Proportional pressure reducing valve of 3-way design

Model 3DREP and 3DREPE

Nominal size 6
Component series 2X
Maximum operating pressure 100 bar (1450 PSI)
Maximum flow 15 L/min (3.96 GPM)

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<td>10</td>
</tr>
</tbody>
</table>

Features

- Directly controlled proportional valves for the control of the pressure and direction of a flow
- Operated via proportional solenoids with central thread and removable coil
- For subplate mounting:
  - Porting pattern to DIN 24 340 part 2 Form A, ISO 4401 and CETOP-RP121H
  - Subplates to catalogue sheet RE 45 052 (separate order), see pages 8 to 10
- Hand override, optional
- Spring centred control spool
- Type 3DREPE with integrated control electronics, interface A1
- External control electronics for type 3DREP:
  - Analogue amplifier type VT-VSPA2-1-2X/… in Eurocard format (separate order), see page 5
  - Digital amplifier type VT-VSPD-1-2X/… in Eurocard format (separate order), see page 5
  - Electrical amplifier type VT 11118 of modular design (separate order), see page 5
Ordering details

### Standard types

<table>
<thead>
<tr>
<th>Type 3DREP</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3DREP 6 A-2X/16EG24K4/M</td>
<td>R900954474</td>
</tr>
<tr>
<td>3DREP 6 A-2X/25EG24K4/M</td>
<td>R900954417</td>
</tr>
<tr>
<td>3DREP 6 A-2X/45EG24K4/M</td>
<td>R900954418</td>
</tr>
<tr>
<td>3DREP 6 C-2X/16EG24K4/M</td>
<td>R900954419</td>
</tr>
<tr>
<td>3DREP 6 C-2X/25EG24K4/M</td>
<td>R900954420</td>
</tr>
<tr>
<td>3DREP 6 C-2X/45EG24K4/M</td>
<td>R900954421</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type 3DREPE</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3DREPE 6 A-2X/16EG24K31/A1M</td>
<td>R900954422</td>
</tr>
<tr>
<td>3DREPE 6 A-2X/25EG24K31/A1M</td>
<td>R900954423</td>
</tr>
<tr>
<td>3DREPE 6 A-2X/45EG24K31/A1M</td>
<td>R900954424</td>
</tr>
<tr>
<td>3DREPE 6 C-2X/16EG24K31/A1M</td>
<td>R900954425</td>
</tr>
<tr>
<td>3DREPE 6 C-2X/25EG24K31/A1M</td>
<td>R900954427</td>
</tr>
<tr>
<td>3DREPE 6 C-2X/45EG24K31/A1M</td>
<td>R900954428</td>
</tr>
</tbody>
</table>

Symbols

- **A**: For external control electronics
- **B**: With integrated control electronics
- **C**: Further details in clear text
- **E**: Nominal size 6
- **G24**: Symbols (simplified)
- **J**: Series 20 to 29 (20 to 29: unchanged installation and connection dimensions)
- **P**: Pressure stage 16 bar (232 PSI)
- **T**: Pressure stage 25 bar (362.6 PSI)
- **b**: Pressure stage 45 bar (652.7 PSI)

Further details in clear text

- **M**: Suitable for mineral oil (HL, HLP) to DIN 51 524
- **V**: For version “J” = sea water resistance only state “K31”
- **A1**: For version “J” = “N” instead of “N9”

### Symbols

- **Type 3DREP 6 A 2X/...E (detailed)**
- **Type 3DREP 6 B 2X/...E (detailed)**
- **Type 3DREP 6 C 2X/...E (detailed)**

Example of a valve with integrated control electronics

Type 3DREP 6 C 2X/...E (simplified)
Function, section

The 3-way pressure reducing valve type 3DREP 6.. is directly operated by proportional solenoids. They convert an electrical input signal into a proportional pressure output signal. The proportional solenoids are controllable wet pin DC solenoids with central thread and removable coil. The solenoids are controlled optionally via external control electronics (type 3DREP) or by integrated control electronics (type 3DREPE).

Design:
The valve mainly comprises of:
- Housing (1) with mounting surface
- Control spool (2) with pressure measuring spools (3 and 4)
- Solenoids (5 and 6) with central thread
- Optional integrated valve electronics (7).

Function:
- With the solenoids (5 and 6) de-energised the control spool (2) is held in its centre position by compression springs
- The control spool (2) is directly operated when one of the solenoids is energised.

E. g. by energising solenoid “a” (5).
→ The pressure measuring spool (3) and control spool (2) moves to the right in proportion to the electrical input signal.
→ The connection from P to B and A to T is via orifice form cross-sections with progressive flow characteristics.
- De-energising of the solenoid (5).
→ The control spool (2) is returned to its centre position by the compression springs.

In the middle position the connections A and B to T are open, therefore the pressure fluid can freely flow to tank.
An optional hand override (9 and 10), makes it possible to move the control spool (2) without energising the solenoid.

Attention!
Unintended use of the hand override can cause uncontrolled machine movement!

Type 3DREP 6..

Type 3DREPE 6..

Valve with 2 switching position
(types 3DREP..A.. or 3DREP..B..)
The function of this version of the valve is basically the same as that of the valve with 3 switching positions. The 2 position valves are however only fitted with either solenoid “a” (5) or solenoid “b” (6). A plug (8) is fitted in place of the second solenoid.

Note:
Draining of the tank line is to be prevented. Taking the installation conditions into account a back pressure valve is to be fitted (back pressure approx. 2 bar).
Technical data (for applications outside these parameters, please consult us!)

**General**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>3DREP</th>
<th>3DREPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve type</td>
<td>3DREP</td>
<td>3DREPE</td>
</tr>
<tr>
<td>Installation</td>
<td>Optional, preferably horizontal</td>
<td></td>
</tr>
<tr>
<td>Storage temperature range °C (°F)</td>
<td>–20 to + 80 (–4 to +176)</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature range °C (°F)</td>
<td>–20 to + 70 (–4 to +158)</td>
<td>–20 to + 50 (–4 to +122)</td>
</tr>
<tr>
<td>Weight kg (lb)</td>
<td>2.0 (4.4)</td>
<td>2.2 (4.84)</td>
</tr>
</tbody>
</table>

**Hydraulic**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>3DREP</th>
<th>3DREPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating pressure range bar (PSI)</td>
<td>20 to 100 (290 to 1450) for pressure stage 16</td>
<td>30 to 100 (435 to 1450) for pressure stage 25</td>
</tr>
<tr>
<td>Port T bar (PSI)</td>
<td>50 to 100 (725 to 1450) for pressure stage 45</td>
<td>0 to 30 (0 to 435)</td>
</tr>
<tr>
<td>Max. flow L/min (GPM)</td>
<td>15 (4.0)</td>
<td>15 (4.0)</td>
</tr>
<tr>
<td>Pressure fluid</td>
<td>Mineral oil (HL, HLP) to DIN 51 524</td>
<td>Further fluids on request!</td>
</tr>
<tr>
<td>Pressure fluid temperature range °C (°F)</td>
<td>–20 to +80 (–4 to +176) preferably +40 to +50 (+104 to +122)</td>
<td></td>
</tr>
<tr>
<td>Viscosity range mm²/s (SUS)</td>
<td>20 to 380 (97 to 1760) preferably 30 to 46 (141 to 215)</td>
<td></td>
</tr>
<tr>
<td>Cleanliness class to ISO code</td>
<td>Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 class 17/15/12</td>
<td></td>
</tr>
<tr>
<td>Hysteresis %</td>
<td>≤ 5</td>
<td></td>
</tr>
<tr>
<td>Repeatability accuracy %</td>
<td>≤ 1</td>
<td></td>
</tr>
<tr>
<td>Response sensitivity %</td>
<td>≤ 0.5</td>
<td></td>
</tr>
<tr>
<td>Reversal span %</td>
<td>≤ 1</td>
<td></td>
</tr>
</tbody>
</table>

**Electrical, solenoid**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>3DREP</th>
<th>3DREPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve type</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>Signal type</td>
<td>Analogue</td>
<td></td>
</tr>
<tr>
<td>Command value signal Voltage input „A1“ V</td>
<td>–</td>
<td>± 10</td>
</tr>
<tr>
<td>Max. current per solenoid A</td>
<td>1.5</td>
<td>2.5</td>
</tr>
<tr>
<td>Solenoid coil resistance Cold value at 20 °C Ω</td>
<td>4.8</td>
<td>2</td>
</tr>
<tr>
<td>Max. warm value Ω</td>
<td>7.2</td>
<td>3</td>
</tr>
<tr>
<td>Duty %</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Coil temperature °C (°F)</td>
<td>Up to 150 (302)</td>
<td></td>
</tr>
<tr>
<td>Electrical connections 3DREP</td>
<td>With component plug to DIN EN 175 301-803</td>
<td>Plug-in connector to DIN EN 175 301-803</td>
</tr>
<tr>
<td>3DREPE</td>
<td>With component plug to E DIN 43 563-AM6-3</td>
<td>Plug-in connector E DIN 43 563-BF6-3/Pg11</td>
</tr>
<tr>
<td>Protection to DIN EN 60 529/VDE 0470 part 1</td>
<td>IP65 with mounted and fixed plug-in connector</td>
<td></td>
</tr>
</tbody>
</table>

1) The cleanliness class stated for the components must be adhered to in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.
For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50 081.

2) Separate order, see page 5
Technical data (for applications outside these parameters, please consult us!)

**Electrical, control electronics**

<table>
<thead>
<tr>
<th>Integrated, control electronics for type 3DREPE</th>
<th>Integrated into the valve, see page 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>Nominal voltage VDC</td>
</tr>
<tr>
<td>Lower limiting value V</td>
<td>19</td>
</tr>
<tr>
<td>Upper limiting value V</td>
<td>35</td>
</tr>
<tr>
<td>Amplifier</td>
<td>$I_{\text{max}}$ A</td>
</tr>
<tr>
<td>current consumption</td>
<td>Impulse current A</td>
</tr>
</tbody>
</table>

**External, control electronics for type 3DREP**

- Analogue amplifier – With 1 ramp time
  - In Eurocard format ¹) VT-VSPA2-50-1X/T1, to catalogue sheet RE 30 113
- Digitale amplifier in Eurocard format ¹)
  - VT-VSPA2-50-1X/T5, to catalogue sheet RE 30 113
- Amplifier of modular design ¹)
  - VT 11118-1X/..., to catalogue sheet RE 30 218

¹) Separate order

**Note:** For details regarding the environmental simulation test covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29 184-U (declaration regarding environmental compatibility).

**Electrical connections, plug-in connectors** (dimensions in mm)

For **type 3DREP** (for external control electronics - not for version "J" = sea water resistant)

**Connections at component plug**

**Connections at plug-in connector**

Plug-in connector to DIN EN 175 301-803
Solenoid a, colour grey
Separate order under Material No. R900074683
Solenoid b, colour black
Separate order under Material No. R900074684

For **type 3DREPE** (with integrated control electronics and for version "J" = sea water resistant)

Plug-in connector to DIN EN 175 201-804
Separate order under Material No. R900021267 (plastic version)
For pin allocations see block circuit diagram on page 6
**Integrated control electronics for type 3DREPE**

<table>
<thead>
<tr>
<th>Plug allocation, component plug</th>
<th>Slot</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>Supply voltage</td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>24 VDC (19 to 35 VDC)</td>
</tr>
<tr>
<td></td>
<td>C</td>
<td>GND</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td>n.c.</td>
</tr>
<tr>
<td></td>
<td>E</td>
<td>Differential input</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>ref. potential</td>
</tr>
</tbody>
</table>

**Command value:**
A positive command value (or 12 to 20 mA) at D and the reference potential at E results in pressure in A.
A negative command value (or 12 to 4 mA) at D and the reference potential at E results in pressure in B.

For a valve with one solenoid on side b (version A), a positive command value at D (4 to 20 mA) and the reference potential at E, results in pressure in A and for a valve with one solenoid on side a (version B) a positive command value at D (4 to 20 mA) and the reference potential at E, results in pressure in B.

**Connection cable:**
Recommended:
- Up to 25 m cable length type LiYCY 5 x 0.75 mm²
- Up to 50 m cable length type LiYCY 5 x 1.0 mm²

Outside diameter 6.5 to 11 mm
Only attach the screen to PE on the supply line.

**Block circuit diagram / connection allocation for the integrated electronics**

1. Protective conductor screwed onto housing and cover
2. Ramp from 0 to 5 s can be externally adjusted ($T_{up}$, $T_{down}$)

1) Output stages are current controlled
**Characteristic curves** - measured with HLP-46, $\theta_{\text{oil}} = 40^\circ\text{C} \pm 5^\circ\text{C}$ (104°F ±41°F) and $p = 100$ bar (1450 PSI)

Pressure stages 16, 25 and 45 bar (230, 360 and 650 PSI)

Pressure differential in bar $\rightarrow$

Flow in L/min $\rightarrow$

Pressure-flow relationship

A(B) $\rightarrow$ T  Flow in L/min $\rightarrow$  P $\rightarrow$ A(B)
1 Valve housing  
2 Name plate  
3 Proportional solenoid “a”  
4 Proportional solenoid “b”  
5 Plug-in connector “A”, colour grey  
6 Plug-in connector “B”, colour black  
7 Identical seal rings for ports A, B, P and T  
8 Protected hand override “N9”  
9 Cover for valves with one solenoid (versions “A” or “B”)  
10 Space required to remove the plug-in connector  
11 Machined valve mounting face and position of the ports

Subplates:  
G 341/01, G 1/4 (SAE-4; 7/16-20)  
G 342/01, G 3/8 (SAE-6; 9/16-18)  
G 502/01, G 1/2 (SAE-8; 3/4-16)

Valve fixing screws:  
4 socket head cap screws M5 x 50 DIN 912 10.9  
(10-24 UNC x 2")  
Tightening torque $M_t = 8.9$ Nm (6.56 lb-ft)

Required surface finish of the mating piece:

$R_{ma,4}$

0.01/100 mm  
0.0004/0.0 in.
Unit dimensions: type 3DREP...J – sea water resistant (dimensions in mm)

1. Valve housing
2. Name plate
3. Proportional solenoid “a”
4. Proportional solenoid “b”
5. Plug-in connector
   (separate order, see page 5)
6. Identical seal rings for ports A, B, P and T
7. Protected hand override "N"
8. Cover for valves with one solenoid (versions “A” or “B”)
9. Space required to remove the plug-in connector
10. Machined valve mounting face and position of the ports

Subplates: G 341/01, G 1/4 (SAE-4; 7/16-20)
         G 342/01, G 3/8 (SAE-6; 9/16-18)
         G 502/01, G 1/2 (SAE-8; 3/4-16)

Valve fixing screws:
4 socket head cap screws M5 x 50 DIN 912 10.9
(10-24 UNC x 2")
Tightening torque $M_\text{T} = 8.9 \text{Nm (6.56 lb-ft)}$
Unit dimensions: types 3DREPE and 3DREPE ... J – sea water resistant (dimensions in mm)

Subplates: G 341/01, G 1/4 (SAE-4; 7/16-20)
G 342/01, G 3/8 (SAE-6; 9/16-18)
G 502/01, G 1/2 (SAE-8; 3/4-16)

Valve fixing screws:
4 socket head cap screws M5 x 50 DIN 912 10.9
(10-24 UNC × 2")
Tightening torque $M_t = 8.9 \text{ Nm (6.56 lb-ft)}$

1 Valve housing
2 Name plate
3 Proportional solenoid “a”
4 Proportional solenoid “b”
5 Plug-in connector
(separate order, see page 5)
7 Identical seal rings for ports A, B, P and T
8.1 Protected hand override “N9”
8.2 Hand override “N” for sea water resistant version “J”
Cover for valves with one solenoid
(versions “A” or “B”)
10 Space required to remove the plug-in connector
11 Machined valve mounting face and position of the ports
12 Integrated control electronics
13 Dim. ( ) for sea water resistant version “J”

Required surface finish of the mating piece

0.01/100 mm
0.0004/4.0 in.

Rmax4

(3.96)

(11.62)

(2.26)

(41.34 [49.80])

(79.27 [78.99])

(112.5 [292])

(19.02)

(10.70)

(8.19)

(3.57)

(0.20)

(0.01/100 mm)

(12.42)

(6.08 [15.37])

(8.00 [19.81])

(0.75 [0.03])

(2.91)

(3.96)

(10.70)

(8.39)

(10.70)

(8.5)

(18.23)

(20.87)

(59.97 [77.14])

(227 [292])

(156.5 [188.5])

(41.34 [49.80])

(266 [299])

(47 (12.42))

(4.0 in.)

(12.42)

(2.26)

(41.34 [49.80])

(79.27 [78.99])

(112.5 [292])

(19.02)

(10.70)

(8.19)

(3.57)

(0.20)

(2.91)

(3.96)

(10.70)

(8.39)

(10.70)

(8.5)

(18.23)

(20.87)

(59.97 [77.14])

(227 [292])

(156.5 [188.5])

(41.34 [49.80])

(266 [299])

(47 (12.42))

(4.0 in.)

(12.42)

(2.26)

(41.34 [49.80])

(79.27 [78.99])

(112.5 [292])

(19.02)

(10.70)

(8.19)

(3.57)

(0.20)

(2.91)

(3.96)

(10.70)

(8.39)

(10.70)

(8.5)

(18.23)

(20.87)

(59.97 [77.14])

(227 [292])

(156.5 [188.5])

(41.34 [49.80])

(266 [299])

(47 (12.42))

(4.0 in.)

(12.42)

(2.26)

(41.34 [49.80])

(79.27 [78.99])

(112.5 [292])

(19.02)

(10.70)

(8.19)

(3.57)

(0.20)

(2.91)

(3.96)
## Throttle insert

When used with a proportional directional valve type 4WRZ…, then the following throttle inserts are to be used for ports A and B:

<table>
<thead>
<tr>
<th>NS</th>
<th>10</th>
<th>16</th>
<th>25</th>
<th>32</th>
<th>52</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ø in mm</td>
<td>1.8</td>
<td>2.0</td>
<td>2.8</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Material No.</td>
<td>00158510</td>
<td>00158547</td>
<td>00157948</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
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