FAQ Title: 3DREP 6 series 1X replacement

Category: Proportional and Servo Valves
Sub-Category: Obsolete valve replacement

Question:
How do I replace the former 3DREP 6 series 1X valves?

Answer:
The now obsolete 3DREP 6 series 1X valves can be replaced with the current series 2X, with the corresponding amplifier changes (or other options may be applicable – see attached comparison doc.)

**However, often the 3DREP6-1X valves are pilot valves on 4WRZ series 3X through 6X. If this is the case, the complete 4WRZ should be replaced with the current series 7X valve. Amplifier changes or other options can also be found on the comparison document. Pertinent data sheets are also listed. The nameplate for the complete 4WRZ valve is found on the main stage.

Attachments:
4WRZ 5X, 6X vs 7X Comparison
4WRZ, 3DREP -674
3DREP 2X -674
RE29115
RE29184
4WRZ
Differences between Series 5X, 6X and 7X

• Series 5X, 6X used rectangular DC proportional solenoids
  o 700mA maximum current required
• Series 7X uses DC proportional solenoids with pole tube and removable coils
  o 1500mA maximum current required

• Control Amplifiers:
  o Series 5X, 6X typically used VT-3000 (RE29935) or VT-3006 (RE29926)
  o Card Holder VT-3002-2X/32D (RE29928)
  o Series 7X uses VT-VSPA2-1-2X/T1 or T5 (RE30110)
  o Card Holder VT-3002-2X/48F (RE29928)
  o Or, modular amplifier VT11118-1X (RE30218)

• Replacement option series 7X available with on-board electronics – 4WRZE
  o No external amplifier needed
  o Input options:
    • A1 = +/- 10volt
    • F1 = 4-20mA

• Series 7X available with -674 replacement option
  o 4WRZ…7X…-674 allows use of existing amplifier for 5X, 6X
  o Not a direct replacement – valve opening is at 43% command vs 32% on the 5X, 6X
  o 750mA needed to achieve maximum shift vs 700 mA in the 5X, 6X
  o Command value adjustment may compensate for differences
• “W” spool designations change from 5X, 6X to 7X
  o 5X, 6X
     W (1:1 SPOOL) W6
     W1 (2:1 SPOOL) W8
     W2 (1:2 SPOOL) not available in 7X
     W3 (regen) W9

• Nominal flow ratings of spools to be considered when replacing with 7X:
  o Command values may need to be adjusted

**Nominal flow of series 5X / 6X:**
5X - NG 10 SO 118 = 25 l/min
5X - NG 10: 25 = 40 l/min
5X - NG 10: 50 = 75 l/min
6X - NG 16: 100 = 130 l/min

**Replacement control spool in series 7X:**
25 = 25 l/min
50 = 50 l/min
85 = 85 l/min
150 = 150 l/min
Alternative to the replacement of the old 4WRZ 5X/6X and 3DREP 6 -1X valve series could be the special version SO 674

- This SO674 version still isn’t a direct 1:1 replacement, however:
  - SO674: valve type with 750mA coil (detachable)
  - The previous electronics can be continued to be used (e.g. VT 3000; VT 3006 – max. current of up to 800mA possible). If the client has his own electronics system, it must be ensured that a maximum power of at least 750 mA can be driven in order that the main stage of the 4WRZ can be opened completely or the nominal pressure be reached with the 3DREP.

- 4WRZ...-7X/... SO 674 has a later opening point than the old series 5X /6X:
  - 4WRZ 5X/6X: Opening at approx. 32% command value (225mA)
  - 4WRZ...-7X/...SO 674: Opening at approx. 43% command value (310mA)
  - 3DREP 6...-2X/... SO 674 only reaches the nominal pressure at 750mA and not at an electric current of 700mA.

- This means that an adjustment of the command value may also be necessary. Through increasing the biasing current on the amplifier, it is possible that the later opening point of the 4WRZ valve (SO674) can be largely compensated for.
Example: comparison of flow rate and opening point for size 10
Characteristic curve comparison, 3DREP6 -2X SO 674 and series 1X:

3DREP6...-2X SO 674 vs. 3DREP6...-1X SO 674...
4/2, 4/3 and 5/2, 5/3 proportional directional valves, pilot operated, without electrical position feedback

Types .WRZ..., .WRZE... and .WRH...

Sizes 10 to 52
Component series 7X
Maximum operating pressure 350 bar
Maximum flow 2800 l/min

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</table>

Features

- Pilot operated 2-stage proportional directional valves with integrated electronics (OBE) on type 4WRZE
- Control the direction and magnitude of a flow
- Operation by proportional solenoids with central thread and detachable coil
- For subplate mounting:
  Porting pattern to ISO 4401
  Subplates according to data sheets RE 45054 to RE 45060 (separate order), see pages 16 to 21
- Manual override, optional
- Spring-centred control spool
- Control electronics
  - .WRZE...
    - integrated electronics (OBE) with voltage input or current input (A1 resp. F1)
  - .WRZ..., (separate order)
    - digital or analogue amplifier in Eurocard format
    - analogue module amplifier
Ordering code for 4WRZ and 4WRH; sizes 10 to 32, subplate mounting; size 52, flange connection

Hydraulic operation = H
Electro-hydraulic operation = Z

For WRZ only:
For external electronics = No code
With integrated electronics = E

Size 10 = 10
Size 16 = 16
Size 25 = 25
Size 32 = 32
Size 52 = 52

Symbols

With symbols E1- and W8-:
P to A: \(q_v \max\)
P to B: \(q_v / 2\)
A to T: \(q_v \max\)

With symbols E3- and W9-:
P to A: \(q_v \max\)
P to B: \(q_v / 2\)
A to T: \(q_v \max\)
(Regenerative circuit, base of spool at port A)

Note: With spools W6-, W8-, W9-, W6A in spool position "0", there is a connection from A to T and B to T with less than 2% of the relevant nominal cross-section.

1) Not for 4WRH and 4WRZ without pilot valve
2) For version "J" instead of "N9"
3) For details on seawater-resistant version, see RE 29115-M
4) For version "J" = seawater-resistant, "K31" only
5) Suitable for mineral oils (HL, HLP) to DIN 51524
6) not for 4WRH

Further details in clear text

M \(^1\) = NBR seals
V \(^1\) = FKM seals

No code = Without pressure reducing valve
D3 \(^1\) = With pressure reducing valve
ZDR 6 DP0-4X/40YM-W80 (fixed setting)

Electronic interface
A1 or F1 with 4WRZE
for 4WRZE:
A1 = Command value input ± 10 V
F1 = Command value input 4 to 20 mA
No code = for WRZ and WRH

Electrical connection
for WRZ:
K4 \(^{1, 4}\) = Without cable socket
with component plug to DIN EN 175301-803
Cable socket – separate order, see page 10
for WRZE:
K31 \(^{1, 4}\) = Without cable socket
with component plug to DIN EN 175201-804
Cable socket – separate order see page 10

Pilot oil supply and drain
No code = External pilot oil supply,
external pilot oil drain
E = Internal pilot oil supply,
external pilot oil drain
ET = Internal pilot oil supply,
internal pilot oil drain
T = External pilot oil supply,
internal pilot oil drain
(for size 52 and type 4WRH, only "no code" possible)
No code = Without special type of protection
J \(^3\) = Seawater-resistant

NO code = Without manual override
N9 \(^{1, 2}\) = With concealed manual override

Supply voltage of electronics
G24 \(^1\) = 24V DC (standard version)
6E \(^1\) = Pilot valve size 6, proportional solenoid with detachable coil

No code = For subplate mounting
F = For flange connection (size 52 only)

Nominal flow in l/min at valve pressure differential \(\Delta p = 10\) bar
25 =
- 50 = 85 = for size 10
- 100 = 150 = for size 16
- 220 = 325 = for size 25
- 360 = 520 = for size 32
- 1000 = for size 52

Special electrical protection on enquiry!
Ordering code for 5WRZ 52 and 5WRH 52; subplate mounting

<table>
<thead>
<tr>
<th>5WR_</th>
<th>52</th>
<th>1000</th>
<th>7X</th>
<th>*</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E1-</td>
<td></td>
</tr>
<tr>
<td>E3-</td>
<td></td>
</tr>
<tr>
<td>W6-</td>
<td></td>
</tr>
<tr>
<td>W8-</td>
<td></td>
</tr>
<tr>
<td>W9-</td>
<td></td>
</tr>
<tr>
<td>EA</td>
<td></td>
</tr>
<tr>
<td>W6A</td>
<td></td>
</tr>
</tbody>
</table>

With symbols E1- and W8-:
- P to A: \( q_v = 1000 \text{ l/min} \)
- P to B: \( q_v = 500 \text{ l/min} \)
- With symbols E3- and W9-:
  - P to A: \( q_v = 1000 \text{ l/min} \)
  - P to B: \( q_v = 500 \text{ l/min} \)
  - (Regenerative circuit, spool base at port A)

**Note:**
- Pilot oil supply and drain only possible externally.
- With spools W6-, W8-, W9-, W6A in their spool position "0", there is a connection from A to T and B to T with less than 2% of the relevant nominal cross-section.

1) Not for 5WRH and 5WRZ without pilot valve
2) For version "J"→"N" instead of "N9"
3) For details on the seawater-resistant version, see RE 29115-M
4) With version "J" = seawater-resistant, "K31" only
5) Suitable for mineral oils (HL, HLP) to DIN 51524
6) not for 5WRH

Special electrical protection on enquiry!
Symbols (simplified)

With electrohydraulic operation and for external electronics

Type 4WRZ…-7X./… and
Type 4WRZ 52…-7XF/…

X = external
Y = external

Type 5WRZ 52-7X./…

X = external
Y = external

Type 4WRZ…-7X./…ET…

X = internal
Y = internal

With electrohydraulic operation and for integrated electronics

Type 4WRZE…-7X./… and
Type 4WRZE 52…-7XF/…

X = external
Y = external

Type 5WRZE 52-7X./…

X = external
Y = external

Type 4WRZE…-7X./…ET…

X = internal
Y = internal

With hydraulic operation

Type 4WRH…-7X./… and
Type 4WRH 52…-7XF/…

X = external
Y = external

Type 5WRH 52-7X.

X = external
Y = external

With hydraulic operation and for integrated electronics

Type 4WRH…-7X./… and
Type 4WRH 52…-7XF/…

X = external
Y = external

Type 5WRH 52 A…-7XF/…

X = external
Y = external

With hydraulic operation

Type 4WRH…-7X./… and
Type 4WRH 52…-7XF/…

X = external
Y = external

Type 5WRH 52 A…-7XF/…

X = external
Y = external
Function, section

Pilot valve type 3DREP 6…
The pilot valve is a proportional solenoid operated 3-way pressure reducing valve. It is used to convert an electrical input signal into a proportional pressure output signal and is used on all 4WRZ… and 5WRZ… valves.

The proportional solenoids are controllable DC wet pin solenoids with central thread and detachable coil. The solenoid is optionally controlled by external electronics (type .WRZ…) or integrated electronics (type .WRZE…).

Design:
The valve basically consists of:
- Housing (1)
- Control spool (2) with pressure measuring spools (3 and 4)
- Solenoids (5 and 6) with central thread
- Optionally with integrated electronics (7)

Function:
- When the solenoids (5 and 6) are in the de-energised condition, the control spool (2) is held by compression springs (8) in the central position
- Direct operation of the control spool (2) by energising a proportional solenoid, e.g. energisation of solenoid “a” (5)
  → Pressure measuring spool (3) and control spool (2) are shifted to the left in proportion to the electrical input signal
  → Connection from P to B and A to T via orifice-like cross-sections with progressive flow characteristics
- De-energisation of the solenoid (5)
  → Control spool (2) is returned to the central position by the compression spring (8)

In the central position, ports A and B are open to T, i.e. the hydraulic fluid can flow to the tank without any restrictions.

Type 3DREP 6…

Throttle insert see page 24

Type 3DREPE 6…

Pilot valve with two spool positions
(Type 3DREP 6…B…)

In principle, the function of this valve version corresponds to that of the valve with three spool positions. However, this 2-position valve is provided with solenoid “a” (5) only.

Instead of the 2nd proportional solenoid, a plug screw (9) is fitted.

Note on type 3DREP 6:
Draining of the tank line must be prevented. In the case of a corresponding installation situation, a pre-load valve is to be installed (pre-load pressure approx. 2 bar).
Function, section

Pilot operated proportional directional valves types 4WRZ… and 5WRZ.52…

Valves of type 4WRZ… are pilot operated 4-way directional valves with operation by proportional solenoids. They control the direction and magnitude of a flow.

Valves of type 5WRZ… are valves with an additional port “R” (size 52 only).

Design:
The valves basically consist of:
- A pilot valve (9) with proportional solenoids (5 and 6)
- A main valve (10) with main spool (11) and centring spring (12)

Function:
- When the solenoids (5 and 6) are de-energised, the main spool (11) is held by centring springs (12) in the central position
- Operation of the main spool (11) via the pilot valve (9) – the main spool is moved proportionally, e.g. by energising solenoid “b” (6)
- The control spool (2) is shifted to the right, pilot oil is fed via the pilot valve (9) into the pressure chamber (13) and moves the main spool (11) in proportion to the electrical input signal

External pilot operated proportional directional valves, types 4WRH… and 5WRH.52…

Valves of type 4WRH… are pilot operated proportional directional valves for the external operation by means of pressure control valves.

Design:
The valves basically consist of:
- A main valve (10) with main spool (11) and centring spring (12)
- An interconnecting plate (16)

Function:
- Interconnecting plate (16) connects pilot port A with port T(Y) and pilot port B with P(X)

The pilot pressure in the main valve must not exceed 25 bar (16 bar for size 52)
### Technical data (for applications outside these parameters, please consult us!)

#### General

<table>
<thead>
<tr>
<th>Valve type</th>
<th>.WRZ</th>
<th>.WRZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation orientation</td>
<td>Optional, preferably horizontal (commissioning notes according to RE 07800)</td>
<td></td>
</tr>
<tr>
<td>Storage temperature range °C</td>
<td>– 20 to + 80 °C</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature range °C</td>
<td>– 20 to + 70</td>
<td>– 20 to + 50</td>
</tr>
<tr>
<td>Weight – Subplate mounting</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size 10 kg</td>
<td>7.8</td>
<td>8.0</td>
</tr>
<tr>
<td>Size 16 kg</td>
<td>13.4</td>
<td>13.6</td>
</tr>
<tr>
<td>Size 25 kg</td>
<td>18.2</td>
<td>18.4</td>
</tr>
<tr>
<td>Size 32 kg</td>
<td>42.2</td>
<td>42.2</td>
</tr>
<tr>
<td>Size 52 kg</td>
<td>79.5</td>
<td>79.7</td>
</tr>
<tr>
<td>– Flange connection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size 52 kg</td>
<td>77.5</td>
<td>77.7</td>
</tr>
</tbody>
</table>

#### Hydraulic (measured with HLP46, $t_{oil} = 40 \, ^\circ C \pm 5 \, ^\circ C$ and $p = 100$ bar)

<table>
<thead>
<tr>
<th>Size</th>
<th>10</th>
<th>16</th>
<th>25</th>
<th>32</th>
<th>52</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pilot valve</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External pilot oil supply</td>
<td>bar</td>
<td>30 to 100</td>
<td>20 to 100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internal pilot oil supply</td>
<td>bar</td>
<td>100 to 315 with &quot;D3&quot; only</td>
<td>100 to 350 with &quot;D3&quot; only</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main valve</td>
<td>bar</td>
<td>up to 315</td>
<td>up to 350</td>
<td>up to 350</td>
<td>up to 350</td>
</tr>
<tr>
<td>Return flow pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Port T (port R) (external pilot oil drain)</td>
<td>bar</td>
<td>up to 250</td>
<td>up to 250</td>
<td>up to 150</td>
<td>up to 250</td>
</tr>
<tr>
<td>Port T (internal pilot oil drain)</td>
<td>bar</td>
<td>up to 30</td>
<td>up to 30</td>
<td>up to 30</td>
<td>up to 30</td>
</tr>
<tr>
<td>Port Y</td>
<td>bar</td>
<td>up to 30</td>
<td>up to 30</td>
<td>up to 30</td>
<td>up to 30</td>
</tr>
<tr>
<td>Flow of the main valve</td>
<td>l/min</td>
<td>up to 170</td>
<td>up to 460</td>
<td>up to 870</td>
<td>up to 1600</td>
</tr>
<tr>
<td>Pilot oil flow in port X and Y with a stepped input signal 0 → 100 %</td>
<td>l/min</td>
<td>3.5</td>
<td>5.5</td>
<td>7</td>
<td>15.9</td>
</tr>
<tr>
<td>Pilot oil volume for switching process 0 → 100 %</td>
<td>cm³</td>
<td>1.7</td>
<td>4.6</td>
<td>10</td>
<td>26.5</td>
</tr>
<tr>
<td>Hydraulic fluid</td>
<td>Mineral oil (HL, HLP) to DIN 51524</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydraulic fluid temperature range °C</td>
<td>– 20 to + 80 (preferably + 40 to + 50)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Viscosity range mm²/s</td>
<td>20 to 380 (preferably 30 to 46)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max. permissible degree of contamination of the hydraulic fluid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleanliness class – Pilot valve</td>
<td>Class 18/16/13 ¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>to ISO 4406 (c) – Main valve</td>
<td>Class 20/18/15 ¹</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hysteresis</td>
<td>%</td>
<td>≤ 6</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

¹ The cleanliness classes specified for components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, increases the service life of components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086 and RE 50088.
**Technical data** (for applications outside these parameters, please consult us!)

### Electrical

<table>
<thead>
<tr>
<th>Parameter</th>
<th>.WRZ</th>
<th>.WRZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve type</td>
<td>.WRZ</td>
<td>.WRZE</td>
</tr>
<tr>
<td>Type of protection of the valve to EN 60529</td>
<td>IP65 with cable socket mounted and locked</td>
<td></td>
</tr>
<tr>
<td>Type of voltage</td>
<td>DC</td>
<td></td>
</tr>
<tr>
<td>Command value overlap</td>
<td>%</td>
<td>15</td>
</tr>
<tr>
<td>Max. current</td>
<td>A</td>
<td>1.5</td>
</tr>
<tr>
<td>Max. current</td>
<td>A</td>
<td>2.5</td>
</tr>
<tr>
<td>Solenoid coil resistance</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>– Cold value at 20 °C</td>
<td>Ω</td>
<td>4.8</td>
</tr>
<tr>
<td>– Max. hot value</td>
<td>Ω</td>
<td>2</td>
</tr>
<tr>
<td>Duty cycle</td>
<td>%</td>
<td>100</td>
</tr>
<tr>
<td>Max. coil temperature</td>
<td>°C</td>
<td>150</td>
</tr>
<tr>
<td>Electrical connection</td>
<td>– WRZ</td>
<td>With component plug to DIN EN 175301-803</td>
</tr>
<tr>
<td>– WRZE</td>
<td></td>
<td>Cable socket to DIN EN 175301-803 ²</td>
</tr>
</tbody>
</table>

### Control electronics

**Integrated** electronics (OBE) for type .WRZE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>.WRZ</th>
<th>.WRZE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current consumption</td>
<td>A</td>
<td>1,8</td>
</tr>
<tr>
<td>– Power pulse current</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Command value signal</td>
<td>V</td>
<td>± 10</td>
</tr>
<tr>
<td>– Voltage input &quot;A1&quot;</td>
<td>mA</td>
<td>4 to 20</td>
</tr>
<tr>
<td>– Current input &quot;F1&quot;</td>
<td>mA</td>
<td></td>
</tr>
</tbody>
</table>

**Suitable for type WRZE**

- Analogue command value card ²)
  - VT-SWKA-1-1X/… according to data sheet RE 30255
- Digital command value card ²)
  - VT-HACD-1-1X/… according to data sheet RE 30143
- Analogue command value modules ²)
  - VT-SWMA-1-1X/… according to data sheet RE 29902
  - VT-SWMKA-1-1X/… according to data sheet RE 29903

**External** electronics for type WRZ

- Analogue amplifier in Euro-card format ²)
  - With 1 ramp time
    - VT-VSPA2-1-2X/V0/T1, according to data sheet RE 30110
  - With 5 ramp times
    - VT-VSPA2-1-2X/V0/T5, according to data sheet RE 30110
- Digital amplifier in Euro-card format ²)
  - VT-VSPD-1-2X/…, acc. to data sheet RE 30523 - middle of 2006
- Analogue amplifiers of modular design ²)
  - VT 11118-1X/…, according to data sheet RE 30218

¹) With control electronics by Bosch Rexroth

²) Separate order

³) Due to the surface temperatures occurring on solenoid coils, the European standards EN 563 and EN 982 must be observed!

---

**Note:** For details regarding environment simulation testing in the fields of EMC (electromagnetic compatibility), climate and mechanical stress, see RE 29115-U (declaration on environmental compatibility).
**Electrical connection, cable sockets** (nominal dimensions in mm)

For **type .WRZ**... *(for external electronics – not for version "J" = seawater-resistant)*

Cable socket to DIN EN 175301-803

Solenoid a, colour: grey
Separate order under material no. **R901017010**

Solenoid b, colour: black
Separate order under material no. **R901017011**

**Pin assignment** for version "J" = seawater-resistant

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>PE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>E</td>
<td>F</td>
<td>PE</td>
</tr>
<tr>
<td>Solenoid A</td>
<td>Solenoid B</td>
<td>Solenoid A</td>
<td>Solenoid B</td>
<td>n.c.</td>
<td>n.c.</td>
<td>Valve body</td>
</tr>
</tbody>
</table>

External electronics

For **type .WRZE**... *(with integrated electronics (OBE) and for version "J" = seawater-resistant)*

Cable socket to DIN EN 175201-804
Separate order under material no. **R900221267** (version made of plastic)
For the pin assignment, see block circuit diagram on page 10

Cable socket to DIN EN 175201-804
Separate order under material no. **R900223890** (metal version)
For the pin assignment, see block circuit diagram on page 10
Integrated electronics (OBE) for type WRZE

**Pin assignment of component plug**

<table>
<thead>
<tr>
<th>Contact</th>
<th>Signal</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Supply voltage 24 VDC (19 to 35 VDC)</td>
</tr>
<tr>
<td>B</td>
<td>GND</td>
</tr>
<tr>
<td>C</td>
<td>Cannot be used 1)</td>
</tr>
<tr>
<td>D</td>
<td>Command value (± 10 V / 4 to 20 mA)</td>
</tr>
<tr>
<td>E</td>
<td>reference potential</td>
</tr>
<tr>
<td>F</td>
<td>Cannot be used 1)</td>
</tr>
<tr>
<td>PE</td>
<td>PE conductor</td>
</tr>
</tbody>
</table>

**Command value**: Positive command value (0 to 10 V or 12 to 20 mA) at D and reference potential at E causes a flow from P to A and B to T.

Negative command value (0 to – 10 V or 12 to 4 mA) at D and reference potential at E causes a flow from P to B and A to T.

For valves with 1 solenoid on the “a” side (spool variants EA and W6A) reference potential at E and positive command value at D (0 to 10 V or 4 to 20 mA) causes a flow from P to B and A to T.

**Connecting cable**: Recommendation:

- 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

Outer diameter 6.5 to 11 mm or 8 to 13.5 mm, respectively

Connect shield to PE on the supply side only.

1) Slots C and F must not be connected!

**Block circuit diagram / pin assignment of integrated electronics**

---

2) Connection PE is to be connected to the heat sink and valve housing

3) PE conductor to be screwed onto the valve housing and cover

4) The ramp can be adjusted externally from 0 to 2.5 s; identical for \( T_{up} \) and \( T_{down} \)

5) Output stages current-regulated
Characteristic curves (measured with spools "E, W6-, EA, W6A" and HLP46, $\theta_{oil} = 40 \degree C \pm 5 \degree C$ and $p = 100$ bar) Size 10

25 l/min nominal flow at 10 bar valve pressure differential

50 l/min nominal flow at 10 bar valve pressure differential

85 l/min nominal flow at 10 bar valve pressure differential

$\Delta p = \text{valve pressure differential to DIN 24311 (inlet pressure} p_p \text{ minus load pressure} p_L \text{ minus return flow pressure} p_T$)

Transient functions with stepped electrical input signals, measured at $p_{st} = 50$ bar

Type 4WRZ…

Type 4WRZE…
Transient functions with stepped electrical input signals, measured at $p_{St} = 50$ bar

Type 4WRZ...

Type 4WRZE...
Characteristic curves (measured with spools "E, W6-, EA, W6A" and HLP46, $\theta_{oil} = 40 \, ^\circ C \pm 5 \, ^\circ C$ and $p = 100$ bar) Size 25

220 l/min nominal flow at 10 bar valve pressure differential

325 l/min nominal flow at 10 bar valve pressure differential

$\Delta p =$ valve pressure differential to DIN 24311 (inlet pressure $p_p$ minus load pressure $p_L$ minus return flow pressure $p_T$)

Transient functions with stepped electrical input signals, measured at $p_{St} = 50$ bar

Type 4WRZ…

Type 4WRZE…
Characteristic curves (measured with spools "E, W6-, EA, W6A" and HLP46, $\vartheta_{oil} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C}$ and $p = 100 \, \text{bar}$) Size 32

360 l/min nominal flow at 10 bar valve pressure differential

520 l/min nominal flow at 10 bar valve pressure differential

$\Delta p = \text{valve pressure differential to DIN 24311 (inlet pressure } p_P \text{ minus load pressure } p_L \text{ minus return flow pressure } p_T)$

Transient functions with stepped electrical input signals, measured at $p_{st} = 50 \, \text{bar}$

Type 4WRZ...

Type 4WRZE...
Characteristic curves (measured with spools "E, W6-, EA, W6A" and HLP46, \( \theta_{oil} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C} \) and \( p = 100 \, \text{bar} \) Size 52

1000 l/min nominal flow at 10 bar valve pressure differential

\[ \Delta p = \text{valve pressure differential to DIN 24311} \quad (\text{inlet pressure } p_P \text{ minus load pressure } p_L \text{ minus return flow pressure } p_T) \]

Transient functions with stepped electrical input signals, measured at \( p_{St} = 50 \text{ bar} \)

Type .WRZ...

Type .WRZE...
Unit dimensions (nominal dimensions in mm)

1. Main valve
2. Pilot valve
3. Dimension for version “4WRZ…” (not seawater-resistant)
4. Dimension for version “4WRZE…”
5. Proportional solenoid “a”
6. Proportional solenoid “b”
7. Cable socket “A”, separate order, see page 9
8. Cable socket “B”, separate order, see page 9
9. Cable socket, separate order, see page 9
10. Concealed manual override “N9”
11. Cover for valves with one solenoid
12. Nameplate for pilot valve
13. Nameplate for main valve
14. Integrated electronics (OBE)
15. Pressure reducing valve “D3”
16. Identical seal rings for ports A, B, P, T and T1
17. Identical seal rings for ports X and Y
18. Space required to remove cable socket
19. Interconnection plate (type 4WRH…)

For section details, see page 22.

Required surface finish of the valve mounting surface

Tolerances to:
- General tolerances ISO 2768-mK

20. Machined mounting face, position of ports to ISO 4401-05-05-0-94, ports X and Y deviating from the standard as required:
   - Ports A, B, T, T1 and P Ø11 mm.

Subplates according to data sheet RE 45054 and valve fixing screws must be ordered separately.

Subplates:
- G 534/01 (G 3/4) without ports X, Y, T1
- G 535/01 (G 3/4) with ports X, Y
- G 536/01 (G 1) with ports X, Y

Valve fixing screws, see page 23
**Unit dimensions** (nominal dimensions in mm)

1. Main valve
2. Pilot valve
3. Dimension for version “4WRZ...” (not seawater-resistant)
4. Dimension for version “4WRZE...”
5. Proportional solenoid “a”
6. Proportional solenoid “b”
7. Cable socket “A”, separate order, see page 9
8. Cable socket “B”, separate order, see page 9
9. Cable socket, separate order, see page 9
10. Concealed manual override “N9”
11. Cover for valves with one solenoid
12. Nameplate for pilot valve
13. Nameplate for main valve
14. Integrated electronics (OBE)
15. Pressure reducing valve “D3”
16. Identical seal rings for ports A, B, P and T
17. Identical seal rings for ports X and Y
18. Space required to remove cable socket
19. Interconnection plate (type 4WRH...)

**Tolerances to:**
- General tolerances ISO 2768-mK

**For section details, see page 22.**

**Required surface finish of the valve mounting surface:**

0,01/100mm

**For section details, see page 22.**

**Rzmax 4**


21. Locating pin

Subplates according to data sheet RE 45056 and valve fixing screws must be ordered separately.

**Subplates:**
- G 172/01 (G 3/4)
- G 172/02 (M27 x 2)
- G 174/01 (G 1)
- G 174/02 (M39 x 2)
- G 174/08 (flange)

**Valve fixing screws,** see page 23
Unit dimensions (nominal dimensions in mm) Size 25

1 Main valve
2 Pilot valve
3 Dimension for version “4WRZ...” (not seawater-resistant)
4 Dimension for version “4WRZE...”
5 Proportional solenoid “a”
6 Proportional solenoid “b”
7 Cable socket “A”, separate order, see page 9
8 Cable socket “B”, separate order, see page 9
9 Cable socket, separate order, see page 9
10 Concealed manual override “N9”
11 Cover for valves with one solenoid
12 Nameplate for pilot valve
13 Nameplate for main valve
14 Integrated electronics (OBE)
15 Pressure reducing valve “D3”
16 Identical seal rings for ports A, B, P and T
17 Identical seal rings for ports X and Y
18 Space required to remove cable socket
19 Interconnection plate (type 4WRH...)

For section details, see page 22.

Tolerances to:
- General tolerances ISO 2768-mK

20 Machined mounting face, position of ports to ISO 4401-08-07-0-94, ports X and Y as required deviating from the standard:
- Ports A, B and T Ø25 mm
- Port P Ø24 mm

21 Locating pin

Subplates according to data sheet RE 45058 and valve fixing screws must be ordered separately.

Subplates:
- G 151/01 (G 1)
- G 154/01 (G 1 1/4); G 154/08 (flange)
- G 156/01 (G 1 1/2)

Valve fixing screws, see page 23

Required surface finish of the valve mounting surface
Unit dimensions (nominal dimensions in mm)

1 Main valve
2 Pilot valve
3 Dimension for version “4WRZ…” (not seawater-resistant)
4 Dimension for version “4WRZE…”
5 Proportional solenoid “a”
6 Proportional solenoid “b”
7 Cable socket “A”, separate order, see page 9
8 Cable socket “B”, separate order, see page 9
9 Cable socket, separate order, see page 9
10 Concealed manual override “N9”
11 Cover for valves with one solenoid
12 Nameplate for pilot valve
13 Nameplate for main valve
14 Integrated electronics (OBE)
15 Pressure reducing valve “D3”
16 Identical seal rings for ports A, B, P and T
17 Identical seal rings for ports X and Y
18 Space required to remove cable socket
19 Interconnection plate (type 4WRH…)

For section details, see page 22.

Required surface finish of the valve mounting surface

Tolerances to:
- General tolerances ISO 2768-mK

20 Machined mounting face, position of ports to ISO 4401-10-08-0-94, ports X and Y as required deviating from standard:
  - Ports A, B, T and P Ø38 mm.
21 Locating pin

Subplates according to data sheet RE 45060 and valve fixing screws must be ordered separately.

Subplates:
- G 157/01 (G 1 1/2)
- G 158/10 (flange)
- G 157/02 (M48 x 2)

阀座紧固件，见第23页
Unit dimensions: Subplate mounting (nominal dimensions in mm)  

Size 52

1 Main valve  
2 Pilot valve  
3 Dimension for version “4WRZ…”  
   (not seawater-resistant)  
4 Dimension for version “4WRZE…”  
5 Proportional solenoid “a”  
6 Proportional solenoid “b”  
7 Cable socket “A”  
8 Cable socket “B”  
9 Cable socket  
   1) separate order, see page 9  
10 Concealed manual override “N9”  
11 Cover for valves with one solenoid  
12 Nameplate for pilot valve  
13 Nameplate for main valve  
14 Integrated electronics (OBE)  
15 Identical seal rings for ports A, B, P, T and R  
16 Identical seal rings for ports X, Y and L  
17 Space required to remove cable socket  
18 Interconnection plate (type 4WRH…)  
19 Machined mounting face, position of ports,  
   ports X and Y as required  
20 Adapter plate  
21 Lifting eye  

Valve fixing screws, see page 23
Unit dimensions: Flange connection (nominal dimensions in mm)

1 Main valve
2 Pilot valve
3 Dimension for version "4WRZ..." (not seawater-resistant)
4 Dimension for version "4WRZE..."
5 Proportional solenoid "a"
6 Proportional solenoid "b"
7 Cable socket "A", separate order, see page 9
8 Cable socket "B", separate order, see page 9
9 Cable socket, separate order, see page 9
10 Concealed manual override "N9"
11 Cover for valves with one solenoid
12 Nameplate for pilot valve
13 Nameplate for main valve
14 Integrated electronics (OBE)
15 Space required to remove cable socket
16 Interconnection plate (type 4WRH...)
17 Adapter plate
18 Lifting eye

Connecting flanges according to data sheet RE 45501 and valve fixing screws must be ordered separately.

Valve fixing screws, see page 23
Pilot oil supply

Type 4WRZ…-…/… and External pilot oil supply
Type 4WRH…-…/… External pilot oil supply

With this version, the pilot oil is supplied from a separate pilot circuit (external).
The pilot oil drain is not directed into the T-channel of the main valve, but fed separately to the tank via port Y (external).

Type 4WRZ…-…/…E… Internal pilot oil supply
External pilot oil drain

With this version, the pilot oil is supplied from the P-channel of the main valve (internal).
The pilot oil drain is not directed into the T-channel of the main valve, but fed separately to the tank via port Y (external). Port X must be plugged on the subplate.

Type 4WRZ…-…/…ET… Internal pilot oil supply
Internal pilot oil drain

With this version, the pilot oil is supplied from the P-channel of the main valve (internal).
The pilot oil drain is fed directly into the T-channel of the main valve (internal).
Ports X and Y must be plugged on the subplate.

Type 4WRZ…-…/…T… External pilot oil supply
Internal pilot oil drain

With this version, the pilot oil is supplied from a separate pilot circuit (external).
The pilot oil drain is fed directly into the T-channel of the main valve (internal).
Port Y must be plugged on the subplate.

Items 1 and 2: Plug screw M6 DIN 906-8.8 SW 3

Size 10
For section location, see page 16

Size 16
For section location, see page 16

Size 25
For section location, see page 18

Size 32
For section location, see page 19
Valve fixing screws (separate order)

The following valve fixing screws are recommended:

### 4WRZ10

4 S.H.C.S. ISO 4762 – M6 x 45 -10.9-flZn-240h-L
(friciton value $\mu_{total} = 0.09$ to 0.14)
Tightening torque $M_A = 13.5$ Nm ± 10%
Material No. R913000288

or

4 S.H.C.S. ISO 4762 – M6 x 45 -10.9
(friciton value $\mu_{total} = 0.12$ to 0.17)
Tightening torque $M_A = 15.5$ Nm ± 10%

### 4WRZ16

2 S.H.C.S. ISO 4762 – M6 x 60 -10.9-flZn-240h-L
(friciton value $\mu_{total} = 0.09$ to 0.14)
Tightening torque $M_A = 12.2$ Nm ± 10%
Material No. R913000115

4 S.H.C.S. ISO 4762 – M10 x 60 -10.9-flZn-240h-L
(friciton value $\mu_{total} = 0.09$ to 0.14)
Tightening torque $M_A = 59$ Nm ± 20%
Material No. R913000116

or

2 S.H.C.S. ISO 4762 – M6 x 60 -10.9
(friciton value $\mu_{total} = 0.12$ to 0.17)
Tightening torque $M_A = 15.5$ Nm ± 10%

4 S.H.C.S. ISO 4762 – M10 x 60 -10.9
(friciton value $\mu_{total} = 0.12$ to 0.17)
Tightening torque $M_A = 75$ Nm ± 20%

### 4WRZ25

6 S.H.C.S. ISO 4762 – M12 x 60 -10.9-flZn-240h-L
(friciton value $\mu_{total} = 0.09$ to 0.14)
Tightening torque $M_A = 100$ Nm ± 20%
Material No. R913000121

or

6 S.H.C.S. ISO 4762 – M12 x 60 -10.9
(friciton value $\mu_{total} = 0.12$ to 0.17)
Tightening torque $M_A = 130$ Nm ± 20%

### 4WRZ32

6 S.H.C.S. ISO 4762 – M20 x 80 -10.9-flZn-240h-L
(friciton value $\mu_{total} = 0.09$ to 0.14)
Tightening torque $M_A = 340$ Nm ± 20%
Material No. R901035246

or

6 S.H.C.S. ISO 4762 – M20 x 80 -10.9
(friciton value $\mu_{total} = 0.12$ to 0.17)
Tightening torque $M_A = 430$ Nm ± 20%

### 5WRZ52

for steel mounting faces:
7 S.H.C.S. ISO 4762 – M20 x 90 -10.9-flZn-240h-L
(friciton value $\mu_{total} = 0.09$ to 0.14)
Tightening torque $M_A = 465$ Nm ± 20%
Material No. R913000397
for cast iron mounting faces:
7 S.H.C.S. ISO 4762 – M20 x 100 -10.9-flZn-240h-L
(friciton value $\mu_{total} = 0.09$ to 0.14)
Tightening torque $M_A = 465$ Nm ± 20%
Material No. R913000386

or

for steel mounting faces:
7 S.H.C.S. ISO 4762 – M20 x 90 -10.9
(friciton value $\mu_{total} = 0.12$ to 0.17)
Tightening torque $M_A = 610$ Nm ± 20%
for cast iron mounting faces:
7 S.H.C.S. ISO 4762 – M20 x 100 -10.9
(friciton value $\mu_{total} = 0.12$ to 0.17)
Tightening torque $M_A = 610$ Nm ± 20%

### Throttle insert

When using a proportional directional valve of type 4WRZ…,
install the following throttle insertsts in channels A and B of the pilot valve:

<table>
<thead>
<tr>
<th>Size</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>R900158510</td>
<td>R900158547</td>
<td>R900157948</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>
Notes

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The data specified above only serve to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The information given does not release the user from the obligation of own judgment and verification. It must be remembered that our products are subject to a natural process of wear and aging.
Proportional pressure reducing valve, in 3-way version

Type 3DREP and 3DREPE

Size 6
Component series 2X
Maximum operating pressure 100 bar
Maximum flow 15 l/min

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<td>4, 5</td>
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<td>Unit dimensions</td>
<td>9 to 11</td>
</tr>
<tr>
<td>Throttle insert</td>
<td>12</td>
</tr>
</tbody>
</table>

Features

– Direct operated proportional valves for controlling a pressure and the direction of a flow
– Operation by means of proportional solenoids with central thread and detachable coil
– Subplate mounting:
  – Porting pattern according to ISO 4401
– Manual override, optional
– Spring-centered control spool
– Type 3DREPE with integrated control electronics
– External control electronics for type 3DREP:
  • Analog amplifiers type VT-VSPA2-1-2X/… in Eurocard format (separate order), see page 5
  • Digital amplifier type VT-SPD-1-1X/… in Eurocard format (separate order), see page 5
  • Electric amplifier type VT 11118 in modular design (separate order), see page 5
Ordering code

<table>
<thead>
<tr>
<th>3DREP</th>
<th>6</th>
<th>-2X/</th>
<th>E</th>
<th>G24</th>
</tr>
</thead>
</table>

For external control electronics = No code
With integrated control electronics = E
Size
Size 6 = 6

Symbols (simplified)

- **A**
- **B**
- **C**

Component series 20 to 29 = 2X
(20 to 29: Unchanged installation and connection dimensions)

Pressure rating

- 16 bar = 16
- 25 bar = 25
- 45 bar = 45

1) With version "J" = sea water-resistant only specify "K31"
2) Only with version 3DREP6
3) With version "J" = "N" instead of "N9"

Electric special types of protection on request!

Symbols

Type 3DREP..6 A 2X/.E (detailed)

Example of valve with integrated control electronics
Type 3DREPE..6 C 2X/.E (simplified)
Function, section

The 3-way pressure reducing valve type 3 DREP 6.. is direct operated by proportional solenoids. It is used to convert an electric input signal into a proportional pressure output signal. The proportional solenoids are controllable wet-pin DC solenoids with central thread and detachable coil. The solenoids are optionally actuated by external control electronics (type 3DREP) or by the internal control electronics (type 3DREPE).

Set-up:
The valve basically consists of:
- Housing (1) with connection surface
- Control spool (2) with pressure measuring spool (3, 4)
- Solenoids (5, 6) with central thread
- Optionally integrated control electronics (7)

Function:
The pressure in A or B is set by means of the proportional solenoids. The amount of the pressure depends on the current. With de-energized solenoids (5, 6), the control spool (2) is held in the central position by means of the pressure springs (8). Ports A and B are connected with T so that the hydraulic fluid can flow off to the tank without obstructions.

By energizing a proportional solenoid e.g. solenoid "a" (5), the pressure measuring spool (3) and with it the control spool (2) are moved to the right. This opens the connection from P to B and A to T via orifice-type cross-sections with progressive flow characteristic. The pressure that builds up in channel B acts with the surface of the pressure measuring spool (4) on the control spool and against the solenoid force. The pressure measuring spool (4) is supported by the solenoid "b". If the pressure exceeds the value set at solenoid "a", the control spool (2) is pushed back against the solenoid force and connects B with T until the set pressure is achieved again. The pressure is proportional to the solenoid current.

After shut-down of the solenoid, the control spool (2) is returned into the central position by the compression springs (8). An optional hand override (9, 10) allows for the displacement of the control spool (2) without solenoid energization.

Note:
The unwanted activation of the hand override may lead to uncontrolled machine movements!

Type 3DREP 6..

Type 3DREPE 6..

Valve with 2 spool positions: (type 3DREP..A.. or 3DREP..B..)
The function of this valve design corresponds basically to the valve with 3 spool positions. The 2 spool position valves are, however, only equipped with solenoid "a" (5) or solenoid "b" (6). Instead of the 2nd proportional solenoid, there is a plug screw (11).

Note:
The tank line must not be allowed to run empty.
With corresponding installation conditions, a pre-charge valve (pre-charging pressure approx. 2 bar) must be installed.
Technical data (For applications outside these parameters, please consult us!)

<table>
<thead>
<tr>
<th>general</th>
<th>3DREP</th>
<th>3DREPE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve type</td>
<td>3DREP</td>
<td>3DREPE</td>
</tr>
<tr>
<td>Weight kg</td>
<td>2.0</td>
<td>2.2</td>
</tr>
<tr>
<td>Installation position</td>
<td>Any, preferably horizontal</td>
<td></td>
</tr>
<tr>
<td>Storage temperature range °C</td>
<td>–20 to +80</td>
<td></td>
</tr>
<tr>
<td>Ambient temperature range °C</td>
<td>–20 to +70</td>
<td>–20 to +50</td>
</tr>
</tbody>
</table>

| hydraulic (measured with HLP 32, \(\theta_{oil} = 40 \, ^\circ C \pm 5 \, ^\circ C\)) |
|------------------------------------------------------------------------|-------|--------|
| Operating pressure range Port P bar                                    | 20 to 100 for pressure rating 16 |
|                                                                      | 30 to 100 for pressure rating 25 |
|                                                                      | 50 to 100 for pressure rating 45 |
| Port T bar                                                             | 0 to 30 |
| Maximum flow l/min                                                     | 15 (\(\Delta p = 50 \, \text{bar}\)) |
| Hydraulic fluid                                                        | See table below |
| Hydraulic fluid temperature range °C (at the valve working ports)     | –20 to +80, preferably +40 to +50 |
| Viscosity range mm\(^2\)/s                                            | 20 to 380, preferably 30 to 46 |
| Maximum admissible degree of contamination of the hydraulic fluid cleanliness class according to ISO 4406 (c) | Class 17/15/12 1) |
| Hysteresis %                                                           | ≤ 5   |
| Repeatability %                                                        | ≤ 1   |
| Response sensitivity %                                                 | ≤ 0.5 |
| Range of inversion %                                                  | ≤ 1   |

1) The cleanliness classes specified for the components must be adhered to in hydraulic systems. Effective filtration prevents faults and at the same time increases the service life of the components.

For the selection of the filters see www.boschrexroth.com/filter

<table>
<thead>
<tr>
<th>Hydraulic fluid</th>
<th>Classification</th>
<th>Suitable sealing materials</th>
<th>Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral oils and related hydrocarbons</td>
<td>HL, HLP</td>
<td>NBR, FKM</td>
<td>DIN 51524</td>
</tr>
<tr>
<td>Flame-resistant – Water-containing</td>
<td>HFC</td>
<td>NBR</td>
<td>ISO 12922</td>
</tr>
</tbody>
</table>

**Important information on hydraulic fluids!**

- For more information and data on the use of other hydraulic fluids refer to data sheet 90220 or contact us!
- There may be limitations regarding the technical valve data (temperature, pressure range, service life, maintenance intervals, etc.)!
- The flash point of the process and operating medium used must be 40 K higher than the maximum solenoid surface temperature.

- Flame-resistant – water-containing: Maximum pressure differential per control edge 175 bar, otherwise, increased cavitation erosion!
  Tank pre-loading < 1 bar or > 20 % of the pressure differential. The pressure peaks should not exceed the maximum operating pressures!
### Technical data

(For applications outside these parameters, please consult us!)

#### Electric

<table>
<thead>
<tr>
<th></th>
<th>3DREP</th>
<th>3DREPE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valve type</strong></td>
<td>Direct voltage</td>
<td></td>
</tr>
<tr>
<td><strong>Voltage type</strong></td>
<td>Analog</td>
<td></td>
</tr>
<tr>
<td><strong>Command value signal</strong></td>
<td>Voltage input &quot;A1&quot;</td>
<td>±10 ±4 to 20</td>
</tr>
<tr>
<td></td>
<td>Current input &quot;F1&quot;</td>
<td>mA</td>
</tr>
<tr>
<td><strong>Maximum current per solenoid</strong></td>
<td>A</td>
<td>1.5</td>
</tr>
<tr>
<td><strong>Solenoid coil resistance</strong></td>
<td>Cold value at 20 °C</td>
<td>Ω</td>
</tr>
<tr>
<td></td>
<td>Maximum hot value</td>
<td>Ω</td>
</tr>
<tr>
<td><strong>Duty cycle</strong></td>
<td>%</td>
<td>100</td>
</tr>
<tr>
<td><strong>Maximum coil temperature</strong></td>
<td>°C</td>
<td>up to 150</td>
</tr>
<tr>
<td><strong>Protection class according DIN EN 60529/VDE 0470 part 1</strong></td>
<td>IP 65 with mating connector mounted and locked</td>
<td></td>
</tr>
</tbody>
</table>

1) Due to the temperatures occurring at the surfaces of the solenoid coils, the European standards ISO 13732-1 and EN 982 need to be adhered to!

#### Control electronics

**For 3DREP**
- Digital amplifier in Eurocard format 1) VT-VSPD-1-2X/... according to data sheet 30523
- Analog amplifier in Eurocard format 1) VT-VSPA2-1-2X/… according to data sheet 30110
- Analog module amplifier 1) VT11118-1X/... according to data sheet 30218

**For 3DREPE**
- Analog command value module Integrated in the valve, see page 8
- Analog command value module VT-SWMA-1-1X/... according to data sheet 29902
- Analog command value module VT-SWMKA-1-1X/... according to data sheet 29903
- Digital command value card VT-HACD-1-1X/… according to data sheet 30143
- Digital command value card VT-SWKA-1-1X/... according to data sheet 30255

<table>
<thead>
<tr>
<th>Supply voltage</th>
<th>Nominal voltage</th>
<th>VDC</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>3DREPE, 3DREP 2)</td>
<td>Lower limit value</td>
<td>V</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Upper limit value</td>
<td>V</td>
<td>35</td>
</tr>
<tr>
<td>Current consumption of the amplifier</td>
<td>$I_{max}$</td>
<td>A</td>
<td>1.8</td>
</tr>
<tr>
<td></td>
<td>Maximum impulse current</td>
<td>A</td>
<td>3</td>
</tr>
</tbody>
</table>

1) Separate order
2) With Bosch Rexroth AG control electronics

**Note:** Information on the environment simulation testing for the areas EMC (electromagnetic compatibility), climate and mechanical load see RE 29055-U (declaration on environmental compatibility).
Block diagram of the integrated electronics (OBE) for type 3DREPE

<table>
<thead>
<tr>
<th>Device connector allocation</th>
<th>Contact</th>
<th>Signal with A1</th>
<th>Signal with F1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>A</td>
<td>24 VDC ($u(t) = 19.4$ to $35$ V); $I_{max} = 2$ A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>B</td>
<td>0 V</td>
<td></td>
</tr>
<tr>
<td>Reference (actual value)</td>
<td>C</td>
<td>Cannot be used</td>
<td>1)</td>
</tr>
<tr>
<td>Differential amplifier input</td>
<td>D</td>
<td>±10 V; $R_s &gt; 50$ kΩ</td>
<td>4 to 20 mA; $R_s &gt; 100$ Ω</td>
</tr>
<tr>
<td>(command value)</td>
<td>E</td>
<td>Reference potential command value</td>
<td></td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>Cannot be used</td>
<td>1)</td>
</tr>
<tr>
<td></td>
<td>PE</td>
<td>Connected to cooling element and valve housing</td>
<td></td>
</tr>
</tbody>
</table>

1) Slots C and F must not be connected!

Command value:
- Reference potential at E and positive command value (or 12 to 20 mA) at D result in pressure in A.
- Reference potential at E and negative command value (or 12 to 4 mA) at D result in pressure in B.
- With valves with 1 solenoid on side b (design A):
  - Reference potential at E and positive command value at D (4 to 20 mA) result in pressure in A.
- With valves with 1 solenoid on side a (design B):
  - Reference potential at E and positive command value at D (4 to 20 mA) result in pressure in B.

Connection cable:
- Recommendation:
  - Up to 25 m line length: Type LiYCY 5 x 0.75 mm²
  - Up to 50 m line length: Type LiYCY 5 x 1.0 mm²
- External diameter 6.5 to 11 mm
- Connect shield on PE only on the supply side.

---

<table>
<thead>
<tr>
<th>Interface</th>
<th>Integrated control electronics</th>
<th>Valve</th>
</tr>
</thead>
</table>

---

1) Protective earthing conductor screwed to valve housing and cover
2) Ramp can be set from 0 to 5 s from the outside ($T_{up}, \Delta T_{down}$)
## Accessories (not included in scope of delivery)

### Mating connectors

<table>
<thead>
<tr>
<th>Mating connectors</th>
<th>Material number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mating connector for 3DREP</td>
<td>Solenoid a, color gray</td>
</tr>
<tr>
<td></td>
<td>R900074683</td>
</tr>
<tr>
<td>Mating connector for 3DREP and 3DREPE...J...</td>
<td>Solenoid b, color black</td>
</tr>
<tr>
<td></td>
<td>e.g. R900021267 (plastic)</td>
</tr>
<tr>
<td></td>
<td>e.g. R900223890 (metal)</td>
</tr>
<tr>
<td></td>
<td>e.g. R900217845 (plastic 90°)</td>
</tr>
<tr>
<td>Mating connector for 3DREP...J...</td>
<td>DIN EN 175201-804</td>
</tr>
<tr>
<td></td>
<td>R900021267 (plastic)</td>
</tr>
</tbody>
</table>

### Hexagon socket head cap screws

<table>
<thead>
<tr>
<th>Material number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 6</td>
</tr>
<tr>
<td>4 x ISO 4762 - M5 x 50 - 10.9</td>
</tr>
<tr>
<td>Tightening torque $M_a = 8.9 \text{ Nm} \pm 10%$</td>
</tr>
</tbody>
</table>

### Subplates

<table>
<thead>
<tr>
<th>Data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size 6</td>
</tr>
<tr>
<td>45052</td>
</tr>
</tbody>
</table>
**Characteristic curves** (measured with HLP 46, $\theta_{\text{oil}} = 40^\circ \text{C} \pm 5^\circ \text{C}$ and $p = 100$ bar)

**Pressure rating 16, 25 and 45 bar**

![Graph showing pressure rating 16, 25 and 45 bar characteristics](image)

**Pressure rating 16, 25 and 45 bar**

![Graph showing pressure differential and flow dependency](image)

**Pressure/flow dependency**

![Graph showing pressure/flow dependency](image)
Unit dimensions: Type 3DREP (dimensions in mm)

1 Valve housing
2 Name plate
3 Proportional solenoid "a"
4 Proportional solenoid "b"
5 Mating connector "A", color gray (order separately, see page 5)
6 Mating connector "B", color black (order separately, see page 5)
7 Identical seal rings for ports A, B, P, and T
8 Concealed manual override "N9"
9 Plug screw for valves with 1 solenoid (version "A" or "B")
10 Space required for removing the mating connector
11 Machined valve mounting face, porting pattern according to ISO 4401-03-02-0-05

Subplates and valve mounting screws see page 7.
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 Mating connector
   (order separately, see page 5)
7 Identical seal rings for ports A, B, P, and T
8 Concealed manual override "N"
9 Plug screw for valves with 1 solenoid (version "A" or "B")
10 Space required for removing the mating connector
11 Machined valve mounting face, porting pattern according
   to ISO 4401-03-02-0-05
12 Dimension for version "N"

Subplates and valve mounting screws see page 7

Required surface quality of the valve mounting face

General tolerances according to ISO 2768-mK
1 Valve housing
2 Name plate
3 Proportional solenoid "a"
4 Proportional solenoid "b"
5 Mating connector
   (order separately, see page 5)
7 Identical seal rings for ports A, B, P, and T
8.1 Concealed manual override "N9"
8.2 Manual override "N" for sea water-resistant version "J"
9 Plug screw for valves with 1 solenoid (version "A" or "B")
10 Space required for removing the mating connector
11 Machined valve mounting face, porting pattern according to ISO 4401-03-02-0-05
12 Integrated control electronics
13 Dimension ( ) for sea water-resistant version "J"

Subplates and valve mounting screws see page 7
Throttle insert

When using a proportional directional valve type 4WRZ..., the following throttle inserts are to be used in channel A and B:

<table>
<thead>
<tr>
<th>Size</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>R900158510</td>
<td>R900158547</td>
<td>R900158548</td>
<td>–</td>
<td>–</td>
</tr>
</tbody>
</table>