4/3-way high response valve
pilot operated
with electrical position feedback
and integrated electronics (OBE)

Type 4WRTE

Nominal size 10 to 35
Component series 4X
Maximum operating pressure 350 bar
Maximum flow 3000 l/min

Overview of contents

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Electrical connections, plug-in connectors 7
Connection allocation / Block circuit diagram for the integrated electronics (OBE) 8
Characteristic curves 9 to 15
Unit dimensions 16 to 21
Pilot oil supply 22, 23

Features

– Pilot operated 2-stage high response directional control valve with electrical position feedback of the main spool and integrated electronics (OBE)
– Suitable for closed loop control of position, velocity, pressure and force
– Closed loop control of the direction and rate of a flow
– Pilot control valve: Direct actuated, closed loop position control with pressure feedback of the control pressures
– Main stage: Self-centering, closed loop position controlled
– Integrated control and closed loop electronics
– Subplate mounting: Porting pattern to ISO 4401 (NS10 to 35)
Subplates to catalogue sheets RE 45054 to RE 45060 (separate order), see pages 16 and 20

Information on available spare parts:
www.boschrexroth.com/spc
Ordering details

<table>
<thead>
<tr>
<th>4WRTE</th>
<th>-4X/6E</th>
<th>G24</th>
<th>K31</th>
<th>M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electrically actuated 2-stage high response valve of 4-way design with integrated electronics (OBE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal size 10</td>
<td>= 10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal size 16</td>
<td>= 16</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal size 25</td>
<td>= 25</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal size 27</td>
<td>= 27</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal size 32</td>
<td>= 32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nominal size 35</td>
<td>= 35</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Spool symbols

- \( E \), \( W_6^- \), \( W_8^- \), \( V \), \( V_1^- \), \( Q_2^- \)

With spool symbols \( E^- \), \( W_8^- \), \( V^- \):

- \( P \to A: q_{\text{max}} \)  
- \( B \to T: q/2 \)  
- \( P \to B: q/2 \)  
- \( A \to T: q_{\text{max}} \)

Note:

With spools symbols \( W_6^- \), \( W_8^- \) there is, in the neutral position, a connection from \( A \) to \( T \) and \( B \) to \( T \) with approx. 2 % of the relevant nominal cross-section.

Further details in clear text

- \( M = 3 \) NBR-seals
- \( 4 \) Electronic interfaces
  - \( A1 = \) Com./act. value ±10 V
  - \( F1 = \) Com./act. value 4 to 20 mA

Electrical connections

- \( K31 = \) Without plug-in connector with component plug to DIN EN 175201-804
- Plug-in connector – separate order, see page 7

Pilot oil supply and drain

- No code = External pilot oil supply, external pilot oil drain
- \( E = \) Internal pilot oil supply, external pilot oil drain
- \( T = \) External pilot oil supply, internal pilot oil drain
- \( ET = \) Internal pilot oil supply, internal pilot oil drain

Supply voltage

- \( +24 \) V DC

- 6E = Pilot control valve size 6, proportional solenoid with removable coil

Component series 40 to 49

(40 to 49: unchanged installation and connection dimensions)

Characteristic curve form

- \( L = \) Linear
- \( P = \) Linear with fine control range

Ordering details: Nominal flow – see pages 11 to 15

- 25 = 1) or 50 = 2) or 100 = For nominal size 10
- 125 = 3) or 200 = For nominal size 16
- 220 = or 350 = For nominal size 25
- 500 = For nominal size 27
- 400 = or 600 = For nominal size 32
- 1000 = For nominal size 35

1) E, W_6^-, V, Q_2^- only available with characteristic curve form \( L \) (linear)
2) E_1^-, W_8^-, V_1^- only available with characteristic curve form \( L \) (linear)
3) V_1^-125 only available with characteristic curve form \( L \) (linear)
4) When replacing the component series 3X with component series 4X the electronic interface is to be defined with \( A5 \) (enable signal at Pin C).
5) Suitable for mineral oil (HL, HLP) to DIN 51524
### Preferred types

<table>
<thead>
<tr>
<th>Type – NS10</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WRTE 10 E100L-4X/6EG24ETK31/A1M</td>
<td>R900954239</td>
</tr>
<tr>
<td>4WRTE 10 E100L-4X/6EG24K31/A1M</td>
<td>R900954240</td>
</tr>
<tr>
<td>4WRTE 10 E50L-4X/6EG24ETK31/A1M</td>
<td>R900954241</td>
</tr>
<tr>
<td>4WRTE 10 E50L-4X/6EG24K31/A1M</td>
<td>R900954253</td>
</tr>
<tr>
<td>4WRTE 10 V1-100L-4X/6EG24ETK31/A1M</td>
<td>R900954254</td>
</tr>
<tr>
<td>4WRTE 10 V1-100L-4X/6EG24K31/A1M</td>
<td>R900954255</td>
</tr>
<tr>
<td>4WRTE 10 V1-50L-4X/6EG24ETK31/A1M</td>
<td>R900954256</td>
</tr>
<tr>
<td>4WRTE 10 V1-50L-4X/6EG24K31/A1M</td>
<td>R900954257</td>
</tr>
<tr>
<td>4WRTE 10 V100L-4X/6EG24ETK31/A1M</td>
<td>R900954258</td>
</tr>
<tr>
<td>4WRTE 10 V100L-4X/6EG24K31/A1M</td>
<td>R900954259</td>
</tr>
<tr>
<td>4WRTE 10 V25L-4X/6EG24ETK31/A1M</td>
<td>R900954260</td>
</tr>
<tr>
<td>4WRTE 10 V25L-4X/6EG24K31/A1M</td>
<td>R900954261</td>
</tr>
<tr>
<td>4WRTE 10 W8-100L-4X/6EG24K31/A1M</td>
<td>R900954262</td>
</tr>
<tr>
<td>4WRTE 10 W8-50L-4X/6EG24K31/A1M</td>
<td>R900954263</td>
</tr>
<tr>
<td>4WRTE 10 W8-100L-4X/6EG24K31/A1M</td>
<td>R900954264</td>
</tr>
<tr>
<td>4WRTE 10 W6-50L-4X/6EG24K31/A1M</td>
<td>R900954265</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type – NS16</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WRTE 16 E125L-4X/6EG24ETK31/A1M</td>
<td>R900954266</td>
</tr>
<tr>
<td>4WRTE 16 E1-200L-4X/6EG24ETK31/A1M</td>
<td>R900954267</td>
</tr>
<tr>
<td>4WRTE 16 E1-200L-4X/6EG24K31/A1M</td>
<td>R900954268</td>
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<tr>
<td>4WRTE 16 E125L-4X/6EG24ETK31/A1M</td>
<td>R900954269</td>
</tr>
<tr>
<td>4WRTE 16 E125L-4X/6EG24K31/A1M</td>
<td>R900954270</td>
</tr>
<tr>
<td>4WRTE 16 E200L-4X/6EG24K31/A1M</td>
<td>R900954271</td>
</tr>
<tr>
<td>4WRTE 16 V1-125L-4X/6EG24ETK31/A1M</td>
<td>R900954272</td>
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<tr>
<td>4WRTE 16 V1-125L-4X/6EG24K31/A1M</td>
<td>R900954273</td>
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<tr>
<td>4WRTE 16 V1-200L-4X/6EG24K31/A1M</td>
<td>R900954274</td>
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<tr>
<td>4WRTE 16 V125L-4X/6EG24K31/A1M</td>
<td>R900954275</td>
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<td>4WRTE 16 W8-200L-4X/6EG24K31/A1M</td>
<td>R900954278</td>
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<tr>
<td>4WRTE 16 W6-200L-4X/6EG24K31/A1M</td>
<td>R900954279</td>
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<table>
<thead>
<tr>
<th>Type – NS25</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WRTE 25 E1-350L-4X/6EG24K31/A1M</td>
<td>R900954280</td>
</tr>
<tr>
<td>4WRTE 25 E220L-4X/6EG24K31/A1M</td>
<td>R900954281</td>
</tr>
<tr>
<td>4WRTE 25 E350L-4X/6EG24ETK31/A1M</td>
<td>R900954282</td>
</tr>
<tr>
<td>4WRTE 25 E350L-4X/6EG24K31/A1M</td>
<td>R900954283</td>
</tr>
<tr>
<td>4WRTE 25 V1-220L-4X/6EG24K31/A1M</td>
<td>R900954287</td>
</tr>
<tr>
<td>4WRTE 25 V1-350L-4X/6EG24K31/A1M</td>
<td>R900954293</td>
</tr>
<tr>
<td>4WRTE 25 V220L-4X/6EG24K31/A1M</td>
<td>R900954294</td>
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<tr>
<td>4WRTE 25 V350L-4X/6EG24ETK31/A1M</td>
<td>R900954295</td>
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<tr>
<td>4WRTE 25 V350L-4X/6EG24K31/A1M</td>
<td>R900954296</td>
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<tr>
<td>4WRTE 25 W8-220L-4X/6EG24ETK31/A1M</td>
<td>R900954297</td>
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<tr>
<td>4WRTE 25 W8-350L-4X/6EG24ETK31/A1M</td>
<td>R900954298</td>
</tr>
<tr>
<td>4WRTE 25 W6-350L-4X/6EG24K31/A1M</td>
<td>R900954299</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type – NS32</th>
<th>Material No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4WRTE 32 E1-600L-4X/6EG24ETK31/A1M</td>
<td>R900954300</td>
</tr>
<tr>
<td>4WRTE 32 E600L-4X/6EG24ETK31/A1M</td>
<td>R900954301</td>
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<tr>
<td>4WRTE 32 E600L-4X/6EG24K31/A1M</td>
<td>R900954302</td>
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<td>4WRTE 32 V600L-4X/6EG24ETK31/A1M</td>
<td>R900954303</td>
</tr>
<tr>
<td>4WRTE 32 W6-600L-4X/6EG24ETK31/A1M</td>
<td>R900954304</td>
</tr>
</tbody>
</table>

Further standard types and components can be found in the EPS (standard price list).
Symbols

simplified

Typ 4WRTE...-4X...
External pilot oil supply

Typ 4WRTE...-4X...ET...
Internal pilot oil supply

Typ 4WRTE...-4X...E...
Internal pilot oil supply; external pilot oil drain

Typ 4WRTE...-4X...T...
External pilot oil supply; internal pilot oil drain

detailed

Example:
1 Pilot control valve
2 Main valve
3 Integrated control electronics (OBE)  

External pilot oil supply
External pilot oil drain
Function, section, valve features

The 4/3-way high response valve is designed as a subplate mounting valve with closed loop position control and integrated control electronics.

**Design:**

The valve comprises of 3 main assemblies:
- Housing (1) with main spool (2)
- Integrated control electronics with inductive position transducer (3) for the main stage
- Pilot control valve (4) with spool bush unit (5), inductive transducer (6) and pressure feedback of the centre position of the main spool (2)

**Function:**

- With the proportional solenoids de-energised (7; 8) the centre position of the main spool (2) is via the centering spring (9) and the pressure feedback
- Control of the main spool (2) is via the pilot control valve (4)
  → The main spool is closed loop position controlled
- Control of the pilot control valve spool (4) by changing the solenoid force of the proportional solenoids (7; 8)
- Integration of the command and actual values within the integrated control electronics

- Pilot oil supply to the pilot control valve internally via port P or externally via port X
- Pilot oil drain internally via port T or externally via port Y to tank
- With a command value of 0 V the control electronics closed loop control moves the main spool (2) into the centre position.

**Failure of the supply voltage:**

- The integrated control electronics de-energise the solenoids if the supply voltage fails or if there is a cable break
- Independent pressure control to the same level in the control chambers (10 and 11) via the pilot control valve
- If the supply pressure fails then the main spool is centred via the centering spring (9)

**Central position of the main spools (2)**

**Attention:**

The interruption of the supply voltage leads to the abrupt standstill of the control axis. The accelerations occurring may cause machine damage.

With spool types E, E-, W6-, W8- and Q2- the centering spring (9) positions, the main spool (2) in the mid position, V- and V1- spools are switched to the preferred direction of P to B and A to T within a tolerance band of 1 % to a max. of 11 % of the spool stroke.

**Valve features**

- The 2nd stage basically comprises of components from our proportional valves.
- The zero point adjustment at the „main stage zero point“ is factory pre-set and can, via a potentiometer in the control electronics, be adjusted within a range of ±20 % of the zero stroke. The integrated control electronics can be accessed by removing a plug in the housing.

- If the pilot control valve or the control electronics are exchanged then these have to be recalibrated. All calibrations must only be carried out by trained personnel.

⚠️ Changing the zero point can lead to damage to the system and must only be carried out by trained personnel!
### Technical data (for applications outside these parameters, please consult us!)

#### General

<table>
<thead>
<tr>
<th>Nominal sizes</th>
<th>NS</th>
<th>10</th>
<th>16</th>
<th>25</th>
<th>27</th>
<th>32</th>
<th>35</th>
</tr>
</thead>
</table>

**Installation and commissioning guidelines**

Preferably horizontal, see RE 07700

**Storage temperature range** °C

-20 to +80

**Ambient temperature range** °C

-20 to +50

**Weight** kg

8.7 11.2 16.8 17 31.5 34

---

### hydraulisch (measured with HLP 46, \( \phi_{ol} = 40 ^\circ C \pm 5 ^\circ C \))

<table>
<thead>
<tr>
<th>Operating pressure</th>
<th>Pilot control valve</th>
<th>Main valve, ports P, A, B</th>
<th>Up to 35</th>
<th>Up to 350</th>
<th>Up to 210</th>
<th>Up to 350</th>
<th>Up to 350</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return pressure</td>
<td>Port T</td>
<td>Pilot oil drain, internal</td>
<td>Static &lt; 10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pilot oil drain, external</td>
<td>Up to 35</td>
<td>Up to 250</td>
<td>Up to 250</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Up to 20</td>
<td>Up to 250</td>
<td>Up to 250</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Nominal flow** \( q_{Vnom} \) \pm 10% at \( \Delta p = 10 \) bar l/min

<table>
<thead>
<tr>
<th>( \Delta p ) = valve pressure differential</th>
<th>25</th>
<th>50</th>
<th>100</th>
<th>125</th>
<th>200</th>
<th>220</th>
<th>350</th>
<th>500</th>
<th>600</th>
<th>1000</th>
</tr>
</thead>
</table>

**Main valve flow (max. permissible)** l/min

<table>
<thead>
<tr>
<th>170</th>
<th>460</th>
<th>870</th>
<th>1000</th>
</tr>
</thead>
</table>

**Control spool stroke (3rd stage)** mm

\( \pm 3.5, \pm 5, \pm 6, \pm 6, \pm 9, \pm 12 \)

**Pilot oil flow at ports X or Y with a stepped form of input signal from 0 to 100 % (315 bar)** l/min

<table>
<thead>
<tr>
<th>7</th>
<th>14</th>
<th>20</th>
<th>20</th>
<th>27</th>
<th>29</th>
</tr>
</thead>
</table>

**Pressure fluid**

Mineral oil (HL, HLP) to DIN 51524; Other pressure fluids on request!

**Pressure fluid temperature range** °C

-20 to +80, preferably +40 to +50

**Viscosity range** mm²/s

20 to 380, preferably 30 to 45

**Hysteresis** %

\( \leq 0,1 \)

**Response sensitivity** %

\( \leq 0,05 \)

**Zero point calibration (factory pre-set)** %

\( \leq 1 \)

---

### Electrical

<table>
<thead>
<tr>
<th>Voltage type</th>
<th>DC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage V</td>
<td>24</td>
</tr>
<tr>
<td>Com. value signal Voltage input „A1“ V</td>
<td>±10</td>
</tr>
<tr>
<td>Act. value signal Voltage output V</td>
<td>±10</td>
</tr>
<tr>
<td>Com. value signal Current input „F1“ mA</td>
<td>4 to 20</td>
</tr>
<tr>
<td>Act. value signal Current output mA</td>
<td>4 to 20</td>
</tr>
<tr>
<td>Duty %</td>
<td>100</td>
</tr>
<tr>
<td>Coil temperature (^4) °C</td>
<td>up to 150</td>
</tr>
</tbody>
</table>

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1) For optimum system behaviour we recommend, for pressures above 210 bar, an external pilot oil supply.

2) The cleanliness class stated for the components must be adhered too in hydraulic systems. Effective filtration prevents faults from occurring and at the same time increases the component service life.

3) Referring to the pressure-signal characteristic curve (V-spool)

4) Due to the occurring surface temperature of the solenoid coils, the European Standards EN 563 and EN 982 must be taken into account!

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

Electrical

Electrical connections
With component plug to DIN EN 17520-804

Separate order, see below
Plug-in connector to DIN EN 17520-804

Valve protection to EN 60529
IP65 with mounted and fixed plug-in connector

Control electronics
Integrated in the valve, see page 8

Note: For details regarding the environmental simulation test covering EMC (electro-magnetic compatibility), climate and mechanical loading see RE 29083-U (declaration regarding environmental compatibility).

Electrical connections, plug-in connector

Plug-in connector
Plug-in connector to DIN EN 17520-804
Separate order under Material No. R900021267 (plastic version)
For pin allocation see block circuit diagram on page 8

Component plug allocation

<table>
<thead>
<tr>
<th>Contact</th>
<th>Signal at A1</th>
<th>Signal at F1</th>
<th>Signal at A5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage</td>
<td>A 24 VDC (18 to 35 VDC); $I_{\text{max}} = 3 \text{ A}$; Impulse load = 4 A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>0 V</td>
<td>0 V</td>
<td>0 V</td>
</tr>
<tr>
<td>Ref. (act. value)</td>
<td>C Ref. potential for act. value (contact „F“)</td>
<td>Enable 4 to 24 V</td>
<td></td>
</tr>
<tr>
<td>Differential amplifier input</td>
<td>D $\pm 10 \text{ V}$</td>
<td>4 to 20 mA</td>
<td>$\pm 10 \text{ V}$</td>
</tr>
<tr>
<td>(com. value)</td>
<td>E 0 V ref. potential (contact „D“)</td>
<td>0 V ref. potential for pins D and F</td>
<td></td>
</tr>
<tr>
<td>Measurement output (act. valve)</td>
<td>F $\pm 10 \text{ V}$</td>
<td>4 to 20 mA</td>
<td>$\pm 10 \text{ V}$</td>
</tr>
<tr>
<td>PE</td>
<td>Connect to cooling body and valve housing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Command value:
Ref. potential at E and a positive command value at D results in flow from P to A and B to T
Ref. potential at E and a negative command value at D results in flow from P to B and A to T

Connection cable:
Recommendation: – Up to 25 m cable length type LiYCY 7 x 0.75 mm²
– Up to 50 m cable length type LiYCY 7 x 1.0 mm²
Outside diameter: – 6.5 to 11 mm (plastic plug-in connector)
– 8 to 13.5 mm (metal plug-in connector)

Only attach the screen to ⊥ on the supply side.

Note:
Electrical signals (e.g. actual valve) taken via valve electronics must not be used to switch off the machine safety functions!
(Also see the European Standard regulations „Safety requirements of fluid technology systems and components – hydraulics“, EN 982!)
Connection allocation / Block circuit diagram for the integrated control electronics (OBE) type VT 13060-3X/…

- Command values
- Dither oscillator
- 440 Hz
- Controller main stage
- Controller pilot stage
- Current controller
- Output stage A
- Current controller
- Output stage B
- Position transducer pilot stage
- Position transducer main stage
- Voltage monitoring
- Enable
- Ref. for output
- Outputs
- Cable break recognition
- Sensitivity
- Zero point

Notes:
1) Only present with A5 electronics
2) Only present with A1 and F1 electronics
Characteristic curves (measured with HLP 46, $\theta_{\text{oil}} = 40 \, ^{\circ}\text{C} \pm 5 \, ^{\circ}\text{C}$ and $p = 100$ bar)

Pressure-signal characteristic curve (V spool)

Leakage flow of the main stage (V spool) with pilot control valve

Leakage flow in l/min $\rightarrow$ $U_{E}$ in % $\rightarrow$

Operating pressure in bar $\rightarrow$

1 = Nominal size 10
2 = Nominal size 16
3 = Nominal sizes 25, 27
4 = Nominal size 32
5 = Nominal size 35
Characteristic curves (measured with HLP46 at 40 °C ± 5 °C)

Flow-command value function at e.g.
P → A / B → T 10 bar valve pressure differential or
P → A oder A → T 5 bar per control land

Spool symbols E, W6- and V

Spools with characteristic curve L

Spools with characteristic curve P

1) Positive overlap 0 to 0.5 % for spool symbol V,
2) Positive overlap 15 % for spool symbols E and W6-

Spool symbol Q2- ... L

Spool symbol Q2- ... P

1) For spool symbols Q2- ... L and Q2- ... P
Characteristic curves (measured with HLP 46, $\theta_{\text{oil}} = 40 \, ^\circ C \pm 5 \, ^\circ C$)

Transient function with a stepped form of electrical input signal

Signal change in %

[Graph showing signal change in % over time in ms]

Stroke in %

Frequency response characteristic curves

Amplitude relationship in dB

[Graph showing amplitude relationship in dB against frequency in Hz]

Phase angle in °

[Graph showing phase angle in ° against frequency in Hz]

Valve pressure differential in bar

Flow in l/min

[Graph showing flow-load function at max. valve opening (tolerance ±10 %)]

1 = Recommended flow limitation (flow velocity 30 m/s)

Measured at:
- Pilot control valve
  Port $X^\prime = 100$ bar
- Main valve
  Port $P^\prime = 10$ bar

NS10
Characteristic curves (measured with HLP 46, $\theta_{oil} = 40 ^\circ C \pm 5 ^\circ C$)

**NS16**

**Transient function with a stepped form of electrical input signal**

**Frequency response characteristic curves**

**Flow-load function at max. valve opening** (tolerance $\pm 10 \%$)

Measured at:
- Pilot control valve
  Port „X“ = 100 bar
- Main valve
  Port „P“ = 10 bar

Signal $\pm 10 \%$
Signal $\pm 25 \%$
Signal $\pm 100 \%$

1 = Recommended flow limitation (flow velocity 30 m/s)
Characteristic curves (measured with HLP 46, \( \theta_{\text{oil}} = 40 \, ^\circ\text{C} \pm 5 \, ^\circ\text{C} \))

NS25 and 27

Transient function with a stepped form of electrical input signal

Frequency response characteristic curves

Flow-load function at max. valve opening (tolerance \( \pm 10 \, \% \))

[Graphs and charts showing the data in the document]
Characteristic curves (measured with HLP 46, $\theta_{oil} = 40 \, ^\circ C \pm 5 \, ^\circ C$)  

**Transient function with a stepped form of electrical input signal**

- Measured at:
  - Pilot control valve
    Port „X“ = 100 bar
  - Main valve
    Port „P“ = 10 bar

**Frequency response characteristic curves**

- Measured at:
  - Pilot control valve
    Port „X“ = 100 bar
  - Main valve
    Port „P“ = 10 bar

**Flow-load function at max. valve opening** (tolerance ±10 %)

- 1 = Recommended flow limitation (flow velocity 30 m/s)
Characteristic curves (measured with HLP 46, $\theta_{oil} = 40 \, ^\circ C \pm 5 \, ^\circ C$) NS35

Transient function with a stepped form of electrical input signal

![Signal change in %](image)

Measured at:
- Pilot control valve
  Port „X“ = 100 bar
- Main valve
  Port „P“ = 10 bar

Frequency response characteristic curves

![Amplitude relationship in dB](image)

Measured at:
- Pilot control valve
  Port „X“ = 100 bar
- Main valve
  Port „P“ = 10 bar

Flow-load function at max. valve opening (tolerance ±10 %)

![Flow in l/min vs Valve pressure differential in bar](image)

1 = Recommended flow limitation
(flow velocity 30 m/s)
Unit dimensions (nominal dimensions in mm)

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

- **Subplates:**
  - G 534/01 (G3/4) without ports X, Y
  - G 535/01 (G3/4) with ports X, Y
  - G 536/01 (G1) with ports X, Y

- **Valve fixing screws**
  The following valve fixing screws are recommended:
  - 4 S.H.C.S. ISO 4762 – M6 x 45 -10.9-flZn-240h-L (friction value $\mu_{\text{total}} = 0.09$ to 0.14)
    - Tightening torque $M = 13.5$ Nm ±10 %
    - Material No. R913000258
  - or
  - 4 S.H.C.S. ISO 4762 – M6 x 45 -10.9 (friction value $\mu_{\text{total}} = 0.12$ to 0.17)
    - Tightening torque $M = 15.8$ Nm ±10 %

- **Note:**
  The tightening torque relates to the maximum operating pressure!
Unit dimensions (nominal dimensions in mm) NS16

1 Pilot control valve
2 Electrical connections
3 Cabling and plug-in connector
4 Inductive position transducer (pilot control valve)
5 Plug-in connector 6-pin + PE separate order, see page 7
6 Name plate
7 Main valve
8 Control electronics (OBE) and inductive position transducer (main valve)
9 Identical seal rings for ports X, Y
10 Identical seal rings for ports A, B, P, T
11 Space required for the connection cable and to remove the plug-in connector
12 Machined valve mounting surface, position of the ports to ISO 4401-07-06-0-94 (ports X, Y as required)
   Deviation from the standard:
   - Ports A, B, T and P Ø20 mm
13 Locating pin

For sectional drawing see page 22

Required surface finish of the valve mounting surface

Tolerances to:
- General tolerances ISO 2768-mK

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

Subplates:
- G 172/01 (G3/4)
- G 172/02 (M27 x 2)
- G 174/01 (G1)
- G 174/02 (M33 x 2)

Valve fixing screws
The following valve fixing screws are recommended:

2 S.H.C.S. ISO 4762 – M6 x 60 -10.9-flZn-240h-L
   (friction 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
   (friction value $\mu_{total} = 0.09$ to 0.14)
   Tightening torque $M_A = 58$ Nm ±20 %
   Material No. R913000116

or

2 S.H.C.S. ISO 4762 – M6 x 60 -10.9
   (friction 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
   (friction value $\mu_{total} = 0.12$ to 0.17)
   Tightening torque $M_A = 75$ Nm ±20 %

Note:
The tightening torque relates to the maximum operating pressure!
**Unit dimensions** (nominal dimensions in mm)

**Diagram**

1. Pilot control valve
2. Electrical connections
3. Cabling and plug-in connector
4. Inductive position transducer (pilot control valve)
5. Plug-in connector 6-pin + PE separate order, see page 7
6. Name plate
7. Main valve
8. Control electronics and inductive position transducer (main valve)
9. Identical seal rings for ports X, Y
10. Identical seal rings for ports A, B, P, T
11. Space required for the connection cable and to remove plug-in connector

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

12. Machined valve mounting surface, position of the ports to ISO 4401-08-07-0-94 (ports X, Y as required)
   - Deviations from the standard:
     - Ports A, B and T deviates from DIN Ø25 mm
     - Port P deviates from DIN and ISO Ø24 mm

13. Locating pin

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

**Subplates:**
- G 151/01 (G1)
- G 154/01 (G1 1/4)
- G 156/01 (G1 1/2)

**Valve fixing screws**
The following valve fixing screws are recommended:

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

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

**Note:**
The tightening torque relates to the maximum operating pressure!
Unit dimensions (nominal dimensions in mm)

For sectional drawing see page 23

Required surface finish of the valve mounting surface

Tolerances to:
- General tolerances ISO 2768-mK

12 Machined valve mounting surface, position of the ports to ISO 4401-08-07-0-94 (ports X, Y as required)
Deviations from the standard:
- Ports A, B, T und P Ø32 mm

13 Locating pin

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

Subplates:
G 151/01 (G1)
G 154/01 (G1 1/4)
G 156/01 (G1 1/2)

Valve fixing screws
The following valve fixing screws are recommended:

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

or

6 S.H.C.S. ISO 4762 – M12 x 60 -10.9
(friction value \( \mu_{\text{total}} = 0.12 \text{ to } 0.17 \))
Tightening torque \( M = 130 \text{ Nm } \pm 20 \% \)

Note:
The tightening torque relates to the maximum operating pressure!
Subplates to catalogue sheet RE 45060 and valve fixing screws must be ordered separately.

**Subplates:**
- G 157/01 (G1 1/2)
- G 157/02 (M48 x 2)
- G 158/10 (Flansch)

**Valve fixing screws**
The following valve fixing screws are recommended:

- 6 S.H.C.S. ISO 4762 – M20 x 80 -10.9-flZn-240h-L
  (friction value $\mu_{\text{total}} = 0.09$ to 0.14)
  Tightening torque $M_s = 340$ Nm $\pm 20\%$
  Material No. R901035246
or
- 6 S.H.C.S. ISO 4762 – M20 x 80 -10.9
  (friction value $\mu_{\text{total}} = 0.12$ to 0.17)
  Tightening torque $M_s = 430$ Nm $\pm 20\%$

**Note:**
The tightening torque relates to the maximum operating pressure!
Unit dimensions (nominal dimensions in mm)

1 Pilot control valve
2 Electrical connections
3 Cabling and plug-in connector
4 Inductive position transducer (pilot control valve)
5 Plug-in connector 6-pin + PE
   separate order, see page 7
6 Name plate
7 Main valve
8 Control electronics (OBE) and inductive position
   transducer (main valve)
9 Identical seal rings for ports X, Y
10 Identical seal rings for ports A, B, P, T
11 Space required for the connection cable and to remove the
   plug-in connector
12 Machined valve mounting surface,
   position of the ports to ISO 4401-10-08-0-94
   (ports X, Y as required)
   Deviations from the standard:
   – Ports A, B, T und P Ø50 mm
13 Locating pin

Valve fixing screws
must be ordered separately
The following valve fixing screws are recommended:

6 S.H.C.S. ISO 4762 – M20 x 100 -10.9-flZn-240h-L
   (friction value μ<sub>total</sub> = 0.09 to 0.14)
   Tightening torque M<sub>t</sub> = 465 Nm ±20 %
   Material No. R913000386
or
6 S.H.C.S. ISO 4762 – M20 x 100 -10.9
   (friction value μ<sub>total</sub> = 0.12 to 0.17)
   Tightening torque M<sub>t</sub> = 610 Nm ±20 %

Hinweis:
Note:
The tightening torque relates to the maximum operating
pressure!

Required surface finish of the valve mounting surface
Tolerances to: – General tolerances ISO 2768-mK

For sectional drawing see page 23
Unit dimensions (nominal dimensions in mm)
Pilot oil supply

Type 4WRTE…-4X/… External pilot oil supply
External pilot oil drain
With this version the pilot oil supply is from a separate control circuit (external).
The pilot oil drain is not passed into the T port of the main valve but separately into the tank via port Y (external).

Type 4WRTE…-4X/…E… Internal pilot oil supply
External pilot oil drain
With this version the pilot oil supply is from the P port of the main valve (internal).
The pilot oil drain is not passed into the T port of the main valve but separately into the tank via port Y (external).
Port X must be plugged on the subplate.

Type 4WRTE…-4X/…ET… Internal pilot oil supply
Internal pilot oil drain
With the version the pilot oil supply is from the P port of the main valve (internal).
The pilot oil drain is passed directly into the T port of the main valve (internal).
Port Y must be plugged on the subplate.

Type 4WRTE…-4X/…T… External pilot oil supply
Internal pilot oil drain
With this version the pilot oil supply is from a separate control circuit (external).
The pilot oil drain is passed directly into the T port of the main valve (internal).
Port Y must be plugged on the subplate.

Pos. 1 and 2: Plug M6 DIN 906-8.8 3A/F

NS10 For cross-section see page 16

NS16 For cross-section see page 17
Pilot oil supply

**NS25 and 27**
For cross-section see pages 18 and 19

<table>
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<tr>
<th>Section</th>
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<th>Pilot oil supply (section b–b)</th>
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<tbody>
<tr>
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<td>external: 1 closed</td>
<td>external: 2 closed</td>
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<tr>
<td></td>
<td>internal: 1 open</td>
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**NS32**
For cross-section see page 20

<table>
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**NS35**
For cross-section see page 21

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<tr>
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<td>external: 1 closed</td>
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<tr>
<td></td>
<td>internal: 1 open</td>
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</table>

<table>
<thead>
<tr>
<th>Pilot oil supply (section b–b)</th>
<th>closed</th>
<th>open</th>
</tr>
</thead>
</table>

Cover
Main valve
Pilot control valve

Main valve
Pilot control valve

Pilot oil supply external:
1 closed
internal:
1 open

Pilot oil supply external:
2 closed
internal:
2 open

Pilot oil supply external:
1 closed
internal:
1 open

Pilot oil supply external:
2 closed
internal:
2 open

Pilot oil supply external:
1 closed
internal:
1 open

Pilot oil supply external:
2 closed
internal:
2 open

For cross-section see pages 8 and 9

Section a–a  Section b–b

For cross-section see page 20

Section a–a

Section a–a

Section b–b

Section b–b