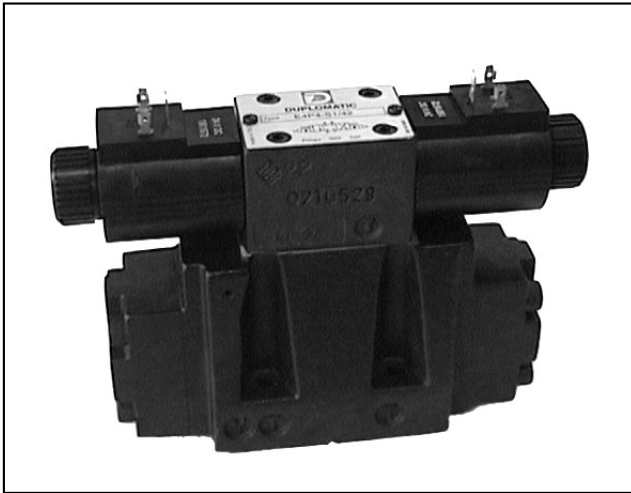




**DIPLOMATIC
HYDRAULICS**

41 400/103 ED



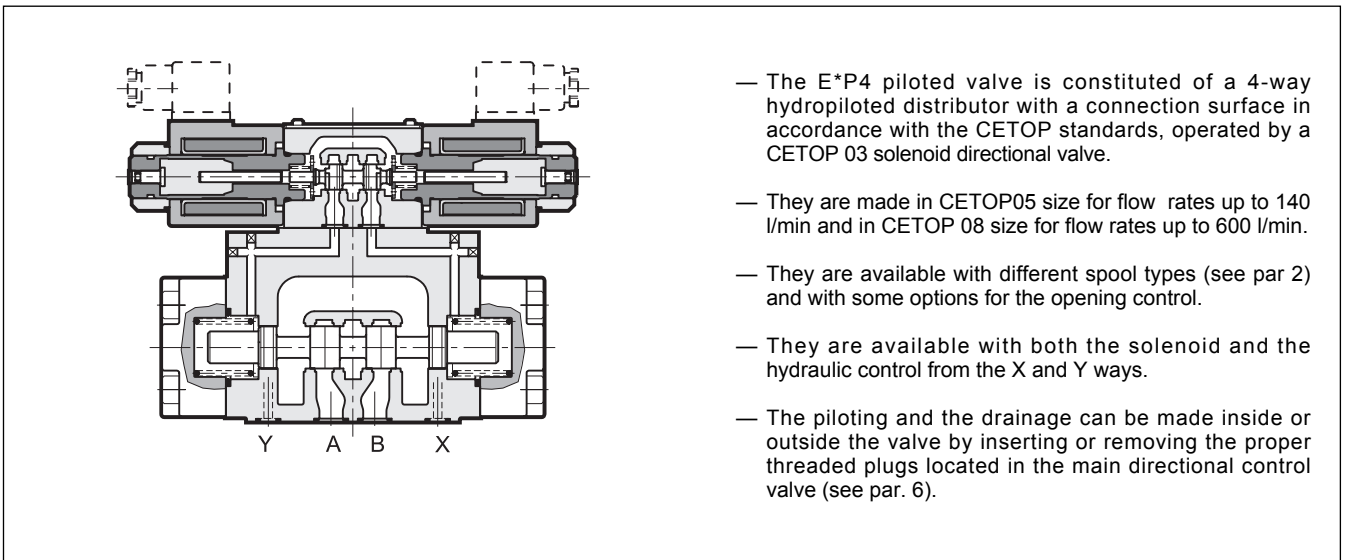
E*P4

PILOT OPERATED DISTRIBUTOR SOLENOID OR HYDRAULIC CONTROLLED (C*P4)

E4 CETOP P05
E5 CETOP 08

p max (see performance ratings table)

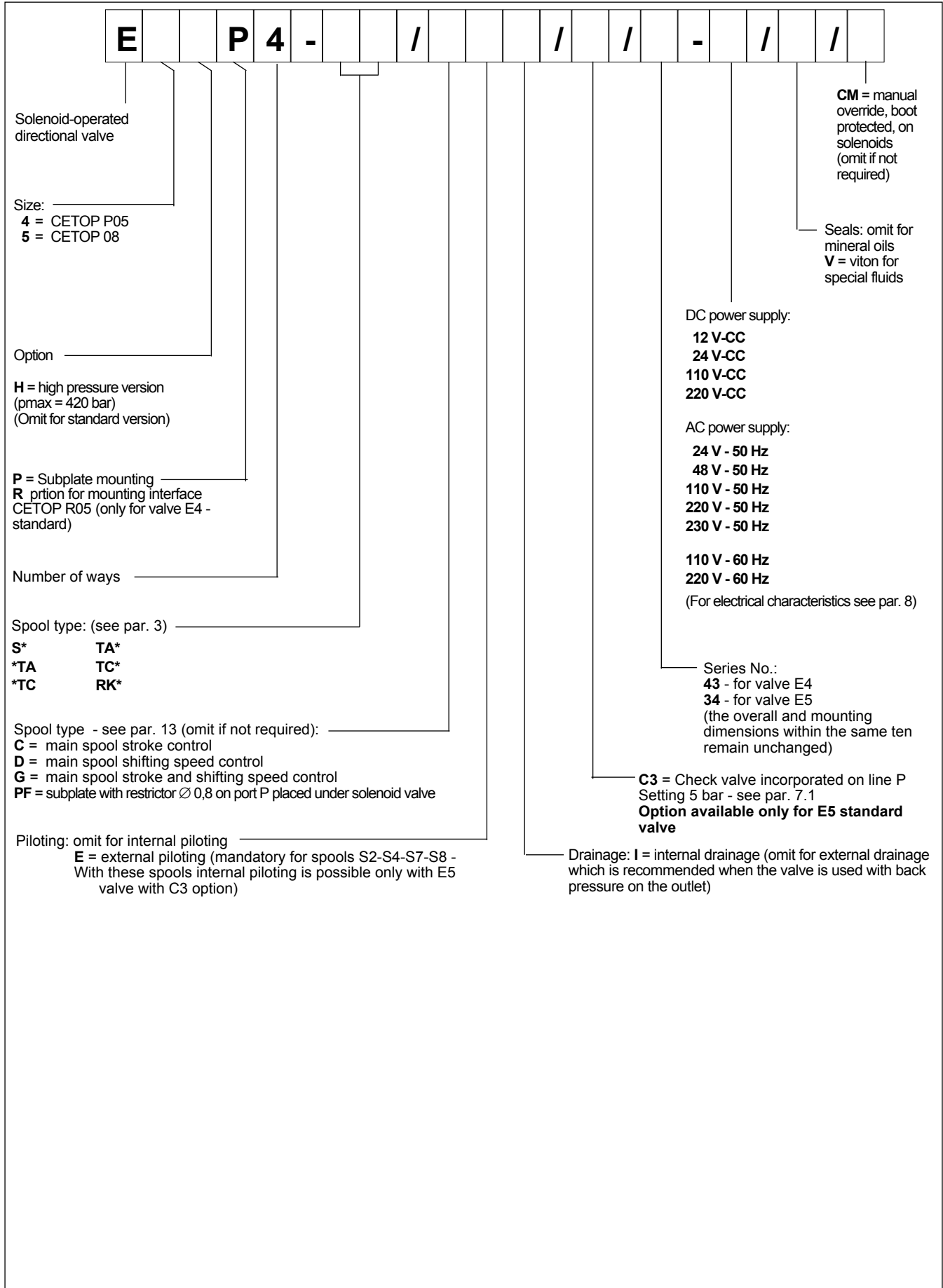
Q max (see performance ratings table)



PERFORMANCE RATINGS (obtained with mineral oil with viscosity of 36 cSt at 50°C)		E4	E5
Maximum operating pressure:	- ports P A B (standard version) (version H) - port T (external drainage version)	bar	320 420 250
Maximum flow rate:	- from port P to A-B-T	l/min	150 600
Ambient temperature range		°C	-20 ÷ +50
Fluid temperature range		°C	-20 ÷ +80
Fluid viscosity range		cSt	10 ÷ 400
Recommended viscosity		cSt	25
Degree of fluid contamination	according to NAS 1638 class 10		
Mass:	E*P4-S, RK E*P4-TA/TC	kg	8.6 15.6 8.0 15



1 - IDENTIFICATION CODE FOR SOLENOID CONTROLLED DISTRIBUTOR



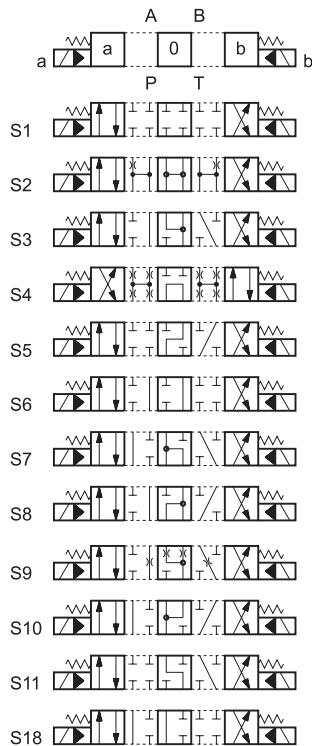


2 - SPOOLTYPE

Symbols are referred to the solenoid valve E*. For the hydraulic control version C* please verify the connection scheme (see par. 4).

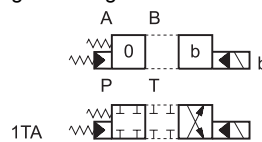
Type S: (see note 1)

3 positions with spring centering



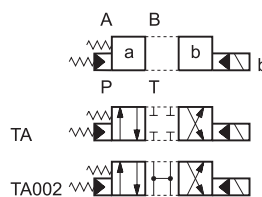
Type *TA: (see note 1)

2 positions (central + external) with spring centering



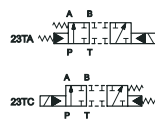
Type TA: (see note 1)

2 external positions with return spring



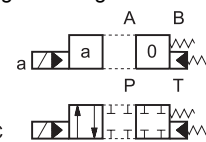
Type 23 (TA/TC): (see note 2)

3-way, 2 external positions with return spring



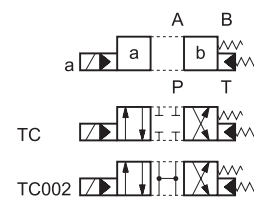
Type *TC: (see note 1)

2 positions (central + external) with spring centering



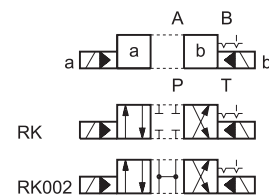
Type TC: (see note 1)

2 external positions with return spring



Type RK:

2 positions with mechanical detent on pilot valve



Besides the diagrams shown, which are the most frequently used, other special versions are available: consult our technical department for their identification, feasibility and operating limits.

3 - PERFORMANCE CHARACTERISTICS

PRESSURES [bar]	E4 - E5	
	MIN	MAX
Piloting pressure	5	210*
Pressure on line T with internal drainage	-	140
Pressure on line T with external drainage	-	250

* For the H execution maximum piloting pressure is 350 bar

MAXIMUM FLOW RATES [l/min]	E4		E5	
	PRESSURES			
Spool type	210 bar	320 bar	210 bar	320 bar
S4, S7, S8	120	100	500	450
All other spools	150	120	600	500



4 - IDENTIFICATION CODE FOR HYDRAULIC CONTROLLED DISTRIBUTOR C*P4

C	P	4	-		/	E	/	
----------	----------	----------	----------	--	----------	----------	----------	--

Hydraulic operated directional valve through X and Y lines

Size:
4 = CETOP P05
5 = CETOP 08

P = Subplate mounting
Option:
R = mounting interface CETOP R05
(only for E4 standard valve)

Number of ways

Spool type (see par. 2)
S* **TA***
TA** **TC
***TC**

Spool type
The distributor is delivered with short-circuit subplate. The X and Y ports are used for the hydraulic control of the valve.

C*P4-S*

C*P4-TA

C*P4-TC

Series No.:
43 - for valve C4
34 - for valve C5
(the overall and mounting dimensions within the same ten remain unchanged)

External piloting
External drainage
(see par. 6)

Overall dimensions

5 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids HL or HLP type, according to ISO 6743/3.

For fluids HFD-R 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.

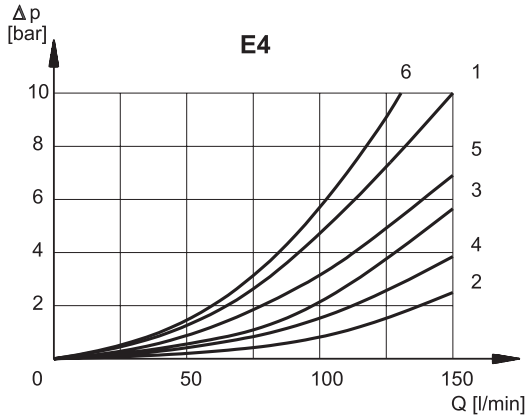
Using fluids at temperatures higher than 70°C causes a faster degradation of the fluid and of the seals characteristics.

The fluid must be preserved in its physical and chemical characteristics.



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

6.1 - Pressure drops E4P4



SPOOL TYPE	SPOOL POSITION	E4				
		CONNECTIONS				
		P → A	P → B	A → T	B → T	P → T
		CURVES ON GRAPH				
S1	Energized	1	1	2	3	
S2	De-energized Energized	5	5	2	4	6*
S3	De-energized Energized	1	1	1• 2	1° 4	
S4	De-energized Energized	6	6	3	5	6
S5	De-energized Energized	1	1 5	2	3	
S6	De-energized Energized	1	1	2	1 4	
S7	De-energized Energized	6	6	3	5	6°
S8	De-energized Energized	6	6	3	5	6•
S9	Energized	1	1	2	2	
S10	De-energized Energized	1• 5	1° 5	2	3	
S11	De-energized Energized	1	1	1 2	3	
S18	De-energized Energized	5 5	1	2	3	
TA	De-energized Energized	1	1	4	3	
RK	Energized	1	1	4	3	

* A-B blocked • B blocked ° A blocked

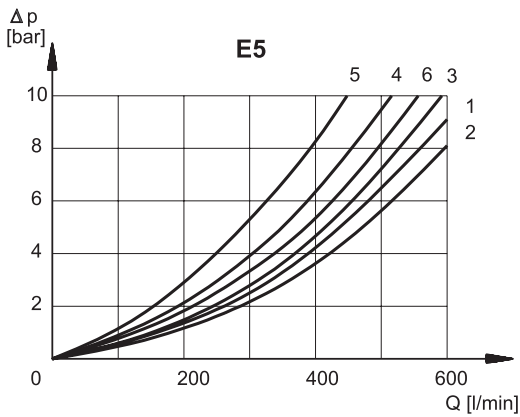
6.2 Switching times E4P4

The values indicated refer to a solenoid valve working with piloting pressure of 100 bar, with mineral oil at a temperature of 50°C, at viscosity of 36 cSt and with PA and BT connections. The energizing and de-energizing times are obtained at the pressure variation which occurs on the lines.

E4				
TIMES (± 10%) [ms]	ENERGIZED		DE-ENERGIZED	
	2 Pos.	3 Pos.	2 Pos.	3 Pos.
CA solenoid	50	40	70	50
CC solenoid	70	55	70	50



6.3 - Pressure drops E5P4



SPOOL TYPE	SPOOL POSITION	E5				
		CONNECTIONS				
		P → A	P → B	A → T	B → T	P → T
		CURVES ON GRAPH				
S1	Energized	1	1	2	3	
S2	De-energized Energized	2	2	1	2	6*
S3	De-energized Energized	1	1	4 [•] 1	4 [°] 2	
S4	De-energized Energized	6	6	3	4	5
S5	De-energized Energized	1	4 2	2	3	
S6	De-energized Energized	1	1	2	4 2	
S7	De-energized Energized	6	6	3	4	5 [°]
S8	De-energized Energized	6	6	4	3	5 [•]
S9	Energized	1	1	2	3	
S10	De-energized Energized	4 [•] 2	4 [°] 2	2	3	
S11	De-energized Energized	1	1	3 1	3	
S18	De-energized Energized	4 2	1	2	3	
TA	De-energized Energized	1	1	2	3	
RK	Energized	1	1	2	3	

* A-B blocked • B blocked ° A blocked

6.4 Switching times E5P4

The values indicated refer to a solenoid valve working with piloting pressure of 100 bar, with mineral oil at a temperature of 50°C, at viscosity of 36 cSt and with PA and BT connections. The energizing and de-energizing times are obtained at the pressure variation which occurs on the lines.

E5				
TIMES (± 10%) [ms]	ENERGIZED		DE-ENERGIZED	
	2 Pos.	3 Pos.	2 Pos.	3 Pos.
CA solenoid	70	40	70	40
CC solenoid	100	70	80	50

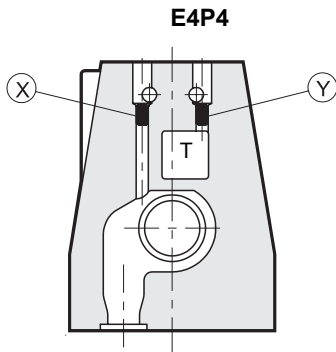


7 - PILOTING AND DRAINAGE

The E*P4 valves are available with piloting and drainage, both internal and external.

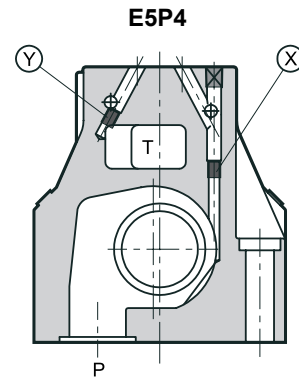
The version with external drainage allows for a higher back pressure on the outlet.

TYPE OF VALVE	Plug assembly		
	X	Y	
E*P4-**	INTERNAL PILOT AND EXTERNAL DRAIN	NO	YES
E*P4-**/I	INTERNAL PILOT AND INTERNAL DRAIN	NO <td>NO</td>	NO
E*P4-**/E	EXTERNAL PILOT AND EXTERNAL DRAIN	YES	YES
E*P4-**/EI	EXTERNAL PILOT AND INTERNAL DRAIN	YES	NO



X: plug M5x6 for external pilot

Y: plug M5x6 for external drain



X: plug M6x8 for external pilot

Y: plug M6x8 for external drain

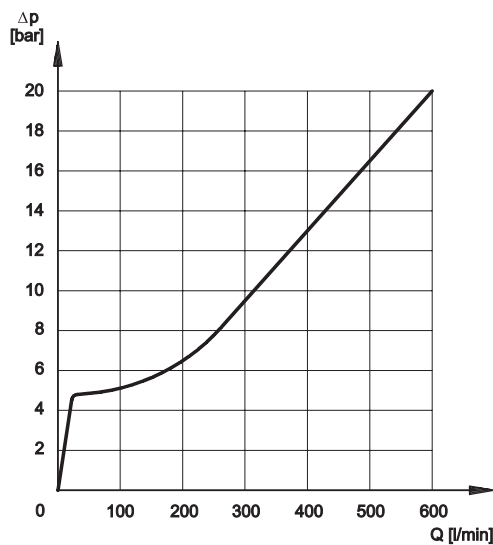
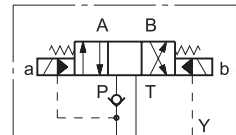
7.1 -Backpressure valve incorporated on line P

(available for E5 valve only)

Valve E5 is available upon request with backpressure valve incorporated on line P. This is necessary to obtain the piloting pressure when the control valve, in the rest position, has the line P connected to the T outlet (spools S2, S4, S7, S8). The cracking pressure is of 5 bar. Add **C3** to the identification code for this request (see par. 1).

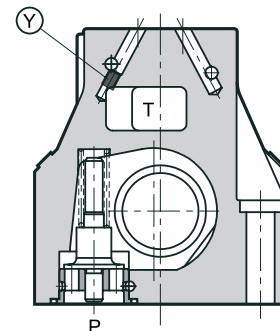
In the C3 version the piloting is always internal.

E5P4/C3



The curve refers to the pressure drop (body part only) with backpressure valve energized to which the pressure drop of the reference spool must be added. (see parag. 5)

E5P4 (with C3 option)



pilot always internal

Y: plug M6x8 for external drain

NOTA: the backpressure valve can't be used as direct check valve because it doesn't assure the seal.



8 - ELECTRICAL FEATURES

8.1 Solenoids

These are essentially made up of two parts: tube and coil. The tube is threaded onto 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 nut, and can be turned 360° on its axis, compatible with the available space.

Note 1: In order to further reduce the emissions, use of type H connectors is recommended. These prevent voltage peaks on opening of the coil supply electrical circuit

VOLTAGE SUPPLY FLUCTUATION	± 10% Vnom
MAX. SWITCH ON FREQUENCY E4 E5	10.000 ins/hr 8.000 ins/hr
DUTY CYCLE	100%
ELECTROMAGNETIC COMPATIBILITY (EMC) EMISSIONS (see note 1) EN 50081-1 IMMUNITIES EN 50082-2	in compliance with 89/336 EEC
LOW VOLTAGE	in compliance with 73/23/EEC 96/68/EEC
Class of protection according to IEC 144 Atmospheric agents Coil insulation Impregnation	IP 65 (see note 2) class H class F

Note 2: The IP65 protection degree is guaranteed only with the connector correctly connected and installed.

8.2 Current and absorbed power for DC solenoid valve

The table shows current and power consumption values relevant to the different coil types for DC.

The rectified current supply takes place by fitting the valve with an alternating current source (50 or 60 Hz), rectified by means of a bridge built-in to the "D" type connectors (see cat. 49 000).

Coils for direct current *VCC (values ± 5%)

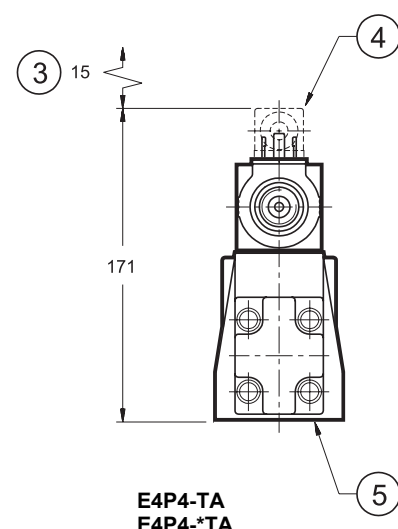
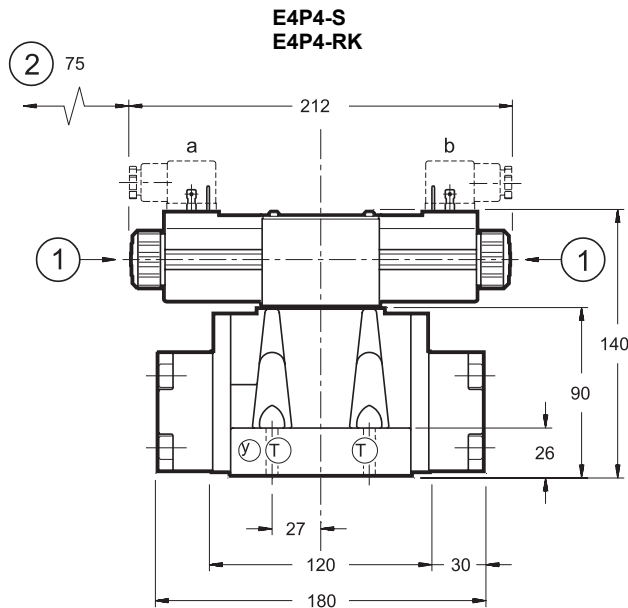
Nominal voltage [V]	Resistance at 20°C [ohm]	Current consumpt. [A]	Power consumpt. [W]	Code
12	4,6	2,6	31,2	1901671
24	17,8	1,35	32,1	1901672
110	390	0,28	30,8	1901674
220	1510	0,15	32	1901675

Coils for alternate current *V-*Hz (values ± 5%)

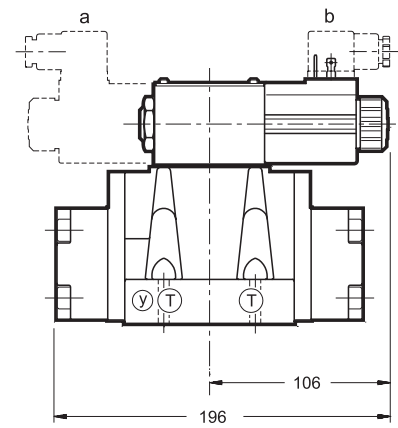
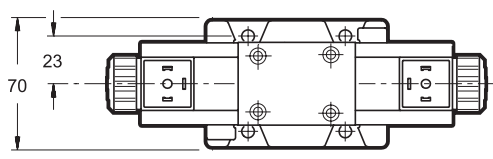
Frequency [Hz]	Nominal voltage [V]	Resistance at 20°C [ohm]	Current consumption at inrush [A]	Current consumption at holding [A]	Power consumption at inrush [VA]	Power consumption at holding [VA]	Code
50	24	0,88	8,7	2,35	209	56,5	1902660
	48	3,2	4,5	1,25	216	60	1902661
	230	80	0,85	0,21	196	49	1902679
50/60	110V-50Hz	17,5	1,9	0,48	209	52,8	1902677
	120V-60Hz	17,5	1,8	0,45	216	54	
	220V-50Hz	70	0,95	0,24	209	52,8	1902677
	240V-60Hz	70	0,95	0,24	209	52,8	
60	110	15	2	0,5	220	55	1902680
	220	60	1	0,26	220	57,2	1902681



8 - E4 OVERALL AND MOUNTING DIMENSIONS

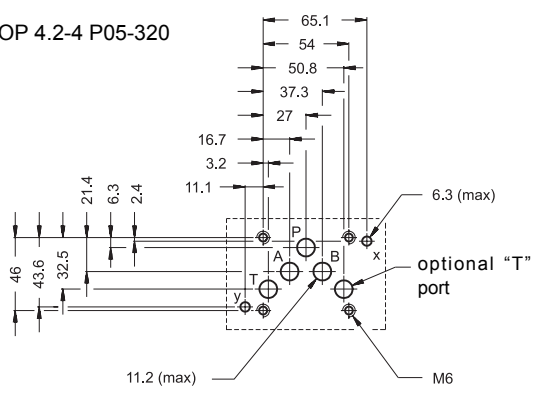


solenoid position configuration TC/*TC



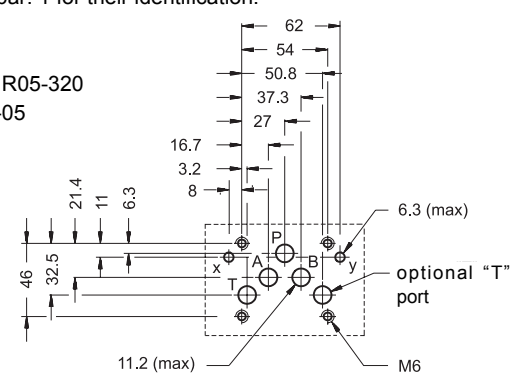
MOUNTING SURFACE (STANDARD)

CETOP 4.2-4 P05-320



Valves with CETOP R05 mounting interface are available upon request. See par. 1 for their identification.

CETOP 4.2-4 R05-320
ISO/CD 4401-05



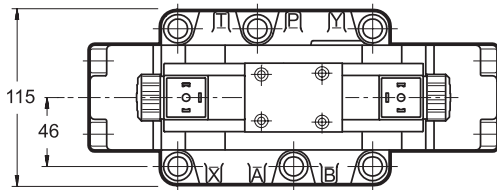
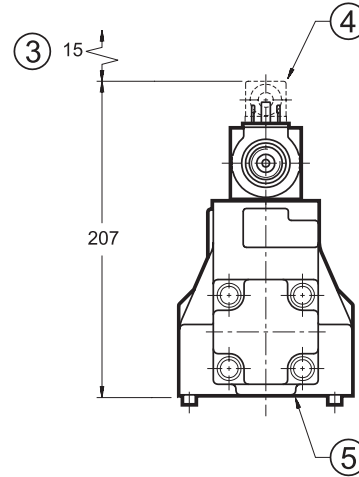
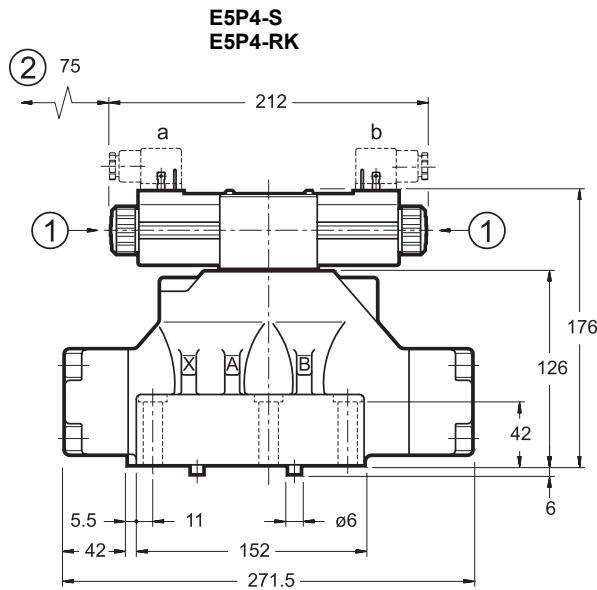
dimensions in mm

Fastening of single valve: 4 bolts M6x35 (see par. 17, Note 5)
Tightening torque: 8 Nm (bolts A 8.8) 14 Nm (bolts A 12.9)
Threads of mounting holes: M6x10
Sealing rings: 5 OR type 2050 2 OR type 2037

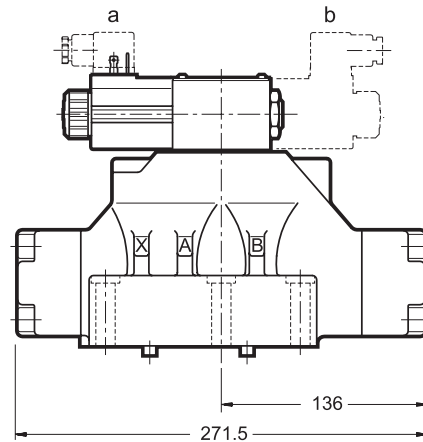
1	Manual override
2	Coil removal space
3	Connector removal space
4	Electric connector to be ordered separately (see cat.49 000)
5	Mounting surface with sealing rings



10 - E5 OVERALL AND MOUNTING DIMENSIONS

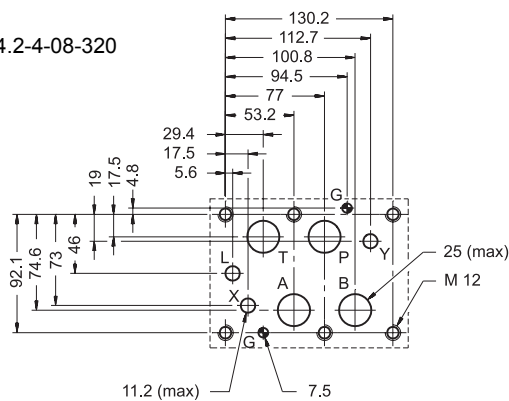


**E5P4-TC
E5P4-TC**



MOUNTING SURFACE

CETOP 4.2-4-08-320



dimensions in mm

Fastening of single valve: 6 bolts M12x60 (see par. 14, Note 5)	1	Manual override
Tightening torque: 69 Nm (bolts A 8.8) 115 Nm (bolts A 12.9)	2	Coil removal space
Threads of mounting holes: M12x20	3	Connector removal space
Sealing rings: 4 OR type 3118 2 OR type 3081	4	Electric connector to be ordered separately (see cat.49 000)
	5	Mounting surface with sealing rings



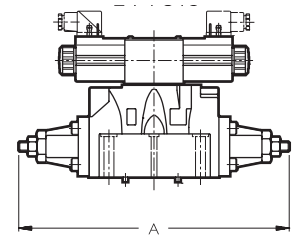
11 - CONTROLS

11.1 Control of the main spool stroke: C

It is possible to introduce special stroke controls in the heads of the hydro-piloted valve so as to vary the maximum spool clearance opening.

This solution allows control of the flow rate from the pump to the actuator and from the actuator to the outlet, obtaining a double adjustable control on the actuator. Add the letter **C** to the identification code to request this device (see par. 1).

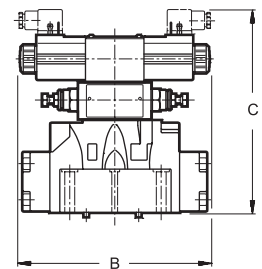
E*P4-S*/C



11.2 Control of the main spool shifting speed: D

By placing a MERS type double flow control valve between the pilot solenoid valve and the hydro-piloted valve, the piloted flow rate can be controlled and therefore the changeover smoothness can be varied. Add the letter **D** to the identification code to request this device (see par. 1).

E*P4-S*/D



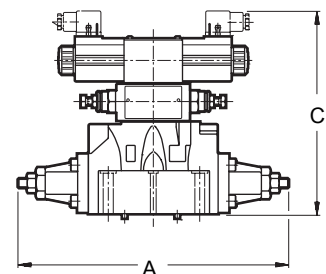
11.3 Subplate with throttle on line P

It is possible to introduce a subplate with a restrictor of $\varnothing 0,8$ on line P between the pilot solenoid valve and the main distributor. Add **PF** to the identification code to request this option (see parag. 1).

11.4 Control of the main spool stroke and shifting speed: G

It is possible to have the valve fitted with both the spool stroke device and the piloting flow rate control device. Add the letter **G** to the identification code to request this solution (see par. 1).

E*P4-S*/G

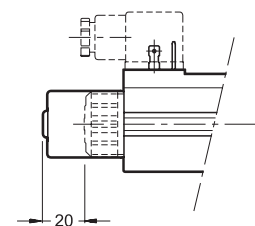


	E4	E5
A	280	401,5
B	212	272
C	211	247

14 - MANUAL OVERRIDE, BOOT PROTECTED: CM

Whenever the solenoid valve installation may involve exposure to atmospheric agents or use in tropical climates, the manual override, boot protection is recommended. Add the suffix **CM** to request this device (see par. 1).

E*P4-*/CM





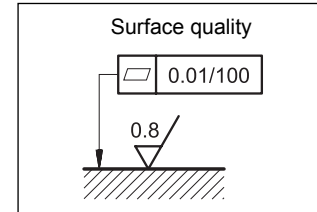
13 - ELECTRIC CONNECTORS

The solenoid valves are never supplied with connector. Connectors must be ordered separately.
For the identification of the connector type to be ordered, please see catalogue 49 000.

14 - INSTALLATION

Configurations with centering and recall springs can be mounted in any position; type RK valves - without springs and with mechanical detent - must be mounted with the longitudinal axis horizontal. Valve fastening takes place by means of screws or tie rods, laying 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.

Note 5: Use of class 12.9 fastening screws is recommended for valves E4, E07, E5 in version H (high pressure).



15 - SUBPLATES (see catalogue 51 000)

	E4	E5
Type with rear ports	PME4-AI5G	
Type with side ports	PME4-AL5G	PME5-AL8G
P, T, A, B, port dimensions	3/4"	1 1/2" BSP
X, Y port dimensions	1/4" BSP	1/4" BSP

	<p>DIPLOMATIC OLEODINAMICA SpA 20025 LEGNANO (MI) - P.le Bozzi, 1 / Via Edison Tel. 0331/472111-472236 - Fax 0331/548328</p>	
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