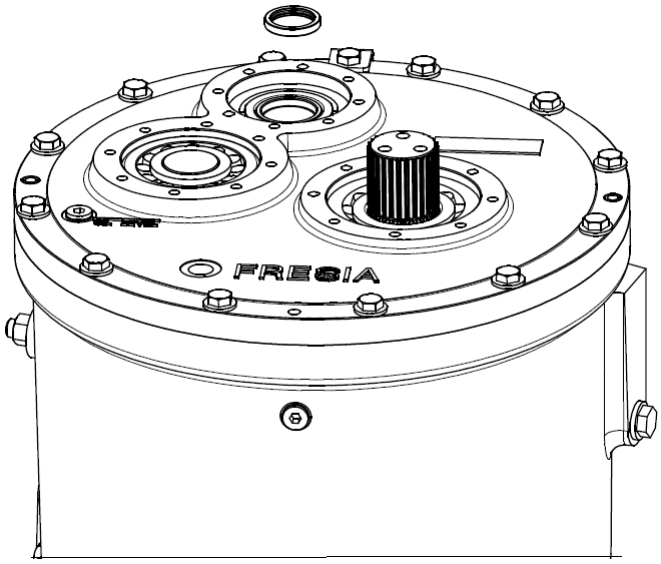


23. Lubricate the seat of the OR ring (66) on the flange cover, and insert the OR ring:

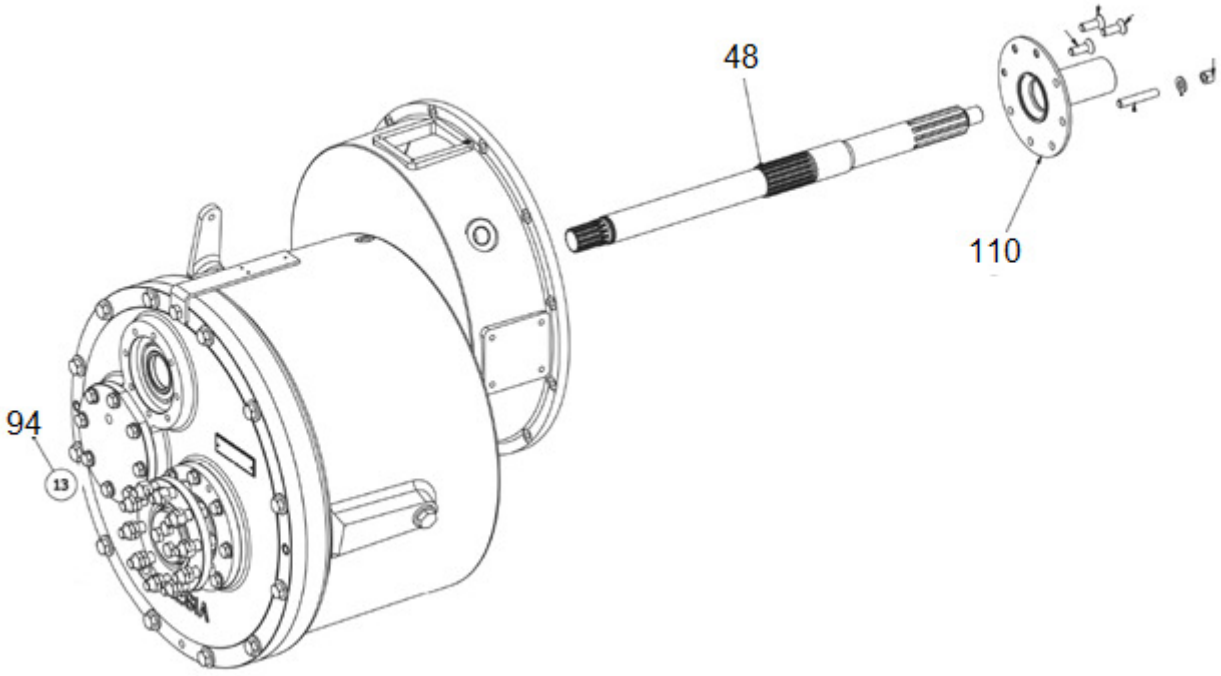
24. Put the oil seal (60) into the flange cover and mount it on the cover with proper screws and washers (2-1)



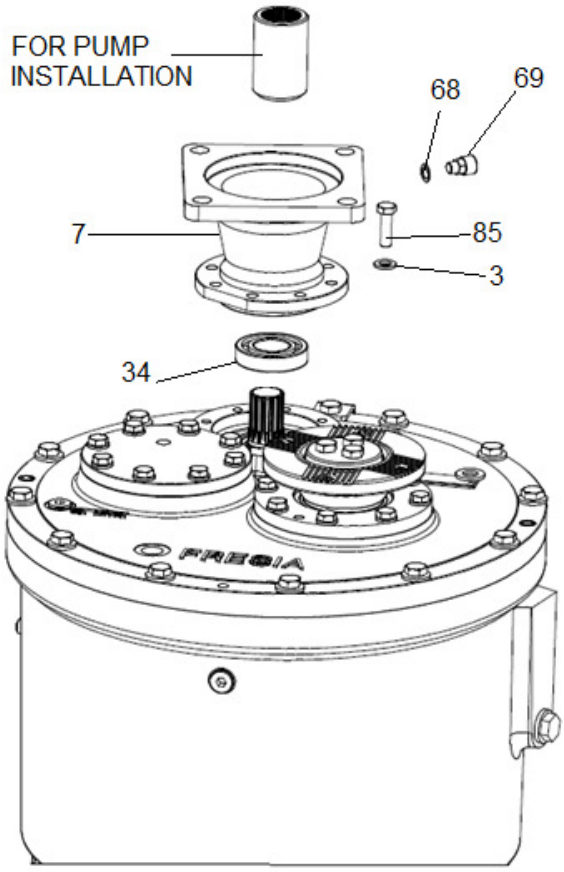
25. Put the seal with OR ring (47) into the shaft seat (following figure)



26. Insert the shaft (48) in the back hole and fix it with the elastic ring (94)



27. Install the pump support on bearing (34). Fix the support with the bolts (85). Mount the breather (69) with its washer (68) .



6.6 REINSTALLING THE TWO SPEED BACK GEAR ON THE VEHICLE

Vehicle should be on an inspection pit

DANGER –Use an appropriate lifting system.

- Position the pallet with the group under the vehicle
- With a proper hoist, lift up the group in position to couple it with the engine
- Fix ,the two speed back gear with proper stud bolts
- Connect the transmission shaft
- Connect the hydraulic hoses
- Mount the hydrostatic pump
- Fill the group with proper oil

Use oil TUTELA W90/ M-DA o equivalent

SECTION 7
BLOWERHEAD HYDRAULIC SYSTEM REPAIR

Sommario

7.1 SNOWBLOWER HYDRAULIC SYSTEM layout 3
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LIFTING CYLINDER DISASSEMBLY 8
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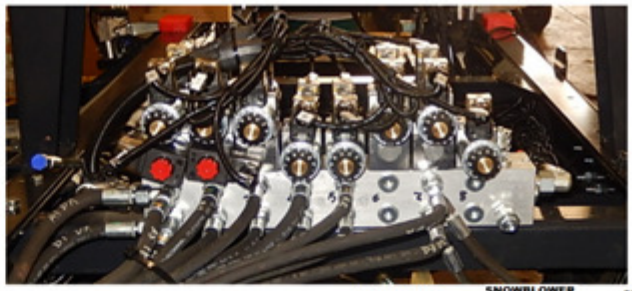
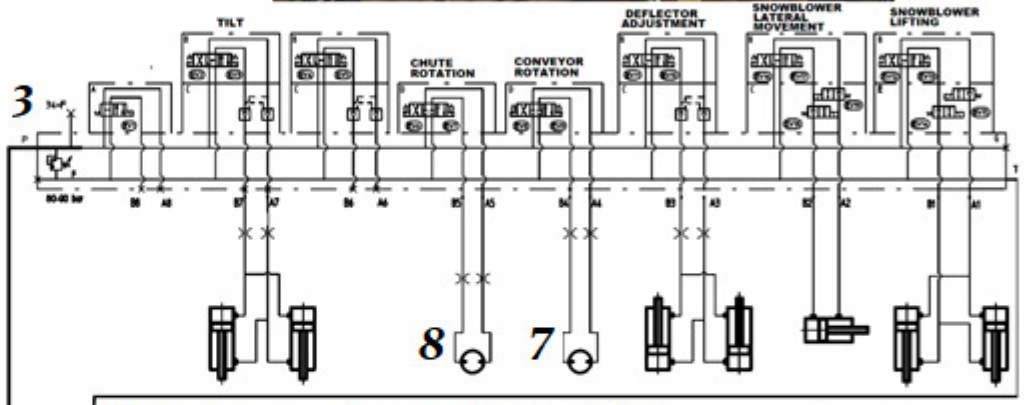
7.8 CONVEYOR ROTATION MOTOR-REDUCER REPLACEMENT 13
7.9 CHUTE ROTATION MOTOR REPLACEMENT 14

7.1 SNOWBLOWER HYDRAULIC SYSTEM layout

The SNOWBLOWER hydraulic system is composed by the following parts:

1. Oil tank;
2. Gear pump;
3. Hydraulic block distributor;
4. nr. 2 blowerhead lifting cylinders;
5. nr. 2 blowerhead lateral movement cylinder
6. nr. 2 chute lifting cylinders;
7. Hydraulic motor for 1st stage rotation (conveyor);
8. Hydraulic motor for chute rotation.
9. nr. 2 tilting cylinder




TILT
CHUTE ROTATION
CONVEYOR ROTATION
DEFLECTOR ADJUSTMENT
SNOWBLOWER LATERAL MOVEMENT
SNOWBLOWER LIFTING
3
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6

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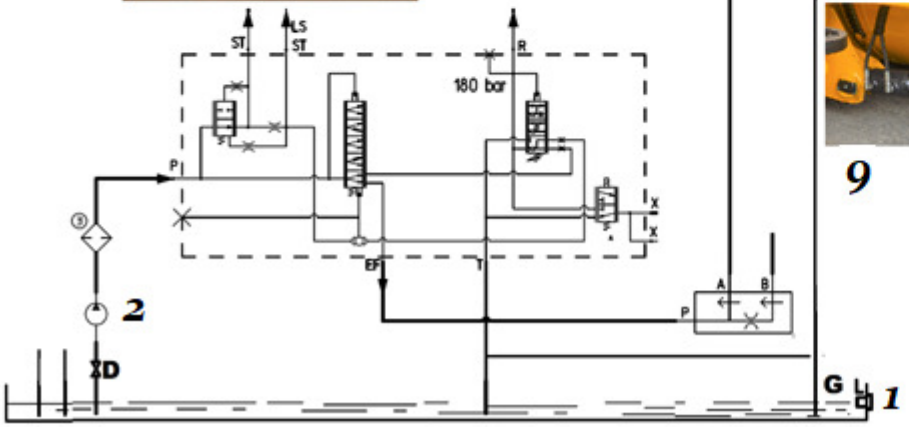
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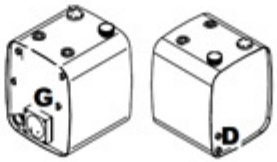
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D

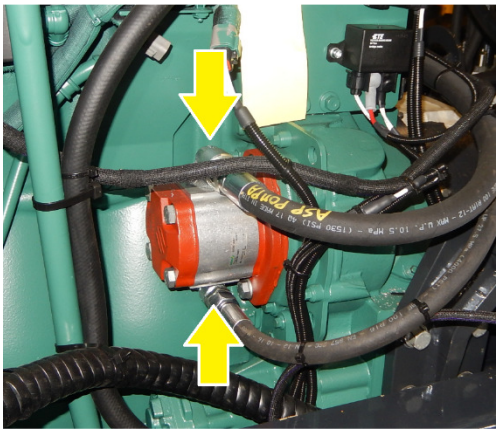
7.2 SNOWBLOWER HYDRAULIC SYSTEM TROUBLE SHOOTING

PROBLEM	CAUSE	REMEDY
Blowerhead does not move or it moves slowly	• hydraulic system low level	• refill
	• hoses leaking	• check that no leak is present
	• hydraulic pump failure	• replace the pump
	• wrong setting of the max pressure valve	• adjust the setting of the valve
	• electrovalves failure	• replace the damaged electrovalves

7.3 HYDRAULIC PUMP REPLACEMENT

1. Close the valve tap D of the tank (rotate in vertical) and remove the corresponding hose;

2. Remove the inlet and outlet hose from the pump (on engine)



3. Unscrew the pump fixing screws;
4. Replace the pump and its gasket;
5. Reconnect all the hydraulic hoses, performing the procedure in reverse

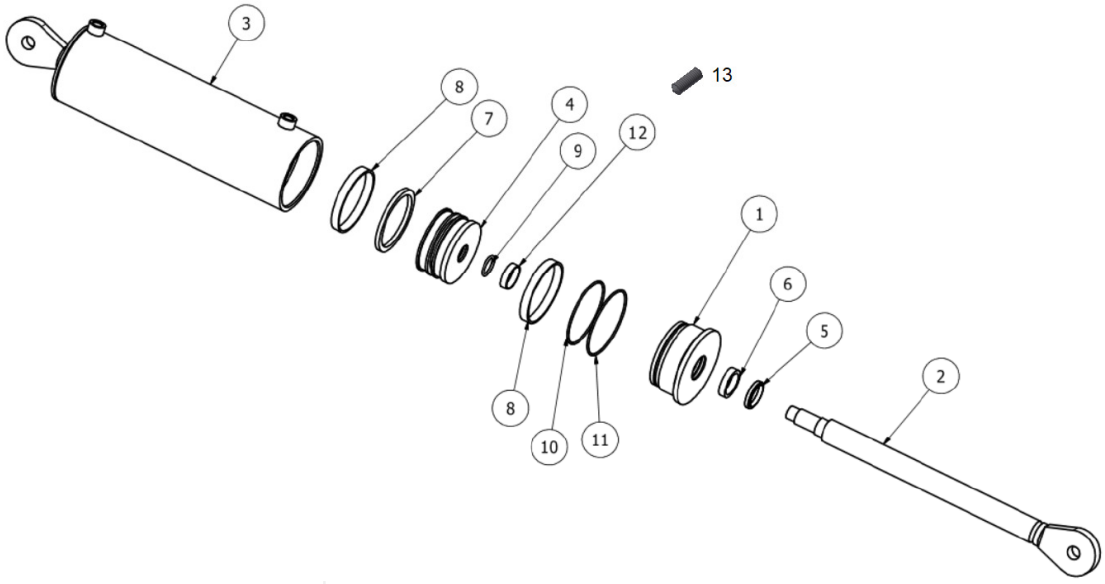
WARNING!
Remember to open the tap valve
Verify the oil level into the hydraulic tank

7.4 LIFTING CYLINDER DISINSTALLING

1. Slow down the blower head in floating position;
2. Remove the hoses which are connected to the cylinder (PUT A MARK TO REMEMBER THEIR RIGHT POSITION)
3. Remove the nut and the in pin in the lower part, after the nut and the pin in the upper.

4. Low down the cylinder
5. Install the new cylinder following the procedure in reverse.

LIFTING CYLINDER DISASSEMBLY

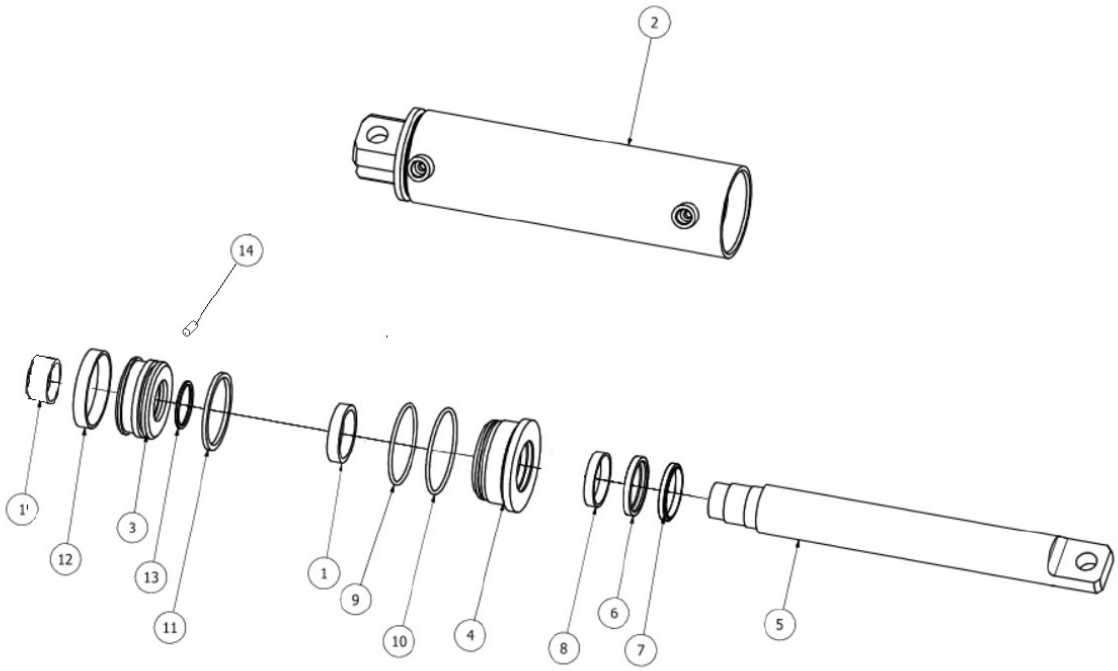


RIF. / REF.	*DESCRIPTION*
1	Head plate
2	Rod
3	Canne
4	Gaskets holder
5*	Scraper
6*	Seal
7*	Seal
8*	Band
9*	OR ring
10*	OR ring
11*	OR ring
12*	Band
13	Screw

7.5 LATERAL MOVEMENT CYLINDER DISINSTALLING

1. Slow down the blower head in floating position;
2. Remove the hoses which are connected to the cylinder (PUT A MARK TO REMEMBER THEIR RIGHT POSITION)
3. Remove the nut and the screws fixing the cylinder on the brackets. Remove the cylinder
4. Install the new cylinder following the procedure in reverse.

LATERAL MOVEMENT CYLINDER DISASSEMBLY

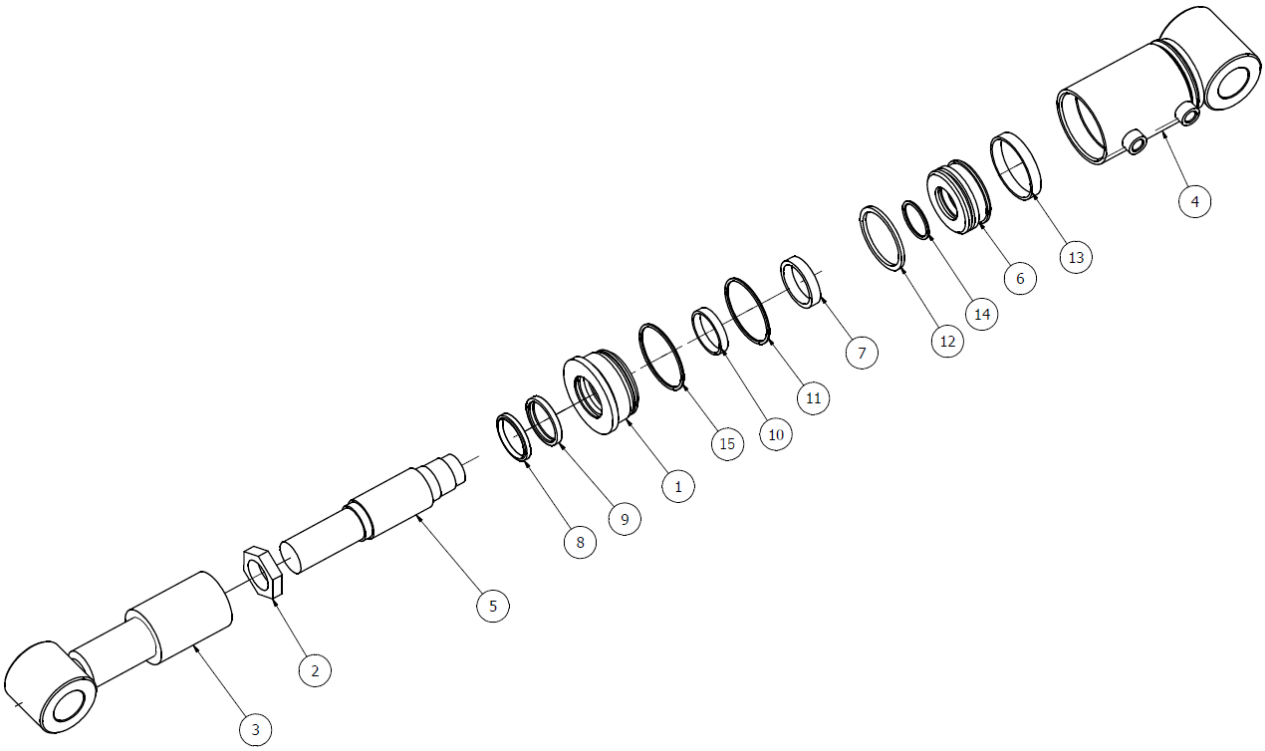


BLOWERHEAD ORIENTIRING CYLINDER_00109310		
RIF. / REF.	***DESCRIPTION***	***Q.TA' / Q.TY***
1	Limiter	1
1'	Limiter	1
2	Canne	1
3	Piston	1
4	Head	1
5	Rod	1
6*	Seal	1
7*	Scraper	1
8*	Band	1
9*	OR ring	1
10*	OR ring	1
11*	Piston seal	1
12*	Band	1
13*	OR ring	1
14	Screw 6x16	1

7.6 TILTING CYLINDER DISINSTALLING

1. Slow down the blower head in floating position;
2. Remove the hoses which are connected to the cylinder (PUT A MARK TO REMEMBER THEIR RIGHT POSITION)
3. Remove the nut and the pins, fixing the cylinder on the brackets. Remove the cylinder
4. Install the new cylinder following the procedure in reverse.

TILTING CYLINDER DISASSEMBLY

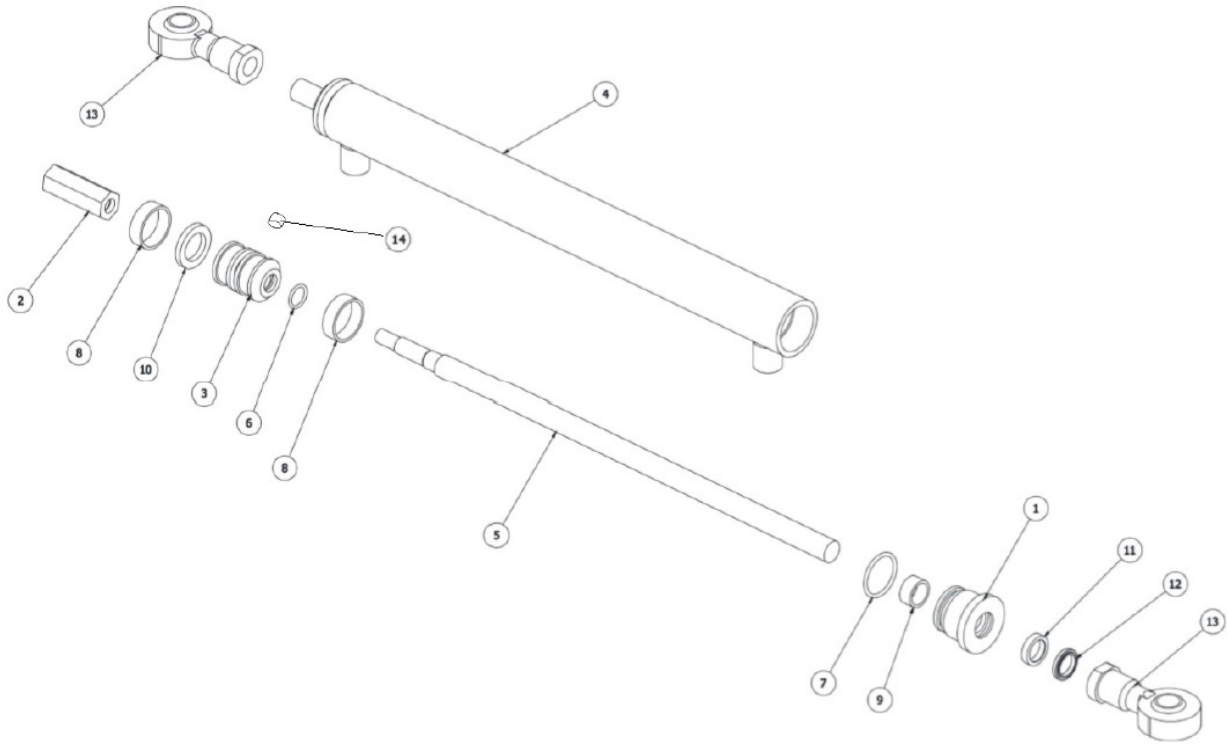


TILTING CYLINDER_FL00104322		
RIF. / REF.	***DESCRIPTION***	***Q.TA' / Q.TY***
1	front head plate	1
2	Counter nut 40x1,5	1
3	Rod	1
4	Canne	1
5	Rod d.50	1
6	Piston	1
7	Limiter	1
8	Rod scraper	1
9	Seal	1
10	Guide band FI50	1
11	OR ring	1
12	Seal	1
13	Guide band FE80	1
14	OR ring	1
15	OR ring	1

7.7 CHUTE CYLINDER REPLACEMENT

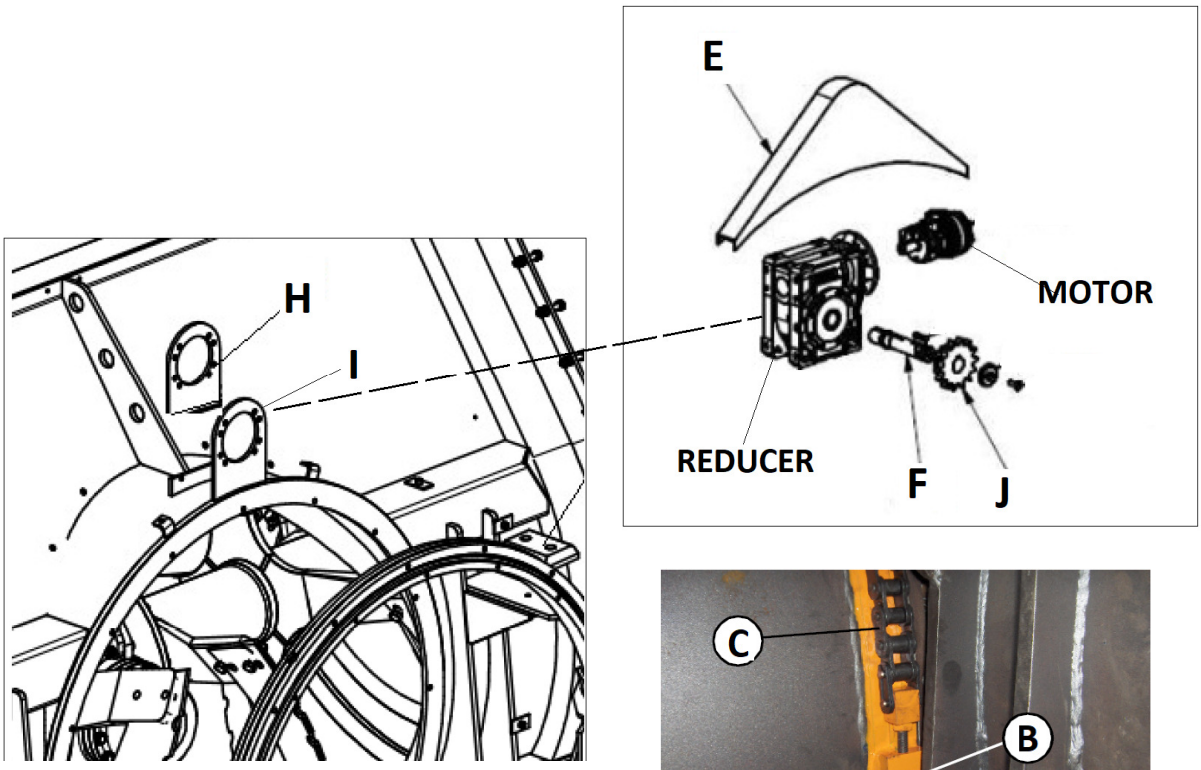
1. Low down the blowerhead in floating
2. Remove the hydraulic hoses **(mark the correct position)**;
3. **Unscrew the nut in the lower part of the cylinder**
4. Unscrew the nut in the upper part
5. Remove the cylinder
6. To reassemble, make the procedure in reverse.

CHUTE CYLINDER DISASSEMBLY



CHUTE COVER CYLINDER_FL00082044		
RIF. / REF.	***DESCRIPTION***	***Q.TA' / Q.TY***
1	Head plate	1
2	Stroke limiter	1
3	Piston	1
4	Housing	1
5	Rod	1
6*	OR ring	1
7*	OR ring	1
8*	Band	2
9*	Guide ring	1
10*	Gasket	1
11*	Gasket	1
12*	Scraper	1
13	Head	2
14	Pin	1

7.8 CONVEYOR ROTATION MOTOR-REDUCER REPLACEMENT



For disassembly:

1. Low down the blowerhead in floating position;
2. Remove the hydraulic hoses (mark the correct position);
3. Remove the protecting carter E;
4. Unscrew the counternut A and the nut B (fixing the chain). Remove the chain C;
5. Slide out the elastic ring D;
6. Remove the shaft F;
7. Unscrew the four screws fixing the motor to the flange H;
8. Remove the motor-reducer from the flange I.
9. unscrew the bolts connecting motor and reducer

For assembly:

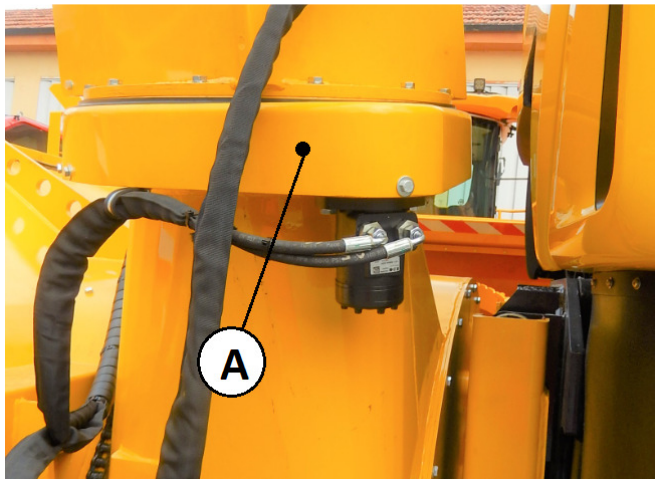
1. Assemble motor and reducer by proper bolts:
2. Position the hydraulic motor on the back flange and fix the four screws

3. Insert the shaft H (and fix with the elastic ring G
4. Position the flange in opposite L
5. Position the chain on the sprocket. Tie the chain by nut and counternut

Grease the chain and the sprocket;

Reinstall the carter and the hydraulic hoses

7.9 CHUTE ROTATION MOTOR REPLACEMENT



7 Low down the blowerhead in floating position;

8 Remove the hydraulic hoses (mark the correct position);

9 Remove the protection carter A

10 Unscrew the two screws fixing the motor and remove it

11 Reinstall the new motor fixing by the two screws without tightening

12 Insert the chain on the sprocket

13 Tie the chain moving the motor;

14 Tie the motor screws D;

15 Grease the chain and the sprocket

16 Reinstall the carter.