John Deere

1458

Forwarder

TM1993 (01AUG01)

Workshop Manual

ENG

Contents

Service tools for 1458 Forwarder

Base Machine

		Notes
F612884	Middle joint pivot pin nut tool	

Boom

F057655	Lifting boom cylinder piston tool	
F034814	Lifting boom cylinder cover tool	
F617765	Jib boom cylinder piston tool	
F046590	Jib boom cylinder cover tool	
F061007	Extension boom cylinder tool	
F055825	Pivot nut spanner, d=60	
F055826	Pivot nut spanner, d=70	
F055827	Pivot nut spanner, d=80	

Engine

F058073	Engine barring tool	Same in all Cummins engines
F058074	Blowby checking tool	
F058079	Injector puller	Same in all Cummins engines
F058080	Turbocharger wastegate pressure set kit	
F058081	Torque angle gauge	
F058082	Capscrew length gauge	
F058083	Piston ring expander	
F058086	Fuel pump drive gear puller	Same in all Cummins engines
F058088	Water manometer for blowby checking	Same in all Cummins engines
F058089	Blowby checking tool hose	Same in all Cummins engines
F058090	Front oil seal installation tool	
F058094	Tappet removal & installation tool kit	Same in all Cummins engines

Electrical

F057934	Etools, tool kit for TMC/LCS	Computer required
F057938	Etools software program	Included in kit F057934
F057935	PCMCIA card for Etools	Included in kit F057934
F057936	Cable PC card / LCS	Included in kit F057934
F057941	LCS programs	Included in kit F057934

1000 Power Unit

1100 Engine

1200 Drive Coupling

1300 Fuel System

Cummins Workshop Manual for B-Series Engines

1100 Engine Mounting

General description

Engine is 6 cylinder, inline, direct injection diesel engine. Engine has water-cooling, wet liners, one-piece cylinder head, 2 valves/cylinder, wastegated turbocharger and Bosch PES6MW inline fuel injection pump with RSV governor.

Manufacturer	Cummins
Model	6CT 8.3-215
Power	124kW / 1800 rpm
Torque	694 Nm / 1500 rpm
Displacement	8,3 litre
Bore	114 mm
Stroke	135 mm

Removal

1. Clean engine compartment well
2. Disconnect battery cable.
3. Remove hood and cover plates.
4. Drain coolant from engine. Draining plug is located at the bottom of radiator.
5. Remove air filter. Protect inlet port of turbocharger.
6. Remove exhaust muffler. Protect exhaust port of turbocharger.
7. Disconnect all water hoses. Mark if necessary.
8. Mark if necessary and disconnect wires from

    - oil pressure switch
    - engine rpm sensor
    - start motor
    - alternator
    - coolant temperature sensor
    - stop solenoid
    - engine rpm regulator unit
    - water valve

9. Remove A/C compressor from engine. Don't open hoses, leave compressor at engine compartment.

10. Remove protection shields, which are around fan blade and alternator and remove fan blade.

11. Disconnect fuel lines. Suction hose from low pressure pump and return hose from injection pump. Protect all connections against dirt.

12. Remove drive clutch mounting bolts.

13. Pull hydraulic pumps backwards a little and support them to that place.

14. Connect load chains between engine lifting lugs and engine crane. Lift up a little and make sure that chains are well connected. NOTE ! Engine wet weight is 620 kg. Check that load chains can carry that weight.

15. Remove engine mounting bolts, 2 pcs front and 2 pcs rear.

16. Lift engine up about 10 mm and pull engine forward so much that drive clutch looses. Beware radiator while lifting engine up.

Installation

1. Check the condition of engine mounting rubber pads. Replace if necessary.

2. Lower engine down to engine compartment carefully. Beware radiator.

3. While lowering and positioning engine to its place install drive clutch.

4. Lower engine properly in its place.

5. Install engine mounting bolts. See tightening torque from operators' manual chapter 6.2.2.

6. Install hydraulic pumps.

7. Install A/C compressor.

8. Install protection shields and fan blade.

9. Connect all wires to

- oil pressure switch
- engine rpm sensor
- start motor
- alternator
- coolant temperature sensor
- stop solenoid
- engine rpm regulator unit
- water valve

10. Install all water hoses.

11. Fill up the coolant. See specifications and instructions from operators' manual, chapters 6.4.1, 6.4.4 and 6.6.8.

12. Fill up the engine oil. See specifications from operators' manual chapter 6.4.3.

13. Connect fuel lines and bleed fuel system. See bleeding instructions from operators' manual chapter 6.8.1.

14. Install exhaust muffler.

15. Install air filter.

16. Connect battery cables.

17. Start engine and check for leaks. Look after engine temperature, coolant level and oil pressure. If everything seems to be properly in condition drive a short test drive.

18. Install hood and cover plates.

19. Check coolant and oil level after the engine has cooled down.

RPM sensor setting

1. Clean threads of sensor and flywheel case well.

2. Rotate crankshaft so that one cog of flywheel ring is visible in the center of sensor mounting hole.

3. Turn sensor carefully by hands clockwise until it contacts to cog. Then turn sensor ½ turn anti-clockwise and tight locking nut. Torque is 25 Nm.
4. Install connector.

Engine troubleshooting and repair instructions

See Cummins manuals, which are specified in page 1000-1.

1200 Fuel System

General description

Fuel tank is located at the right side of rear frame. From fuel tank fuel is sucked through suction pipe to water separator. In suction line is a solenoid valve, which closes fuel line when engine is not running.

From water separator fuel is transferred to suction/low pressure pump which is located at left side of engine and to engine pre-heater (if installed.) Low pressure pump pumps fuel from water separator to fuel filters. At first fuel filter is another water separator.

From filters fuel goes to injection pump which delivers fuel to injection nozzles.

From injection pump comes fuel return line, which goes straight to the fuel tank. The bleeding fuel line of injection nozzles is connected to fuel filters. Low-pressure pump has hand lever, which is needed when bleeding fuel system.

Engine shut down is controlled by solenoid, which turns stop lever in fuel pump governor to zero position. Engine rpm is controlled by VDO throttle motor, which is controlled by TMC.

Specification

Fuel tank capacity	190 L
Fuel transfer pump	Carter, located at the left side of engine, driven by engine camshaft
Fuel injection pump	Bosch - Type PES6MW, inline, gear driven by engine camshaft
Injection pump governor	Bosch - Type RSV, constant speed governor with boost pressure controlled air fuel control
Injection nozzles	Bosch

Repair instructions / troubleshooting / service instructions

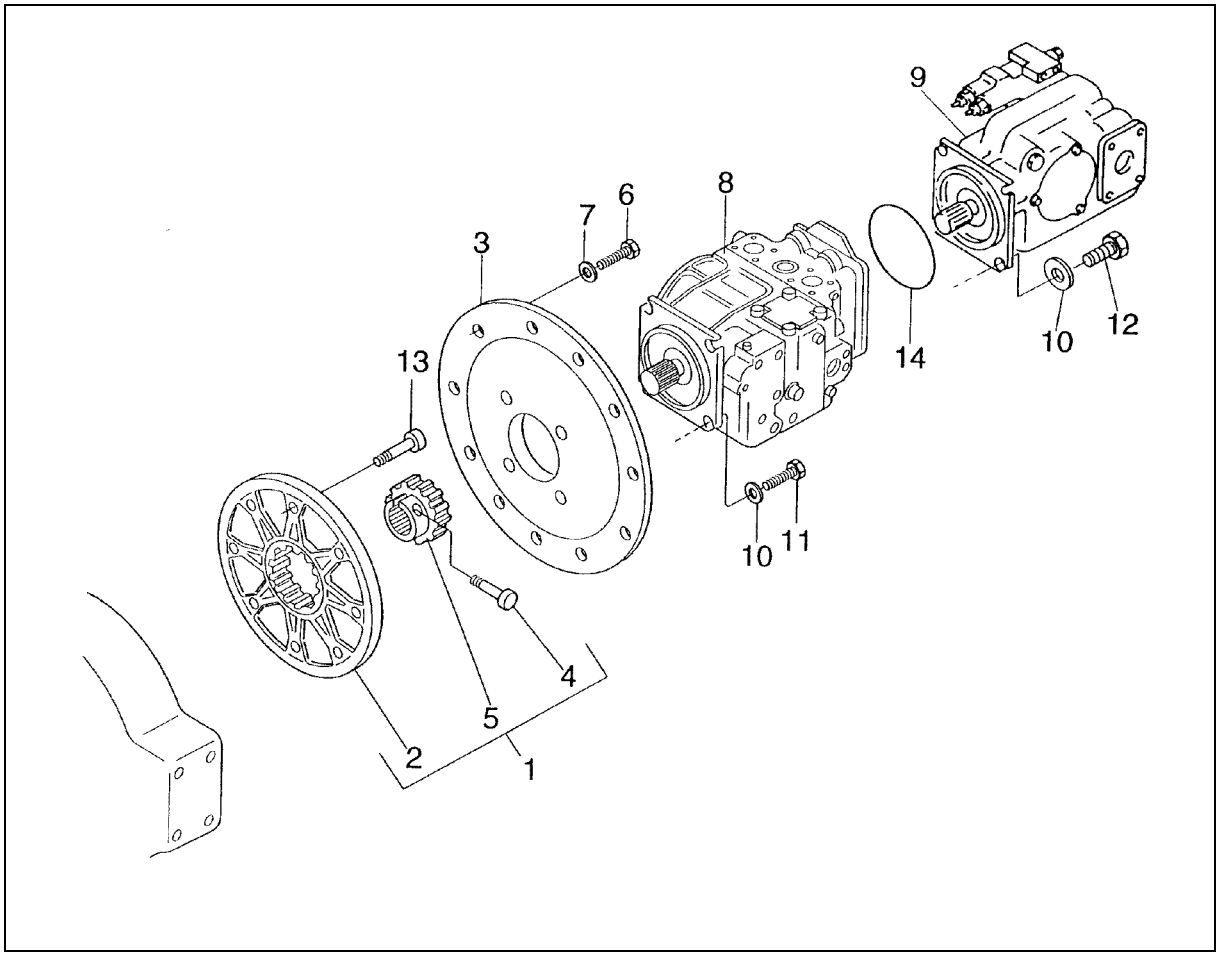
See Cummins manuals, which are specified at page 1000-1.

For service and bleeding instructions see Timberjack Operator manual.

1300 Drive Coupling

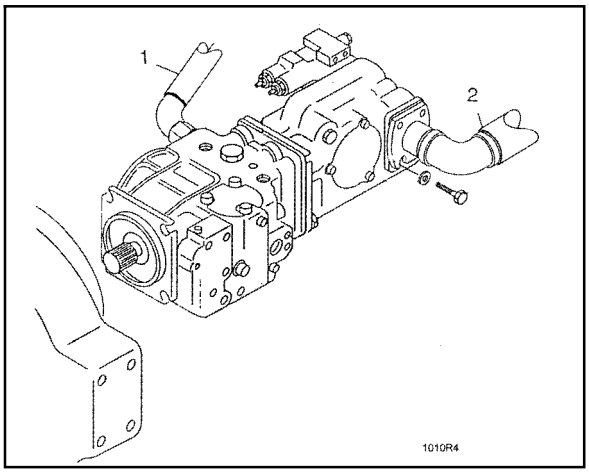
Description and Operation

The drive coupling transmits the power from the engine to the drive and working pumps. The coupling consists of a splined adapter attached to the hydrostatic drive pump input shaft and a splined flange mounted to the engine flywheel.



1 - Coupling Assembly
2 - Splined Flange
3 - Adapter Plate
4 - Screw
5 - Hub Screw
6 - Screw
7 - Washer
8 - Driving Pump
9 - Working Pump
10 - Washer
11 - Screw
12 - Screw
13 -Screw
14 - O-ring

Coupling Removal



NOTE !

Both hydraulic pumps may be removed as an assembly.

Drain the hydraulic tank.
Disconnect and cap the following hydraulic hoses to enable the pump to be moved away from the engine.:-

Hose - Hydrostatic pump to tank (1)
Hose - Working pump to tank (2)

Disconnect two screws mounting the hydraulic cooler (3) valve to the bracket.

Check and record the amount of crankshaft end play prior to removing the pump

CAUTION !

Observe strict cleanliness when disconnecting and connecting hydraulic components. Contamination introduced into the hydraulic system can result in early equipment failure.

Coupling Removal Cont'd.

CAUTION !

The hydraulic pump assembly is heavy. Use appropriate support, slings and lifting device to prevent personal injury or equipment damage when moving the pump.

Using a lifting device to support the pump assembly, remove the four bolts that secure the pump assembly to the adapter plate.

Slide the pump rearwards 100mm (4") to clear the spline.

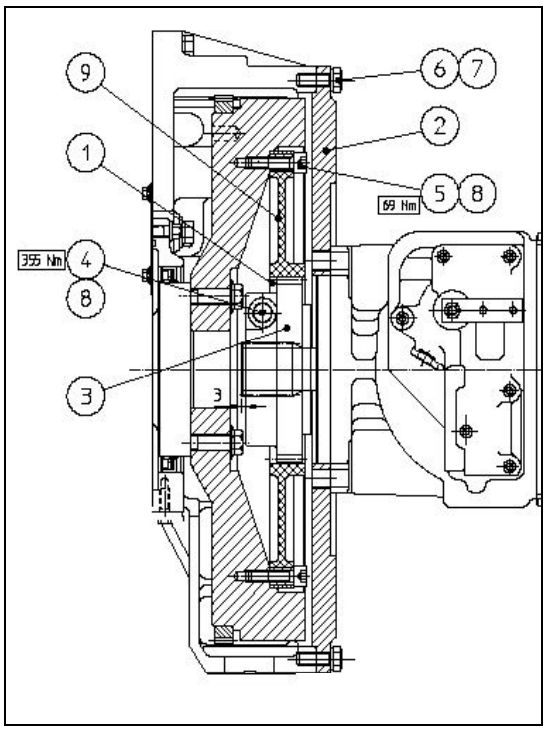
Inspect the splined adapter on the pump shaft and if damaged, remove and replace.

Remove screws and adapter plate.

Remove the splined flange attached to the engine flywheel.

Inspect the bushing and if damaged, remove and replace.

Coupling Installation



Install flange to engine flywheel. Use Loctite 242 Blue and torque screws (5) to 49 Nm.

NOTE !
The longer hub of the splined flange MUST be installed toward the engine flywheel.

Install adapter plate to flywheel housing using screws with Nord-lock washers.

The cooler valve bracket is installed to the engine using the flywheel housing screws

If the splined adapter has been removed or loosened, it must be re-installed as follows :-

Adapter hub must extend past end of pump input shaft by 4.9mm

Install locking screw (4) using Loctite 242 Blue and torque to 355 Nm.

Slide pump forward and install four screws to secure pump. Torque screws to 100 Nm (74 lb ft)

CAUTION !

Use care when installing pump as the splined flange is Nylon and can be damaged. Rotate the pump shaft to line up the splines before installation.

Coupling Installation Cont'd.

Re-check end play on the engine crankshaft.

If no end play is noticeable, remove pump assembly and check that the splined flange is installed with the long hub towards the engine flywheel.

Reconnect hydraulic hoses and refill hydraulic tank.

NOTE !

Air must be removed from the hydrostatic and working systems before machine operation. See Sections 2010 and 2300.

2000 Hydraulic System

1. Check and Adjust the Hydrostatic System; Drive Pump

1.1 Checking and Adjusting the Charge Pressure

- Disconnect the parking brake solenoid Y41 (1) from the valve block. After this, the parking brake will stay engaged (fig. 1).
- Connect a 6,0 MPa (870 psi) pressure gauge to pressure measuring point MH1 (fig. 2). When the engine RPM is 1600, the pressure should be 2.8 ... 3.2 MPa (406 ... 464 psi).
- If necessary, adjust the pressure with adjusting screw CH1 (fig. 1).
- Fit the solenoid into the valve and tighten the lockscrew (2) hand tight.

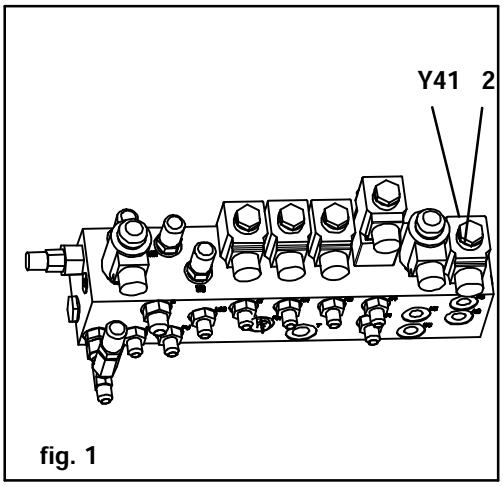


fig. 1

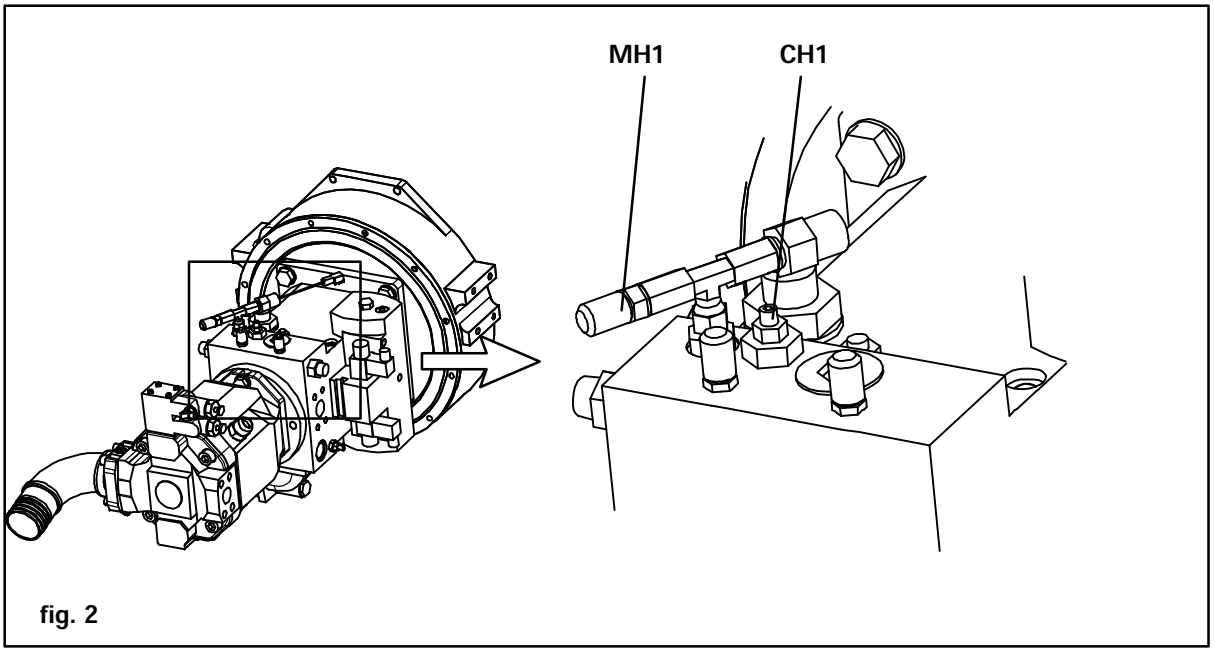


fig. 2

1.2 Checking and Adjusting the Pressure Cut-Off Valve Setting of the Drive Pump

- Disconnect the parking brake solenoid Y41 from the valve block (1). After this, the parking brake will stay engaged.
- Connect 60 MPa (8700 psi) pressure gauges to measuring points MH2 (forward) and MH3 (reverse) (fig. 1).
- Engage high gear.
- Drive the machine both forward and backward even though the brake is on. Do not do this longer than for five seconds at a time.
- The pressure should rise to **45.0** + **0.5 MPa (6527 + 72 psi)** both directions.
- If necessary, adjust the pressure with adjusting screw CH2 (forward/reverse).
- After making the adjustment, check the pressures once again.
- Fit the solenoid into the valve and tighten the lockscrew (2) hand tight.

MH2 = Driving forward
MH3 = Driving reverse
CH2 = Pressure cut -off adjustment screw

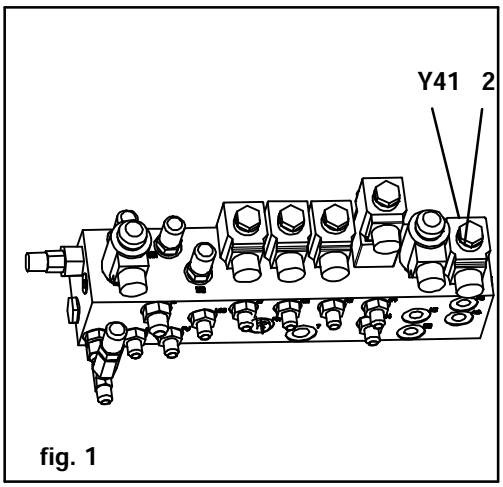


fig. 1

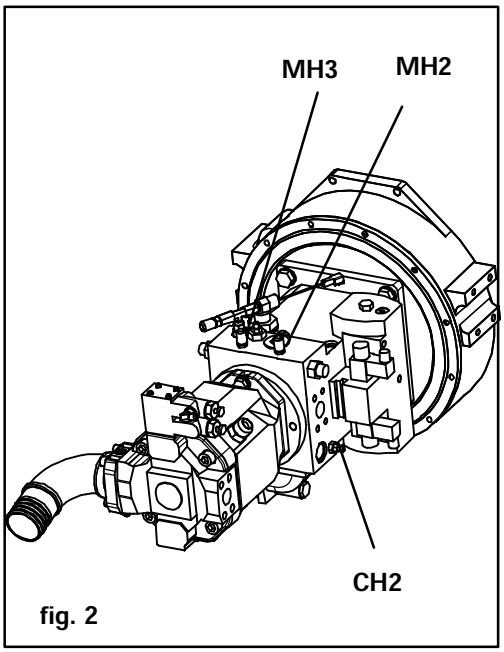
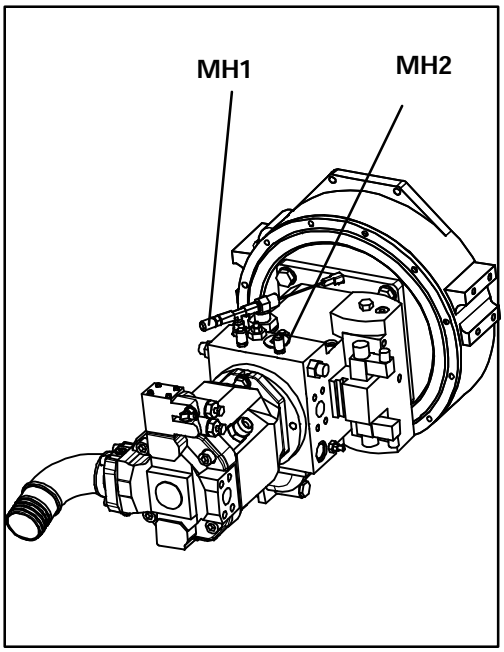


fig. 2

2. Check and Adjust the Hydrostatic System; Drive Motor

2.1 Checking the Function of Hydrostatic Flushing Valve

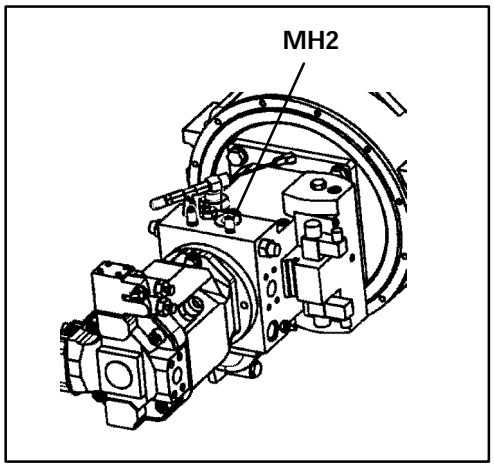


The function of hydrostatic flushing valve is checked by measuring the supply pressure MH1 (fig.).

- Connect a 6,0 MPa (870 psi) pressure gauge to measuring point MH1 and a 60 MPa (8700 psi) pressure gauge to measuring point MH2.
- First, press the brake pedal all the way down.
- Press the accelerator pedal until the machine tries to start moving.
- The very moment the machine 'should' start moving (i.e. the pressure measuring point MH2 rises) the pressure at the measuring point MH1 must drop by appr. 0,1...0,6 MPa (14,5...87 psi).

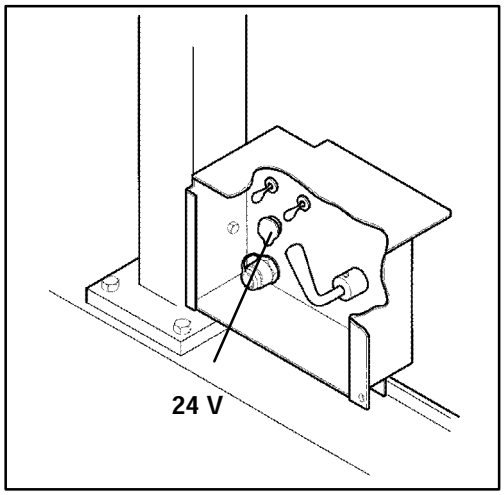
The hydrostatic flushing valve cannot be adjusted.

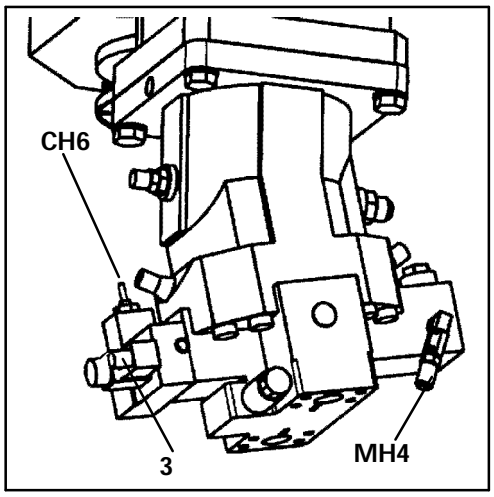
2.2 Checking and Adjusting the Constant Pressure Setting of the Drive Motor.



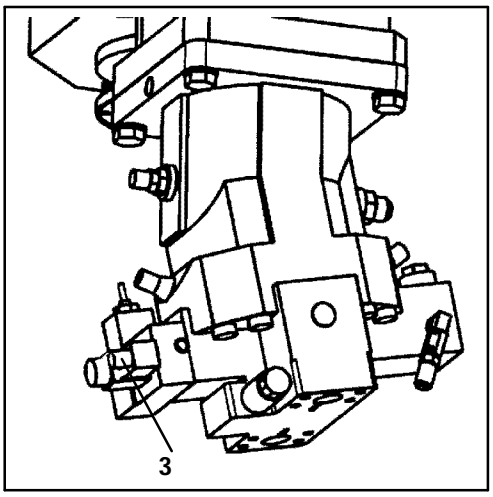
The tools needed: 3-mm hex key and 10-mm wrench

- Disconnect the parking brake solenoid Y41 from the valve block. After this, the parking brake will stay engaged.
- Connect a 60 MPa (8700 psi) pressure sensor to measuring point MH2 and other 60 MPa (8700 psi) pressure gauge to measuring point MH4.
- Disconnect the connector of the motor steering (pos. 3, fig. 3).
- Connect a 24 V tension with a separate cable from the power outlet next to the main switch to the motor steering (pos. 3).
- Start the engine.
- Engage high gear and rear wheel drive. Let it idle.
- Select the driving direction forward.
- Set the adjustable speed range (snail) to 15 %.
- Press smoothly the drive pedal, the pressure will first start to rise at measuring points MH4 and MH2.
- The engine rpm and the pressures are increasing, but at a certain point the pressure of MH4 stops to increase and finally it starts to decrease.
- When the pressure at MH2 reaches **36 MPa (5220 psi)** the pressure at MH4 should then be **17 ¦ 2 MPa (2465 ¦ 290 psi) .**
- If MH2 reaches 36 MPa and the value at MH4 is higher than 17 ¦ 2 MPa, turn the adjusting screw CH6 counterclockwise in small increments and repeat the test.
- If MH2 reaches 36 MPa and the value at MH4 is lower than 17 ¦ 2 MPa, turn the adjusting screw CH6 clockwise in small increments and repeat the test.





- Disconnect the cable between the power outlet and the position 3.
- Connect back the connector of the motor steering (pos. 3, fig. 3) .



- After making the adjustment, fit the solenoid into the valve and tighten the lockscrew (2) hand tight .

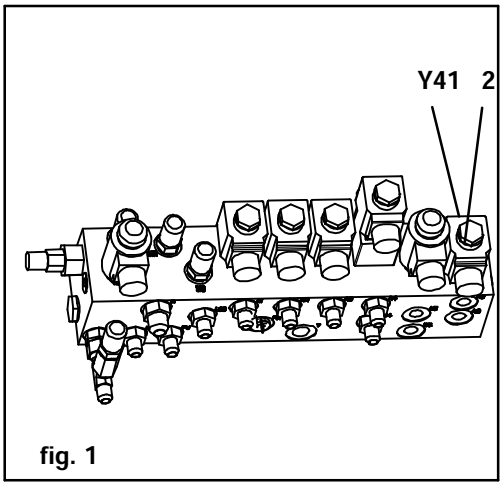


fig. 1

MH2 = Driving forward
MH4 = Servo pressure
CH6 = Constant Pressure adjustment screw

3. How to Check and Adjust the Pressures of the Working Hydraulics

3.1 Adjustment of Pressure Difference (△p)

- Connect 30 MPa (4350 psi) pressure sensors to measuring points MP1 and MP3 (pump main pressure and signal lines).
- Engage the working rpm and boom.
- Lift the boom free of the load area.
- Rotate the rotator freely and simultaneously check the pressure at measuring points MP1 and MP3. The pressure at MP3 must be lower than that of MP1 (fig.1.) by 2.5...2.7 MPa (363...391psi).
- When checking at measuring point MP1 the pressure should not rise over 15 MPa (2175 psi).
- If necessary, adjust the pressure with adjusting screw CP1 (fig. 2). Turning the screw clockwise will increase the pressure difference △p.

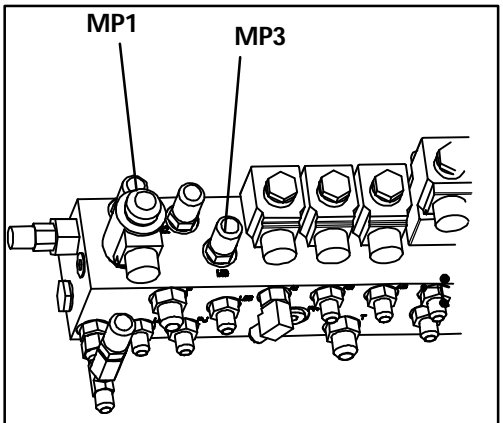


fig. 1

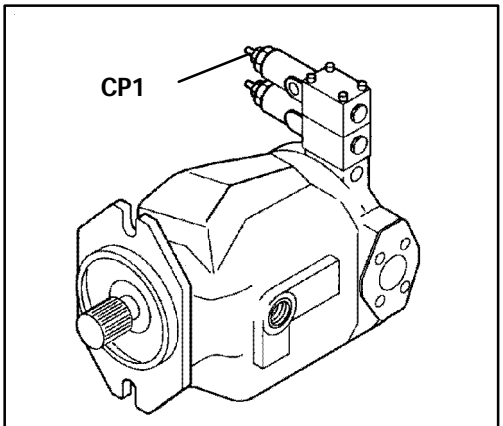


fig. 2