

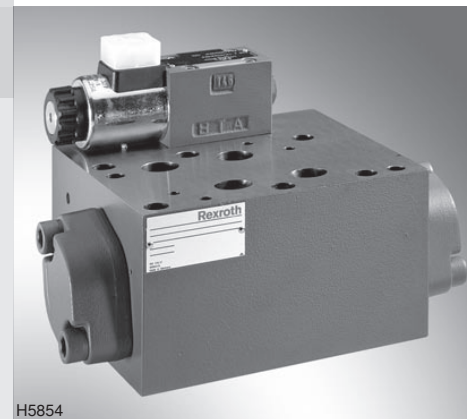
4/2 and 4/3 directional shut-off valves, internally pilot operated, externally pilot operated

RE 24768/08.08
Replaces: 10.97

1/12

Types Z4WEH and Z4WH

Size 25
Component series 5X
Maximum operating pressure 315 bar
Maximum flow 650 l/min



H5854

Table of contents

Content	Page
Features	1
Ordering code	2, 3
Mating connectors	3
Symbols	4
Function, section	5
Pilot oil supply	6
Technical data	7
Switching times	8
Characteristic curves	8
Unit dimensions	9, 10
Stroke adjustment, attachment options	11

Features

- Directional spool valve, pilot operated
- 2 types of actuation:
 - Electrohydraulic (type WEH)
 - Hydraulic (type WH)
- Function as shut-off through valve or shut-off/through valve/short-circuit valve
- Free flow in P and T in every spool position
- Porting pattern to ISO 4401-08-08-0-05
- Wet-pin DC or AC voltage solenoids, optional
- Manual override, optional
- Electrical connection as individual connection, see RE 23178 and RE 08010 (central connection on request)
- Switching time adjustment, optional
- Stroke adjustment am main spool, optional
- Inductive position switches and proximity sensors (contactless), see RE 24830

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

Ordering code

	Z4		22	-5X/					
Types of actuation	= WEH		= WH						
Electrohydraulic									
Hydraulic									
Size 25			= 22						
Spool symbols see page 4									
Component series 50 to 59 (50 to 59: unchanged installation and connection dimensions)					= 5X				
Pilot valve									
High-performance valve (RE 23178)					= 6E ¹⁾				
DC voltage 24 V					= G24 ¹⁾				
AC voltage 230 V 50/60 Hz					= W230 ¹⁾				
DC voltage 205 V 50/60 Hz					= G205 ^{1); 2)}				
For further voltages, frequencies and electrical data, see data sheet RE 23178									
Without manual override					= No code				
With manual override					= N ¹⁾				
With concealed manual override (standard)					= N9 ¹⁾				
External pilot oil supply, external pilot oil drain					= No code				
Internal pilot oil supply, internal pilot oil drain (standard)					= ET ³⁾				
External pilot oil supply, internal pilot oil drain (with type Z4WH... only "No code" possible!)					= T				
Without switching time adjustment					= No code				
Switching time adjustment as meter-in control					= S				
Switching time adjustment as meter-out control					= S2				

¹⁾ Only in the case of electrohydraulic actuation, version "WEH"

²⁾ For connection to the AC voltage mains, a DC solenoid **must** be used, which is controlled via a rectifier (see table on the right-hand side).

In the case of individual connection, a mating connector with integrated rectifier can be used (separate order, see page 3).

³⁾ Internal pilot oil **supply**:

- Minimum pilot pressure: Please read page 6!
- To prevent impermissibly high pressure peaks, a **throttle insert "B10"** must be provided in the P port of the pilot valve (see page 5).

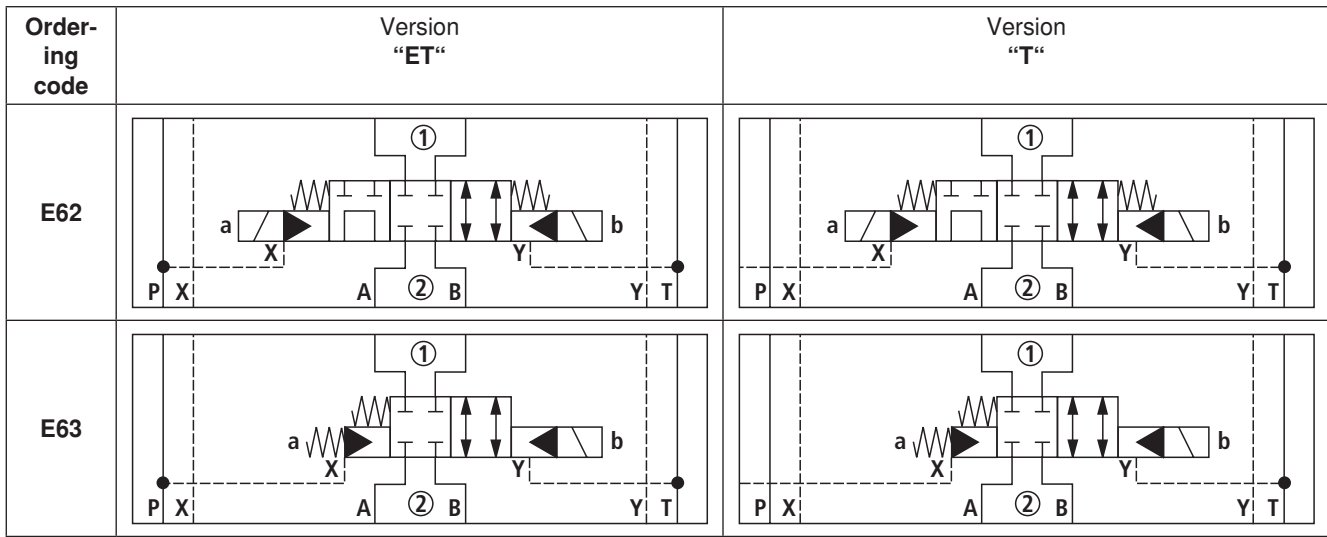
⁴⁾ Mating connectors, separate order, see page 3.

⁵⁾ On version "D3", a throttle insert "B10" must be installed in port P of the pilot valve!

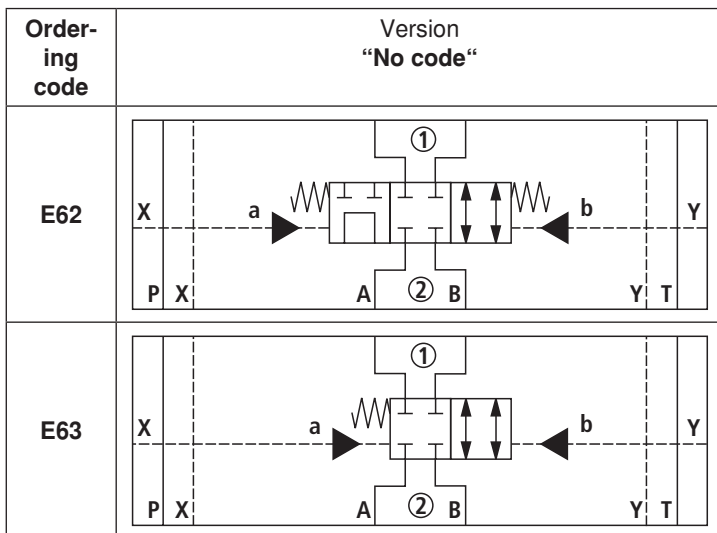
AC voltage mains (permissible voltage tolerance ±10%)	Nominal voltage of the DC voltage solenoid when operated with AC voltage	Ordering code
110 V - 50/60 Hz 120 V - 60 Hz	96 V	G96
230 V - 50/60 Hz	205 V	G205

Standard types and components are shown in the EPS (standard price list).

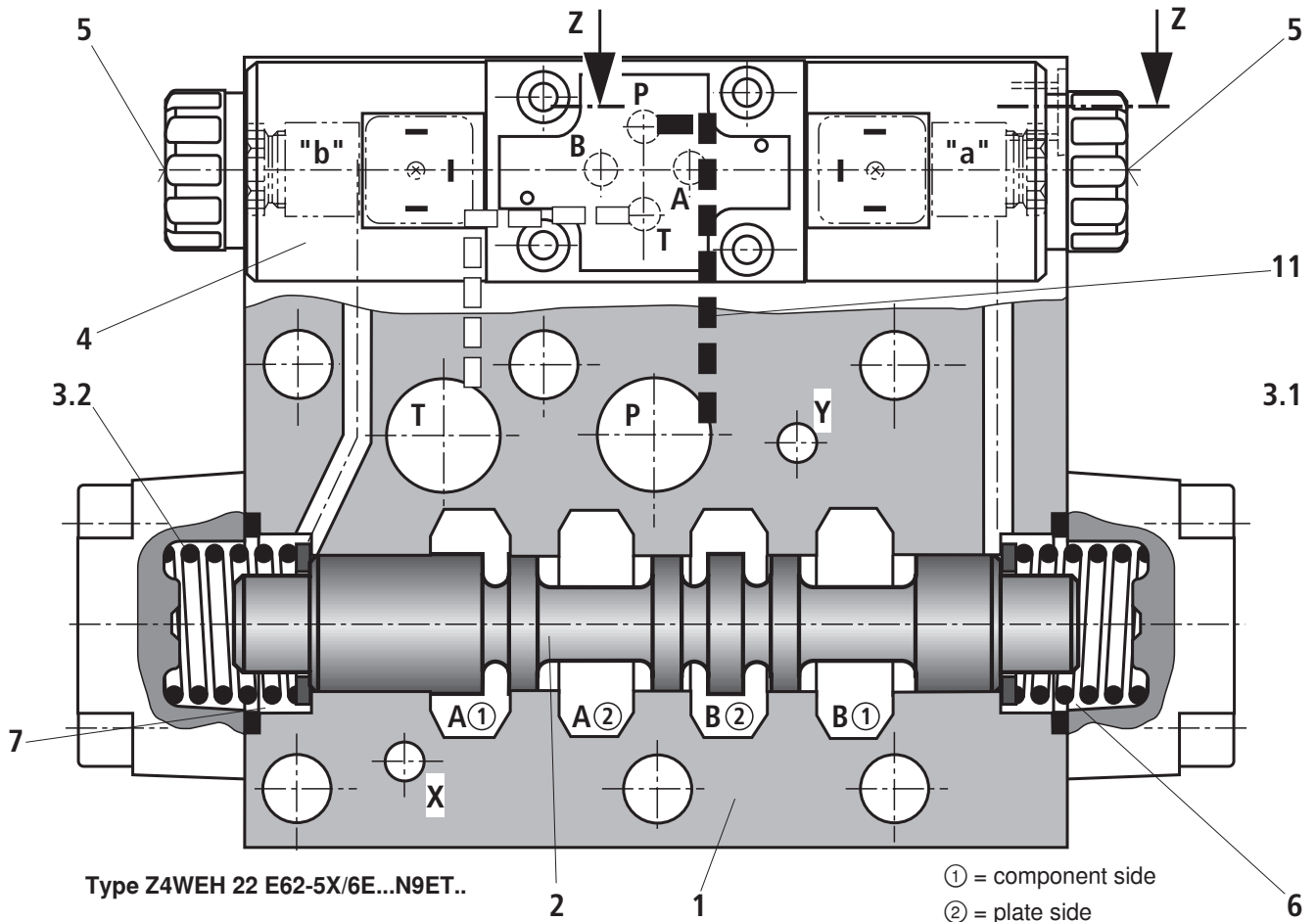
Symbols: Type Z4WEH (① = component side, ② = plate side)



Symbols: Type Z4WH (① = component side, ② = plate side)



Function, section



Valves of type Z4WEH are directional spool valves with electrohydraulic actuation. They control the start and stop of a flow.

These directional valves basically consist of the main valve with housing (1), main control spool (2), one or two return springs (3.1 and 3.2), as well as pilot valve (4).

Main control spool (2) in the main valve is held by springs or through pressurization in the zero or initial position. In the initial position, the two spring chambers (6) and (7) are connected pressureless to tank via pilot channel (4). The pilot valve is supplied with pilot oil via pilot line (11). The supply can be provided internally or externally (externally via port X in the sandwich plate, see page 6).

When the pilot valve is operated, e.g. solenoid "a", the pilot spool (not shown on the drawing) is pushed to the left and spring chamber (7) is consequently pressurized to pilot pressure. Spring chamber (6) remains pressureless.

The pilot pressure acts on the left side of main control spool (2) and pushes it against spring (3.1). In the main valve the ports are connected on the component side and on the plate side depending on the symbol.

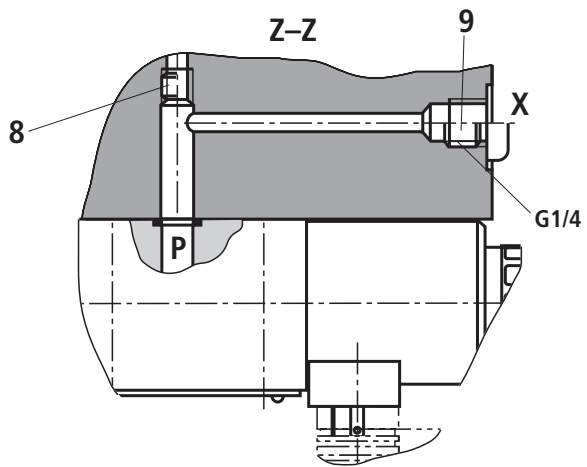
When the solenoid is de-energized, the pilot spool returns to its initial position. Spring chamber (7) is unloaded to tank.

The pilot oil is drained internally from spring chamber (7) via pilot valve (4) into channel T (Y).

An optional manual override (5) allows the pilot spool to be moved without energization of the solenoid.

Pilot oil supply (section Z – Z), see page 6.

Pilot oil supply



Pilot oil supply

External: 8 closed
9 open

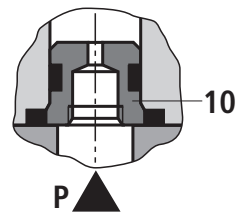
internal: 8 open
9 closed

Pilot oil port "X" only possible with Z4WEH 22

Throttle insert

The use of throttle insert (10) is required, if the pilot oil supply is to be limited in channel P of the pilot valve.

Throttle insert (10) is to be installed in channel P of the pilot valve.



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

Masse	– Valve with 1 solenoid	kg	20.8
	– Valve with 2 solenoids	kg	21.1
	– Valve with hydraulic actuation (type 4WH...)	kg	20.0
	– Switching time adjustment	kg	0.8
	– Pressure reducing valve	kg	0.4
	– Plate for version "T"	kg	0.5
Installation position			Optional
Ambient temperature range		°C	–30 to +50 (NBR seals) –20 to +50 (FKM seals)

Hydraulic

Maximum operating pressure	– Ports A, B, X and Y	bar	315
	– Port P		
	External pilot oil supply	bar	315
	Internal pilot oil supply	bar	210 (without pressure reducing valve) 315 (with pressure reducing valve)
	– Port T (Only internal pilot oil drain)	bar	210 (version "WEH" with DC solenoid) 160 (version "WEH" with AC solenoid) 315 (version "WH")
Minimum pilot pressure		bar	12
Maximum pilot pressure		bar	210
Maximum flow		l/min	650
Pilot volume for operation		cm ³	7,7
Hydraulic fluid ¹⁾			Mineral oil (HL, HLP) to DIN 51524 ²⁾ ; fast bio-degradable hydraulic fluids to VDMA 24568 (see also RE 90221); HETG (rape seed oil) ²⁾ ; HEPG (polyglycols) ³⁾ ; HEES (synthetic esters) ³⁾ ; other hydraulic fluids on request
Hydraulic fluid temperature range		°C	–30 to +80 (NBR seals) –20 to +80 (FKM seals)
Viscosity range		mm ² /s	2.8 to 500
Permissible max. degree of contamination of the hydraulic fluid - cleanliness class to ISO 4406 (c)			Class 20/18/15 ⁴⁾

¹⁾ The ignition temperature of the process and operating medium used must be higher than the maximum solenoid surface temperature.

²⁾ Suitable for NBR and FKM seals

³⁾ Suitable only for FKM seals

⁴⁾ The cleanliness classes specified for components must be adhered to in hydraulic systems. Effective filtration prevents malfunction and, at the same time, prolongs the service life of components.

For the selection of filters, see data sheets RE 50070, RE 50076, RE 50081, RE 50086, RE 50087 and RE 50088.

Notes!

- The manual override can only be actuated up to a tank pressure of ca. 50 bar. Avoid damage to the bore for the manual override! (Special tool for operation, separate order, Material no. **R900024943**). When the manual override is blocked, operation of the solenoids must be ruled out!
- The simultaneous operation of the solenoids must be ruled out!

Switching times (= making contact on the pilot valve until the control land starts to open in the main valve and change of the pressure value by 5%)

ON – AC voltage (~) and DC voltage (=)

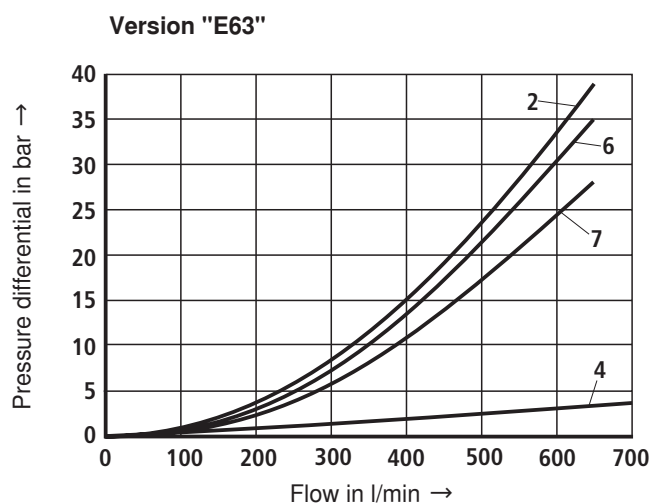
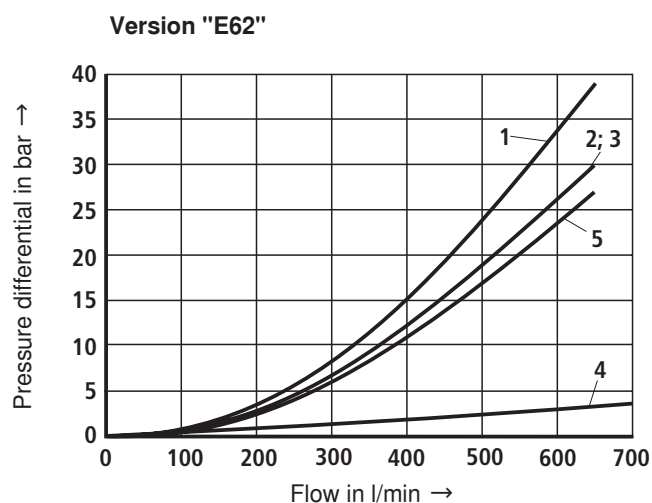
Pilot pressure	bar	70		140		210	
Type of voltage		~	=	~	=	~	=
3-position valve (spring-centered)							
– Version "ET" (with throttle insert "B10")	ms	80	115	60	85	50	75
– Version "ET" (with pressure reducing valve "D3; 45 bar")	ms	80	80	65	75	50	65
– Version "T"	ms	30	50	20	50	20	50
2-position valve (spring end position)							
– Version "ET" (with throttle insert "B10")	ms	100	140	70	100	50	75
– Version "ET" (with pressure reducing valve "D3; 45 bar")	ms	110	125	65	95	50	75
– Version "T"	ms	45	65	40	60	55	85

OFF – AC voltage (~) and DC voltage (=)

Pilot pressure	bar	70		140		210	
Type of voltage		~	=	~	=	~	=
3-position valve (spring-centered)							
– Version "ET" (with throttle insert "B10")	ms	60	50	60	50	60	50
– Version "ET" (with pressure reducing valve "D3; 45 bar")	ms	85	50	85	50	85	50
– version "T"	ms	55	50	55	50	55	50
2-position valve (spring end position)							
– Version "ET" (with throttle insert "B10")	ms	175	160	160	140	150	130
– Version "ET" (with pressure reducing valve "D3; 45 bar")	ms	175	150	150	120	140	110
– Version "T"	ms	110	55	100	45	95	40

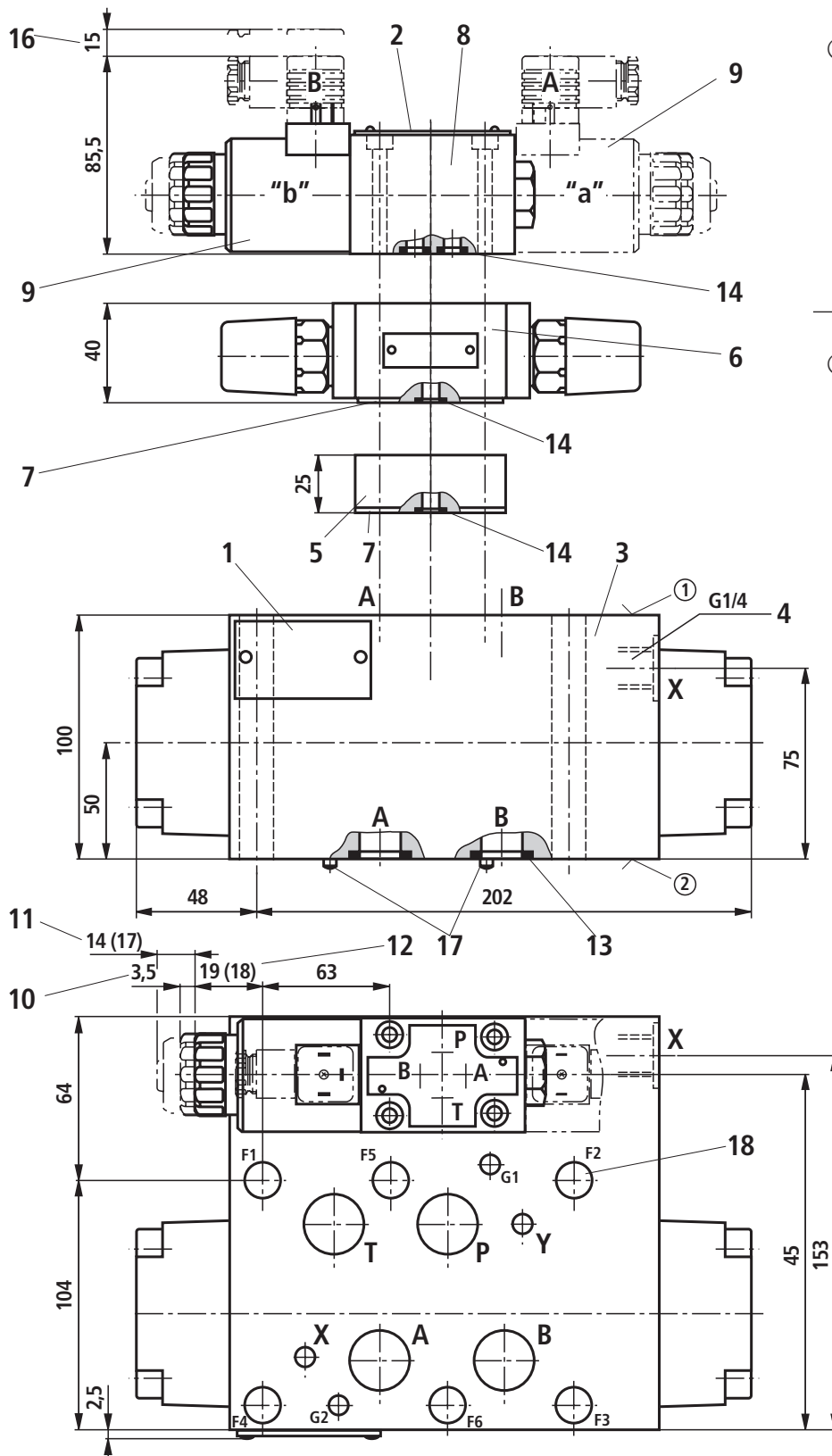
Characteristic curves (measured with HLP46, $\vartheta_{oil} = 40 \text{ }^\circ\text{C} \pm 5 \text{ }^\circ\text{C}$)

Δp - q_v characteristic curves



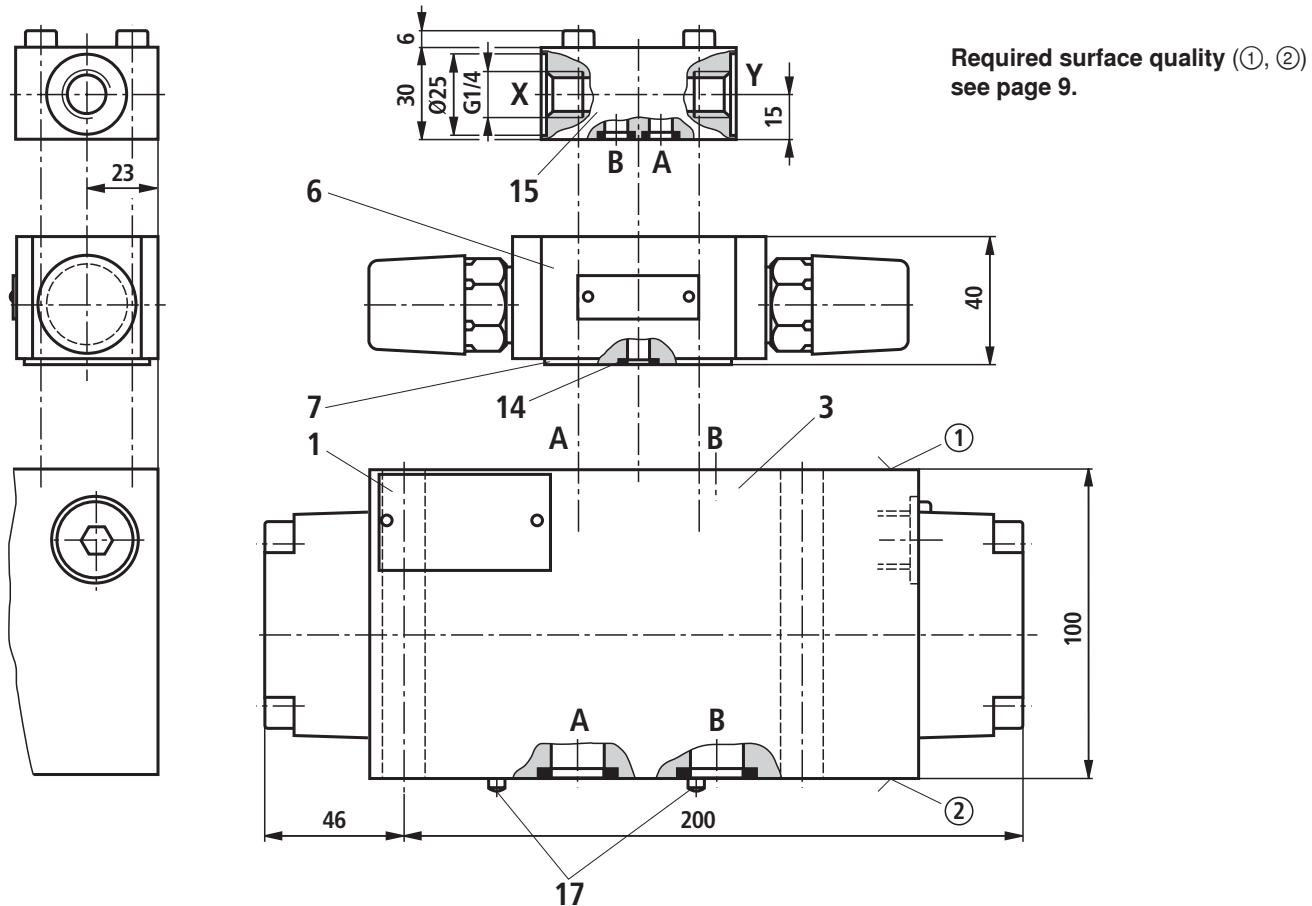
- | | |
|--|--|
| 1 A2 \rightarrow A1 | 5 A1 \rightarrow A2; A2 \rightarrow B2 |
| 2 B2 \rightarrow B1 | 6 A1 \rightarrow A2 |
| 3 B1 \rightarrow B2; B2 \rightarrow A2 | 7 A2 \rightarrow A1; B1 \rightarrow B2 |
| 4 P2 \rightarrow P1; T2 \rightarrow T1 | |

Unit dimensions: Type Z4WEH22 (dimensions in mm)



For explanations of items, see page 10.

Unit dimensions: Type Z4WH22 (dimensions in mm)



Required surface quality (①, ②)
see page 9.

- | | |
|---|--|
| <p>1 Nameplate of complete valve</p> <p>2 Nameplate of pilot valve</p> <p>3 Main valve</p> <p>① = component side – porting pattern to ISO 4401-08-08-0-05</p> <p>② = plate side – porting pattern to ISO 4401-08-08-0-05</p> <p>4 Port X (G1/4) for external pilot control</p> <p>5 Pressure reducing valve “D3” (must be used in the case of pilot pressures above 210 bar; only for version “Z4WEH”)</p> <p>Material no.:
NBR seals: R900323180
FKM seals: R900323664</p> <p>⚠ Attention!
If a pressure reducing valve “D3” is used, a throttle insert “B10” must be installed in port P of the pilot valve!</p> <p>6 Switching time adjustment (throttle check valve, see data sheet RE 27506); depending on the installation position, meter-in or meter-out control (illustration: meter-in control)</p> <p>7 R-ring plate</p> <p>8 Pilot valve (see data sheet RE 23178)</p> <ul style="list-style-type: none"> – Type 4WE 6 J.. with symbol E62 – Type 4WE 6 Y.. with symbol E63 | <p>9 Solenoids “a” and “b” (can be rotated 90°)</p> <p>10 Dimension for valve without manual override</p> <p>11 Dimension for valve with manual override “N”; dimensions () for valve with AC solenoid</p> <p>12 Dimension for valve with concealed manual override “N9”; dimensions () for valve with AC solenoid without manual override</p> <p>13 Identical seal rings for ports A, B, P, T (main valve)</p> <p>14 Identical seal rings for ports A, B, P, T</p> <p>15 Pilot oil subplate</p> <p>16 Space required to remove mating connector</p> <p>17 Locating pin</p> <p>18 Valve mounting bores</p> <p>Valve mounting screws (separate order)
6 hexagon socket head cap screws
ISO 4762 - M12 - 10.9</p> |
|---|--|

Note!

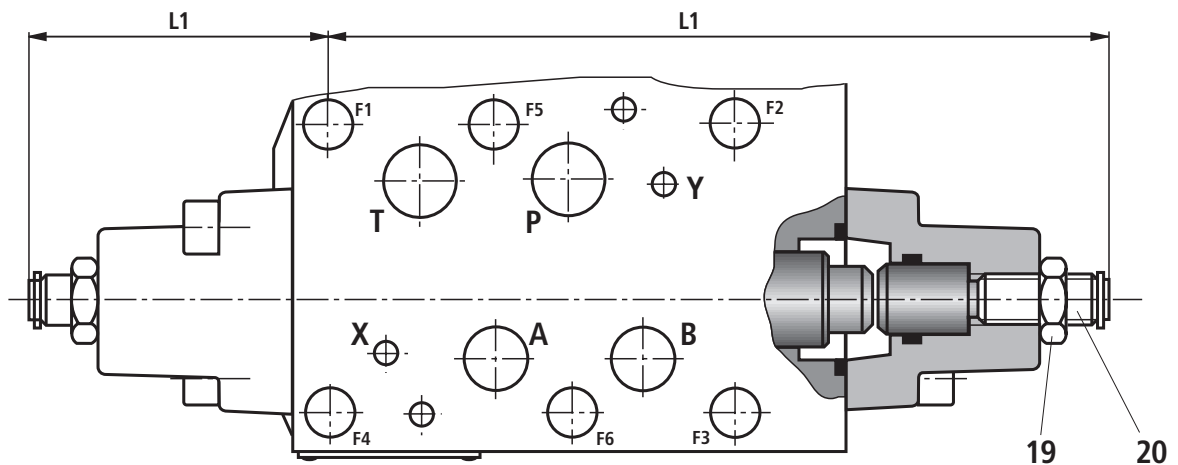
The length and tightening torque of the valve mounting screws must be calculated taking account of the components mounted.

Stroke adjustment, attachment options (dimensions in mm)

Attachment options	Ordering code	L1	L2
Stroke adjustment on sides A and B	10	94	248
Stroke adjustment on side A	11	94	
Stroke adjustment on side B	12		248

The stroke adjustment feature limits the stroke of the main spool. The spool stroke can be reduced by loosening locknut (19) and turning adjustment spindle (20) clockwise. The control chamber must be pressureless during this process.

Stroke 9.5 mm (1 turn = 1.5 mm stroke)



19 Locknut 24 A/F

20 Adjustment spindle, hexagon socket 6 A/F

Notes

Bosch Rexroth AG
Hydraulics
Zum Eisengießer 1
97816 Lohr am Main, Germany
Phone +49 (0) 93 52 / 18-0
Fax +49 (0) 93 52 / 18-23 58
documentation@boschrexroth.de
www.boschrexroth.de

© This document, as well as the data, specifications and other information set forth in it, are the exclusive property of Bosch Rexroth AG. It may not be reproduced or given to third parties without its consent. 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.