

<b>REXROTH</b> <b>HYDRONORMA</b> ®	<b>4/3- and 4/2-Way Directional Control Valve Type WEH 82/WH 82</b>		<b>RE</b> <b>24 806</b>
	electro-hydr. or hydr. operation	up to 350 bar	
Description	indirect (WEH) and direct (WH) operated spool valves subplate connections to international standards		Issue: 10.78

**Type WEH**

Operation of the main spool is by means of a pilot valve, available with either DC or AC air gap or 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**

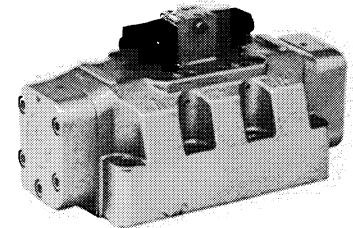
Operation of the main spool is by direct application of hydraulic pressure.

**Design Features:**

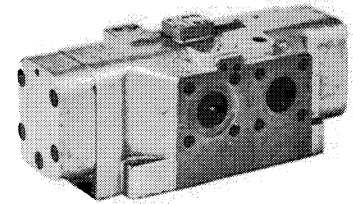
- subplate mounting
- or flange connections
- cast oil passages
- hydraulic centering of main spool.

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

- pilot choke adjustment (p. 14)
- stroke limiter on main spool (p. 16)
- main spool position indicator (p. 16)
- throttle orifices to reduce pilot oil supply (p. 15) (WEH only)
- pressure reducing valve for reducing pilot pressure in excess of 250 bar (p. 15) (WEH only)
- electrical connections (p. 5) (WEH only)



Type WEH for subplate mounting



Type WH for flange connections

**Description****4/2-Way Valves Spring Offset**

The main spool is held in the zero position by a spring. Pressurization of one spool area causes the spool to move into the end position. On unloading of the pressurized spool area the spring returns the spool to the zero position.

**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 maximum performance data at minimum pilot pressure of 15 bar are shown in the table. Max. Performance Data, p. 4. For applications in excess of these values a higher pilot pressure is required. For example, at operating pressure  $p = 350$  bar and a flow of  $Q = 4500$  l/min a pilot pressure of 25 bar is required.

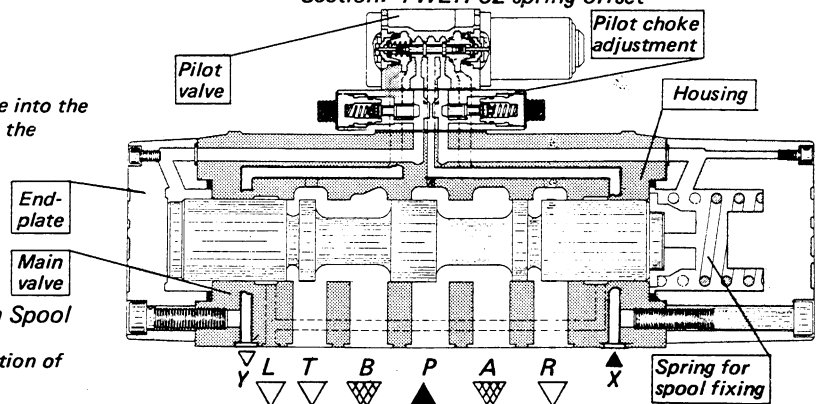
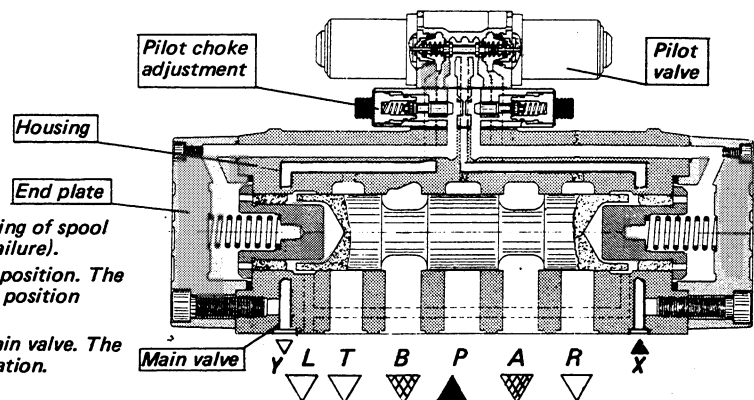
The maximum for this valve model is therefore entirely dependent on the  $\Delta p$  value in the system.

**4/2-Way Valve (p. 8 and 10) (WEH)**

4 different types are available:

- 1) Pilot valve and main valve each have one spring for fixing of spool end position (guaranteed switching even with power failure).
- 2) 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.
- 3) Pilot valve has two solenoids. No springs in pilot or main valve. The spool positions are fixed by means of solenoid energisation. 1 solenoid must therefore always remain energised.
- 4) 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 2, 3 and 4 the switching positions are guaranteed only when pilot pressure is available.

**Section: 4 WEH 82 spring offset****Section: 4 WEH 82 hydraulically centred**

Ordering Code

H-4 W 82 /

350 bar model = H

4 service ports = 4

Directional control valve = W

hydraulically operated = H  
electro-hydr. operated = EH

Operation

Size 82 = 82

Size

hydraulic return = H  
spring return = no desig.

Spool return (main valve)

Symbols with crossover pos. (subplate mounting)	Spool Types (subplate mounting)	Symbols with crossover pos. (flange connections)	Spool Types (flange connections)
	= C		= C
	= D		= D
	= K		= K
	= Z		= Z
	= E		= E
	= F		= F
	= G		= G
	= H		= H
	= J		= J
	= L		= L
	= M		= M
	= Q		= Q
	= R		= R
	= S		= S
	= T		= T
	= U		= U
	= V		= V
	= W		= W

Series 30 = 30  
30 to 39 installation and connection dimensions remain the same

Series no.

subplate mounting = no desig.  
flange connections = F

Mounting

without spring return = O  
without spring return, with detent = OF  
(in both cases the 'H' for hydraulic centering is still required. The detent is in the pilot valve only)  
(not for valve type 'WH')

Spool fixing (pilot valve)  
2-position valves and 2 solenoids only

Pilot valve size 10 = 10  
(not for valve type 'WH')

Pilot valve size

Oil immersed solenoid = A  
Air gap solenoid = L  
(not for valve type 'WH')

Solenoid type

\*

**Options**

Further details to be added in clear text

seals

no desig. = Perbunan seals  
V = Viton seals

pressure reducing (not for type 'WH')

no desig. = without pressure reducing valve  
D1 = with pressure reducing valve pressure ratio 1:0.66

throttle orifice (not for type 'WH')

no desig. = without orifice  
B 08 = orifice, 0.8 mm dia.  
B 10 = orifice, 1.0 mm dia.  
B 11 = orifice, 1.1 mm dia.  
B 12 = orifice, 1.2 mm dia.  
B 15 = orifice, 1.5 mm dia.

Additional features (see p. 16)

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')**

no desig. =	side cable entry
D =	top cable entry
L =	with light (s)
L =	side cable entry
Z =	side plug-in connector;
K =	socket only
DL =	with light (s)
	top cable entry
DZ =	top plug-in connector;
DK =	socket only
ZL =	side plug-in connector, with light (s)
KL =	socket only with light (s)

DZL =	top plug-in connector with light (s)
DKL =	socket only with light (s)
Z 1 =	single plug-in connector
Z 1 L =	as Z1 with light (s)
Z 2 =	single connection with terminal box
Z 2 L =	single connection with terminal box and light (s)
Z 4 =	single plug-in connector DIN 43 650
Z 5 =	"large plug-in connector"
Z 5 L =	as Z5 with light (s)

pilot choke adjustment (not for type 'WH')

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

no desig. = external pilot supply, external pilot drain

additional solenoid features

no desig. = without limit switch on solenoid  
Y = limit switch on solenoid  
(Only for pilot valve with DC solenoid type L)

hand emergency (not for type 'WH')

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

Solenoid details (not for type 'WH')

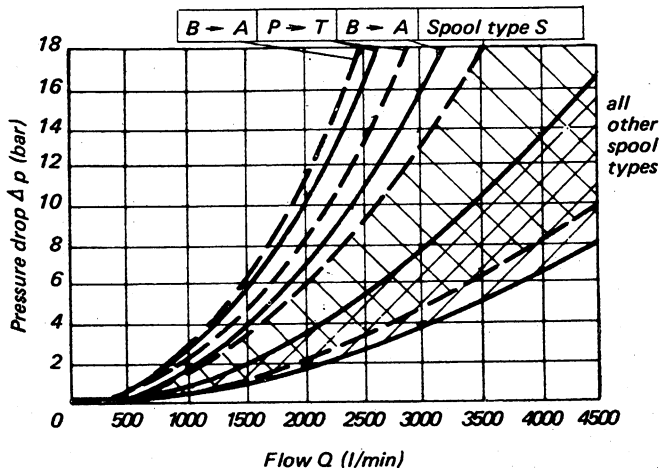
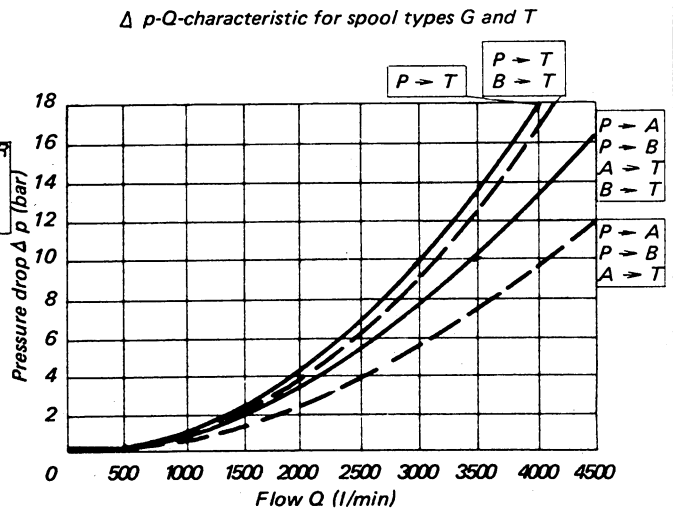
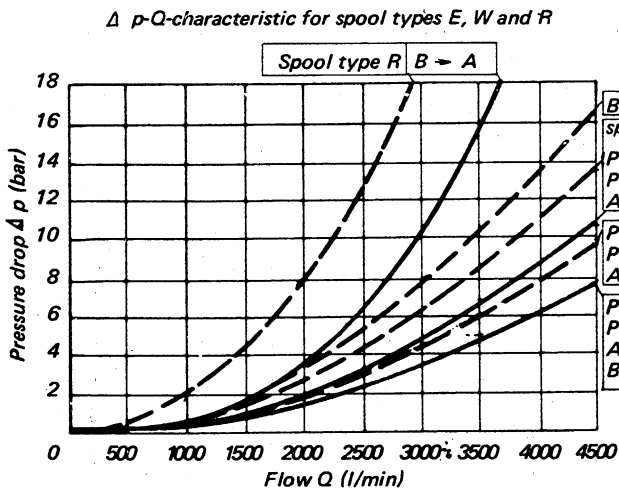
W 220-50 = 220 V AC, 50 Hz  
G 24 = 24 V DC  
(see technical data for further voltages)  
W 110 R } DC solenoid with built-in rectifier in connector Z5 (only without 'L')  
W 220 R } for 110 V or 220 V supply independent of frequency

Technical Data (Valve description: RE 24 000 Spares information: RE 24 806-E)							
Weight	Valve, subplate mtg.	Type WH 210 kg	with 2 solenoids max. 214,5 kg: with 1 solenoid max. 213 kg (acc. to pilot valve)				
	Valve, flange conn.	Type WH 208 kg	with 2 solenoids max. 212,5 kg: with 1 solenoid max. 211 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	Solenoid type L, up to 150 bar/Solenoid type A, up to 60 bar					
Min. pilot pressure	Pilot supply x = external	3 position valves, hydr. centred 2 position valves, spring offset 2 position valves, hydraulic return	$p_{st} = 15 \text{ bar}$ $p_{st} = 12 \text{ bar}$ $p_{st} = 6 \text{ bar}$				
Max. pilot pressure		250 bar					
Pilot Volume for Switching Operation							
3 position valves, hydr. centred			101,5 cm <sup>3</sup>				
2 position valves, spring offset/hydr. return			203,5 cm <sup>3</sup>				
Total switching time of valve from zero into end position (with AC voltage) WEH							
at pilot pressure $p_{st}$		50 bar	150 bar	250 bar			
2 position valves		240 ms		180 ms	140 ms		
3 position valves, hydr. centred		"a"	"b"	"a"	"b"		
solenoid energised		140 ms	140 ms	110 ms	110 ms	90 ms	90 ms
Total switching time of valve from end into zero position WEH							
2-position valves		240 ms		180 ms	140 ms		
3-position valves, hydr. centred		"a"	"b"	"a"	"b"		
		150 ms	150 ms	120 ms	120 ms	100 ms	100 ms
Pilot flow at shortest switching time $Q_X$		40 l/min					

The total switching times from zero into end position increase by 30 ms for DC voltage.

For applications to other specifications please consult us.

Performance Curves (pressure drop  $\Delta p$  related to flow  $Q$  at 37 cSt)



Due to tilting the function of the valves is dependent on the filtration. In order to obtain the maximum flow values shown, main flow filtration of 25  $\mu\text{m}$  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).

Max. Performance Data					
Flow (l/min)	at pressure (bar) of				
	70	140	210	280	350
	4500	3500	2850	2450	2200

--- Curve for valve with flange connections  
 ——— Curve for valve for subplate mounting

**Pilot Valve (WEH only)**

A 4-way directional control valve size 10 is used as pilot valve. The valve spool is held in zero position by springs, and in switching position by solenoids or detents. Operation of the spool is by means of air gap or oil immersed DC or AC solenoids



The air gap solenoid is of simple construction, is fully encapsulated and tropicalised. The oil immersed solenoid has a long working life, and is fully encapsulated and tropicalised. The armature runs in oil, thus giving low wear, good heat dissipation and cushioned stop.

The DC solenoid is extremely reliable, gives smooth operation and is suitable for high switching frequencies. It is not affected by voltage fluctuations in either direction.

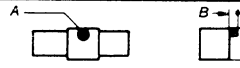
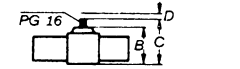
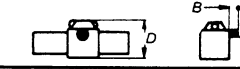
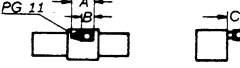
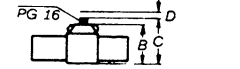
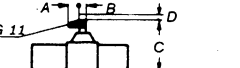
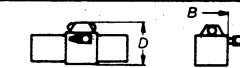
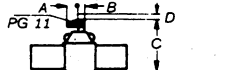
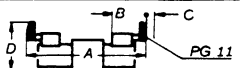
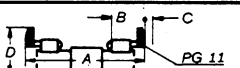
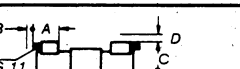


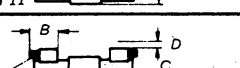
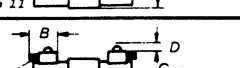
The AC solenoid has short switching times. Simple operation and no special contact protection are its main features.

Solenoid type	DC solenoid dry	DC solenoid wet	AC solenoid dry	AC solenoid wet
Catalogue sheet	RE 23 299	RE 23 196	RE 23 300	RE 23 197
Power requirement	43 W	35 W	—	—
Holding current	—	—	64 VA	130 VA
In-rush current	—	—	430 VA	530 VA
Duty cycle	100 % ED			
Voltage Rating	12; 24; 42; 60; 110; 180; 195 & 220 V		42; 110; 127; 220 V, 50 Hz; 120 & 220 V, 60 Hz	
Insulation	IP 65			
Terminal connections for central connection	with 1 solenoid		with 2 solenoids	
	solenoid always to terminals 1 and 2 earth to terminal 5		solenoid a to terminals 1 and 2, solenoid b to terminals 3 and 4, earth to terminal 5	

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

Main valve	2-position valve		3-position valve, hydr. centred	
Pilot valve	2-position valve, spring offset without spring return or without spring return with detent		3-position valve spring centred	
	spool type D = 		spool type M = 	

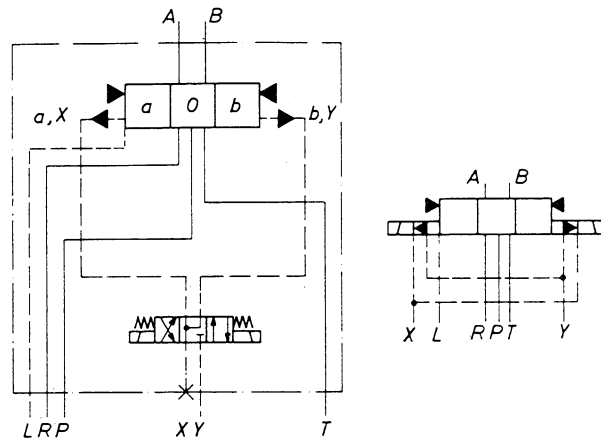
**Electrical connections (WEH only)**

Code	Illustration	A	B	C	D	
no de-sig.		PG 16	18	7	87,5	
D		—	113	131	5	
L		PG 16	18	7	113	
Z K		63	14	48	16	
DL		—	113	131	5	
DZ DK		49	14	161	16	
ZL KL		—	48	16	113	
DZL DKL		49	14	161	16	
Z 1		Available only for pilot valve with air gap solenoids	321	106	16	142
Z 1 L			321	104	16	142
Z 2			79	5	112	15
Z 2 L			79	5	112	15
Z 4			—	48	110	15
Z 5			—	66	121	15
Z 5 L			—	66	121	15

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

Valves with Hydraulic Centering

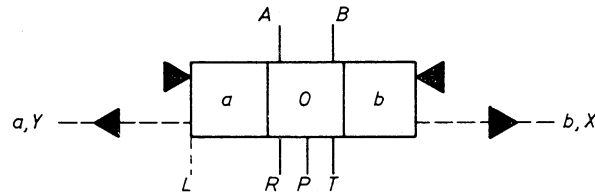
X = external; Y = external



Valve Type WH

Symbols for 3-position valves

hydr. centering



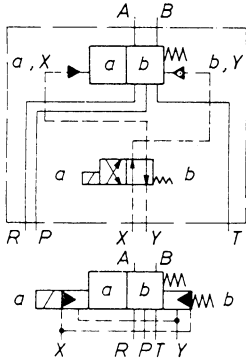
Subplate mounting valves have 5 service ports: A, B, P, T, R  
Valves with flange connections have 4 service ports: A, B, P, T; port R omitted.

Model Code hydr. centering (WEH)	Model Code hydr. centering (WH)	Spool Type	Symbol (subplate mounting)	Symbol (flange connections)
H-4 WEH 82... HE... /...	H-4 WH 82... HE... /...	E		
H-4 WEH 82... HF... /...	H-4 WH 82... HF... /...	F		
H-4 WEH 82... HG... /...	H-4 WH 82... HG... /...	G		
H-4 WEH 82... HH... /...	H-4 WH 82... HH... /...	H		
H-4 WEH 82... HJ... /...	H-4 WH 82... HJ... /...	J		
H-4 WEH 82... HL... /...	H-4 WH 82... HL... /...	L		
H-4 WEH 82... HM... /...	H-4 WH 82... HM... /...	M		
H-4 WEH 82... HQ... /...	H-4 WH 82... HQ... /...	Q		
H-4 WEH 82... HR... /...	H-4 WH 82... HR... /...	R		
H-4 WEH 82... HS... /...	H-4 WH 82... HS... /...	S		
H-4 WEH 82... HT... /...	H-4 WH 82... HT... /...	T		
H-4 WEH 82... HU... /...	H-4 WH 82... HU... /...	U		
H-4 WEH 82... HV... /...	H-4 WH 82... HV... /...	V		
H-4 WEH 82... HW... /...	H-4 WH 82... HW... /...	W		

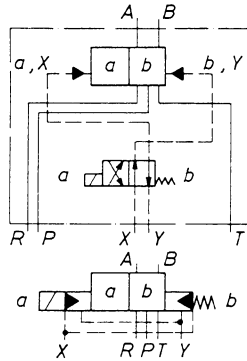
Valve Type WEH Detailed and simplified symbols for 2-position valves

x = external; y = external

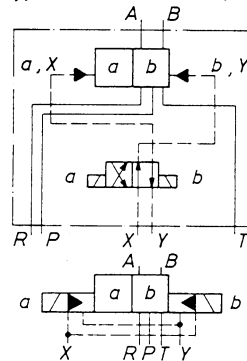
Type H-4 WEH 82 ... / ...



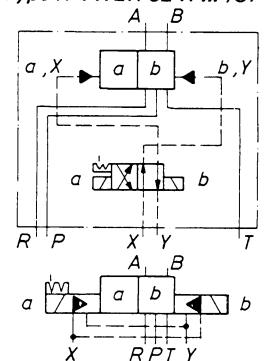
Type H-4 WEH 82 H ... / ...



Type H-4 WEH 82 H ... /O ...

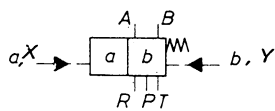


Type H-4 WEH 82 H ... /OF ...

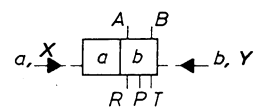


Valve Type WH Symbols for 2-position valves

spring offset



hydr. return



Spool Type

- C
- D
- K
- Z

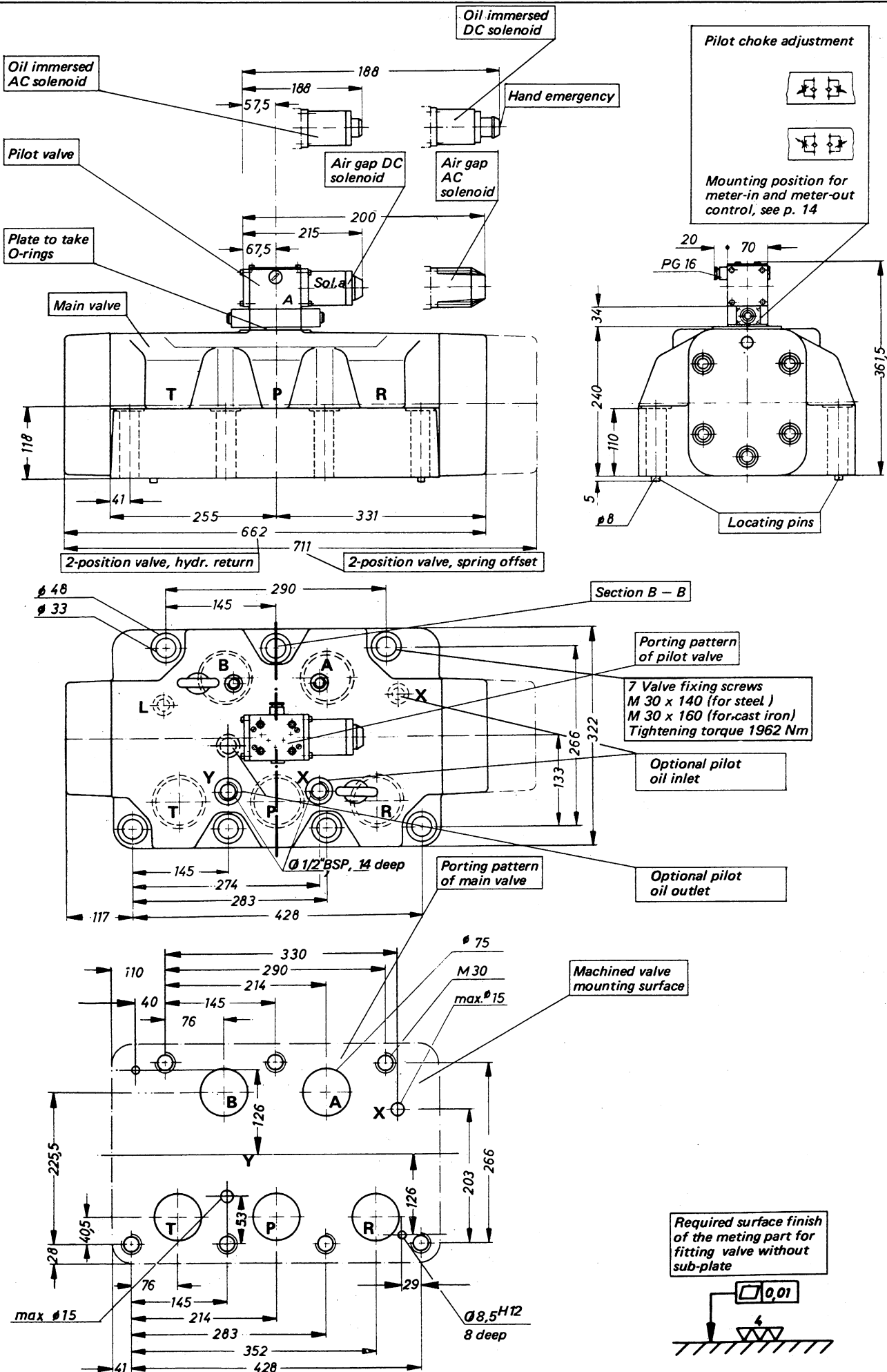
Symbol, subplate mounting



Symbol, flange connections



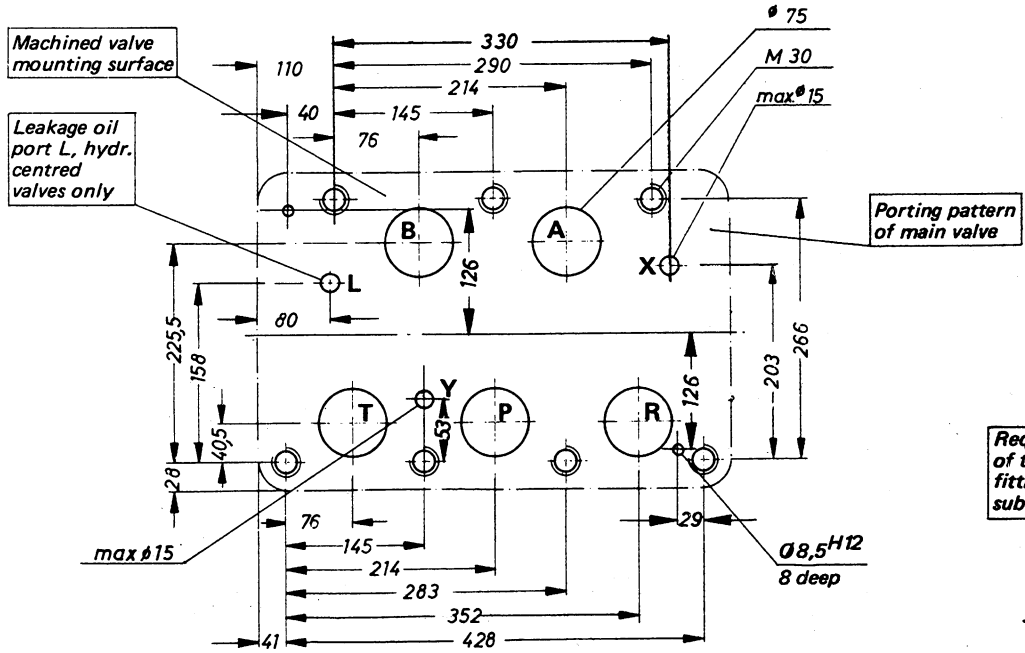
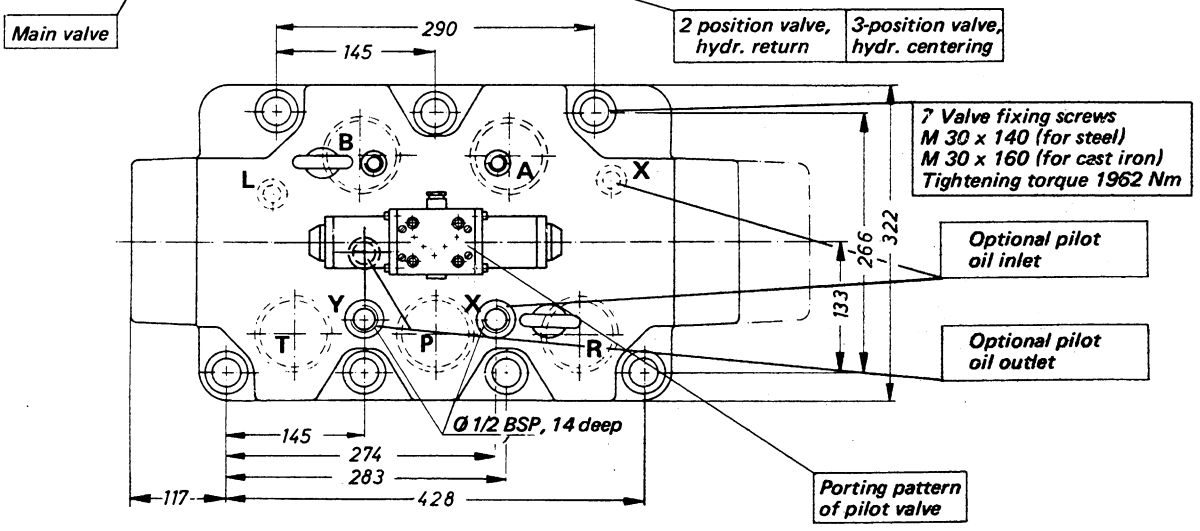
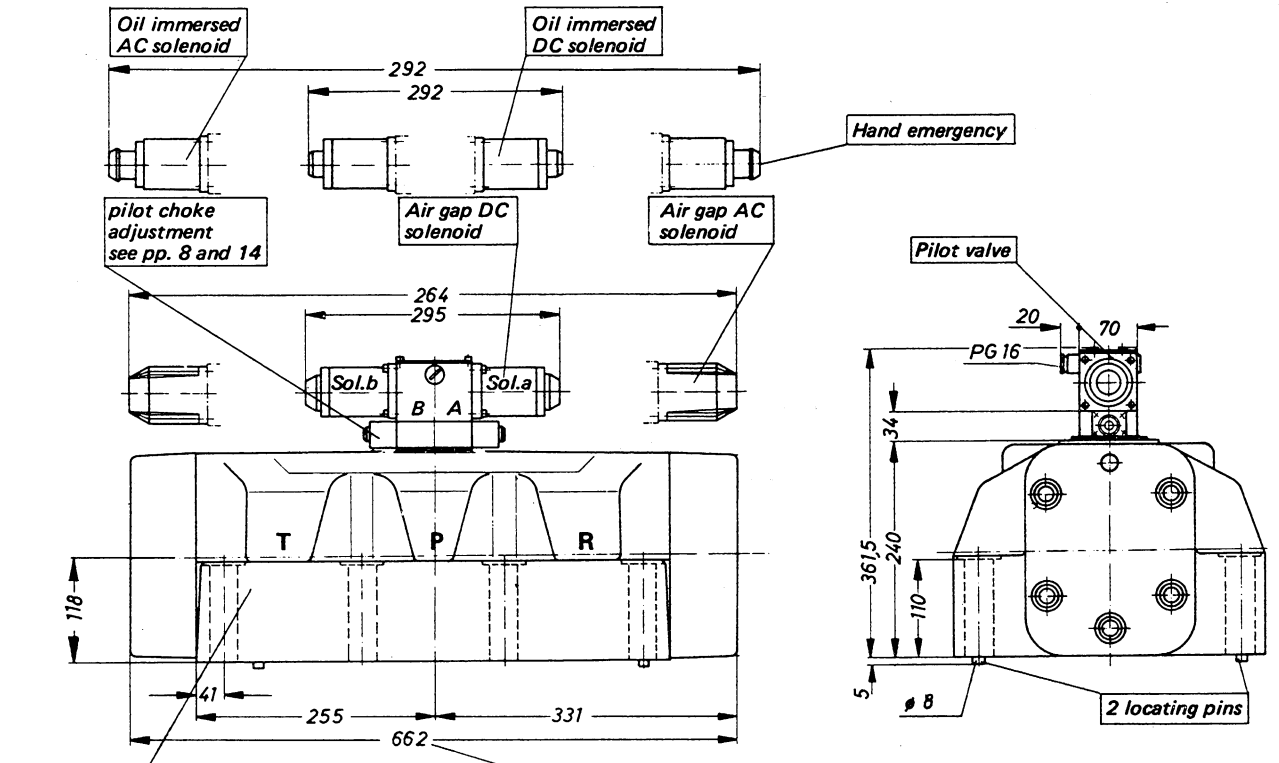
**Valve Type WEH for subplate mounting**  
**2-position valve, spring offset, and hydraulic return**



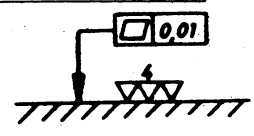


**Valve Type WEH for subplate mounting**

2-position valves, hydr. return and 3-position valves, hydr. centering

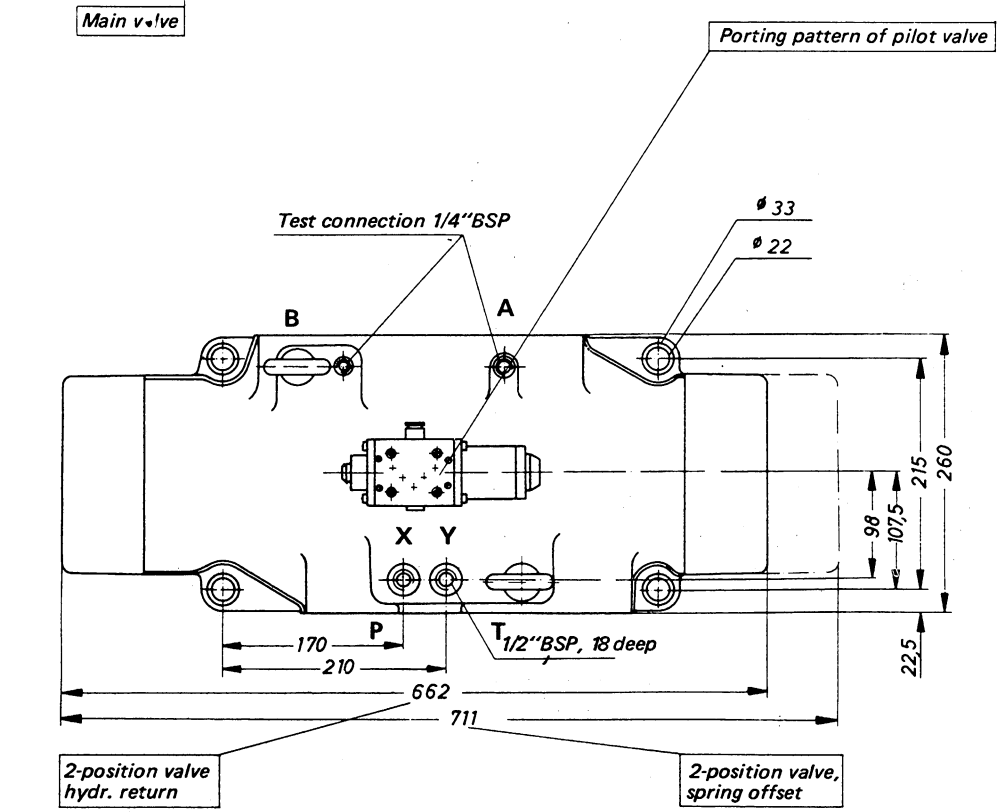
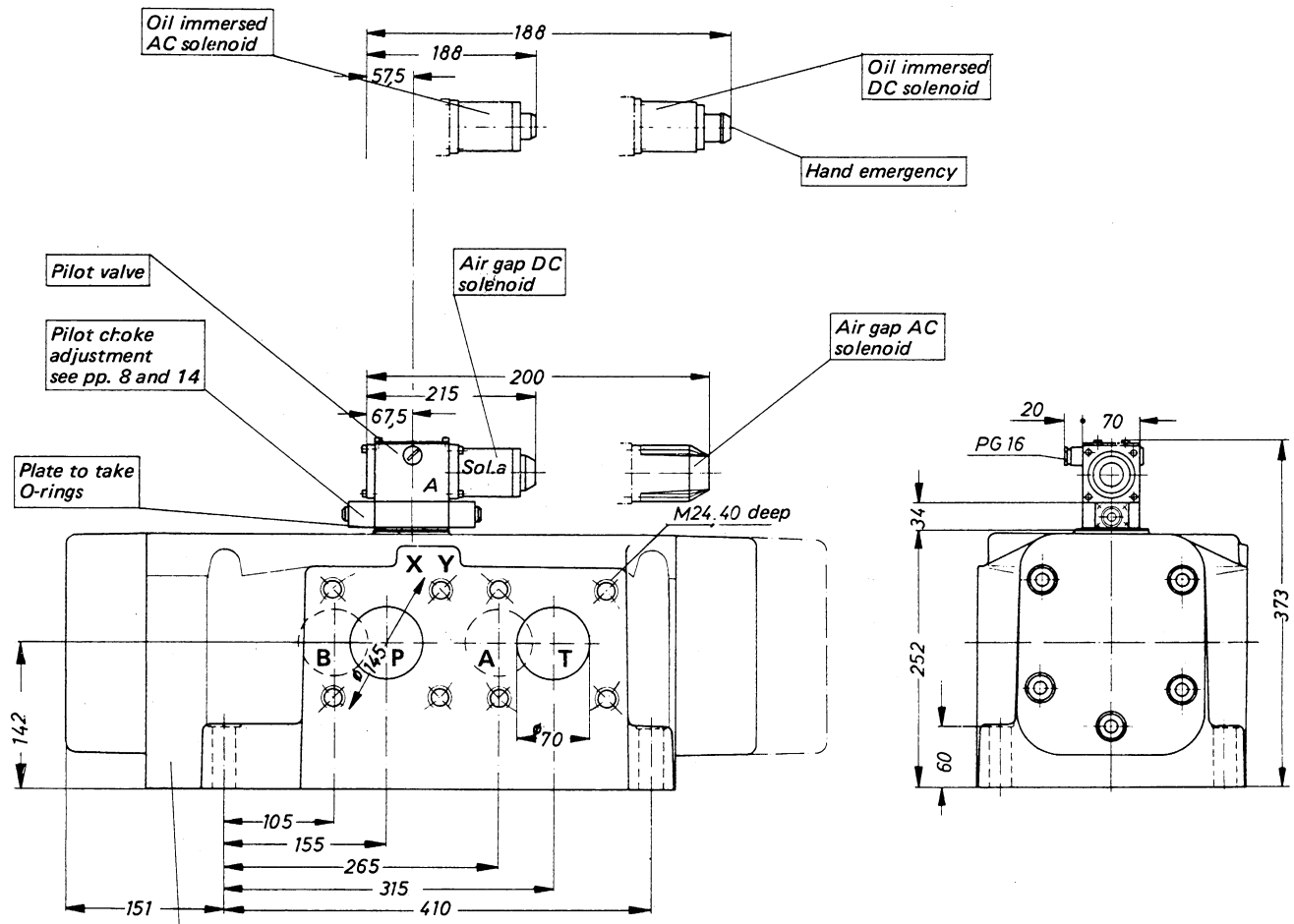


Required surface finish of the mating part for fitting valve without sub-plate



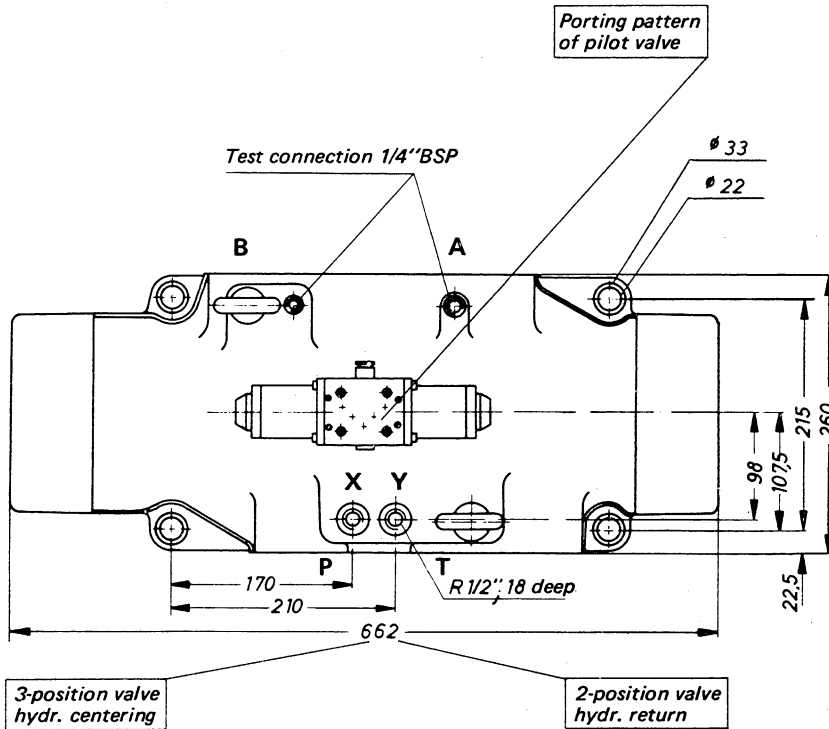
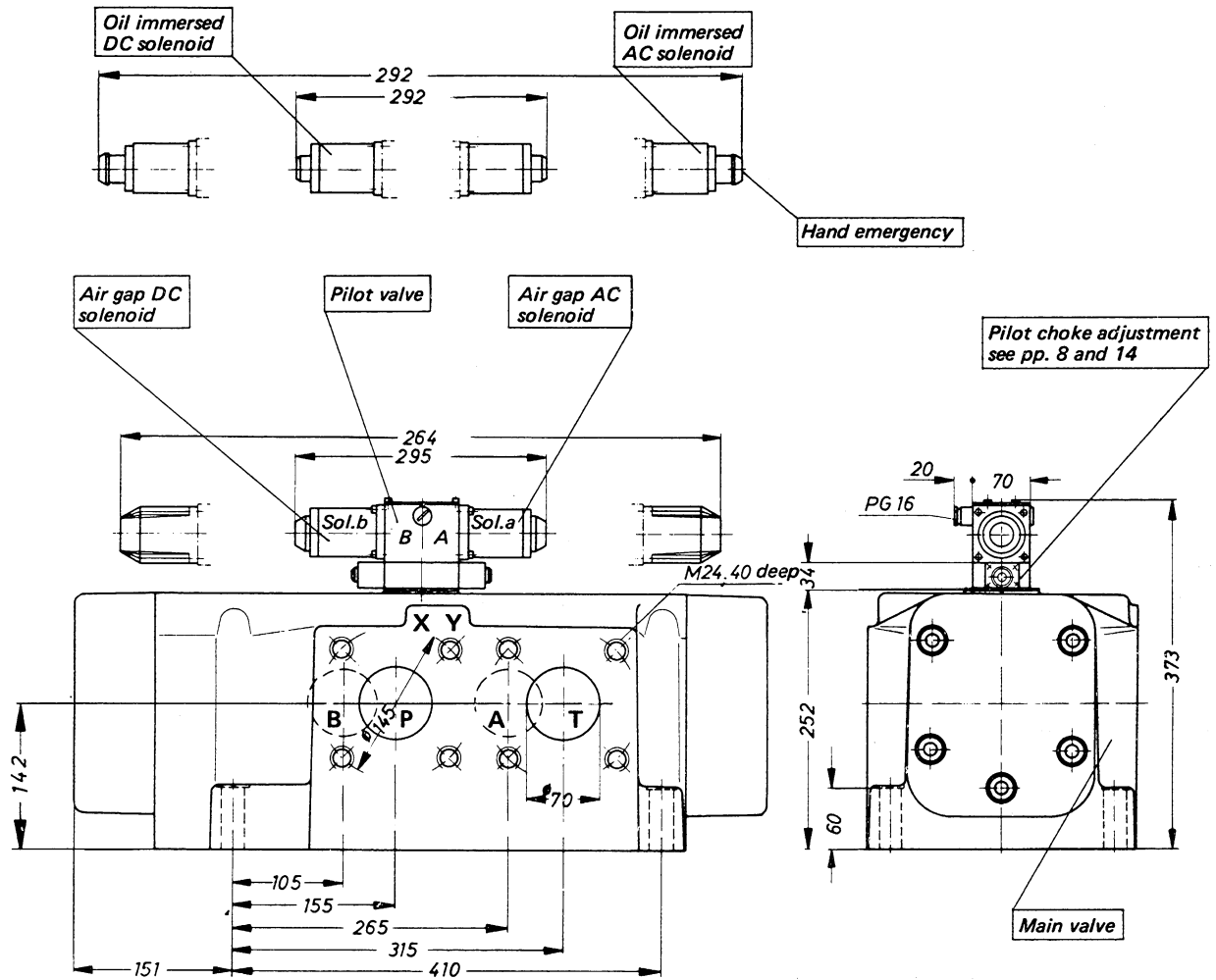
Valve Type WEH for flange connections

2-position valves, spring offset and hydr. return



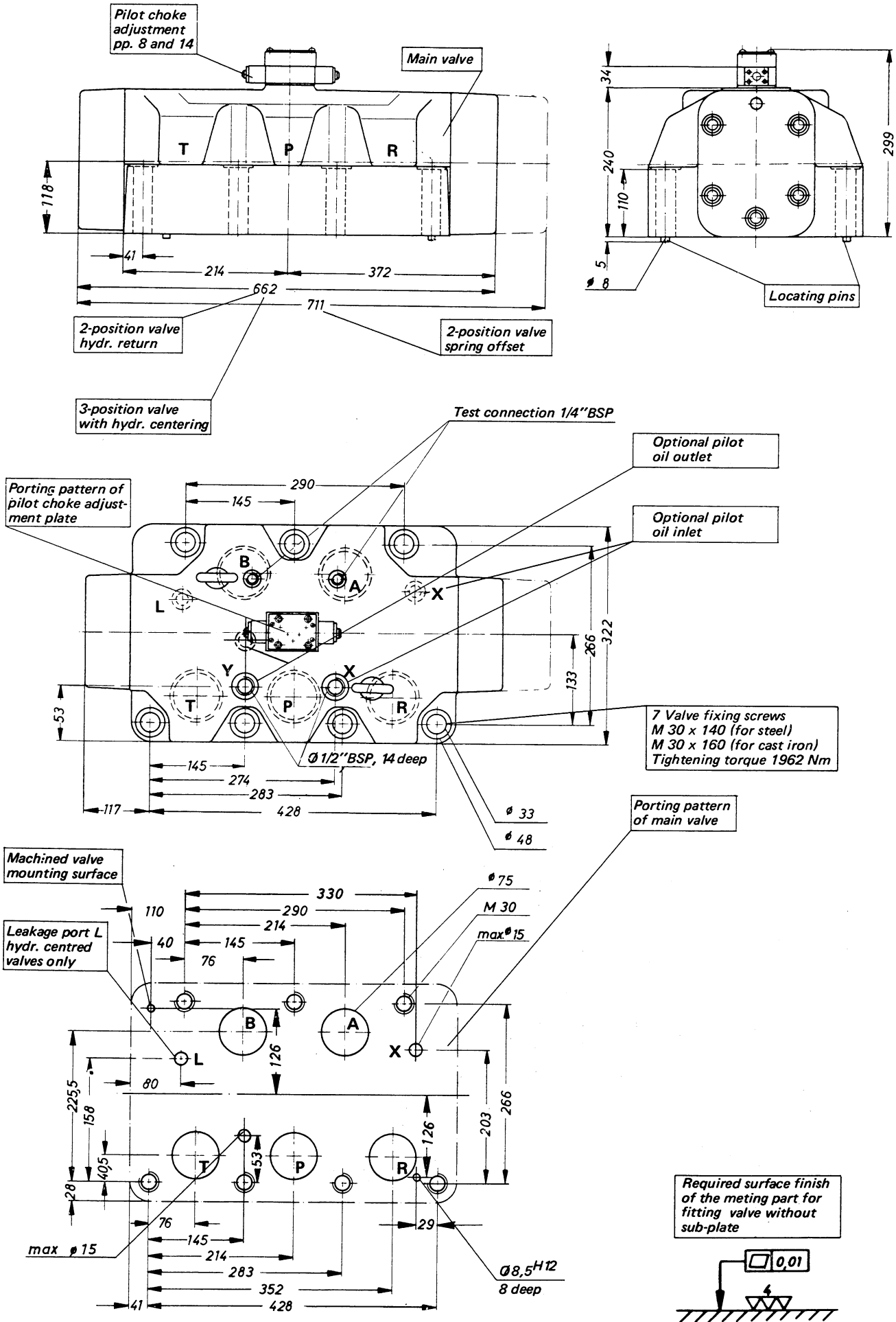
**Valve Type WEH for flange connections**

2-position valve with hydr. return and 3-position valve with hydr. centering



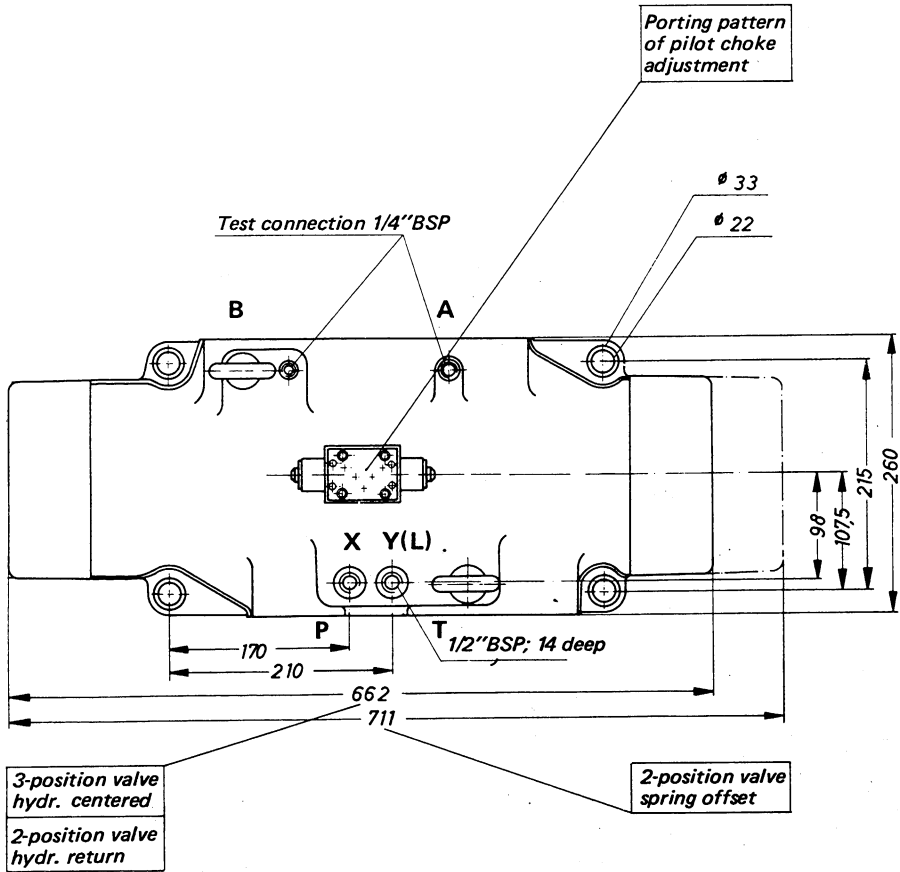
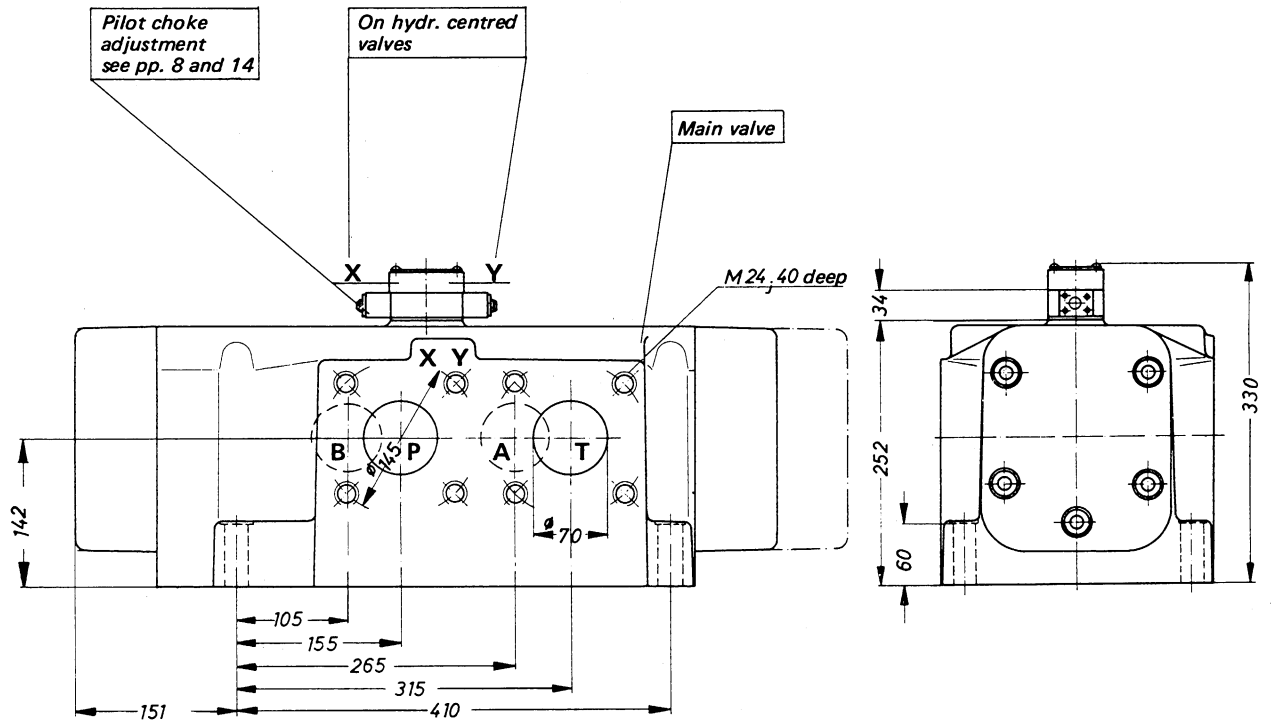
Valve Type WH for subplate mounting

2-position valve, spring offset, hydr. return and 3-position valve with hydr. centering

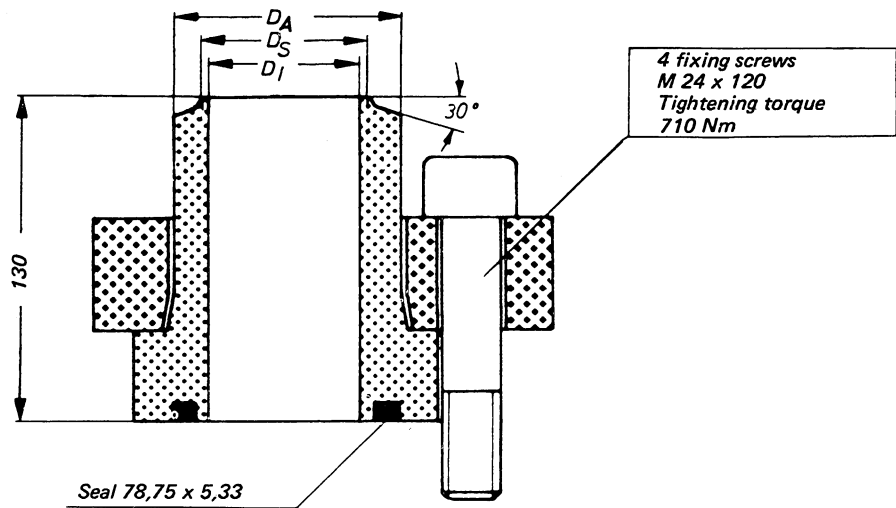


Valve Type WH for flange connections

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

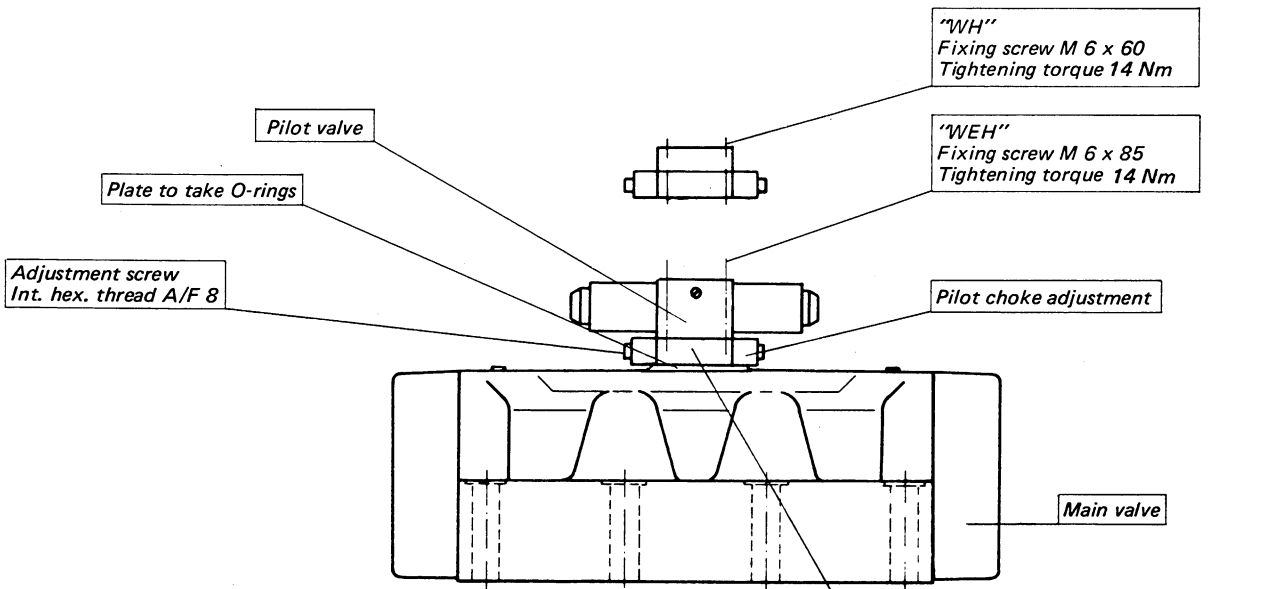


Connection Flange (valves with flange connections only) Dimensions in mm



Pressure rating	Size	$D_A$	$D_S$	$D_I$	Part No. Perbunan (seals)	Pressure rating	Size	$D_A$	$D_S$	$D_I$	Part No. Viton (seals)
160 bar	82	101,6	87	84,0	303 905	160 bar	82	101,6	87	84,0	303 945
320 bar	82	101,6	77	73,2	303 925	320 bar	82	101,6	77	73,2	303 965

Pilot Choke Adjustment Plate Type Z 2 FS 10

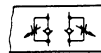


**Pilot choke adjustment**

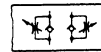
Clockwise rotation of adjustment screw increases switching time of main valve, anti-clockwise rotation reduces the switching time.

**Conversion from meter-in to meter-out control:**

Remove pilot valve, leaving O-ring plate in place; rotate pilot choke adjustment plate 180° and replace; re-assemble pilot valve.

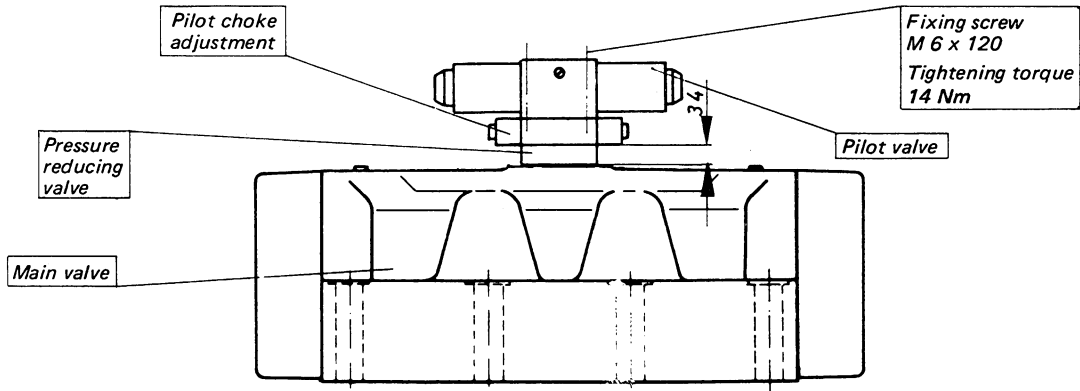


Mounting position for meter-in control



Mounting position for meter-out control

Pressure Reducing Valve (Part No. 303 871) for WEH



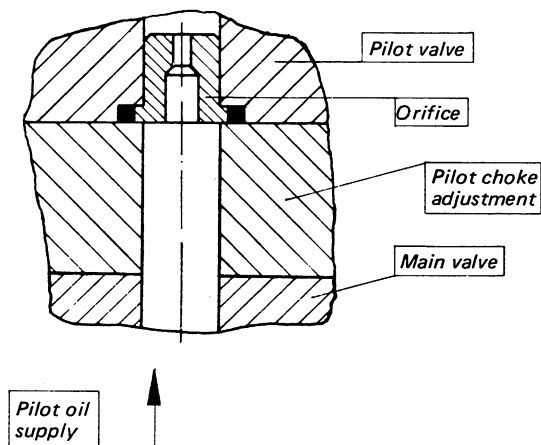
The pressure reducing valve must be used with pilot pressures in excess of 250 bar. It effects a pressure reduction of the pilot pressure in the ratio 1:0.66.

**Important!**

The min. pilot pressures shown on page 4, must be increased by the factor  $\frac{1}{0.66} = 1.515$  if a pressure reducing valve is fitted.

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.



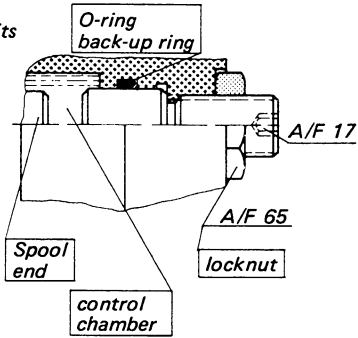
Available Orifices		
Dia	Type No.	Part No.
0.8 mm	B 08	121 741
1.0 mm	B 10	121 747
1.1 mm	B 11	121 810
1.2 mm	B 12	121 746
1.5 mm	B 15	129 186

**Stroke Limiter, mounting possibilities**

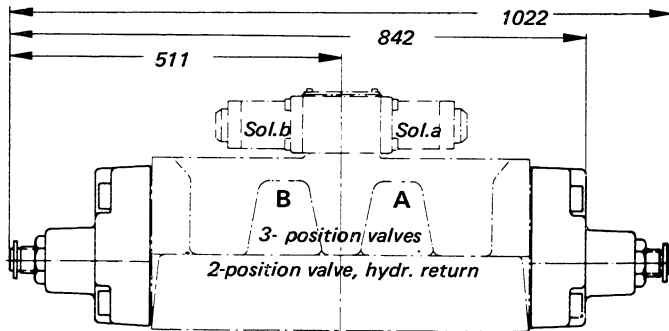
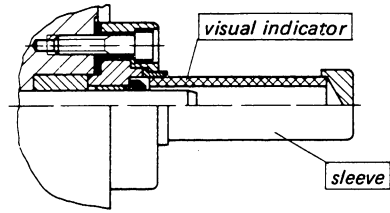
**Spool Position Indicator, mounting possibilities**

Adjustment range: 32 mm; 1 turn = 1.5 mm adjustment stroke

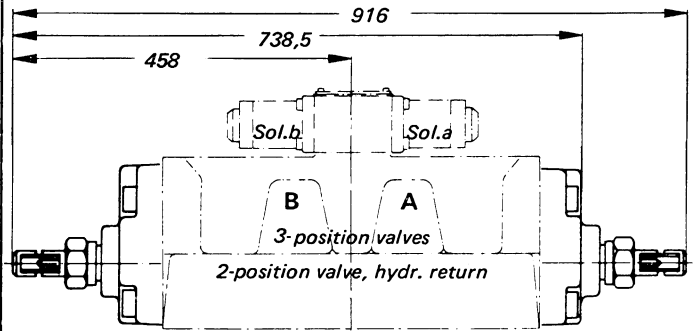
The stroke limiter limits the stroke of the main spool. By loosening the lock-nut and clockwise rotation of the adjustment spindle the spool stroke is decreased. The control chamber must not be under pressure.



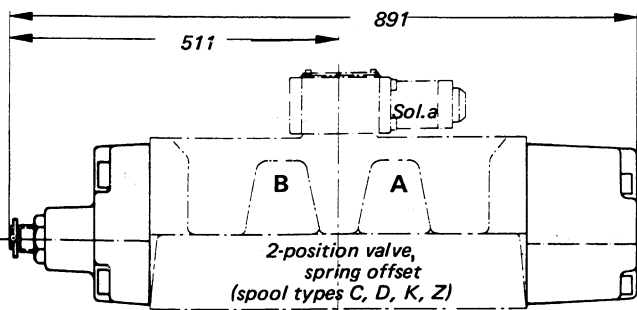
By loosening the fixing screws the sleeve with visual indicator can be adjusted through 360°. The control chamber must be under pressure.



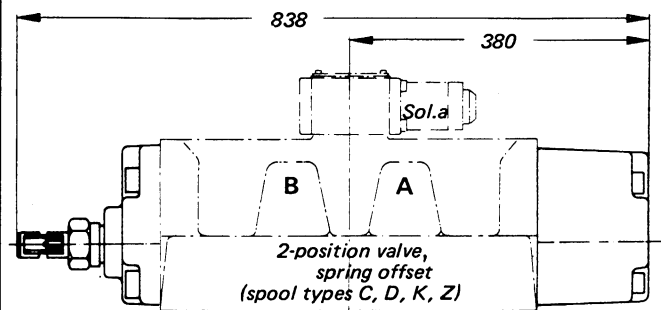
stroke limiter on A and B sides of main valve = additional feature 10 stroke limiter on A side = 11 stroke limiter on B side = 12



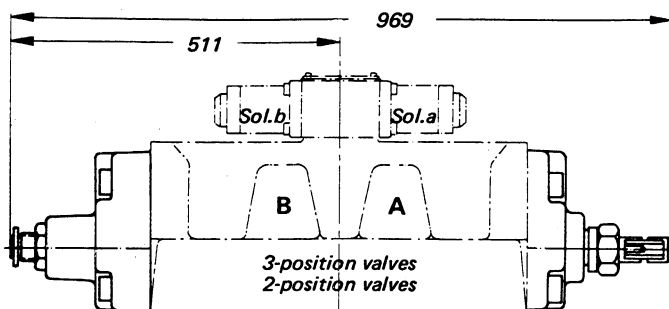
spool position indicator on A and B side of main valve = additional feature 13 spool position indicator on A side = 14 spool position indicator on B side = 15



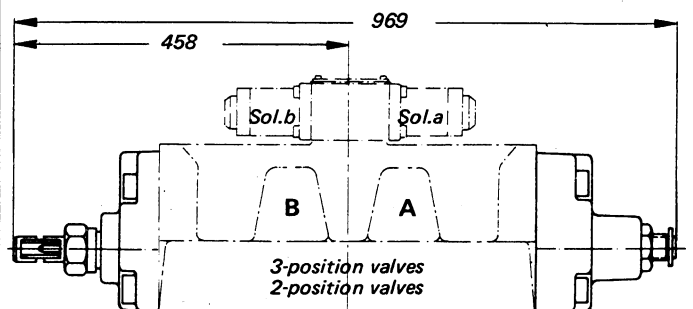
stroke limiter on B side of main valve = additional feature 12



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

**REXROTH HYDRAULICS**

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RE 24 806/10.78  
Replaces: RE 24 806/2.76