

## TECHNICAL INSTRUCTION 920152-03

**Instruction for disassembly, cleaning and testing SIP I valves onboard.**

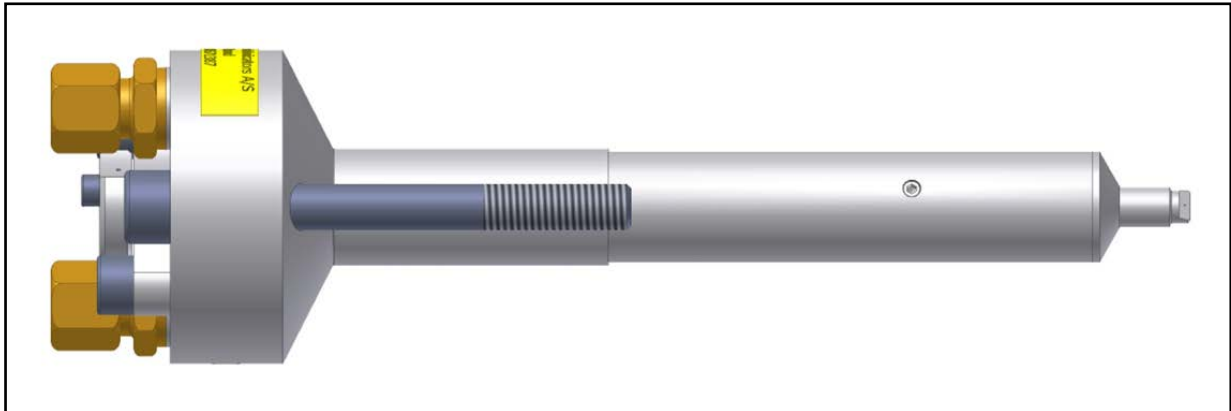
***We recommend that SIP I valves are returned to HJL for overhaul.  
If an overhaul onboard is necessary, please follow the instruction below.***

### 1. Disassembling and cleaning SIP I valves

#### 1.1 Preparation

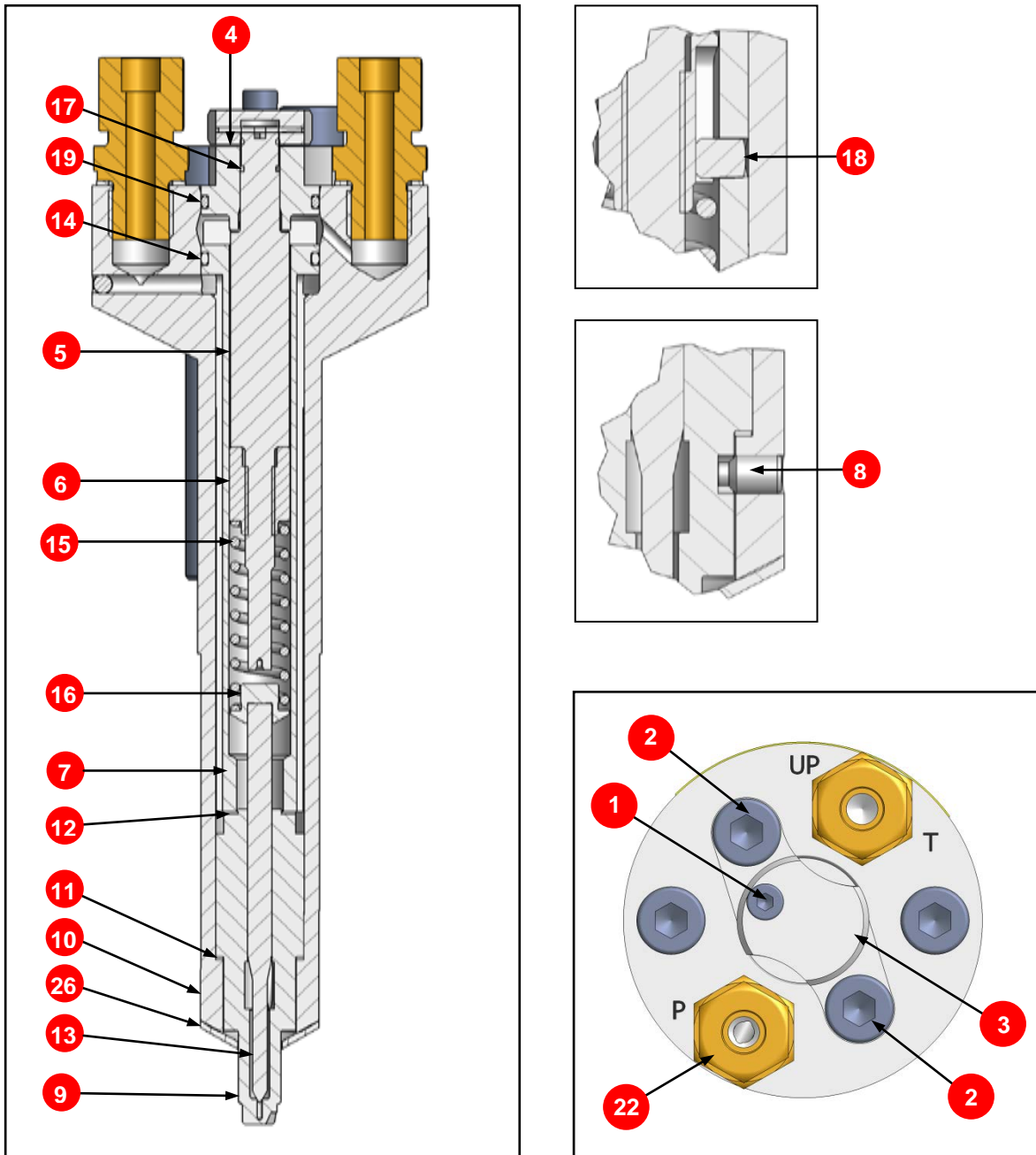
It is important that the work is carried out in a completely clean environment.

For the cleaning of the valves, use kerosene for cleaning the parts, a Ø0.Xmm drill for cleaning the nozzle hole (See HJ manual for nozzle hole size), and compressed air free from water and impurities for blowing the parts clean. Do not use rags, as they may contain fluff.



## Sectional drawing of HJL SIP I valve

To be used for the explanations in the following TI, where all numbers in (red) refer to this drawing.



## Disassembly of SIP I valve

- 1.2.1 Clean the valve on the outside before commencing disassembly.
- 1.2.2 Loosen screws (1) and (2) completely and remove them together with the lock cover (3).
- 1.2.3 With your fingers, carefully pull out the unit consisting of the guide for adjustable screw (4) and the adjustable screw (5) with the adjustable spring nut (6).
- 1.2.4 Place the valve in the fixing tool (HJL no. 980192).
- 1.2.5 Unscrew the tightening bush (7) completely with special tool (HJL no. 980191).
- 1.2.6 Dismantle the pointed screw (8), so that the nozzle (9) can be removed from the valve housing (10).
- 1.2.7 Turn the valve upside down (keep your hand beneath it) with the oil connection turned downwards, so that all parts can slide out of the valve housing (10).
- 1.2.8 Press on the nozzle tip (9) with your finger so that the nozzle (9) slides out of the valve housing (10).
- 1.2.9 It is essential to be very careful during Dismantling in order not to damage, bump, or drop any of the parts or bring impurities into them.
- 1.2.10 Do not bump the valve parts and be careful not to drop the loose parts.

## 1.3 Cleaning

Clean the individual parts with kerosene. Clean the nozzle hole carefully with a Ø0.Xmm drill (See HJ manual for nozzle hole size). Blow the parts through with compressed air inside out. Make sure to apply oil to the nozzle/needle after cleaning.

If the needle (13) in the nozzle (9) does not move freely and without resistance as it is supposed to do after cleaning and applying fresh oil, it must be removed and replaced.

Both the needle (13) and the nozzle (9) must be removed and replaced as the parts are matched together in pairs.

When replacing the nozzle/needle, the new nozzle/needle must be cleaned with kerosene, to remove the rust protection they are packed in. Fresh lubrication oil must then be applied to the nozzle/needle before assembly.



#### 1.4 Assembly of the SIP I valve

It is important that the components are placed at the same positions as before the valve was disassembled. Please note that the carrier between the tightening bush and the nozzle is different.

We recommend a change of all packing after disassembly of a SIP I valve. The order no. for packing set, consisting of different O-rings, gaskets and shims, can be found in the spare parts list, in the HJ manual

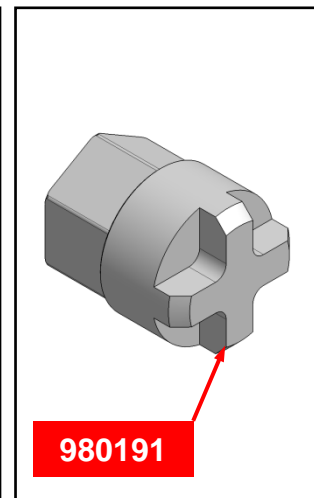
Oil all parts, including packings, with thin acid-free oil, e.g. hydraulic oil SAE 10-20 before assembly.

- 1.4.1 Place the copper gasket (11) at the bottom of the valve housing (10). Look into the valve housing (10) to ensure that the copper gasket (11) is correctly placed at the bottom of the valve housing (10).
- 1.4.2 Place copper gasket (12) on nozzle (9), using the special tool 103508.
- 1.4.3 Push the complete nozzle (9) and needle (13) set including copper gasket (12) into the valve housing (10) with the nozzle tip first.
- 1.4.4 Mount the pointed screw (8) loosely so that the tip catches the groove in the nozzle (9), applying Loctite 243 or similar to the thread. The pointed screw (8) is screwed until it touches the nozzle (9) and is then screwed half a rotation out again. The nozzle (9) should be able to move freely up and down, but not rotate.



#### 1.4 Assembly of the SIP I valve (continued)

- 1.4.5 Mount a new o-ring (14) on the tightening bush (7). Place the valve in the fixing tool (HJL no. 980192). Fill the SIP valve with Hydraulic SAE 10-20 oil up until the thread, to reduce the air in the system when flushing for the test (section 2.2).
- 1.4.6 Screw the tightening bush (7) with spring (15) and spring disc (16) into the valve housing (10). Ensure that the spring disc (16) is placed correctly in the valve housing (10). Apply the spanner (HJL no. 980191) and tighten to 70 Nm.
- 1.4.7 Mount new O-rings (17) on the adjustable screw (5).
- 1.4.8 Carefully push the adjustable screw (5) with adjustable spring nut (6) into the tightening bush (7). The groove in the adjustable spring nut (6) must catch the guide pin (18) inside the tightening bush (7). Completely tightening the adjustable screw (5) with the adjustable spring nut (6).
- 1.4.9 Mount a new O-ring (19) on the guide for adjustable screw (4). Mount the guide for adjustable screw (4) on the valve housing (10) with the screw (2) and tighten to 10 Nm. Tighten manually, being careful not to overtighten the screw (2) as it can damage the O-ring (19).



## 2. Adjustment and test of SIP I valves

### 2.1 Safety precautions

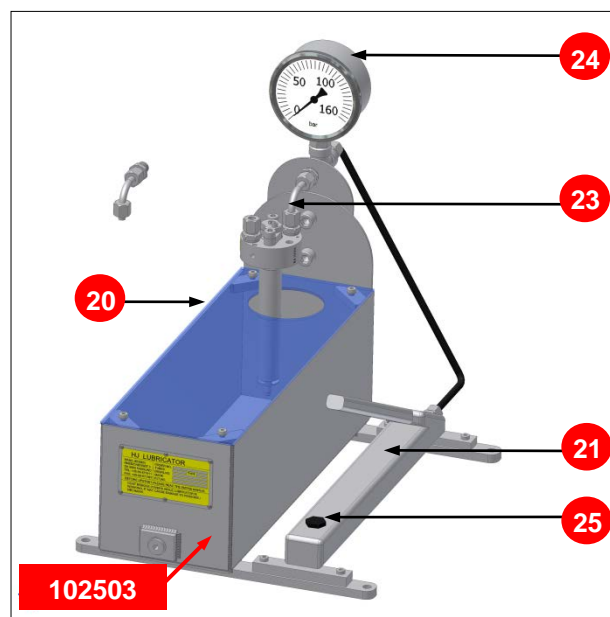
#### 2.1 Safety precautions

Before mounting the SIP I valve in the HJ Test rig (HJL no. 102503) make sure that the following safety precautions are followed:

- 2.1.1 During testing make sure that eyes and hands are in a safe distance from the nozzle.
- 2.1.2 Make sure that the cover (20) is mounted on the HJ Test rig.
- 2.1.3 The maximum permissible flow to the hand pump (21) must not exceed a flow corresponding to the adjustment of the lubricator, approx 0.4l/h.

### 2.2 Testing

- 2.2.1 Loosen and remove the screw (25). Fill the hand pump (21) with hydraulic oil SAE 10-20 at the oil-filling branch. Remember to mount the screw (25) after filling.
- 2.2.2 Place the SIP I valve in the HJ Test rig (102503). Connect the union (23) to the joint marked "P" (22) on the SIP I valve. Before tightening the union (23), pump with the hand pump (21) until the oil flows free of air at the union (23). Then tighten the union (23).



## 2.2 Testing (continued)

- 2.2.3 Pump with the hand pump and adjust the closing pressure according to manometer (24) on the HJ Test rig during pumping by screwing the adjustment screw (5) on the SIP I valve anti-clockwise for higher pressure or clockwise for lower pressure. Valve closing pressure, adjusted as described below.
- 2.2.4 Correct spray is checked when pumping with the hand pump. There is to be a continuous cone of droplets of oil through the nozzle hole – “droplets” is not accepted.
- 2.2.5 If the spray is not acceptable, impurities have entered the valve and a disassembly and a cleaning is necessary. If the valve needle (13) does not move freely after cleaning, the nozzle (9) must be replaced.
- 2.2.6 Mount the lock cover (3) with the screw (1).

## 2.3 Mounting

- 2.3.1 The SIP I valve is now ready for mounting in the cylinder.
- 2.3.2 During the mounting of the HJ SIP valves it is very important that the distance between the nozzle tip and the running surface is correct.

The distance is important for the lubrication process and keeps the nozzle of the valve away from any damages caused by the running cylinder.

Furthermore, we recommend that the distance is checked so that the wear in the cylinder liner does not cause the piston rings to touch the nozzle tip, whereby nozzle, piston rings and liner may be damaged.

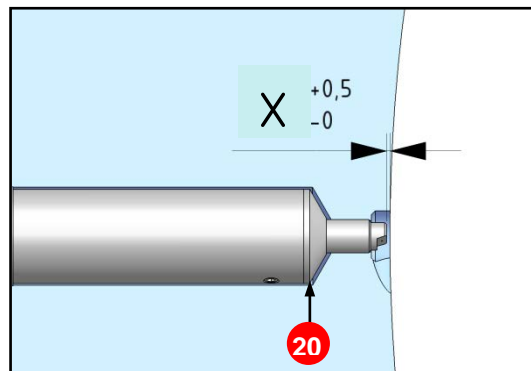
Parameter	On delivery	Service
Valve closing pressure	35-65 bar	Suitable intervals e.g. each time a cylinder is overhauled or every 12,000-15,000 hours. (See HJ manual for valve closing pressure)
Leak per SIP I valve	15±10ml/h	The leak quantity may increase over time. Therefore we recommend that it is checked at suitable intervals, e.g. each time a cylinder is overhauled or every 12,000-15,000 hours.
Distance from nozzle tip to running surface	MAN = 1.5 <sup>+0.5</sup> <sub>-0</sub> mm MHI = 2.5 <sup>+0.5</sup> <sub>-0</sub> mm Sulzer = 3 <sup>+0.5</sup> <sub>-0</sub> mm	Suitable intervals e.g. each time a cylinder is overhauled or once every 12,000-15,000 hours. Adjust the distance by means of conical shims (26).



The depth of the valve in the cylinder liner must be adjusted so that the tip of the nozzle is placed  $X$  mm behind the running surface of the cylinder liner. See the table on the previous page for the actual values.

This is done by mounting the HJ SIP valve, measuring the distance from the running surface to the nozzle tip, then equipping the nozzle with the necessary number of conical shims (20) until the distance between the running surface of the cylinder liner and the nozzle tip is  $X$  mm.

The conical shims (20) are delivered in five dimensions: 0.5, 1, 1.5, 2 and 5mm. No more than 5 shims per valve should be used.



**Mounting Tip:** Use grease when mounting the shims to prevent them to fall of the SIP valve.

**PLEASE NOTE:** No sealing material is used between the cylinder liner and the valve.

2.3.3 The HJ SIP valve is mounted in the cylinder liner with 2 pcs screws or stay bolts. They are tightened in the following two steps whereby the valve is secured and tight:



**PLEASE NOTE:** For valves with both M8 and M10 screws, the M8 screws must be tightened to 35 Nm before the M10 screws are tightened to 48 Nm.

M10 x 1.5	
Step 1:	Bolts tightened to 20Nm
Step 2:	Bolts tightened to 48Nm

M8 x 1.25	
Step 1:	Bolts tightened to 20Nm
Step 2:	Bolts tightened to 35Nm



- 2.3.1 As shown in the pictures below, the pressure pipe **(25)** is mounted at the union marked **“P”** (pressure). The return pipe **(26)** is mounted at the union marked **“T”** (tank).

At the first mounting of tubes, it is necessary that the cutting sleeves are pre-mounted on the tubes, using correct designed tools for this purpose. If such precaution is not taken there is a serious risk that the union may be damaged and that the joints will not be tight or chips from mounting will prevent correct function of the HJ SIP valve.

- 2.3.2 Make sure that the pressure pipes **(25)** are clean by flushing the tubes with clean oil.

