

RA 24 751/09.99

Replaces: 06.98



4/2 and 4/3-way Directional Valves Pilot Operated Model 4 WEH... Externally Pilot Operated Model 4 WH ...

Sizes 10 to 32

Series 4X, 6X, 7X

Maximum pressure up to 5076 PSI (350 bar)

Maximum volume up to 290.6 GPM (1100 L/min)

Features

- Solenoid pilot operated directional valves (WEH)
- Hydraulic pilot operated directional valves (WH)
- Mounts on standard ISO 4401-**5, 7, 8** or **10**, NFPA T 3.5.1 M R1 and ANSI B 93.7 **D 05, D 07, D 08** or **D10** interfaces
- For subplates, see data sheets RA 45 045 ... RA 45 060, may be ordered separately
- 3-position spring centered (sizes 10 to 32)
- 3-position spring or hydraulic centering (sizes 16, 25 and 32)
- 2-position hydraulic or spring offset (sizes 10 to 32)
- Wet pin AC or DC solenoids as required
- Manual overrides standard (WEH)
- Individual solenoid plug-in connectors or central wiring box, see datasheet RA 08 006
- Optional meter-in or meter-out pilot choke option
- Optional stroke limiter and/or spool position indicator upon request (Size 16 or 32), see data sheet RA 24 830
- Optional inductive limit switches to monitor main spool position, upon request, see data sheet RA 24 830
- "P" port pilot pressure insert (sizes 16 to 32), for open center spools



4WEH10.tif

Model 4WEH 10 .4X/..6EW...K4.. with plug-in connector



4WEH22.tif

Model 4WEH 22 E 7X/..6EG..N9..DA.. with plug-in connector



K 3841/4

Model 4WH 32 .6X/..



4WEH25.tif

Model 4WEH 25 E6X/..6EG..N9...K4.. with plug-in connector

Pilot oil supply

4WEH...

All Rexroth solenoid pilot operated directional valves are field convertible from external to internal pilot or drain. This requires removing or replacing internal plugs as shown in sectional views on this page. For plug location within the sectional views, please refer to the appropriate installation drawing. Since the method of piloting is designated by model code, nameplates should be corrected when conversions are made.

4WEH/... (no designation = external pilot and external drain)

This model is externally piloted via port "X" and externally drained via port "Y". All internal plugs (10), (11) are installed.

4WEH/...E (E = internal pilot and external drain)

Pilot fluid is supplied internally from "P", while externally drained through port "Y". Port "X" in the subplate must be plugged. To convert valve Model 4WEH 16..., the port "X" side end cap must be removed. Spool (see section c-c) with O-ring seal is removed and rotated around the vertical axis. The valve is re-assembled by re-installing the spool and replacing the end cap. Torque on bolts $t = 27 \text{ lb-ft (37 Nm)}$.

4WEH/...T (T = external pilot and internal drain)

This model is externally piloted through port "X" and internally drained to port "T". Port "Y" in the subplate must be plugged.

4WEH/...ET (ET = internal pilot and internal drain)

On this model, pilot fluid supply is internal from port "P" and the drain is internal through port "T". Both ports "X" and "Y" in the subplate are plugged.

- 1 Plug M6 DIN 906-8.8, 3 A/F – pilot oil drain
- 2 Plug M6 DIN 906-8.8, 3 A/F – pilot oil supply
- 3 Plug M8 x 1 DIN 906-8.8, 4 A/F – for external sealing

Tightening torques M_A for cover mounting bolts:

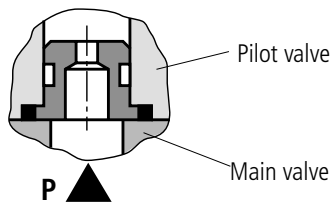
Size 16: 35.8 lb-ft (35 Nm) **Size 25:** 50.2 lb-ft (68 Nm)

Tightening torque M_A for pilot valve mounting bolts:

Sizes 10 to 32: 6.64 lb-ft (9 Nm)

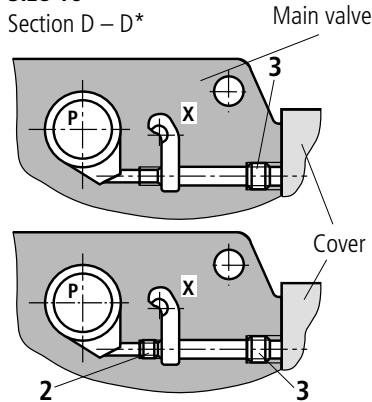
Pilot orifice insert (option B08, B10, B12, B15)

To limit maximum flow, orifice inserts are optionally available. Primarily, the orifice insert is intended to prevent flow rates in excess of the maximum performance data of the pilot valve (see page 9). For this purpose the insert is installed in the "P" port however, will fit any of the ports, allowing for design flexibility.

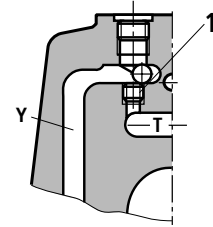


Size 16

Section D – D*



Section C – C



Pilot oil supply

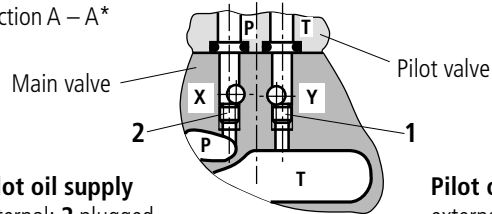
external: 2 plugged
internal: 2 open

Pilot oil drain

external: 1 plugged
internal: 1 open

Size 22 (model 4W.H 22 .7X/...)

Section A – A*



Pilot oil supply

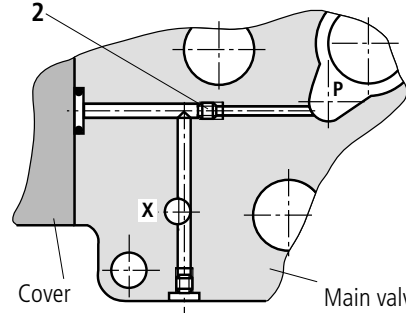
external: 2 plugged
internal: 2 open

Pilot oil drain

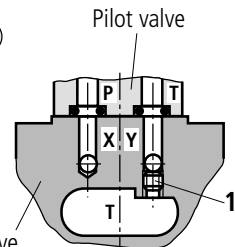
external: 1 plugged
internal: 1 open

Size 25 (model 4W.H 25 .6X/...)

Section B – B*



Section A – A



Pilot oil supply

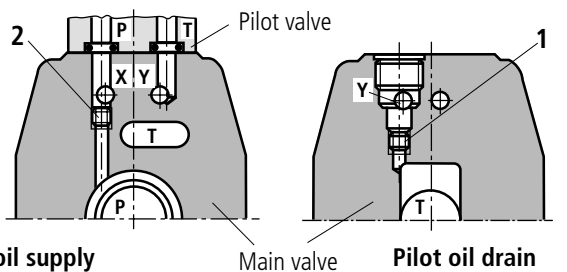
external: 2 plugged
internal: 2 open

Pilot oil drain

external: 1 plugged
internal: 1 open

Size 10

Section A – A*



Pilot oil supply

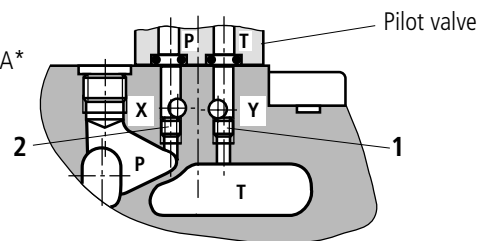
external: 2 plugged
internal: 2 open

Pilot oil drain

external: 1 plugged
internal: 1 open

Size 32

Section A – A*



Pilot oil supply

external: 2 plugged
internal: 2 open

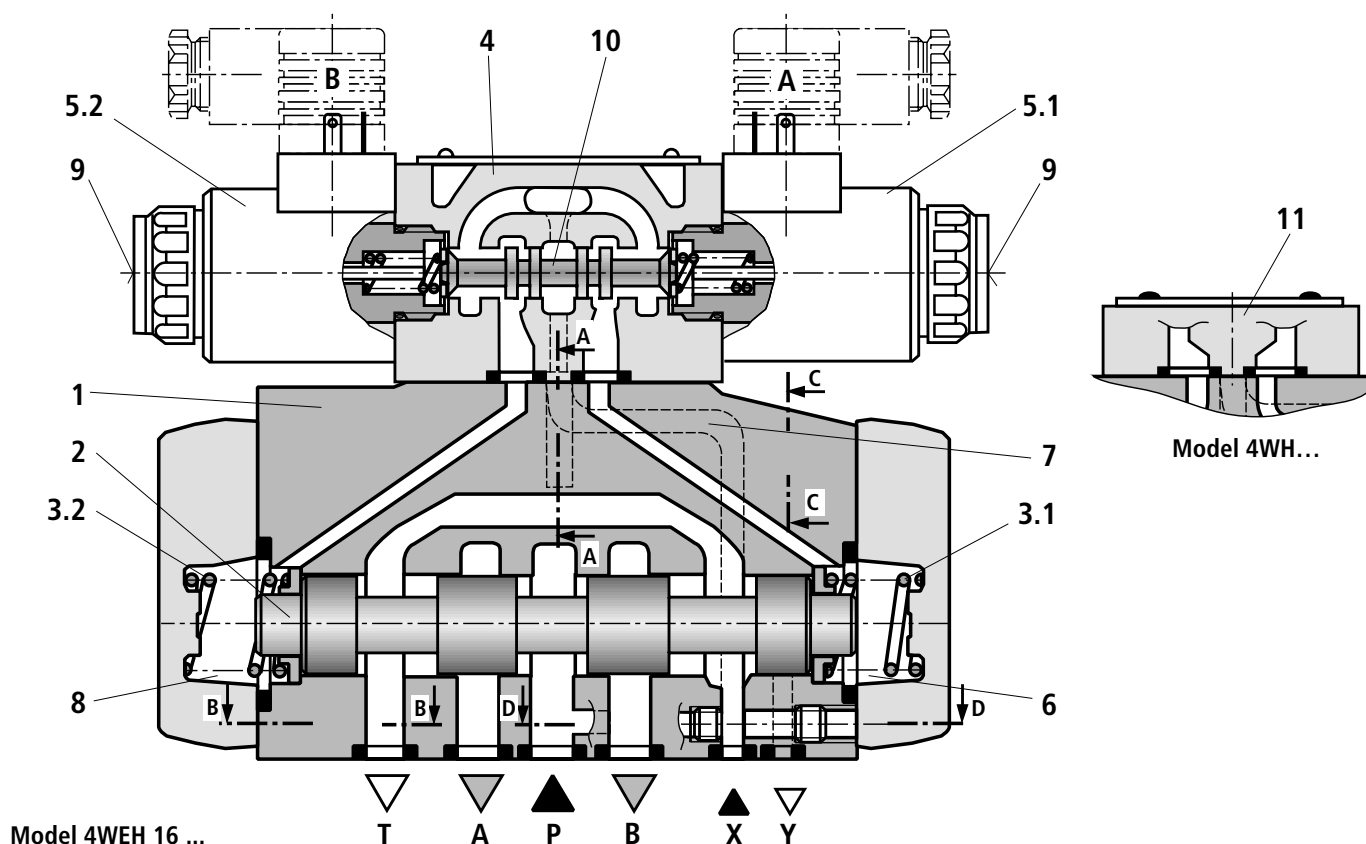
Pilot oil drain

external: 1 plugged
internal: 1 open

* See page 3

A/F = Across Flats

Functional description, section



Directional Controls Model 4WEH

Directional valves Model 4WEH... are solenoid pilot operated spool type valves. In the standard version, 3-position spools are spring centered, while 2-position spools are hydraulically offset. A spring offset two-position, and hydraulically centered three-position, option is also available for most sizes. Directional control valves control the start, stop and direction of fluid flow.

3-Position Valves, Example 4WEH 22 E-7X/6...

In spring centered versions, the pilot valve vents both chambers (6) to tank in center position. This allows return springs (3.1, 3.2) to center spool (2) with respect to housing (1). Pilot valve (4) is supplied via passage (7), either internally from main port "P" or externally through pilot port "X". When a solenoid is energized, one of the two end caps (6) is pressurized, while the other is drained to tank. Main spool (2) moves to a shifted position, (flow pattern "P" to "A" and "B" to "T" or "P" to "B" and "A" to "T"), depending on which solenoid (5) is energized. Please refer to symbols on page 6, 7, and 8 for exact flow patterns/solenoid relationships. Pilot valve (4) can be internally drained through main port "T" or externally drained through pilot port "Y". Manual overrides are provided to operate the valve without electrically energizing the solenoid.

For three-position valves (except sizes 10 and 22), a hydraulic centered option is available (not shown). In this model, hydraulic centering requires both end cap chambers (6) be pressurized in the non-energized condition. An "L" drain port (not shown) is provided through the main valve interface.

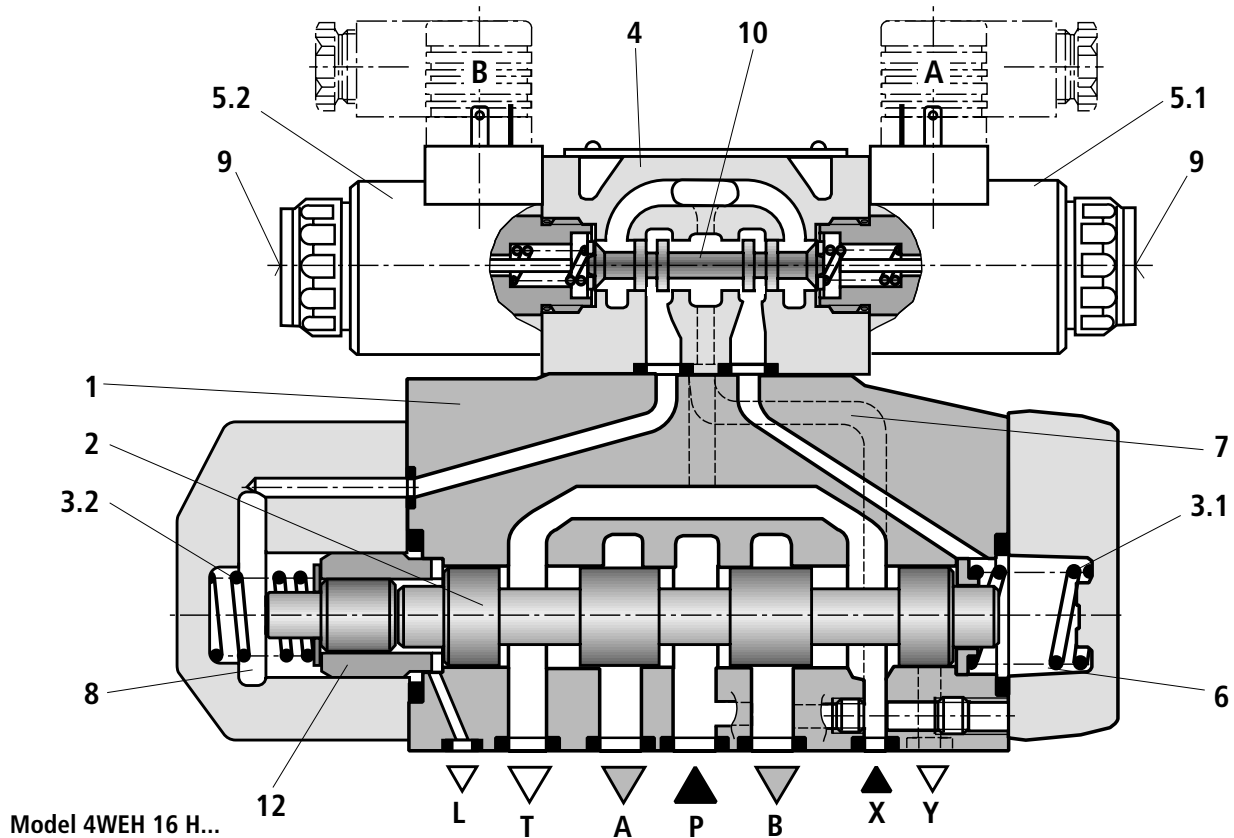
2-Position Valves, Example 4WEH 22C7X/6...

In this model, the main spool (2) is normally hydraulically offset by a 2-position pilot valve (4). The end cap chambers (6) are supplied without springs (3.1, 3.2). The pilot valve may be a 2-position, single solenoid (spool type "D"); 2-position, double solenoid (spool type "D/O"); or double solenoid with detent (spool type "D/OF"). Please refer to data sheet RA 23 178 for additional information on the pilot valve. A spring offset, 2-position main spool (not shown) is also available. This option assures the position of the main spool (2) during start-up and is particularly intended to be used with externally piloted systems, where the main pumps are started before the pilot oil supply system.

Directional Controls Model 4WH...

Directional control valves Model 4WH... are identical to Model 4WEH... except that the solenoid operated pilot valve (4) is replaced by a cover plate (10). The cover plate connects pilot port "X" to chamber (6) on "A" port side and pilot port "Y" to chamber (6) on the "B" port side. Pilot pressure on port "X" provides shifted position "a", while pilot pressure on port "Y" provides shifted position "b". During system design, please consider the following: To achieve center position, the spring centered version requires venting both end cap chambers (6). The pressure centered version requires pressurization of both end cap chambers (6); and two-position hydraulically offset versions, spool (2) position can only be assured by maintaining a pilot pressure on either "X" or port "Y".

Functional description, section



4/3-way directional valve with pressure centering of the main control spool, model 4WEH...H

The main control spool (2) in the main valve is held in the neutral position by pressurization of the two front faces. A centering sleeve (12) is supported in the housing and holds the spool in position.

By removing the pressure from one of the spool ends, the main control spool (2) is moved to the shifted position.

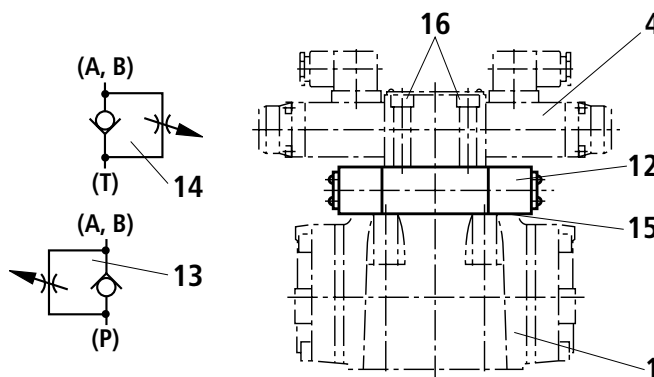
The unloaded spool area displaces the returning pilot oil via the pilot valve into the Y channel (external).

Shifting time adjustment, pressure reducing valve, pre-load valve

Pilot choke adjustment (option S or S2)

The shifting time of the main valve (1) can be adjusted by using a sandwich mounted throttle valve with reverse free flow check (12), model Z2FS 6 (data sheet RA 27 506). Turning adjustment (13) clockwise will increase the shifting time.

Conversion from option "S" meter-in (13) to option "S2" meter-out (14) requires removal of the pilot valve (4). The O-ring plate (15) remains with the main valve housing (1), while the throttle valve is rotated around the longitudinal axis. Pilot valve (4) is then re-installed. Tightening torque for bolts (16) is 6.5 lb-ft (8.9 Nm).



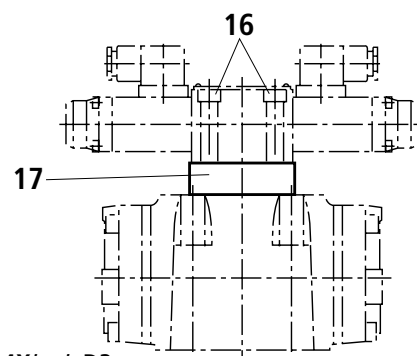
Model 4WEH 10 ..4X/...S or S2

Pilot pressure reducing valve (option "D3")

To achieve smoother shifts with internally piloted valves, reduce internal pilot pressure to minimum values, and optimize the pilot choke, meter-out throttle (S2). Option "D3", model ZDR 6 DP2-5x/75YM sandwich mounted reducing valve (see data sheet RA 26 569) can be adjusted from approximately 30 PSI (2 bar) to 1000 PSI (75 bar). A pressure setting of 200 PSI (14 bar) to 400 PSI (28 bar) is usually adequate.

Please note:

The minimum pilot pressures stated on page 9, must be increased by 1.515 when the fixed ratio pilot pressure valve is applied.

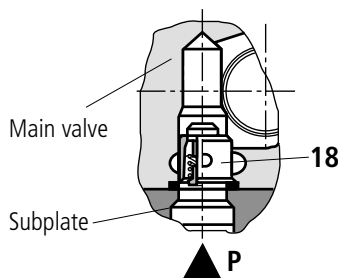


Model 4WEH 10 ..4X/.../..D3

Port "P" pilot pressure insert (option P 4.5)

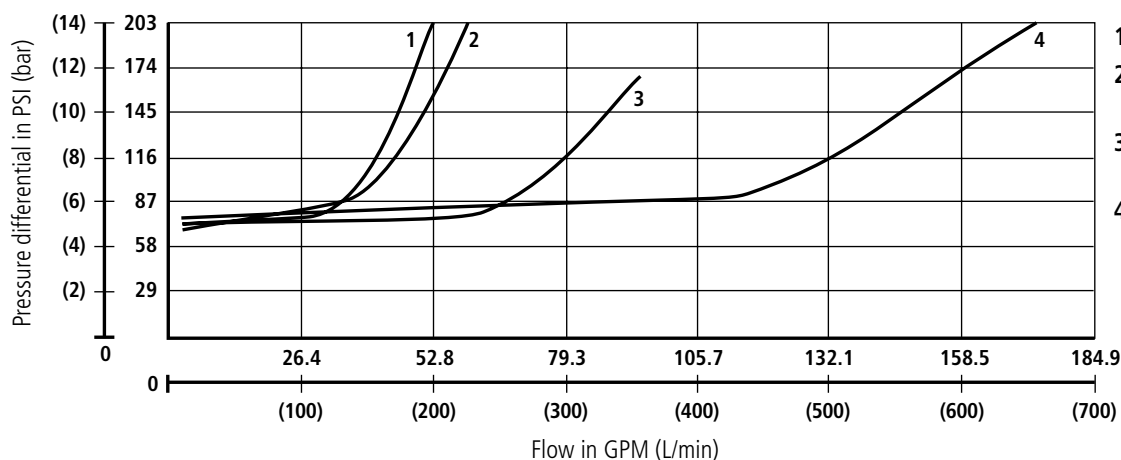
(not available for size 10, order sandwich plate Model Z1S 10 P3-3X S01)

For internally piloted valves with open or tandem center spools (types C, F, G, H, P, T, V, Z, S), minimum pilot pressure requirements can be achieved by using a pilot pressure insert (18) in port "P" of the main valve. This design permits the main valve to be internally piloted and internally drained. The pressure drop of the pilot pressure insert (see graph below) is in addition to the pressure drop of the main valve (see performance curves). The cracking pressure of a "P 4.5" pilot pressure insert is approximately 65 PSI (4.5 bar).



Size	Order number P 4.5
16	RR00 302628
25 (model 4W.H 22 .7X/...)	RR00 315596
25 (model 4W.H 25 .6X/...)	RR00 303717
32	RR00 317066

$\Delta p/q_v$ characteristic curve, measured at $v = 190$ SUS (41 mm²/s) and $t = 122^\circ\text{F}$ (50°C)



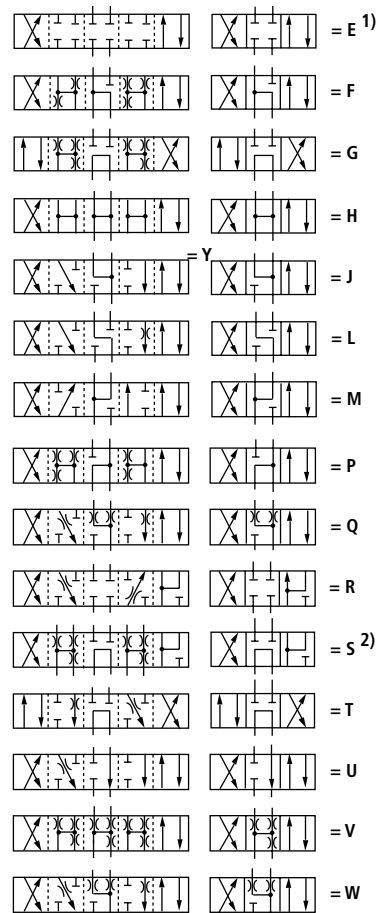
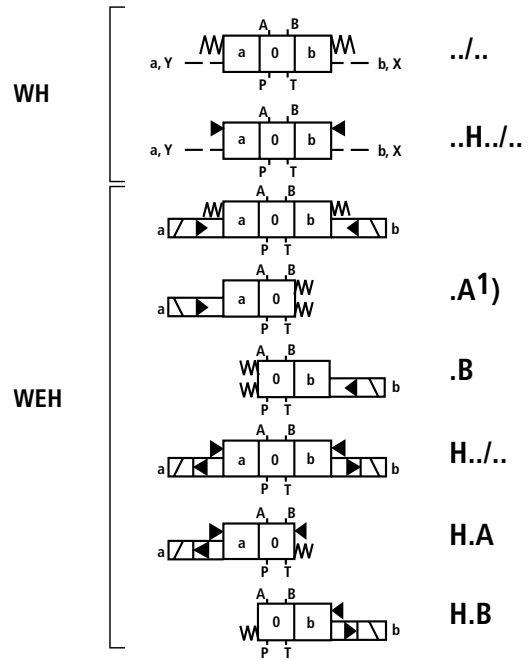
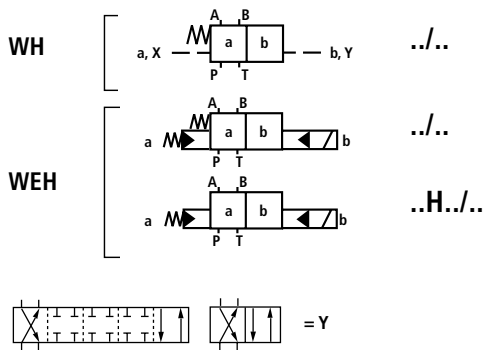
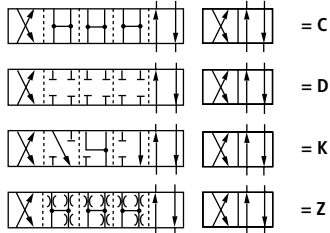
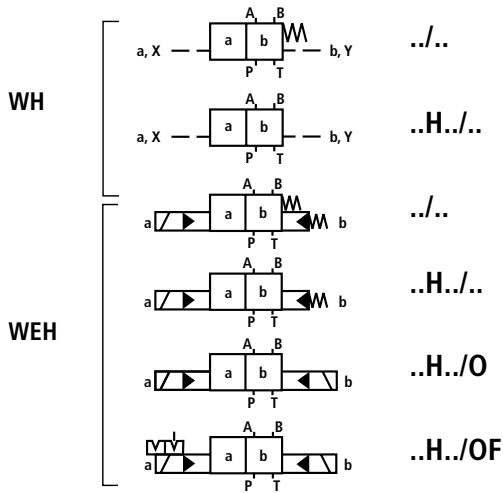
- 1 Size 16
- 2 Size 25
(model 4W.H 25 .6X/...)
- 3 Size 25
(model 4W.H 22 .7X/...)
- 4 Size 32

Ordering code

	1	2	3	4	5	6	6.5	7	9	10	11	12	13	14	15	16	17	19	20	21	22	23	
...4100 PSI (280 bar)	4								/														*
= no code																							Further details to be written in clear text
...5100 PSI (350 bar)																							no code = NBR seals, suitable for petroleum oils (HM, HL, HLP)
= H-																							V = FPM seals, suitable for phosphate ester (HFD-R)
4-way (Four service ports)																							no code = without pilot pressure control valve
= 4																							D1 = Fixed ratio pressure reducing valve ^{1: 3)}
Operation																							D3 = Adjustable pressure reducing valve ^{1: 3)} (recommended with meter-out pilot chokes)
Solenoid operated pilot valve																							no code = Without pilot pressure insert
= WEH																							P4.5 = $p_o = 65$ PSI (4.5 bar) ^{4: 3)}
Hydraulically operated																							P7 = $p_o = 100$ PSI (7 bar) ^{4: 3)} (For spool types C, F, G, H, P, T, V, Z, S)
= WH																							Orifice insert
Size																							no code = Without orifice insert
10 (D 05)																							B 08 = Orifice Ø 0.031" (0.8 mm)
= 10																							B 10 = Orifice Ø 0.039" (1.0 mm)
16 (D 07)																							B 12 = Orifice Ø 0.047" (1.2 mm)
= 16																							B 15 = Orifice Ø 0.059" (1.5 mm)
22 (D 08) ⁶⁾																							Auxiliary accessories
= 22																							Mechanical limit switch, stroke limiters, end position monitor, etc. see RA 24 830
25 (D 08) ⁷⁾																							Auxiliary accessories
= 25																							Inductive limit switch, see RA 24 830
32 (D 10)																							Electrical connections
= 32																							to data sheet RA 08006 ¹⁾
Spool return⁹⁾ (main body)																							Central electrical connections
Spring return (size 10 to 32)																							DA = Terminal box with 1/2" NPT conduit connection
= no code																							DAL = Terminal box with 1/2" NPT conduit connection and light(s)
Hydraulic return (size 10 to 32)*																							ANSI B 93.55 M plug-in type connections (without female end)
= H																							DK23 = Terminal box w/3-pin connector (single solenoid)
*(Size 10 and 22 with spool types C, D, K, Z, Y only)																							DK25 = Terminal box w/5-pin connector (double solenoid)
Spool type (ex. C, E, etc.) for possible spool configuration, see page 6																							DK23L = Terminal box w/3-pin connector & light (single sol.)
3-position valve																							DK25L = Terminal box w/5-pin connector & light (single sol.)
= no code																							DK24L2 = Terminal box with lights & surge suppression ¹²⁾
3-position valve with position "a" only ¹⁰⁾																							Individual solenoid plug-in connection
= A																							K4¹³⁾ = without angled plug connector(s)
3-position valve with position "b" only ¹⁰⁾																							no code = without pilot choke adjustment
= B																							S = With meter-in pilot choke adjustment
Series																							S2 = With meter-out pilot choke adjustment
Size 10	Series 40 to 49*																					= 4X	
Size 25, 32	Series 60 to 69*																					= 6X	
Size 16, 22	Series 70 to 79*																					= 7X	
*externally interchangeable																							
Variation to the pilot valve																							
For 2-position valves with 2 solenoids:																							
Only possible with spool types C, D, K, Z, and hydraulic spool return "H" in the main valve																							
Without spring return																							= O
Without spring return with detent																							= OF
Pilot valve WE 6 (D 03), with removable solenoids																							= 6E
AC voltage¹⁾																							
– 120 Volts AC, 50/60 Hz																							= W 110 ⁸⁾
– DC solenoid with rectifier																							= W 110 R
for AC operation (only for voltages ≥ 110 V and with Z 55 (Z5) plug-in connector																							
DC voltage:¹⁾																							
(Ex. 12, 24 V DC)																							= G + voltage ⁸⁾
Without manual overrides																							= no code
With manual overrides ^{1: 11)}																							= N
With protected manual overrides ¹⁾ (standard 6E)																							= N9
Externally piloted, externally drained ⁵⁾																							= no code
Internally piloted, externally drained ^{2: 5)}																							= E
Internally piloted, internally drained ²⁾																							= ET
Externally piloted, internally drained ⁵⁾																							= T
(On sizes 16, 25, 32 models "ET" and "T" with hydraulically centered three-position valves, are only possible if: $p_{pilot} \geq 2 \times p_{tank} + p_{pilot min}$)																							
p_{pilot} = pilot pressure	p_{tank} = Tank pressure																						
$p_{pilot min}$ = minimum pilot pressure	p_o = Cracking pressure																						

1) Enter only for solenoid operated valves, Model WEH
 2) With internal piloting, note the minimum pilot pressure values, see page 10.
 3) When combining a pressure reducing option D1, D3 with a pilot pressure insert, use Model P7 only
 4) For size 10 valves a pilot pressure sandwich plate Model Z15 10 P3-3X S01 may be used
 5) With externally piloted or drained size 10 valves, order sandwich plates (ZDB..., ZDR..., Z2FS...) with "SO 30" designation at the end of the model code, for X & Y through ports
 6) Model 4W.H 22 7X...(standard model)
 7) Model 4W.H 25 6X...(high flow model)
 8) Removable solenoids (6E) are dual frequency; additional voltages see RA 23 178.
 9) Defines method to return to main spool
 10) Defines 3-position spool, i.e. J, E, W, M... where only one side is required. See pg. 6 Example 4WEH22-EA-7X/6E...
 11) For WE6.6X/E pilots, "N" is a covered override with rubber boot
 12) With surge suppression, 24 V DC only, with 4-pin micro connector; Example: 4WEH22.7X/6EG24ETN9DK24L2
 13) For additional connectors, please see page 18.

Symbols (to ISO 1219)



- 1) Example: Spool E, solenoid on side "a"
Order example:
H-4WEH 16 EA7X/6EG24N9ETSK4..B10..V..
- 2) Spool S only for size 16

Valve opening in neutral position for spools Q, V and W

Size Spool	Valve opening in neutral position in in ² (mm ²)				
	10	16	25 (model 4W.H 22.7X/...)	25 (model 4W.H 25.6X/...)	32
Q P-A P-B A-T B-T	-	-	-	-	-
	0.02 (13)	0.05 (32)	0.121 (78)	0.129 (83)	0.121 (78)
	0.02 (13)	0.05 (32)	0.121 (78)	0.129 (83)	0.121 (78)
	0.02 (13)	0.05 (32)	0.121 (78)	0.129 (83)	0.121 (78)
V P-A P-B A-T B-T	0.02 (13)	0.05 (32)	0.113 (73)	0.129 (83)	0.113 (73)
	0.02 (13)	0.05 (32)	0.113 (73)	0.129 (83)	0.113 (73)
	0.02 (13)	0.05 (32)	0.13 (84)	0.129 (83)	0.13 (84)
	0.02 (13)	0.05 (32)	0.13 (84)	0.129 (83)	0.13 (84)
W P-A P-B A-T B-T	-	-	-	-	-
	0.0037 (2.4)	0.0093 (6)	0.0155 (10)	0.0217 (14)	0.031 (20)
	0.0037 (2.4)	0.0093 (6)	0.0155 (10)	0.0217 (14)	0.031 (20)
	0.0037 (2.4)	0.0093 (6)	0.0155 (10)	0.0217 (14)	0.031 (20)

Detailed and simplified symbols for 3-position valves (to DIN ISO 1219)

	Valve with spring-centered neutral position	Valve with pressure-centered neutral position {only sizes 16, 25 (model 4W.H 25 .6X/...) and 32}
X = external; Y = external	<p>Model 4WEH.../...</p>	<p>Model 4WEH..H.../...</p>
X = internal; Y = external	<p>Model 4WEH.../...E..</p>	<p>Model 4WEH..H.../...E..</p>
X = internal; Y = internal	<p>Model 4WEH.../...ET..</p>	<p>3-position valves, pressure-centered, preferably with external pilot oil supply and/or drain (No code, E) For the preconditions for internal pilot oil supply and/or drain (ET, T) see page 6 or 10.</p>
X = external; Y = internal	<p>Model 4WEH.../...T..</p>	

Detailed and simplified symbols for 2-position valves (to DIN ISO 1219)

	Valves with spring offset	Valves with hydraulic offset		
<p>Y = external</p> <p>X = external</p>	<p>Model 4WEH.../...</p>	<p>Model 4WEH..H.../...</p>	<p>Model 4WEH..H.../O...</p>	<p>Model 4WEH..H.../OF...</p>
<p>Y = external</p> <p>X = internal</p>	<p>Model 4WEH.../...E...</p>	<p>Model 4WEH..H.../...E...</p>	<p>Model 4WEH..H.../O...E...</p>	<p>Model 4WEH..H.../OF...E...</p>
<p>Y = internal</p> <p>X = internal</p>	<p>Model 4WEH.../...ET...</p>	<p>Model 4WEH..H.../...ET...</p>	<p>Model 4WEH..H.../O...ET...</p>	<p>Model 4WEH..H.../OF...ET...</p>
<p>Y = internal</p> <p>X = external</p>	<p>Model 4WEH.../...T...</p>	<p>Model 4WEH..H.../...T...</p>	<p>Model 4WEH..H.../O...T...</p>	<p>Model 4WEH..H.../OF...T...</p>

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

Sizes (ordering code)			10	16	22 4W.H 22.7X/.	25 4W.H 25.6X/.	32	
Operating pressure, max.								
– Port P, A, B	Model 4WEH	PSI (bar)	4061 (280)	4061 (280)	4061 (280)	–	4061 (280)	
	Model H-4WEH	PSI (bar)	5076 (350)	5076 (350)	5076 (350)	5076 (350)	5076 (350)	
– Port T	Pilot oil drain Y external	PSI (bar)	4569 (315) ⁵⁾	3626 (250)	3626 (250)	3626 (250)	3626 (250)	
	Pilot oil drain Y internal ¹⁾	PSI (bar)	3046 (210) ⁷⁾ DC					
		PSI (bar)	2321 (160) ⁷⁾ AC					
– Port Y	Pilot oil drain external:		3046 (210) ⁷⁾ DC, 2321 (160) ⁷⁾ AC					
	with version 4WH	PSI (bar)	3626 (250)	3626 (250)	3046 (210)	3626 (250)	3626 (250)	
Pilot pressure, max. (With higher pilot pressures, a pressure reducing valve is required.)			PSI (bar)	3626 (250)	3626 (250)	3046 (210)	3626 (250)	
Pilot pressure, min.								
–	Pilot oil supply X external, pilot oil supply X internal (not with spools: C, F, G, H, P, T, V, Z, S ²⁾)				H-4W. 181 (12.5)	4W.. 152 (10.5)		
	3-position valve, spring-centred	PSI (bar)	145 (10)	203 (14)			189 (13)	123 (8.5)
	3-position valve, pressure-centred	PSI (bar)	–	203 (14)	–	–	18	123 (8.5)
	2-position valve, with spring offset	PSI (bar)	145 (10)	203 (14)	203 (14)	160 (11)	189 (13)	145 (10)
	2-position valve, with hydraulic offset	PSI (bar)	102 (7)	203 (14)	116 (8)	–	116 (8)	72.5 (5)
–	pilot oil supply X internal (with spools C, F, G, H, P, T, V, Z, S ²⁾)	PSI (bar)	65.3 (4.5) ³⁾	65.3 (4.5) ⁴⁾	65.3 (4.5) ⁴⁾	65.3 (4.5) ⁴⁾	65.3 (4.5) ⁴⁾	
Hydraulic fluid ⁸⁾ Suitable for NBR and FPM seals ⁹⁾ Only suitable for FPM seals			Mineral oil (HL, HLP) to DIN 51 524 ⁸⁾ ; Fast bio-degradable hydraulic fluids to VDMA 24 568 (see also RA 90 221); HETG (rape seed oil) ⁸⁾ ; HEPG (polyglycols) ⁹⁾ ; HEES (synthetic esters) ⁹⁾ ; other hydraulic fluids on inquiry					
Fluid temperature range			°F (°C) –22 to +176 (–30 to +80), NBR seals; –4 to +176 (–20 to +80), FPM seals					
Viscosity range			SUS (mm ² /s) 35 to 2318 (2.8 to 500)					
Cleanliness			Maximum permissible degree of contamination of the hydraulic NAS 1638 class 9. We therefore recommend a filter with a minimum retention rate of $\beta_{10} \geq 75$.					
Pilot oil volume for shifting operation								
– 3-position valve, spring-centred	in ³ (cm ³)		0.125 (2.04)	0.349 (5.72)	0.466 (7.64)	0.867 (14.2)	1.8 (29.4)	
– 2-position valve	in ³ (cm ³)		0.249 (4.08)	0.699 (11.5)	0.932 (15.3)	1.733 (28.4)	3.59 (58.8)	
– 3-position valve, pressure-centred	in ³ (cm ³)			WH WEH		WH WEH	WH WEH	
	from neutral position to shifted position "a"	in ³ (cm ³)	–	0.173 (2.83) 0.173 (2.83)	–	0.436 (7.15) 0.436 (7.15)	0.88 (14.4) 0.88 (14.4)	
	from shifted position "a" to neutral position	in ³ (cm ³)	–	0.349 (5.72) 0.177 (2.9)	–	0.865 (14.2) 0.427 (7.0)	1.793 (29.4) 0.921 (15.1)	
	from neutral position to shifted position "b"	in ³ (cm ³)	–	0.349 (5.72) 0.349 (5.72)	–	0.865 (14.2) 0.863 (14.2)	1.8 (29.4) 1.8 (29.4)	
	from shifted position "b" to neutral position	in ³ (cm ³)	–	0.522 (8.55) 0.173 (2.83)	–	1.213 (19.88) 0.35 (5.73)	2.68 (43.8) 0.879 (14.4)	
Pilot oil flow for shortest shifting time (approx.)			GPM (L/min) 9.25 (35) 9.25 (35) 9.25 (35) 9.25 (35) 11.9 (45)					
Weight (approx.)								
Valve with one solenoid	lbs (kg)		14.1 (6.4)	18.7 (8.5)	25.4 (11.5)	38.8 (17.6)	89.3 (40.5)	
Valve with two solenoids, spring-centred	lbs (kg)		15 (6.8)	19.6 (8.9)	26.2 (11.9)	39.7 (18.0)	90.4 (41.0)	
Valve with two solenoids, pressure-centred	lbs (kg)		15 (6.8)	19.6 (8.9)	26.2 (11.9)	41.9 (19.0)	90.4 (41.0)	
Valve with hydraulic operation (4 WH...)	lbs (kg)		12.1 (5.5)	16.1 (7.3)	23.1 (10.5)	36.4 (16.5)	87.1 (39.5)	
Shifting time adjustment	lbs (kg)		1.76 (0.8)	1.76 (0.8)	1.76 (0.8)	1.76 (0.8)	1.76 (0.8)	
Pressure reducing valve	lbs (kg)		0.882 (0.4)	0.882 (0.4)	0.882 (0.4)	0.882 (0.4)	0.882 (0.4)	
Installation position			optional; valve with hydraulic spool return "H" (spools C, D, K, Z, Y) horizontal					

¹⁾ As 3-position valve with spring-centering only possible if $p_{\text{pilot}} \geq 2 \times p_{\text{tank}} + p_{\text{pilot min}}$.

²⁾ Spool S only for size 16

³⁾ For symbols C, F, G, H, P, T, V, Z internal pilot oil supply is only possible, if the flow from P to T in the neutral position (in a 3-position valve) or when the valve is moving through the neutral position (in a 2-position valve) is large enough to ensure a minimum pressure differential of 94.3 PSI (6.5 bar) from P to T.

⁴⁾ For spools C, F, G, H, P, T, V, Z, S ²⁾ (by means of a preload valve or a sufficiently large flow)

⁵⁾ Model 4WEH 10...: 4061 PSI (280 bar), Model H-4WEH 10...: 4569 PSI (315 bar)

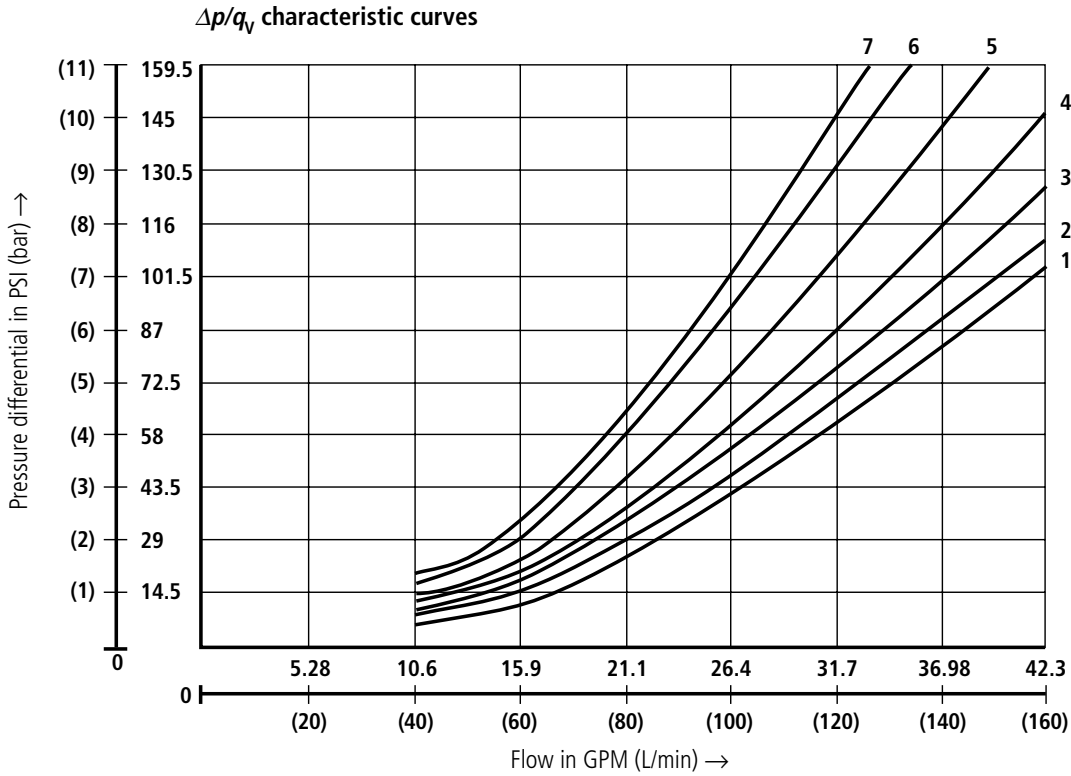
⁷⁾ High-performance valve "6E" (RD 23 178)

Shifting times ¹⁾

¹⁾ Shifting time = Contacting at the pilot valve up to start of opening of the control land in the main valve

Size 10	Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation																	
	at pilot pressure	PSI (bar)	~ 1015 (70) =		~ 2031 (140) =		~ 3046 (210) =		~ 3626 (250) =									
	- 3-position valve	ms	30	65	25	60	20	55	15	50								
	- 2-position valve	ms	35	80	30	75	25	70	20	65								
	Shifting time of the valve from shifted position to neutral position																	
	- 3-position valve	ms	30															
- 2-position valve	ms	35	40	30	35	25	30	20	25									
Size 16	Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation																	
	at pilot pressure	PSI (bar)	~ 1015 (70) =		~ 2031 (140) =		~ 3046 (210) =		~ 3626 (250) =									
	- 3-position valve, spring-centered	ms	25...30	40	25...30	40	25...30	40	20...25	40								
	- 2-position valve	ms	30...35	55	30...35	55	30...35	55	25...30	50								
	- 3-position valve, Solenoid operated		a	b	a	b	a	b	a	b	a	b						
	pressure-centeed	ms	30	30	40	40	30	30	40	40	30	30	35	40				
	Shifting time of the valve from shifted position to neutral position																	
	- 3-position valve, spring-centered	ms	20 to 35 for ~ / 30 for =															
	- 2-position valve	ms	35...50	45	35...50	45	30...45	40	30...45	35								
	- 3-position valve, from -		a	b	a	b	a	b	a	b	a	b	a	b				
pressure-centeed	ms	20...35	20	20...55	20	20...35	20	20...35	20	20...35	20							
Size 22 (4W.H 22..7X)	Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation																	
	at pilot pressure	PSI (bar)	~ 508 (35) =		~ 1015 (70) =		~ 2031 (140) =		~ 3046 (210) =									
	- 3-position valve, spring-centered	ms	50	100	40	80	35	65	30	60								
	- 2-position valve	ms	110	160	90	110	75	95	70	85								
	Shifting time of the valve from shifted position to neutral position																	
	- 3-position valve, spring-centered	ms	35 to 50 for ~ / 35 for =															
- 2-position valve	ms	90...105	95	65...80	70	50...65	55	45...60	50									
Size 25 (4W.H 25..6X)	Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation																	
	at pilot pressure	PSI (bar)	~ 1015 (70) =		~ 2031 (140) =		~ 3046 (210) =		~ 3626 (250) =									
	- 3-position valve, spring-centered	ms	50	85	40	75	35	70	30	65								
	- 2-position valve	ms	120	160	100	130	85	120	70	105								
	- 3-position valve, Solenoid operated		a	b	a	b	a	b	a	b	a	b	a	b				
	pressure-centered	ms	30	35	55	65	30	35	55	65	25	30	50	60	25	30	50	60
	Shifting time of the valve from shifted position to neutral position																	
	- 3-position valve, spring-centered	ms	40 to 55 for ~ / 40 for =															
	- 2-position valve	ms	120	125	85	100	85	90	75	80								
	- 3-position valve, from -		a	b	a	b	a	b	a	b	a	b	a	b				
pressure-centered	ms	30...50	30	35	30...50	30	35	30...50	30	35	30...50	30	35					
Size 32	Shifting time of the valve from neutral position to shifted position with AC (~) and DC (=) operation																	
	at pilot pressure	PSI (bar)	~ 725 (50) =		~ 2176 (150) =		~ 3626 (250) =											
	- 3-position valve, spring-centered	ms	65	80	50	90	35	105										
	- 2-position valve	ms	100	130	75	100	60	115										
	- 3-position valve, Solenoid operated		a	b	a	b	a	b	a	b	a	b	a	b				
	pressure-centered	ms	55	60	100	105	40	45	85	95	35	40	85	95				
	Shifting time of the valve from shifted position to neutral position																	
	- 3-position valve, spring-centered	ms	60 to 75 for ~ / 50 for =															
	- 2-position valve	ms	115...130	90	85...100	70	65...80	65										
	- 3-position valve, from -		a	b	a	b	a	b	a	b	a	b	a	b				
pressure-centered	ms	30...65	30	40	60...90	30	30	105...155	50	50								

Characteristic curves: Model 4 WEH 10... measured at $v = 190 \text{ SUS}$ ($41 \text{ mm}^2/\text{s}$) and $t = 122 \text{ }^\circ\text{F}$ ($50 \text{ }^\circ\text{C}$)



Spool	Shifted position			
	P-A	P-B	A-T	B-T
E, Y, D	2	2	4	5
F	1	4	1	4
G, T	4	2	2	6
H, C	4	4	1	4
J, K	1	2	1	3
L	2	3	1	4
M	4	4	3	4
P	4	1	3	4
Q, V, W, Z	2	2	3	5
R	2	2	3	-
U	3	3	3	4

Spool	Neutral position		
	A-T	B-T	P-T
F	3	-	6
G, T	-	-	7
H	1	3	5
L	3	-	-
P	-	7	5
U	-	4	-

Shifting performance limits: Model 4 WEH 10... measured at $v = 190 \text{ SUS}$ ($41 \text{ mm}^2/\text{s}$) and $t = 122 \text{ }^\circ\text{F}$ ($50 \text{ }^\circ\text{C}$)

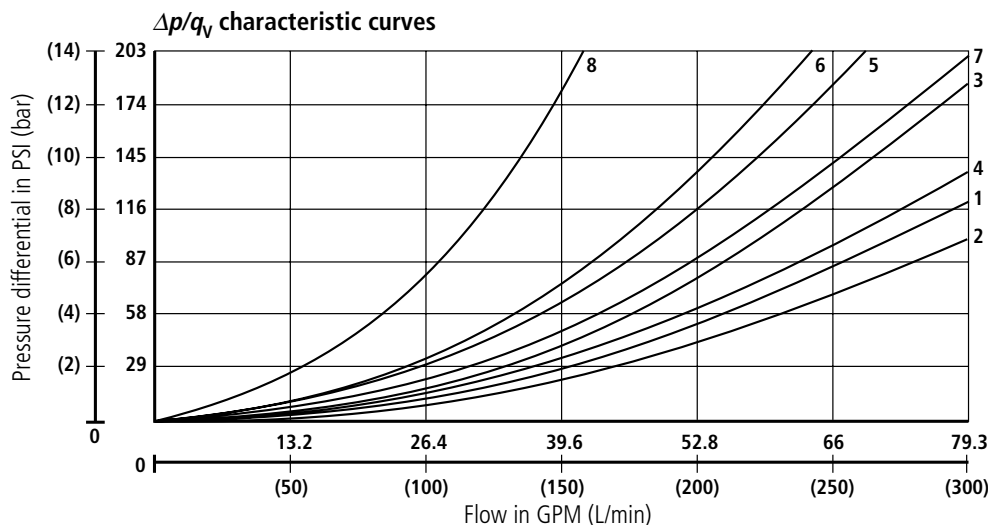
2 and 3-position valves			
Permissible flow q_v in GPM (L/min)			
Spool	Operating pressure p_{max} in PSI (bar)		
	2901 (200)	3626 (250)	4569 (315)
E, J, L, M, Q, R, U, V, W, C, D, K, Z, Y	42.3 (160)		
H	42.3 (160)	39.6 (150)	31.7 (120)
G, T	42.3 (160)	42.3 (160)	37 (140)
F, P	42.3 (160)	37 (140)	31.7 (120)

General:

Because of silting, the shifting function of the valves is dependent upon filtration. To obtain the maximum flow values shown, full filtration of $25 \mu\text{m}$ is recommended. The flow forces acting within the valve also influence performance. In 4-way valves, the data provided is for applications with 2 directions of flow (flow from P to A and an equal, simultaneous return flow from B to T) (see left). If only one direction of flow is required, for example, when a 4-way valve has one port plugged, or unbalanced flows from large rod cylinders, permissible flow in critical cases can be considerably lower.

Performance limits measured with solenoids at operating temperature, 10% undervoltage and without tank port pressure.

Characteristic curves: Model 4 WEH 16... measured at $v = 190$ SUS (41 mm²/s) and $t = 122$ °F (50 °C)

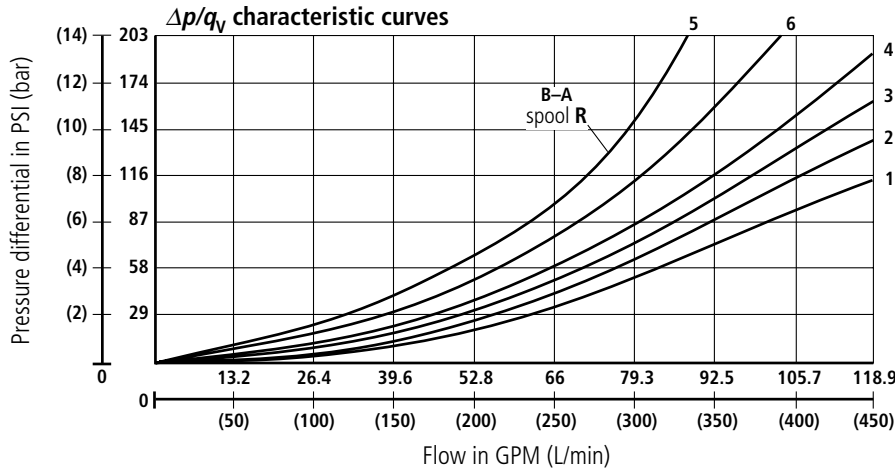


Spool	Shifted position				
	P-A	P-B	A-T	B-T	P-T
E, D, Y	1	1	1	3	-
F	2	2	3	3	-
G, T	5	1	3	7	6
H, C, Q, V, Z	2	2	3	3	-
J, K, L	1	1	3	3	-
M, W	2	2	4	3	-
R	2	2	4	-	-
U	1	1	4	7	-
S	4	4	4	-	8

Performance limits: Model 4 WEH 16... measured at $v = 190$ SUS (41 mm²/s) and $t = 122$ °F (50 °C)

2-position valves Permissible flow q_v in GPM (L/min)						Pre-load valve, required for X = internal	Regarding the performance limits, see "General", pages 12, 13. ⚠ Attention! When using 4/3-way directional valves with spring-centering of the control spool in the main valve, above given performance limits, a higher pilot pressure is required. Example: At an operating pressure of $p_{max} = 5076$ PSI (350 bar) and a flow of $q_v = 79.3$ GPM (300 L/min), a pilot pressure of 232 PSI (16 bar) is required. The maximum flow for those valves is therefore only dependent on the Δp value which is acceptable for the system.
Operating pressure p_{max} in PSI (bar)							
Spool	1015 (70)	2031 (140)	3046 (210)	4061 (280)	5076 (350)	with spring offset in the main valve ¹⁾	
C, D, K, Z, Y	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)		
with spring offset in the main valve ²⁾						Spools C, Z up to approx. 42.3 GPM (160 L/min)	
C	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)		
D, Y	79.3 (300)	71.3 (270)	68.7 (260)	66 (250)	60.8 (230)		
K	79.3 (300)	66 (250)	63.4 (240)	60.8 (230)	55.5 (210)		
Z	79.3 (300)	68.7 (260)	50.2 (190)	47.6 (180)	42.3 (160)	Spools HC, HZ up to ca. 42.3 GPM (160 L/min)	
with hydraulic offset in the main valve							
HC, HD, HK	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)		
HZ, HY	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)		
3-position valves Permissible flow q_v in GPM (L/min)						Pre-load valve, required for X = internal	
spring-centred							
E, H, J, L, M, Q, U, W, R	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)	Spools F, G, H, P and S in general	
F, P	79.3 (300)	66 (250)	47.6 (180)	44.9 (170)	39.6 (150)		
G, T	79.3 (300)	79.3 (300)	63.4 (240)	55.5 (210)	50.2 (190)		
S	79.3 (300)	79.3 (300)	79.3 (300)	66 (250)	58.1 (220)		
V	79.3 (300)	66 (250)	55.5 (210)	52.8 (200)	47.6 (180)		
pressure-centred; at min. pilot pressure of 232 PSI (16 bar)						Spool V up to ca. 42.3 GPM (160 L/min)	
for all spools	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)	79.3 (300)		

Characteristic curves: Model 4 WEH 22... measured at $v = 190 \text{ SUS}$ ($41 \text{ mm}^2/\text{s}$) and $t = 122 \text{ }^\circ\text{F}$ ($50 \text{ }^\circ\text{C}$)



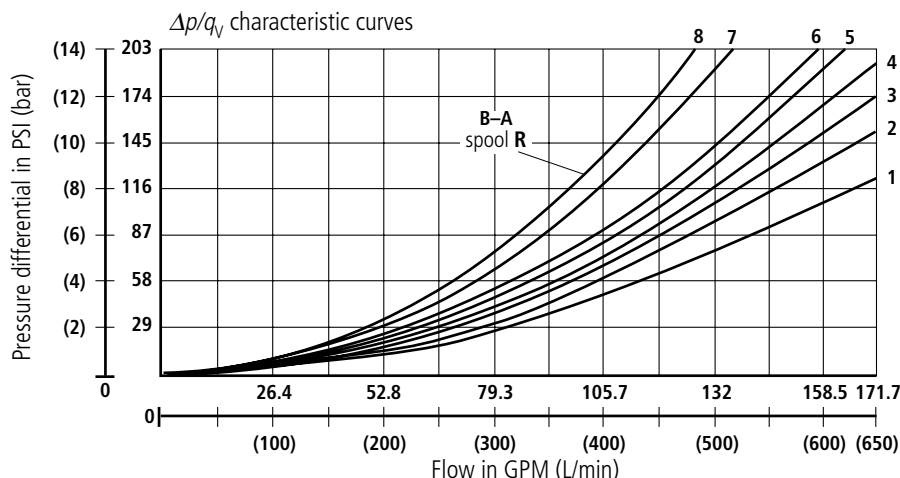
Spool	Shifted position				Spool	Shifted position				Spool	Neutral position		
	P-A	P-B	A-T	B-T		P-A	P-B	A-T	B-T		A-T	B-T	P-T
E	2	2	1	4	P	2	2	1	4	F	-	-	4
F	1	2	1	2	Q	2	2	1	4	G	-	-	6
G	2	2	2	4	R	1	2	1	-	H	-	-	2
H	2	2	1	3	U	2	2	1	4	L	4	-	-
J	2	2	1	3	V	2	2	1	4	P	-	-	6
L	2	2	1	2	W	2	2	1	3	T	-	-	5
M	2	2	1	4	T	2	2	2	4	U	-	6	-

Performance limits: Model 4 WEH 22... measured at $v = 190 \text{ SUS}$ ($41 \text{ mm}^2/\text{s}$) and $t = 122 \text{ }^\circ\text{F}$ ($50 \text{ }^\circ\text{C}$)

2-position valves Permissible flow q_v in GPM (L/min)						Pre-load valve, required for X = internal	Regarding the performance limits, see "General", pages 12 and 13.
Spool	Operating pressure p_{max} in PSI (bar)						
	1015 (70)	2031 (140)	3046 (210)	4061 (280)	5076 (350)		
with spring offset in the main valve ¹⁾							
C, D, K, Z, Y	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
with spring offset in the main valve ²⁾							
C	119 (450)	119 (450)	84.5 (320)	66 (250)	52.8 (200)	Spool Z up to approx. 47.6 GPM (180 L/min)	
D, Y	119 (450)	119 (450)	119 (450)	106 (400)	84.5 (320)		
K	119 (450)	56.8 (215)	39.6 (150)	31.7 (120)	26.4 (100)		
Z	92.5 (350)	79.3 (300)	76.6 (290)	68.7 (260)	42.3 (160)		
with hydraulic offset in the main valve							
HC, HD, HK	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)	Spools HZ up to approx. 47.6 GPM (180 L/min)	
HZ, HY	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
HC../O..	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
HD../O..	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
HK../O..	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
HZ../O..	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
HC../OF..	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
HD../OF..	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
HK../OF..	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
HZ../OF..	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)		
3-position valves Permissible flow q_v in GPM (L/min) spring-centered							
E, J, L, M, Q, U, W, R	119 (450)	119 (450)	119 (450)	119 (450)	119 (450)	Pre-load valve, required for X = internal	
H	119 (450)	119 (450)	79.3 (300)	68.7 (260)	60.8 (230)		
G	106 (400)	92.5 (350)	66 (250)	52.8 (200)	47.6 (180)	Spools F, G, H, P and T in general, spool V up to approx. 47.6 GPM (180 L/min)	
F	119 (450)	71.3 (270)	46.2 (175)	34.3 (130)	29.1 (110)		
V	119 (450)	79.3 (300)	63.4 (240)	58.1 (220)	42.3 (160)		
T	106 (400)	79.3 (300)	63.4 (240)	52.8 (200)	42.3 (160)		
P	119 (450)	71.3 (270)	47.6 (180)	44.9 (170)	29.1 (110)		

¹⁾ The flow values given are achieved when the minimum pilot pressure of 160 or 203 PSI (11 or 14 bar) is present.
²⁾ The flow values given are limiting values at which the return spring can return the valve when the pilot pressure fails.

Characteristic curves: Model 4 WEH 25... measured at $v = 190 \text{ SUS}$ ($41 \text{ mm}^2/\text{s}$) and $\vartheta = 122 \text{ }^\circ\text{F}$ ($50 \text{ }^\circ\text{C}$)



7 spool **G** central position **P – T**
 8 spool **T** central position **P – T**

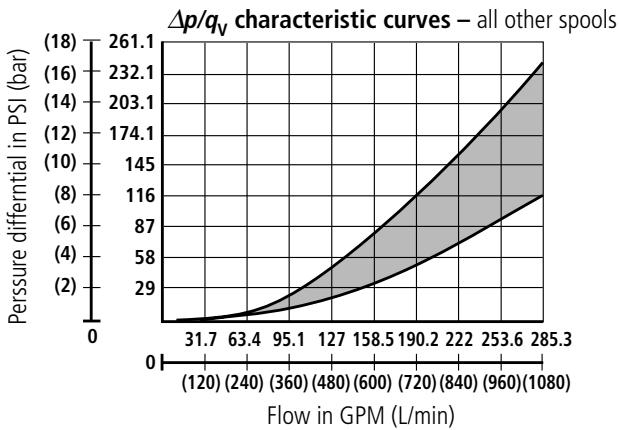
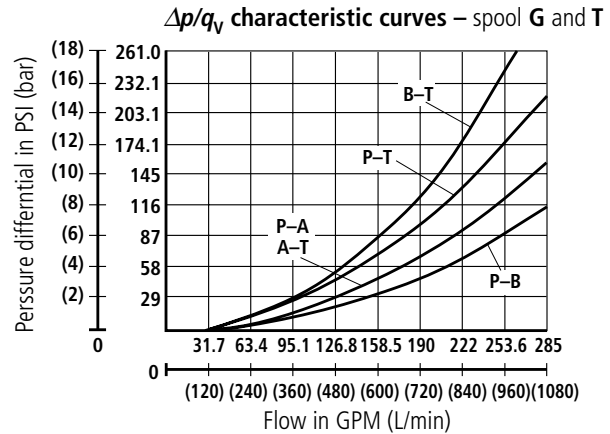
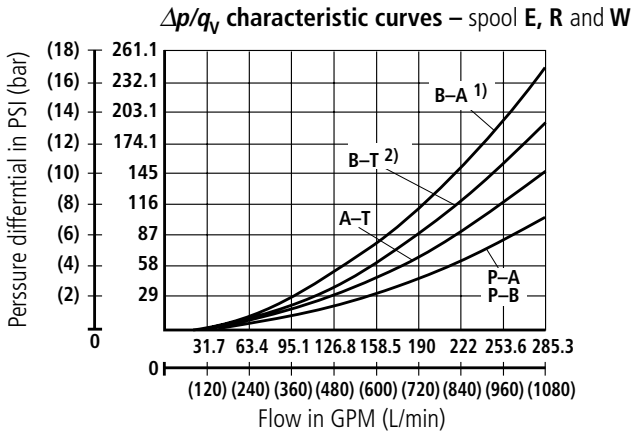
Spool	Shifted position				Spool	Shifted position				Spool	Shifted position			
	P-A	P-B	A-T	B-T		P-A	P-B	A-T	B-T		P-A	P-B	A-T	B-T
E	1	1	1	3	L	2	2	3	3	U	2	1	1	6
F	1	4	3	3	M	4	4	1	4	V	4	4	3	6
G	3	1	2	4	P	4	1	1	5	W	1	1	1	3
H	4	4	3	4	Q	2	2	3	5	T	3	1	2	4
J	2	2	3	5	R	2	1	1	-					

Performance limits: Model 4 WEH 25... measured at $v = 190 \text{ SUS}$ ($41 \text{ mm}^2/\text{s}$) and $t = 122 \text{ }^\circ\text{F}$ ($50 \text{ }^\circ\text{C}$)

2-position valves Permissible flow q_v in GPM (L/min)						Pre-load valve, required for X = internal	Regarding the performance limits, see "General", pages 12 and 13.	
Spool	Operating pressure p_{max} in PSI (bar)							
	1015 (70)	2031 (140)	3046 (210)	4061 (280)	5076 (350)			
with spring offset in the main valve ¹⁾								
C, D, K, Z, Y	185 (700)	185 (700)	185 (700)	185 (700)	172 (650)	Spool C in general, spool Z up to approx. 47.6 GPM (180 L/min)		
with spring offset in the main valve ²⁾								
C	185 (700)	185 (700)	185 (700)	185 (700)	172 (650)			
D, Y	185 (700)	172 (650)	106 (400)	92.5 (350)	79.3 (300)			
K	185 (700)	172 (650)	111 (420)	97.7 (370)	84.5 (320)			
Z	185 (700)	185 (700)	172 (650)	127 (480)	106 (400)			
with hydraulic offset in the main valve								
HC, HD, HK	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)	Spool HC in general, spool HZ up to approx. 47.6 GPM (180 L/min)		
HZ, HY	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
HC../O..	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
HD../O..	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
HK../O..	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
HZ../O..	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
HC../OF..	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
HD../OF..	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
HK../OF..	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
HZ../OF..	185 (700)	185 (700)	185 (700)	185 (700)	185 (700)			
3-position valves Permissible flow q_v in GPM (L/min) spring-centered								
E, L, M, Q, U, W	185 (700)	185 (700)	185 (700)	185 (700)	172 (650)	Pre-load valve, required for X=int. Spools F, G, H, P and T in general, spool V up to approx. 47.6 GPM (180 L/min)		
G, T	106 (400)	106 (400)	106 (400)	106 (400)	106 (400)			
F	172 (650)	145 (550)	114 (430)	87.2 (330)	79.3 (300)			
H	185 (700)	172 (650)	145 (550)	106 (400)	95.1 (360)			
J	185 (700)	185 (700)	172 (650)	158 (600)	137 (520)			
P	172 (650)	145 (550)	114 (430)	87.2 (330)	79.3 (300)			
V	172 (650)	145 (550)	106 (400)	92.5 (350)	82 (310)			
R	185 (700)	185 (700)	185 (700)	172 (650)	153 (580)			
pressure-centered (at min. pilot pressure of 261 PSI (18 bar))								
E, F, H, J	185 (700)	185 (700)	185 (700)	185 (700)	172 (650)			
L, M, P, Q	185 (700)	185 (700)	185 (700)	185 (700)	172 (650)			
R, U, V, W	185 (700)	185 (700)	185 (700)	185 (700)	172 (650)			
G, T	106 (400)	106 (400)	106 (400)	106 (400)	106 (400)			
at > 435 PSI (30 bar) pilot pressure								
G, T	185 (700)	185 (700)	185 (700)	185 (700)	172 (650)			

¹⁾ The flow values given are achieved when the minimum pilot pressure of 189 PSI (13 bar) is present.
²⁾ The flow values given are limiting values at which the return spring can return the valve when the pilot pressure fails.

Characteristic curves: Model 4 WEH 32... measured at $v = 190 \text{ SUS}$ ($41 \text{ mm}^2/\text{s}$) and $t = 122 \text{ }^\circ\text{F}$ ($50 \text{ }^\circ\text{C}$)



- 1) **only** with spool **R**
- 2) **not** with spool **R**

Performance limits: Model 4 WEH 32... measured at $v = 190 \text{ SUS}$ ($41 \text{ mm}^2/\text{s}$) and $t = 122 \text{ }^\circ\text{F}$ ($50 \text{ }^\circ\text{C}$)

2-position valves Permissible flow q_v in GPM (L/min)						Pre-load valve, required for X = internal	Regarding the performance limits, see "General", pages 12 and 13. ⚠ Attention! When using 4/3-way directional valves with spring-centering of the control spool in the main valve, above performance limits, a higher pilot pressure is required. Example: At an operating pressure of $p_{max} = 5076 \text{ PSI}$ (350 bar) and a flow of $q_v = 291 \text{ GPM}$ (1100 L/min), a pilot pressure of 218 PSI (15 bar) is required. The maximum flow for those valves is therefore only dependent on the Δp value which is acceptable for the system.
Spool	Operating pressure p_{max} in PSI (bar)						
	1015 (70)	2031 (140)	3046 (210)	4061 (280)	5076 (350)	Spool C in general, spool Z up to approx. 47.6 GPM (180 L/min)	
with spring offset in the main valve ¹⁾							
C, D, K, Z, Y	291 (1100)	275 (1040)	227 (860)	198 (750)	180 (680)		
with spring offset in the main valve ²⁾							
C	291 (1100)	275 (1040)	227 (860)	211 (800)	185 (700)		
D, Y	291 (1100)	275 (1040)	143 (540)	127 (480)	111 (420)		
K	291 (1100)	275 (1040)	227 (860)	132 (500)	119 (450)		
Z	291 (1100)	275 (1040)	227 (860)	185 (700)	172 (650)		
with hydraulic offset in the main valve							
HC, HD, HK,	291 (1100)	275 (1040)	227 (860)	198 (750)	180 (680)		
HZ, HY	291 (1100)	275 (1040)	227 (860)	198 (750)	180 (680)		
3-position valves Permissible flow q_v in GPM (L/min)						Pre-load valve, required for X = internal	
spring-centered							
E, J, L, M, Q, R, U, W	291 (1100)	275 (1040)	227 (860)	198 (750)	180 (680)	Spools F, G, H, P and T in general, spool V up to ~47.6 GPM (180 L/min)	
G, T, H, F, P	238 (900)	238 (900)	211 (800)	172 (650)	119 (450)		
V	291 (1100)	264 (1000)	180 (680)	132 (500)	119 (450)		
pressure-centered; at min. pilot pressure of 123 PSI (8.5 bar)							
for all spools	291 (1100)	275 (1040)	227 (860)	198 (750)	180 (680)		

Unit dimensions

- 1 Main valve
- 2 Pilot valve model 4WE 6... to data sheet RA 23 178²⁾
 - ⚠ **Attention!**
Dimensions of size 10, 22, 25 and 32 correspond to the standard valve "6A" to data sheet RA 23 177
 - Dimensions of size 16 correspond to the standard valve "6E" to data sheet RA 23 178
- 2.1 • Pilot valve model 4WE 6 D... (1 solenoid) for main valves with spools C, D, K, Z and spools HC, HD, HK, HZ
- Pilot valve model 4WE 6 J... (1 solenoid "a") for main valves with spools EA, FA, etc., spring return
- Pilot valve model 4WE 6 M... (1 solenoid "a") for main valves with spools HEA, HFA, etc., hydraulic spool return
- 2.2 • Pilot valve model 4WE 6 Y... (1 solenoid) for main valves with spool Y and spool HY
- Pilot valve model 4WE 6 J... (1 solenoid "b") for main valves with spools EB, FB, etc., spring return
- Pilot valve model 4WE 6 M... (1 solenoid "b") for main valves with spools HEB, HFB, etc., hydraulic spool return
- 2.3 • Pilot valve model 4WE 6 J... (2 solenoids) for main valves with 3 positions, spring-centered
- Pilot valve model 4WE 6 M... (2 solenoids) for main valves with 3 positions, pressure-centered
- 3.1 Solenoid "a" (grey plug-in connector)
- 3.2 Solenoid "b" (black plug-in connector)
- 4 Manual override "N", optional
 - The manual override can only be operated up to a tank pressure of up to approx. 725 PSI (50 bar). Take care not to damage the manual override bore!

- 5 Solenoid without manual override
- 6 Height of connector plate for hydraulic operation (model 4WH...)
- 7 Optional pilot choke adjustment, Model Z2FS 6-2-4X/1QV, see RA 27 506
- 8 Pressure reducing valve, optional
- 9 Machined valve mounting surface, position of ports
- 10 Nameplate for the pilot valve
- 11 Nameplate for the entire valve
- 12 R-rings/O-rings
- 13 Space required to remove the plug-in connector
- 14 2-position valves with spring offset in the main valve (C, D, K, Z)
- 15 2-position valves with spring offset in the main valve (Y)
- 16 3-position valves, spring-centered;
2-position valves with hydraulic offset in the main valve
- 17 3-position valves, pressure-centered
- 18 Locating pin

Order no. – Seal kit for main valve

	NBR seals	FPM seals
Size 10	00317200	00317201
Size 16	00314424	00314425
Size 25 ⁶⁾	00314435	00314436
Size 25 ⁷⁾	00314449	00314450
Size 32	00314443	00314444

⁶⁾ Model 4W.H 22 .7X/...

⁷⁾ Model 4W.H 25 .6X/...

A/F = Across Flats

Size	A, B, T ³⁾ A, B, T, P ⁴⁾	Ports X, Y, L X, Y, L	P ³⁾
10	R-ring 0.512 x 0.063 x 0.079 (13 x 1.6 x 2)	R-ring 0.44 x 0.063 x 0.07 (11.18 x 1.6 x 1.78)	
16	R-ring 0.887 x 0.091 x 0.103 (22.53 x 2.3 x 2.62)	R-ring 0.394 x 0.079 x 0.079 (10 x 2 x 2)	O-ring 0.866 x 0.098 (22 x 2.5)
25 ⁵⁾	R-ring 1.1 x 0.102 x 0.118 (27.8 x 2.6 x 3)	R-ring 0.748 x 0.118 x 0.118 (19 x 3 x 3)	O-ring 1.063 x 0.118 (27 x 3)
32	R-ring 1.673 x 0.118 x 0.118 (42.5 x 3 x 3)	R-ring 0.748 x 0.118 x 0.118 (19 x 3 x 3)	O-ring 1.654 x 0.118 (42 x 3)

²⁾ High-performance valve "6E"

³⁾ Pre-load valve P 4,5 (not for size 10)

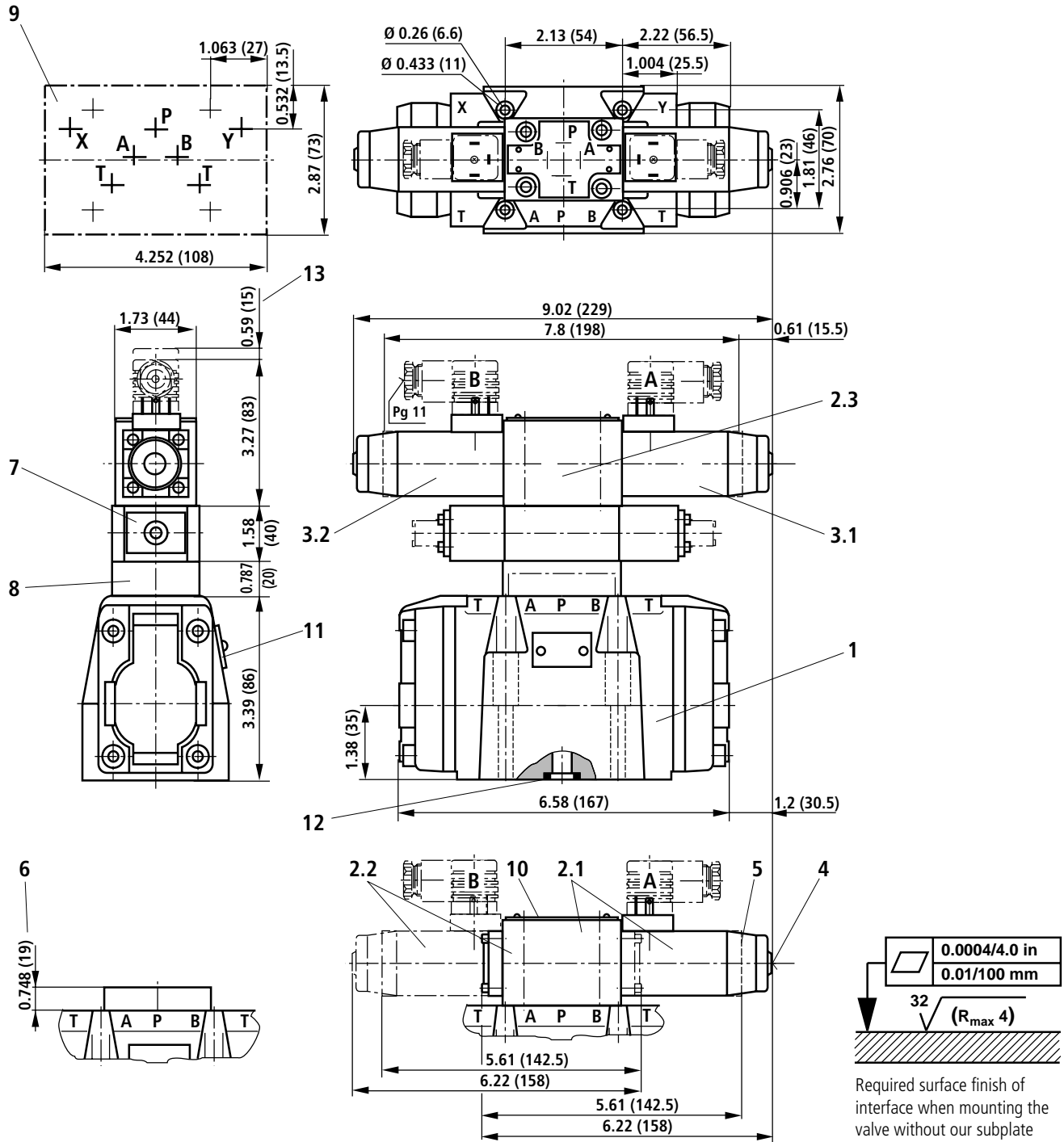
⁴⁾ Without pre-load valve

⁵⁾ Model 4W.H 22 .7X/... and model 4W.H 25 .6X/...

Ordering code, plug-in connectors to DIN 43 650 A and ISO 4400 for component plug "K4"

For further plug-in connectors see RA 08 006		Material no.					
		Without circuitry	With indicator light 12 ... 240 V	With LED & rectifier 24 ... 240 V	With rectifier 12 ... 240 V	With indicator light and Z diode protective circuit 24 V	Thread
a	grey	RR00 074683	–	–	–	–	Pg 11
b	black	RR00 074684	–	–	–	–	Pg 11
a/b	black	–	RR00 057292	RR00 057423	RR00 313933	RR00 310995	Pg 11
a	red/brown	RR00 004823	–	–	–	–	1/2" NPT
b	black	RR00 011039	–	–	–	–	1/2" NPT
a/b	black	–	RR00 057453	RR00 057455	RR00 842566	–	1/2" NPT

Unit dimensions, Model 4 WEH 10... : dimensions in inches (millimeters)



Porting pattern to ISO 4401-5 NFPA T 3.5.1 M R1 and ANSI B 93.7 D 05

Subplates, see data sheet RA 45 054;
Internally piloted, internally drained valves only:

- G 534/05 (3/4" NPT);
- G 534/12 (SAE-12; 1 1/16-12);
- G 535/05 (3/4" NPT);
- G 535/12 (SAE-12; 1 1/16-12);
- G 536/05 (1" NPT);
- G 536/12 (SAE-16; 1 5/16-12);

For description of numbered items, see page 17

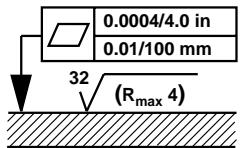
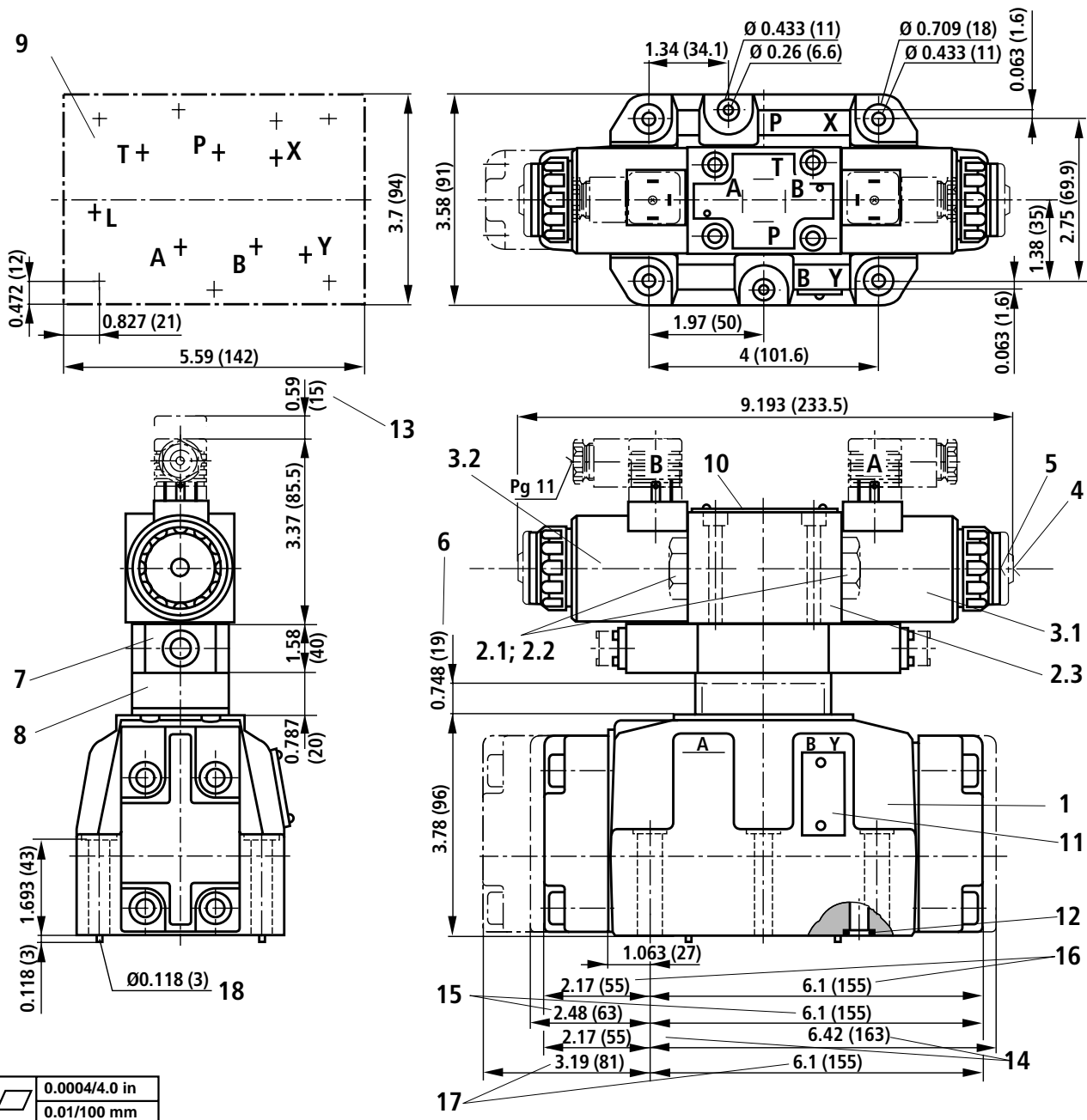
Valve Mounting Bolts

- 4) 1/4-20 UNC x 1 3/4" (M6 x 45 mm)
(UNC bolt kit # US00 833 367)
- Socket head cap screws, SAE grade 8 or better
- Tightening torque 11.5 lb-ft (15.5 Nm)
- Subplates and valve mounting bolts must be ordered separately

Note:

Pilot valve dimensions for designation 6E (removable solenoids), see data sheet RA 23 178

Unit dimensions, Model 4 WEH 16... : dimensions in inches (millimeters)



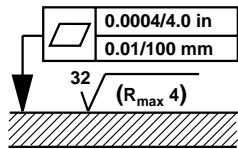
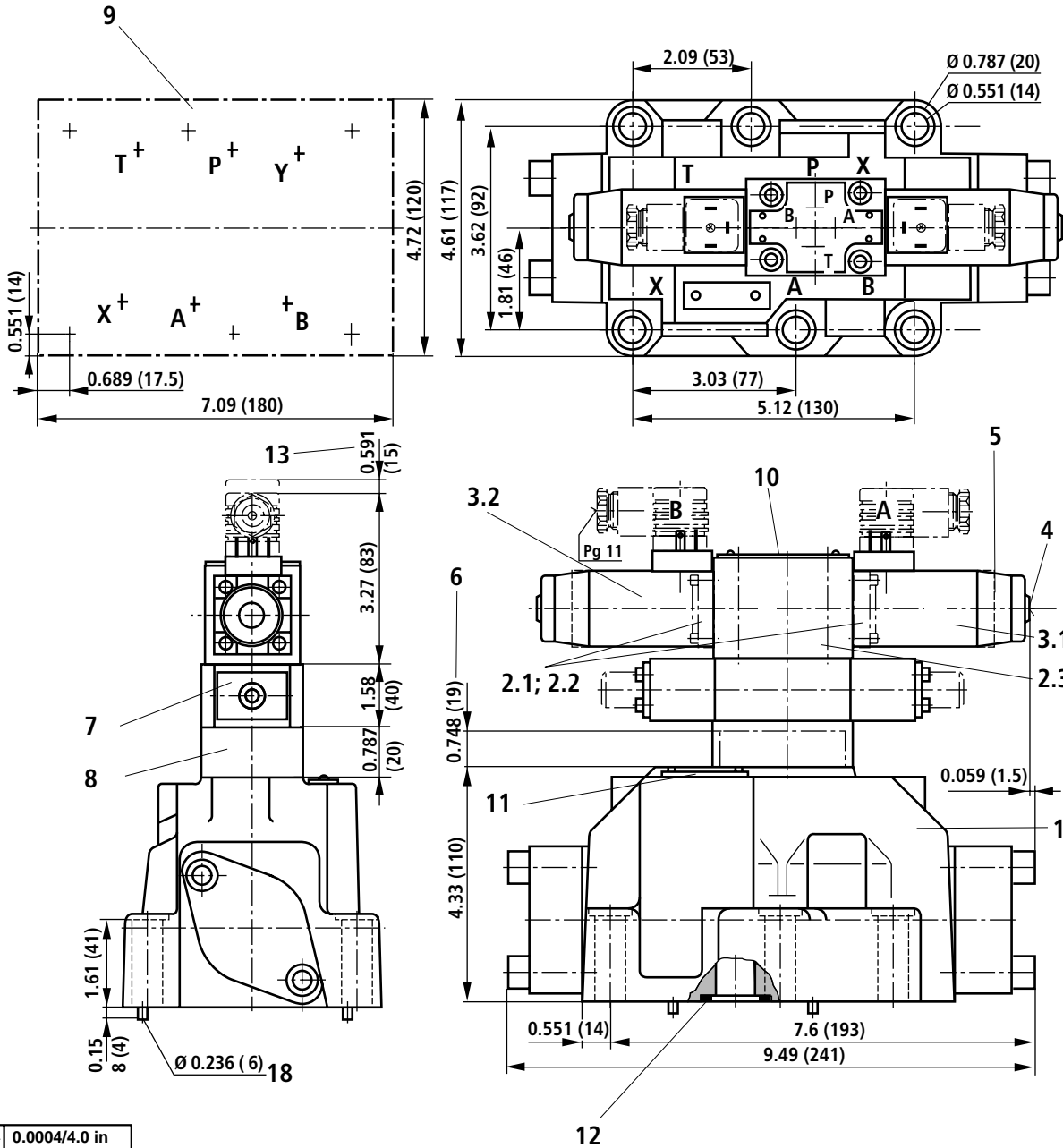
Required surface finish of interface when mounting the valve without our subplate

Porting pattern to ISO 4401-7 NFPA T 3.5.1 M R1 and ANSI B 93.7 D 07
Subplates, see data sheet RA 45 056;
 G 172/05 (3/4" NPT);
 G 172/12 (SAE-12; 1 1/16-12);
 G 174/05 (1" NPT);
 G 174/12 (SAE-16; 1 5/16-12);
 G 174/08 (3/4" ISO flanged ports)
 For description of numbered items, see page 17

Valve Mounting Bolts
 2) 1/4-20 UNC x 2 1/4" (M6 x 60 mm)
 Tightening torque 11.5 lb-ft (15.5 Nm)
 4) 3/8-16 UNC x 2 1/4" (M10 x 60 mm)
 Tightening torque 55 lb-ft (75 Nm)
 (UNC bolt kit # US00 833 395)
 Socket head cap screws, SAE grade 8 or better
 Subplates and valve mounting bolts must be ordered separately

Note:
 Pilot valve dimensions for designation 6E (removable solenoids), see RA 23 178

Unit dimensions, Model 4 WEH 22... : dimensions in inches (millimeters)



Required surface finish of interface when mounting the valve without our subplate

Porting pattern to ISO 4401-8 NFPA T 3.5.1 M R1 and ANSI B 93.7 D 08

Subplates, see data sheet RA 45 058;

- G 153/05 (1" NPT);
- G 155/12 (SAE-16; 1 5/16-12);
- G 154/05 (1 1/4" NPT);
- G 154/12 (SAE-20; 1 5/8-20);
- G 156/05 (1 1/2" NPT);
- G 156/12 (SAE-24; 1 7/8-20)

For description of numbered items, see page 17

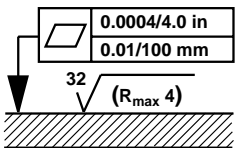
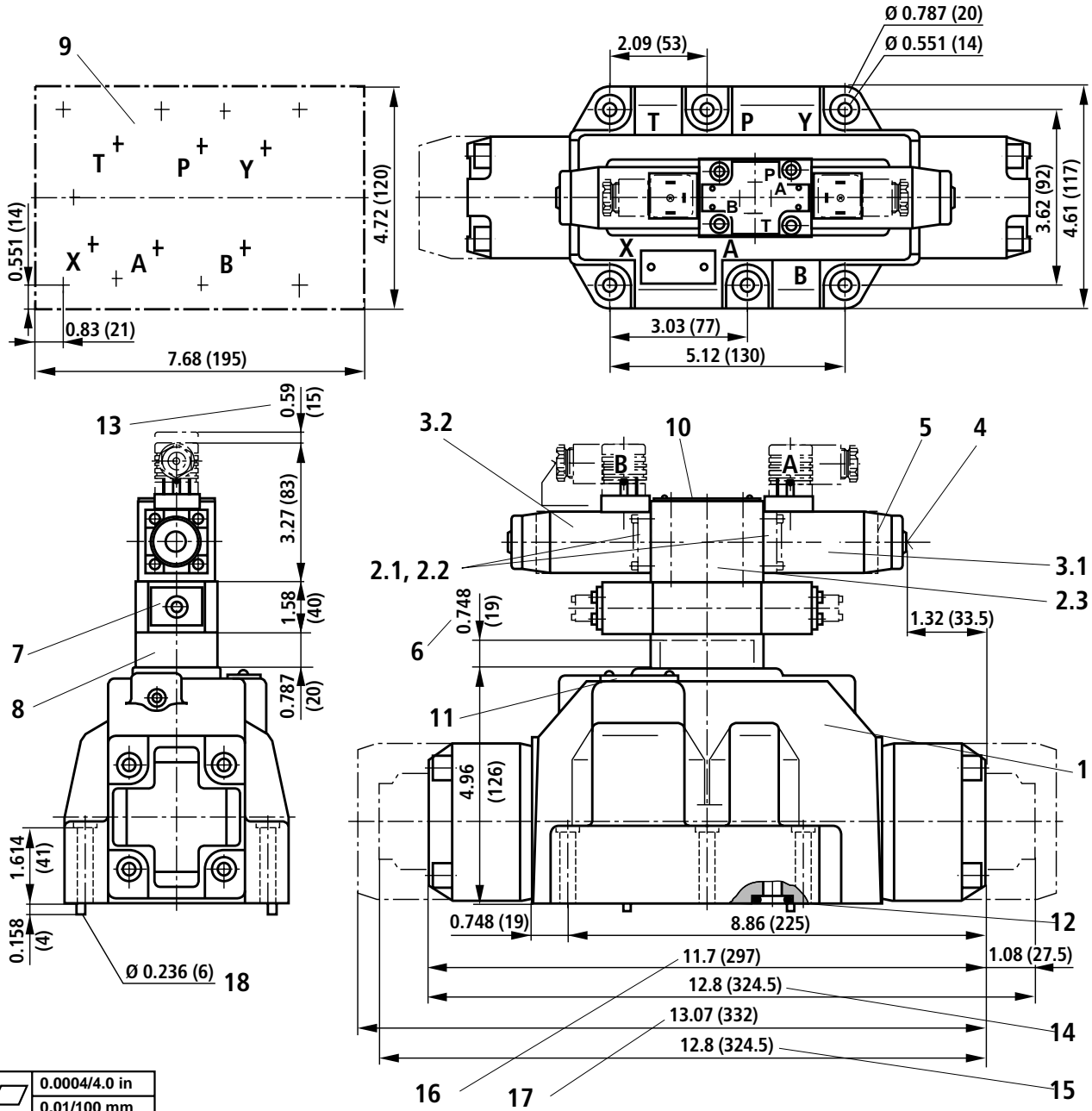
Valve Mounting Bolts

- 6) 1/2-13 UNC x 2 1/2" (M12 x 60 mm)
- Tightening torque 83 lb-ft (112 Nm)
- (UNC bolt kit # US00 833 387)
- Socket head cap screws, SAE grade 8 or better
- Subplates and valve mounting bolts must be ordered separately

Note:

Pilot valve dimensions for designation 6E (removable solenoids), see RA 23 178

Unit dimensions, Model 4 WEH 25... : dimensions in inches (millimeters)



Required surface finish of interface when mounting the valve without our subplate

Porting pattern to ISO 4401-8 NFPA T 3.5.1 M R1 and ANSI B 93.7 D 08

Subplates, see data sheet RA 45 058;

- G 153/05 (1" NPT);
- G 155/12 (SAE-16; 1 5/16-12);
- G 154/05 (1 1/4" NPT);
- G 154/12 (SAE-20; 1 5/8-20);
- G 156/05 (1 1/2" NPT);
- G 156/12 (SAE-24; 1 7/8-20);
- G 154/21 (1 1/4" ISO flanged ports)

For description of numbered items, see page 17

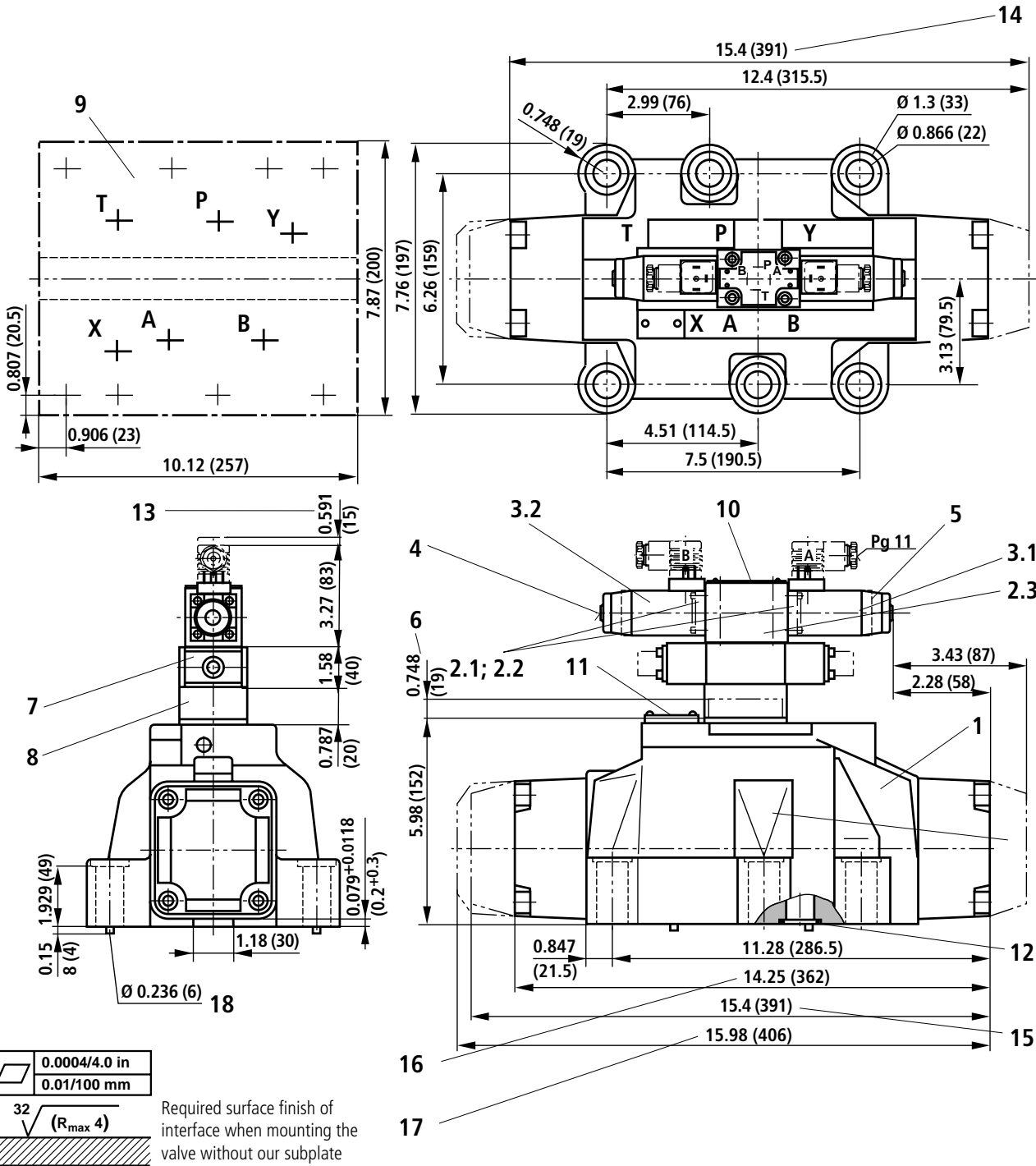
Valve Mounting Bolts

- 6) 1/2-13 UNC x 2 1/2" (M12 x 60 mm)
- Tightening torque 83 lb-ft (112 Nm)
- (UNC bolt kit # US00 833 387)
- Socket head cap screws, SAE grade 8 or better
- Subplates and valve mounting bolts must be ordered separately

Note:

Pilot valve dimensions for designation 6E (removable solenoids), see RA 23 178

Unit dimensions, Model 4 WEH 32... : dimensions in inches (millimeters)



Porting pattern to ISO 4401-10 NFPA T 3.5.1 M R1 and ANSI B 93.7, **D 10**

Subplates, see data sheet RA 45 060;

- G 157/05 (1 1/2" NPT);
- G 157/12 (SAE-24; 1 7/8-12);
- G 158/34 (1 1/2" ISO flanged ports)

For description of numbered items, see page 17

Valve Mounting Bolts

- 6) 3/4-10 UNC x 3 1/4" (M20 x 80 mm)
- Tightening torque 295/320 lb-ft (400/430 Nm)
- (UNC bolt kit # US00 833 394)
- Socket head cap screws, SAE grade 8 or better
- Subplates and valve mounting bolts must be ordered separately

Note:

Pilot valve dimensions for designation 6E (removable solenoids), see RA 23 178

Notes



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