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 I/min

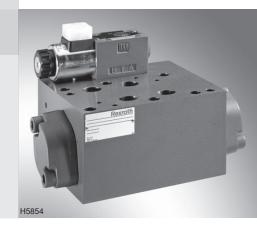


Table of contents

Content Features Ordering code Mating connectors Symbols Function, section Pilot oil supply Technical data Switching times Characteristic curves Unit dimensions Stroke adjustment, attachment options

Features

Page

- Directional spool valve, pilot operated

- 2 types of actuation:

2, 3 • Electrohydraulic (type WEH)

• Hydraulic (type WH)

 Function as shut-off through valve or shut-off/through valve/ short-circuit valve

5 – Free flow in P and T in every spool position

6 – Porting pattern to ISO 4401-08-08-0-05

Wet-pin DC or AC voltage solenoids, optional

8 – Manual override, optional

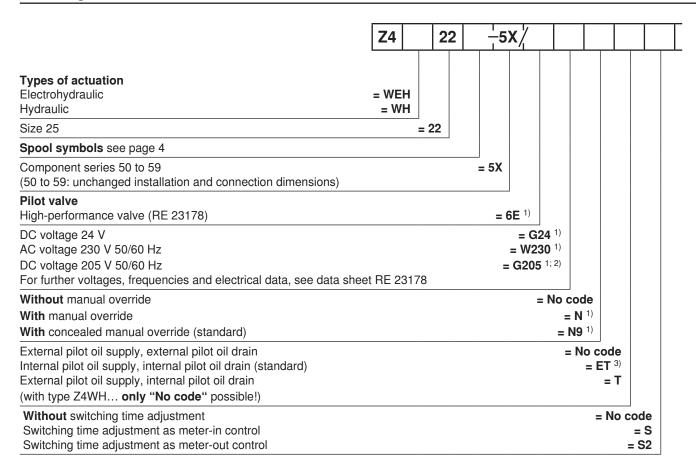
Electrical connection as individual connection, see
 10 RE 23178 and RE 08010 (central connection on request)

11 - Switching time adjustment, optional

- Stroke adjustment am main spool, optional

 Inductive position switches and proximity sensors (contactless), see RE 24830

Ordering code



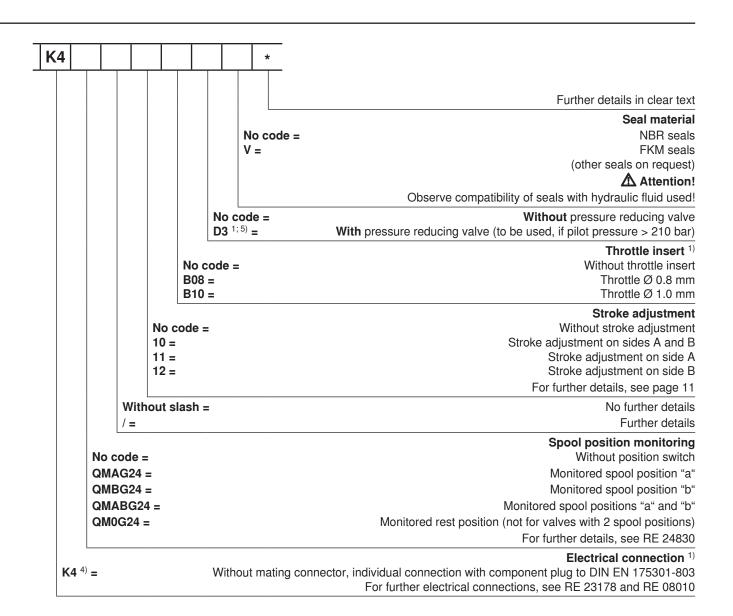
- 1) Only in the case of electrohydraulic actuation, version "WEH"
- ²⁾ For connection to the AC voltage mains, a DC solenoid must be used, which is controlled via a rectifier (see table on the right-hand side).

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	

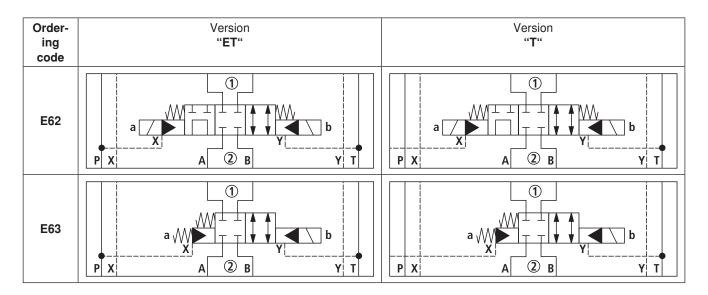
Standard types and components are shown in the EPS (standard price list).



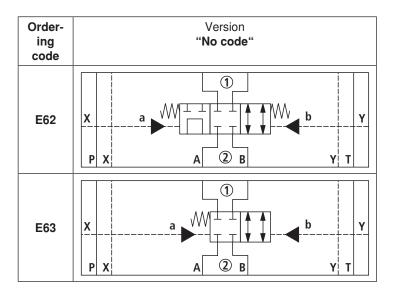
Mating connectors to DIN EN 175301-803

ther ma	ils and fur- ating con- ctors, E 08006							
			Mater	ial no.				
Valve side	Color	Without circuitry	With indicator lamp 12 240 V	With rectifier 12 240 V	With indicator lamp and Zener-diode suppressor circuit 24 V			
a	Gray	R901017010	-	-	-			
b	Black	R901017011	-	_	_			
a/b	Black	-	R901017022	R901017025	R901017026			

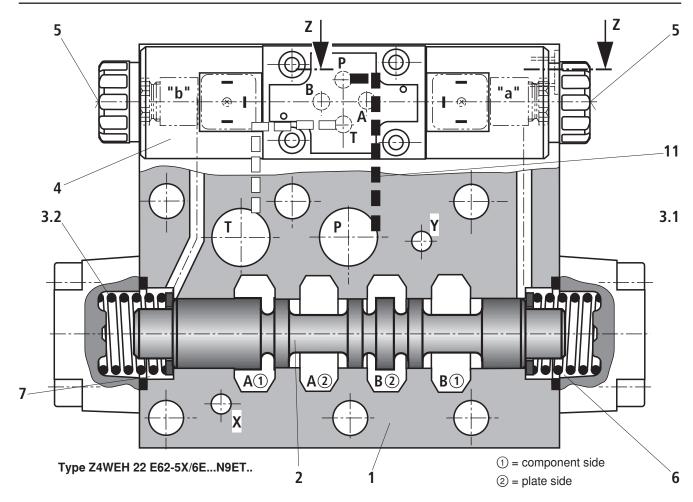
Symbols: Type Z4WEH (1) = component side, 2) = plate side)



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.

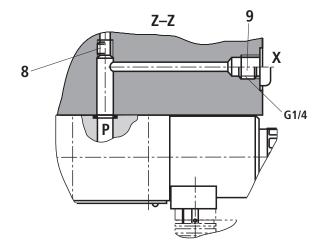
The pilot pressure acts on the left side of main control spool (2) and pushes it against spring (3.1). In the main valve the ports are connected on the component side and on the plate side depending on the symbol.

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



Pilot oil supply

External: 8 closed

9 open

internal: 8 open

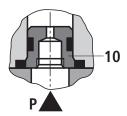
9 closed

Pilot oil port "X" only possible with Z4WEH 22 \dots .

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		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 pos	sition		Optional			
Ambient tempe	erature range	°C	-30 to +50 (NBR seals) -20 to +50 (FKM seals)			
Hydraulic						
Maximum oper	- Ports A, B, X and Y	bar	315			
ating pressure	– 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		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	9	mm²/s	2.8 to 500			
Permissible ma	ax. degree of contamination of the		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.

hydraulic fluid - cleanliness class to ISO 4406 (c)

- 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 (=)

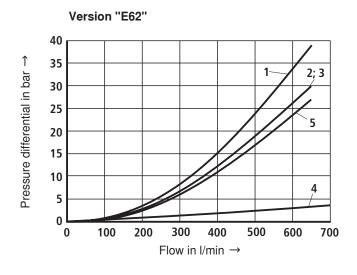
Pilot pressure	bar	70		140		210	
Type of voltage		~	=	~	=	~	=
3-position valve (spring-centered)							
Version "ET" (with throttle insert "B10")	ms	80	115	60	85	50	75
- Version "ET" (with pressure reducing valve "D3; 45 bar")	ms	80	80	65	75	50	65
- Version "T"	ms	30	50	20	50	20	50
2-position valve (spring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

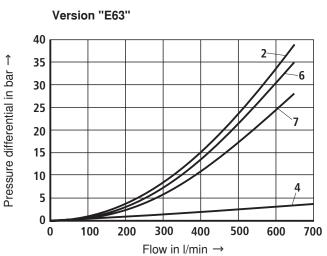
OFF – AC voltage (~) and DC voltage (=)

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, ϑ_{oil} = 40 °C ±5 °C)

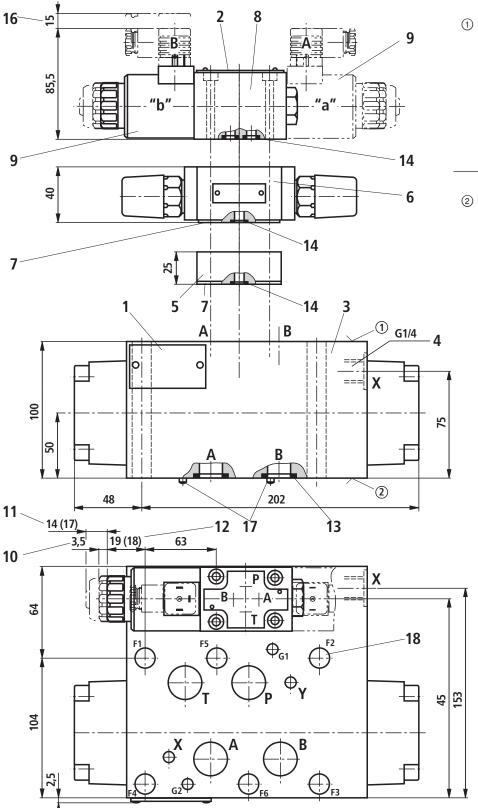
Δp - q_V characteristic curves



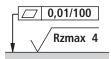


- **1** A2 → A1
- **5** A1 → A2; A2 → B2
- 2 B2 → B1
- **6** A1 → A2
- **3** B1 → B2; B2 → A2
- **7** A2 → A1; B1 → B2
- **4** P2 → P1; T2 → T1

Unit dimensions: Type Z4WEH22 (dimensions in mm)

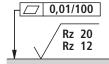


① component side - porting pattern to ISO 4401-08-08-0-05



Required surface quality of the valve mounting face

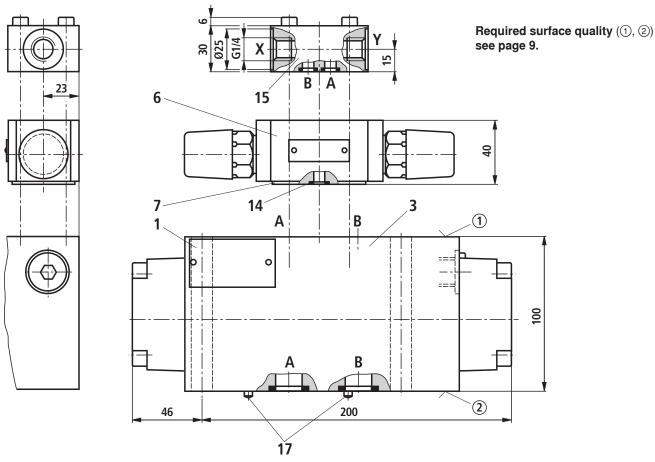
② plate side - porting pattern to ISO 4401-08-08-0-05



Required surface quality of the valve mounting face

For explanations of items, see page 10.

Unit dimensions: Type Z4WH22 (dimensions in mm)



- 1 Nameplate of complete valve
- 2 Nameplate of pilot valve
- 3 Main valve
 - \bigcirc = component side porting pattern to ISO 4401-08-08-0-05
 - ② = plate side porting pattern to ISO 4401-08-08-0-05
- 4 Port X (G1/4) for external pilot control
- 5 Pressure reducing valve "D3" (must be used in the case of pilot pressures above 210 bar; only for version "Z4WEH")

Material no.:

NBR seals: **R900323180** FKM seals: **R900323664**

⚠ Attention!

If a pressure reducing valve "D3" is used, a throttle insert "B10" must be installed in port P of the pilot valve!

- 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)
- 7 R-ring plate
- 8 Pilot valve (see data sheet RE 23178)
 - Type 4WE 6 J.. with symbol E62
 - Type 4WE 6 Y.. with symbol E63

- 9 Solenoids "a" and "b" (can be rotated 90°)
- 10 Dimension for valve without manual override
- 11 Dimension for valve with manual override "N"; dimensions () for valve with AC solenoid
- 12 Dimension for valve with concealed manual override "N9"; dimensions () for valve with AC solenoid without manual override
- 13 Identical seal rings for ports A, B, P, T (main valve)
- 14 Identical seal rings for ports A, B, P, T
- 15 Pilot oil subplate
- 16 Space required to remove mating connector
- 17 Locating pin
- 18 Valve mounting bores

Valve mounting screws (separate order) 6 hexagon socket head cap screws ISO 4762 - M12 - 10.9

Mote!

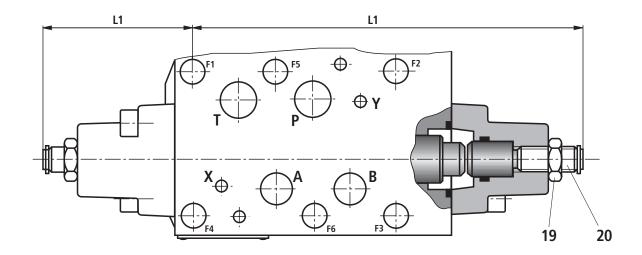
The length and tightening torque of the valve mounting screws must be calculated taking account of the components mounted.

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.

Hydraulics | Bosch Rexroth AG

Stroke 9.5 mm (1 turn = 1.5 mm stroke)



19 Locknut 24 A/F

20 Adjustment spindle, hexagon socket 6 A/F