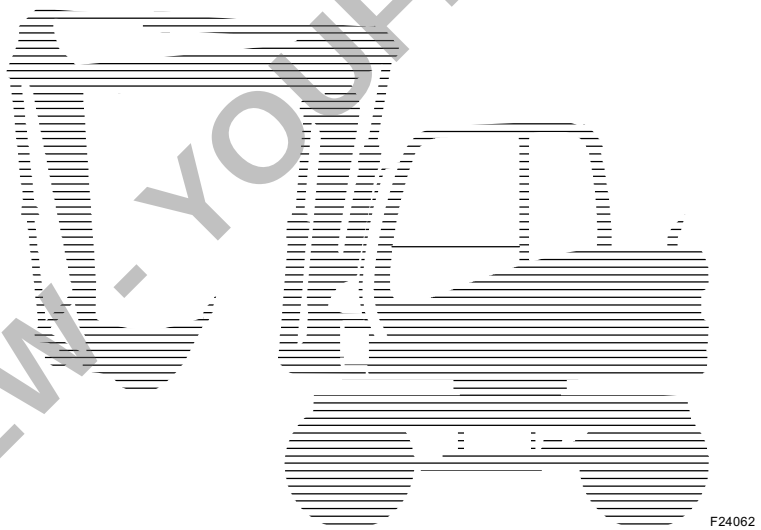
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EXCAVATOR

MH2.6
MH3.6

SERVICE MANUAL



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IMPORTANT:

Data contained in this manual was current at the time of publication. As the Manufacturer improves constantly his products, some information may result as not updated. If variances are observed, contact your Dealer and After-Sales Service.

NEW HOLLAND KOBELCO CONSTRUCTION MACHINERY S.p.A. - ENGINEERING

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MH2.6
MH3.6



SECTION 1 MAIN OPERATING RULES

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SAFETY PRECAUTIONS

GENERAL NOTES

Read the Operation and Maintenance Instruction Manual carefully before starting, operating, maintaining, fuelling or servicing the machine.
Carefully read the explanation to each and all safety signs in the special section of this Manual before starting, operating, maintaining, fuelling or servicing the machine.
Machine-mounted safety plates are colour coded yellow with black borders when they refer to points where special **ATTENTION** must be paid and failure to observe them may cause a serious **DANGER** to the integrity of machine operators.
They are white with red borders and black lettering when they refer to a **FORBIDDEN** practice.
It is fundamental that all machine operators know very well the meaning of each safety plate as this considerably decreases operating hazards and accidents.
Do not allow unauthorised personnel to operate or service this machine.
Do not wear rings, wrist watches, jewellery, loose or hanging garments, such as ties, torn clothing, scarves, unbuttoned or unzipped jackets that can get caught in moving parts. Wear certified safety clothes such as: hard hat, no-slip footwear, heavy gloves, ear protection, safety glasses, reflector vests, respirators every time the job requires it.
Ask your employer about safety regulations in force and protective equipment.
Always keep the operator's compartment, step plates, grab-rails and handles clean and clear of foreign objects, oil, grease, mud or snow to minimise the danger of slipping or stumbling. Remove mud or grease from your shoes before operating the machine.
Do not jump on or off the machine. Always keep both hands and one foot, or both feet and one hand in contact with steps and/or grab rails.
Do not use controls or hoses as hand holds. Hoses and controls are movable parts and do not provide solid support. Besides, controls may be inadvertently moved and cause unexpected movement of the machine or its attachments.
Never operate the machine or its attachments from any position other than sitting in the driver's seat. Keep head, body, limbs, hands and feet inside the operator's compartment at all times to reduce exposure to external hazards.
Be careful of possible slippery conditions of the steps and hand rails as well as of the ground around the machine. Wear protective boots or shoes with the soles made of highly no-slip rubber.
Do not leave the machine until it has come to a complete stop.
Always check height, width and weight limitations which may be encountered in the working site and ensure the machine does not exceed them.
Assess exact paths of gas ducts, water mains, telephone lines, sewers, overhead and underground electric lines and all other possible obstacles.
Such paths should be opportunely defined by competent Authorities. If necessary, require that the service is interrupted or said installations are moved prior to starting the work.
You must know the working capacity of the machine.
Define the rear superstructure swing area and provide for opportune barriers to prevent access into it.
Never exceed machine lifting capacity.
Remain within the limits shown in the loading capacity chart located on the machine.

START UP

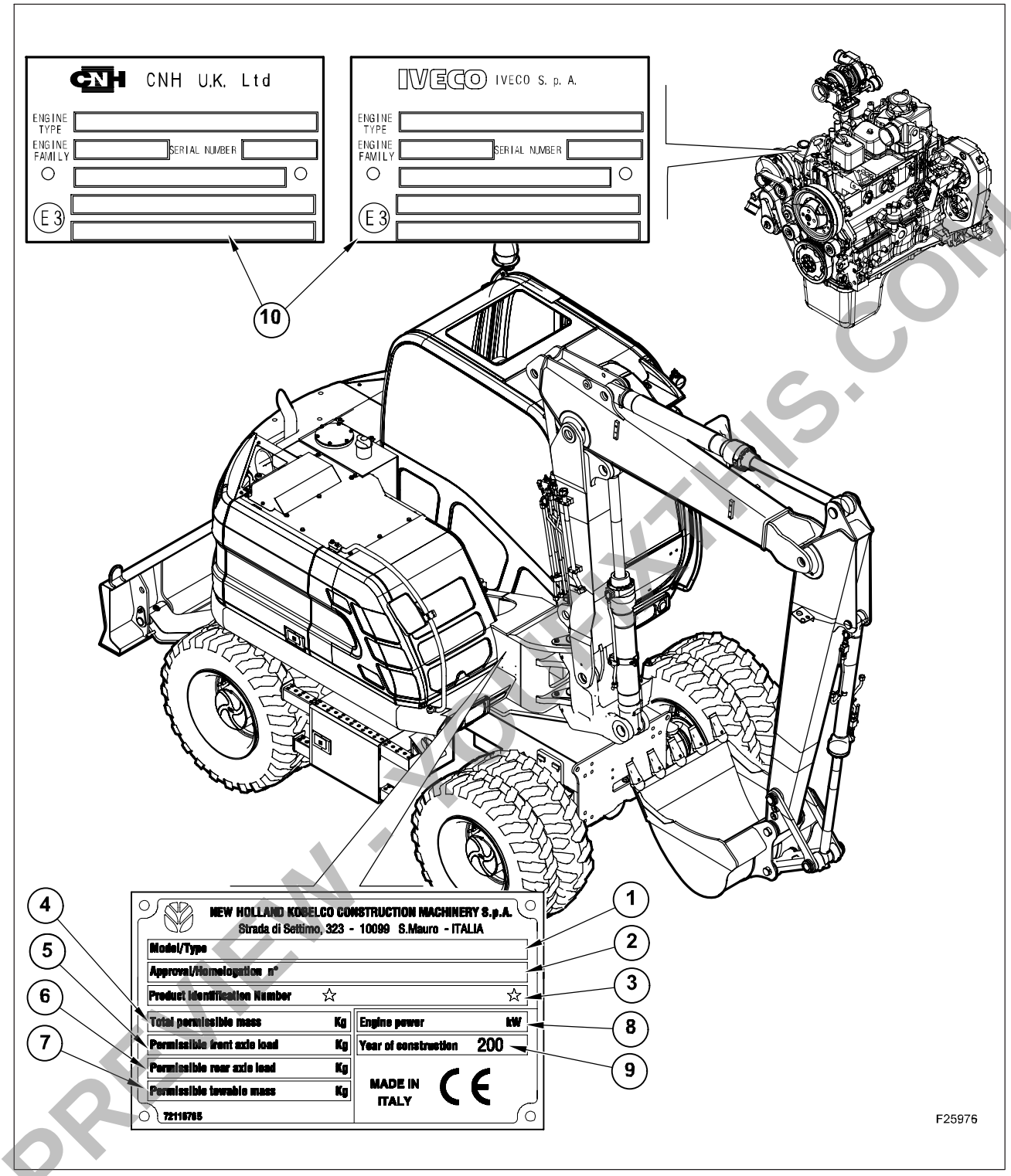
Never start up or set in motion a failed machine. Before getting on, walk around the machineto inspect it. Before operating the machine, make sure that any possible dangerous condition has been properly removed.
Before starting machine, check that steering and attachment controls are in the neutral position and the safety lever is in the LOCK position.
Immediately report any malfunction of parts or systems to the maintenance managers for proper action.
Prior to starting the engine, check, adjust and lock the driver's seat for maximum riding comfort and control accessibility.
Prior to operating the machine and/or its attachments, check that bystanders are outside the machine operating range. Sound horn.
Obey all hand signals, safety indications and signs.
Due to the presence of flammable fluids, never check fuel level, refuel, charge the batteries or use the starting fluid in the presence of smoking materials, open flames or sparks.
Ensure that nobody is within the excavator operating area before starting the machine, swinging the upper structure or moving in any direction.
Adjust all rear-view mirrors for maximum visibility of the area behind the machine.
Ensure that engine speed is appropriate to the job to be carried out.
If any hydraulic control or system exhibits erratic performance or responds abnormally, have the machine checked for air in the system.
Air in these circuits may cause incorrect movements with consequent accident hazard.
Refer to the Operation and Maintenance Instruction Manual about corrective action to be taken.

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IDENTIFICATION DATA



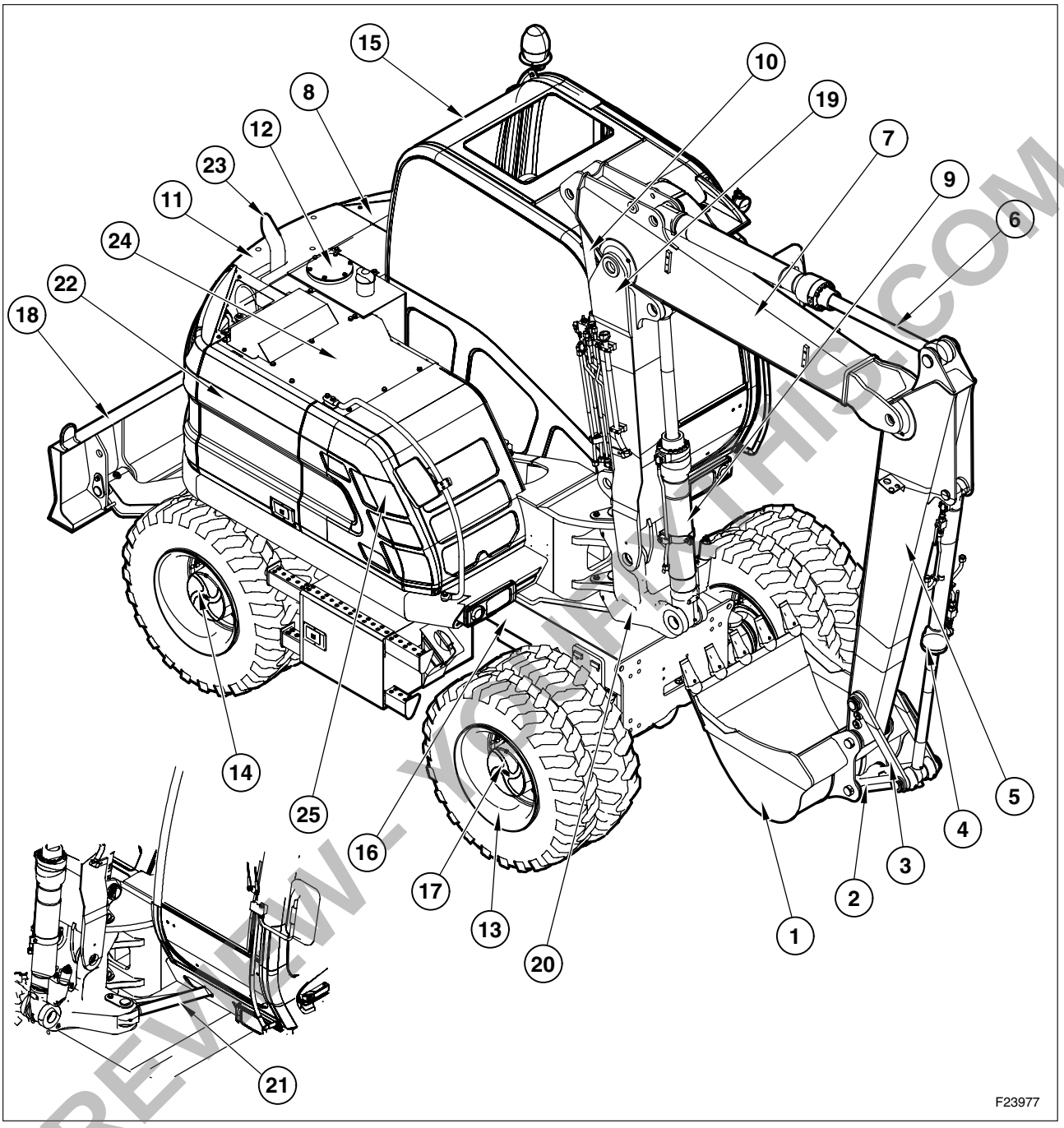
WHEELED EXCAVATOR MARKING TAGS

1. Machine technical type
2. Homologation number
3. Identification number
4. Machine total mass allowable
5. Max. load on front axle
6. Max. load on rear axle
7. Not applicable
8. Engine power in kW
9. Machine manufacturing year
10. Identification decal: diesel engine type and serial number

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WHEELED EXCAVATOR MAIN COMPONENTS



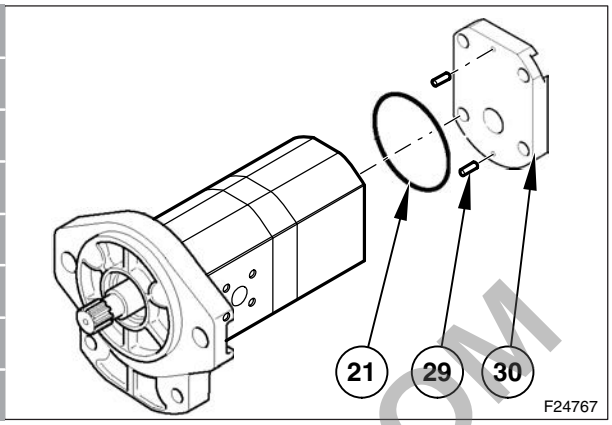
1. Bucket
2. Link rod
3. Bucket link
4. Bucket cylinder
5. Arm
6. Arm cylinder
7. Triple articulation arm
8. Fuel tank
9. Boom cylinder
10. Positioner cylinder
11. Counterweight
12. Hydraulic oil tank
13. Wheel assy
14. Rear axle
15. Cab and operator's compartment
16. Carriage
17. Front axle
18. Blade
19. Boom (lifting)
20. Swinging assy
21. Swing cylinder
22. Hoods
23. Exhaust gases silencer
24. Engine and radiator
25. Main control valve

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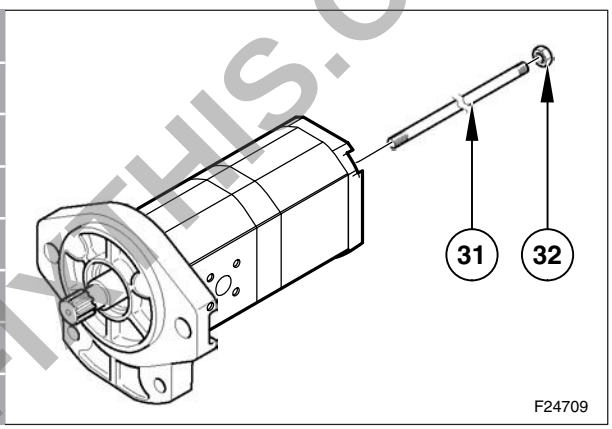
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12. Assemble O-ring (**21**).
Install pins (**29**) for a correct location. Install the closing plate (**30**).



13. Assemble the ttie rods (**31**) and tighten the four nuts (**32**).

NOTE:
Before reassembling the machine, rotate by hand and check that the double gear pump is not locked.



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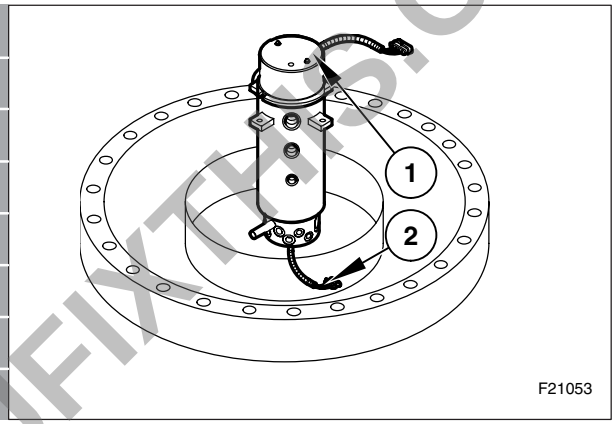
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DISASSEMBLY

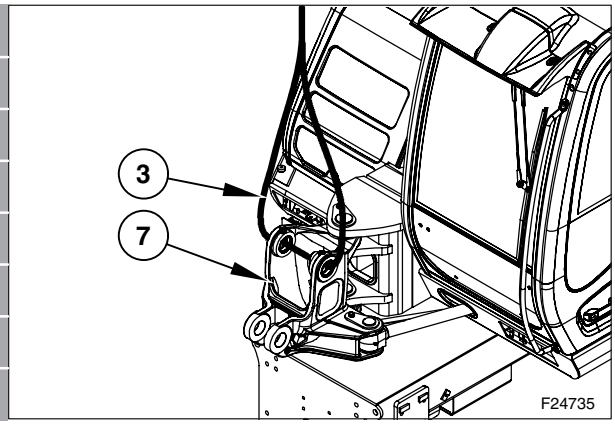
IMPORTANT:
Carry out the following operations previously:
- *park the machine on a level surface and stop the engine;*
- *remove the front attachment.*

1. Drain the hydraulic oil from the tank. Disconnect the hydraulic pipes from the rotor of the swivel joint (**1**).
Disconnect electric circuits (**2**) of the swivel joint on the rotor side.

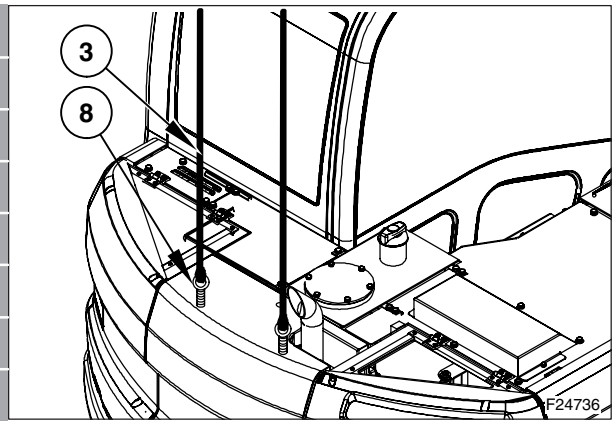


IMPORTANT:
Plug all pipe ends to avoid the entrance of impurities into the system.

2. Fasten some lifting wires (**3**) to the swing support (**7**).



3. Fit the lifting eyes (**8**) on the counterweight (No. 2 lifting eyes M27). Fix the lifting wires (**3**) to the counterweight eyes.



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INTRODUCTION


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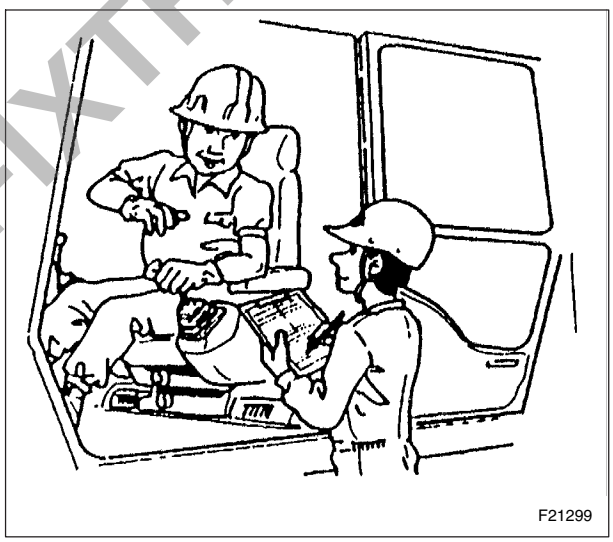
These six basic steps are essential for efficient troubleshooting:

- Study the system
- Ask the operator
- Inspect the machine
- Operate the machine yourself
- Perform troubleshooting
- Trace possible causes

STUDY THE SYSTEM

Study the machine's technical manuals. Know the system and how it works, and what the construction, functions and specifications of the system components are.

ASK THE OPERATOR

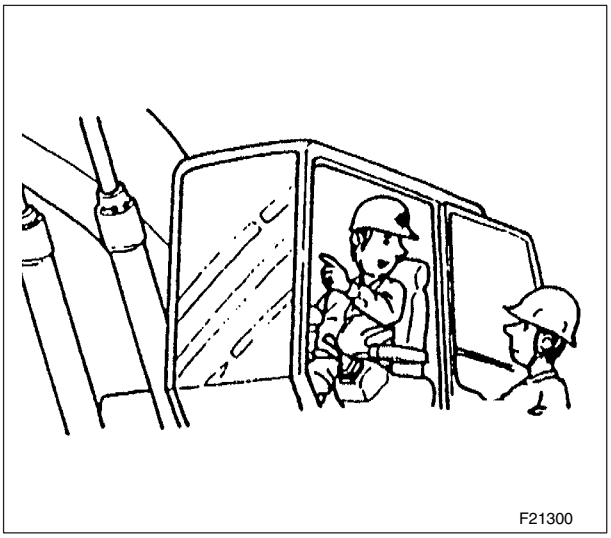

F21299

Before inspecting, get the full story of malfunctions from your star witness-the operator.

- How is the machine being used?
  (Find out if the machine is being operated correctly).
- When was the trouble noticed, and what types of work the machine doing at that time?
- What are the details of the trouble?
- Is the trouble getting worse, or did it appear suddenly for the first time?
- Did the machine have any other troubles previously? If so, which parts were repaired before?

INSPECT THE MACHINE

Before starting the troubleshooting procedure, check the machine's daily maintenance points, as shown in the Operation and Maintenance Instruction Manual.
Also, check the electrical system, including the batteries, as troubles, in the electrical system such as low battery voltage, loose connections and blown fuses will result in malfunction of the controllers, causing total operational failure of the machine.
Fuse failure is often caused by a fine crack in the fuse, and such fine cracks are very hard to detect by visual inspection.


F21300

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MH 2.6
TECHNICAL SPECIFICATIONS

DIESEL ENGINE	
Manufacturer	CNH / IVECO
Model	F4BE0454B* D602
Type	Diesel, 4-strokes, direct injection, turbocharged (turbo)
Net power at flywheel at 2100 rpm(ISO 14396)	74 kW
Cylinders number	4 in line
Displacement	3.9 l
Bore per stroke	102 x 120 mm
Ignition order	1-3-4-2
Rotation direction	clockwise (fan side)
Cooling system	with water
Alternator	Bosch
Voltage	24 V
Injection pump, feeding system	Bosch rotating VE 4/12 F
ELECTRICAL SYSTEM	
Operating voltage	24 V
Batteries (Capacity/Voltage)	2 x 100 Ah / 12 V
Alternator (Current/Voltage)	70 A / 24 V
Starter motor (Power)	4 kW
HYDRAULIC SYSTEM	
Hydraulic oil tank	
Capacity	132 l
Main pump	
Manufacturer	REXROTH
Model	A11VO75LE2S
Displacement	V_{max} = 74 cm^3 V_{min}= 13 cm^3
Maximum delivery at 2100 min^{-1}	Q_{max} = 151 l/min
Maximum power at 2100 min^{-1}	N_{max} = 73 kW
Double gear pump	
Manufacturer	REXROTH
Model	2PF2G241/19 + 11LR20MR S107
Maximum pressure	23.5 MPa
Pilot control pump / brakes at 2100 min^{-1}	q = 11 rpm - Q = 22 l/min
Steering pump at 2100 min^{-1}	q = 19 rpm - Q = 39 l/min
Travel/attachment control circuit	
Maximum delivery	151 l/min
Maximum power	35 MPa
Superstructure slew control circuit	
Maximum delivery	70 l/min
Maximum power	19 MPa
Hydraulic cylinders (Ø x stroke)	
Swing	95 x 600 mm
Boom	110 x 700 mm
Arm	95 x 875 mm
Bucket	70 x 800 mm
Positioner	105 x 600 mm

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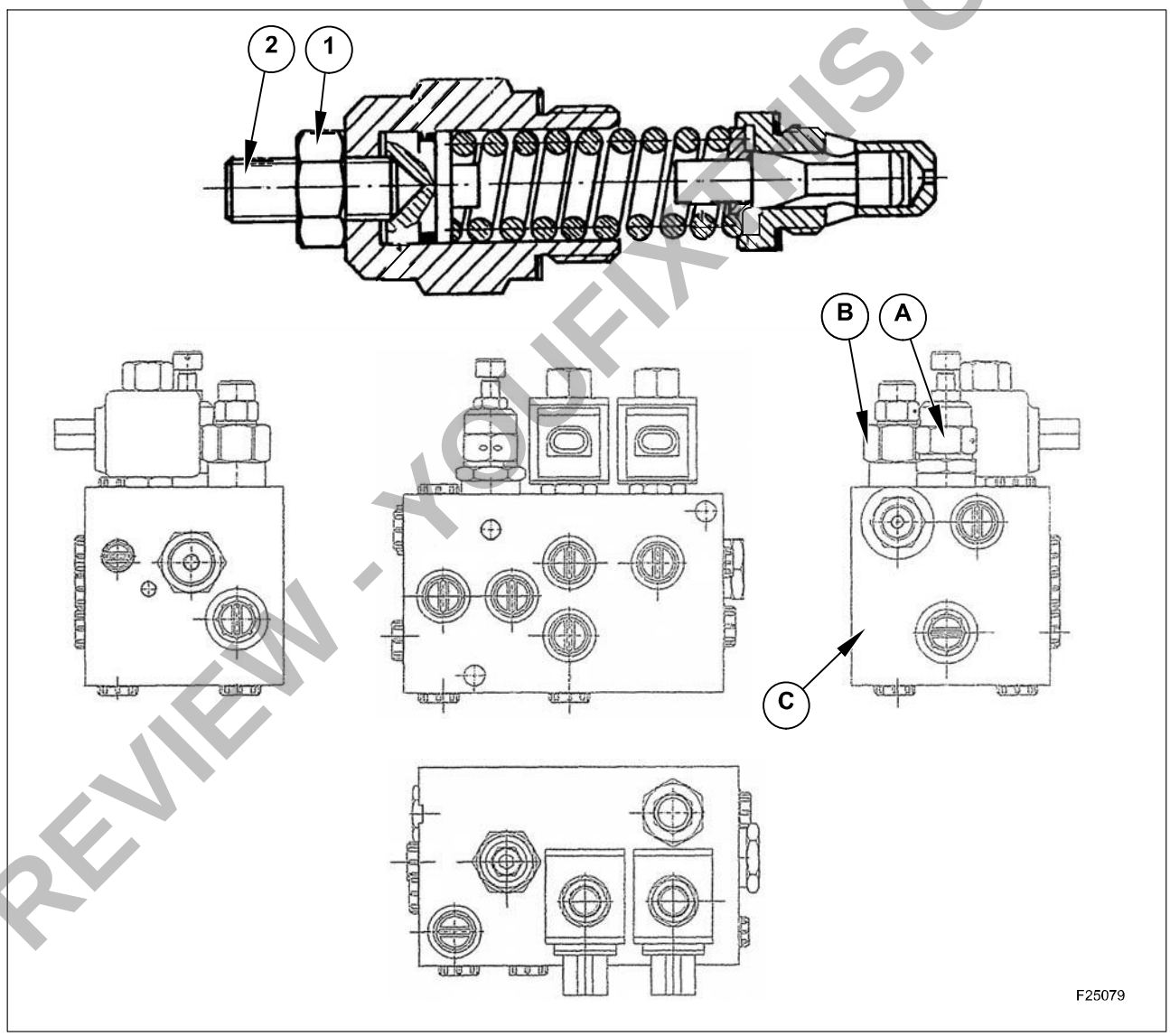
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ADJUSTMENT OF OVERPRESSURE VALVE CONTAINED IN THE SOLENOID VALVE BODY

Preparation:

Loosen nut (**1**).

Adjust the overpressure relief valve by acting directly on the screw (**2**) and checking the pressure on pressure gauge connected according to procedure.



A. Overpressure release valve
B. Priority valve
C. Solenoids block

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STANDARD PERFORMANCES

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TABLE OF EXCAVATOR STANDARD PERFORMANCES

ENGINE SPEED	min^{-1}	
Idle		1000 ± 50
Automatic Idle (A/I)		1000 ± 50
Maximum speed		1900 ± 50
Maximum speed (travel)		2300 ± 50
Idle up		1300 ± 50

SLEW SPEED	s/3 rev.	
Right side		22,5 ± 1
Left side		22,5 ± 1
SLEW STOP DRIFT	mm / 180°	250 ± 50
SLEW MOTOR BLEEDING	mm / 5 min	0
SLEWING RING PLAY	mm	≤ 2

CYLINDER STROKE TIME	s	
Boom	Raise	3,3 ± 0,5
	Lower	2,4 ± 0,3
Arm	Rod extension	3,3 ± 0,5
	Rod retraction	2,3 ± 0,3
Bucket	Rod extension	2,8 ± 0,3
	Rod retraction	2,1 ± 0,3
Positioner	Rod extension	4,5 ± 0,5
	Rod retraction	4,5 ± 0,5
ATTACHMENT BLEEDING CHECK	mm / 5 min	
Boom cylinder		≤ 15
Positioner cylinder		≤ 5
Arm cylinder		≤ 30
Bucket cylinder		≤ 15

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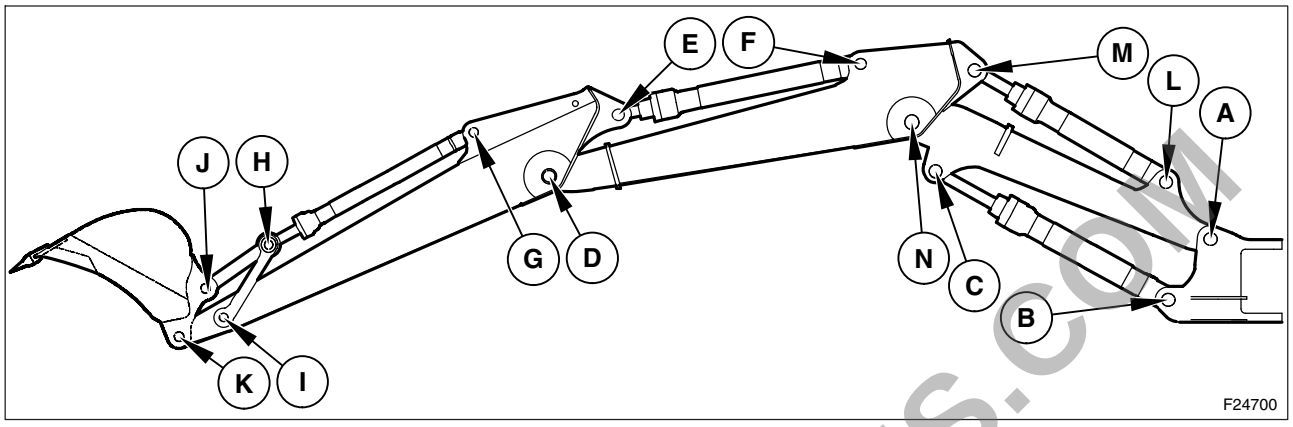
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PINS AND BUSHINGS

MH 2.6

Unit: mm



Index	Part to measure	Pin		Bushing		Remedy
		Dimension	Limit	Dimension	Limit	
A	1st arm foot	Ø 71	- 0.1 - 0.174	Ø 71	+ 0.26 + 0.14	
B	1st arm cylinder head side	Ø 71	- 0.1 - 0.174	Ø 71	+ 0.28 + 0.21	
C	1st arm cylinder rod side	Ø 71	- 0.1 - 0.174	Ø 71	+ 0.28 + 0.21	
D	2nd arm point	Ø 65	- 0.1 - 0.174	Ø 65	+ 0.37 + 0.25	
E	2nd arm cylinder rod side	Ø 65	- 0.1 - 0.174	Ø 65	+ 0.27 + 0.2	
F	2nd arm cylinder head side	Ø 60	- 0.1 - 0.174	Ø 60	+ 0.27 + 0.2	
G	Bucket cylinder head side	Ø 50	- 0.08 - 0.142	Ø 50	+ 0.27 + 0.2	
H	Bucket cylinder rod side	Ø 50	- 0.08 - 0.142	Ø 50	+ 0.27 + 0.2	
I	Arm side (B) tie rod	Ø 50	- 0.08 - 0.142	Ø 50	+ 0.26 + 0.14	
J	Bucket side (A) tie rod	Ø 50	- 0.08 - 0.142	Ø 50	+ 0.26 + 0.14	
K	Bucket 2nd arm side	Ø 50	- 0.08 - 0.142	Ø 50	+ 0.26 + 0.14	
L	Positioner cylinder head side	Ø 71	- 0.1 - 0.174	Ø 71	+ 0.28 + 0.21	
M	Positioner cylinder rod side	Ø 71	- 0.1 - 0.174	Ø 71	+ 0.28 + 0.21	
N	1st arm point	Ø 65	- 0.1 - 0.174	Ø 65	+ 0.37 + 0.25	

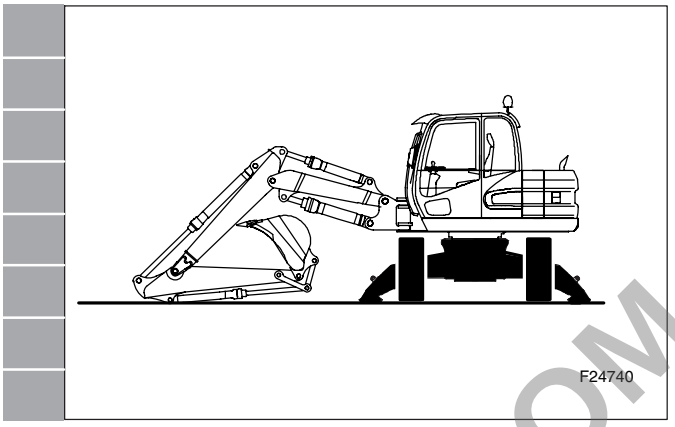
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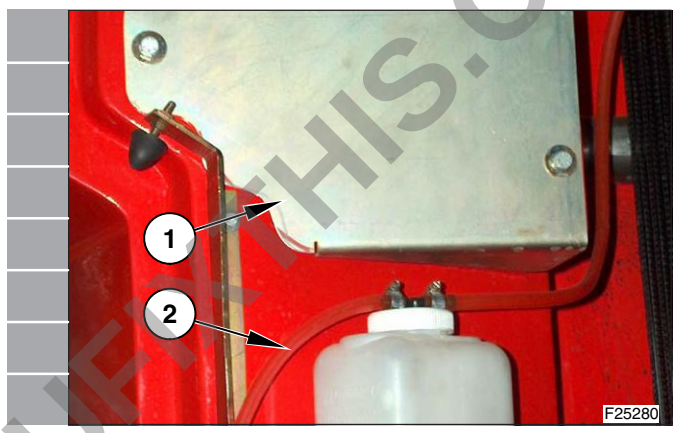
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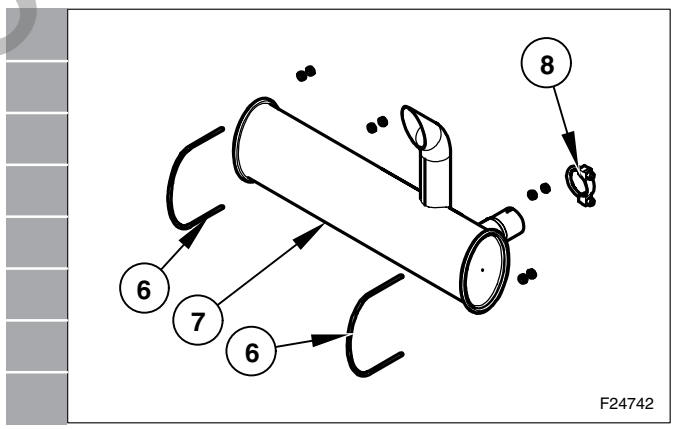
1. Slew the upper structure of 90° according to the position of the undercarriage and set the equipment with the bucket to the ground. Stop the engine.



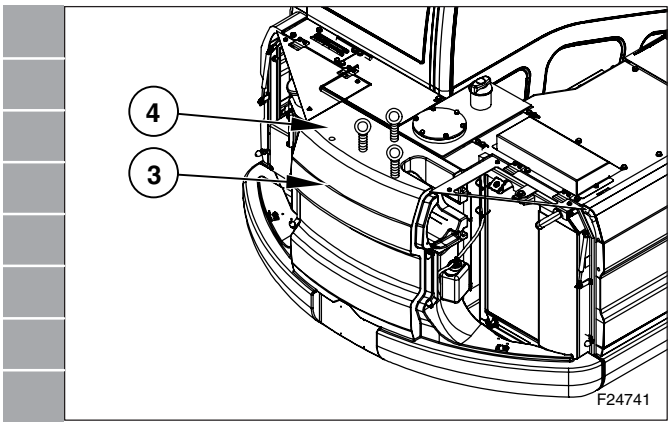
2. Open the lateral hoods. Remove the lateral protection (**1**) (from both sides).
Disconnect the hose of the water collection tank (**2**).



3. Remove the collars (**6**) and loosen the clamp (**8**).
Pull out the exhaust silencer (**7**).



4. Fit the lifting eyes (**4**) on the counterweight (**3**).
No.3 lifting eyes: M27



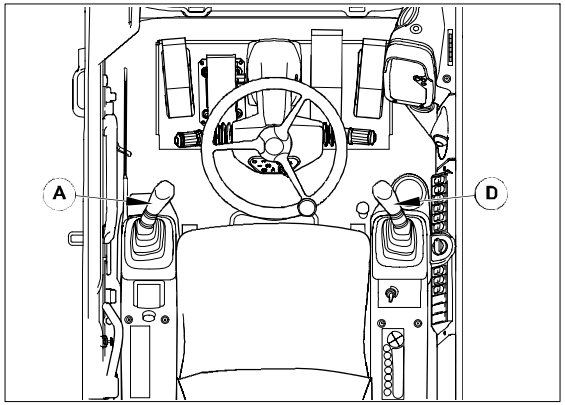
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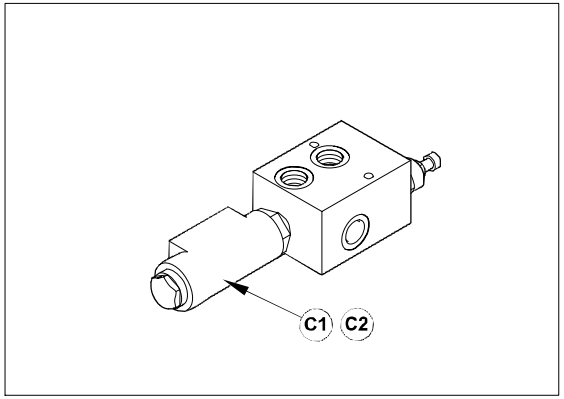
CONTROL LINE AND WIRING HARNESSES

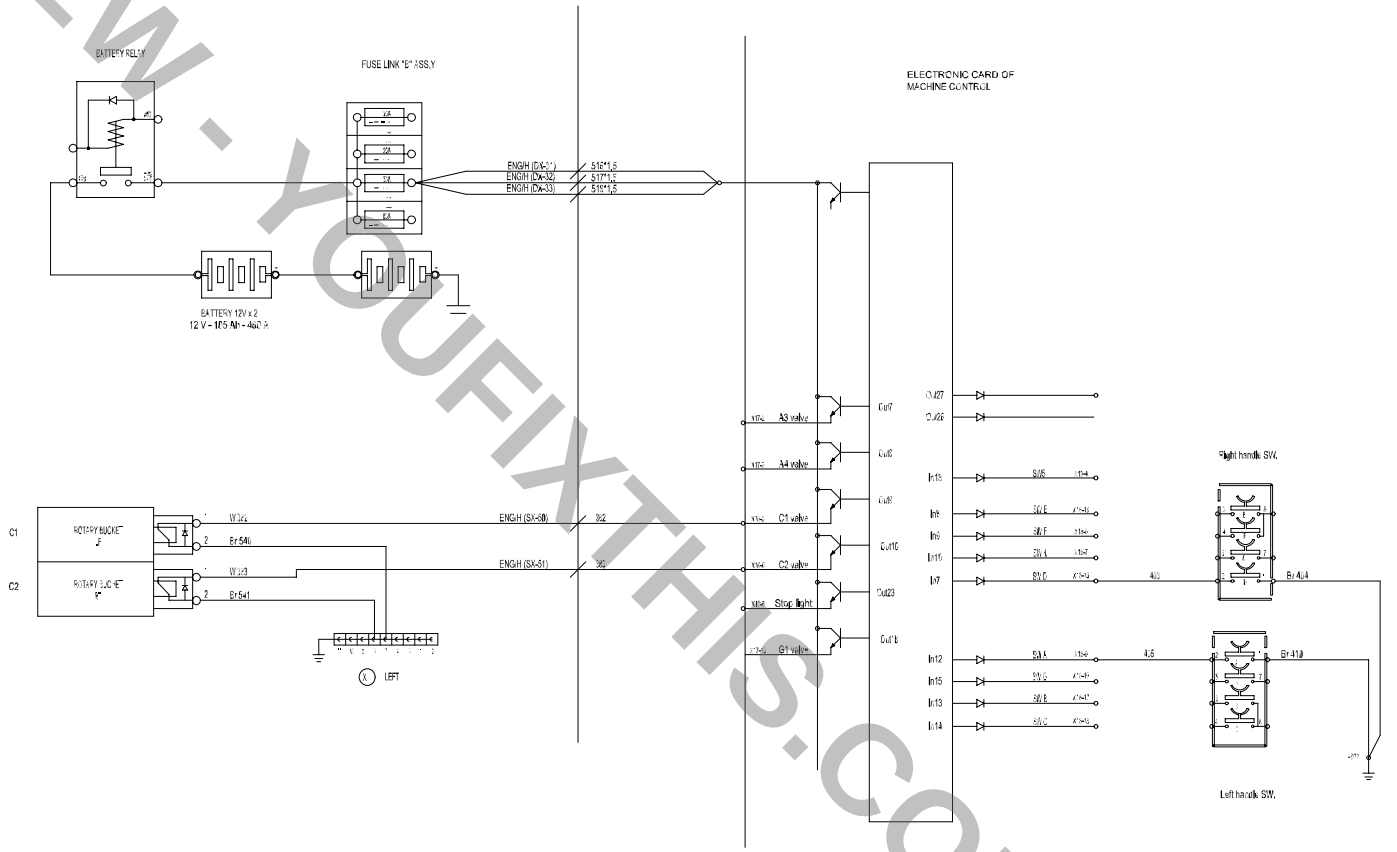
CONTROLS ON CONSOLES

CONTROL LINE FOR ATTACHMENT SLEW

Parts involved:
Fuse Link no. 5
R.h. control lever **D**
L.h. control lever **A**
Electronic card for machine check
Solenoid valve **C1-C2**







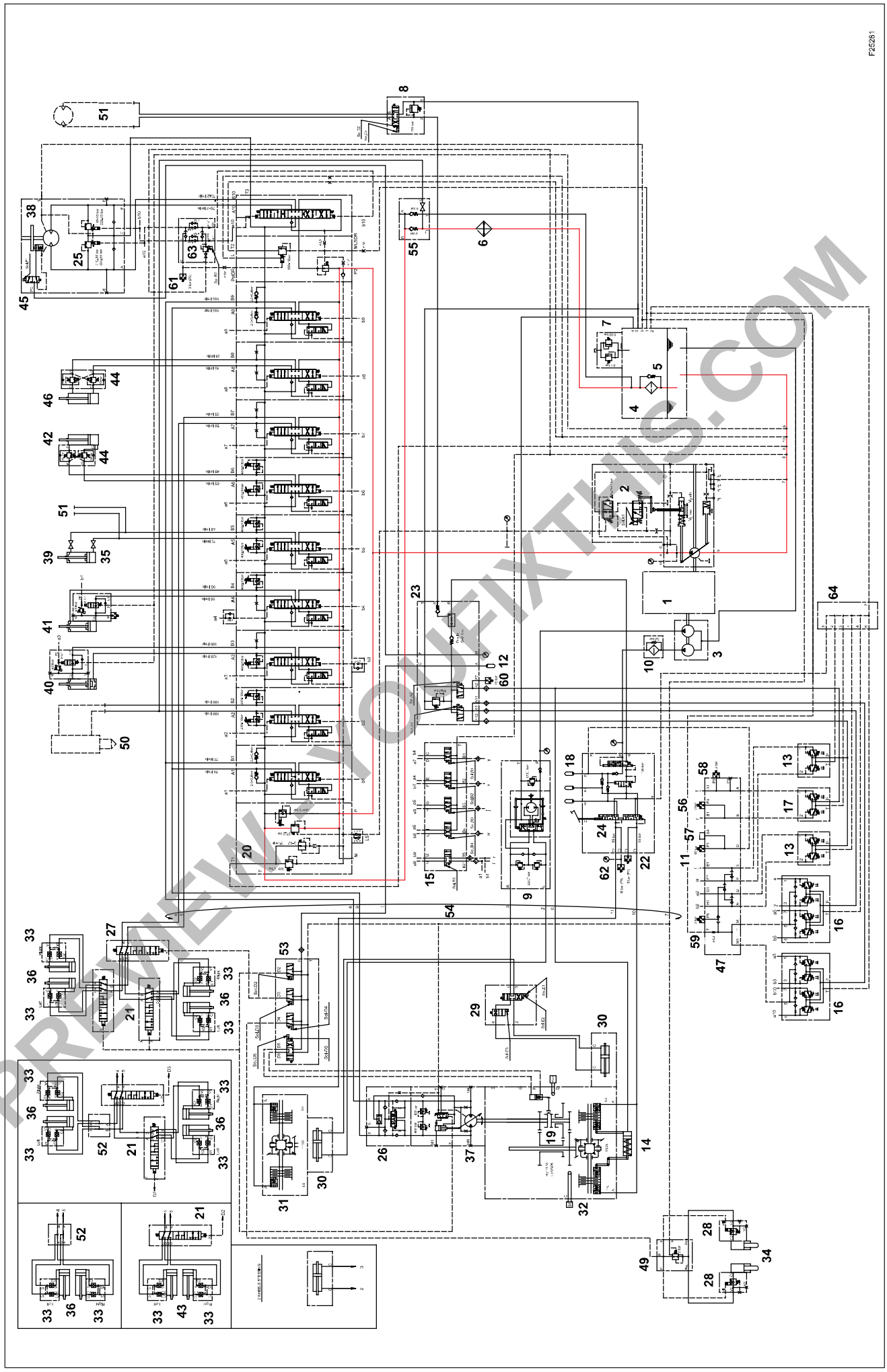
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CONTROLS CIRCUIT IN NEUTRAL POSITION



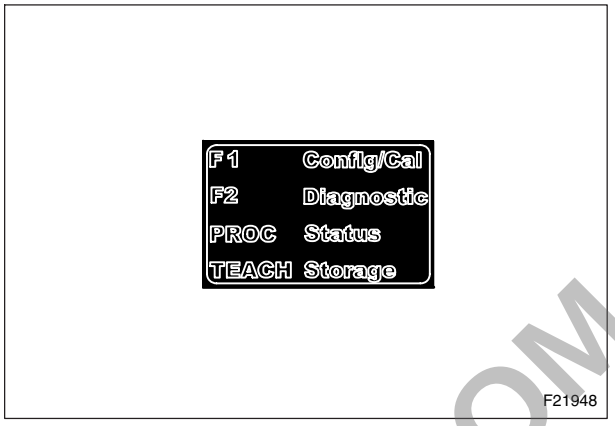
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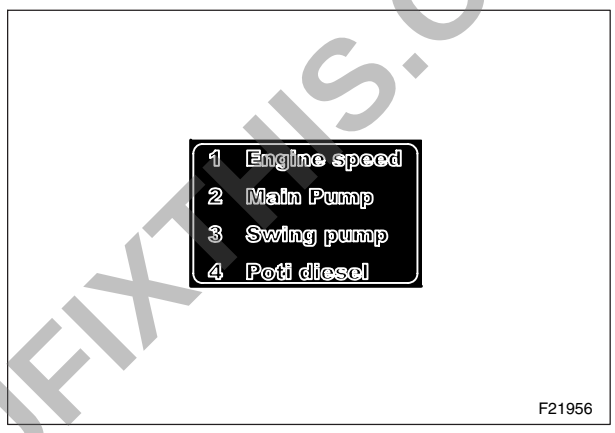
TROUBLESHOOTING BY BB-3

1. Connect cable 380001304, of control panel BB-3 380001303, to serial connection located in the rear place of the right console.
2. Start the diesel engine.
3. On the display of BB-3, after a short self-diagnose will appear following visualization:



F21948

4. Press (**PROC**)
   - following visualization will appear:

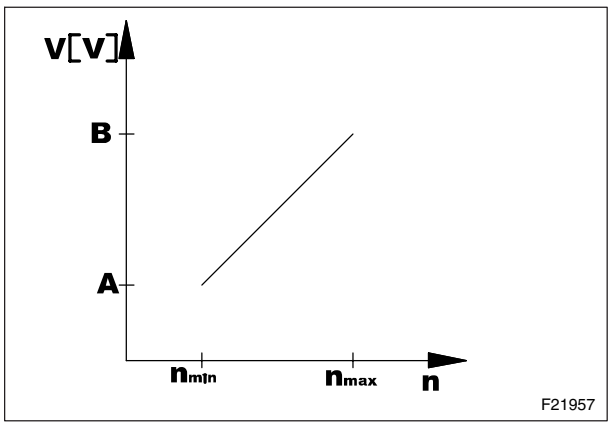


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5. Press buttons relevant to parameters to be checked. It is possible to check two parameters at a time.

   - Engine speed (rpm);
     It indicates the value of the engine rpm detected immediately.

   - Poti diesel (V);
     It indicates the value of tension detected on the potentiometer of the actuator according to the engine revolutions.
     A > 0.8 Volt
     B < 5 Volt
     n_{min} = 1000 ± 50 rpm



F21957

MH 2.6:

$n_{max\ translation}$ = 2200 ± 50 rpm

MH 3.6:

$n_{max\ translation}$ = 2300 ± 50 rpm

   - Diesel charac (rpm)
     It indicates the value of engine revolutions detected during the set-up phase, according to the potentiometer position.
     Diesel charac = Engine speed ± 50.

   - Main current (mA)

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AVOID ACCIDENTS

The majority of accidents and injuries which occur in plants, in farms and at home or on roads, are caused by the non-observance of some simple and fundamental rules of precaution and safety. For this reason in the MAJORITY OF CASES THEY CAN BE AVOIDED: it is sufficient to foresee possible causes and to act according with the necessary precaution and care.
With any type of machine, as much as good planned or built, it is impossible to absolutely avoid risks of accidents without involving negatively some essential features for a reasonable access and an efficient operation.
Read carefully the indication and cautions of this manual contained in the SECTION SAFETY PRECAUTIONS .
A careful and cautious operator is the best warranty against accidents.
The careful observation of a single and elementary safety precautions would be enough to avoid many serious accidents. This precaution is:
Never attempt any cleaning, lubrication or maintenance operation when machine is moving.

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 in oder to get access to a machine part it is necessary to hold the attachment lifted, this should duly be supported by means that are not use to control the machine.

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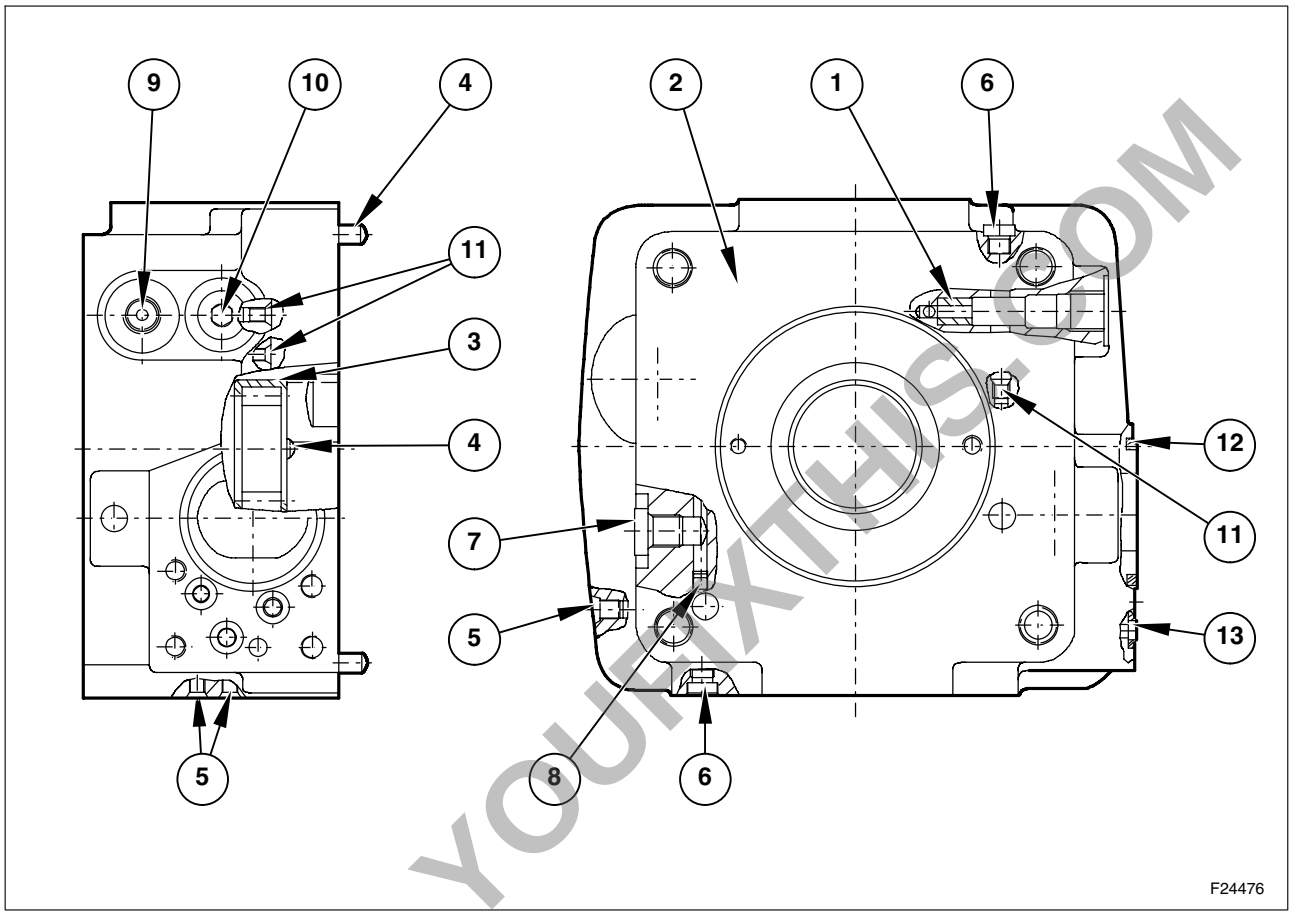
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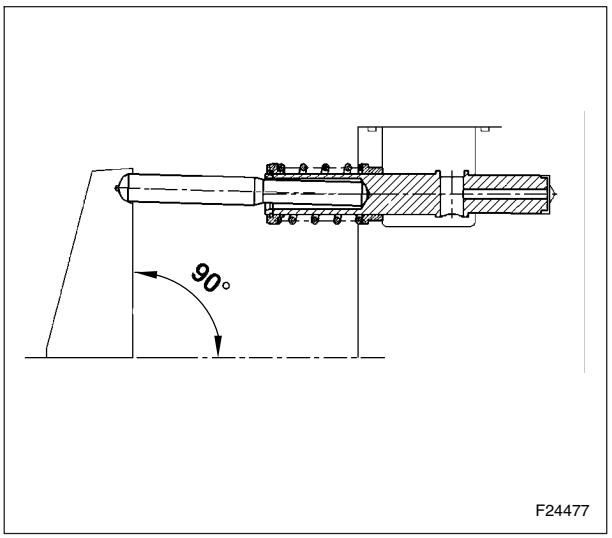
INLET PLATE

The inlet plate is mounted on the pump body and supports the regulator.



1. Bushing
2. Inlet plate
3. Bearing
4. Centring pin
5 Dowel
6. Plug
7. Plug
8. Orifice
9. Plug
10. Plug
11. Orifice
12. Ring
13. Bonded seal

Inside, the seats for the swash plate control piston are made.



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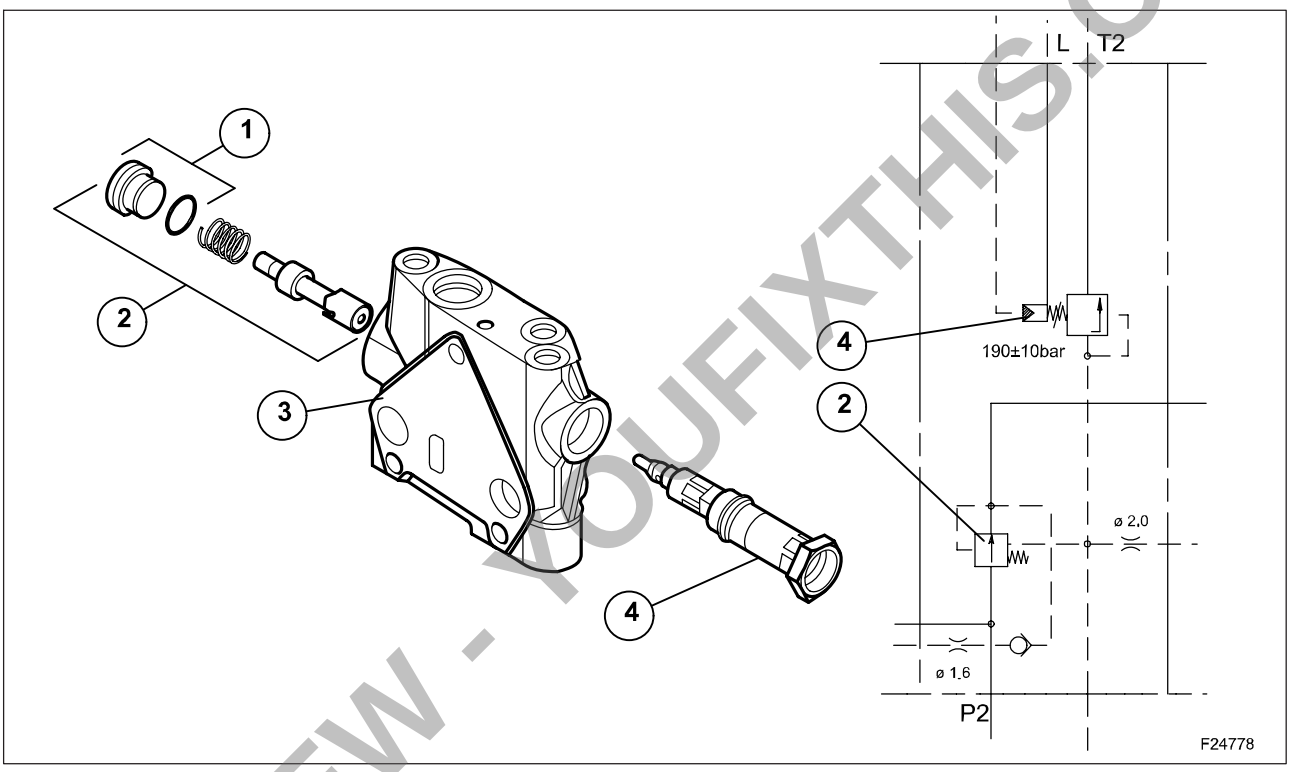
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SLEW PRIORITY SECTION

The priority section of slew has fundamental tasks:
- motion priority in case of simultaneous motion
- torque control (see torque control valve)

Motion priority

In the circuit all actuators are connected in parallel and supplied from a central pump. The slew has priority and can be controlled independently from all other actuators.
During simultaneous motion, the slew priority is ensured by the following conditions:
- compensator to the bottom of the spool with respect to those used for the other motions;
- compensator spring setting lower than ΔP (21 bar) for system operation.



1. Plug
2. Compensator valve
3. Section body
4. Torque regulation valve

TORQUE CONTROL VALVE

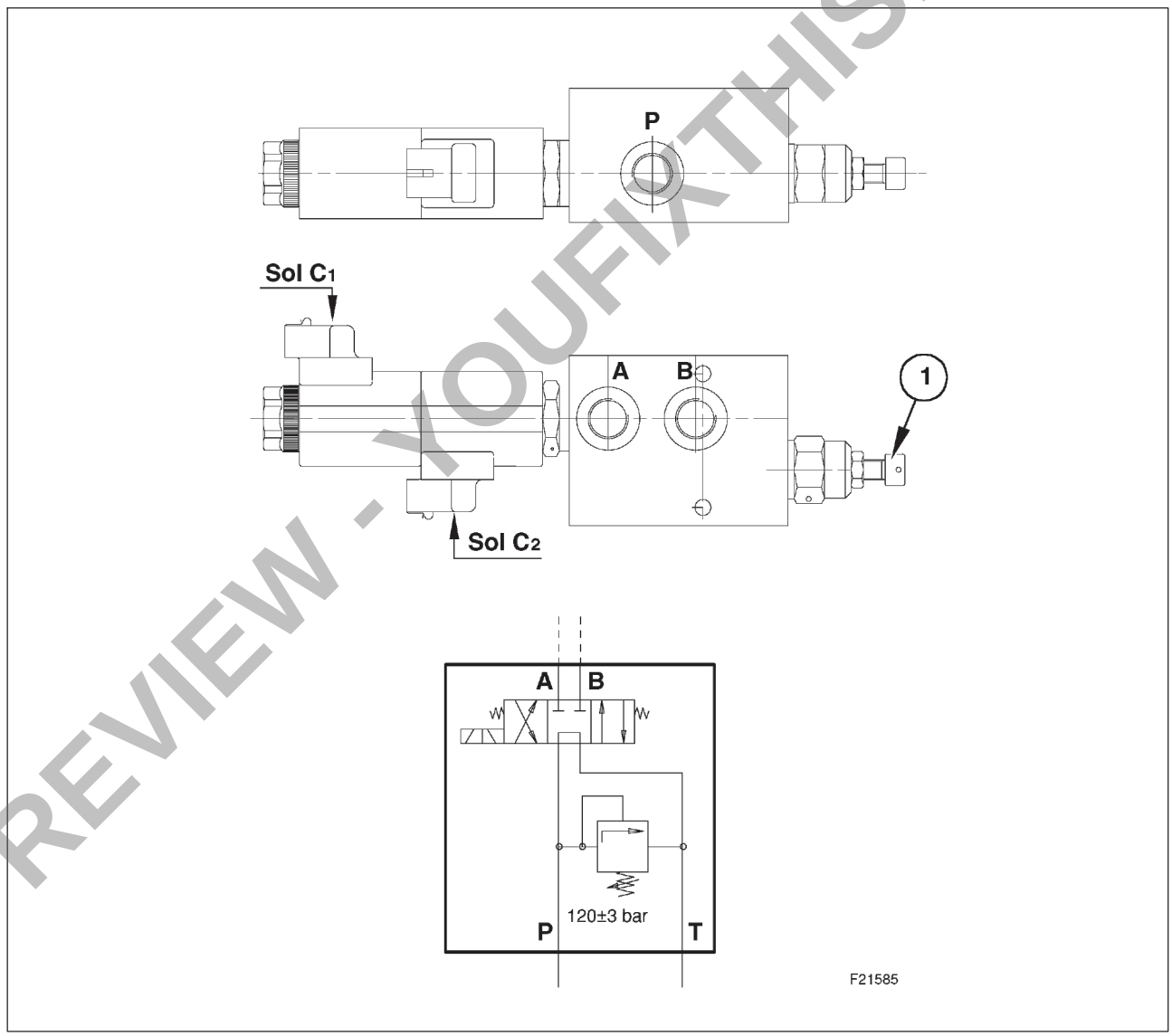
The torque control valve is used to load the slew operating pressure, according to the control lever shift. The slew operating pressure is the hydraulic parameter which can be checked to change the slew torque of the upper structure. The slew torque change determines an acceleration change of the upper structure. The torque control valve enables to check the slew acceleration by shifting the control lever.
The setting increases when pilot pressure, coming from control lever, increases.

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SOLENOID VALVE FOR CLAMSHELL BUCKET SLEW

If activated in a position, power control flow divider exceeding oil feeds clamshell bucket rotation in one direction.
If activated in the other position, it feeds clamshell bucket rotation in the opposite direction. In central position, it connects the circuit to the tank with rotation connections cut off. The block of this solenoid valve includes also the overload relief valve (**1**), calibrated at 120 bar.



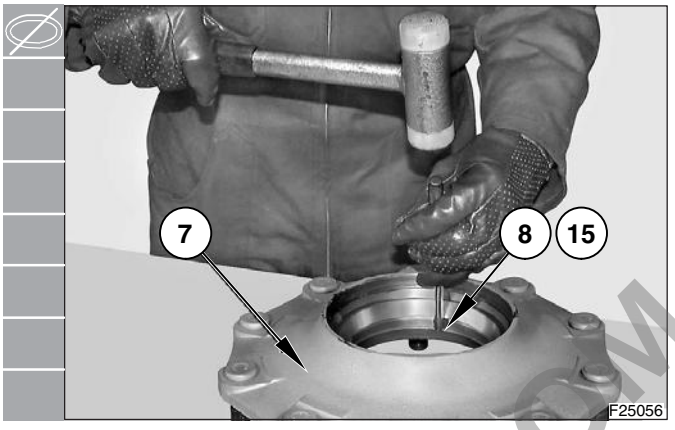
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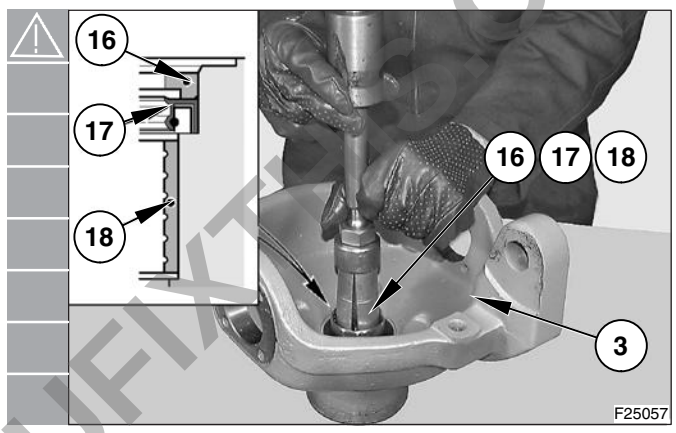
17. Remove the external cups of the bearings (**8**) and (**15**) forcing a pin-driver into the appropriate slots on the hub (**7**).

NOTE. Hammer in an alternate way so as to avoid crawling or deformation of the bearing cups.



18. Use a puller to remove the centring ring (**16**), the seal ring (**17**) and the bushing (**18**) from the steering case (**3**).

NOTE:
*note down the orientation of both centring ring (**16**) and seal ring (**17**).*

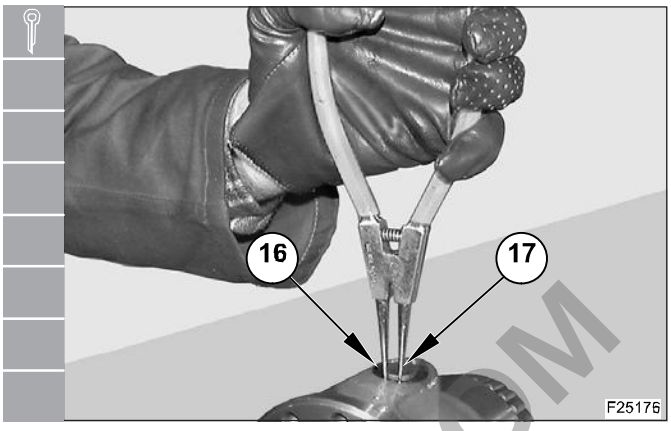


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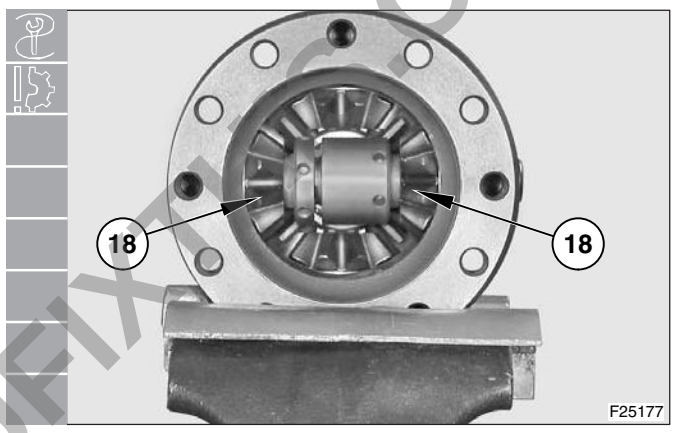
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13. Remove the snap rings (**16**) from pins (**17**) of the planetary gears.



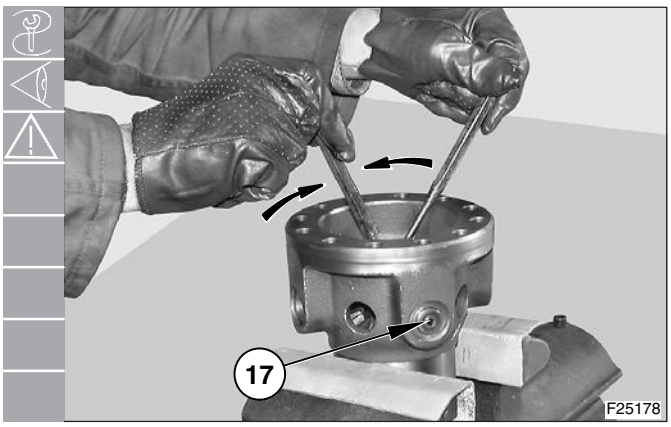
14. Insert suitable tool 75301754 between planetary gears (**18**).



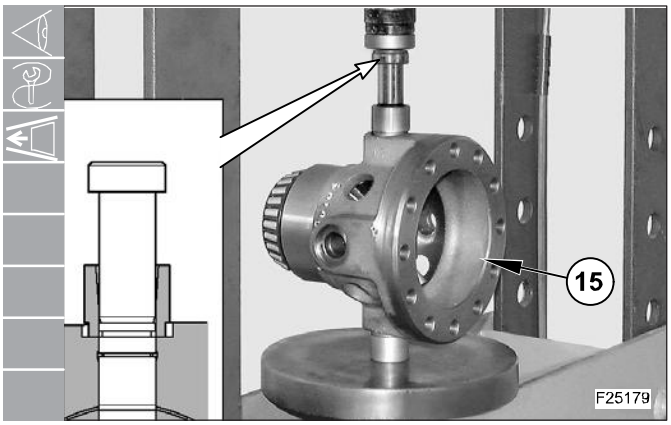
15. Using two pin-drivers, force tool 75301754 in between the planetary gears

WARNING

*Carefully check that tool 75301754 is perfectly lined up with pins (**17**) when locked.*



16. Place the differential body (**15**) under a press, position bush 75301755 and insert gudgeon 75301756. Press pin 75301756 up to stroke end.



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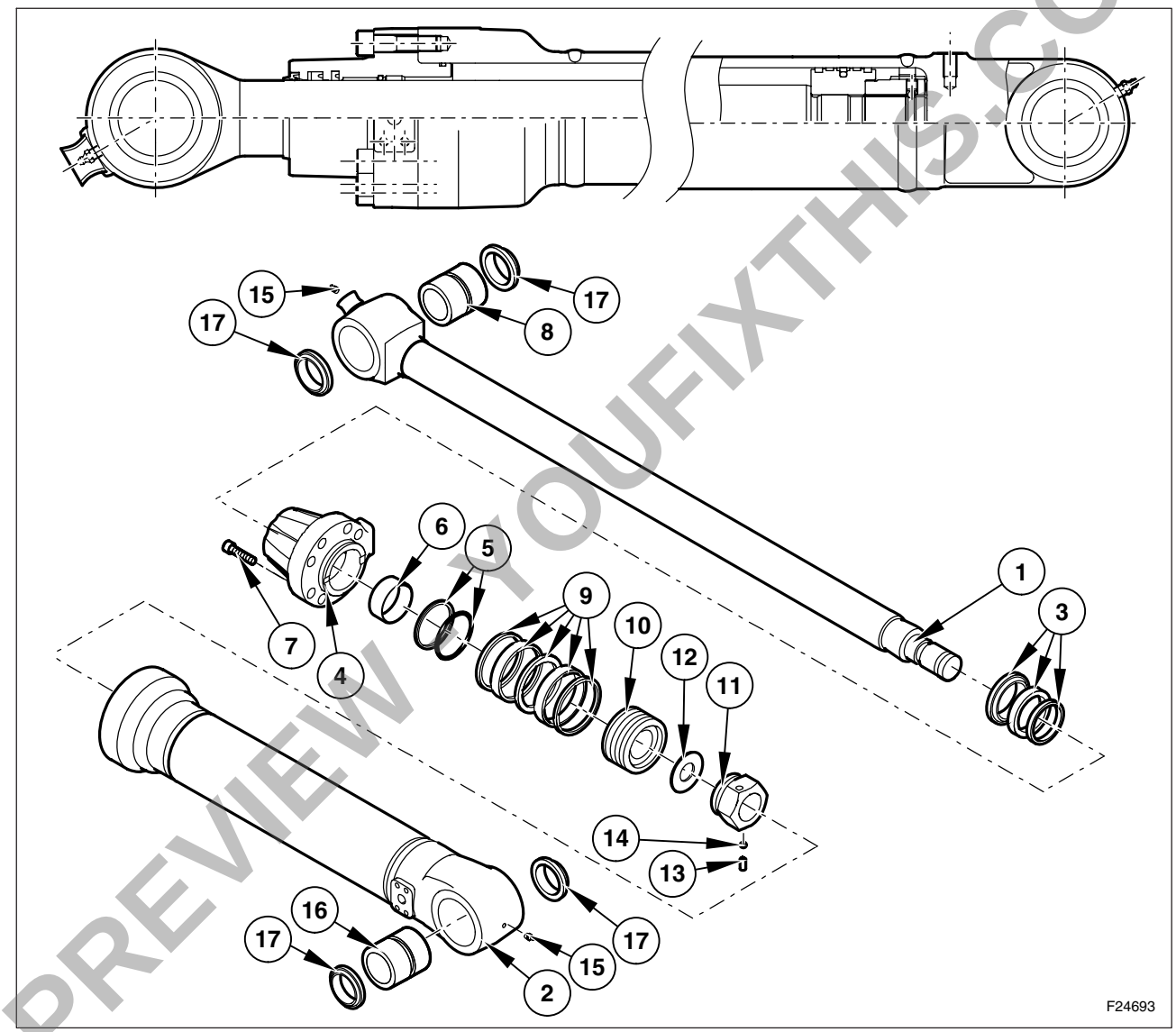
MH 3.6
BUCKET CYLINDER

Data and features:

Bore: ..... Ø 95 mm
Ø rod: ..... Ø 65 mm
completely closed: ..... 1350 mm
Stroke: ..... 875 mm
Max. operating pressure: ..... 34.3 MPa

Max. pressure relief valves:
..... 37.3 MPa (extension)
..... 39.2 MPa (retraction)
Extension force: ..... 243 KN
Retraction force: ..... 129 KN
Temperature range: ..... -20°C ÷ 90 °C
Weight: ..... 86 Kg

Components:



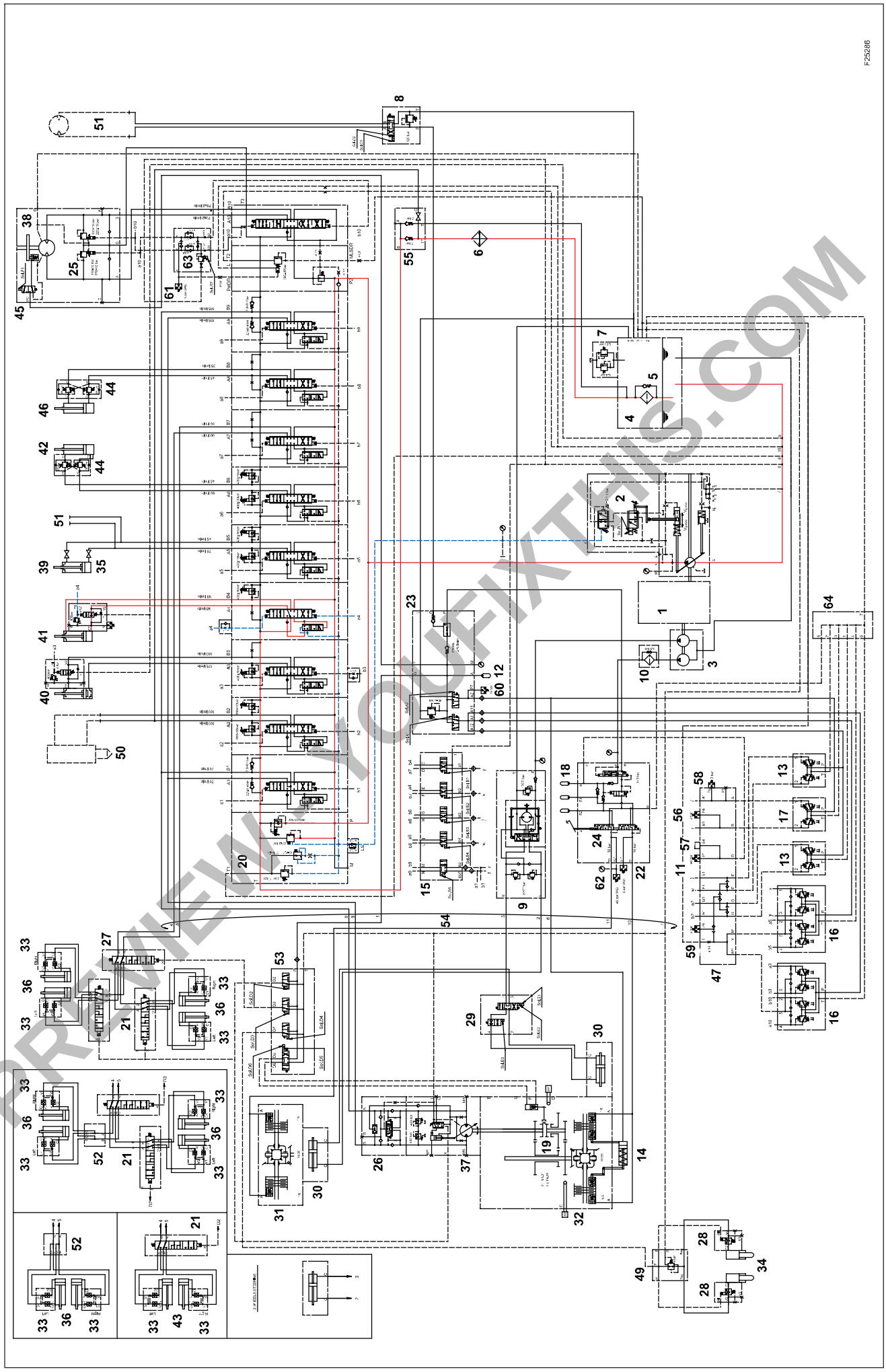
1. Cylinder rod
2. Cylinder liner
3. Front head seals
4. Front head
5. O-ring and back-up ring
6. Bushing
7. Screw
8. Rod bush
9. Piston seal
10. Piston
11. Nut
12. Shim
13. Pin
14. Ball
15. Grease nipple
16. Liner bush
17. Scraper ring

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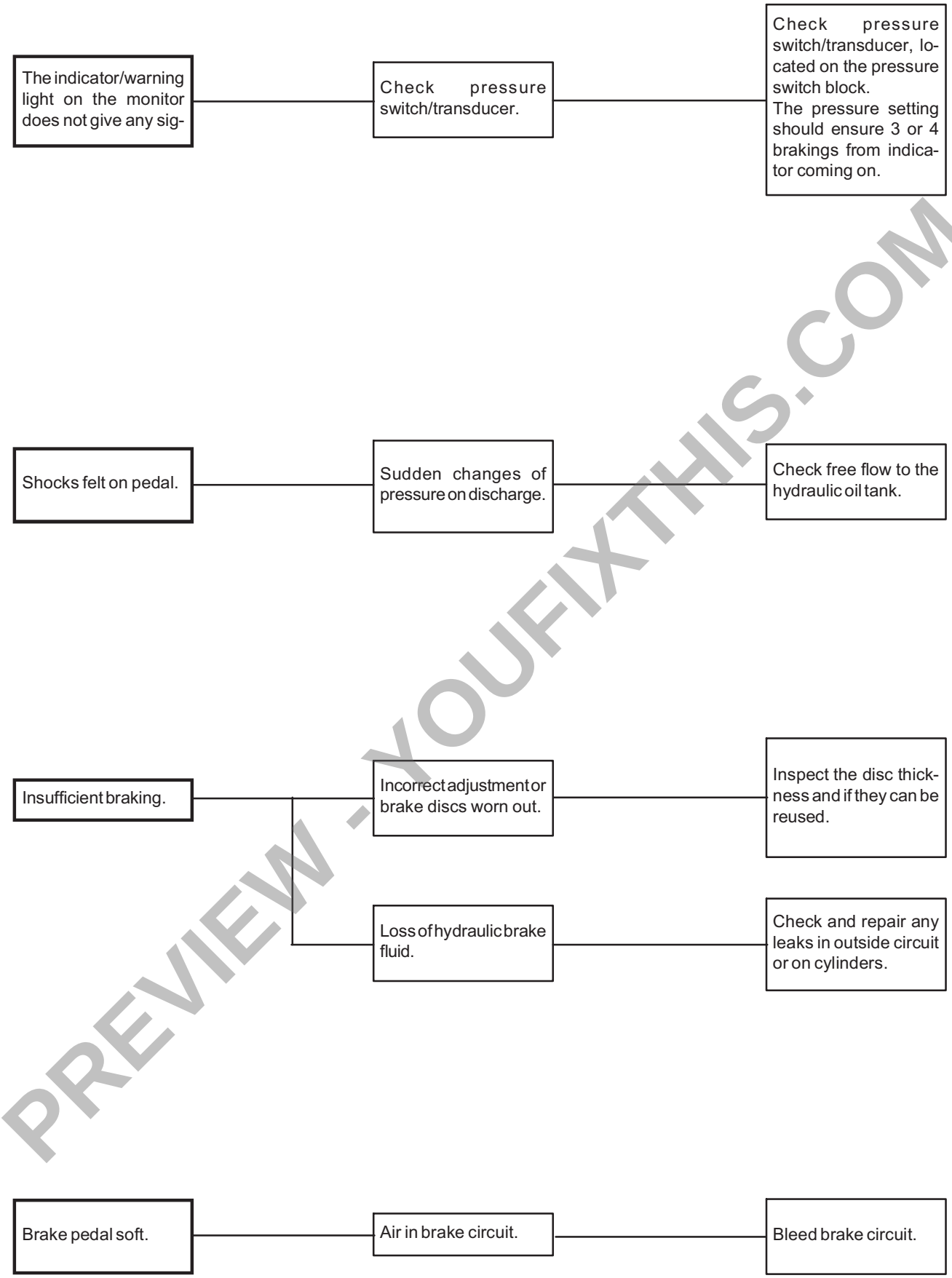
ARM CIRCUIT



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