
PREVENT ACCIDENTS

The majority of accidents and injuries which occur in the workshop, at the worksite or on the road, are caused by the failure of some individual to follow simple and fundamental safety rules or precautions. For this reason most accidents can be prevented by recognizing the real cause and taking the necessary precautions, before the accident occurs.

Regardless of the care used in design and construction of any type of equipment, there may be conditions that cannot be completely safeguarded against, without interfering with reasonable accessibility and efficient operation.

A careful operator and / or technician is the best insurance against accidents.
The careful observance of this single safety rule would be sufficient to prevent serious injuries:

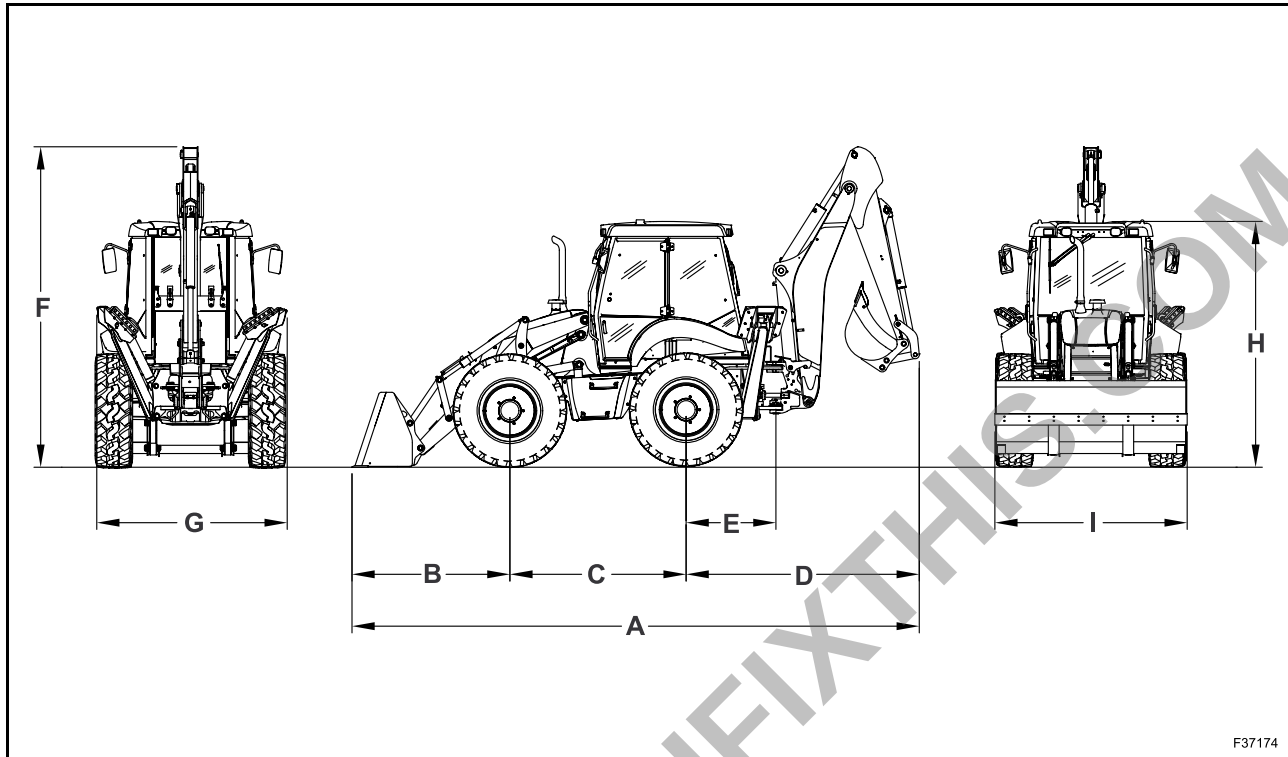
Never attempt to clean, lubricate or adjust a machine while it is in motion.

WARNING

Before carrying out any maintenance operation, adjustment and or repair on machines equipped with attachments, controlled hydraulically or mechanically, make sure that the attachment is lowered and safely set on the ground. If it is necessary to have the equipment partially or fully raised to gain access to certain items, be sure the equipment is suitably supported by means other than the hydraulic lift cylinders, cable and /or mechanical device used for controlling the equipment.

CNH ITALIA S.p.A.
Technical Information
Via Plava, 80
10135 Torino - Italy

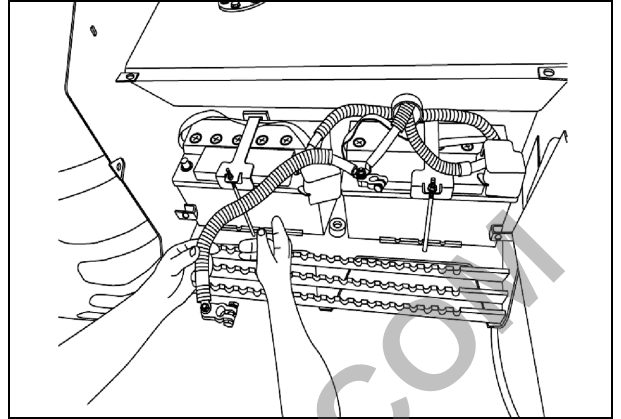
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DIMENSIONS - 4WS CENTER PIVOT

Front and rear tyres 440/80 R28 IT530
 Standard loader bucket 1.15 m³ (40.61 ft³)
 Standard backhoe bucket 910 mm (35.82 in)

A	Overall machine length	7080 mm (278.73 in)
B	Loader bucket reach	1970 mm (77.55 in)
C	Wheel base	2200 mm (86.61 in)
D	Backhoe bucket dimensions	2910 mm (114.56 in)
E	Rear wheel base - backhoe attachment swing support	1120 mm (44.09 in)
F	Maximum machine height	4000 mm (157.48 in)
G	Stabilizer width	2380 mm (93.70 in)
H	Cab height	3065 mm (120.66 in)
I	Loader bucket width	2400 mm (94.48 in)

Disconnect the negative battery cable from the negative battery terminal.



TBR00004

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TECHNICAL SPECIFICATIONS**4WD/2WS TRANSMISSION - POWERSHUTTLE (B100C - B100CTC - B110C - B110CTC)**

Model CARRARO TLB1 MPB 4WD

Type (4x4) 4 forward and 4 reverse travel gears

Torque converter ratio 2.38

Transmission ratios:

1st gear forward travel 5.603:1 reverse travel 4.643:1

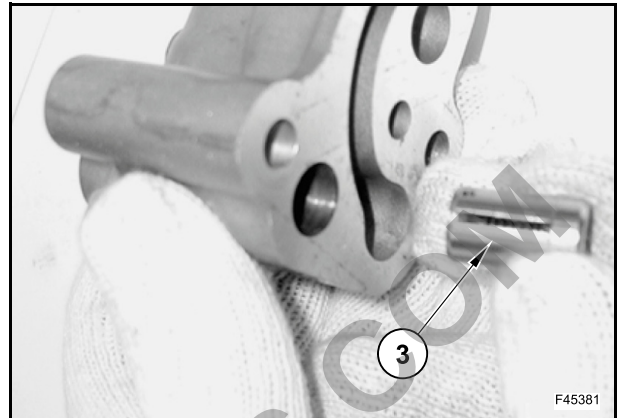
2nd gear forward travel 3.481:1 reverse travel 2.884:1

3rd gear forward travel 1.585:1 reverse travel 1.313:1

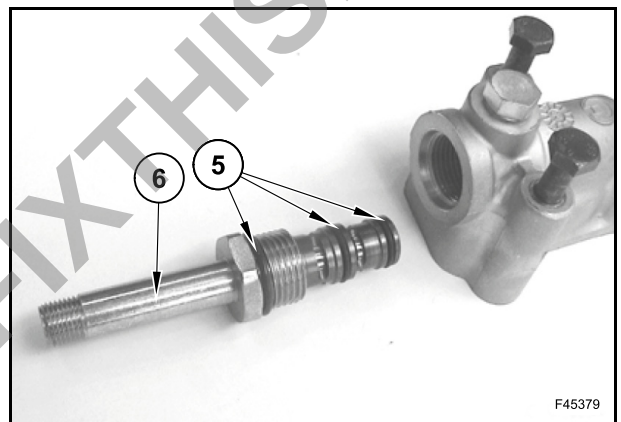
4th gear forward travel 0.793:1 reverse travel 0.657:1

Assembly

Assemble valve (3).

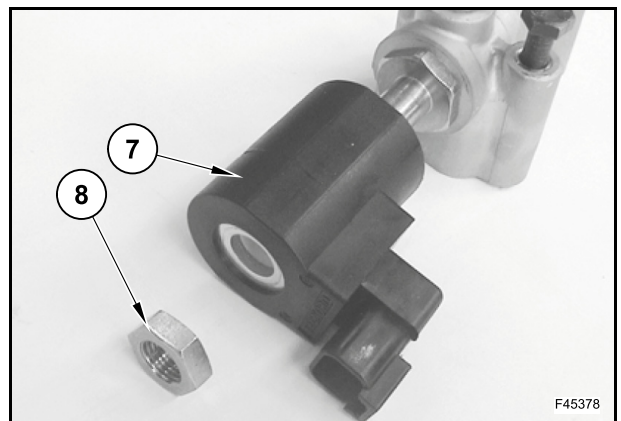


Assemble the O-rings (5) on the shaft (6).

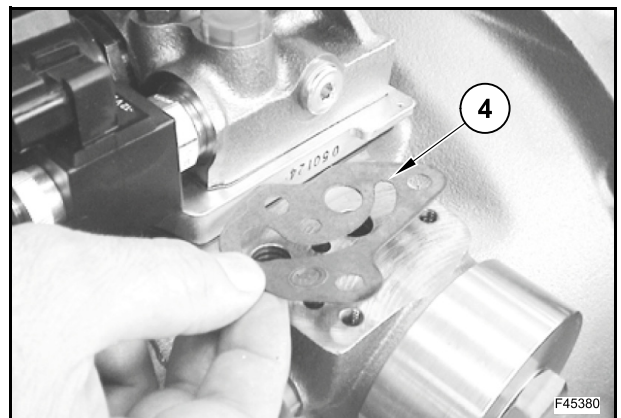


Assemble the 4WD solenoid coil (7).

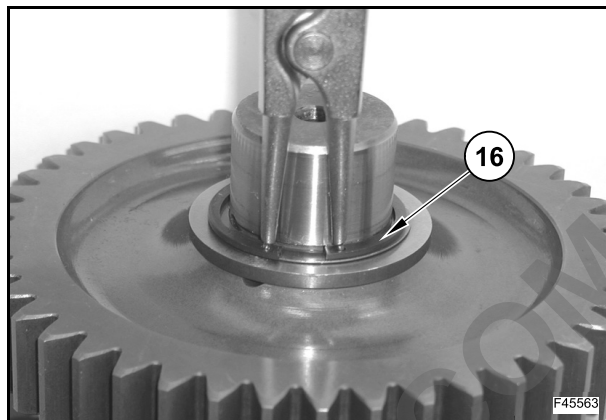
Screw in and tighten the nut (8) to the tightening torque of $5 \div 8$ Nm ($3.6 \div 5.9$ lbf·ft).



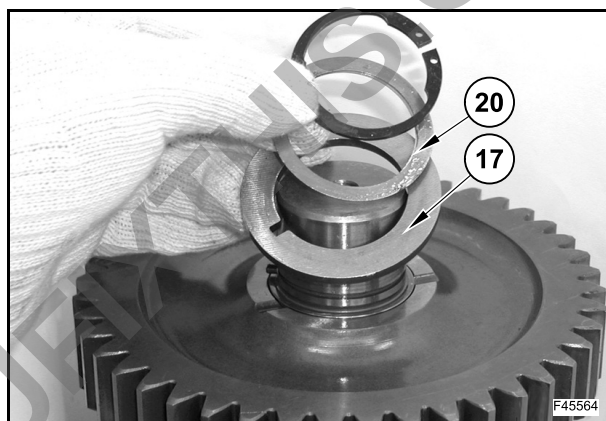
Position the gasket (4).



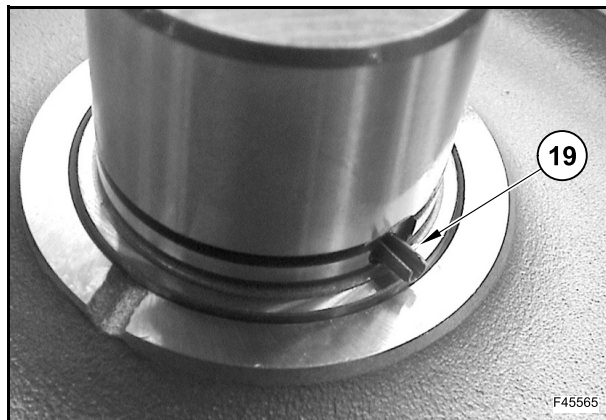
Remove the snap ring (16).



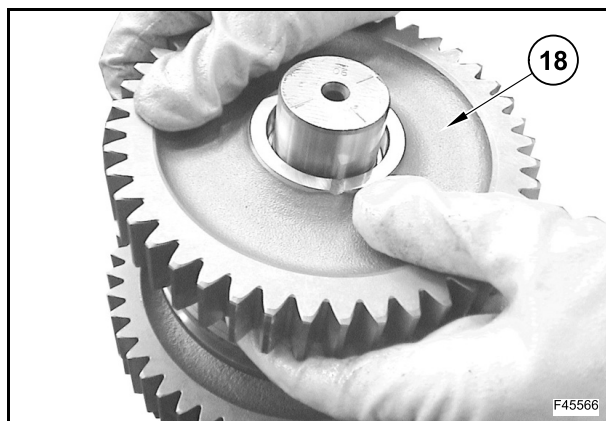
Remove the shims (20) and the thrust washer (17).



Remove the pin (19).

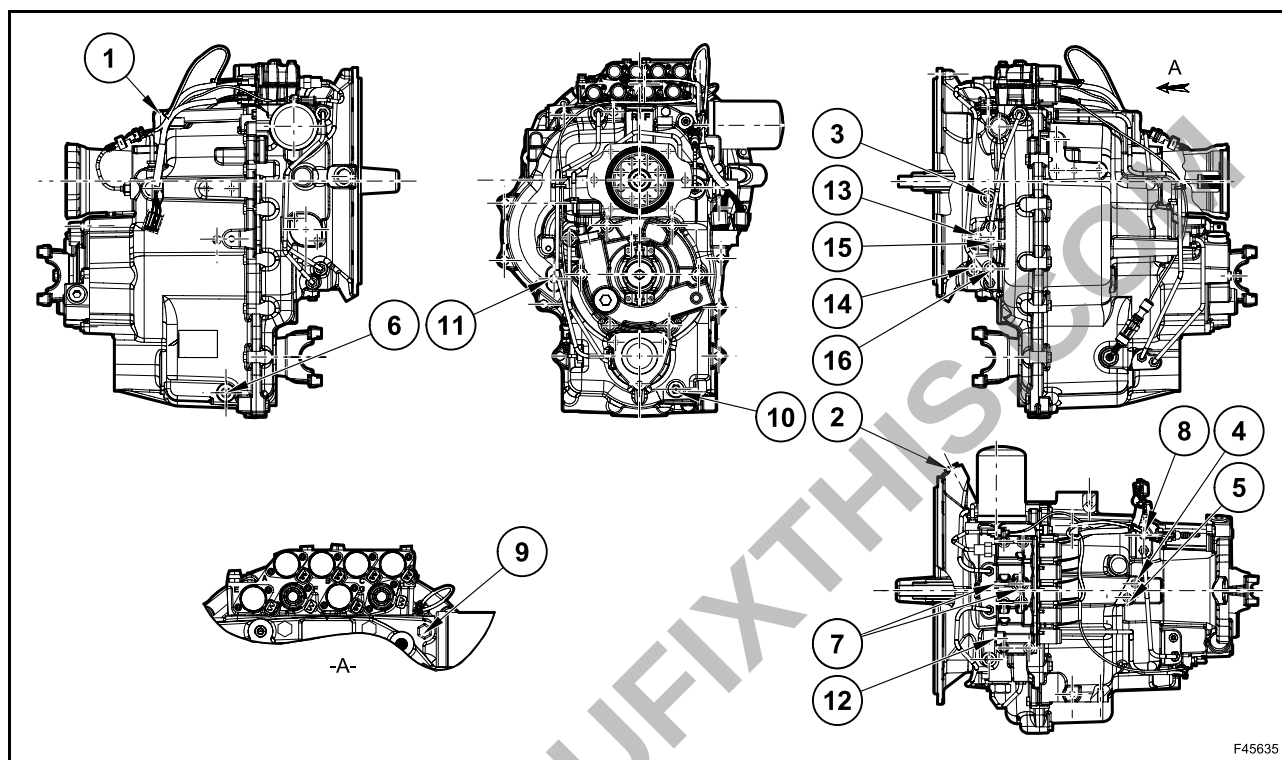


Remove the 2nd speed gear (18).



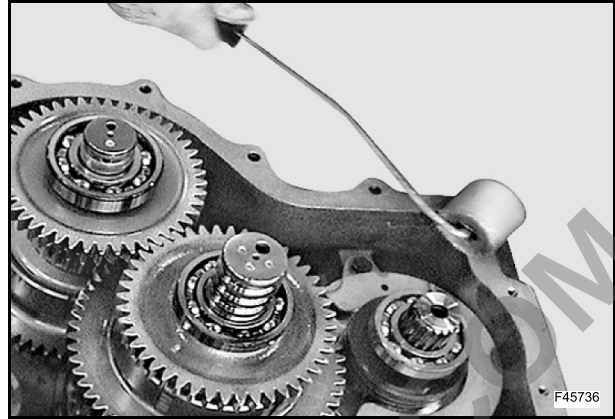
PORTS

2WS



REF.	DIMENSION	USE	NOTES - MISCELLANEOUS
1	7/8" - 14 UNF	Oil inlet from cooler	
2	7/8" - 14 UNF	Oil outlet to cooler	
3	9/16" - 18 UNF	Check port for torque converter input pressure	3 ÷ 9 bar (43.5 ÷ 130 psi)
4	9/16" - 18 UNF	Forward gear pressure check port	13.5 ÷ 16.5 bar (196 ÷ 239 psi) 0.3 bar (4.3 psi) = maximum pressure in neutral position
5	9/16" - 18 UNF	Reverse gear pressure check port	13.5 ÷ 16.5 bar (196 ÷ 239 psi) 0.3 bar (4.3 psi) = maximum pressure in neutral position
6		Oil drain plug	
7	9/16" - 18 UNF	Oil pressure delivery to differential lock	14 ÷ 17 bar (203 ÷ 246 psi)
8	9/16" - 18 UNF	Lubrication pressure check port (from cooler) Oil outlet to brake tank	1 ÷ 5 bar (14.5 ÷ 72.5 psi) forward/reverse gear 1 ÷ 5 bar (14.5 ÷ 72.5 psi) neutral position
9	9/16" - 18 UNF	Brake oil pressure delivery	14 ÷ 17 bar (203 ÷ 246 psi)
10	9/16" - 18 UNF	Oil return	
11	9/16" - 18 UNF	Oil level check port	
12	9/16" - 18 UNF	Oil main pressure check port	14 ÷ 17 bar (203 ÷ 246 psi)
13	1/8" - BSP	Lubrication check port	
14	1/8" - BSP	Check port of 1st gear	
15	1/8" - BSP	Check port of 2nd gear	
16	1/8" - BSP	Check port of 4th gear	

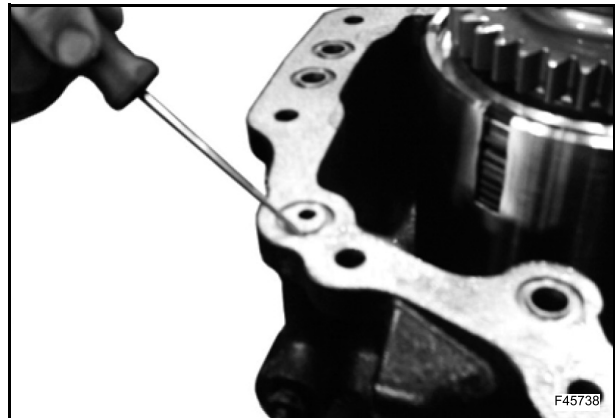
Spread the sealant uniformly.



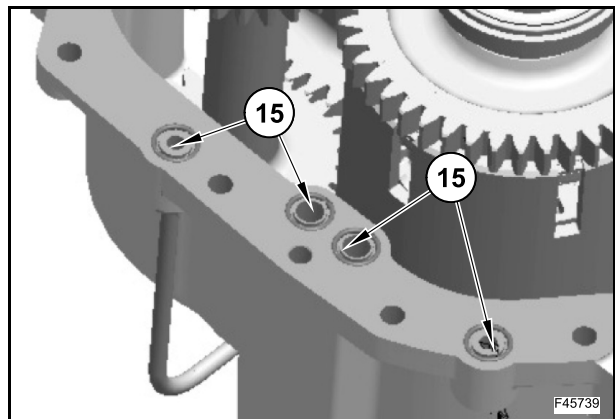
Prevent the penetration of the sealant in the O-ring seats.



Carefully clean the O-ring seats.

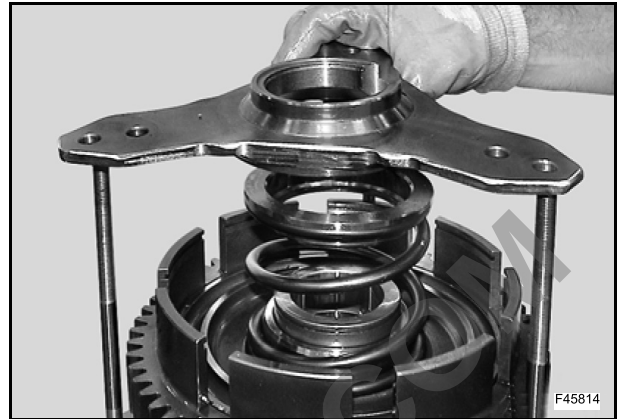


Assemble the O-rings (15).
Do not lubricate the O-rings.

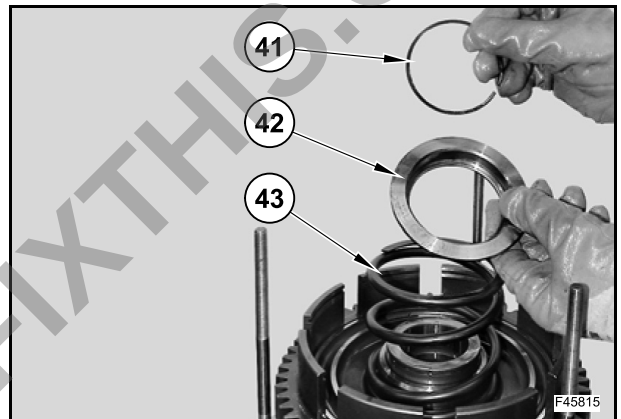


Loosen the knobs of the threaded bars to clear the spring tension.

Remove the upper part of tool 380200215.



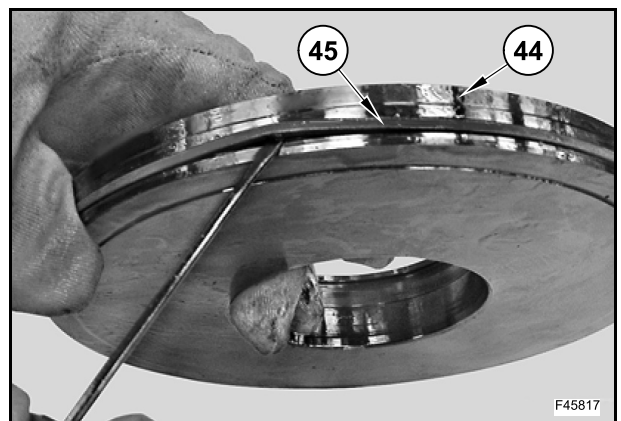
Remove the snap ring (41), the cover (42) and the spring (43).



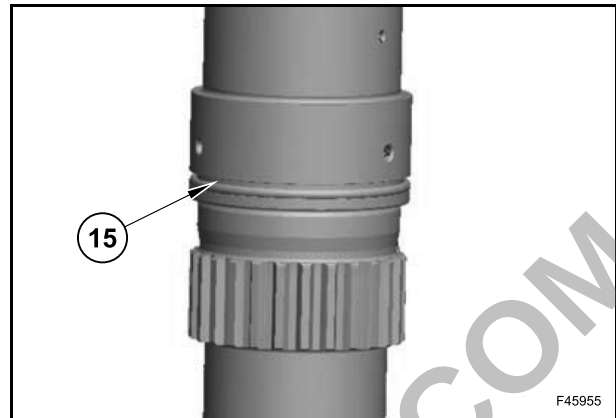
Remove the piston (44) by blowing in compressed air through the delivery hole.



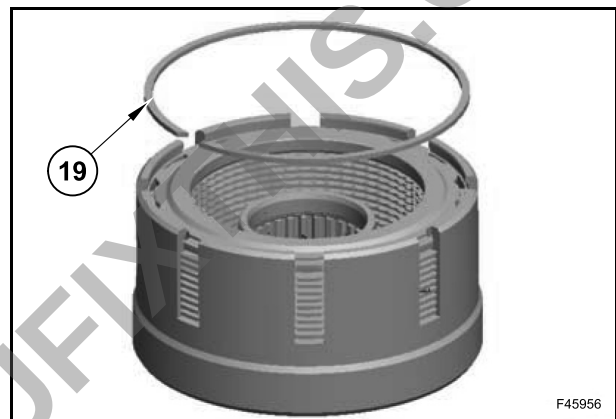
If necessary, remove the seal ring (45) with the relevant O-ring from the outer seat of piston (44).



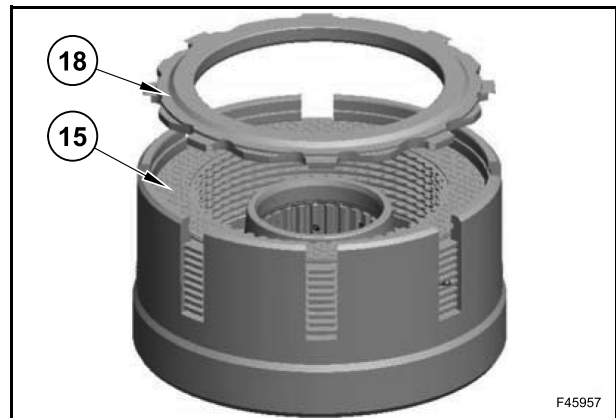
Remove the O-ring (15).



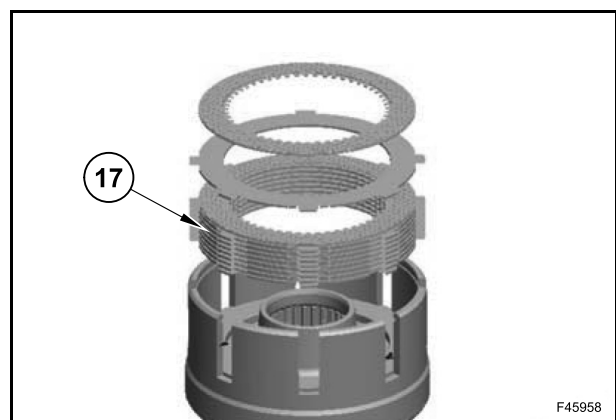
Remove the snap ring (19).



Remove the thrust washer (18) and the disc and counterdisc kit (15).



Remove the 4WD disc and counterdisc kit (17).



REMOVAL FROM MACHINE

Move the machine to a level and firm ground, away from any soft ground, excavations and poorly shored cavity.

Rest the loader attachment on the ground in order to unload the weight of the machine from the 2 front wheels, then lift the front part, thus ensuring the safety of the subsequent operations.

Use the locking pin (if provided) to lock the loader attachment controls.

Place the backhoe attachment in the road travel position.

Place the direction-of-travel lever and gearshift lever in neutral position.

Immobilize the machine by means of the parking brake.

Completely raise the stabilizers and lock them mechanically.

Stop the engine and remove the starter key.

Release the hydraulic pressure by operating the control levers in all directions.

On hydraulically controlled machines, turn the key to ON and release the pressure by moving the hydraulic control levers in all directions.

Place some wedges under the wheels so as to prevent the machine from moving.

Disconnect the electric system by disconnecting the battery master switch.

Fasten the front axle (4) to a lifting hoist or to a support.

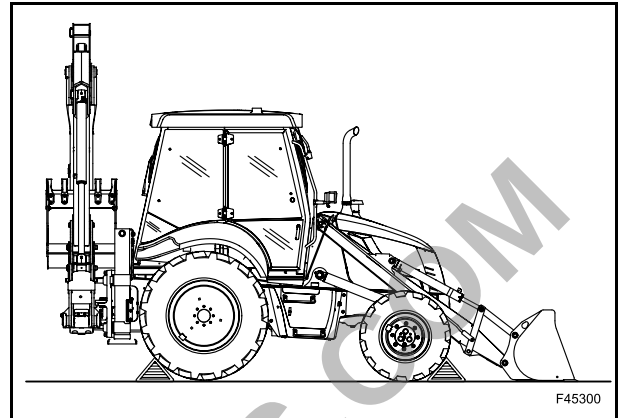
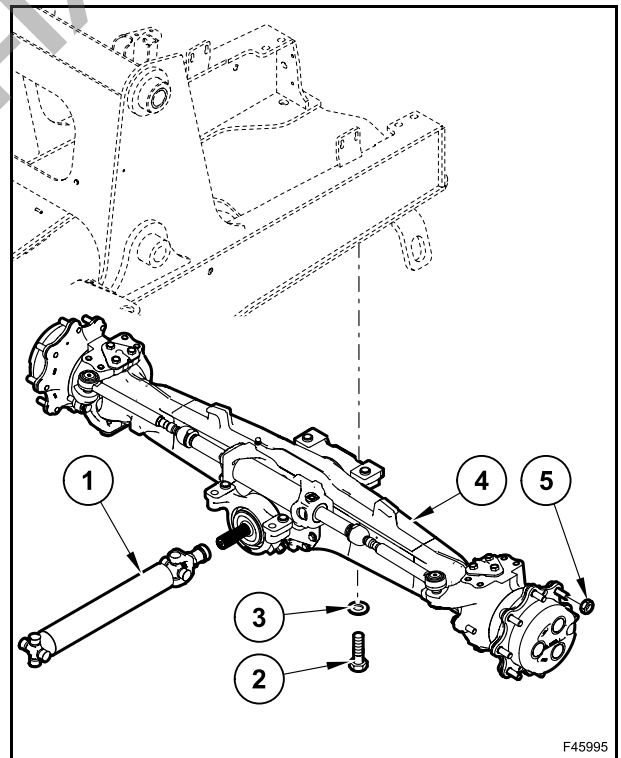
Now it is possible to carry out the disassembly of the 2 front tyres by loosening and removing the relevant fixing nuts (5) [tightening torque = 330 Nm (243 lbf·ft)].

Disconnect the hoses of the steering cylinder, paying attention to possible oil leaks, preventing spillage over the ground using a container.

Disconnect the cardan joint (1).

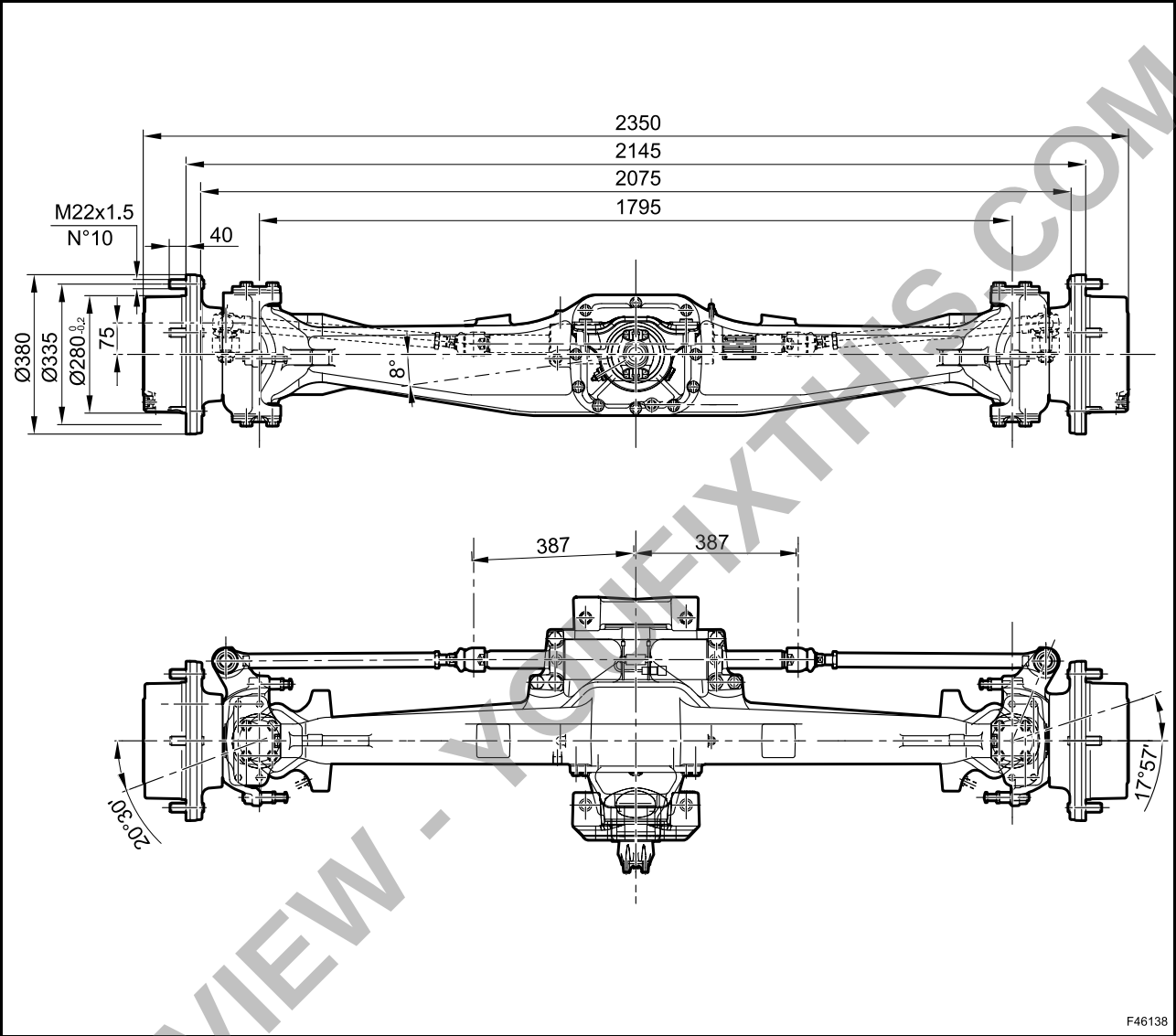
Loosen and remove the screws (2) with the relevant washers (3) [tightening torque = 460 ÷ 540 Nm (339 ÷ 398 lbf·ft)].

Remove the front axle (4).



4WS FRONT AXLE

TECHNICAL SPECIFICATIONS



Manufacturer	CARRARO
Model	26.32
Differential ratio	2.75
Planetary hub ratio	6.92
Total reduction ratio	19.04
Lubrication angle	35° maximum (front and rear) - 35° maximum (from side to side)

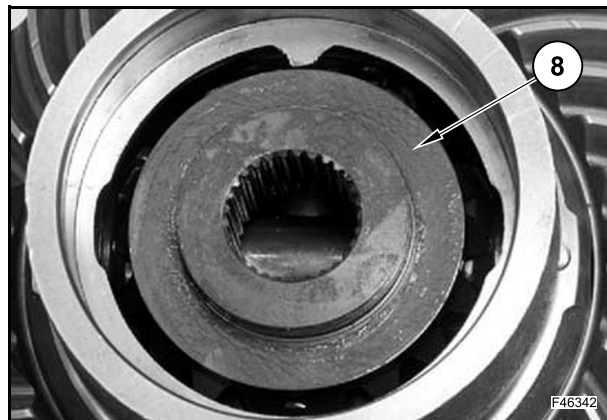
Remove the snap ring (4).



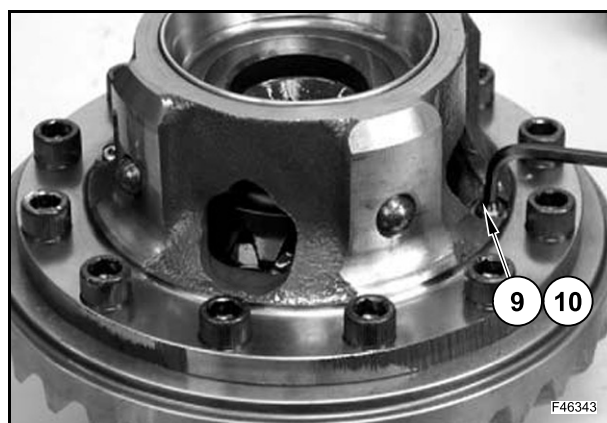
Take out the cover (5) and collect the anti-rotation pin (6) and the shoulder ring (7).



Remove the gear (8).



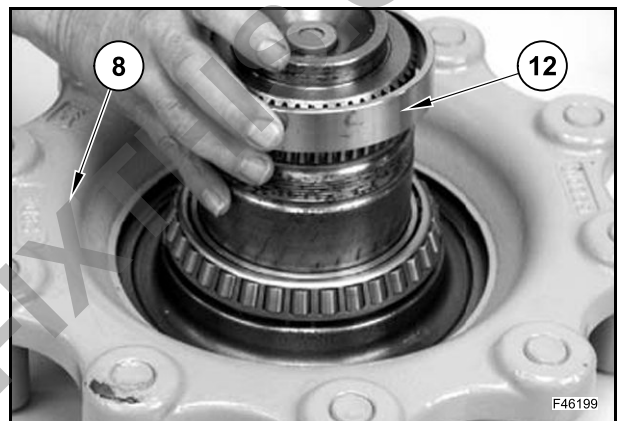
Remove the dowels (9).



Assemble the bearing (11) onto wheel flange (8) with a press.



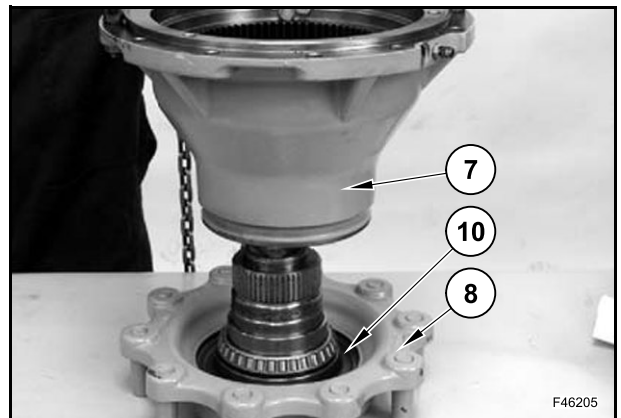
Place the spacer (12) on the wheel flange (8).



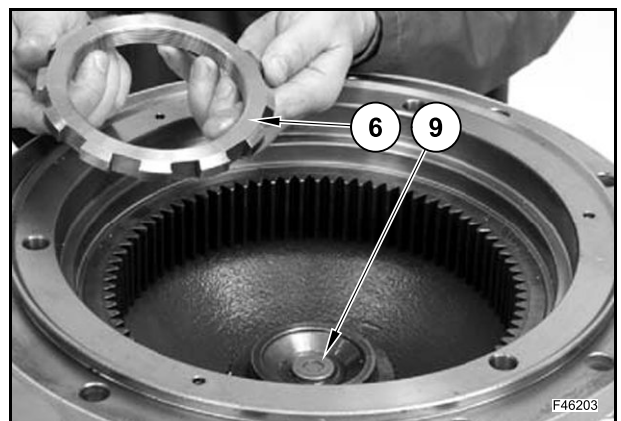
Connect the wheel hub (7) to a lifting device and place it on the wheel flange (8).

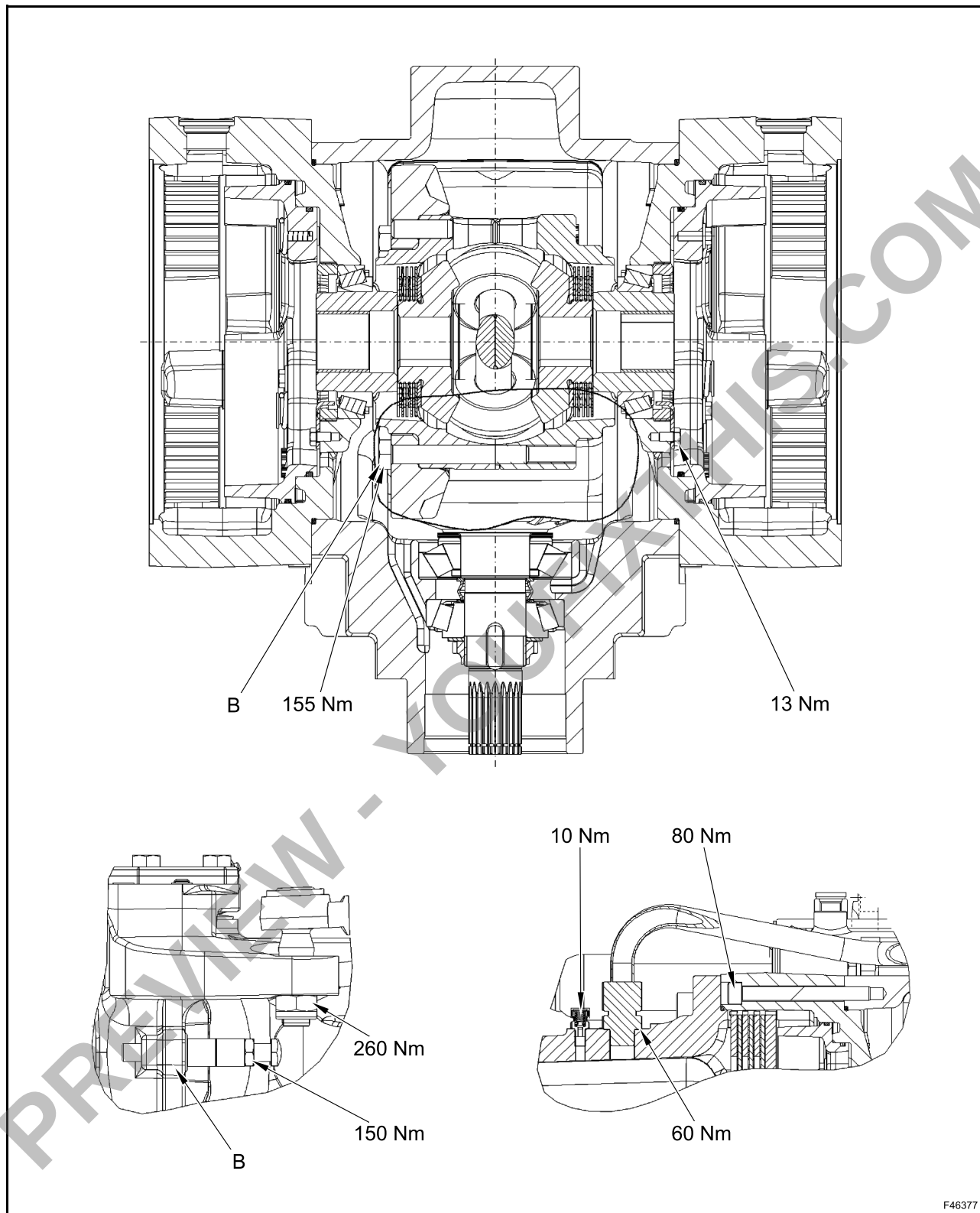
Clean the sealing surface of the flange.

Pay attention not to damage the seal ring (10).



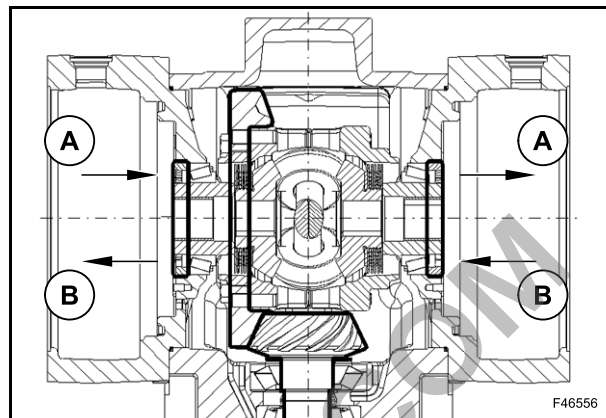
Assemble the bearing (9) and the ring nut (6).





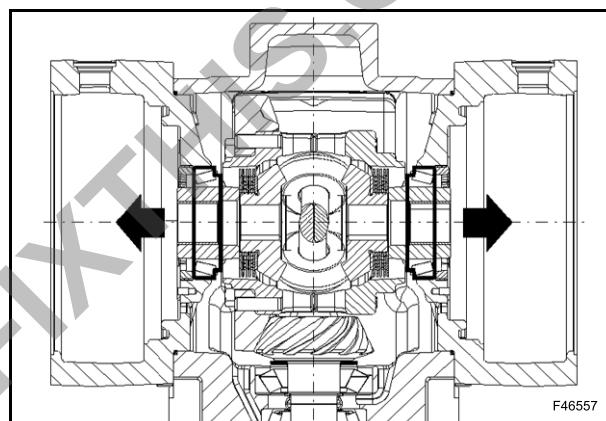
Adjust the ring nuts (8) remembering that:

- if the measured backlash is higher than the prescribed tolerance range, tighten the ring nut on the opposite side of the ring gear and loosen the opposite ring nut by the same measure (A);
- if the measured backlash is lower than the prescribed tolerance range, tighten the ring nut on the ring gear side and loosen the opposite ring nut by the same measure (B).



After pinion-ring gear backlash adjustment, check that there is a minimum preload on the differential box bearings.

Repeat the whole sequence of the above mentioned operations until the indicated conditions are reached.



Once the pinion-ring gear backlash has been adjusted, if the bearings have not been replaced, measure the total preload F_{Tm} of the bearings (pinion-ring gear system), using a dynamometer whose cord is wound on the end of the pinion shaft.

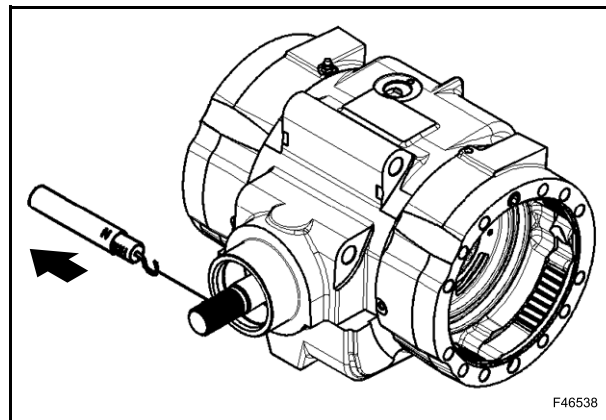
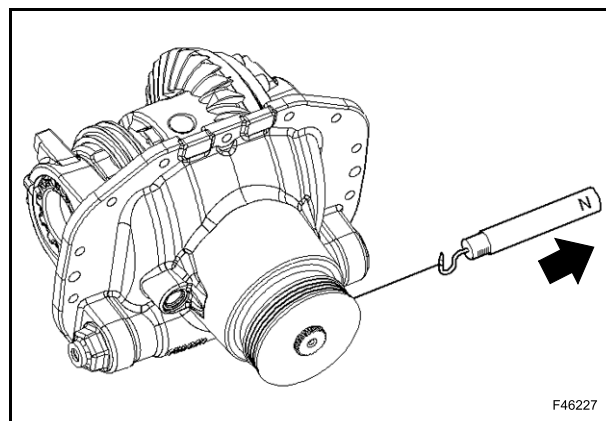
Use this method only if the bearings are already run in.

The measured value F_{Tm} should be within the following range:

$$F_{Tm} = F_{T0} \div (F_{T0} + 10) \text{ N}$$

$$[F_{Tm} = F_{T0} \div (F_{T0} + 2.25) \text{ lbf}]$$

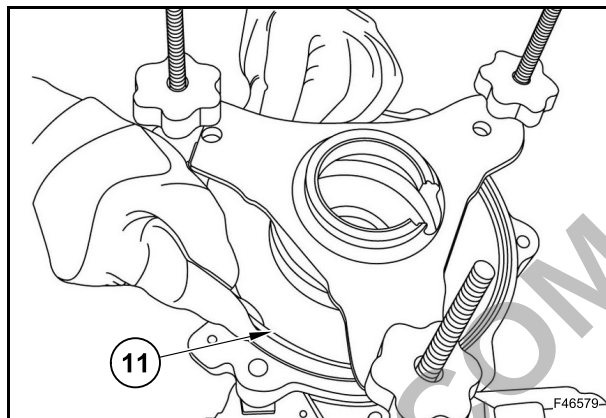
If the bearings have been replaced, measure the total preload F_{Tm} of the bearings (pinion-ring gear system), using a dynamometer whose cord is wound on tool 380200237 inserted on the pinion splined end.



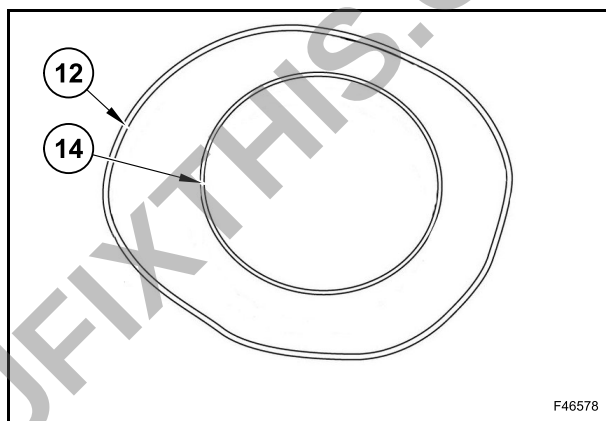
⚠ WARNING ⚠

All preloads must be measured without seal ring.

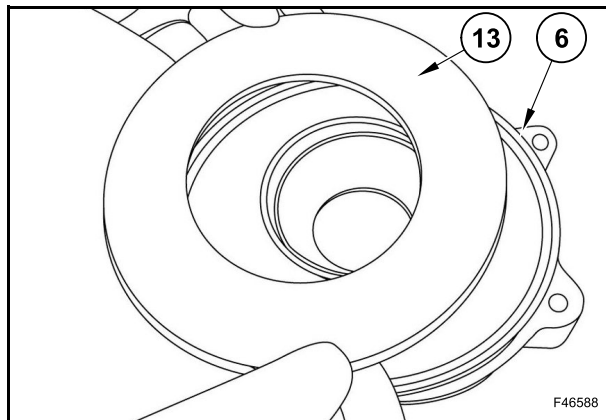
Compress the belleville washers, to assemble the snap ring (11).



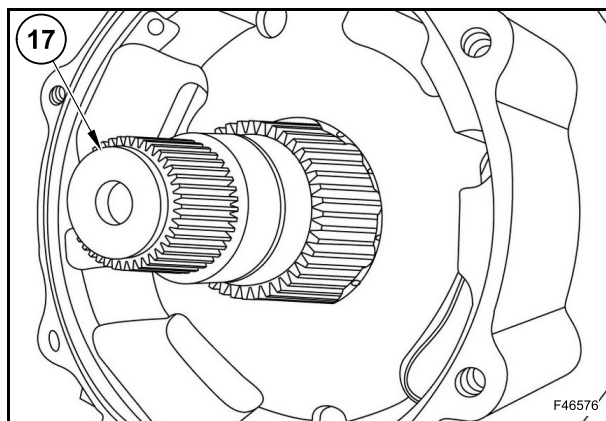
Assemble new O-rings (12) and (14) onto the retaining plate.



Lubricate and install the retaining plate (13) into the brake cover (6).



Assemble the hub (17).

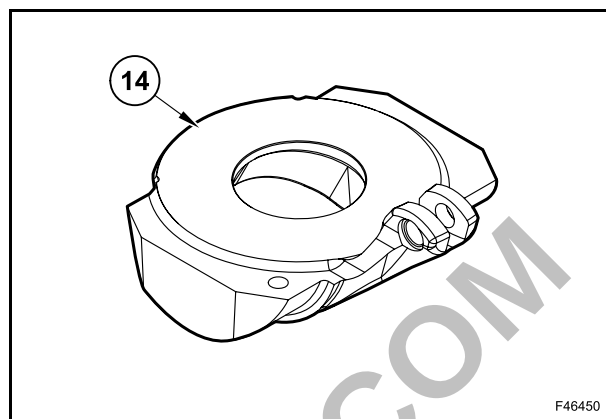


Carefully inspect each surface of the swashplate (14) for wear. All swashplate surfaces should be smooth.

Inspect the swashplate's running surface for damage and brass transfer.

Excessive transfer may indicate that the pistons should be replaced.

Finally, check the swashplate pin for scratches.



Inspect the cradle bearings (10) for damage or excessive wear.

The polymer wear layer must be smooth and intact.

Replace if scratched or excessively worn.

Inspect the valve plate (21) for scratches or grooves.

Check the plate for evidence of any cavitation along the running face.

If pitting from cavitation exists, replace the valve plate.

Check for excess wear on the running face. If any discoloration or burn marks are observed, replace.

Run a fingernail or a pencil tip across the diameter of the sealing land surface. No deep or outstanding grooves should be felt, as these may decrease pump flow. Lap or replace if grooves or nicks are present.

Inspect the mating surfaces of the end cap and valve plate for any possible contamination.

Measure the thickness of the valve plate (21).

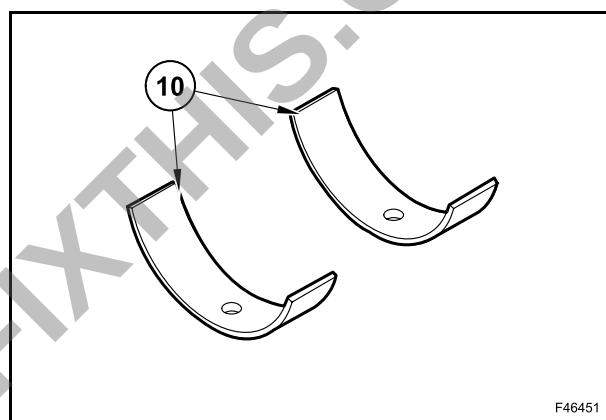
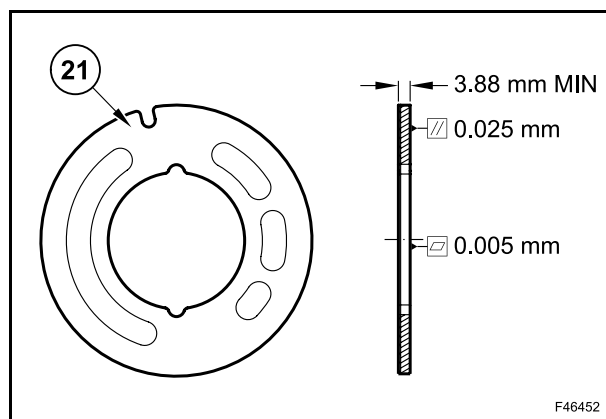
Ensure that valve plate parallelism is equal to or less than 0.025 mm (0.0010 in).

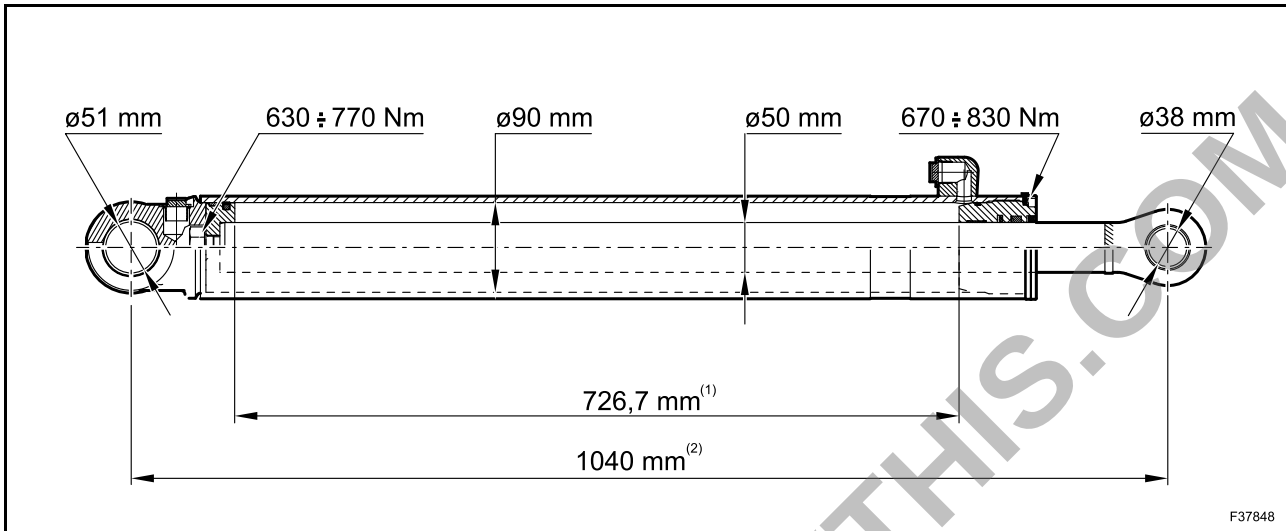
Appearance should be flat and smooth on both the running face and the bottom surface.

The valve plate should be flat to 0.005 mm (0.0002 in) convex.

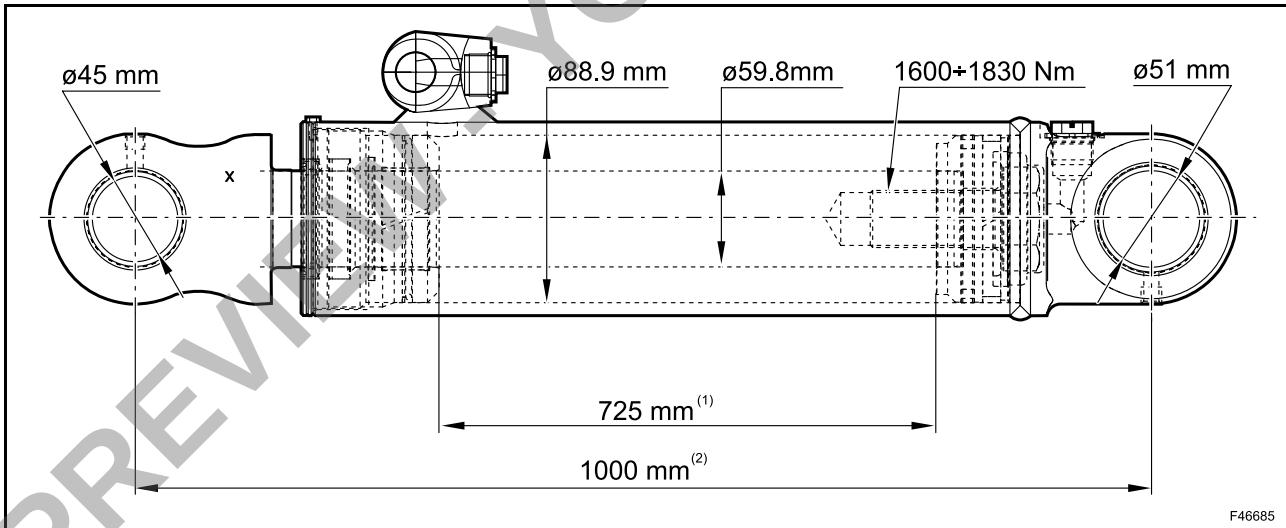
Carry out a magnetic particle inspection to detect possible cracks.

The plate (21) must be replaced in case of cracks.



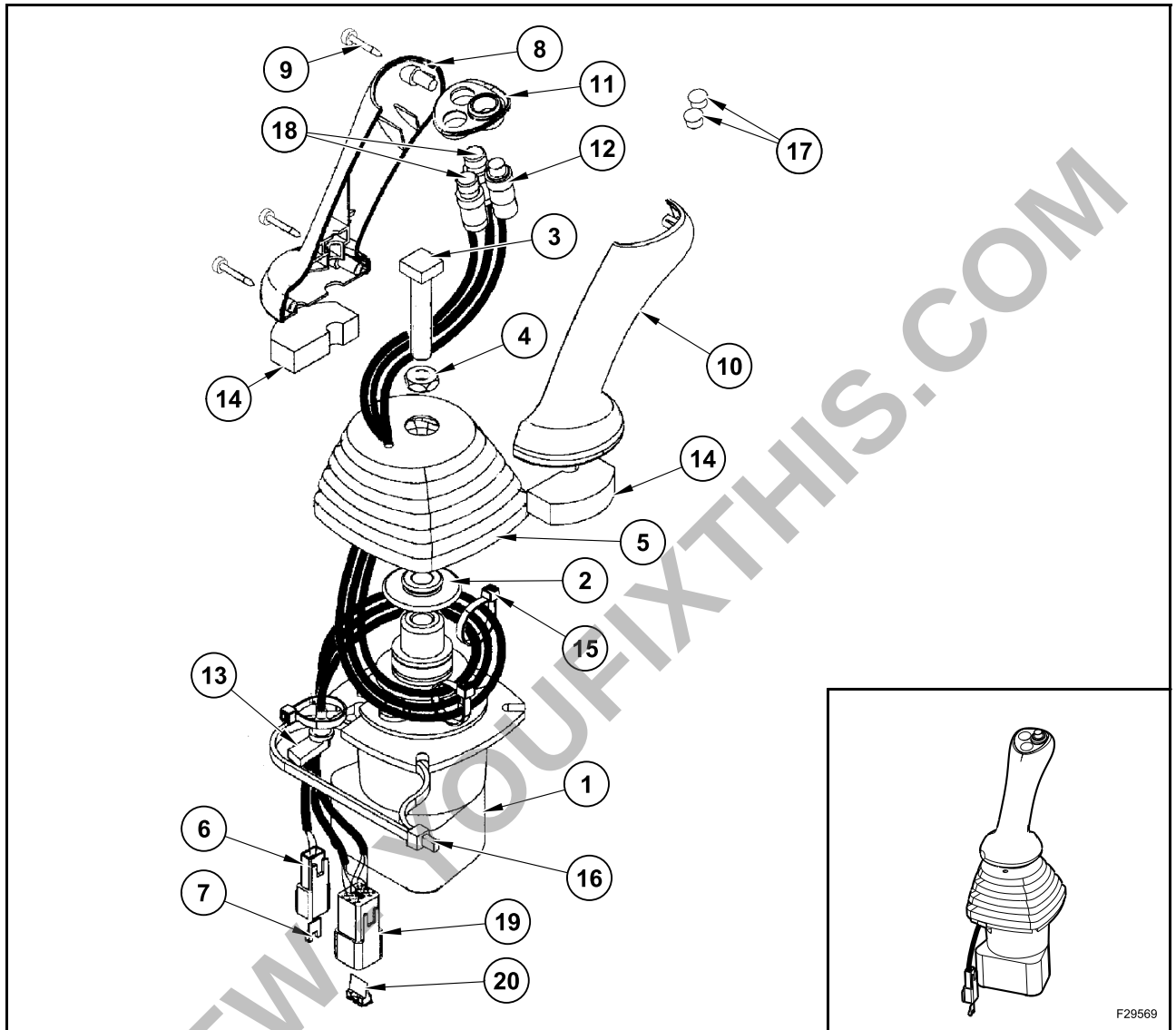
LOADER ATTACHMENT BOOM CYLINDER**2WS**

1. Stroke
2. Completely retracted

2WS-TC

1. Stroke
2. Completely retracted

LEFT HAND CONTROL LEVER

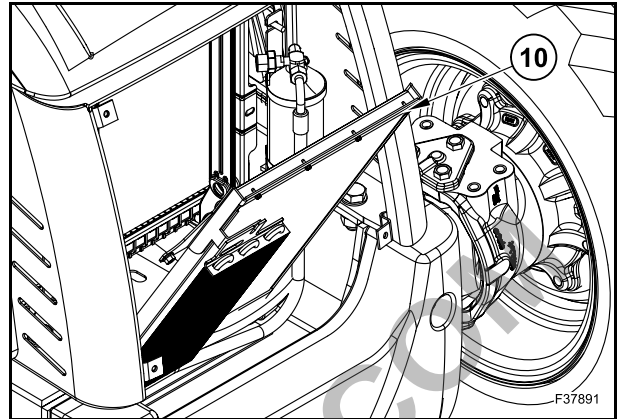


1. Valve
2. Plate
3. Screw
4. Nut
5. Boot
6. Connector
7. Wedge
8. Half handle
9. Screw
10. Half handle

11. Cover
12. Switch push button (horn)
13. Washer
14. Spacer
15. Clip
16. Clip
17. Plugs [if the switches (18) are not fitted]
18. Push-buttons (auxiliary bidirectional)
19. Connector
20. Wedge

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Move the condenser (10) forward.
Clean the condenser (10) by compressor air.



AIR FILTER

Before servicing the filter (1), switch off the blower and close all windows and one door.

Slam the final door closed and the resulting back pressure will dislodge most of the loose dirt from the underside of the filter.

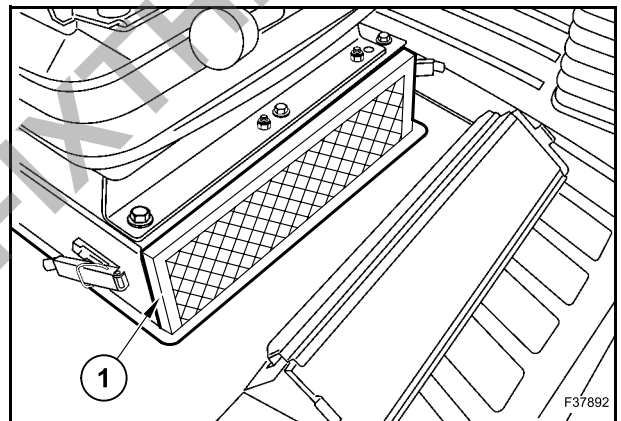
Remove the filter (1) and clean it by blowing with compressed air not exceeding 2 bar (29 psi).

IMPORTANT: make sure you protect your face before using compressed air.

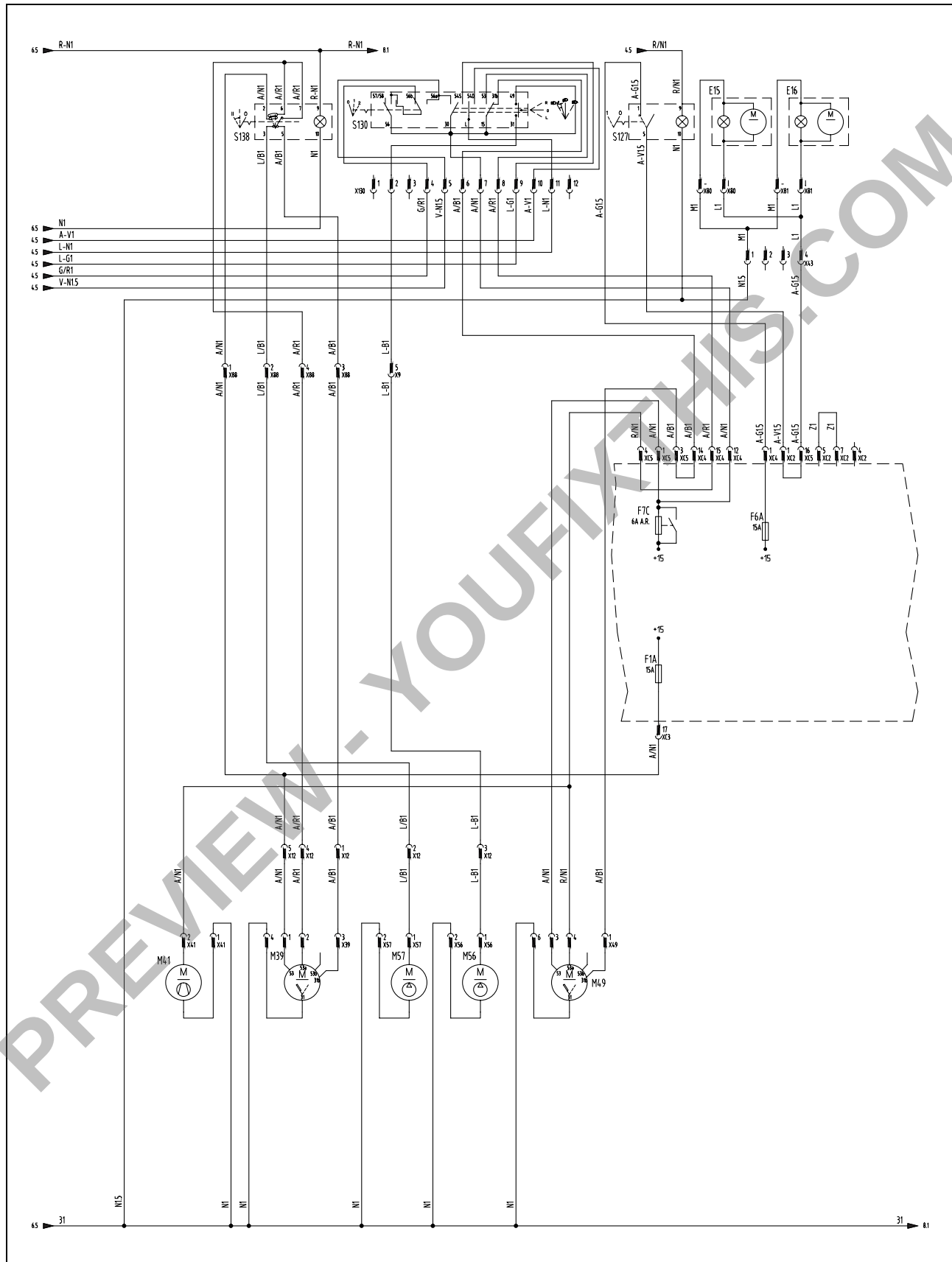
Blow the dust from the upper surface through the element to the lower surface. Hold the nozzle at least 300 mm (11.8 in) from the element to prevent damage to the paper pleats.

Clean both filter chambers with a damp, lint free cloth.

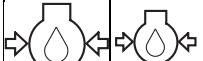
Replace the filter element with the rubber seal uppermost and re-install the covers.



WINDSHIELD WIPER AND WASHER LINE DIAGRAM



TBR00213

Function	Lamp	Alarm	Lamp	Display lamp	Condition	DTC	SA	Description	Priority	Colour
One touch idle active						N/A	VCM		1	Red
Parking brake engaged		Continuous, if vehicle is in gear			Switch closed to ground	N/A	VCM	This prevents damaging the parking brake	2	Red
Brake temperature too high		Continuous			Sender temperature over 152 °C (306 °F) for 5 seconds	1006	VCM	Warns customer before brake fade	2	Red
Engine oil pressure too high		Continuous			Pressure depends on speed	3032	ECU		2	Red
Battery charge voltage too high		Continuous				3051	ECU	Battery voltage too high	2	Red
Battery charge voltage too high		Continuous			Supply source above 16 V for 5 seconds	1014	VCM	Supply battery voltage above 16 V	2	Red
Battery charge voltage too low		Continuous				3052	ECU	Battery voltage too low	2	Red
Battery charge voltage too low		Continuous			Supply source below 11 V for 5 seconds	1015	VCM	Supply battery voltage below 11 V	2	Red
Alternator unable to charge		Continuous			Alternator L+ terminal under 1.5 V for 5 seconds	1050	VCM	Alternator unable to charge	2	Red
Accelerator pedal signal out of range		One second alarm every 30 seconds			IVS not changing state in 300 ms	1010	VCM	Foot accelerator sensor - not plausible	2	Amber
Accelerator pedal signal out of range		One second alarm every 30 seconds			Accelerator above 4.75 V for 5 seconds	1011	VCM	Foot accelerator sensor -signal above range	2	Amber
Accelerator pedal signal out of range		One second alarm every 30 seconds			Accelerator under 0.25 V for 5 seconds	1012	VCM	Foot accelerator sensor -signal below range	2	Amber

LOADER ATTACHMENT SAFETY STRUT

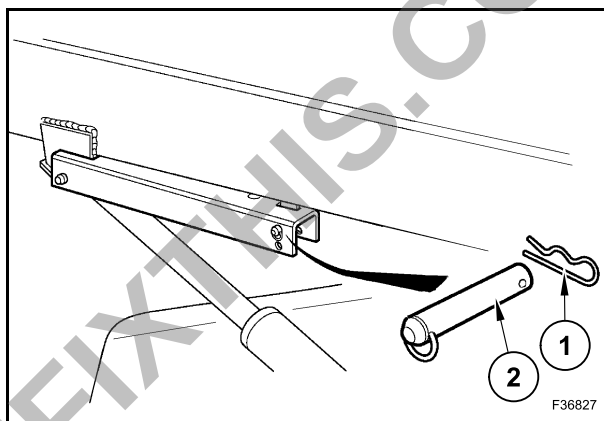
LOADER ATTACHMENT SAFETY STRUT (B100C - B110C)

Located on the left-hand side of the loader attachment, this safety strut enables the loader attachment to be locked in the raised position in case of defects in the system.

LOCKED POSITION

Completely raise the loader attachment. Stop the engine and remove the starter key.

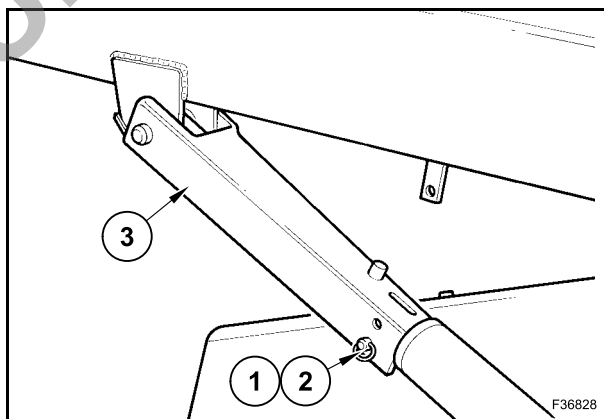
Remove the split pin (1) and the lock pin (2).



Place the strut (3) on the cylinder rod and install the pin (2) and the split pin (1) back into the holes in the strut.

⚠ WARNING ⚠

It is mandatory to install the safety strut when carrying out any operation requiring the loader attachment to be in the raised position.



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