

DIRECTIONAL CONTROL VALVES CETOP 5/NG10 **ARON**[®]

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CETOP 5/NG10

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INTRODUCTION

The ARON directional control valves NG10 designed for subplate mounting with an interface in accordance with UNI ISO 4401 - 05 - 04 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-05), and can be used in all fields on account of their excellent capacity and pressure specifications.

The use of solenoids with wet armatures means that the construction is extremely functional and safe completely dispensing with need for dynamic seals. The solenoid dust cover is screwed directly onto the valve casing whilst the coil is kept in position by a ring nut.

Great care has been taken in the design and the production of the ducts and the improvement of the spools has allowed relatively high flow rates to be accommodated with minimal pressure drops (Δp). The operation of the directional valves can be electrical, pneumatic, oleodynamic, mechanical or lever operated .

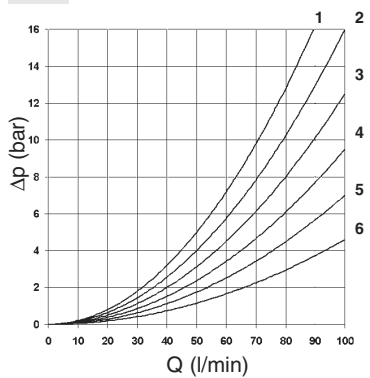
The centring position is achieved by means of calibrated length springs which, once the action of impulse is over, return the spool to the centre or end travel position.

The solenoids constructed with protection class in accordance with DIN 40050 standards are available in either direct current (IP65) or alternating current (IP66) with different voltage and frequencies.

All types of electrical controls can be fitted, on request, with different types of manual emergency controls. The electrical supply takes place through connectors meeting DIN 43650 ISO 4400 standards; connectors are also available with built in rectifier or pilot lights.

The valves are designed for use with DIN 51524 standard hydraulic mineral oils and it is recommended that filters should be fitted to ensure a maximum contamination level of class 10 in accordance with NAS 1638, $\beta_{25} \geq 75$.

PRESSURE DROPS



The diagram at the side show the pressure drop curves for spools during normal usage. The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C; the tests have been carried out at a fluid

temperature of 40°C.

For higher flow rates than those in the diagram, the losses will be those expressed by the following formula:

$$\Delta p_1 = \Delta p \times (Q_1/Q)^2$$

where Δp will be the value for the losses for a specific flow rate Q which can be obtained from the diagram, Δp_1 will be the value of the losses for the flow rate Q₁ that is used.

Spool type	Connections				
	P → A	P → B	A → T	B → T	P → T
01	2	2	5	5	
02	3	3	6	6	3
03	2	2	6	6	
04	3	3	4	4	1
05	3	3	5	5	
06	2	2	5	5	
66	2	2	5	5	
07		1	5	5	
10	3	3	5	5	
11	4			5	
	Curve No.				

Spool type	Connections				
	P → A	P → B	A → T	B → T	P → T
22		4	5		
14	3	3	6	6	2
15	2	2	4	5	
16	2	2	4	5	
17	3	3			
19	3	3	4	5	
20	3	3	4	5	
21	3	3			
28	3	3	6	6	2
	Curve No.				

DIRECTIONAL CONTROL VALVES CETOP 5/NG10

1

ORDERING CODE

AD	Directional valve
5	CETOP 5/NG10
*	Type of operator (tab.1)
**	Spools (see tables on page I•30)
*	Mounting type (tab.2)
*	Voltage (tab.3)
**	Variants (tab.4)
2	Serial No.

**TAB.1
TYPE OF OPERATOR**

E	Electrical
D	Direct mechanical
O	Oleo-pneumatic
L	Lever

**TAB.2
MOUNTING**

STANDARD	
C	
D	
E	
F	
SPECIALS (WITH PRICE INCREASING)	
G	
H	
I	
L	
M	

TAB.3 - "E" TYPE OPERATION

AC VOLTAGE	
A	24V/50Hz
B	48V/50Hz*
J	115V/50Hz - 120V/60Hz
Y	230V/50Hz - 240V/60Hz
E	240V/50Hz*
F	24V/60Hz*
DC VOLTAGE	
L	12V
M	24V
N	48V*
P	110V*
Z	102V*
X	205V*
K	Without AC coils
W	Without DC coils
Z	other controls

115Vac/50Hz 120Vac/60Hz with rectifier
230Vac/50Hz 240Vac/60Hz with rectifier

Voltage codes are not stamped on the plate, their are readable on the coils.

* Special voltage

- Mounting type **D** is only for valves with detent
- In case of mounting **D** with detent a maximum supply time of 2 sec is needed (only for AC coils).
- The springs for the version with detent (mounting **D**) are different from those for standard versions.

TAB.4 - VARIANTS

VARIANT	CODE	◆	PAGE
No variant	00		
Viton	V1		
Emergency button	E1		I•35
Pilot light	X1		I•19
Rectifier	R1		I•19
Preset for microswitch - (E/F/G/H only) see below note ◇	M1	◆	I•31- I•34
Rotary emergency button	P1		I•35
Solenoid valve without connectors	S1		
Marine version (AD.5.O..)	H1	◆	
Cable gland "PG 11"	C1		I•19
Emergency + Viton	EV		
Emergency + Pilot light	EX		
Viton + Pilot light	VX		
Emergency + Viton + Pilot light	A1		
Emergency + Rectifier	ER		
Viton + Rectifier	VR		
Viton + Rectifier + Emergency	A2		
Pilot light + Rectifier	XR		I•19
Pilot light + Rectifier + Emergency	A3		
Pilot light + Rectifier + Emergency + Viton	A4		
Preset for microswitch + Viton	MV	◆	
Spool movement speed control (VDC only) with ø 0.5 mm diameter orifice	J5	◆	I•32
Spool movement speed control (VDC only) with ø 0.6 mm diameter orifice	J6	◆	I•32
Spool movement speed control (VDC only) with ø 0.7 mm diameter orifice	J7	◆	I•32
Spool movement speed control (VDC only) with ø 0.8 mm diameter orifice	J8	◆	I•32
External draining solenoid (electrically operated only)	Q5	◆	I•32
Microswitch+ Detent (for lever operation)	MD	◆	
Detent for lever control	D1	◆	

◇ = Maximum counter-pressure on T port: 4 bar

◆ = Variant codes stamped on the plate

DIRECTIONAL CONTROL VALVES CETOP 5/NG10

1

TWO SOLENOIDS, SPRING CENTRED "C" MOUNTING			
Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
05		+	
66		+	
06		+	
07*		+	
08*		+	
10*		+	
22*		+	
11*		+	
12*		+	
13*		+	
14*		-	
28*		-	

ONE SOLENOID, SIDE A "E" MOUNTING			
Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
05		+	
66		+	
06		+	
08*		+	
10*		+	
12*		+	
15		-	
16		+	
17		+	
14*		-	
28*		-	

STANDARD SPOOLS

(*) Spool with price increasing

• With spools 15 / 16 / 17 only the mounting E / F are possible

• 19 / 20 / 21 spool not planned for variant J*

• For lever operated the spools used are different.

Available spools for this kind of valve are: 01 / 02 / 03 / 04 / 05 / 06 / 66 / 07 / 22 / 13 / 15 / 16 / 17

ONE SOLENOID, SIDE B "F" MOUNTING

Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
05		+	
66		+	
06		+	
08*		+	
10*		+	
22*		+	
12*		+	
13*		+	
07*		+	
15		-	
16		+	
17		+	
14*		-	
28*		-	

TWO SOLENOIDS "D" MOUNTING

Spool type		Covering	Transient position
19*		-	
20*		+	
21*		+	

AD.5.E... SOLENOID OPERATED VALVES CETOP 5/NG10

1

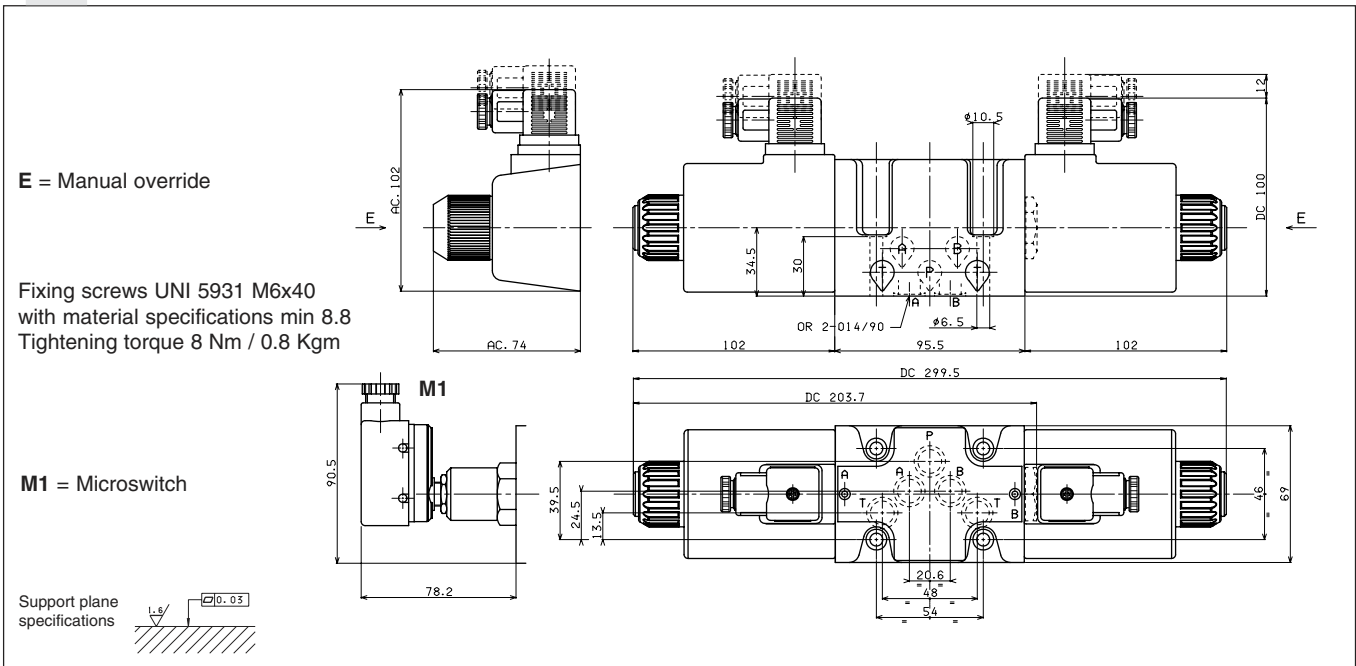


A max. counter-pressure of 4 bar at T is permitted for the variant with a microswitch (M1).

Max. pressure ports P/A/B	350 bar
Max. pressure port T (DC coil) see note (*)	250 bar
Max. pressure port T (AC coil)	160 bar
Max. flow	100 l/min
Max. excitation frequency	3 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter β ₂₅ ≥ 75
Weight (with one DC solenoid)	4 Kg
Weight (with two DC solenoids)	5,1 Kg
Weight (with one AC solenoid)	3,5 Kg
Weight (with two AC solenoids)	4,3 Kg

(*) Pressure dynamic allowed for 2 millions of cycles.

OVERALL DIMENSIONS



LIMITS OF USE

The tests have been carried out with solenoids at operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 40°C. The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40°C.

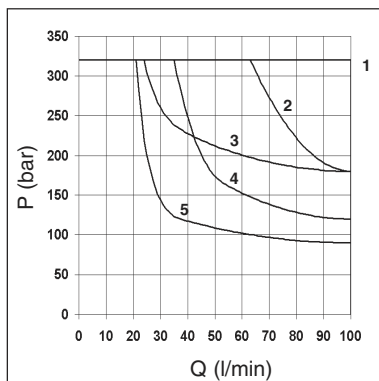
The values in the diagram refer to tests carried out with the oil flow in two directions simultaneously T = 2 bar (e.g. from P to A and the same time B to P).

In the cases where valves 4/2 and 4/3 were used with the flow in one direction only, the limits of use could have variations which may even be negative. Rest time: the values are indicative and depend on the following parameters: hydraulic circuit, fluid used and variations in hydraulic scales (pressure P, flow Q, temperature T).

Direct current : Energizing 60 ÷ 95 ms.
De-energizing 25 ÷ 70 ms.

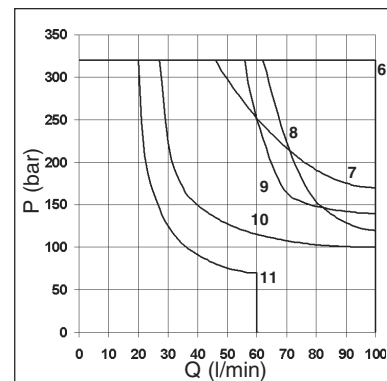
Alternating current: Energizing 12 ÷ 30 ms.
De-energizing 10 ÷ 55 ms.

DIRECT CURRENT SOLENOIDS (DC)



Spool type	Solenoids	
	DC	AC
01	1	8
02	1	6
03	2	7
04	4	10
05	1	6
06 - 66	3	9
14-28	5	11
15	3	10
16	1	6
Curves		

ALTERNATING CURRENT SOLENOIDS (AC)



AD.5.E...J* VALVES WITH SPOOL MOVEMENT SPEED CONTROL VARIANT J*

1

Valves type AD.5.E... with spool movement speed control variant J*

These ON-OFF type valves are used when a lower spool movement speed than usual for conventional solenoid valves is required to prevent impacts which could adversely affect the smooth running of the system. The system consists of reducing the transfer section for the fluid from one solenoid to the other by means of calibrated orifice.

• This version can only be used with a direct current (DC) and also involves a **reduction in the limits of use so that we suggest to always test the valve in your application.**

- To order AD.5.J* version valves, specify the orifices code.
- The operation is linked to a minimum counter-pressure on the T line (1 bar min.)
- The switching time referred to the spool travel detected by a LVDT transducer can vary for the NG10 valve a minimum of 200 to a maximum of 400 ms depending on 5 fundamental variables:

- 1) Diameter of the calibrated orifice (see table)
- 2) Hydraulic power for clearance referring to flow and pressure values through the valve
- 3) Spool type
- 4) Oil viscosity and temperature
- 5) Counter-pressure at T line

• **Possible mounting: C / E / F / G / H**

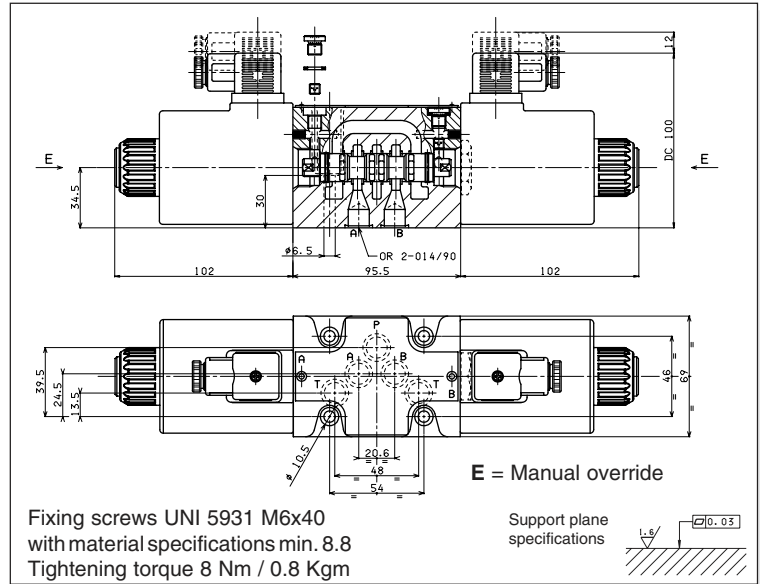
• **19 / 20 / 21 spools not planned for variant J***

CALIBRATED ORIFICE AVAILABLE		
ø (mm)	M6x6	Code
0.5	M89.10.0031	J5
0.6	M89.10.0026	J6
0.7	M89.10.0032	J7
0.8	M89.10.0033	J8

EAD5E...J\$ - 00/2000/e

Max. pressure ports P/A/B	320 bar
Max. pressure port T - see note (*)	250 bar
Max. flow	100 l/min
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Weight with one DC solenoid	3,6 Kg
Weight with two DC solenoids	4,5 Kg

(*) Pressure dynamic allowed for 2 millions of cycles.



AD.5.E...Q5 VALVES WITH EXTERNAL DRAINING SOLENOID - VARIANT Q5

Valves type AD.5.E... variant Q5 with external draining solenoid

This involves valves with solenoid drainage chambers separated by line T in the CETOP 5 interface distinguished by the letter L. This solution makes it possible to operate with a maximum counter-pressure at T up to 320 bar using only 12.9 material fixing screws to ensure the maximum safety of the solenoid valve fixing and use of an additional drain. This version can be used for direct current (DC) and alternating current (AC), but involves a reduction in the limits of usage depending on the pressure at T.

• **Mounting possible: C / D / E / F / G / H / I / L / M**

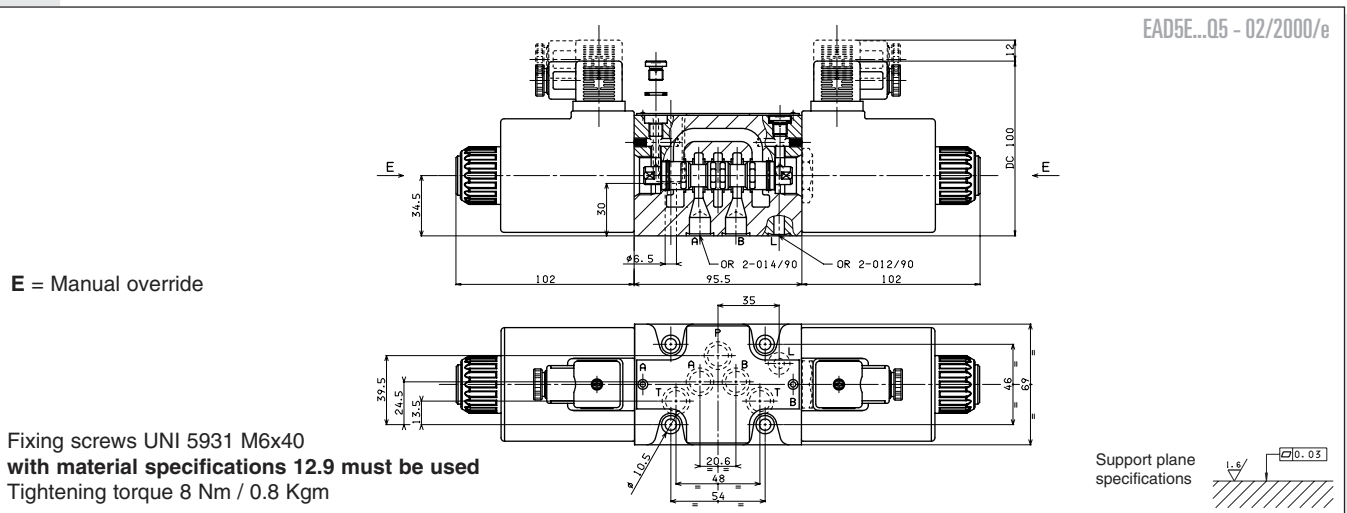
• **For subplate see BSH.5.31..**

Max. pressure ports P/A/B/T	320 bar
Max. pressure port L (DC coils) see note (*)	250 bar
Max. pressure port L (AC coils)	160 bar
Max. flow	100 l/min
Max. excitation frequency	2 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Weight with one DC solenoid	3,6 Kg
Weight with two DC solenoids	4,5 Kg
Weight with one AC solenoid	3,5 Kg
Weight with two AC solenoids	4,3 Kg

(*) Pressure dynamic allowed for 2 millions of cycles.

OVERALL DIMENSIONS

EAD5E...Q5 - 02/2000/e



ADP. 5.E... DIRECTIONAL CONTROL CETOP 5/NG10

HIGH PERFORMANCES SOLENOID OPERATED VALVES



ADP.5.E...

"D19" DC SOLENOIDS	CH. I PAGE 38
STANDARD CONNECTORS	CH. I PAGE 19

The ARON NG10 directional control valves are designed for subplate mounting with an interface in accordance with UNI ISO 4401 - 05 - 04 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-05). The use of solenoids with wet armatures allows an extremely safe construction completely dispensing with the need for dynamic seal. The solenoid tube is screwed directly onto the valve casing whilst the coil is kept in position by a ring nut. Great care has been taken over the design and production of the ducts and the improvement of the spools allows relatively high flow rates to be accommodated for its size with minimal pressure drops (Δp). The operation of the directional valve is electrical. The centring is achieved by means of calibrated length springs which, once the impulse is over, immediately reposition the spool in the neutral position. The solenoids, constructed with a protection class of IP66 in accordance with BS 5490 standards, are available in direct current form and different voltage. The electrical controls are equipped with an emergency manual control inserted in the tube.

The ADP.5.E.. valve has certain design features which allow it to "manage" a hydraulic power equal to $Q = 120\text{ l/min}$ with a $P = 320\text{ bar}$, maintaining a considerable safety margin. These features can be summarized as follows:

- Solenoid D19 with an optimum ratio between the power absorbed (42W) and the magnetic force
- Diameter of the spool 18 mm, with carefully designed geometry improved to compensate for the flow forces
- Compact graphite cast iron valve casing with high mechanical resistance
- Different springs, improved according to the features of the spool

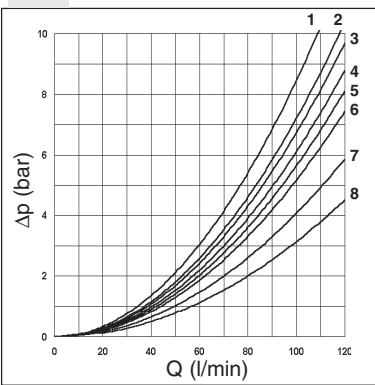
The electrical supply connectors meet DIN 43650 ISO 4400 standards; connectors are also available with built in rectifiers or pilot lights.

The recommended fluids are hydraulic mineral based oils in accordance with DIN 51524 and it is recommended that filters should be fitted to ensure a maximum contamination level of class 10 in accordance with NAS 1638, $\beta_{25} \geq 75$.

For other fluids please contact our Technical DPT.

• **The solenoids are in DC voltage only**

PRESSURE DROPS



The diagram at the side shows the pressure drop curves for spools during normal usage. The fluid used is a mineral oil with a viscosity of $46\text{ mm}^2/\text{s}$ at 40°C ; the tests have been carried out at a fluid temperature of 40°C . For higher flow rates than those in the diagram, the losses will be those expressed by the following formula:

$$\Delta p_1 = \Delta p \times (Q_1/Q)^2$$

where Δp will be the value for the losses for a specific flow rate Q which can be obtained from the diagram, Δp_1 will be the value of the losses for the flow rate Q_1 that is used.

Spool type	Connections				
	P → A	P → B	A → T	B → T	P → T
01	4	4	7	7	
02	6	6	8	8	7
03	3	3	8	8	
04	4	4	2	2	3
05	6	6	6	6	
66	4	4	8	7	
06	4	4	7	8	
14	6	4	8	6	2
15-19	2	2	5	5	
16-20	1	1	2	2	
28	4	6	6	8	2

Curve No.

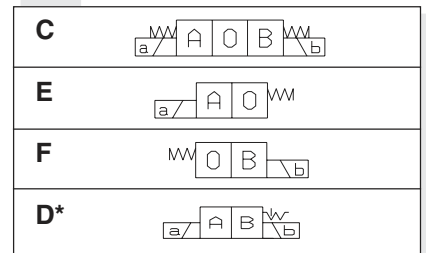
ORDERING CODE

ADP	High performances directional control valve
5	CETOP 5/NG10
E	Electrical operator
**	Spools (Table next page)
*	Mounting (table 1)
*	Voltage (table 2)
**	Variants (table 3)
1	Serial No.

TAB.3 - VARIANTS

VARIANTS	CODE
No variant	00
Viton	V1
Pilot light	X1
Rectifier	R1
Rotary emergency button	P1
Solenoid valve without connectors	S1
Cable gland "PG 11"	C1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
Adjustable spool movement speed control	Q4
With solenoid chamber external drainage (Y)	Q5

TAB.1 - MOUNTING



(*) Valve with detent

TAB.2 - SOLENOID D19 (42 W)

DC VOLTAGE	
L	12V
M	24V
N	48V*
P	110V*
Z	102V*
X	205V*
W	Without DC coils

115Vac/50Hz
120Vac/60Hz
with rectifier

230Vac/50Hz
240Vac/60Hz
with rectifier

Voltage codes are not stamped on the plate, they are readable on the coils.

* Special voltage

STANDARD SPOOLS

* SPOOLS WITH PRICE INCREASING

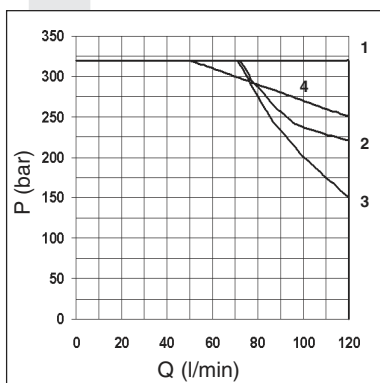
TWO SOLENOIDS, SPRING CENTRED "C MOUNTING"			
Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
05		-	
66		-	
06		-	
14*		-	
28*		-	

TWO SOLENOIDS "D MOUNTING"			
Spool type		Covering	Transient position
19*		-	
20*		+	

ONE SOLENOID, SIDE A "E MOUNTING"			
Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
05		-	
66		-	
06		-	
14*		-	
15		-	
16		+	
28*		-	

ONE SOLENOID, SIDE B "F MOUNTING"			
Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
05		-	
66		-	
06		-	
14*		-	
15		-	
16		+	
28*		-	

LIMITS OF USE



Spool type	n° curves
01	1
02	1
03	2
04	1
05	1
66	1
06	1
14	3
15	1
16	1
28	3
19	4
20	4

The tests have been carried out with solenoids at operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 50°C.

The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40°C.

The values in the diagram refer to tests carried out with the oil flow in two directions simultaneously (e.g. from P to A and at the same time B to T).

In the cases where valves 4/2 and 4/3 were used with the flow in one direction only, the limits of use could have variations which may even be negative.

The tests were carried out with a counter-pressure of 2 bar at T.

ADP.5.E. HIGH PERFORMANCES SOLENOID OPERATED VALVE CETOP 5/NG10



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ADP.5.E... Q4 variant - These ON-OFF type valves are used when a lower spool movement speed is required than it is generally available with a conventional solenoid valve in order to avoid those shocks which might otherwise compromise proper system operation. This is obtained by forcing the fluid to pass through the gap which exists between the screw thread and the M8x1 tapped thread, restricting in this way the transfer cross section between the 2 solenoid chambers. Using this variant may entail a reduction in the operational limits according to the spool used, up to the complete blocking of the change over itself. The valve operation depends on the presence of a minimum back pressure on the T line (min. 1 bar). The change over time referred to the spool stroke depends on 4 main variables:

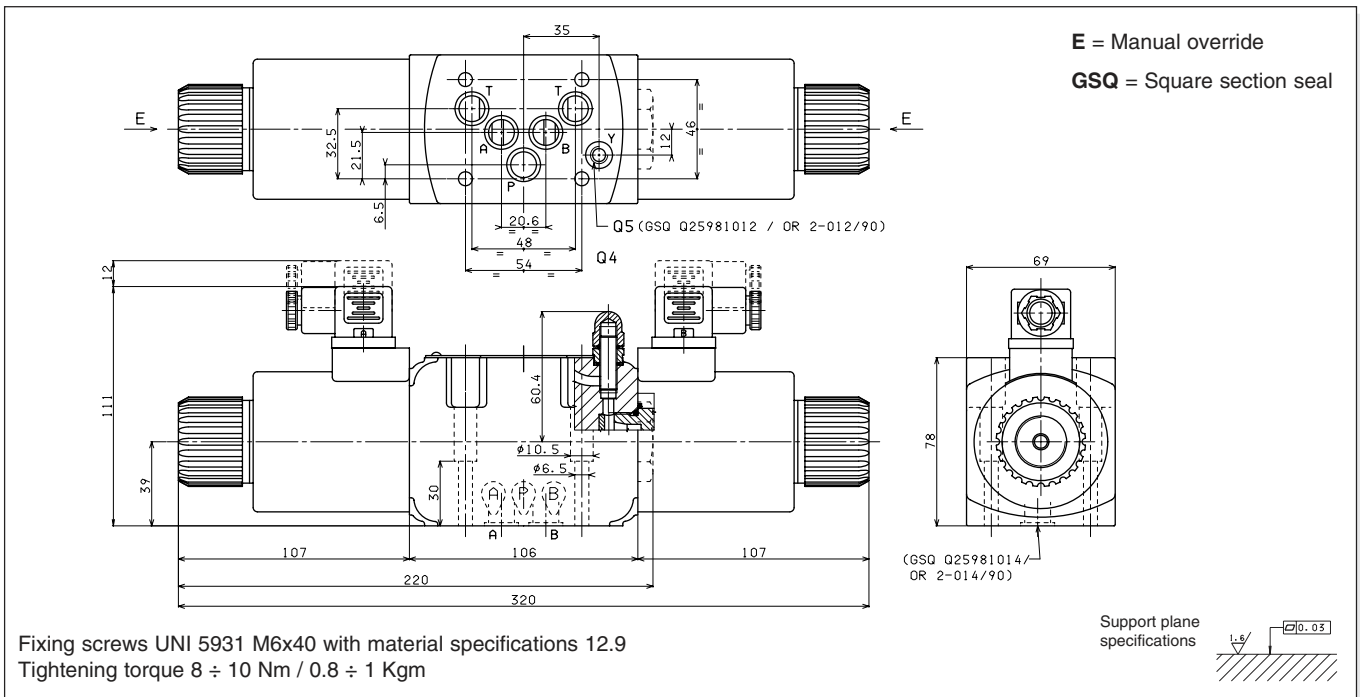
- Applicable hydraulic power, related to the flow rate and pressure drop across the valve;
- Spool type (system configuration);
- Oil viscosity and temperature;
- Back pressure on T.

Max. operating pressure: ports P/A/B	350 bar
Max. operating pressure: port T (*)	250 bar
Max. flow	120 l/min
Max. excitation frequency	3 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter β ₂₅ ≥ 75
Weight with one DC solenoid	5 Kg
Weight with two DC solenoids	6,5 Kg

(*) Pressure dynamic allowed for 2 millions of cycles

Pressure on port T valid in case Y is blocked (no external drainage). Normally the external drained is blocked with a plug S.T.E.I M6x6 UNI 5923

ADP.5.E... Q5 variant - These are valves with solenoid chambers drainage separated from the T line, obtained on CETOP RO5 interface and characterized by the letter Y. This solution allows operation with up to 320 bar max. back pressure on the T line while using only 12.9 material fixing screws to ensure maximum solenoid valve mounting safety and supplementary drainage.

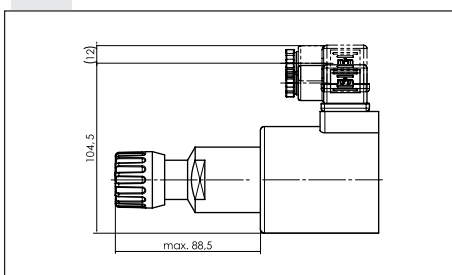


"D19" DC SOLENOIDS



Type of protection (in relation to the connector used)	IP 66
Number of cycle	18.000/h
Supply tolerance	±10%
Ambient temperature	-54°C ÷ 60°C
Duty cycle	100% ED
Max static pressure	210 bar
Insulation class	H
Weight	1,63 Kg

P1 ROTARY EMERGENCY



VOLTAGE (V)	MAX WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RATED POWER (W)	RESISTANCE AT 20°C (OHM) ±10%
12V	105°C	42	3.43
24V	105°C	42	13.71
48V*	105°C	42	55
102V*	105°C	42	248
110V*	105°C	42	288
205V*	105°C	42	1000

* Special voltage

ETD19 - 03/2000/e

AD.5.L... LEVER OPERATED TYPE VALVES CETOP 5/NG10



Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	100 l/min
Lever angle	2 x 15°
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	4,7 Kg
Weight with M1 variant	5,35 Kg

• Possible mounting:
C / E / F

• There is no **D** type mounting

• The variant **D1** specifies the detent (mechanical connection) for lever operation

• The springs for the version with detent (variant **D1**) are different from those for standard versions.

• Completely different spools are used for these (lever operated) valves than for all other types of operation (e.g. electrical, mechanical, pneumatic operation,)

• Available spools: 01 / 02 / 03 / 04 / 05 / 06 / 66 / 07 / 22 / 13 / 15 / 16 / 17 (for hydraulic symbols see page 1•30)

• Available on request NATIONAL AM1107 type microswitch

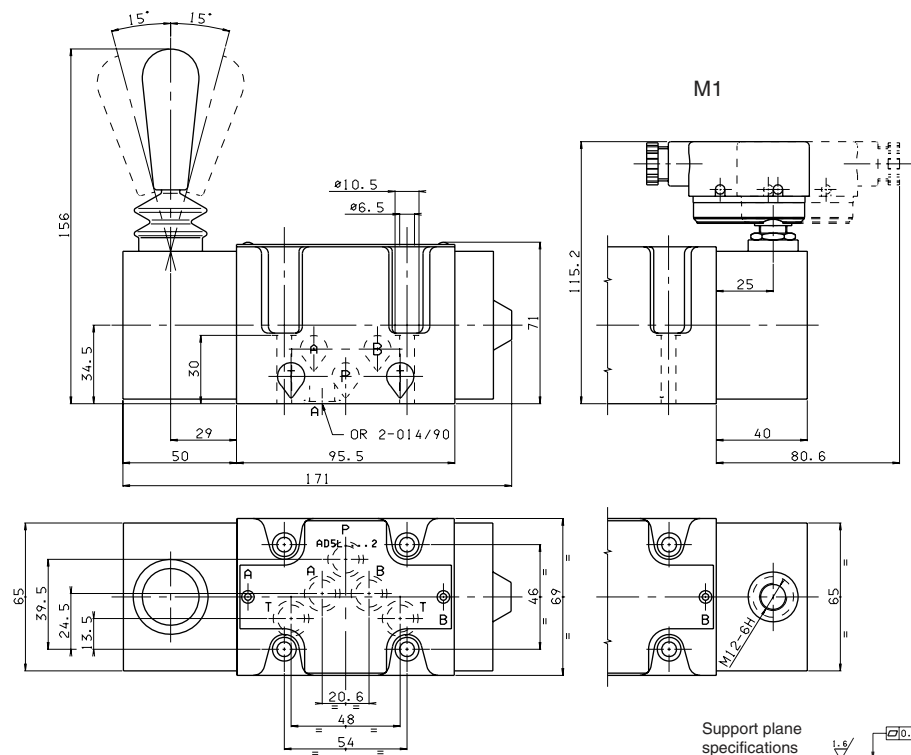
AD.5.L...

ORDERING CODE CH. I PAGE 29

STANDARD SPOOLS CH. I PAGE 30

OVERALL DIMENSIONS

M1 = Microswitch



Fixing screws UNI 5931 M6x40
with material specifications min. 8.8
Tightening torque 8 Nm / 0.8 Kgm

Support plane
specifications

AD.5.O... OLEO-PNEUMATIC OPERATION TYPE VALVES CETOP 5/NG10

1

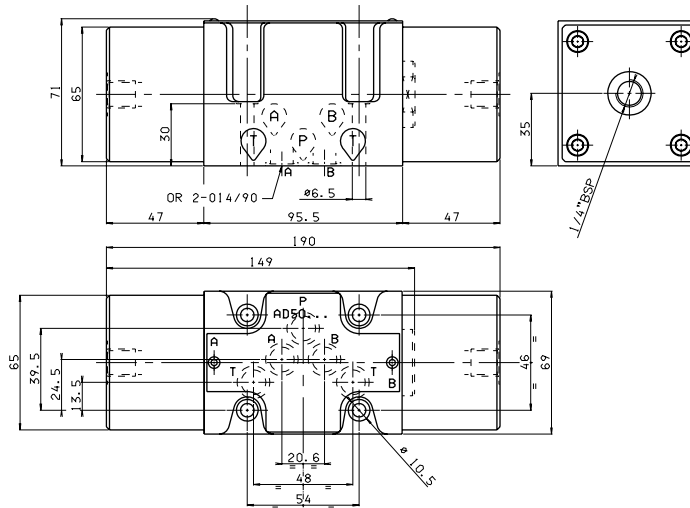


Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	100 l/min
Min. operating pressure	4 + [0.027 x (pt*)] bar - see note
Max. operating pressure	200 bar
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter β ₂₅ ≥ 75
Weight (single pilot)	4,1 Kg
Weight (twin pilot)	5,4 Kg

- Possible mounting:
C / D / E / F / G / H / I / L / M
- Ordering code see page I•29

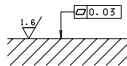
(pt*) = Pressure at port T

OVERALL DIMENSIONS



Fixing screws UNI 5931 M6x40
with material specifications min. 8.8
Tightening torque 8 Nm / 0.8 Kgm

Support plane
specifications



EAD50 - 02/2000/e

AD.5.D... DIRECT MECHANICALLY OPERATED TYPE VALVES CETOP 5/NG10



Max. pressure ports P/A/B	320 bar
Max. pressure port T	20 bar
Max. flow	100 l/min
Operating force - see note (*)	8 Kg - see note (**)
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter β ₂₅ ≥ 75
Weight	3,8 Kg

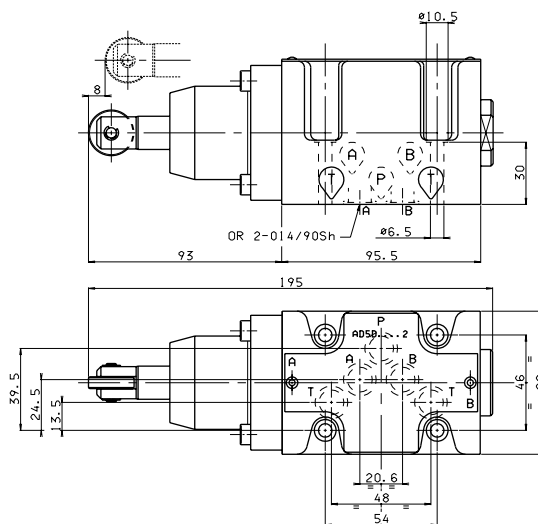
- Possible mounting:
E / F / G / H

• Ordering code see page I•29

• Notes:
(*) In the absence of counter-pressure at port T

(**) 10 Kg with a pressure of 20 bar at T

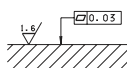
OVERALL DIMENSIONS



Stroke	8 mm
Extra stroke	2 mm
Working stroke	4 mm

Fixing screws UNI 5931 M6x40
with material specifications min. 8.8
Tightening torque 8 Nm / 0.8 Kgm

Support plane
specifications



EAD5D - 03/2000/e

ADH.5... 4/3 AND 4/2 PILOTED VALVES CETOP 5/NG10



Type ADH.5 distributors are intended for interrupting, inserting and diverting a hydraulic system flow. Normally these distributors are composed of a main stage, crossed by circuit main flow, and of a pilot stage available in several versions. Various types of controls are available, used either individually or in combination for, among other functions, stroke limitation and main spool movement speed control, in order to optimize the hydraulic system operation where this type of valve is employed.

In those case where normally to drain spools are used, it is necessary to remember that the minimum changeover pressure due to the opposing springs is equal to approximately 7 bar (see the operating features table on page I•45) and consequently necessary to insert a check valve in the P way (as shown above).

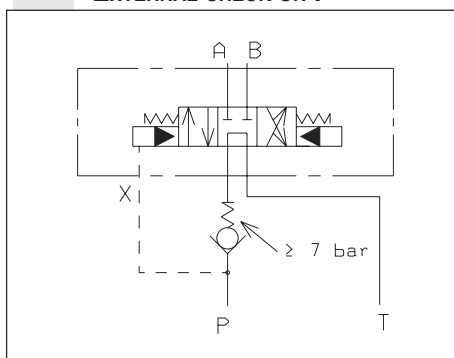
- Mounting surface in accordance with UNI ISO 4401 - 05 - 05 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-05).
- Pilot operated spool, solenoid controller.
- Stroke control of main spool.
- Presetting for pressure reducing valve mounting.
- Presetting for single-acting throttle valve mounting.

ADH.5...	
STANDARD SPOOLS FOR ADH.5	CH. I PAGE 49
TECH. SPECIFICATIONS ADH.5	CH. I PAGE 50
SUBPLATES BSH.5...	CH. I PAGE 51
CMP.30...	CH. V PAGE 21
CETOP 3/NG06	CH. I PAGE 8
STANDARD SPOOLS FOR AD.3.E	CH. I PAGE 10
AD.3.E...	CH. I PAGE 11
"D15" DC COILS	CH. I PAGE 18
"K12" AC SOLENOIDS	CH. I PAGE 18
STANDARD CONNECTORS	CH. I PAGE 19

ORDERING CODE

ADH	Piloted valve (Pilot valve and any mounting valves should be ordered separately)
5	CETOP 5/NG10
*	Mounting type (Table next page)
**	Spool type (Table next page)
*	Piloting and draining I = X internal / Y internal IE = X internal / Y external EI = X external / Y internal E = X external / Y external (see diagram at side)
**	00 = No variant LC = Main spool stroke limiter
1	Serial No.

EXTERNAL CHECK ON P

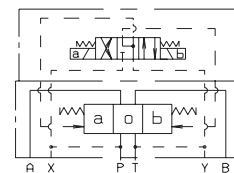
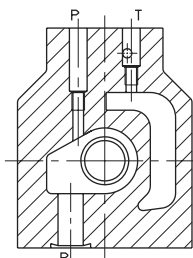


PLUGS ARRANGEMENT FOR THE PILOT AND DRAIN LINES

Plugs type used: M5x6 both for pilot and drain

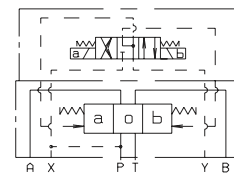
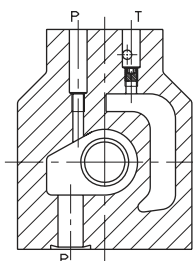
ADH.5...I

X internal piloting
Y internal draining



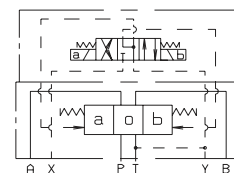
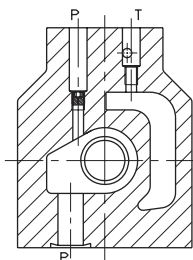
ADH.5...IE

X internal piloting
Y external draining



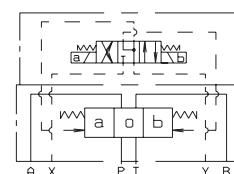
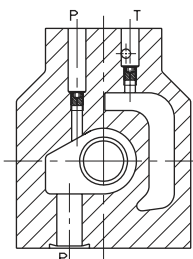
ADH.5...EI

X external piloting
Y internal draining



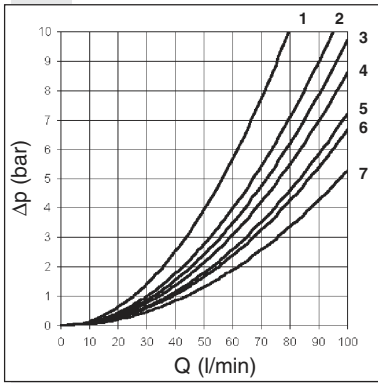
ADH.5...E

X external piloting
Y external draining



ADH.5... 4/3 AND 4/2 PILOTED VALVES CETOP 5/NG10

PRESSURE DROPS



The diagram on the side shows the pressure drops in relation to spools adopted for normal usage (see table).

Tests carried out at a constant temperature of 40°C.

The fluid used was a mineral based oil with a viscosity of 46 mm²/s at 40°C.

Spool type	Connections				
	P → A	P → B	A → T	B → T	P → T
01	3	3	5	5	
02	3	3	6	6	3
03	3	3	6	6	
04	2	2	5	5	1
05	3	3	5	5	
06-66	3	3	6	6	
07		1	6		
10	3	3	5	5	
11	4		5		
22		4	5		
14-28	3	3	7	7	2
15	3	3	4	5	
16	3	3	4	5	
17	3	3			
	Curve No.				

SPOOLS AND MOUNTING TYPE

(* Spools with price increasing)

(*) For the E mounting the locating spring works only with the steady system

Pilot Piloted	C mounting AD.3.E.03.C... ADH.5.C...	A mounting AD.3.E.03.E... ADH.5.A...	B mounting AD.3.E.03.F... ADH.5.B...	E mounting (*) AD.3.E.16.E... ADH.5.E...	Mounting P AD3E16E/AD3E16F ADH.5.P...
Scheme					
Spool type					
01					
02					
03					
04*					
05					
66					
06					
07*					
10*					
11*					
22*					
14*					
28*					
15					
16					
17					

ADH.5... 4/3 AND 4/2 PILOTED VALVES CETOP 5/NG10

PILOT SOLENOID CONTROL VALVE SPECIFICATIONS

FOR DIFFERENT CONTROLS, PLEASE CONTACT OUR TECHNICAL ARON SERVICE

1

Max. operating pressure ports P/A/B	320 bar
Max. operating pressure port T (int. drainage)	160 bar
Max. pressure on T (ext. drainage)	250 bar
Max. piloting pressure	250 bar
Min. piloting pressure	7 bar
Max. flow	100 l/min
Piloting oil volume engagement 3 position valves	0,8 cm ³
Piloting oil volume engagement 2 position valves	1,6 cm ³
Hydraulic fluid	mineral oil DIN 51524
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight ADH5 without pilot valve	2,7 Kg
Weight ADH5 with pilot valve with 1 AC solenoid	4 Kg
Weight ADH5 with pilot valve with 1 DC solenoid	4,2 Kg
Weight ADH5 with pilot valve with 2 AC solenoids	4,3 Kg
Weight ADH5 with pilot valve with 2 DC solenoids	4,7 Kg

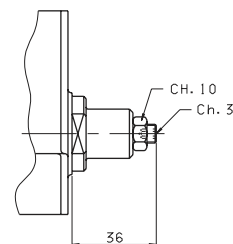
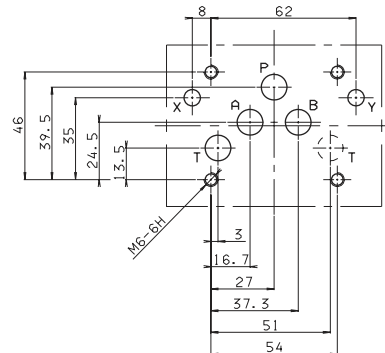
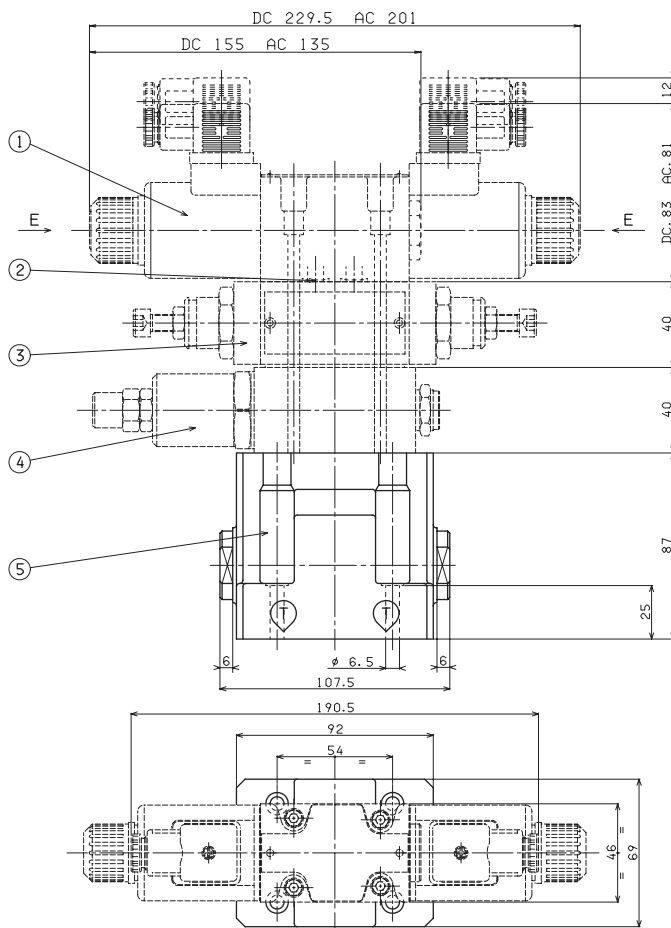
SWITCHING TIMES PILOTED VALVE

OPERATING PRESSURE (bar)	CURRENT	ENERGIZING centre-extern (ms)	DE-ENERGIZING extern-centre (ms)
50	ALTERNATING	30	50
100		25	
200		20	
50	DIRECT	40	60
100		35	
200		30	

3 position valve. The values are indicative and depend on the hydraulic circuit, the fluid used and the variations in pressure, flow rate and temperature.

OVERALL DIMENSIONS

CETOP 5 MOUNTING SURFACE



SPOOL STROKE ADJUSTMENT

- 1 Piloted solenoid valve type **AD3E... CETOP 3/NG6**
- 2 Calibrated diaphragms for **AD3E...**
- 3 Flow regulation valve type **AM3QF..C**
- 4 Pressure reduction valve type **AM3RD..C**
- 5 Main valve type **ADH5..E**

Fixing screws UNI 5931 M6x35
with material specifications 12.9
Tightening torque 8 N / 0,8 Kgm