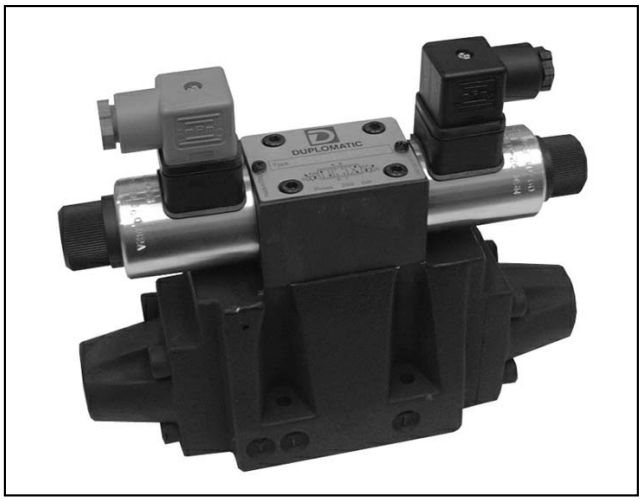
DUPLOMATIC
HYDRAULICS



E4E

PILOT OPERATED DIRECTIONAL CONTROL VALVE WITH ELECTRIC PROPORTIONAL CONTROL

SERIES 51

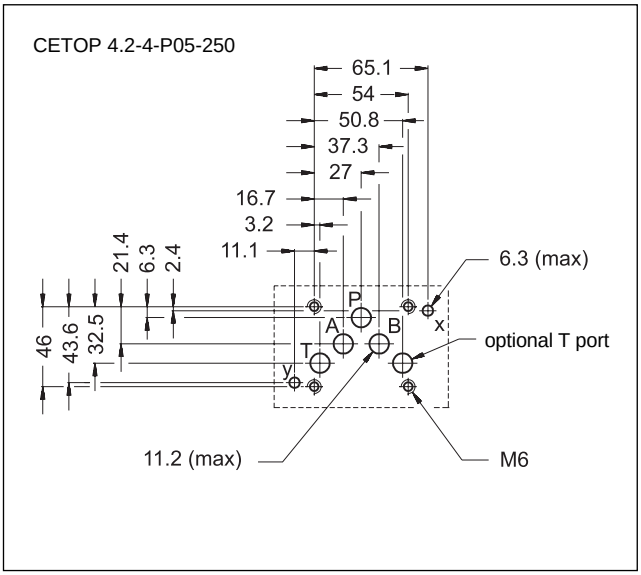
SUBPLATE MOUNTING

CETOP P05

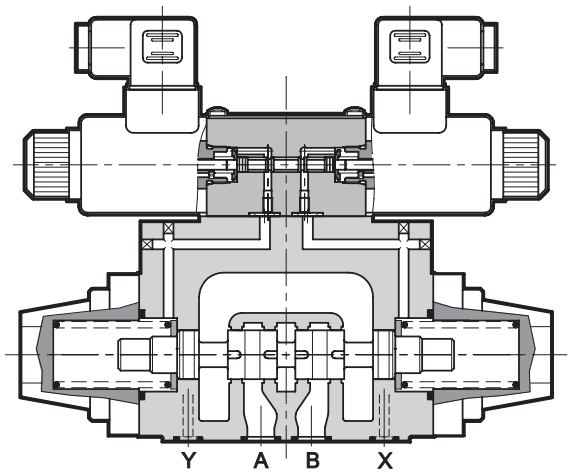
p max **250** bar

Q max (see specification table)

MOUNTING INTERFACE



OPERATING PRINCIPLE



— The E4E valve is a pilot operated directional control valve with electric proportional control and mounting interface in compliance with CETOP standards.

— Valve opening and flow rate can be modulated continuously in proportion to the current supplied to the proportional solenoids of the pilot valve.

— The valve can be controlled directly by a current control supply unit or by means of the relative electronic control units to exploit valve performance to the full (see par. 10).

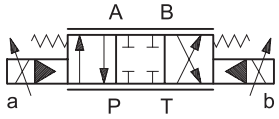
— Valves are available in open loop versions and in three flow rate control ranges up to 100 l/min.

— The valves are normally supplied with internal pilot and external drain. See par. 5 for other combinations.

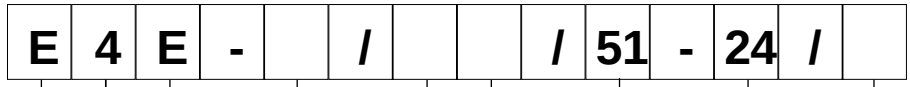
— To ensure correct valve operation, maintain a minimum control pressure of 20 bar and flow rate of 3 l/min.

SPECIFICATIONS (obtained with mineral oil with viscosity of 36 cSt at 50°C in conjunction with the relative electronic control units)		**E4E**
Maximum operating pressure: – P-A-B ports – T port	bar bar	250 see par. 5
Maximum flow (with Δp 10 bar P-T)	l/min	50 - 75 - 100
Step response	see par. 8	
Hysteresis	% Q max	< 8%
Repeatability	% Q max	< ±2%
Electrical characteristics	see par. 7	
Ambient temperature range	°C	–10 ÷ +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 E4E - S* E4E - TA/TC	kg	8,3 7,8

HYDRAULIC SYMBOL (typical)



1 - IDENTIFICATION CODE



Pilot operated directional control valve

Size: CETOP P05

Electric proportional control

Configurations, spool type and controlled flow rate (see table 2)

Piloting: **E**=external pilot (omit for internal pilot)

Drain: **I** =internal drain (omit for external drain)

Series No. (from 50 to 59 sizes and mounting dimensions remain unchanged)

Nominal solenoid voltage 24 V DC

Seal: omit for mineral oils
V = viton for special fluids

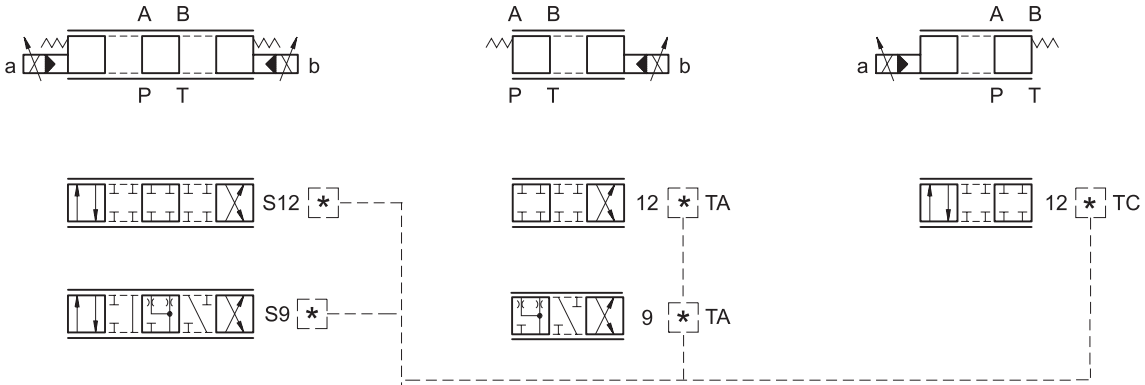
2 - CONFIGURATIONS

Valve configuration depends on the combination of the following elements:
number of proportional solenoids, type of spool, controlled flow rate, number of return springs.

"**S**" configuration:
2 solenoids with spring centering

"**TA**" configuration:
1 solenoid on port B side with return spring in main valve

"**TC**" configuration:
1 solenoid on port A side with return spring in main valve



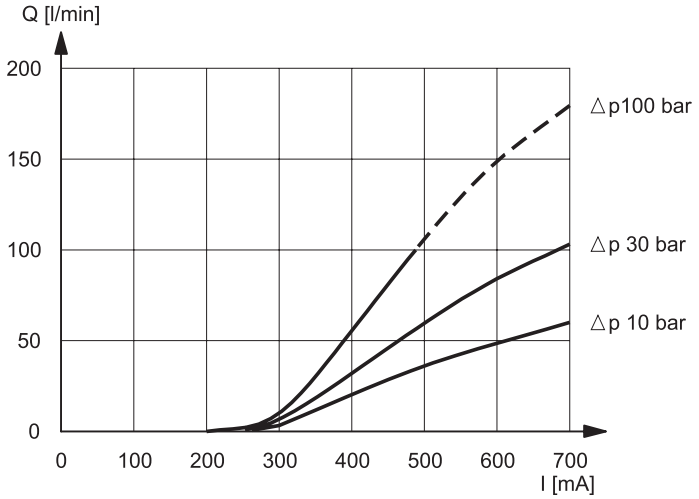
*	Controlled flow with △ p 10 bar P-T
1	50 l/min
2	75 l/min
3	100 l/min

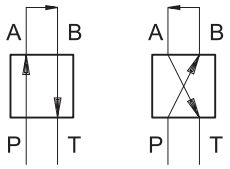
N.B. Spools with differential control areas (ratio 1:2) are available on request.

3 - CHARACTERISTIC CURVES (values measured with viscosity of 36 cSt at 50°C with valves connected to the relative electronic control units)

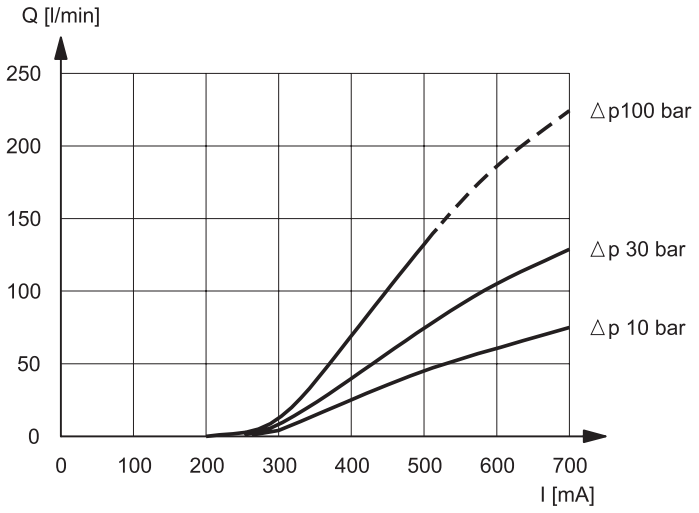
3.1 - Flow control

Typical constant flow rate control curves at Δp according to current supply to solenoid, measured for spool types S12* - 12*TA - 12*TC.
The reference Δp values are measured between ports P and T on the valve.

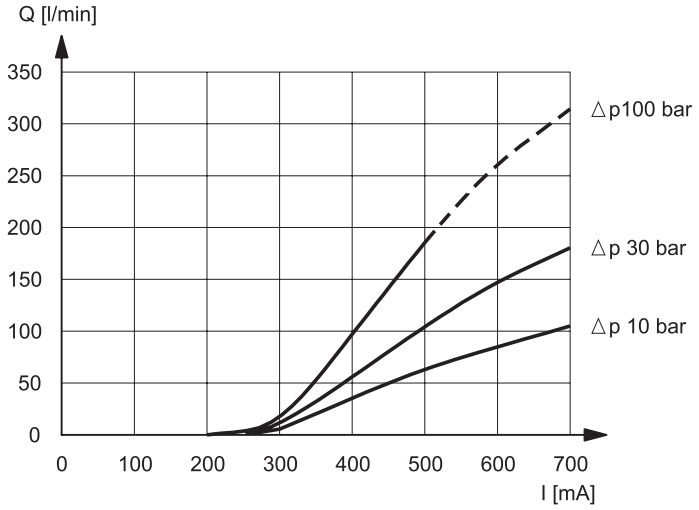




SPOOL TYPE 121

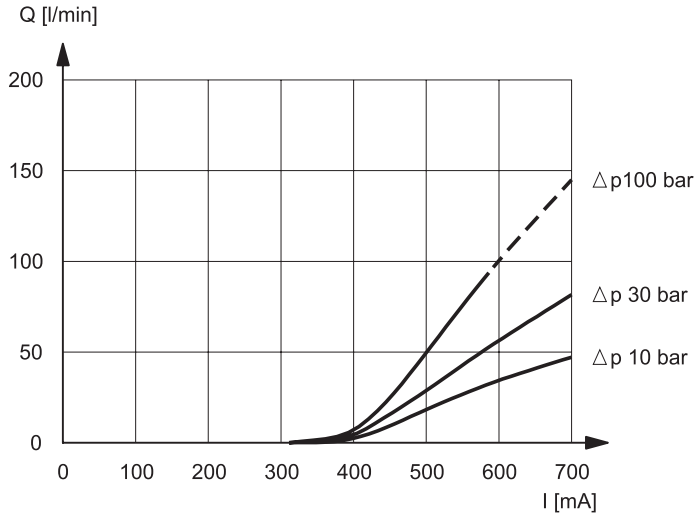


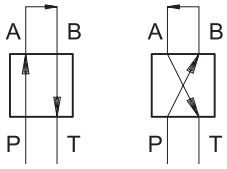
SPOOL TYPE 122



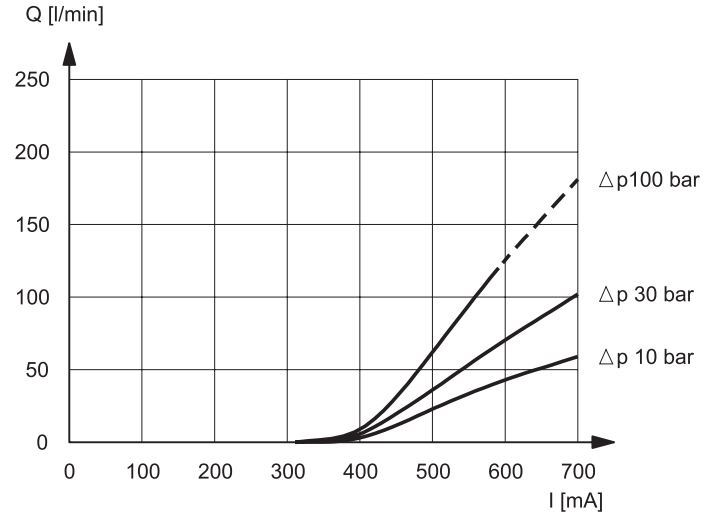
SPOOL TYPE 123

Typical flow rate control curves at constant Δp according to current supply to solenoid, measured for spool type S9*.
The reference Δp values are measured between ports P and T on the valve.

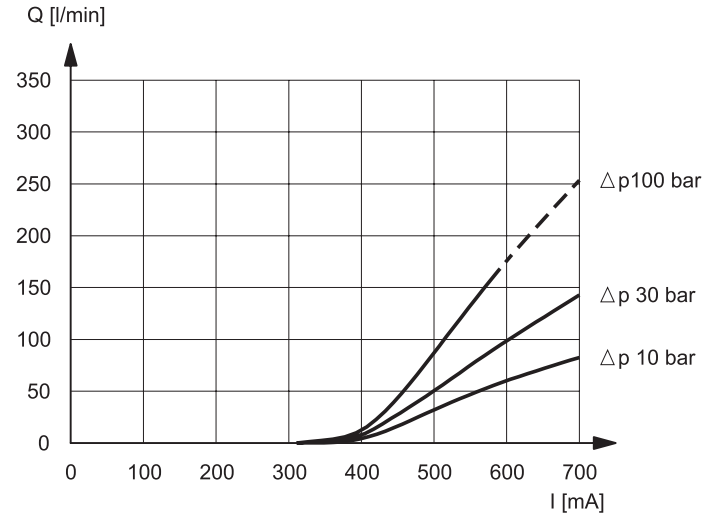




SPOOL TYPE 91



SPOOL TYPE 92



SPOOL TYPE 93

4 - HYDRAULIC FLUIDS

Use mineral oil-based hydraulic fluids with anti-foam and anti-oxidant additives.
For use with other types of fluids (water glycol, phosphate esters and others) consult our technical department.

Operation with fluid temperature exceeding 70°C causes premature deterioration of the quality of the fluid and seals.

The physical and chemical properties of the fluid must be maintained.

5 - PILOTING AND DRAINS

E4E valves are normally supplied with internal pilot and external drain. For special plant requirements other combinations are possible; refer to the table below.

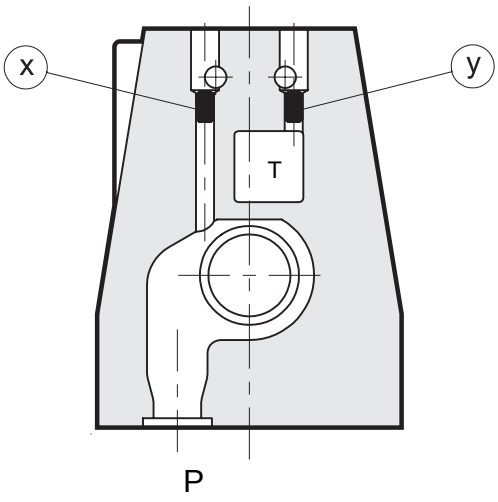
VALVE TYPE		Plug assembly	
		X	**Y**
E4E - **	INTERNAL PILOT AND EXTERNAL DRAIN	NO	YES
E4E - **/I	INTERNAL PILOT AND INTERNAL DRAIN	NO	NO
E4E - **/E	EXTERNAL PILOT AND EXTERNAL DRAIN	YES	YES
E4E - **/EI	EXTERNAL PILOT AND INTERNAL DRAIN	YES	NO

PRESSURE (bar)

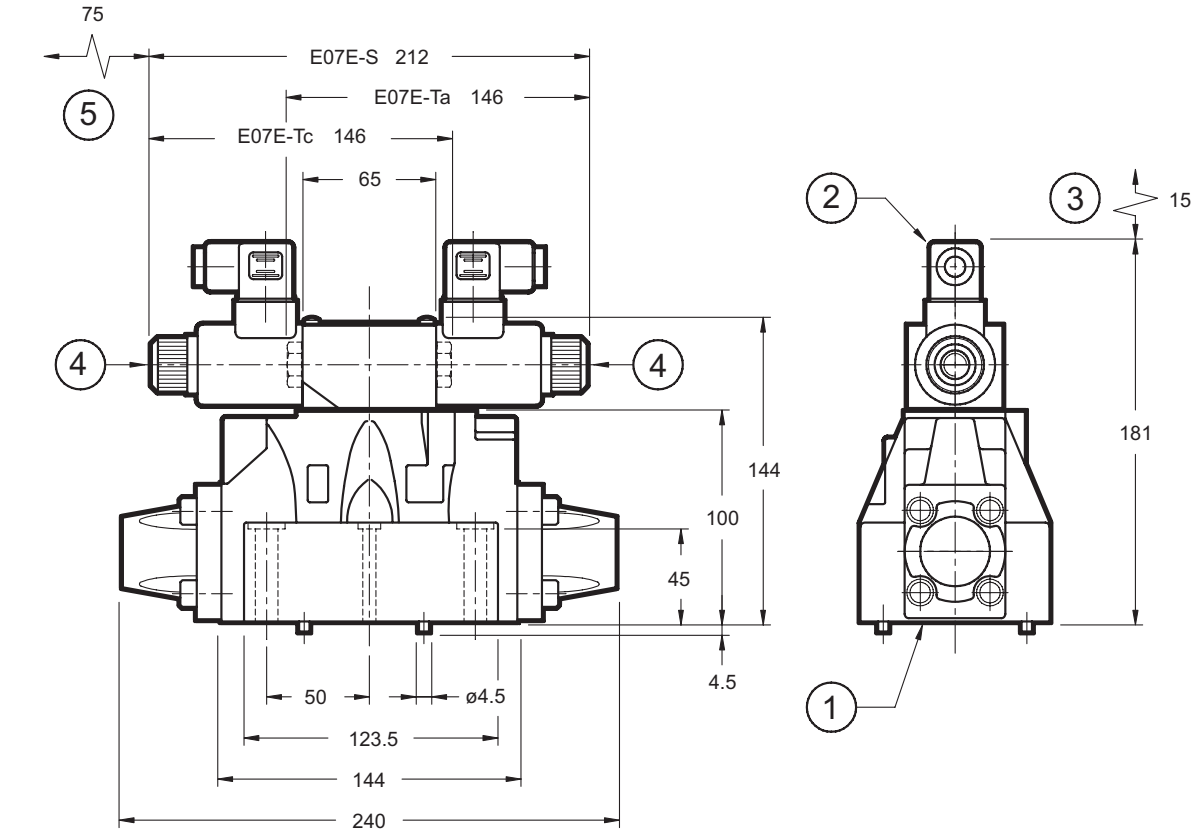
Pressure	MIN	MAX
X line pilot pressure	20	250
Pressure in T line with internal drain	–	2
Pressure in T line with external drain	–	200

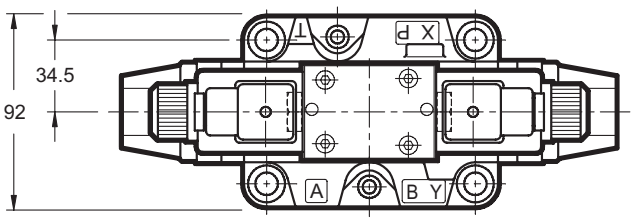
X: plug for external pilot M5x6

Y: plug for external drain M5x6



6 - OVERALL AND MOUNTING DIMENSIONS





dimensions in mm

1	Mounting surface with sealing rings: 5 off OR type 2050 - 2 off OR type 2037
2	DIN 43650 electrical connector
3	Connector removal space
4	Manual emergency control
5	Coil removal space

Fastening bolts: 4 bolts M6x35
Torque: 8 Nm

7 - ELECTRICAL CHARACTERISTICS

Proportional solenoid

The proportional solenoid comprises two parts: tube and coil.

The tube, screwed to the valve body, contains the armature which is designed to maintain friction to a minimum thereby reducing hysteresis.

The coil is mounted on the tube secured by means of a lock nut and can be rotated through 360° depending on installation clearances.

NOMINAL VOLTAGE		V DC	20
COIL RESISTANCE (at 20°C)		Ω	18,5
CURRENT	**nominal** **maximum**	A	0,7 0,82
DUTY CYCLE		100%	
ELECTROMAGNETIC COMPATIBILITY (EMC) **- EMISSIONS** EN 50081-1 **- IMMUNITY** EN 50082-2		in compliance with 89/336 EEC	
PROTECTION TO ATMOSPHERIC AGENTS (according to IEC 144 standards)		IP 65	

8 - STEP RESPONSE (measured with mineral oil with viscosity of 36 cSt at 50°C in conjunction with the relative electronic control units)

Step response is the time taken for the valve to reach 90% of the set pressure value following a step change of reference signal.

The table shows typical response times with valve flow rate of 75 l/min and Δp=10 bar P-T.

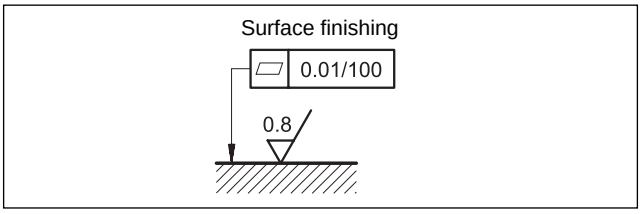
Reference signal step	0→100%	100%→0	25→75%	75→25%	+90 → –90%
Step response [ms]					
E4E-S*	60	50	50	60	95
E4E-*T*					–

9 - INSTALLATION

E4E valves can be installed in any position without impairing correct operation.

Ensure that there is no air in the hydraulic circuit.

Valves are fixed by means of screws or tie rods on a flat surface with planarity and roughness equal to or better than those indicated in the relative symbols. If minimum values are not observed fluid can easily leak between the valve and support surface.



10 - ELECTRONIC CONTROL UNITS

E4E - 12 * TA (TC)

EPC-111	plug version		(see cat. 89 110)
EPA-M111	rail mounting	DIN EN 50022	(see cat. 89 220)
UEIK-11	Eurocard format		(see cat. 89 300)

E4E - S *

EPA-M211	rail mounting	DIN EN 50022	(see cat. 89 220)
UEIK-21	Eurocard format		(see cat. 89 320)

11 - SUBPLATES (see 51 000)

PME4-AI5G ports on rear	
PME4-AL5G side ports	
Port dimensions:	P, T, A, B: 3/4" BSP X, Y: 1/4" BSP

DUPLOMATIC HYDRAULICS

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