Service Unit Type 3999-009X
for conditioning and control of compressed air

General

The reliability and efficiency of a pneumatic instrumentation and control system depends largely on the condition of the supply air. Supply air conditioning to meet the operational requirements is essential for the functional reliability of pneumatic components.

The Type 3999-009X Service Unit is used for the compressed air supply of pneumatic transmitters, controllers and valve positioners. The unit removes dirt, water and oil from the compressed air. At the same time, the air pressure is regulated to a constant output pressure.

The Type 3999-0096 Filter Regulator (see Data Sheet T 3999-8 EN) can be used for the compressed air supply of pneumatic volume boosters for large actuators.

Versions

Service unit with bracket
comprising coarse filter, pressure reducer, pressure gauge and submicro filter,
condensate drainage over float valves Order no. 3999-0090
condensate drainage over solenoid valves Order no. 3999-0093

Service unit on mounting plate
comprising manual spool valve, coarse filter, pressure reducer, pressure gauge, submicro filter and pressure switch,
condensate drainage over float valves Order no. 3999-0091
condensate drainage over solenoid valves Order no. 3999-0094

Service unit on mounting plate
comprising manual spool valve, coarse filter, pressure reducer, pressure gauge, submicro filter, differential pressure switch and pressure switch,
condensate drainage over float valves Order no. 3999-0092
condensate drainage over solenoid valves Order no. 3999-0095

Principle of operation

The compressed air flows across a manual spool valve ① and a coarse filter ② with a maximum input pressure p1 of 16 bar. The air is cleaned of coarse dirt particles larger than 8 µm as well as water and oil, while the pressure is reduced to a constant output pressure p2 of 0.5 to 10 bar by a pressure reducer ③. The output pressure p2 is indicated on a pressure gauge ④ and monitored by a pressure switch ⑤. The prefiltered air flows across a submicro filter ⑥, retaining dirt particles larger than 0.01µm. The function of the submicro filter ⑥ is monitored by a differential pressure switch ⑦.

The coarse filter ② and the submicro filter ⑥ are fitted with either float valves or solenoid valves. The float valves open automatically when a defined liquid level is reached. In the event of failure, the condensate receptacle can be drained manually by unscrewing the drain plug. The solenoid valves must be opened by an external control signal at regular intervals, depending on the degree of contamination of the compressed air.
### General data

<table>
<thead>
<tr>
<th>Attachment</th>
<th>Pipe or wall mounting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting position</td>
<td>Upright, condensate drainage downwards</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>+5 … +50°C</td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IP 54</td>
</tr>
<tr>
<td>Connection Input</td>
<td>G 3/8 female (for Types -0090/-0093),</td>
</tr>
<tr>
<td></td>
<td>G 3/8 male (for Types -0091/-0092/-0094/-0095)</td>
</tr>
<tr>
<td>Connection Output</td>
<td>G 3/8 female (for Types -0090/-0093),</td>
</tr>
<tr>
<td></td>
<td>Compression fitting for pipe ⊙ 12 mm (for Types -0091/-0092/-0094/-0095)</td>
</tr>
<tr>
<td>Weight, approx.</td>
<td>3.6 kg (for Types -0090/-0093),</td>
</tr>
<tr>
<td></td>
<td>5.8 kg (for Types -0091/-0094),</td>
</tr>
<tr>
<td></td>
<td>6.3 kg (for Types -0092/-0095)</td>
</tr>
</tbody>
</table>

### Bracket (Types -0090/-0093)

- Material: Steel, chromated

### Mounting plate (Types -0091/-0092/-0094/-0095)

- Material: Steel, powder-coated, gray-beige RAL 1019

### Manual spool valve (Types -0091/-0092/-0094/-0095)

- Nominal size: 3/8"x

### Filter unit

<table>
<thead>
<tr>
<th>Version</th>
<th>Coarse filter, submicro filter, pressure reducer with secondary venting, pressure gauge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material</td>
<td></td>
</tr>
<tr>
<td>Coarse filter cartridge</td>
<td>Sintered bronze</td>
</tr>
<tr>
<td>Submicro filter cartridge</td>
<td>Borosilicate glass</td>
</tr>
<tr>
<td>Condensate receptacle</td>
<td>Makrolon, clear, with chromated steel cage</td>
</tr>
<tr>
<td>Medium</td>
<td>Compressed air, free of corrosive particles</td>
</tr>
<tr>
<td>Input pressure p1</td>
<td>Max. 16 bar (max. 8 bar for solenoid valves with 24 V DC)</td>
</tr>
<tr>
<td>Output pressure p2</td>
<td>0.5 … 10 bar, adjustable</td>
</tr>
<tr>
<td>Flow rate</td>
<td>According to characteristic (see Fig.3)</td>
</tr>
<tr>
<td>Filter mesh</td>
<td></td>
</tr>
<tr>
<td>Coarse filter cartridge</td>
<td>8 µm particle size</td>
</tr>
<tr>
<td>Submicro filter cartridge</td>
<td>0.01 µm particle size</td>
</tr>
<tr>
<td>Receptacle volume</td>
<td>2 x 65 cm³ condensate</td>
</tr>
<tr>
<td>Condensate drainage</td>
<td>Automatic over float valves (for Types -0090/-0091/-0092),</td>
</tr>
<tr>
<td></td>
<td>Automatic over solenoid valves (for Types -0093/-0094/-0095)</td>
</tr>
</tbody>
</table>

### Differential pressure switch (Types -0092/-0095)

- Set point: 0.25 bar, set by manufacturer
- Version: Double-throw contact, floating
- Switching capacity: Max. 250 V AC, 5 A
- Connection: Connector according to EN 175301-801, form A

### Pressure switch (Types -0091/-0092/-0094/-0095)

- Set point: 0.5 … 6 bar, adjustable
- Version: Double-throw contact, floating
- Switching capacity: Max. 250 V AC, 5 A
- Connection: Connector according to EN 175301-801, form A

### Solenoid valves (Types -0093/-0094/-0095)

- Rated signal: 24 V DC (for p1 = max. 8 bar), AC rated signal (for p1 = max. 16 bar) on request
- Connection: Connector according to EN 175301-801, form A

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**Flow rate diagram**

Fig. 3 - Flow rate Q at a differential pressure of 0.5 bar between input pressure p1 and output pressure p2
Dimensions Types 3999-0090/-0093

Fig. 4 · Dimensions in mm

Designation | Order no.  
---|---  
① Manual spool valve G 3/8 | 0790-6697  
② Coarse filter | -  
③ Pressure reducer | -  
④ Pressure gauge | 0790-6967  
⑤ Submicro filter | -  
⑥ Differential pressure switch | 0790-6659  
⑦ Pressure switch | 3994-9001  
⑧ Mounting plate | 0790-6683

Dimensions Types 3999-0091/-0092/-0094/-0095

Designation | Order no.  
---|---  
⑨ Coarse filter cartridge 8 µm | 0790-6691  
⑩ Submicro filter cartridge 0.01 µm | 0790-6692  
⑾ Condensate receptacle | 0790-6693  
⑿ Diaphragm | 0790-6694  
⒀ Cable socket | 0790-6658  
⒁ Float valve G 1/8, according to EN 175301-803, form A | -  
⒂ Solenoid valve G 1/8 | 0790-6965  
⒃ Mounting plate | 0790-6966

Fig. 4 · Dimensions in mm
Installation instructions

Ambient conditions
The service unit may be installed only in rooms with an ambient temperature of +5 to +50°C. It should be installed preferably in the coolest location in the room so that no water can condense in the output pressure pipe.

Mounting position
The service unit must be installed in the output pressure pipe with the condensate drainage in the upright position facing downwards. It must be installed at the lowest point of the output pressure pipe so that condensate can flow always to the service unit.

Output pressure pipe
The output pressure piping must be adequately sized so that the pressure loss is negligible.

Operation
⚠️ The maximum permissible input pressure $p_1$ of 16 bar must not be exceeded!

Adjustment instructions
The following adjustment instructions apply to the versions with pressure switch and differential pressure switch:

Differential pressure switch
The differential pressure switch is adjusted by the manufacturer to a set point of 0.25 bar.

⚠️ This adjusted set point must not be changed!

Pressure switch
The set point of the pressure switch can be adjusted between 0.5 to 6 bar (see Fig. 5). The set point is adjusted using a screwdriver by turning the stem 1, after unscrewing the threaded pin 2. The set point is indicated on the scale 3. The stem 1 must be secured by retightening the threaded pin 2.

Maintenance instructions
The following maintenance must be performed at regular intervals, dependent on the degree of contamination of the compressed air (see Fig. 4):

Filter cartridges
Check coarse filter cartridge 1 and submicro filter 6 for contamination and replace when heavily contaminated. For the versions with differential pressure switch 2, contamination of the submicro filter cartridge 6 is monitored continuously and automatically registered as contamination causes the pressure to drop.

Condensate drainage
Check functioning of the automatic drainage of the flow valve 7 or the solenoid valves 8. In case of failure, the condensate receptacles 5 with float valves 7 can be drained manually by unscrewing the drain plugs. The condensate receptacles 5 must be resealed afterwards by retightening the drain plugs.

(Specifications subject to change without notice.)