Industrial Electric Drives Hydraulics and Controls

Pneumatics

Service Automation Mobile

#### **Rexroth** Hydraulics **Bosch Group**

### RE 22 282/02.03

Replaces: 07.02

# 4/3-, 4/2- and 3/2-way directional valves with fluidic actuators Types WP, WH

Nominal size 6 Series 6X (WP), 5X (WH) Maximum operating pressure 315 bar Maximum flow 60 L/min



Fluidic actuators

Overview of contents		Features
Contents	Page	<ul> <li>Direct operated directional spool valve</li> </ul>
Features	1	<ul> <li>Operating elements:</li> </ul>
Ordering details	2	Pneumatic
Symbols	2, 3	Hydraulic
Preferred types	3	<ul> <li>Porting pattern to DIN 24 340 form A, without locating pin</li> </ul>
Function, section	3, 4	hole (standard)
Technical data	5	<ul> <li>Porting pattern to ISO 4401 and CETOP—RP 121 H, with</li> </ul>
Characteristic curves	6, 7	locating pin hole (ordering detail <b>/60</b> at the end of the valve
Performance limits	7	type code)
Unit dimensions	8	For subplates see catalogue sheet RE 45 052 (separate order)

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# **Ordering details**

			6		
3 actuator ports =	3				
4 actuator ports =	4				
Fluidic actuation					
Pneumatc	= W	P			
Hydraulic	= W	н			
Nominal size 6		=	6		
Symbols, e. g. C, E, EA, EB etc. 1)					
WP					
Series 60 to 69				= 6	X
(60 to 69: unchanged installation and c	onnecti	on dim	ension	s)	
WH					
Series 50 to 59				= 5	X
(50 to 59: unchanged installation and c	onnecti	on dim	ension	s)	
With spring return				= N	o code
Without spring return					= 0
Without spring return, with detent					= OF

	Switched	position	Valve type		
	2 Pos. 3 Pos.		WP	WH	
No code	•	•	•	•	
0	•		•	•	
OF	•		•	•	
$\bullet$ = Available					



- <sup>1)</sup> For symbols and examples see below and page 3.
- <sup>2)</sup> Only with pneumatic actuation "WP"
- <sup>3)</sup> Used with flows > than the valve performance limit, effective in the P port.
- <sup>4)</sup> Locating pin 3 x 8 DIN EN ISO 8752. Material No. **R900005694** (separate order)

# Symbols







#### <sup>5)</sup> Example:

- Spool E in switched position "a" → Ordering detail ..EA..
- Spool E in switched position "b" → Ordering detail ..EB..
- <sup>6)</sup> Symbol E1-:  $P \rightarrow A/B$ -pre-opening

### Attention!

Take the pressure intensification into account with differential cylinders!



#### Symbols: fluidic actuation

Ordering details		ls	Valve type			
	Spool	Detent	<b>WP</b> (pneumatic)	WH (hydraulic)		
			$-\frac{a}{b} \xrightarrow{A_1 B} b$	$= \frac{a}{b} \frac{b}{b}$		
A, C, D		/0	$A_1$ $B_2$ $b_1$ $-$	A, B a b p'T		
		/OF	$\begin{array}{c c} a & A_{1} & B \\ \hline & & b \\ \hline & & b \\ \hline & & p^{1} & T \\ \end{array}$	a b b -		
В, Ү			$A_{1} B_{1} B_{1$	$ \mathbb{A}_{1} \xrightarrow{B} \mathbf{b} \xrightarrow{b} \xrightarrow{b} \mathbf{b} \xrightarrow{b} \xrightarrow{b} \xrightarrow{b} \xrightarrow{b} \xrightarrow{b} \xrightarrow{b} \xrightarrow{b} \xrightarrow$		
E, F, G, H,	Switched pos. "a" <sup>4)</sup> = <b>.A</b>	<sup>I)</sup> see page 2	$- + \sum_{n=1}^{n} \frac{A_{n-1}B_{n-1}}{B_{n-1}} M_{n-1}$	$\begin{array}{c} A_{1} \\ B_{1} \\$		
j, l, M, P, Q, R,	Switched pos. "b" <sup>4)</sup> = . <b>B</b>	(symbols)	$M_{\mathbf{p}} \stackrel{\mathbf{b}}{\longrightarrow} \mathbf{b}$	$M_{\mathbf{a}} = B_{\mathbf{b}} $		
T, U, V, W			$ \begin{array}{c c} A_{1} & B \\ \hline A_{1} & b \\ \hline A_{2} & b \\ \hline A_{1} & b \\ \hline B_{1} & T \\ \hline B_{1} & T \\ \hline B_{2} & T \\ \hline B_{1} & T \\ \hline B_{2} & T \\ \hline B_{1} & T \\ \hline B_{2} & T \\ \hline B_{1} & T \\ \hline B_{2} & T \\ \hline B_{1} & T \\ \hline B_{2} & T \\ \hline B_{1} & T \\ \hline B_{2} & T \\ \hline B_{1} & T \\ \hline B_{2} & T \\ \hline B_{1} $	$\begin{array}{c c} A_{1} & B \\ \hline a & 0 & b \\ P' & T \end{array}$		

## Preferred types (readily available)

Material No.	Туре WH
R900472229	3WH 6 A5X/
R900449957	4WH 6 D5X/
R900476667	4WH 6 E5X/
R900470475	4WH 6 J5X/
R900470211	4WH 6 Y5X/

Material No.	Type WP
R900752414	4WP 6 D6X/
R900752415	4WP 6 E6X/
R900753849	4WP 6 G6X/
R900752413	4WP 6 J6X/

Further preferred types and standard units are to be found in the EPS (Standard Price List).

## **Function**, section

The WP and WH directional control valves are fluidically actuated directional spool valves.

They control the start, stop and direction of a flow.

The directional valves basically comprise of a housing (1), one or two actuating elements (2) (hydraulic, pneumatic actuating cylinders), the control spool (3), as well as one or two return springs (4).

In the de-energised condition the control spool (3) is held in the neutral or initial position by the return springs (4) (with the exception of impulse spools).

The control spool (3) is pushed into the required switched position by the actuating element.

### Throttle insert

The use of a throttle insert is required, if, due to the operating

conditions, flows are to be expected during the switching proceedure that are higher than the stated maximum performance limits of the valve.



The throttle insert is fitted into the P port of the directional valve.



## **Function**, section

#### With detent, version .. OF/..

Hydraulically or pneumatically operated directional valves are also available as 2-position valves with detent (5). When the operating elements with detent are used, each switching position may be locked.

#### Without spring return, without detent, version .. O/...

When using operating elements without spring return and without detent there is no defined switching position when de-energised.



Type 4WP 6 C6X/OF/N... A

## Technical data (for applications outside these parameters, please consult us!)

General						
Valve type			WP WH			
Installation			Optional <sup>1)</sup>			
Ambient temperature range °C		-30  to  + 80  (NBR seals)				
		-20  to  + 80  (FKM seals)				
Weight   1 operating cylinder   kg		Approx. 1.8 Approx. 2.0				
Valve with:	2 operating cylinders	kg	Approx. 2.0 Approx. 2.2			
Hydraulic						
Max. operating pressure	Ports A, B, P	bar	Up to 315			
Port T bar		Up to 160 (with symbols A and B the port T must be used as leakage port when the operating pressure is above 160 bar.)				
Max. flow		L/min	60			
Flow cross-section	With symbol Q		6 % of the nominal cross-section			
(switched position 0):	witched position 0): With symbol W 3 % of the nominal cross-section		1			
Min. control pressure		bar	4 (see char. curves on page 5)	6 to 10 > tank pressure $^{2)}$		
Max. control pressure		bar	10	200		
Control volume		cm <sup>3</sup>	1.23			
Pressure fluid			Mineral oil (HL, HLP) to DIN 51 524 <sup>3</sup> ; Fast bio-degradable pressure fluids to VDMA 24 568 (also see RE 90 221); HETG (rape seed oil) <sup>3</sup> ; HEPG (polyglycols) <sup>4</sup> ; HEES (synthetic ester) <sup>4</sup> ; Other pressure fluids on request			
Pressure fluid temperature r	range	°C	-30 to $+80$ (with NBR seals)			
			-20 to $+80$ (with FKM seals)			
Viscosity range		mm²/s	2.8 to 500			
Cleanliness class to ISO code			Maximum permissible degree of contamination of the pressure fluid is to ISO 4406 (C) class 20/18/15 $^{\rm 5)}$			
<ol> <li>With version/O (A, C, and D): horizontal</li> <li>Performance limits dependent on the minimum control pressure, see page 6</li> <li>Suitable for NBR and FPM seals</li> <li>Only suitable for FKM seals</li> </ol>		<sup>5)</sup> 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. For the selection of filters see catalogue sheets RE 50 070, RE 50 076 and RE 50081.				



## **Performance limits: type WP...** (measured with HLP46, $\vartheta_{oil} = 40 \text{ °C} \pm 5 \text{ °C}$ )





 $^{1)}$  The switching function of the valve is, due to the sticking effect, dependent on the filtration. To obtain the stated permissible flow data we recommend full flow filtration with a filter rating of 25  $\mu m$ . The flow forces acting within the valve also affects the flow performance limits.

For 4-way valves the stated flow data is therefore valid for the normal application case of 2 directions of flow (e.g. from P to A and at the same time return flow from B to T) (see table).

If there is only one direction of flow then the permissible flow in critical cases can be considerably lower, (e.g. when using a 4-way directional valve as a 3-way directional valve with ports A or B plugged).



Control pressure 6 bar > T-pressure		Control pressure 10 bar > T-pressure			
Char. curve Symbol		Char. curve		Symbol	
	1	А, В		1	А, В
	2	C, D, Y	_	8	C, D, Y, E, G, H, J, L,
return	3	E, J, L, U, M, Q, V, W, E1-	j return		U, M, Q, V, W, E1-
	4	F, P		9	F, P
ng	5	Т	rinç	10	R
Spri	6	G,H	Sp	11	Т
	7	R			
/O /OF	8	A, C, D	/O /OF	8	A, C, D

3

60

50

40





- Valve with 2 switched positions and2 operating cylinders
   Valve with 3 switched positions and2 operating cylinders
- 2 Operating cylinder "a"
- **3** Operating cylinder "b"
- 4 Plug for valve with 1 operating cylinder (2 switched position)

- 5 Hand override, optional (only with version "WP")
- 6 Identical seal rings for ports A, B, P, T
- 7 Name plate
- 8 Porting pattern to DIN 24 340 form A, without locating pin hole
- **9** Porting pattern to ISO 4401 and CETOP-RP 121 H **with** locating pin hole

Required surface finish of the mating piece

#### **Subplates**

(Without locating pin hole) G 341/01 (G 1/4) G 342/01 (G 3/8) G 502/01 (G 1/2) (With locating pin hole) G 341/60 (G 1/4) G 342/60 (G 3/8) G 502/60 (G 1/2)

to catalogue sheet RE 45 052 and

### Valve fixing screws

M5 x 50 DIN 912-10.9,  $M_{\rm A} = 8,9$  Nm, must be ordered separately Туре WH...



- Valve with 2 switched positions and 2 operating cylinders
   Valve with 3 switched positions and 2 operating cylinders
- 2 Operating cylinder "a"
- 3 Operating cylinder "b"
- 4 Plug for valve with 1 operating cylinder (2 switched positions)
- 5 Identical seal rings for ports A, B, P, T
- 6 Name plate
- 7 Porting pattern to DIN 24 340 form A, without locating pin hole
- 8 Porting pattern to ISO 4401 and CETOP-RP 121 H with locating pin hole

#### Subplates

G 341/01 (G 1/4)
G 342/01 (G 3/8)
G 502/01 (G 1/2)
G 341/60 (G 1/4)
G 342/60 (G 3/8)
G 502/60 (G 1/2)

to catalogue sheet RE 45 052 and

#### Valve fixing screws

M5 x 50 DIN 912-10.9,  $M_{\rm A} = 8,9$  Nm, must be ordered separately

#### Bosch Rexroth AG Industrial Hydraulics

D-97813 Lohr am Main Zum Eisengießer 1 • D-97816 Lohr am Main Telefon 0 93 52 / 18-0 Telefax 0 93 52 / 18-23 58 • Telex 6 89 418-0 eMail documentation@boschrexroth.de Internet www.boschrexroth.de

#### **Bosch Rexroth Limited**

Cromwell Road, St Neots, Cambs, PE19 2ES Tel: 0 14 80/22 32 56 Fax: 0 14 80/21 90 52 eMail: info@boschrexroth.co.uk The data specified above only serves to describe the product. No statements concerning a certain condition or suitability for a certain application can be derived from our information. The details stated do not release you from the responsibility for carrying out your own assessment and verification. It must be remembered that our products are subject to a natural process of wear and ageing.