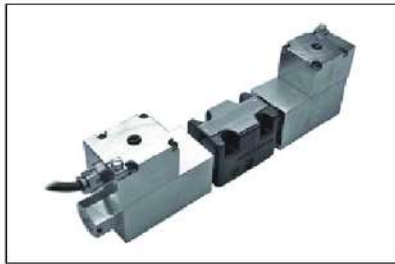


CETOP 2/NG04



CETOP 2/NG04	CAP. I • 2
AD2E...	CAP. I • 4
"A09" DC COILS	CAP. I • 4

ATEX 2014/34/UE DIRECTIVE



ATEX 2014/34/UE DIRECTIVE	CAP. I • 23
AD3XD...	CAP. I • 25
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AUTOMATIC RECIPROCATING VALVES



AD3I...	CAP. I • 46
AD5I...	CAP. I • 47
AD3RI...	CAP. I • 48
AD5RI...	CAP. I • 49

CETOP 3/NG06



ADC3...	CAP. I • 5
"A09" DC COILS	CAP. I • 7

CETOP 5/NG10



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AD5E...	CAP. I • 36
AD5E...J* AND AD5E...Q5	CAP. I • 37
AD5O... AND AD5D...	CAP. I • 38
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"A16" DC COILS	CAP. I • 40
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PILOTED VALVES AND SUBPLATE MOUNTING



ADPH5...	CAP. I • 50
ADH5...	CAP. I • 53
BSH5...	CAP. I • 56
ADH7...	CAP. I • 57
BSH7...	CAP. I • 60
ADH8...	CAP. I • 62
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CETOP 3



CETOP 3/NG06	CAP. I • 8
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AD3E...J*	CAP. I • 12
AD3V...	CAP. I • 14
AD3L...	CAP. I • 15
CETOP 3 OTHER OPERATORS	CAP. I • 16
AD3P... AND AD3O...	CAP. I • 17
AD3M... AND AD3D...	CAP. I • 18
"D15" DC COILS	CAP. I • 19
"B14" AC SOLENOIDS	CAP. I • 19
STANDARD CONNECTORS	CAP. I • 20
"LE" VARIANTS FOR ADC3/AD3	CAP. I • 21
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CETOP 5/NG10 HIGH PERFORMANCES



ADP5E...	CAP. I • 41
"D19" DC SOLENOIDS	CAP. I • 41
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"D19" DC SOLENOIDS	CAP. I • 45

FLOW DIVERSION VALVES



CDL046... "OEM MACHINERY"	CAP. I • 66
CDL066... "OEM MACHINERY"	CAP. I • 68
ADL066... "OEM MACHINERY"	CAP. I • 69
BDL066... "OEM MACHINERY"	CAP. I • 70
CDL106... "OEM MACHINERY"	CAP. I • 71
ADL106... "OEM MACHINERY"	CAP. I • 72
"A09" AND "D15" DC COILS	CAP. I • 73
"40W" AND "A16" DC COILS	CAP. I • 74



CETOP 2/NG04

AD2E...	CAP. I • 4
"A09" DC COILS	CAP. I • 4
STANDARD CONNECTORS	CAP. I • 20

DIRECTIONAL CONTROL VALVES CETOP 2/NG4

The directional control valves NG4 are designed for subplate mounting with an interface in accordance with UNI ISO 4401 - 02 - 01 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-02), and are the smallest on the market in their category whilst still featuring excellent performance.

The use of solenoids with wet armatures ensures quiet operation, means that dynamic seals are no longer required and important levels of counter-pressure are accepted on the return line. The solenoid's tube is screwed at valve body directly, while a locking ring nut seal the coil in right position.

The cast body with a great care in the design and production of the ducts of the 5 chambers have made it possible to improve the spools allowing relatively high flow rate with low pressure drops (Δp).

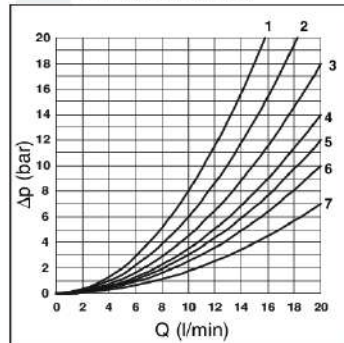
The spool rest positions are obtained by means of springs which centre it when there is no electrical impulse. The solenoids are constructed to DIN 40050 standards and are supplied by means of DIN 43650 ISO 4400 standard connectors which, suitably assembled, ensure a protection class of IP 65.

The solenoid coils are normally arranged for DIN 43650 ISO 4400 type connectors (standard version). On request, could be available the following coil connection variants: AMP Junior connections; flying leads connections, with or without integrated diode; Deutsch connections with bidirectional integrated diode.

The supply may be in either DC or AC form (with the use of a connector and rectifier) in most common voltage.

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



Spool type	Connections				
	P → A	P → B	A → T	B → T	P → T
01	4	4	6	6	
02	6	6	7	7	5
03	4	4	7	7	
04	1	1	2	2	3
05	6	6	4	4	
06	5	5	5	7	
06	5	5	7	5	
15	4	4	4	4	
16	5	5	6	6	
20*	5	5	6	6	
Curve No.					

* = with energized spool

The diagram at the side shows the pressure drop curves for spools during normal usage. The fluid used is a mineral based 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.

ORDERING CODE

AD	Directional valve
2	CETOP 2/NG4
E	Electrical operator
**	Spool (tables next page)
*	Mounting (table 1 next page)
*	Voltage (table 2 next page)
**	Variants (table 3 next page)
3	Serial No.

DIRECTIONAL CONTROL VALVES CETOP 2/NG4

TAB.1 MOUNTING

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

TAB.3 - VARIANTS

VARIANT	CODE
No variant (without connectors)	S1(*)
Viton	SV(*)
Emergency button	ES(*)
Rotary emergency button	P2(*)(**)
AMP Junior connection	AJ(*)
Solenoid with flying leads (250 mm)	FL
Solenoid with flying leads (130 mm) integrated diode	LD
Deutsch connection with bidir. diode	CX
Coil 8W (only 24V)	8W
Other variants available on request.	

(*) Coils with Hirschmann and AMP Junior connection supplied without connectors. The connectors can be ordered separately, CAP. I • 20.

(**) P2 Emergency tightening torque max. 6±9 Nm / 0.6 ± 0.9 Kgm with CH n. 22

TAB.2 - A09 (27 W) COIL

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

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

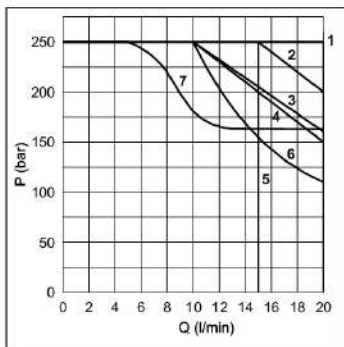
230Vac/50Hz
240Vac/60Hz
with rectifier

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

- Mounting type **D** is only for solenoid valves with detent
- In case of mounting **D** with detent, the supply to solenoid must be longer than 100 ms.
- The AMP Junior coil, the Deutsch coil with bidirectional diode and the coil with flying leads (with or without diode) coils are available in 12V or 24V DC voltage only.

* Special voltage
** Technical data see page CAP. I • 4

LIMITS OF USE (MOUNTING C-E-F)



Spool Type	
01	1
02	3
03	1
04	4
05	1
66	1
06	1
15	1(7*)
16	2(6*)
20	5

(6*) = 16 spool used as 2 or 3 way, follow the curve n°4
(7*) = with 8W coil

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 refers 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 case of valve 4/2 or 4/3 used with flow in one direction only, the limits of use could have variations which may even be negative.**

Medium switching times
Energizing: 20 ms
De-energizing: 40 ms

Tests have been carried out by spool normally closed with flow of 10 l/min at 125 bar and a 100% supply, warm standard coil and without any electronic components. These values are indicative and depend on the following parameters: the hydraulic circuit, the fluid used and the variation of pressure, flow and temperature.

NOTE: Limits of use are available for C, E, F mounting.

STANDARD SPOOLS

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

ONE SOLENOID, SIDE A "E" MOUNTING

Spool Type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
05		+	
66		+	
06		+	
15		-	
16		+	

ONE SOLENOID, SIDE B "F" MOUNTING

Spool Type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
05		+	
66		+	
06		+	
15		-	
16		+	

TWO SOLENOIDS "D" MOUNTING

Spool Type		Covering	Transient position
20*		+	

* SPOOLS WITH PRICE INCREASING

AD2E... DIRECTIONAL CONTROL SOLENOID OPERATED VALVES CETOP 2/NG4

1

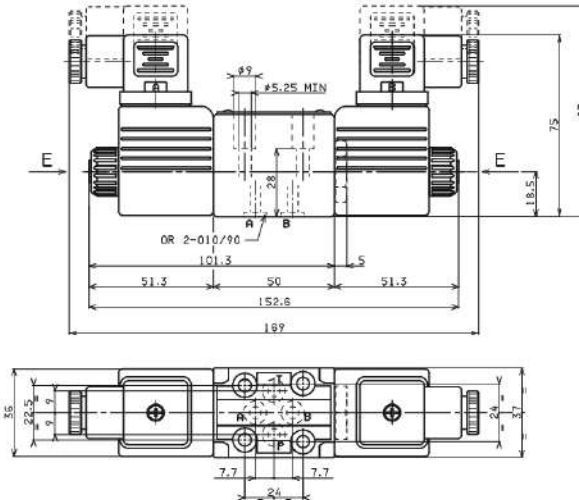
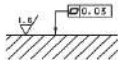


Max. pressure ports P/A/B	250 bar
Max pressure port T (dynamic)	250 bar
Max flow	20 l/min
Max excitation frequency	3 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight with one DC solenoid	0,88 Kg
Weight with two DC solenoids	1,1 Kg

E = Manual override

Screws with material specifications min. 8.8 recommended - UNI 5931
Tightening torque of screws M5x35 = 5 Nm / 0.5 Kgm.

Support plane specifications



DC COILS A09

Type of protection (in relation to connector used)	IP 65
Number of cycle	18.000/h
Supply tolerance	±10%
Ambient temperature	-30°C ÷ 60°C
Duty cycle	100% ED
Insulation class wire	H
Weight	0,215 Kg

• The AMP Junior coil, the Deutsch coil with bidirectional diode and the coil with flying leads (with or without diode) coils are available in 12V or 24V DC voltage only.

AMP JUNIOR (AJ)

VOLTAGE (V)	MAX WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RATED POWER (W)	RESISTANCE AT 20°C (OHM) ±7%
12V	123°C	27	5.3
24V	123°C	27	21.3
48V*	123°C	27	85.3
102V ^(*) ^(**)	123°C	27	392
110V ^(*) ^(**)	123°C	27	448
205V ^(*) ^(**)	123°C	27	1577

* Special voltages

** The european low voltage directive is applied to electrical equipments used at a nominal voltages between 50 and 1000 VAC or 75 and 1500 VDC. In conformity with the low directive each part of the manifold or the subplate on which the valve is mounted should be connected to a protective earth with a resistance less than 0.1 ohms.

DEUTSCH COIL WITH BIDIR. DIODE (CX) DT04 - 2P

FLYING LEADS (FL) LEADS WITH DIODE (LD)

EMERGENCY (COILS WITH HIRSCHMANN CONNECTION)

MANUAL WITHOUT CONNECTOR (ES)
MANUAL WITH CONNECTOR (E1)

**ROTARY WITHOUT CONNECTOR (P2*)
ROTAN ROTARY WITH CONNECTOR (P1*)**

(*) Emergency tightening torque max. 6 ÷ 9 Nm / 0.6 ÷ 0.9 Kgm with CH n. 22



ADC3... DIRECTIONAL CONTROL VALVES CETOP 3

SOLENOID OPERATED WITH REDUCED OVERALL SIZE

The NG6 directional control valves are designed for subplate mounting with an interface in accordance with UNI ISO 4401 - 03 - 02 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-03).

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 casting whilst the coil is kept in position by a ring nut.

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. To improve the valve performance, different springs are used for each spool.

The solenoids, constructed with a protection class of IP65 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 ADC3 valve uses shorter solenoids than the standard AD3.E to reduce the overall dimensions.

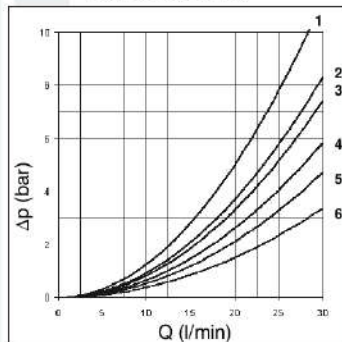
The solenoid coils are normally arranged for DIN 43650 ISO 4400 type connectors (standard version). On request, could be available the following coil connection variants: AMP Junior connections; flying leads connections, with or without integrated diode; Deutsch connections with bidirectional integrated diode.

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, $\beta_{25} \geq 75$.

ADC3E...	
"A09" DC COILS	CAP. I • 7
STANDARD CONNECTORS	CAP. I • 20

Max. pressure ports P/A/B/T	250 bar
Max flow	30 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 $\beta_{25} \geq 75$
Weight with one DC solenoid	1,25 Kg
Weight with two DC solenoids	1,5 Kg

PRESSURE DROPS



Spool type	Connections				
	P→A	P→B	A→T	B→T	P→T
01	4	4	4	4	
02	6	6	6	6	6
03	4	4	6	6	
04	3	3	2	2	5
15E-16E	6	3	1	5	
15F-16F	3	6	5	1	
	Curve No.				

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 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:

$$\Delta p1 = \Delta p \times (Q1/Q)^2$$

where Δp will be the value for the losses for a specific flow rate Q which can be obtained from the diagram, $\Delta p1$ will be the value of the losses for the flow rate Q1 that is used.

ADC3... SOLENOID OPERATED WITH REDUCED OVERALL SIZE CETOP 3/NG6

1

ORDERING CODE

ADC	Directional valve
3	CETOP 3/NG6
E	Electrical operator
**	Spool (tables at the side)
*	Mounting (table 1)
*	Voltage (table 2)
**	Variants (table 3)
1	Serial No.

TAB.1 - MOUNTING

STANDARD	
C	
E	
F	
SPECIALS (WITH PRICE INCREASING)	
G	
H	

STANDARD SPOOL

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

ONE SOLENOID, SIDE A "E" MOUNTING

Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
15		-	
16		+	

ONE SOLENOID, SIDE B "F" MOUNTING

Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
15		-	
16		+	

TAB.2 - A09 (27 W) COIL

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.

• The AMP Junior coil, the Deutsch coil with bidirectional diode and the coil with flying leads (with or without diode) coils are available in 12V or 24V DC voltage only.

* Special voltage
** Technical data see page CAP. I • 7

TAB.3 - VARIANTS

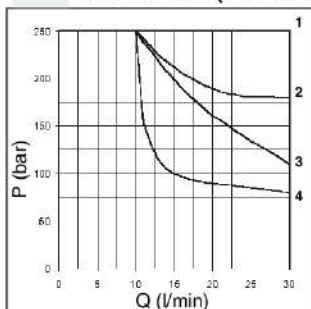
Variant	Code
No variant (without connectors)	S1(*)
Viton	SV(*)
Emergency button	ES(*)
Rotary emergency button	P2 (*) (**)
Rotary emergency button (180°)	R5 (*) (**)
Variant with lever for emergency button	LF(*)
AMP Junior connection	AJ(*)
Coil with flying leads (250 mm)	FL
Coil with flying leads (130 mm) with diode	LD
Deutsch connection with bidirectional diode	CX

Other variants available on request.

(*) Coils with Hirschmann and AMP Junior connection supplied without connectors. The connectors can be ordered separately, CAP. I • 20.

(**) P2 and R5 Emergency tightening torque max. 6÷9 Nm / 0.6 ÷ 0.9 Kgm with CH n. 22

LIMITS OF USE (MOUNTING C-E-F)



Spool type	n° curve
01	2
02	1
03	3
04	3
15	4
16	1(4*)

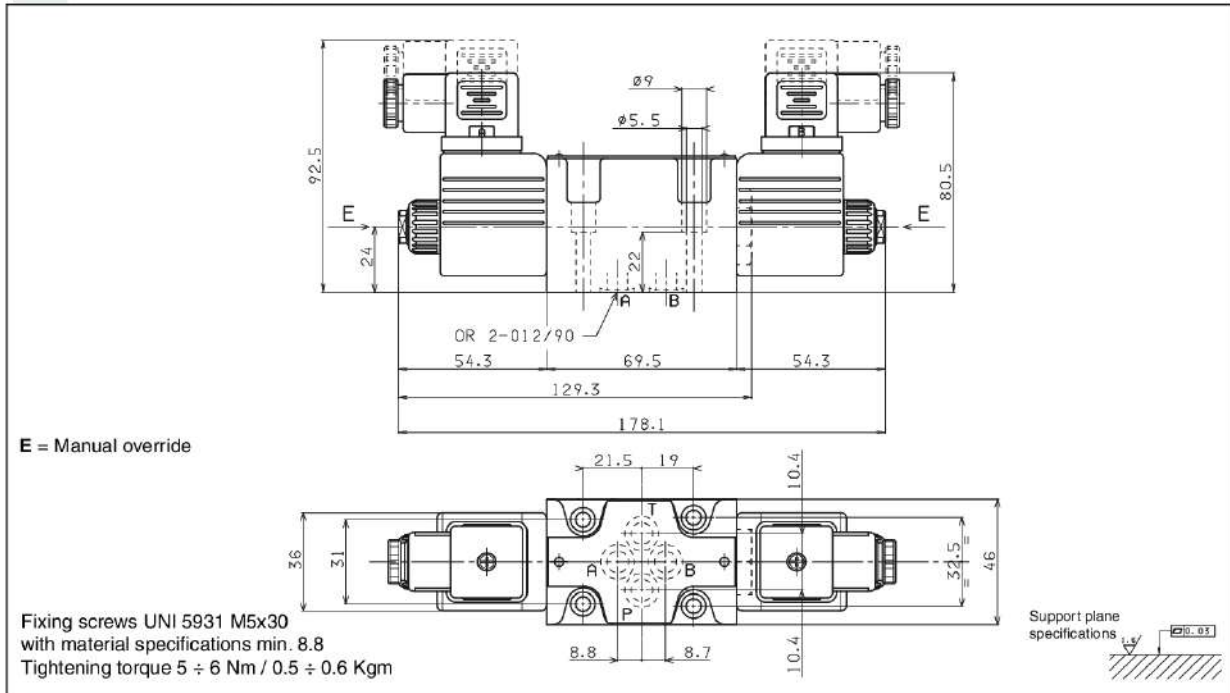
(4*) = 16 spools used for 3 way valve, follow the curve n°4

The tests have been carried out with solenoids 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 degrees 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 are used with the flow in one direction only, the limits of use could have variations which may even be negative (See curve No 4 and Spool No 16). The tests were carried out with a counter-pressure of 2 bar at T port.

ADC3... SOLENOID OPERATED WITH REDUCED OVERALL SIZE CETOP 3/NG6

OVERALL DIMENSIONS



1



A09 DC COILS

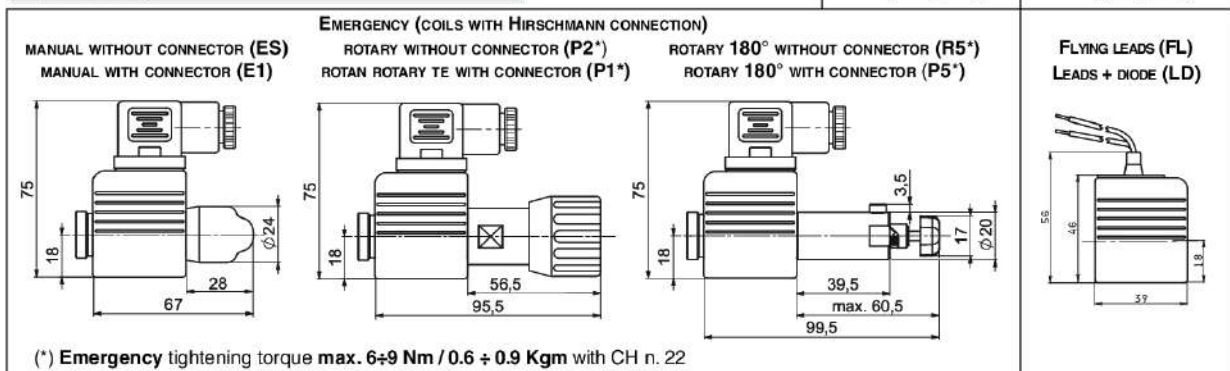
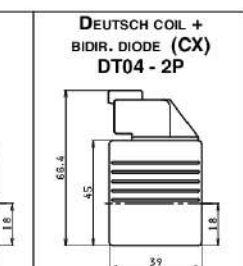
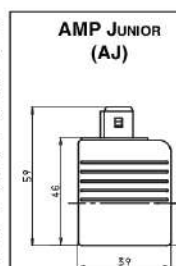
Type of protection (in relation to connector used)	IP 65
Number of cycle	18.000/h
Supply tolerance	±10%
Ambient temperature	-30°C ÷ 60°C
Duty cycle	100% ED
Insulation class wire	H
Weight	0,215 Kg

• The AMP Junior coil, the Deutsch coil with bidirectional diode and the coil with flying leads (with or without diode) coils are available in 12V or 24V DC voltage only.

VOLTAGE (V)	MAX WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RATED POWER (W)	RESISTANCE AT 20°C (OHM) ±7%
12V	123°C	27	5.3
24V	123°C	27	21.3
48V*	123°C	27	85.3
102V ^(*) (**)	123°C	27	392
110V ^(*) (**)	123°C	27	448
205V ^(*) (**)	123°C	27	1577

* Special voltages

** The european low voltage directive is applied to electrical equipments used at a nominal voltages between 50 and 1000 VAC or 75 and 1500 VDC. In conformity with the low directive each part of the manifold or the subplate on which the valve is mounted should be connected to a protective earth with a resistance less than 0.1 ohms.





CETOP 3/NG06

STANDARD SPOOLS	CAP. I • 10
AD3E...	CAP. I • 11
AD3E...J*	CAP. I • 12
AD3E...KJ	CAP. I • 13
AD3V...	CAP. I • 14
AD3L...	CAP. I • 15
OTHER OPERATOR	CAP. I • 16
AD3P...	CAP. I • 17
AD3O...	CAP. I • 17
AD3M...	CAP. I • 18
AD3D...	CAP. I • 18
"D15" DC COILS	CAP. I • 19
"B14" AC SOLENOIDS	CAP. I • 19
STANDARD CONNECTORS	CAP. I • 20
"LE" VARIANTS	CAP. I • 21
L.V.D.T.	CAP. I • 22

DIRECTIONAL CONTROL VALVES CETOP 3/NG6

INTRODUCTION

The directional control valves NG6 are designed for subplate mounting with an interface in accordance with UNI ISO 4401 - 03 - 02 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-03), and can be used in all fields on account of their high flow rate and pressure capacities combined with compact overall dimensions.

The use of solenoids with wet armatures allows a very practical, safe construction completely dispensing with dynamic seals; the solenoid tube is screwed directly onto the valve chest whilst the coil is kept in position by means of a lock nut.

The special, precise construction of the ports and the improvement of the spools enables relatively high flow rates to be accommodated with a minimal pressure drop (Δp).

The operation of the directional valves may be electrical, pneumatic, oleodynamic, mechanical or lever.

The centre position is obtained by means of calibrated length springs which reposition the spool in the centre or end of travel position once the action of the impulse is over.

The solenoids are constructed with a protection class of IP66 to DIN 40050 standards and are available in either AC or DC form in different voltage and frequencies.

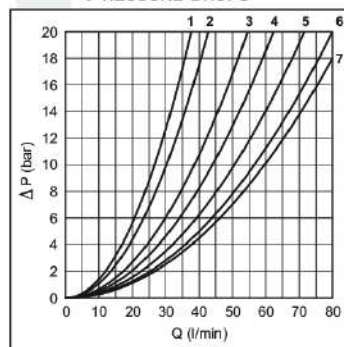
The new type DC coil "D15", of cause their high performance, allows to increasing the limits of use respect to last series.

All types of electrical control are available, on request, with different types of manual emergency controls.

The solenoid coils are normally arranged for DIN 43650 ISO 4400 type connectors; is available on request these variant coils: with AMP Junior connections, with AMP junior and integrated diode, with Deutsch DT04-2P connections or solenoid with flying leads. Connectors with built in rectifiers or pilot lights are also available.

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 shows 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	5	5	5	5	
02	7	7	7	7	6
03	5	5	6	6	
04	2	2	2	2	4
44	1	1	2	2	3
05	7	7	5	5	
06	5	5	7	5	
66	5	5	5	7	
07		2	6		
08	6	6			
09		5		5	

Curve No.

Spool type	Connections				
	P→A	P→B	A→T	B→T	P→T
10	5	5	5	5	
11	5			5	
22		5	5		
12		5		6	
13		5	6	6	
14	4	3	3	3	4
28	3	4	3	3	4
15-19*	5	5	6	6	
16	5	5	4	4	
17-21*	3	4			
20*	4	4	4	4	

Curve No.

(* Value with energized solenoid)

DIRECTIONAL CONTROL VALVES CETOP 3/NG6

ORDERING CODE

AD	Directional valve
3	CETOP 3/NG6
E	Type of operator For other operator see next pages
**	Spool see page Cap. I • 10
*	Mounting type (table 1)
*	Voltage (table 2)
**	Variants (table 3)
*	Serial No.
	3 = Standard
	4 = Only for RS - R6 - KJ - 7J variants

TAB.2 - VOLTAGE

AC SOLENOID B14 **	
A	24V/50-60 Hz
B	48V/50-60 Hz
J	115V/50Hz - 120V/60Hz
Y	230V/50Hz - 240V/60Hz
K	AC without coils
Other voltages available on request.	
DC COIL D15 (30W) **	
L	12V
M	24V
V	28V*
N	48V*
Z	102V*
P	110V*
X	205V*
K	DC without coils
W	DC without 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.

• AMP Junior coils (with or without diode) and coils with flying leads and coils type Deutsch, are available in 12V or 24V DC voltage only.

• The coil with eCoat protection (RS variant) is available in 12V, 24V, 28V or 110V DC voltage only.

* Special voltage

** Technical data see page Cap. I • 19

TAB.1- MOUNTING

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

• **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).

TAB.3 - VARIANTS

VARIANT	CODE	◆	PAGE
No variant (without connectors)	S1(*)		
Viton	SV (*)		
Emergency control lever for directional control valves type ADC3 and AD3E	LE-LF-AX-CE(*)	◆	Cap. I • 21
Emergency button	ES(*)		Cap. I • 19
Rotary emergency button	P2(*)		Cap. I • 19
Rotary emergency button (180°)	R5(*)		Cap. I • 19
Preset for microswitch (E/F/G/H mounting only) (see below note ◊)	MS(*)	◆	Cap. I • 11 - Cap. I • 15
5 micron clearance	SQ(*)	◆	
Spool movement speed control (only VDC) with ø 0.3 mm orifice	3S(*)	◆	Cap. I • 12
Spool movement speed control (only VDC) with ø 0.4 mm orifice	JS(*)	◆	Cap. I • 12
Spool movement speed control (only VDC) with ø 0.5 mm orifice	5S(*)	◆	Cap. I • 12
Spool movement speed control (only VDC) with ø 0.6 mm orifice	6S(*)	◆	Cap. I • 12
AMP Junior coil - for 12V or 24V DC voltage only	AJ(*)		Cap. I • 19
AMP Junior coil and integrated diode - for 12V or 24V DC voltage only	AD(*)		Cap. I • 19
Coil with flying leads (175 mm) - for 12V or 24V DC voltage only	SL		Cap. I • 19
Hirschmann coil eCoat surface treatment - for 12V, 24V, 28V or 110V DC voltage only	RS(*)		Cap. I • 19
Deutsch DT04-2P connection eCoat surface treatment - for 12V, 24V DC voltage only	R6		Cap. I • 19
High corrosion resistance valve - Hirschmann connector	KJ		Cap. I • 13
High corrosion resistance valve - Deutsch DT04-2P connector - for 12V, 24V DC voltage only	7J		Cap. I • 13
Deutsch DT04-2P coil - for 12V or 24V DC voltage only	CZ		Cap. I • 19

Other variants available on request.

◊ = Maximum counter-pressure on T port: 8 bar - Microswitch type AM1107 code V79000001 can be ordered separately.
◆ = Variant codes stamped on the plate

(*) Coils with Hirschmann and AMP Junior connection supplied without connectors. The connectors can be ordered separately, Cap. I • 20.

1

TWO SOLENOIDS, SPRING CENTRED "C" MOUNTING

Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
44*		-	
05		+	
66		+	
06		+	
07*		+	
08*		+	
09*		+	
10*		+	
22*		+	
11*		+	
12*		+	
13*		+	
14*		-	
28*		-	

ONE SOLENOID, SIDE A "E" MOUNTING

Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
44*		-	
05		+	
66		+	
06		+	
08*		+	
10*		+	
12*		+	
15		-	
16		+	
17		+	
14*		-	
28*		-	

**DIRECTIONAL CONTROL VALVES
STANDARD SPOOLS CETOP 3/NG6**

NOTE

(*) Spool with price increasing

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

• 16 / 19 / 20 / 21 spool not planned for AD3E...J*

• For lever operated the spools used are different.
Available spools for this kind of valve see AD3L...

ONE SOLENOID, SIDE B "F" MOUNTING

Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
44*		-	
05		+	
66		+	
06		+	
08*		+	
09*		+	
10*		+	
22*		+	
12*		+	
13*		+	
07*		+	
15		-	
16		+	
17		+	
14*		-	
28*		-	

TWO SOLENOIDS "D" MOUNTING

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

AD3E... DIRECTIONAL CONTROL VALVES SOLENOID OPERATED CETOP 3/NG6



A max. counter-pressure of 8 bar at T is permitted for the variant with a microswitch (MS).
 (1) Dynamic pressure allowed on P for 800.000 cycles.
 (2) DC: Dynamic pressure allowed for 2 millions of cycles.
 AC: Dynamic pressure allowed for 350.000 of cycles.
 For dynamic pressure of 100 bar are allowed 1 million cycles.

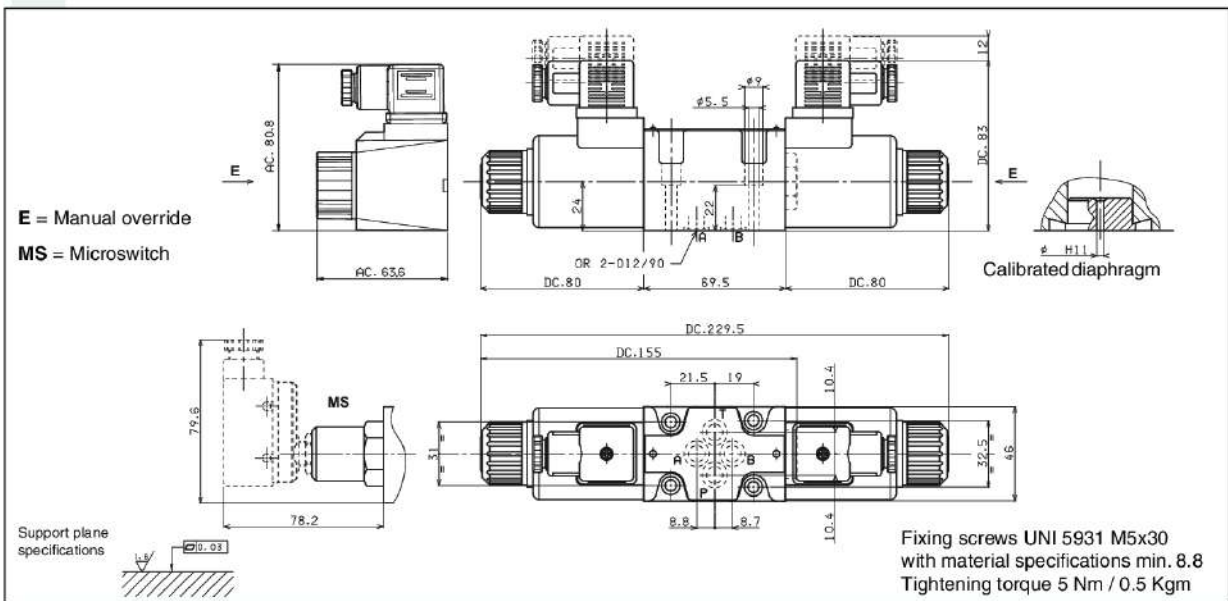
Max. pressure port P/A/B (1)	350 bar
Max. pressure port T (for DC) (2)	250 bar
Max. pressure port T (for AC) (2)	160 bar
Max. flow	80 l/min
Max. excitation frequency	3 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight with one DC solenoid	1,65 Kg
Weight with two DC solenoids	2 Kg
Weight with one AC solenoid	1,31 Kg
Weight with two AC solenoids	1,72 Kg

CALIBRATED DIAPHRAGMS (3)	
Ø mm	Code
blind	M52.05.0023/4
0.5	M52.05.0023/1
0.6	M52.05.0023/6
0.7	M52.05.0023/8
0.8	M52.05.0023
1.0	M52.05.0023/2
1.2	M52.05.0023/3
1.5	M52.05.0023/7
2.0	M52.05.0023/10
2.2	M52.05.0023/9
2.5	M52.05.0023/5

1

(3) For high differential pressure please contact our technical department.

OVERALL DIMENSIONS



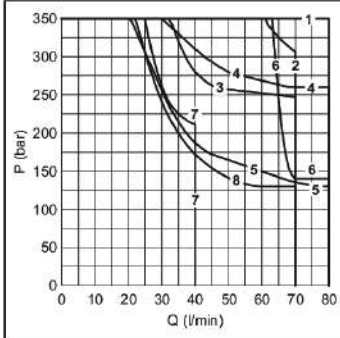
LIMITS OF USE (MOUNTING C-E-F)

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 refers 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 T). In the case 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 times: the values are indicative and depend on following parameters: hydraulic circuit, fluid used and variations in hydraulic scales (pressure P, flow Q, temperature T). The limit of use for AC solenoids were detected with 50 Hz power.

Direct current:	Energizing	30 ÷ 50 ms.	Alternating current:	Energizing	8 ÷ 30 ms.
	De-energizing	10 ÷ 30 ms.		De-energizing	15 ÷ 55 ms.

NOTE: The operating limits shown are valid for mountings C, E, F.

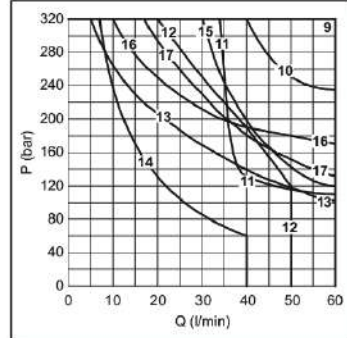
DIRECT CURRENT SOLENOIDS (DC)



Spool type	Solenoids	
	DC	AC
01	1	9
02	1	9
03	3	10
04	2	15
44	1	9
05	1	16
06-66	5	13
11-22	4	17
14-28	7	12
15	8	14
16	6	11

Curves

ALTERNATING CURRENT SOLENOIDS (AC)



AD3E...J* VALVES WITH SPOOL MOVEMENT SPEED CONTROL VARIANT J*

1

Valves type AD3E...J* with spool movement speed control

These ON-OFF type valves are used 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 consist of reducing the transfer section for the fluid from one solenoid to the other by means of calibrated orifices.

• 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 AD3...J* version valves, specify the orifices code.
- The operation is linked to a minimum counter-pressure on T line (1 bar min.)
- The switching time referred to the spool travel detected by a LVDT transducer can vary for the NG6 valve from a minimum of 100 to a maximum of 300 ms depending on 5 fundamental variables:
 - 1) Diameter of the calibrated orifices (see table)
 - 2) Hydraulic power for clearance referring to flow and pressure values through valve
 - 3) Spool type
 - 4) Oil viscosity and temperature
 - 5) Counter-pressure at T line

Max. pressure ports P/A/B	320 bar
Max. pressure port T (*)	250 bar
Max. flow	30 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	1,65 Kg
Weight with two solenoids DC solenoids	2 Kg

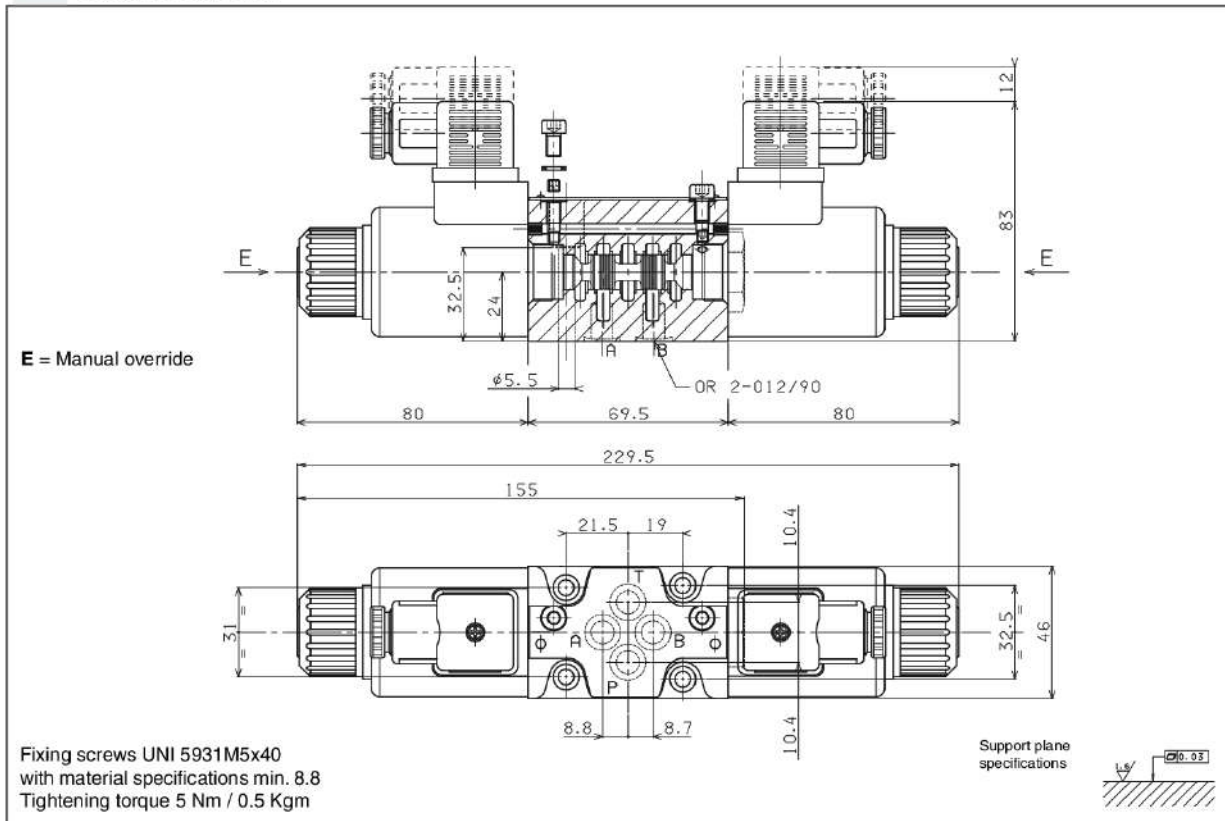
(*) Pressure dynamic allowed for 2 millions of cycles.

CALIBRATED ORIFICES AVAILABLE		
ø (mm)	M4x4	Code
0.3	M89.10.0028	3S (J3+S1)*
0.4	M89.10.0029	JS (J4+S1)*
0.5	M89.10.0006	5S (J5+S1)*
0.6	M89.10.0030	6S (J6+S1)*

* Old code

- Possible mountings: C / E / F / G / H
- 16 / 19 / 20 / 21 spools not planned for AD.3.E...J*

OVERALL DIMENSIONS



AD3E...KJ / 7J HIGH CORROSION RESISTANCE



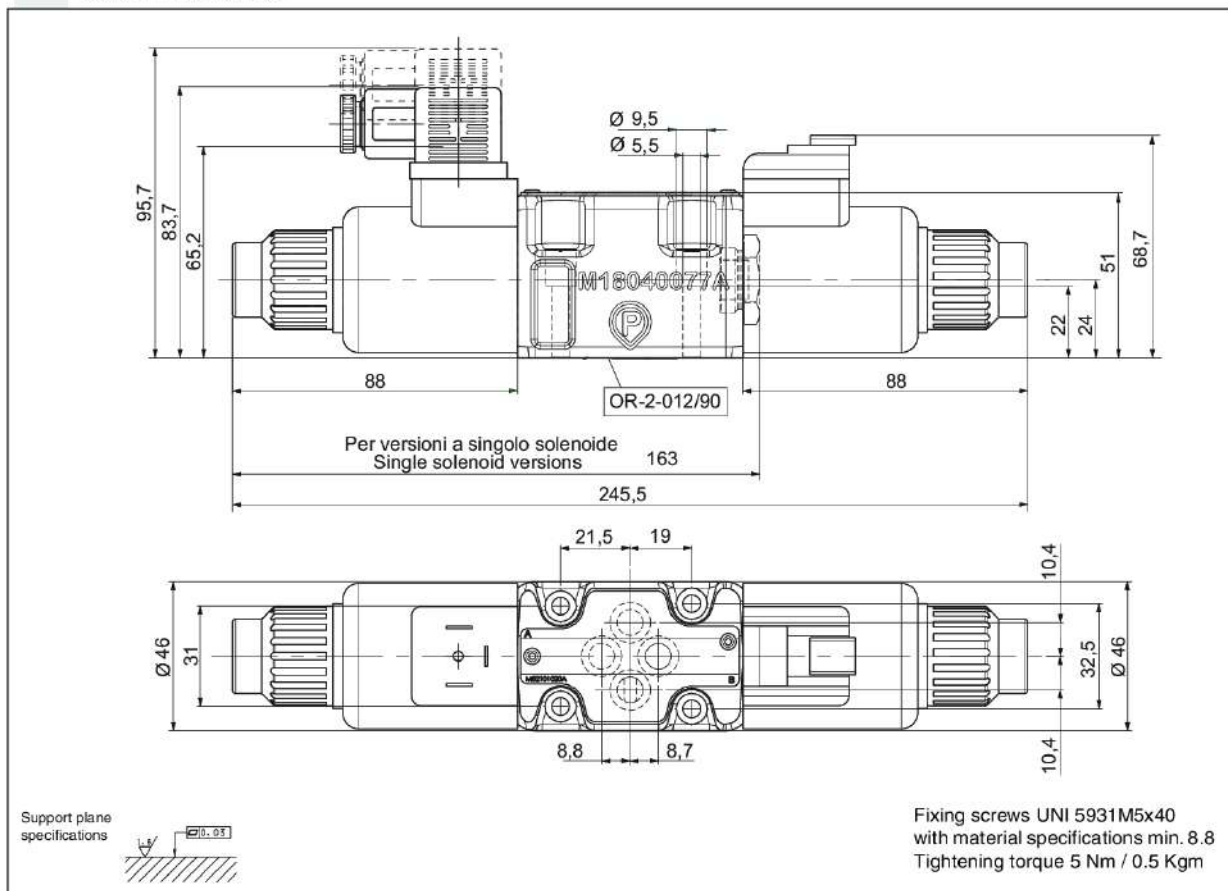
AD3EJ..

"D15" DC COILS	CAP. I • 19
STANDARD CONNECTORS	CAP. I • 20

- This variant has a Zinc-Nickel surface treatment on metallic parts for a higher corrosion resistance
- Coil windings are sealed and outer metal housing has eCoat surface treatment
- The complete valve withstand more than 700 hours exposure of Salt Spray Test (test performer according to UNI EN ISO 9227 and evaluation according to UNI EN ISO10289).
- The plastic blind retainer is assembled as standard to protect the end surface of solenoid tube

1

OVERALL DIMENSIONS





AD3V...	
"D15" DC COILS	CAP. I • 19
STANDARD CONNECTORS	CAP. I • 20
LVDT	CAP. I • 22

AD3V... CETOP 3/NG6 WITH PROXIMITY SENSOR LVDT

The single solenoid directional valves type AD.3.V are used in applications where the monitoring of the position of the spool inside the valve is requested to manage the machine safety cycles in accordance with the accident prevention legislation. These directional valves are equipped with an horizontal positioned inductive sensor on the opposite side of the solenoid, which is capable of providing the first movement of the valve when the passage of a minimum flow is allowed. Integrated in safety systems, these valves intercept actuator movements that could be dangerous for the operators and for the machine.

Max. operating pressure ports P/A/B (*)	350 bar
Max. operating pressure port T dynamic (**)	250 bar
Max. flow	60 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
Type of protection (in relation to connector used)	IP 66
Weight	1,7 Kg

(*) Dynamic pressure allowed on P for 800.000 cycles.
(**) Pressure dynamic allowed for 2 millions of cycles.

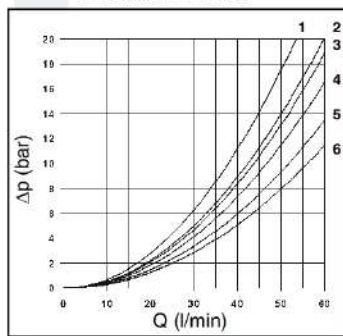
- Possible mountings: E / F / H
- The valve is supplied with DC solenoid only

ORDERING CODE

AD	Directional control valve
3	CETOP 3/NG6
V	Directional valve with single solenoid and LVDT proximity sensor
***	Spool and mounting (table 1)
*	Voltage (table 2)
**	Variants (table 3)
3	Serial No.

CE registered mark for industrial environment with reference to the electromagnetic compatibility. European norms:
- EN50082-2 general safety norm - industrial environment
- EN 50081-1 emission general norm - residential environment

PRESSURE DROPS



Spool type	Connections				
	P→A	P→B	A→T	B→T	P→T
01	5	5	5	5	
02	6	6	6	6	5
06	5	5	6	5	
16	5	5	4	4	
17	1	3			
66	5	5	5	6	
32	1	1	2	2	

Curves No.

The diagram at side shows the Δp curves for spool in 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.

TAB.2 - VOLTAGE

D15 COIL (30W) **	
L	12V
M	24V
V	28V*
N	48V*
Z	102V*
P	110V*
R	205V*
W	Without DC coils and connectors

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
** Technical data see Cap. I • 19

TAB1 - STANDARD SPOOLS FOR AD3V

Spool type	POSSIBLE MOUNTING: E / F / H		
	Covering	Transient position	
01E	+		
01F	+		
02E	-		
06H*	+		
16E	+		
17F	+		
66F	+		
32E	+		

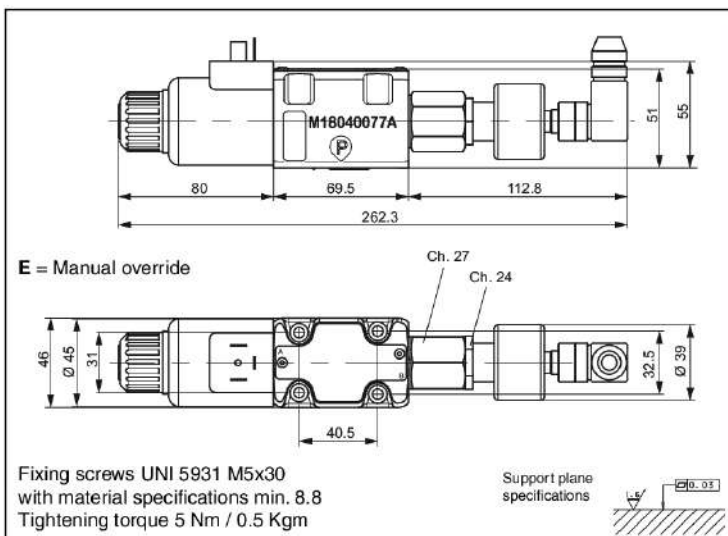
(*) Spool with price increasing

TAB.3 - VARIANTS

No variant (without connectors)	S1(*)
Viton	SV(*)
Emergency button	ES(*)
Without proximity connector LVDT	S3
Without coils and proximity connector	S4
AMP Junior coil	AJ(*)
AMP Junior coil and integrated diode	AD(*)
Coil with flying leads (175mm)	SL
Deutsch DT04-2P Coil type	CZ

Other variants available on request.

(*) Coils with Hirschmann and AMP Junior connection supplied without connectors. The connectors can be ordered separately, Cap. I • 20.





AD3L...

STANDARD SPOOLS

CAP. I • 10

AD3L... LEVER OPERATED CETOP 3/NG6

Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	60 l/min
Lever angle	2 x 17°
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	1,2 Kg
Weight M1 variant	1,8 Kg

1

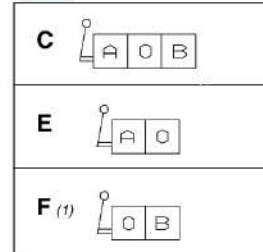
ORDERING CODE

AD	Directional valve
3	CETOP 3/NG6
L	Lever operation
**	Spool type (see table 1) Spool symbol see CAP. I • 10
*	Mounting type (see table 2)
*	Z = Valve with lever X = Valve without lever
*	Variants (see table 3)
4	Serial No.

TABLE 1 - SPOOLS TYPE

- For these valves spools are different from ones used on the other directional valves
- Available spools:
01 / 02 / 03 / 04 / 05 / 06 / 66
07 / 22 / 13 / 15 / 16 / 17

TABLE 2 - MOUNTING TYPE



(1) For spools 15-16-17 the lever is mounted on site B

OVERALL DIMENSIONS

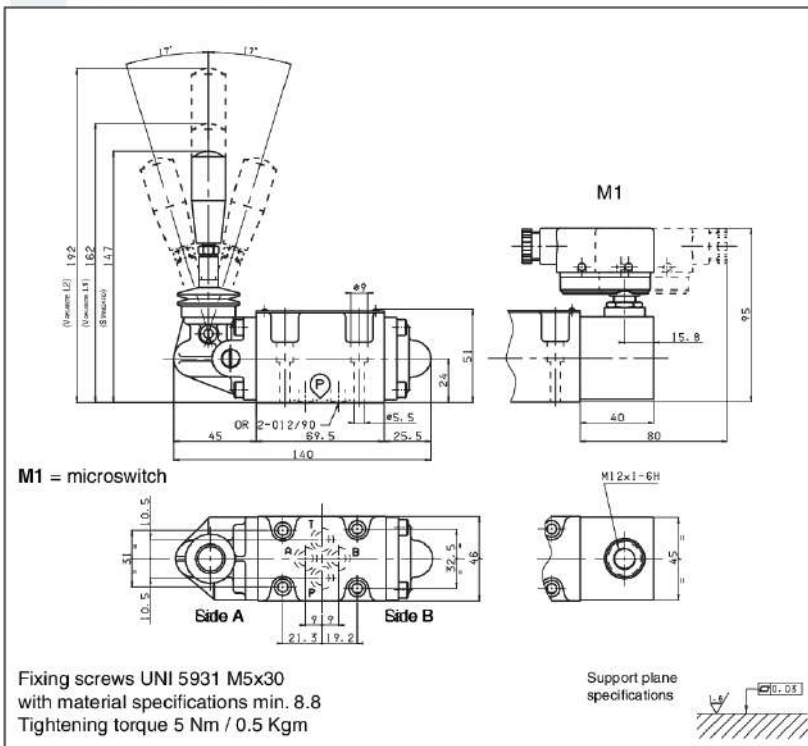


TABLE 3 - VARIANTS TABLE

VARIANTS	CODE (♦)
No variant	00
Viton	V1
Preset for microswitch Microswitch type AM1107 code V79000001 can be ordered separately.	M1 (♦)
Preset for microswitch + Viton	MV (♦)
With detent (*) (mechanical connection) (Springs are different from those for standard versions)	D1 (♦)
Preset for microswitch + Detent (*)	MD (♦)
Lever length 162 mm	L1
Lever length 192 mm	L2
♦ Variant codes stamped on the plate	
(*) max. 150.000 cycles.	



DIRECTIONAL CONTROL VALVES OTHER OPERATOR CETOP 3/NG6

INTRODUCTION

The directional control valves NG6 are designed for subplate mounting with an interface in accordance with UNI ISO 4401 - 03 - 02 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-03), and can be used in all fields on account of their high flow rate and pressure capacities combined with compact overall dimensions.

The use of solenoids with wet armatures allows a very practical, safe construction completely dispensing with dynamic seals; the solenoid tube is screwed directly onto the valve chest whilst the coil is kept in position by means of a lock nut.

The special, precise construction of the ports and the improvement of the spools enables relatively high flow rates to be accommodated with a minimal pressure drop (Δp).

The centre position is obtained by means of calibrated length springs which reposition the spool in the centre or end of travel position once the action of the impulse is over.

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, $\beta_{25} \geq 75$.

ALTRI COMANDI

STANDARD SPOOLS	CAP. I • 10
AD3P...	CAP. I • 17
AD3O...	CAP. I • 17
AD3M...	CAP. I • 18
AD3D...	CAP. I • 18

ORDERING CODE

AD	Directional valve
3	CETOP 3/NG06
*	Type of operator P = Pneumatic O = Oleodynamic M = Mechanically D = Direct mechanically (For other operator see past pages)
**	Spool (see CAP. I • 10)
*	Mounting type (tab.1)
z	No voltage
**	Variants: 00 = no variant V1 = Viton H1 = Marine version (for AD3P only) DI(*) = Internal draining (for AD3O only)
2	Serial No.

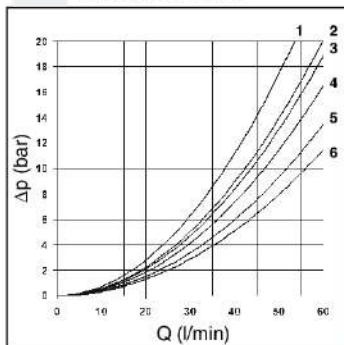
TAB.1 MOUNTING

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

• In case of **mounting D** with detent a maximum supply time of 2 sec is needed (only for AC coils).

(*)The DI variant is recommended in the environments characterised by the presence of dust or any type of contamination.

PRESSURE DROPS



Spool type	Connections				
	P→A	P→B	A→T	B→T	P→T
01	5	5	5	5	
02	6	6	6	6	5
03	5	5	6	6	
04	1	1	2	2	4
05	5	5	5	5	
06	5	5	6	5	
66	5	5	5	6	
07		4	6		
08	6	6			
09	5	5		5	
10	5	5	5	5	

Curve No.

Spool type	Connections				
	P→A	P→B	A→T	B→T	P→T
11	4			6	
22		4	6		
12		5	6		
13		5	6		
14	2	1	1	1	2
28	1	2	1	1	2
15 - 19	4	4	6	6	
16	5	5	4	4	
17 - 21	1	3			
18	5	5			
20	4	4	4	4	

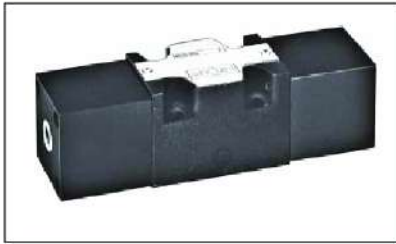
Curve No.

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 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.

AD3P... PNEUMATIC OPERATION TYPE VALVES CETOP 3/NG6



Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	60 l/min
Minimum operating pressure	$2 + [0.027 \times (pt^*)]$ bar - see note
Maximum operating pressure	20 bar
Fluid viscosity	$10 \div 500$ 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 single pilot	1,2 Kg
Weight twin pilot	1,8 Kg

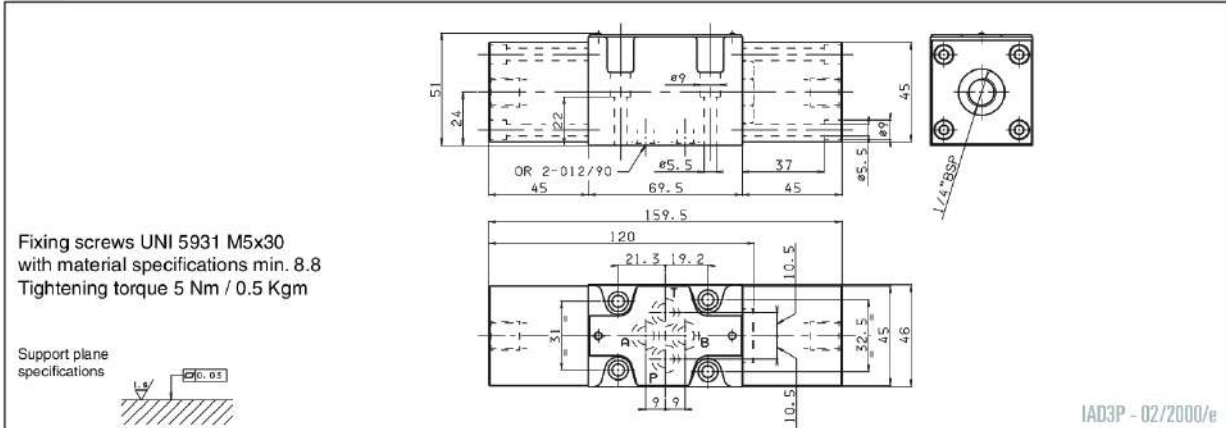
• Possible mountings:
C/D/E/F/G/H/I/L/M

Ordering code see page before

(pt*)= pressure at port T

1

OVERALL DIMENSIONS



AD30... OLEODYNAMIC OPERATION TYPE VALVES CETOP 3/NG6



Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	60 l/min
Minimum operating pressure	$15 + [0.1 \times (pt^*)]$ bar - see note
Maximum operating pressure	250 bar
Fluid viscosity	$10 \div 500$ mm ² /s
Fluid temperature	0°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 single pilot	1,5 Kg
Weight twin pilot	2,3 Kg

• Possible mountings:
C/D/E/F/G/H/I/L/M

Ordering code see page before

(pt*)= pressure at port "T"

Minimum pilot pressure depends on spool scheme, flow rate and pressure.

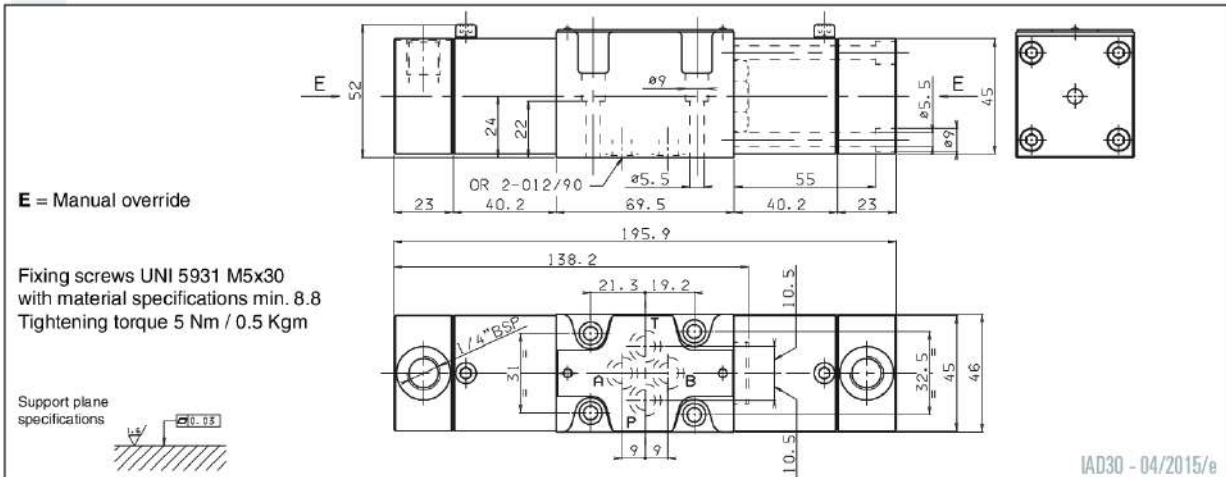
To allow the spool to return to neutral position, the pilot pressure must be below 3 bar.

The DI variant is recommended in the environments characterised by the presence of dust or any type of contamination.

Further technical specifications (for DI variant only)

Minimum operating pressure	$[10 + (pt^*)]$ bar - see note
Maximum operating pressure	250 bar
Max. piloting leakage	1 l/min

OVERALL DIMENSIONS



AD3M... MECHANICALLY OPERATED TYPE VALVES CETOP 3/NG6

1



OVERALL DIMENSIONS

Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	60 l/min
Minimum operating force - see note (*)	2,5 Kg
Maximum operating force - see note (**)	13 Kg
Cam angle	27°
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	1 Kg

• Possible mountings:
E / F / G / H

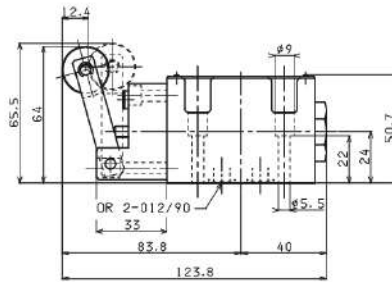
• Ordering code see page before

• Note:

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

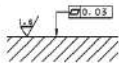
(**) with a pressure of 160 bar at port T

Stroke	12,4 mm
Working stroke	3 mm



Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications



EAD3M - 02/2000/e

AD3D... DIRECT MECHANICALLY OPERATED TYPE VALVES CETOP 3/NG6



OVERALL DIMENSIONS

Max. pressure ports P/A/B	320 bar
Max. pressure port T	20 bar
Max. flow	60 l/min
Operating force - see note (*)	6 Kg
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	0°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	1,5 Kg

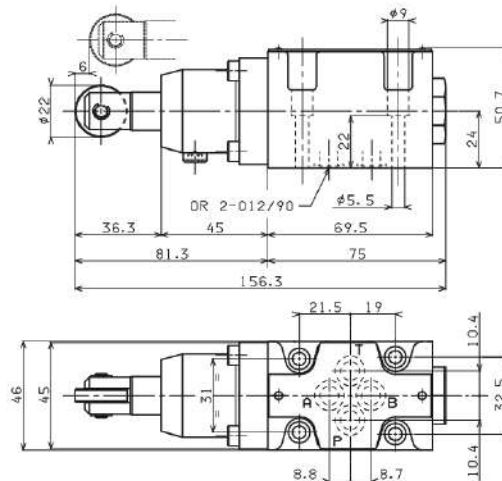
• Possible mountings:
E / F / G / H

• Ordering code see page before

• Note:

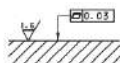
(*) In absence of counter-pressure at port T

Stroke	6 mm
Extra stroke	2 mm
Working stroke	3 mm



Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications



EAD3D - 02/2000/e



"D15" DC COILS FOR CETOP 3

Type of protection (in relation to the connector used)	IP 66
Number of cycles	18.000/h
Supply tolerance	±10%
Ambient temperature	-25°C ÷ 60°C
Duty cycle	100% ED
Insulation class wire	H
Weight	0,354 Kg

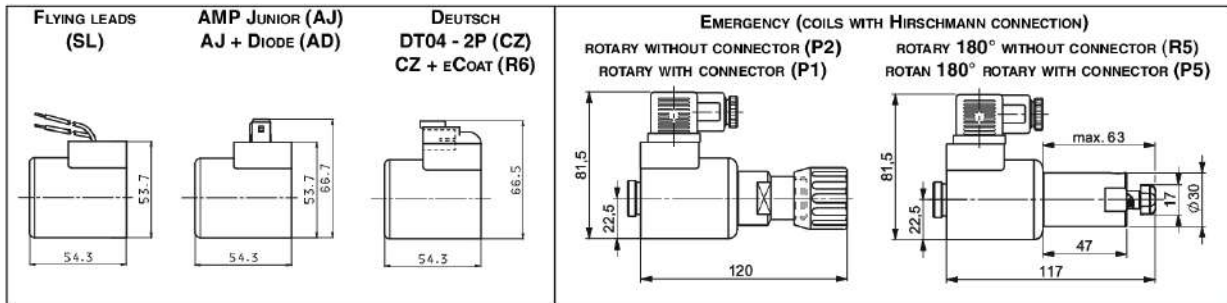
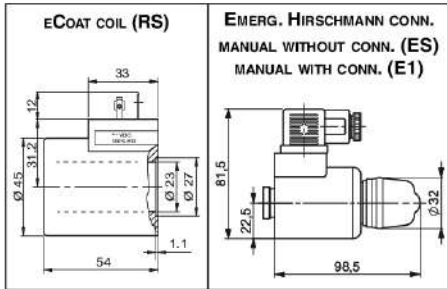
- AMP Junior coils (with or without diode) and coils with flying leads and coils type Deutsch, are available in 12V or 24V DC voltage only.
- The pastic type coil (RS variant) is available in 12V, 24V, 28V or 110V DC voltage only.

1

VOLTAGE (V)	MAX WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RATED POWER (W)	RESISTANCE AT 20°C (OHM) ±10%
12V	110°C	30	4.8
24V	110°C	30	18.8
28V*	110°C	30	25.6
48V*	110°C	30	75.2
102V ^(**)	110°C	30	340
110V ^(**)	110°C	30	387
205V ^(**)	110°C	30	1375

* Special voltages

** The european low voltage directive is applied to electrical equipments used at a nominal voltages between 50 and 1000 VAC or 75 and 1500 VDC. In conformity with the low directive each part of the manifold or the subplate on which the valve is mounted should be connected to a protective earth with a resistance less than 0.1 ohms.

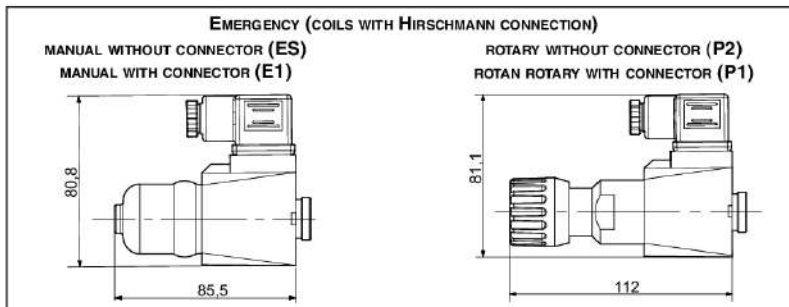


"B14" AC SOLENOIDS FOR CETOP 3

Type of protection (in relation to the connector used)	IP 65
Number of cycles	18.000/h
Supply tolerance	+10% / -10%
Ambient temperature	-30°C ÷ 60°C
Duty cycle	100% ED
Insulation class wire	H
Weight	0,436 Kg

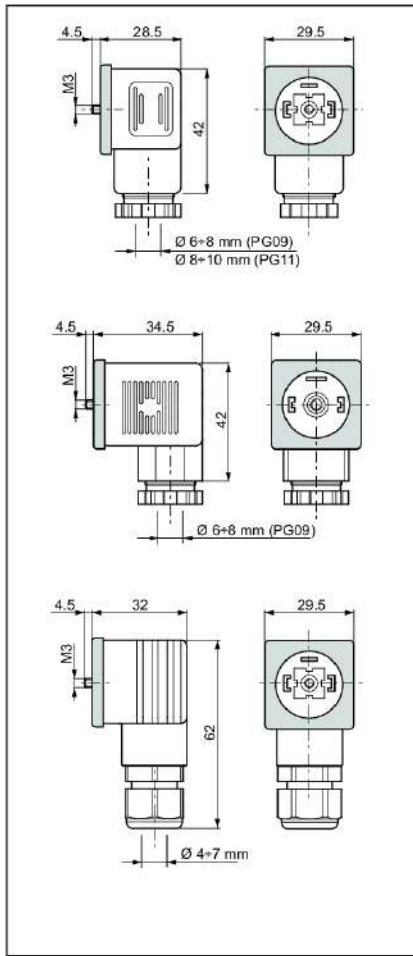
VOLTAGE (V)	MAX. WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RESISTANCE AT 20°C (OHM) ±10%	RATED POWER. (VA)	PICKUP CURRENT (A)
24V/50Hz - 24V/60Hz	100°C - 96°C	1.7	54 - 40	5.6 - 5
48V/50Hz - 48V/60Hz	112°C - 98°C	6.8	45 - 34	5.3 - 5
115V/50Hz - 120V/60Hz *	133°C - 101°C	32.5	61 - 51	3.2 - 3.2
230V/50Hz - 240V/60Hz *	120°C - 103°C	134	62 - 52	1.6 - 1.6

* The european low voltage directive is applied to electrical equipments used at a nominal voltages between 50 and 1000 VAC or 75 and 1500 VDC. In conformity with the low directive each part of the manifold or the subplate on which the valve is mounted should be connected to a protective earth with a resistance less than 0.1 ohms.



CONNECTORS DIRECTIONAL CONTROL VALVES IN ACCORDANCE WITH DIN 43650/ISO4400

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Connector	Protection level	Type	Cable gland	Code
Standard	IP65	Black color	PG09	V86 05 0002
		Grey color	PG09	V86 05 0004
		Black color	PG11	V86 05 0006
		Grey color	PG11	V86 05 0008
Lens cover with pilot light (bipolar led) (*)	IP65	12 VAC/VDC	PG09	V86 10 0018
		24 VAC/VDC	PG09	V86 10 0012
		115 VAC/VDC	PG09	V86 10 0020
		230 VAC/VDC	PG09	V86 10 0022

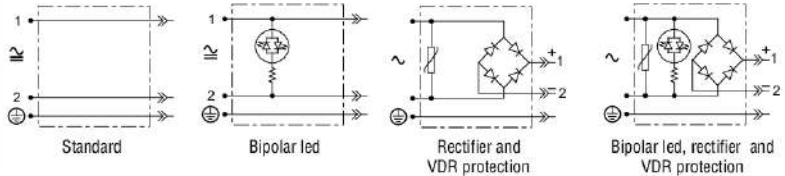
(*) Don't use for proportional versions

Connector	Protection level	Type	Cable gland	Code
With rectifier (*) Inlet voltage 12÷230 VAC Outlet voltage 9÷205 VDC	IP65	Black color	PG09	V86 20 0002
		Grey color	PG09	V86 20 0004
Lens cover with pilot light (bipolar led) and rectifier (*) Inlet voltage 12÷230 VAC Outlet voltage 9÷205 VDC	IP65	12 VAC	PG09	V86 25 0018
		24 VAC	PG09	V86 25 0019
		48 VAC	PG09	V86 25 0020
		115 VAC	PG09	V86 25 0021
		230 VAC	PG09	V86 25 0022

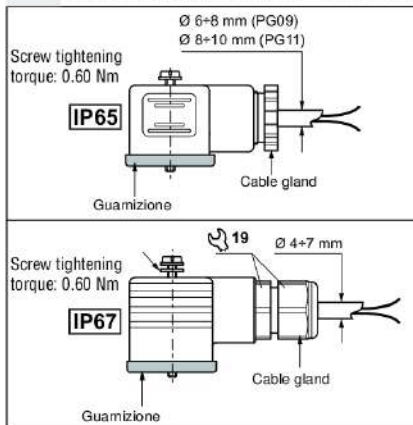
(*) Don't use for proportional versions

Connector	Protection level	Type	Cable gland	Code
With protection level IP67	IP67	Black color	—	V86 28 0001
		Grey color	—	V86 28 0002

Electrical circuits



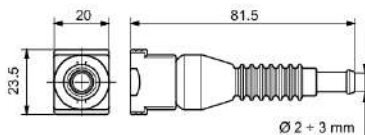
ELECTRICAL FEATURES OF CONNECTORS



Description	IP65	IP67
AC rated voltage	Max. 250 V	Max. 250 V
DC rated voltage	Max. 300 V	Max. 300 V
Pin contact nominal current	10A	10A
Pin contact max. current	16A	16A
Max. section cable	1.5 mm ²	1.5 mm ²
Cable gland PG09 - M16x1,5	Ø cable 6 ÷ 8 mm	Ø cable 4 ÷ 7 mm
Cable gland PG11 - G 1/2" - M20x1,5	Ø cable 8 ÷ 10 mm	—
Protection level	IP65 EN60529	IP67 EN60529
Insulation class	VDE 0110-1/89	VDE 0110-1/89
Operating temperature	-40°C ÷ 90°C	-20°C ÷ 80°C

The degrees of protection indicate is guaranteed only if the connectors were properly mounted with his original seals.

AMP JUNIOR CONNECTORS



Connector	Type	Cable section	Pin contact max current	Code
AMP Junior connector Timer 2 contact	Black color	0,5 ÷ 1,5 mm ²	10A	RKRC0808000