DIRECTIONAL CONTROL VALVES CETOP 3/NG6

INTRODUCTION

The ARON 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.

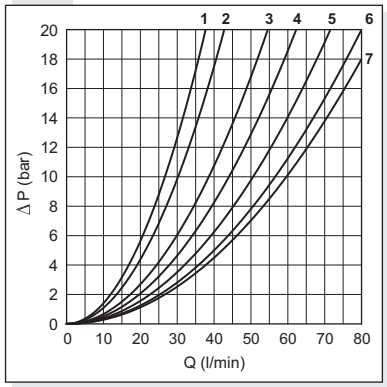
The centre position is obtained by means of calibrated length springs which reposition the spool in the centre or end of travel position once the action of the impulse is over.

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, $ß_{25} \geq 75$.

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:

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

where Δp will be the value for the losses for a specific flow rate Q which can be obtained from the diagram, Δp1 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

1

ORDERING CODE

AD	Directional valve
3	CETOP 3/NG6
E	Type of operator For other operator see next pages
**	Spool see page I•10
*	Mounting type (table 1)
*	Voltage (table 2)
**	Variants (table 3)
*	Serial No.

3 = DC voltage ("D15" coil)
3 = AC voltage ("B14" solenoid)

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	115Vac/50Hz 120Vac/60Hz with rectifier
V	28V*	
N	48V*	
Z	102V*	
P	110V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	DC without coils	

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

(*) Special voltage

• 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.

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	LF(*)	♦	I•20
Emergency button	ES(*)		I•18
Rotary emergency button	P2(*)		I•18
Rotary emergency button (180°)	R5(*)		I•18
Preset for microswitch (E/F/G/H mounting only) (see below note ◊)	MS(*)	♦	I•11- I•14
5 micron clearance	SQ(*)	♦	
Spool movement speed control (only VDC) with ø 0.3 mm orifice	3S(*)	♦	I•12
Spool movement speed control (only VDC) with ø 0.4 mm orifice	JS(*)	♦	I•12
Spool movement speed control (only VDC) with ø 0.5 mm orifice	5S(*)	♦	I•12
Spool movement speed control (only VDC) with ø 0.6 mm orifice	6S(*)	♦	I•12
AMP Junior coil - for12V or 24V DC voltage only	AJ		I•18
AMP Junior coil and integrated diode - for12V or 24V DC voltage only	AD		I•18
Coil with flying leads (175 mm) - for12V or 24V DC voltage only	SL		I•18
D15 plastic type coil - for12V, 24V, 28V or 110V DC voltage only	RS(*)		
Deutsch DT04-2P coil - for12V or 24V DC voltage only	CZ		I•18

Other variants available on request.

◊ = Maximum counter-pressure on T port: 8 bar
♦ = Variant codes stamped on the plate

(*) Coils with Hirschmann connection supplied without connectors. The connectors can be ordered separately, ch. I page 19.

22 W COIL

27 W COIL

UL Recognized Component Mark coils

UL Recognized Component Mark

The UL Recognized Component Mark may be used on component parts that are part of a larger product or system. The UL Mark is the most widely recognised and accepted evidence of product's compliance with Canadian and USA safety requirements.

UL category code (CCN)

- U.S.A. **YSY12**
- Canada **YSY18**

UL category code number (CCN) is assigned in order to identify wich product categories are covered by UL's Certification. Our category covers valve parts, such as solenoid operators, coil assemblies, coil enclosures, valve assemblies and similar items intended to be used as parts of electrically operated valves as indicated in the individual Recognitions.

Aron UL File Number

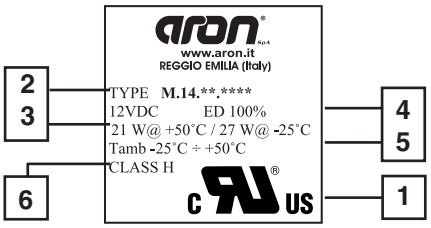
MH45162

Visiting the UL web site (www.ul.com), linking *certifications* and writing the correct Aron UL File Number you can find our Certification.

The UL File Number is an alphanumeric designation assigned to any Company upon successful completion of a product evaluation or company certification.

"22 W" DC COILS

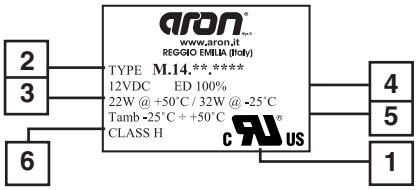
Identification mark



1		Recognized Component Mark
2	**Type**	Coil code, voltage and connector type
	M.14.04.0021	12 VDC (Hirschmann)
	M.14.04.0022	24 VDC (Hirschmann)
	M.14.04.0031	12 VDC (With flying leads)
	M.14.04.0032	24 VDC (With flying leads)
3	**21W@+ 50°C**	Power at +50°C (ambient temperature) for 12 and 24V coils
	27W@- 25°C	Power at -25°C (ambient temperature) for 12 and 24V coils
4	**ED 100%**	Duty cycle
5	**Tamb -25°C ÷ +50°C**	Ambient operating temperature
6	**Class H**	Insulation class wire

"27W" DC COILS

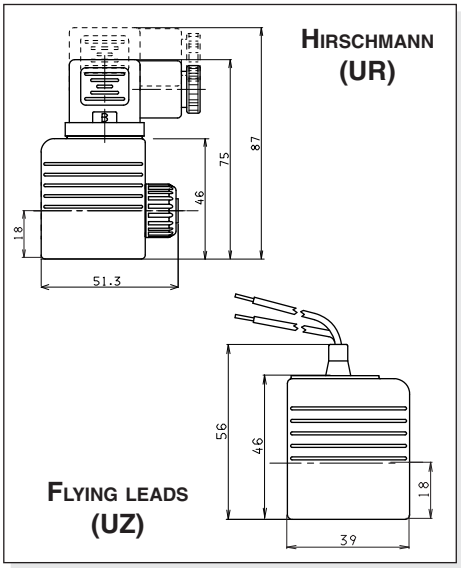
Identification mark



1		Recognized Component Mark
2	**Type**	Coil code, voltage and connector type
	M.14.31.0011	12 VDC (Hirschmann)
	M.14.31.0012	24 VDC (Hirschmann)
	M.14.07.0021	12 VDC (With flying leads)
	M.14.07.0022	24 VDC (With flying leads)
3	**22W@+ 50°C**	Power at +50°C (ambient temperature) for 12V coils
	27W@+ 50°C	Power at +50°C (ambient temperature) for 24V coils
	32W@- 25°C	Power at -25°C (ambient temperature) for 12 and 24V coils
4	**ED 100%**	Duty cycle
5	**Tamb -25°C ÷ +50°C**	Ambient operating temperature
6	**Class H**	Insulation class wire

The Underwriters Laboratories Inc.® is the accredited Unit to release the UL Mark, the most valued product safety symbol.

"22W" DC COILS - UL RECOGNIZED



Type of protection (in relation to connector used)	IP 65
Number of cycle	18.000/h
Supply tolerance	-15% / +10%
Ambient temperature	-25°C ÷ 50°C
Power at +50°C (ambient temperature) for 12 and 24V coils	21W
Power at -25°C (ambient temperature) for 12 and 24V coils	27W
Duty cycle	100% ED
Insulation class wire	H
Weight	0,215 Kg

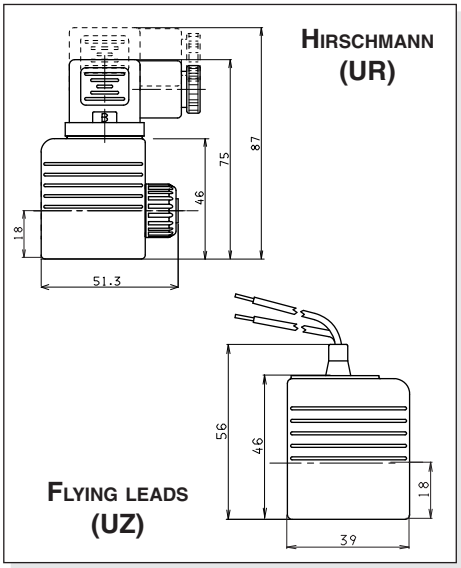
VOLTAGE (V)	MAX WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RATED POWER (W)	RESISTANCE AT 20°C (OHM) ±10%
12V	116°C	22	6.30
24V	116°C	22	25.60

ETUL22W - 00/2007/e

VARIANT AND VOLTAGE CODES (WICH HAVE TO PUT IN THE ORDERING CODE VALVE)

"22W" MOUNTING COMPATIBILITY	CRP, CRD, C2V02 and C3V02 see Ch. V "Cartridge valves"
VARIANT CODE	**UR** = Hirschmann connection **UZ** = Solenoid with flying leads (500 mm) Other variants relate to a special design
VOLTAGE CODE	**L** = 12 VDC **M** = 24 VDC Voltage code is always stamped over on the coil

"27W" DC COILS - UL RECOGNIZED



Type of protection (in relation to connector used)	IP 65
Number of cycle	18.000/h
Supply tolerance	-15% / +10%
Ambient temperature	-25°C ÷ 50°C
Power at +50°C (ambient temperature) for 12V coil	22W
Power at +50°C (ambient temperature) for 24V coil	27W
Power at -25°C (ambient temperature) for 12 and 24V coils	32W
Duty cycle	100% ED
Insulation class wire	H
Weight	0,215 Kg

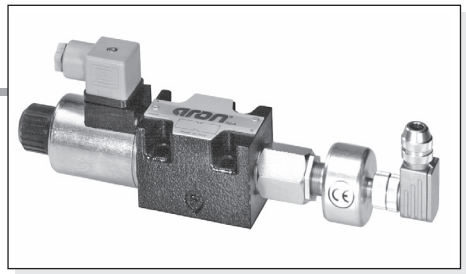
VOLTAGE (V)	MAX WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RATED POWER (W)	RESISTANCE AT 20°C (OHM) ±7%
12V	123°C	27	5.30
24V	123°C	27	21.30

ET27WUL - 00/2007/e

VARIANT AND VOLTAGE CODES (WICH HAVE TO PUT IN THE ORDERING CODE VALVE)

"27W" MOUNTING COMPATIBILITY	AD2E... ADC3E.. and CDL04... see Ch. I "Directional control" C3V03... see Ch. V "Cartridge valves" CDC3... see Ch. XI "Stackable valves"
VARIANT CODE	**UR** = Hirschmann connection **UZ** = Solenoid with flying leads (250 mm) Other variants relate to a special design
VOLTAGE CODE	**L** = 12 VDC **M** = 24 VDC Voltage code is always stamped over on the coil

12



AD.3.V... CETOP 3/NG6

WITH PROXIMITY SENSOR L.V.D.T.

AD.3.V...	
"D15" DC COILS	CH. I PAGE 18
STANDARD CONNECTORS	CH. I PAGE 19
L.V.D.T.	CH. I PAGE 21

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 according 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 (see note*)	250 bar
Max. flow	60 l/min
Max. excitation frequency	3 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm²/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

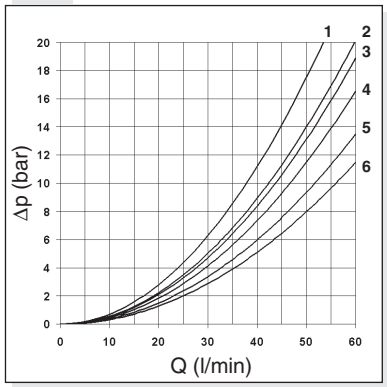
(*) Pressure dynamic allowed for 2 millions of cycles.

- **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 L.V.D.T. proximity sensor
***	Spool and mounting (table 1)
*	Voltage (table 2)
**	Variants (table 3)
2	Serial No.

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.

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

TAB.2 - VOLTAGE

D15 COIL (30W)		
L	12V	
M	24V	115Vac/50Hz 120Vac/60Hz with rectifier
V	28V*	
N	48V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
P	110V*	
R	205V*	
W	Without DC coils and connectors	

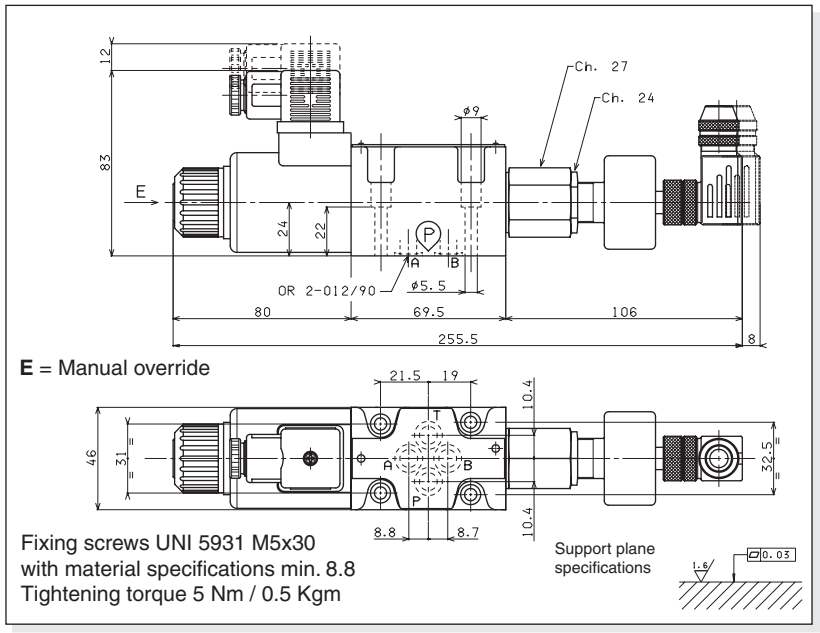
Voltage codes are not stamped on the plate, their are readable on the coils.

* Special voltage

TAB1 - STANDARD SPOOLS FOR AD3V

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

(*) Spool with price increasing



E = Manual override

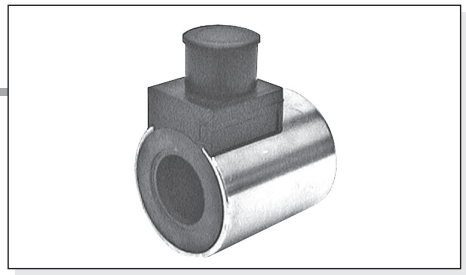
Fixing screws UNI 5931 M5x30 with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

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 connection supplied without connectors. The connectors can be ordered separately, ch. I page 19.



"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	-54°C ÷ 60°C
Duty cycle	100% ED
Insulation class wire	H
Weight	0,354 Kg

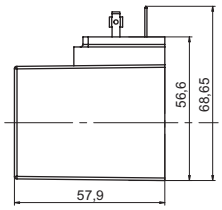
- AMP Junior coils (with or without diode) and coils with flying leads and coils type Deutsch, are available in 12V or 24V DC voltage only.
- The pastic type coil (RS variant) is available in 12V, 24V, 28V or 110V DC voltage only.

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

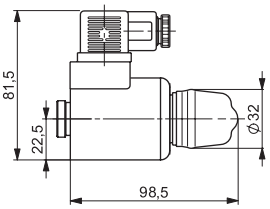
(*) SPECIAL VOLTAGES

ETD15 - 04/2001/e

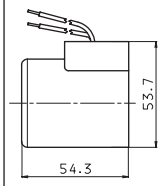
PLASTIC COIL (RS)



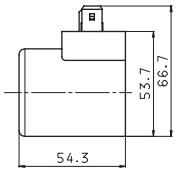
EMERG. HIRSCHMANN CONN.
MANUAL WITHOUT CONN. (ES)
MANUAL WITH CONN. (E1)



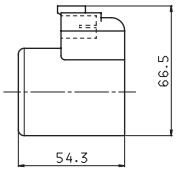
FLYING LEADS (SL)



AMP JUNIOR (AJ)
AJ + DIODE (AD)

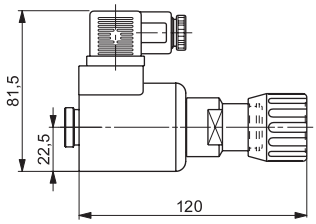


DEUTSCH (CZ)
DT04 - 2P

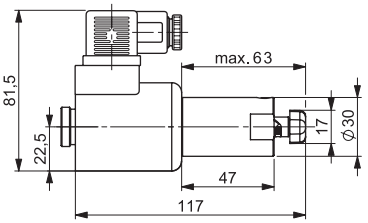


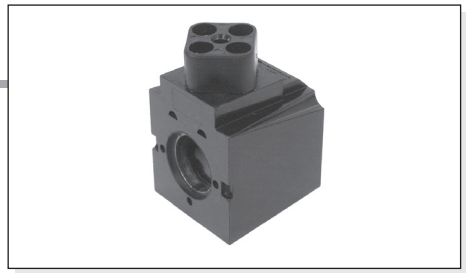
EMERGENCY (COILS WITH HIRSCHMANN CONNECTION)

ROTARY WITHOUT CONNECTOR (P2)
ROTARY WITH CONNETOR (P1)



ROTARY 180° WITHOUT CONNECTOR (R5)
ROTAN 180° ROTARY WITH CONNETOR (P5)





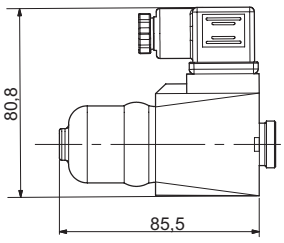
"B14" AC SOLENOIDS FOR CETOP 3

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

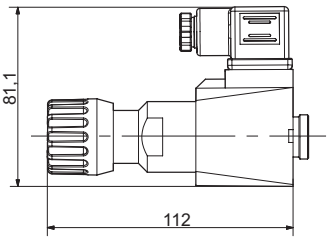
VOLTAGE (V)	MAX. WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RESISTANCE AT 20°C (OHM) ±10%	RATED POWER (VA)	PICKUP CURRENT (A)
24V/50Hz - 24V/60Hz	100°C - 96°C	1.7	54 - 40	5.6 - 5.0
48V/50Hz - 48V/60Hz	112°C - 98C°	6.8	45 - 34	5.3 - 5.0
115V/50Hz - 120V/60Hz	133°C - 101C°	32.5	61 - 51	3.2 - 3.2
230V/50Hz - 240V/60Hz	120°C - 103C°	134	62 - 52	1.6 - 1.6

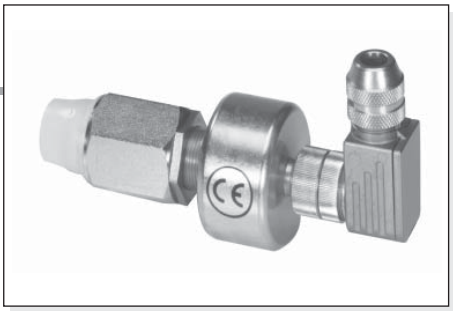
EMERGENCY (COILS WITH HIRSCHMANN CONNECTION)

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



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





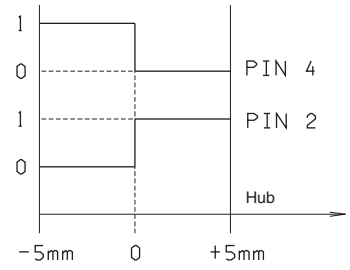
PROXIMITY SENSOR TYPE L.V.D.T.

Supply voltage	24 V ± 20%
Polarity reversal protection	max 300 V
Switching point hysteresis	≤ 0,06 mm
Reproducibility	± 0,02 mm
Max. output current	≤ 250 mA
Protection against short circuit	yes
Operating temperature	-25°C ÷ 85°C
Connection type	connector
Protection according to DIN	IP65
Max. pressure	315 bar

CE certificate according to 89/336/EEC EMC is provided. A screened cable is needed.

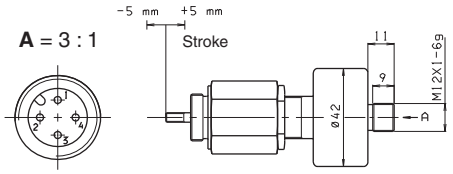
The LVDT position transducers allow to check exactly the very instant when the passage of a minimum flow is allowed.

FUNCTIONAL DIAGRAM ON PIN 2 AND 4

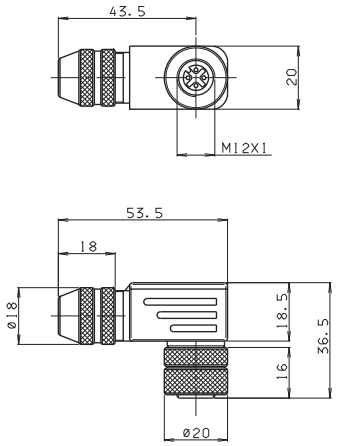


0 = Voltage Pin 2 and Pin 4 < 1,8 V
1 = Voltage Pin 2 and Pin 4 24 V ± 20%

OVERALL DIMENSION LVDT



OVERALL DIMENSIONS CONNECTOR

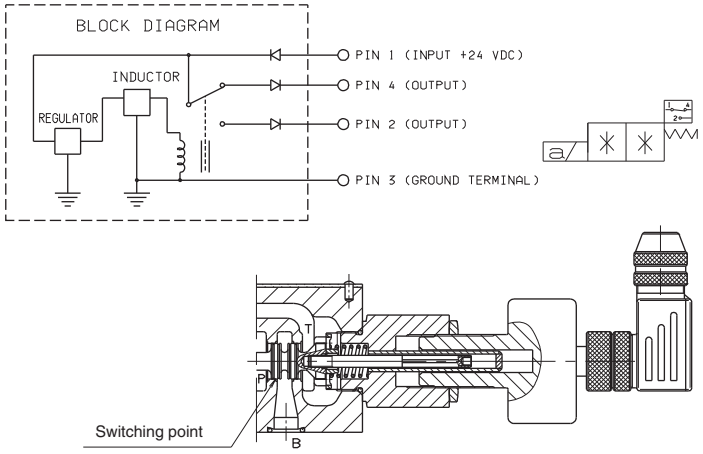


Type of protection IP67
Ambient temperature -40°C ÷ 85°C

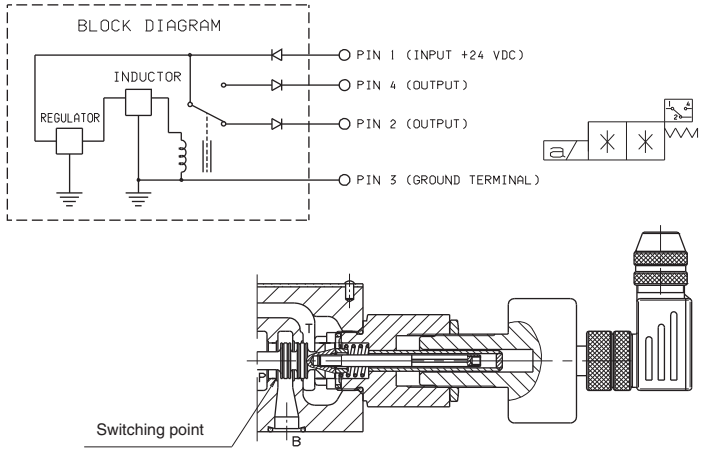
Ordering code: V86400003

ELECTRICAL CONNECTIONS LVDT

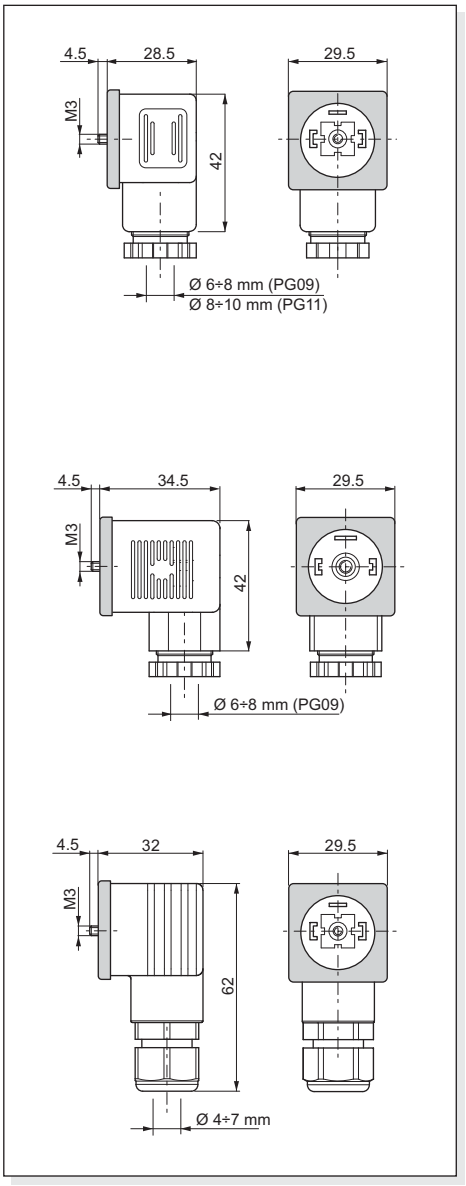
A With this connection, on the Pin 4 an output signal is active when no oil is crossing the valve (from P → B).



B With this connection, on the Pin 4 there is no output signal when oil is crossing the valve (from P → B).



NB:
connecting the output to Pin 4 or Pin 2 the type of contact, normally closed or open, can be chosen.



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 (*)	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

Screw tightening torque: 0.60 Nm

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 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

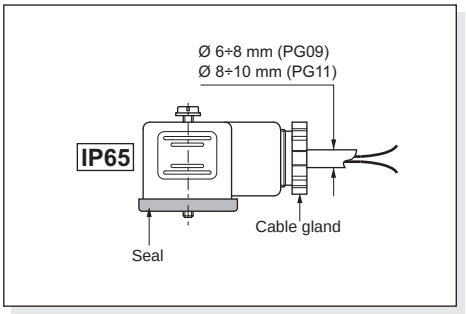
Screw tightening torque: 0.60 Nm

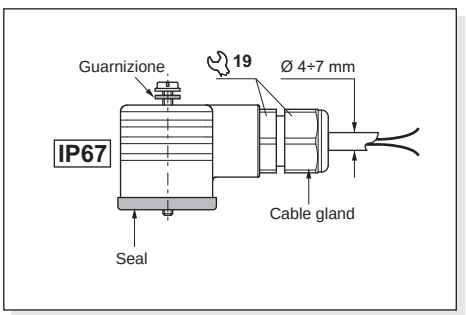
Connector	Protection level	Type	Cable gland	Code
With protection level IP67	IP67	Black color	—	V86 28 0001
		Grey color	—	V86 28 0002

Screw tightening torque: 0.60 Nm

(*) Don't use for proportional versions

ELECTRICAL FEATURES OF CONNECTORS





Description	IP65	IP67
AC rated voltage DC rated voltage	Max. 250 V Max. 300 V	Max. 250 V Max. 300 V
Pin conctat rated flow Pin conctat max. flow	10A 16A	10A 16A
Max. section cable	1.5 mm²	1.5 mm²
Cable gland PG09 - M16x1,5 Cable gland PG11 - G 1/2" - M20x1,5	Ø cable 6 ÷ 8 mm Ø cable 8 ÷ 10 mm	Ø cable 4 ÷ 7 mm —
Protection level Insulation class Operating temperature	IP65 EN60529 VDE 0110-1/89 -40°C ÷ 90 C°	IP67 EN60529 VDE 0110-1/89 -20°C ÷ 80 C°

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

AD.3.L... LEVER OPERATED CETOP 3/NG6

AD.3.L...

STANDARD SPOOLS CH. I PAGE 10

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 mm²/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

ORDERING CODE

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

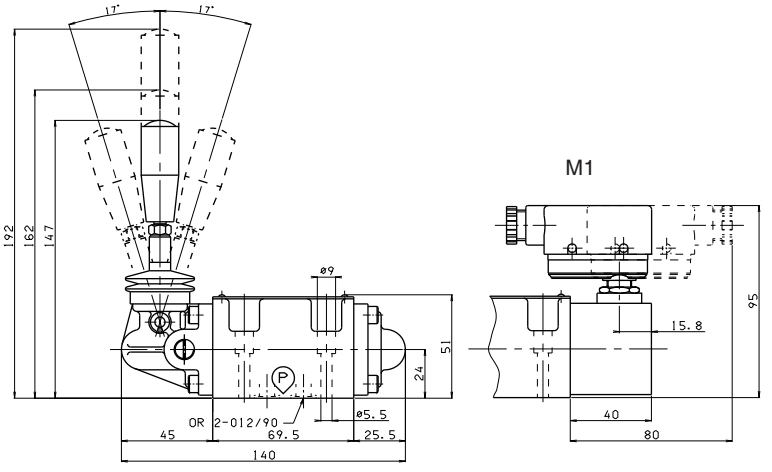
TAB.1 SPOOLS TYPE

- 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

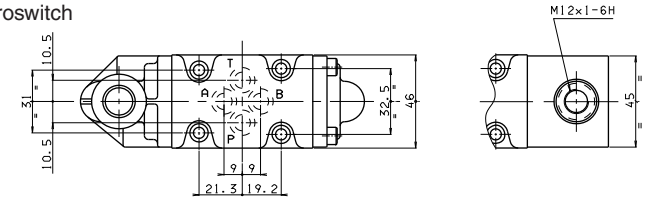
TAB.2 MOUNTING TYPE

C	
E	
F	

OVERALL DIMENSIONS



M1 = microswitch



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

Support plane specifications

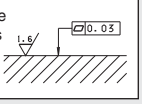


TABLE 3 - VARIANTS TABLE

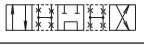
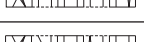
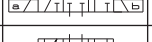
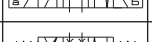
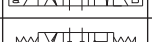
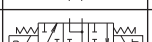
VARIANTS	CODE (♦)
No variant	00
Viton	V1
Preset for microswitch Available on request NATIONAL AM1107 type microswitch	M1 (♦)
Preset for microswitch + Viton	MV (♦)
With detent (*) (mechanical connection) (Springs are different from those for standard versions)	D1 (♦)
Preset for microswitch + Detent (*)	MD (♦)
Lever length 162 mm	L1
Lever length 192 mm	L2
♦ Variant codes stamped on the plate	

(*) max. 150.000 cycles.

DIRECTIONAL CONTROL VALVES
STANDARD SPOOLS CETOP 3/NG6

aron

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*		-	

NOTE

(*) Spool with price increasing

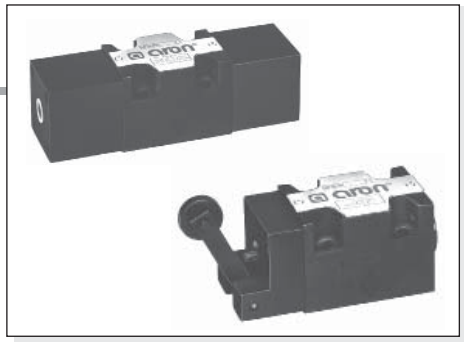
- With spools **15** / **16** / **17** only mounting **E** / **F** are possible
- **16 / 19** / **20** / **21** spool not planned for **AD.3.E...J***
- For lever operated the spools used are different.
Available spools for this kind of valve are: 01 / 02 / 03 / 04 / 05 / 06 / 66 / 07 22 / 13 / 15 / 16 / 17

ONE SOLENOID, SIDE B "F" MOUNTING

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



DIRECTIONAL CONTROL VALVES
OTHER OPERATOR CETOP 3/NG6

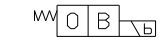
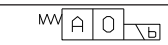
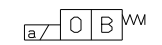
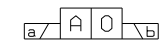
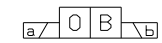
INTRODUCTION

The ARON directional control valves NG6 are designed for subplate mounting with an interface in accordance with 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, $ß_{25} \geq 75$.

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 page 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.

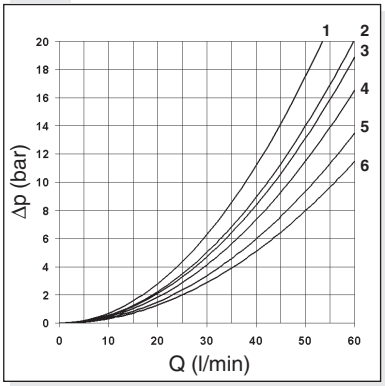
TAB.1
MOUNTING

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	
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	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:

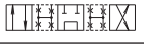
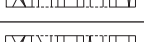
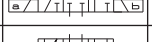
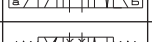
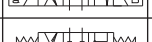
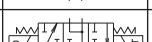
$$\Delta p1 = \Delta p \times (Q1/Q)^2$$

where Δp will be the value for the losses for a specific flow rate Q which can be obtained from the diagram, Δp1 will be the value of the losses for the flow rate Q1 that is used.

DIRECTIONAL CONTROL VALVES
STANDARD SPOOLS CETOP 3/NG6

aron

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*		-	

NOTE

(*) Spool with price increasing

- With spools **15** / **16** / **17** only mounting **E** / **F** are possible
- **16 / 19** / **20** / **21** spool not planned for **AD.3.E...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

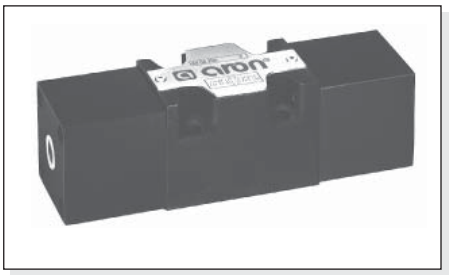
ONE SOLENOID, SIDE B "F" MOUNTING

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

AD.3.P... PNEUMATIC OPERATION TYPE VALVES CETOP 3/NG6



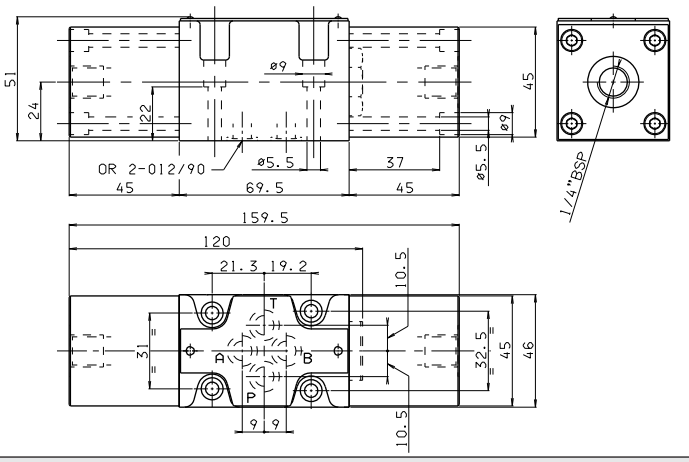
Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	60 l/min
Minimum operating pressure	2 + [0.027 x (pt*)] bar - see note
Maximum operating pressure	20 bar
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	
class 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

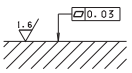
(**pt***) = pressure at port T

OVERALL DIMENSIONS



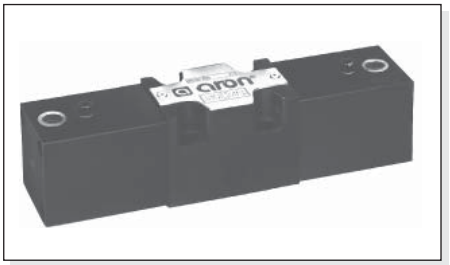
Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications



IAD3P - 02/2000/e

AD.3.O... 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 x (pt*)] bar - see note
Maximum operating pressure	250 bar
Fluid viscosity	10 ÷ 500 mm²/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

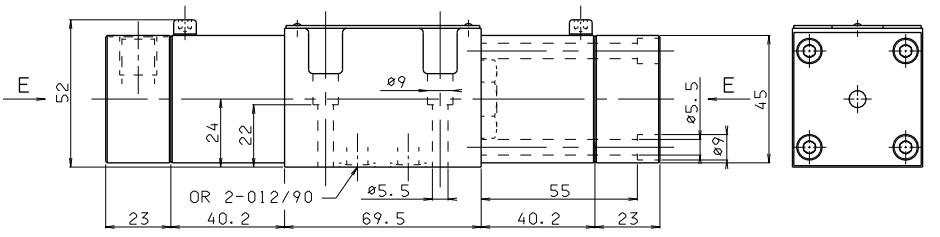
Ordering code see page before

(**pt***) = pressure at port T

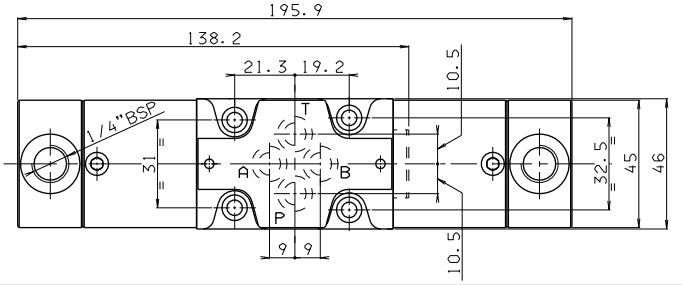
The DI variant is recommended in the environments characterised by the presence of dust or any type of contamination.

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

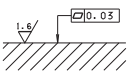


E = Manual override



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

Support plane specifications

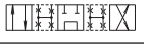
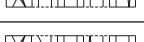
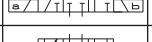
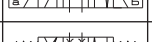
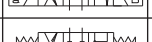
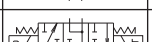


IAD3O - 03/2000/e

DIRECTIONAL CONTROL VALVES
STANDARD SPOOLS CETOP 3/NG6

aron

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*		-	

NOTE

(*) Spool with price increasing

- With spools **15** / **16** / **17** only mounting **E** / **F** are possible
- **16 / 19** / **20** / **21** spool not planned for **AD.3.E...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

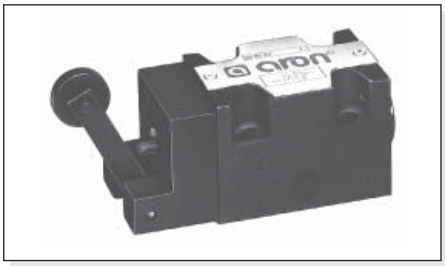
ONE SOLENOID, SIDE B "F" MOUNTING

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

AD.3.M... MECHANICALLY OPERATED 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 force - see note (*)	2,5 Kg
Maximum operating force - see note (**)	13 Kg
Cam angle	27°
Fluid viscosity	10 ÷ 500 mm²/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**

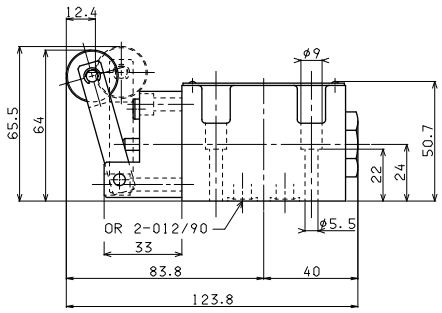
• Ordering code see page before

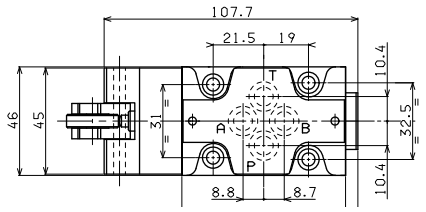
• Note:

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

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

OVERALL DIMENSIONS

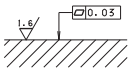




Stroke	12,4 mm
Working stroke	3 mm

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

AD.3.D... DIRECT MECHANICALLY OPERATED TYPE VALVES CETOP 3/NG6

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 mm²/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

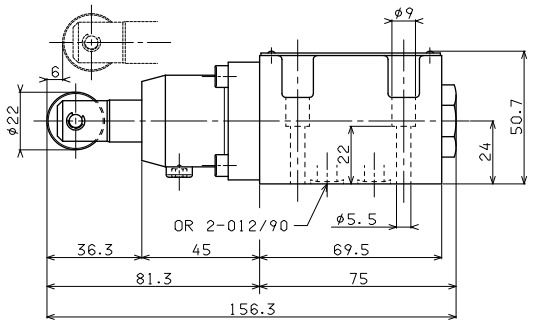
• Possible mountings: **E / F / G / H**

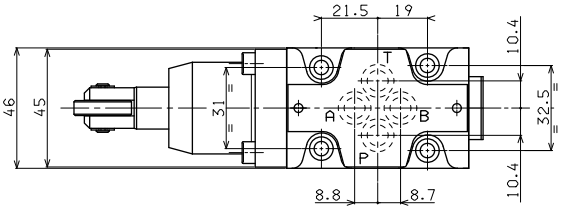
• Ordering code see page before

• Note:

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

OVERALL DIMENSIONS

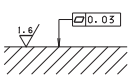




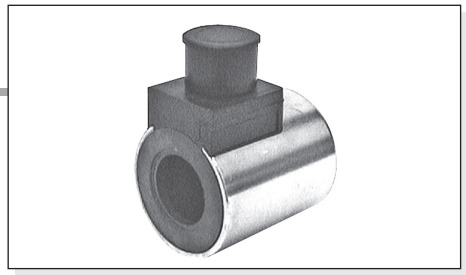
Stroke	6 mm
Extra stroke	2 mm
Working stroke	3 mm

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	-54°C ÷ 60°C
Duty cycle	100% ED
Insulation class wire	H
Weight	0,354 Kg

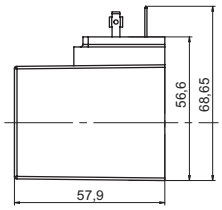
- AMP Junior coils (with or without diode) and coils with flying leads and coils type Deutsch, are available in 12V or 24V DC voltage only.
- The pastic type coil (RS variant) is available in 12V, 24V, 28V or 110V DC voltage only.

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

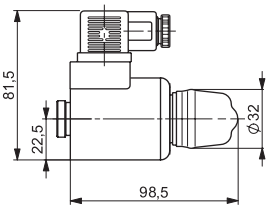
(*) SPECIAL VOLTAGES

ETD15 - 04/2001/e

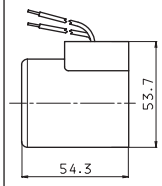
PLASTIC COIL (RS)



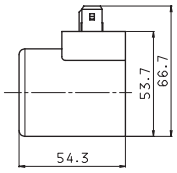
EMERG. HIRSCHMANN CONN.
MANUAL WITHOUT CONN. (ES)
MANUAL WITH CONN. (E1)



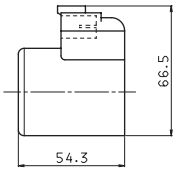
FLYING LEADS (SL)



AMP JUNIOR (AJ)
AJ + DIODE (AD)

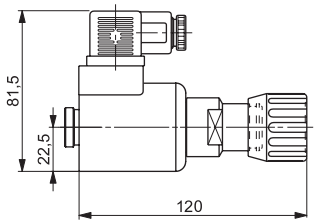


DEUTSCH (CZ)
DT04 - 2P

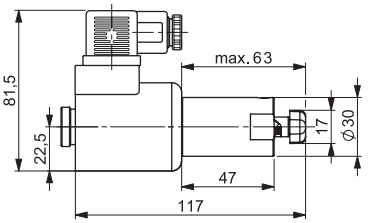


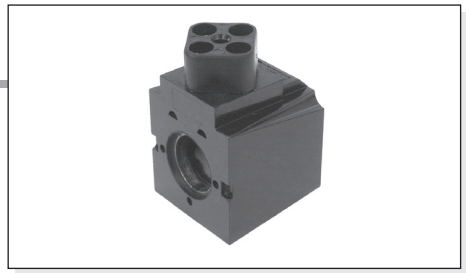
EMERGENCY (COILS WITH HIRSCHMANN CONNECTION)

ROTARY WITHOUT CONNECTOR (P2)
ROTARY WITH CONNETOR (P1)



ROTARY 180° WITHOUT CONNECTOR (R5)
ROTAN 180° ROTARY WITH CONNETOR (P5)





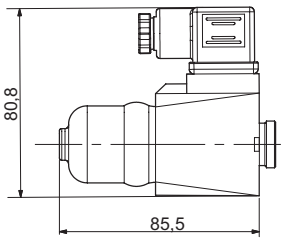
"B14" AC SOLENOIDS FOR CETOP 3

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

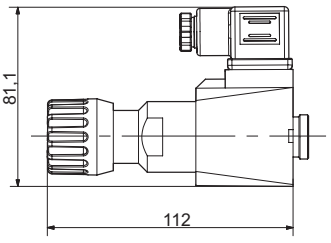
VOLTAGE (V)	MAX. WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RESISTANCE AT 20°C (OHM) ±10%	RATED POWER (VA)	PICKUP CURRENT (A)
24V/50Hz - 24V/60Hz	100°C - 96°C	1.7	54 - 40	5.6 - 5.0
48V/50Hz - 48V/60Hz	112°C - 98C°	6.8	45 - 34	5.3 - 5.0
115V/50Hz - 120V/60Hz	133°C - 101C°	32.5	61 - 51	3.2 - 3.2
230V/50Hz - 240V/60Hz	120°C - 103C°	134	62 - 52	1.6 - 1.6

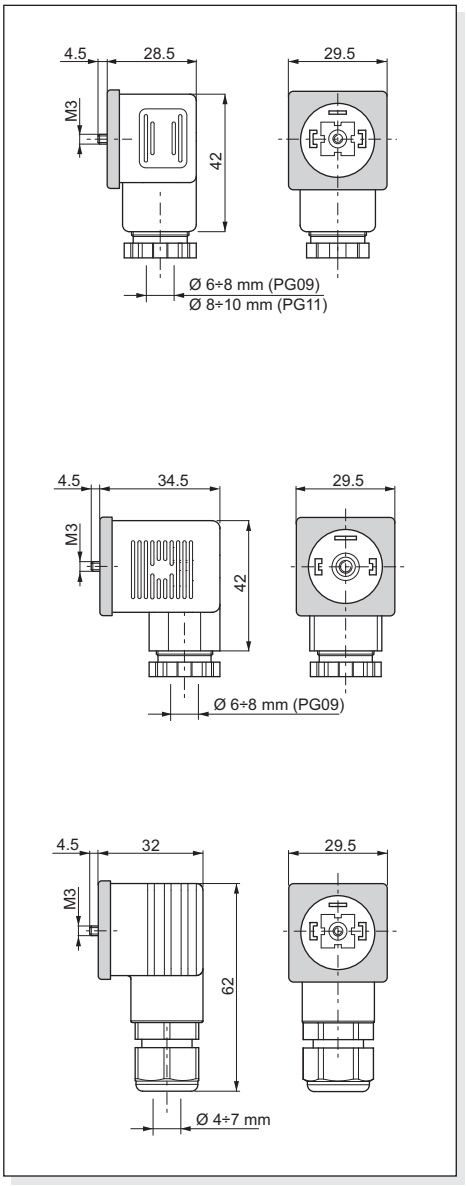
EMERGENCY (COILS WITH HIRSCHMANN CONNECTION)

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



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





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 (*)	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

Screw tightening torque: 0.60 Nm

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 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

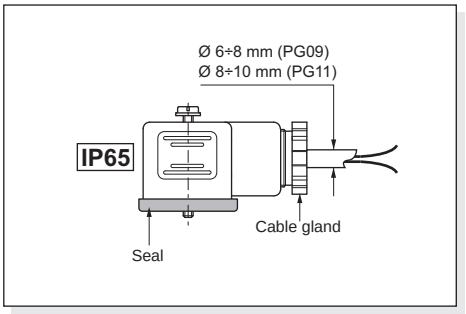
Screw tightening torque: 0.60 Nm

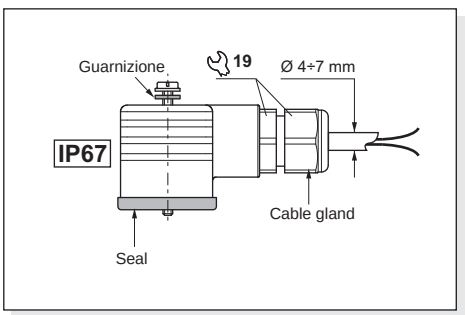
Connector	Protection level	Type	Cable gland	Code
With protection level IP67	IP67	Black color	—	V86 28 0001
		Grey color	—	V86 28 0002

Screw tightening torque: 0.60 Nm

(*) Don't use for proportional versions

ELECTRICAL FEATURES OF CONNECTORS





Description	IP65	IP67
AC rated voltage DC rated voltage	Max. 250 V Max. 300 V	Max. 250 V Max. 300 V
Pin conctat rated flow Pin conctat max. flow	10A 16A	10A 16A
Max. section cable	1.5 mm²	1.5 mm²
Cable gland PG09 - M16x1,5 Cable gland PG11 - G 1/2" - M20x1,5	Ø cable 6 ÷ 8 mm Ø cable 8 ÷ 10 mm	Ø cable 4 ÷ 7 mm —
Protection level Insulation class Operating temperature	IP65 EN60529 VDE 0110-1/89 -40°C ÷ 90 C°	IP67 EN60529 VDE 0110-1/89 -20°C ÷ 80 C°

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

A max. counter-pressure of 8 bar at T is permitted for the variant with a microswitch (**MS**).
(*) 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 milion cycles.

Max. pressure port P/A/B	350 bar
Max. pressure port T (for DC) see note (*)	250 bar
Max. pressure port T (for AC) see note (*)	160 bar
Max. flow	80 l/min
Max. excitation frequency	3 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm²/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 (**)

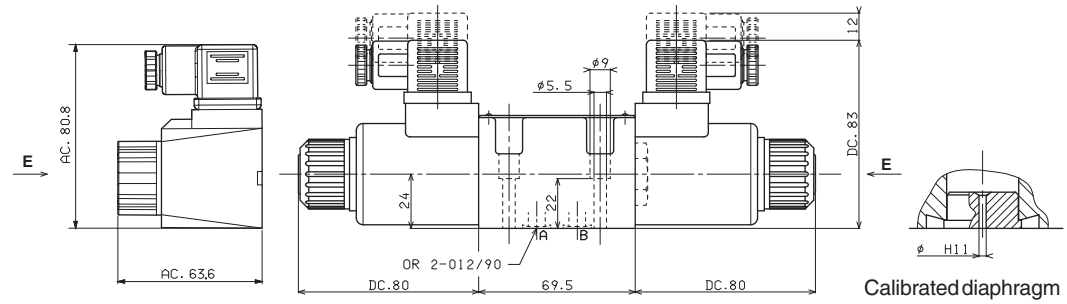
Ø mm	Code
blind	M52.05.0023/4
0.5	M52.05.0023/1
0.6	M52.05.0023/6
0.7	M52.05.0023/8
0.8	M52.05.0023
1.0	M52.05.0023/2
1.2	M52.05.0023/3
1.5	M52.05.0023/7
2.0	M52.05.0023/10
2.2	M52.05.0023/9
2.5	M52.05.0023/5

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

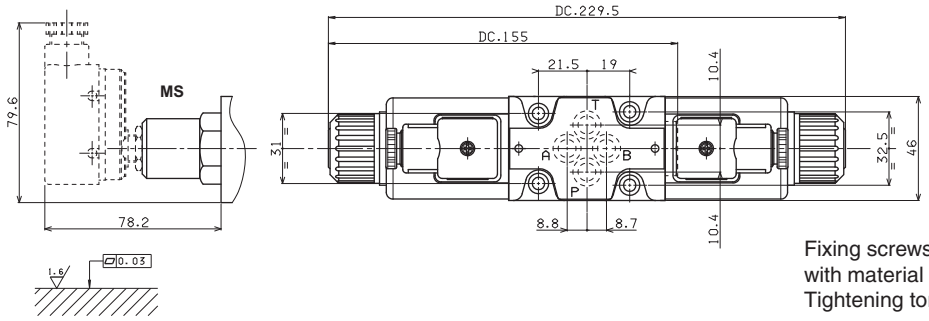
OVERALL DIMENSIONS

E = Manual override

MS = Microswitch



Calibrated diaphragm



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

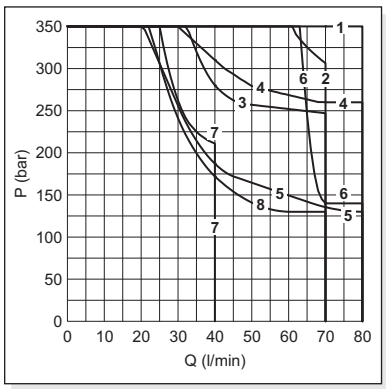
Support plane specifications

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.

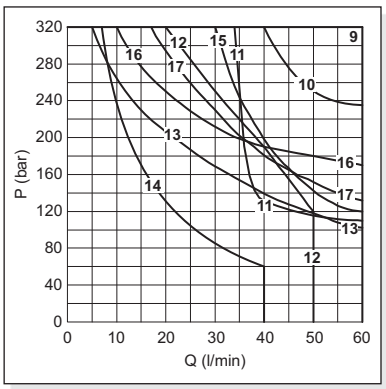
Direct current:	Energizing	30 ÷ 50 ms.	Alternating current:	Energizing	8 ÷ 30 ms.
	De-energizing	10 ÷ 30 ms.		De-energizing	15 ÷ 55 ms.

DIRECT CURRENT SOLENOIDS (DC)



Spool type	Solenoids DC	Solenoids 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)



1

Valves type AD3.E...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 AD.3...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

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

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 mm²/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

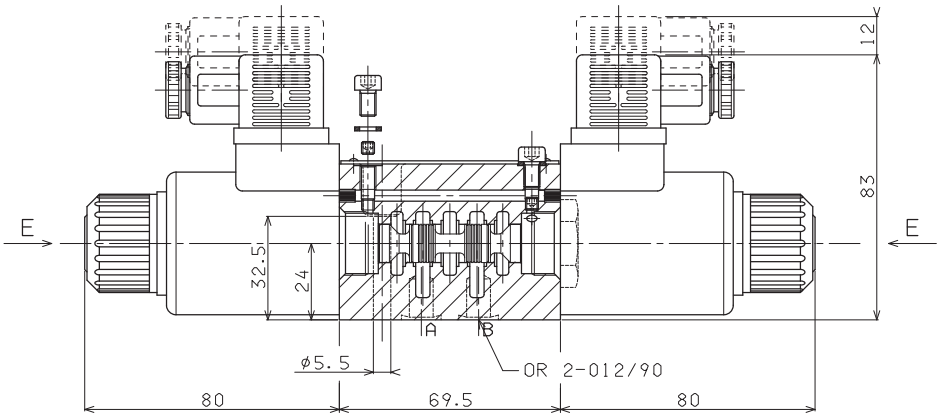
(*) Pressure dynamic allowed for 2 millions of cycles.

CALIBRATED ORIFICES AVAILABLE

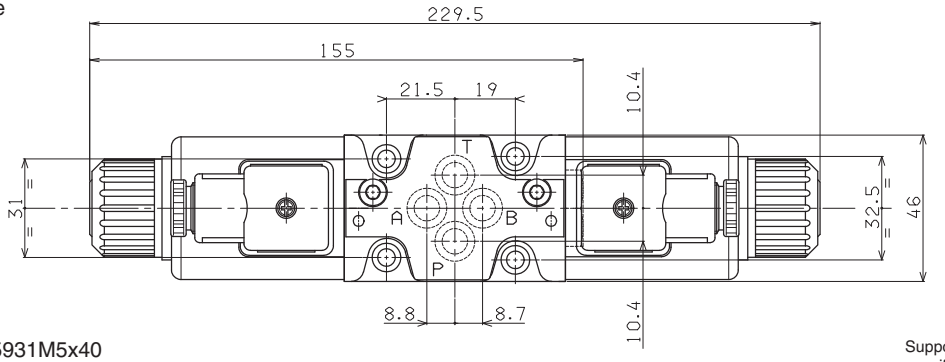
ø (mm)	M4x4	Code
0.3	M89.10.0028	**3S** (J3+S1)*
0.4	M89.10.0029	**JS** (J4+S1)*
0.5	M89.10.0006	**5S** (J5+S1)*
0.6	M89.10.0030	**6S** (J6+S1)*

* Old code

OVERALL DIMENSIONS

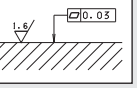


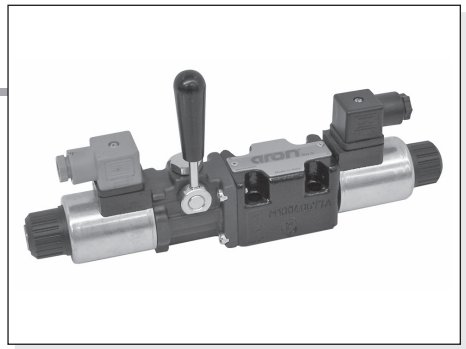
E = Manual override



Fixing screws UNI 5931M5x40
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications





VARIANTS (*) - EMERGENCY CONTROL LEVER FOR DIRECTIONAL CONTROL VALVES (ADC/AD.3.E)

The emergency control lever for solenoid valves by Aron, represents a develop in terms of safety and flexibility among applied hydraulic components.

Thanks to his flexibility, the component was designed to be inserted between the valve body and the spool, providing total interchangeability between the different types of solenoid body valves manufactured by Aron. It is compatible with the standard CETOP 3 and stackable valves with threaded connections –G3/8" or 9/16-18UNF (SAE 6). The component is available for both directional control and proportional valves (for the last type of control please consult our Technical Department)

As an emergency lever applied to solenoid valves, the control can be used as a safety device in conformity with the industry standards , also playing an useful role in the event of power cuts. The control can be used in agricultural and mobile fields; the manual action can be used to carry out periodic maintenance work on mobile components of the vehicle , in perfectly safe working conditions.

(*) VARIANTS

Variant	Description
LE	Standard coil with Hirschmann connection
LF	Standard coil without Hirschmann connection
AX	AMP Junior coil
CE	Deutsch coil

Other variants available on request.

Max operating pressure port T:	
dynamic	160 bar
static	210 bar
Max operating pressure port P for series connection configuration	160 bar

- **MOUNTING TYPE: C / F / H**
- **SPOOLS TYPE: 01/02/03*/04/16/17/66**

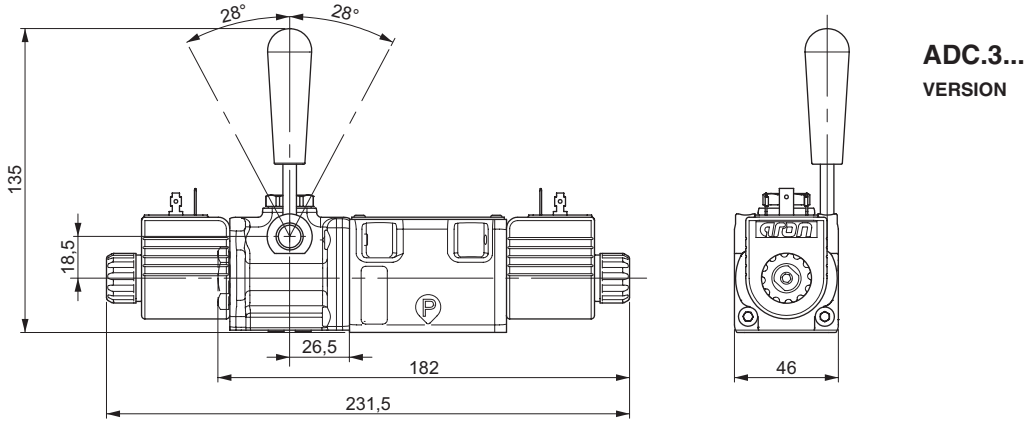
* The spool 03 is allowed only on AD3E. Not permitted with ADC3

HYDRAULIC SIMBOL

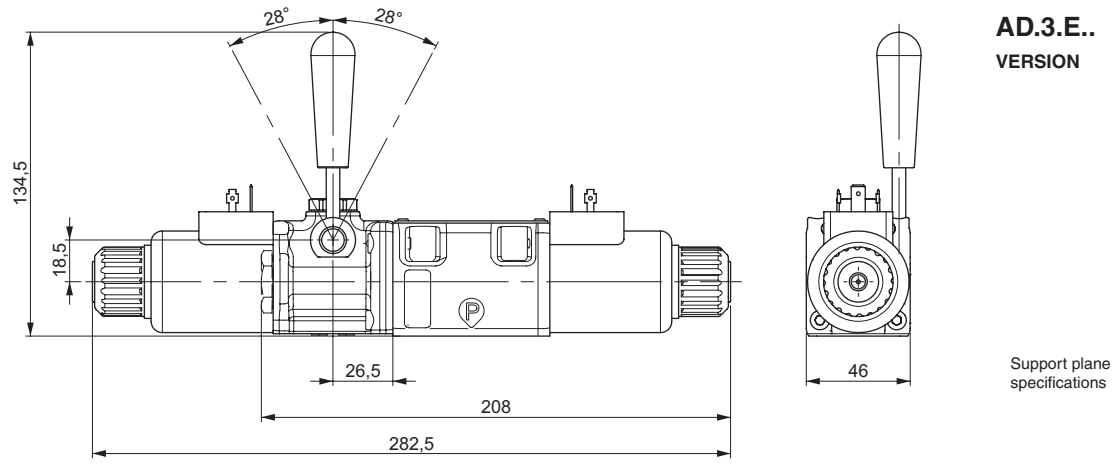
MOUNTING COMPATIBILITY

CODE VALVE	DESCRIPTION	COIL	VOLTAGE
ADC.3...	Directional control valve	A09	27 W
AD.3.E...	Directional control valve	D15	30 W

OVERALL DIMENSION

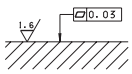


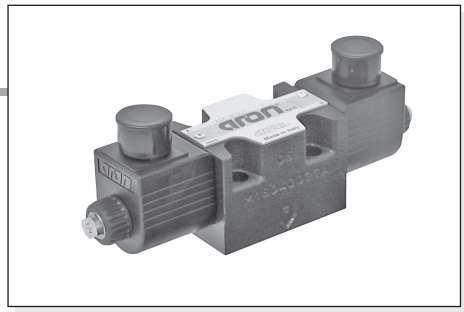
ADC.3...
VERSION



AD.3.E..
VERSION

Support plane specifications





ADC.3... DIRECTIONAL CONTROL VALVES CETOP 3

SOLENOID OPERATED WITH REDUCED OVERALL SIZE

ADC.3.E...	
"A09" DC COILS	CH. I PAGE 7
STANDARD CONNECTORS	CH. I PAGE 19

The ARON 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.

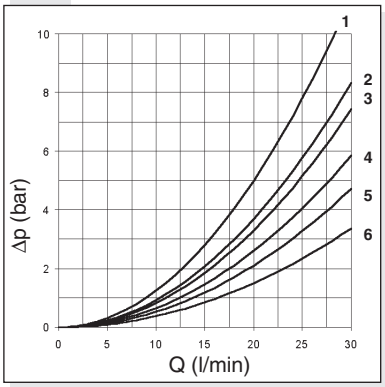
The ADC.3 valve uses shorter solenoids than the standard AD.3.E to reduce the overall dimensions.

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

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 mm²/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:

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

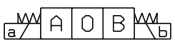
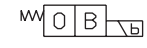
where Δp will be the value for the losses for a specific flow rate Q which can be obtained from the diagram, $\Delta p1$ will be the value of the losses for the flow rate Q1 that is used.

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.

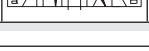
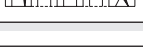
TAB.1 - MOUNTING

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

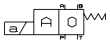
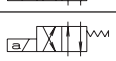
STANDARD SPOOL

* SPOOLS WITH PRICE INCREASING

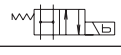
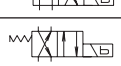
TWO SOLENOIDS, SPRING CENTRED "C" MOUNTING

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*	115Vac/50Hz 120Vac/60Hz with rectifier
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	Without DC coils	

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

* Special voltage

TAB.3 - VARIANTS

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.

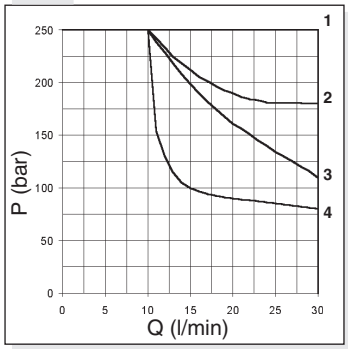
(*) Coils with Hirschmann connection supplied without connectors. The connectors can be ordered separately, ch. I page 19.

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

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

• The Deutsch coil with bidirectional diode is available in 12V DC voltage only.

LIMITS OF USE (MOUNTING C-E-F)



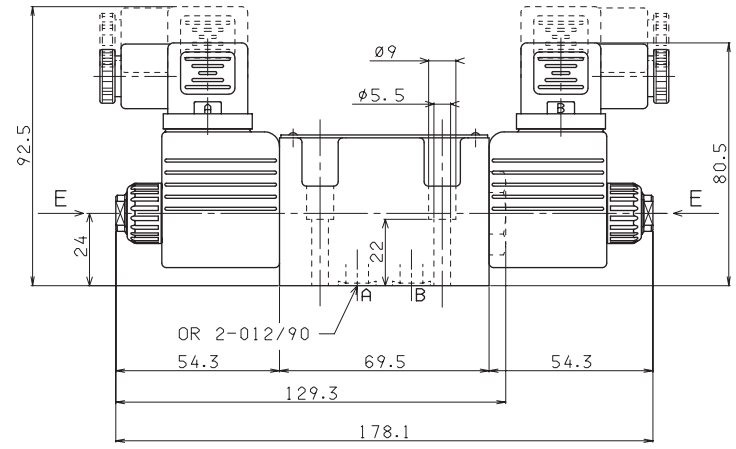
Spool type	n° curve
01	2
02	1
03	3
04	3
15-16	1(4*)

(4*) = 15 and 16 spools used as 2 or 3 way, follow the curve n°4

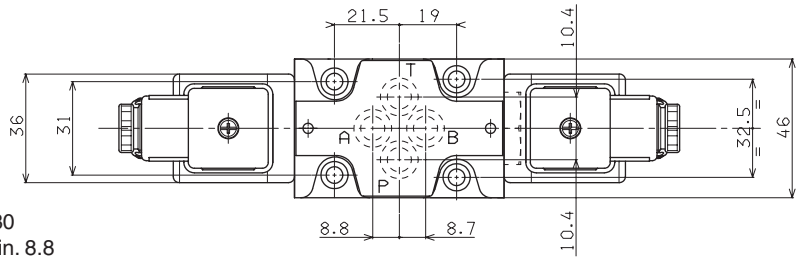
The tests have been carried out with solenoids operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 50 C°. The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40 degrees C. The values in the diagram refer to tests carried out with the oil flow in two 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 15-16). The tests were carried out with a counter-pressure of 2 bar at T port.

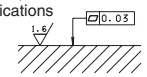
OVERALL DIMENSIONS



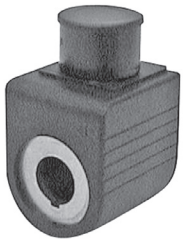
E = Manual override



Support plane specifications



Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 ÷ 6 Nm / 0.5 ÷ 0.6 Kgm



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

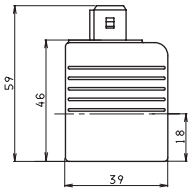
- The AMP Junior coil and with the flying leads (with or without diode) coils are available in 12V or 24V DC voltage only.
- The Deutsch coil with bidirectional diode is available in 12V DC voltage only.

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

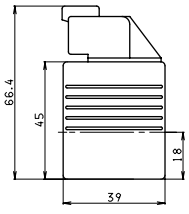
* SPECIAL VOLTAGES

ETA09 - 04/2001/e

AMP JUNIOR (AJ)

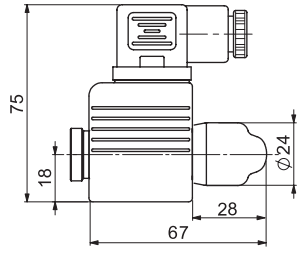


DEUTSCH COIL + BIDIR. DIODE (CX) DT04 - 2P

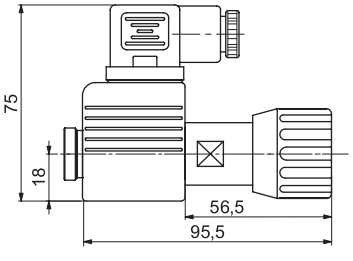


EMERGENCY (COILS WITH HIRSCHMANN CONNECTION)

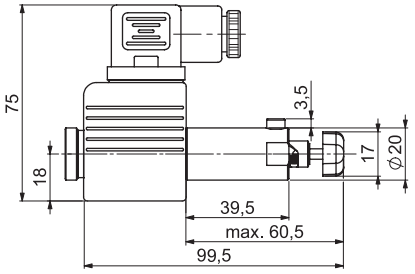
MANUAL WITHOUT CONNECTOR (ES)
MANUAL WITH CONNETOR (E1)



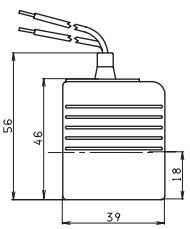
ROTARY WITHOUT CONNECTOR (P2*)
ROTAN ROTARY TE WITH CONNETOR (P1*)



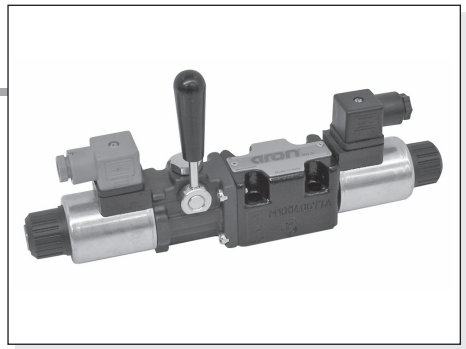
ROTARY 180° WITHOUT CONNECTOR (R5*)
ROTARY 180° WITH CONNETOR (P5*)



FLYING LEADS (FL)
LEADS + DIODE (LD)



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



VARIANTS (*) - EMERGENCY CONTROL LEVER FOR DIRECTIONAL CONTROL VALVES (ADC/AD.3.E)

The emergency control lever for solenoid valves by Aron, represents a develop in terms of safety and flexibility among applied hydraulic components.

Thanks to his flexibility, the component was designed to be inserted between the valve body and the spool, providing total interchangeability between the different types of solenoid body valves manufactured by Aron. It is compatible with the standard CETOP 3 and stackable valves with threaded connections –G3/8" or 9/16-18UNF (SAE 6). The component is available for both directional control and proportional valves (for the last type of control please consult our Technical Department)

As an emergency lever applied to solenoid valves, the control can be used as a safety device in conformity with the industry standards , also playing an useful role in the event of power cuts. The control can be used in agricultural and mobile fields; the manual action can be used to carry out periodic maintenance work on mobile components of the vehicle , in perfectly safe working conditions.

(*) VARIANTS

Variant	Description
LE	Standard coil with Hirschmann connection
LF	Standard coil without Hirschmann connection
AX	AMP Junior coil
CE	Deutsch coil

Other variants available on request.

Max operating pressure port T:	
dynamic	160 bar
static	210 bar
Max operating pressure port P for series connection configuration	160 bar

- **MOUNTING TYPE: C / F / H**
- **SPOOLS TYPE: 01/02/03*/04/16/17/66**

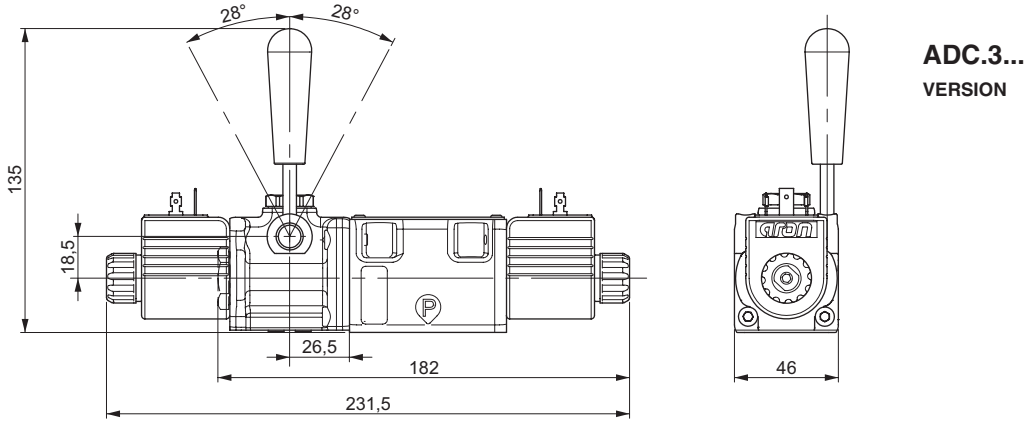
* The spool 03 is allowed only on AD3E. Not permitted with ADC3

HYDRAULIC SIMBOL

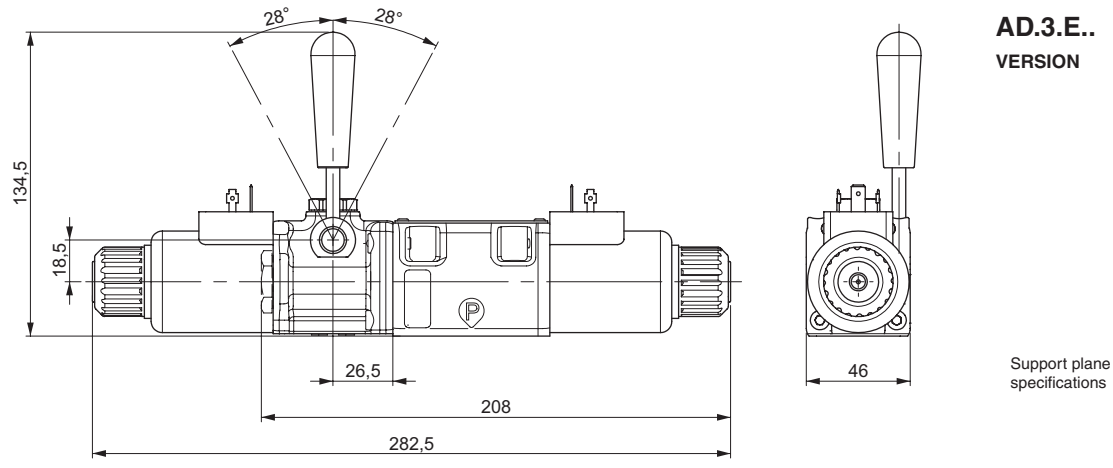
MOUNTING COMPATIBILITY

CODE VALVE	DESCRIPTION	COIL	VOLTAGE
ADC.3...	Directional control valve	A09	27 W
AD.3.E...	Directional control valve	D15	30 W

OVERALL DIMENSION



ADC.3...
VERSION



AD.3.E..
VERSION

Support plane specifications