

Part number:

093-10012a

HYDROMA

HYDRAULICKÉ SYSTÉMY

**HIDROMA
SISTEMS**

UKŁADY HYDRAULICZNE

HYDROMA

ГИДРАВЛИЧЕСКИЕ СИСТЕМЫ

41 150/110 ED

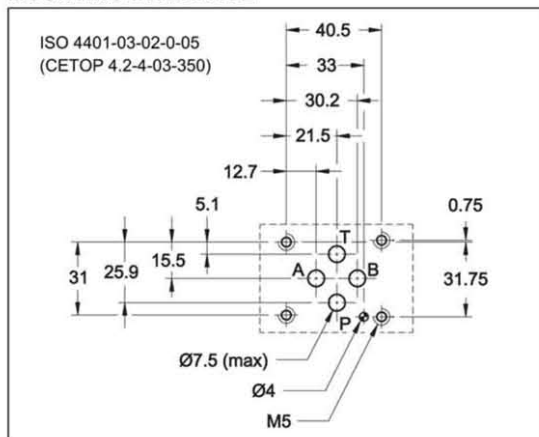


DS3 SOLENOID OPERATED DIRECTIONAL CONTROL VALVE

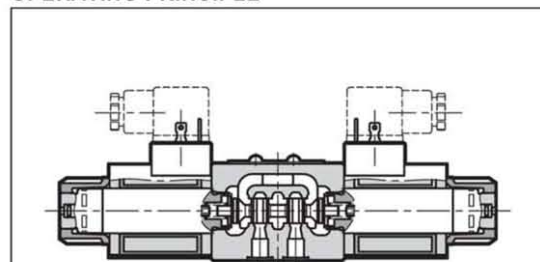
**SUBPLATE MOUNTING
ISO 4401-03 (CETOP 03)**

**p max 350 bar
Q max 100 l/min**

MOUNTING INTERFACE



OPERATING PRINCIPLE



- Direct acting, subplate mounting directional control valve, with mounting surface according to ISO 4401 (CETOP RP121H) standards.
- The valve body is made with high strength iron castings provided with wide internal passages in order to minimize the flow pressure drop. Wet armature solenoids with interchangeable coils are used (for further information on solenoids see par. 7).
- The valve is supplied with 3 or 4 ways designs, with 2 or 3 positions and with several interchangeable spools with different porting arrangements.
- The valve is available with DC or AC solenoids. DC solenoids can also be fed with AC power supply, by using connectors with a built-in rectifier bridge (see paragraph 7.2).
- The DC solenoids DS3 directional valve is also available with connection DUAL DIN 43650.
- The DC solenoids DS3 directional valve is also available in the versions with soft shifting (see par. 14) and with lever manual override.

PERFORMANCES (obtained with mineral oil with viscosity of 36 cSt at 50°C)

Maximum operating pressure	bar	CC	CA
		Ports P - A - B	350
Port T		210	160
Maximum flow rate	l/min	100	90
Pressure drop $\Delta p-Q$	see paragraph 4		
Operating limits	see paragraph 6		
Electrical features	see paragraph 7		
Electrical connections	see paragraph 14		
Ambient temperature range	°C	-20 / +50	
Fluid temperature range	°C	-20 / +80	
Fluid viscosity range	cSt	10 + 400	
Recommended viscosity	cSt	25	
Fluid contamination degree	according to ISO 4406:1999 class 20/18/15		
Mass:	single solenoid valve	kg	1,5
	double solenoid valve	kg	2
			1,35
			1,8

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ГИДРАВЛИЧЕСКИЕ СИСТЕМЫ

DS3

1 - IDENTIFICATION CODE

	D	S	3	-		/	10	-		/	
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Solenoid operated directional control valve

ISO 4401-03 (CETOP 03) size

Spool type (see paragraph 3)

S*	RSA*	TA	RK
SA*	RSB*	TB	
SB*		TA*	
		TB*	

Series:
(the overall and mounting dimensions remain unchanged from 10 to 19)

Seals:
N = NBR seals for mineral oil (standard)
V = FPM seals for special fluids

DC power supply

D12 = 12 V
D24 = 24 V
D28 = 28 V
D48 = 48 V
D110 = 110 V
D220 = 220 V
D00 = valve without coils (see NOTE)

AC power supply

A24 = 24 V - 50 Hz
A48 = 48 V - 50 Hz
A110 = 110 V - 50 Hz / 120 V - 60 Hz
A230 = 230 V - 50 Hz / 240 V - 60 Hz
A00 = valve without coils (see NOTE)

F110 = 110 V - 60 Hz
F220 = 220 V - 60 Hz

Option: Surface treatment not standard. Omit if not required (see NOTE 2)

Manual override: omit for override integrated in the tube (standard)
CM = manual override, boot protected
CH = lever manual override (only for DC version)
CP = push manual override (only for DC version)
CPK = push manual override with mechanical retention (only for DC version)

Coil electrical connection:
K1 = plug for connector type DIN 43650 (standard)
K7 = plug for connector type DEUTSCH DT04-2P male (available on **D12** and **D24** coils only)
K12 = plug for M12 connector
K1 coils and **DUAL** DIN 43560 connector delivered together

NOTE 1: Coils locking ring and related OR are supplied together with valves.

NOTE 2: The valve is supplied with standard surface treatment of phosphating black. On request we can supply these valves with other surface finishes. Add suffix **/W*** at the end of the code.

W4 = carbonitriding with oxidation process. black colour

W5 = semi-gloss epoxy painting black RAL 9005
thickness 80 ÷ 100µ

W6 = gloss polyurethane painting black RAL 9005
thickness 140µ

NOTE: The locking rings of the coils and the relevant O-Rings are supplied together with valves

2 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HM type, according to ISO 6743-4. For these fluids, use NBR seals (code N). For fluids HFDR type (phosphate esters) use FPM seals (code V). For the use of other fluid types such as HFA, HFB, HFC, please consult our technical department. Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics. The fluid must be preserved in its physical and chemical characteristics.

Part number:

093-10012d

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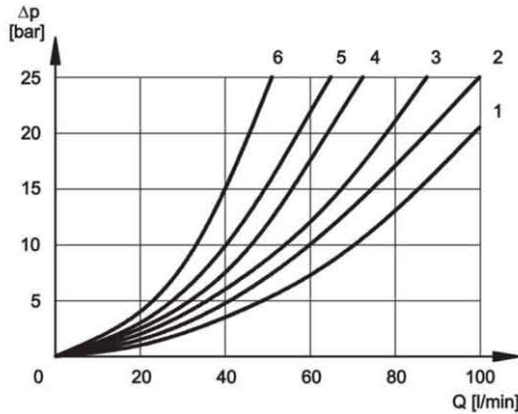
UKŁADY HYDRAULICZNE

HYDROMA

ГИДРАВЛИЧЕСКИЕ СИСТЕМЫ

DS3

4 - PRESSURE DROPS Δp -Q (obtained with viscosity 36 cSt at 50 °C)



For pressure drops between A and B lines of spools S10, S20, S21, S22 and S23, which are used in the regenerative diagram, refer to curve 5.

PRESSURE DROPS WITH VALVE IN ENERGIZED POSITION

SPOOL TYPE	FLOW DIRECTION			
	P→A	P→B	A→T	B→T
	CURVES ON GRAPH			
S1, SA1, SB1	2	2	3	3
S2, SA2, SB2	1	1	3	3
S3, SA3, SB3, RSA3, RSB3	3	3	1	1
S4, SA4, SB4, RSA4, RSB4	6	6	6	6
S5	2	1	3	3
S6	2	2	3	1
S7, S8	6	6	6	6
S9	2	2	3	3
S10	1	3	1	3
S11	2	2	1	3
S12	2	2	3	3
S17	2	2	3	3
S18	1	2	3	3
S19	2	2	3	3
S20	1	5	2	
S21	5	1		2
S22	1	5	2	
S23	5	1		2
TA, TB	2	2	2	2
TA02, TB02	2	2	2	2
TA23, TB23	3	3		
RK	2	2	2	2
RK02	2	2	2	2
RK1, 1RK	2	2	2	2

PRESSURE DROPS WITH VALVE IN DE-ENERGIZED POSITION

SPOOL TYPE	FLOW DIRECTION				
	P→A	P→B	A→T	B→T	P→T
	CURVES ON GRAPH				
S2, SA2, SB2					2
S3, SA3, SB3, RSA3, RSB3			3	3	
S4, SA4, SB4, RSA4, RSB4					5
S5		4			
S6				3	
S7, S8					5
S10	3	3			
S11			3		
S18	4				
S22			3	3	
S23			3	3	

5 - SWITCHING TIMES

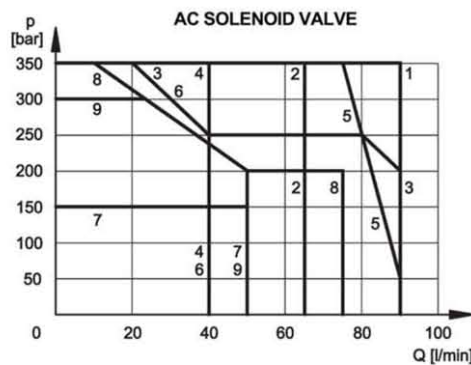
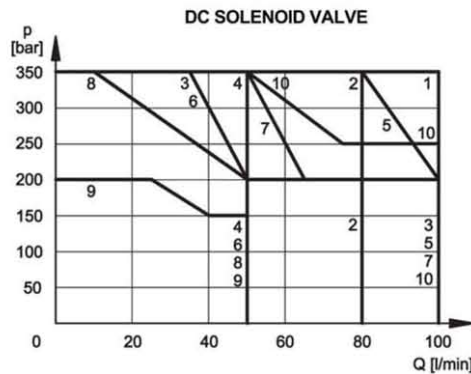
The values indicated are obtained according to ISO 6403 standard, with mineral oil viscosity 36 cSt at 50°C.

SPOOL TYPE	TIMES	
	ENERGIZING	DE-ENERGIZING
DC	25 ÷ 75 ms	15 ÷ 25 ms
AC	10 ÷ 25 ms	15 ÷ 40 ms

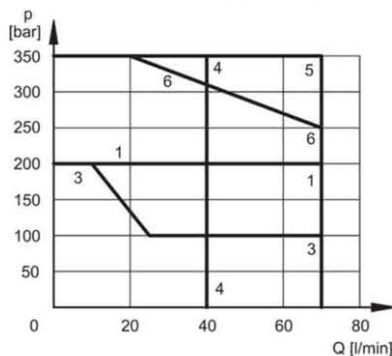
DS3

6 - OPERATING LIMITS

The curves define the flow rate operating fields according to the valve pressure of the different versions. The values have been obtained according to ISO 6403 norm with solenoids at rated temperature and supplied with voltage equal to 90% of the nominal voltage. The value have been obtained with mineral oil, viscosity 36 cSt, temperature 50 °C and filtration according to ISO 4406:1999 class 18/16/13.



**AC SOLENOID VALVE with coil A110
fed with 110V - 60 Hz**



DC SOLENOID VALVE

SPOOL	CURVE	
	P→A	P→B
S1, SA1, SB1	1	1
S2, SA2, SB2	2	2
S3, SA3, SB3, RSA3, RSB3	3	3
S4, SA4, SB4, RSA4, RSB4	4	4
S5	1	1
S6	6	7
S7	4	4
S8	4	4
S9	10	10
S10	1	1
S11	7	6
S12	1	1
S17		
S18	1	1
S19		
S20	8*	8
S21	8	8*
S22	9*	8
S23	8	9*
TA, TB	5	5
TA02, TB02	1	1
TA23, TB23	2	2
RK	1	1
RK02	1	1
RK1, 1RK	1	1

AC SOLENOID VALVE

SPOOL	CURVE	
	P→A	P→B
S1, SA1, SB1	1	1
S2, SA2, SB2	2	2
S3, SA3, SB3, RSA3, RSB3	3	3
S4, SA4, SB4, RSA4, RSB4	4	4
S5	1	1
S6	3	4
S7	4	4
S8	4	4
S9	1	1
S10	1	1
S11	1	3
S12	1	1
S17		
S18	1	1
S19		
S20	9*	8
S21	8	9*
S22	7*	6
S23	6	7*
TA, TB	1	1
TA02, TB02	1	1
TA23, TB23	5	5
RK	1	1
RK02	1	1
RK1, 1RK	1	1

* Performance obtained for a valve with A and B lines connected the one to the piston-side chamber and the other to the rod-side chamber of a double-acting cylinder with area ratio 2:1.

SPOOL	CURVE	
	P→A	P→B
S1, SA1, SB1	1	1
S2, SA2, SB2	5	5
S3, SA3, SB3, RSA3, RSB3	3	3
S4, SA4, SB4, RSA4, RSB4	4	4

S9	1	1
TA, TB	5	5
RK	6	6

NOTE: The values indicated in the graphs are relevant to the standard solenoid valve. The operating limits can be considerably reduced if a 4-way valve is used with port A or B plugged.

For flow and pressure performances of soft-shifting configuration see paragraph 14. For DC solenoid valves fed with AC by means of connectors with built-in rectifier bridge, see paragraph 7.2