

**OPERATING INSTRUCTION
FILLING AND TESTING DEVICE**

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General

Translation

When supplying to countries in the EEA, the Operating Instructions must be translated into the language of the user country.

In the event of inconsistencies in the translated text, please consult the original operating instruction (German) or contact the manufacturer.

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1 Roth filling and testing device

Description:

The filling and testing device serves to check the N2 pressure and to fill Roth pressure equipment's / accumulator systems with N2.

The filling and testing device (1) consist of:

- 1.1 Filling hose connection (with non-return valve)
- 1.2 Accumulator connection
- 1.3 Pressure gauge
- 1.4 Pressure relief valve
- 1.5 Spindle to open / close the fill valve
- 2 Filling hose DN8 (length 1500 mm) / DN2 (length 3000 mm)
- 2.1 Roth N2 vessel adapter (FA1 ... FA8)
- 3 Roth filling valve adapter (A1 ... A4)

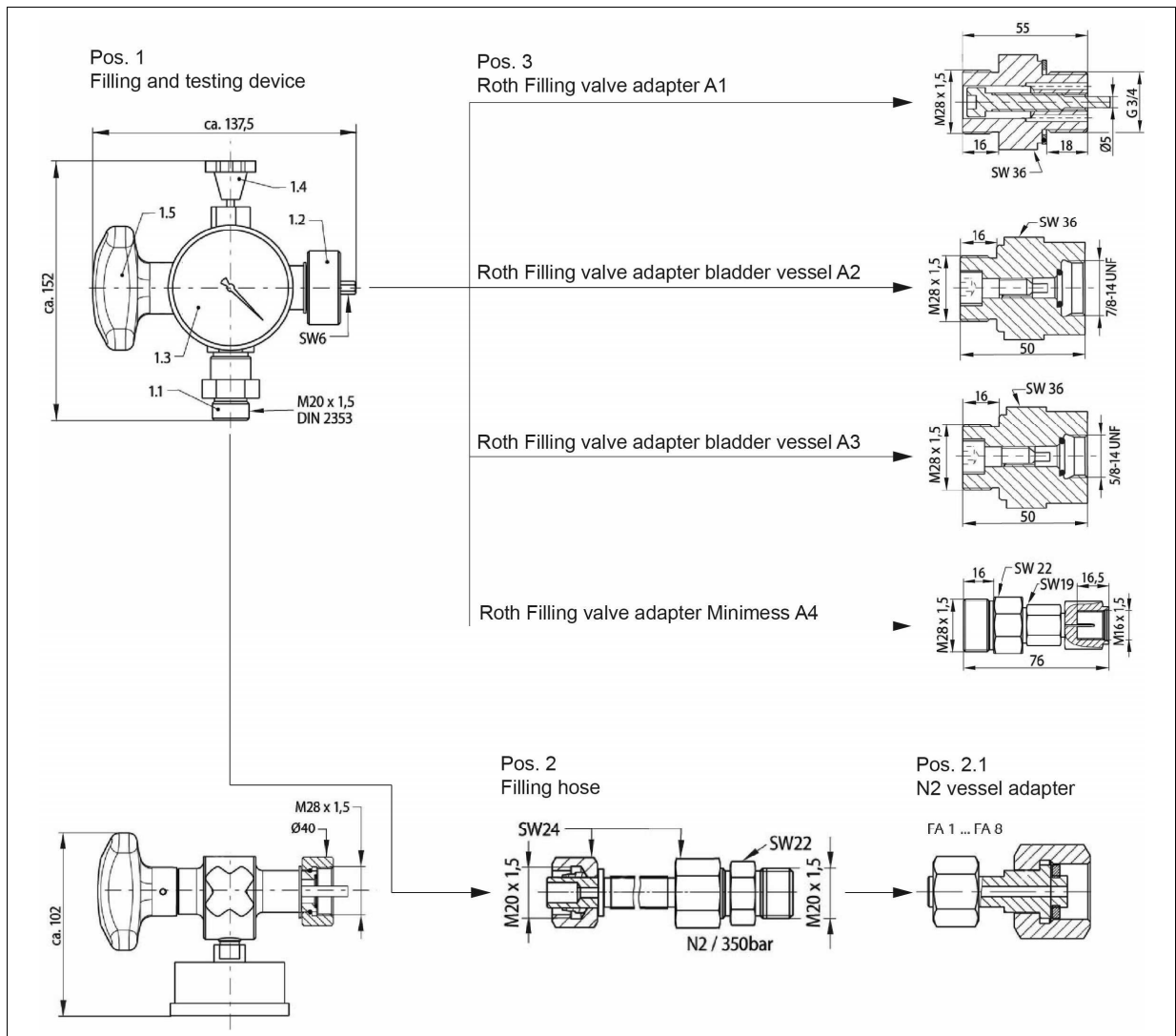




Figure 1-1 Roth filling and testing device

1.1 Filling process


The filling and testing device (see Fig. 1-1, Pos. 1) may only be operated by trained qualified staff in accordance with the work instruction below.

Please reference the flow diagram and list of equipment for filling.

Filling process preparations

Process step	with Roth filling valve adapters A1, A2, A3 (see Fig. 1-1, Pos. 3)	with Roth filling valve adapter Minimes A4 (see Fig. 1-1, Pos. 3)	without filling valve adapter
1.	Remove the sealing plug and seal of the filling valve on the pressure equipment.	Remove the sealing cap of the Minimes filling valve on the pressure equipment.	Remove the sealing plug and seal of the filling valve on the pressure equipment.
2.	Rotate the spindle of pressure relief valve (Fig. 1-1, Pos. 1.4) on the filling and testing device (Fig. 1-1, Pos. 1) clockwise up to the stop (closed).		
3.	 <p>Use the previously removed seal of the sealing plug for filling valve adapter A1, A2, A3 and screw the filling adapter into the threaded bore provided for the filling process.</p> <p><i>Make sure that the cylinder screw of filling valve adapter will not prematurely open the filling valve on the pressure equipment whilst screwing in. Screw the cylinder screw far enough out to prevent premature opening of the filling valve adapter.</i></p>	First connect the Minimes filling valve adapter A4 to the filling and testing device. The hexagonal rod will not be functional in this configuration.	-
4.	Now screw the filling and testing device connection on to the filling valve adapter A1, A2, A3. Make sure that the hexagonal rod of the filling and testing device locks into the cylinder screw of the filling valve adapter.	Now screw the Minimes filling valve adapter with the filling and testing device on to the Minimes filling valve of the pressure equipment. The Minimes filling valve will open automatically whilst screwing in.	Now screw the filling and testing device connection directly on to the filling valve of the pressure equipment to fill. Make sure that the hexagonal rod of the filling and testing device locks into the cylinder screw of the filling valve.
5.	Connect the corresponding filling hose connection (Fig. 1-1, Pos. 2) to the connection point of the filling and testing device.		
6.	 <p>Connect the other end of the filling hose (Fig. 1-1, Pos. 2) to the connection of the N2 vessel. You will need the corresponding N2 vessel adapter FA1 ... FA8 to do this (Fig. 1-1, Pos. 2.1).</p> <p><i>Check the filling hose (Fig. 1-1, Pos. 2) for damages every time before filling. Take appropriate safety precautions to prevent any danger should the hose rupture. You may, for instance, run a tensioned steel cable parallel to the filling hose, joined to the hose in several places. Please note that the max. filling hose service life of ca. 6 years should not be exceeded.</i></p>		
7.	Rotate the spindle (Fig. 1-1, Pos. 1.5) clockwise up to the stop to open the filling valve adapter. The pressure equipment can then be filled with N2 or the N2 pressure tested.	The pressure equipment can then be filled with N2 or the N2 pressure tested.	Turn the spindle (Fig. 1-1, Pos. 1.5) anticlockwise up to the stop to open the filling valve. The pressure equipment can then be filled with N2 or the N2 pressure tested.
If you only want to check the nitrogen pressure, you can skip points 5 and 6.			

Filling with N2

Process step	with Roth filling valve adapters A1, A2, A3 (see Fig. 1-1, Pos. 3)	with Roth filling valve adapter Minimess A4 (see Fig. 1-1, Pos. 3)	without filling valve adapter
8.	Keep the N2 cylinder valve open until the pressure gauge shows the required pre-filling pressure (P_0). With the filling valve open, P_0 may also be read off on the pressure equipment or accumulator systems gas side pressure gauge, if existing. To read P_0 , the N2 vessel adapter (Fig. 1-1, Pos. 2.1) must be closed from time to time.		
9.	Since P_0 is temperature dependent and the N2 temperature will change during filling, the final P_0 reading will need to wait until the N2 temperature has approached that of the environment. This requires a waiting period of ca. 15 min.		
10.	Reduce P_0 to the correct value via the pressure relief valve (Fig. 1-1, Pos. 1.4), should it be too high. The N2 vessel valve must be closed.		
	<i>If the pressure of the N2 vessel is higher than the maximum permissible pressure of the pressure equipment and the pressure equipment itself does not have a pressure protection device, it is necessary to connect a pressure limiter in between to protect the pressure equipment.</i>		

Completing the filling process

Process step	with Roth filling valve adapters A1, A2, A3 (see Fig. 1-1, Pos. 3)	with Roth filling valve adapter Minimess A4 (see Fig. 1-1, Pos. 3)	without filling valve adapter
11.	Close the N2 vessel adapter after filling is complete.		
12.	Turn the spindle (Fig. 1-1, Pos. 1.5) of the filling and testing device anticlockwise up to the stop. This closes the filling valve in the pressure equipment or the accumulator system.	Now unscrew the Minimess filling valve adapter with the filling and testing device from the Minimess filling valve of the pressure equipment. The Minimess filling valve will close automatically as it is unscrewed. <i>The residual pressure in the filling device and in the filling hose (Fig. 1-1, Pos. 2) will audibly escape via the Minimess filling valve adapter, since manual pressure relief via the pressure relief valve (Fig. 1-1, Pos. 1.4) is not possible here. Depending on the length of the filling hose, this procedure may take a while. Only loosen the screwed connection completely after full release of the pressure.</i>	Rotate the spindle (Fig. 1-1, Pos. 1.5) of the filling and testing device clockwise, to its stop. This closes the filling valve in the pressure equipment or the piston accumulator system.
13.	Open the pressure relief valve (Fig. 1-1, Pos. 1.4) to release the pressure in the filling and testing device.	-	Open the pressure relief valve (Fig. 1-1, Pos. 1.4) to release the pressure in the filling and testing device.
14.	You may now detach the filling and testing device and any filling valve adapter you may have used.		
15.	Retighten the sealing plug and seal (steps 1 and 2). (use only the original screw plug with pressure relief).		

Potential problems and solutions:

Should the pressure in the pressure equipment and the N2 vessel equalise before P_0 is reached, filling of the pressure equipment must terminate (inadequate pressure in the N2 vessel).

Changing the N2 vessel:

- Carry out steps 11 to 13. Unscrew the N2 vessel adapter (see Fig. 1-1, Pos. 2.1) from the filling hose (Fig. 1-1, Pos. 2.1) on the empty N2 cylinder and attach the filling hose to a full N2 vessel.
- You may now continue filling the pressure equipment from step 7 onwards, as described.

1.2 Pressure relief



Pressure relief of the oil side is to be carried out by the operator.

Pressure relief of the gas side

Process step	with Roth filling valve adapters A1, A2, A3 (see Fig. 1-1, Pos. 3)	with Roth filling valve adapter Minimes A4 (see Fig. 1-1, Pos. 3)	without filling valve adapter
1.	See steps 1 to 4, Chapter 1.1.		
2.	Slowly rotate the spindle (Fig. 1-1, Pos. 1.5) clockwise. The filling valve in the pressure equipment will open and N2 flows into the filling and testing device.	-	Slowly rotate the spindle (Fig. 1-1, Pos. 1.5) anticlockwise. The filling valve in the pressure equipment will open and N2 flows into the filling and testing device.
3.	Rotate the pressure relief valve (Fig. 1-1, Pos. 1.4) anticlockwise to release N2.		
4.	Make sure that the pressure equipment of the gas side is depressurised. The pressure gauge will in this case show 0 bar. Leave the pressure relief valve (Fig. 1-1, Pos. 1.4) in open position.		
5.	Repeat the procedure should the system still have over-pressure.		

Additional steps for accumulator systems

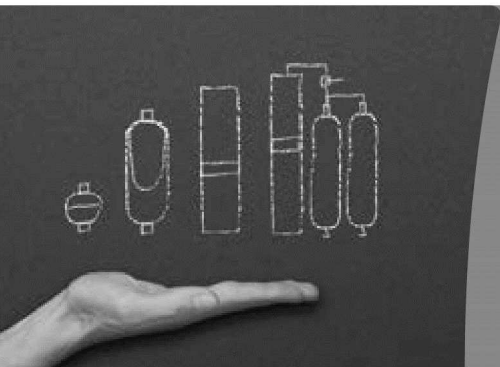
Pressure relief of the gas side (with N2 vessel)

- Close the N2 shut-off device between the connected N2 vessel and the pressure equipment.

Additional steps as described under Point 1.2.



The N2 vessel remain under pressure up to the N2 shut-off unit. Simply skip step 1 to depressurise the latter also.



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Roth
Hydraulics



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