REXROTH
HYDRONORMA®

4/3- and 4/2-Way Directional Control Valve Type WEH 102/WH 102

electro-hydr. or hydr. operation | up to 350 bar

indirect (WEH) and direct (WH) operated spool valves

RE 24 812

Issue: 2.76

Description

Type WEH

Operation of the main spool is by means of a pilot valve size 16, which in turn is controlled by a size 6 control valve. The size 6 valve is available with either DC or AC oil immersed solenoids. Hand emergency on the pilot valve solenoids allows operation of the main spool without energisation of the solenoids, provided pilot pressure is available. The main valve spool is held in the centre or end positions by hydraulic pressure.

Pilot oil supply and pilot oil drain external.

Type WH

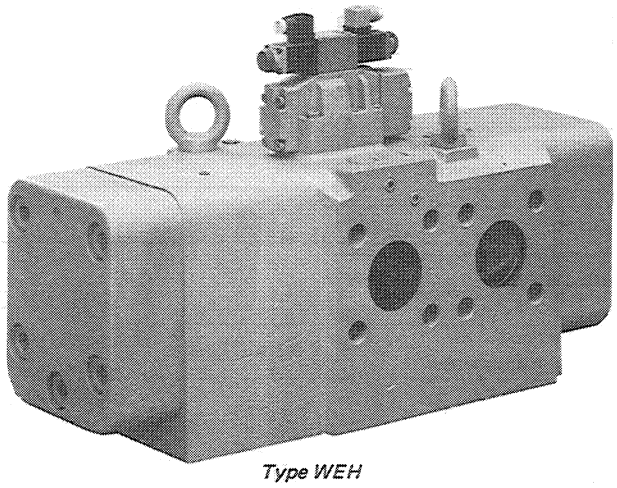
Operation of the main spool is by direct application of hydraulic pressure.

Design Features:

- *flange connections*
- *cast oil passages*
- *hydraulic centering of main spool*

Depending on the application, the valves can be supplied with the following additional features:

- *pilot choke adjustment (p.11)*
- *stroke limiter on main spool (p.12)*
- *main spool position indicator (p.12)*
- *throttle orifices to reduce pilot oil supply (p.11)*
- *electrical connections (p.5)*



Type WEH

Description

4/3-Way Valves with Hydraulic Centering of Main Spool

The main spool is held in the zero position by pressurization of both spool areas.

Unloading one spool area causes the spool to move into one of the end positions. For all spool types of this model the required minimum pilot pressure at Q = 4500 l/min is shown in the table on page 4. For applications in excess of this valuea higher pilot pressure is required. For example, at operating pressure p = 350 bar and a flow of Q = 7000 l/min a pilot pressure of 30 bar is required.

4/2-Way Valve (p.8) (WEH)

3 different types are available:

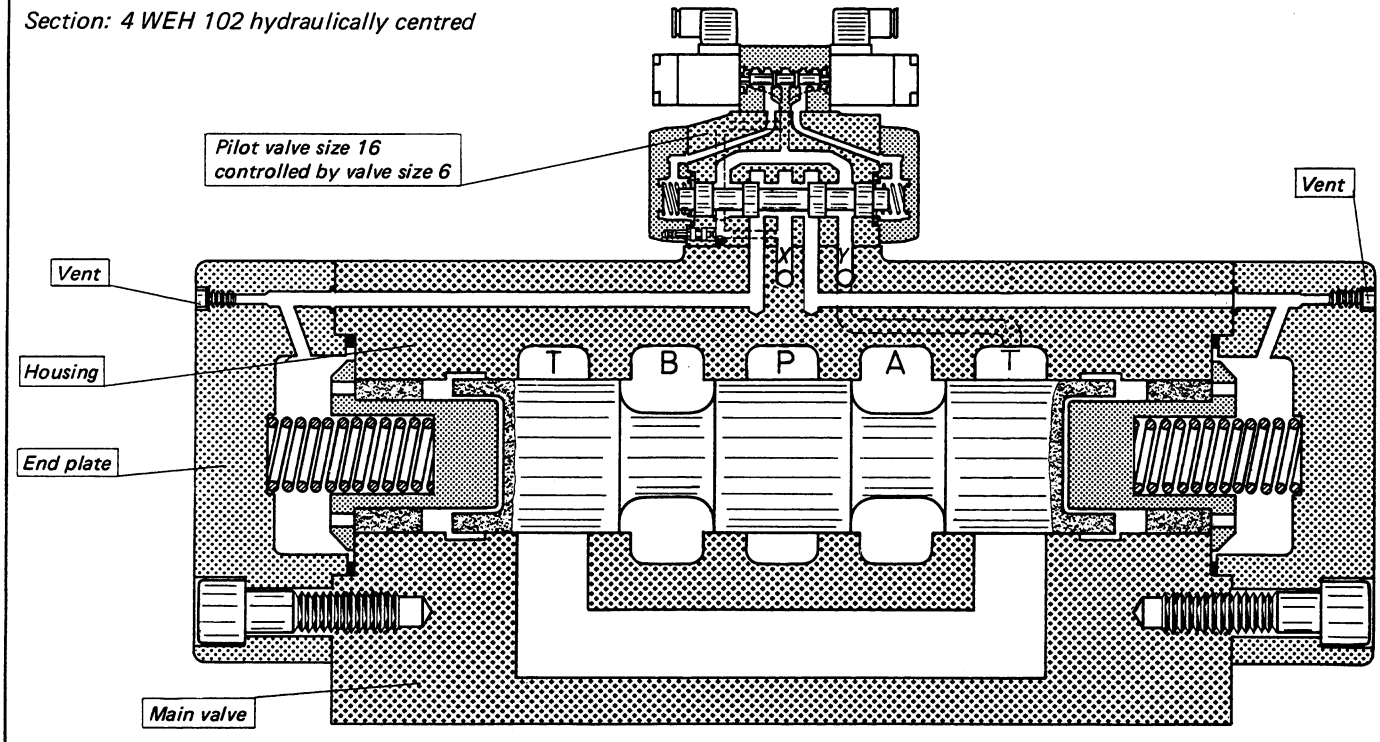
1.) *Pilot valve has one spring to hold the spool in the end position. The main valve spool has no springs and is fixed in the end position hydraulically.*

2.) *Pilot valve has two solenoids. No springs in pilot or main valve. The spool positions are fixed by means of solenoid energisation.. The 1 solenoid must therefore always remain energised.*

3.) *Pilot valve has two solenoids, the spool has detents in the end position (impulse valve). The main valve spool has no detents and moves into position when pressurized.*

With types 1, 2 and 3 the switching positions are guaranteed only when pilot pressure is available.

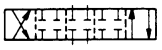
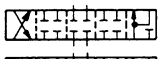
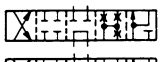
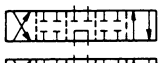
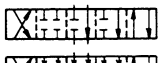
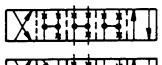
Section: 4 WEH 102 hydraulically centred



Ordering Code

H	–	4	W		102	H			F	/			

- 350 bar model = H
- 4 service ports = 4
- Directional control valve = W
- hydraulically operated = H; electro-hydr. operated = EH — Operation
- Size 102 = 102 — Size
- hydraulic return = H — Spool return (main valve)

Symbols with crossover position	Spool Types
	 = C
	 = D
	 = K
	 = Z
	 = E
	 = F
	 = G
	 = H
	 = J
	 = L
	 = M
	 = Q
	 = R
	 = S
	 = T
	 = U
	 = V
	 = W

- Series 30 = 30 (30 to 39 installation and connection dimensions remain the same) — Series no.
- flange connections = F — Mounting
- without spring return = O
- without spring return, with detent = OF
  (The detent is in the pilot valve only)
  — Spool fixing (pilot valve) (not for valve type "WH") 2 position valves and 2 solenoids only
- Pilot valve size 16 = 16 — (not for valve type "WH") Pilot valve size
- Oil immersed solenoid = A — (not for valve type "WH") Solenoid type

					/			*	

Options

Further details to be added in clear text	

seals

no desig. =	Perbunan seals
V =	Viton seals

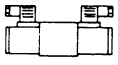
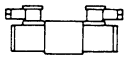
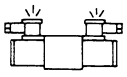
throttle orifice (p.11) (not for type "WH")

no desig. =	without orifice
B 15 =	orifice, 1,5 mm dia.
B 20 =	orifice, 2,0 mm dia.
B 25 =	orifice, 2,5 mm dia.
B 30 =	orifice, 3,0 mm dia.

Additional features (see p.12)

no desig. =	without any additional features
10 =	stroke limiter on side of A and B ports
11 =	stroke limiter on side of A port
12 =	stroke limiter on side of B port
13 =	spool position indicator on side of A and B ports
14 =	spool position indicator on side of A port
15 =	spool position indicator on side of B port
16 =	stroke limiter on side of A port and spool position indicator on side of B port
17 =	stroke limiter on side of B port and spool position indicator on side of A port

Electrical connections (see p.5) (not for type "WH")

Z4 =		single plug-in connector DIN 43 650
Z5 =		"large plug-in connector"
Z5L =		as Z5 with light (s)

Pilot choke adjustment (Please see pp.5 and 11!)

no desig. =	without pilot choke adjustment
S =	pilot choke adjustment for meter-in-control
S2 =	pilot choke adjustment for meter-out-control

Pilot oil connections (not for type "WH")

no desig. =	external pilot supply, external pilot drain

hand emergency (not for type "WH")

no desig. =	without hand emergency
N =	with hand emergency

Solenoid details (not for type "WH")

W 220-50 =	220 V AC, 50 Hz
G 24 =	24 V DC (see technical data for further voltages)
W 110 R =	DC solenoid with built-in rectifier in connector Z5 (only without "L") for 110 V or 220 V supply independent of frequency
W 220 R =	

Technical Data

Weight	Valve type WH:	max. 535 kg	
	Valve type WEH:	max. 545 kg; (acc. to pilot valve)	
Hydraulic medium		Mineral oil	
Viscosity range		2,8 to 380 cSt	
Fluid temperature range		−30 to +70°C	
Max. operating pressure	Ports P, A, B, T	350 bar	
	Port Y	Pilot drain y = external ("WEH")	60 bar
Min. pilot pressure	Pilot supply x = external	3-position valves, hydr. centred	p_{st} = 15 bar
Max. pilot pressure		250 bar	

Pilot Volume for Switching Operation

3-position valves, hydr. centred	189 cm^3
2-position valves, hydr. return	380 cm^3

Total switching time of valve from zero into end position (with AC voltage) WEH

Pilot flow Q_x	Pilot pressure p_{st}									
	50 bar		100 bar		150 bar		200 bar		250 bar	
	3-pos. valve	2-pos. valve	3-pos. valve	2-pos. valve	3-pos. valve	2-pos. valve	3-pos. valve	2-pos. valve	3-pos. valve	2-pos. valve
20 l/min	225 ms	450 ms	200 ms	400 ms	185 ms	370 ms	160 ms	320 ms	155 ms	310 ms
40 l/min	145 ms	290 ms	120 ms	240 ms	115 ms	230 ms	100 ms	200 ms	85 ms	170 ms
80 l/min	105 ms	210 ms	90 ms	180 ms	75 ms	150 ms	60 ms	120 ms	55 ms	110 ms
160 l/min	85 ms	170 ms	70 ms	140 ms	55 ms	110 ms	60 ms	120 ms	55 ms	110 ms

Total switching time of valve from end into zero position WEH

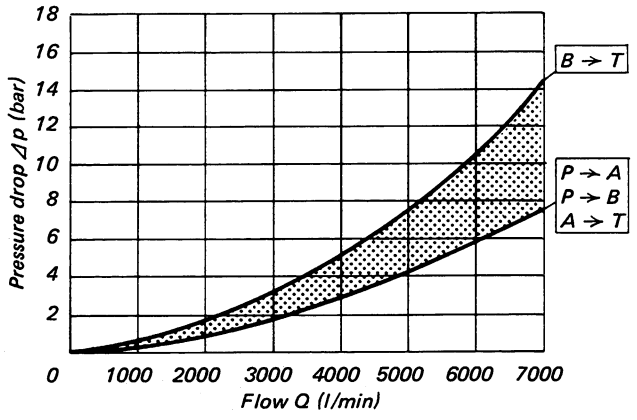
Pilot flow Q_x	Pilot pressure p_{st}									
	50 bar		100 bar		150 bar		200 bar		250 bar	
	3-pos. valve	2-pos. valve	3-pos. valve	2-pos. valve	3-pos. valve	2-pos. valve	3-pos. valve	2-pos. valve	3-pos. valve	2-pos. valve
20 l/min	420 ms	840 ms	380 ms	760 ms	380 ms	760 ms	290 ms	580 ms	280 ms	560 ms
40 l/min	270 ms	540 ms	230 ms	460 ms	230 ms	460 ms	210 ms	420 ms	190 ms	380 ms
80 l/min	180 ms	360 ms	160 ms	320 ms	150 ms	300 ms	140 ms	280 ms	130 ms	260 ms
160 l/min	160 ms	320 ms	130 ms	260 ms	110 ms	220 ms	140 ms	280 ms	150 ms	300 ms

The total switching times from zero into end position increase by 50 ms for DC voltage

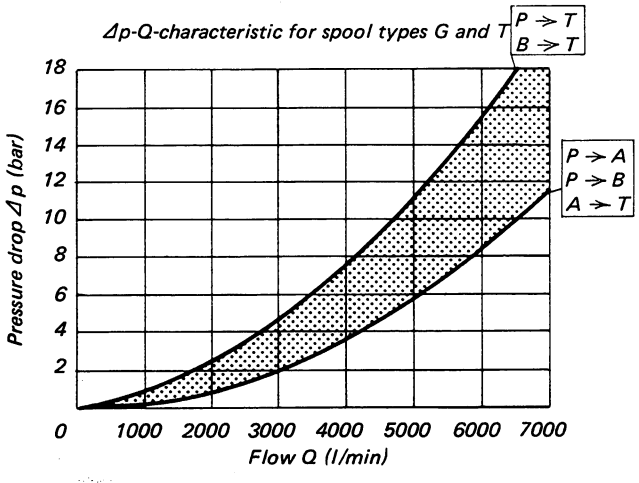
For applications to other specifications please consult us

Performance Curves (pressure drop Δp related to flow Q at 37 cSt)

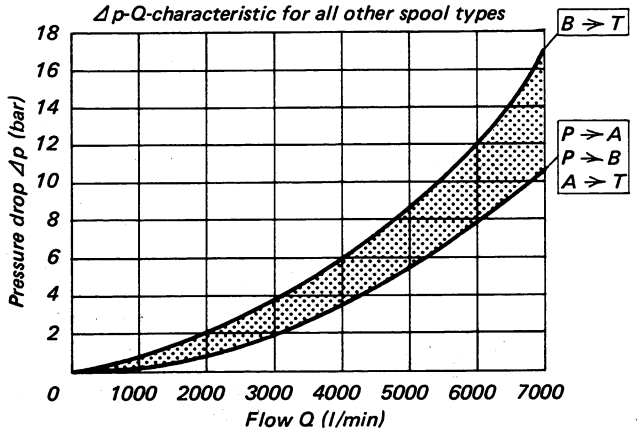
Δ p-Q-characteristic for spool types E, W and R



Δp-Q-characteristic for spool types G and T



Δ p-Q-characteristic for all other spool types



Due to silting the function of the valves is dependent on the filtration. In order to obtain the maximum flow values shown, main flow filtration of 25 µm is recommended. The internal flow forces in the valve also affect the flow, and therefore the flow details shown for 4-way valves apply for normal application with two flow directions (e.g. from P to A and simultaneously return flow from B to T).

Pilot Valve (see RE 24 757 for further details)

A 4-way directional control valve size 16 is used as pilot valve, which is in turn controlled by a directional control valve size 6.

Operation of the spool in the size 6 valve is by means of oil immersed DC or AC solenoids. The spool of the size 16 valve is held in zero position by springs and in switching position by hydraulic pressure.

Hand emergency on the size 6 valve permits operation of the valve spool without solenoid energisation.

For the various models of the main valve the following models and spool types of the pilot valve are used:

Main Valve	Pilot Valve (Size 16)
2-position valve hydraulic return	2-position valve, spring offset without spring return or without spring return, with detent spool type D = 
3-position valve hydraulically centred	3-position valve, spring centred spool type M = 

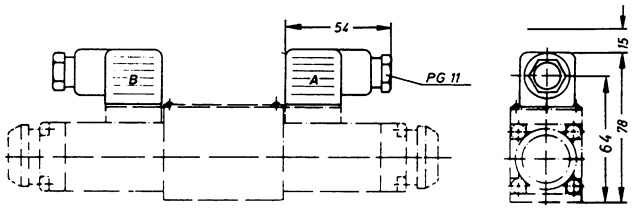
Electrical Data

AC voltage	42V; 110V; 127V; 220V – 50 Hz
	120V and 220V – 60 Hz
DC voltage	12; 24; 42; 60; 110; 180; 195 and 220V
Duty cycle	100 % ED
Max. ambient temperat.	+50°C
Max. coil temperature	+150°C
Insulation	IP 65

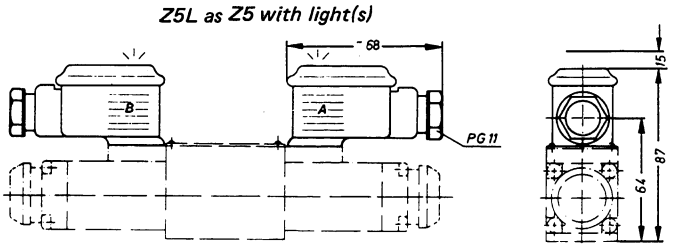
Voltage	DC	AC
Power requirement	26 W	–
Holding current	–	46 VA
In-rush current	–	130 VA

Electrical Connections

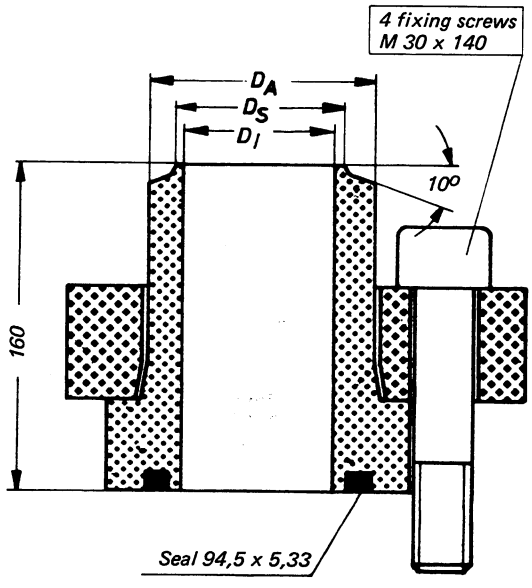
Z4 single plug-in connector



Z5L as Z5 with light(s)



Connection flange (dimensions in mm)

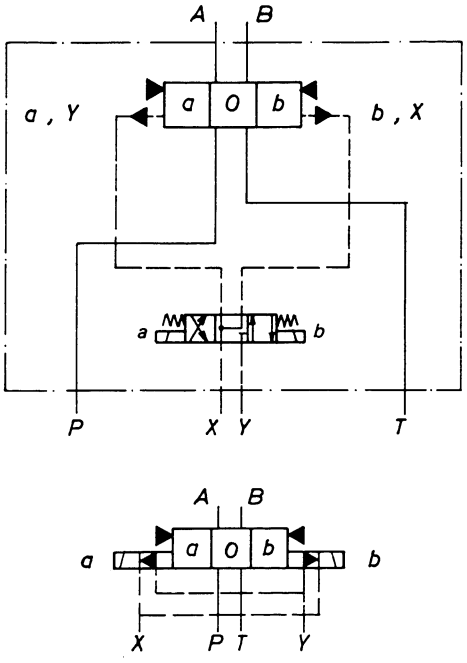


Pressure rating	Size	D_A	D_S	D_I	Part No. Perbunan seals	Part No. Viton seals
160 bar	102	114,3	98	94,3	303 907	303 947
320 bar	102	114,3	86	82,3	303 927	303 967

Valve Type WEH Detailed and simplified symbols for 3-position valves

Valves with Hydraulic Centering

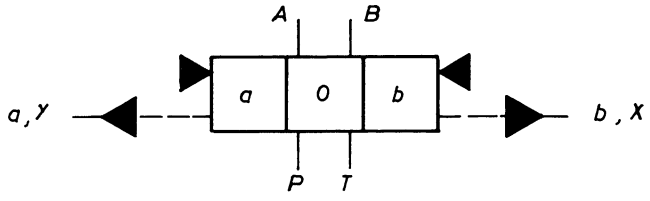
x = external; y = external



Valve Type WH

Symbols for 3-position valves

Valves with Hydraulic Centering

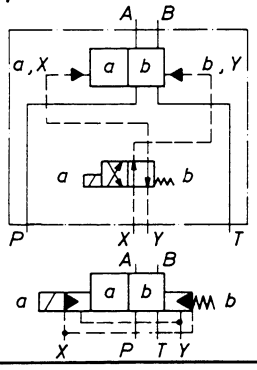


Model Code hydr. centering (WEH)	Model Code hydr. centering (WH)	Spool Type	Symbol	Symbol (with crossover position)
H-4 WEH 102. . .HE. . ./. . .	H-4 WH 102. . .HE. . ./. . .	E		
H-4 WEH 102. . .HF. . ./. . .	H-4 WH 102. . .HF. . ./. . .	F		
H-4 WEH 102. . .HG. . ./. . .	H-4 WH 102. . .HG. . ./. . .	G		
H-4 WEH 102. . .HH. . ./. . .	H-4 WH 102. . .HH. . ./. . .	H		
H-4 WEH 102. . .HJ. . ./. . .	H-4 WH 102. . .HJ. . ./. . .	J		
H-4 WEH 102. . .HL. . ./. . .	H-4 WH 102. . .HL. . ./. . .	L		
H-4 WEH 102. . .HM. . ./. . .	H-4 WH 102. . .HM. . ./. . .	M		
H-4 WEH 102. . .HQ. . ./. . .	H-4 WH 102. . .HQ. . ./. . .	Q		
H-4 WEH 102. . .HR. . ./. . .	H-4 WH 102. . .HR. . ./. . .	R		
H-4 WEH 102. . .HS. . ./. . .	H-4 WH 102. . .HS. . ./. . .	S		
H-4 WEH 102. . .HT. . ./. . .	H-4 WH 102. . .HT. . ./. . .	T		
H-4 WEH 102. . .HU. . ./. . .	H-4 WH 102. . .HU. . ./. . .	U		
H-4 WEH 102. . .HV. . ./. . .	H-4 WH 102. . .HV. . ./. . .	V		
H-4 WEH 102. . .HW. . ./. . .	H-4 WH 102. . .HW. . ./. . .	W		

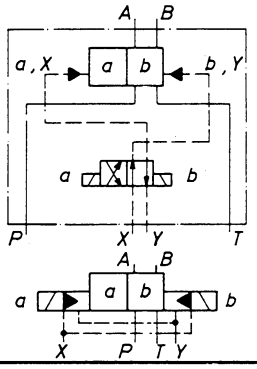
Valve Type WEH Detailed and simplified symbols for 2-position valves

x = external; y = external

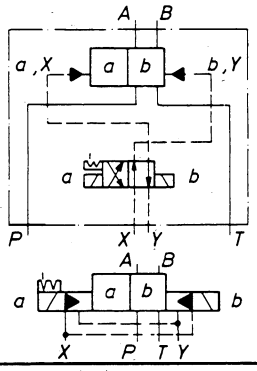
Type H-4 WEH 102 H . . . /. . .



Type H-4 WEH 102 H . . . /O . . .

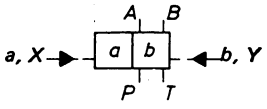


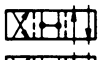
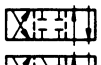
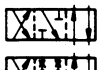
Type H-4 WEH 102 H . . . /OF . . .

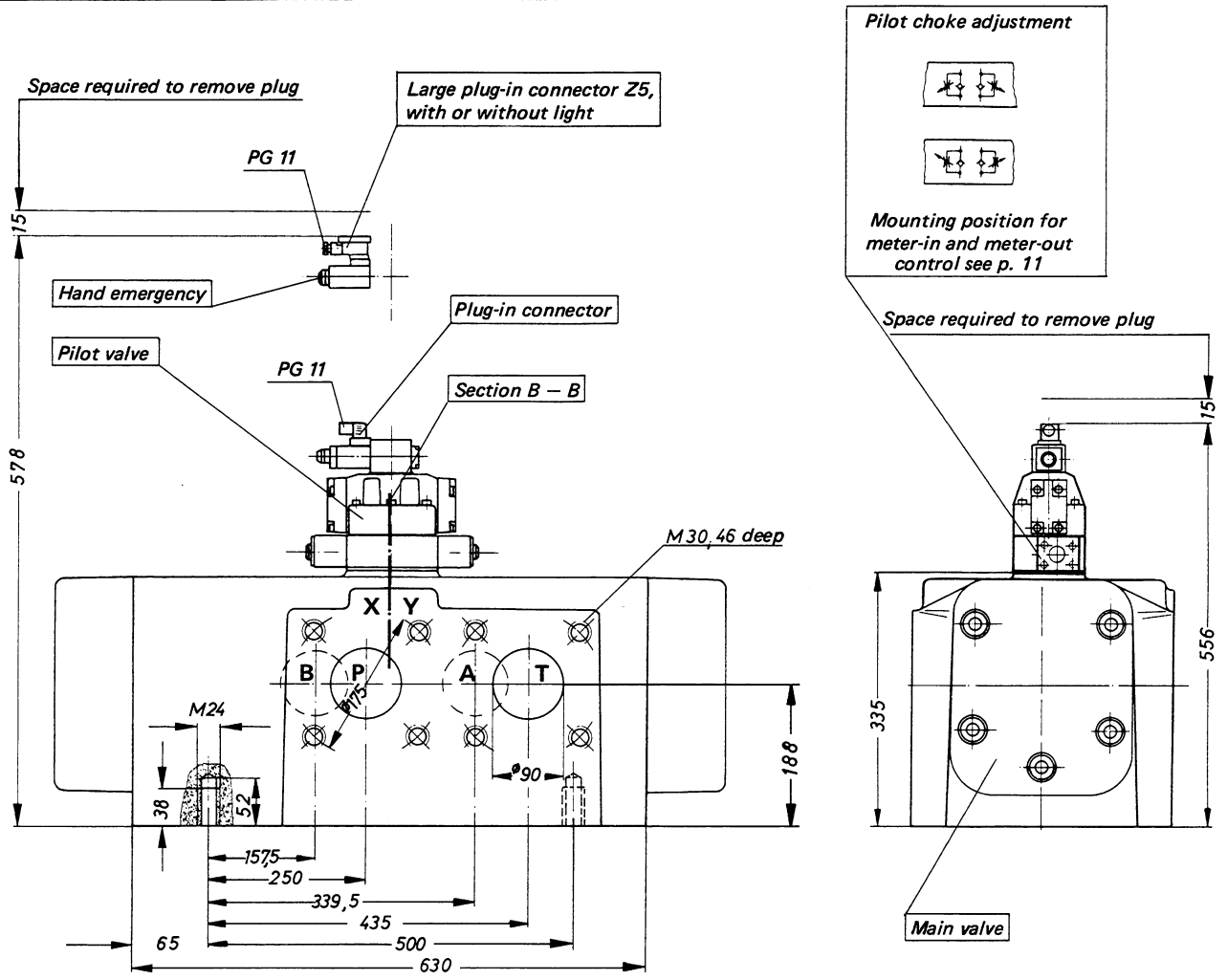


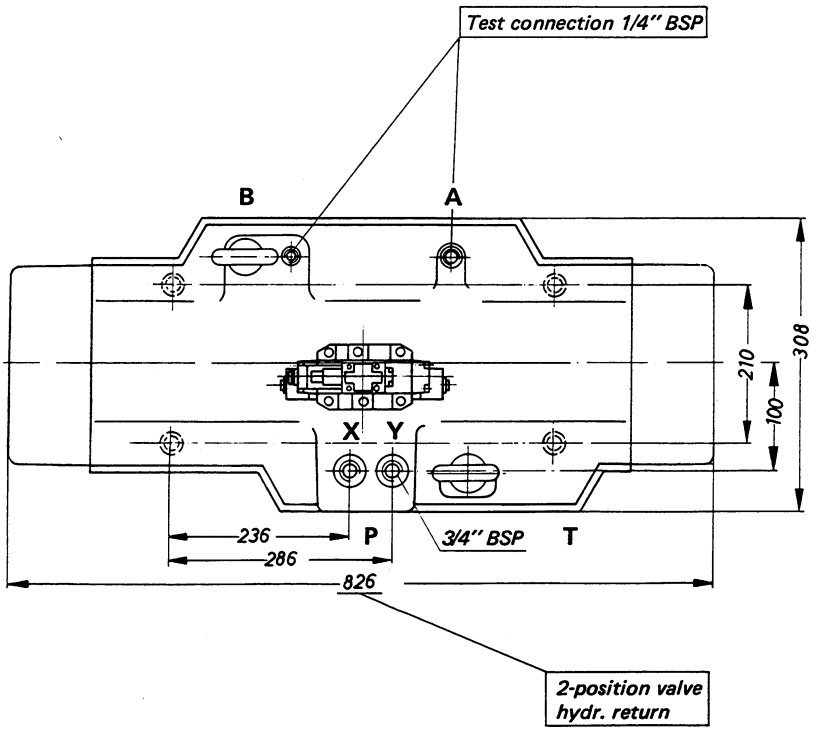
Valve Type WH Symbols for 2-position valves

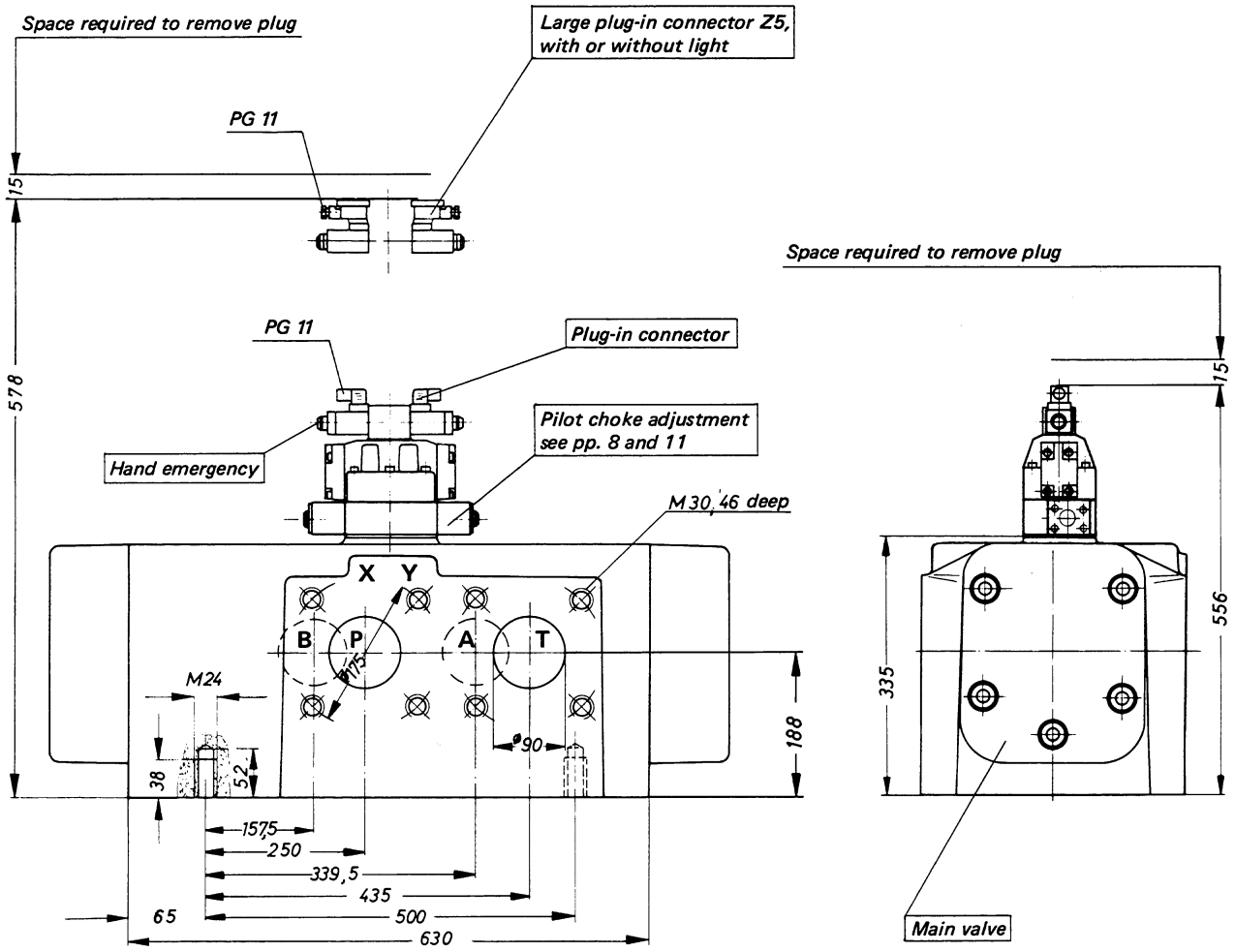
hydraulic return

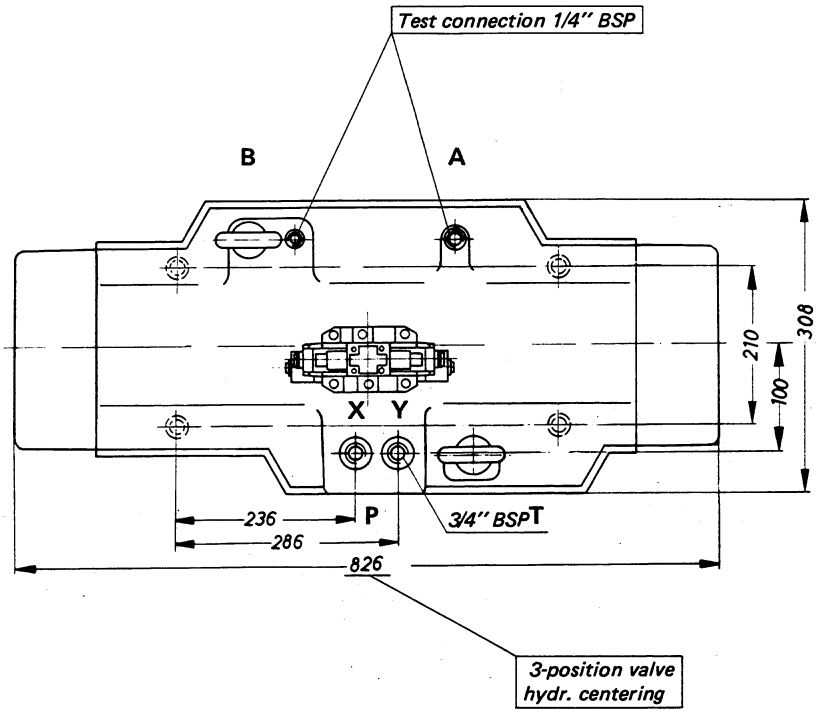


Spool Type	Symbol	Symbol, with crossover position
C		
D		
K		
Z		


Space required to remove plug
Large plug-in connector Z5, with or without light
PG 11
15
Hand emergency
Plug-in connector
Pilot valve
PG 11
Section B – B
578
M 30, 46 deep
X
Y
B
P
A
T
ø175
ø90
M24
38
52
188
157,5
250
339,5
435
500
65
630
Pilot choke adjustment
Mounting position for meter-in and meter-out control see p. 11
Space required to remove plug
15
556
335
Main valve

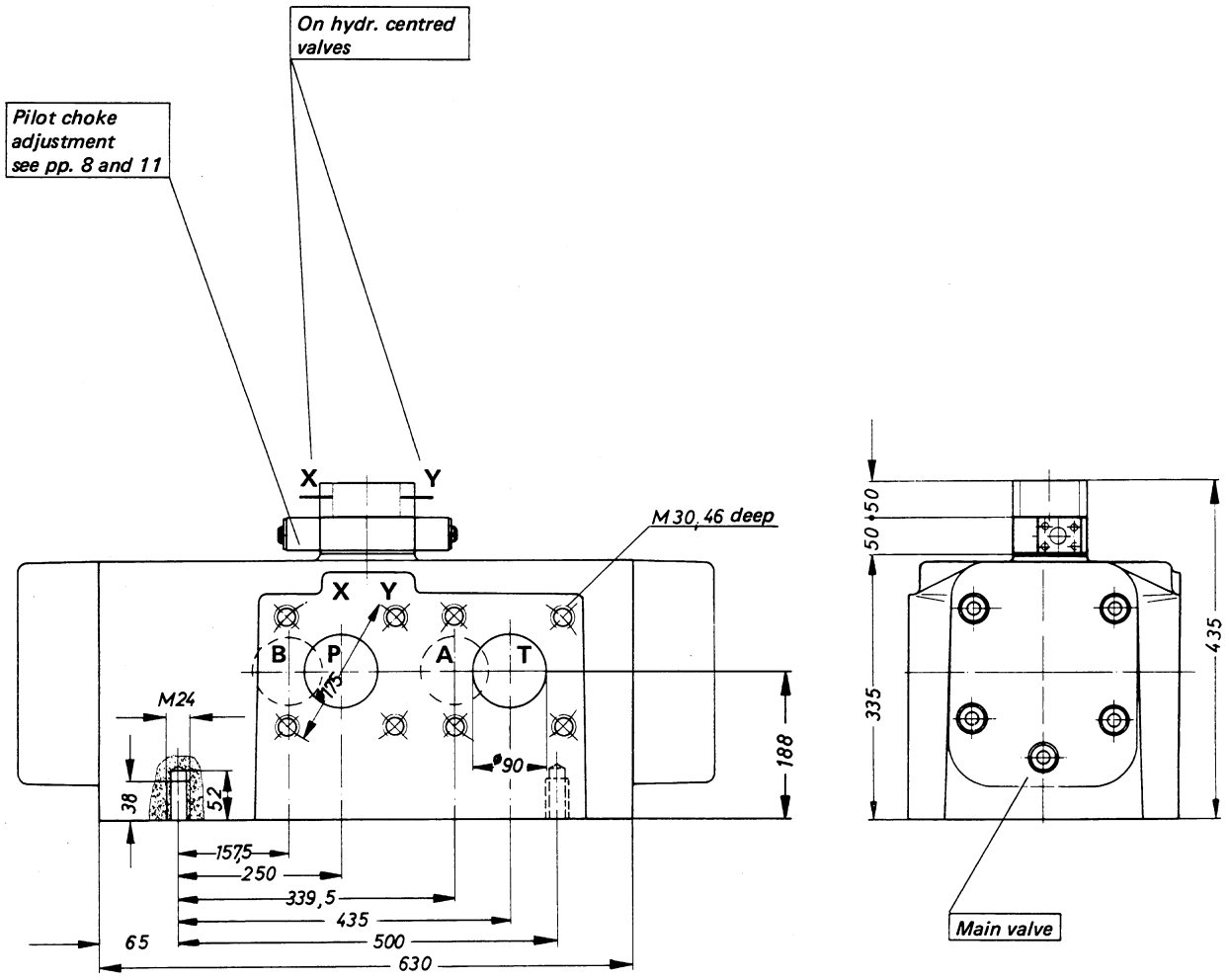

Test connection 1/4" BSP
B
A
X
Y
308
210
100
236
286
826
P
3/4" BSP
T
2-position valve hydr. return

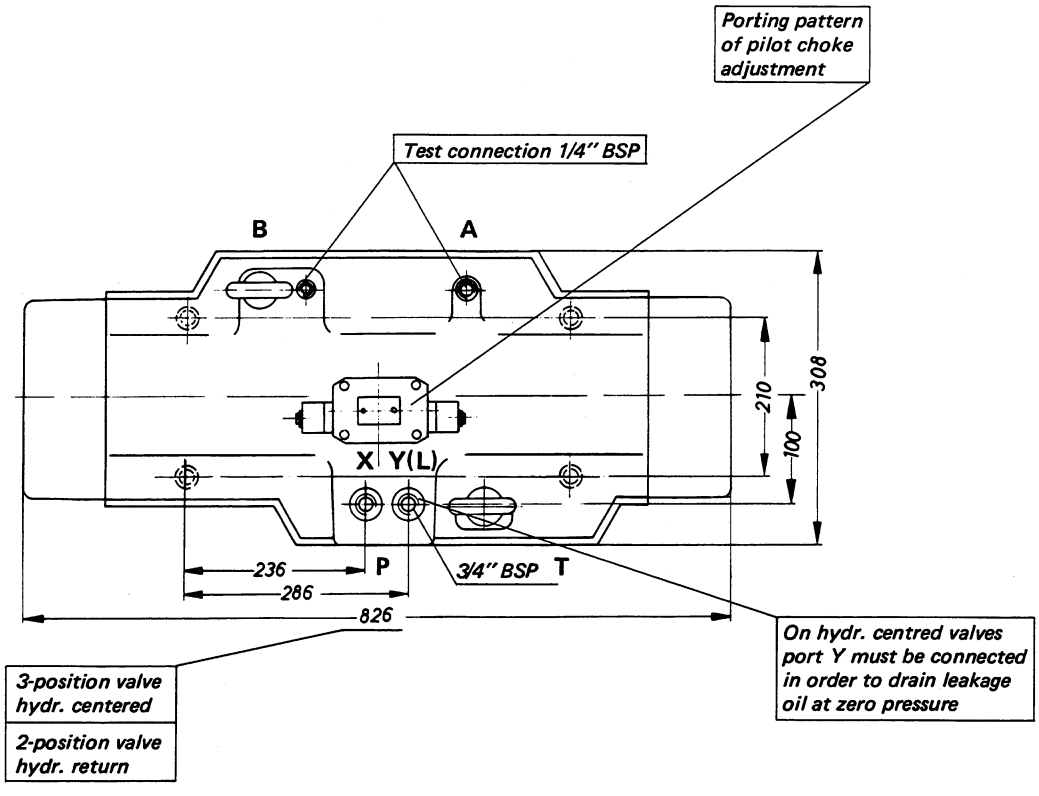

Space required to remove plug
Large plug-in connector Z5, with or without light
PG 11
15
578
PG 11
Plug-in connector
Pilot choke adjustment see pp. 8 and 11
Hand emergency
M 30, 46 deep
X Y
B P A T
ø175
M24
38
5,2
90
188
157,5
250
339,5
435
65
500
630
Space required to remove plug
15
556
335
Main valve


Test connection 1/4" BSP
B
A
X Y
210
308
100
236
P
286
3/4" BSP T
826
3-position valve hydr. centering

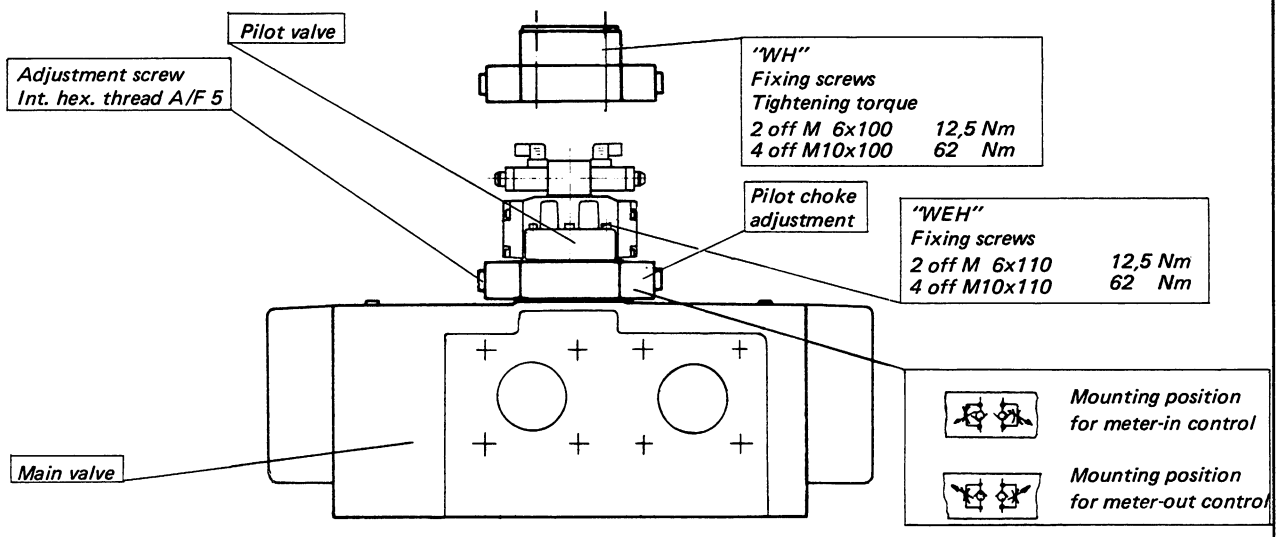
Valve Type WH for flange connections

2-position valve, hydr. return; 3-position valve, hydr. centering





Pilot Choke Adjustment Plate Type Z 2 FS 16

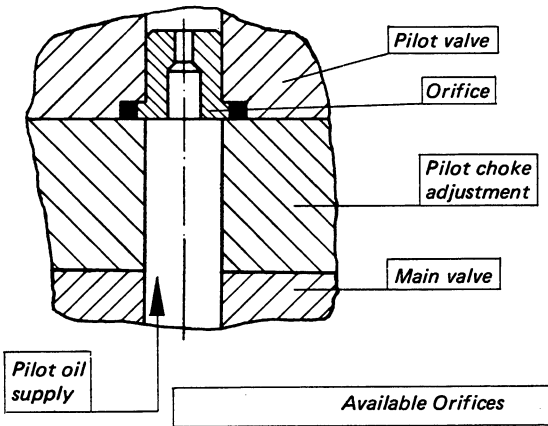


Pilot choke adustment:
Clockwise rotation of adjustment screw increases switching time of main valve, anti-clockwise rotation reduces the switching time

Conversion from meter-in to meter-out control:
Conversion from meter-in to meter-out control or vice versa is by interchanging the throttle inserts. The insert must always be fitted so that the symbol is on the same side as the nameplate.

Throttle Orifice *(not for valve type WH)*

Section B – B (position of section, see p. 8)
The throttle orifice serves to reduce the pilot oil supply to the P-port of the pilot valve.

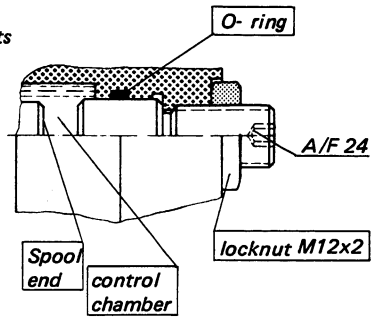


Available Orifices		
Dia.	Type No.	Part No.
1,5 mm	B 15	135 063
2,0 mm	B 20	135 064
2,5 mm	B 25	135 132
3,0 mm	B 30	135 133

Stroke Limiter, mounting possibilities

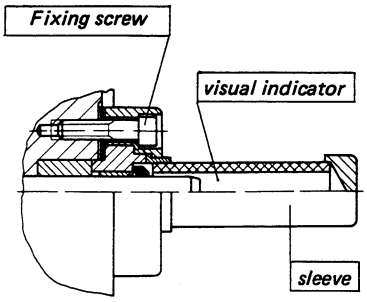
Adjustment range: 40 mm; 1 turn = 2 mm adjustment stroke

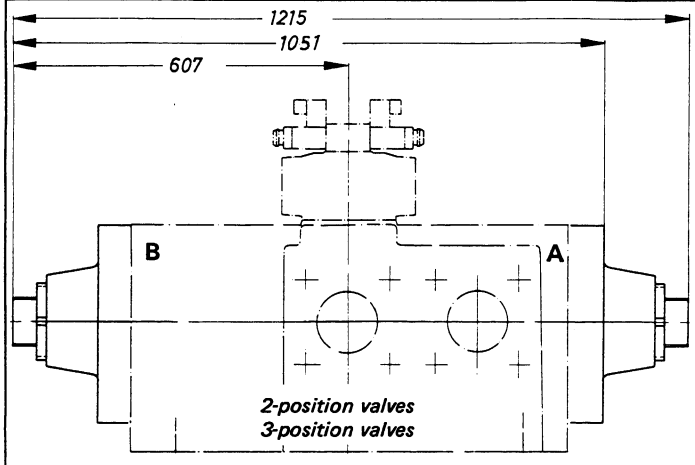
The stroke limiter limits the stroke of the main spool. By loosening the lock-nut and clockwise rotation of the adjustment spindle the spool stroke is decreased. The control chamber must not be under pressure.



Spool Position Indicator, mounting possibilities

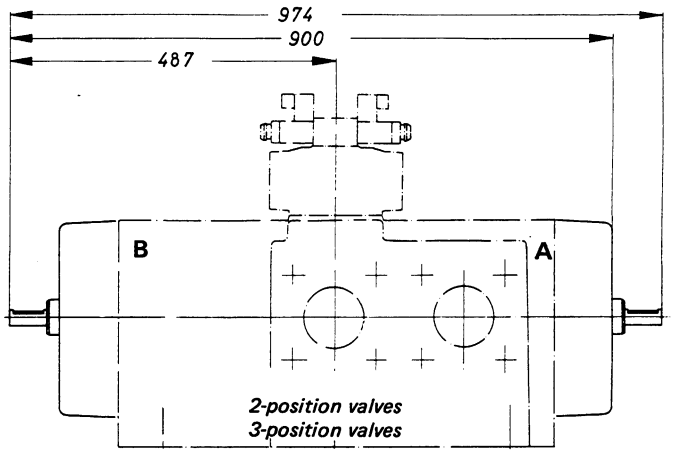
By loosening the fixing screws the sleeve with visual indicator can be adjusted through 360°. The control chamber must not be under pressure.





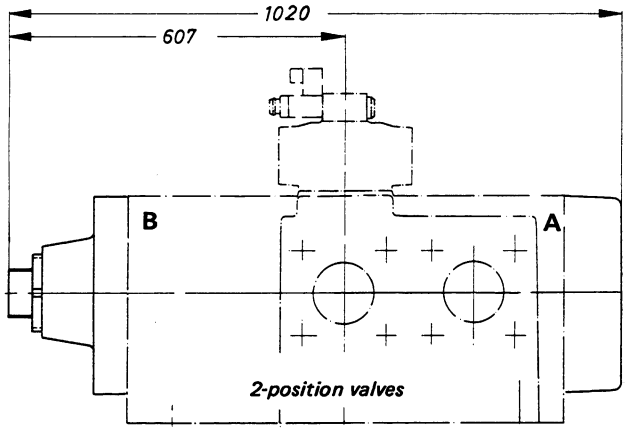
stroke limiter on A and B sides of main valve = additional feature 10

stroke limiter on A side = 11
stroke limiter on B side = 12

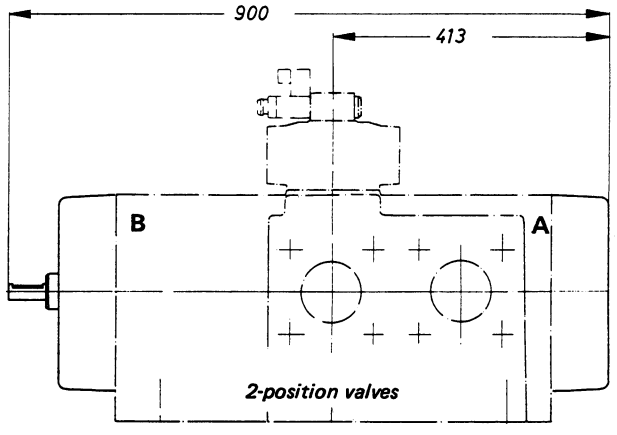


spool position indicator on A and B side of main valve = additional feature 13

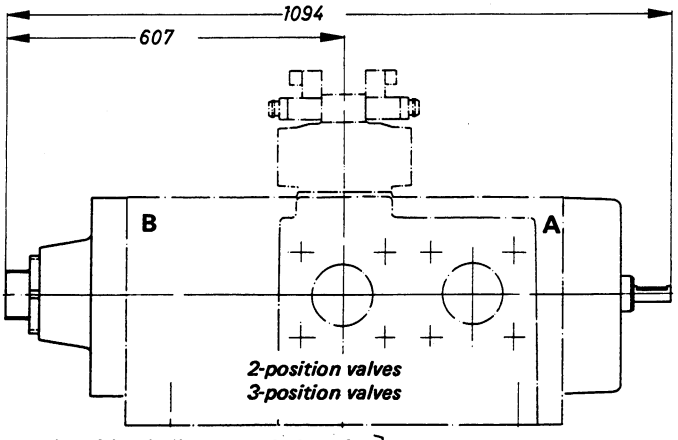
spool position indicator on A side = 14
spool position indicator on B side = 15



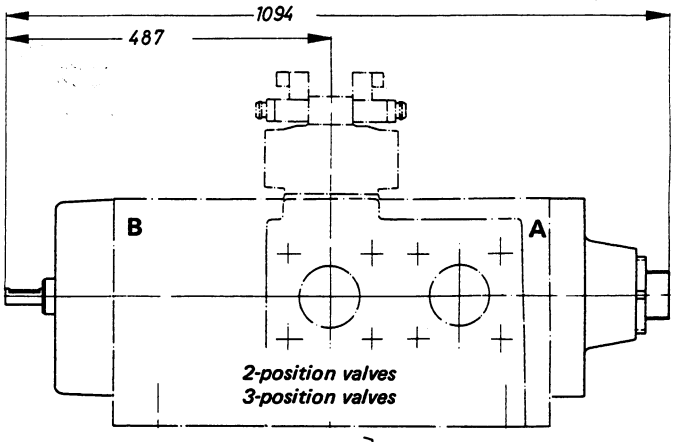
stroke limiter on B side of main valve = additional feature 12



spool position indicator on B side of main valve, additional feature 15



spool position indicator on A side of main valve and stroke limiter on b side } *additional feature 17*



stroke limiter on A side of main valve and spool position indicator on B side } *additional feature 16*

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RE 24 812/2.76 GH
Replaces: RE 24 812/2.74