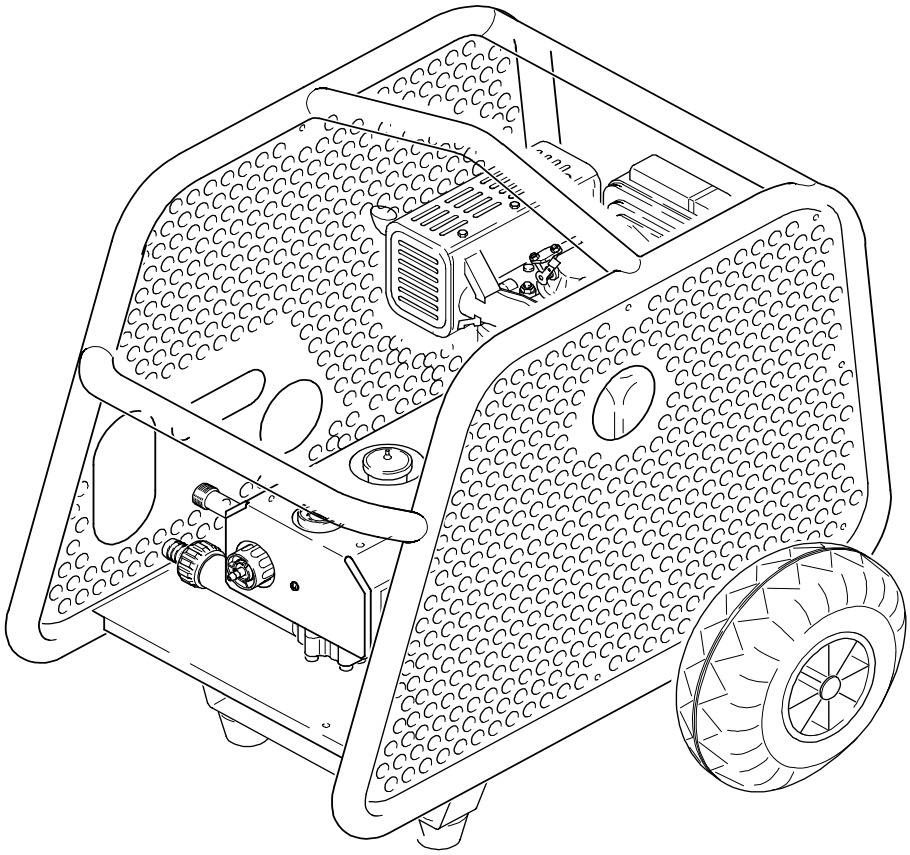
HD 1050 DE Cage New Unit Information	International Service Information Dec. 22nd,1999

HD 1050 DE Cage

1.810-993



5.905-870

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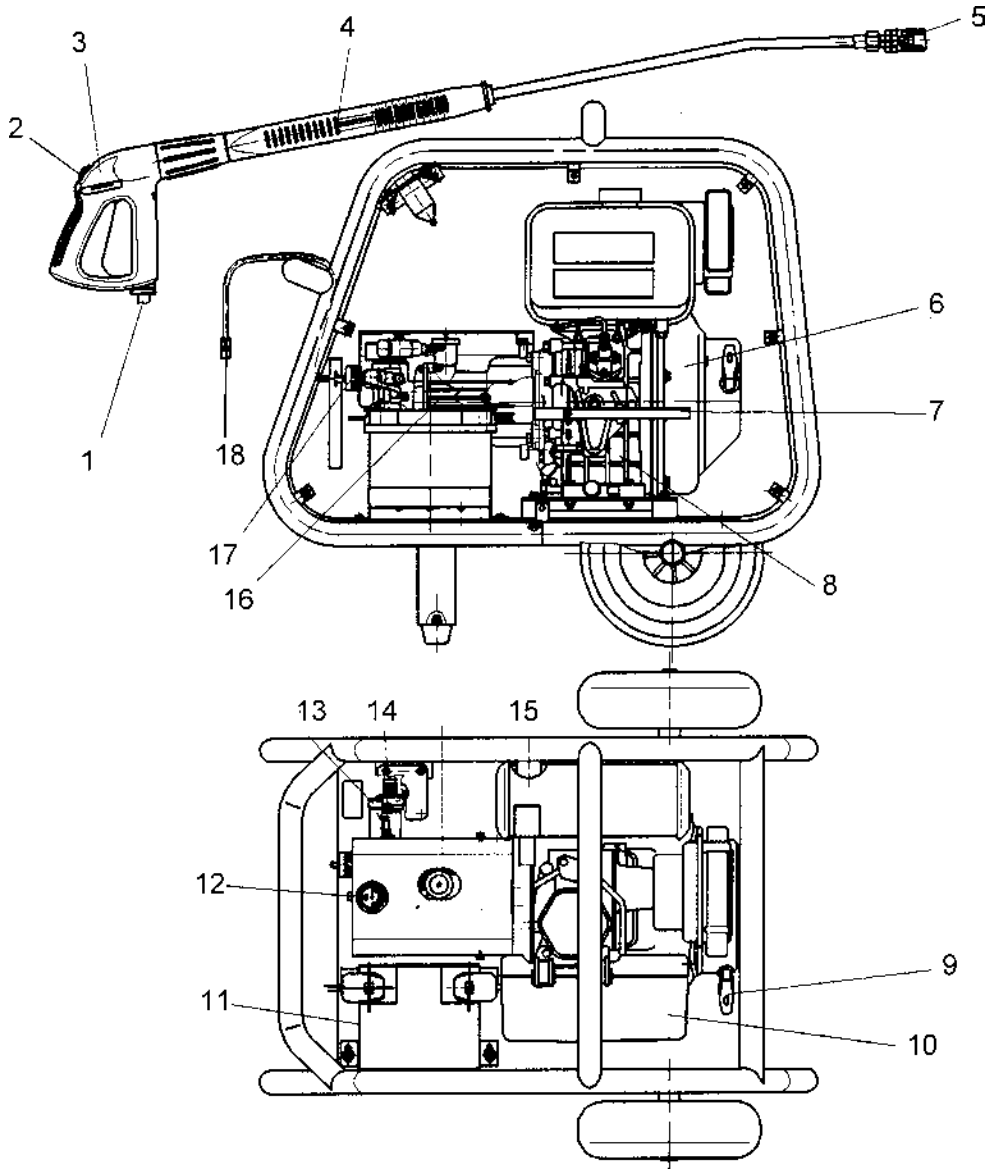
Equipment



1 High-pressure hose
2 Pressure and flow control
3 Servopress handgun
4 Spray lance
5 Three-way nozzle
6 Yanmar diesel engine
7 Throttle lever engine stop
8 Oil dipstick
9 Recoil hand starter
10 Fuel tank
11 Battery
12 Pressure gauge
13 High-pressure connection
14 Water inlet
15 Oil reservoir (high-pressure pump)
16 High-pressure pump
17 Cleaning agent metering valve
18 Cleaning agent suction hose with filter

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Technical features

General

HD 1050 DE Cage is the same as HD1050 DE 1.810-988 (Service Information HD 1050 DE dated Jun 22nd,1999), but has an additional frame with side protection screen.

Drive

– Yanmar 1-cylinder, 4-phase diesel engine L 90 AE
– Aircooled
– Electrical starter / recoil hand starter
– Decompression lever for engine start, trigger for engine stop
– Automatic r.p.m. control: engine r.p.m. decreases during circulation mode.

High-pressure pump

– Similar to HD 895 S
– 3-piston axial pump
– Piston made of stainless steel (diameter:16 mm)
– High-pressure seals, low-pressure seals, oil seals
– Cylinder head made of brass
– Suction and pressure valves made of stainless steel
– Swash plate with axial ball bearing
– Pressure and flow control
– Injector to cleaning agent supply
– Pressure gauge at cylinder head
– Safety valve at cylinder head

Cleaning agent system

– Cleaning agent supply in low-pressure mode (injector)
– Non-return at cylinder head
– Metering valve at cylinder head

Electric system

– Electric starter with key start switch
– Alternator
– Charging regulator (15 A, 12 V)

Standard accessory

– Servopress handgun
– Spray lance with three-way nozzle (0°, 25°, 40°)
– Connecting system 2000

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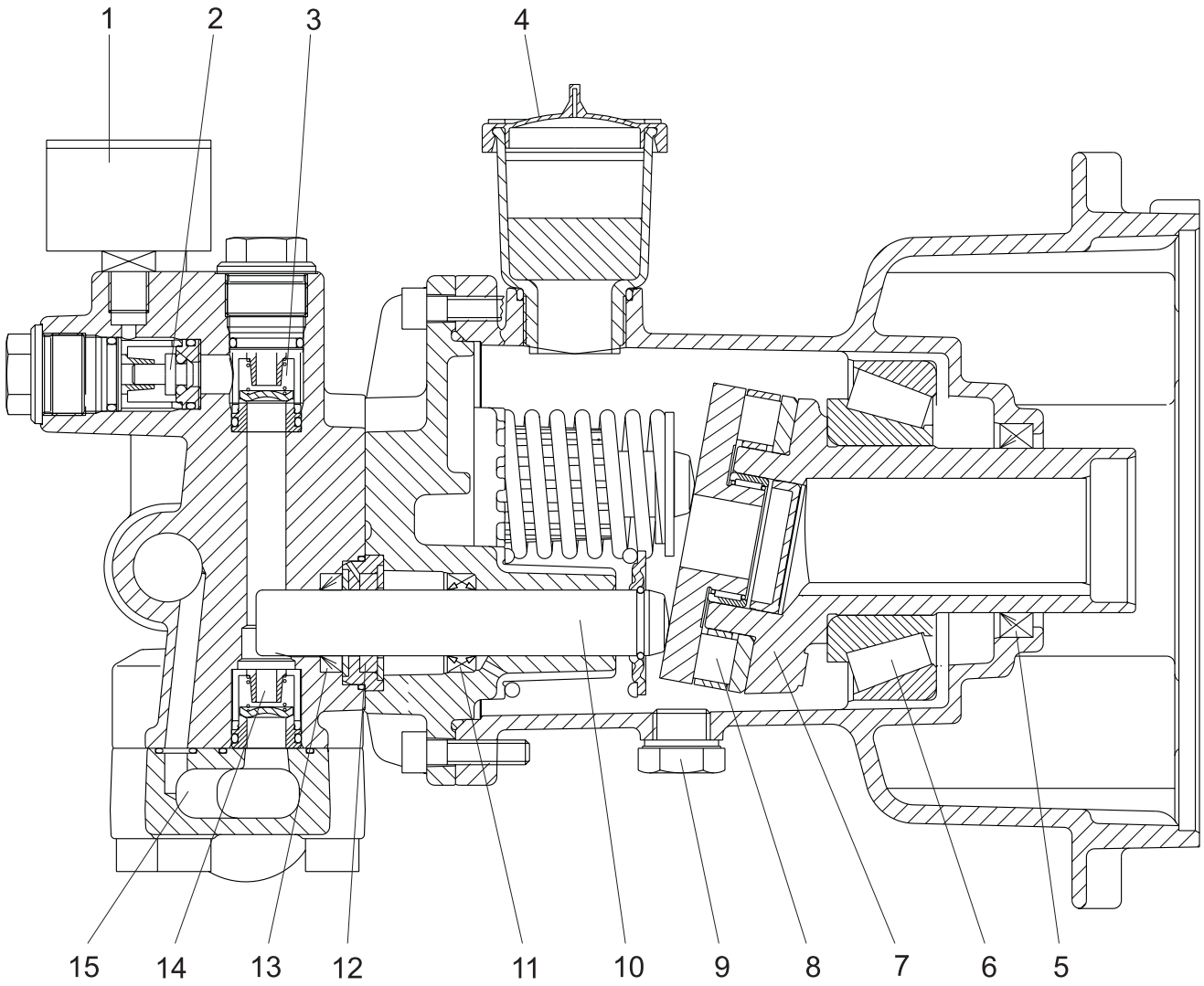
Technical features: high-pressure pump



1 Pressure gauge
2 Non-return valve
3 Pressure valve
4 Oil reservoir
5 Shaft seal
6 Swash plate bearing
7 Swash plate
8 Axial roller bearing
9 Oil drain plug
10 Piston
11 Oil seal
12 Low-pressure seal
13 High-pressure seal
14 Suction valve
15 Suction chamber

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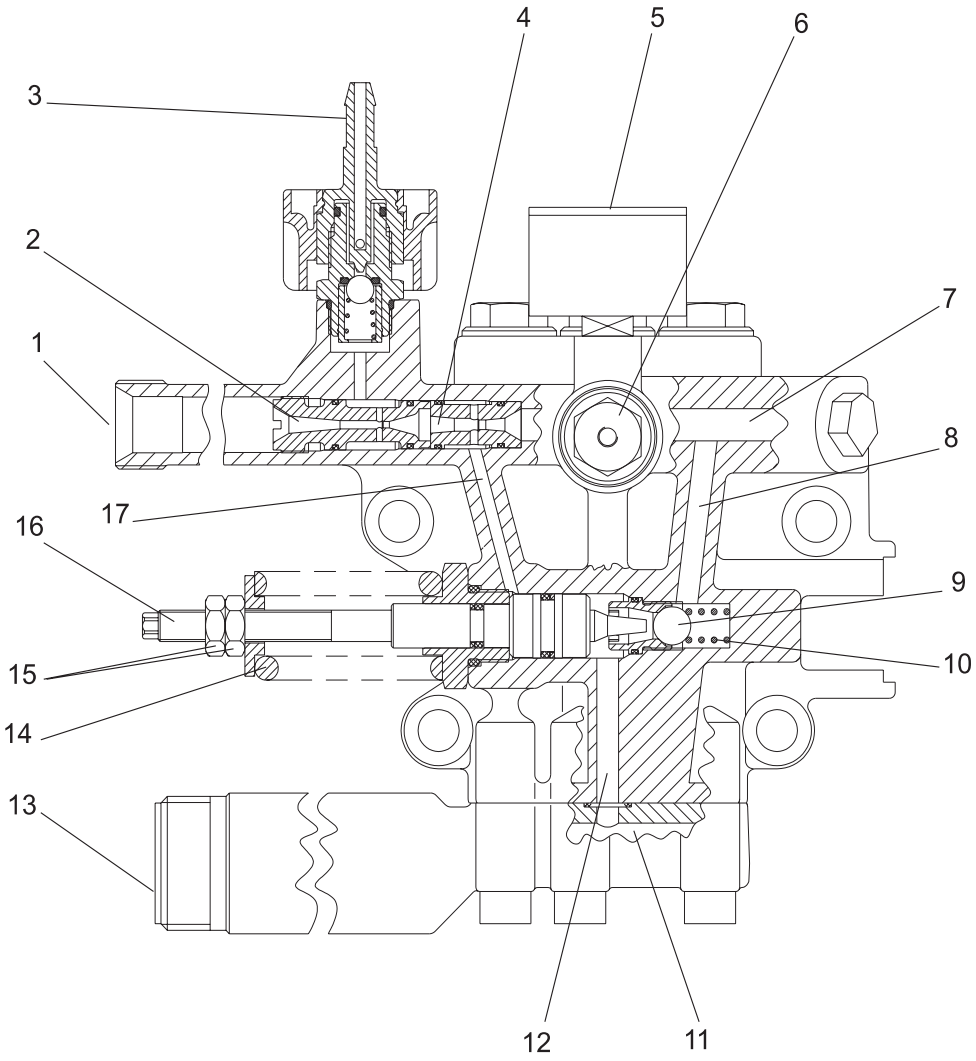
Unit function: overflow valve



1 High-pressure outlet
2 Cleaning agent injector
3 Cleaning agent connection
4 Control pressure injector
5 Pressure gauge
6 Non-return valve screw plug
7 Pressure chamber
8 Connection bore from pressure chamber to ball (9)
9 Ball
10 Spring
11 Suction chamber
12 Connection bore from overflow valve to suction chamber
13 Water inlet
14 Spring
15 Adjusting nut with locking nut
16 Overflow valve spindle
17 Connection bore from injector to overflow valve (control pressure)

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Unit function: overflow valve

1. Servopress handgun is open.

When the servopress handgun is completely open, water flows from the pressure chamber (7) through the non-return valve (6) and through both injectors (2+4) to the high-pressure outlet (1).

The ball (9) is pressed against the valve seat by the pump pressure, thus sealing the connection bore (12) to the suction chamber (11).

The pressure gauge (5) indicates the operating pressure.

The pressure in the connection bore (17) is approx. 30 bar less due to the injector influence (4) (control pressure).

The motor runs with operating speed when the handgun is open.

2. Servopress handgun is partly closed.

When the handgun is partly closed, the pressure in the pressure chamber (7) does not increase. Due to the decreased water flow rate, the influence of the injector (4) is reduced so that the control pressure in the connection bore (17) increases. The increasing control pressure pushes the overflow valve spindle (16) against the spring (14) and slightly to the right. The tip of the spindle pushes the ball (9) off its seat so that part of the water can flow through the connection bores (8) and (12) to the suction chamber (11).

3. Servopress handgun is completely closed.

When the handgun is completely closed, the pressure in the pressure chamber (7) increases. The increased control pressure pushes the overflow valve spindle (16) via connection bore (17) completely to the right. The tip of the spindle pushes the ball (9) off its seat, so that the entire water volume can flow through the connection bores (8) and (12) to the suction chamber.

As soon as the handgun is closed, the non-return valve closes (6). Therefore the entire pressure in the system between handgun and non-return valve (6) is trapped.

The pump continues running with decreased pressure in circulation operation.

The motor continues running via automatic r.p.m. control with decreased circulation r.p.m.

4. Servopress handgun is opened.

When the handgun is opened, the pressure in the system decreases.

The overflow valve spindle (16) is pushed back by the spring (14) to its original position to the left. The spring (10) and the pump pressure of the connection bore (8) push the ball (9) back onto the valve seat.

The connection bore (8) is thereby closed and the operating pressure can be built up again.

The engine r.p.m. increases to the operating speed.

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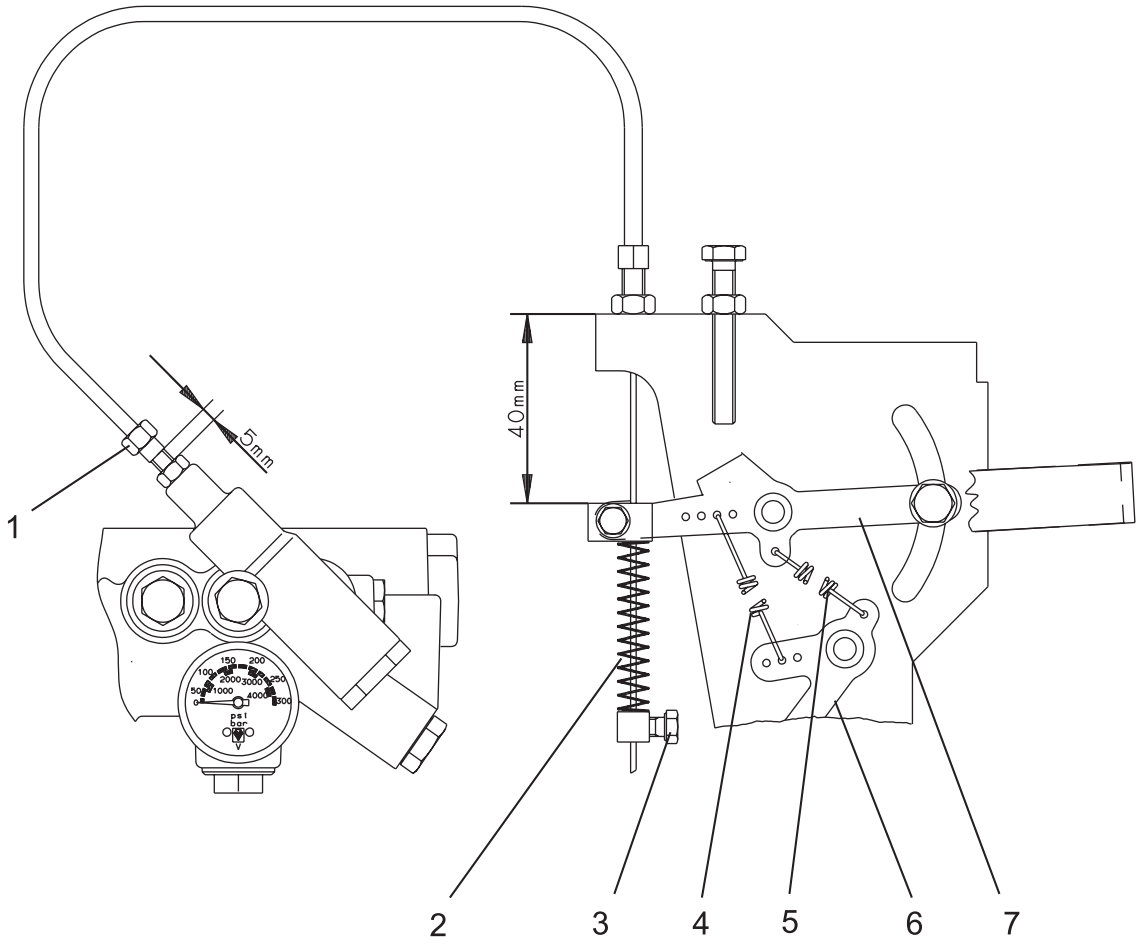
Basic setting: bowden cable



1 Adjusting screw
2 Spring
3 Clamping screw
4 Governor spring
5 Governor spring
6 Governor lever
7 Governor lever

- Switch off engine and release pressure.
- Adjust bowden cable as indicated:
  5 mm : with adjusting screw (1)
  40 mm : with clamping screw (3)

Note:
The governor springs (3) and (4) must be attached in the holes of the governor levers (5) and (6).

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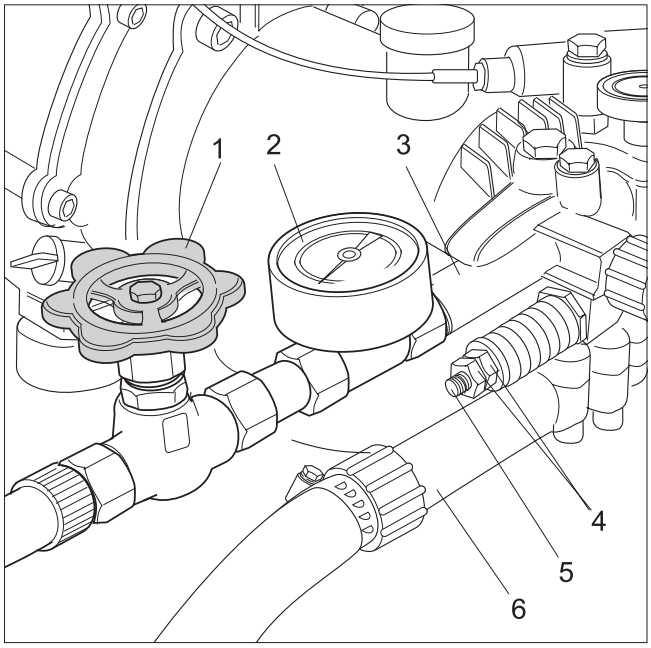
Basic setting: overflow valve



1 Shut-off valve
2 Testing pressure gauge
3 High-pressure outlet
4 Adjusting nut with locking nut
5 Overflow valve spindle
6 Water inlet

Note:
Before any adjustments check the high-pressure nozzle and the air filter for damage or wear. All defective parts must be replaced.

- Mount testing pressure gauge (2), shut-off valve (1), high-pressure hose and servopress handgun without high-pressure nozzle on high-pressure outlet (3). The unit pressure gauge is not to be used to check the operating pressure because it measures too inaccurate !

- Set servopress handgun to max. water volume, open it and operate the unit.

- Close shut-off valve (1) slowly until low pressure flow rate has been achieved (see technical data). This corresponds to the smallest servopress setting. Measure flow rate and compare it with technical data.

- Adjust max. operating pressure with adjusting nut (4) (see technical data) and check with testing pressure gauge (2):
  Increase spring tension: operating pressure increases.
  Decrease spring tension: operating pressure decreases.

- Mount servopress handgun with new high-pressure nozzle (see technical data) and open again shut-off valve (1) completely. Close and open servopress handgun several times. Check max. flow rate and max. operating pressure during high pressure.

- Set servopress handgun to min. water volume (low pressure operation) to check and check low pressure flow rate. If required repeat the above mentioned steps.

- Finally secure the adjusting nut (4) with locking nut and seal with safety paint.

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New Unit Information

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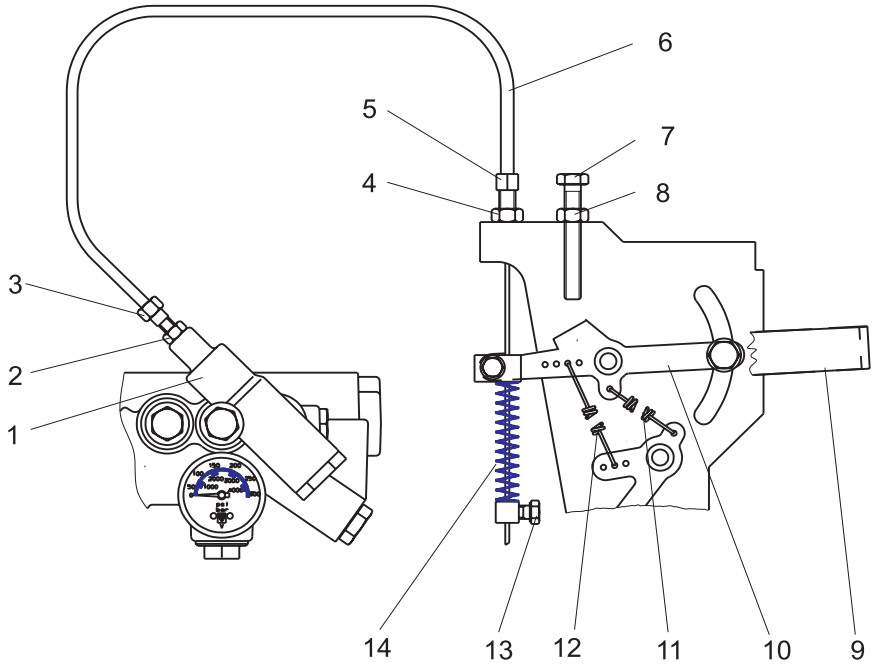
Basic setting: operating speed



Note:
Before adjusting the operating speed, the overflow valve must be adjusted correctly. The operating speed can only be adjusted during high pressure (max. operating pressure / flow rate).

1 Operating speed control
2 Locking nut
3 Adjusting screw
4 Locking nut
5 Adjusting screw
6 Bowden cable
7 Adjusting screw for max. operating speed
8 Locking nut
9 Engine stop lever
10 Regulator lever
11 Spring
12 Spring
13 Clamping screw
14 Spring

- Mount shut-off valve with testing pressure gauge on high-pressure outlet (see page 8 step 1, 2), set servopress handgun to max. water volume, set three-way nozzle to 0° pencil jet and operate the unit.
- Measure operating pressure and flow rate (see technical data).
- Adjust engine r.p.m. with adjusting screw (3) so that max. operating pressure (see technical data) at testing pressure gauge is achieved. With this operating pressure the corresponding operating speed must also be achieved (see technical data).
- Close and open servopress handgun several times and check the adjustment. When the handgun is closed, the pump pressure decreases (circulation operation) and the engine r.p.m. reduces.
- Finally seal screws (3), (5) and (13) with safety paint.

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Troubleshooting

Problem	Remedy
Engine does not start.	Check / clean fuel system. Check engine stop lever. Check decompression lever. Check starter battery and charging regulator.
Engine r.p.m. fluctuates.	Check / clean / replace air filter. Eliminate leakages in high-pressure system: handgun, high-pressure hose, cleaning agent system, non-return valve, overflow valve, valve seat of the ball.
Low operating pressure and flow rate	Check / replace high-pressure nozzle. Check / clean water inlet filter. Check / adjust engine r.p.m. Eliminate leakages in high-pressure system (as mentioned above). Check / adjust spring at overflow valve. Replace suction and pressure valves. Replace high-pressure and low-pressure seals.
Pump does not draw in any cleaning agent.	Clean cleaning agent system and eliminate leakages. High-pressure hose is too long or its inner diameter too small. **Note:** **Cleaning agent is only drawn in during low-pressure operation when the servopress handgun is completely opened.** **Replace injector:** **- Unscrew front injector as much as possible.** **- Then slowly pull through hand start rope. While doing so, the engine must not start.** **- The resulting pump pressure pushes both injectors out of the high-pressure outlet.**

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Technical data

unit	technical data	circuit diagram	operating instructions	maintenance booklet	spare parts list
HD 1050 DE Cage Yanmar-Diesel L 90 AE	1.810-993	0.087-634	5.959-276	-	5.958-483

The technical data sheet and circuit diagram are on the next edition of the Spare Parts CD-ROM (DISIS) and in the Intranet (KMN), folder: "Central / Service Info Int`l / Technical Data resp. Circuit Diagram".

Further operating instructions and spare parts lists can be ordered with the corresponding part number from our Spare Parts Dept.

Special tools

Shut-off valve	4.580-034
Adapter for system 2000	4.401-072
Testing pressure gauge	4.742-025
R.p.m. tester (mechanical)	6.491-361
Valve pliers	4.901-012

Torques

Cylinder head screws	40 - 45 Nm
Screws for piston housing	5 - 7 Nm
Oil drain plug	25 - 30 Nm
Fastening screw for pressure valve	40 - 45 Nm
Injector	1,5 - 2,5 Nm
Valve seat for safety valve	8 - 10 Nm