# 3/2- and 4/2 directional poppet valves with solenoid operation

**Type M-.SED10...L1X**

Size 10  
Up to 350 bar  
Up to 40 L/min

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<td>06-07</td>
<td>- Solenoid coil can be rotated through 90°</td>
</tr>
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<td></td>
<td></td>
<td>- With concealed manual override, optional</td>
</tr>
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</table>
Function and configuration

·Type M-SED10 3/2 directional poppet valve
Directional valves of the type SED are direct operated directional poppet valves with solenoid actuation. They control the start, stop and direction of flow. The directional poppet valves consist of housing (1), the solenoid (2), the valve seat (7) and (11) and the control spool (4).

The manual override (6) allows for the switching of the valve without solenoid energization.

General principle (3/2 directional poppet valve):
The initial position of the valve (normally open "UK" or normally closed "CK") is determined by the arrangement of the spring (5). The chamber (3) behind the control spool (4) is connected to port P and sealed against port T. Thus, the valve is pressure-compensated in relation to the actuating forces (solenoid and spring).

By means of the control spool (4), the port P, A and T can be loaded with maximum operating pressure (350 bar) and the flow can be directed in both directions (see symbols).

In the initial position, the control spool (4) is pressed onto the seat (11) by the spring (5), in spool position, it is pressed onto the seat (7) by the solenoid (2). The flow is blocked.

·Type M-4SED10 4/2 directional poppet valve
With a sandwich plate, the Plus-1 plate, under the 3/2 directional poppet valves, the function of a 4/2 directional poppet valve is achieved.

1). Initial position:
The main valve is not actuated. The spring (5) holds the control spool (4) on the seat (11). Port P is blocked and A is connected to T. Apart from that, one control line is connected from A to the large area of the control spool (8), which is thus unloaded to the tank. The pressure applied via P now pushes the ball (9) onto the seat (10). Now, P is connected to B, and A to T.

2). Transition position:
When the main valve is actuated, the control spool (4) is shifted against the spring (5) and pressed onto the seat (7). During this, port T is blocked, P, A, and B are briefly connected to each other.

3). Spool position:
P is connected to A. As the pump pressure acts via A on the large area of the control spool (8), the ball (9) is pressed onto the seat (12). Thus, B is connected to T, and P to A. The ball (9) in the Plus-1 plate has a "positive spool overlap".

·Throttle insert:
The use of a throttle insert is required, if, due to the operating conditions, flows are to be expected during the switching procedure, which are higher than the started maximum performance limits of the valve.
The throttle is inserted into port P of the valve.

·Cartridge check valve:
The cartridge check valve allows free flow from P to A and provides leak-free closed from A to P.
The cartridge check valve is inserted into port P of the valve.
### Spool symbols

**Type M-3SED10UK-L1X/..**

![Spool symbol](image1)

**Type M-3SED10CK-L1X/..**

![Spool symbol](image2)

**Type M-4SED10D-L1X/..**

![Spool symbol](image3)

**Type M-4SED10Y-L1X/..**

![Spool symbol](image4)

### Ordering code

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>Type code</td>
</tr>
<tr>
<td>SED</td>
<td>Subtype code</td>
</tr>
<tr>
<td>10</td>
<td>Size</td>
</tr>
<tr>
<td>L1X</td>
<td>Spool symbol</td>
</tr>
<tr>
<td>35</td>
<td>Operating pressure (bar)</td>
</tr>
<tr>
<td>C</td>
<td>Wet-pin solenoid with detachable coil</td>
</tr>
<tr>
<td>N</td>
<td>No code = NBR seals, V = FKM seals</td>
</tr>
</tbody>
</table>

3 service port = 3  
4 service port = 4  
Poppet valve  
Size 10 = 10  
Spool symbols  
Series L10 to L19 = L1X  
(L10 to L19: unchanged installation and connection dimensions)  
Operating pressure 350 bar = 35  
Wet-pin solenoid with detachable coil = C  
12VDC = G12  
24VDC = G24  
110VDC = G110  
205VDC = G205  
220VDC = G220  
Plug rectification 110V = W110R  
Plug rectification 220V = W220R  
With manual override = N

No code = Without cartridge check valve, without throttle insert  
P = With cartridge check valve  
B12 = Throttle Φ1.2 mm  
B15 = Throttle Φ1.5 mm  
B18 = Throttle Φ1.8 mm  
B20 = Throttle Φ2.0 mm  
B22 = Throttle Φ2.2 mm

K4 = Din4365 sockets without plug  
Z4 = Square plug  
Z5L = Square plug with lamps  
Z5 = Rectification plug (only suitable for W110R and W220R)  
**Note:** K4, Z4, Z5L is not suitable for W110R and W220R
## Technical data

<table>
<thead>
<tr>
<th>Installation position</th>
<th>Optional</th>
</tr>
</thead>
</table>
| Environment temperature °C | -30 to +50 (NBR seal)  
-20 to +50 (FKM seal) |
| Weight | Two tee Solenoidic directional valve Kg | 2.6 |
| | Two four-way Solenoidic directional valve Kg | 3.9 |
| Max operation pressure bar | 350 |
| Max flow L/min | 40 |
| Hydraulic fluid | Mineral oil suitable for NBR and FKM seal  
Phosphate ester for FKM seal |
| Fluid temperature range °C | -30 to +80 (NBR seal)  
-20 to +80 (FKM seal) |
| Viscosity range mm²/s | 2.8 to 500 |
| Degree of contamination | Maximum permissible degree of fluid contamination:  
Class 9. NAS 1638 or 20/18/15, ISO4406 |

## Electrical data

<table>
<thead>
<tr>
<th>Voltage type</th>
<th>DC</th>
<th>AC+ rectifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage version V</td>
<td>12, 24, 110, 205, 220</td>
<td>110,220 (only possible via Z5 rectifier)</td>
</tr>
<tr>
<td>Permissible voltage(deviation) %</td>
<td>+10 ~ -15</td>
<td></td>
</tr>
<tr>
<td>Input power W</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>Continuous power-on time</td>
<td>Continuous</td>
<td></td>
</tr>
</tbody>
</table>

### Switching time to ISO 6403

<table>
<thead>
<tr>
<th>Pressure bar</th>
<th>Flow L/min</th>
<th>DC solenoid On/ms (without oil tank pressure)</th>
<th>Off/ms</th>
<th>AC + rectifier On/ms (without oil tank pressure)</th>
<th>Off/ms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>UK</td>
<td>CK</td>
<td>D</td>
<td>Y</td>
</tr>
<tr>
<td>70</td>
<td>40</td>
<td>40</td>
<td>30</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>140</td>
<td>40</td>
<td>40</td>
<td>30</td>
<td>40</td>
<td>35</td>
</tr>
<tr>
<td>210</td>
<td>40</td>
<td>40</td>
<td>35</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>280</td>
<td>40</td>
<td>40</td>
<td>35</td>
<td>45</td>
<td>35</td>
</tr>
<tr>
<td>315</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>35</td>
<td>50</td>
</tr>
<tr>
<td>350</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>45</td>
<td>50</td>
</tr>
</tbody>
</table>

**Note:** The switching types relate to a flow of P to A and A to T.  
With reversed flows deviations are possible.

<table>
<thead>
<tr>
<th>Switching frequency</th>
<th>Cycles/h</th>
<th>to 15000</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP rating as per DIN 40050</td>
<td>IP65</td>
<td></td>
</tr>
<tr>
<td>Max coil temperature °C</td>
<td>+150</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** for electrical connection, protective wire (PE) shall be earthed as required.
**Characteristic curves**  
(Measured at $\theta_{oil}=40^\circ C \pm 5^\circ C$, using HLP46)

### 3/2 Directional Poppet Valve

**$\Delta p-qv$ Characteristic Curves**

- **1 M-3SED6** $^{\text{CK}}_{\text{UK}}\ldots$, P to A
- **2 M-3SED6** $^{\text{CK}}_{\text{UK}}\ldots$, P to A

![Graph](image-url)

### 4/2 Directional Poppet Valve

**$\Delta p-qv$ Characteristic Curves**

- **1 M-4SED6** $^{\text{D}}_{\text{UK}}\ldots$, P to B, A to T
- **2 M-4SED6** $^{\text{D}}_{\text{UK}}\ldots$, B to T, P to A

![Graph](image-url)

### Cartridge Check Valve

**$\Delta p-qv$ Characteristic Curves**

![Graph](image-url)

### Throttle Insert

**$\Delta p-qv$ Characteristic Curves**

- B12
- B15
- B18
- B20
- B22

![Graph](image-url)
Unit dimensions

- **M-3SED10** solenoid directional poppet valve

<table>
<thead>
<tr>
<th>Requirement for mounting surface</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install the base size</td>
</tr>
<tr>
<td>3×Φ10.5 max</td>
</tr>
<tr>
<td>4×M6/12</td>
</tr>
<tr>
<td>0.01/100mm</td>
</tr>
<tr>
<td>0.8</td>
</tr>
</tbody>
</table>

1. Solenoid
2. Manual override
3. Plug-in connector to DIN 43650 (rotatable 90°)
4. Space required to remove the Plug-in connector
5. O-rings 12×2 for ports A,B,TA,TB
   O-rings 14×2 for port P
6.1 Plug for M-4SED10D-L1X/
6.2 Plug for M-4SED10Y-L1X/
7. Name plate
8. Space required to remove the coil
9.1 Total length of M-4SED10D-L1X
9.2 Total length of M-4SED10Y-L1X
10. Plus-1 Plate
11. Securing nut tightening torque M_n = 4Nm
12. Port TB is a blind counterbore
13. Valve fixing screws
   Internal hexagon screw: M6×40 GB/T 70.1-10.9,
   tightening torque M_n = 15.5 Nm

**It must be ordered separately, if connection plate is needed.**

**Type:**
- G 66/01 (G 3/8), G 66/02 (M18×1.5)
- G 67/01 (G 1/2), G 67/02 (M22×1.5)
Unit dimensions

- M-4SED10 \( \frac{6}{4} \) -L1X/...solenoid directional poppet valve

1. Solenoid
2. Manual override
3. Plug-in connector to DIN 43650 (rotatable 90°)
4. Space required to remove the Plug-in connector
5. O-rings 12×2 for ports A,B,TA,TB
   O-rings 14×2 for port P
6.1 Plug for M-3SED10UK-L1X/
6.2 Plug for M-3SED10CK-L1X/
7. Name plate
8. Space required to remove the coil
9.1 Total length of M-3SED10UK-L1X/
9.2 Total length of M-3SED10CK-L1X/
10. Securing nut tightening torque Mₘₙ = 4Nm
11. Ports B and TB are a blind counterbore
12. Valve fixing screws
    Internal hexagon screw: M6×40 GB/T 70.1-10.9,
    tightening torque Mₘₙ = 15.5 Nm

It must be ordered separately, if connection plate is needed. Type:
G 66/01 (G 3/8), G 66/02 (M18×1.5)
G 67/01 (G 1/2), G 67/02 (M22×1.5)
Directional valve  | Type M-.SED10...L1X

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