

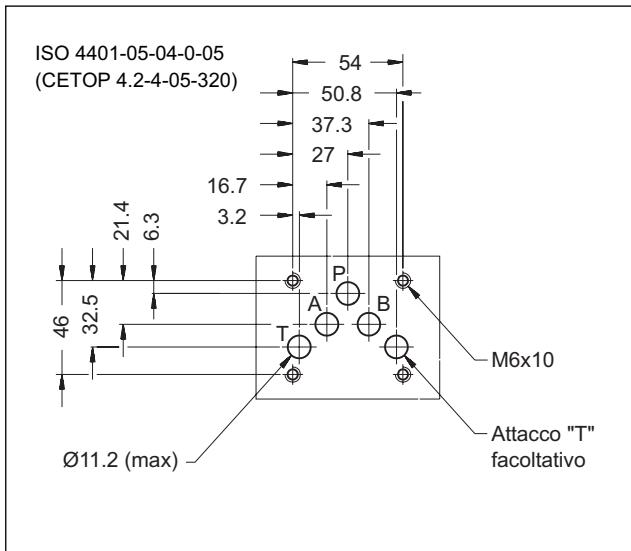
DL5

SOLENOID OPERATED DIRECTIONAL CONTROL VALVE IN COMPACT EXECUTION SERIES 10

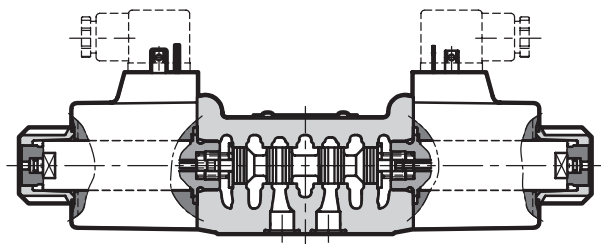
SUBPLATE MOUNTING ISO 4401-05 (CETOP 05)

p max 320 bar
Q max 125 l/min

MOUNTING INTERFACE



OPERATING PRINCIPLE



- Direct acting, subplate mounting directional control valve, with mounting surface according to ISO 4401 (CETOP RP 121H) standards.
- The valve is suitable for special applications, guaranteed by the reduced solenoid dimensions.
- 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 paragraph 7).
- The valve is supplied with 3 or 4 way designs and with several interchangeable spools with different porting arrangements.
- The valve is available with DC or AC current solenoids
- The valve is available also with DIN 43560 connections, with DUAL DIN 43560 connector (see paragraphs 7, 12 and 13).

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

		CC		CA
Maximum operating pressure: - ports P - A - B - port T	bar	320		
		210	160	
Maximum flow rate	l/min	125	100	
Pressure drop $\Delta p-Q$		see paragraph 4		
Operating limits		see paragraph 5		
Electrical features		see paragraph 7		
Electrical connections		see paragraph 12		
Ambient temperature range	°C	-20 / +50		
Fluid temperature range	°C	-20 / +80		
Fluid viscosity range	cSt	10 ÷ 400		
Fluid contamination degree		according to ISO 4406:1999 class 20/18/15		
Recommended viscosity	cSt	25		
Masse: single solenoid valve double solenoide valve	kg	2,8		
		3,7		

1 - IDENTIFICATION CODE

	D	L	5	-		/	10	-		/	
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Solenoid operated directional control valve

Model in compact execution

ISO 4401-05 (CETOP 05) size

Spool type (see paragraph 3):

S* **TA***
SA* **TB***
SB* **RK**

Series no.: (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

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

Manual override
Omit for override integrated in the tube (**standard**)
CM = boot protected. for DC version only - see par. 11)

Coil electrical connection: (see paragraph 12)
K1 = plug for connector type DIN 43650 (**standard**)
K12 = plug for M12 connector K1 coils and DUAL DIN 43560 connector delivered together (see par. 13)

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

DC power supply

D12 = 12 V
D24 = 24 V
D28 = 28 V
D00 = valve without coils (see **NOTE 1**)

AC power supply

A24 = 24 V - 50 Hz
A48 = 48 V - 50 Hz
A110 = 110 V - 50 Hz
A230 = 230 V - 50 Hz
A00 = valve without coils (see **NOTE 1**)

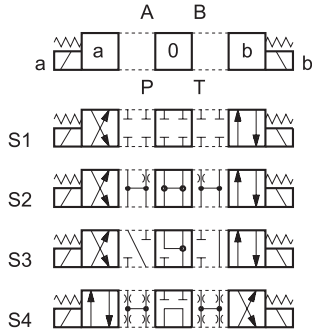
2 - HYDRAULIC FLUIDS

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.

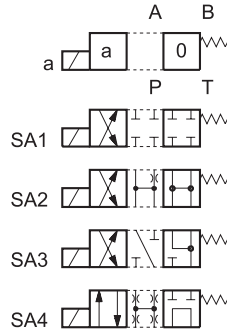
Using fluids at temperatures higher than 80 °C causes a faster degradation of the fluid and of the seals characteristics. The fluid must be preserved in its physical and chemical characteristics.

3 - SPOOL TYPE

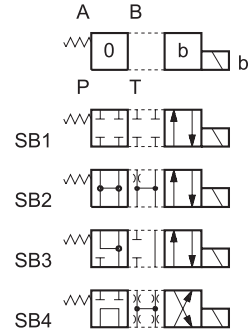
Type S*:
2 solenoids - 3 positions
with spring centering



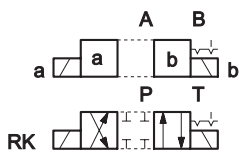
Type SA*:
1 solenoid side A
2 positions (central + external)
with spring centering



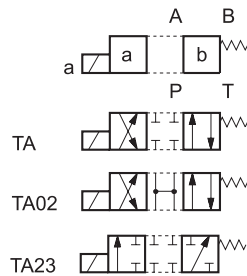
Type SB*:
1 solenoid side B
2 positions (central + external)
with spring centering



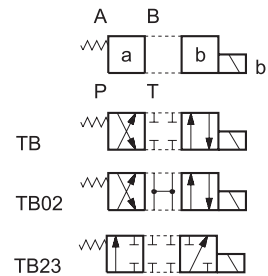
Type RK:
2 solenoids - 2 positions
with mechanical retention



Type TA:
1 solenoid side A
2 external positions
with return spring

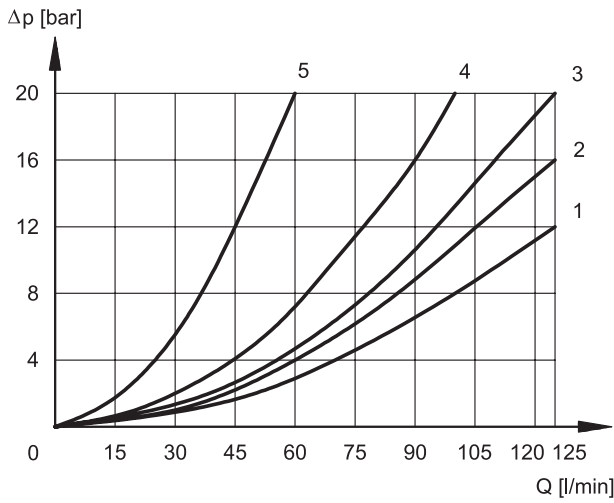


Type TB:
1 solenoid side B
2 external positions
with return spring



NOTE: Others spools available on request only.

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



ENERGIZED VALVE

SPOOL	FLOW DIRECTIONS			
	P→A	P→B	A→T	B→T
	CURVES ON GRAPHS			
S1	1	1	2	2
S2	1	1	1	1
S3	1	1	1	1
S4	4	4	4	4
RK	2	2	2	2
TA	2	2	3	3
TA02	2	2	1	1
TA23	3	3	-	-

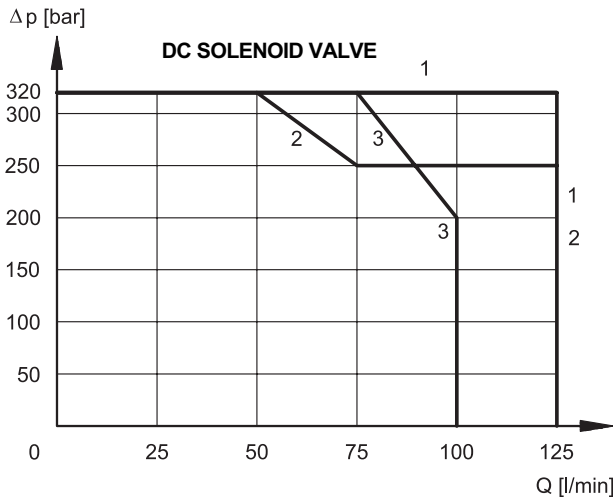
DE-ENERGIZED VALVE

SPOOL	FLOW DIRECTIONS		
	A→T	B→T	P→T
	CURVES ON GRAPHS		
S2	-	-	1
S3	5	5	-
S4	-	-	1

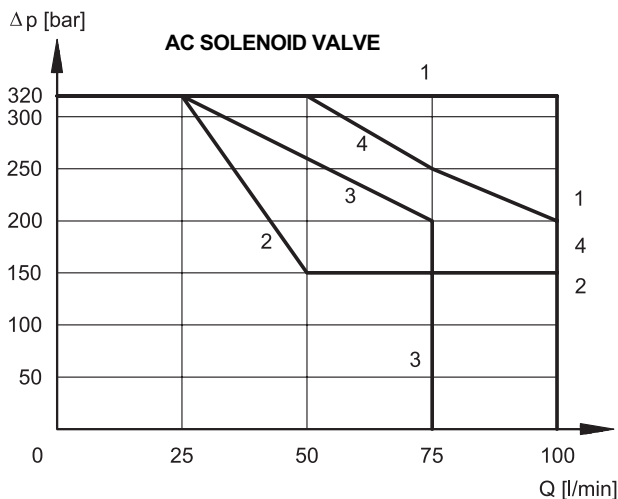
5 - OPERATING LIMITS

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.



SPOOL	CURVE
S1, S2, RK, TA	1
S3	2
S4, TA02	3



SPOOL	CURVE
S1, S2, RK, TA02, TA23	1
S3	2
S4	3
TA	4

6 - SWITCHING TIMES

The values indicated are obtained with spool S1, according to ISO 6403 standard, with mineral oil viscosity 36 cSt at 50°C.

SUPPLY	TIMES ($\pm 10\%$) [ms]	
	ENERGIZING	DE-ENERGIZING
DC	40 + 90	20 + 50
AC	15 + 30	20 + 50

7 - ELECTRICAL FEATURES

7.1 Solenoids

These are essentially made up of two parts: tube and coil. The tube is threaded into the valve body and includes the armature that moves immersed in oil, without wear. The inner part, in contact with the oil in the return line, ensures heat dissipation.

The coil is fastened to the tube by a threaded ring, and can be rotated +/- 90°, to suit the available space

The interchangeability of coils of different voltages is allowed within the same type of supply current, alternating or direct.

Protection from atmospheric agents CEI EN 60529

Plug-in type	IP 65	IP 67
K1 DIN 43650	x (*)	
K12 DUAL DIN 43650	x	x (*)

(*) The protection degree is guaranteed only with the connector correctly connected and installed

NOTE: In order to further reduce the emissions, with DC supply, use of type H connectors is recommended. These prevent voltage peaks on opening of the coil supply electrical circuit (see cat. 49 000).

SUPPLY VOLTAGE FLUCTUATION	$\pm 10\%$ Vnom
MAX SWITCH ON FREQUENCY	10.000 ins/hr
DUTY CYCLE	100%
ELECTROMAGNETIC COMPATIBILITY (EMC)	In compliance with 2004/108/CE
LOW VOLTAGE	In compliance with 2006/95 CE
CLASS OF PROTECTION : Coil insulation (VDE 0580) Impregnation:	class H class H

7.2 DC valve - Current and power consumption

In direct current energizing, current consumption stays at fairly constant values, essentially determined by Ohm's law: $V = R \times I$

The table shows current and power consumption values for DC types.

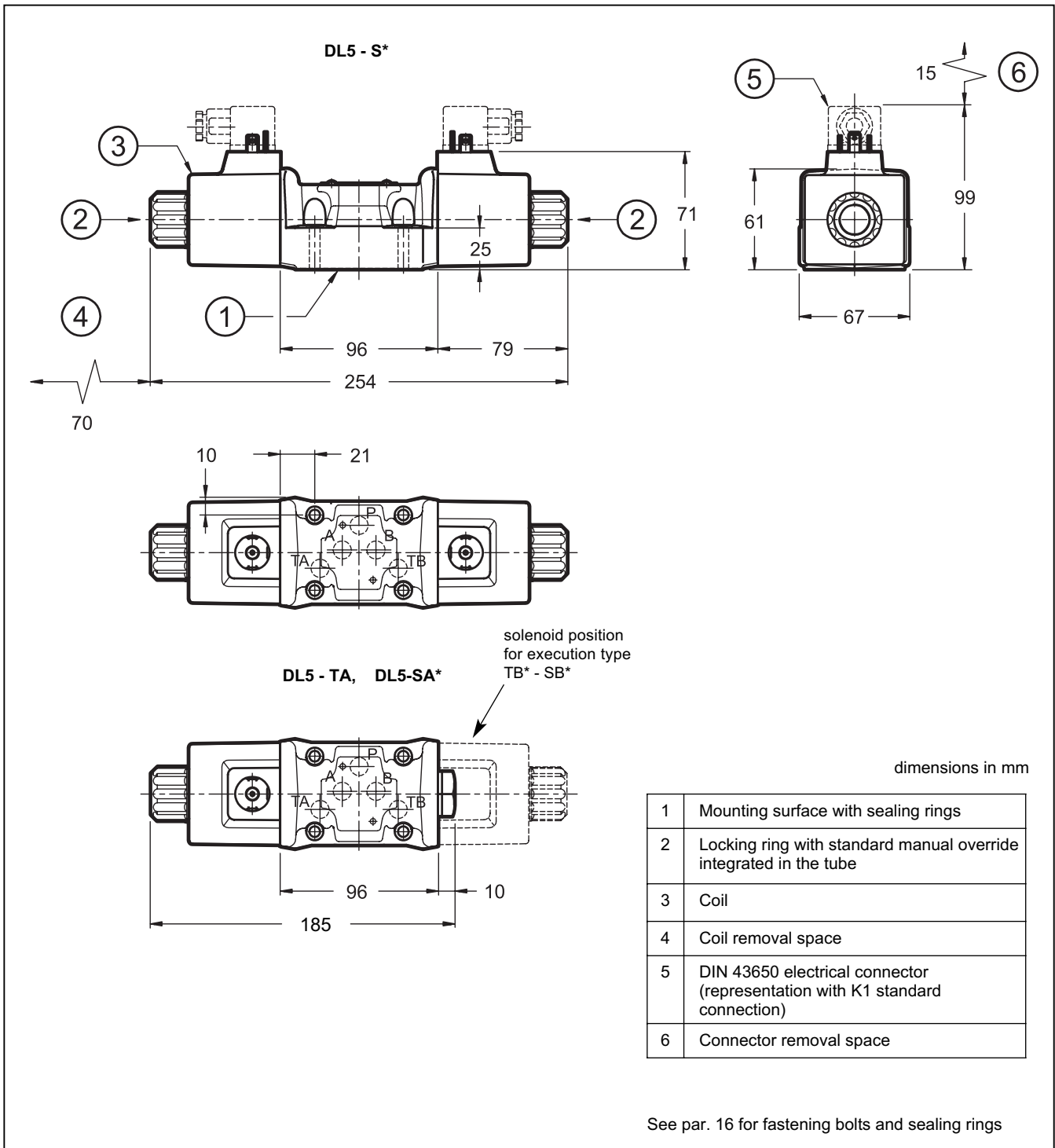
	Resistance at 20°C [Ω] ($\pm 5\%$)	Current consumption [A] ($\pm 10\%$)	Power consumption [W] ($\pm 10\%$)	Coil code K1 and K12
C22L5-D12K1	2,9	4,14	50	1903150
C22L5-D24K1	12,3	1,95	47	1903151
C22L5-D28K1	16,8	1,67	47	1903152

7.3 AC valve - Current and power consumption

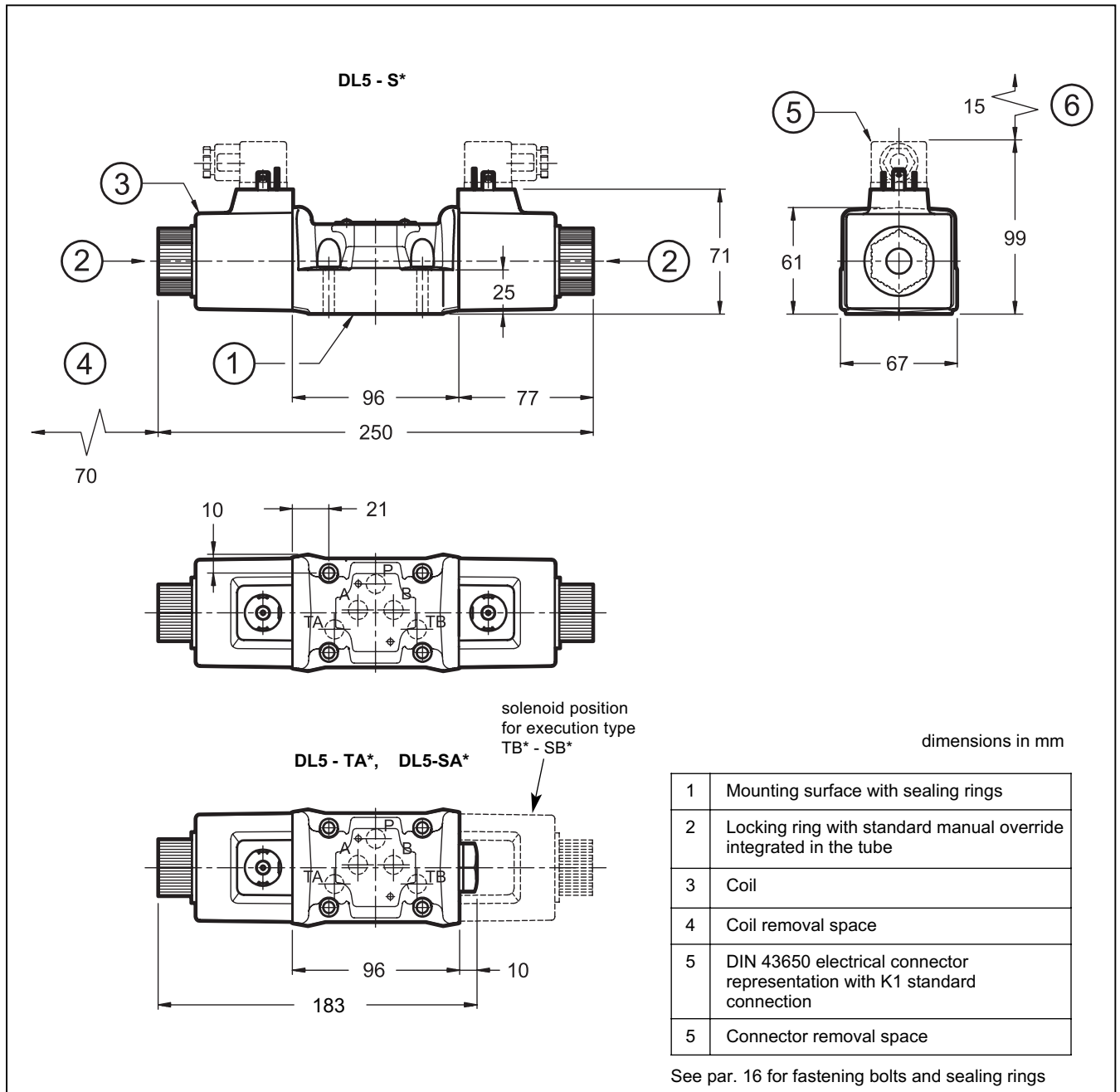
In alternating current energizing, an initial phase (maximum movement) is seen, during which the solenoid consumes elevated value currents (inrush current); the current values diminish during the plunger stroke until it reaches the minimum values (holding current) when the plunger reaches the stroke end. The table shows the values of absorption at the inrush and at holding.

	Freq. [VAC/Hz] ($\pm 10\%$)	Resistance at 20°C [Ω] ($\pm 5\%$)	Current consumption at inrush [A] ($\pm 10\%$)	Current consumption at holding [A] ($\pm 5\%$)	Power consumption at inrush ($\pm 10\%$) [VA]	Power consumption at holding ($\pm 10\%$) [VA]	Coil code K1 and K12
C26L5-A24K1/10	24/50	0,58	15,1	2,84	362,4	68,2	193160
C26L5-A48K1/10	48/50	2,34	7,4	1,29	355,2	61,9	193161
C26L5-A110K1/10	110/50-120/60	12,3	3,6 - 3,3	0,64 - 0,62	396	70,4 - 74,4	193162
C26L5-A230K1/10	230/50-240/60	51,6	1,8 - 1,6	0,31 - 0,28	414 - 384	71,3 - 67,2	193163

8 - DL5 DC OVERALL AND MOUNTING DIMENSIONS



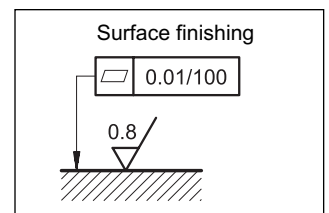
9 - DL5 AC OVERALL AND MOUNTING DIMENSIONS



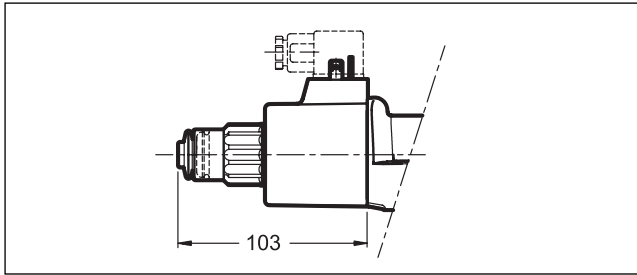
10 - INSTALLATION

The configuration with centering and return springs can be mounted in any position.

Valve fitting takes place by means of screws or tie rods, fixing the valve on a lapped surface, with values of planarity and smoothness that are equal to or better than those indicated in the drawing. If the minimum values of planarity or smoothness are not met, fluid leakages between valve and mounting surface can easily occur.



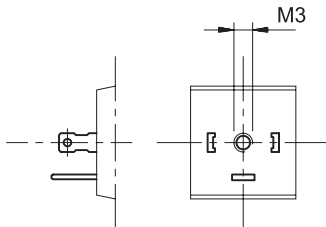
11 - BOOT MANUAL OVERRIDE



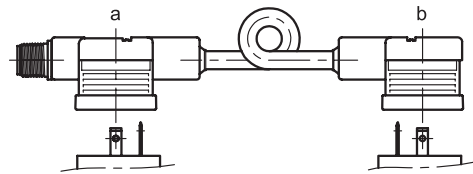
The boot protected manual override is available for the DC version only, and it may be ordered inserting the suffix CM in the identification code (see paragraph 1)

12 - ELECTRIC CONNECTIONS

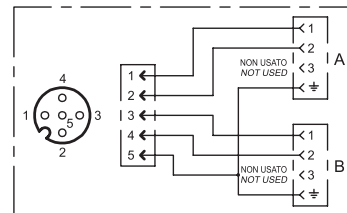
connection for DIN 43650 connector type code **K1 (standard)**



connection for DUAL DIN 43650 connector type code **K12**



CONNECTOR M12x1 CONNECTION SCHEME

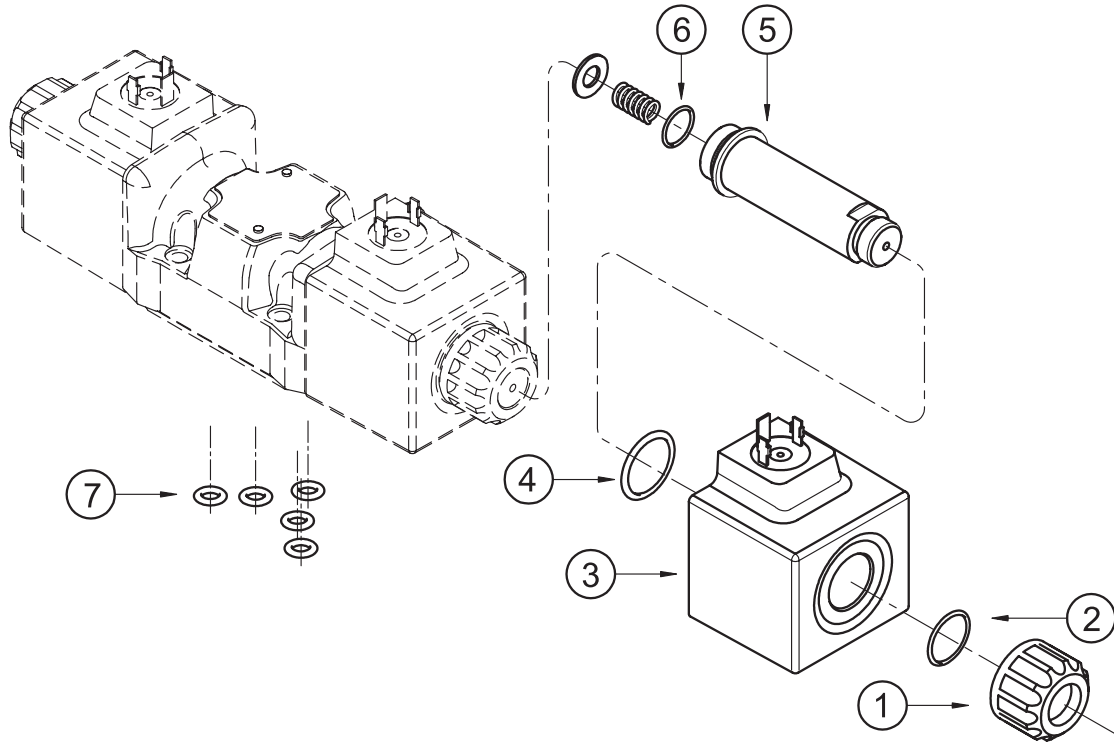


In K12 version the valve will be delivered together with the DUAL DIN 43650 with M12 connection mounted on K1 coils. DUAL DIN connector allows you to power two solenoids with a single cable with socket M12.

13 - ELECTRIC CONNECTORS

The solenoid operated valves with K1 connection are not supplied with connector. Connectors must be ordered separately (see catalogue 49 000), except the version K12, where the connector is delivered already mounted on the valve.

14 - SPARE PARTS FOR DC SOLENOID VALVE



IDENTIFICATION CODE FOR DC AND RC COILS

C 22 L5 - / 10

Supply voltage

D12 = 12 V
D24 = 24 V
D28 = 28 V

Series no.:
 (the overall and
 mounting dimensions
 remain unchanged
 from 10 to 19)

Coil electrical connection:

K1 = plug for connector type
 DIN 43650 (**standard**)

K12 = K1 coil + DUAL DIN 43560
 connector

1	Coil locking ring - code 0119412
2	ORM-0220-20 - 70 shore
3	Coil (see identification code)
4	ORM-0296-24 (29.6x2.4) - 70 shore
5	Solenoid tube: TD22-DL5/10N (NBR seals) TD22-DL5/10V (FPM seals) (OR n° 6 included)
6	OR type 3.910 (19.18x2.46) - 70 shore
7	N. 5 OR type 2050 (12.42x1.78) - 90 Shore

SEAL KIT

The codes included the OR n° 2, 4, 6 and 7.

Cod. 1985447 NBR seals

Cod. 1985448 FPM seals

NOTE: the spare part of the connector K12 (DUAL DIN) may be ordered with code 0672136

15 - SPARE PARTS FOR AC SOLENOID VALVE

IDENTIFICATION CODE FOR AC COILS

C	26	L5	-			/	10
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Supply voltage

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

Series no.:
 (the overall and mounting dimensions remain unchanged from 10 to 19)

Coil electrical connection:
K1 = plug for connector type DIN 43650 (**standard**)
K12 = K1 coil + DUAL DIN 43560 connector

1	Coil locking ring - code. 0119480
2	Coil (see identification code)
3	ORM-0296-24 (29.6x2.4) - 70 shore
4	Solenoid tube: TA26-DL5/10N (NBR seals) TA26-DL5/10V (FPM seals) NOTE: OR n° 5 included.
5	OR type 3.910 (19.18x2.46) - 70 shore
6	N. 5 OR type 2050 (12.42x1.78) - 90 Shore

SEAL KIT
 The codes included the OR n° 3, 5 and 6.
Cod. 1985449 NBR seals
Cod. 1985450 FPM seals

NOTE: the spare part of the connector K12 (DUAL DIN) may be ordered with code 0672136

16 - FASTENING BOLTS AND SEALING RINGS

Single valve fastening: 4 screws M6x35
Tightening torque: 8 Nm
Sealing rings: N. 5 OR type 2050 (12.42x1.78) - 90 Shore

17 - SUBPLATES (See catalogue 51 000)

Type PMD4-AI4G with rear ports
Type PMD4-AL3G with side ports
P, T, A, B port threading: 1/2" BSP



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