



RS(E)H4 - 25

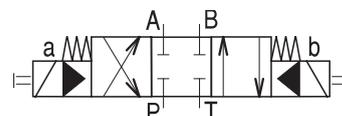
DIRECTIONAL CONTROL VALVES

| KE 2036 | 10/14 |

D_n 25 mm | p_{max} 32 MPa | Q_n 550 dm³/min

Pilot or hydraulic operated directional control valves RS(E)H4-25 are used to control start, stop and direction of flow in hydraulic circuit.

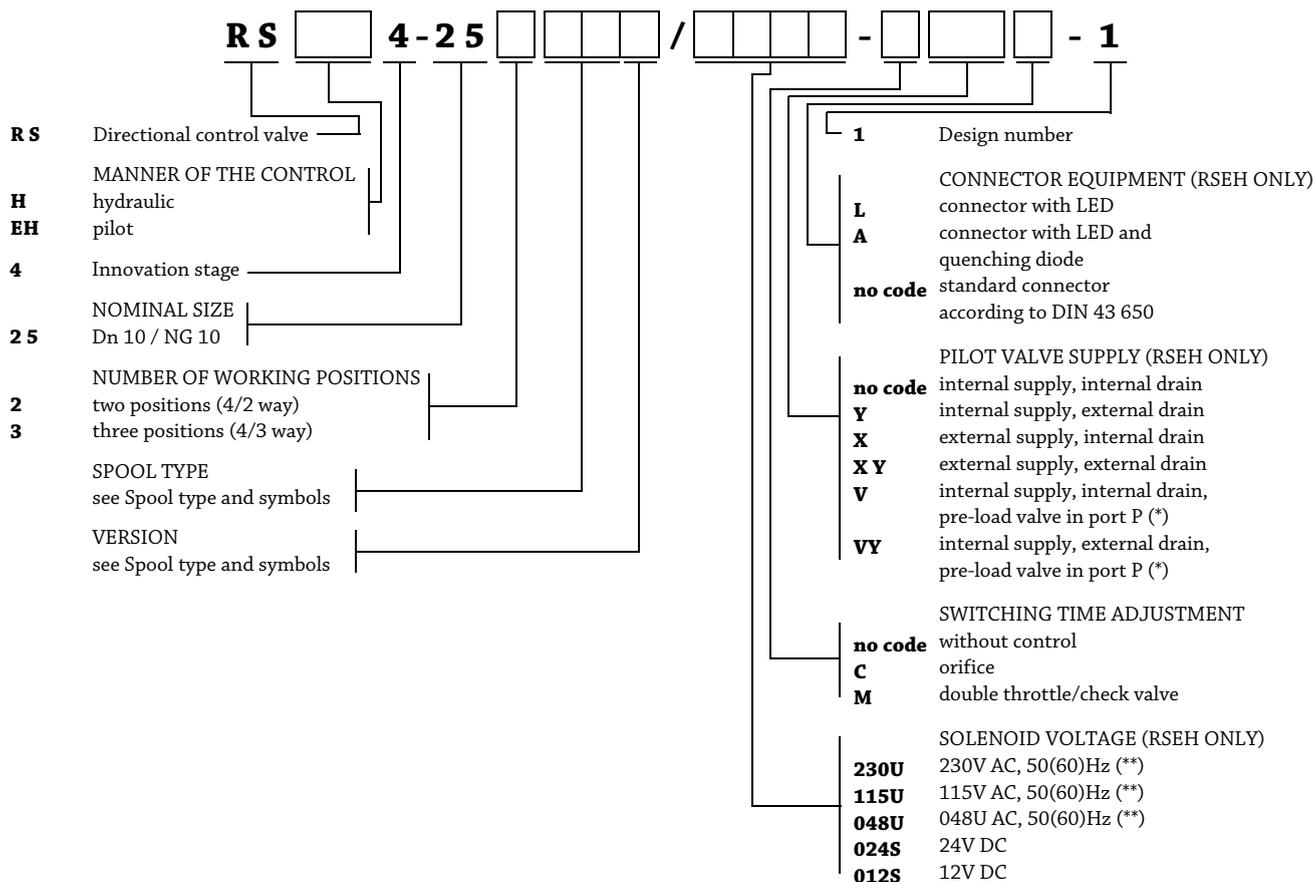
Installation dimensions according to DIN 24 340, ISO 4401, CETOP RP 121H-08 | pilot or hydraulic control | high reliability | manual override (only for RSEH) any working position



FUNCTIONAL DESCRIPTION

Pilot operated directional control valves RSEH4-25 consist of solenoid operated directional control valve RSE4-06 (see KE2020) and the main valve with connection surface according to ISO 4401 (CETOP 8), whereas RSH4-25 valves consist of the main valve only. Both pilot and hydraulic operated directional control valves are available in several configurations and spool types. To avoid pressure surges in hydraulic system the spool switching time of the main valve can be adjusted using orifices or double throttle check valve in both manners of control (see ordering code). Both pilot and drain connection can be either internal or external. Surface treatment of pilot and main valve housing is phosphate coated, solenoids of type RSEH are zinc coated.

ORDERING CODE



(*) Spool types: C1, C2, L1, L2

(**) Connector with rectifier





PILOT VALVE

The pilot valve can either be two or three positional. Two positional (4/2 way) pilot valves are manufactured in the one or two solenoid configuration. Control spool of the two positional pilot valve with one solenoid is moved in one direction by a solenoid and returned back to its initial position by a spring. Control spool of two positional pilot valves with two solenoids is moved between two end positions. For special application, 2 solenoid 4/2 way pilot valve is also available with detent assembly in both end position. The spool of such a valve is held in one of the end positions until being released and moved to the opposite end position. Control spool of 3 positional (4/3 way) pilot valve is moved from its central position in both direction to the left or right end position by one of two solenoids and returned back to its central position by springs. For safety purposes the solenoids are equipped with manual override.

MAIN VALVE

Number of positions of the pilot valve determines number of positions of the main valve. Control spool of 4/2 way main valve is either positioned between initial and end position by one-solenoid pilot valve or between two end positions by two-solenoid pilot valve (with/without detent assembly in both end positions). The control spool of 4/3 way main valve is held in the central position by two springs and moved to the end positions by the pressure from pilot valve. As soon as the pilot pressure relieves, the main spool returns to the initial (central position). The pilot and the drain connections can be internal or external:

- internal drain, internal pilot: T ports of both valves are connected, control and working pressure are the same,
 - internal drain, external pilot: T ports of both valves are connected, control and working pressure are independent,
 - external drain, internal pilot: T port (pilot) connected to port Y (main), control and working pressure are the same,
 - external drain, external pilot: T port (pilot) connected to port Y (main), control and working pressure are independent.
- (*) A pre-load valve in port P must be used in 4/3 way valves with internal oil supply of the pilot valve and spool types C, L and H. Such a valve increases flow resistance and thus increases the pressure in pilot valve to the level required for main spool positioning.

DOUBLE THROTTLE/CHECK VALVE

To avoid pressure surges in the hydraulic system controlled by directional control valve of type RS(E)H, the speed of main spool movement needs to be reduced using double throttle/check valve of sandwich plate design. Such a device consists of two opposite located throttle check valves that limit flow in one direction and provide free return in reverse direction. The flow rate in both channels is adjusted by the screw with internal hexagon. Installation dimensions of double throttle/check valve corresponds with Dn06/NG06 (CETOP 3) size. The valve can be used according to the desired throttled port. Both check valves in port A and B are equally arranged in the valve body (arrangement matches the symbol on the nameplate of the valve).

DELIVERY

Directional control valves RS(E)H4-25 are delivered assembled. Spare parts and mounting screws are not included in the package. These must be ordered separately.

INSTALLATION, SERVICE, MAINTENANCE

Directional control valves RS(E)H4-25 are designed for panel installation. They are being mounted by 6 screws M12x80 DIN 912-10.9 with torque 60Nm. Valves can be installed in any working position. The reliability of the valves is conditional upon use of prescribed working fluid, especially its parameters such as purity and temperature. It is required that the contact surfaces of the valve must be clear and intact before installation. O-rings must not be disshaped or damaged by any means. Flatness deviation and roughness of the subplate shall not exceed 0,01/100 mm and Ra = 1,6 µm respectively. Directional control valves RS(E)H4-25 do not require any special maintenance.

SPOOL TYPE

In the ordering code, the spool type is understood as the spool type of the main valve. The spool type together with its position determine the interconnection of P, A, B, T channels.



TECHNICAL DATA

Technical data	Symbol	Unit	Value
Nominal size	D _n	mm	25
Max. flow	Q _{MAX}	dm ³ /min	550
Max. operating pressure in ports P, A, B	P _{MAX}	Mpa	32
Max. operating pressure in port T	P _{MAX,T}	MPa	16
internal pilot oil drain			25
Max. pressure in port X for the pilot valve	P _{MAX,X}	MPa	32
internal pilot oil supply			32
Max. pressure in port Y	P _{MAX,Y}	MPa	25
RSEH			16
RSH			
Hydraulic fluid	Hydraulic oils of power classes (HL, HLP) according to DIN 51524		
Pressure drop	Δp	MPa	see Δp = f(Q) curves
Min. required pilot pressure	p _{MIN}	MPa	1.3
Viscosity range	ν	mm ² /s	10 ... 400
Maximum degree of fluid contamination	Class 21/18/15 according to ISO 4406 (1999)		
Fluid temperature range	t _{PO}	°C	-20...+60
RSEH			-20...+80
RSH			
Ambient temperature range	t _A	°C	-20...+50
RSEH			-20...+70
RSH			
Weight (without throttle valve interplate)	m	kg	18.5
RSEH4-253, RSEH4-252K			17.9
RSEH4-252			15.6
RSH 4-25			
Weight of the throttle valve interplate	m	kg	1.1
Mounting position			optional
Protection degree according to EN 60 529			IP65

Note: measured at $v = 35\text{mm}^2/\text{s}$, $T = 50^\circ\text{C}$

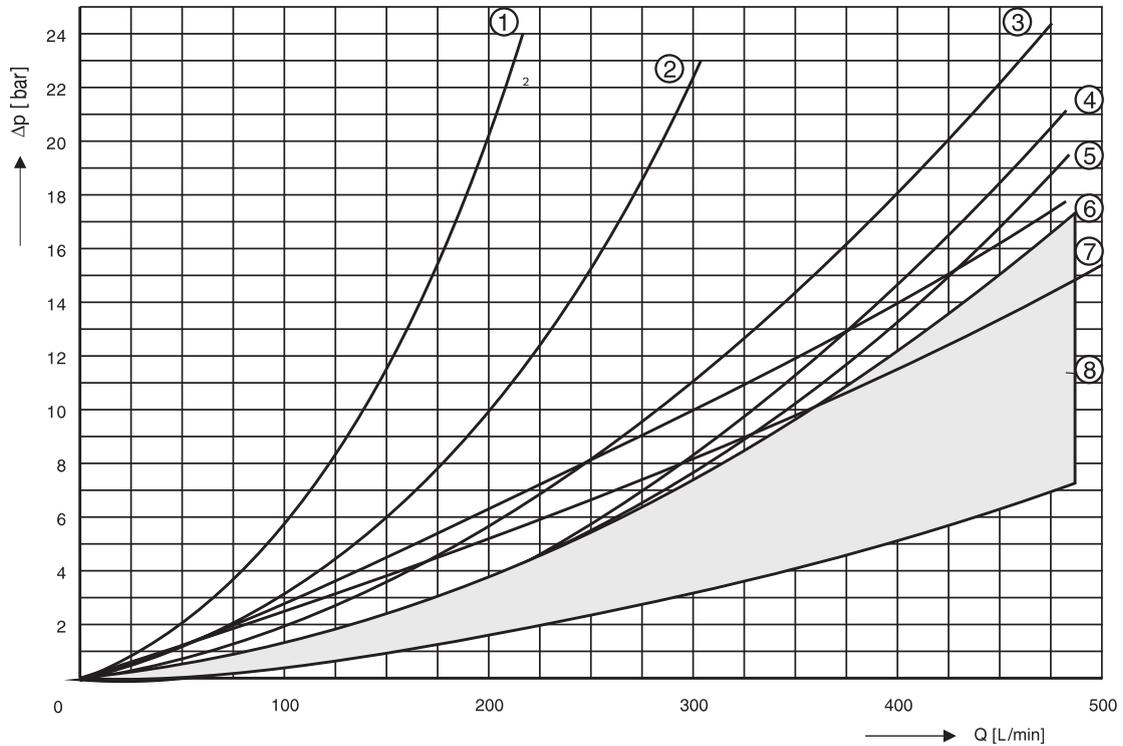
ELECTRICAL DATA

Technical data	Symbol	Unit	Value	
Nominal voltage of solenoids	U _N	V	12, 24, 48 (DC)	48, 110, 230 (AC)
Nominal voltage frequency	f _N	Hz		50, 60
Nominal power input	P _N	W	30	
Voltage ripple	ΔU	%	±10%	
Maximal switching frequency	f _{SM}	1/h	10000	7200
Switching time (on)	t ₀ (T ₄)	ms	up to 80	up to 60
Switching time (off)	t ₀ (T ₃)	ms	up to 100	up to 120

Note: Switching time according to ISO 6403

PRESSURE DROP $\Delta p = f(Q)$

Note: average values with upper deviation 20%, measured at $v = 35\text{mm/s}$, $T = 50^\circ\text{C}$,



Curve number	Spool type	Measured flow
1	Y22	A → B centered position
2	Y22	A → T centered position
3	B12, H12, C22, C12, L12	A → T, B → T
4	L12, C22	P → A, P → B : L12; P → T centered position: C22
5	L12	P → A centered position
6	Y22	B → T
7		A → T
8	N12, Z12, X11, R11, K14, X31, R31, K34, Y12, P12	A → T, B → T, P → B, P → A
	Y12	B → T centered position A → T centered position A → B centered position
	Y22, X41, R41, K44	P → A, P → B
	Z22	A → T, P → B
	P12	P → A centered position P → B centered position A → B centered position
	B12	P → A, P → B, B → T, B → T centered position
	N12	A → T centered position
	L12, C12	P → T centered position
	H12, H22, C22, C12	P → T, P → B

**OPERATING LIMITS**

Note: measured at $v = 35\text{mm}^2/\text{s}$, $T = 50^\circ\text{C}$,

Spool type	Flow Q [dm ³ /min] at the pressure p [MPa]	
	20	32
Z12 (X11, R11, K14)	550	550
Y12 (X31, R31, K34)	360	350
C12 (*)	500	500
C22 (*)	450	450
H12 (X21, R21, K24) (*)	550	500
Z22	550	550
N12	410	410
L12 (*)	480	480
B12	400	380
Y22	450	450
P12	550	550
Y31	450	450
L12	500	450

(*) Internal pilot supply X - max. flow through pre-load valve 260dm³/min

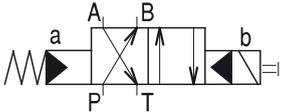
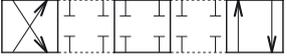
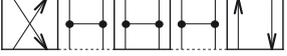
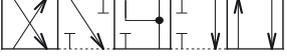
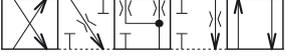
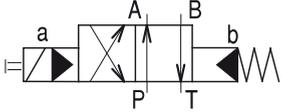
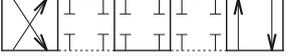
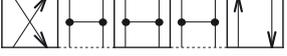
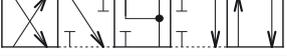
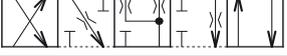
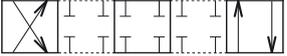
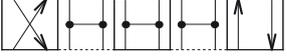
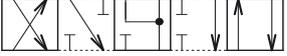
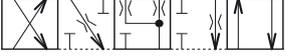
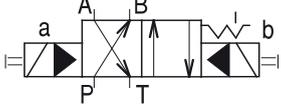
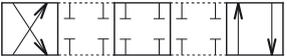
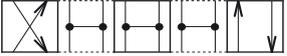
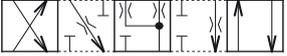
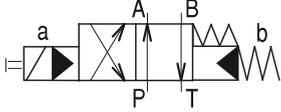
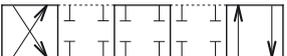
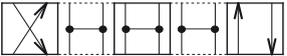
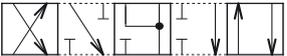
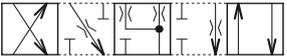
SPOOL REACTION TIME

Measurement conditions: 2 edges throttling
 Measured at operating limits (Q_{MAX}), $p = 32\text{MPa}$, internal pilot oil supply and drain
 Hydraulic medium: 50°C , viscosity $35\text{mm}^2/\text{s}$

Definition: reaction time: elapsed time until the spool starts moving
 total time: full spool stroke time

Spool type	Switching time [ms] in direction								Solenoids supply voltage
	PA - center (pressure)		PA - center (relief)		PB - center (pressure)		PB - center (relief)		
	reaction	total	reaction	total	reaction	total	reaction	total	
Z 12	35	80	30	190	30	75	30	170	24 V =
Y 12	35	75	25	290	30	75	25	230	24 V =
C 12	20	45	25	280	25	55	25	250	24 V =
C 22	25	45	30	200	20	55	25	180	24 V =
H 12	20	45	30	230	30	55	25	210	24 V =
Z 22	24 no flow	66	30	170	40	72	25	150	24 V =
N 12	27	66	25	170	30	64	25	260	24 V =
L 12	30	62	40	380	28	65	35	820	24 V =
B 12	25	63	30	260	34	63	25	130	24 V =
Y 22	20	61	38	190	22	61	30	145	24 V =
P 12	24	64	30	280	27	65	25	150	24 V =
P 12	19	60	95	280	19	58	100	235	220 V ≈
Y 32	20	60	35	200	25	60	30	145	240 V =

SPOOL TYPE AND CROSSOVERS
RSEH 4/2 WAY
Initial position fixed by pilot valve spring

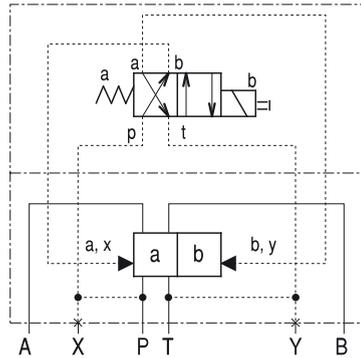
Type	Symbol	Crossover	
RSEH 4-252 X 11			
RSEH 4-252 X 21			
RSEH 4-252 X 31			
RSEH 4-252 X 41			
RSEH 4-252 R 11			
RSEH 4-252 R 21			
RSEH 4-252 R 31			
RSEH 4-252 R 41			
Pilot valve: two solenoids, initial position indefinite			
RSEH 4-252 K 14			
RSEH 4-252 K 24			
RSEH 4-252 K 34			
RSEH 4-252 K 44			
Pilot valve: with detent assembly, initial position indefinite			
RSEH 4-252 K 15			
RSEH 4-252 K 25			
RSEH 4-252 K 35			
RSEH 4-252 K 45			
Initial position fixed by main valve spring			
RSEH 4-252 R 12			
RSEH 4-252 R 22			
RSEH 4-252 R 32			
RSEH 4-252 R 42			

Type	Symbol	Crossover
RSEH 4- 252 X 12		
RSEH 4- 252 X 22		
RSEH 4- 252 X 32		
RSEH 4- 252 X 42		
RSEH 4/3 WAY Initial position fixed by springs		
RSEH 4- 253 Z 12		
RSEH 4- 253 H 12		
RSEH 4- 253 C 12		
RSEH 4- 253 C 22		
RSEH 4- 253 Y 12		
RSEH 4- 253 Y 22		
RSEH 4- 253 Y 32		
RSEH 4- 253 Z 22		
RSEH 4- 253 P 12		
RSEH 4- 253 B 12		
RSEH 4- 253 N 12		
RSEH 4- 253 L 12		
RSH 4/3 WAY Initial position fixed by springs		
RSH 4- 253 Z 11		
RSH 4- 253 H 11		
RSH 4- 253 C 11		
RSH 4- 253 C 21		

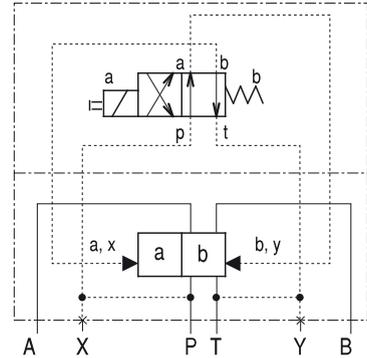
INTERNAL CONNECTION OF RSEH4-252

diagrams apply to valves with internal pilot oil supply (X) and internal pilot oil drain (Y)

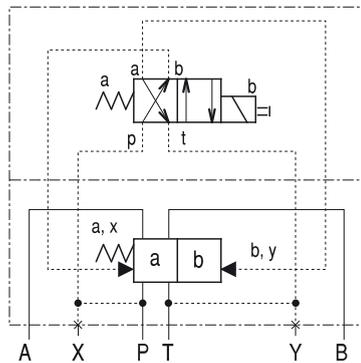
RSEH 4-252X × 1/



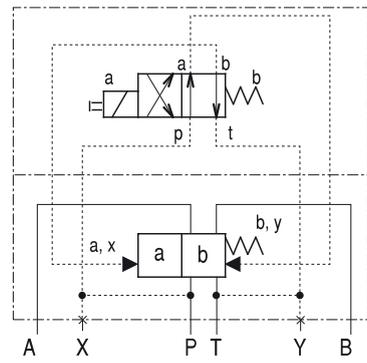
RSEH 4-252R × 1/



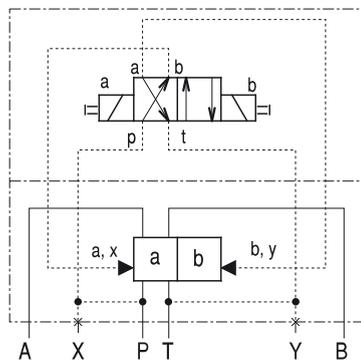
RSEH 4-252X × 2/



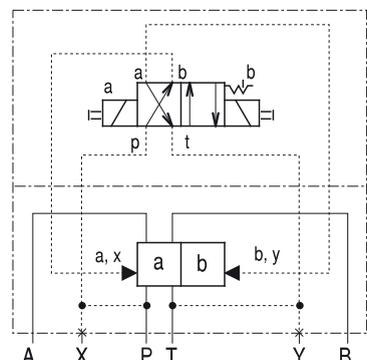
RSEH 4-252R × 2/



RSEH 4-252K × 4/

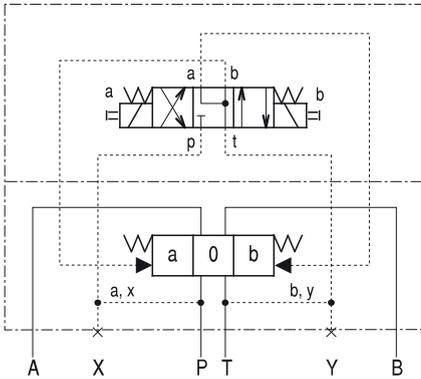


RSEH 4-252K × 5/



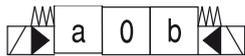
INTERNAL CONNECTION OF RSEH4-253

Internal pilot oil supply (X),
internal pilot oil drain (Y)

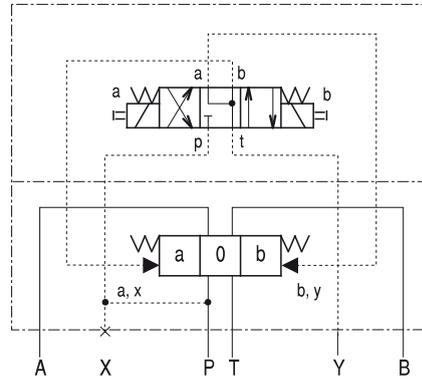


Code: no code

Symbol:

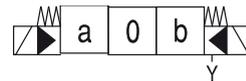


Internal pilot oil supply (X),
external pilot oil drain (Y)

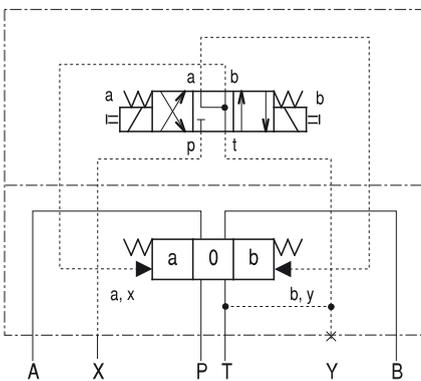


Code: Y

Symbol:

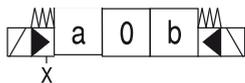


External pilot oil supply (X),
internal pilot oil drain (Y)

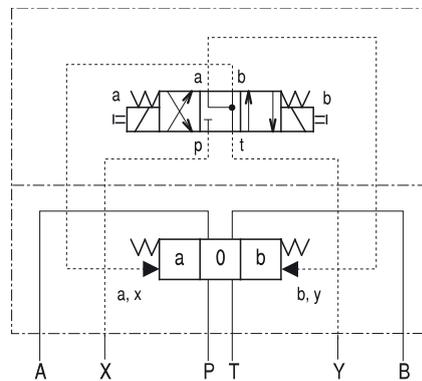


Code: X

Symbol:



External pilot oil supply (X),
external pilot oil drain (Y)



Code: XY

Symbol:

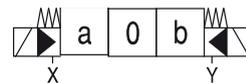
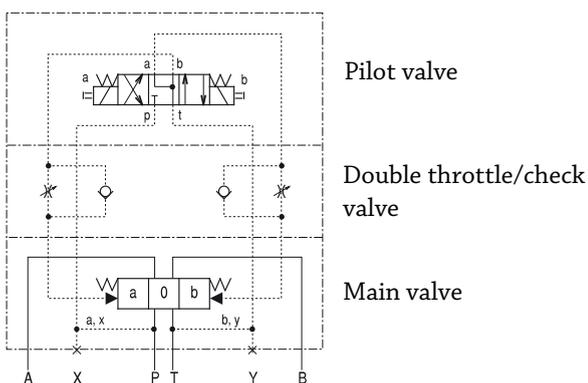


DIAGRAM WITH DOUBLE THROTTLE/CHECK VALVE

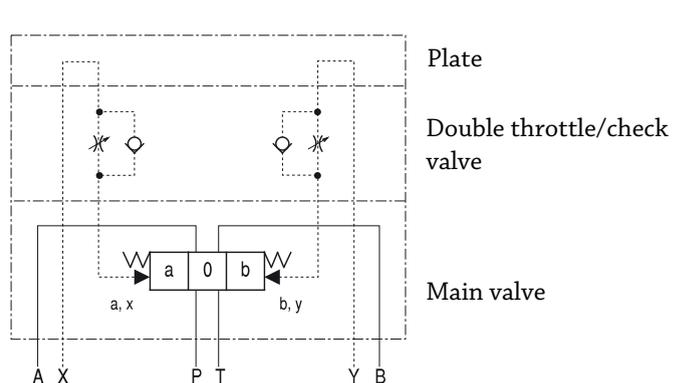
Example of electro-hydraulically operated valve

RSEH 4 -253xxx/xxxx - Mxx-1



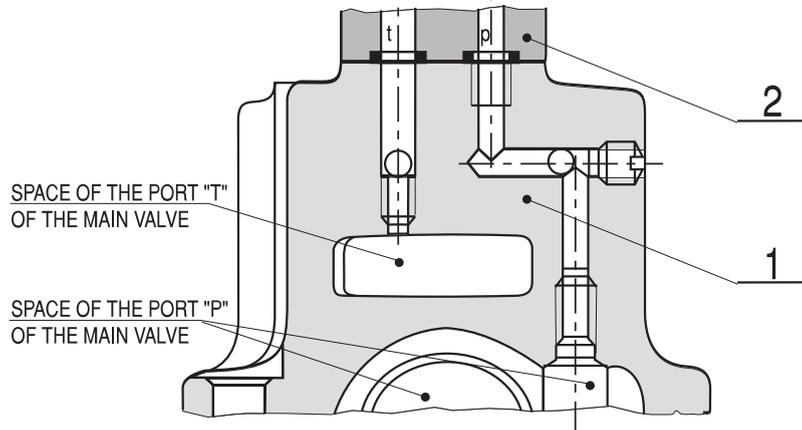
Example of hydraulically operated valve

RSH 4 -253xxx/M-1

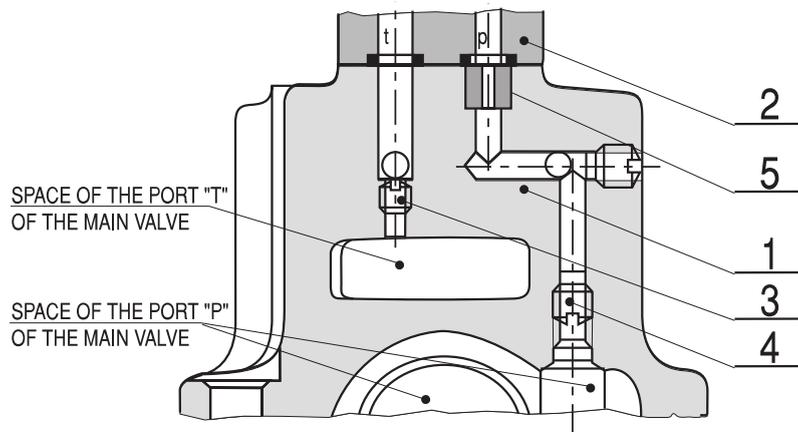


ORIFICES

Internal pilot oil feed and oil return.
Operating time is not controlled by a flow orifice.



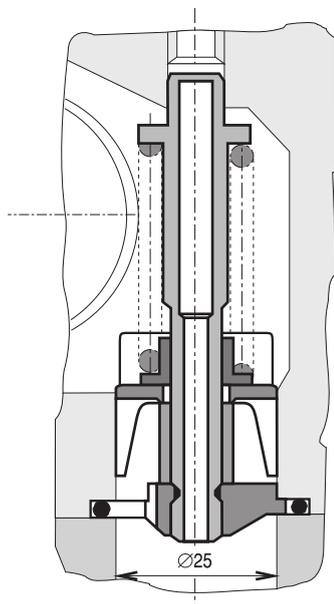
External pilot oil supply and drain
Operating time is controlled by a flow orifice.



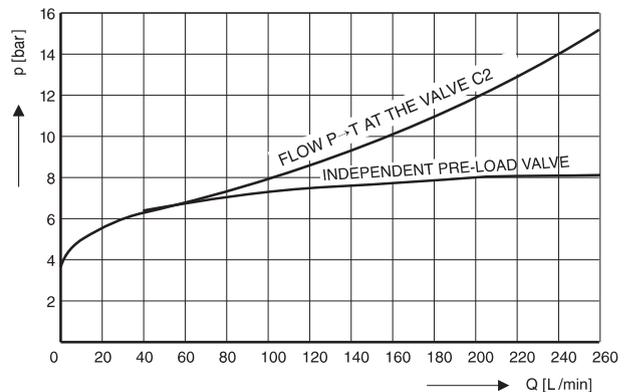
- Item description:
- 1 - Main valve
 - 2 - Pilot valve
 - 3 - Plug, M6×8 (placed in port T of the main valve)
 - 4 - Plug, M8×10 (placed in port P of the main valve)
 - 5 - Orifice (made of a screw M6×8, placed in port P of the main valve)

PRE-LOAD VALVE

Position of the valve in port "P" of the main valve



Pressure drops $p = f(Q)$ of the pre-load valve



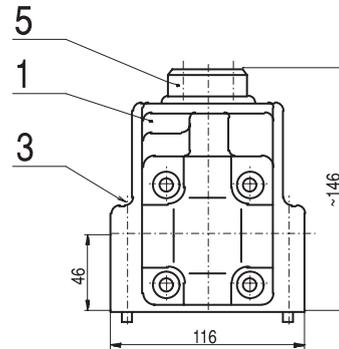
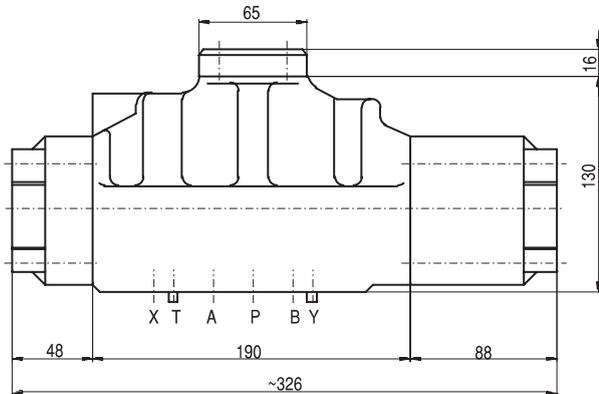
Maximal flow through a pre-load valve 260 dm³/min.



RS(E)H4-25

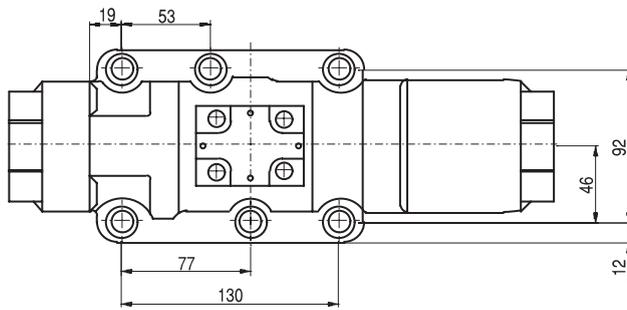
DIMENSIONS RSH4-252 Rx1

all dimensions in [mm]



Item description:

1. Main valve
3. Hole for fixing screw
5. Closing plate

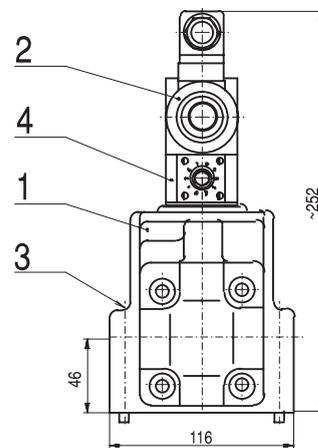
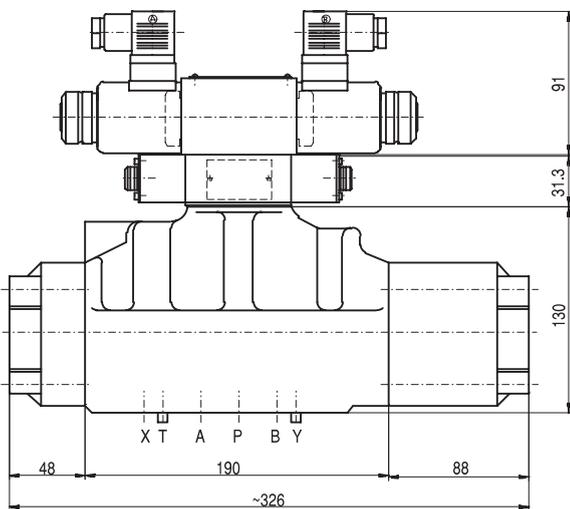


Used sealing "O" rings:

- Ports p, a, b, t (closing plate)
4 pcs ring 9.25×1.78 NBR-80 ShA
- Ports P, A, B, T (main valve)
4 pcs ring 26×3 – 02 9281(26.2×3 – NBR80)
- Ports X, Y
2 pcs ring 24×20 – 02 9280 (19.8×2.4–NBR80)

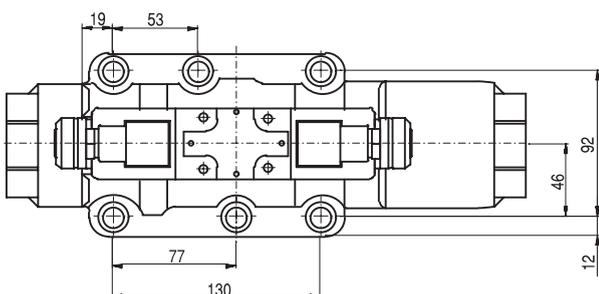
DIMENSIONS RSEH4-253 xxx/xxx-M, RSEH4-252 Kxx/xxx-M

all dimensions in [mm]



Item description:

1. Main valve
2. Pilot valve
3. Hole for fixing screw
4. Interplate with throttle valve



Used sealing "O" rings:

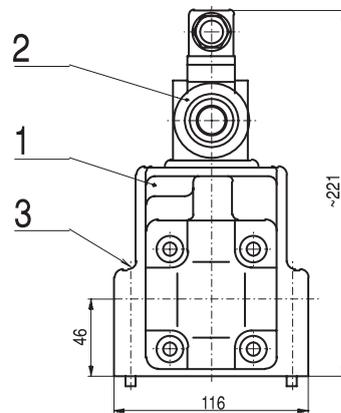
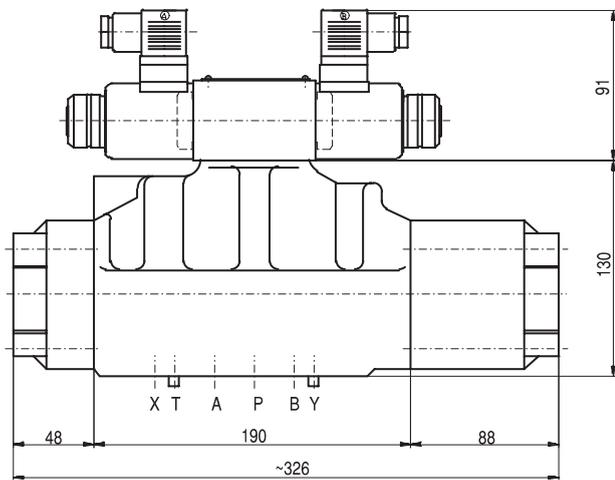
- Ports p, a, b, t (pilot valve)
4 pcs ring 9.25×1.68×1.68 NBR70
- Ports p, a, b, t (interplate)
4 pcs ring 9×1.8 NBR80 (ISO 3601-1)
- Ports P, A, B, T (main valve)
4 pcs ring 26×3 – 02 9281 (26.2×3 – NBR80)
- Ports X, Y
2 pcs ring 24×20 – 02 9280 (19.8×2.4 – NBR80)





RS(E)H4-25

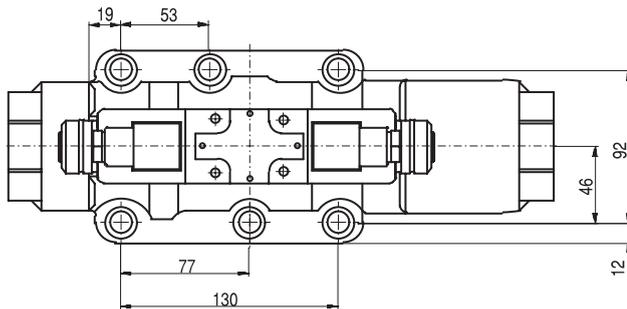
DIMENSIONS RSEH4-253, RSEH4-252 K



all dimensions in [mm]

Item description:

1. Main valve
2. Pilot valve
3. Hole for fixing screw



Used sealing "O" rings:

Ports p, a, b, t (pilot valve)

4 pcs ring 9.25×1.68×1.68 NBR70

Ports P, A, B, T (main valve)

4 pcs ring 26×3 – 02 9281 (26.2×3 – NBR80)

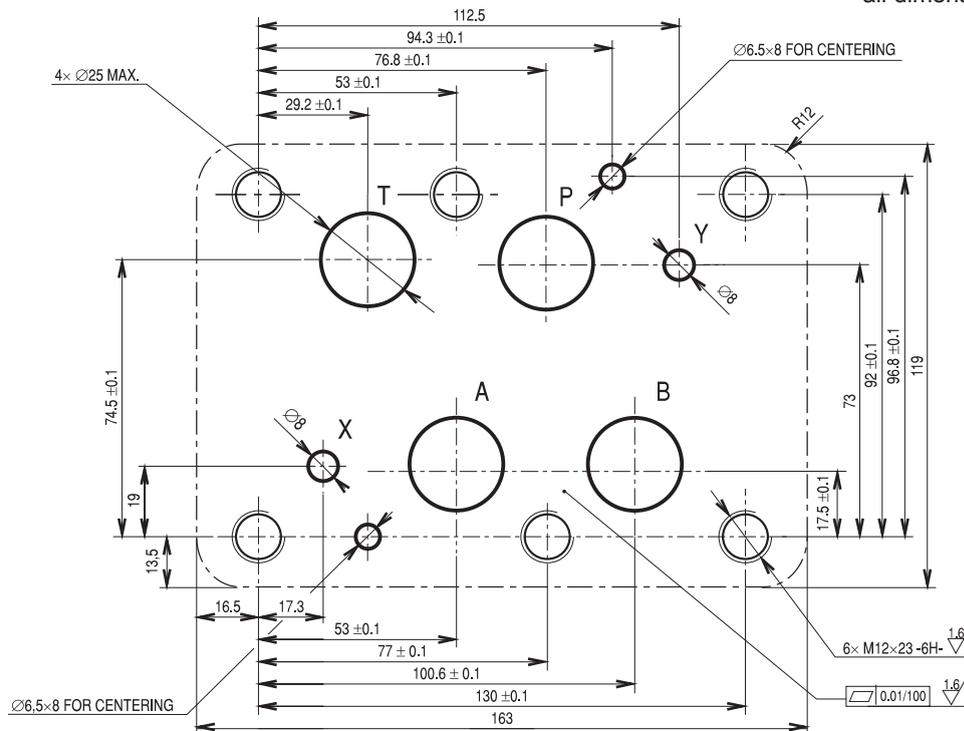
Ports X, Y

2 pcs ring 24×20 – 02 9280 (19.8×2.4 – NBR80)

Sealing material: Rubena 3156, 3158

INSTALLATION DIMENSIONS

all dimensions in [mm]



- Description of ports:
- P input of pressured oil into the main valve
 - A, B outputs from the main valve towards controlled devices
 - T oil drain from the maon valve
 - X external oil supply of the pilot valve
 - Y oil drain of the pilot valve





NOTES

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