КАТАЛОГ

на гидравлическое оборудование ARON

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Севастополь (8692)22-31-93
Симферополь (3652)67-13-56
Смоленск (4812)29-41-54
Сочи (862)225-72-31
Ставрополь (8652)20-65-13
Таджикистан (992)427-82-92-69
Сургут (3462)77-98-35
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Томск (3822)98-41-53
Тула (4872)74-02-29
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Единый адрес для всех регионов: any@nt-rt.ru || www.aron.nt-rt.ru

CETOP 2/NG04	
AD.2.E...	Ch. I page 4
"A09" DC Coils	Ch. I page 4
Standard connectors	Ch. I page 19

Directional control valves CETOP 2/NG4

The ARON 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).

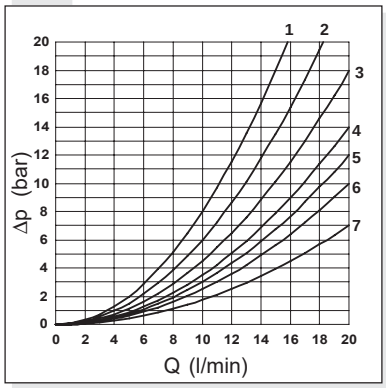
The spool rest positions are obtained by means of springs which centre it when there is no electrical impulse. The solenoids are constructed to DIN 40050 standards and are supplied by means of DIN 43650 ISO 4400 standard connectors which, suitably assembled, ensure a protection class of IP 65.

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, $ß_{25} \geq 75$..

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	
66	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 mm^2/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:

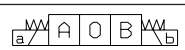
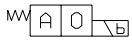
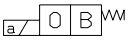
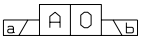
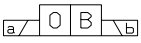
$$\Delta p1 = \Delta p \times (Q1/Q)^2$$

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.

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.

TAB. 1 MOUNTING

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

TAB.3 - VARIANTS

VARIANT	CODE
No variant	00
Viton	V1
Pilot light	X1
Rectifier	R1
Emergency button	E1
Rotary emergency button	P1 (*)
Solenoid valve without connectors	S1
Cable gland "PG 11"	C1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
AMP Junior connection	AJ
Solenoid with flying leads (250 mm)	FL
Solenoid with flying leads (130 mm) and integrated diode	LD
Deutsch connection with bidir. diode	CX
Coil 8W (only 24V)	8W
Other variants relate to a special design	

(*) **P1 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	115Vac/50Hz 120Vac/60Hz with rectifier
M	24V	
N	48V*	
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	Without DC coils	

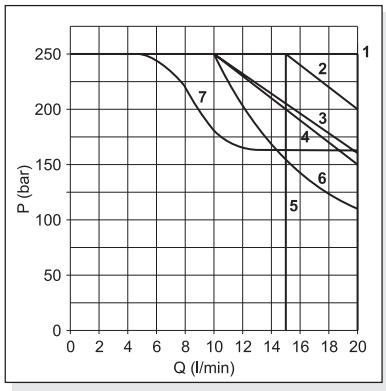
Voltage codes are not stamped on the plate, their are readable on the coils.

* Special voltage

- **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 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



Spool Type	Curves No
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

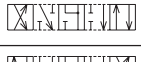
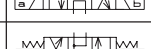
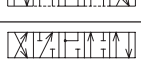
The tests have been carried out with solenoids at operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 40°C. The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40 C°. The values in the diagram refers to tests carried out with the oil flow in two directions 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

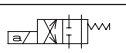
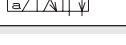
Tests have been carried out by spool normally closed with flow of 10 l/min at 125 bar and a 100% supply, warm standard coil and without any electronic components. These values are indicative and depend on the following parameters: the hydraulic circuit, the fluid used and the variation of pressure, flow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

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

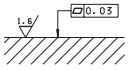
AD.2.E... DIRECTIONAL CONTROL SOLENOID OPERATED VALVES CETOP 2/NG4

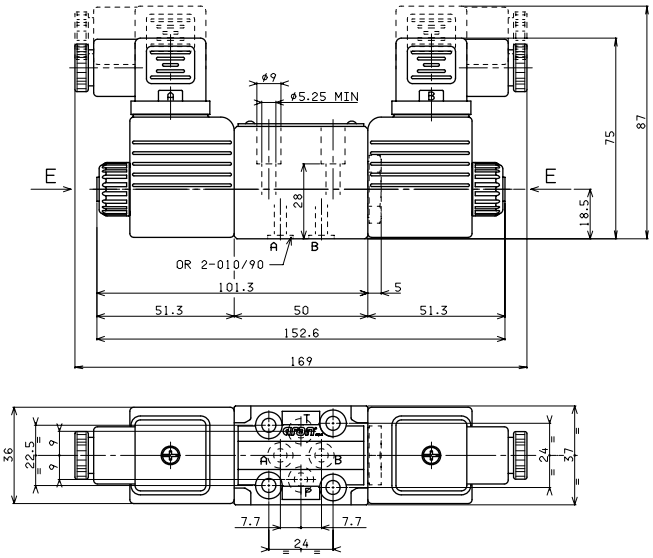
Max. pressure ports P/A/B	250 bar
Max pressure port T (dynamic)	250 bar
Max flow	20 l/min
Max excitation frequency	3 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm^2/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max contamination level	class 10 in accordance with NAS 1638 with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





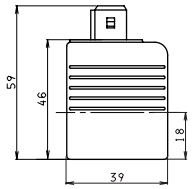
DC COILS A09

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	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.

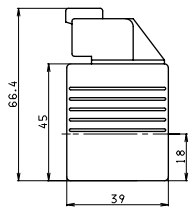
AMP JUNIOR (AJ)



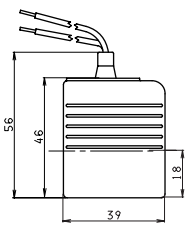
VOLTAGE (V)	MAX WINDING TEMPERATURE (AMBIENT TEMPERATURE 25°C)	RATED POWER (W)	RESISTANCE AT 20°C (OHM) ±7%
12V	123°C	27	5.3
24V	123°C	27	21.3
48V*	123°C	27	85.3
102V*	123°C	27	392
110V*	123°C	27	448
205V*	123°C	27	1577

***** Special voltages

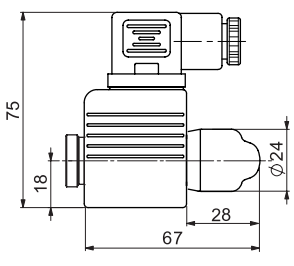
DEUTSCH COIL WITH BIDIR. DIODE (CX) DT04 - 2P



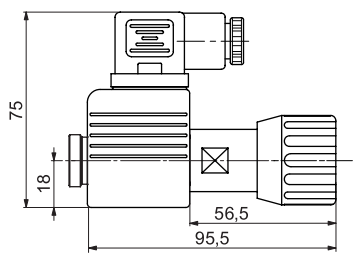
FLYING LEADS (FL) LEADS WITH DIODO (LD)



E1 MANUAL EMERGENCY



P1(*) ROTARY EMERGENCY



(*) **P1 Emergency** tightening torque **max. 6÷9 Nm / 0.6 ÷ 0.9 Kgm** with CH n. 22

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

ADC.3... DIRECTIONAL CONTROL VALVES CETOP 3

SOLENOID OPERATED WITH REDUCED OVERALL SIZE

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.

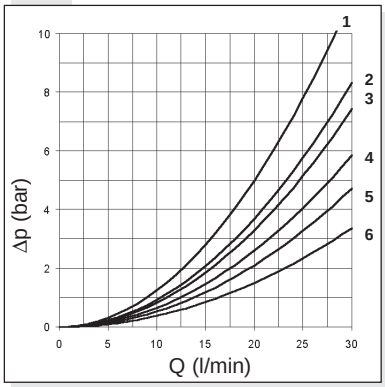
The ADC.3 valve uses shorter solenoids than the standard AD.3.E to reduce the overall dimensions.

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, $ß_{25} \geq 75$.

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 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 $ß_{25} \geq 75$
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 mm^2/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:

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

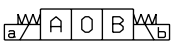
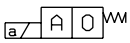
where Δp will be the value for the losses for a specific flow rate Q which can be obtained from the diagram, $\Delta p1$ will be the value of the losses for the flow rate Q1 that is used.

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

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	
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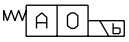
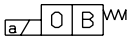
SPECIALS (WITH PRICE INCREASING)	
G	
H	

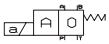
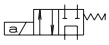
STANDARD SPOOL

* 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

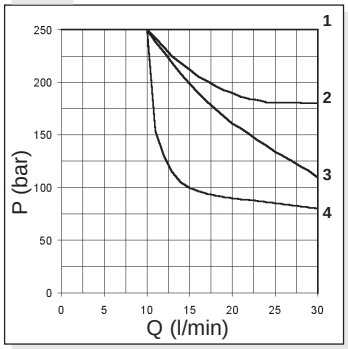
No variant	00
Viton	V1
Pilot light	X1
Rectifier	R1
Solenoid valve without connectors	S1
Cable gland"PG 11"	C1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
Emergency button	E1
Rotary emergency button	P1 (*)
Rotary emergency button (180°)	P5 (*)
Variant with lever for emergency button	LE
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 relate to a special design

- 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.

(*) **P1 and P5 Emergency** tightening torque **max. 6÷9 Nm / 0.6 ÷ 0.9 Kgm** with CH n. 22

LIMIT OF USE



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

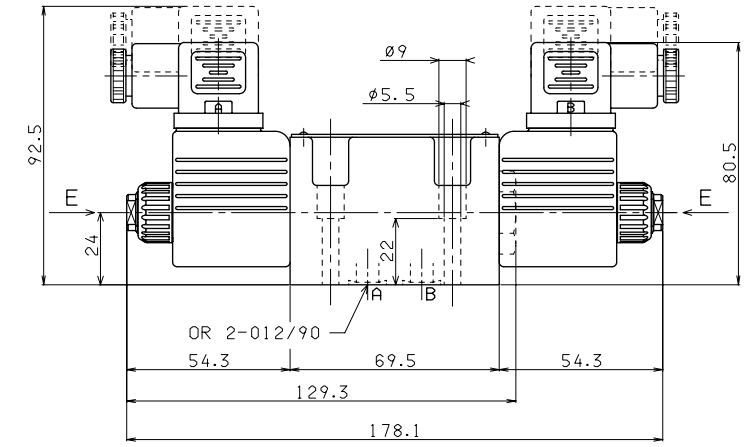
(4*) = 15 and 16 spools used as 2 or 3 way, follow the curve n°4

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).

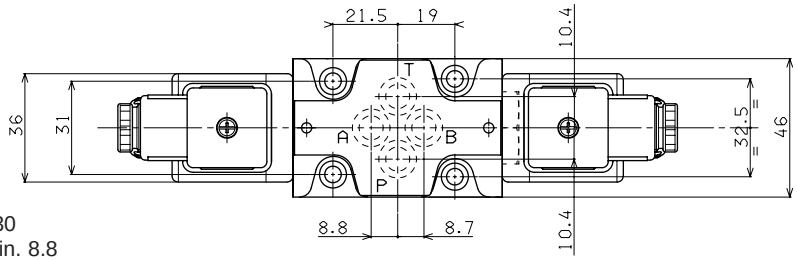
In the cases where valves 4/2 and 4/3 are used with the flow in one direction only, the limits of use could have variations which may even be negative (See curve No 4 and Spool No 15-16). The tests were carried out with a counter-pressure of 2 bar at T port.

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

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	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.

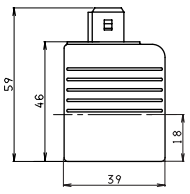
• The Deutsch coil with bidirectional diode is available in 12V DC voltage only.

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

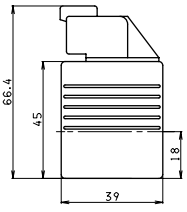
* SPECIAL VOLTAGES

ETA09 - 04/2001/e

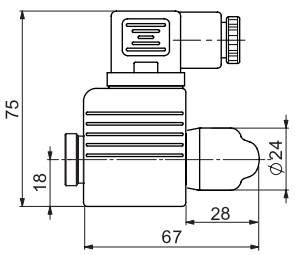
AMP JUNIOR (AJ)



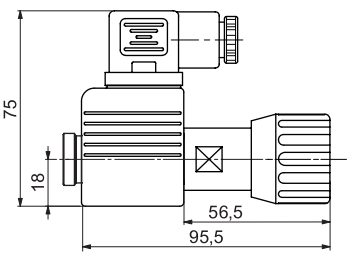
DEUTSCH COIL + BIDIR. DIODE (CX) DT04 - 2P



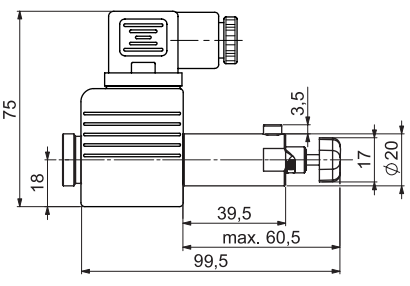
E1 MANUAL EMERGENCY



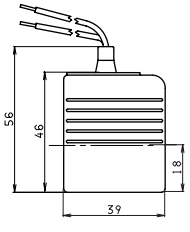
P1(*) ROTARY EMERGENCYE



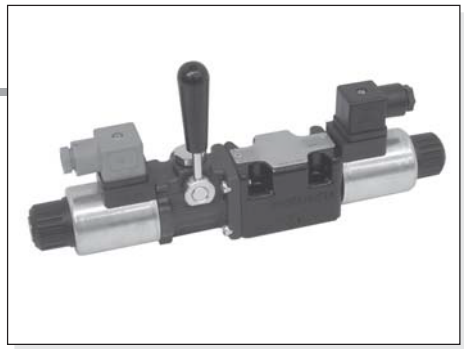
P5(*) ROTARY EMERGENCY 180°



FLYING LEADS (FL) LEADS + DIODE (LD)



(*) **P1 and P5 Emergency** tightening torque **max. 6÷9 Nm / 0.6 ÷ 0.9 Kgm** with CH n. 22



"LE" VARIANT - 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.

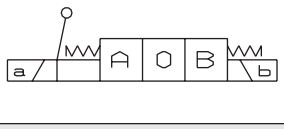
Thanks to his flexibility, the component was designed to be inserted between the valve body and the spool, providing total interchangeability between the different types of solenoid body valves manufactured by Aron. It is compatible with the standard CETOP 3 and stackable valves with threaded connections –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.

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**

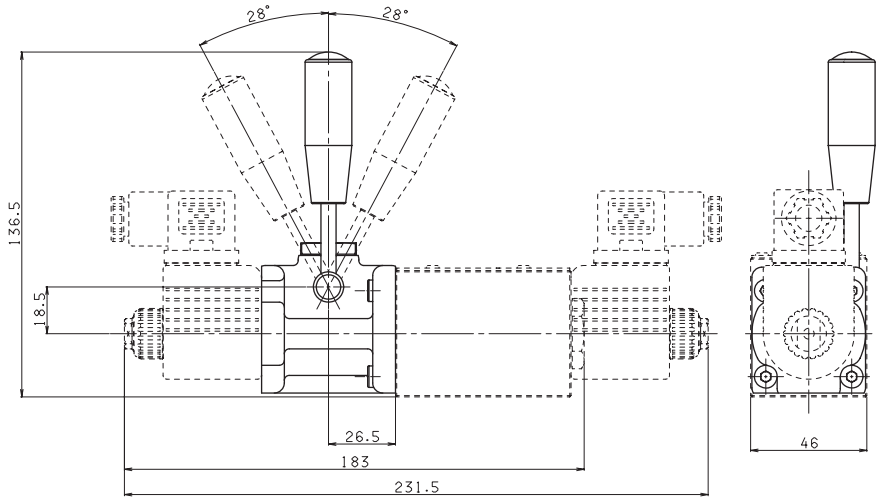
HYDRAULIC SIMBOL



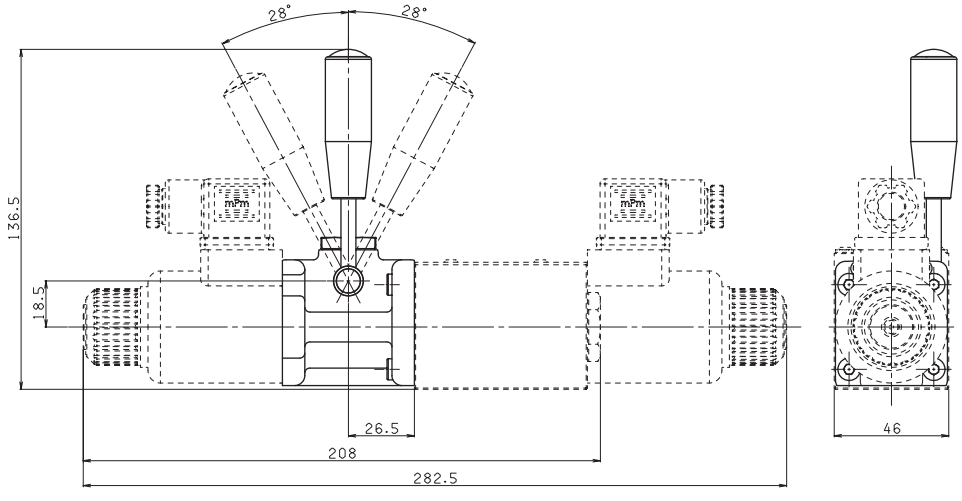
MOUNTING COMPATIBILITY

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

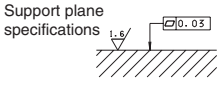
OVERALL DIMENSION

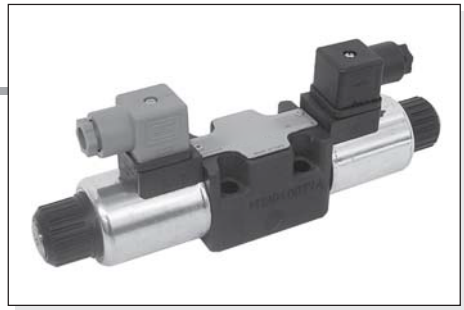


ADC.3...
VERSION



AD.3.E..
VERSION





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.

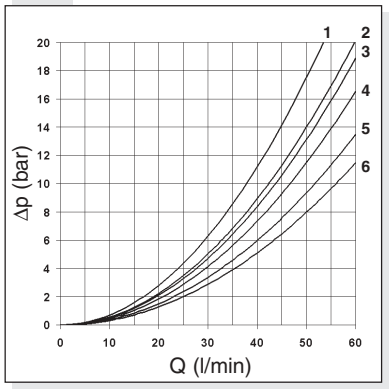
The centre position is obtained by means of calibrated length springs which reposition the spool in the centre or end of travel position once the action of the impulse is over.

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, $\Delta p1$ 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	6	6	6	6	5
03	5	5	6	6	
04	1	1	1	1	4
44	1	1	1	1	2
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.				

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)
2 = AC voltage ("K12" solenoid)

TAB.2 "E" OPERATOR TYPE

	AC VOLTAGE	
A	24V/50Hz	
B	48V/50Hz*	
J	115V/50Hz - 120V/60Hz	
Y	230V/50Hz - 240V/60Hz	
E	240V/50Hz*	
F	24V/60Hz*	
K	AC without coils	
	DC VOLTAGE	
L	12V	115Vac/50Hz 120Vac/60Hz with rectifier
M	24V	
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.

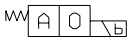
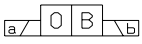
• The pastic type coil (BR variant) is available in 12V, 24V, 28V or 110V DC voltage only.

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	00		
Viton	V1		
Emergency control lever for directional control valves type ADC3 and AD3E	LE		I•20
Emergency button	E1		I•18
Rotary emergency button	P1		I•18
Rotary emergency button (180°)	P5		I•18
Pilot light	X1		I•19
Rectifier	R1		I•19
Preset for microswitch (E/F/G/H mounting only) (see below note ◊)	M1	♦	I•11- I•14
Solenoid valve without connectors	S1		
Marine version (AD.3.P..)	H1	♦	
Cable gland "PG 11"	C1		I•19
Emergency button+ Viton	EV		
Emergency button+ Pilot light	EX		
Viton + Pilot light	VX		
Emergency button+ Viton + Pilot light	A1		
Emergency button+ Rectifier	ER		
Viton + Rectifier	VR		
Viton + Rectifier + Emergency button	A2		
Pilot light + Rectifier	XR		I•19
Pilot light + Rectifier + Emergency button	A3		
Pilot light + Rectifier + Emergency button+ Viton	A4		
Preset for microswitch + Viton	MV	♦	
5 micron clearance	Q1	♦	
Spool movement speed control (only VDC) with ø 0.3 mm orifice	J3	♦	I•12
Spool movement speed control (only VDC) with ø 0.4 mm orifice	J4	♦	I•12
Spool movement speed control (only VDC) with ø 0.5 mm orifice	J5	♦	I•12
Spool movement speed control (only VDC) with ø 0.6 mm orifice	J6	♦	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	BR		
Deutsch DT04-2P coil - for12V or 24V DC voltage only	CZ		I•18
IP67 type of connector	CN		I•19

Other variants relate to a special design

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

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 variant J***
- For lever operated the spools used are different.
Available spools for this kind of valve are: 01 / 02 / 03 / 04 / 05 / 06 / 66 / 07
22 / 13 / 15 / 16 / 17

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*		-	

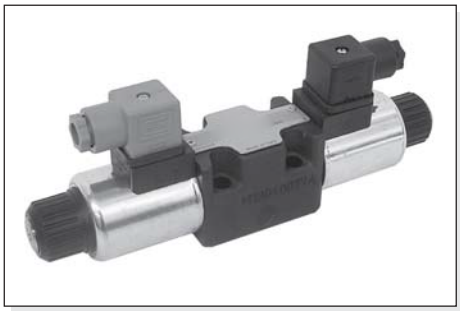
ONE SOLENOID, SIDE B "F" MOUNTING

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.E... 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 (**M1**).

(*) Pressure dynamic allowed for 2 millions of 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)	160 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
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	1,25 Kg
Weight with two AC solenoids	1,55 Kg

CALIBRATED DIAPHRAGMS (**)

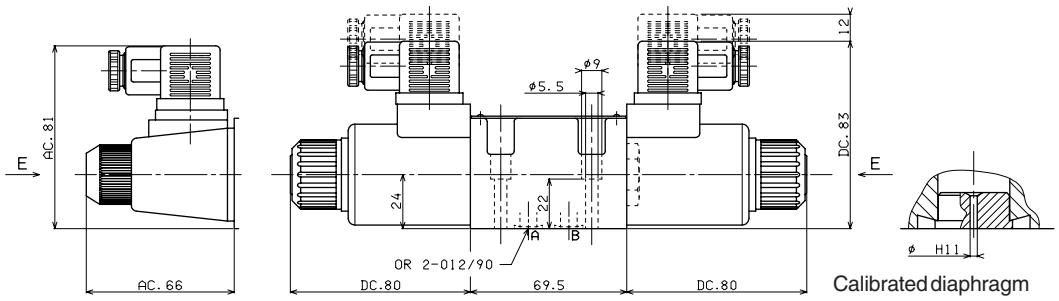
ø (mm)	Code
blind	M52.05.0023/4
0.5	M52.05.0023/1
0.6	M52.05.0023/6
0.7	M52.05.0023/8
0.8	M52.05.0023
1.0	M52.05.0023/2
1.2	M52.05.0023/3
1.5	M52.05.0023/7
2.0	M52.05.0023/10
2.2	M52.05.0023/9
2.5	M52.05.0023/5

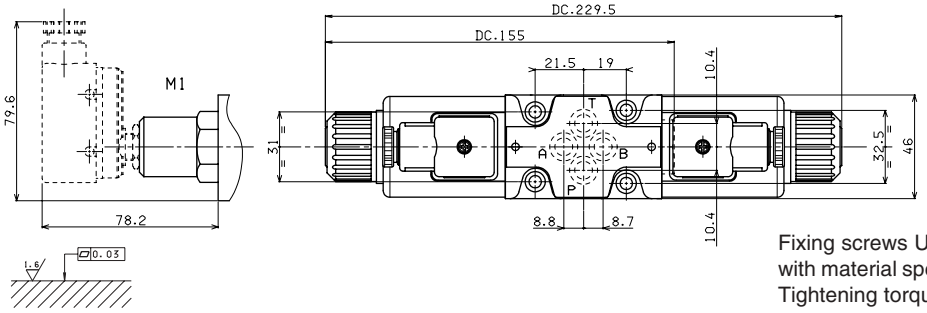
(**) For high differential pressure please contact our technical department.

OVERALL DIMENSIONS

E = Manual override

M1 = Microswitch





Support plane specifications

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

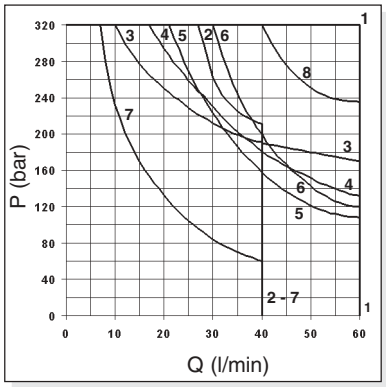
LIMITS OF USE

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

Direct current: Energizing 30 ÷ 50 ms. De-energizing 10 ÷ 30 ms.

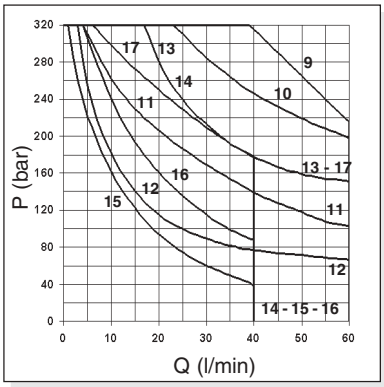
Alternating current: Energizing 8 ÷ 30 ms. De-energizing 15 ÷ 55 ms.

DIRECT CURRENT SOLENOIDS (DC)



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

ALTERNATING CURRENT SOLENOIDS (AC)



AD.3.E...J* VALVES WITH SPOOL MOVEMENT SPEED CONTROL VARIANT J*

Valves type AD3.E... variant 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 AD3E variant J*

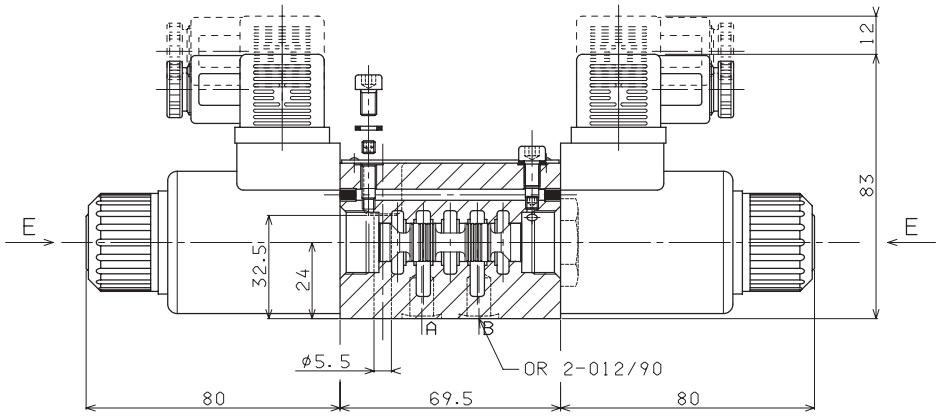
Max. pressure ports P/A/B	320 bar
Max. pressure port T (*)	250 bar
Max. flow	30 l/min
Max. excitation frequency	2 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Weight with one DC solenoid	1,65 Kg
Weight with two solenoids DC solenoids	2 Kg

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

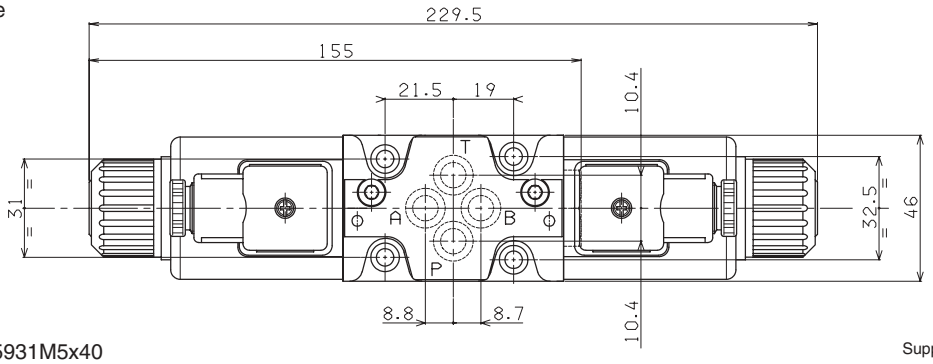
CALIBRATED ORIFICES AVAILABLE

ø (mm)	M4x4	Code
0.3	M89.10.0028	**J3**
0.4	M89.10.0029	**J4**
0.5	M89.10.0006	**J5**
0.6	M89.10.0030	**J6**

OVERALL DIMENSIONS

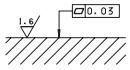


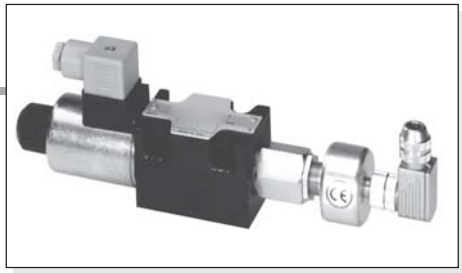
E = Manual override



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

Support plane specifications





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**

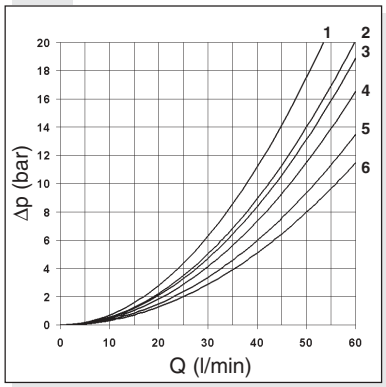
ORDERING CODE

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.

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)

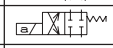
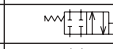
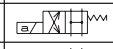
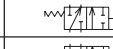
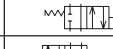
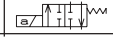
L	12V	
M	24V	115Vac/50Hz 120Vac/60Hz with rectifier
V	28V*	
N	48V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
P	110V*	
R	205V*	
W	Without DC coils and connectors	

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

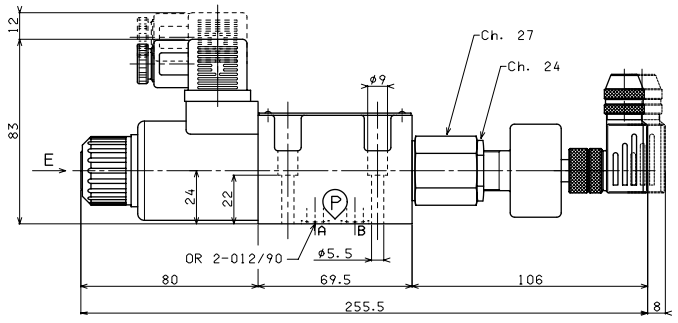
* Special voltage

TAB1 - STANDARD SPOOLS FOR AD3V

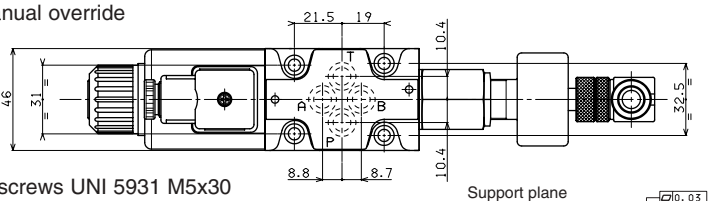
POSSIBLE MOUNTING: E / F / H

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

(*) Spool with price increasing

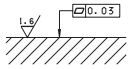


E = Manual override



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

Support plane specifications



TAB.3 - VARIANTS

No variant (connectors as in the drawing)	00
Viton	V1
Emergency button	E1
Pilot light	X1
Rectifier	R1
Flow diversion without connector (coil)	S1
Without proximity connector LVDT	S3
Without coils and proximity connector	S4
Cable gland "PG 11"	C1
Viton + Pilot light	VX
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 relate to a special design

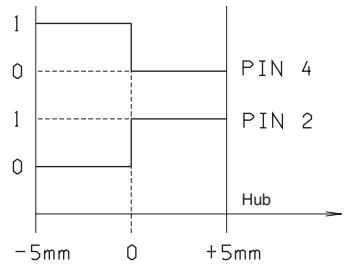
PROXIMITY SENSOR TYPE L.V.D.T.

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.

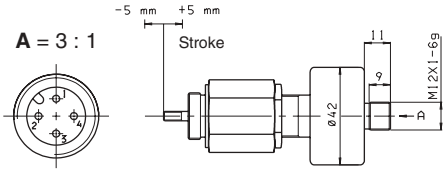
The LVDT position transducers allow to check exactly the very instant when the passage of a minimum flow is allowed.

FUNCTIONAL DIAGRAM ON PIN 2 AND 4

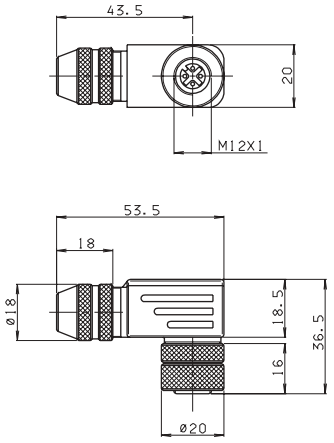


0 = Voltage Pin 2 and Pin 4 < 1,8 V
1 = Voltage Pin 2 and Pin 4 24 V ± 20%

OVERALL DIMENSION LVDT



OVERALL DIMENSIONS CONNECTOR

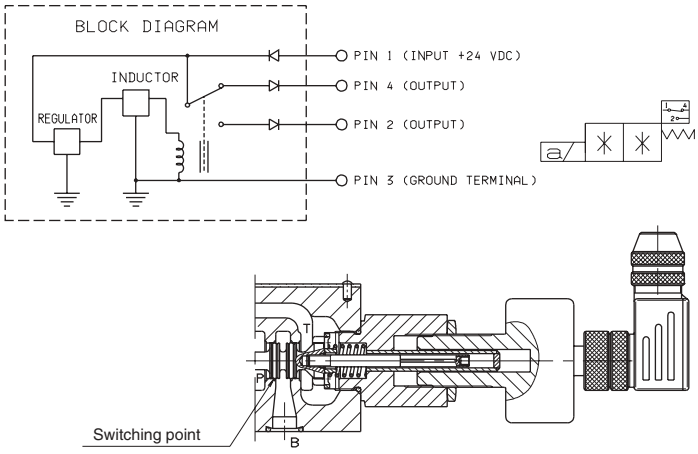


Type of protection IP67
Ambient temperature -40°C ÷ 85°C

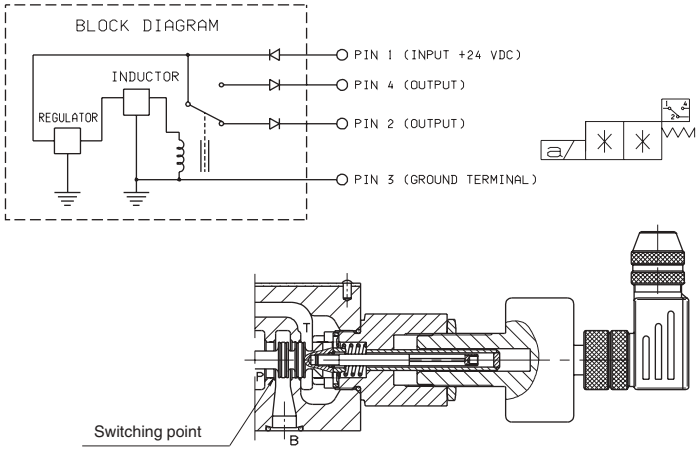
Ordering code: V86400003

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.

AD.3.L... 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 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 $ß_{25} \geq 75$
Weight	1,2 Kg
Weight M1 variant	1,8 Kg

AD.3.L...

STANDARD SPOOLS CH. I PAGE 10

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.

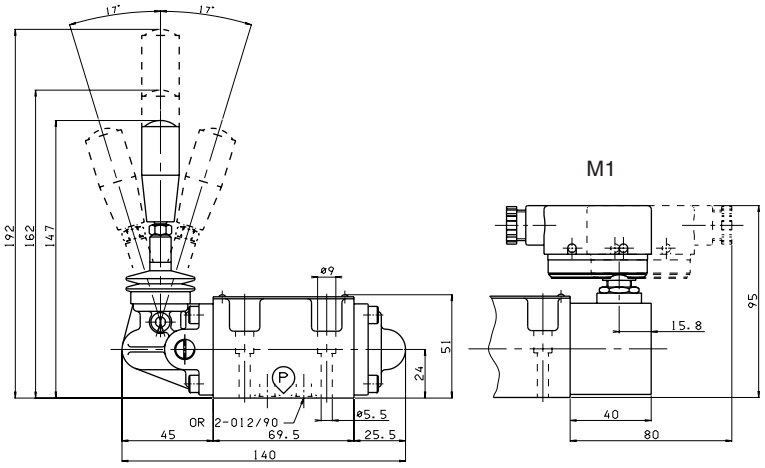
TAB.1 SPOOLS TYPE

- 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

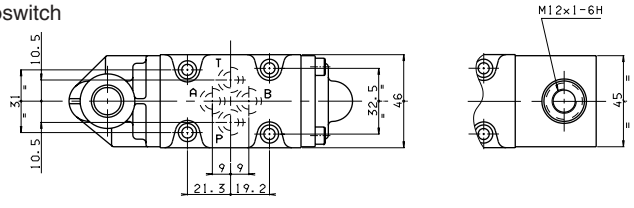
TAB.2 MOUNTING TYPE

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

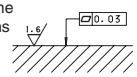
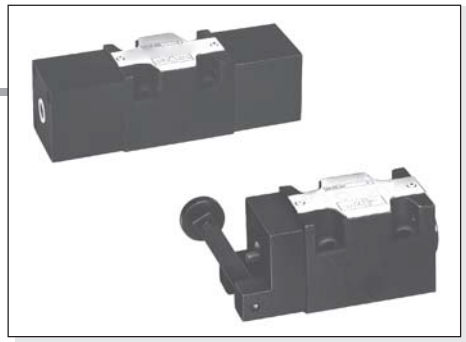


TABLE 3 - VARIANTS TABLE

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	



DIRECTIONAL CONTROL VALVES
OTHER OPERATOR CETOP 3/NG6

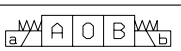
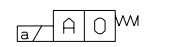
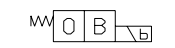
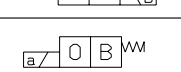
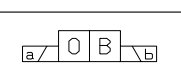
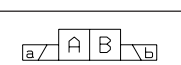
INTRODUCTION

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.

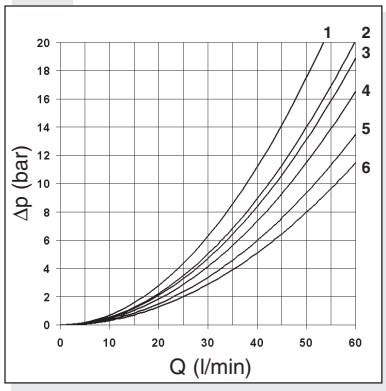
TAB.1
MOUNTING

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.				

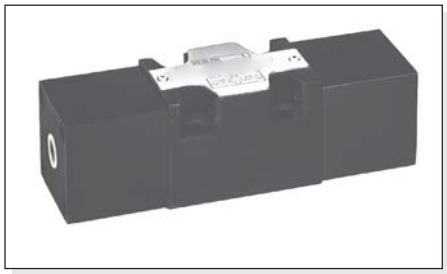
Spool type	Connections				
	P →A	P →B	A →T	B →T	P →T
11	4			6	
22		4	6		
12		5		6	
13		5	6	6	
14	2	1	1	1	2
28	1	2	1	1	2
15 - 19	4	4	6	6	
16	5	5	4	4	
17 - 21	1	3			
18	5	5			
20	4	4	4	4	
	Curve No.				

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.

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



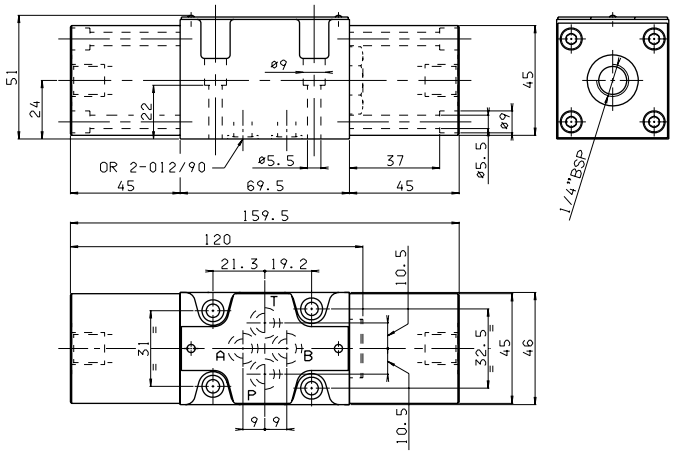
Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	60 l/min
Minimum operating pressure	2 + [0.027 x (pt*)] bar - see note
Maximum operating pressure	20 bar
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class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

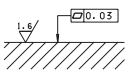
(**pt***) = pressure at port T

OVERALL DIMENSIONS



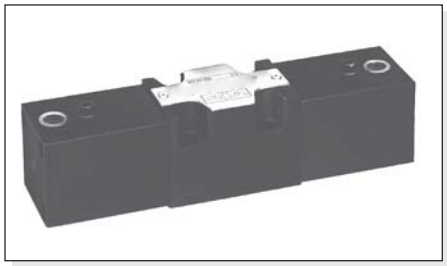
Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

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

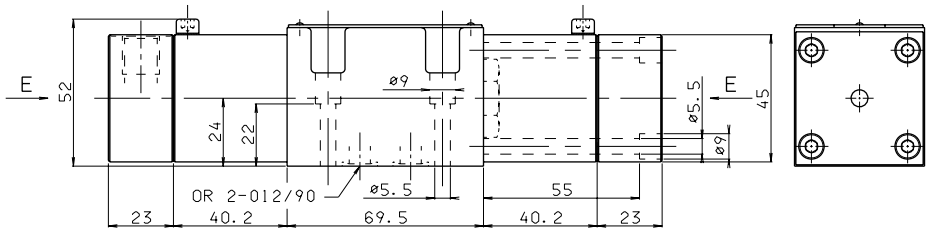
Ordering code see page before

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

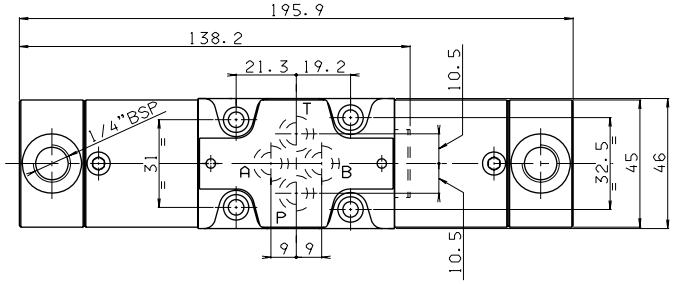
The DI variant is recommended in the environments characterised by the presence of dust or any type of contamination.

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

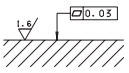


E = Manual override



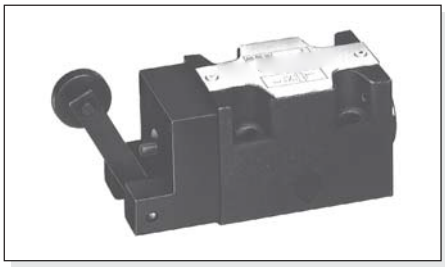
Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications



IAD3O - 03/2000/e

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**

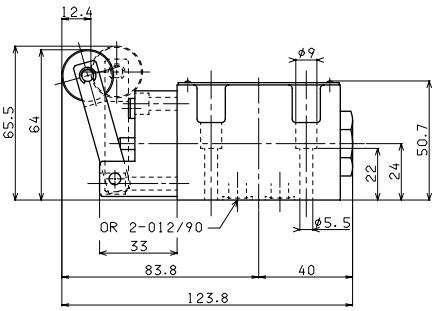
• Ordering code see page before

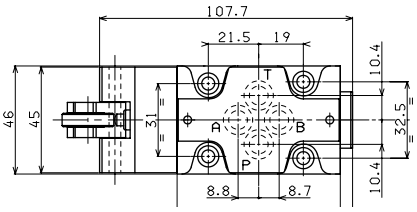
• Note:

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

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

OVERALL DIMENSIONS

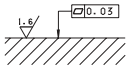




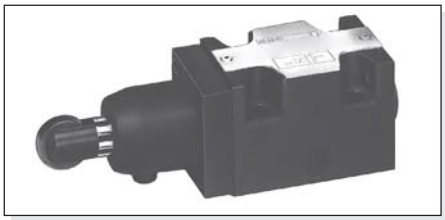
Stroke	12,4 mm
Working stroke	3 mm

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

Support plane specifications



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

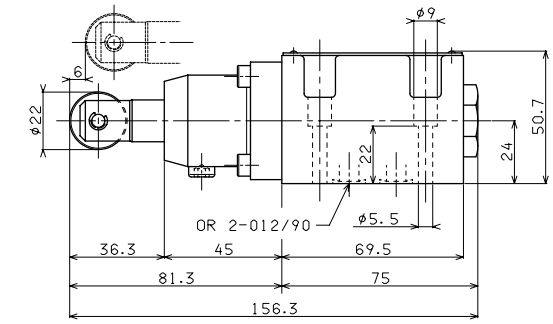
•Possible mountings: **E / F / G / H**

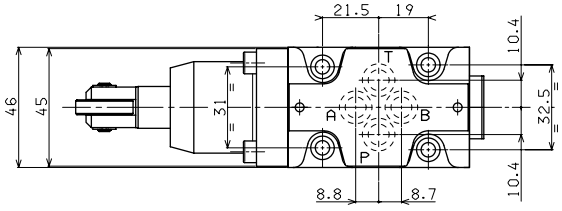
• Ordering code see page before

• Note:

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

OVERALL DIMENSIONS

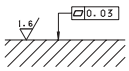




Stroke	6 mm
Extra stroke	2 mm
Working stroke	3 mm

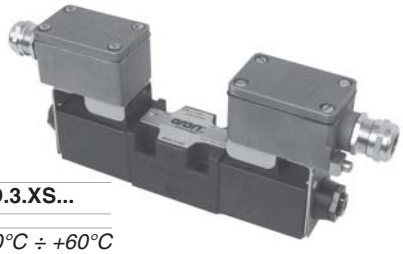
Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications



AD.3.XD...

-20°C ÷ +40°C



AD.3.XS...

-30°C ÷ +60°C

AD.3.X*... DIRECTIONAL CONTROLE CETOP 3 IN ACCORDANCE WITH 94/9/CE ATEX DIRECTIVE

94/9/CE ATEX EC DIRECTIVE (EXPLOSIVE ATMOSPHERE)

INTRODUCTION

Since 30/06/2003 products introduced into the market (or started-up) inside the EU, destined to be used in potentially explosive environments, must be in compliance with the 94/4/EC Directive through special marking. The directive regarding ATEX products 94/9/EC is therefore the regulation instrument that the European Union uses to obtain legislative harmonisation between the States and guarantee free circulation of goods inside the European Community itself.

The directive affirms that to eliminate obstacles from commerce it is necessary to guarantee a high level of protection and, with this aim, define the essential requirements on the subject of safety and health. The dispositions base themselves on the principle of the “new approach” (NA), for which the essential safety requirements of products must be established depending on the risk evaluation concurrent at the time of their use.

The 94/4/EC Directive is applied to the manufacture specifications of all those products (electrical and not) destined to be used in potentially explosive environments caused, by the dangers deriving from the presence of dust or gas, with the scope of reducing the risk of use that could be derived.

The term **product** refers to appliances, protection systems, devices, components and relative combinations, as defined in 94/9/EC Directive.

The term **appliances** intends machines, materials, fixed or mobile devices, control elements, instruments detection and prevention systems. Alone or combined these are destined for production, transport, deposit, measurement, adjustment and conversion of energy, and to the transformation of material and which, by way of the powerful triggering sources, risk causing an explosion. As a consequence, even intrinsically safe appliances re-enter within the field of application of the directive.

Ther combination of two or more appliance parts, as well as any other components, makes up a whole unit that can be considered a product and therefore re-enters within the field of application of the 94/9/EC Directive. If the whole unit requires adequate **installation** (therefore it is not immediately ready for use) the attached instructions should guarantee maintenance of compliance to the 94/9/EC Directive on installation, without further evaluations of conformity. The installer must follow the instructions correctly.

When a combination of appliances leads to a **plant** this may not re-enter within the field of application of the directive. Each part must be certified and in compliance with the directive (as well as being subject to the relative evaluation of conformity, EC marking, etc.).

The plant manufacturer must therefore presume the conformity of the various components (each supplied with conformity certificate released by the respective manufacturer) and limit their evaluation only to any additional risks that become important in the final combination. Nevertheless, if the plant manufacturer inserts parts without EC marking or components not supplied with the certificate it will be obligatory to carry out further conformity evaluation of the whole unit.

The 94/9/EC Directive envisions **obligations of the person** who introduces products into the market and/or starts them up, whether they are manufacturer’s, his agent’s, importer’s or any other responsible person. The dispositions and obligations envisioned by the directive for **introduction into the market** have been applied, since 30 June 2003, to every individual product, independently from the date and place of manufacture. It is the manufacturers responsibility to guarantee conformity of all products, where these re-enter within the field of application of the directive.

The directive does not govern the use of the appliances; rather it establishes that the products can only be used if in compliance with safety requirements at the time of their introduction into the market or of their start-up. “**Start-up**” means the first use of the products subject of the 94/9/EC Directive on EU territory by a final user. Nevertheless, a product that is immediately ready for use and does not need assembly or installation, and whose distribution conditions (deposit, transport, etc.) are not important for performance, is considered started-up at the time of introduction into the market.

Among the main potential causes/sources of triggering an explosion, such as sparks, flames, electric arcs etc.., **maximum surface temperature** also plays an important role. The dispositions of the directive establish evaluation criteria for the maximum temperature admissible depending on the type of explosive atmosphere in which the appliance must operate.

For environments characterised by the presence of **gas-air**, some temperature values are supplied to which the appliances must refer. They are indicated by the letter T followed by a number. The criterion to apply is that for which the temperature of the appliance must never exceed 80% of the value indicated for its own category.

For environments characterised by the presence of **dust-air**, to prevent setting on fire of the airborne dust, the surface temperature of the appliances must be decidedly lower than the predictable temperature of catching fire of the air+dust mixture. Therefore, during planning the maximum working surface temperature must be declared directly (in degrees centigrade).

Increases in temperature deriving from an accumulation of heat and chemical reactions must also be taken into consideration. The thickness of the deposited layer of dust must also be considered and, if necessary, limit the temperature, to prevent an accumulation of heat.

AD.3.X*... DIRECTIONAL CONTROLE CETOP 3
IN ACCORDANCE WITH 94/9/CE ATEX DIRECTIVE

CLASSIFICATIONS OF AREA - MIX - GROUP AND RELATIVE CATEGORY – ACCORDING TO ATEX DIRECTIVES

The 94/9/EC Directive is a "new approach" directive based on risk analysis. Its objective is to minimise the risks deriving from the use of some products indoors or in relation to a potentially explosive atmosphere. The probability of an explosive atmosphere manifesting must be considered not only as "one-off" or from a static point of view: all operative conditions that can derive from the transformation process must be taken into consideration.

• An **explosive atmosphere** for the 94/9/EC Directive is made up from a mixture of inflammable substances (as gas, vapours, mists and dust), with air, in determined atmospheric conditions in which, after triggering, the combustion propagates together with the unburned mixture.

• An atmosphere susceptible to transforming into an explosive atmosphere because of local and/or operative conditions is defined **potentially explosive atmosphere**.

Explosive atmospheres are not only formed in the presence of obviously dangerous substances such as fuel, solvents etc., but also in the presence of apparently harmless products such as wood dust, metal dusts, flour, grain, sugar etc. Therefore it can concern not only industries in the chemical or oil industry sectors, but also industries in the foodstuffs, textile, manufacturing etc.. It is important to consider that to re-enter within the 94/9/EC Directive a product must be applied in presence of one or more of the characteristic elements listed above: *presence of inflammable substances and air, in atmospheric conditions that favour the propagation of combustion*. The directive does not define the atmospheric conditions itself. The relative norms indicate a temperature range, but this does not exclude that the products may be planned and evaluated specifically to occasionally function outside of this range, introducing the opportune construction transformations.

To define a **conformity evaluation procedure** adequate for the directive, the Manufacturer must, on the basis of the declared use, establish the products functioning conditions (this means to say, envision the type of working area, the type of explosive mixture with which it will come into contact and the level of probability that an explosive atmosphere verifies itself); successively he must establish to which Group the product belongs and individualise the category inside the Group.

With the Atex 99/92/EC Directive (For the safety of workers) the working conditions in which products in compliance with Atex 99/4/EC Directive will function are indicated here. These are expressed in **"Areas"** and defined according to the level of probability that a potentially explosive atmosphere is verified, respectively for every type of atmosphere (gas-air mix or dust-air mix).

Area 0 and 20 Places in which an explosive atmosphere is constantly present or present for long periods or frequently.

Area 1 and 21 Places in which an explosive atmosphere is probable. It is verified in normal functioning and exercise conditions.

Area 2 and 22 Places in which an explosive atmosphere has low probability of being verified or, if it occurs only lasts for a brief period of time.

GAS-AIR-TYPE EXPLOSIVE MIXTURE (G)

The products destined to work in environments characterised by this type of explosive atmosphere will be respectively indicated for Area **0, 1 or 2** depending on the Group and category of origin (see below) and are marked with the letter G.

DUST-AIR-TYPE EXPLOSIVE MIXTURE (D)

The products destined to work in environments characterised by this type of explosive atmosphere will be respectively indicated for Area **20, 21 or 22** depending on the Group and category of origin (see below) and are marked with the letter D.

GROUP I

Includes the appliances destined to be used in underground jobs in the mines and their surface plants, exposed to the risk of the release of firedamp and/or combustible dust. The subdivision into categories depends on the fact if the power supply must be interrupted or not if an explosive atmosphere manifests due to a mixture of air and gas, vapours mists (D) or a mixture of air and dust (G).

Category **M1** **Very high protection level.** These products must be able to remain operative, for safety reasons, in the presence of an explosive atmosphere and present specific performances or protection configurations for breakdown in case of explosion.

Category **M2** **High protection level.** The power supply to these products must be interrupted in the presence of an explosive atmosphere. Protection means must be incorporated to guarantee the level of protection during normal functioning and also in oppressive working conditions or resulting from great stressi.

GROUP II

Includes appliances destined to be used in different environments (from the mines) in which there is a probability that an explosive atmosphere manifests itself. Their subdivision into categories depends on two factors: the place, where the product will be used and if the probability that a potentially explosive atmosphere, owing to the mixture of air and gas, vapours, mists (D) and the mixture of air and dust (G), comes about in a constant or occasional manner and if it does occur, does this possibility remain for long or brief period of time.

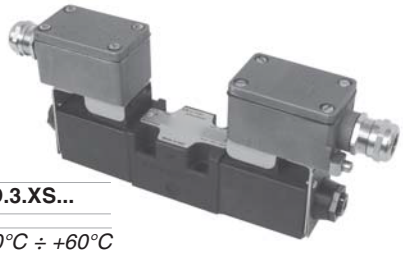
Category 1 **Very high protection level.** These products must be planned to function in compliance with operative parameters established by the Manufacturer in environments in which there is a high probability that explosive atmospheres are always detected or manifest often or for long periods of time. They must present specific performances or protection configurations for breakdown in case of explosion.

Category 2 **High protection level.** These products must be planned to function in compliance with operative parameters established by the Manufacturer in environments in which there is a high probability that explosive atmospheres can manifest. Protection against explosions relative to this category must function in a way to guarantee the required safety level even in the presence of functioning defects of the appliances or in dangerous operative conditions, which frequently must be taken into consideration.

Category 3 **Normal protection level.** These products must be planned to function in compliance with operative parameters established by the Manufacturer in environments in which there is a slight probability that explosive atmospheres can manifest, and however only rarely or for a brief period of time. This type of product belonging to the category in question must guarantee the safety level required in normal functioning conditions.

AD.3.XD...

-20°C ÷ +40°C



AD.3.XS...

-30°C ÷ +60°C

AD.3.X*... DIRECTIONAL CONTROLE CETOP 3 IN ACCORDANCE WITH 94/9/CE ATEX DIRECTIVE

VALVES SUITABLE FOR APPLICATIONS IN ZONES WHERE EXPLOSIVE ATMOSPHERE MAY OCCUR, AND ALSO ZONES CHARACTERIZED BY THE PRESENCE OF GAS MIXTURES

The AD3.X* valve series are **Group II** appliances (destined to be used in environments, apart from mines, where there is the probability of explosive atmospheres) **category 2** (high protection level), for use in **Zones 1 and 2** (places where it is probable that an explosive atmosphere forms in normal working conditions) and classified by the presence of gas-air type explosive mixtures, vapours and mists (letter **G**). We are therefore, talking about specially designed valves that are realised in compliance with the ATEX 94/9/EC Directive and according to European regulations EN 1127-1, EN 13463-1 and EN 13463-5.

Going back to Aron's "NG06 direction control" range, these valves are prepared for plate-mounting with attachment surface in compliance with UNI ISO 4401 - 03 - 02 - 0 - 94 (ex CETOP R 35 H 4.2-4-03). Activation is electrical and the centre position is obtained using springs with calibrated lengths, which once the impulse or command action has ceased, re-position the cursor in the centre or at the end run.

The coils used for these valves are subject to separate conformity certification, according to the ATEX Directive (EC-type). Suitable for use in zones 1 and 2, these coils are suitable for functioning in presence of gas (group IIC) and offer construction-type protection safety, respectively initialled "EEx d IIC T5 for the AD3XD" valve and "EEx me II T4 for the AD3XS" valve.

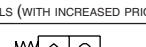
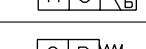
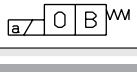
Before marking and issue onto the market, the valves of the AD3.XD / AD3.XS series undergo controls and inspections as envisioned by the internal Manufacturing System and as envisioned by the Certified Company Quality System in compliance with ISO 9001 regulations according to Vision 2000. All of the AD3.XD and AD3.XS valve series undergo100% functional inspections. These controls guarantee that the products sold are in compliance with all reported in the Technical Specifications File deposited and declared by marking with AD3X/ATEX/04.

TECHNICAL SPECIFICATIONS	AD.3.XD...	AD.3.XS...
Valve marking	CE Ex II 2 G cT5	CE Ex II 2 G cT4
Max. operating pressure ports P/A/B	320 bar	320 bar
Max. pressure port T (dynamic)	250 bar	70 bar
Max. flow	60 l/min	60 l/min
Max. excitation frequency	3 Hz	3 Hz
Duty cycle	100%ED	100%ED
Hydraulic fluid	mineral oil DIN 51524	mineral oil DIN 51524
Fluid viscosity	10 ÷ 500 mm^2/s	10 ÷ 500 mm^2/s
Fluid temperature	**-20°C ÷ +40°C**	**-30°C ÷ +60°C**
Ambient temperature	**-20°C ÷ +40°C**	**-30°C ÷ +60°C**
Max. contamination level	class 10 with NAS 1638 with filter $\beta_{25} \geq 75$	class 10 with NAS 1638 with filter $\beta_{25} \geq 75$
Weight (with one solenoid)	2,37 Kg	2,10 Kg
Weight (with two solenoids)	3,82 Kg	3,40 Kg
Coil rated power	11-13 W	
Degree of protection	IP 67	IP 66
Supply tolerance	±10%	-10% ÷ 0%
Supply cable	standard length 3m with cable gland	Cable gland in accordance with Atex for cable type Ø external = 7÷ 12 mm
Solenoid marking	CE 0722 Ex II 2 G EEx d IIC T5 W11 - CESI 03 ATEX 212	Ex CE 1180 II 2 G EEx me II T4 BASEEFA02AATEX0199X
Connector marking	EEx d II C KEMA 01 Atex X2240X	EEx e II KEMA 99 Atex 6971

ORDERING CODE

AD	Directional control valve
3	CETOP 3/NG06
X*	Solenoid valve in accordance with 94/9/CE Atex Directive **D =** with performed explosion proof solenoids (EEx d) **S =** with performed icreased safety solenoids (EEx me)
******	Spool **01/02/03/04/16** (see sideways) For different spools, please conctat Aron Customer Service
*****	Mounting **C / E / F / G / H** (tab.1) For different mounting, please conctat Aron Customer Service
*****	Voltages (tab.2)
******	Variants **00 =** No variants **V1** = Viton (for AD3XD only)
1	Serial No.

TAB.1 MOUNTING

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

TAB. 2 - VOLTAGES

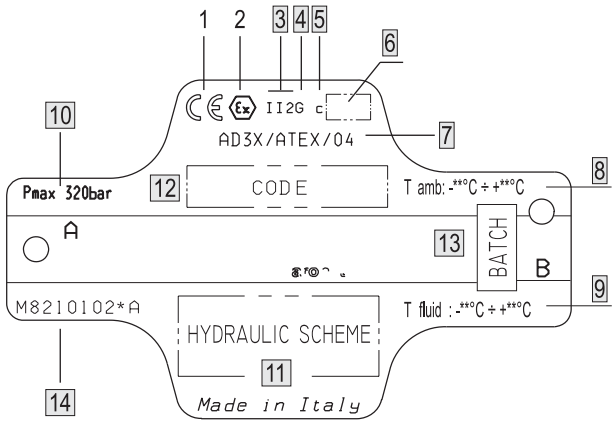
AC VOLTAGE	FOR AD3XD	FOR AD3XS
A	24/50Hz	24/50Hz
B*	/	48/50Hz
C	110V/50Hz	/
J	/	115V/50Hz
D	220V/50Hz	/
I	230V/50Hz	230V/50Hz
DC VOLTAGE	**FOR AD3XD**	**FOR AD3XS**
L	12V	12V
M	24V	24V
P*	110V	/
N	48V	/

(*) Special voltage — Voltage code is always stamped on the plate of the AD3X* valve

AD.3.X* VALVES SUITABLE FOR APPLICATIONS IN ZONES WHERE EXPLOSIVE ATMOSPHERE MAY OCCUR (GAS MIXTURES) - 94/9/CE ATEX DIRECTIVE

VALVE MARKING

REGISTRED MARK AND IDENTIFICATION PLATE FOR AD3X*... SOLENOID VALVES IN ACCORDANCE WITH ATEX DIRECTIVE



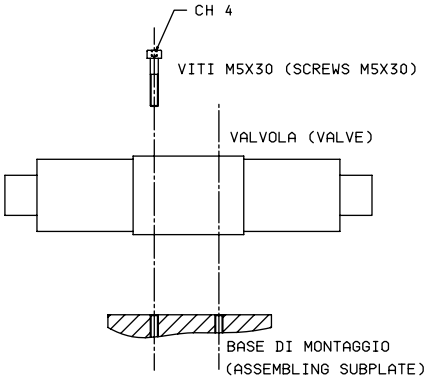
1	CE	In accordance with Europe Directive
2	Ex	In accordance with Atex 94/9/CE Directive
3	**II 2**	Group II (surface places) Class 2 (high degree of protection)
4	**G**	Explosive atmosphere which is comprised of gas, vapours or mist
5	**c**	safety performed
6	**T*** series AD3XD series AD3XS	Class of temperature T5 (<100) T4 (< 135)
7	**AD3X/ATEX/04**	Reference of the Technical issue put down at the Notifying Body

8	**T amb** series AD3XD series AD3XS	Operating ambient temperature - 20°C ÷ + 40°C - 30°C ÷ + 60°C
9	**T fluid** series AD3XD series AD3XS	Operating fluid temperature - 20°C ÷ + 40°C - 30°C ÷ + 60°C
10	**Pmax 320 bar**	Max. operating pressure
11	**HYDRAULIC SCHEME**	Hydraulic scheme of the valve
12	**CODE**	Complete reference number of the valve's ordering code
13	**BATCH**	Reference number of the technical ordering code (batch)
14	**M8210102*A**	Plate code

Every solenoid valve is supply with its **"Identification Plate"** and with the **"Declaration of Conformity"** in accordance with the 94/4/CE Atex Directive.

The identification plate shows the most important technical perfomance and constructive specifications so **it has to be always integral and visible.**

DAMAGING SUBSTANCE AND ZONE	CLASS (94/9/CE DIRECTIVE)
Gas, vapours or mist **Zone 0**	1G
Gas, vapours or mist **Zone 1**	2G or 1G
Gas, vapours or mist **Zone 2**	3G, 2G or 1G



EXAMPLE OF A CORRECT INSTALLATION

INSTRUCTIONS FOR A CORRECT INSTALLATION

1 Assemble the valve on the mounting base using 4 - M5x30 UNI5931 screw fasteners in class 8.8 minimum material with tightening torque of 5 Nm. Surface features: roughness Ra < 1.6 and planarity 0.03mm max.

2 Carry out wiring of the solenoids according to the user instructions of the relative coils (a copy is always supplied with each solenoid).

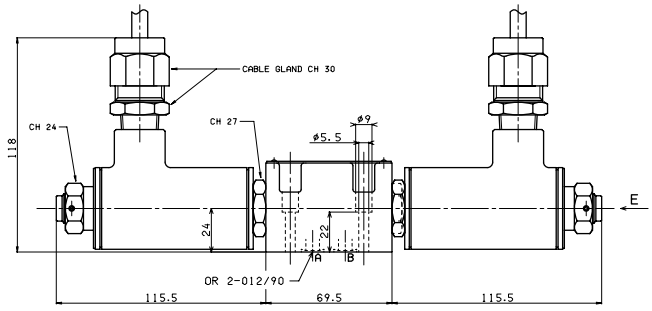
- The valves must be connected to earth using the special anti-loosening and anti-rotation connection element.
- When mounting the valve onto the base (manifold) ensure not to damage the OR sealing rings on the surface.
- For the aspects tied to the installation of the solenoids, see the relative safety instructions. The electrical components must not be opened when live.
- If it is necessary to loosen the ring nuts on the external ends of the coil to opportunely position the cable-holders, they must be tightened again to the respective tightening torques.

Tightening torque ring nut/coil (Ch. 24) for series AD3XD = 25 ± 2Nm
Tightening torque ring nut/coil (Ch. 22) for series AD3XS = 19 ± 1Nm

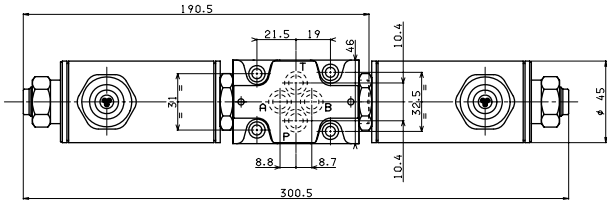
AD.3.X* VALVES SUITABLE FOR APPLICATIONS IN ZONES WHERE EXPLOSIVE ATMOSPHERE MAY OCCUR (GAS MIXTURES) - 94/9/CE ATEX DIRECTIVE

OVERALL DIMENSIONS

AD.3.XD... SOLENOID VALVES EQUIPPED WITH EXPLOSION PROOF COILS SUITABLE FOR APPLICATIONS IN ZONES WHERE EXPLOSIVE ATMOSPHERE MAY OCCUR (GAS MIXTURES)

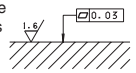


E = Manual override

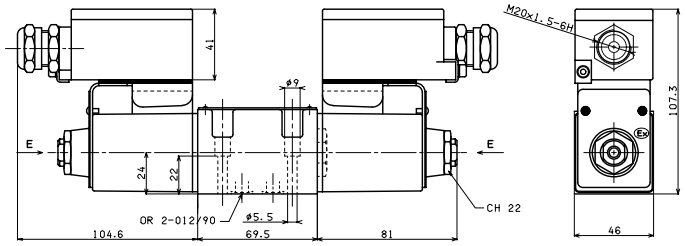


Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

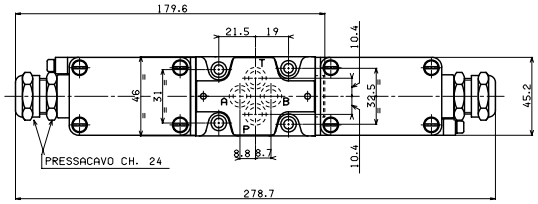
Support plane specifications



AD.3.XS... SOLENOID VALVES EQUIPPED WITH INCREASED SAFETY COILS SUITABLE FOR APPLICATIONS IN ZONES WHERE EXPLOSIVE ATMOSPHERE MAY OCCUR (GAS MIXTURES)

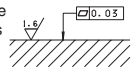


E = Manual override



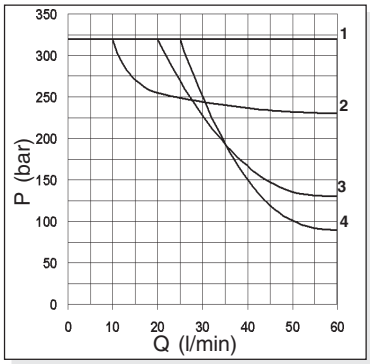
Fixing screws UNI 5931 M5x30
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications

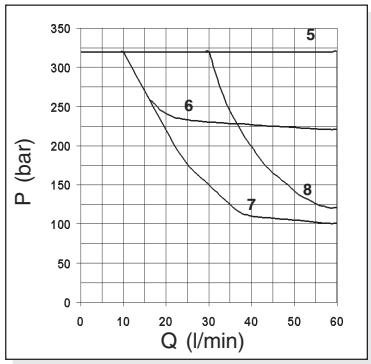


LIMITS OF USE

AD.3.XD...



AD.3.XS...



Spool type	Curve AD3XD
01	2
02	1
03	3
04	4
16	1
	AD3XS
01	6
02	5
03	7
04	8
16	5

The tests have been carried out with solenoids at operating temperature with 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 mm^2/s at 40°C. The values in the diagram refers to tests carried out with the oil flow in two direction simultaneously (e.g.. from P to A and in the same time B to T).
In cases where valves 4/2 e 4/3 were used with the flow in one direction only, the limits of use could have variations which may even be negative.

AD.3.X* VALVES SUITABLE FOR APPLICATIONS IN ZONES WHERE EXPLOSIVE ATMOSPHERE MAY OCCUR (GAS MIXTURES) - 94/9/CE ATEX DIRECTIVE

SAFETY INSTRUCTIONS

- ***Carefully read everything reported in the instruction sheet attached to the valves, before installation. All maintenance operations must be performed according to the manual.***
- The AD3.XD and AD3.XS series valves must be installed and maintained in compliance with plant and maintenance regulations for environments classified against the risk of explosion because of presence of gas (for example: EN 60079-14, EN 60079-17 or other national regulations/standards).
- The valves must be connected to earth using the special anti-loosening and anti-rotation connection element.
- For all safety aspects tied to the use of the coil see the relative use and maintenance instructions. The electrical appliances/components must not be opened when live.
- The user must periodically control, depending on the conditions of use and the substances used, the presence of deposits, cleaning, wear and correct functioning of the valves.

Attention: all installation and maintenance interventions must be performed by qualified staff.

INSTRUCTIONS FOR A CORRECT USE AND MAINTENANCE

USE:

- Respect functional limits indicated in the *technical features* section and those, where restrictive, indicated in the solenoid safety instructions.
- The oil used must be within the types envisioned by the manufacturer and its contamination level must be maintained within the indicated limits.

MAINTENANCE:

- The user must periodically control, depending on the conditions of use and the substances used, the presence of deposits, cleaning, wear and correct functioning of the valves.
- If the OR sealing rings are damaged, only replace them with those specifically supplied by the manufacturer.

DIRECTIONAL CONTROL VALVES CETOP 5/NG10

INTRODUCTION

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

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

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

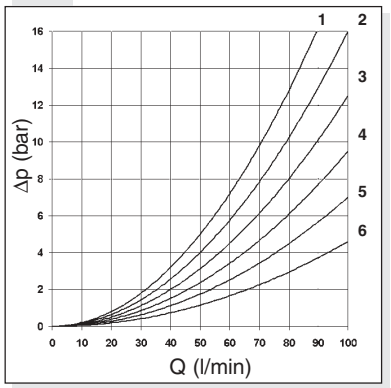
The centring position is achieved by means of calibrated length springs which, once the action of impulse is over, return the spool to the centre or end travel position.

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

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

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

PRESSURE DROPS



The diagram at the side show the pressure drop curves for spools during normal usage. The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C; the tests have been carried out at a fluid temperature of 40°C.
For higher flow rates than those in the diagram, the losses will be those expressed by the following formula:

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

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.

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

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

ORDERING CODE

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

TAB.1 TYPE OF OPERATOR

E	Electrical
D	Direct mechanical
O	Oleo-pneumatic
L	Lever

TAB.3 - "E" TYPE OPERATION

AC VOLTAGE

A	24V/50Hz
B	48V/50Hz*
J	115V/50Hz - 120V/60Hz
Y	230V/50Hz - 240V/60Hz
E	240V/50Hz*
F	24V/60Hz*

DC VOLTAGE

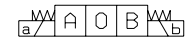
L	12V	
M	24V	115Vac/50Hz 120Vac/60Hz with rectifier
N	48V*	
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
K	Without AC coils	
W	Without DC coils	
Z	other controls	

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

* Special voltage

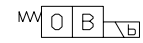
TAB.2 MOUNTING

STANDARD

C 

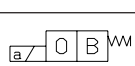
D 

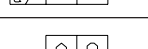
E 

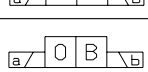
F 

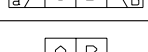
SPECIALS (WITH PRICE INCREASING)

G 

H 

I 

L 

M 

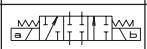
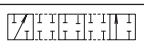
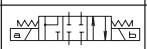
- **Mounting type D** is only for valves with detent
- In case of **mounting D** with detent a maximum supply time of 2 sec is needed (only for AC coils).
- The springs for the version with detent (mounting **D**) are different from those for standard versions.

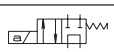
TAB.4 - VARIANTS

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

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

♦ = Variant codes stamped on the plate

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

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

STANDARD SPOOLS

(*) Spool with price increasing

- With spools **15** / **16** / **17** only the mounting **E** / **F** are possible
- **19** / **20** / **21** spool not planned for variant **J***
- For lever operated the spools used are different.

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

ONE SOLENOID, SIDE B "F" MOUNTING			
Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
05		+	
66		+	
06		+	
08*		+	
10*		+	
22*		+	
12*		+	
13*		+	
07*		+	
15		-	
16		+	
17		+	
14*		-	
28*		-	

TWO SOLENOIDS "D" MOUNTING			
Spool type		Covering	Transient position
19*		-	
20*		+	
21*		+	

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

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

Max. pressure ports P/A/B	350 bar
Max. pressure port T (DC coil) see note (*)	250 bar
Max. pressure port T (AC coil)	160 bar
Max. flow	100 l/min
Max. excitation frequency	3 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 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 $ß_{25}≥75$
Weight (with one DC solenoid)	4 Kg
Weight (with two DC solenoids)	5,1 Kg
Weight (with one AC solenoid)	3,5 Kg
Weight (with two AC solenoids)	4,3 Kg

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

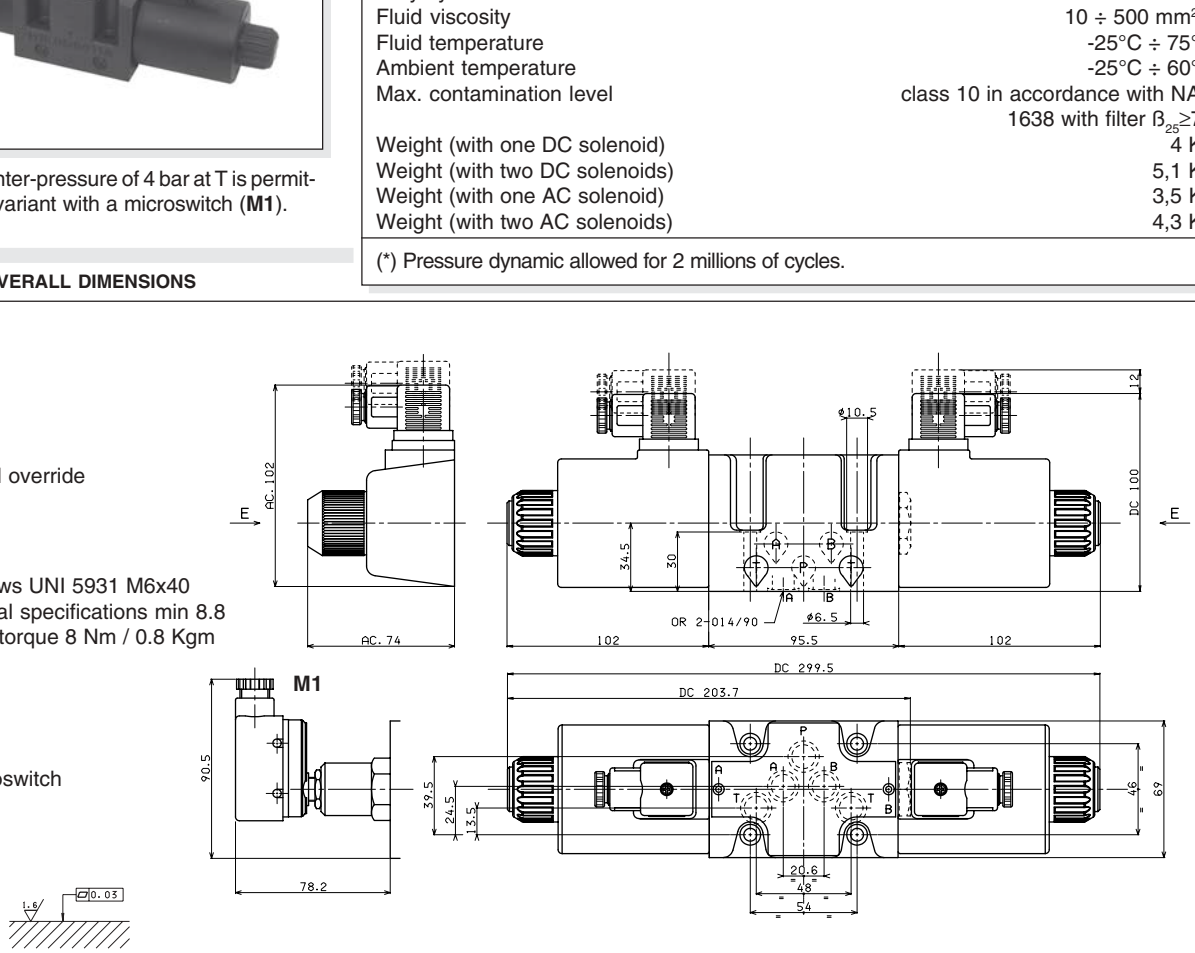
OVERALL DIMENSIONS

E = Manual override

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

M1 = Microswitch

Support plane specifications



LIMITS OF USE

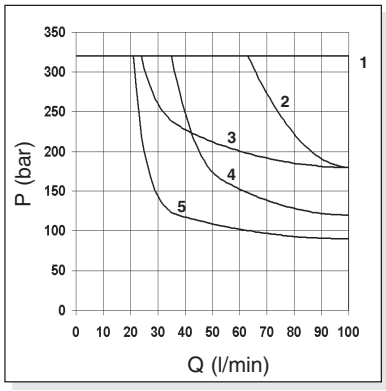
The tests have been carried out with solenoids at operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 40°C. The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40°C.
The values in the diagram refer to tests carried out with the oil flow in two directions simultaneously T = 2 bar (e.g. from P to A and the same time B to P).

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

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

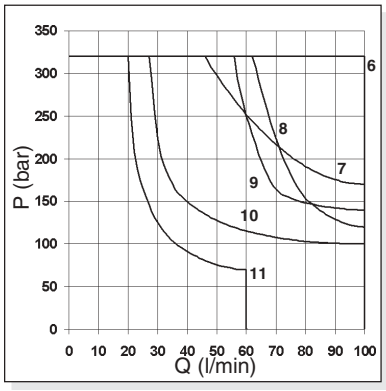
Alternating current: Energizing 12 ÷ 30 ms. De- energizing 10 ÷ 55 ms.

DIRECT CURRENT SOLENOIDS (DC)



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

ALTERNATING CURRENT SOLENOIDS (AC)



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

Valves type AD5.E... with spool movement speed control variant J*
These ON-OFF type valves are used when a lower spool movement speed than usual for conventional solenoid valves is required to prevent impacts which could adversely affect the smooth running of the system. The system consists of reducing the transfer section for the fluid from one solenoid to the other by means of calibrated orifice.

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

• To order AD.5.J* version valves, specify the orifices code.

• The operation is linked to a minimum counter-pressure on the T line (1 bar min.)

• The switching time referred to the spool travel detected by a LVDT transducer can vary for the NG10 valve a minimum of 200 to a maximum of 400 ms depending on 5 fundamental variables:

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

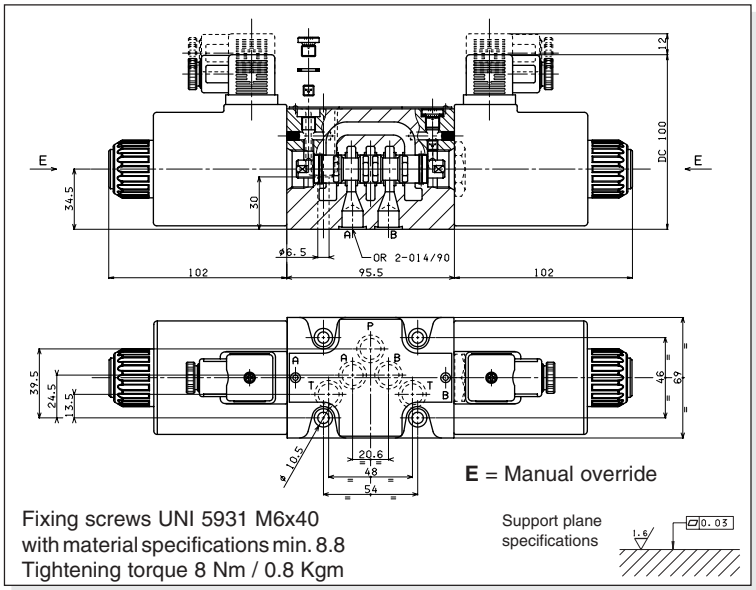
• **Possible mounting: C / E / F / G / H**

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

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

Max. pressure ports P/A/B	320 bar
Max. pressure port T - see note (*)	250 bar
Max. flow	100 l/min
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Weight with one DC solenoid	3,6 Kg
Weight with two DC solenoids	4,5 Kg

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



E = Manual override

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

Support plane specifications

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

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

Valves type AD5.E... variant Q5 with external draining solenoid
This involves valves with solenoid drainage chambers separated by line T in the CETOP 5 interface distinguished by the letter L. This solution makes it possible to operate with a maximum counter-pressure at T up to 320 bar using only 12.9 material fixing screws to ensure the maximum safety of the solenoid valve fixing and use of an additional drain. This version can be used for direct current (DC) and alternating current (AC), but involves a reduction in the limits of usage depending on the pressure at T.

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

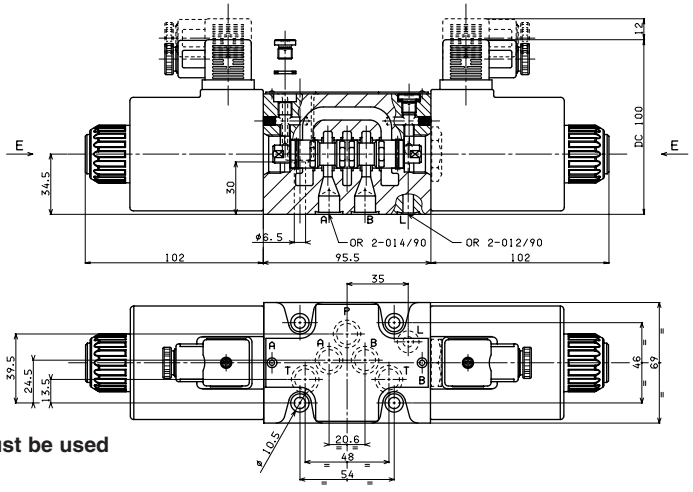
• **For subplate see BSH.5.31..**

Max. pressure ports P/A/B/T	320 bar
Max. pressure port L (DC coils) see note (*)	250 bar
Max. pressure port L (AC coils)	160 bar
Max. flow	100 l/min
Max. excitation frequency	2 Hz
Duty cycle	100% ED
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Weight with one DC solenoid	3,6 Kg
Weight with two DC solenoids	4,5 Kg
Weight with one AC solenoid	3,5 Kg
Weight with two AC solenoids	4,3 Kg

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

OVERALL DIMENSIONS

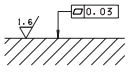
EAD5E...Q5 - 02/2000/e



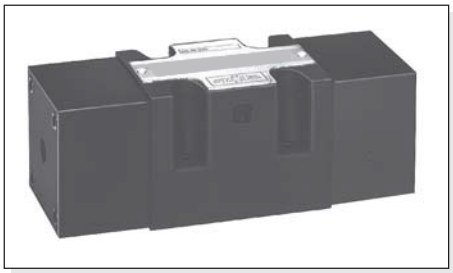
E = Manual override

Fixing screws UNI 5931 M6x40
with material specifications 12.9 must be used
Tightening torque 8 Nm / 0.8 Kgm

Support plane specifications



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

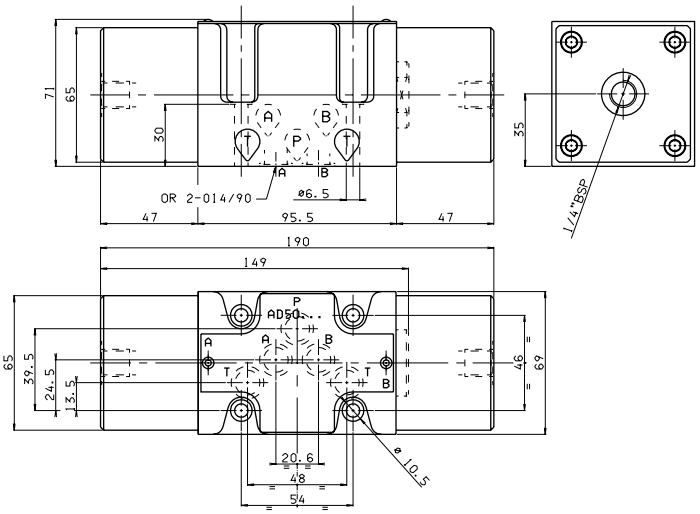


Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	100 l/min
Min. operating pressure	4 + [0.027 x (pt*)] bar - see note
Max. operating pressure	200 bar
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in according with NAS 1638 with filter $\beta_{25} \geq 75$
Weight (single pilot)	4,1 Kg
Weight (twin pilot)	5,4 Kg

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

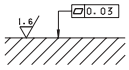
(**pt***) = Pressure at port T

OVERALL DIMENSIONS

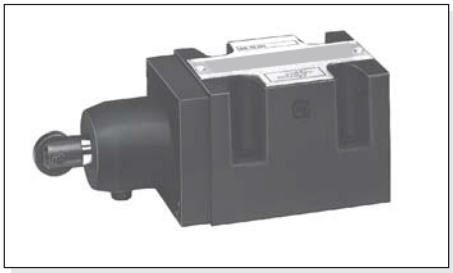


Fixing screws UNI 5931 M6x40
with material specifications min. 8.8
Tightening torque 8 Nm / 0.8 Kgm

Support plane specifications



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

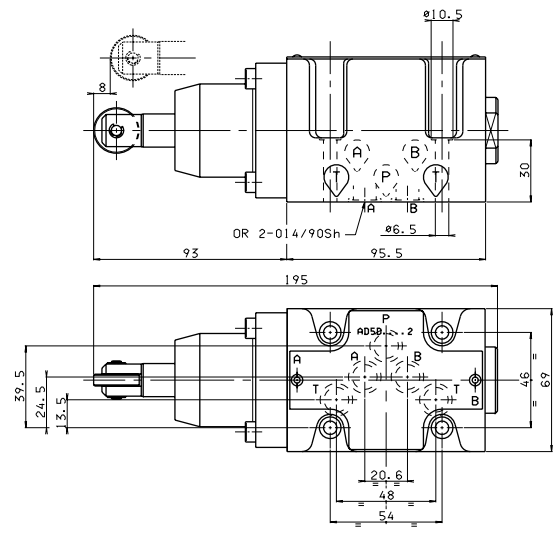


Max. pressure ports P/A/B	320 bar
Max. pressure port T	20 bar
Max. flow	100 l/min
Operating force - see note (*)	8 Kg - see note (**)
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	3,8 Kg

• Possible mounting: **E / F / G / H**
• Ordering code see page I•29
• Notes:
(*) In the absence of counter-pressure at port T

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

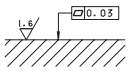
OVERALL DIMENSIONS



Stroke	8 mmm
Extra stroke	2 mm
Working stroke	4 mm

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

Support plane specifications



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

Max. pressure ports P/A/B	320 bar
Max. pressure port T	160 bar
Max. flow	100 l/min
Lever angle	2 x 15°
Fluid viscosity	10 ÷ 500 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 $ß_{25}≥75$
Weight	4,7 Kg
Weight with M1 variant	5,35 Kg

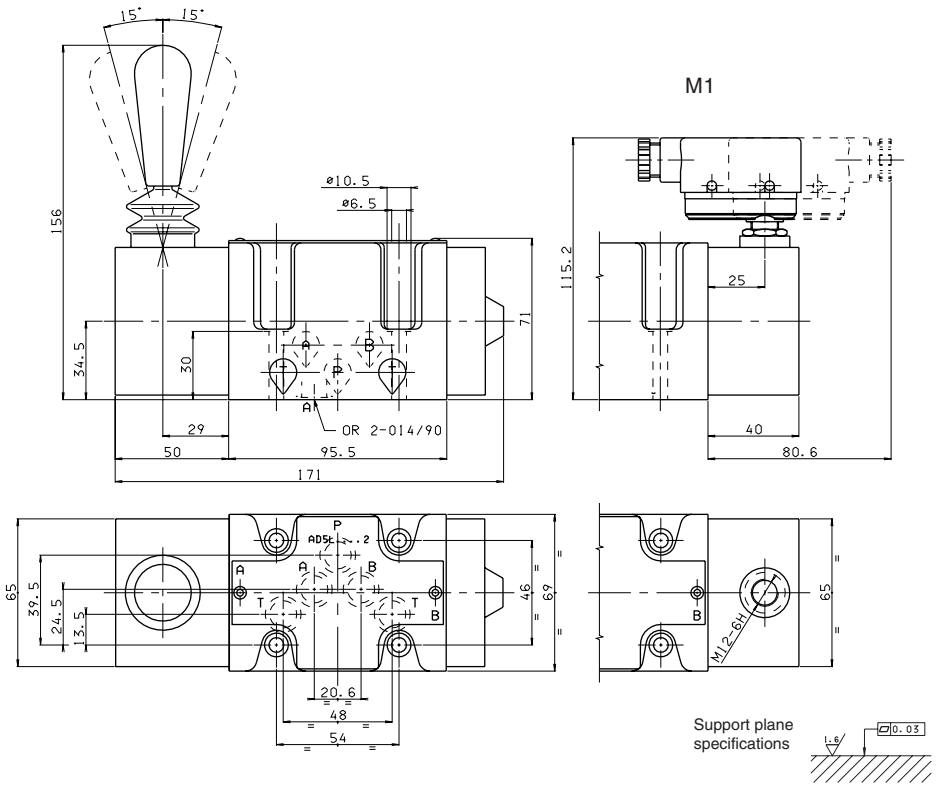
- Possible mounting: **C / E / F**
- There is no **D** type mounting
- The variant **D1** specifies the detent (mechanical connection) for lever operation
- The springs for the version with detent (variant **D1**) are different from those for standard versions.

AD.5.L...	
ORDERING CODE	CH. I PAGE 29
STANDARD SPOOLS	CH. I PAGE 30

- Completely different spools are used for these (lever operated) valves than for all other types of operation (e.g. electrical, mechanical, pneumatic operation, ...)
- Available spools: 01 / 02 / 03 / 04 / 05 / 06 / 66 / 07 / 22 / 13 / 15 / 16 / 17 (for hydraulic symbols see page 1•30)
- Available on request NATIONAL AM1107 type microswitch

OVERALL DIMENSIONS

M1 = Microswitch



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

Support plane specifications

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

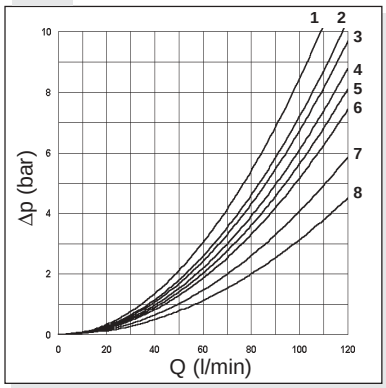
HIGH PERFORMANCES SOLENOID OPERATED VALVES

ADP.5.E...	
"D19" DC SOLENOIDS	CH. I PAGE 38
STANDARD CONNECTORS	CH. I PAGE 19

The ARON NG10 directional control valves are designed for subplate mounting with an interface in accordance with UNI ISO 4401 - 05 - 04 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-05). The use of solenoids with wet armatures allows an extremely safe construction completely dispensing with the need for dynamic seal. The solenoid tube is screwed directly onto the valve casing whilst the coil is kept in position by a ring nut. Great care has been taken over the design and production of the ducts and the improvement of the spools allows relatively high flow rates to be accommodated for its size with minimal pressure drops (Δp). The operation of the directional valve is electrical. The centring is achieved by means of calibrated length springs which, once the impulse is over, immediately reposition the spool in the neutral position. The solenoids, constructed with a protection class of IP66 in accordance with BS 5490 standards, are available in direct current form and different voltage. The electrical controls are equipped with an emergency manual control inserted in the tube.
The ADP.5.E.. valve has certain design features which allow it to "manage" a hydraulic power equal to Q = 120l/min with a P = 320 bar, maintaining a considerable safety margin. These features can be summarized as follows:
- Solenoid D19 with an optimum ratio between the power absorbed (42W) and the magnetic force
- Diameter of the spool 18 mm, with carefully designed geometry improved to compensate for the flow forces
- Compact graphite cast iron valve casing with high mechanical resistance
- Different springs, improved according to the features of the spool

The electrical supply connectors meet DIN 43650 ISO 4400 standards; connectors are also available with built in rectifiers or pilot lights.
The recommended fluids are hydraulic mineral based oils in accordance with DIN 51524 and it is recommended that filters should be fitted to ensure a maximum contamination level of class 10 in accordance with NAS 1638, $ß_{25} \geq 75$.
For other fluids please contact our Technical DPT.
• The solenoids are in DC voltage only

PRESSURE DROPS



The diagram at the side shows the pressure drop curves for spools during normal usage. The fluid used is a mineral oil with a viscosity of 46 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	4	4	7	7	
02	6	6	8	8	7
03	3	3	8	8	
04	4	4	2	2	3
05	6	6	6	6	
66	4	4	8	7	
06	4	4	7	8	
14	6	4	8	6	2
15-19	2	2	5	5	
16-20	1	1	2	2	
28	4	6	6	8	2
	Curve No.				

ORDERING CODE

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

TAB.1 - MOUNTING

C	
E	
F	
D*	

(*) Valve with detent

TAB.3 - VARIANTS

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

TAB.2 - SOLENOID D19 (42 W)

DC VOLTAGE

L	12V	
M	24V	115Vac/50Hz 120Vac/60Hz with rectifier
N	48V*	
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	Without DC coils	

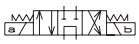
Voltage codes are not stamped on the plate, their are readable on the coils.

* Special voltage

STANDARD SPOOLS

* SPOOLS WITH PRICE INCREASING

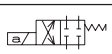
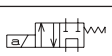
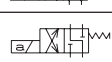
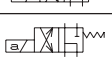
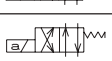
TWO SOLENOIDS, SPRING CENTRED "C MOUNTING"

Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
05		-	
66		-	
06		-	
14*		-	
28*		-	

TWO SOLENOIDS "D MOUNTING"

Spool type		Covering	Transient position
19*		-	
20*		+	

ONE SOLENOID, SIDE A "E MOUNTING"

Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
05		-	
66		-	
06		-	
14*		-	
15		-	
16		+	
28*		-	

ONE SOLENOID, SIDE B "F MOUNTING"

Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
05		-	
66		-	
06		-	
14*		-	
15		-	
16		+	
28*		-	

LIMITS OF USE

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

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

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

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

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

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

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

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

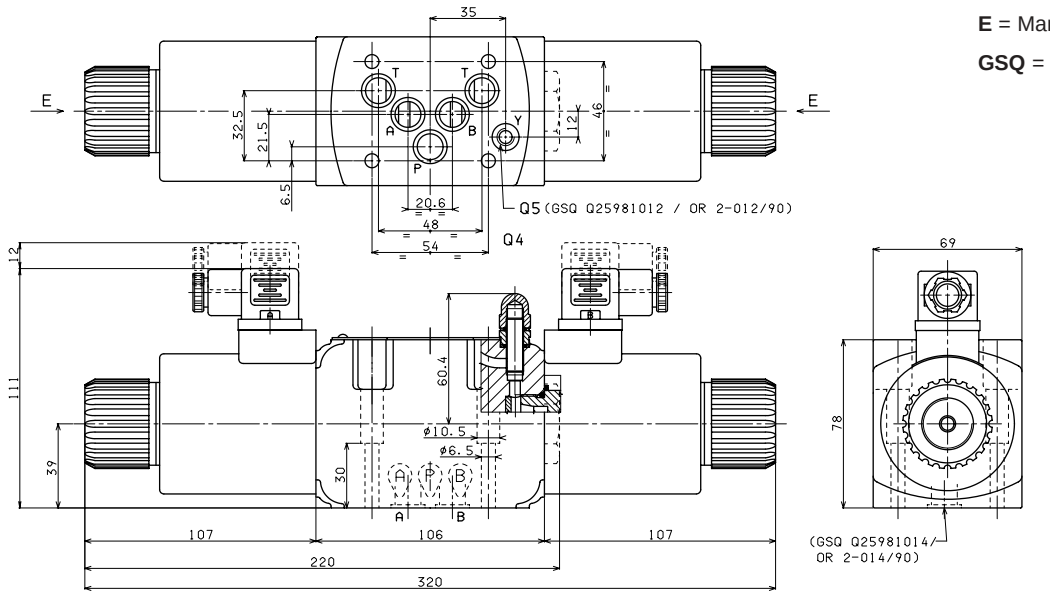
- Applicable hydraulic power, related to the flow rate and pressure drop across the valve;
- Spool type (system configuration);
- Oil viscosity and temperature;
- Back pressure on T.

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

(*) Pressure dynamic allowed for 2 millions of cycles

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

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

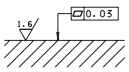


E = Manual override

GSQ = Square section seal

Fixing screws UNI 5931 M6x40 with material specifications 12.9
Tightening torque 8 ÷ 10 Nm / 0.8 ÷ 1 Kgm

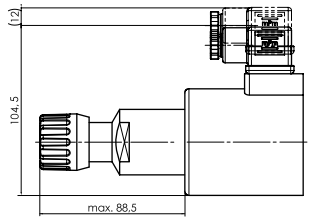
Support plane specifications



"D19" DC SOLENOIDS

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

P1 ROTARY EMERGENCY



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

***** Special voltage

ADP.5.V... WITH PROXIMITY SENSOR L.V.D.T. CETOP 5/NG10

ADP.5.V...	
"D19" DC SOLENOIDS	CH. I PAGE 39
STANDARD CONNECTORS	CH. I PAGE 19
L.V.D.T.	CH. I PAGE 21

The ARON NG10 directional control valves are designed for subplate mounting with an interface in accordance with UNI ISO 4401 - 05 - 04 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-05).

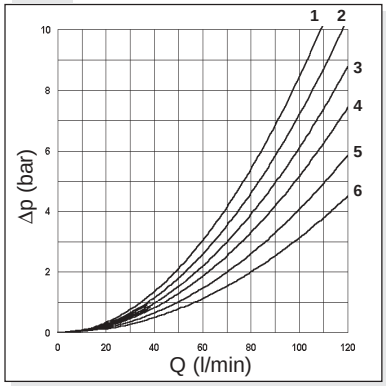
The single solenoid directional valves type ADP5V are used in applications where the monitoring of the position of the spool inside the valve is requested to manage the machine safety cycles in according with the accident prevention legislation. These directional valves are equipped with an horizontal 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 (*)	250 bar
Max. flow	120 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 $ß_{25} \geq 75$
Type of protection (in relation to connector used)	IP 66
Weight	6,2 Kg

(*) Pressure dynamic allowed for 2 millions of cycles

- **Possible mountings: E / F**
- **The solenoid is in DC voltage only**

PRESSURE DROPS



The diagram at the side shows the pressure drop curves for spools during normal usage. The fluid used is a mineral oil with a viscosity of 46 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.

Spool type	Connections				
	P→A	P→B	A→T	B→T	P→T
01	3	3	5	5	
02	4	4	6	6	5
66	3	3	6	5	
06	3	3	5	6	
16	1	1	2	2	
	Curve No.				

ORDERING CODE

ADP	High performances directional control valve
5	CETOP 5/NG10
V	Directional valve with single solenoid and L.V.D.T. proximity sensor
***	Spool and mounting (table 1)
*	Voltage (table 2)
**	Variants (table 3)
1	Serial No.

TAB.2 - DC VOLTAGE

DC VOLTAGE		
L	12V	
M	24V	115Vac/50Hz 120Vac/60Hz with rectifier
N	48V*	
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	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 SPOOL

ONE SOLENOID			
Spool type		Covering	Transient position
01E		+	
01F		+	
02E		-	
02F		-	
66E		-	
06F		-	
16E		+	
16F		+	
32E		+	

TAB.3 - VARIANTS

VARIANTS	CODE
No variant (connectors as in the drawing)	00
Pilot light	X1
Rectifier	R1
Rotary emergency button	P1
Solenoid valve without connectors (coils)	S1
Without proximity connector LVDT	S3
Without coils and proximity connector	S4
Cable gland "PG 11"	C1
With solenoid chamber external drainage (Y)	Q5

CE registered mark for industrial environment with reference to the electromagnetic compatibility.

European norms:

- EN50082-2 general safety norm - industrial environment

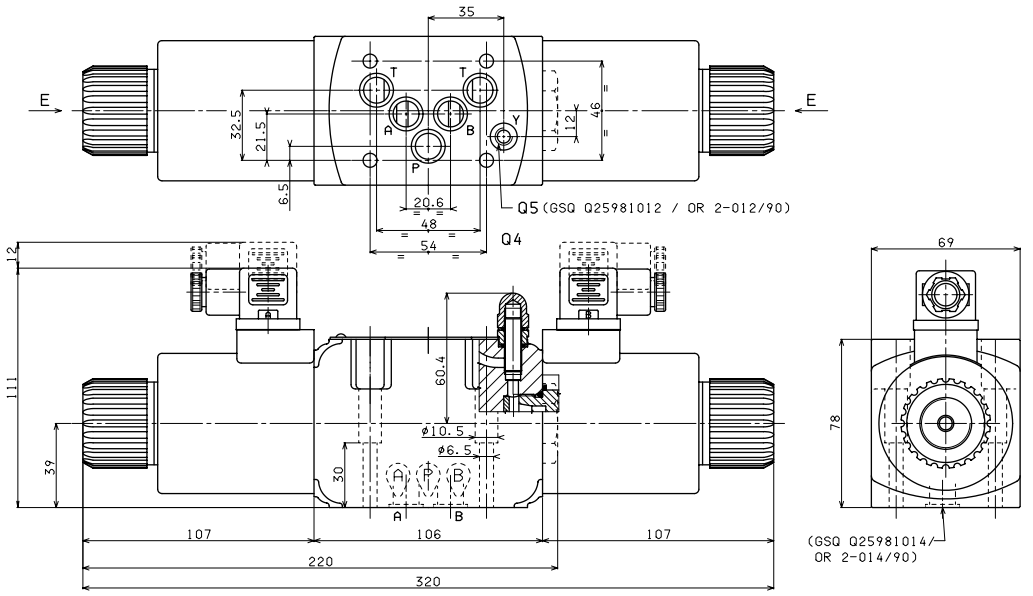
- EN 50081-1 emission general norm - residential environment

ADP.5.V... WITH PROXIMITY SENSOR L.V.D.T. CETOP 5/NG10

OVERALL DIMENSIONS

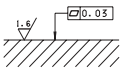
E = Manual override

GSQ = Square section seal



Fixing screws UNI 5931 M6x40
with material specifications 12.9
Tightening torque
8 ÷ 10 Nm / 0.8 ÷ 1 Kgm

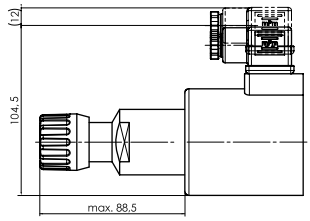
Support plane specifications



"D19" DC SOLENOIDS

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

P1 ROTARY EMERGENCY



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

***** Special voltage

AD.3.I...

AD.3.I... AUTOMATIC RECIPROCATING VALVES CETOP 3

These automatic reciprocating valves, with interface UNI ISO 4401 - 03 - 02 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-03), reverse the movement of an actuator every time the flow through the valve stops.
With no max. pressure valves inside the body, the spool is moved by two springs and locked by unbalanced pressure inside valve; when no more flow is crossing the valve, the spool changes the position inverting the direction of the actuator.

With a preferential starting P → B and A → T position, these valves are mainly used to control the movement compactors or system where is not possible to use electrical device.

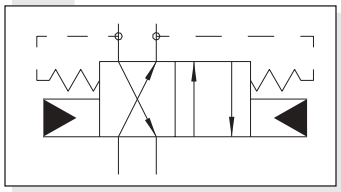
Max. operating pressure port P	320 bar
Max. flow	30 l/min
Minimum permitted flow	3 l/min
Fluid viscosity	20 ÷ 200 mm²/s
Fluid temperature	-20°C ÷ 60°C
Max. contamination level(*) class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$	
Positioner activating force (measured with 1 bar on the T line)	130 N
Weight of version without positioner	0,95 Kg
Weight of version with positioner	1 Kg

(*) Max contamination level must be respect to obtain the right function of the valve

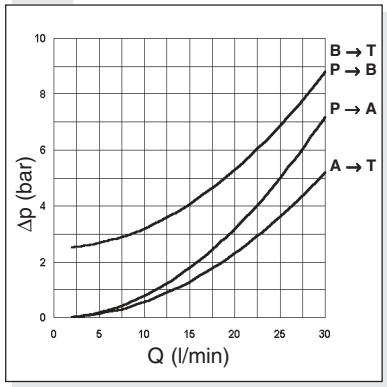
ORDERING CODE

AD	Directional valve
3	CETOP 3/NG6
I	Automatic reciprocating valve at null flow
P	Version with positioner to adjust the pressure relief valve of the system
******	**00** = No variant **V1** = Viton
1	Serial No.

HYDRAULIC SYMBOL

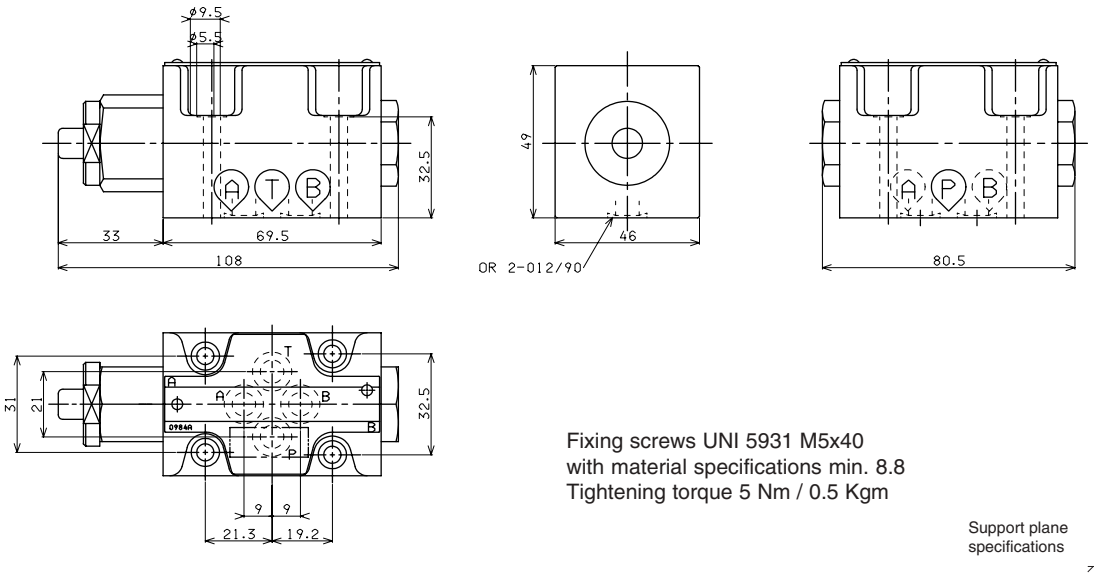


PRESSURE DROPS



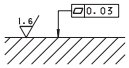
Tests carried out with mineral oil at a temperature of 40°C with viscosity of 46 mm²/s.

OVERALL DIMENSIONS



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

Support plane specifications



AD.5.I... AUTOMATIC RECIPROCATING VALVES CETOP 5

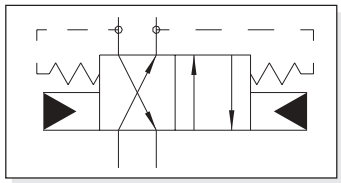
AD.5.I...

The operating principle of this type of inverter valve, with interface UNI ISO 4401 - 05 - 04 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-05), is based on the pressure unbalanced created in its interior as a consequence of the fluid flow rate. On starting the system this valve assumes always a preferential position P → B e A → T.

When a pressure is applied to the cylinder which exceeds the system maximum flow rate valve calibration value (e.g. end stroke actuator), a hydraulic unbalanced is generated capable of changing over the valve and inverting the cylinder direction of the movement.

Max. operating pressure port P	320 bar
Max. flow	100 l/min
Minimum permitted flow	10 l/min
Fluid viscosity	32 ÷ 60 mm²/s
Fluid temperature	-20°C ÷ 60°C
Max. contamination level(*) class 10 in accordance with NAS 1638 with filter $ß_{25}≥75$	
Positioner activating force (measured with 1 bar on the T line)	190 N
Weight of version without positioner	3,4 Kg
Weight of version with positioner	3,6 Kg

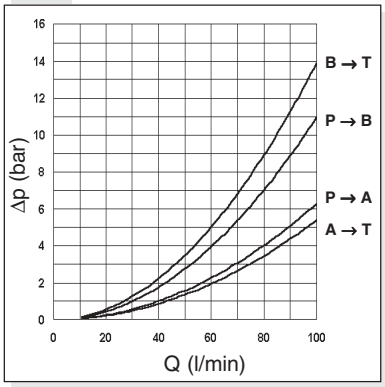
(*) Max contamination level must be respect to obtain the right function of the valve



ORDERING CODE

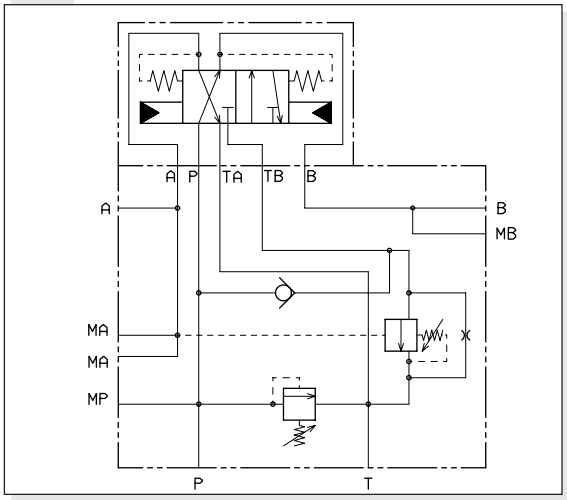
AD	Directional control
5	CETOP 5/NG10
I	Automatic reciprocating valve at null flow
P	Version with positioner to adjust the pressure relief valve of the system
******	**00** = No variant **V1** = Viton **2T** = Variant for regenerative system
1	Serial No.

PRESSURE DROPS

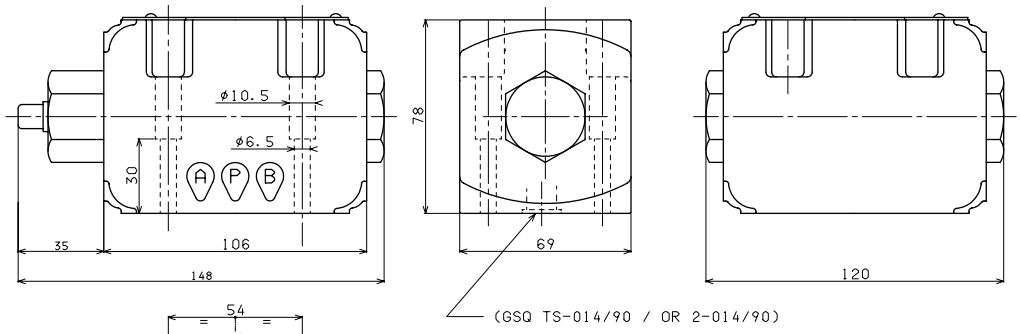


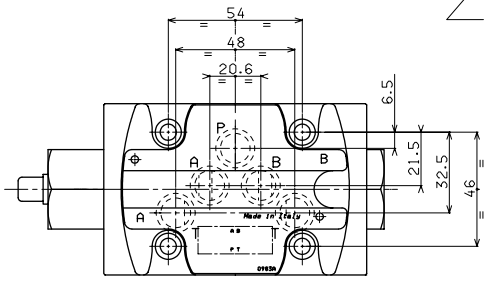
Tests carried out with mineral oil a temperature of 40°C with a viscosity of 46 mm²/s.

AD.5.I.P.2T.1 FOR REGENERATIVE SYSTEM



Version AD.5.I.P.2T.1 integrated in a regenerative circuit for compactors with roll on-off mobile system, solution useful for all applications where to connect microswitch of proximity is not possible. For any information about our regenerative manifold Aron please contact our technical department. For special subplate BS.5.RIA see Chapter X "Systems", next pages.

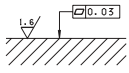


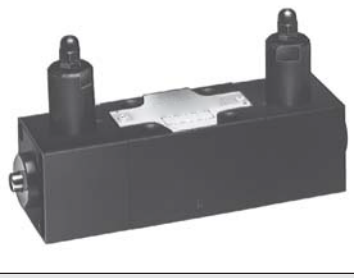


GSQ = square section seal

Fixing screws UNI 5931 M6x40
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications





AD.3.RI...

AD.3.RI... AUTOMATIC RECIPROCATING VALVES CETOP 3

This valve type is characterized by fully hydraulic operation, as it takes advantage of the system pressure rise to cause an automatic and continuous inversion of the utilization. The changeover takes place when the system pressure exceeds the inversion valves calibration pressure, and therefore also in not predetermined positions. At cylinder stroke end, the overall maximum pressure valve should be adjusted on a value 30% higher than the system operating pressure.

The inverter valves pressure calibration values should be 15% lower than that of the overall maximum pressure valve, and 15% higher than the maximum operating pressure.

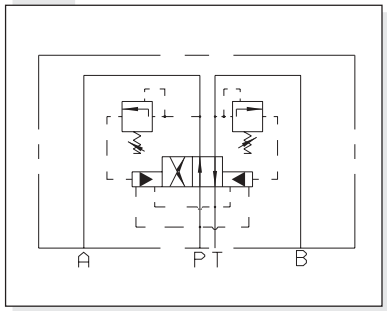
Note: to operate the push button emergency, a minimum pressure of 3 bar on the actuator is needed.

Max. operating pressure		320 bar
Max. pressure port T		160 bar
Min. recommended pressure		15 bar
Max. flow		25 l/min
Min. flow		2 l/min
Setting ranges:	Spring 1	15 ÷ 50 bar
	Spring 2	20 ÷ 140 bar
	Spring 3	50 ÷ 320 bar
Fluid viscosity		10 ÷ 60 mm²/s
Fluid temperature		-20°C ÷ 75°C
Max. contamination level		class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight		2,3 Kg

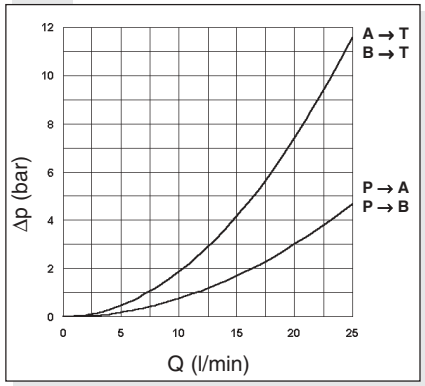
ORDERING CODE

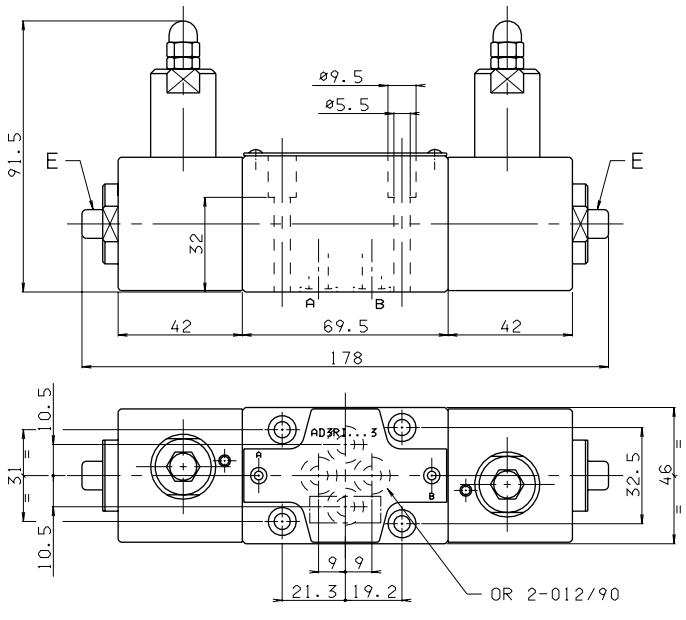
AD	Directional valve
3	CETOP 3/NG6
RI	Automatic reciprocating valve hydraulically operated automatic reciprocation
211	Scheme
Z	No voltage
*	Setting ranges: **1** = 15 ÷ 50 bar **2** = 20 ÷ 140 bar **3** = 50 ÷ 320 bar
**	**00** = No variant **V1** = Viton
3	Serial No.

HYDRAULIC SYMBOL



PRESSURE DROPS

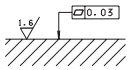


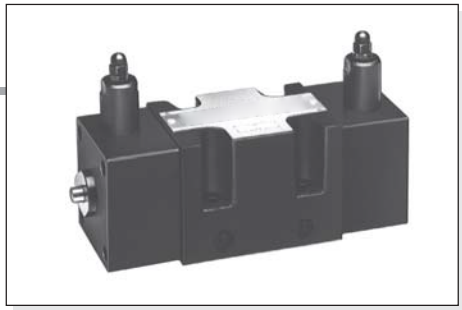


E = Manual override

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

Support plane specifications





AD.5.RI...

AD.5.RI... AUTOMATIC RECIPROCATING VALVES CETOP 5

This valve type is characterized by a fully hydraulic operation, as it takes advantage of the system pressure rise to cause an automatic and continuous inversion of the utilization. The changeover takes place when the system pressure exceeds the inversion valves calibration pressure, and therefore also in not predetermined position. At the cylinder stroke end, the overall maximum pressure valve should be adjusted on a value 30% higher than the system operating pressure.

The inverter valves pressure calibration values should be 15% lower than that of the overall maximum pressure valve, and 15% higher than the maximum operating pressure.

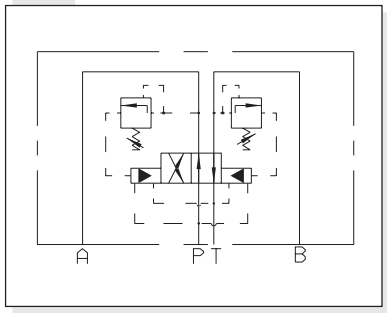
Note: to operate the push button emergency, a minimum pressure of 3 bar on the actuator is needed.

Max. operating pressure		320 bar
Max. pressure port T		160 bar
Min. recommended pressure		15 bar
Max. flow		70 l/min
Min. flow		6 l/min
Setting ranges:	Spring 1	15 ÷ 50 bar
	Spring 2	20 ÷ 140 bar
	Spring 3	50 ÷ 320 bar
Fluid viscosity		10 ÷ 60 mm²/s
Fluid temperature		-20°C ÷ 75°C
Max. contamination level		class 10 in accordance with NAS 1638 with filter $ß_{25}≥75$
Weight		5,4 Kg

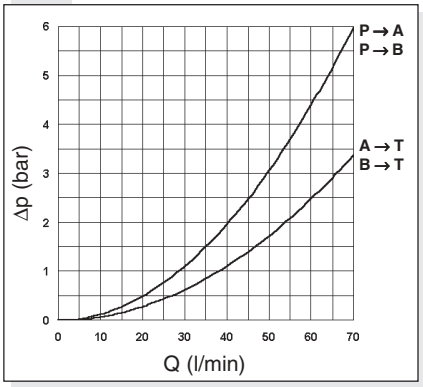
ORDERING CODE

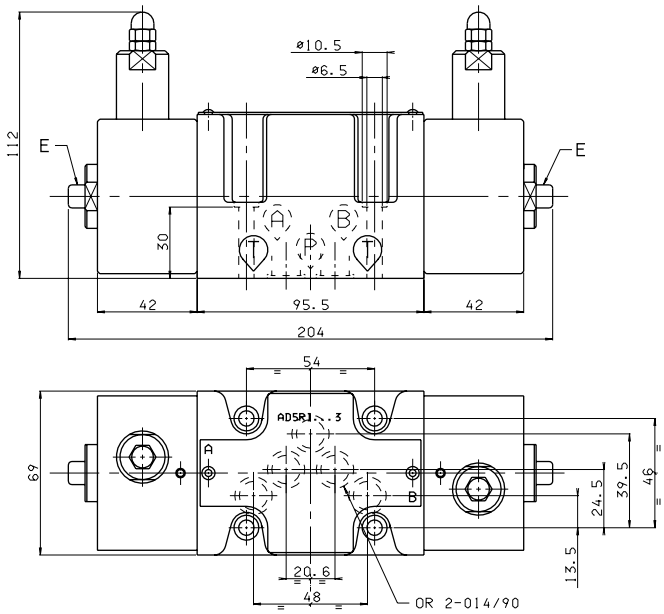
AD	Directional valve
5	CETOP 5/NG10
RI	Automatic reciprocating valve hydraulically operated automatic reciprocation
211	Scheme
Z	No voltage
*	Setting ranges: **1** = 15 ÷ 50 bar **2** = 20 ÷ 140 bar **3** = 50 ÷ 320 bar
**	**00** = No variant **V1** = Viton
3	Serial No.

HYDRAULIC SYMBOL



PRESSURE DROPS

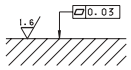




E = Manual override

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

Support plane specifications

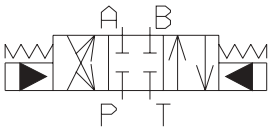


ADPH.5... Piloted valves Cetop 5/NG10 with Cetop 2/NG4 Pilot Valve

These ADPH 5 valves are used primarily for controlling the starting, stopping and direction of fluid flow. These kind of distributors are composed by a main stage crossed by the big flow from the pump (ADPH.5) and by a cetop 2 pilot directional solenoid valve (AD.2.E) available with different mounting type .

When a short response time is requested, a special version of solenoids with high dynamics is available with the code AD.2.E.**.*.*FF.2 (Please, contact our Technical Aron Service).

Hydraulic symbol



ADPH.5...	
Standard spools for ADPH.5	Ch. I page 46
Tech. specifications ADPH5	Ch. I page 47
CETOP 2/NG04	Ch. I page 2
AD.2.E...	Ch. I page 4
"A09" DC Coils	Ch. I page 4
Standard connectors	Ch. I page 19

Ordering code

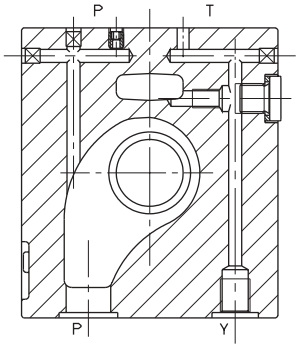
ADPH	Piloted valve **The pilot valves AD.2.E... must be ordered separately**
5	CETOP 5/NG10
**	Spool type (Table next page)
*	Mounting (Table next page) Standard orifice at port P: ∅ 1mm
*	Orifice type on Cetop 2 valves (Table 1) **0** = none **A / B / C / D / E / F / G** = orifice on line A **H / I / L / M / N / P / Q** = orifice on line B
*	Piloting and draining type (Tab.2) **I** = internal piloting internal draining **E** = internal piloting external draining **X** = external piloting internal draining (special body)
00	No variant
1	Serial No.

Tab.1 - Orifice on line A/B

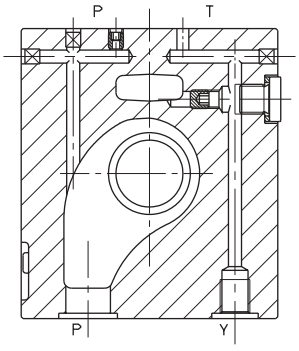
On line A	On line B	ø(mm)
0	**0**	None
A	**H**	0,5
B	**I**	0,6
C	**L**	0,7
D	**M**	0,8
E	**N**	0,9
F	**P**	1
G	**Q**	1,2

Tab.2 - Plugs disposal

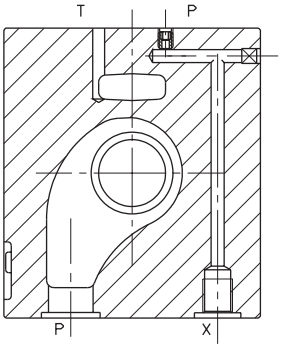
Internal piloting
Internal draining (**I** code)



Internal piloting
External draining (**E** code)



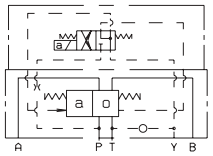
External piloting
Internal draining (**X** code)

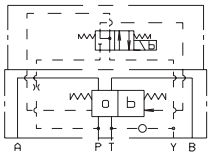


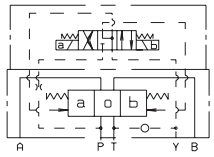
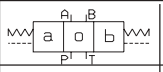
ADPH.5... PILOTED VALVES 5/NG10 WITH CETOP 2/NG4 PILOT VALVE

HYDRAULIC SYMBOLS, SPOOLS AND MOUNTING

(* Spools with price increasing)

	"A" MOUNTING		
Pilot Piloted			
Scheme			
Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
06		+	
15		-	
16		+	

	"B" MOUNTING		
Pilot Piloted			
Scheme			
Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
06		+	
15		-	
16		+	

	"C" MOUNTING		
Pilot Piloted			
Scheme			
Spool type		Covering	Transient position
01		+	
02		-	
03		-	
04*		-	
06		+	

PRESSURE DROPS

The diagram at the side shows the pressure drop curves for spools during normal usage. The used fluid 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 flow rates higher 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	4	4	7	7	
02	6	6	8	8	7
03	3	3	8	8	
04	4	4	2	2	3
06	4	4	7	8	
15	2	2	5	5	
16	1	1	2	2	
	Curve No.				

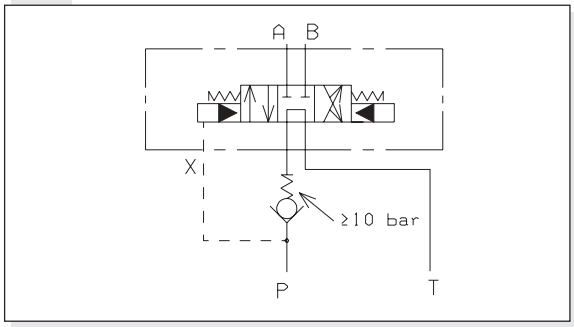
ADPH.5... PILOTED VALVES 5/NG10 WITH CETOP 2/NG4 PILOT VALVE

PILOT SOLENOID CONTROL VALVE SPECIFICATIONS

Max. operating pressure: ports P/A/B	250 bar
Max. operating pressure: port T (dynamic)	70 bar
Max. piloting pressure	250 bar
Min. piloting pressure	10 bar
Max. flow	120 l/min
Switching times (*see note below)	Energizing: 20 ms De-energizing: 50 ms
Piloting oil volume for engagement	1 cm^3
Hydraulic fluid	mineral oil DIN 51524
Fluid viscosity	10 ÷ 500 mm^2/s
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Mounting	plate
Weight ADPH5 without pilot valve	3,4 Kg
Weight ADPH5 with pilot valve with one solenoid	4,3 Kg
Weight ADPH5 with pilot valve with two solenoids	4,5 Kg

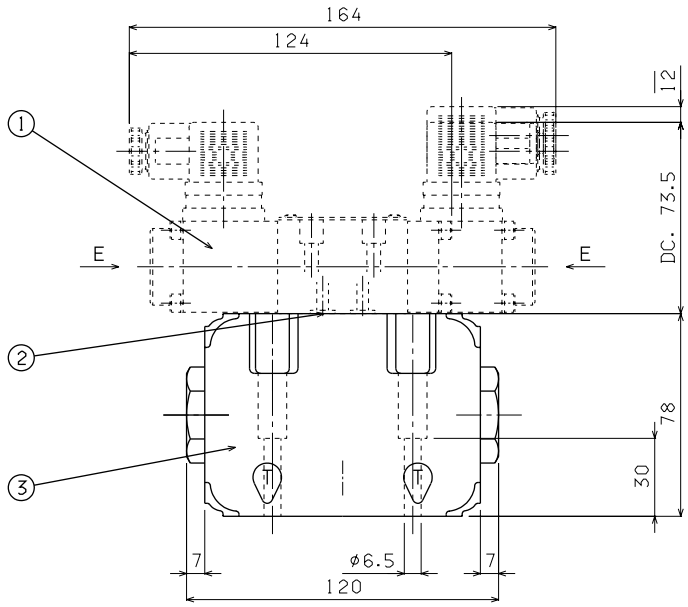
(*) All the tests have been carried out with AD.2.E pilot valve with variant FF, mounting type C, spool 03, flow 100 l/min,pressure 160 bar, back pressure on the T line of 2 bar and oil temperature 40°C.

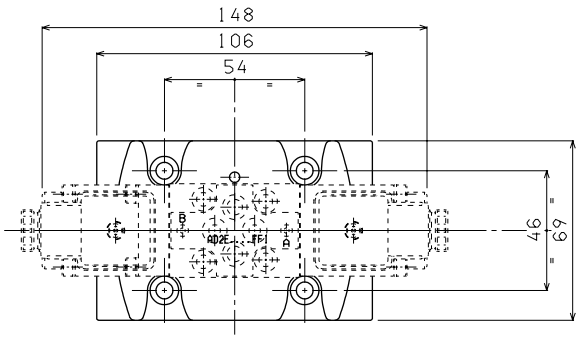
EXTERNAL BACK PRESSURE ON LINE P (FOR SPOOL IN THE CENTRE POSITION)



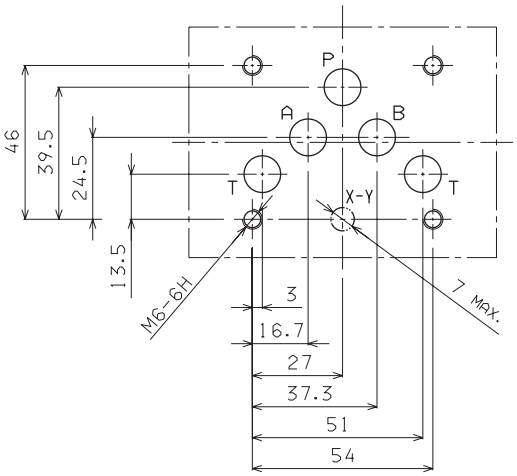
When the main spool connect P to T in the centre position, the minimum pressure of 10 bar is needed to move the main spool (see the “Specifications”); for this reason a check valve on the P line (see the drawing above) is necessary.

OVERALL DIMENSIONS AND MOUNTING SURFACE





Mounting surface



1 Pilot solenoid valve **Cetop 2/NG4** type **AD.2.E...FF variant**

2 Calibrated springs

3 Piloted valve **ADPH.5**

Fixing screws UNI 5931 M6x40
with material specifications 12.9
Tightening torque 8 ÷ 10 N / 0,8 ÷ 1 Kgm

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

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

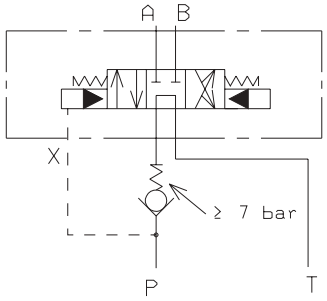
In those case where normally to drain spools are used, it is necessary to remember that the minimum changeover pressure due to the opposing springs is equal to approximately 7 bar (see the operating features table on page I•45) and consequently necessary to insert a check valve in the P way (as shown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

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

ORDERING CODE

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

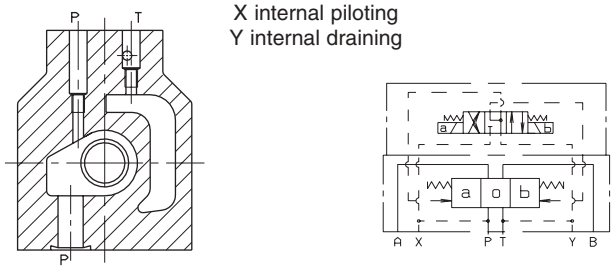
EXTERNAL CHECK ON P



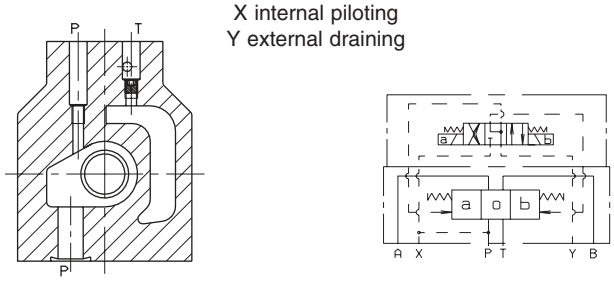
PLUGS ARRANGEMENT FOR THE PILOT AND DRAIN LINES

Plugs type used: M5x6 both for pilot and drain

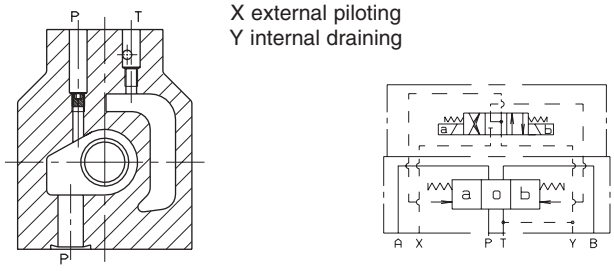
ADH.5...I
X internal piloting
Y internal draining



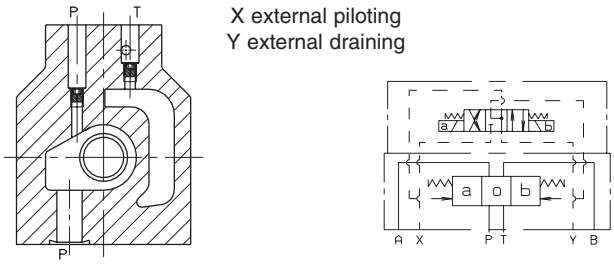
ADH.5...IE
X internal piloting
Y external draining



ADH.5...EI
X external piloting
Y internal draining

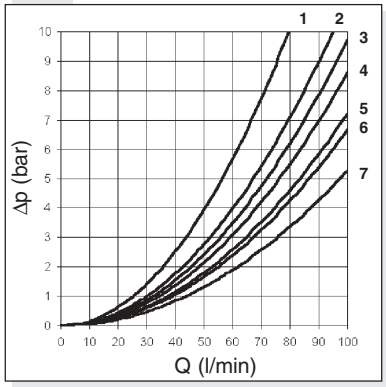


ADH.5...E
X external piloting
Y external draining



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

PRESSURE DROPS



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

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

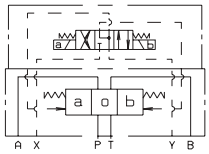
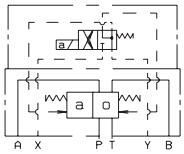
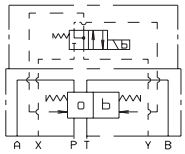
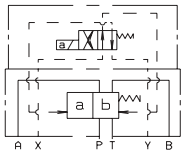
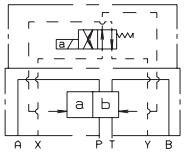
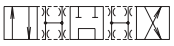
The fluid used was a mineral based oil with a viscosity of 46 mm²/s at 40°C.

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

SPOOLS AND MOUNTING TYPE

(* Spools with price increasing)

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

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

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

PILOT SOLENOID CONTROL VALVE SPECIFICATIONS

FOR DIFFERENT CONTROLS, PLEASE CONTACT OUR TECHNICAL ARON SERVICE

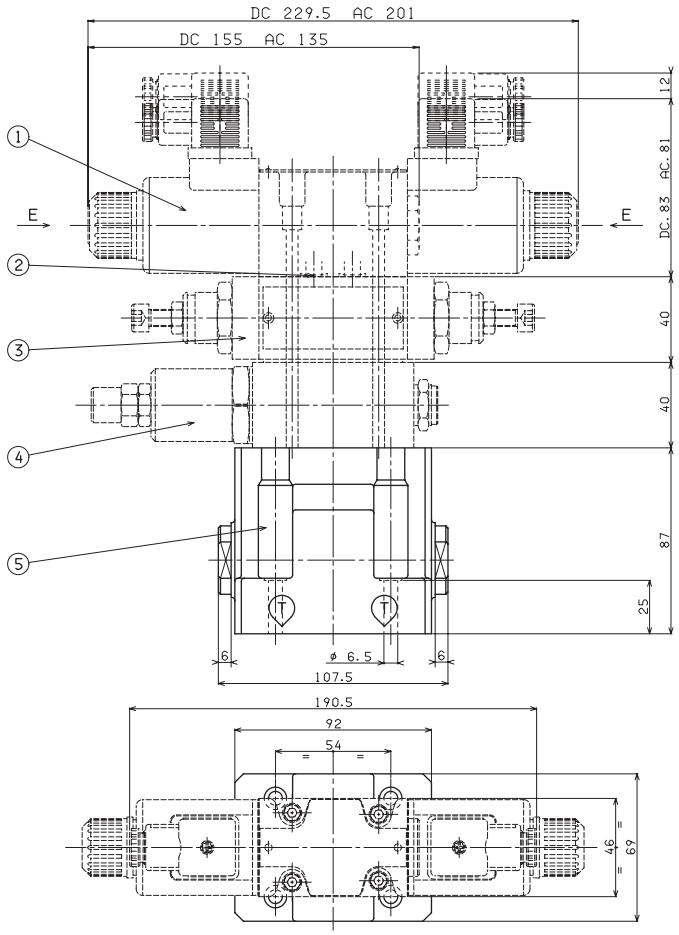
Max. operating pressure ports P/A/B	320 bar
Max. operating pressure port T (int. drainage)	160 bar
Max. pressure on T (ext. drainage)	250 bar
Max. piloting pressure	250 bar
Min. piloting pressure	7 bar
Max. flow	100 l/min
Piloting oil volume engagement 3 position valves	0,8 cm^3
Piloting oil volume engagement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

SWITCHING TIMES PILOTED VALVE

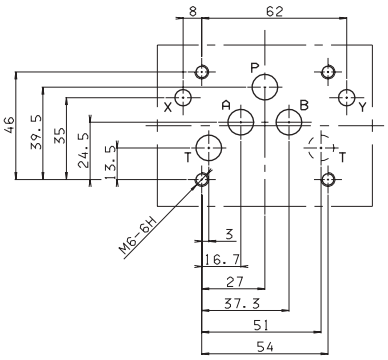
OPERATING PRESSURE (bar)	CURRENT	ENERGIZING centre-extern (ms)	DE-ENERGIZING extern-centre (ms)
50 100 200	ALTERNATING	30 25 20	50
50 100 200	DIRECT	40 35 30	60

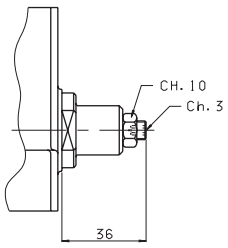
3 position valve. The values are indicative and depend on the hydraulic circuit, the fluid used and the variations in pressure, flow rate and temperature.

OVERALL DIMENSIONS



CETOP 5 MOUNTING SURFACE





SPOOL STROKE ADJUSTMENT

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

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

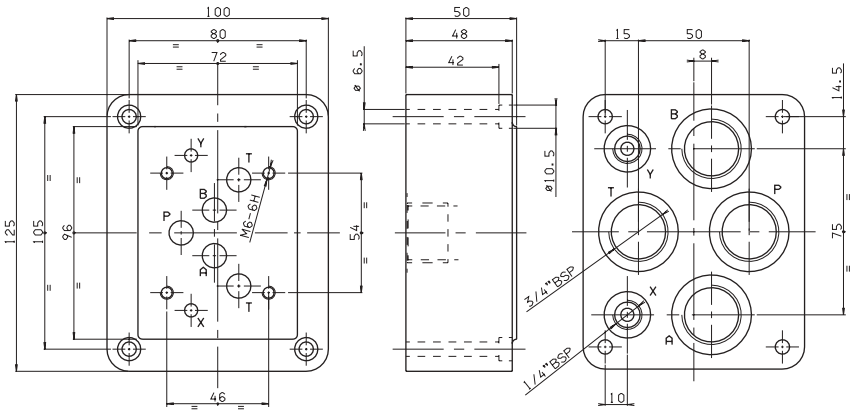
BSH.5... SUBPLATES MOUNTING FOR ADH.5 TYPE PILOTED VALVES CETOP 5/NG10

BSH.5.13 WITH P, T AND A, B REAR 3/4" BSP, X AND Y CLEARANCE HOLES

BSH	Single plate for piloted valve
5	CETOP 5/NG10
13	3/4" BSP rear connectors
00	No variant
1	Serial No.

Weight: 3,8 Kg

Fixing screws M6x50 UNI 5931

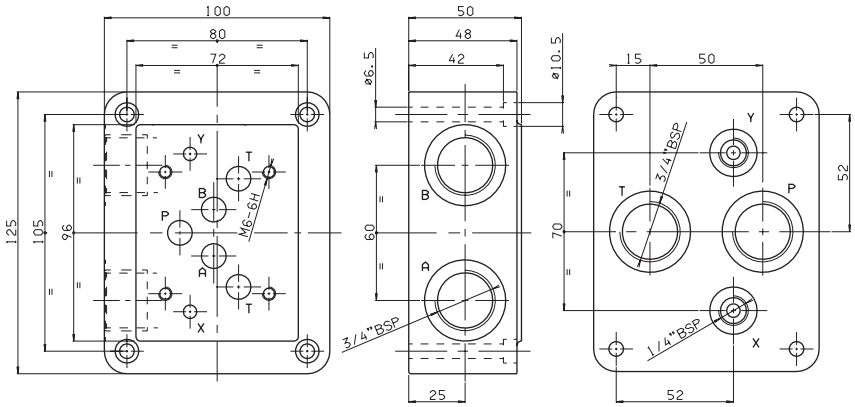


BSH.5.17 WITH P AND T REAR AND A, B SIDE 3/4" BSP, X AND Y CLEARANCE HOLES

BSH	Single plate for piloted valve
5	CETOP 5/NG10
17	3/4" BSP rear and side connectors
00	No variant
1	Serial No.

Weight: 3,9 Kg

Fixing screws M6x50 UNI 5931

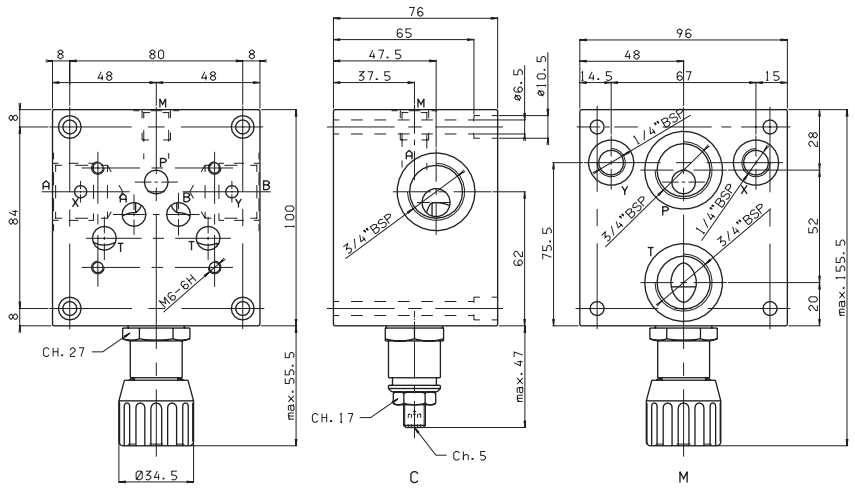


BSH.5.31 WITH P AND T REAR, A AND B SIDE 3/4" BSP, X AND Y CLEARANCE HOLES WITH MAXIMUM PRESSURE VALVE

BSH	Single plate for piloted valve
5	CETOP 5/NG10
31	3/4" BSP rear and side connectors
*	**M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = Max 50 bar **2** = Max 140 bar **3** = Max 320 bar
* *	**00** = No variant **V1** = Viton
2	Serial No.

Weight: 5,5 Kg

Fixing screws M6x75 UNI 5931



• For the minimum permissible setting pressure depending on the spring, see minimum setting curve pressure CMP30

ADH.7... 4/3 AND 4/2
PILOTED VALVES CETOP 7/NG16

Type ADH.7 distributors are intended for interrupting, inserting and diverting a hydraulic system flow. Normally these distributors are composed of a main stage, crossed by the circuit main flow, and of a pilot stage available in several versions.

Various types of controls are available, used either individually or in combination for, among other functions, stroke limitation and main spool movement speed control, in order to optimize the hydraulic system operation where this type of valve is employed.

In those cases where normally to drain spools are used, it is necessary to remember that the minimum changeover pressure due to the opposing springs is equal to approximately 5 bar (see the operating features table next pages) and it is consequently necessary to specify when ordering the check valve incorporated in the P line, if required (as shown below).

- Mounting surface in accordance with UNI ISO 4401 - 07 - 06 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-07).
- Pilot operated spool, solenoid controller.
- Stroke control of main spool.
- Presetting for pressure reducing valve mounting.
- Presetting for single-acting throttle valve mounting.

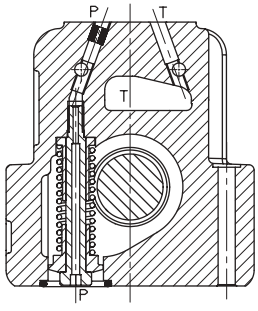
ADH.7...	
STANDARD SPOOLS FOR ADH.7	CH. I PAGE 53
TECH. SPECIFICATIONS ADH.7...	CH. I PAGE 54
SUBPLATES BSH.7...	CH. I PAGE 55/56
CETOP 3/NG06	CH. I PAGE 8
STANDARD SPOOLS FOR AD.3.E	CH. I PAGE 10
AD.3.E...	CH. I PAGE 11
ADC.3...	CH. I PAGE 5
"A09" DC COILS	CH. I PAGE 7
"D15" DC COILS	CH. I PAGE 18
"K12" AC SOLENOIDS	CH. I PAGE 18
STANDARD CONNECTORS	CH. I PAGE 19

ORDERING CODE

ADH	Piloted valve - **Pilot valves and any modulating valves should be ordered separately**
7	CETOP 7/NG16
*	Mounting type (see next page)
**	Spool type (see next page)
*	Piloting and draining **I** = X internal / Y internal **IE** = X internal / Y external **EI** = X external / Y internal **E** = X external / Y external (see Tab.1 at side)
R	Check valve incorporated at port P (Tab. 2) Only for **I** and **IE** versions (omit if not required)
**	**00** = No variant **LC** = Main spool stroke limiter
2	Serial No.

TAB. 2 - INTERNAL CHECK ON P

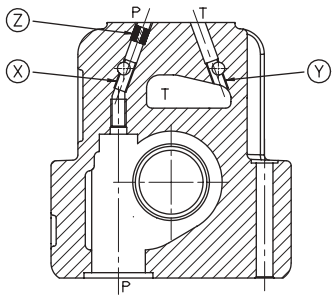
ADH7*..*.R.**.2 VERSION**



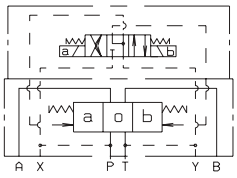
• For the spools 02-04-14-28 the piloting is normally external; the internal piloting is possible only with the internal check valve (R).

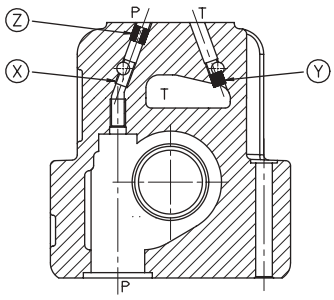
TAB.1 - PLUGS ARRANGEMENT FOR THE PILOT AND DRAIN LINES

Plugs type used: M5x5 both for pilot and drain.
Note: standard M6x6 orifice Ø1,5 insert in the P port (Z)

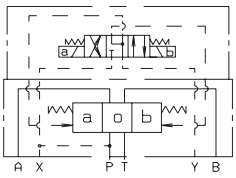


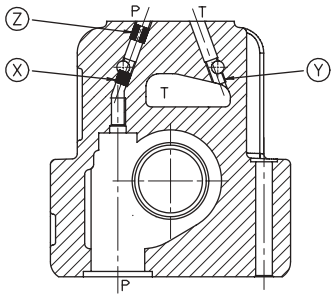
ADH.7...I
X internal piloting
Y internal draining



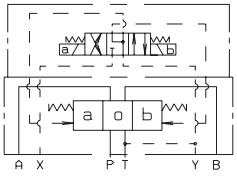


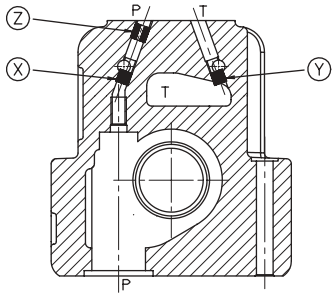
ADH.7...IE
X internal piloting
Y external draining



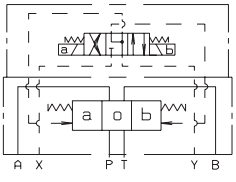


ADH.7...EI
X external piloting
Y internal draining



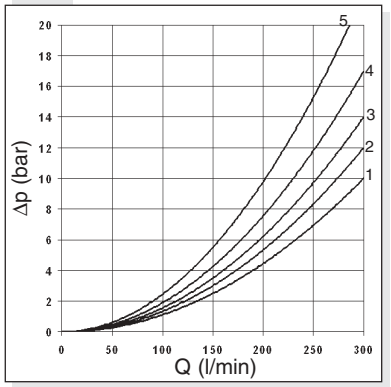


ADH.7...E
X external piloting
Y external draining



ADH.7... 4/3 AND 4/2 PILOTED VALVES CETOP 7/NG16

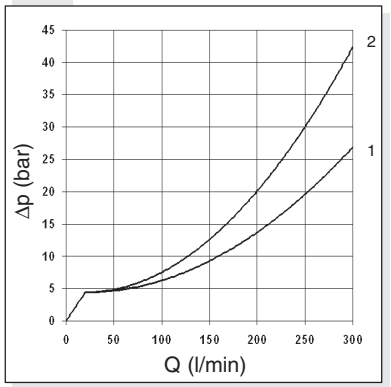
PRESSURE DROPS



The two diagrams show the "Pressure drops" in relation to spools adopted for normal usage (see table).
The fluid used was a mineral based oil with a viscosity of 46 mm²/s at 40° C.

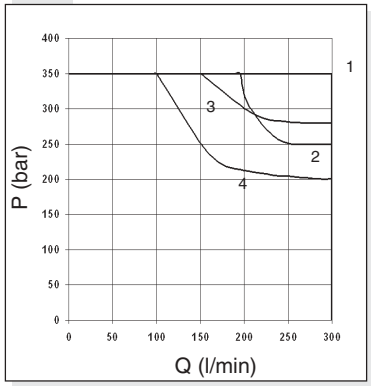
Spool type		Connections				
		P→A	P→B	A→T	B→T	P→T
01	ENERGIZING	2	1	3	3	
	DE-ENERGIZ.					
02	ENERGIZING	1	1	3	3	
	DE-ENERGIZ.					2
03	ENERGIZING	2	1	3	3	
	DE-ENERGIZ.					
04	ENERGIZING	2	2	4	4	
	DE-ENERGIZ.					5
05	ENERGIZING	1	1	2	2	
	DE-ENERGIZ.	2	2			
66	ENERGIZING	1	1	2	3	
	DE-ENERGIZ.				4	
10	ENERGIZING	2	1	3	3	
	DE-ENERGIZ.					
14	ENERGIZING	1	1	3	3	
	DE-ENERGIZ.					4
28	ENERGIZING	1	1	3	3	
	DE-ENERGIZ.					4
23	ENERGIZING	2	1	3	3	
	DE-ENERGIZ.					
	Curve No.					

PRESSURE DROPS FOR INTERNAL CHECK ON P VERSION



Spool type	Connections		
	P→A	P→B	P→T
02	1	1	1
04	1	1	2
	Curve No.		

LIMIT OF USE

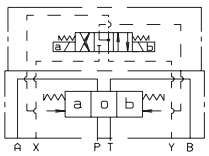
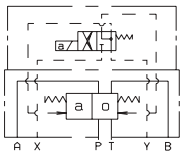
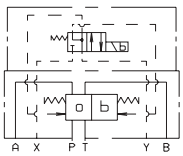
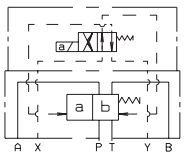
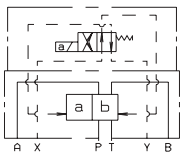
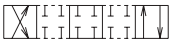
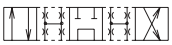
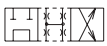


Spool type	No. Curve
01	1
02	2
03	1
04	3
05	1
66	1
10	1
14	4
28	4
23	1

The limit of use test has been carried out with external draining and orifice Ø1,5 insert in the P port (Z). The fluid used was a mineral based oil with a viscosity of 46 mm²/s at 40° C.

SPOOLS AND MOUNTING TYPE

(•) For the "E mounting" the locating spring works only with the steady system (* Spools with price increasing)

	C mounting	A mounting	B mounting	E mounting (•)	P mounting
Pilot Piloted	**AD.3.E.03.C... ADH.7.C...**	**AD.3.E.03.E... ADH.7.A...**	**AD.3.E.03.F... ADH.7.B...**	**AD.3.E.16.E... ADH.7.E...**	**AD3E16E/AD3E16F ADH.7.P...**
Scheme					
Spool type					
01					
02					
03					
04*					
05					
66					
10*					
14*					
28*					
23*					

ADH.7... 4/3 AND 4/2 PILOTED VALVES CETOP 7/NG16

PILOT SOLENOID CONTROL VALVE SPECIFICATIONS

FOR DIFFERENT CONTROLS, PLEASE CONTACT OUR TECHNICAL ARON SERVICE

Max. operating pressure ports P/A/B	350 bar
Max. operating pressure port T (int. drainage)	160 bar
Max. operating pressure port T (ext. drainage)	250 bar
Max. piloting pressure	210 bar
Min. piloting pressure	12 bar
Max flow	300 l/min.
Piloting oil volume for engagement 3 position valves	4 cm^3
Piloting oil volume for engagement 2 position valves	8 cm^3
Hydraulic fluid	mineral oil DIN 51524
Fluid viscosity	2.8 ÷ 380 mm^2/s
Fluid temperature	-20°C ÷ 70°C
Ambient temperature	-20°C ÷ 50°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight ADH7 without pilot valve	7 Kg
Weight ADH7 with pilot valve with 1 AC solenoid	8,2 Kg
Weight ADH7 with pilot valve with 1 DC solenoid	8,4 Kg
Weight ADH7 with pilot valve with 2 AC solenoids	8,5 Kg
Weight ADH7 with pilot valve with 2 DC solenoids	9 Kg

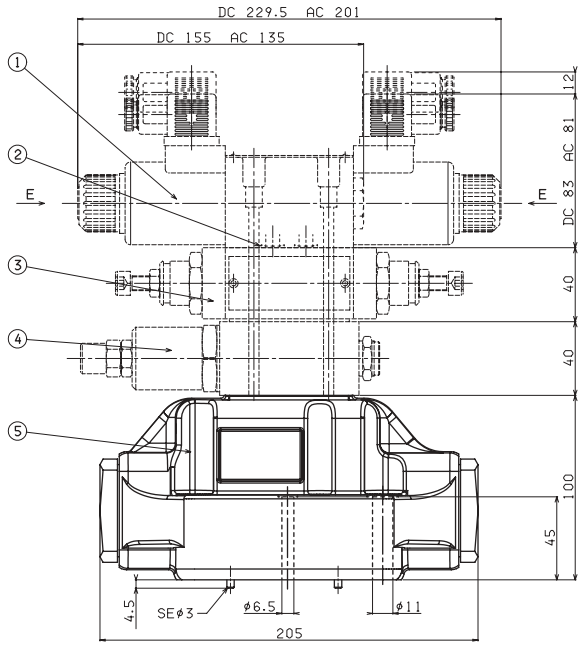
Note: the solenoid valve type **ADC.3.E...** (with A09 coil) and **AD3.E...** (with D15 or K12 coils) could be used both as pilote valve, without any changement of technical features.

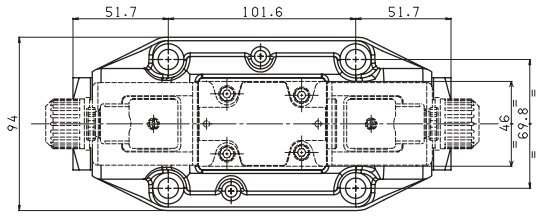
Switching time

Such values refer to a tests carried out with Aron solenoid valve type AD3E03 with P = 100 bar pressure and Q = 100 l/min flow. Orifice ø1.5 mm, insert on piloting port, using a mineral oil at 40°C. with 46 mm^2/s viscosity.

TEMPI DI RISPOSTA VALVOLA PILOTATA

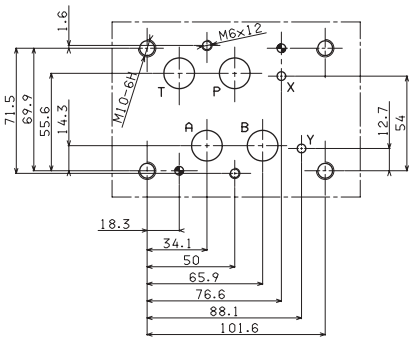
Solenoids	**ENERGIZING** ±10% (ms)			**DE-ENERGIZING** ±10%(ms)	
No. Spool	**01 - 03**			**01 - 03**	
Scheme	2 positions	3 positions		2 positions	3 positions
AC	50	20		25	30
DC	70	35		40	50
No. Spool	**02**	**04**	**02 - 04**	**02 - 04**	
Scheme	2 posit.	2 posit.	3 posit.	2 positions	3 positions
AC	35	60	30	25	25
DC	55	80	40	40	50





1 Piloted solenoid valve type **AD3E...** or **ADC.3.E... CETOP 3/NG6**
2 Calibrated diaphragms **AD3E...**
3 Flow regulation valve type **AM3QF..C**
4 Pressure reduction valve type **AM3RD..C**
5 Main valve type **ADH7..E**

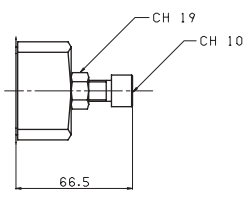
CETOP 7 MOUNTING SURFACE



• Piloted valve fixing:
n° 4 screws T.C.E.I. M10x60 - Tightening torque 40 Nm
n° 2 screws T.C.E.I. M6x55 - Tightening torque 8 Nm
Fixing screws UNI 5931 with material specifications 12.9

• Seals:
n° 4 OR 2-118 PARKER (type 130)
n° 2 OR 2-013 PARKER (type 2043)

SPOOL STROKE ADJUSTMENT



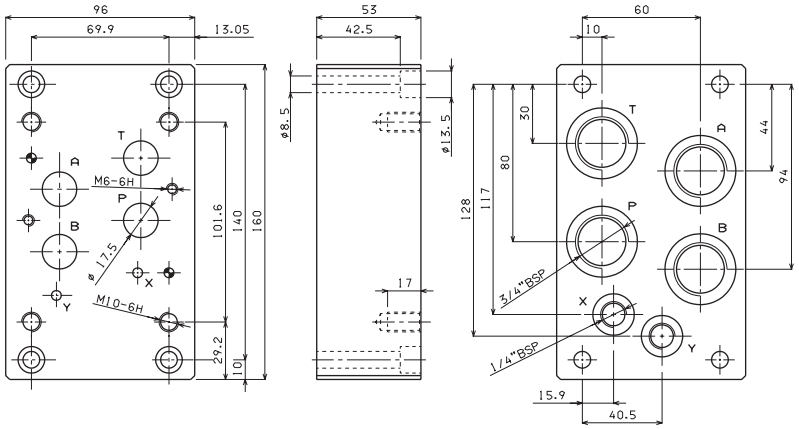
BSH.7... SUBPLATES MOUNTING FOR ADH.7 TYPE PILOTED VALVES CETOP 7/NG16

BSH.7.12 WITH P, T, AND A, B REAR 3/4" BSP

BSH	Single plate for piloted valve
7	CETOP 7/NG16
12	3/4" BSP rear connectors
00	No variant
1	Serial No.

Weight: 5,5 Kg

Fixing screws M8x55 UNI 5931

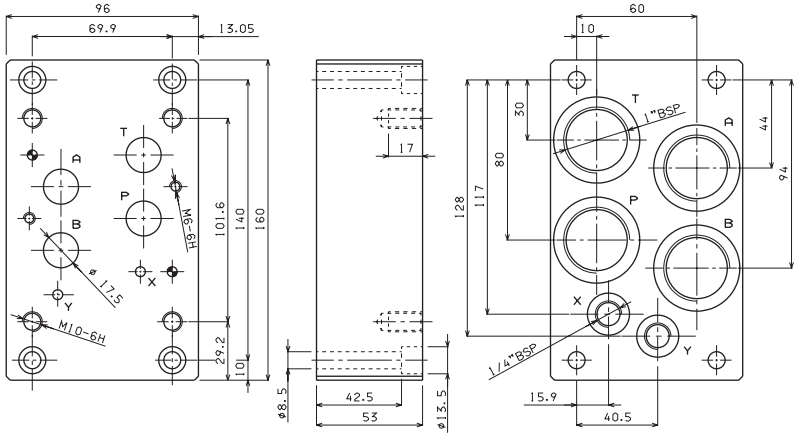


BSH.7.13 WITH P, T AND A,B REAR 1" BSP

BSH	Single plate for piloted valve
7	CETOP 7/NG16
13	1" BSP rear connectors
00	No variant
1	Serial No.

Weight: 4,7 Kg

Fixing screws M8x55 UNI 5931

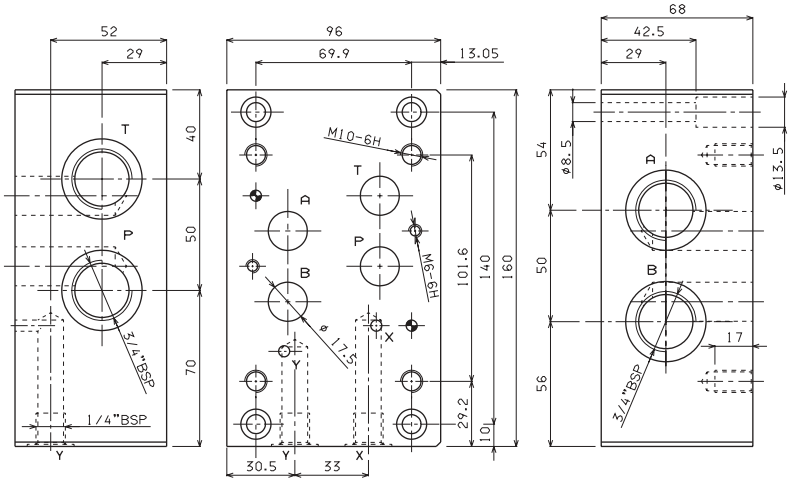


BSH.7.14 WITH P, T AND A, B SIDE 3/4" BSP

BSH	Single plate for piloted valve
7	CETOP 7/NG16
14	3/4" BSP side connectors
00	No variant
1	Serial No.

Weight: 6,3 Kg

Fixing screws M8x55 UNI 5931



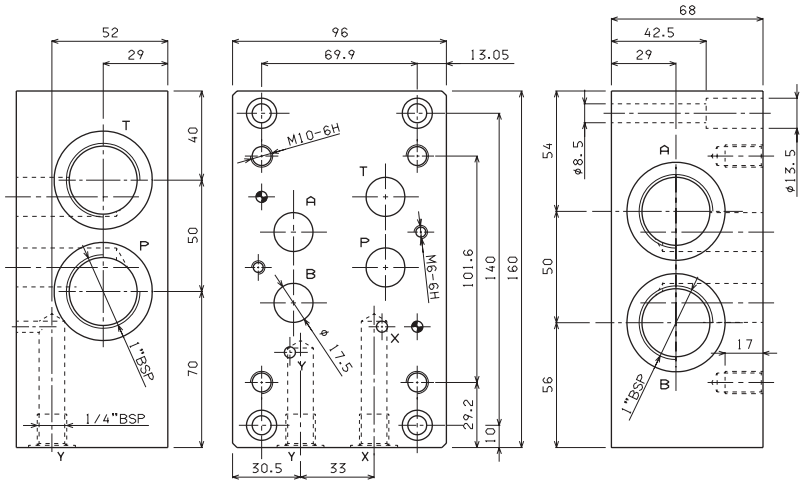
BSH.7... SUBPLATES MOUNTING FOR ADH.7 TYPE PILOTED VALVES CETOP 7/NG16

BSH.7.15 WITH P, T AND A, B SIDE 1" BSP

BSH	Single plate for piloted valve
7	CETOP 7/NG16
15	1" BSP side connectors
00	No variant
1	Serial No.

Weight: 6,3 Kg

Fixing screws M8x55 UNI 5931

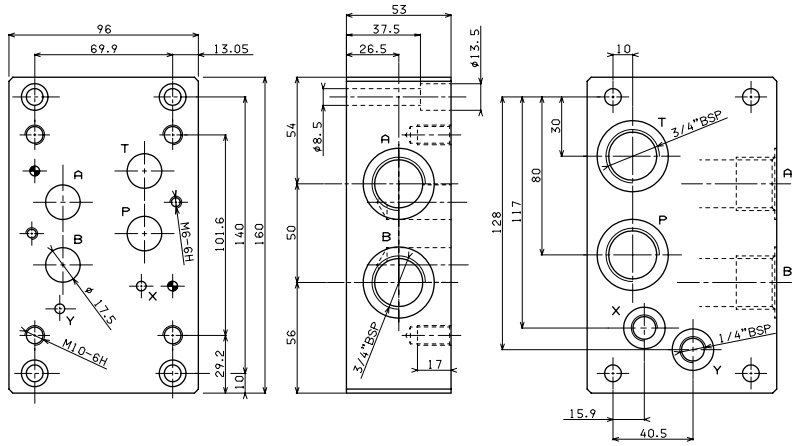


BSH.7.16 WITH P AND T REAR, A AND B SIDE 3/4" BSP, X AND Y REAR

BSH	Single plate for piloted valve
7	CETOP 7/NG16
16	3/4" BSP rear and side connectors
00	No variant
1	Serial No.

Weight: 5,1 Kg

Fixing screws M8x50 UNI 5931

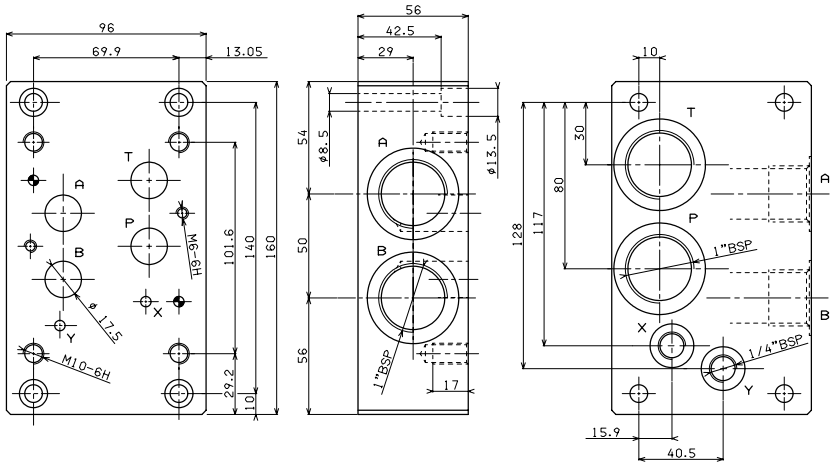


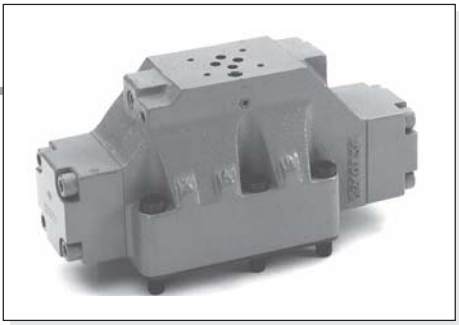
BSH.7.17 WITH P AND T REAR, A AND B SIDE 1" BSP, X AND Y REAR

BSH	Single plate for piloted valve
7	CETOP 7/NG16
17	1" BSP rear and side connectors
00	No variant
1	Serial No.

Weight: 5,3 Kg

Fixing screws M8x55 UNI 5931





ADH.8...4/3 AND 4/2
PILOTED VALVES CETOP 8/NG25

Type ADH.8 distributors are intended for interrupting, inserting and diverting a hydraulics system flow.
Normally these distributors are composed of a main stage, crossed by circuit main flow, and of a pilot stage available in several versions.
Various types of controls are available, used either individually or in combination for, among other functions, stroke limitation and main spool movement speed control, in order to optimize the hydraulic system operation where this type of valve is employed.
In those cases where normally to drain spools are used, it is necessary to remember that the minimum changeover pressure due to the opposing springs is equal to approximately 5 bar (see the operating features table next pages) and it is consequently necessary to specify when ordering the check valve incorporated in the P line, if required (as shown below).

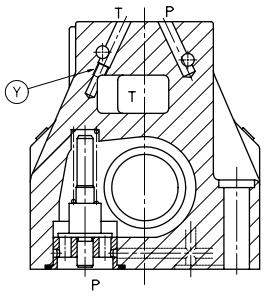
- Mounting surface in accordance with UNI ISO 4401 - 08 - 07 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-08).
- Pilot operated spool, solenoid controller.
- Stroke control of main spool.
- Presetting for pressure reducing valve mounting.
- Presetting for single-acting throttle valve mounting.

ADH.8...	
STANDARD SPOOLS FOR ADH.8	CH. I PAGE 58
TECH. SPECIFICATIONS ADH.8...	CH. I PAGE 59
SUBPLATES BSH.7...	CH. I PAGE 60
CETOP 3/NG06	CH. I PAGE 8
STANDARD SPOOLS FOR AD.3.E	CH. I PAGE 10
AD.3.E...	CH. I PAGE 11
"D15" DC COILS	CH. I PAGE 18
"K12" AC SOLENOIDS	CH. I PAGE 18
STANDARD CONNECTORS	CH. I PAGE 19

ORDERING CODE

ADH	Piloted valve (Pilot valves and any modulating valves should be ordered separately)
8	CETOP 8/NG25
*	Mounting type (see next page)
**	Spool type (see next page)
*	Piloting and draining **I** = X internal / Y internal **IE** = X internal / Y external **EI** = X external / Y internal **E** = X external / Y external (see Tab.1 at side)
R	Check valve incorporated at port P - setting 5 bar (Tab. 2 below) Only for **I, IE** versions (Omit if not required)
**	**00** = No variant **LC** = Main spool stroke limiter
1	Serial No.

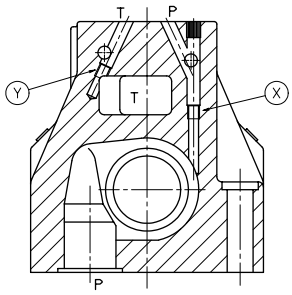
TAB. 2 - INTERNAL CHECK ON P



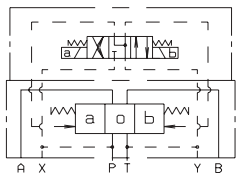
• For the spools 02-04-14-28 the piloting is normally external; the internal piloting is possible with the internal check valve (R).

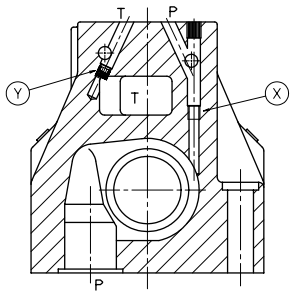
TAB.1 - PLUGS ARRANGEMENT FOR THE PILOT AND DRAIN LINES

Plugs type used: M6x6 both for pilot and drain

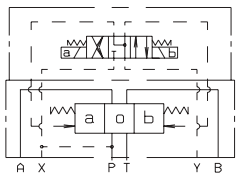


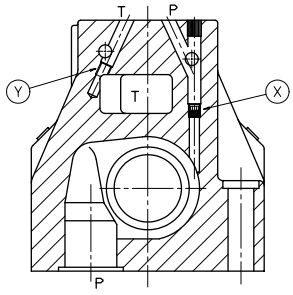
ADH.8...I
X internal piloting
Y internal draining



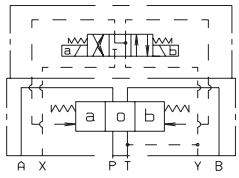


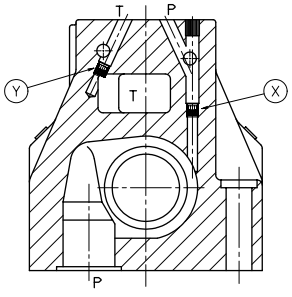
ADH.8...IE
X internal piloting
Y external draining



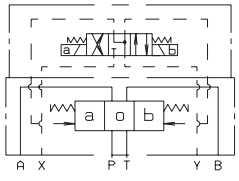


ADH.8...EI
X external piloting
Y internal draining

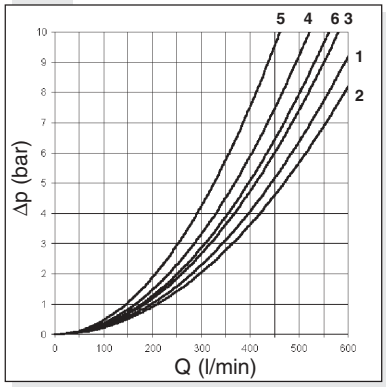




ADH.8...E
X external piloting
Y external draining



PRESSURE DROPS



The diagram shows the pressure drops in relation to spools adopted for normal usage (see table).
The fluid used was a mineral based oil with a viscosity of 35 mm²/s at 50° C.

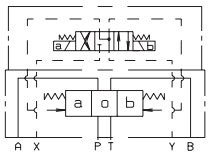
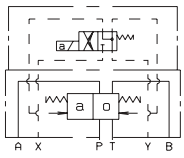
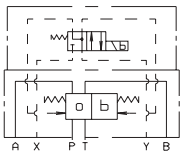
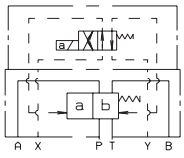
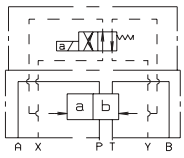
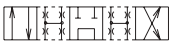
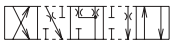
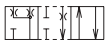
Spool type	Connections					
		P→A	P→B	A→T	B→T	P→T
01	ENERGIZING	1	1	2	3	
02	DE-ENERGIZ. ENERGIZING	2	2	1	2	6(1)
03	DE-ENERGIZ. ENERGIZING	1	1	4(2) 1	4(3) 2	
04	DE-ENERGIZ. ENERGIZING	6	6	3	4	5
05	DE-ENERGIZ. ENERGIZING	4(2) 2	4(3) 2	2	3	
66	DE-ENERGIZ. ENERGIZING	1	1	2	4 2	
10	ENERGIZING	1	1	2	3	
14	DE-ENERGIZ. ENERGIZING	6	6	3	4	5(3)
28	DE-ENERGIZ. ENERGIZING	6	6	4	3	5(2)
23	DE-ENERGIZ. ENERGIZING	1	4 2	2	3	
	Curve No.					

Notes: (1) A/B stopped - (2) B stopped - (3) A stopped

SPOOLS AND MOUNTING TYPE

(* Spools with price increasing)

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

	C mounting	A mounting	B mounting	E mounting	P mounting
Pilot Piloted	**AD.3.E.03.C... ADH.8.C...**	**AD.3.E.03.E... ADH.8.A...**	**AD.3.E.03.F... ADH.8.B...**	**AD.3.E.16.E... ADH.8.E...**	**AD3E16E/AD3E16F ADH.8.P...**
Scheme					
Spool type					
01					
02					
03					
04*					
05					
66					
10*					
14*					
28*					
23*					

ADH.8... 4/3 AND 4/2 PILOTED VALVES CETOP 8/NG25

PILOT SOLENOID CONTROL VALVE SPECIFICATIONS

FOR DIFFERENT CONTROLS, PLEASE CONTACT OUR TECHNICAL ARON SERVICE

Max. operating pressure ports P/A/B	320 bar
Max. operating pressure port T (int. drainage)	160 bar
Max. operating pressure port T (ext. drainage)	250 bar
Max. piloting pressure	210 bar
Min. piloting pressure	5 bar
Max. flow with 04-14-28 spools	500 l/min a 210 bar 450 l/min a 320 bar
Max. flow with all other spools	600 l/min a 210 bar 500 l/min a 320 bar
Piloting oil volume for engagement 3 position valves	11.1 cm^3
Piloting oil volume for engagement 2 position valves	22.12 cm^3
Hydraulic fluid	mineral oil DIN 51524
Fluid viscosity	2.8 ÷ 380 mm^2/s
Fluid temperature	-20°C ÷ 70°C
Ambient temperature	-20°C ÷ 50°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight ADH8 without pilot valve	13,1 Kg
Weight ADH8 with pilot valve with 1 AC solenoid	14,3 Kg
Weight ADH8 with pilot valve with 1 DC solenoid	14,5 Kg
Weight ADH8 with pilot valve with 2 AC solenoids	14,6 Kg
Weight ADH8 with pilot valve with 2 DC solenoids	15,1 Kg

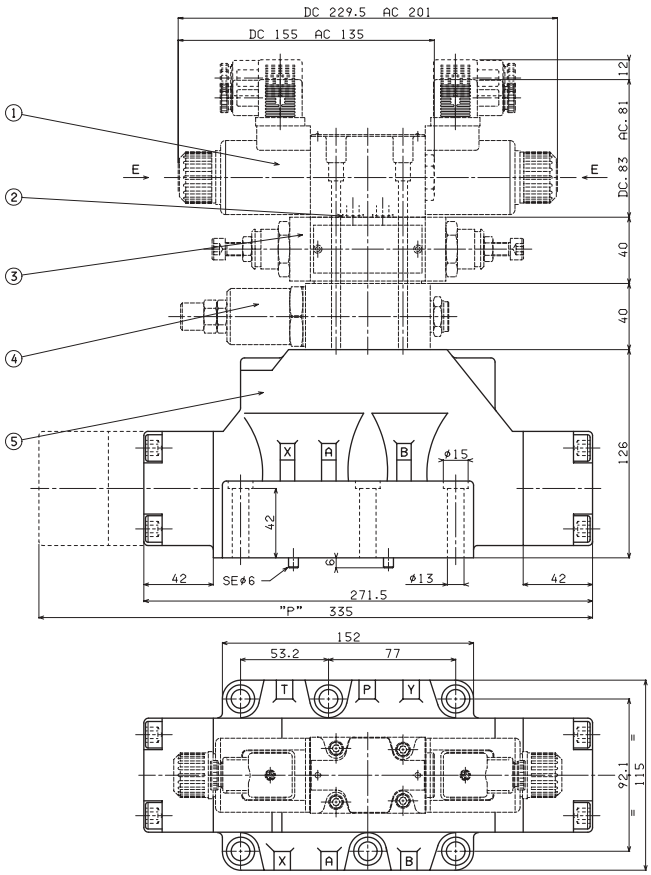
Switching time

Such values refer to a solenoid valve with P = 100 bar pressure using a mineral oil at 50°C with 36 mm^2/sec viscosity PA and BT connections.

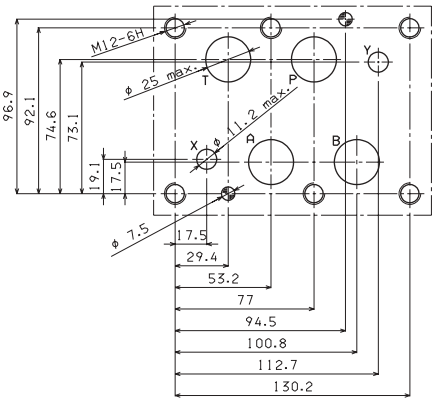
SWITCHING TIMES PILOTED VALVE

Solenoids	ENERGIZING ±10% (ms) 2 posit.	ENERGIZING ±10% (ms) 3 posit.	DE-ENERGIZING ±10% (ms) 2 posit.	DE-ENERGIZING ±10% (ms) 3 posit.
AC	60	45	90	60
DC	75	55	90	60

OVERALL DIMENSIONS

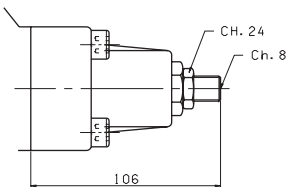


CETOP 8 MOUNTING SURFACE



- Piloted valve fixing: n° 6 screws T.C.E.I. M12x60
- Tightening torque: 69 Nm

- Seals: n° 4 OR 2-123 PARKER (type 3118)
  n° 2 OR 2-117 PARKER (type 3081)



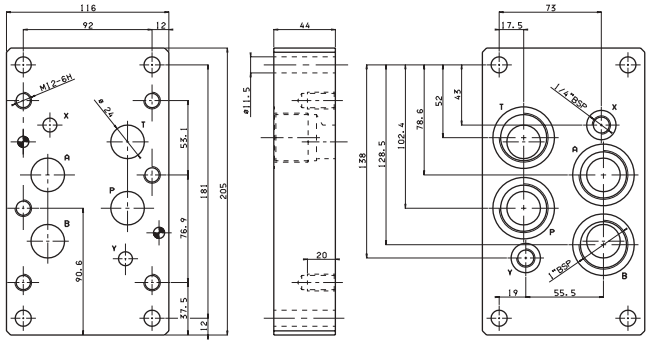
SPOOL STROKE ADJUSTMENT

1 Piloted solenoid valve type **AD3E... CETOP 3/NG6**
2 Calibrated diaphragms **AD3E...**
3 Flow regulation valve type **AM3QF..C**
4 Pressure reduction valve type **AM3RD..C**
5 Main valve type **ADH7..E**

BSH.8... SUBPLATES MOUNTING FOR ADH.8 TYPE PILOTED VALVES CETOP 8/NG25

BSH.8.13 WITH P, T AND A, B REAR 1" BSP

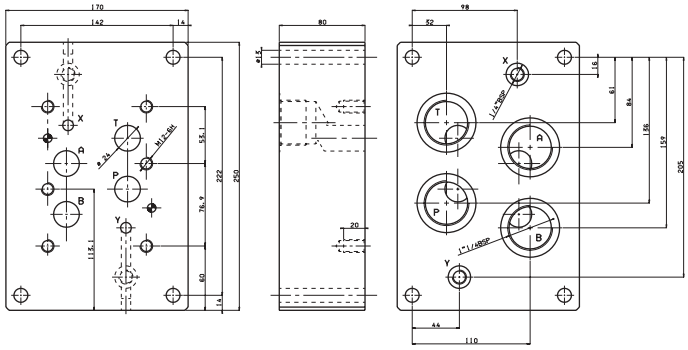
BSH	Single plate for piloted valve
8	CETOP 8/NG25
13	1" BSP rear connectors
00	No variant
1	Serial No.



Weight: 6,3 Kg - Fixing screws M10x60 UNI 5931

BSH.8.13* WITH P, T AND A, B REAR 1"1/4 BSP OR 1" 1/2 BSP

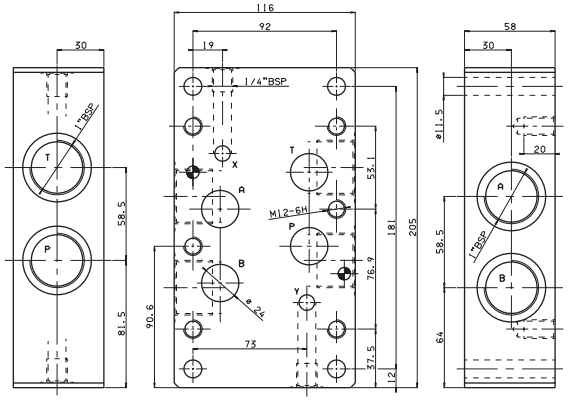
BSH	Single plate for piloted valve
8	CETOP 8/NG25
13*	**A** = 1"1/4 BSP rear connectors **B** = 1"1/2 BSP rear connectors
00	No variant
1	Serial No.



Weight: 21,7 Kg (BSH.8.13A) - Weight: 21,2 Kg (BSH.8.13B)
Fixing screws M12x100 UNI 5931

BSH.8.15 WITH T, P AND A, B SIDE 1" BSP

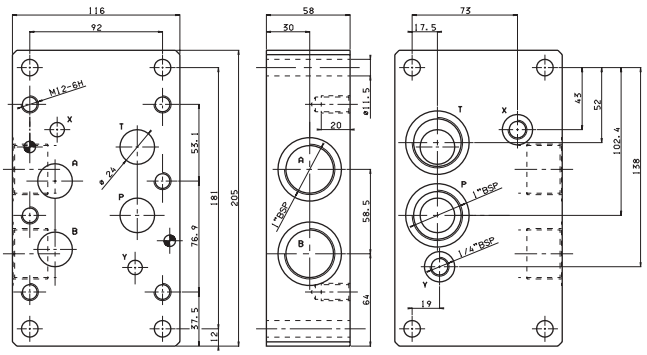
BSH	Single plate for piloted valve
8	CETOP 8/NG25
15	1" BSP side connectors
00	No variant
1	Serial No.



Weight: 8,2 Kg
Fixing screws M10x75 UNI 5931

BSH.8.17 WITH P AND T REAR, A AND B SIDE 1" BSP, X AND Y REAR

BSH	Single plate for piloted valve
8	CETOP 8/NG25
17	1" BSP rear and side connectors
00	No variant
1	Serial No.



Weight: 8,3 Kg - Fixing screws M10x75 UNI 5931

CDL.04.6... STACKABLE CIRCUIT SELECTOR VALVES

The stackable circuit selector valves, type CDL.04.6, allows one single drive of 5 users with 4 elements connected in series.

As they are moved from high performances solenoids they don't need the external drainage.

Additionally, beyond having a reduced and compact dimensions, they can manage high hydraulic powers with a minimal pressure drop.

Max. pressure	250 bar
Max. flow	20 l/min
Overlap	positive
Hydraulic fluids	Mineral oils DIN 51524
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 NAS with 1638 with filter $ß_{25} \geq 75$
Weight	see "Overall dimension"

CDL.04.6...	
"A09" DC COILS	CH. I PAGE 67
CONNECTORS STANDARD	CH. I PAGE 19

TAB.1 - A09 (27 W) COIL

DC VOLTAGE

L	12V	
M	24V	115Vac/50Hz 120Vac/60Hz with rectifier
N	48V*	
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	Without DC coil	

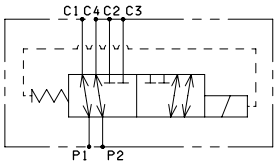
Voltage codes are not stamped on the plate, their are readable on the coils.

* Special voltage

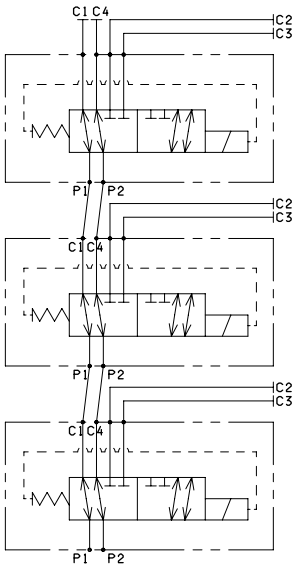
- The AMP Junior coil and with the flying leads (with or without diode) coils are available in 12V or 24V DC voltage only.
- The Deutsch coil with bidirectional diode is available in 12V DC voltage only.

HYDRAULIC SYMBOLS

SINGLE ELEMENT



MULTI STATION CONNECTION



ORDERING CODE

CDL	Stackable circuit selector valve
04	Size NG04
6	No. of way (single element)
W	Threaded connectors 1/4" BSP
I	Internal drainage
*	No. of elements: **1 / 2 / 3 / 4**
*	Voltage (Tab. 1)
**	Variants (Tab. 2)
1	Serial No.

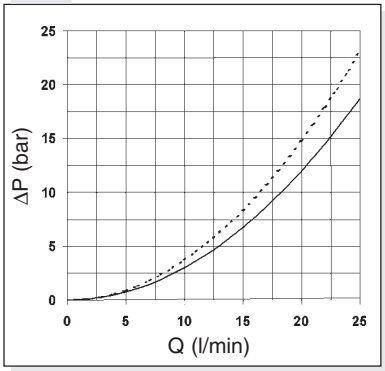
(*) **P1 Emergency** tightening torque **max. 6÷9 Nm / 0.6 ÷ 0.9 Kgm** with CH n. 22

TAB. 2 - VARIANTI

VARIANTE	CODE
No variant	00
Viton	V1
Pilot light	X1
Rectifier	R1
Solenoid valve without connectors	S1
Cable gland "PG 11"	C1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
Rotary emergency button	P1(*)
Emergency button	E1
AMP Junior connection	AJ
Bobina con fili (250 mm)	FL
with flying leads (130 mm) and integr. diode	LD
Deutsch connection with bidir. diode	CX

Other variants relate to a special design.

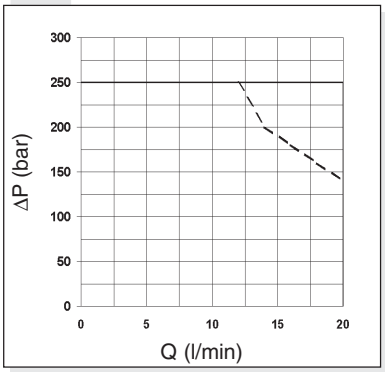
PRESSURE DROPS



P1 →C1
P1→ C2

P2 →C3
P2 →C4

LIMITS OF USE



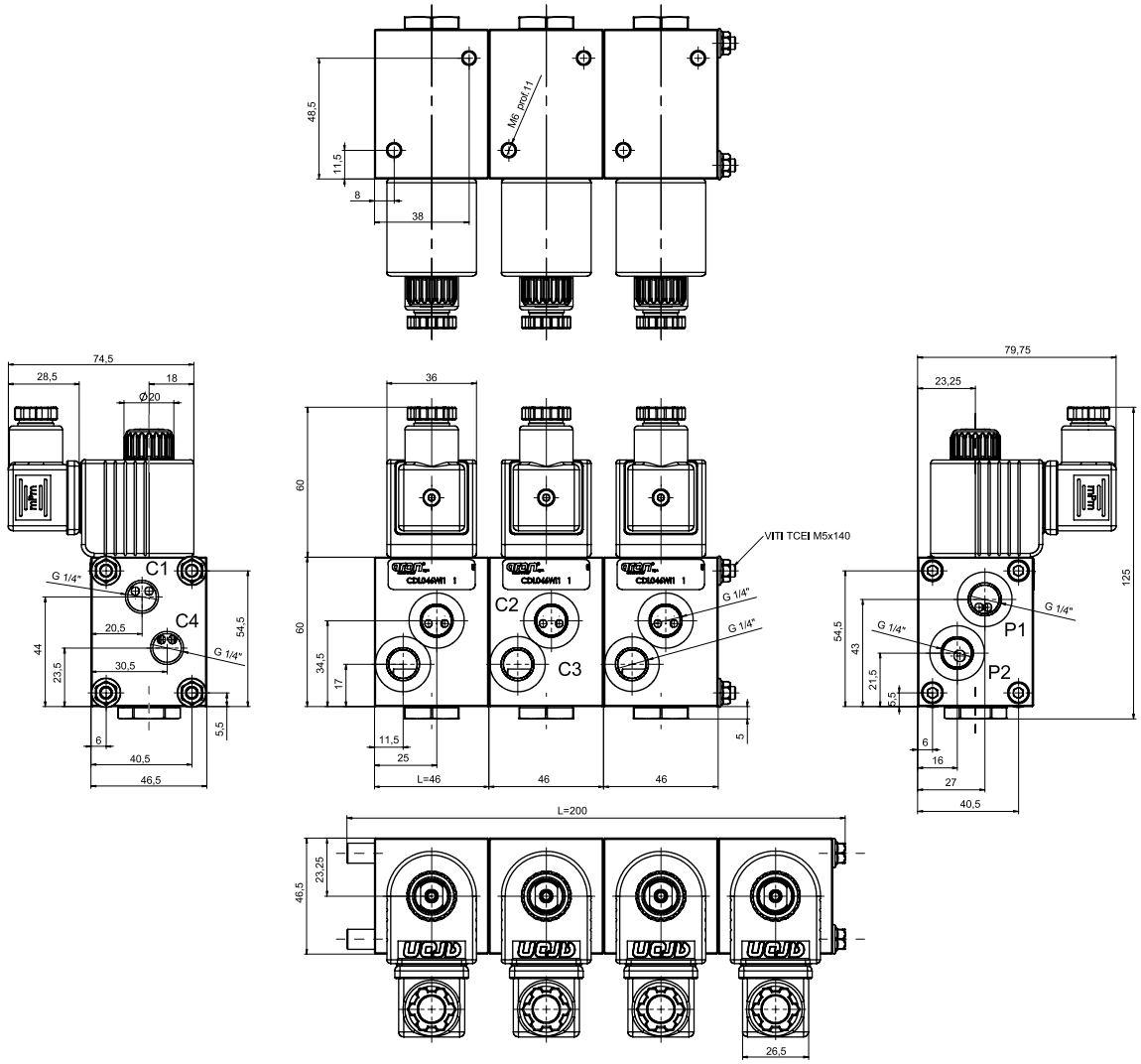
Energizing

De-energizing

Leakages: ≤10 cc/min with rest carried out at a fluid temperature of 40°C with a pressure at 200 bar; the fluid used was a mineral based oil with viscosity of 46 mm²/s at 40° C.

The tests have been carried out with solenoids at operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 50 C°. The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40 degrees C.

OVERALL DIMENSIONS

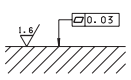


Fixing screws with material specifications min. 8.8
Tighten the screws to a torque of 5 Nm (0.5 Kgm)

No. of elements	No. of way	L (Length)	Weight (Kg)	Fixing screws	Kit spare part code* (rods and studs)
1	06	46	1,05	-	/
2	08	100	2,20	TCEI M5x95	V89.54.0020
3	10	145	3,30	TCEI M5x140	V89.54.0021
4	12	200	4,45	TCEI M5x194 (special rods)	V89.54.0022

(*) For multiple composition rods and studs are available.

Support plane specifications



CDL.06.6... STACKABLE CIRCUIT
SELECTOR VALVES

The stackable circuit selector valves, type CDL.06.6, allows one single drive of 6 users with 5 elements connected in series.
As they are moved from high performances solenoids they don't need the external drainage.
This valves can manage high hydraulic powers with a minimal pressure drop.

Max. pressure	250 bar
Max. flow	50 l/min
Overlap	negative
Hydraulic fluids	Mineral oils DIN 51524
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 NAS with 1638 with filter $ß_{25}≥75$
Weight	see "Overall dimension"

CDL.06.6...	
"40W" DC COILS	CH. I PAGE 68
CONNECTORS STANDARD	CH. I PAGE 19

ORDERING CODE

CDL	Stackable circuit selector valve
06	Size NG06
6	No. of way (single element)
W	Threaded connectors 3/8" BSP
I	Internal drainage
*	No. of elements: **1 / 2 / 3 / 4 / 5**
*	Voltage (Tab. 1)
**	Variants (Tab. 2)
1	Serial No.

TAB.1 - 40W COIL

DC VOLTAGE	
L	12V
M	24V
W	Without DC coil

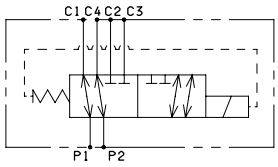
Voltage codes are not stamped on the plate, their are readable on the coils.

TAB.2 - VARIANTS

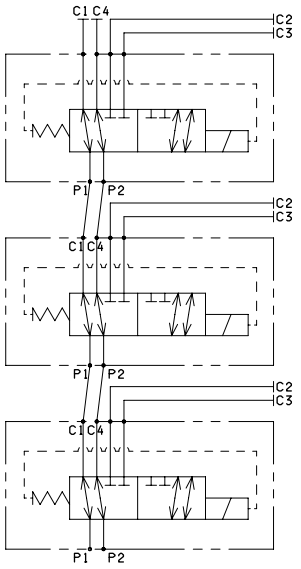
No variant (connectors as in the drawing)	00
Viton	V1
Pilot light	X1
Rectifier	R1
Valve without connector (coil)	S1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
Emergency button	E1
Rotary emergency button	P1
Raccordements Deutsch DT04-2P	CZ

HYDRAULIC SYMBOLS

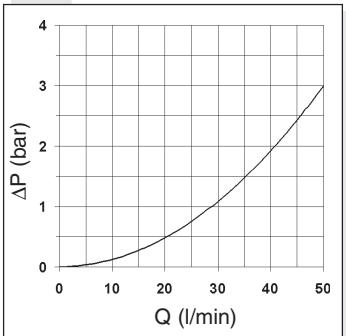
SINGLE ELEMENT



MULTISTATION CONNECTION



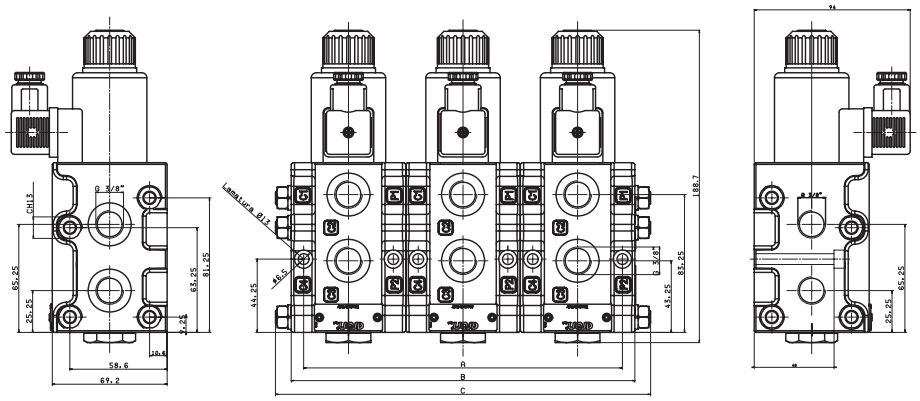
PRESSURE DROPS



P1 →C1, P1→ C2,
P2 →C3 et P2 →C4

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.

OVERALL DIMENSIONS



No. of elements	No. of way	A	B	C	Weight (Kg)	Kit spare part code* (rods and studs)
		Lengths (mm)				
1	06	54	69	-	3	/
2	08	123	138	160	6,3	V89.56.0001
3	10	192	207	226	9,3	V89.56.0002
4	12	261	276	296	12,3	V89.56.0003
5	14	330	345	365	25,3	V89.56.0004

(*) For multiple composition rods and studs are available.

Fixing screws UNI 5931 M6x60
with material specifications min. 8.8
Tightening torque for studs 8 Nm / 0.8 Kgm
Tightening torque for rods 20 Nm / 2 Kgm

ADL06.6... FLOW DIVERSION VALVES

The 6 way flow diversion valves are special solenoid valves which allow the simultaneous connection of two systems.

In order to obtain valve's working at pressure of 250 bar up to 320 bar (exeternal drainge) the G 1/8" BSP plug must be removed to Y connector.

Max. pressure (without drainage, Y pluged)	250 bar
Max. pressure (external drainage)	320 bar
Max. flow	40 l/min
Overlap	negative
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 $ß_{25} \geq 75$
Weight	2,4 Kg

ADL06.6...	
"D15" DC COILS	CH. I PAGE 67
STANDARD CONNECTORS	CH. I PAGE 19

ORDERING CODE

ADL06	Flow diversion valves NG6
6	No. of way
W	Threaded connectors 3/8"BSP
I	Without drainage Y connector pluged
*	Voltage (see table 1)
**	Variants (see table 2)
3	Serial No.

TAB.2 - VOLTAGE

D15 COIL (30W)

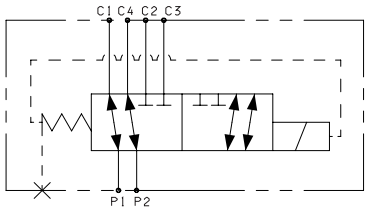
L	12V	
M	24V	
V	28V*	115Vac/50Hz 120Vac/60Hz with rectifier
N	48V*	
Z	102V*	
P	110V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	Without DC coils and connectors	

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

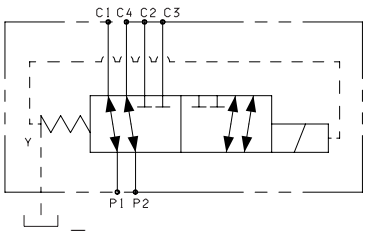
* Special voltage

• AMP Junior (with or without diode) and Deutsch and with flying leads coils, are available in 12V or 24V DC voltage only.
• Plastic type coils are available in 12V, 24V, 28V or 110V DC voltage only.

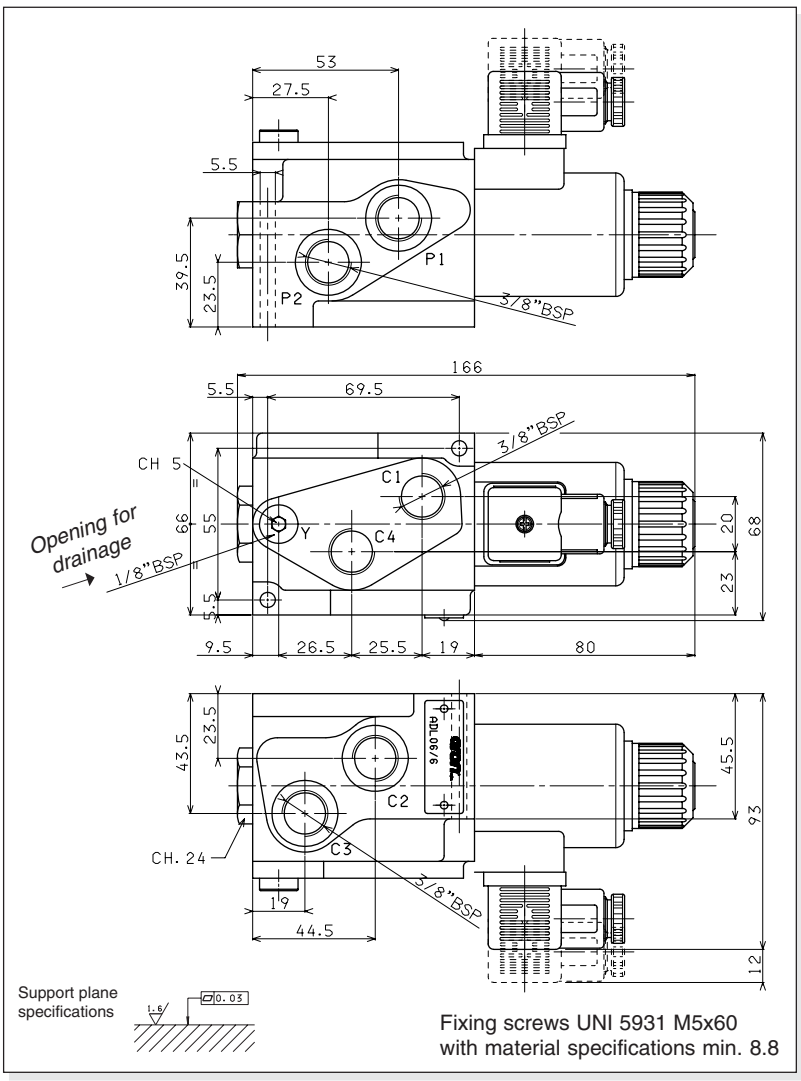
DRAINS AND HYDRAULIC SYMBOLS



WITHOUT DRAINAGE - Y PLUGED



EXTERNAL DRAINAGE



Fixing screws UNI 5931 M5x60 with material specifications min. 8.8

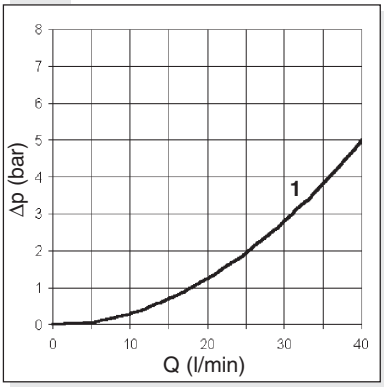
TAB.2 - VARIANTS

No variant (connectors as in the drawing)	00
Viton	V1
Pilot light	X1
Rectifier	R1
Flow diversion without connector (coil)	S1
Emergency button	E1
Rotary emergency button	P1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
AMP Junior coil	AJ
AMP Junior coil and integrated diode	AD
Coil with flyning leads (175mm)	SL
Deutsch DT04-2P Coil type	CZ
Plastic type coil	BR

PRESSURE DROPS

Curve n° 1:

P1 →C1
P1→ C2
P2 →C3
P2 →C4



Leakages: ≤10 cc/min with rest carried out at a fluid temperature of 40°C with a pression at 200 bar; the fluid used was a mineral based oil with viscosity of 46 mm²/s at 40° C.

CDL.10.6... STACKABLE CIRCUIT
SELECTOR VALVES

The stackable circuit selector valves, type CDL.10.6, allows one single drive of 6 users with 5 elements connected in series.
As they are moved from high performances solenoids they don't need the external drainage.
This valves can manage high hydraulic powers with a minimal pressure drop.

Max. pressure	250 bar
Max. flow	80 l/min
Overlap	negative
Hydraulic fluids	Mineral oils DIN 51524
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 NAS with 1638 with filter $ß_{25}$³75
Weight	see "Overall dimension"

CDL.10.6...	
"A16" DC COILS	CH. I PAGE 68
CONNECTORS STANDARD	CH. I PAGE 19

ORDERING CODE

CDL	Stackable circuit selector valve
10	Size NG10
6	No. of way (single element)
W	Threaded connectors 1/2" BSP
I	Internal drainage
*	No. of elements: **1 / 2 / 3 / 4 / 5**
*	Voltage (Tab. 1)
**	Variants (Tab. 2)
1	Serial No.

TAB.1 - A16 COIL

DC VOLTAGE

L	12V	115Vac/50Hz 120Vac/60Hz with rectifier
M	24V	
N	48V*	
P	110V*	230Vac/50Hz 240Vac/60Hz with rectifier
Z	102V*	
X	205V*	
W	Without DC coil	

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

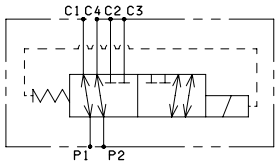
* Special voltage

TAB.2 - VARIANTS

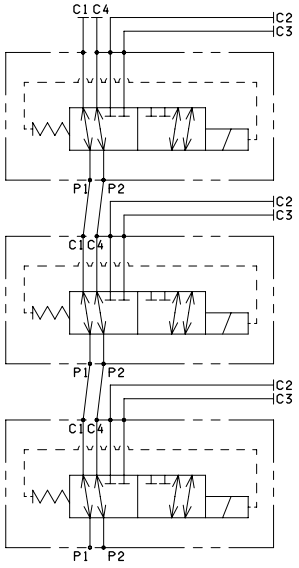
No variant (connectors as in the drawing)	00
Viton	V1
Pilot light	X1
Rectifier	R1
Valve without connector (coil)	S1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
Emergency button	E1
Rotary emergency button	P1

HYDRAULIC SYMBOLS

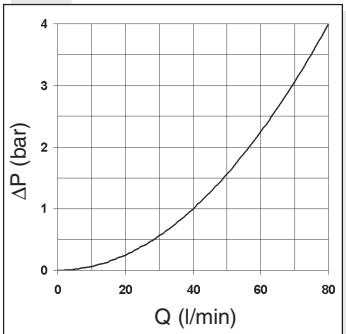
SINGLE ELEMENT



MULTISTATION CONNECTION



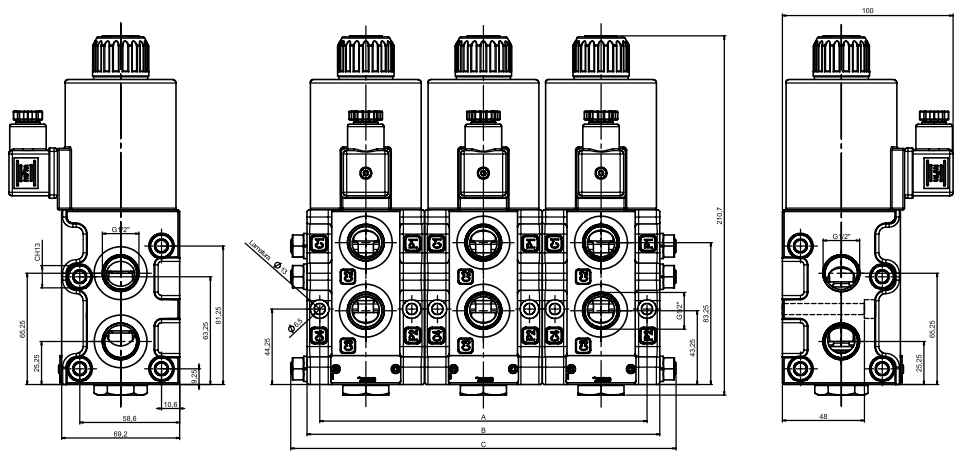
PRESSURE DROPS



——— P1 →C1, P1→ C2, P2 →C3 et P2 →C4

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.

OVERALL DIMENSIONS



No. of elements	No. of way	A	B	C	Weight (Kg)	Kit spare part code* (rods and studs)
		Lengths (mm)				
1	06	54	69	-	4,5	/
2	08	123	138	160	9,3	V89.56.0001
3	10	192	207	226	14	V89.56.0002
4	12	261	276	296	18,5	V89.56.0003
5	14	330	345	365	23,3	V89.56.0004

(*) For multiple composition rods and studs are available.

Fixing screws UNI 5931 M6x60
with material specifications min. 8.8
Tightening torque for studs 8 Nm / 0.8 Kgm
Tightening torque for rods 20 Nm / 2 Kgm

ADL10.6... FLOW DIVERSION VALVES

The 6 way flow diversion valves are special solenoid valves which allow the simultaneous connection of two systems.

In order to obtain valve's working at pressure of 250 bar up to 320 bar (external drainage) the G 1/8" BSP plug must be removed to Y connector.

Max. pressure (without drainage, Y plugged)	250 bar
Max. pressure (external drainage)	320 bar
Max. flow	80 l/min
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	3,6 Kg

ADL10.6...	
"A16" DC COILS	CH. I PAGE 68
STANDARD CONNECTORS	CH. I PAGE 19

ORDERING CODE

ADL10	Flow diversion valves NG10
6	No. of way
J	Connectors 3/4"BSP
I	Without drainage Y connector plugged
*	Voltage (see table 1)
**	Variants (see table 2)
1	Serial No.

TAB.1 - A16 COIL

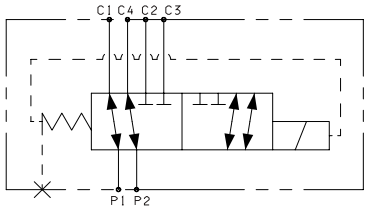
DC VOLTAGE

L	12V	
M	24V	115Vac/50Hz 120Vac/60Hz with rectifier
N	48V*	
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	Without DC coil	

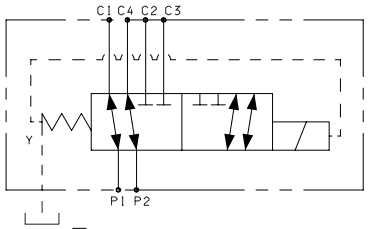
Voltage codes are not stamped on the plate, their are readable on the coils.

* Special voltage

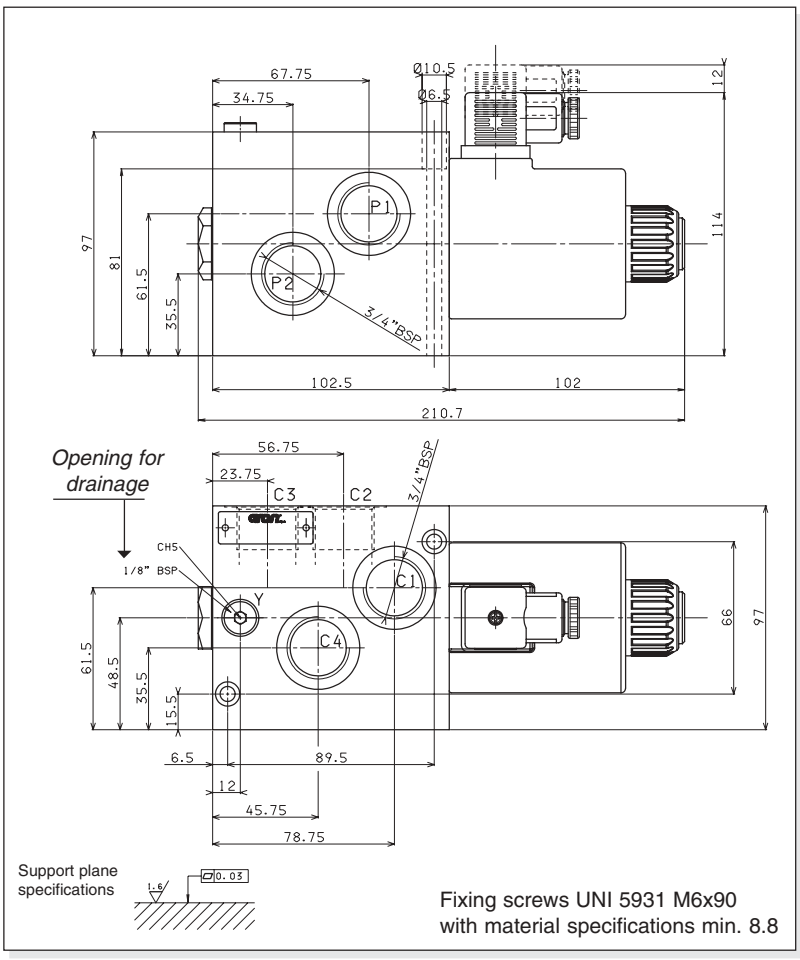
DRAINS AND HYDRAULIC SYMBOLS



WITHOUT DRAINAGE - Y PLUGGED



EXTERNAL DRAINAGE

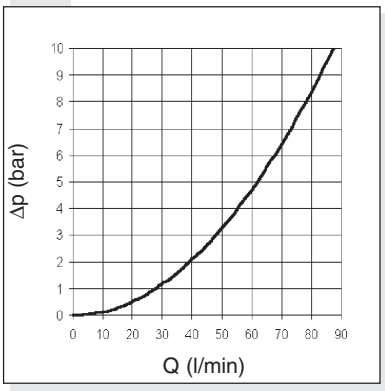


Fixing screws UNI 5931 M6x90 with material specifications min. 8.8

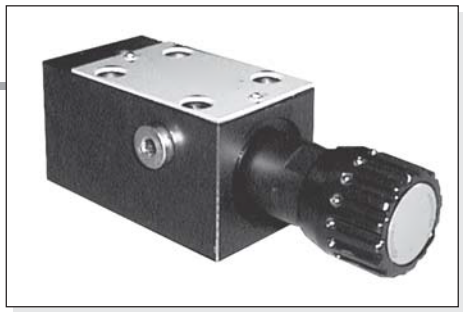
TAB.2 - VARIANTS

VARIANT	CODE
No variant (connectors as in the drawing)	00
Viton	V1
Pilot light	X1
Rectifier	R1
Flow diversion without connector (coil)	S1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
Emergency button	E1
Rotary emergency button	P1

PRESSURE DROPS



PV*.3 / PV*.U.3 PRESSURE REDUCING AND SEQUENCING VALVES CETOP 3/NG6



PVR.3 / PVS.3...

These subplate mounting piloted type pressure reducing and sequencing valves ensure a minimum variation in their calibrated pressure value with changing flow rate.

They are normally supplied with internal piloting and internal drainage on B, but they are already provided with a hole on the front cover to allow for external drainage.

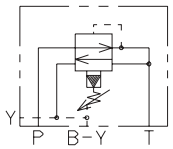
They are available with two different types of adjustment and three calibrated ranges that cover pressure 7 ÷ 250 bar, with and without check valve.

The adjustment is carried out by means of a grub screw or a metric plastic knob.

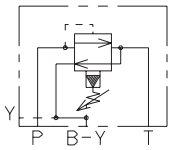
Max. pressure		320 bar
Setting ranges	Spring 1	max. 60 bar
	Spring 2	max. 120 bar
	Spring 3	max. 250 bar
Maximum allowed Δp pressure between the inlet and outlet pressure (PVR only)		150 bar
Max. flow		40 l/min
Draining on port T		0.5 ÷ 0.7 l/min
Hydraulic fluids		Mineral oils DIN 51524
Fluid viscosity		10 ÷ 500 mm²/s
Fluid temperature		-25°C ÷ 75°C
Ambient temperature		-25°C ÷ 60°C
Max. contamination lever		class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight (without check valve)		1,5 Kg
Weight (with check valve)		2 Kg

HYDRAULIC SYMBOLS

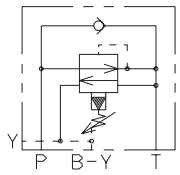
PVR.3...



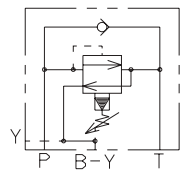
PVS.3...



PVR.U.3...



PVS.U.3...



ORDERING CODE

PV* — **R** = Reducing valve; **S** = Sequencing valve

U — Check valve (omit if not required)

3 — CETOP 3/NG6

***** — Type of adjustment: **M** = Plastic knob; **C** = Grub screw

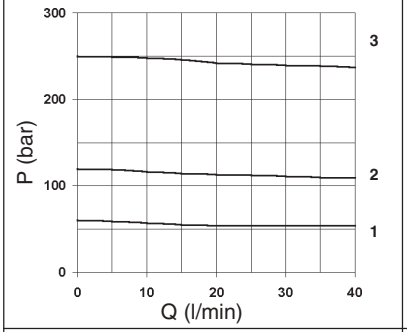
***** — Setting ranges: **1** = max. 60 bar **(white spring)**; **2** = max. 120 bar **(yellow spring)**; **3** = max. 250 bar **(green spring)**

****** — **00** = No variant; **V1** = Viton

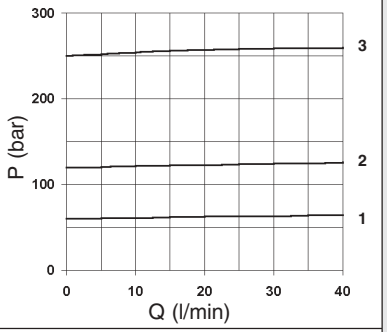
1 — Serial No.

DIAGRAMS

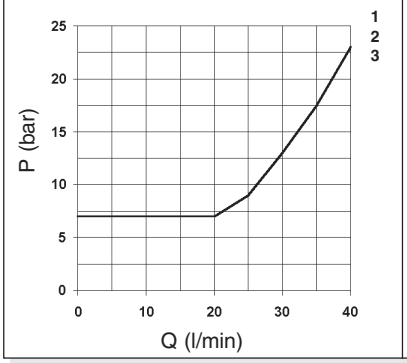
PVR.3... / PVR.U.3...
PRESSURE - FLOW RATE



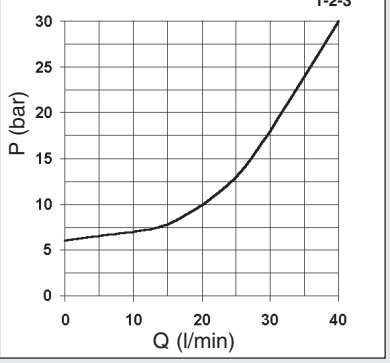
PVS.3... / PVS.U.3...
PRESSURE - FLOW RATE



PVR.3... / PVR.U.3...
MINIMUM SETTING PRESSURE



PVS.3... / PVS.U.3...
MINIMUM SETTING PRESSURE



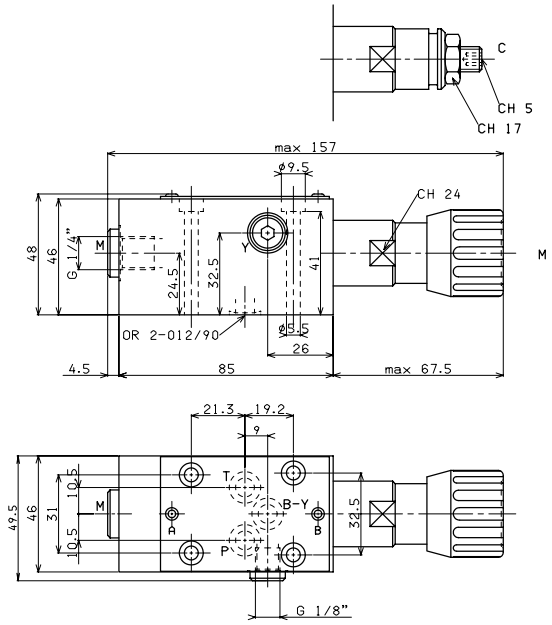
Curves n° 1 - 2 - 3 = setting ranges

The fluid used is a mineral oil with viscosity of 46 mm²/s at 40°C. The tests were carried out at a fluid temperature of 50°C.

OVERALL DIMENSIONS

REDUCING VALVE
PVR.3... CETOP 3/NG6

SEQUENCING VALVE
PVS.3... CETOP 3/NG6



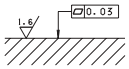
Type of adjustment

M Plastic knob

C Grub screw

Fixing screws UNI 5931 M5x50
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

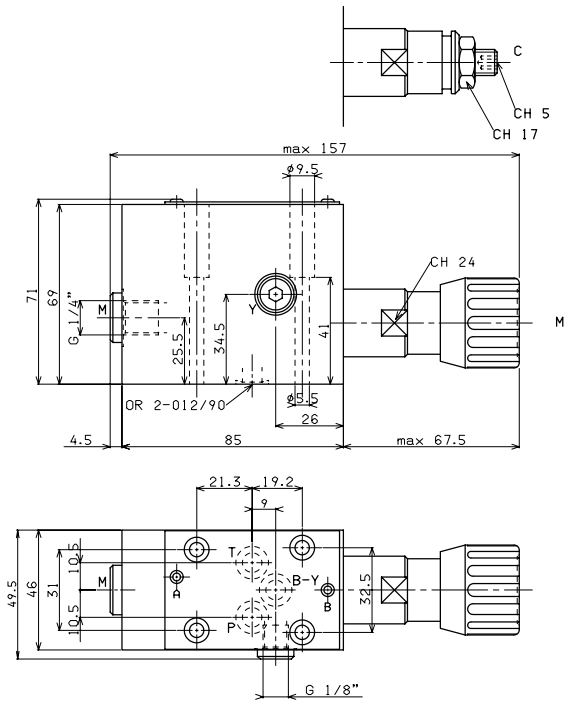
Support plane specifications



OVERALL DIMENSIONS

REDUCING VALVE WITH CHECK VALVE
PVR.U.3... CETOP 3/NG6

SEQUENCING VALVE WITH CHECK VALVE
PVS.U.3... CETOP 3/NG6



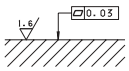
Type of adjustment

M Plastic knob

C Grub screw

Fixing screws UNI 5931 M5x50
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

Support plane specifications



PVR.5 / PVS.5...

PV*.5 / PV*.U.5 PRESSURE REDUCING AND SEQUENCING VALVES CETOP 5/NG10

These subplate mounting piloted type pressure reducing and sequencing valves ensure a minimum variation in their calibrated pressure value with changing flow rate.

They are normally supplied with internal piloting and internal drainage on B, but they are already provided with a hole on the front cover to allow for external drainage.

They are available with two different types of adjustment and three calibrated ranges that cover pressure 7 ÷ 250 bar, with and without check valve.

The adjustment is carried out by means of a grub screw or a metric plastic knob.

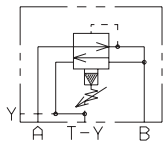
Max. pressure		320 bar
Setting ranges	Spring 1	max. 60 bar
	Spring 2	max. 120 bar
	Spring 3	max. 250 bar
Maximum allowed Δp pressure between the inlet and outlet pressure (PVR only)		150 bar
Max. flow		90 l/min
Draining on port T		0.5 ÷ 0.7 l/min
Hydraulic fluids		Mineral oils DIN 51524
Fluid viscosity		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 $ß_{25} \geq 75$
Weight (without check valve)		3,8 Kg
Weight (reducing valve with check valve)		4,2 Kg
Weight (sequencing valve with check valve)		4,5 Kg

ORDERING CODE

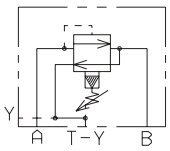
PV*	**R** = Reducing valve **S** = Sequencing valve
U	Check valve (omit if not required)
5	CETOP 5/NG10
*	Type of adjustment: **M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = max. 60 bar **(white spring)** **2** = max. 120 bar **(yellow spring)** **3** = max. 250 bar **(green spring)**
**	**00** = No variant **V1** = Viton
1	Serial No.

HYDRAULIC SYMBOLS

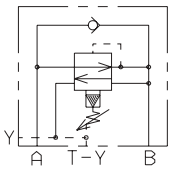
PVR.5...



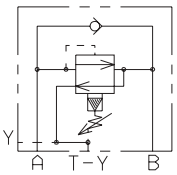
PVS.5...



PVR.U.5...

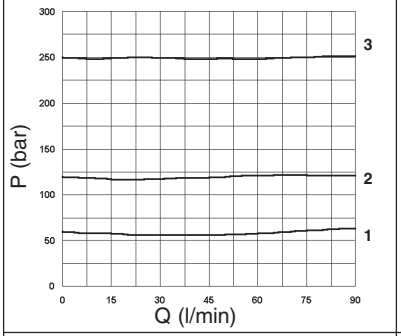


PVS.U.5...

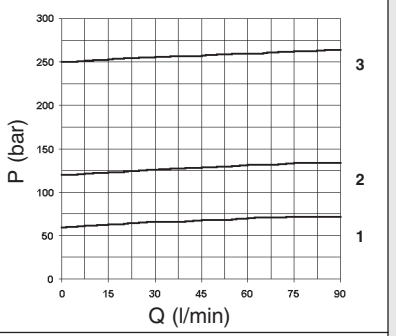


DIAGRAMS

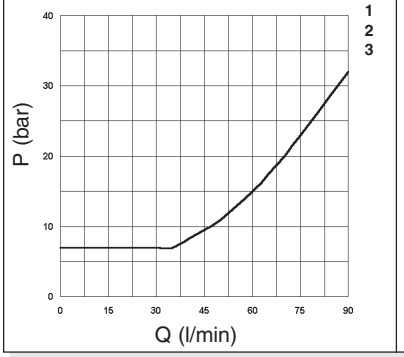
PVR.5... / PVR.U.5...
PRESSURE - FLOW RATE



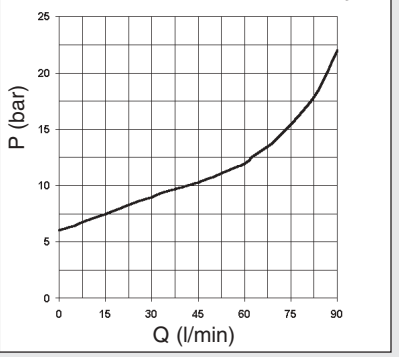
PVS.5... / PVS.U.5...
PRESSURE - FLOW RATE



PVR.5... / PVR.U.5...
MINIMUM SETTING PRESSURE



PVS.5... / PVS.U.5...
MINIMUM SETTING PRESSURE

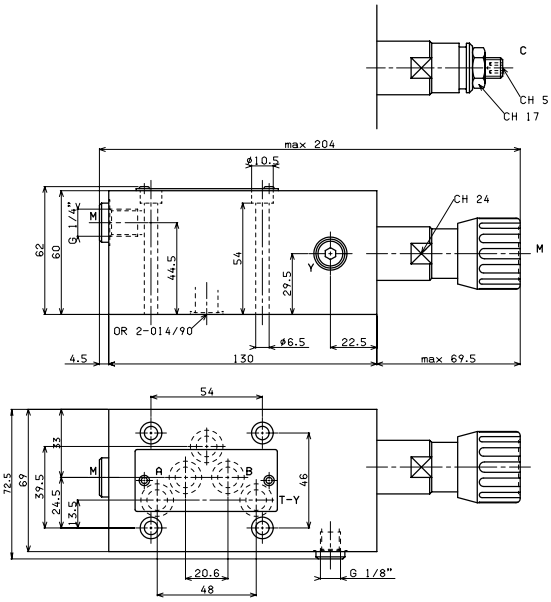


Curves n° 1 - 2 - 3 = setting ranges

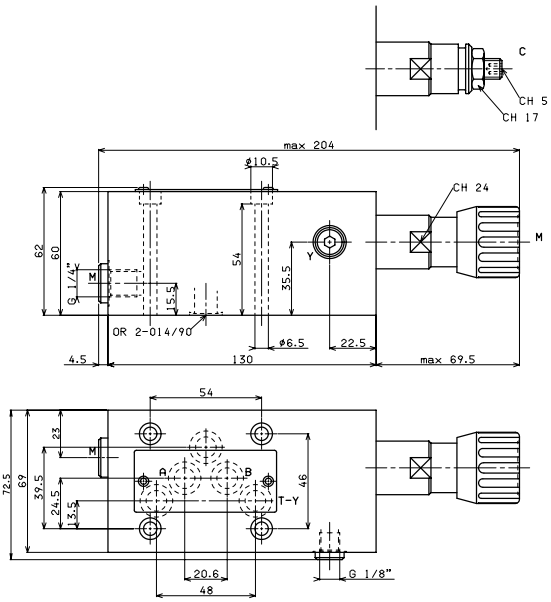
The fluid used is a mineral oil with viscosity of 46 mm^2/s a 40°C. The tests were carried out at a fluid temperature of 50°C.

OVERALL DIMENSIONS

REDUCING VALVE
PVR.5... CETOP 5/NG10



SEQUENCING VALVE
PVS.5... CETOP 5/NG10



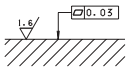
Type of adjustment

M Plastic knob

C Grub screw

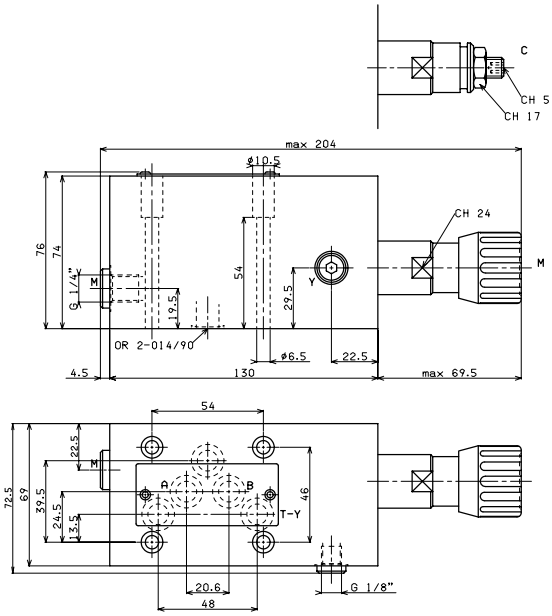
Fixing screws UNI 5931 M6x65
with material specifications min. 8.8
Tightening torque 8 Nm / 0.8 Kgm

Support plane specifications

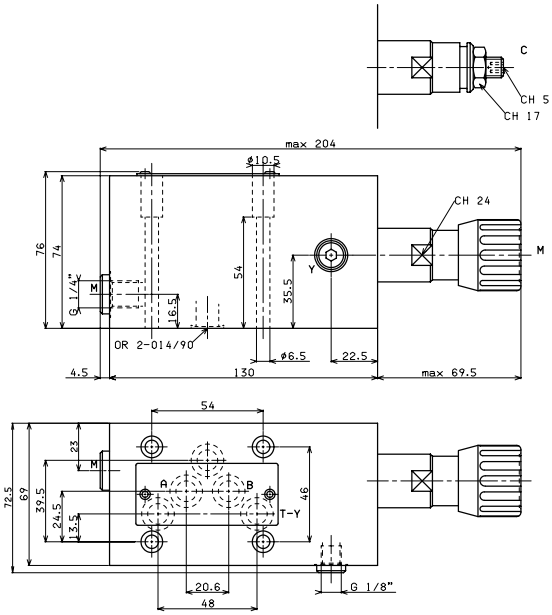


OVERALL DIMENSIONS

REDUCING VALVE WITH CHECK VALVE
PVR.U.5... CETOP 5/NG10



SEQUENCING VALVE WITH CHECK VALVE
PVS.U.5... CETOP 5/NG10



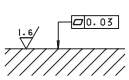
Type of adjustment

M Plastic knob

C Grub screw

Fixing screws UNI 5931 M6x65
with material specifications min. 8.8
Tightening torque 8 Nm / 0.8 Kgm

Support plane specifications



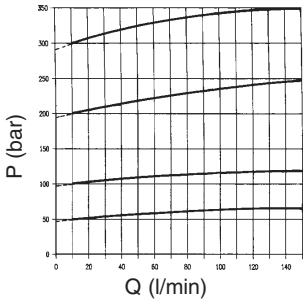
V.*.P PRESSURE CONTROL VALVES PLATE
V.*.L PRESSURE CONTROL VALVES IN LINE

These pressure control valves are available in the basic VMP* maximum pressure, VSP* sequence and VUP* exclusion versions, with a single pressure value and three calibration ranges that cover the band 15 ÷ 400 bar. It is possible to use auxiliary pilot valves, which can be the simple standard AD3E solenoid valve, by the mere exchange of covers. These valves have been fitted with an important safety feature for the operation of the system where they are used; a mechanical end of stroke stop prevents the operator from setting pressure values higher than those specified in the catalogue (it is impossible to compress the spring completely). In the standard configuration these valves are supplied with a 1.6 bar main spring and with calibrated ø1 mm pilot feed orifice (Variant part No. 00).
Subplate mounting valves are suitable for covers which do not conform to DIN standards type C*P16/25.. whilst in line mounting valves are suitable for DIN standards covers type KEC16/25...

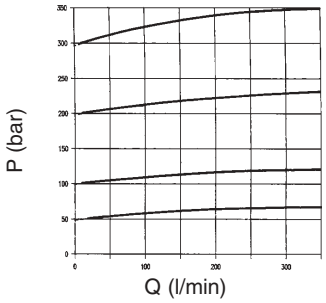
Pressure max.		400 bar
Setting ranges	Spring 1	15 ÷ 45 bar
	Spring 2	15 ÷ 145 bar
	Spring 3	45 ÷ 400 bar
Max. flow V*P16...		150 l/min
Max. flow V*P25...		350 l/min
Hydraulic fluids		Mineral oils DIN 51524
Fluid viscosity		10 ÷ 500 mm²/s
Fluid temperature		-25°C ÷ 75°C
Ambient temperature		-25°C ÷ 60°C
Max. contamination level		class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Drainage V*P16...		1 ÷ 2 l/min
Drainage V*P25...		1 ÷ 2.5 l/min
Dynamic pressure at drainage		Max. 2 bar
Weight V*P16... (without pilot valve)		3,3 Kg
Weight V*P25... (without pilot valve)		7,4 Kg
Weight V*L16... (without pilot valve)		4,6 Kg
Weight V*L161... (without pilot valve)		4,5 Kg
Weight V*L251... (without pilot valve)		7,7 Kg
Weight V*L25... (without pilot valve)		8,3 Kg

V.*.P / V.*.L...	
V.*.P...	CH. II PAGE 7
V.*.P.E...	CH. II PAGE 8
V.*.L...	CH. II PAGE 9/10
BS.VMP...	CH. II PAGE 11
KEC.16/25...	CH. V PAGE 9
C*P.16/25...	CH. V PAGE 9
CETOP 3/NG06	CH. I PAGE 8
STANDARD SPOOLS FOR AD.3.E	CH. I PAGE 10
AD.3.E...	CH. I PAGE 11
AM.3.VM...	CH. IV PAGE 9

PRESSURE - FLOW V.*.16



PRESSURE - FLOW V.*.P.25

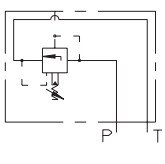
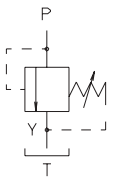
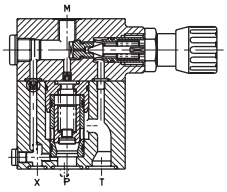
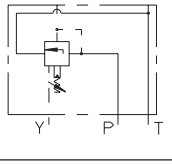
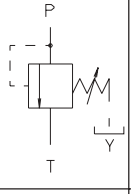
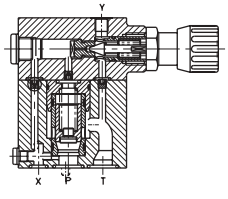
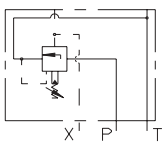
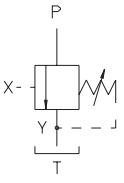
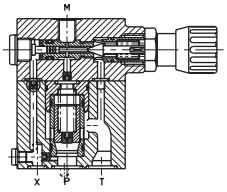


The fluid used is a mineral oil with viscosity of 46 mm²/s at 40°C.
The tests were carried out at a fluid temperature 40°C.

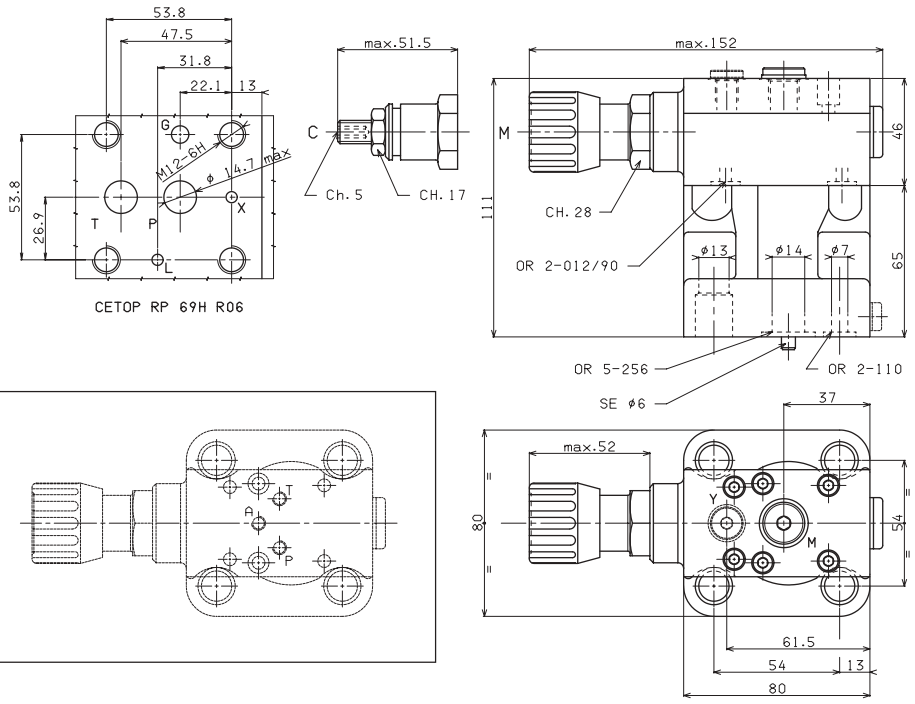
ORDERING CODE

V	Valve
*	**M** = maximum pressure **S** = sequence **U** = exclusion (areas rep. 1,15 : 1)
*	**P** = Plate mounting **L** = In line mounting
*	**E** = Presetting for solenoid valve **Not for sequencing valve V.S.P...** (omit if not required)
***	Size (see overall dimensions) **16 - 25** = NG16 or NG25 **161 - 251** = for V.*.L... only (in line mounting valve)
*	Type of adjustment: **M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = 15 ÷ 45 bar **(white spring)** **2** = 15 ÷ 145 bar **(yellow spring)** **3** = 45 ÷ 400 bar **(green spring)**
**	**00** = No variant **V1** = Viton **AC** = Exclusion valve for accumulators (only for VU*.**) **AQ** = Presetting for XP3
2	Serial No.

HYDRAULIC SYMBOLS

V.M.P.16....** **V.M.P.25.**...** **Maximum pressure valve** Internal piloting and draining			
V.S.P.16....** **V.S.P.25.**...** **Sequencing valve** Internal piloting External draining			
V.U.P.16....** **V.U.P.25.**...** **Exclusion valve** External piloting Internal draining			

OVERALL DIMENSIONS V.*.P.16...

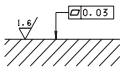


VERSION WITH PRESETTING FOR SOLENOID VALVE

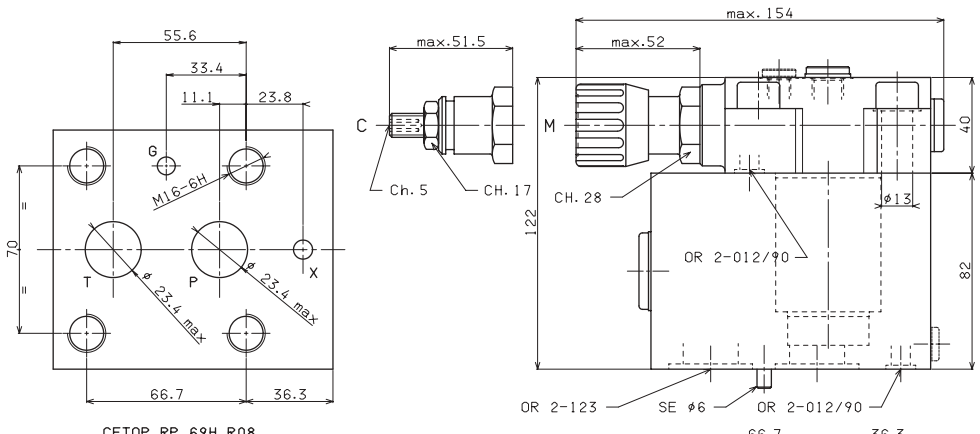
Fixing screws UNI 5931 M12x40 with material specifications min. 8.8
Tightening torque 70 Nm / 7 Kgm

M = 1/4" BSP connector for pressure gauge for maximum pressure valve version only
Y = 1/8" BSP external draining for sequencing valve version only

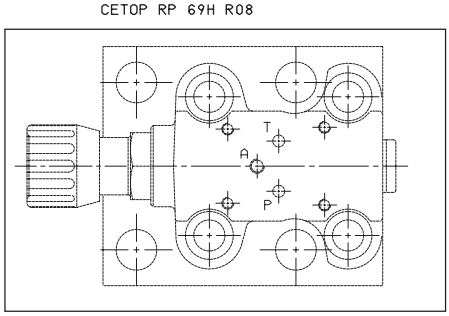
Support plane specifications

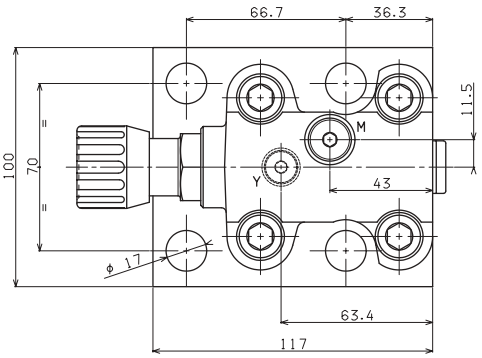


OVERALL DIMENSIONS V.*.P.25...



VERSION WITH PRESETTING FOR SOLENOID VALVE

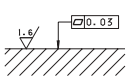




Fixing screws UNI 5931 M16x100 with material specifications min. 8.8
Tightening torque 70 Nm / 7 Kgm

M = 1/4" BSP connector for pressure gauge for maximum pressure valve version only
Y = 1/8" BSP external draining for sequencing valve version only

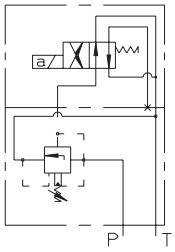
Support plane specifications

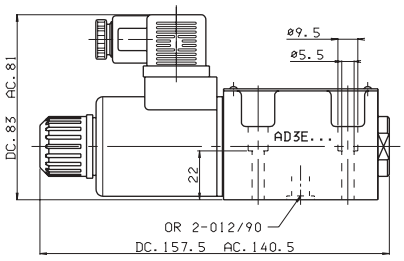


MOUNTING TYPE V.*.P.E...

V.*.P.E... + AD.3.E.15.E... OR AD.3.E.16.E...

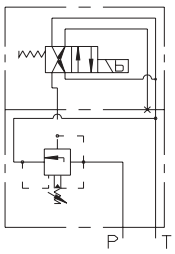
1) Solenoid de-energized, pump to tank.
2) Solenoid energized, circuit pressure controlled by valve on cover.
For mounting valves to have normally discharged configuration it is necessary to use an AD.3.E.15.F.. or AD.3.E.16.F... type solenoid valve, whilst for subplate mounting valves it is necessary to use type AD.3.E.15.E.. or AD.3.E.16.E.

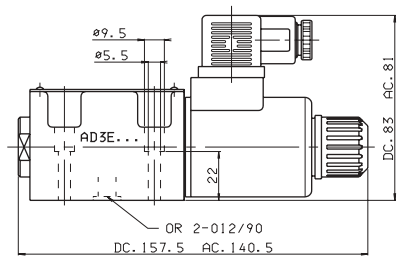




V.*.P.E... + AD.3.E.15.F... OR AD.3.E.16.F...

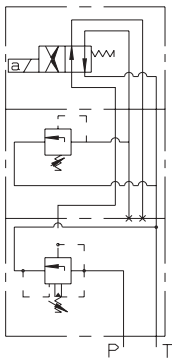
1) Solenoid de-energized, pump pressure controlled by valve on cover.
2) Solenoid B energized, pump to tank.

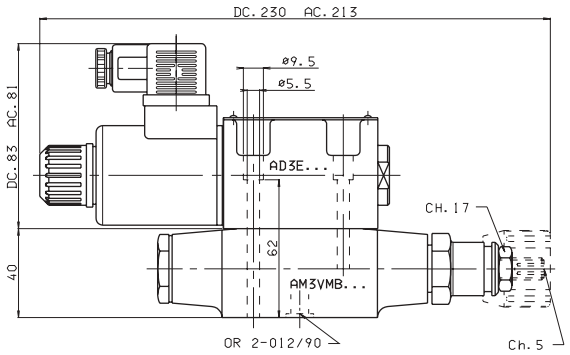




V.*.P.E... + AM.3.VM.B... + AD.3.E.15.E... OR AD.3.16.E...

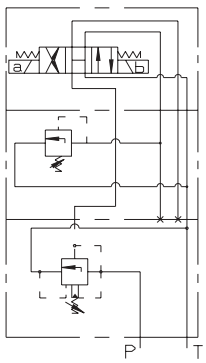
1) Solenoid de-energized, pump pressure controlled by valve on cover.
2) Solenoid energized, pump pressure controlled by valve AM.3.VM.B.

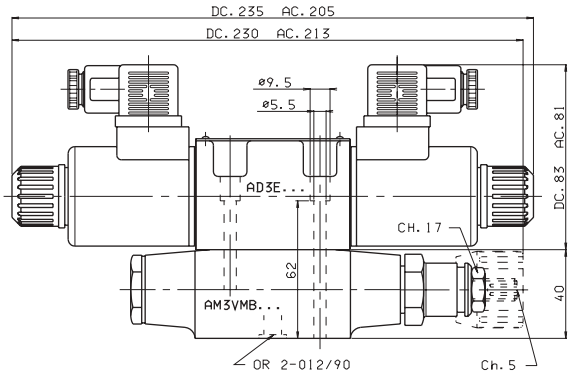




V.*.P.E... + AM.3.VM.B... + AD.3.E.02.C...

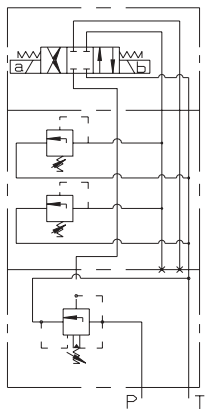
1) Solenoid de-energized, pump to tank.
2) Solenoid A energized, pump pressure controlled by valve AM.3.VM.B.
3) Solenoid B energized, pump pressure controlled by valve on cover.

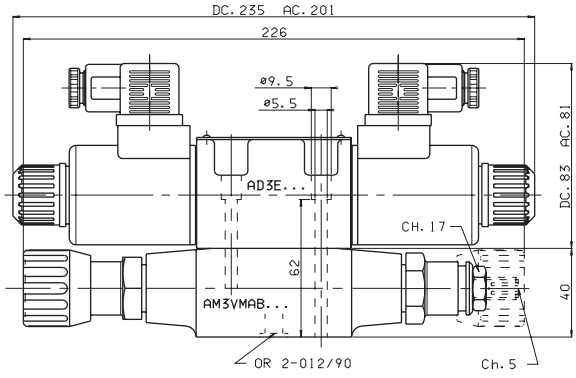




V.*.P.E... + AM.3.VM.B... + AD.3.E.01.C...

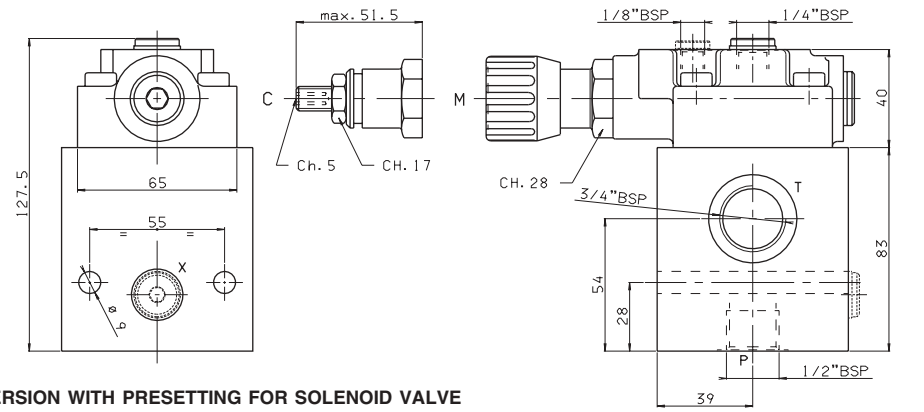
1) Solenoid de-energized, pump pressure controlled by valve on cover.
2) Solenoid A energized, pump pressure controlled by valve AM.3.VM.AB.
3) Solenoid B energized, pump pressure controlled by valve AM.3.VM.AB.



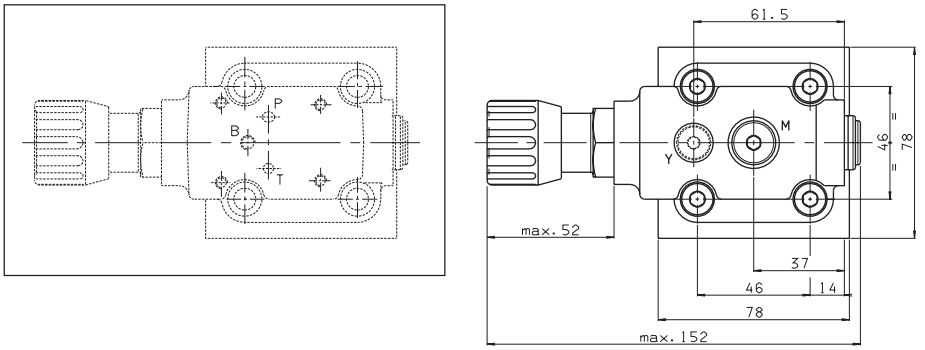


OVERALL DIMENSIONS V.*.L.16...

1/2" BSP P connector
3/4" BSP T connector



VERSION WITH PRESETTING FOR SOLENOID VALVE

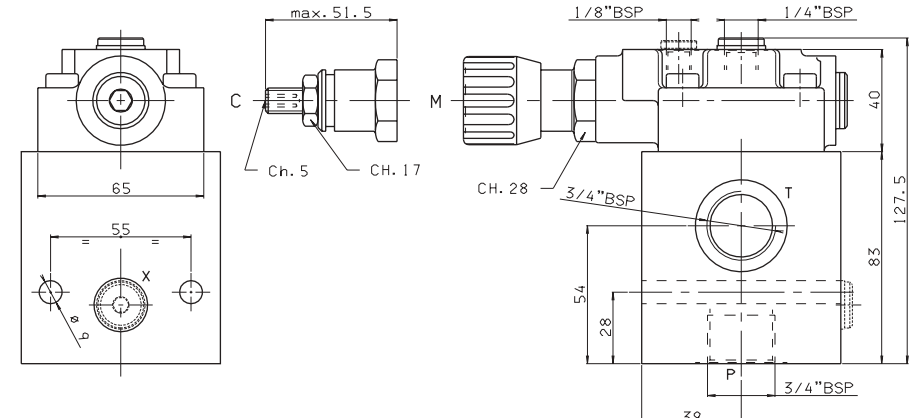


Fixing screws UNI 5931 M8x90 with material specifications min. 8.8
Tightening torque 24 Nm / 2.4 Kgm

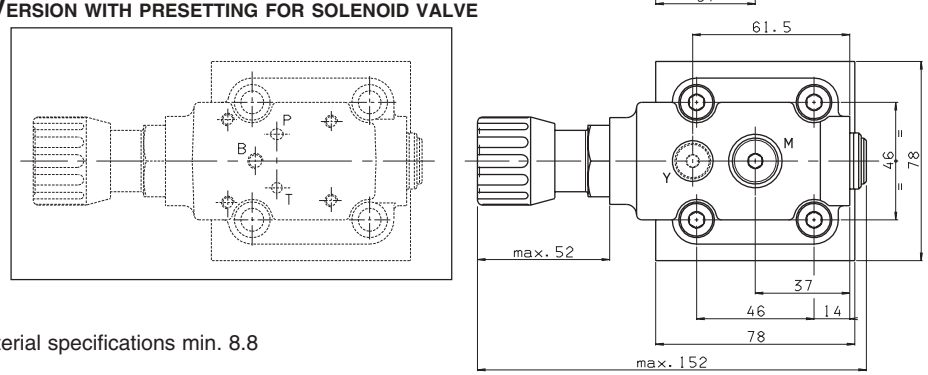
M = 1/4" BSP connector for pressure gauge for maximum pressure valve version only
Y = 1/8" BSP external draining for sequencing valve version only

OVERALL DIMENSIONS V.*.L.161...

3/4" BSP P and T connectors



VERSION WITH PRESETTING FOR SOLENOID VALVE

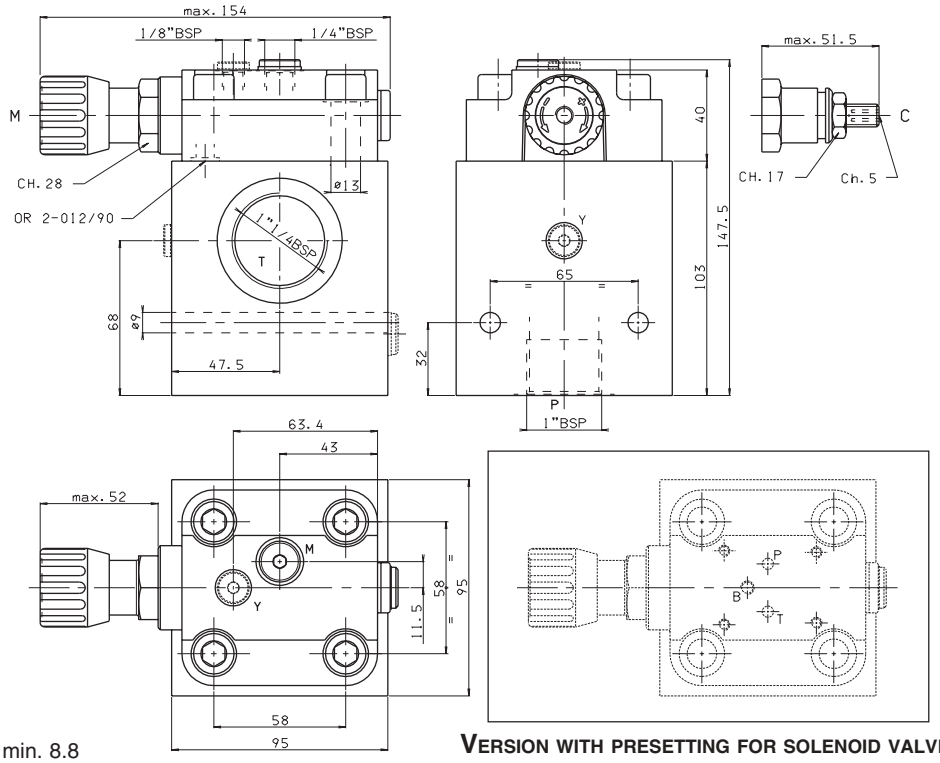


Fixing screws UNI 5931 M8x90 with material specifications min. 8.8
Tightening torque 24 Nm / 2.4 Kgm

M = 1/4" BSP connector for pressure gauge for maximum pressure valve version only
Y = 1/8" BSP external draining for sequencing valve version only

OVERALL DIMENSIONS V.*.L.25...

1" BSP P connector
1 1/4" BSP T connector



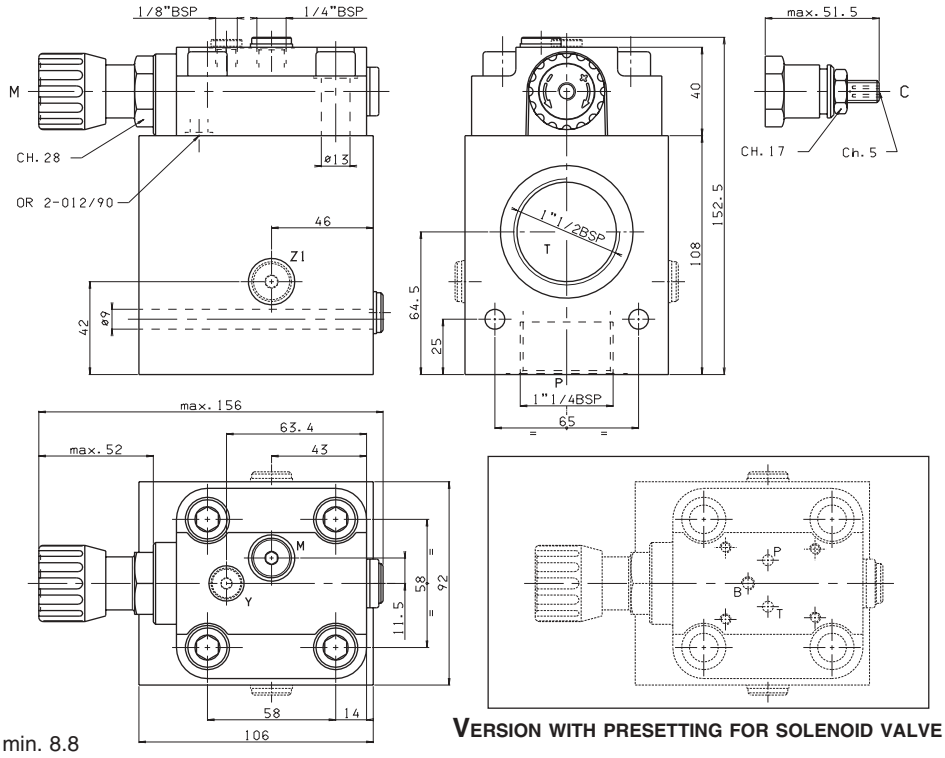
VERSION WITH PRESETTING FOR SOLENOID VALVE

Fixing screws UNI 5931
M8x110 with material specifications min. 8.8
Tightening torque 24 Nm / 2.4 Kgm

M = 1/4" BSP connector for pressure gauge for maximum pressure valve version only
Y = 1/8" BSP external draining for sequencing valve version only

OVERALL DIMENSIONS V.*.L.251...

1 1/4" BSP P connector
1 1/2" BSP T connector



VERSION WITH PRESETTING FOR SOLENOID VALVE

Fixing screws UNI 5931
M8x120 with material specifications min. 8.8
Tightening torque 24 Nm / 2.4 Kgm

M = 1/4" BSP connector for pressure gauge for maximum pressure valve version only
Y = 1/8" BSP external draining for sequencing valve version only

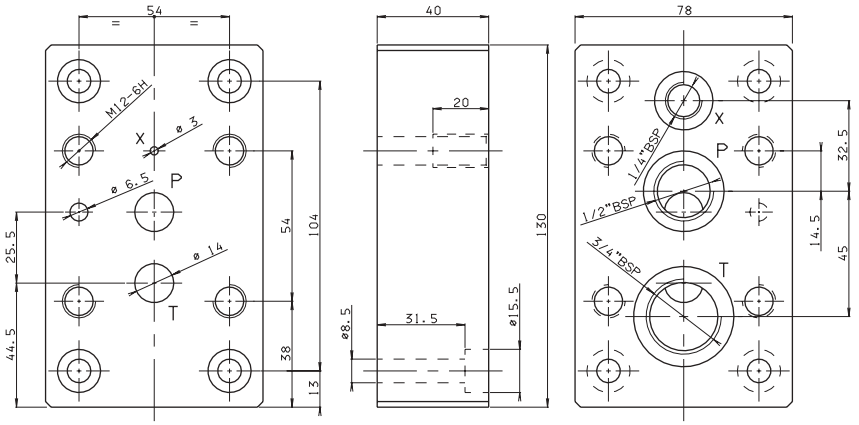
BS.VMP... SUBPLATE MOUNTING FOR V.*.P

BS.VMP.16... CONNECTORS: P = 1/2'' BSP - T = 3/4'' BSP - X = 1/4'' BSP

BS	Single plate
VMP	Maximum pressure
16	Size NG16
00	No variant
1	Serial No.

Weight: 2,2 Kg

Fixing screws M8x45 UNI 5931

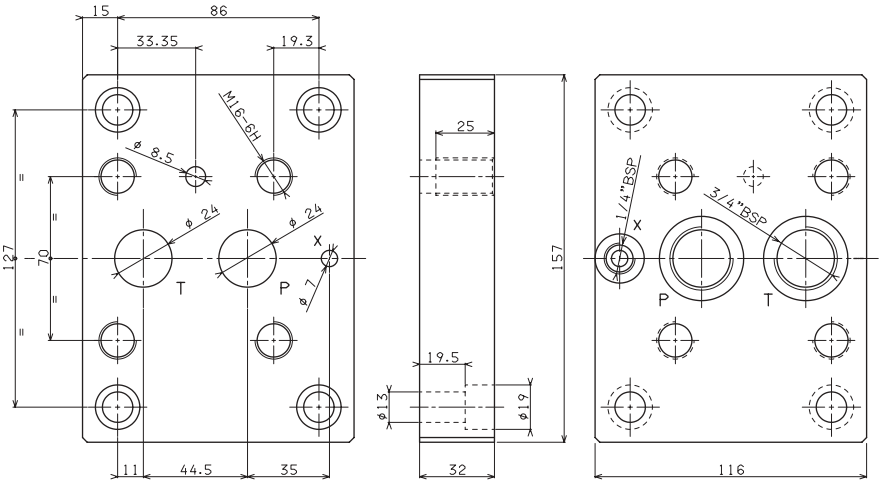


BS.VMP.25... CONNECTORS: P AND T = 3/4'' BSP - X = 1/4'' BSP

BS	Single plate
VMP	maximum pressure
25	Size NG25
00	No variant
1	Serial No.

Weight: 3,6 Kg

Fixing screws M12x35 UNI 5931

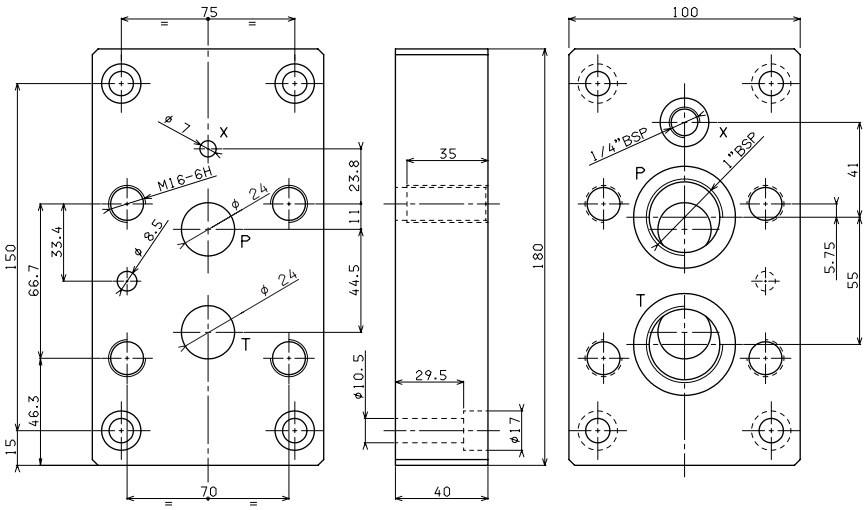


BS.VMP.25/1... CONNECTORS: P AND T = 1'' BSP - X = 1/4'' BSP

BS	Single plate
VMP	maximum pressure
25/1	Size NG25
00	No variant
1	Serial No.

Weight: 4,2 Kg

Fixing screws M10x45 UNI 5931



VMP.10 MAXIMUM / DIRECT PRESSURE VALVES

IN LINE MOUNTING

VMP.10...

CMP.10... CH. V PAGE 19

The maximum pressure valves VMP10 are direct actions units.
Their use is essential for the limitation of hydraulic system pressure. In order to achieve more convenient calibration adjustment the whole pressure range (2÷320 bar) has been subdivided into 3 smaller bands, as shown in the ordering part number table. For each pressure band a different calibration spring is used, selected for the corresponding minimum operating pressure. The CMP10 cartridge is of direct acting type.

Max. pressure		320 bar
Setting ranges:	Spring 0	max. 30 bar
	Spring 1	max. 50 bar
	Spring 2	max. 150 bar
	Spring 3	max. 320 bar
Max. flow		40 l/min
Hydraulic fluids		mineral oils DIN 51524
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		0,8 Kg

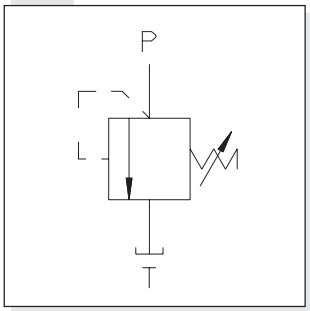
• The minimum permissible setting pressure depending on the spring: see curves below

These direct action valves offer 2 important safety features for the systems where they are used:

1) A mechanical end of stroke stop prevents the user from setting pressure value higher than those specified in the catalogue (it is impossible to compress the spring completely;

2) In order to prevent temporary closure of port P in case of high pressure peaks, the adjustment pin is mechanically blocked at a fixed opening value.

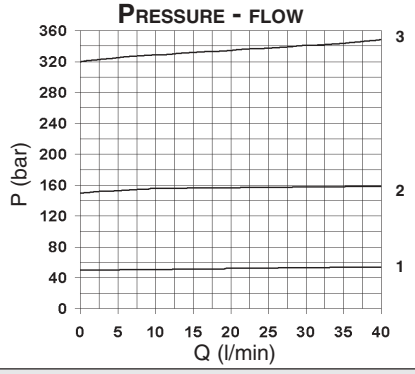
HYDRAULIC SYMBOL



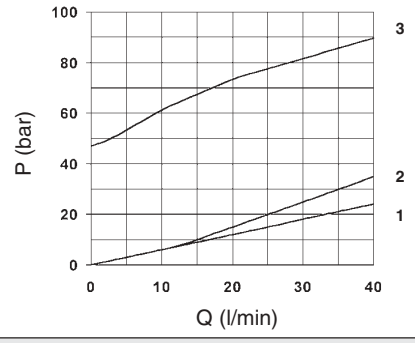
ORDERING CODE

VMP	Max. pressure valve
10	Connector size: 3/8" BSP
*	Type of adjustment **M** = Steel knob **C** = Grub screw **V** = Handwheel
*	Setting ranges **0** = max. 30 bar **(without col.)** **1** = max. 50 bar **(white spring)** **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
**	**00** = No variant **V1** = Viton
2	Serial No.

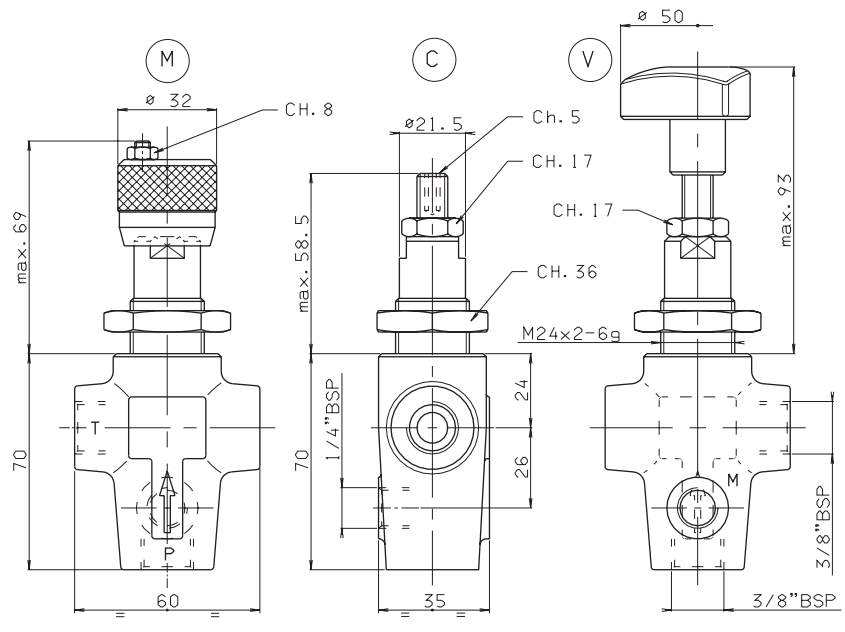
PRESSURE - FLOW



MINIMUM SETTING PRESSURE



OVERALL DIMENSIONS



Type of adjustment

(M) Steel knob

(C) Grub screw

(V) Handwheel

VMP.20 MAXIMUM / DIRECT PRESSURE VALVES

IN LINE MOUNTING

The maximum pressure valves VMP20... are direct action units.
Their use essential for the limitation of hydraulic system pressure. In order to achieve a more convenient calibration adjustment the whole pressure range (2÷250 bar) has been subdivided into 3 smaller bands, as shown in the ordering part number table.
For each pressure band, a different calibration spring is used, selected for the corresponding minimum operating pressure. The CMP20 cartridge is of direct acting type.

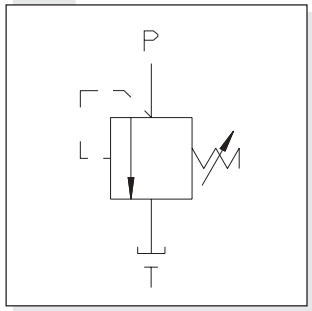
Max. pressure		250 bar
Setting range:	Spring 1	max. 30 bar
	Spring 2	max. 140 bar
	Spring 3	max. 250 bar
Max. flow		80 l/min
Hydraulic fluids		Mineral oils DIN 51524
Fluid viscosity		10 ÷ 500 mm²/s
Fluid temperature		-25°C ÷ 75°C
ambient temperature		-25°C ÷ 60°C
Max. contamination level		class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight		1,7 Kg

• The minimum permissible setting pressure depending on the spring: see curves below

VMP.20...

CMP.20... CH. V PAGE 20

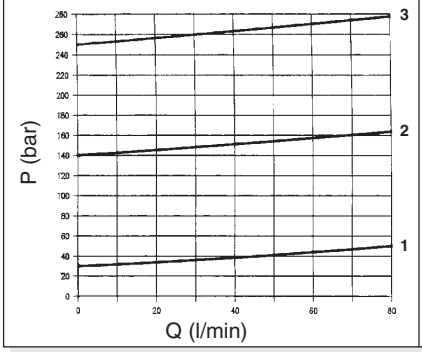
HYDRAULIC SYMBOL



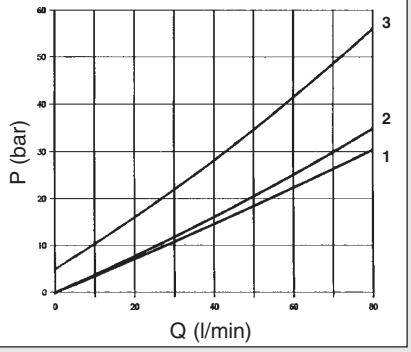
ORDERING CODE

VMP	Max. pressure valve
20	Connector size: 1/2" BSP
*	Type of adjustment **M** = Steel knob **C** = Grub screw **V** = Handwheel
*	Setting ranges **1** = max. 30 bar **(white spring)** **2** = max. 140 bar **(yellow spring)** **3** = max. 250 bar **(green spring)**
**	**00** = No variant **V1** = Viton
2	Serial No.

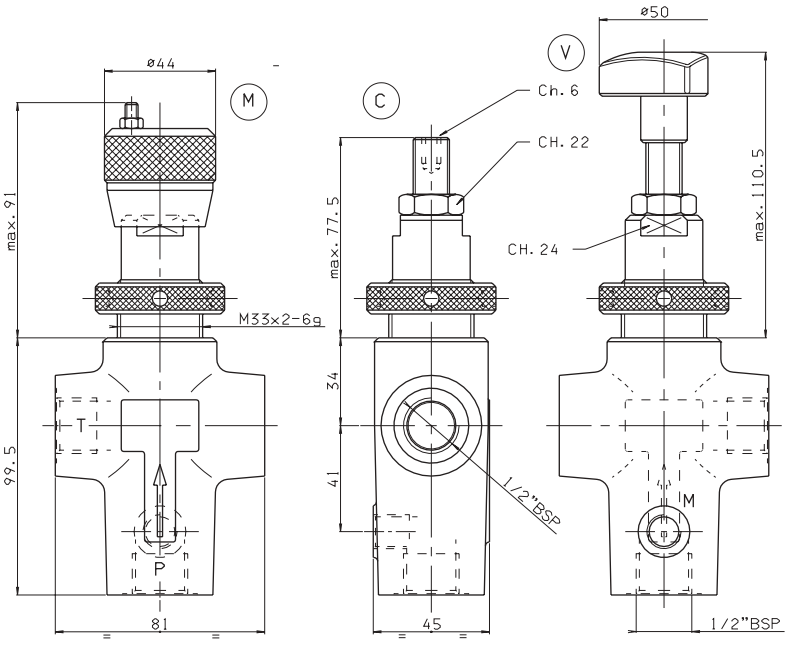
PRESSURE - FLOW



MINIMUM SETTING PRESSURE



OVERALL DIMENSIONS



Type adjustment

- (M) Steel knob
- (C) Grub screw
- (V) Handwheel

VMP.30 MAXIMUM PRESSURE / PILOTED VALVES

IN LINE MOUNTING

The maximum pressure valves VMP30... are piloted action units.
Their use is essential for the limitation of hydraulic system pressure. In order to achieve a more convenient calibration adjustment the whole pressure range (7÷350 bar) has been subdivided into 3 smaller bands, as shown in the ordering part number table.
For each pressure band a different calibration spring is used, selected for the corresponding minimum operating pressure. The CMP30 cartridge is a piloted action unit.

These piloted action valves offer an important safety feature for the systems in which they are used: a mechanical end of stroke stop prevents the user from setting pressure values higher than those specified in the catalogue (it is impossible to compress the spring completely).

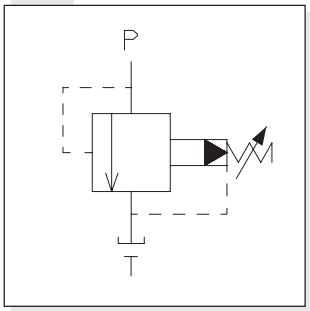
Max. operating pressure		350 bar
Setting ranges:	Spring 1	max. 50 bar
	Spring 2	max. 140 bar
	Spring 3	max. 350 bar
Max. flow		100 l/min
Hydraulic fluids		Mineral oils DIN 51524
Fluid viscosity		10 ÷ 500 mm²/s
Fluid temperature		-25°C ÷ 75°C
Ambient temperature		-25°C ÷ 60°C
Max. contamination level		class 10 in accordance with NAS 1638 with filter $ß_{25}≥75$
Weight		1,4 Kg

• The minimum permissible setting pressure is the same for all springs: see curve below

VMP.30...

CMP.30... CH. V PAGE 21

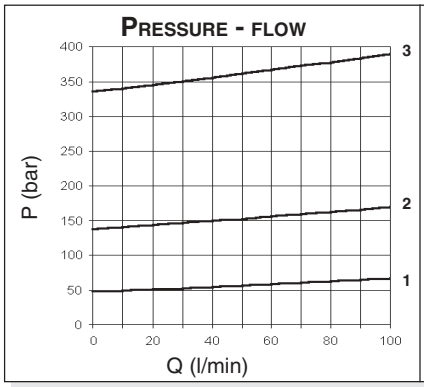
HYDRAULIC SYMBOL



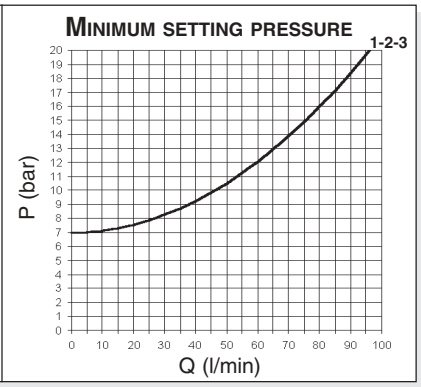
ORDERING CODE

VMP	Max. pressure valve
30	Connector size: 3/4" BSP
*	Type of adjustment **M** = Steel knob **C** = Grub screw **V** = Handwheel
*	Setting ranges **1** = max. 50 bar **(white spring)** **2** = max. 140 bar **(yellow spring)** **3** = max. 350 bar **(green spring)**
**	**00** = No variant **V1** = Viton
2	Serial No.

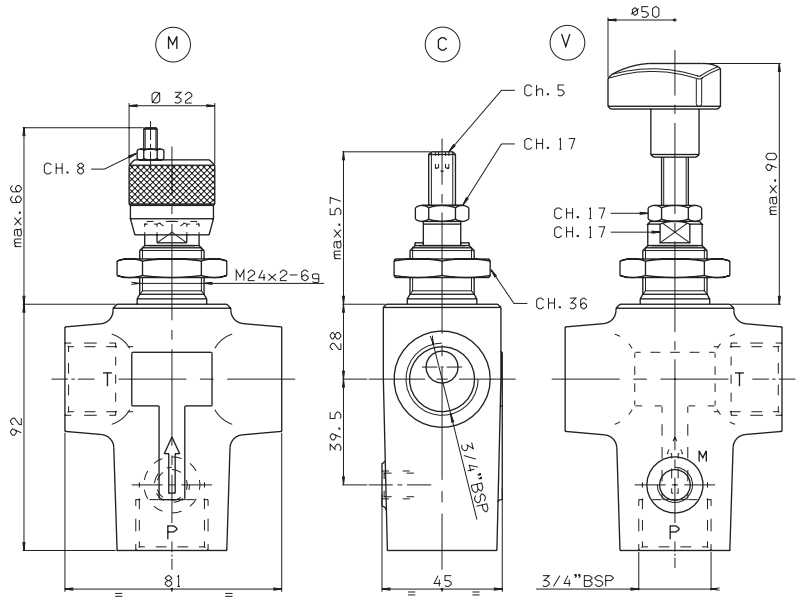
PRESSURE - FLOW



MINIMUM SETTING PRESSURE



OVERALL DIMENSIONS



Type of adjustment

(M) Steel knob

(C) Grub screw

(V) Handwheel

QC.3.2...

OVERALL DIMENSIONS CH. III PAGE 4

QC.3.2... 2 WAY COMPENSATED FLOW RATE REGULATORS

These QC.3.2... compensated flow rate regulators are designed to control and maintain a constant irrespective of the pressure variations upstream and downstream of the regulation section. Their new cast construction has made it possible to obtain a wider flow rate range, taking the upper limit to 35 l/min (4 turns version) while maintaining unchanged the pressure differential required to obtain good pressure compensation.

All models are available with and without reverse flow check valve, complete with an "anti-jump" device on request. This accessory has been designed to eliminate the problem which manifests itself as a "anti-jump" in the controlled actuator due to the instantaneous flow rate variation that takes place under the form of a transient every time the flow is made to pass through the regulator.

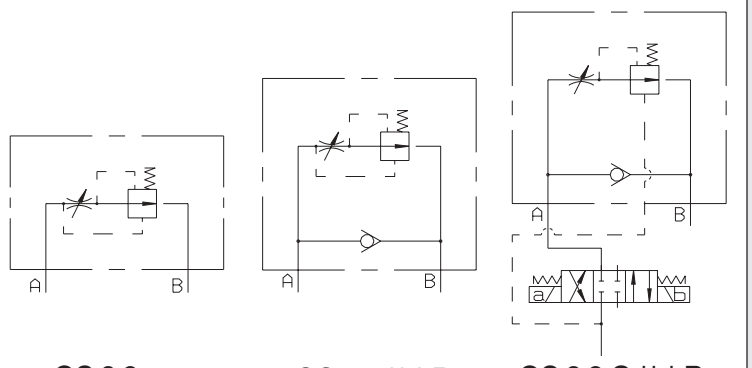
Max. operating pressure	320 bar
Opening pressure (with bypass)	1 bar
Min. regulated flow rate (Q1 version)	0.03 ÷ 0.05 l/min
Nominal regulated flow rate (1 turn version)	1,5 ÷ 30 l/min
Nominal regulated flow rate (4 turns version)	1,5 ÷ 35 l/min
Difference in pressure (Δp) for vers. Q1	3 bar
Difference in pressure (Δp) Q2-Q3-Q4-Q5-Q6	8 bar
Hydraulic fluids	Mineral oils DIN 51524
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 $ß_{25} \geq 75$	
Dependency on temperature (Q1 vers.)	5%
Dependency on temperature (Q2 vers.)	3%
Dependency on temperature (Q3-Q4-Q5-Q6)	2%
Weight	1,5 Kg

(*) Max contamination level must be respect to obtain the right function of the valve

ORDERING CODE

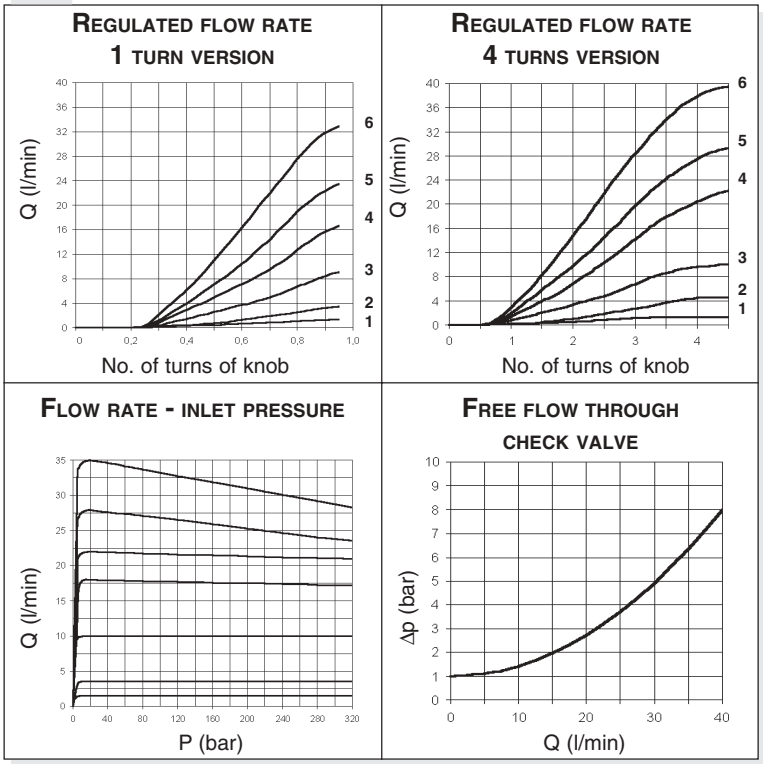
QC	Compensated flow rate regulated
3	CETOP 3/NG6
2	2 way
G	Anti-jump system with internal check valve (omit if not required)
******	Nominal flow rate ranges **1 Turn version** **4 Turn version** **Q1** = 1,5 l/min **Q1** = 1,5 l/min **Q2** = 3 l/min **Q2** = 4 l/min **Q3** = 9 l/min **Q3** = 10 l/min **Q4** = 19 l/min **Q4** = 21 l/min **Q5** = 24 l/min **Q5** = 28 l/min **Q6** = 30 l/min **Q6** = 35 l/min
K	Version with lock (omit if not required)
*****	**1** = 1 turn version **4** = 4 turns version
R	With internal check valve (omit if not required)
******	**00** = No variant **V1** = Viton
5	Serial No.

HYDRAULIC SYMBOLS



QC.3.2... **QC.3.2.**.*.R** **QC.3.2.G.**.*.R**

DIAGRAMS



QC.3.3... 3 WAY COMPENSATED FLOW RATE REGULATORS

This regulator type can be used whenever it is necessary to obtain a constant fluid flow irrespective of the pressure variations present upstream or downstream. It is fitted with a third T line for discharging any excessive flow rate.

When the reverse flow check valve is needed, the check valve holder type "AM.3.ABU.3..."can be fitted underneath the valve. (The check valve holder must be ordered separately see page III•4)

Max. operating pressure	320 bar
Opening pressure (with bypass)	1 bar
Min. regulated flow rate (Q1 version)	0.03 ÷ 0.05 l/min
Nominal regulated flow rate	1 ÷ 22 l/min
Difference in pressure (Δp) for vers. Q1	3 bar
Difference in pressure (Δp) Q2-Q3-Q4-Q5-Q6	8 bar
Hydraulic fluids	Mineral oils DIN 51524
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 $\beta_{25} \geq 75$
Dependency on temperature (Q1 vers.)	5%
Dependency on temperature (Q2 vers.)	3%
Dependency on temperature (Q3-Q4-Q5)	2%
Weight	1,5 Kg

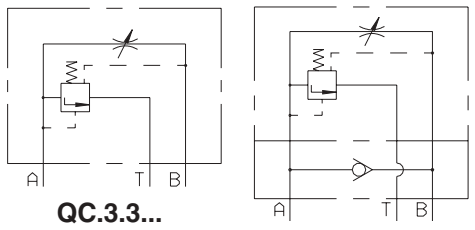
(*) Max contamination level must be respect to obtain the right function of the valve

QC.3.3...	
OVERALL DIMENSIONS	CH. III PAGE 4
AM.3.ABU...	CH. III PAGE 4

ORDERING CODE

QC	Compensated flow rate regulator
3	CETOP 3/NG6
3	3 way
**	Flow rate ranges **Q1** = 1 l/min **Q2** = 3 l/min **Q3** = 9 l/min **Q4** = 17 l/min **Q5** = 24 l/min
K	Version with lock (omit if not required)
*	**1** = 1 turn version **4** = 4 turns version
**	**00** = No variant **V1** = Viton
3	Serial No.

HYDRAULIC SYMBOLS

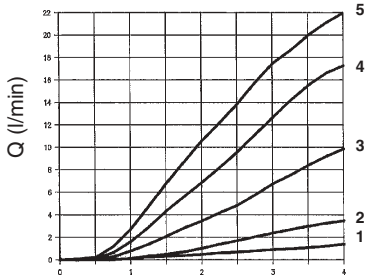


QC.3.3...

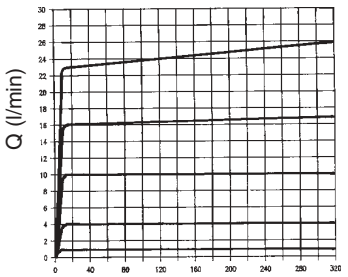
QC.3.3... + AM.3.ABU

DIAGRAMS

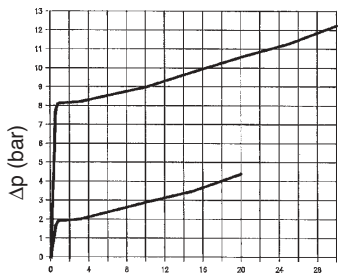
REGULATED FLOW RATE



FLOW RATE - PRESSURE DROP

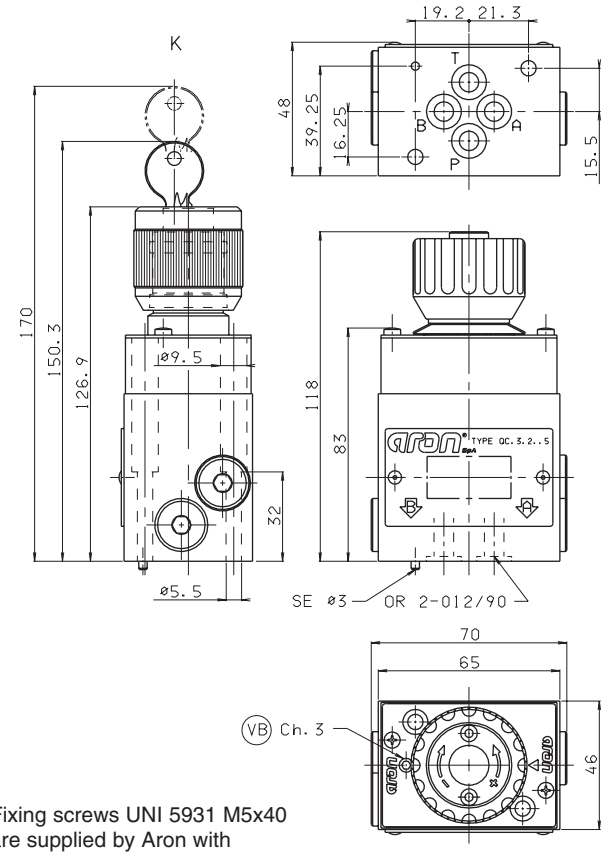


Δp - PUMP FLOW RATE



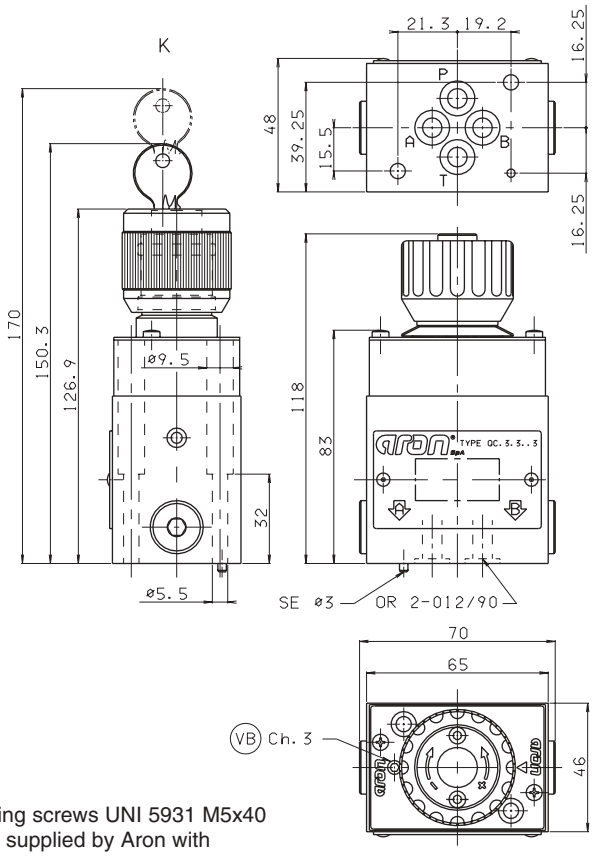
QC.3.2... QC.3.3... COMPENSATED FLOW RATE REGULATORS

QC.3.2... 2 WAY FLOW RATE REGULATOR

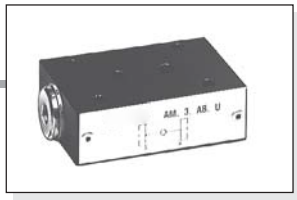


Fixing screws UNI 5931 M5x40
are supplied by Aron with
material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

QC.3.3... 3 WAY FLOW RATE REGULATOR



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

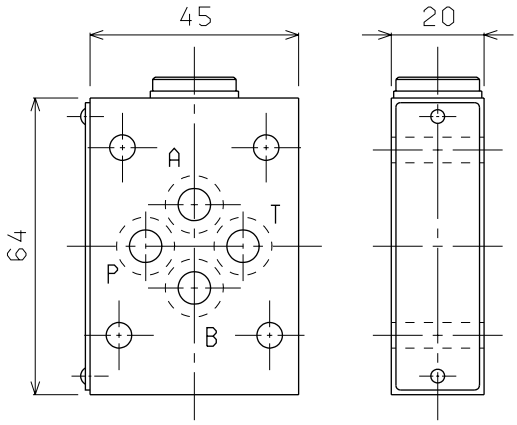


AM.3.ABU... CHECK VALVE HOLDER FOR REGULATORS TYPE QC.3...

This check valve holder must be fitted underneath the QC valve when he reverse flow function is needed.

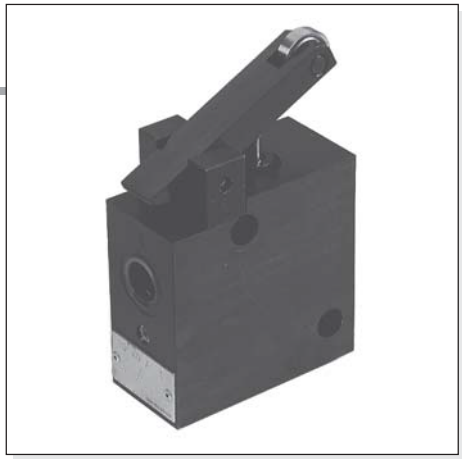
ORDERING CODE

AM	Modulating valve
3	CETOP 3/NG06
ABU	External check valve for QC.3.*.
3	For 2 way and 3 way
00	No variant
1	Serial No.



Weight: 0,4 Kg
Fixing screws for regulator and modular check valve M5x60 UNI 5931 - 12K

VD.40... DECELERATION VALVES

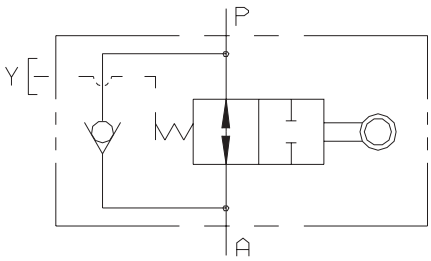


VD.40...

These valves are used as cam controlled unidirectional flow regulators. Normally mounted in line between actuator and directional valve for the displacement of carriages or slides, they enable cam controlled acceleration or deceleration of the moving mass.
A special internal check valve allows free flow the opposite direction.

Max. operating pressure	180 bar
Max. flow	40 l/min
Leakages	0,06 l/min
Cam travel	See diagram
Hydraulic fluids	Mineral oils DIN 51524
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 $ß_{25} \geq 75$
Weight	2,8 Kg

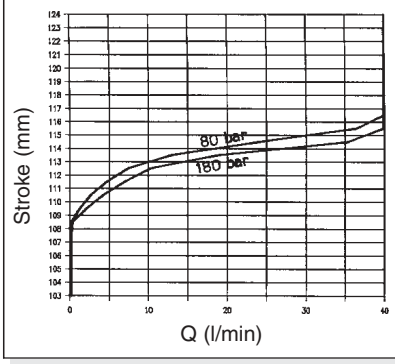
HYDRAULIC SYMBOL



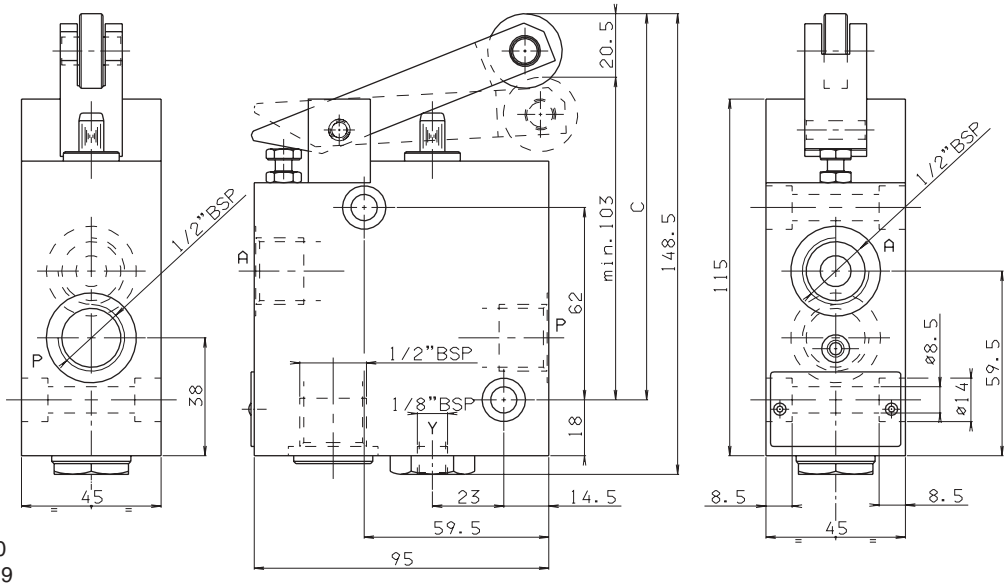
ORDERING CODE

VD	Deceleration valve
40	Flow rate 40 l/min
A	1/2" BSP ports thread
******	**00** = No variant **V1** = Viton **FA** = Not complete closing to avoid the "jump" in the controlled actuator
3	Serial No.

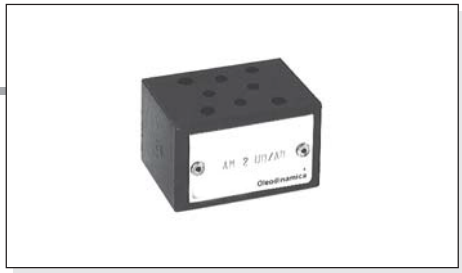
FLOW RATE / STROKE



OVERALL DIMENSIONS



Fixing screws UNI 5931 M8x50
with material specifications 12.9
Tightening torque 8 Nm / 0.8 Kgm



AM.2.UD...

SCREWS AND STUDS CH. IV PAGE 6

AM.2.UD... MODULAR DIRECT CHECK VALVES CETOP 2

AM.2.UD type modular check valves allow one way free flow, while preventing any flow in the opposite direction by means of a conical seated poppet.

They are available on single P and T lines (see hydraulic symbols).

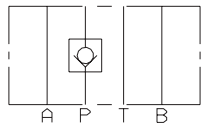
1 bar spring is standard, while a 5 bar rated spring is available on request.

Max. operating pressure	250 bar
Minimum opening pressure spring 1	1 bar
Minimum opening pressure spring 5	5 bar
Max. flow	20 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s a 50°C
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	0,4 Kg

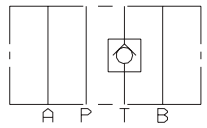
ORDERING CODE

AM	Modular valve
2	CETOP 2/NG4
UD	Direct check valve
*	Control on lines **P / T**
*	Minimum opening pressure **1** = 1 bar **5** = 5 bar
**	**00** = No variant **V1** = Viton
1	Serial No.

HYDRAULIC SYMBOLS

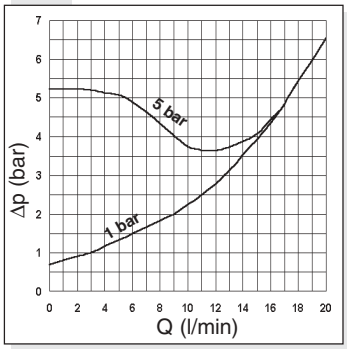


AM.2.UD.P

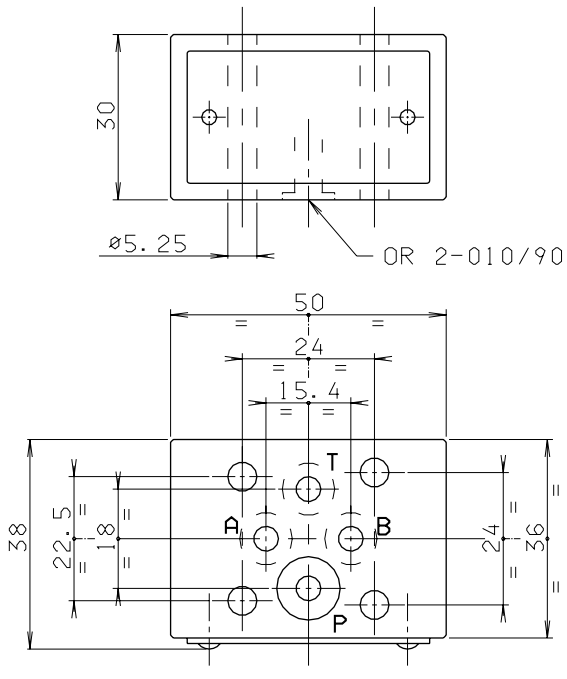


AM.2.UD.T

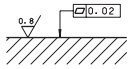
PRESSURE DROPS



OVERALL DIMENSIONS



Support plane specifications



AM.2.UP... MODULAR PILOT OPERATED CHECK VALVES CETOP 2

AM.2.UP...

SCREWS AND STUDS CH. IV PAGE 6

AM.2.UP type modular check valves allow one way free flow by raising a conical shutter, while in the opposite direction the fluid can return by means of a small piston piloted by the pressure in the other line.

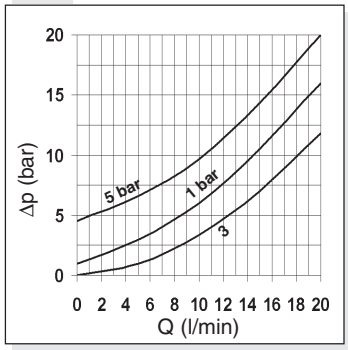
They are available on single A or B lines, and on double A and B lines (see hydraulic symbols).

Max. operating pressure	250 bar
Minimum opening pressure spring 1	1 bar
Minimum opening pressure spring 5	5 bar
Piloting ratio:	1:4
Max. flow	20 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s a 50°C
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight	0,5 Kg

ORDERING CODE

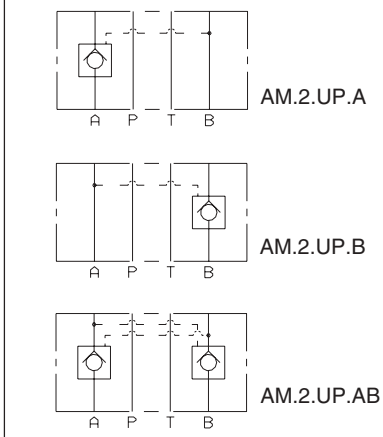
AM	Modular valve
2	CETOP 2/NG4
UP	Piloted check valve
**	Control on lines **A / B / AB**
*	Minimum opening pressure **1** = 1 bar **5** = 5 bar
**	**00** = No variant **V1** = Viton
1	Serial No.

PRESSURE DROPS

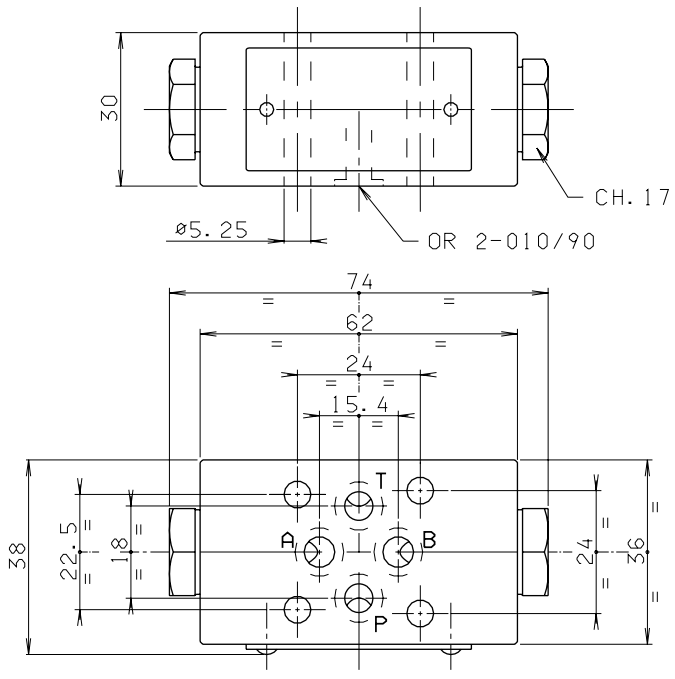


Curve n. 3 = Piloted side flow

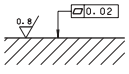
HYDRAULIC SYMBOLS

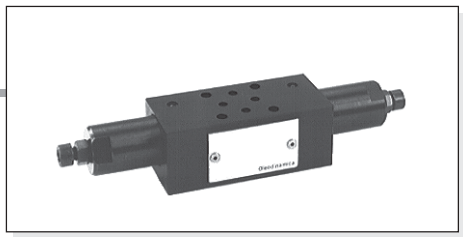


OVERALL DIMENSIONS



Support plane specifications





AM.2.VM... MODULAR MAXIMUM PRESSURE VALVES CETOP 2

AM.2.VM type pressure regulating valves are available with an operating pressure range of 4 to 250 bar.
Adjustment is via a grub screw. Two base versions are available: **AM.2.VM..** single on A or B, and double on A and B lines, with drainage on T; **AM.3.VM.P..** single on P line, with drainage on T.
4 different types of springs can be mounted on all versions, with the adjustment range specified in the specifications. The cartridge used is the CMP.02 type.

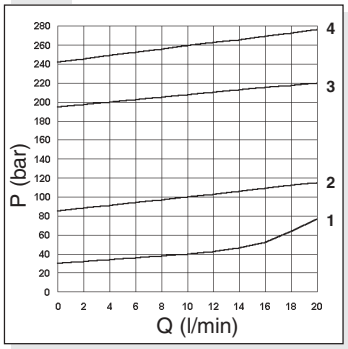
Max. operating pressure	250 bar
Setting ranges:	
spring 1	30 bar
spring 2	90 bar
spring 3	180 bar
spring 4	250 bar
Max. flow	20 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s a 50°C
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25}≥75$
Weight AM.2.VM.A/B/P...	0,53 Kg
Weight AM.2.VM.AB...	0,7 Kg

AM.2.VM...	
CMP.02...	CH. V PAGE 17
SCREWS AND STUDS	CH. IV PAGE 6

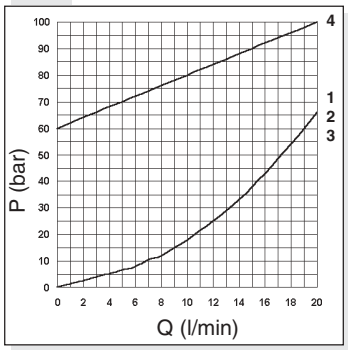
ORDERING CODE

AM	Modular valve
2	CETOP 2/NG4
VM	Max. pressure valves
******	Adjustment on the lines **A / B / P / AB**
C	Type of adjustment grub screw
*****	Setting ranges at port A/B/P **1** = max.30 bar **(white spring)** **2** = max.90 bar **(yellow spring)** **3** = max.180 bar **(green spring)** **4** = max.250 bar **(orange spring)**
*****	Setting ranges at port B (Omit if the setting is same as that at port A) **1** = max.30 bar **(white spring)** **2** = max.90 bar **(yellow spring)** **3** = max.180 bar **(green spring)** **4** = max.250 bar **(orange spring)**
******	**00** = No variant **V1** = Viton
1	Serial No.

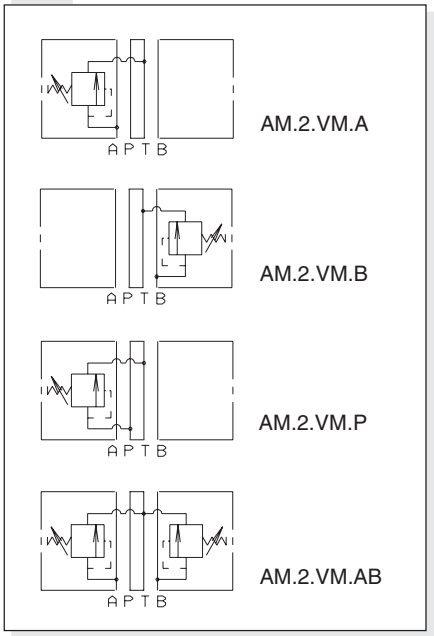
PRESSURE - FLOW RATE



MINIMUM SETTING PRESSURE

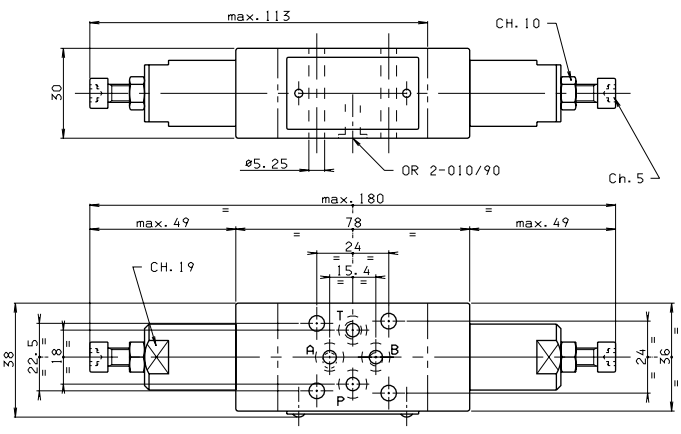


HYDRAULIC SYMBOLS

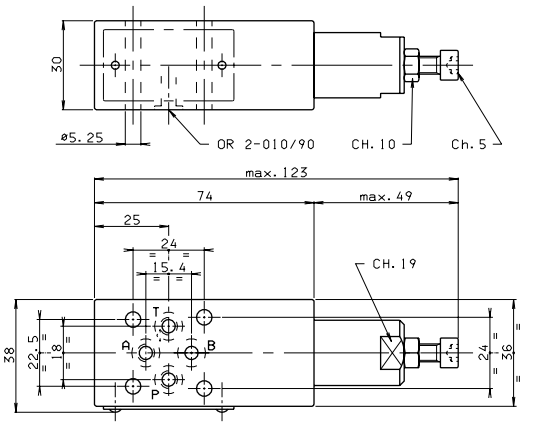


OVERALL DIMENSIONS

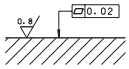
AM.2.VM.AB...



AM.2.VM.A/B/P...



Support plane specifications



AM.2.QF... MODULAR FLOW REGULATOR CETOP 2

AM.2.QF type one way non-compensated throttle valves are adjustable by means of a grub screw.

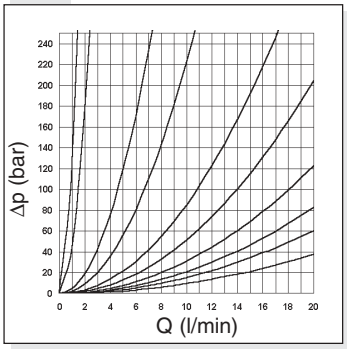
Three types of regulations are available on A / B / AB lines, as shown in the hydraulic symbols.

Max. operating pressure	250 bar
Flow rate regulation	on 6 screw turns
Max. flow.	20 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s a 50°C
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight AM.2.QF.A/B...	0,5 Kg
Weight AM.2.QF.AB...	0,6 Kg

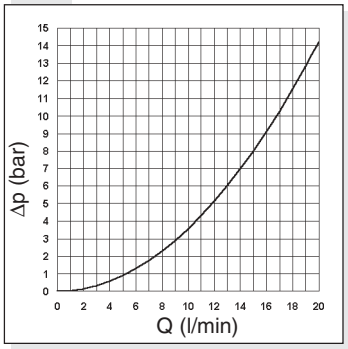
AM.2.QF...

SCREWS AND STUDS CH. IV PAGE 6

FLOW REGULATION



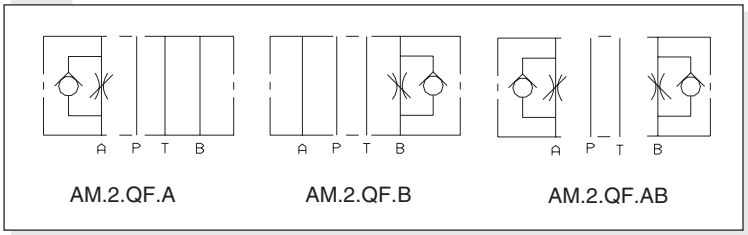
FREE FLOW THROUGH CHECK VALVE



ORDERING CODE

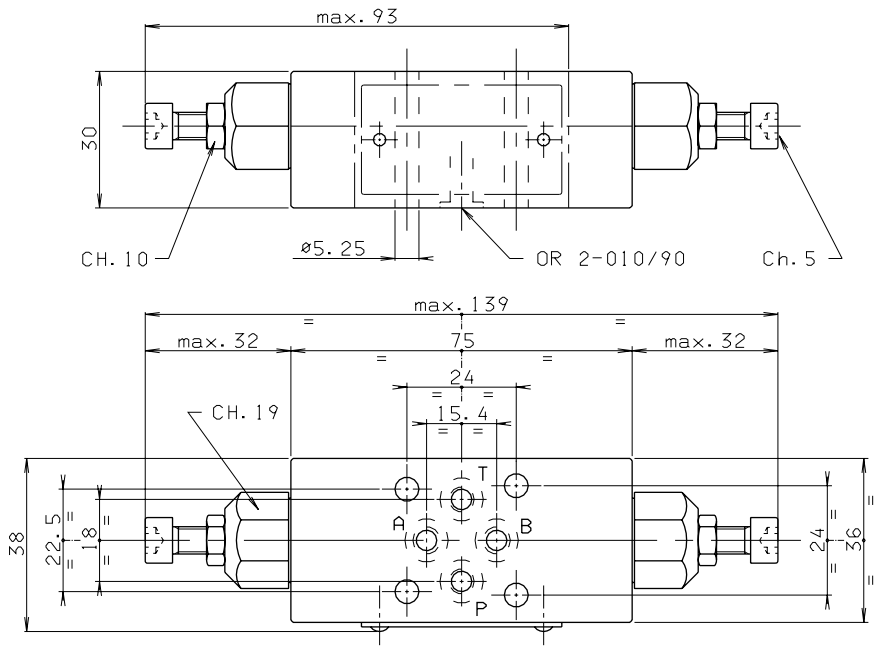
AM	Modular valve
2	CETOP 2/NG4
QF	Non-compensated flow rate regulator
******	Control on lines **A / B / AB**
C	Type of adjustment grub screw
******	**00** = No variant **V1** = Viton
1	Serial No.

HYDRAULIC SYMBOLS

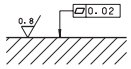


AM.2.QF.A AM.2.QF.B AM.2.QF.AB

OVERALL DIMENSIONS



Support plane specifications



AM.3.UD... MODULAR DIRECT CHECK VALVES CETOP 3

AM.3.UD type modular check valves allow one way free flow, while flow in the opposite direction is prevented by means of a conical seated poppet.

They are available on single A, B, P and T lines, and on double A and B, P and T lines (see hydraulic symbols).

1 bar spring is standard, while a 5 bar rated spring is available on request.

Max. operating pressure	350 bar
Minimum opening pressure spring 1	1 bar
Minimum opening pressure spring 5	5 bar
Max. flow	40 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s a 50°
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight	0,8 Kg

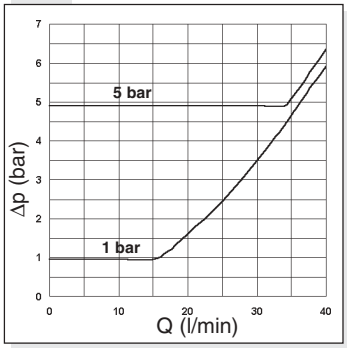
AM.3.UD...

SCREWS AND STUDS CH. IV PAGE 21

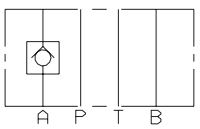
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
UD	Direct check valve
**	Control on lines **A / B / P / T / AB**
*	Minimum opening pressure **1** = 1 bar **5** = 5 bar
**	**00** = No variant **V1** = Viton
2	Serial No.

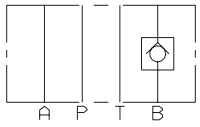
PRESSURE DROPS



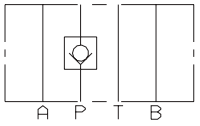
HYDRAULIC SYMBOLS



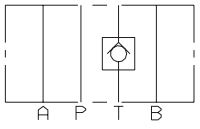
AM.3.UD.A



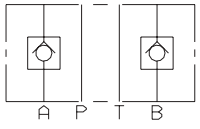
AM.3.UD.B



AM.3.UD.P

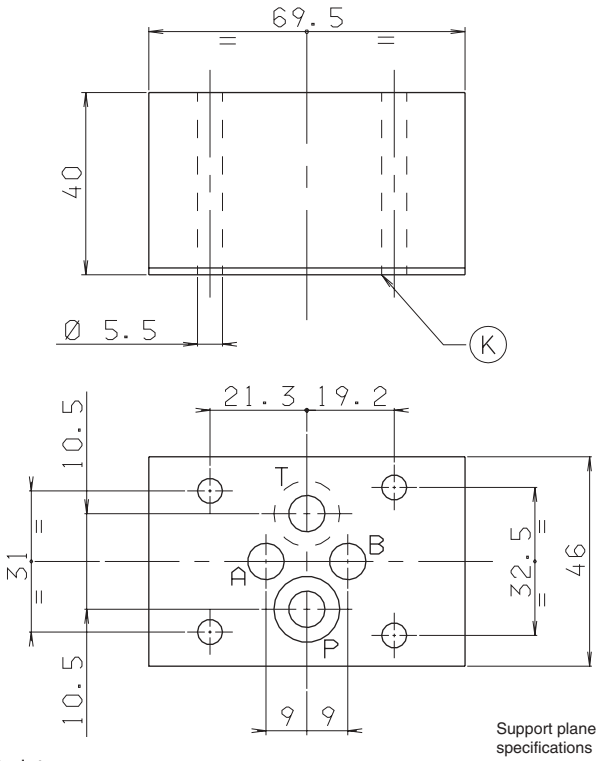


AM.3.UD.T

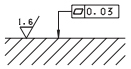


AM.3.UD.AB

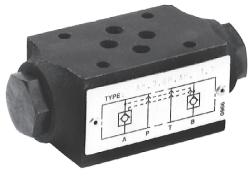
OVERALL DIMENSIONS



Support plane specifications



K = OR plate



AM.3.UP... / AM.3.UP1... MODULAR
PILOT OPERATED CHECK VALVES CETOP 3

AM.3.UP type modular check valves allow free flow in one direction by raising a conical seated poppet valve, while in the opposite direction the fluid can return by means of a small piston piloted by the other line pressure (piloted side).

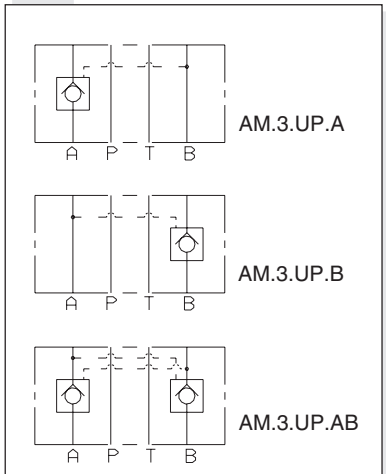
They are available on single A or B lines, and double A and B lines (see hydraulic symbols).

A pre-opening version is also available (AM3UP1..) only with 5 bar spring.

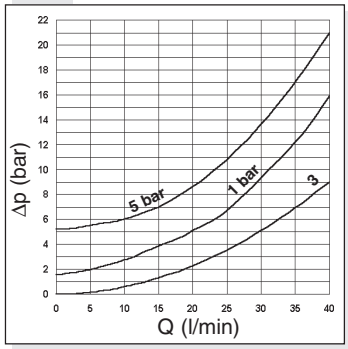
Max. operating pressure	350 bar
Minimum opening pressure spring 1	1 bar
Minimum opening pressure spring 5	5 bar
Piloting ratio AM.3.UP	1:4
Piloting ratio AM.3.UP1	1:12,5
Max. flow	40 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	1 Kg

AM.3.UP / AM.3.UP1...
SCREWS AND STUDS CH. IV PAGE 21

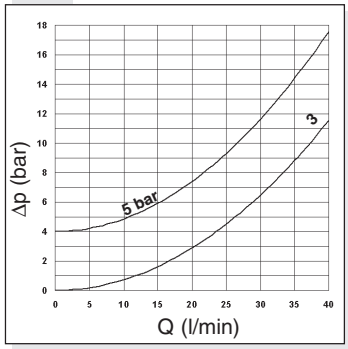
HYDRAULIC SYMBOLS



PRESSURE DROPS AM3UP



PRESSURE DROPS AM3UP1



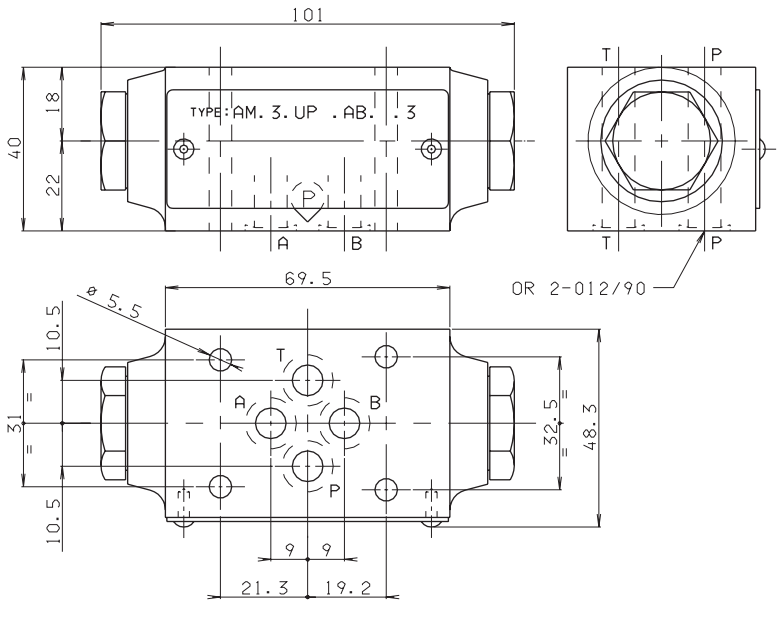
Curve n. 3 = Piloted side flow

ORDERING CODE

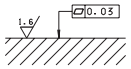
AM	Modular valve
3	CETOP 3/NG6
**	**UP** = Piloted check valve **UP1** = With pre-opening
**	Control on lines **A / B / AB**
*	Minimum opening pressure **1** = 1 bar (only for UP version) **5** = 5 bar
**	**00** = No variant **V1** = Viton
3	Serial No.

The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out a fluid temperature of 50°C.

OVERALL DIMENSIONS



Support plane specifications



AM.3.VM... / AM.3.VI... MODULAR
MAX. PRESSURE VALVES CETOP 3

AM.3.VM type pressure regulating valves are available with a pressure range of 2 ÷ 320 bar.

Adjustment is by means of a grub screw or a plastic knob.

Three basic versions are available:
- AM3VM on single A or B lines, and on A and B lines, with drainage to T;
- AM3VMP on single P line, with drainage to T;
- AM3VI on single A or B lines, and on A and B lines, with crossed drainage on A or B (see hydraulic symbols).

All versions can accept three types of springs with calibrated ranges as shown in the specifications.

The cartridge, which is the same for all versions, is the direct acting type CMP10.
For the minimum permissible setting pressure depending on the spring, see minimum pressure setting curve.

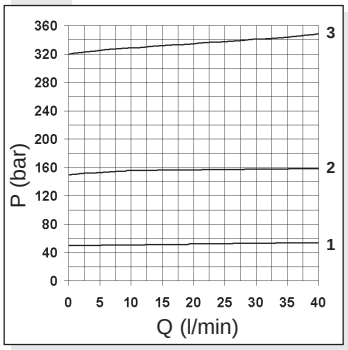
Max. operating pressure		320 bar
Setting ranges:	spring 1	max. 50 bar
	spring 2	max. 150 bar
	spring 3	max. 320 bar
Max. flow		40 l/min
Hydraulic fluids		Mineral oils DIN 51524
Fluid viscosity		10 ÷ 500 mm^2/s
Fluid temperature		-25°C ÷ 75°C
Ambient temperature		-25°C ÷ 60°C
Max. contamination level		class 10 in accordance with NAS 1638 with filter $ß_{25}≥75$
Weight AM.3.VM.A/B/P...		1,2 Kg
Weight AM.3.VM.AB...		1,3 Kg
Weight AM.3.VI.A/B...		2 Kg
Weight AM.3.VI.AB...		2,2 Kg

AM.3.VM / AM.3.VI...	
CMP.10...	CH. V PAGE 19
SCREWS AND STUDS	CH. IV PAGE 21

ORDERING CODE

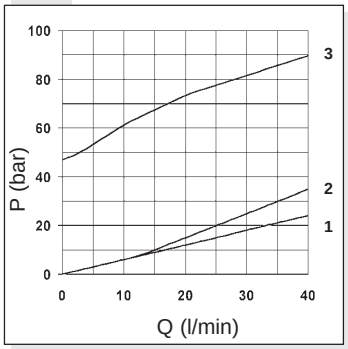
AM	Modular valve
3	CETOP 3/NG6
**	**VM** = Maximum pressure **VI** = Maximum pressure crossline
**	Adjustment on the lines AM.3.VM Version = **A / B / P / AB** AM.3.VI Version = **A / B / AB**
*	Type of adjustment **M** = Plastic knob **C** = Grub screw
*	Setting ranges at port A/B/P **1** = max. 50 bar **(white spring)** **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
*	Setting ranges at port B (Omit if the setting is same as that at port A) **1** = max. 50 bar **(white spring)** **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
**	**00** = No variant **V1** = Viton
3	Serial No.

PRESSURE - FLOW RATE

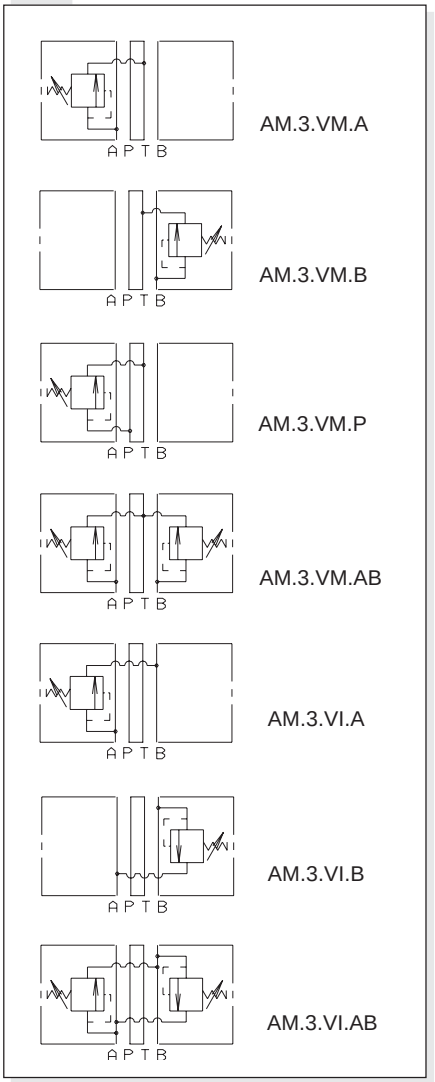


Curves n° 1 - 2 - 3 = setting ranges

MINIMUM SETTING PRESSURE

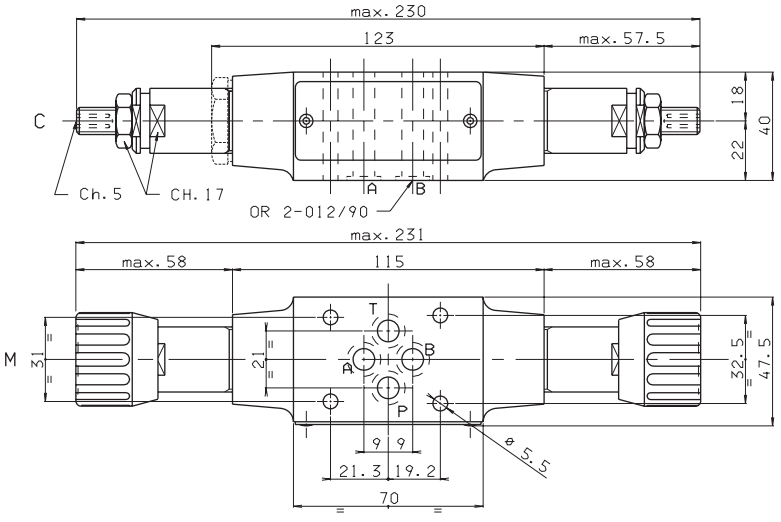


HYDRAULIC SYMBOLS



OVERALL DIMENSIONS

AM.3.VM.AB...

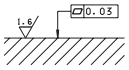


Type of adjustment

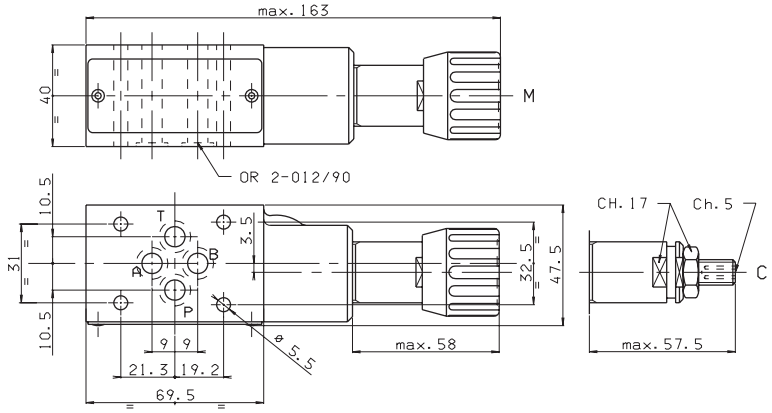
M Plastic knob

C Grub screw

Support plane specifications



AM.3.VM.P...

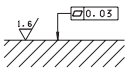


Type of adjustment

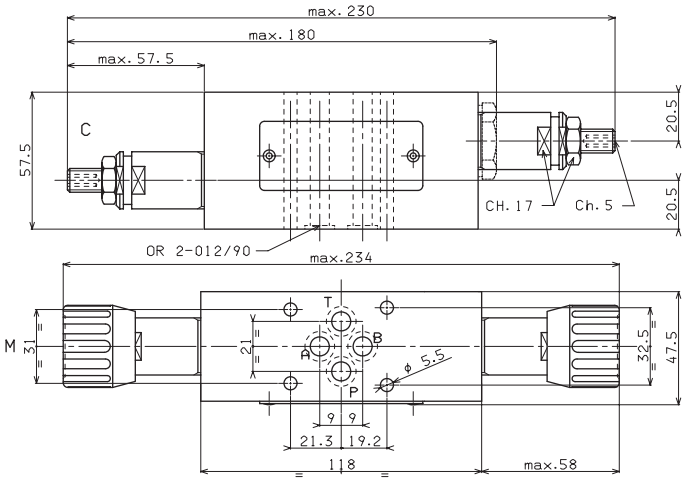
M Plastic knob

C Grub screw

Support plane specifications



AM.3.VI.AB...

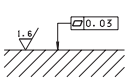


Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



AM.3.CP... MODULAR BACK PRESSURE VALVE CETOP 3

AM3CP type back pressure valves are damped in-line direct acting pressure relief valves fitted with bypass non-return valves.

Adjustment within the range 2 ÷ 320 bar is by means of a grub screw or a plastic knob, on ports A or B (single) or AB (double).

The cartridge is the direct acting type CMP10.

These valves are especially used on vertically working cylinders with dragging loads.

For the minimum permissible setting pressure depending on the spring, see minimum pressure setting curve.

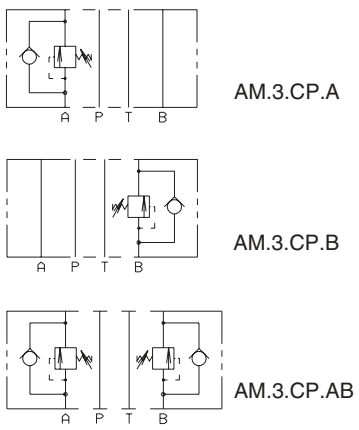
Max. operating pressure		350 bar
Setting ranges:	spring 1	max. 50 bar
	spring 2	max. 150 bar
	spring 3	max. 320 bar
Max. flow		40 l/min
Hydraulic fluids		Mineral oils DIN 51524
Fluid viscosity		10 ÷ 500 mm²/s
Fluid temperature		-25°C ÷ 75°C
Ambient temperature		-25°C ÷ 60°C
Max. contamination level		class 10 in accordance with NAS 1638 with filter $ß_{25}≥75$
Weight AM.3.CP.A/B...		2 Kg
Weight AM.3.CP.AB...		2,7 Kg

AM.3.CP...	
CMP.10...	CH. V PAGE 19
SCREWS AND STUDS	CH. IV PAGE 21

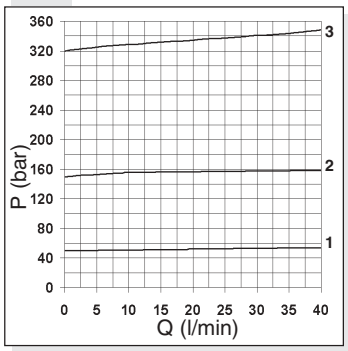
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
CP	Back pressure valve
**	Control on lines **A / B / AB**
*	Type of adjustment **M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = max. 50 bar **(white spring)** **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
**	**00** = No variant **V1** = Viton
3	Serial No.

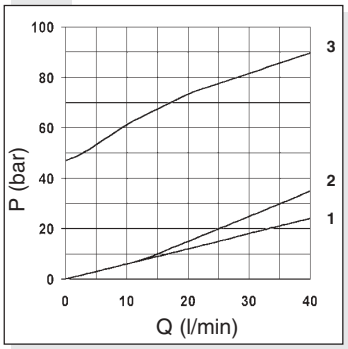
HYDRAULIC SYMBOLS



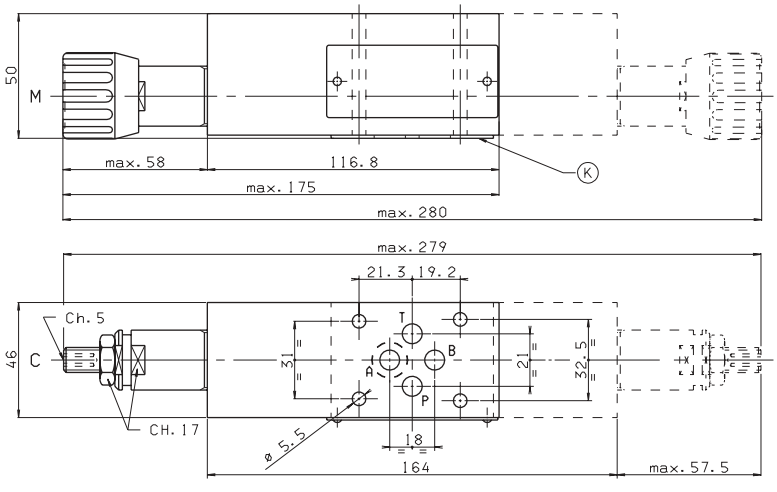
PRESSURE - FLOW RATE



MINIMUM SETTING PRESSURE



OVERALL DIMENSIONS



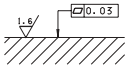
K = OR plate

Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



AM.3.RD... /AM.3.SD... MODULAR PRESSURE REDUCING / PRESSURE SEQUENCING VALVES CETOP 3

AM3RD and AM3SD valves are direct acting spool type pressure reducing and sequencing units, respectively, with one end pre-loaded by means of a spring an the other end exposed to the hydraulic pressure.
The drainage is drained within the valve to port T. Pressure is adjustable by means of a screw and locknut, or of a handwheel. Three types of springs allow adjustment within the range 2÷250 bar. The pressure reducing valves are available in two versions: with positive overlap (suitable with low flow rate) and with negative overlap to obtain a greater pressure reinstatement speed.

Max. operating pressure: port P		350 bar
Max. pressure adjustable		250 bar
Setting ranges:	spring 1	2 ÷ 30 bar
	spring 2	10 ÷ 120 bar
	spring 3	60 ÷ 250 bar
Max. flow		40 l/min
Internal drainage RD:		
Positive overlap version		0,5 l/min
Negative overlap version		2 l/min
Hydraulic fluids		Mineral oils DIN 51524
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		1,3 Kg

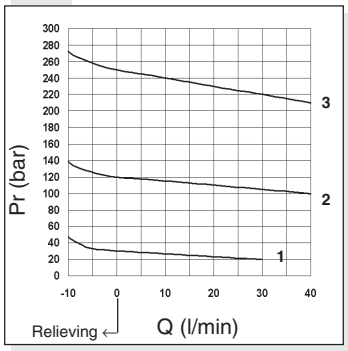
AM.3.RD / AM.3.SD...

SCREWS AND STUDS CH. IV PAGE 21

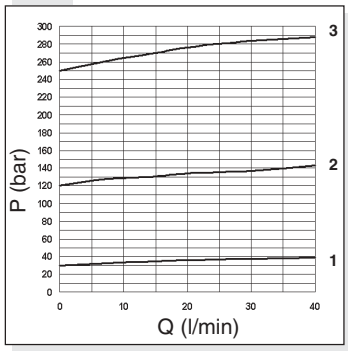
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
**	**RD** = Direct pressure reducing valve **SD** = Direct pressure sequencing valve
*	Control on lines AM.3.RD version = **A / P** AM.3.SD version = **P**
*	**1** = Positive overlap **2** = Negative overlap Omit for version AM3SD
*	Type of adjustment **C** = Grub screw **V** = Handwheel
*	Setting ranges **1** = max. 2 ÷ 30 bar **(white spring)** **2** = max. 10 ÷ 120 bar **(yellow spring)** **3** = max. 60 ÷ 250 bar **(green spring)**
**	**00** = No variant **V1** = Viton
4	Serial No.

PRESSURE - FLOW RATE AM3RD

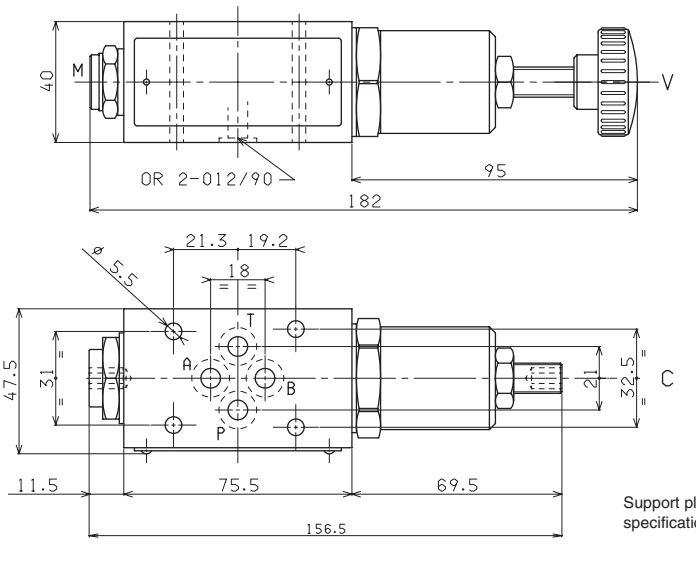


PRESSURE - FLOW RATE AM3SD



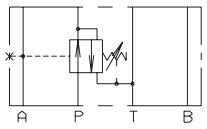
The fluid used is a mineral based oil with a viscosity of 46 mm²/sec at 40 degrees C.
The tests have been carried out at with a fluid temperature of 40 degrees C.

OVERALL DIMENSIONS

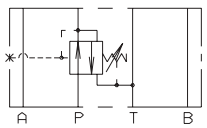


Type of adjustment
V Handwheel
C Grub screw

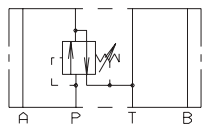
HYDRAULIC SYMBOLS



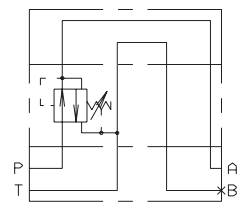
AM.3.RD.A



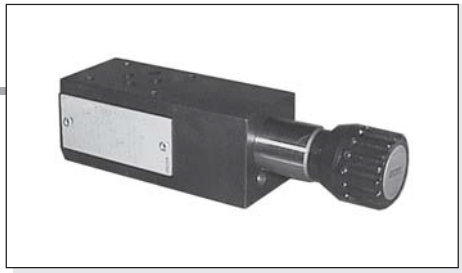
AM.3.RD.P



AM.3.SD.P



Application example



AM.3.VR... MODULAR REDUCING VALVES WITH RELIEVING - PILOT OPERATED CETOP 3

AM.3.VR...	
CVR.20...	CH. V PAGE 23
SCREWS AND STUDS	CH. IV PAGE 21

These pressure reducing valves ensure a minimum pressure variation on the P or A port with changing flow rate up to 90 l/min.

Three spring types allow adjustment within the range 7 ÷ 250 bar. Manual adjustment is available by a grub screw or plastic knob.

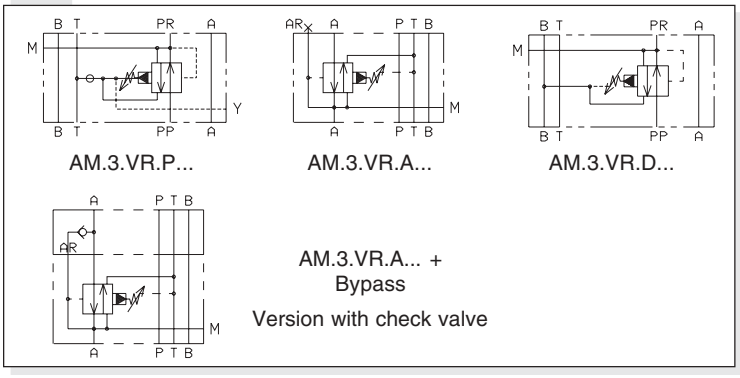
The RELIEVING SYSTEM inside the valve AM3VR allows the passage from the setting pressure line to T line of the flow through the valve to avoid the increasing of pressure in the reduced-pressure line by diverting exceeding flow to reservoir. A bypass module with check valve for free flow from A to AR port (see hydraulic symbol) is available..

Max. operating pressure		350 bar
Setting ranges:	spring 1	max. 60 bar
	spring 2	max. 120 bar
	spring 3	max. 250 bar
Maximum allowed Δp pressure between the inlet an outlet pressure		**150 bar**
Max. flow		40 l/min
Draining on port T		0,5 ÷ 0,7 l/min
Hydraulic fluids		Mineral oils DIN 51524
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 $ß_{25}≥75$
Weight		1,36 Kg
Weight bypass version		2 Kg

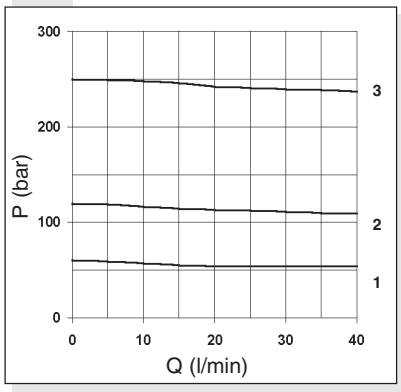
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
VR	Pilot operated pressure reducing valve with relieving
*	Control on lines **P** = Drain on T **A** = Drain on T **D** = Drain on B reduct pressure on A
*	Drain connection **E** = External (only for control on the P line) **I** = Internal (Standard)
B	Version with bypass on line A only **Omit if not required**
*	Type of adjustment **M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = max. 60 bar **(white spring)** **2** = max. 120 bar **(yellow spring)** **3** = max. 250 bar **(green spring)**
**	**00** = No variant **V1** = Viton
1	Serial No

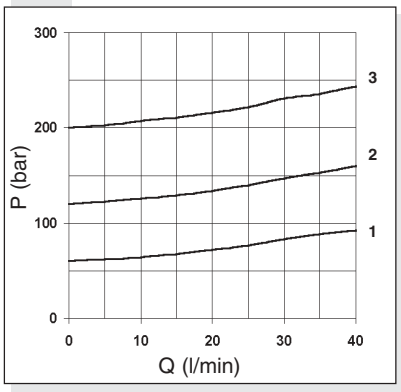
HYDRAULIC SYMBOLS



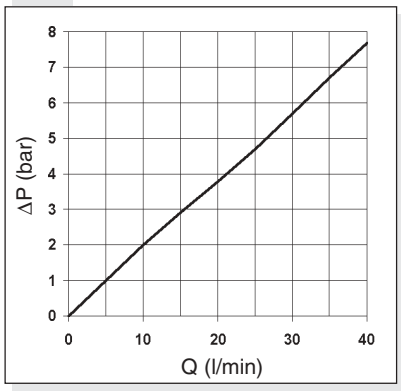
PRESSURE-FLOW RATE



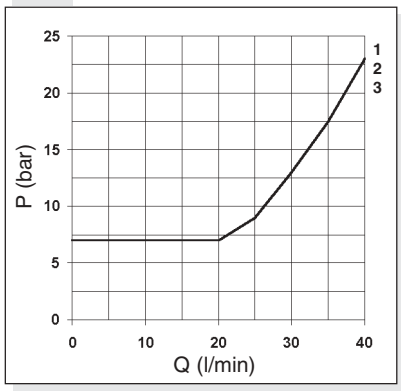
PRESSURE-FLOW OF RELIEVING



ΔP AM.3.VR... + BYPASS



MINIMUM SETTING PRESSURE



To changes valves AM.3.VR.P... from internal to external drainage it is necessary:
- screw out the plug on the "Y" port
- screw out the plug T.C.E.I. M8x1 from the body
- screw in a screw S.T.E.I. M6
- rescrew the T.C.E.I. M8x1 plug on the body

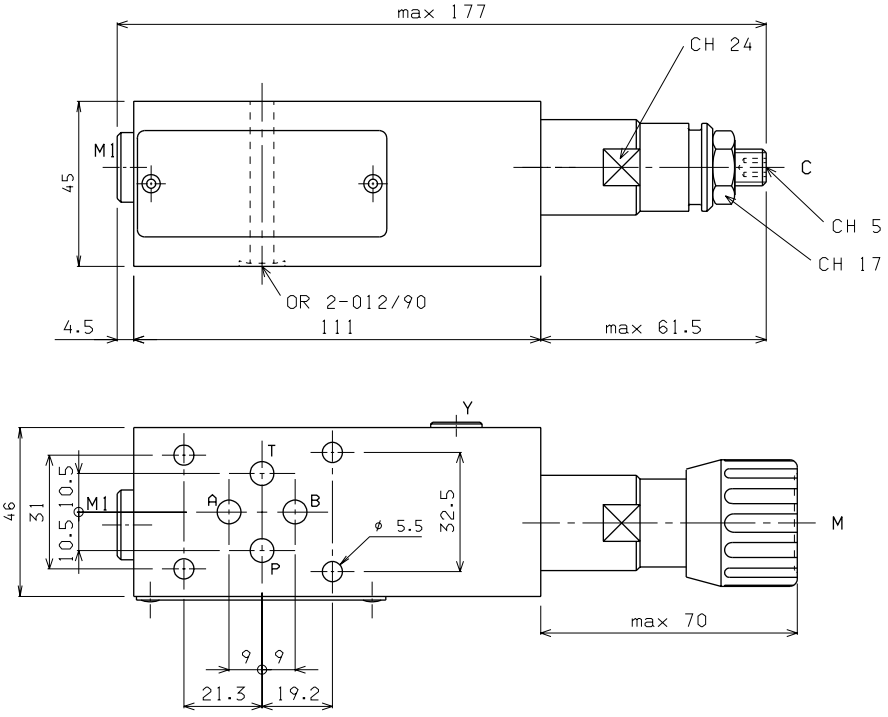
NOTE: the external draining can be used as a piloting line (please, contact our Technical Service for other informations)

Curves n° 1 - 2 - 3 = setting ranges

The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out a fluid temperature of 50°C.

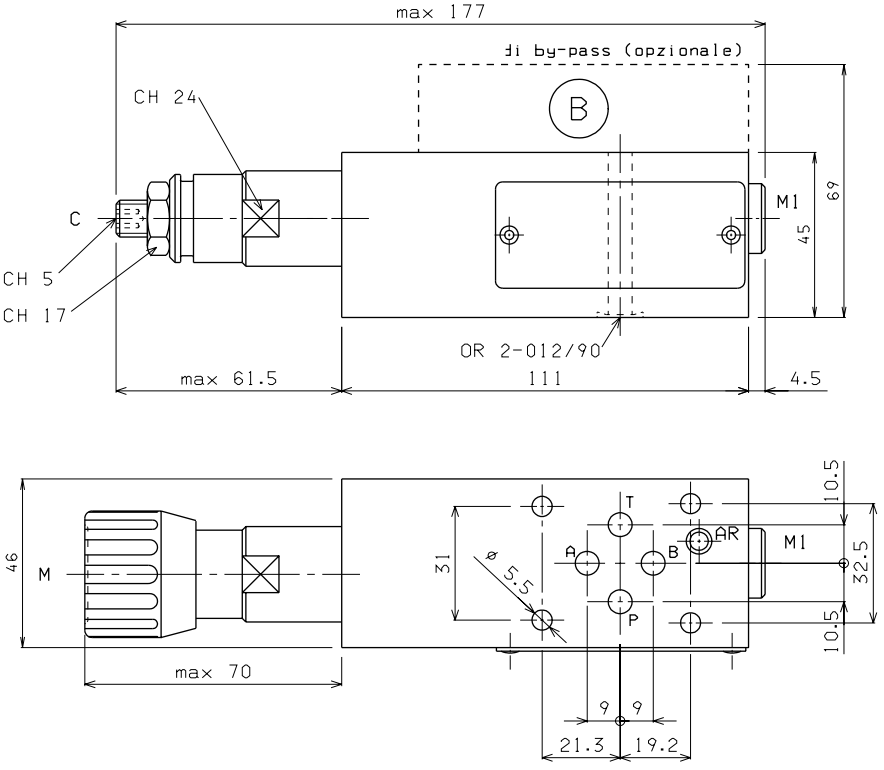
OVERALL DIMENSIONS

AM.3.VR.P... / AM.3.VR.D...



AM.3.VR.A... + BYPASS

Ⓑ Bypass (optional)
Ordering code:
V89.45.000
(if ordered separately)

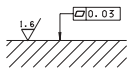


Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



AM.3.VS... MODULAR SEQUENCING VALVES CETOP 3

AM.3.VS...	
CVS.20...	CH. V PAGE 24
SCREWS AND STUDS	CH. IV PAGE 21

The sequence valve are used to assure that a secondary circuit is pressurized when the setting pressure is reached.

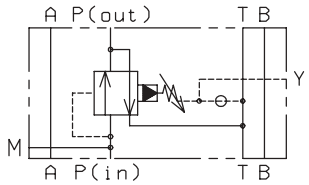
These valves grant a minimum variation of the setting pressure with a changing flow up to 40 l/min (see diagram).

Three spring types allow adjustment within the range 7 ÷ 250 bar. Manual adjustment is available by a grub screw or plastic knob.

The cartridge used is the "CVS" type.

Max. operating pressure		350 bar
Setting ranges:	Spring 1	max. 60 bar
	Spring 2	max. 120 bar
	Spring 3	max. 250 bar
Max. flow		40 l/min
Draining on port T		0,5 ÷ 0,7 l/min
Hydraulic fluids		Mineral oils DIN 51524
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 $ß_{25} \geq 75$
Weight		1,36 Kg

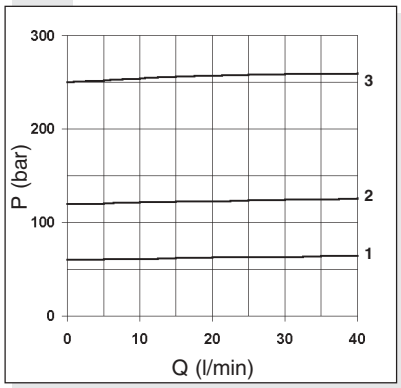
HYDRAULIC SYMBOL



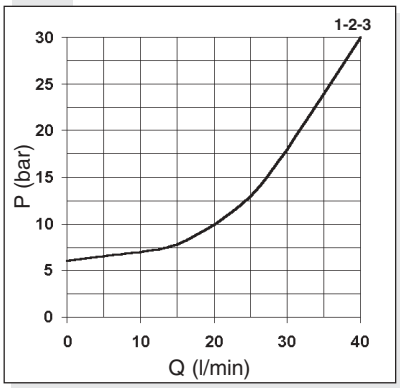
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
VS	Sequencing valve
*	Drain connection **E** = External **I** = Internal (Standard)
*	Type of adjustment **M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = max. 60 bar **(white spring)** **2** = max. 120 bar **(yellow spring)** **3** = max. 250 bar **(green spring)**
**	**00** = No variant **V1** = Viton
1	Serial No

PRESSURE-FLOW RATE



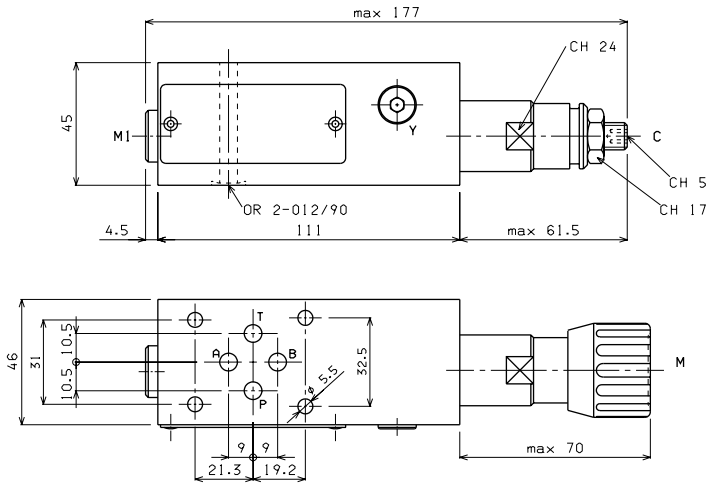
MINIMUM SETTING PRESSURE



Curves n° 1 - 2 - 3 = setting ranges

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 50°C.

OVERALL DIMENSIONS

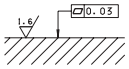


Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



To changes valves AM.3.VS... from internal to external drainage it is necessary:

- **screw out the plug on the Y port**
- **screw out the plug T.C.E.I. M8x1 from the body**
- **screw in a screw S.T.E.I. M6**
- **rescrew the T.C.E.I. M8x1 plug on the body**

NOTE: the external draining can be used as a piloting line (please, contact our Technical Service for other informations)

AM.3.SH... MODULAR SHUTTLE VALVES CETOP 3

Modular valves type AM.3.SH are actuator load pressure selecting units, as they are fitted with an integral shuttle valve cartridge which allows taking of the highest pressure signal to the external port via displacement of a ball. They are usually employed to signal the actuator load to the pressure compensator of load sensing pump, or for the command of fail-safe brakes.

For seat overall dimensions see cartridge shuttle SH.03 type.

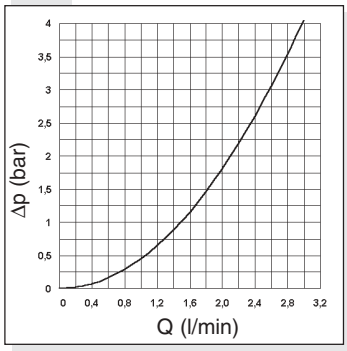
Max. operating pressure	350 bar
Max. flow at the cartridge	3 l/min
Max. flow at ports A/B/P/T	40 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25}≥75$
Weight	1 Kg
Cartridge tightening torque	20÷30 Nm/2÷3 Kgm

AM.3.SH...	
SH.03...	CH. V PAGE 16
SCREWS AND STUDS	CH. IV PAGE 21

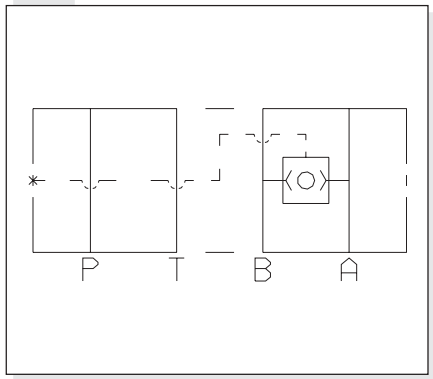
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
SH	Cartridge shuttle
******	**00** = No variant **V1** = Viton
1	Serial No.

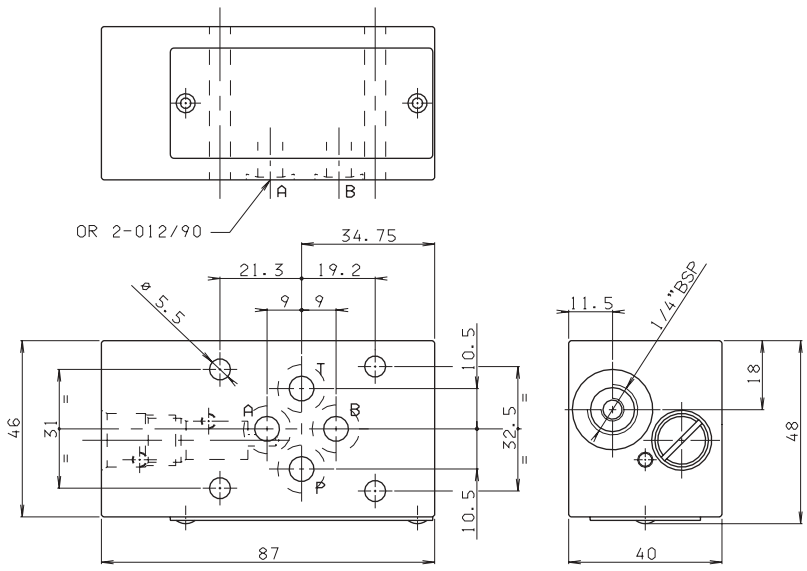
PRESSURE DROPS ON THE SHUTTLE VALVE



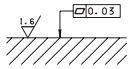
HYDRAULIC SYMBOL

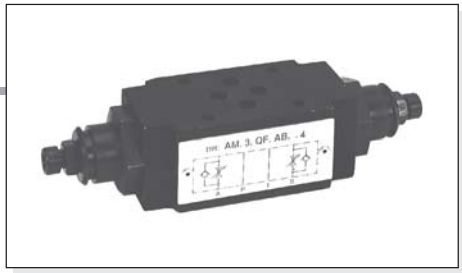


OVERALL DIMENSIONS



Support plane specifications





AM.3.QF...

SCREWS AND STUDS CH. IV PAGE 21

AM.3.QF... MODULAR FLOW REGULATOR CETOP 3

AM.3.QF type one way non-compensated throttle valve are fitted with an O-Ring mounting plate which allows its assembly for either input or output regulation. Adjustment is obtained by means of a grub screw or a plastic knob. They are available in the four regulating configurations shown in the hydraulic diagrams.

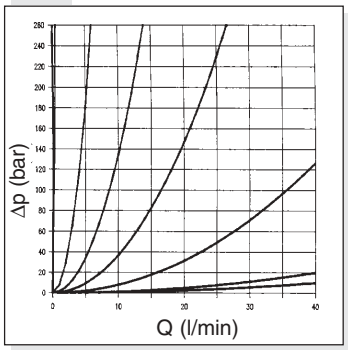
The standard valve configuration allows "meter in" regulation, while it is possible to obtain "meter out" regulation by turning the valve by 180° along its longitudinal axis.

Max. operating pressure	350 bar
Max. pressure adjustable	250 bar
Flow rate regulation	on 8 screw turns
Max. flow	40 l/min
Hydraulic fluids	Mineral oils DIN 51524
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	1,5 Kg

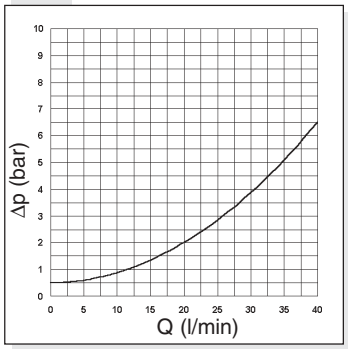
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
QF	Non compensated throttle valve
******	Control on lines **A / B / P / AB**
*****	Type of adjustment **M** = Plastic knob **C** = Grub screw
******	**00** = No variant **V1** = Viton
4	Serial No.

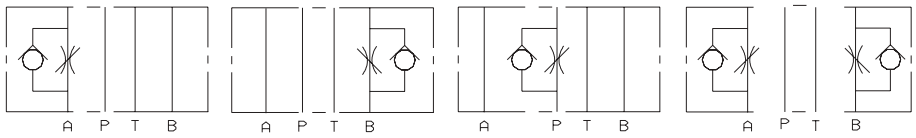
FLOW REGULATION



FREE FLOW TOWARDS CHECK VALVE

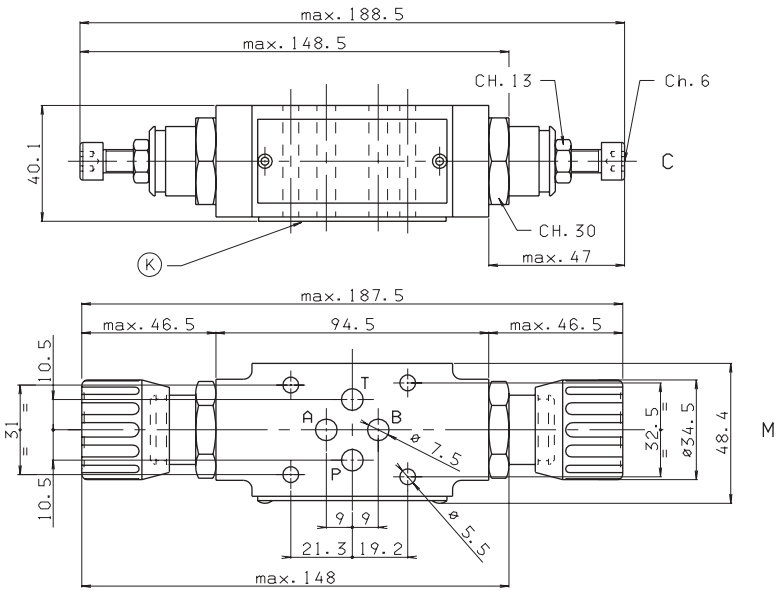


HYDRAULIC SYMBOLS



AM.3.QF.A AM.3.QF.B AM.3.QF.P AM.3.QF.AB

OVERALL DIMENSIONS



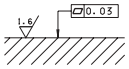
K = OR plate

Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



AM.66... MODULAR COMPENSATED FLOW CONTROL ASSEMBLY CETOP 3

This is an intermediate block (AM.66) for modular mounting of one or two flow rate regulators type QC.3...

The flow regulator type QC.3.2... must be ordered separately.

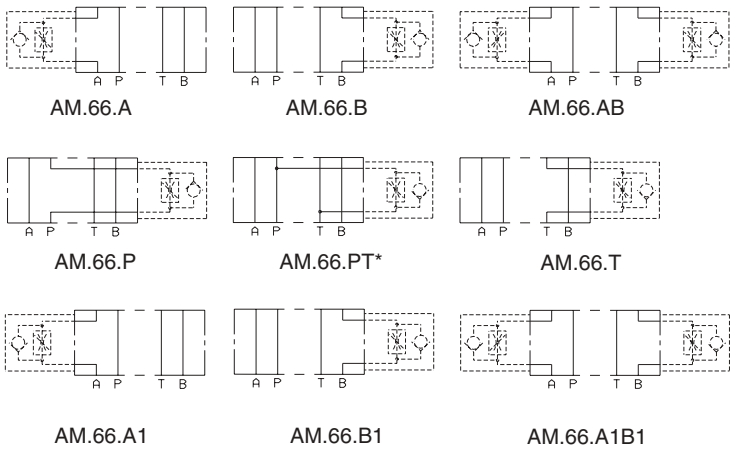
Max. operating pressure	320 bar
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight	1,3 Kg

AM.66...	
QC.3.2...	CH. III PAGE 2
SCREWS AND STUDS	CH. IV PAGE 21

ORDERING CODE

AM	Modular valve
66	Size
******	Control on lines **A / B / P / PT* / AB** For T / A1 / B1 / A1B1 versions see table "Hydraulic symbols"
******	**00** = No variant **V1** = Viton
3	Serial No.

HYDRAULIC SYMBOLS



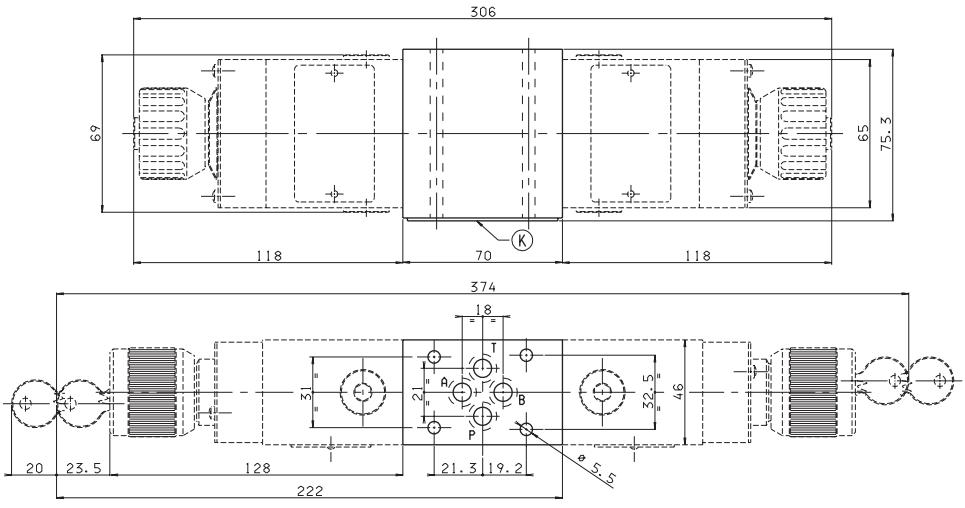
PT * = From line towards exhaust (**P→T** drain)

• In order to obtain versions with regulation on **T**, the AM.66.P regulator carrying block should be turned by 180°.

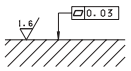
• In order to obtain versions **A1**, **B1** and **A1B1** the AM.66.B, AM.66.A or AM.66.AB regulators carrying block should be turned by 180°.

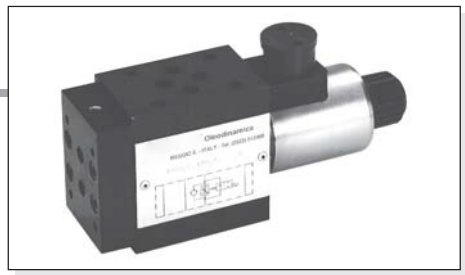
OVERALL DIMENSIONS

K = OR plate



Support plane specifications





A.66... MODULAR FLOW CONTROL VALVES FAST / SLOW ASSEMBLY CETOP 3

This is modular assembly ON/OFF solenoid valve which, by fitting suitable 2 way regulator, allows two speed operation in the same system via an electrical changeover command.

The flow rate regulator type QC.3.2... must be ordered separately.
The operational limit curves have been obtained with the regulator fully closed, and those same limits improve gradually with the opening of the regulator
• Solenoids used are standard type D15 for DC voltage and K12 for AC voltage.

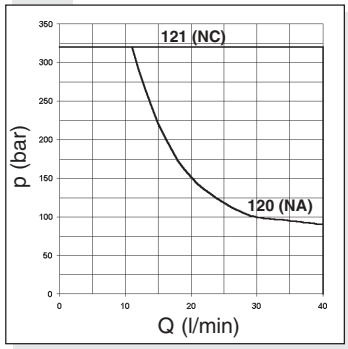
Max. operating pressure	320 bar
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight with an AC solenoid	2,2 Kg
Weight with a DC solenoid	2,4 Kg

The test have been carried out at operating temperature, with a voltage 10% lower than rated voltage and with a fluid temperature of 50 degrees C. The fluid used was a mineral based oil with a viscosity of 46 mm²/s at 40 degrees C.

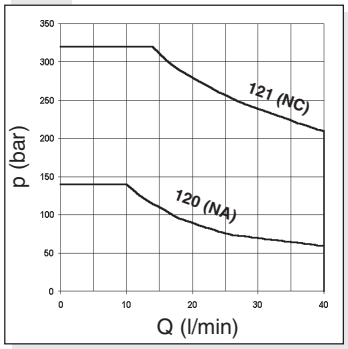
ORDERING CODE

A	Speed control valve
66	Size
E	Electrical operator
***	**120** = Normally open **121** = Normally closed See table hydraulic symbols
*	Control on lines **A/B/P/T** (see symbols) The interface holder "H" must be turned by 180° in order to obtain the **A1** and **B1** versions.
*	Voltage: see tab.1
**	Variants: see tab.2
*	**3** = Serial No. for AC voltage **4** = Serial No. for DC voltage

LIMITS OF USE DC SOLENOID



LIMITS OF USE AC SOLENOID



TAB.1 "E" OPERATOR TYPE

	AC VOLTAGE	
A	24V/50Hz	
B	48V/50Hz*	
J	115V/50Hz - 120V/60Hz	
Y	230V/50Hz - 240V/60Hz	
E	240V/50Hz*	
F	24V/60Hz*	
K	AC without coils	
	DC VOLTAGE	
L	12V	115Vac/50Hz 120Vac/60Hz with rectifier
M	24V	
V	28V*	
N	48V*	230Vac/50Hz 240Vac/60Hz with rectifier
Z	102V*	
P	110V*	
X	205V*	
W	DC without coils	

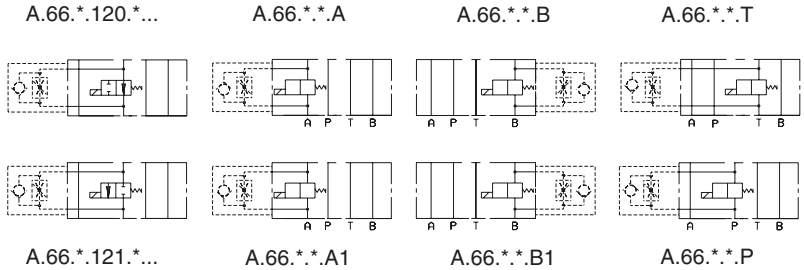
Voltage codes are not stamped on the plate, their are readable on the coils.

(*) Special voltage

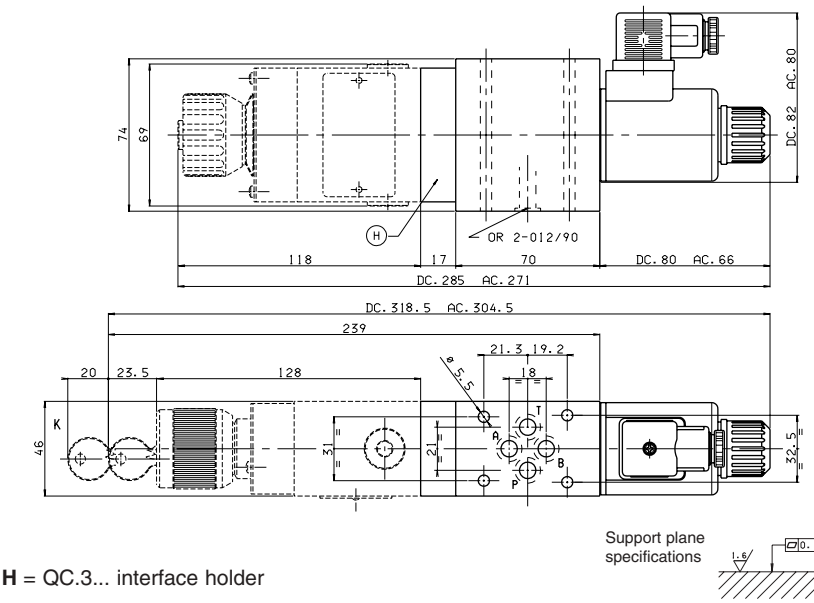
TAB.2 - VARIANTS

No variant (connectors as in the drawing)	00
Viton	V1
Indicator light	X1
Rectifier	R1
Cable gland "PG11"	C1
Valve without connector (coil)	S1
Indicator light + rectifier	XR

HYDRAULIC SYMBOLS



OVERALL DIMENSIONS



H = QC.3... interface holder

AM.3.RGT... MODULAR VALVES FOR REGENERATIVE CIRCUIT CETOP 3

This modular valve produces a regenerative system to increase the actuator (differential cylinder) exit speed as shown in the diagram.

In particular, if a cylinder is used with a 2:1 ratio for the operating surfaces, the exit and re-entry speeds are the same.

Max. operating pressure	350 bar
Max. flow at port A/B/P/T	20 l/min
Hydraulic fluids	Mineral oils DIN 51524
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 $ß_{25} \geq 75$
Weight	1,7 Kg

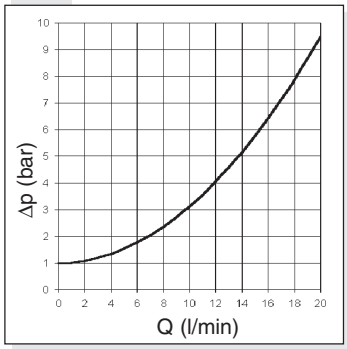
AM.3.RGT...

SCREWS AND STUDS CH. IV PAGE 21

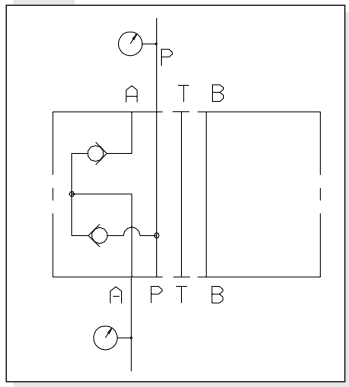
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
RGT	For regenerative circuit
A	Size of check valves 3/8"BSP
1	Opening pressure 1 bar
******	**00** = No variant **V1** = Viton
1	Serial No.

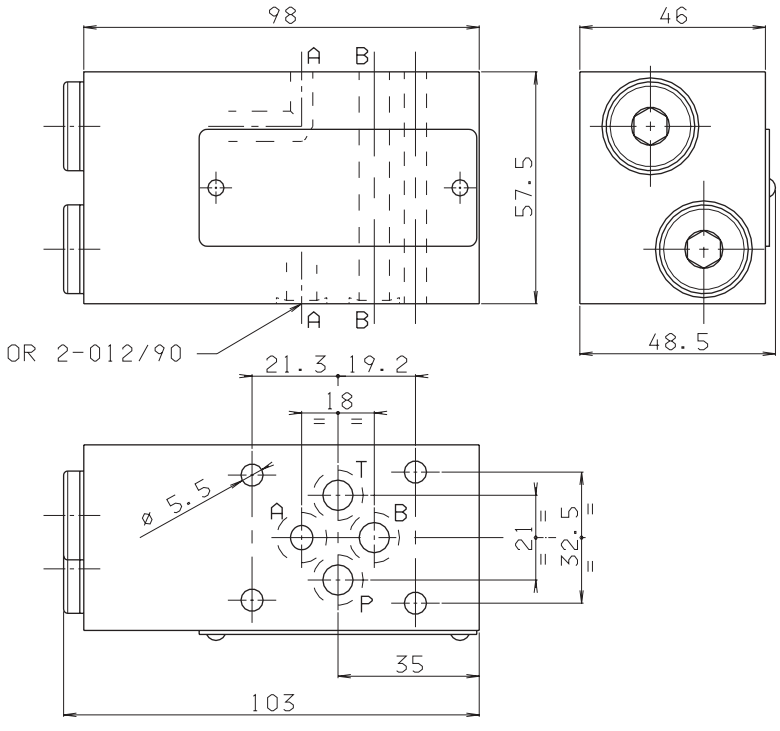
PRESSURE DROPS A→P



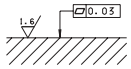
HYDRAULIC SYMBOL



OVERALL DIMENSIONS



Support plane specifications



AM.5.UD... MODULAR DIRECT CHECK VALVES CETOP 5

AM5UD type modular check valves allow free flow in one direction, while a conical seated poppet prevents flow in the opposite direction.
They are available on single A, B, P and T lines, and on double A and B, P and T lines (see hydraulic symbols).

1 bar springs are standard, while 5 bar rated springs are available on request.

Max. operating pressure	350 bar
Minimum opening pressure spring 1	1 bar
Minimum opening pressure spring 5	5 bar
Max. flow	80 l/min
Hydraulic fluids	Mineral oils DIN 51524
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	2,1 Kg

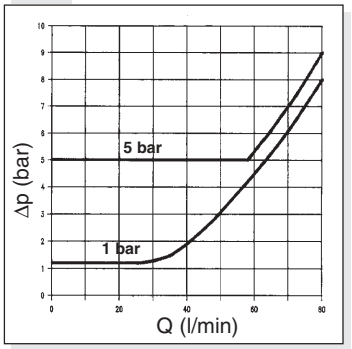
AM.5.UD...

SCREWS AND STUDS CH. IV PAGE 35

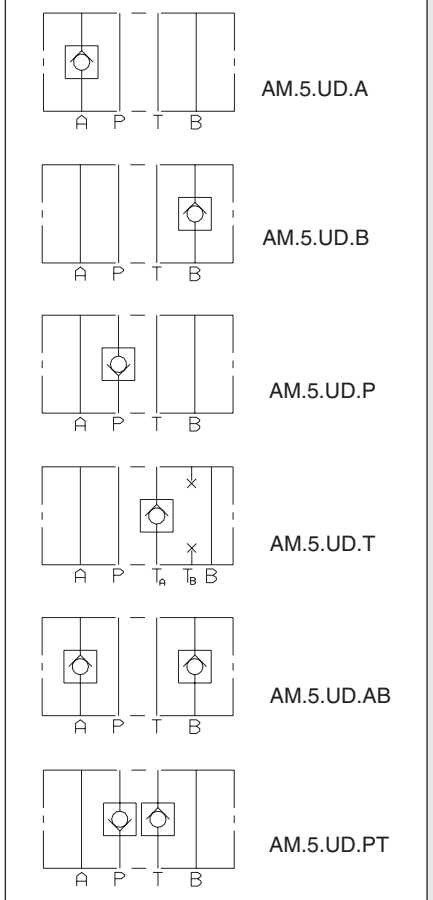
ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
UD	Direct check valve
**	Control on lines **A / B / P / T / AB / PT**
*	Minimum opening pressure **1** = 1 bar **5** = 5 bar
**	**00** = No variant **V1** = Viton
2	Serial No.

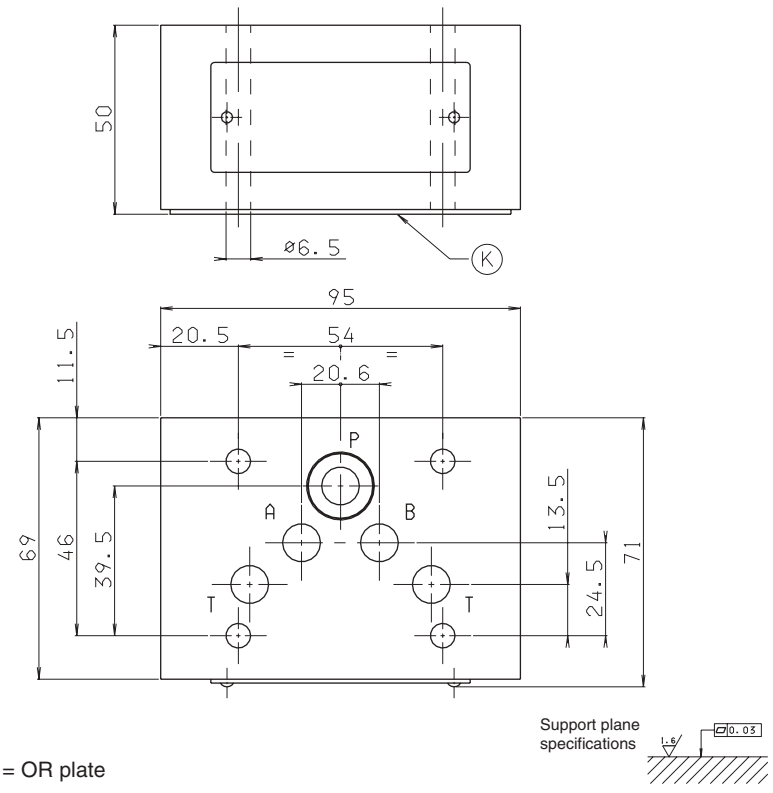
PRESSURE DROPS



HYDRAULIC SYMBOLS



OVERALL DIMENSIONS



K = OR plate

AM.5.VM... / AM.5.VI... MODULAR
MAX. PRESSURE VALVES CETOP 5

AM.5.VM... / AM.5.VI...	
CMP.20...	CH. V PAGE 20
CMP.30...	CH. V PAGE 21
SCREWS AND STUDS	CH. IV PAGE 35

AM.5.VM type pressure regulating valves are available within operating range 7 ÷ 350 bar. Adjustment is by means of a grub screw or a plastic knob. They are three basic versions: **AM.5.VM**, on single A or B lines, and on double A and B lines, with drainage on T; **AM.5.VM.P,** on single P line, with drainage on T; **AM.5.VI,** on single A or B lines, and on double A and B lines, with crossed drainage on either A or B (see hydraulic symbols). Three spring types can be fitted on all versions, with calibrated ranges as shown in the unit specifications.
Piloted operation cartridge type CMP.30 is used on versions AM.5.VM and AM.5.VM.P (see ordering code), while on version AM.5.VI direct acting cartridge type CMP.20 is used instead.

For the minimum permissible setting pressure depending on the spring, see the minimum pressure setting curve.

Max. operating pressure		350 bar
Setting ranges:	spring 1	50 bar
	spring 2	140 bar
	spring 3	350 bar
Max. flow		80 l/min
Hydraulic fluids		Mineral oils DIN 51524
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 $ß_{25}≥75$
Weight AM.5.VM.A/B/P...		2,5 Kg
Weight AM.5.VM.AB...		2,7 Kg
Weight AM.5.VI.A/B...		5,7 Kg
Weight AM.5.VI.AB...		5,9 Kg

ORDERING CODE

AM — Modular valve

5 — CETOP 5/NG10

****** — **VM** = Maximum pressure
VI = Maximum crossline relief

****** — Adjustment on the lines
AM.5.VM Version = **A / B / P / AB**
AM.5.VI Version = **A / B / AB**

***** — Type of adjustment
M = Plastic knob
C = Grub screw

***** — Setting ranges at port A/B/P

CMP 30 (AM.5.VM only)	CMP 20 (AM.5.VI only)	
1 = max. 50 bar	**1** = max.50 bar	**(white spring)**
2 = max. 140 bar	**2** = max. 140 bar	**(yellow spring)**
3 = max. 350 bar	**3** = max. 250 bar	**(green spring)**

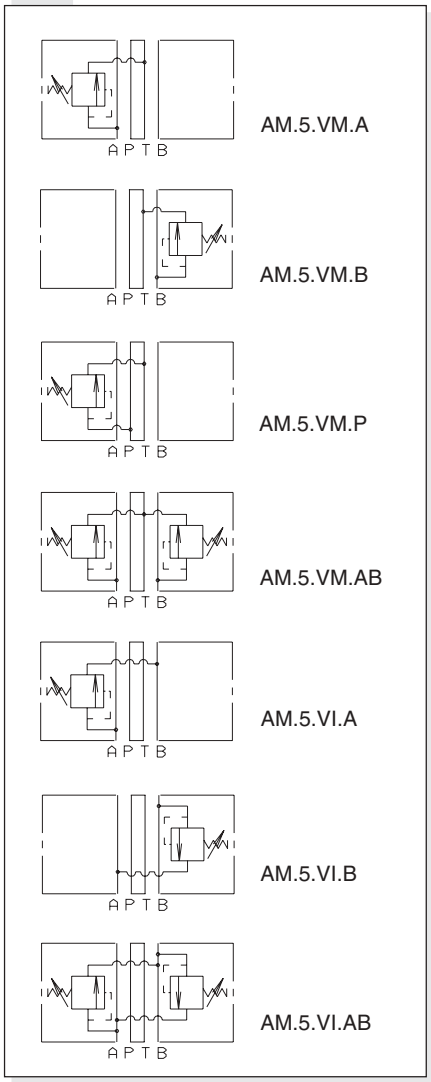
***** — Setting ranges at port B
Omit if the setting is same as that at port A

CMP 30 (AM.5.VM only)	CMP 20 (AM.5.VI only)	
1 = max.50 bar	**1** = max.50 bar	**(white spring)**
2 = max. 140 bar	**2** = max. 140 bar	**(yellow spring)**
3 = max. 350 bar	**3** = max. 250 bar	**(green spring)**

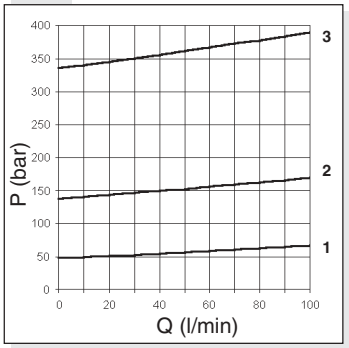
****** — **00** = No variant
V1 = Viton

3 — Serial No.

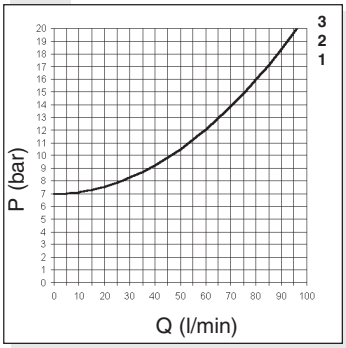
HYDRAULIC SYMBOLS



PRESSURE - FLOW RATE FOR CMP.30

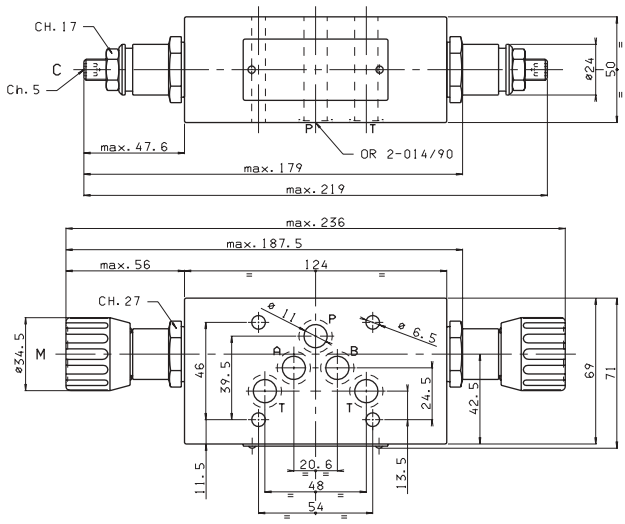


MINIMUM SETTING PRESSURE FOR CMP.30



OVERALL DIMENSIONS

AM.5.VM.AB...

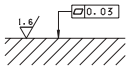


Type of adjustment

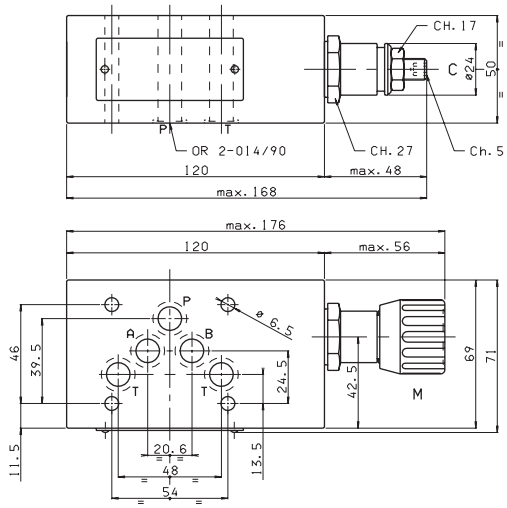
M Plastic knob

C Grub screw

Support plane specifications



AM.5.VM.P...

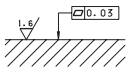


Type of adjustment

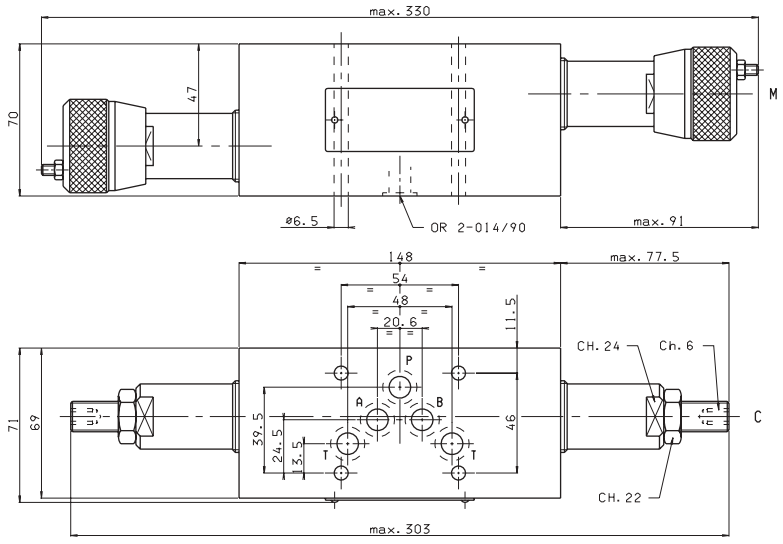
M Plastic knob

C Grub screw

Support plane specifications



AM.5.VI.AB...

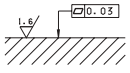


Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



AM.5.UP...

SCREWS AND STUDS CH. IV PAGE 35

AM.5.UP... MODULAR

PILOT OPERATED CHECK VALVES CETOP 5

AM5UP type modular check valves allow free flow in one direction by lifting a conical steel seated poppet, while in the opposite direction the fluid can return by means of a small piston piloted by the other line pressure (piloted side).

The cast valve body allows limited pressure drops during the fluid flow through the various P/A/B/T lines.

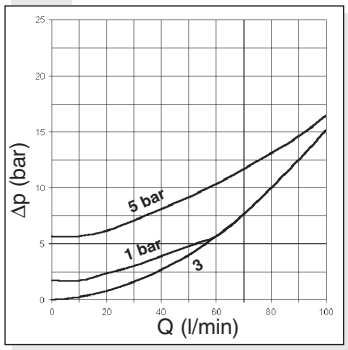
They are available on single A or B lines, and on double A and B lines (see hydraulic symbols).

Max. operating pressure	280 bar
Minimum opening pressure spring 1	1 bar
Minimum opening pressure spring 5	5 bar
Piloting ratio	1 : 14,3
Max. flow	80 l/min
Hydraulic fluids	Mineral oils DIN 51524
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 $ß_{25} \geq 75$
Weight	2,7 Kg

ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
UP	Piloted check valve
**	Control on lines **A / B / AB**
*	Minimum opening pressure **1** = 1 bar **5** = 5 bar
**	**00** = No variant **V1** = Viton
5	Serial No.

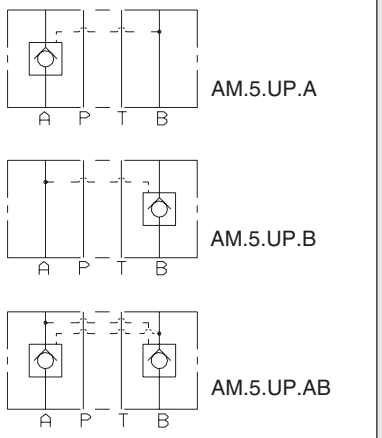
PRESSURE DROPS



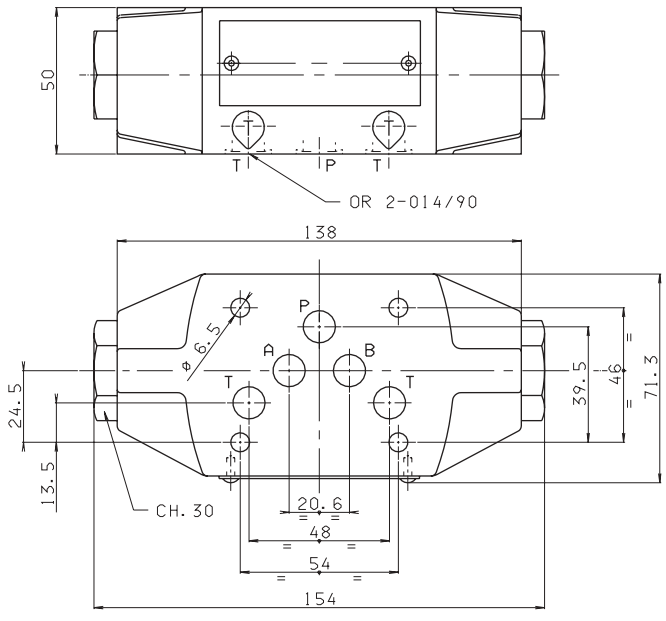
Curve n. 3 = Piloted side flow

The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out a fluid temperature of 50°C.

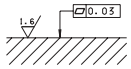
HYDRAULIC SYMBOLS



OVERALL DIMENSIONS



Support plane specifications



AM.5.CP... MODULAR BACK PRESSURE VALVES CETOP 5

AM.5.CP...	
CMP.20...	CH. V PAGE 20
SCREWS AND STUDS	CH. IV PAGE 35

Back pressure valves type AM.5.CP are direct acting damped maximum pressure in-line valves fitted with by-pass non-return valves. They are obtainable within the adjustable range 2 ÷ 250 bar.
Adjustment is by means of a grub screw or a plastic knob, on ports A or B (single), or on AB double.
The cartridge is direct acting type CMP.20.
These valves are especially used on vertical working cylinders with dragging loads.

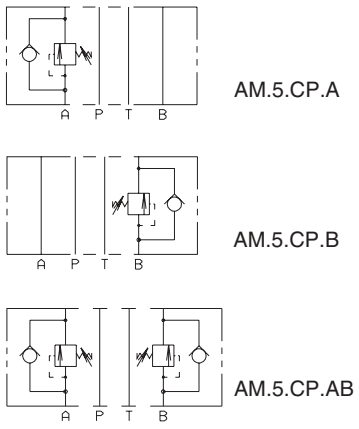
For the minimum permissible setting pressure depending on the spring, see the minimum pressure setting curve

Max. operating pressure		350 bar
Setting ranges:	spring 1	30 bar
	spring 2	140 bar
	spring 3	250 bar
Max. flow		80 l/min
Hydraulic fluids		Mineral oils DIN 51524
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 $ß_{25}≥75$
Weight	AM.5.CP.A/B...	5,3 Kg
Weight	AM.5.CP.AB...	7,2 Kg

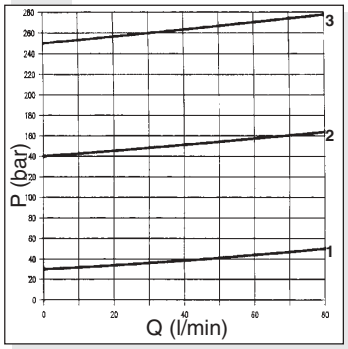
ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
CP	Back pressure valve
**	Control on lines **A / B / AB**
*	Type of adjustment **M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = max. 30 bar **(white spring)** **2** = max. 140 bar **(yellow spring)** **3** = max. 250 bar **(green spring)**
**	**00** = No variant **V1** = Viton
3	Serial No.

HYDRAULIC SYMBOLS

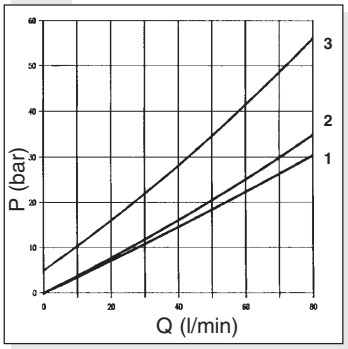


PRESSURE - FLOW RATE

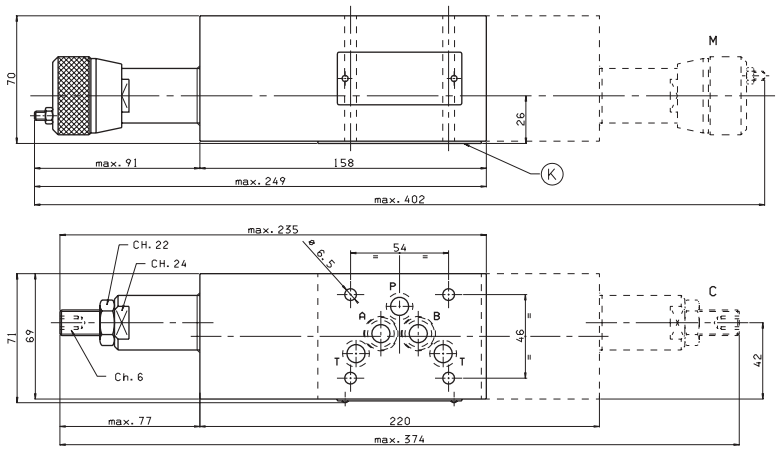


Curves n° 1 - 2 - 3 = setting ranges

MINIMUM SETTING PRESSURE



OVERALL DIMENSIONS



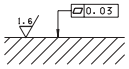
K = OR plate

Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



AM.5.VR... MODULAR PRESSURE REDUCING VALVES WITH RELIEVING - PILOT OPERATED CETOP 5

AM.5.VR...	
CVR.20...	CH. V PAGE 23
SCREWS AND STUDS	CH. IV PAGE 35

These pressure reducing valves ensure a minimum pressure variation on the P or A port with changing flow rate up 90 l/min.

Three spring types allow adjustment with the range 7 ÷ 250 bar.
Manual adjustment is available by a grub screw or plastic knob.

The RELIEVING SYSTEM inside the valve AM.5.VR allows the passage from the setting pressure line to T line of the flow through the valve to avoid the increasing of pressure in the reduced-pressure line by diverting exceeding flow to reservoir.

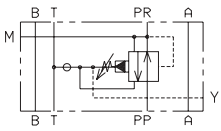
A by pass module with check valve for free flow from A to AR port (see hydraulic symbol) is available.

Max. operating pressure		350 bar
Setting ranges:	spring 1	60 bar
	spring 2	120 bar
	spring 3	250 bar
Maximum allowed Δp pressure between the inlet and outlet pressure		**150 bar**
Max. flow		90 l/min
Draining on port T		0,5 ÷ 0,7 l/min
Hydraulic fluids		Mineral oils DIN 51524
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		3,73 Kg
Weight by-pass version		6,56 Kg

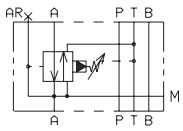
ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
VR	Pilot operated pressure reducing valve with relieving
*	Control on lines **P** = Drain on T **A** = Drain on T **D** = Drain on B reduct pressure on A
*	Drain connection **E** = External (only for control on the P line) **I** = Internal (Standard)
B	Version with by-pass on line A only **Omit if not required**
*	Type of adjustment **M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = max. 60 bar **(white spring)** **2** = max. 120 bar **(yellow spring)** **3** = max. 250 bar **(green spring)**
**	**00** = No variant **V1** = Viton
1	Serial No.

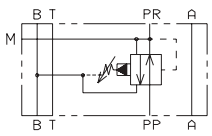
HYDRAULIC SYMBOLS



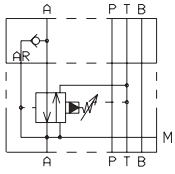
AM.5.VR.P...



AM.5.VR.A...



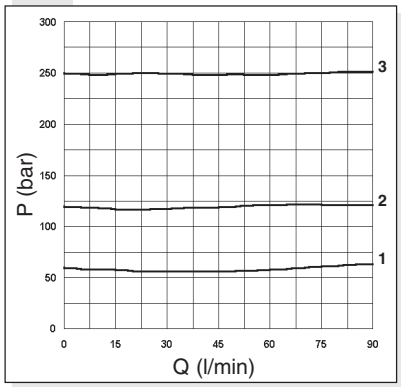
AM.5.VR.D...



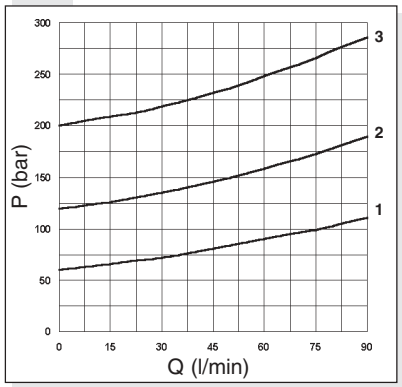
AM.5.VR.A... + Bypass

Version with check valve

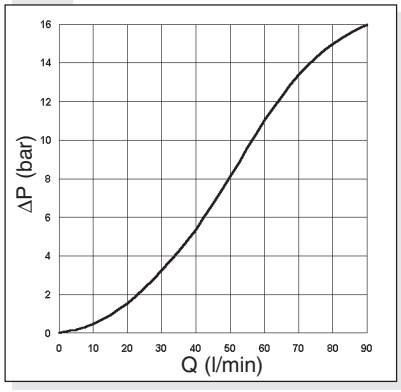
PRESSURE-FLOW RATE



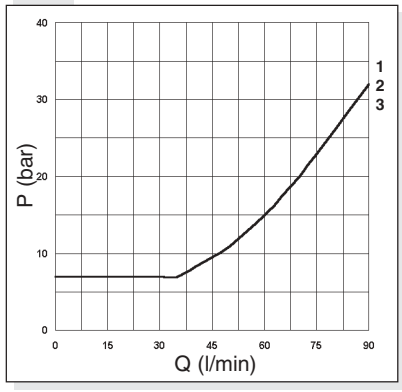
PRESSURE-FLOW OF RELIEVING



ΔP AM.5.VR... + BY-PASS



MINIMUM SETTING PRESSURE



To change valves AM.5.VR.P... from internal to external drainage it is necessary:
- **screw out the plug on the Y port**
- **screw out the plug T.C.E.I. M8x1 from the body**
- **screw in a screw S.T.E.I. M6**
- **rescrew the T.C.E.I. M8x1 plug on the body**

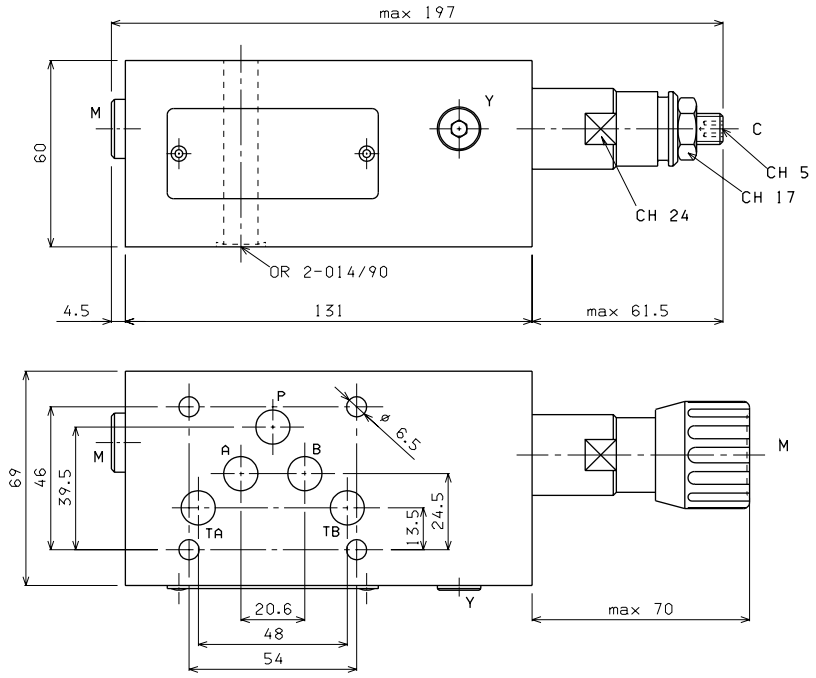
NOTE: the external draining can be used as a piloting line (please, concta our Technical Service for other informations)

Curves n° 1 - 2 - 3 = setting ranges

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 50°C.

OVERALL DIMENSIONS

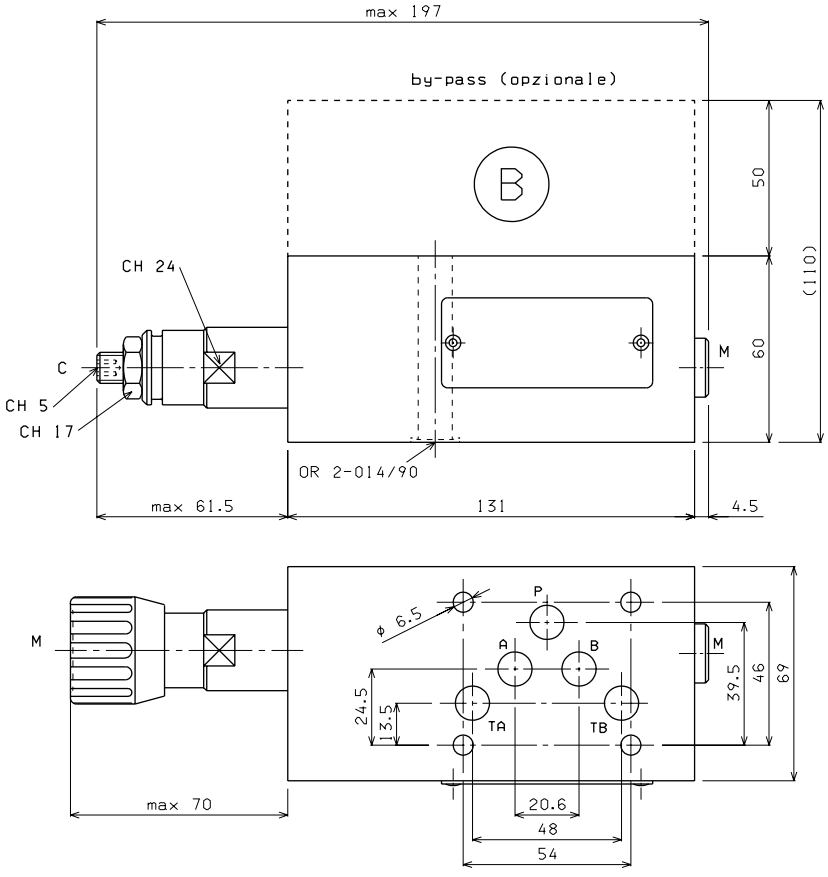
AM.5.VR.P... / AM.5.VR.D...



AM.5.VR.A... + BYPASS

Ⓑ By-pass (optional)

Ordering code:
V89.46.0000
(if ordered separately)

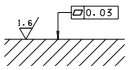


Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



AM.5.VS... MODULAR PRESSURE SEQUENCING VALVES CETOP 5

AM.5.VS...	
CVS.20...	CH. V PAGE 24
SCREWS AND STUDS	CH. IV PAGE 35

The sequence valve are used to assure that a secondary circuit is pressurized when the setting pressure with a changing flow to up 90 l/min (see diagram).

Three spring types allow adjustment within the range 7 ÷ 250 bar.
Manual adjustment is available by a grub screw or plastic knob.

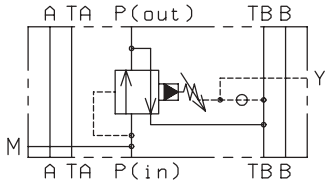
The cartridge used is the "CVS" type.

Max. operating pressure		350 bar
Setting ranges:	spring 1	60 bar
	spring 2	120 bar
	spring 3	250 bar
Max. flow		90 l/min
Draining on port T		0,5 ÷ 0,7 l/min
Hydraulic fluids		Mineral oils DIN 51524
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 $ß_{25}≥75$
Weight		3,73 Kg

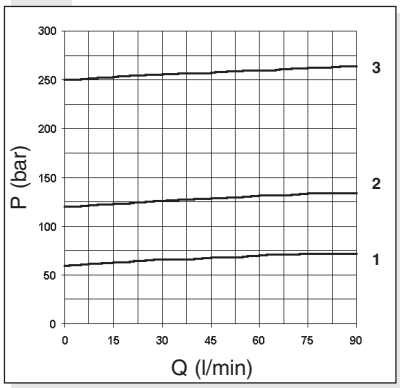
ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
VS	Sequencing valve
*	Drain connection **E** = External **I** = Internal (Standard)
*	Type of adjustment **M** = Plastic knob **C** = Grub screw
*	Setting ranges **1** = max. 60 bar **(white spring)** **2** = max. 120 bar **(yellow spring)** **3** = max. 250 bar **(green spring)**
**	**00** = No variant **V1** = Viton
1	Serial No.

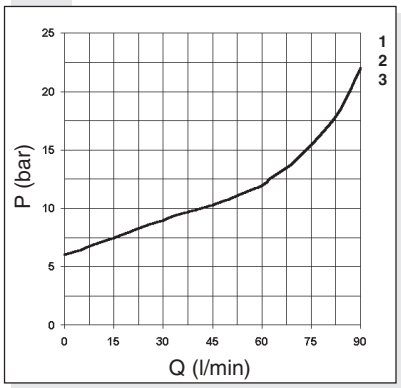
HYDRAULIC SYMBOL



PRESSURE-FLOW RATE



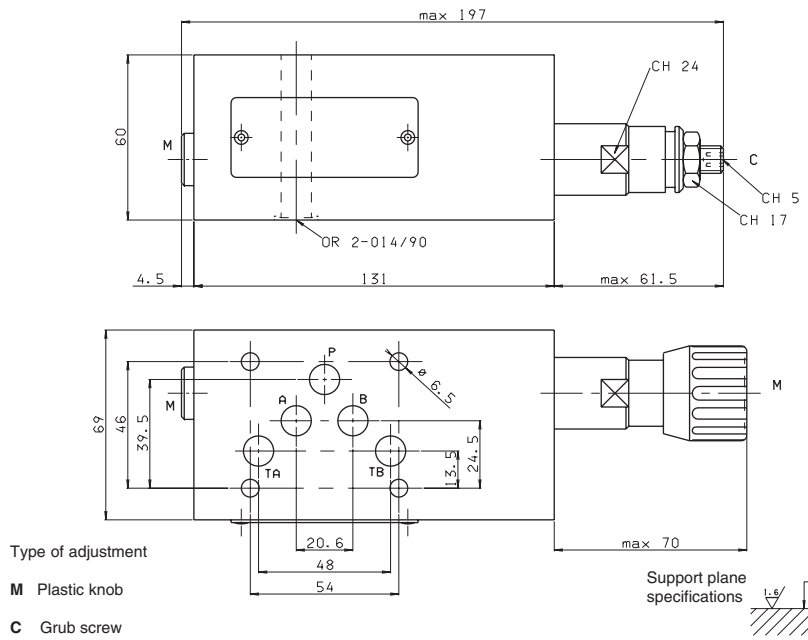
MINIMUM SETTING PRESSURE



Curves n° 1 - 2 - 3 = setting ranges

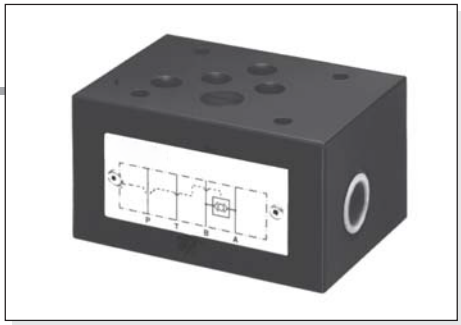
The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out a fluid temperature of 50°C.

OVERALL DIMENSIONS



To change valves AM.5.VS... from internal to external drainage it is necessary:
- screw out the plug on the Y port
- screw out the plug T.C.E.I. M8x1 from the body
- screw in a screw S.T.E.I. M6
- rescrew the T.C.E.I. M8x1 plug on the body

NOTE: the external draining can be used as a piloting line (please, contact our Technical Service for other informations)



AM.5.SH... MODULAR SHUTTLE VALVES CETOP 5

Modular valves type AM.5.SH are actuator load pressure selecting units, as they are fitted with an integral shuttle valve cartridge which allows taking of the highest pressure signal to the external port via displacement of a ball. They are usually employed to signal the actuator load to the pressure compensator of a load sensing pump, or for the command of fail-safe brakes. For seat overall dimensions see cartridge shuttle type SH.03.

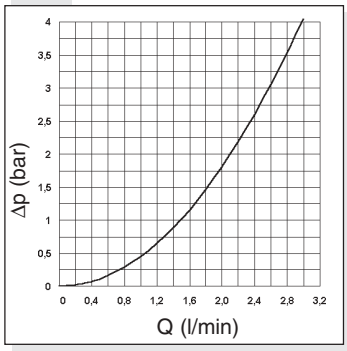
Max. operating pressure	350 bar
Max. flow at the cartridge	3 l/min
Max. flow at ports A/B/P/T	80 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight	2,1 Kg
Cartridge tightening torque	20÷30 Nm/2÷3 Kgm

AM.5.SH...	
SH.03...	CH. V PAGE 16
SCREWS AND STUDS	CH. IV PAGE 35

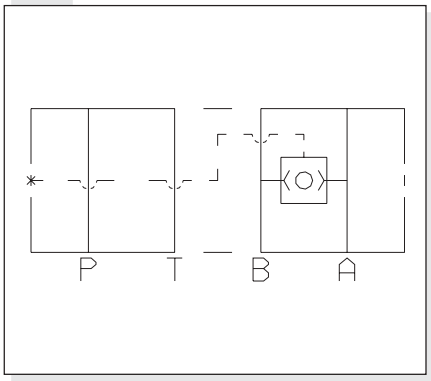
ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
SH	Cartridge shuttle
**	**00** = No variant **V1** = Viton
1	Serial No.

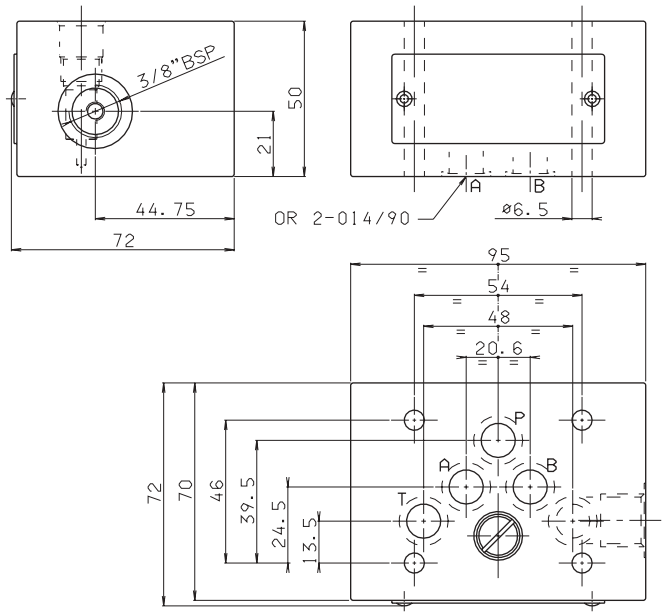
PRESSURE DROPS (ΔP) ON THE SHUTTLE VALVE



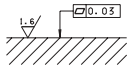
HYDRAULIC SYMBOL

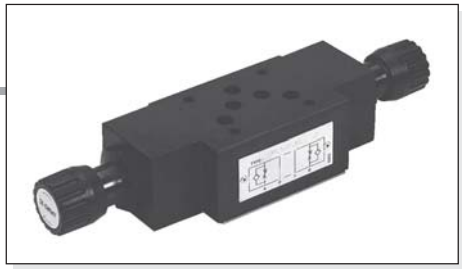


OVERALL DIMENSIONS



Support plane specifications





AM.5.QF...

SCREWS AND STUDS CH. IV PAGE 35

AM.5.QF... MODULAR FLOW REGULATOR CETOP 5

AM.5.QF type one way non-compensated throttle valve are fitted with an O-Ring mounting plate which allows its assembly for either input or output regulation. Adjustment is obtained by means of a grub screw or a plastic knob. They are available in the four regulating configurations shown in the hydraulic diagrams.

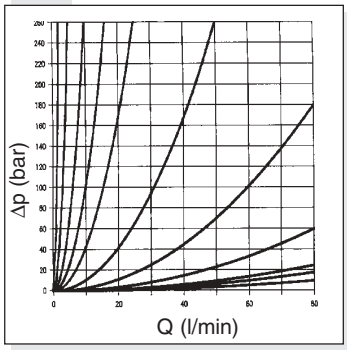
These valves are supplied with related hydraulic scheme. In case of inversion of rated flow direction, turn valve 180° right or left (attention: in this case the label will appear upside down with A and B inverted).

Max. operating pressure	350 bar
Max. pressure adjustable	250 bar
Flow rate regulation	on 9 screw turns
Max. flow	80 l/min
Hydraulic fluids	Mineral oils DIN 51524
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 $ß_{25}≥75$
Weight	3,7 Kg

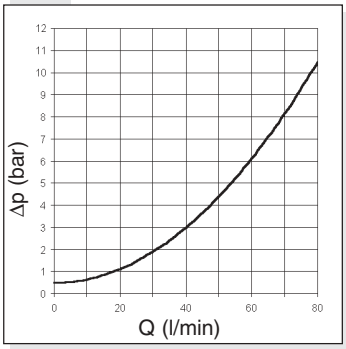
ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
QF	Non compensated throttle valve
******	Control on lines **A / B / P / AB**
*****	Type of adjustment **M** = Plastic knob **C** = Grub screw
******	**00** = No variant **V1** = Viton
4	Serial No.

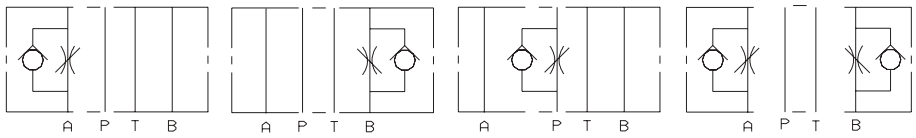
FLOW RATE



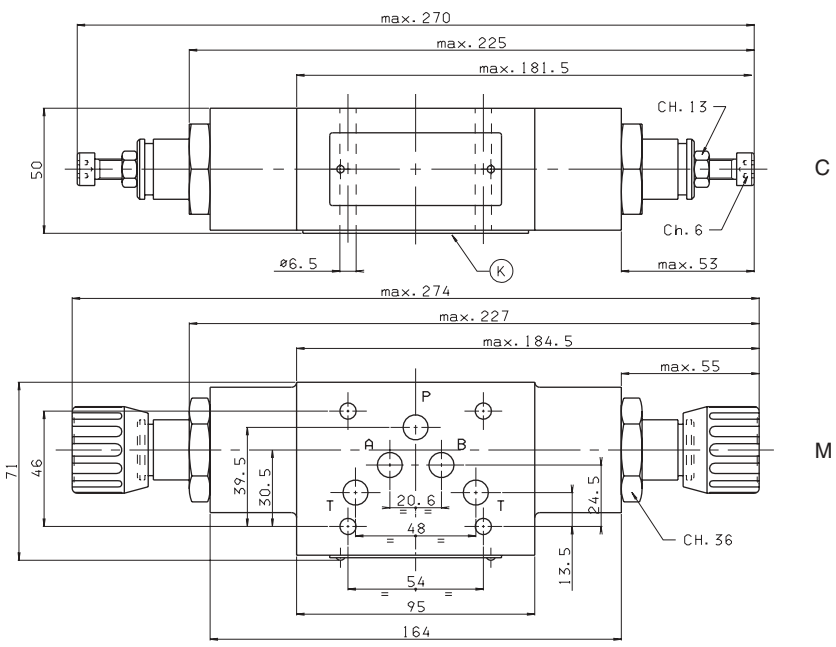
FREE FLOW TOWARDS CHECK VALVE



HYDRAULIC SYMBOLS



OVERALL DIMENSIONS



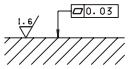
K = OR plate

Type of adjustment

M Plastic knob

C Grub screw

Support plane specifications



AM.88... MODULAR COMPENSATED FLOW CONTROL ASSEMBLY CETOP 5

This is an intermediate block (AM.88) for modular mounting of one or two compensated flow rate regulators QC.3...

The flow regulator type QC32 must be ordered separately.

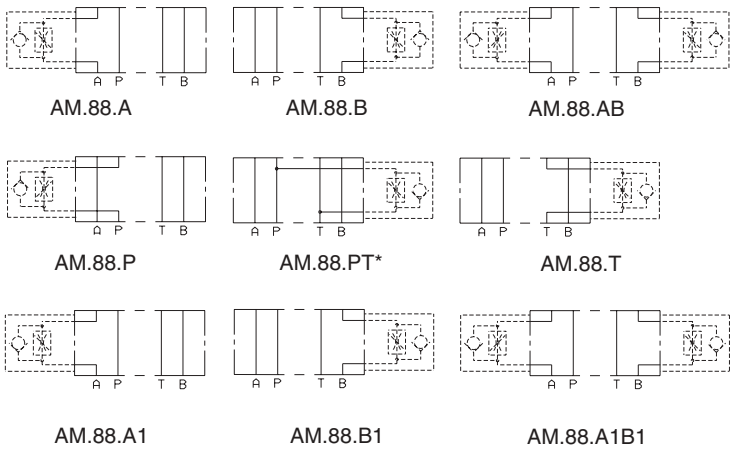
Max. operating pressure	320 bar
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight	2,75 Kg

AM.88...	
QC.3.2...	CH. III PAGE 2
SCREWS AND STUDS	CH. IV PAGE 35

ORDERING CODE

AM	Modular valve
88	Size
******	Control on lines **A / B / P / T / PT* / AB** For A1 / B1 / A1B1 see table "Hydraulic symbols"
******	**00** = No variant **V1** = Viton
3	Serial No.

HYDRAULIC SYMBOLS

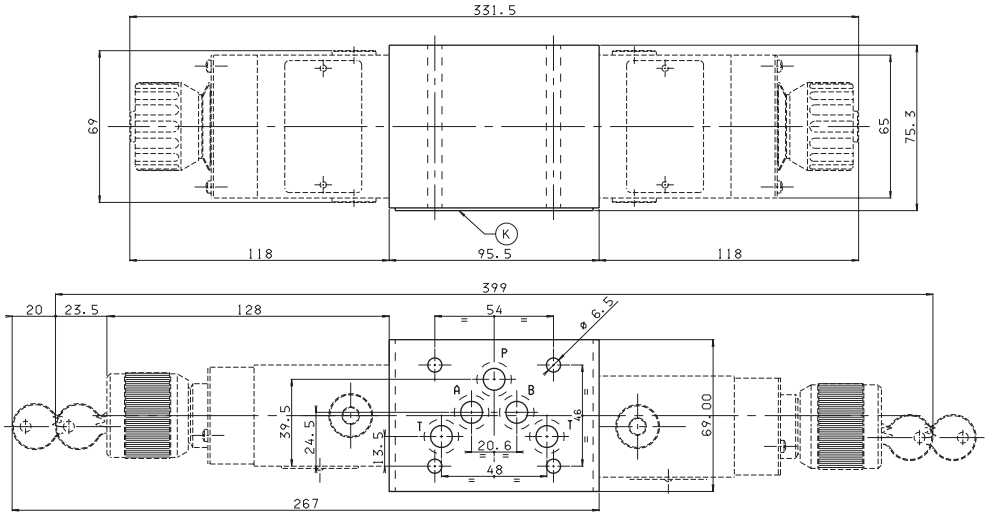


PT * = From line towards exhaust (**P→ T** drain)

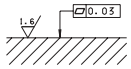
• In order to obtain versions A1, B1 and A1B1 the AM.88.B, AM.88.A or AM.88.AB regulators carrying block should be turned by 180°.

OVERALL DIMENSIONS

K = OR plate



Support plane specifications



A.88... MODULAR FLOW CONTROL VALVES FAST / SLOW ASSEMBLY CETOP 5

This is a modular assembly ON/OFF solenoid valve which, by fitting a suitable 2 way regulator, allows two speed operation in the same system via an electrical changeover command.

The flow rate regulator type QC.3.2 must be ordered separately.
The limit of use curves have been obtained with the regulator fully closed, and those same limits improve gradually with the opening of the regulator.

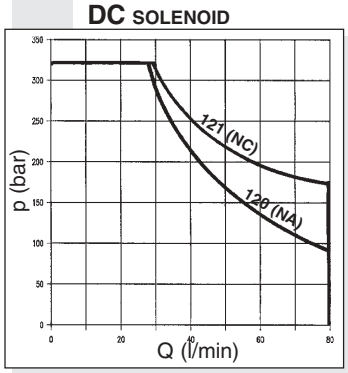
• Solenoids used are standard type A16 for DC voltage.

Max. operating pressure	320 bar
Hydraulic fluids	Mineral oils DIN 51524
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 a DC solenoid	4,2 Kg

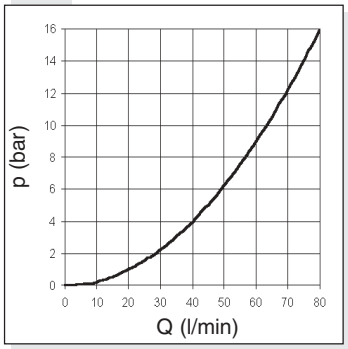
The test have been carried out at operating temperature, with a voltage 10% lower than rated voltage and with a fluid temperature of 50 degrees C. The fluid used was a mineral based oil with a viscosity of 46 mm²/sec at 40 degrees C.

A.88...	
"A16" DC COILS	CH. I PAGE 35
STANDARD CONNECTORS	CH. I PAGE 19
QC.3.2...	CH. III PAGE 2
SCREWS AND STUDS	CH. IV PAGE 35

LIMITS OF USE DC SOLENOID



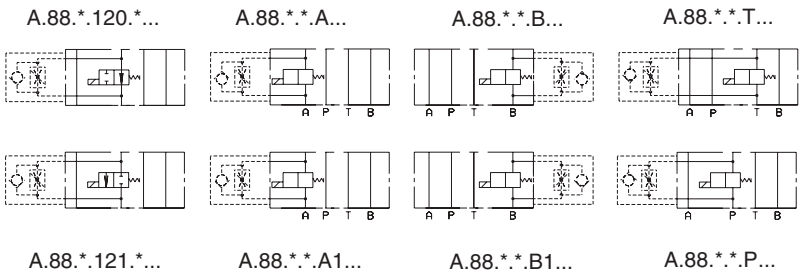
FREE FLOW THROUGH SPOOL



ORDERING CODE

A	Speed control valve
88	Size
E	Electrical operator
***	**120** = Normally open **121** = Normally closed See table "Hydraulic symbols"
*	Control on lines **A/B/P/T** (see symbols) The interface holder "H" must be turned by 180° in order to obtain the **A1** and **B1** versions.
*	Voltage : see tab.1
**	Variants: see tab.2
3	Serial No.

HYDRAULIC SYMBOLS



TAB.1 - A16 COIL

DC VOLTAGE

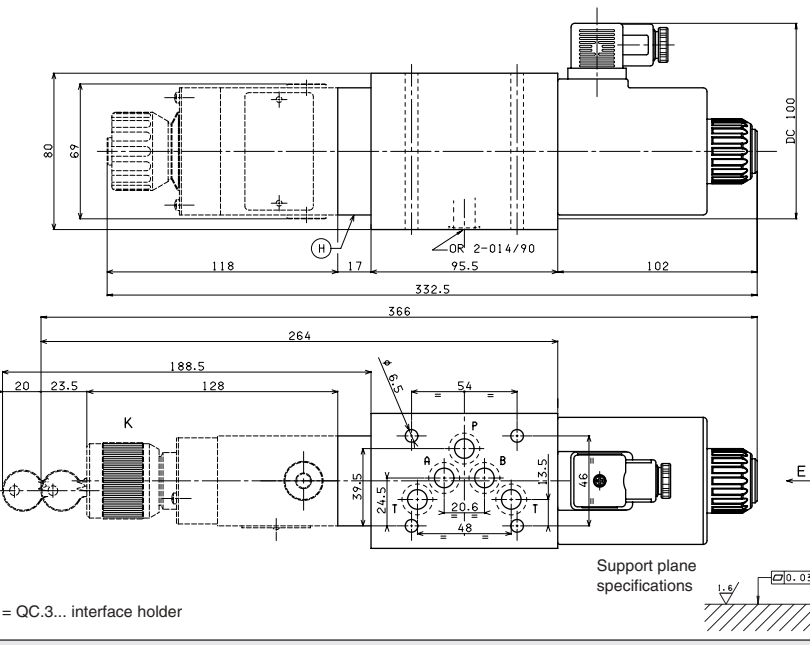
L	12V	115Vac/50Hz 120Vac/60Hz with rectifier
M	24V	
N	48V*	
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	Without DC coil	

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

* Special voltage

TAB.2 - VARIANTS

No variant (connectors as in the drawing)	00
Viton	V1
Indicator light	X1
Rectifier	R1
Cable gland "PG11"	S1
Valve without connector (coil)	S1
Indicator light + rectifier	XR



H = QC.3... interface holder

AM.5.RGT... MODULAR VALVES FOR REGENERATIVE CIRCUIT CETOP 5

This modular system produces a re-generative circuit to increasing the actuator (differential cylinder) exit speed as shown in the diagram. In particular, if a cylinder is used with a 2:1 ratio for operating surfaces, the exit and re-entry speeds are the same.

Max. operating pressure	350 bar
Max. flow at port A/B/P/T	70 l/min
Hydraulic fluids	Mineral oils DIN 51524
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 $ß_{25} \geq 75$
Weight	2,1 Kg

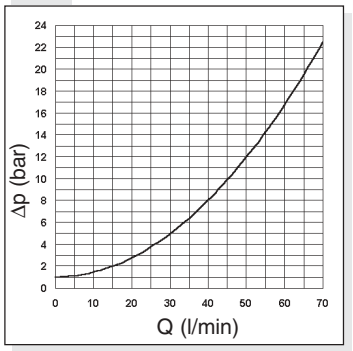
AM.5.RGT...

SCREWS AND STUDS CH. IV PAGE 35

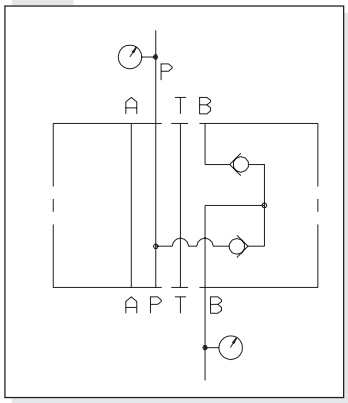
ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
RGT	For regenerative circuit
A	Size of check valves 1/2"BSP
1	Opening pressure 1 bar
******	**00** = No variant **V1** = Viton
1	Serial No.

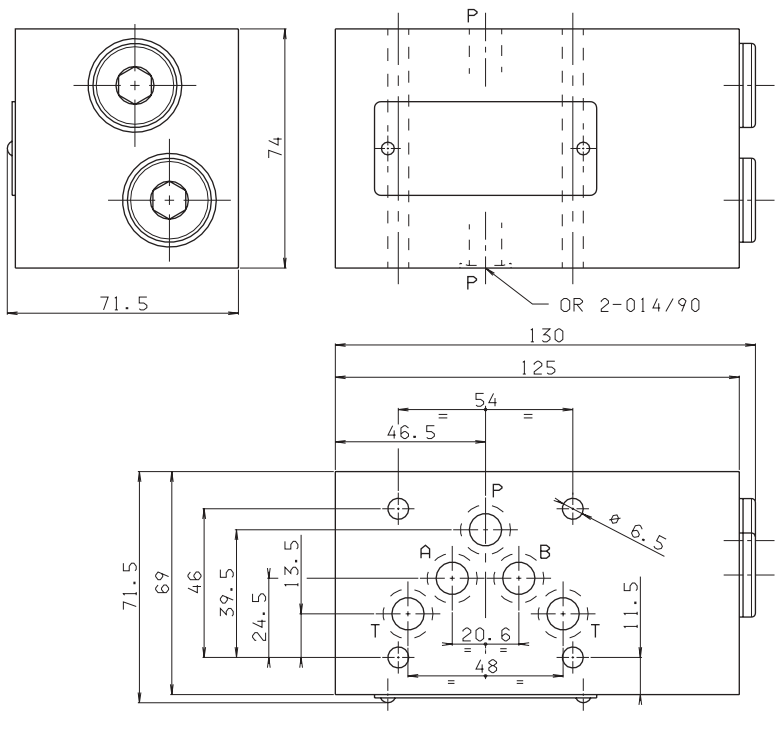
PRESSURE DROPS B→P



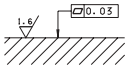
HYDRAULIC SYMBOL



OVERALL DIMENSIONS



Support plane specifications



AM.7.UP...

AM.7.UP... MODULAR

PILOT OPERATED CHECK VALVES CETOP 7

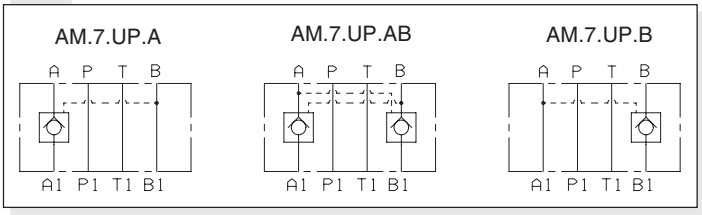
AM.7.UP type modular check valves allow free flow in one direction by lifting a seated poppet, while in the opposite direction the fluid can return by means of a small piston piloted by the other line pressure (piloted side).

The cast valve body allows limited pressure drops during the fluid flow through the various P/A/B/T lines.

They are available on single A or B lines, and on double A and B lines (see hydraulic symbols).

Max. operating pressure	350 bar
Opening pressure	2 bar
Piloting ratio	1 : 11,7
Max. flow	250 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 80°C
Ambient temperature	-20°C ÷ 50°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	7,2 Kg

HYDRAULIC SYMBOLS



ORDERING CODE

AM	Modular valve
7	CETOP 7/NG16
UP	Piloted check valve
******	Control on lines **A / B / AB**
*****	Opening pressure **2** = 2 bar
******	**00** = No variant **V1** = Viton
1	Serial No.

The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out a fluid temperature of 50°C.

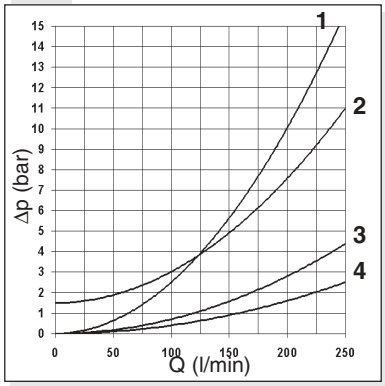
1 = A1→A, B1→B

2 = A→A1, B→B1

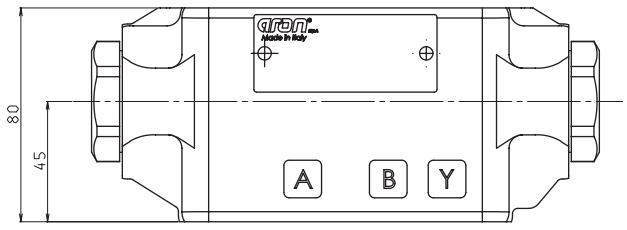
3 = A1→A (AM.7.UP.B), B1→B (AM.7.UP.A)

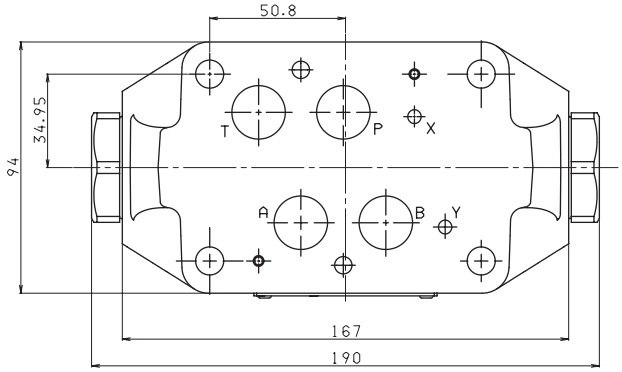
4 = P1→T, T1→P

PRESSURE DROPS ΔP-Q



OVERALL DIMENSIONS



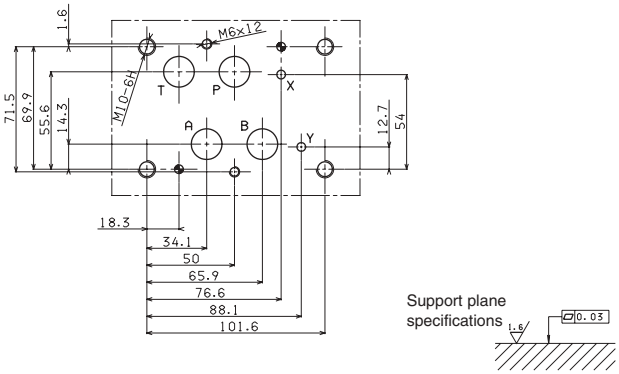


- Valve fixing:
  n° 4 screws T.C.E.I. M10 - Tightening torque 40 Nm
  n° 2 screws T.C.E.I. M6 - Tightening torque 8 Nm

The longer of the screws depends on the type of assembly used.
Fixing screws UNI 5931 with material specifications 12.9

- Seals:
  n° 4 pieces OR 2-118/90SH PARKER (type 130)
  n° 2 pieces OR 2-013/90SH PARKER (type 2043)

CETOP 7 (4.2-4-07) MOUNTING SURFACE



AM.7.QF...

AM.7.QF... MODULAR FLOW REGULATOR CETOP 7

AM.7.QF type one way non-compensated throttle valve are fitted with an O-Ring mounting plate which allows its assembly for either input or output regulation. Adjustment is obtained by means of a grub screw. They are available in the three regulating configurations shown in the hydraulic diagrams.

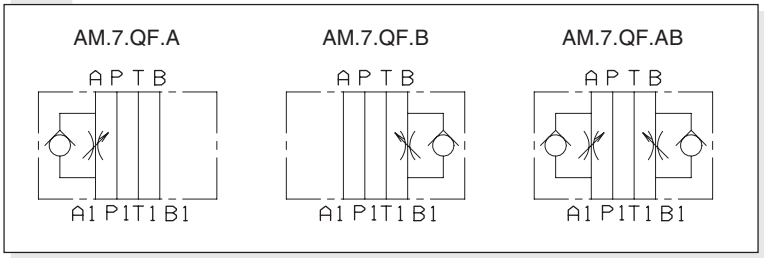
All configurations have a built in check valve that allows reserve free flow.

Max. operating pressure	350 bar
Flow rate regulation	on 10 screw turns
Max. flow	250 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 80°C
Ambient temperature	-20°C ÷ 50°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight AM.7.QF for A or B versions	7,35 Kg
Weight AM.7.QF for AB version	7,7 Kg

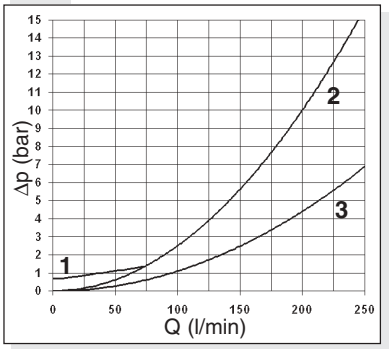
ORDERING CODE

AM	Modular valve
7	CETOP 7/NG16
QF	Non compensated throttle valve
******	Control on lines **A** = meter out control on line **A** **AB** = meter out control on lines **A** and **B** **B** = meter out control on line **B**
*****	Type of adjustment **M** = Plastic knob **C** = Grub screw
******	**00** = No variant **V1** = Viton
1	Serial No.

HYDRAULIC SYMBOLS



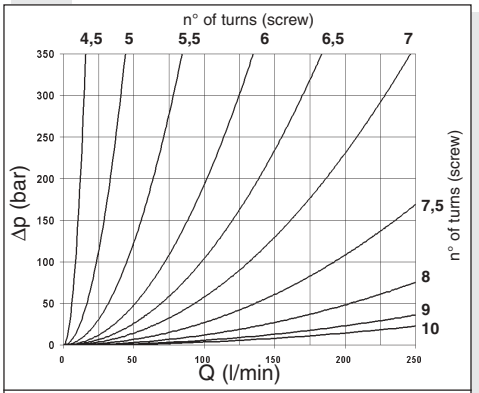
PRESSURE DROPS Δp-Q



1 = Regulator closed A→A1 / B→B1
2 = Regulator open A→A1 / B→B1
3 = Without regulator A→A1 (AM.7.QF.B)
B→B1 (AM.7.QF.A)

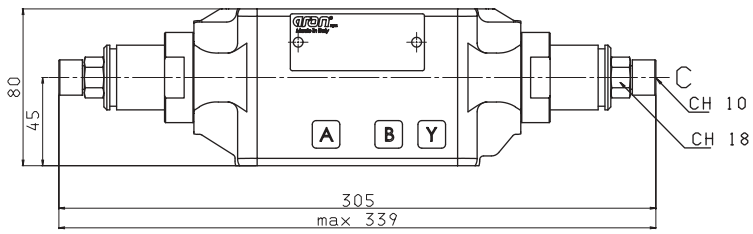
The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out a fluid temperature of 50°C.

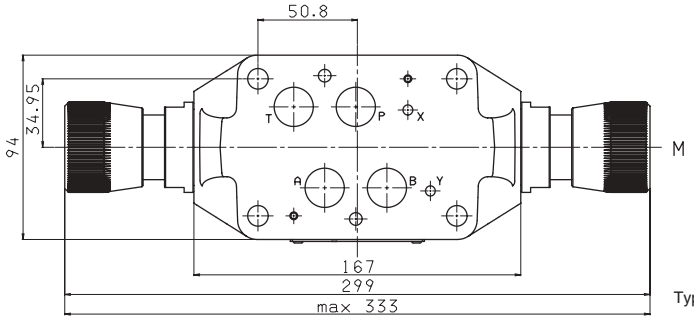
REGULATED FLOW RATE



Regulated flow rate depending on No. of turns: from **4,5** to **10** turns (unscrewing).

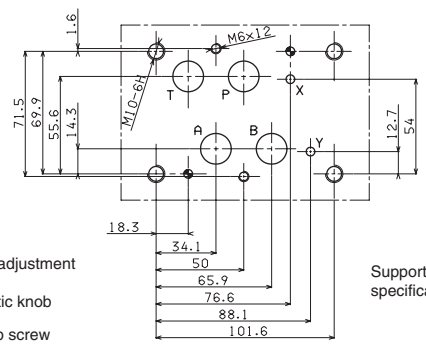
OVERALL DIMENSIONS





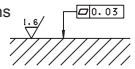
- Valve fixing:
  n° 4 screws T.C.E.I. M10 - Tightening torque 40 Nm
  n° 2 screws T.C.E.I. M6 - Tightening torque 8 Nm
  The longer of the screws depends on the type of assembly used.
  Fixing screws UNI 5931 with material specifications 12.9.
- Seals:
  n° 4 pieces OR 2-118/90SH PARKER (type 130)
  n° 2 pieces OR 2-013/90SH PARKER (type 2043)

CETOP 7 (4.2-4-07) MOUNTING SURFACE



Type of adjustment
M Plastic knob
C Grub screw

Support plane specifications



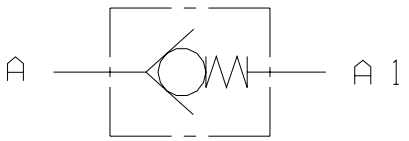
VR... IN LINE MOUNTING
ONE-WAY CHECK VALVES

VR...

Single-acting check valves type VR.., allow free fluid flow in one direction while blocking in the opposite direction, ensuring at the same time no blow-by thanks to a guided conical shutter.
The body of these valves is zincked yellow steel made, while their conical shutter is manufactured in heat-treated steel.

Max. operating pressure	350 bar
Standard opening pressure	0,5 bar
Max. flow	310 l/min
Hydraulic fluid	Mineral oils DIN 51524
Fluid viscosity	2.8 ÷ 380 mm²/s
Fluid temperature	-20°C ÷ 80°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight	See table below

HYDRAULIC SYMBOL

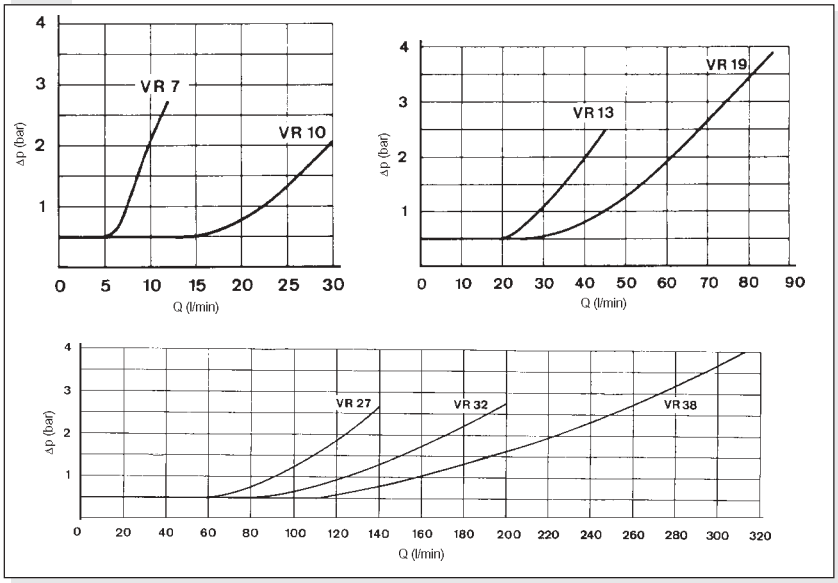


ORDERING CODE

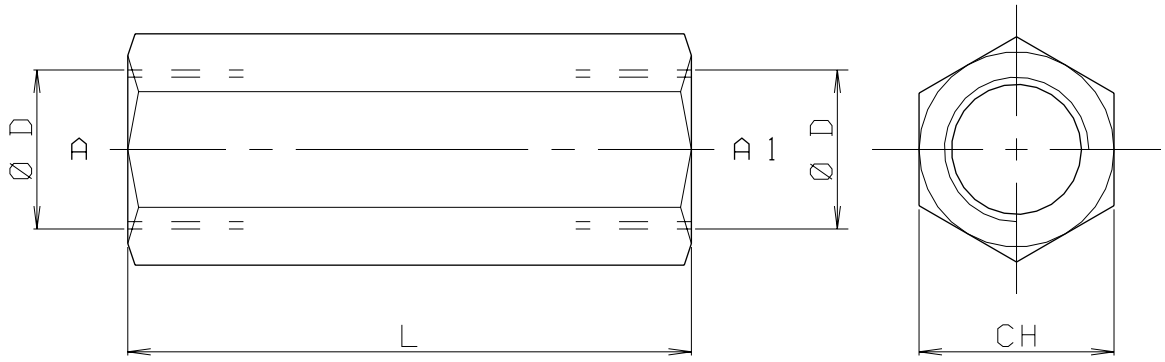
VR	Check valve
**	Size **07** **10** **13** **19** **27** **32** **38**
*	Opening pressure **1** = 0.5 bar (standard) **3** = 5 bar **4** = 10 bar
00	No variant
1	Serial No.

Test carried out with mineral based oil with a viscosity of 24 mm²/s at 50°C

PRESSURE DROPS - FLOW



OVERALL DIMENSIONS



Valve type	Max flow (l/min)	Pressure max. (bar)	L	CH	D	Weight (Kg)
VR07	12	350	62	19	1/4"BSP	0.10
VR10	30	350	68	24	3/8"BSP	0.17
VR13	45	350	78	27	1/2"BSP	0.22
VR19	85	300	88	36	3/4"BSP	0.45
VR27	140	250	112	46	1"BSP	0.97
VR32	200	250	142	55	1"1/4 BSP	1.68
VR38	310	210	155	60	1"1/2 BSP	2.10

VRS... IN LINE MOUNTING

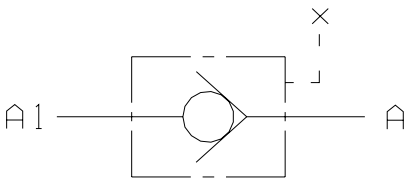
SIMPLE ACTING PILOTED CHECK VALVES

VRS...

Direct simple piloted check valves type VRS.. allow free flow in one direction but by using their external piloting feature it is also possible to obtain fluid flow in the direction opposite to that of the free flow.
When the piloting line has no pressure these valves fulfil the normal one-way check valve function. A guided conical shutter blocks the fluid flow in the opposite direction ensuring no blow-by. The body of these valves is zincked yellow steel made, while their conical shutter is manufactured in heat-treated steel.

Max. operating pressure	350 bar
Standard opening pressure	0,5 bar
Piloting ratio	See table below
Max. flow	85 l/min
Hydraulic fluid	Mineral oils DIN 51524
Fluid viscosity	2.8 ÷ 380 mm²/s
Fluid temperature	-20°C ÷ 70°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	See table below

HYDRAULIC SYMBOL

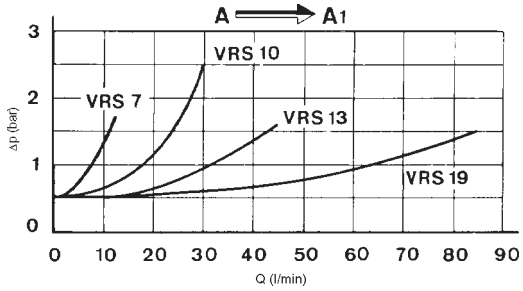


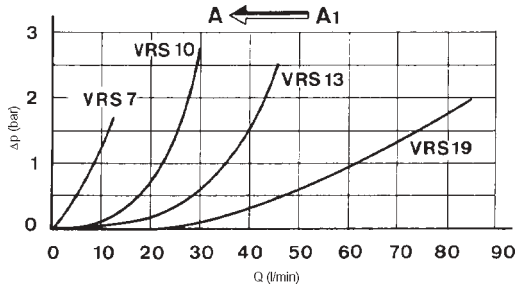
ORDERING CODE

VRS	Simple acting piloted check valve
**	Size **07** **10** **13** **19**
1	Opening pressure 0.5 bar (standard)
00	No variant
1	Serial No.

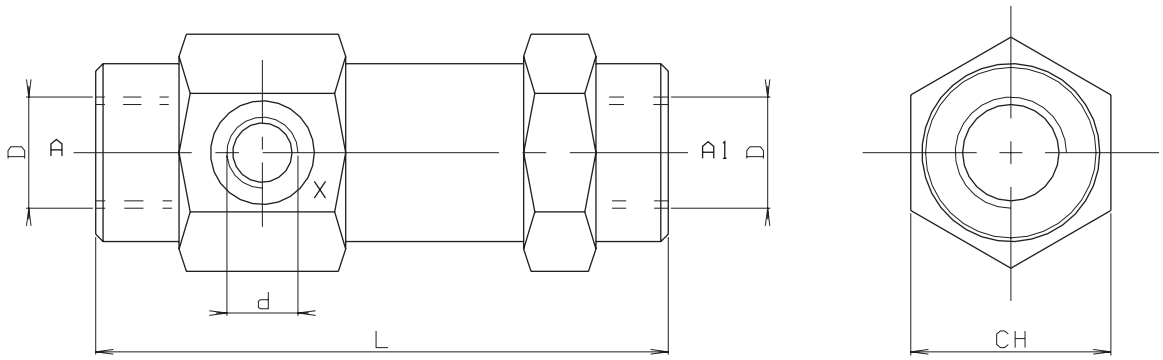
Test carried out with mineral based oil with a viscosity of 24 mm²/s at 50°C

PRESSURE DROPS - FLOW





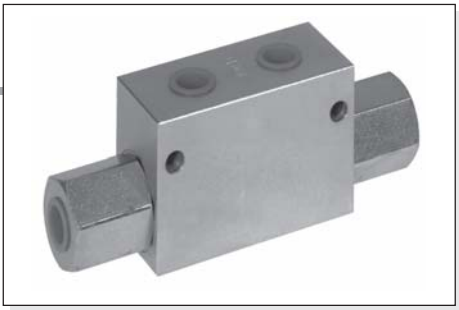
OVERALL DIMENSIONS



Valve type	Max flow (l/min)	Max Pressure (bar)	L	CH	Piloting Ratio	d	D	Weight (Kg)
VRS07	12	350	103	36	1 : 9	1/4"BSP	1/4"BSP	0.65
VRS10	30	310	109	40	1 : 6	1/4"BSP	3/8"BSP	0.82
VRS13	45	310	120	42	1 : 4,5	1/4"BSP	1/2"BSP	0.96
VRS19	85	300	131	55	1 : 3,7	1/4"BSP	3/4"BSP	1.95

VRD... IN LINE MOUNTING

DOUBLE ACTING PILOTED CHECK VALVES



VRD...

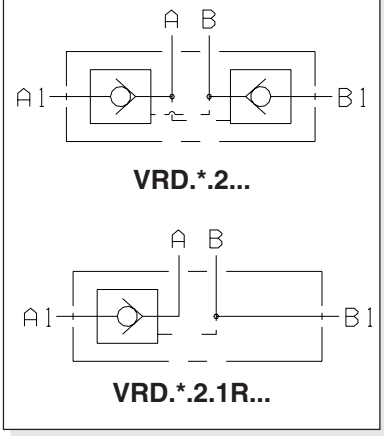
Piloted double check valves type VRD.. can be hydraulically unblocked via an internal small piloting piston. They are used in those hydraulic systems where it is necessary to block an actuator and to make would tend to modify its position. Fluid flow in the A→A1 direction allows the small piloting piston to open the check function on port B1, thus allowing B1→B free flow. By directing the fluid flow B→B1 the opposite function is obtained. The body of these valves is zincked yellow steel made, while their conical shutter is manufactured in heat-treated steel.

Max. operating pressure	350 bar
Standard opening pressure	2 bar
Piloting ratio	See table below
Max. flow	85 l/min
Hydraulic fluid	Mineral oils DIN 51524
Fluid viscosity	2.8 ÷ 380 mm²/s
Fluid temperature	-20°C ÷ 70°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25}≥75$
Weight	See table below

ORDERING CODE

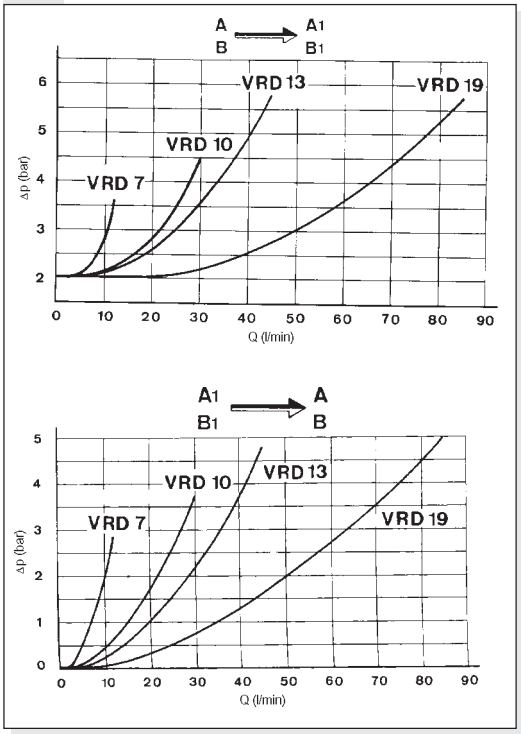
VRD	Double acting piloted check valve
**	Size **07** **10** **13** **19**
2	Opening pressure 2 bar (standard)
1R	With one check valve only (omit if not required)
00	No variant
1	Serial No.

HYDRAULIC SYMBOLS

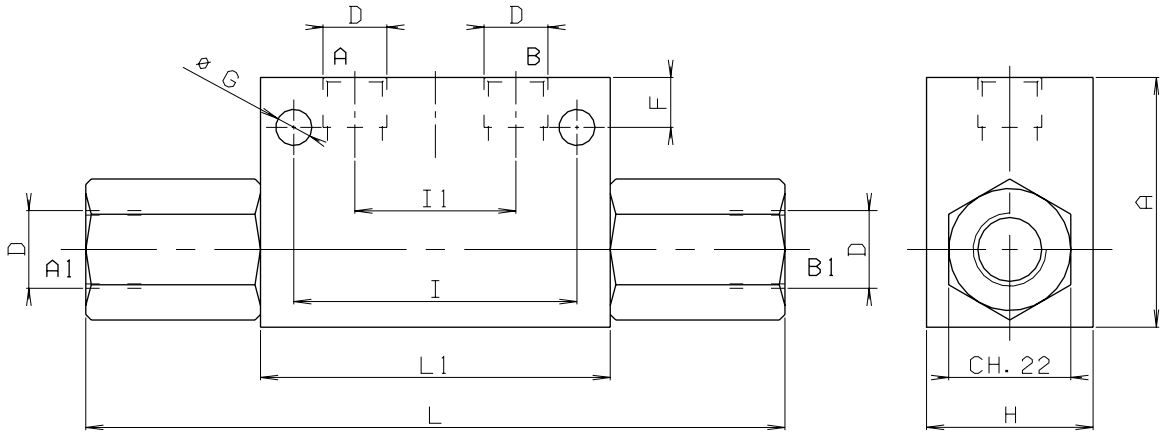


Test carried out with mineral based oil with a viscosity of 24 mm²/s at 50°C

PRESSURE DROPS - FLOW



OVERALL DIMENSIONS



Valve type	Max flow (l/min)	Max Pressure (bar)	L	L1	Piloting ratio	D	I1	I	F	G	H	A	Weight (Kg)
VRD07	12	350	126	63	1 : 4	1/4"BSP	29	51	9	6.5	30	45	0.65
VRD10	30	300	158	90	1 : 6	3/8"BSP	40	75	17	8	40	60	1.75
VRD13	45	300	174	90	1 : 4	1/2"BSP	40	75	17	8	40	60	1.78
VRD19	85	280	212	120	1 : 3,6	3/4"BSP	60	104	16	9	50	70	3.25

QFU... IN LINE MOUNTING

ONE-WAY FLOW CONTROL VALVES

QFU...

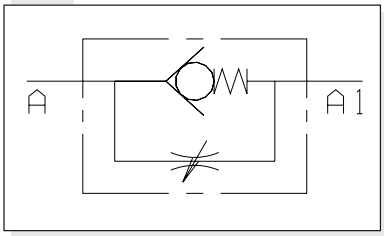
One-way adjustable flow regulating type QFU.. allow free flow in one direction by means of a check valve while controlling it in the opposite direction. Their operation depends on the fluid pressure and viscosity.
Flow regulation is obtained by turning a knurled knob, which permits control of the flow rate via a graduated scale from which it can be read. The special needle configuration allows an a easy and precise control.
The body of these valves is zincked yellow steel made, while the internal components are manufactured in heat-treated steel. Their particular construction permits both panel and in-line mounting.

Max. operating pressure	300 bar
Standard opening pressure	0,5 bar
Max. flow	85 l/min
Hydraulic fluid	Mineral oils DIN 51524
Fluid viscosity	2.8 ÷ 380 mm²/s
Fluid temperature	-20°C ÷ 70°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	See table below

ORDERING CODE

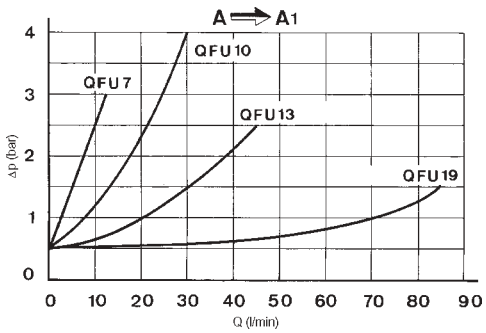
QFU	One-way flow control valve
**	Size **07** **10** **13** **19**
1	Opening pressure 0.5 bar (standard)
G	Fixing ring nut (omit if not required)
00	No variant
1	Serial No.

HYDRAULIC SYMBOL

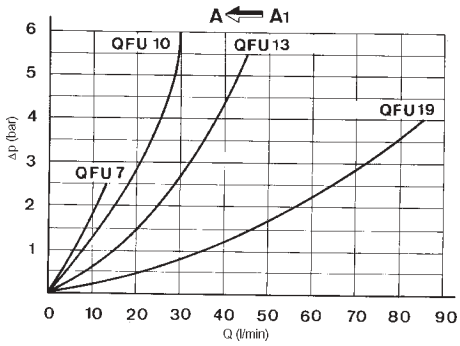


Test carried out with mineral based oil with a viscosity of 24 mm²/s at 50°C

PRESSURE DROPS - FLOW



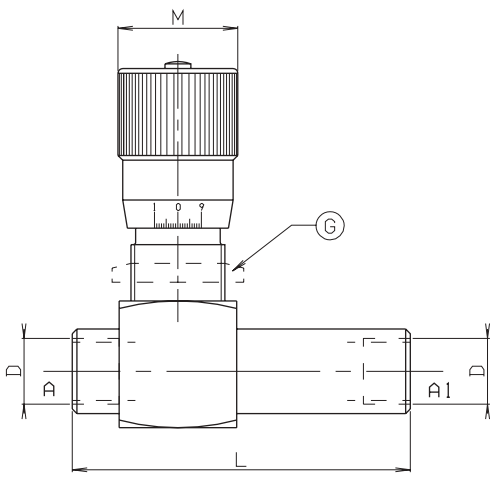
THROTTLE COMPLETELY CLOSED

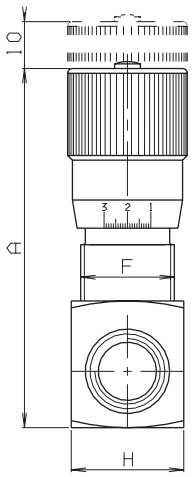


THROTTLE COMPLETELY OPEN

OVERALL DIMENSIONS

G = Fixing ring nut on request





Valve type	Max flow (l/min)	Max. pressure (bar)	L	A	D	M	H	F	Weight (Kg)
QFU07	12	300	72	80	1/4"BSP	25	25	M20x1	0.25
QFU10	30	300	78	85	3/8"BSP	32	30	M25x1.5	0.42
QFU13	45	280	92	92	1/2"BSP	35	35	M30x1.5	0.60
QFU19	85	250	106	105	3/4"BSP	40	45	M35x1.5	1.10

QFB... IN LINE MOUNTING

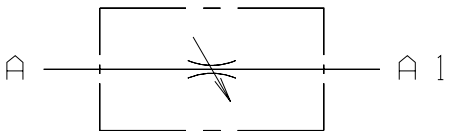
TWO-WAY FLOW CONTROL VALVES

QFB...

Two-way adjustable flow regulating type QFB.. allow flow in both directions. Their operation depends on the fluid pressure and viscosity.
Flow regulation is obtained by turning a knurled knob, which permits control of the flow rate via a graduated scale from which it can be read. The special needle configuration allows an a easy and precise control.
The body of these valves is zincked yellow steel made, while the internal components are manufactured in heat-treated steel. Their particular construction permits both panel and in-line mounting.

Max. operating pressure	300 bar
Max. flow	85 l/min
Hydraulic fluid	Mineral oils DIN 51524
Fluid viscosity	2.8 ÷ 380 mm²/s
Fluid temperature	-20°C ÷ 70°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	See table below

HYDRAULIC SYMBOL

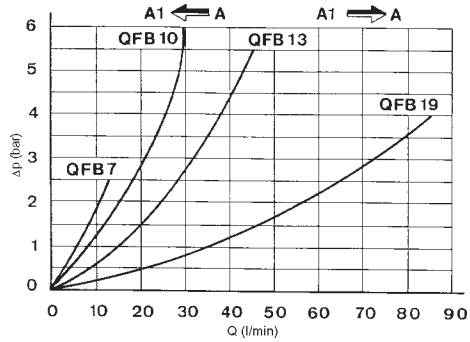


ORDERING CODE

QFB	Two-way flow control valve
**	Size **07** **10** **13** **19**
G	Fixing ring nut (omit if not required)
00	No variant
1	Serial No.

Test carried out with mineral based oil with a viscosity of 24 mm²/s at 50°C

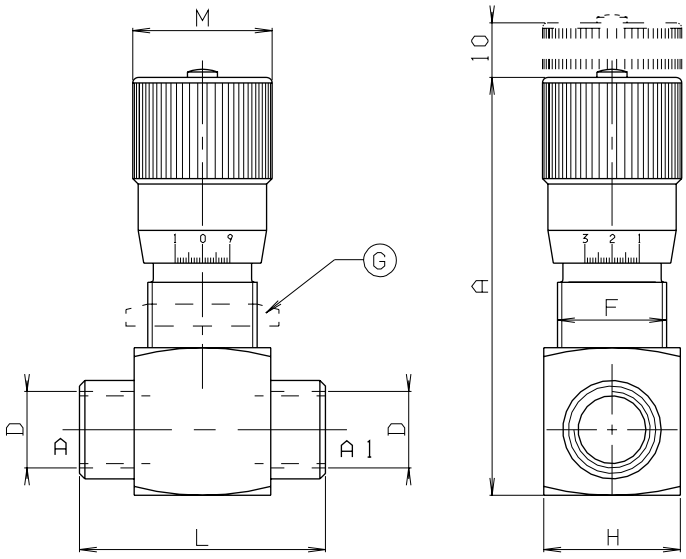
PRESSURE DROPS - FLOW



THROTTLE COMPLETELY OPEN

OVERALL DIMENSIONS

G = Fixing ring nut on request



Valve type	Max flow (l/min)	Max. pressure (bar)	L	A	D	M	H	F	Weight (Kg)
QFB07	12	300	45	80	1/4"BSP	25	25	M20x1	0.21
QFB10	30	300	52	85	3/8"BSP	32	30	M25x1.5	0.35
QFB13	45	280	60	92	1/2"BSP	35	35	M30x1.5	0.50
QFB19	85	250	68	105	3/4"BSP	40	45	M35x1.5	0.87

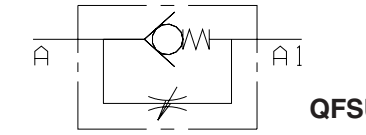
QFSU... QFSB... IN LINE MOUNTING

FLOW CONTROL VALVES

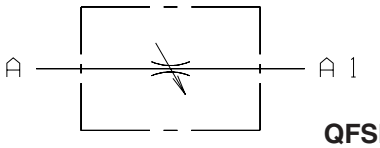
QFSU... / QFSB...

Two-way adjustable flow regulating valves type QFSU / QFSB allow flow in both directions. Their operation depends on the fluid pressure and viscosity. Flow regulation is obtained by turning a knurled knob, which is provided with a mechanical clamp to ensure holding of the set value even in the presence of system vibrations. The special needle configuration allows an a easy and precise control. The body of these valves is zincked yellow steel made, while the internal components are manufactured in heat-treated steel. Their particular construction permits both panel and in-line mounting.

Max. operating pressure	300 bar
Standard opening pressure (For QFSU only)	0,5 bar
Max. flow	40 l/min
Hydraulic fluid	Mineral oils DIN 51524
Fluid viscosity	2.8 ÷ 380 mm²/s
Fluid temperature	-20°C ÷ 70°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight	See table below



QFSU



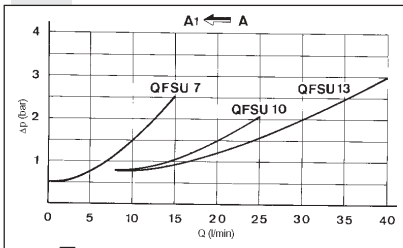
QFSB

ORDERING CODE

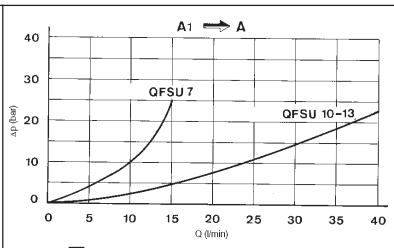
QFS	Flow control valve
*	**U** = One-way valve **B** = Two-way valve
**	Size **07** **10** **13**
1	Opening pressure 0.5 bar (standard) (for QFSU version only, omit for QFSB version)
00	No variant
1	Serial No.

Test carried out with mineral based oil with a viscosity of 24 mm²/s at 50°C

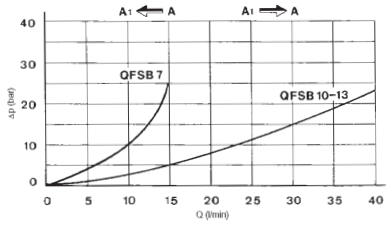
PRESSURE DROPS - FLOW



THROTTLE COMPLETELY CLOSED

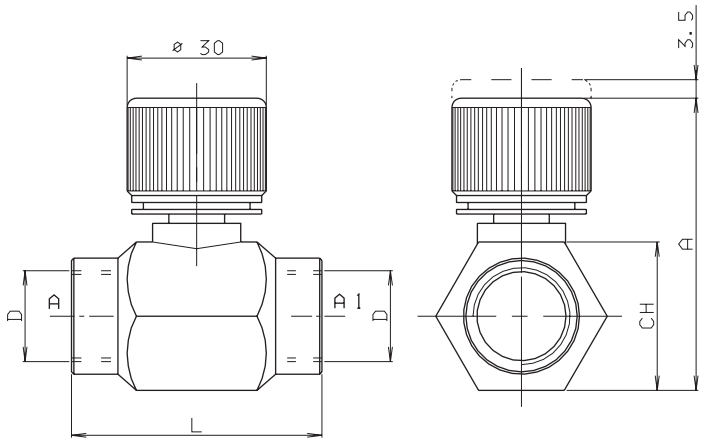


THROTTLE COMPLETELY OPEN



THROTTLE COMPLETELY OPEN

OVERALL DIMENSIONS



Valve type	Valve type	Max flow (l/min)	Max. pressure (bar)	L	A	D	CH	Weight (Kg)
QFSU07	QFSB07	15	300	54	64	1/4"BSP	32	0.30
QFSU10	QFSB10	25	300	62	64	3/8"BSP	32	0.31
QFSU13	QFSB13	40	280	62	64	1/2"BSP	32	0.31

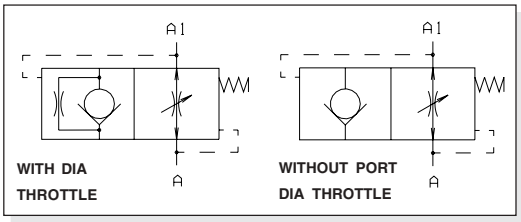
VPF... / VPM...

VPF / VPM... IN LINE MOUNTING

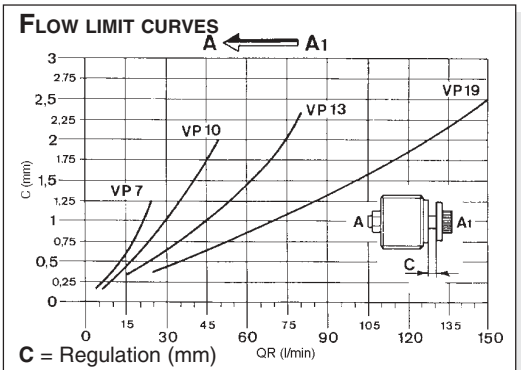
ONE-WAY CHECK VALVES

One-way check valves type VP.. are mounted directly onto the cylinder ports to prevent uncontrolled load drop in case of hydraulic system failure. A disc supported in the raised position by a spring allows A→ A1 free flow. Under normal conditions reverse flow A1→A takes place as usual, but should the reverse (reaction) flow rate go beyond the value set for the valve, the disc will position itself in such a way as to interrupt completely or partially the A1 →A a flow. Total or partial A1 →A flow shut-off is ensured in the first case by a nearly perfect disk seal on the valve seat, which allows the load blocking in the position it happens to be at the moment of failure. In the second case, on the other hand, a choked opening provided on the disk allows for a blow-by to take place in the direction A1→A, such as to make the load drop slowly. These valves are manufactured in heat-treated steel.

Max. operating pressure	350 bar
Max. flow	150 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	2.8 ÷ 380 mm²/s
Fluid temperature	-30°C ÷ 80°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	See table below



FLOW LIMIT CURVES



C = Regulation (mm)
QR = Reaction flux (l/min)

ORDERING CODE

VP*	**F** = Check valve with internal thread **M** = Check valve with internal/external thread
**	Size**: 07 / 10 / 13 / 19**
*	Reaction flow setting (l/min) see Table 1 **Omit for setting standard (*)** **A / B / C / D / E / F / G / H**
**	Ø throttle port dia - see Table 2 (omit if not required) **05** = 0.5 mm **08** = 0.8mm **10** = 1 mm **15** = 1.5 mm **20** = 2 mm
00	No variant
1	Serial No.

For the correct use it is advisable to carry out adjustment "C" so that the reaction flow is 1.5 times the flow rate of the system.

For "VP"one-way cartridge check valves, see Chapter V.

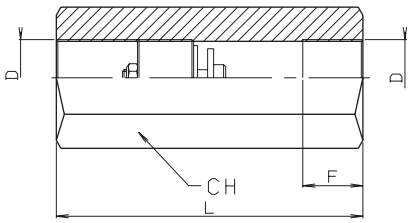
TABLE 1 - REACTION FLOW SETTINGS (l/min)

Valve type	A	B	C	D	E	F	G	H
VP*07	4	6	10	16	25*			
VP*10	6	10	16	25	40	50*		
VP*13	16	25	40	50	60	80*		
VP*19	25	40	50	60	80	100	125	150*

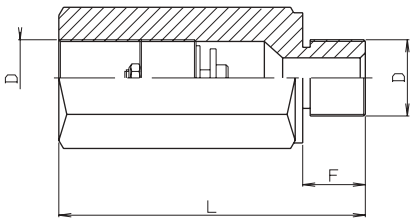
(*)Standard setting if is omit the code

TABLE 2	Ø THROTTLE PORT DIA REQUEST				
Valve type	D	Ø	Ø	Ø	Ø
VP07	1/4"BSP	0.5	0.8	1	
VP10	3/8"BSP	0.5	0.8	1.2	1.5
VP13	1/2"BSP	0.5	0.8	1.2	1.5
VP19	3/4"BSP	0.5	1.2	1.5	2

OVERALL DIMENSIONS



Valve type	L	F	D	CH	Weight (Kg)
VPF07	48	12	1/4"BSP	19	0.075
VPF10	52	12	3/8"BSP	22	0.097
VPF13	62	14	1/2"BSP	27	0.160
VPF19	72	16	3/4"BSP	36	0.350



Valve type	L	F	D	CH	Weight (Kg)
VPM07	50	12	1/4"BSP	19	0.075
VPM10	58	12	3/8"BSP	22	0.105
VPM13	70	14	1/2"BSP	27	0.185
VPM19	78	16	3/4"BSP	36	0.365

BS.2... SINGLE STATION SUBPLATE

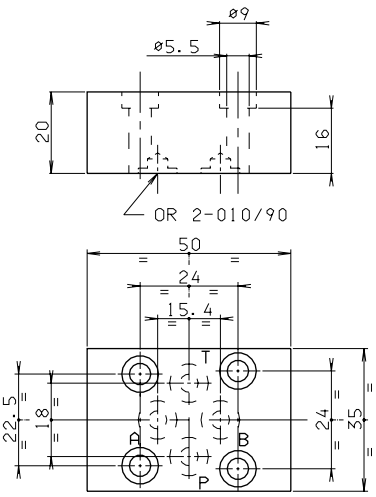
CETOP 2 SUBPLATES	
BS.2.**.../ BS.2.12...	
BS.2.14...	CH. VII PAGE 2
BS.2.16... / BS.2.20...	
BS.3.2...	CH. VII PAGE 3
BC.2.50.AB... / BC.2.50.PT...	
BC.2.51...	CH. VII PAGE 4
BM.2.**.../ BM.2.60...	
	CH. VII PAGE 5
BM.2.50... / BM.2.70...	
	CH. VII PAGE 6
CMP.02...	CH. V PAGE 17

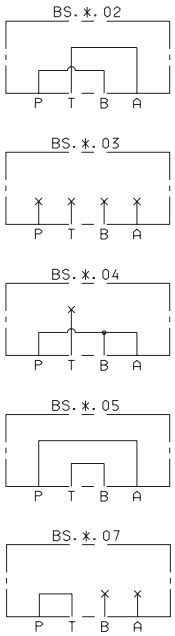
BS.2.**...

BS	Single subplate (blanking)
2	CETOP 2/NG4
**	**02 / 03 / 04 / 05 / 07**
00	No variant
1	Serial No.

Weight: 0,09 Kg

Fixing screws
M5x25 UNI 5931



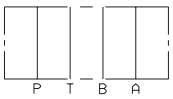


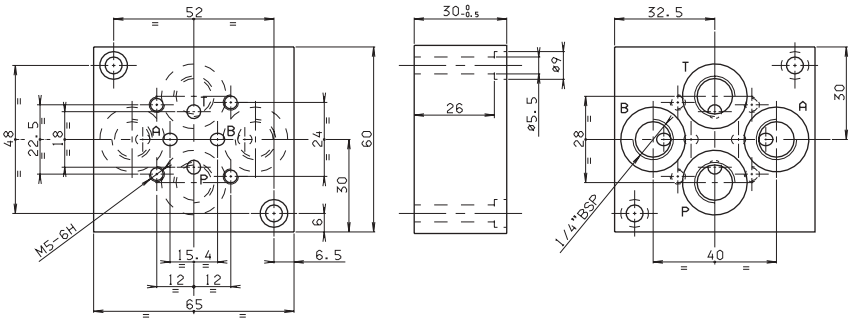
BS.2.12 (REAR CONNECTORS)

BS	Single subplate
2	CETOP 2/NG4
12	1/4" BSP rear connectors
00	No variant
1	Serial No.

Weight: 0,3 Kg

Fixing screws M5x35 UNI 5931



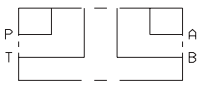


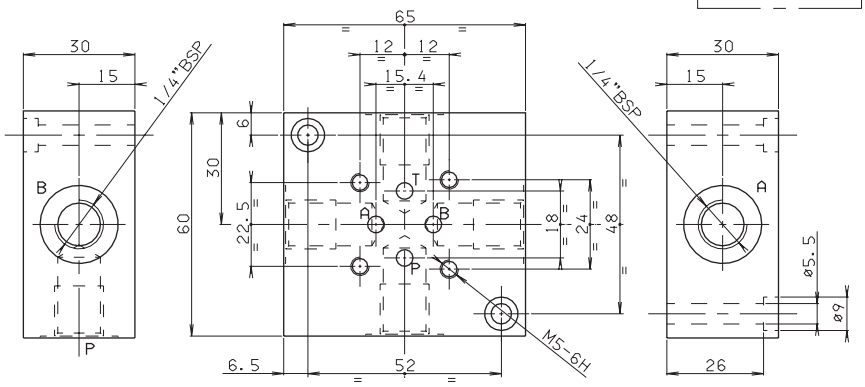
BS.2.14 (SIDE CONNECTORS)

BS	Single subplate
2	CETOP 2/NG4
14	1/4" BSP side connectors
00	No variant
1	Serial No.

Weight: 0,3 Kg

Fixing screws M5x35 UNI 5931



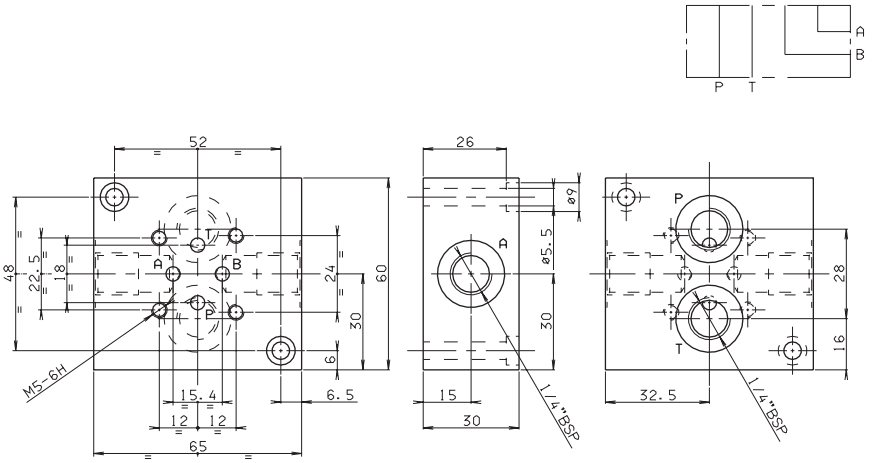


BS.2.16 (CONNECTORS SIDE A AND B, REAR P AND T)

BS	Single subplate
2	CETOP 2/NG4
16	1/4" BSP rear and side connectors
00	No variant
1	Serial No.

Weight: 0,3 Kg

Fixing screws M5x35 UNI 5931

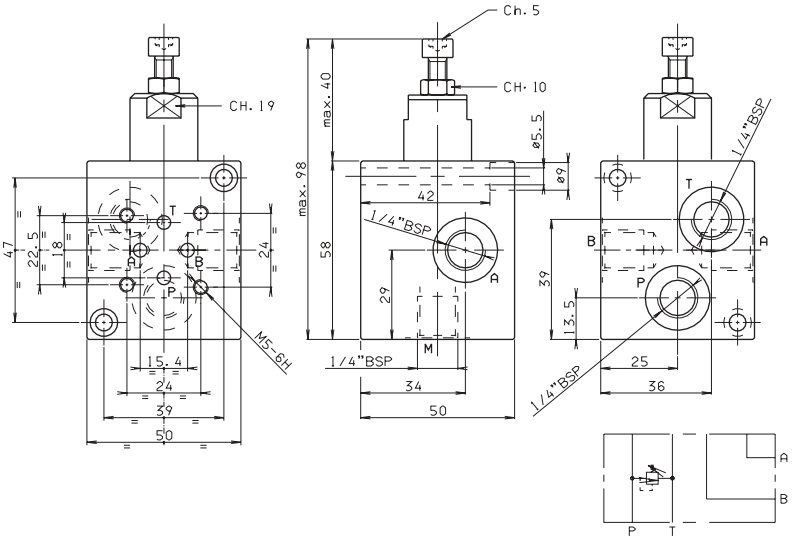


BS.2.20 (CONNECTORS SIDE A AND B, REAR P AND T)

BS	Single subplate
2	CETOP 2/NG4
20	1/4" BSP rear and side connectors
C	Type of adjustment grub screws
*****	Setting ranges **1** = max. 30 bar **(white spring)** **2** = max. 90 bar **(yellow spring)** **3** = max. 180 bar **(green spring)** **4** = max. 250 bar **(orange spring)**
******	**00 =** No variant **V1** = Viton
1	Serial No.

Weight: 0,45 Kg

Fixing screws M5x50 UNI 5931



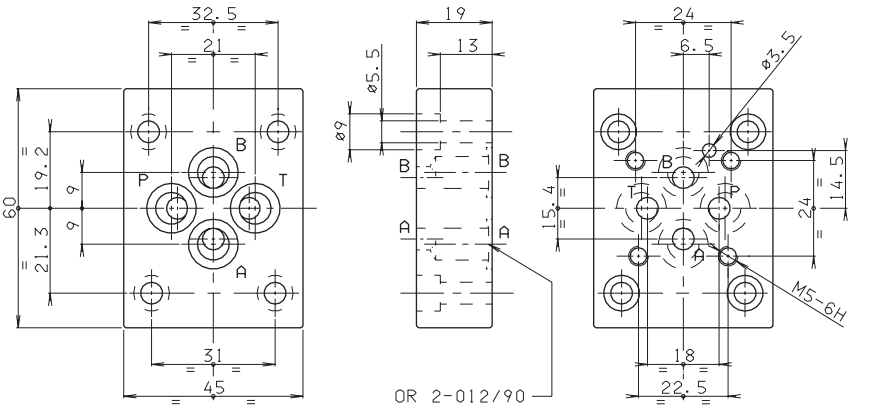
• The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.02...

BS.3.2 (REDUCTION PLATE FROM CETOP 3/NG6 TO CETOP 2/NG4)

BS	Single subplate
3	CETOP 3/NG6
2	CETOP 2/NG4
00	No variant
1	Serial No.

Weight: 0,12 Kg

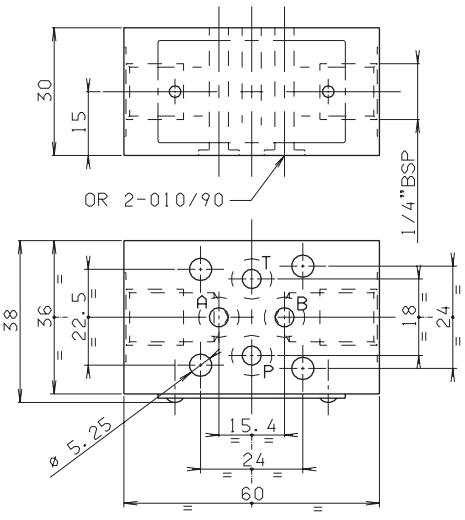
Fixing screws M5x20 UNI 5931

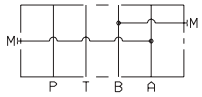


BC.2.50.AB INTERMEDIATE MODULE FOR PRESSURE GAUGE CONNECTION (VENTS A AND B LINES)

BC	Module base
2	CETOP 2/NG4
50	Intermediate module for pressure gauge connection
AB	Check at ports A and B
00	No variant
1	Serial No.

Weight: 0,4 Kg

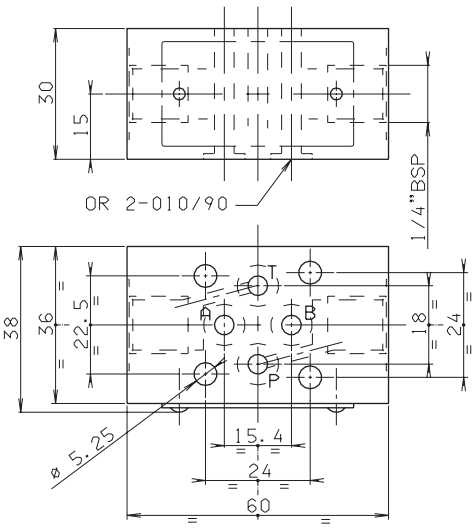


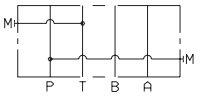


BC.2.50.PT INTERMEDIATE MODULE FOR PRESSURE GAUGE CONNECTION (VENTS P AND T LINES)

BC	Module base
2	CETOP 2/NG4
50	Intermediate module for pressure gauge connection
PT	Check at ports P and T
00	No variant
1	Serial No.

Weight: 0,4 Kg

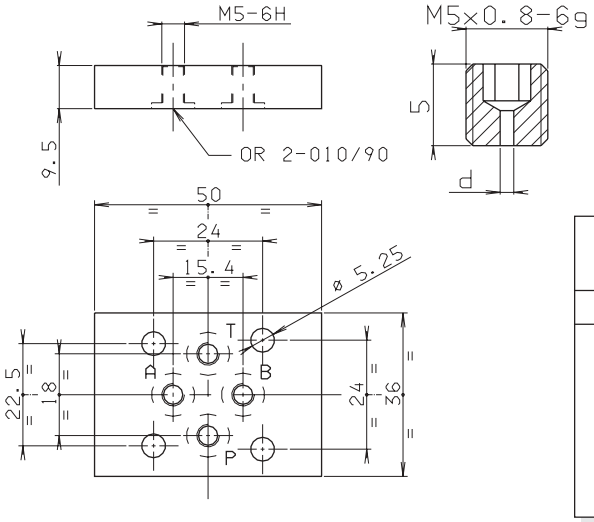


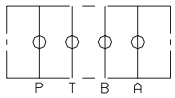


BC.2.51 DOWEL CARRIER PLATE FOR SOLENOID VALVE

BC	Module base
2	CETOP 2/NG4
51	Dowel carrier plate for solenoid valve
00	No variant
1	Serial No.

Weight: 0,05 Kg





CALIBRATED DIAPHRAGMS AVAILABLE

d	M5x0.8x5
0.5	M89.10.0044
0.6	M89.10.0045
0.7	M89.10.0046
0.8	M89.10.0015
0.9	M89.10.0047
1	M89.10.0048
1.2	M89.10.0049

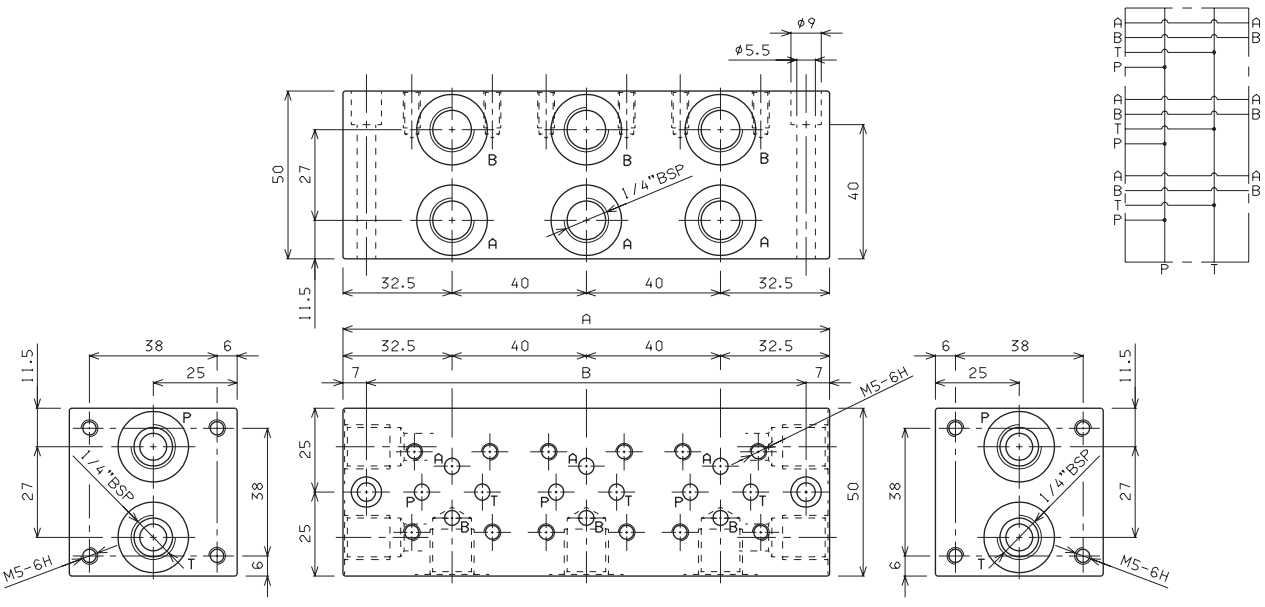
BM.2.50/60/70

BM	Multi station subplate (supplied in aluminium material)
2	CETOP 2/NG4
**	**50** = Connected in parallel with pressure relief valve and rear connectors **70** = Connected in parallel with pressure relief valve and side connectors **60** = Connected in parallel without pressure relief valve and side connectors
*	No. of valve seats **2 / 3 / 4 / 5 / 6 / 7 / 8**
C	Type of adjustment (omit for 60 version) Grub screw
*	Setting range (omit for 60 version) **1** = max. 30 bar **(white spring)** **2** = max. 90 bar **(yellow spring)** **3** = max. 180 bar **(green spring)** **4** = max. 250 bar **(orange spring)**
**	**00 =** No variant **V1** = Viton
1	Serial No.

• The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.02...

BM.2.60 CONNECTED IN PARALLEL WITHOUT PRESSURE RELIEF VALVE

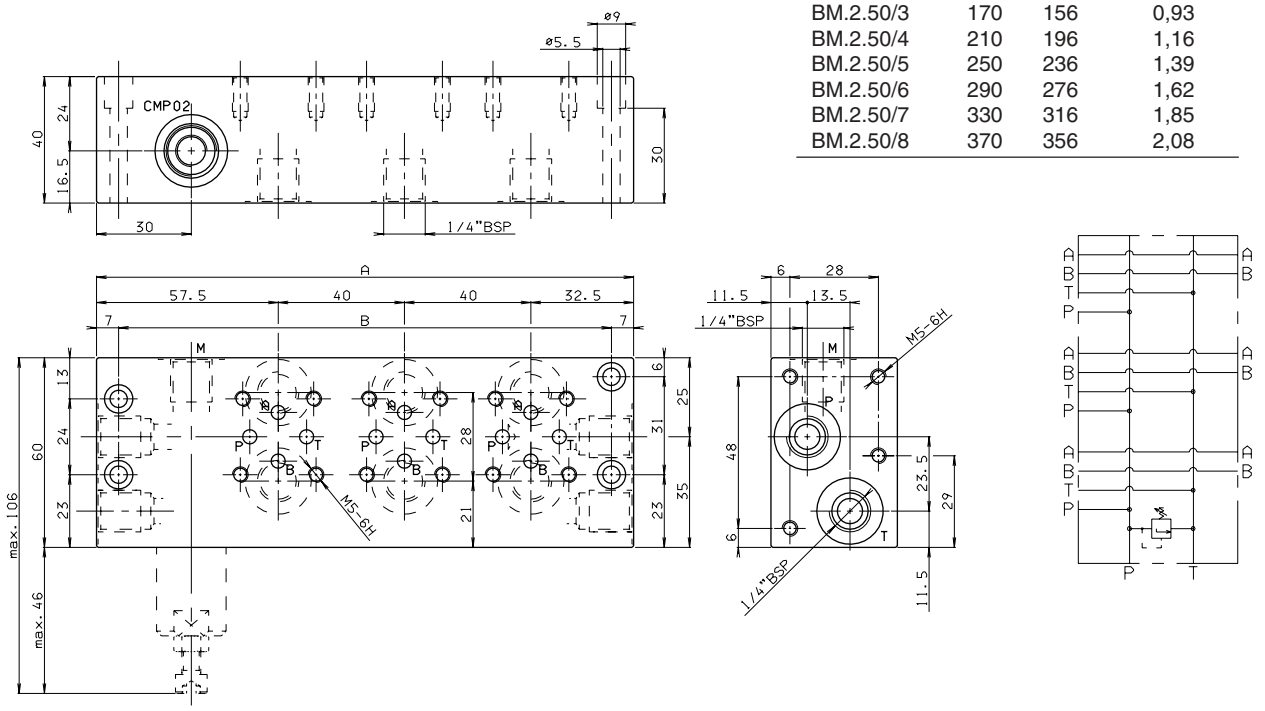
Type	A	B	Weight (Kg)
BM.2.60/2	105	91	0,64
BM.2.60/3	145	131	0,87
BM.2.60/4	185	171	1,10
BM.2.60/5	225	211	1,33
BM.2.60/6	265	251	1,56
BM.2.60/7	305	291	1,79
BM.2.60/8	345	331	2,02



Fixing screws M5x50 UNI 5931

BM.2.50 CONNECTED IN PARALLEL WITH PRESSURE RELIEF VALVE

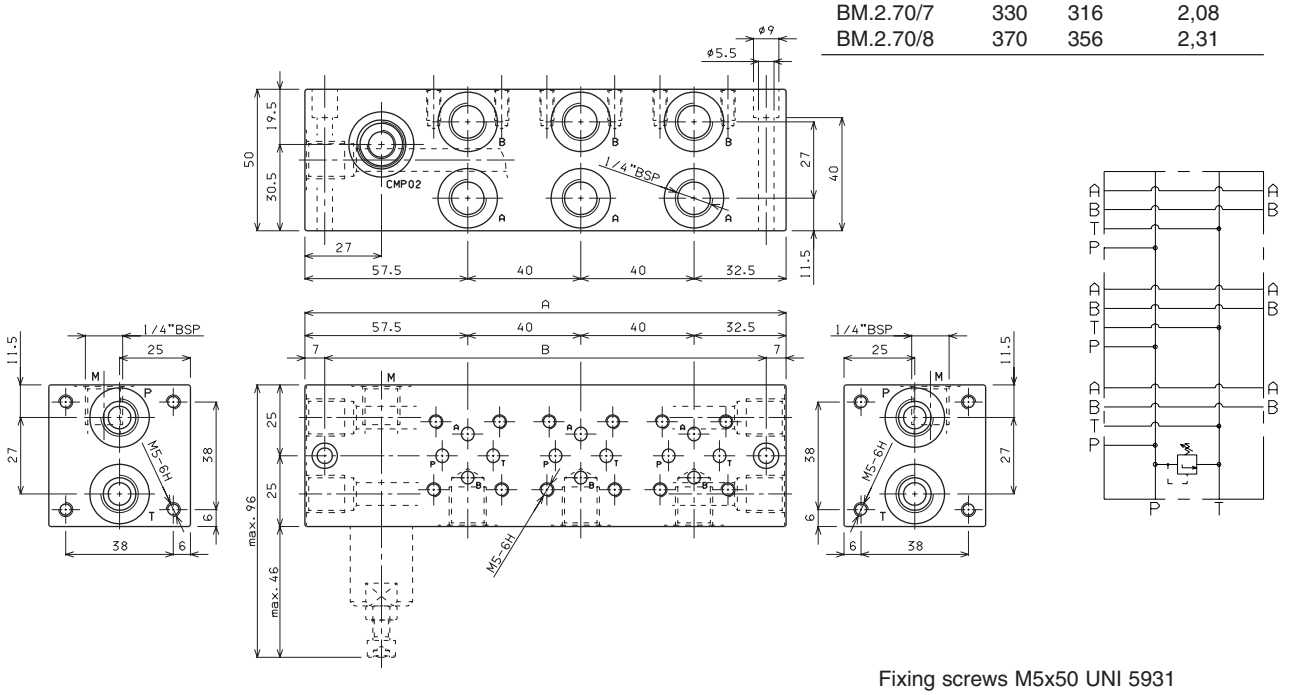
Type	A	B	Weight (Kg)
BM.2.50/2	130	116	0,70
BM.2.50/3	170	156	0,93
BM.2.50/4	210	196	1,16
BM.2.50/5	250	236	1,39
BM.2.50/6	290	276	1,62
BM.2.50/7	330	316	1,85
BM.2.50/8	370	356	2,08



Fixing screws M5x40 UNI 5931

BM.2.70 CONNECTED IN PARALLEL WITH PRESSURE RELIEF VALVE

Type	A	B	Weight (Kg)
BM.2.70/2	130	116	0,93
BM.2.70/3	170	156	1,16
BM.2.70/4	210	196	1,39
BM.2.70/5	250	236	1,62
BM.2.70/6	290	276	1,85
BM.2.70/7	330	316	2,08
BM.2.70/8	370	356	2,31



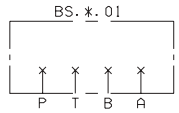
Fixing screws M5x50 UNI 5931

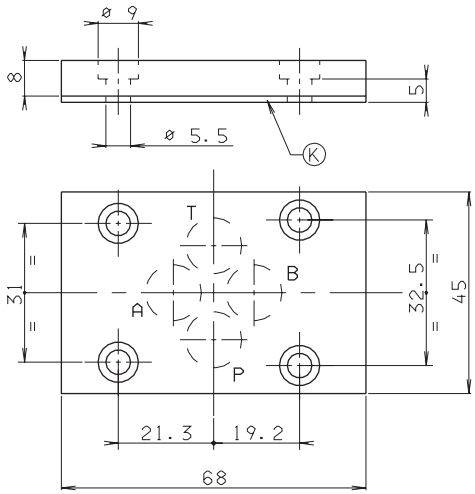
CETOP 3 SUBPLATES

BS.3... SINGLE STATION SUBPLATE

BS.3.01...

BS	Single subplate (blanking)
3	CETOP 3/NG6
01	P / T / A / B closed
00	No variant
1	Serial No.



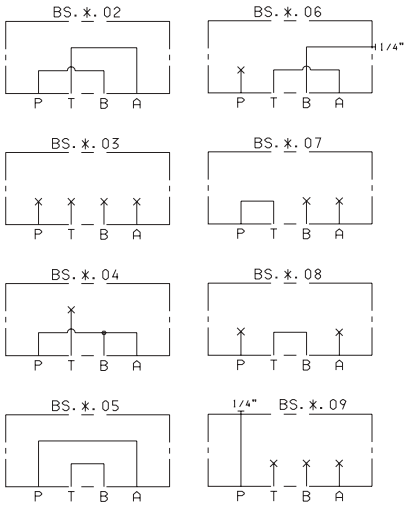


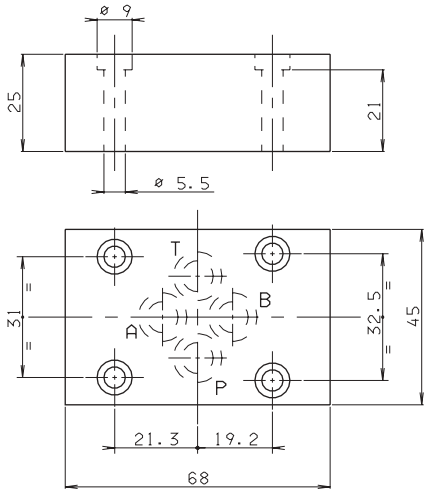
Weight: 0,2 Kg

Fixing screws
M5x14 UNI 5931
K = plate OR (Q25.95.0001)

BS.3.**...

BS	Single subplate (blanking)
3	CETOP 3/NG6
******	**02/03/04/05/06/07/08/09**
00	No variant
1	Serial No.





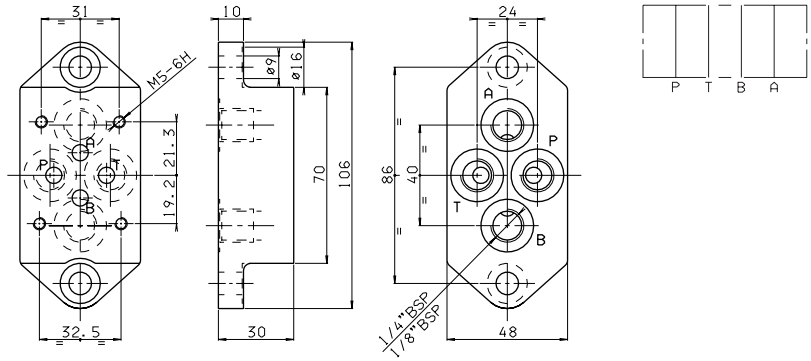
Weight: 0,5 Kg

Fixing screws M5x30 UNI 5931

BS.3... SINGLE STATION SUBPLATE

BS.3.10/11... (REAR CONNECTORS)

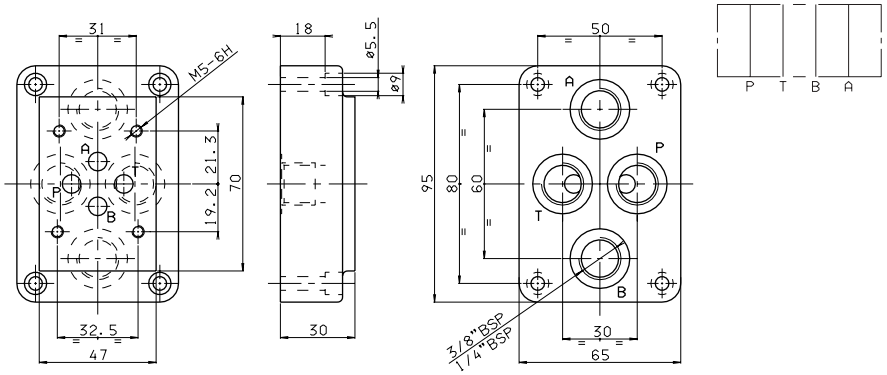
BS	Single subplate
3	CETOP 3/NG6
******	**10** = 1/8" BSP rear connectors **11** = 1/4" BSP rear connectors
00	No variant
1	Serial No.



Weight: 0,7 Kg - Fixing screws M8x20 UNI 5931

BS.3.12/13 (REAR CONNECTORS)

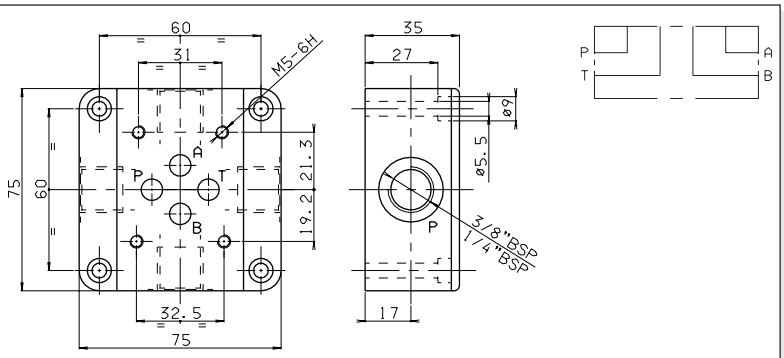
BS	Single subplate
3	CETOP 3/NG6
******	**12** = 3/8" BSP rear connectors **13** = 1/4" BSP rear connectors
00	No variant
1	Serial No.



Weight: 1 Kg - Fixing screws M5x25 UNI 5931

BS.3.14/15 (SIDE CONNECTORS)

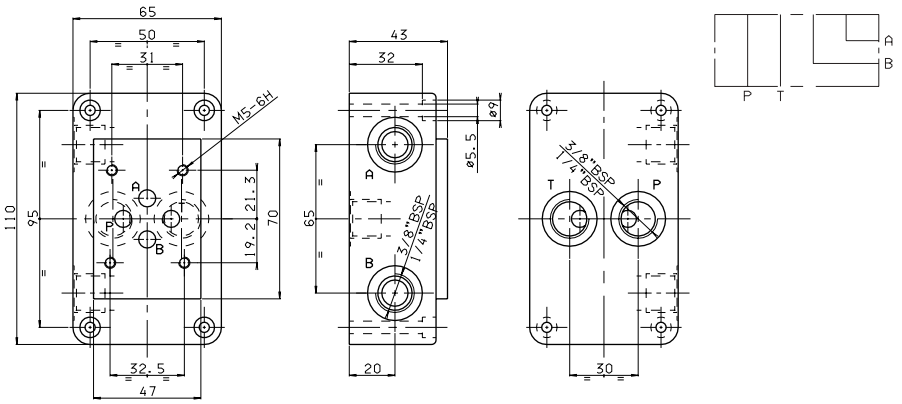
BS	Single subplate
3	CETOP 3/NG6
******	**14** = 3/8" BSP side connectors **15** = 1/4" BSP side connectors
00	No variant
1	Serial No.



Weight: 1,2 Kg - Fixing screws M5x35 UNI 5931

BS.3.16/17 (CONNECTORS SIDE A AND B, REAR P AND T)

BS	Single subplate
3	CETOP 3/NG6
******	**16** = 3/8" BSP rear and side connectors **17** = 1/4" BSP rear and side connectors
00	No variant
1	Serial No.

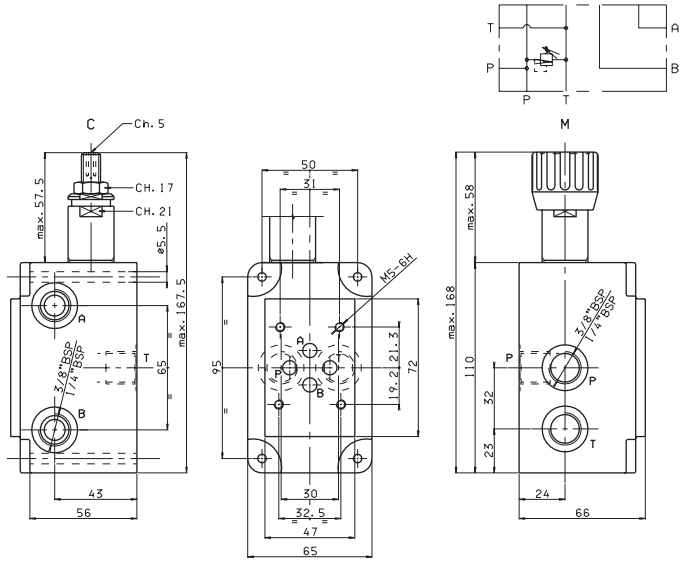


Weight: 1,8 Kg - Fixing screws M5x40 UNI 5931

BS.3... SINGLE STATION SUBPLATE

BS.3.20/21 (CONNECTORS SIDE A AND B, REAR P AND T)

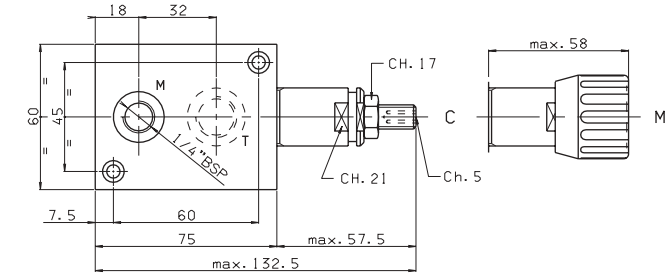
BS	Single subplate
3	CETOP 3/NG6
**	**20** = 3/8" BSP rear and side connectors **21** = 1/4" BSP rear and side connectors
*	**M** = Plastic knob **C** = Grub screws
*	Setting range **1** = max. 50 bar **(white spring)** **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
00	No variant
1	Serial No.

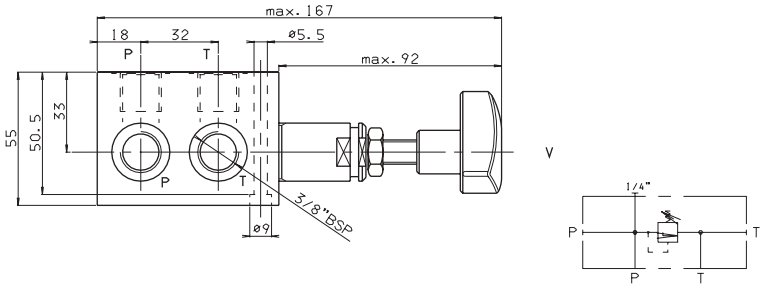


Weight: 2,9 Kg - Fixing screws M5x65 UNI 5931

BS.VMP.10 SINGLE STATION SUBPLATE WITH MAX. PRESSURE VALVE FOR SURFACE MOUNTING (E.G. ON TAKE COVER)

BS	Single subplate
VMP	Max. pressure valve
10	3/8" BSP connectors
*	**M** = Plastic knob **C** = Grub screw **V** = Handwheel
*	Setting range **1** = max. 50 bar **(white spring)** **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
00	No variant
1	Serial No.



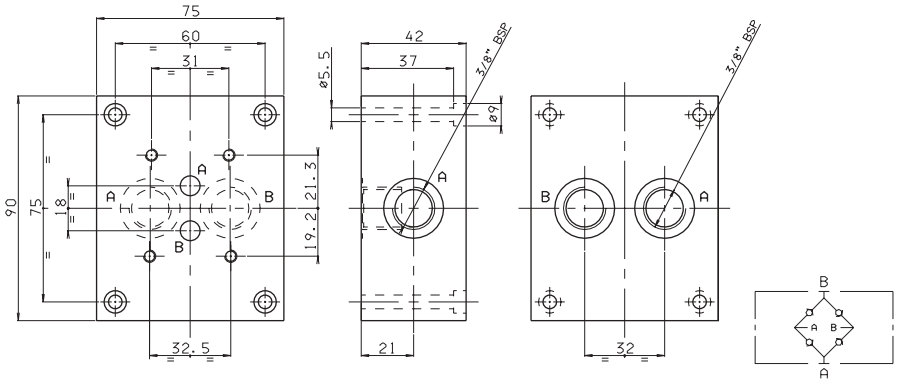


Weight: 1,6 Kg
Fixing screws M5x60 UNI 5931

• The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.10...

BS.3.W...

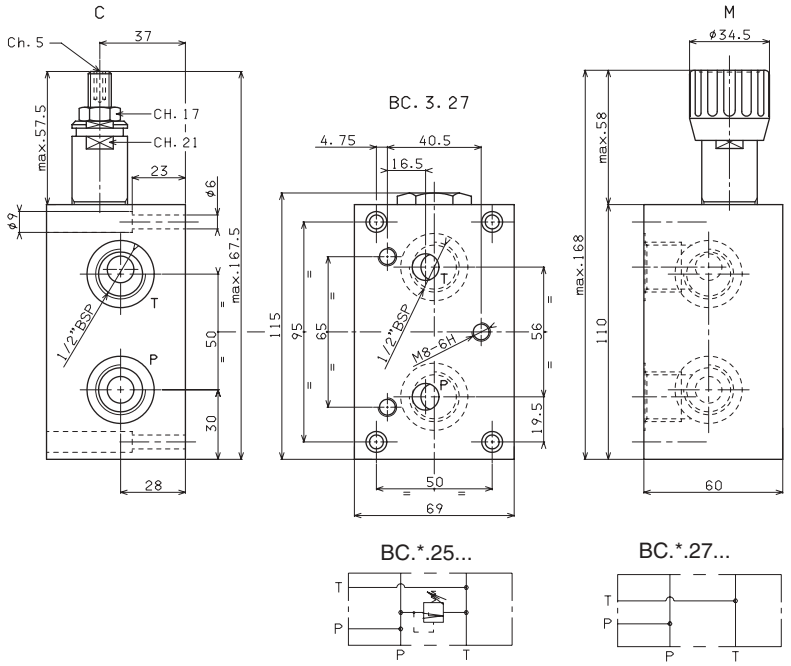
BS	Single subplate
3	CETOP 3/NG6
W	Wheatstone bridge
00	No variant
1	Serial No.



Weight: 1,8 Kg
Fixing screws M5x45 UNI 5931

BC.3.25/27 P/T REAR AND SIDE CONNECTORS 1/2" BSP- 3 RODS

BC	Module base
3	CETOP 3/NG6
******	**25** = 1/2" BSP rear and side connectors with CMP **27** = 1/2" BSP rear and side connectors without CMP
*****	Adjustment (omit for 27 version) **M** = Plastic knob **C** = Grub screw
*****	Setting range (omit for 27 version) **1** = max. 50 bar **(white spring)** **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
00	No variant
1	Serial No.

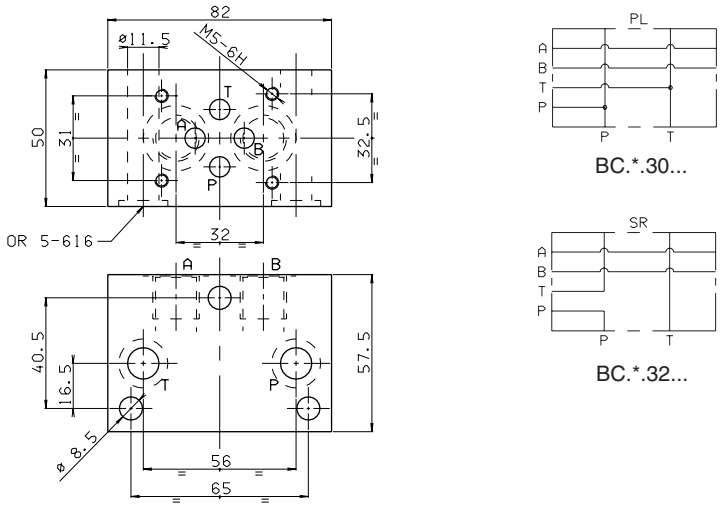


Weight BC.3.25: 2,7 Kg
Weight BC.3.27: 2,6 Kg
Fixing screws M5x30 UNI 5931

• The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.10...

BC.3.30/32 - 3 RODS

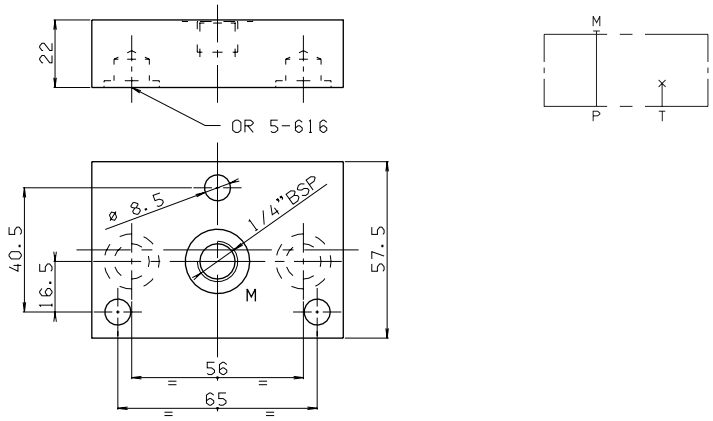
BC	Module base
3	CETOP 3/NG6
******	**30** = 3/8" BSP connectors in parallel **32** = 3/8" BSP connectors in series
00	No variant
1	Serial No.



Weight Kg. 1,4

BC.3.40 - 3 RODS

BC	Module base
3	CETOP 3/NG6
40	Blanking
00	No variant
1	Serial No.

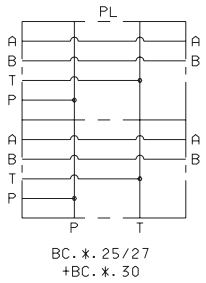


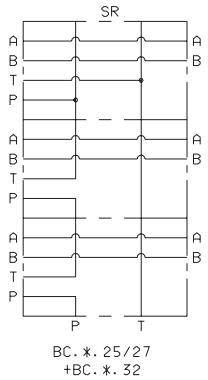
Weight: 0,7 Kg

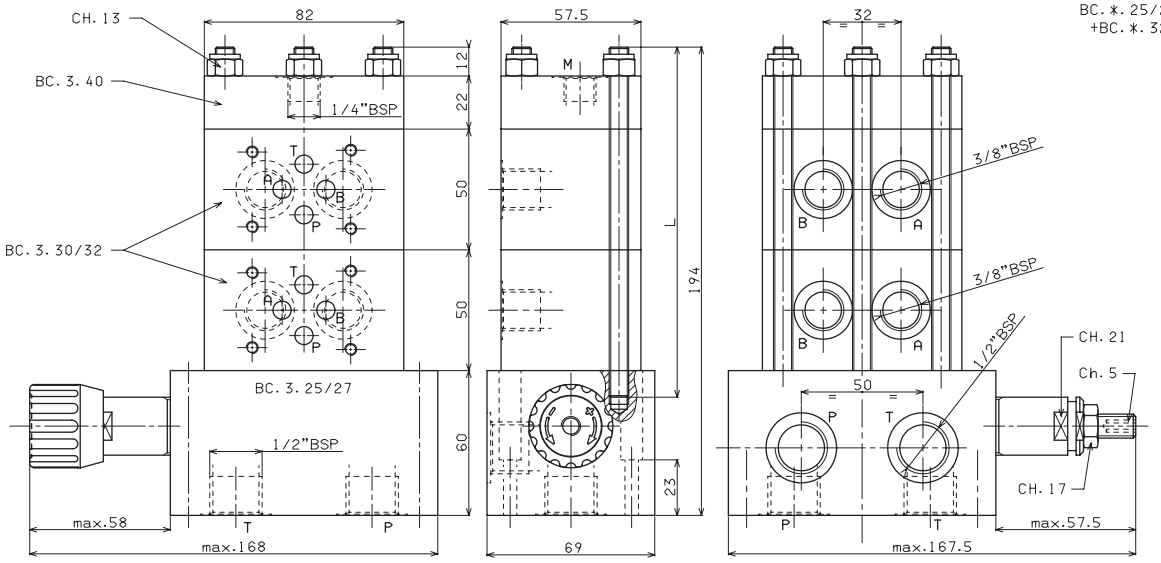
ASSEMBLED MODULAR COMPONENT BASES - 3 RODS

Rods code		L	Composition
BC.3.41/2	M80.20.0010	146	BC.3.25/27 + 2 BC.3.30/32 + BC.3.40
BC.3.41/3	M80.20.0011	196	BC.3.25/27 + 3 BC.3.30/32 + BC.3.40
BC.3.41/4	M80.20.0012	246	BC.3.25/27 + 4 BC.3.30/32 + BC.3.40
BC.3.41/5	M80.20.0013	296	BC.3.25/27 + 5 BC.3.30/32 + BC.3.40
BC.3.41/6	M80.20.0014	346	BC.3.25/27 + 6 BC.3.30/32 + BC.3.40
BC.3.41/7	M80.20.0015	396	BC.3.25/27 + 7 BC.3.30/32 + BC.3.40
BC.3.41/8	M80.20.0016	446	BC.3.25/27 + 8 BC.3.30/32 + BC.3.40

Nuts code	Q26.56.0514
Pieces	3



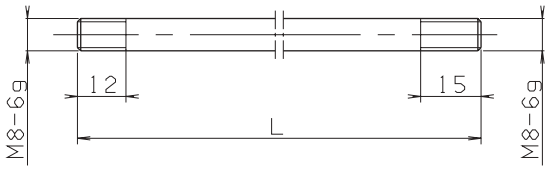




- **For series connection the last block high up should be connected in parallel (BC.3.30)**
- **Single components should be ordered separately**
- **The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.10...**

BC.3.41/* RODS FOR MODULAR ASSEMBLY

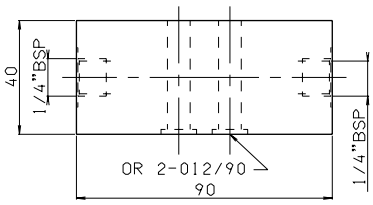
Rod code	Pieces	L	Composition
BC.3.41/2.00.1	3	146	for 2 solenoid valves
BC.3.41/3.00.1	3	196	for 3 solenoid valves
BC.3.41/4.00.1	3	246	for 4 solenoid valves
BC.3.41/5.00.1	3	296	for 5 solenoid valves
BC.3.41/6.00.1	3	346	for 6 solenoid valves
BC.3.41/7.00.1	3	396	for 7 solenoid valves
BC.3.41/8.00.1	3	446	for 8 solenoid valves

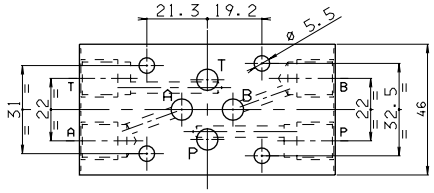


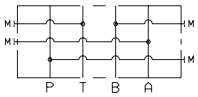
BC.3.50 INTERMEDIATE MODULE FOR PRESSURE GAUGE CONNECTION

BC	Module base
3	CETOP 3/NG6
50	Intermediate module for pressure gauge connection at ports A/B/P/T
00	No variant
1	Serial No.

Weight: 1 Kg







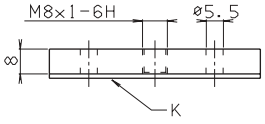
BC.3.51 DOWEL BASE PLATE FOR SOLENOID VALVE

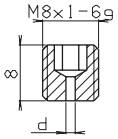
BC	Module base
3	CETOP 3/NG6
51	Dowel base plate
00	No variant
1	Serial No.

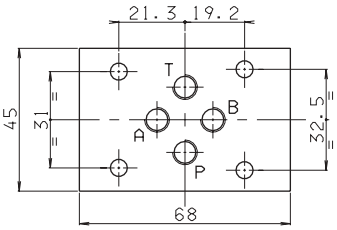
Weight: 0,2 Kg
K = plate OR (Q25.95.0001)

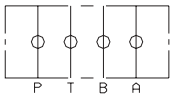
CALIBRATED DIAPHRAGMS AVAILABLE

d	M8x1x8
0.6	M89.10.0007
0.7	M89.10.0008
0.8	M89.10.0009
0.9	M89.10.0012
1	M89.10.0010
1.2	M89.10.0011
1.4	M89.10.0038
1.5	M89.10.0035
1.75	M89.10.0042
2	M89.10.0041
2.5	M89.10.0036





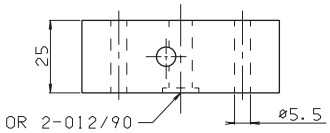


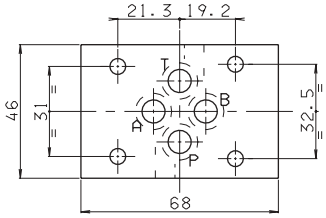


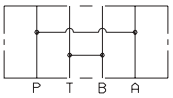
BC.3.07 BASE PLATE FOR DOUBLE FLOW RATE P→A AND B→T

BC	Module base
3	CETOP 3/NG6
07	bases plate for twin flow rate
00	No variant
1	Serial No.

Weight: 0,5 Kg



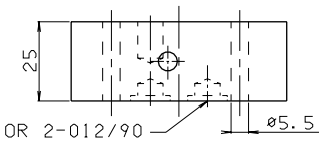


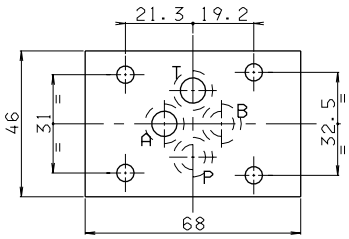


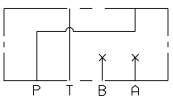
BC.3.107 BASE PLATE FOR USING 4 WAY VALVE AS 2 WAY ONLY

BC	Module base
3	CETOP 3/NG6
107	base for using 4 way valve as 2 way only
00	No variant
1	Serial No.

Weight: 0,5 Kg



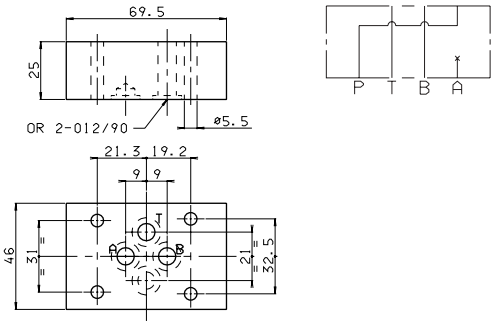




BC.3.08 INTERMEDIATE BASE PLATE FOR XQ.3... (P → A)

BC	Module base
3	CETOP 3/NG6
08	Base plate for XQ3 (P→A)
00	No variant
1	Serial No.

Weight: 1,5 Kg

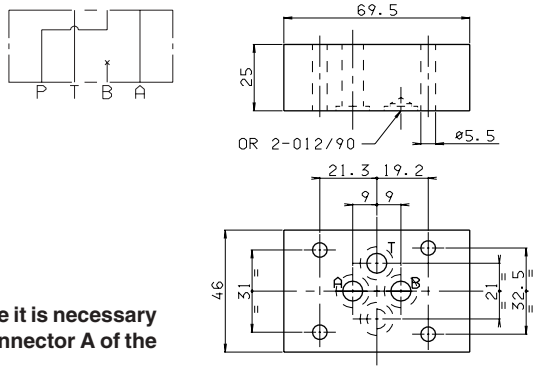


BC.3.09 INTERMEDIATE BASE PLATE FOR XQ.3... (B → P)

BC	Module base
3	CETOP 3/NG6
09	Base plate for XQ3 (B→P)
00	No variant
1	Serial No.

Weight: 1,4 Kg

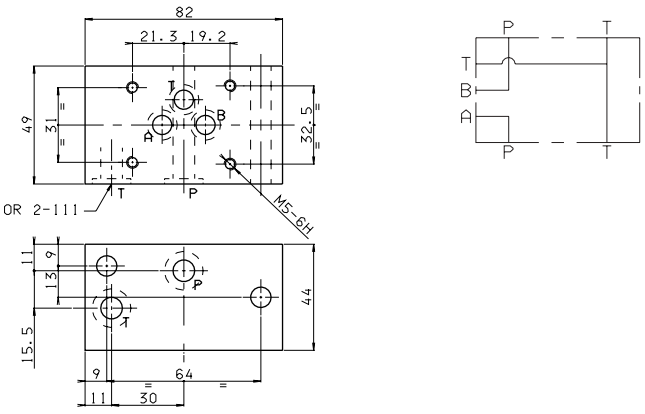
• To take advantage of this base it is necessary to operate with the pump at connector A of the multi station base plate



BC.06.XQ3 BASE PLATE FOR PROPORTIONAL VALVE TYPE XQ.3...

BC	Module base
06	CETOP 3/NG6
XQ3	base plate XQ3
00	No variant
1	Serial No.

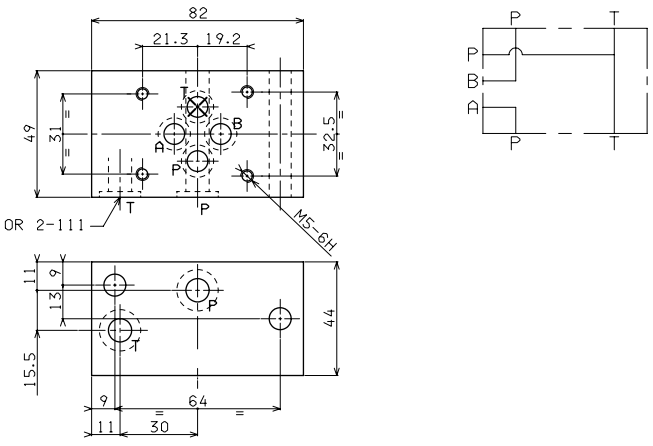
Weight: 1,4 Kg



BC.06.XQP3 BASE PLATE FOR PROPORTIONAL REGULATOR TYPE XQP.3...

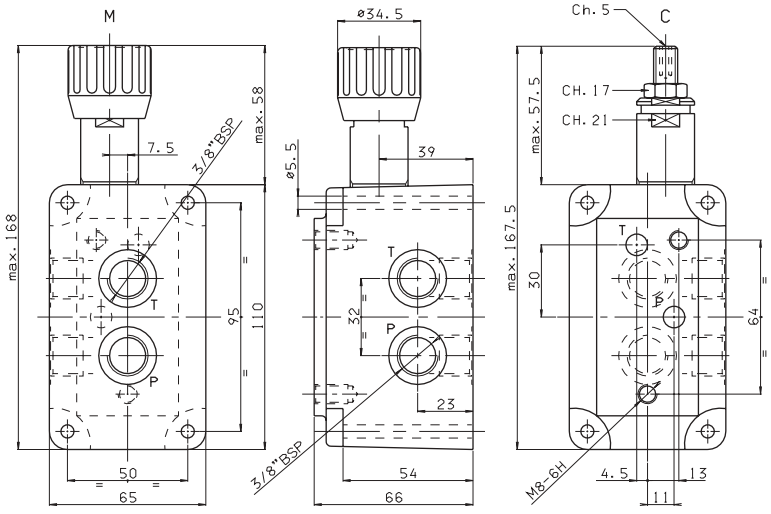
BC	Module base
06	CETOP 3/NG06
XQP3	Base for XQP3 proportional regulator
00	No variant
1	Serial No

Weight: 1,4 Kg



BC.06.25/27 P AND T REAR AND SIDE CONNECTORS 3/8" BSP - 2 RODS

BC	Module base
06	CETOP 3/NG6
**	**25** = 3/8" BSP rear and side connectors with CMP **27** = 3/8" BSP rear and side connectors without CMP
*	Adjustment (omit for 27 version) **M** = Plastic knob **C** = Grub screw
*	Setting range (omit for 27 version) **1** = max. 50 bar **(white spring)** **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
00	No variant
1	Serial No.



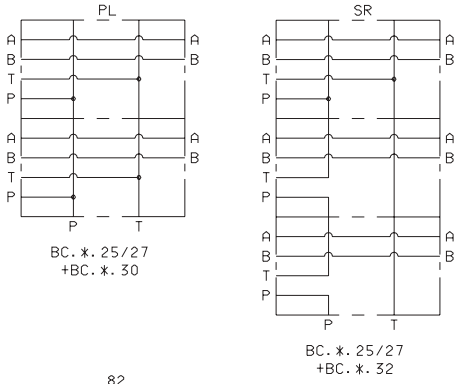
Weight BC.3.25 : 3 Kg
Weight BC.3.27 : 2,8 Kg
Fixing screws M5x65 UNI 5931

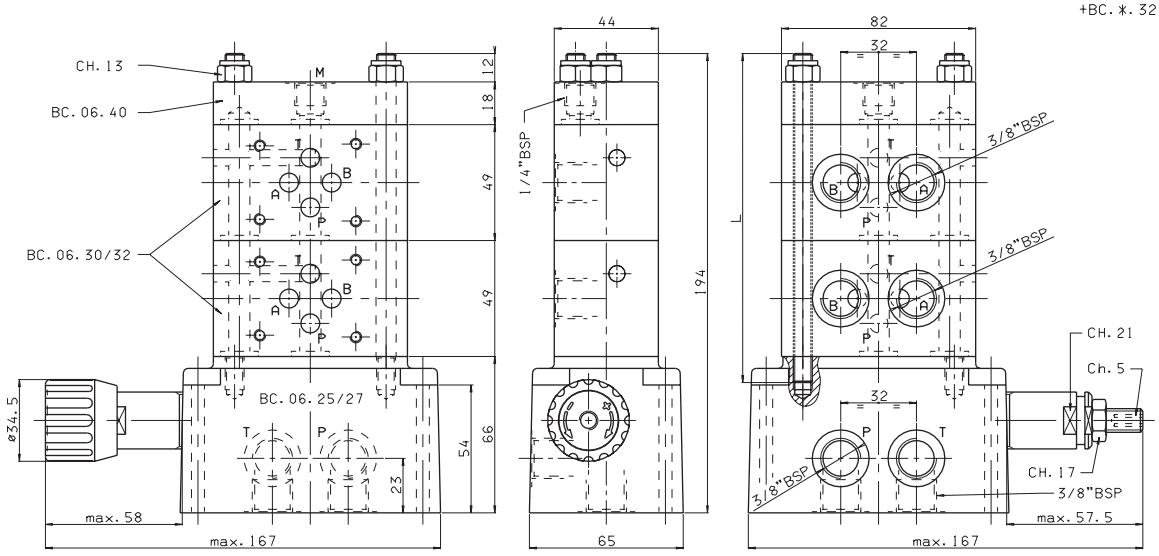
• The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.10...

ASSEMBLED MODULAR COMPONENT BASES - 2 RODS

Rods code	L	Composition
BC.06.41/2 M80.20.0001	138	BC.06.25/27 + 2 BC.06.30/32 + BC.06.40
BC.06.41/3 M80.20.0002	187	BC.06.25/27 + 3 BC.06.30/32 + BC.06.40
BC.06.41/4 M80.20.0003	236	BC.06.25/27 + 4 BC.06.30/32 + BC.06.40
BC.06.41/5 M80.20.0004	285	BC.06.25/27 + 5 BC.06.30/32 + BC.06.40
BC.06.41/6 M80.20.0005	334	BC.06.25/27 + 6 BC.06.30/32 + BC.06.40
BC.06.41/7 M80.20.0006	382	BC.06.25/27 + 7 BC.06.30/32 + BC.06.40
BC.06.41/8 M80.20.0007	430	BC.06.25/27 + 8 BC.06.30/32 + BC.06.40

Nuts code Q26.56.0514
Pieces 2



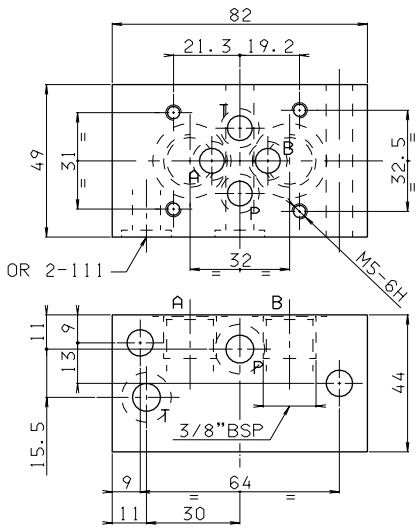


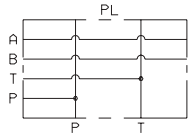
• For series connection the last block high up should be connected in parallel (BC.06.30)
• Single components should be ordered separately
• The minimum permissible setting range depending on the spring: see cartridge valve type CMP.10...

BC.06.30/32 - 2 RODS

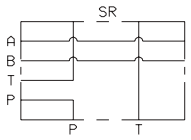
BC	Module base
06	CETOP 3/NG6
******	**30** = 3/8" BSP connectors in parallel **32** = 3/8" BSP connectors in series
00	No variant
1	Serial No.

Weight: 1,1 Kg





BC.*.30...

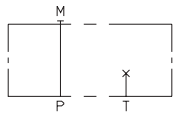


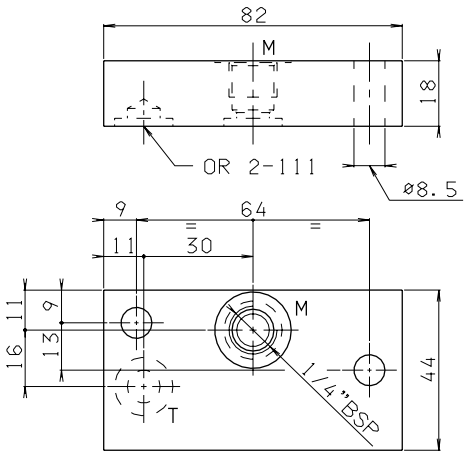
BC.*.32...

BC.06.40 - 2 RODS

BC	Module base
06	CETOP 3/NG6 - 2 rods
40	Blanking
00	No variant
1	Serial No.

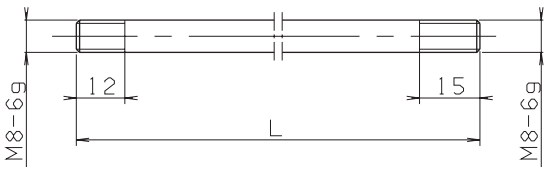
Weight: 0,4 Kg





BC.06.41/* RODS FOR MODULAR ASSEMBLY

Rod code	Pieces	L	Composition
BC.06.41/2.00.1	2	138	for 2 solenoid valves
BC.06.41/3.00.1	2	187	for 3 solenoid valves
BC.06.41/4.00.1	2	236	for 4 solenoid valves
BC.06.41/5.00.1	2	285	for 5 solenoid valves
BC.06.41/6.00.1	2	334	for 6 solenoid valves
BC.06.41/7.00.1	2	382	for 7 solenoid valves
BC.06.41/8.00.1	2	430	for 8 solenoid valves



BM.3... MULTI STATION SUBPLATE

BM.3.**...

BM Multi station subplate (standard versions are supplied in cast iron material)

3 CETOP 3/NG6

****** **50** = Connected in parallel with pressure relief valve and rear connectors
70 = Connected in parallel with pressure relief valve and side connectors
52 = Connected in series with pressure relief valve and rear connectors
72 = Connected in series with pressure relief valve and side connectors
60 = Connected in parallel without pressure relief valve and side connectors

***** No. of valve seats
2 / 3 / 4 / 5 / 6 / 7 / 8

***** Type of adjustment (omit for 60 version)
M = Plastic knob
C = Grub screw

***** Setting range (omit for 60 version)
1 = max. 50 bar **(white spring)**
2 = max. 150 bar **(yellow spring)**
3 = max. 320 bar **(green spring)**

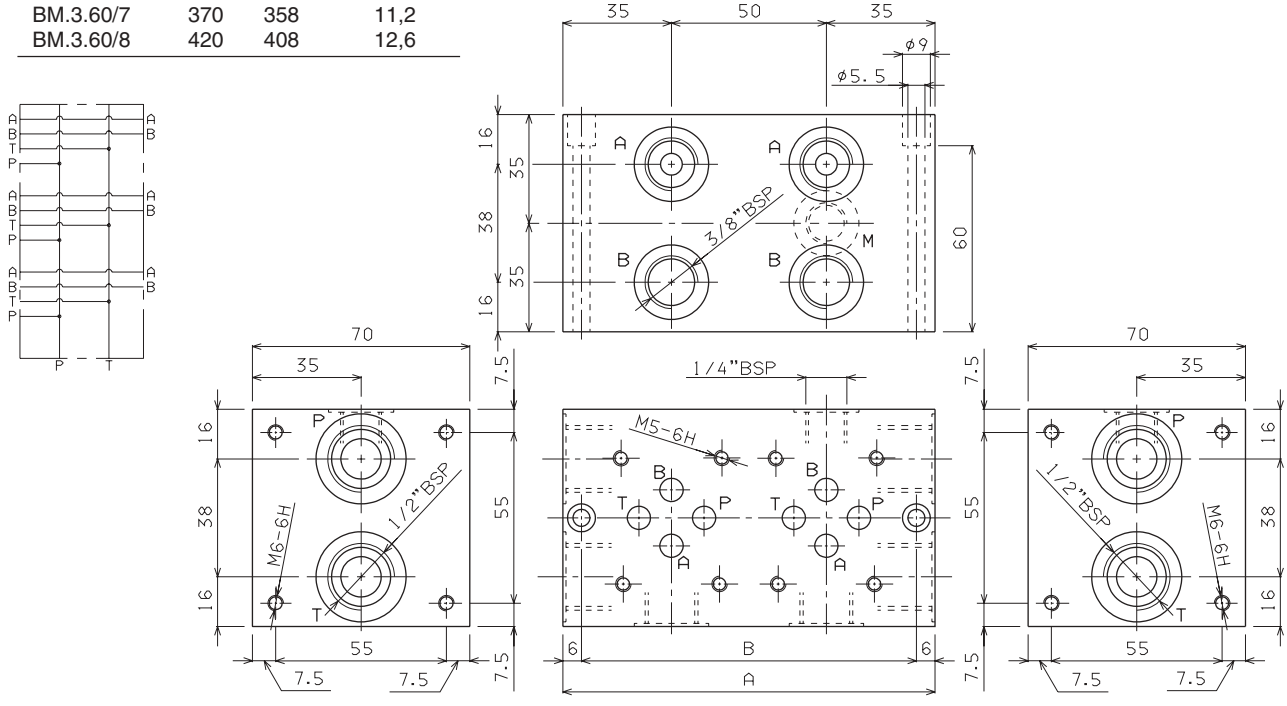
****** **00** = No variant
AL = in aluminium material versions

1 Serial No.

• The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.10...

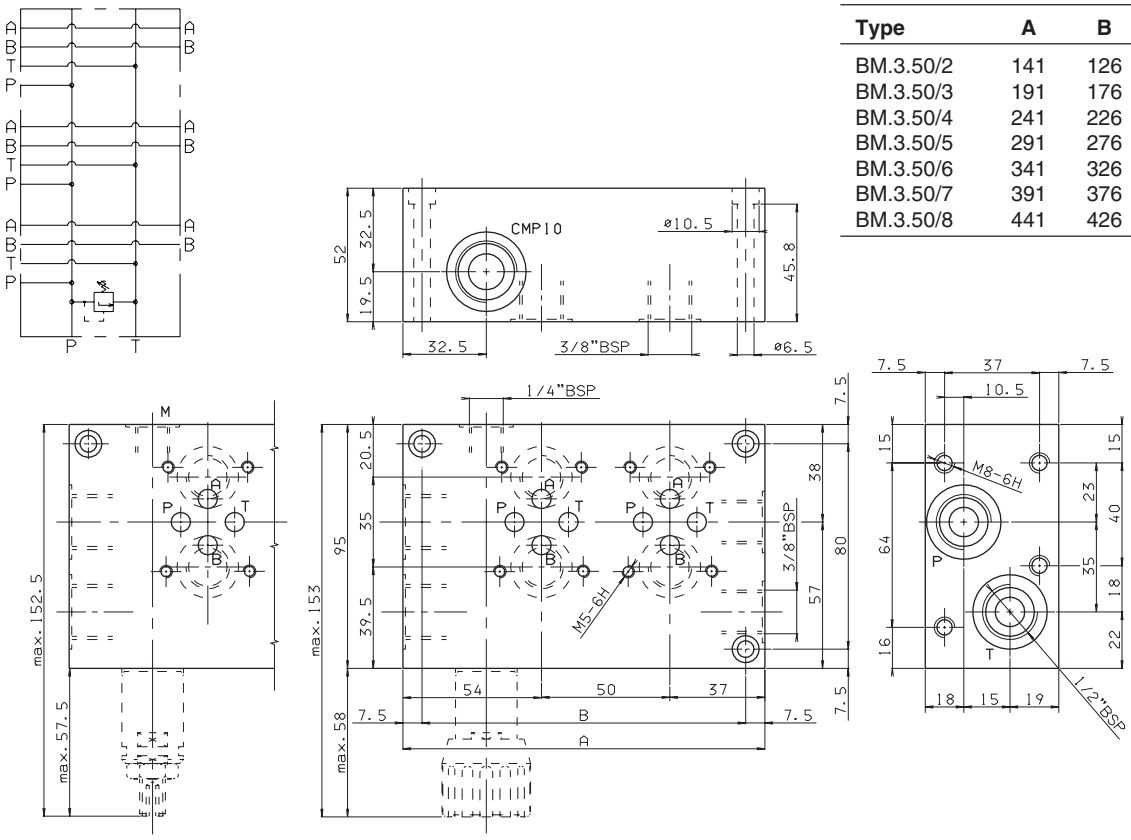
BM.3.60 CONNECTED IN PARALLEL WITHOUT PRESSURE RELIEF VALVE

Type	A	B	Weight (Kg)
BM.3.60/2	120	108	3,6
BM.3.60/3	170	158	5,1
BM.3.60/4	220	208	6,7
BM.3.60/5	270	258	8.2
BM.3.60/6	320	308	9,7
BM.3.60/7	370	358	11,2
BM.3.60/8	420	408	12,6



Fixing screws M5x70 UNI 5931

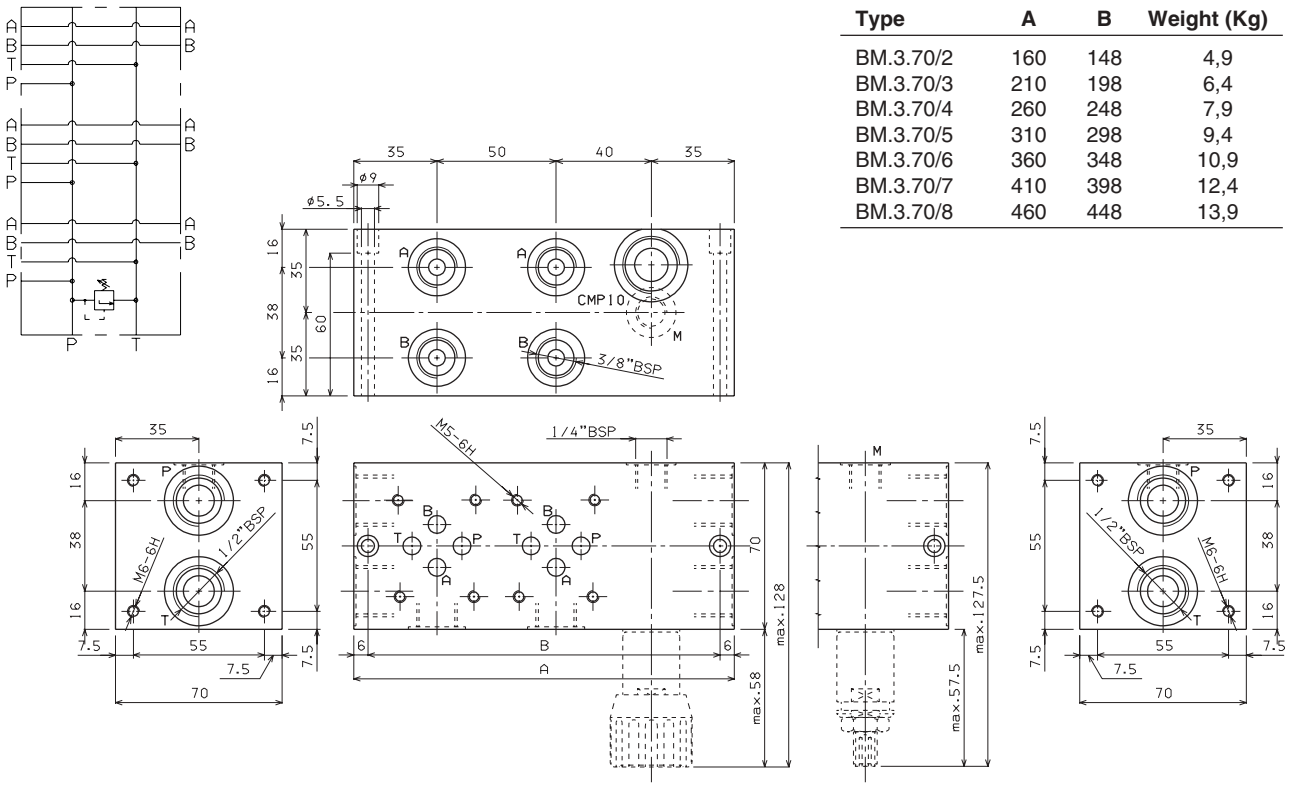
BM.3.50 CONNECTED IN PARALLEL WITH PRESSURE RELIEF VALVE



Type	A	B	Weight (Kg)
BM.3.50/2	141	126	4,6
BM.3.50/3	191	176	6,1
BM.3.50/4	241	226	7,6
BM.3.50/5	291	276	9,1
BM.3.50/6	341	326	10,6
BM.3.50/7	391	376	12,1
BM.3.50/8	441	426	13,6

Fixing screws M6x55 UNI 5931

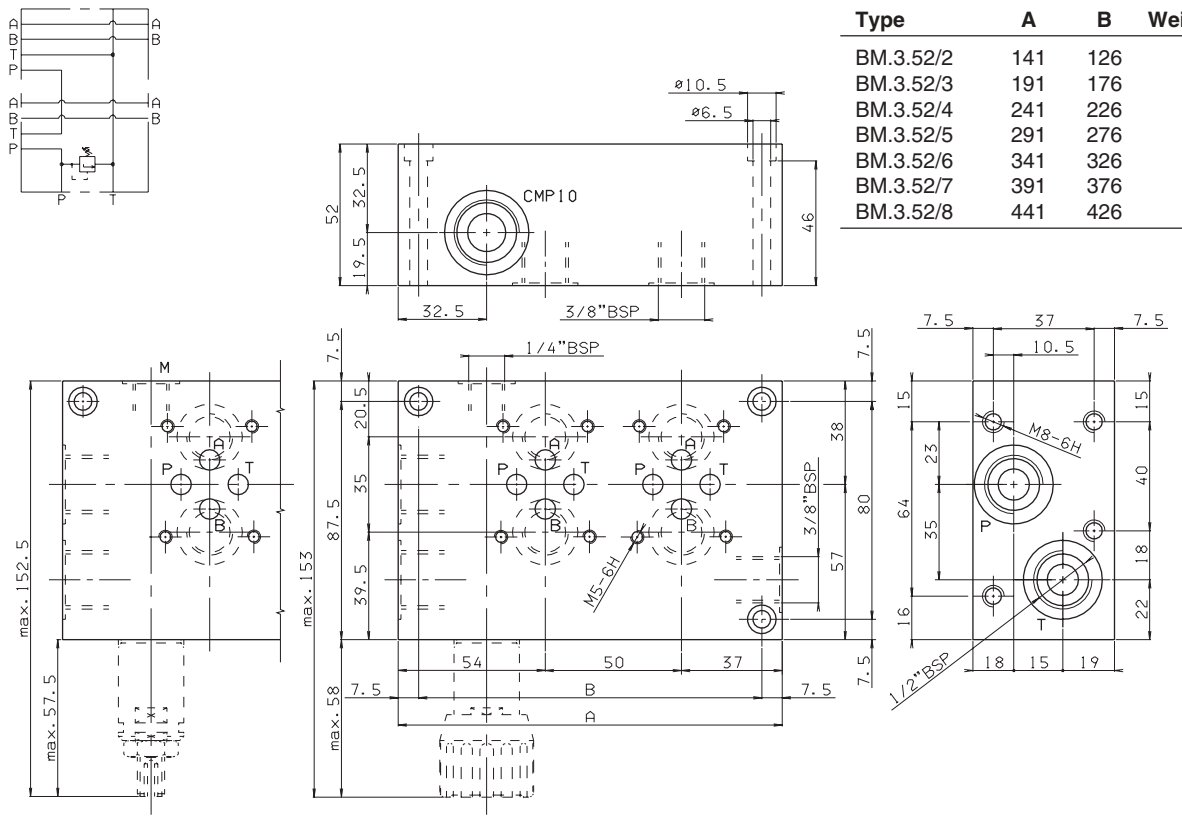
BM.3.70 CONNECTED IN PARALLEL WITH PRESSURE RELIEF VALVE



Type	A	B	Weight (Kg)
BM.3.70/2	160	148	4,9
BM.3.70/3	210	198	6,4
BM.3.70/4	260	248	7,9
BM.3.70/5	310	298	9,4
BM.3.70/6	360	348	10,9
BM.3.70/7	410	398	12,4
BM.3.70/8	460	448	13,9

Fixing screws M5x70 UNI 5931

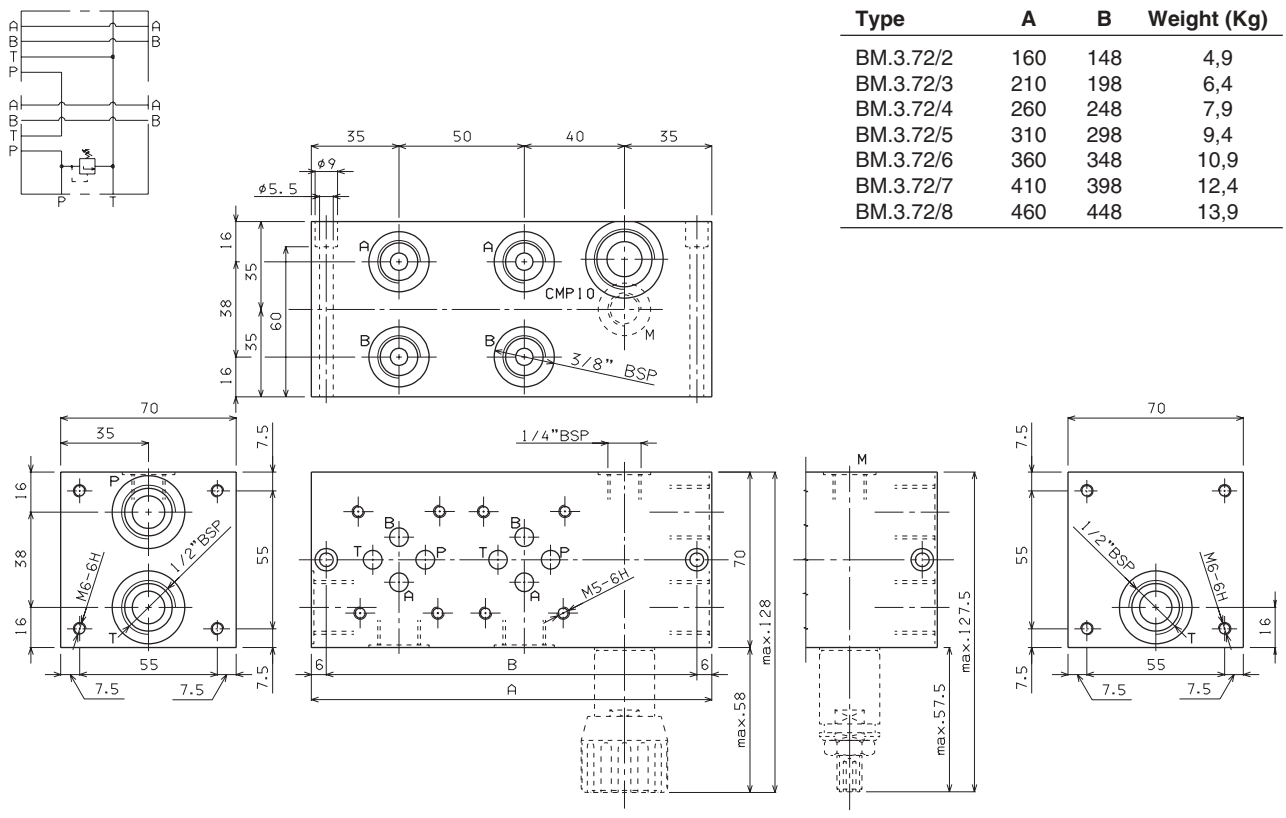
BM.3.52 CONNECTED IN SERIES WITH PRESSURE RELIEF VALVE



Type	A	B	Weight (Kg)
BM.3.52/2	141	126	4,6
BM.3.52/3	191	176	6,3
BM.3.52/4	241	226	7,6
BM.3.52/5	291	276	9,2
BM.3.52/6	341	326	10,7
BM.3.52/7	391	376	12,2
BM.3.52/8	441	426	13,7

Fixing screws M6x55 UNI 5931

BM.3.72 CONNECTED IN SERIES WITH PRESSURE RELIEF VALVE



Type	A	B	Weight (Kg)
BM.3.72/2	160	148	4,9
BM.3.72/3	210	198	6,4
BM.3.72/4	260	248	7,9
BM.3.72/5	310	298	9,4
BM.3.72/6	360	348	10,9
BM.3.72/7	410	398	12,4
BM.3.72/8	460	448	13,9

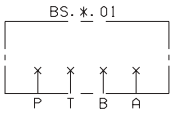
Fixing screws M5x70 UNI 5931

BS.5... SINGLE STATION SUBPLATE

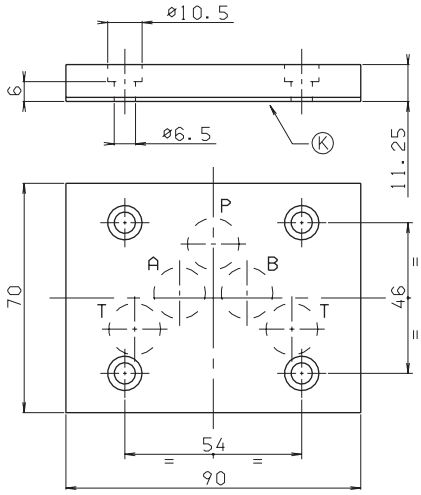
CETOP 5 SUBPLATES	
BS.5.01 / BS.5.0*	CH. VII PAGE 19
BS.5.12... / BS.5.13... BS.5.14... / BS.5.15...	CH. VII PAGE 20
BS.5.16... / BS.5.17...	
BS.5.3...	CH. VII PAGE 21
BS.5.30/31...	CH. VII PAGE 22
BS.VMP.20... / BS.5.29...	CH. VII PAGE 23
BC.5.36/28...	CH. VII PAGE 24
BC.5.41/*... / BC.5.40...	CH. VII PAGE 25
BC.5.30/32... / BC.5.50... / BC.5.51...	CH. VII PAGE 26
BC.5.07... / BC.5.107... BC.5.3A... / BC.10.06...	CH. VII PAGE 27
BM.5.**... / BM.5.50...	CH. VII PAGE 28
BM.5.60... / BM.5.70... BM.5.80...	CH. VII PAGE 29
CMP.20...	CH. V PAGE 20
CMP.30...	CH. V PAGE 21

BS.5.01...

BS	Single subplate (blanking)
5	CETOP 5/NG10
01	P/T/A/B closed
00	No variant
1	Serial No.



• Pay attention please, use these subplate in applications at slow pressure (P max. 150 bar dynamic)

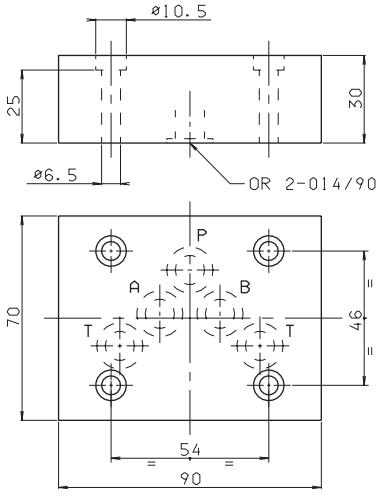


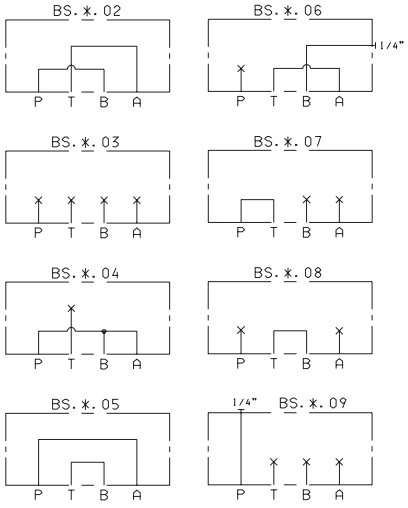
Weight: 0,5 Kg

Fixing screws
M6x15 UNI 5931
K = plate OR (Q25.95.0002)

BS.5.**...

BS	Single subplate (blanking)
5	CETOP 5/NG10
**	**02/03/04/05/06/07/08/09**
00	No variant
1	Serial No.





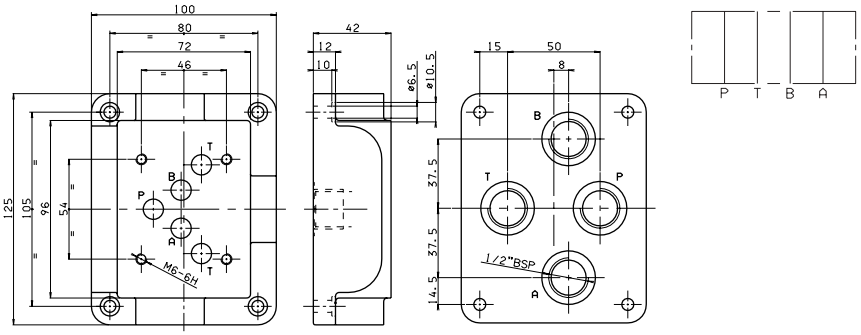
Weight: 1,2 Kg

Fixing screws M6x35 UNI 5931

BS.5... SINGLE STATION SUBPLATE

BS.5.12 (REAR CONNECTORS)

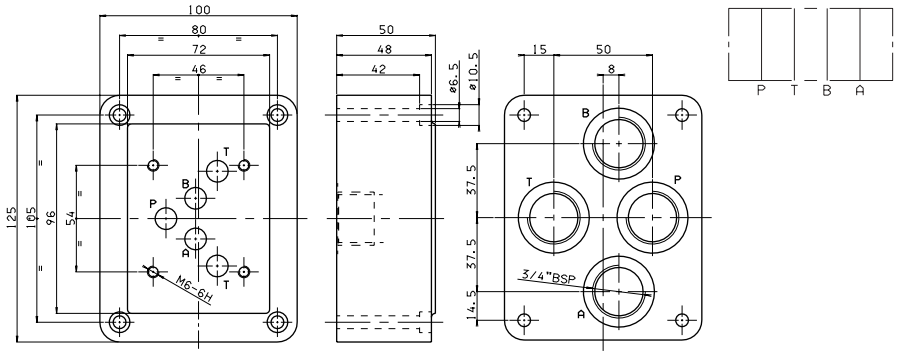
BS	Single subplate
5	CETOP 5/NG10
12	1/2" BSP rear connectors
00	No variant
1	Serial No.



Weight: 2,7 Kg - Fixing screws M6x25 UNI 5931

BS.5.13 (REAR CONNECTORS)

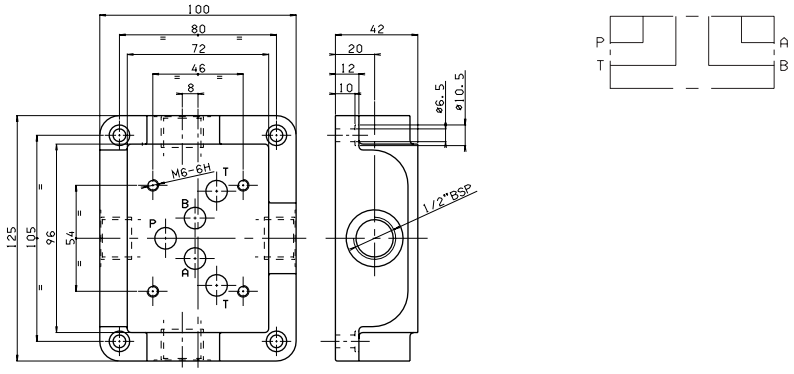
BS	Single subplate
5	CETOP 5/NG10
13	3/4" BSP rear connectors
00	No variant
1	Serial No.



Weight: 3,8 Kg - Fixing screws M6x50 UNI 5931

BS.5.14 (SIDE CONNECTORS)

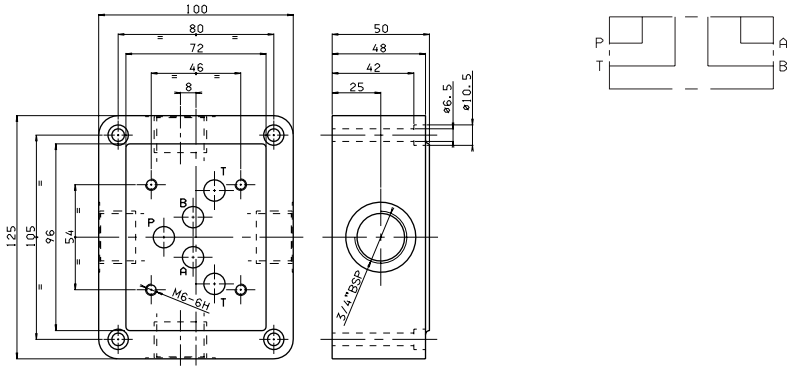
BS	Single subplate
5	CETOP 5/NG10
14	1/2" BSP side connectors
00	No variant
1	Serial No.



Weight: 2,6 Kg - Fixing screws M6x20 UNI 5931

BS.5.15 (SIDE CONNECTORS)

BS	Single subplate
5	CETOP 5/NG10
15	3/4" BSP side connectors
00	No variant
1	Serial No.



Weight: 3,8 Kg - Fixing screws M6x50 UNI 5931

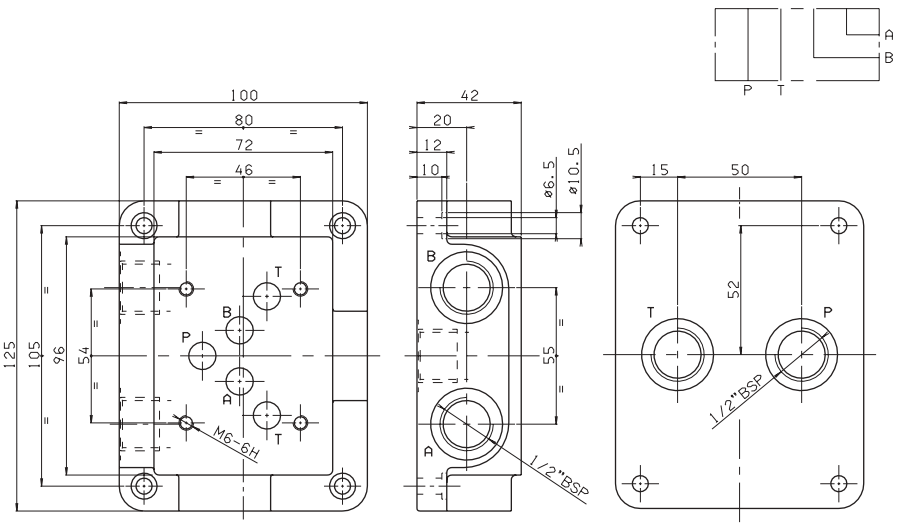
BS.5... SINGLE STATION SUBPLATE

BS.5.16 (CONNECTORS SIDE A AND B, REAR P AND T)

BS	Single subplate
5	CETOP 5/NG10
16	1/2" BSP rear and side connectors
00	No variant
1	Serial No.

Weight: 2,6 Kg

Fixing screws M6x20 UNI 5931

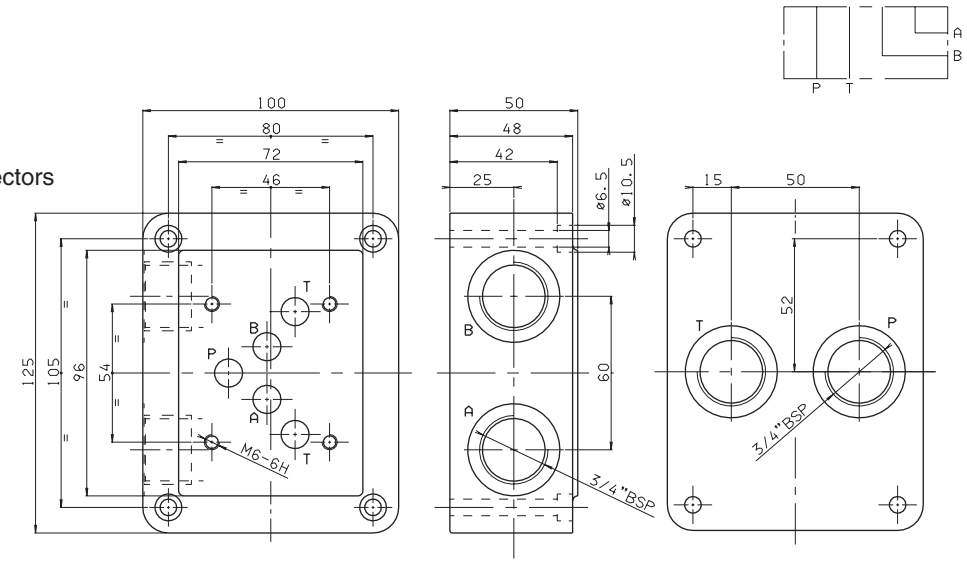


BS.5.17 (CONNECTORS SIDE A AND B, REAR P AND T)

BS	Single subplate
5	CETOP 5/NG10
17	3/4" BSP rear and side connectors
00	No variant
1	Serial No.

Weight: 3,9 Kg

Fixing screws
M6x50 UNI 5931

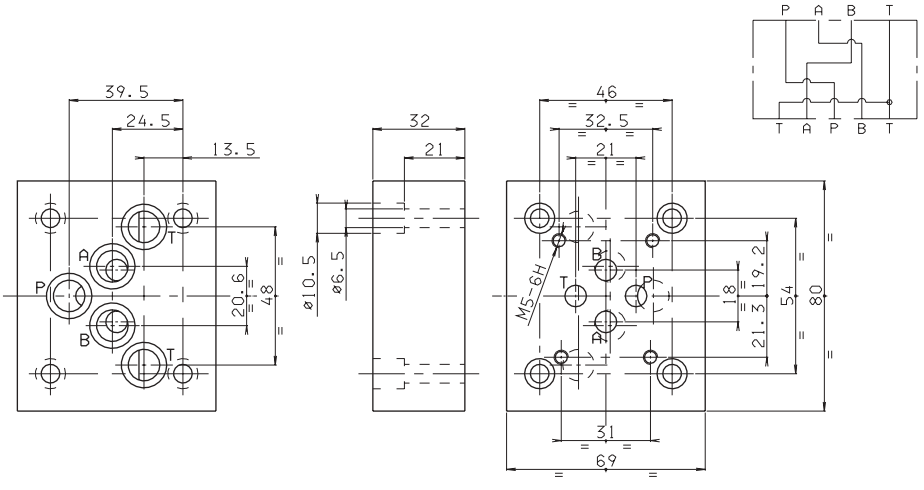


BS.5.3 (REDUCTION PLATE FROM CETOP 5/NG10 TO CETOP 3/NG6)

BS	Single subplate
5	CETOP 5/NG10
3	CETOP 3/NG6
00	No variant
1	Serial No.

Weight: 1,1 Kg

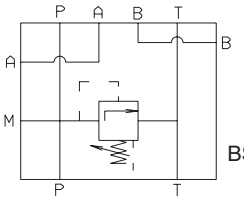
Fixing screws
M6x30 UNI 5931



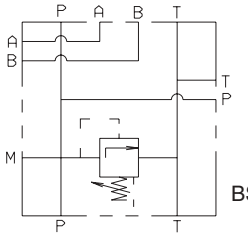
BS.5... SINGLE STATION SUBPLATE

BS.5.30/31

BS	Single subplate
5	CETOP 5/NG10
******	**30** = Connectors A and B side, P and T rear (all 3/4" BSP) **31** = Connectors A and B side, P and T rear (all 3/4" BSP)
*****	**M** = Plastic knob **C** = Grub screw
*****	Setting range **1** = max. 50 bar **(white spring)** **2** = max. 140 bar **(yellow spring)** **3** = max. 350 bar **(green spring)**
00	No variant
1	Serial No.



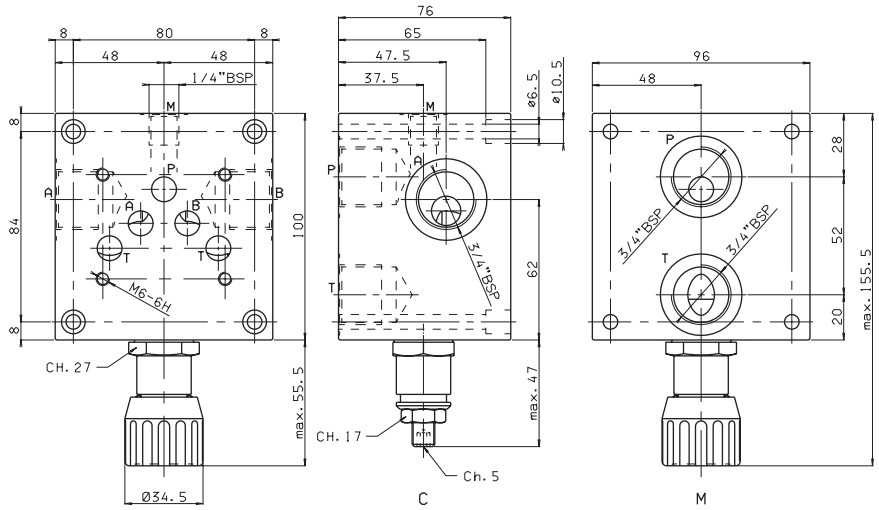
BS.5.30...



BS.5.31...

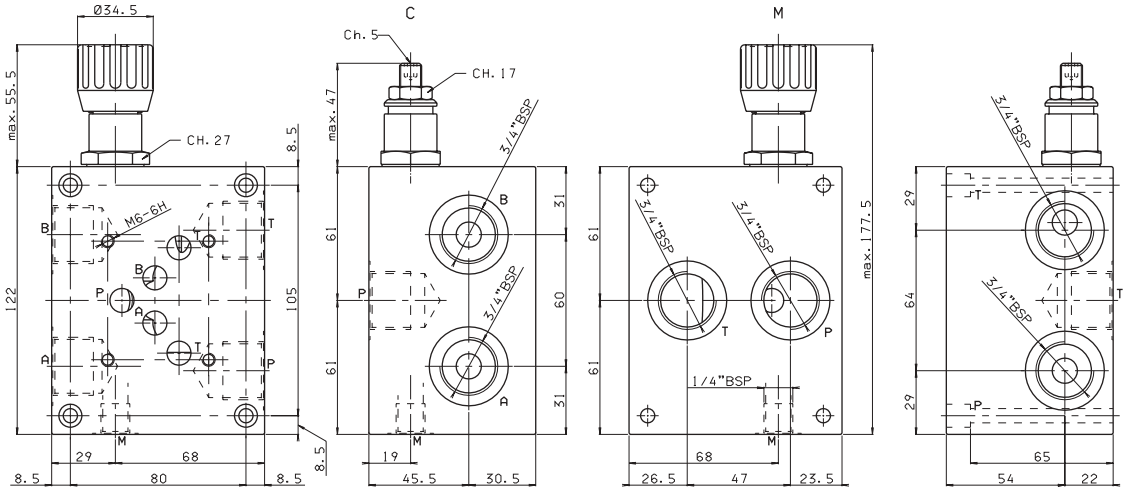
• The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.30...

BS.5.30 (CONNECTORS A AND B SIDE, P AND T REAR)



Weight: 5,5 Kg
Fixing screws
M6x75 UNI 5931

BS.5.31 (CONNECTORS A AND B SIDE, P AND T SIDE AND REAR)

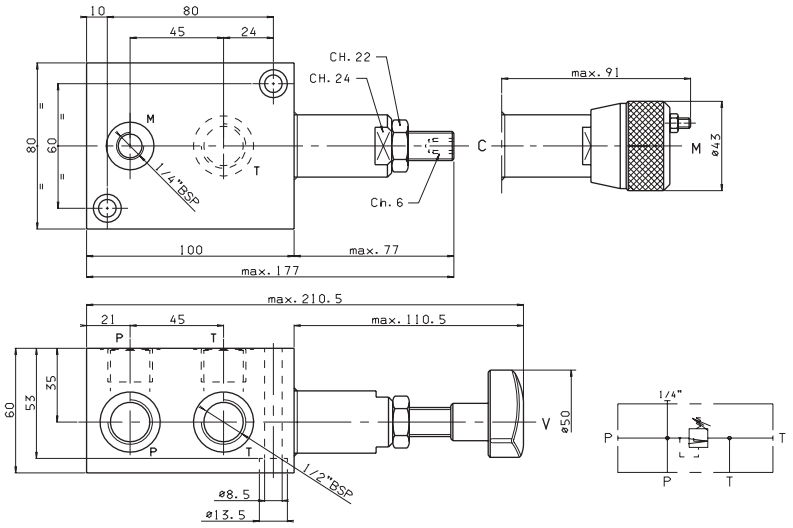


Weight: 6,7 Kg - Fixing screws M6x75 UNI 5931

BS.5... SINGLE STATION SUBPLATE

BS.VMP.20 SINGLE STATION SUBPLATE WITH MAX. PRESSURE VALVE FOR SURFACE MOUNTING (E.G. ON TANK COVER)

BS	Single subplate
VMP	Max. pressure valve
20	1/2" BSP connectors
*	**M** = Plastic knob **C** = Grub screw **V** = Handwheel
*	Setting range **1** = max. 50 bar **(white spring)** **2** = max. 140 bar **(yellow spring)** **3** = max. 250 bar **(green spring)**
00	No variant
1	Serial No.

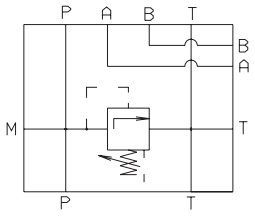


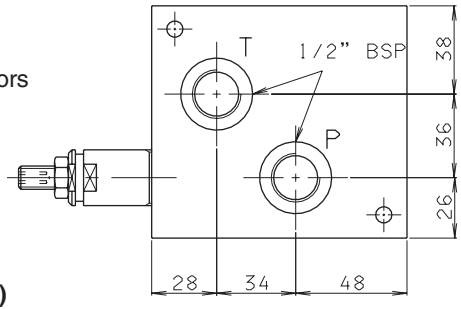
Weight: 3,1 Kg
Fixing screws M8x65 UNI 5931

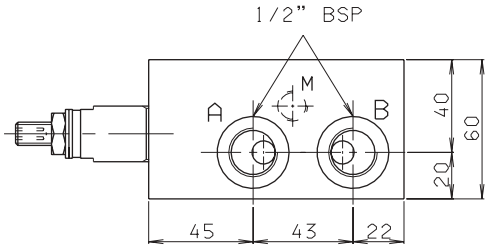
- **The minimum permissible setting pressure depending on the spring: see cartridge valve type CMP.20...**

BS.5.29 SINGLE STATION SUBPLATE WITH MAX. PRESSURE VALVE FOR AD.5.I...

BS	Single subplate
5	CETOP 5/NG10
29	1/2" BSP - P rear connector 1/2" BSP - A and B side connectors 1/2" BSP - T rear connector 3/4" BSP - T side connector
C	Type of adjustment Grub screw
*	Setting range **2** = max. 150 bar **(yellow spring)** **3** = max. 320 bar **(green spring)**
00	No variant
1	Serial No.



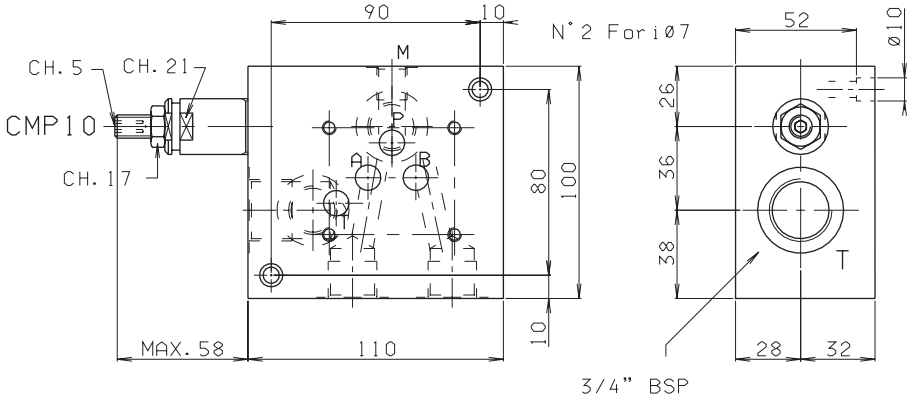




Weight: 4,5 Kg
Fixing screws M6x60 UNI 5931

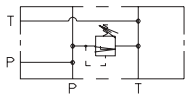
Tightening torque CMP.10...
60 ÷ 70 Nm / 6 ÷ 7 Kgm

M = Manometer connector (1/4" BSP)

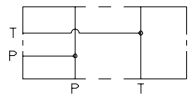


BC.5.36/28 P AND T REAR AND SIDE CONNECTORS 3/4" BSP

BC	Module base
5	CETOP 5/NG10
**	**36** = 3/4" BSP (P and T rear and side connectors with pressure relief valve) **28** = 3/4" BSP (P and T rear and side connectors without pressure relief valve)
*	Type adjustment (omit for 28 version) **M** = Plastic knob **C** = Grub screw
*	Setting range (omit for 28 version) **1** = max. 50 bar **(white spring)** **2** = max. 140 bar **(yellow spring)** **3** = max. 350 bar **(green spring)**
00	No variant
1	Serial No.



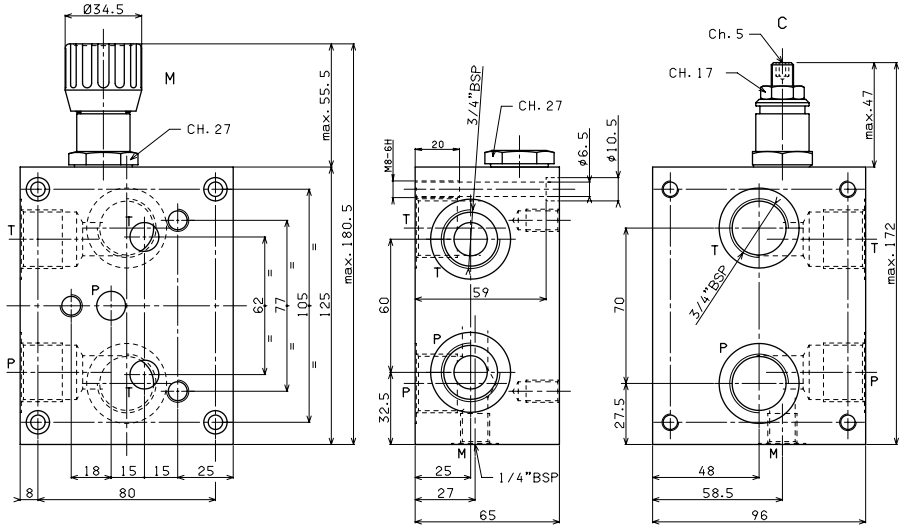
BC.5.36...



BC.5.28...

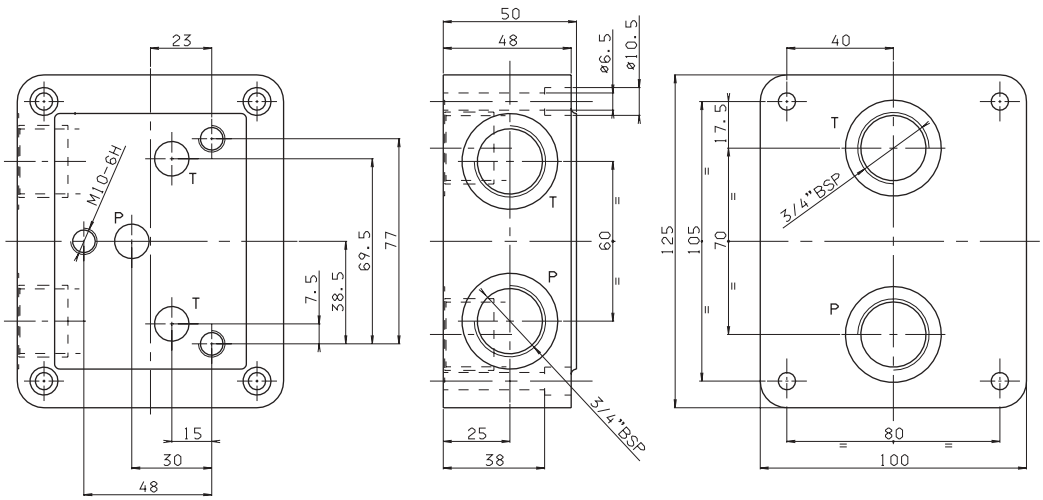
- **The minimum permissible setting pressure valve is the same for all spring: see cartridge valve type CMP.30...**

BC.5.36 P/T REAR AND SIDE CONNECTORS WITH PRESSURE RELIEF VALVE



Weight: 5,3 Kg
Fixing screws M6x70 UNI 5931

BC.5.28 P/T REAR AND SIDE CONNECTORS WITHOUT PRESSURE RELIEF VALVE

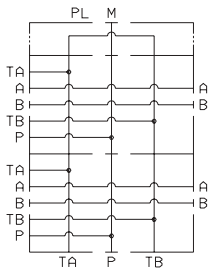


Weight: 3,9 Kg
Fixing screws
M6x50 UNI 5931

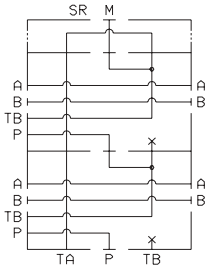
ASSEMBLED BASE MODULES - 3 RODS

Rods code	L	Composition
BC.5.41/2 M80.25.0001	205	BC.5.36/28+ 2 BC.5.30/32 + BC.5.40
BC.5.41/3 M80.25.0002	280	BC.5.36/28+ 3 BC.5.30/32 + BC.5.40
BC.5.41/4 M80.25.0003	355	BC.5.36/28+ 4 BC.5.30/32 + BC.5.40
BC.5.41/5 M80.25.0004	430	BC.5.36/28+ 5 BC.5.30/32 + BC.5.40
BC.5.41/6 M80.25.0005	505	BC.5.36/28+ 6 BC.5.30/32 + BC.5.40
BC.5.41/7 M80.25.0006	580	BC.5.36/28+ 7 BC.5.30/32 + BC.5.40
BC.5.41/8 M80.25.0007	655	BC.5.36/28+ 8 BC.5.30/32 + BC.5.40

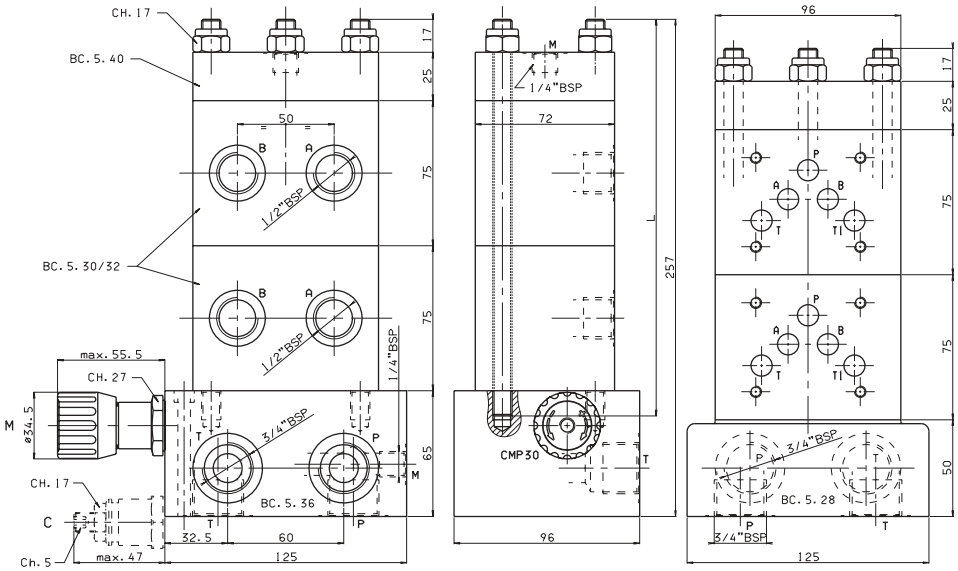
Nuts code Q26.56.0545
Pieces 3



BC. 5. 36/28
+BC. 5. 30



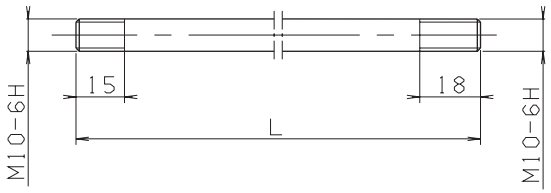
BC. 5. 36/28
+BC. 5. 32



- **Single components should be ordered separately (see pages VII•24,26,27)**
- **The minimum permissible setting pressure is the same for all spring: see cartridge valve type CMP.30...**

BC.5.41/* RODS FOR MODULAR ASSEMBLIES

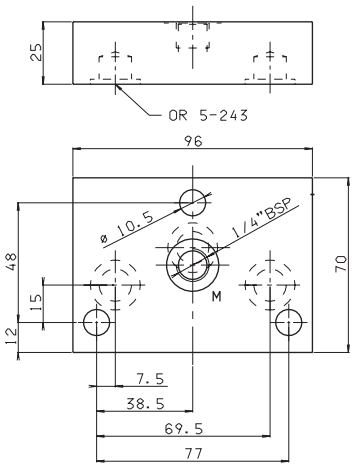
Rods code	Pieces	L	Composition
BC.5.41/2.00.1	3	205	for 2 solenoid valve
BC.5.41/3.00.1	3	280	for 3 solenoid valve
BC.5.41/4.00.1	3	355	for 4 solenoid valve
BC.5.41/5.00.1	3	430	for 5 solenoid valve
BC.5.41/6.00.1	3	505	for 6 solenoid valve
BC.5.41/7.00.1	3	580	for 7 solenoid valve
BC.5.41/8.00.1	3	655	for 8 solenoid valve

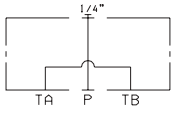


BC.5.40...

BC	Module base
5	CETOP 5/NG10 - 3 rods
40	Blanking
00	No variant
1	Serial No.

Weight: 1 Kg

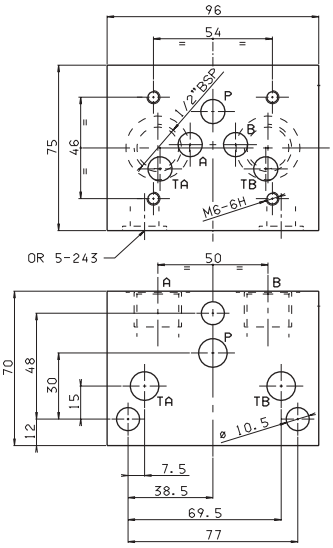


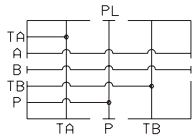


BC.5.30/32

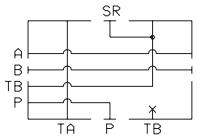
BC	Module base
5	CETOP 5/NG10 - 3 rods
**	**30** = 1/2" BSP connectors in parallel **31** = 3/4" BSP connectors in parallel **32** = 1/2" BSP connectors in series
**	**00** = No variant **AI** = A and B rear connector **AS** = A and B upper connectors
1	Serial No.

Weight: 3 Kg





BC.5.30...
BC.5.31...



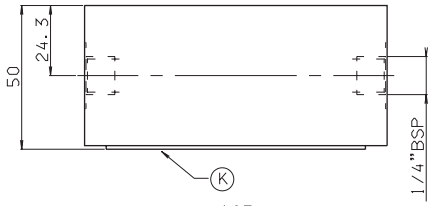
BC.5.32...

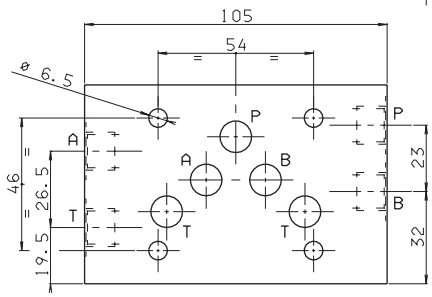
BC.5.50 INTERMEDIATE MODULE FOR PRESSURE GAUGE

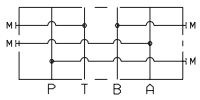
BC	Module base
5	CETOP 5/NG10
50	Intermediate module for pressure gauge connection at ports A/B/P/T
00	No variant
1	Serial No.

Weight: 2,3 Kg

K = plate OR (Q25.95.0002)





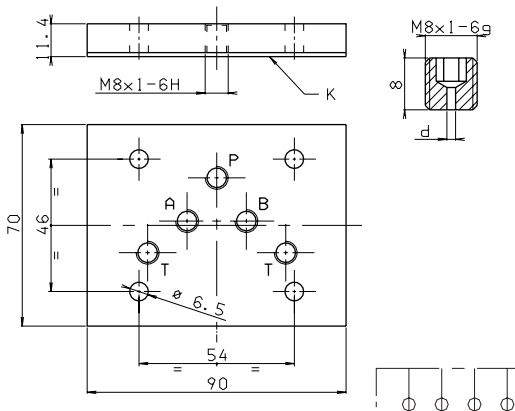


BC.5.51 DOWEL PLATE FOR SOLENOID VALVE

BC	Module base
5	CETOP 5/NG10
51	Subplate for solenoid valve
00	No variant
1	Serial No.

Weight: 0,5 Kg
K = plate OR (Q25.95.0002)

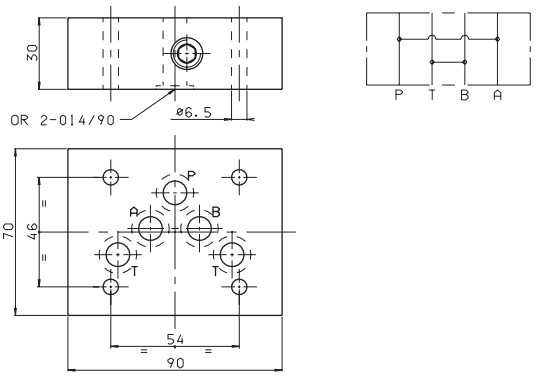
CALIBRATED DIAPHRAGMS AVAILABLE	
d	**M8x1x8**
0.6	M89.10.0007
0.7	M89.10.0008
0.8	M89.10.0009
0.9	M89.10.0012
1	M89.10.0010
1.2	M89.10.0011
1.4	M89.10.0038
1.5	M89.10.0035
1.75	M89.10.0042
2	M89.10.0041
2.5	M89.10.0036



BC.5.07 BASE FOR DOUBLE FLOW RATE P→A E B→T

BC	Module base
5	CETOP 5/NG10
07	Base for double flow rate
00	No variant
1	Serial No.

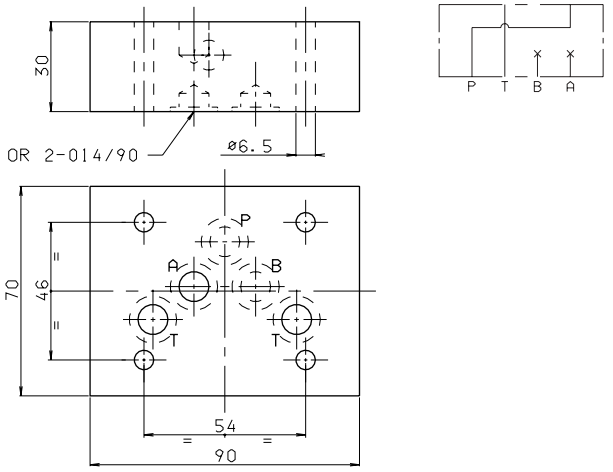
Weight: 1,2 Kg



BC.5.107 BASE FOR USE WITH 2 WAY VALVE

BC	Module base
5	CETOP 5/NG10
107	Base for use with 2 way valve
00	No variant
1	Serial No.

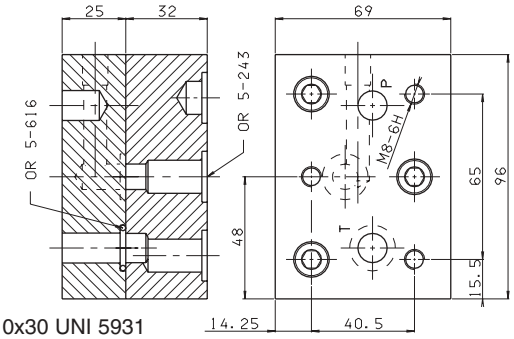
Weight: 1,2 Kg



BC.5.3A REDUCTION BASE FROM BC.5... TO BC.3...

BC	Module base
5	CETOP 5/NG10 - 3 rods
3A	CETOP 3/NG6 - 3 rods
00	No variant
1	Serial No.

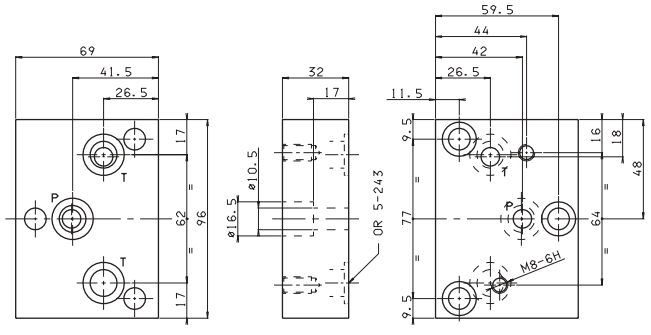
Weight: 2,4 Kg - Fixing screws M10x30 UNI 5931



BC.10.06 REDUCTION BASE FROM BC.5... TO BC.06...

BC	Module base
10	CETOP 5/NG10 - 3 rods
06	CETOP 3/NG6 - 2 rods
00	No variant
1	Serial No.

Weight: 1,3 Kg - Fixing screws M10x30 UNI 5931



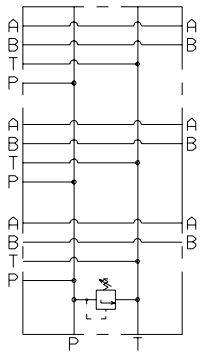
BM.5... MULTI STATION SUBPLATES

BM.5.**...

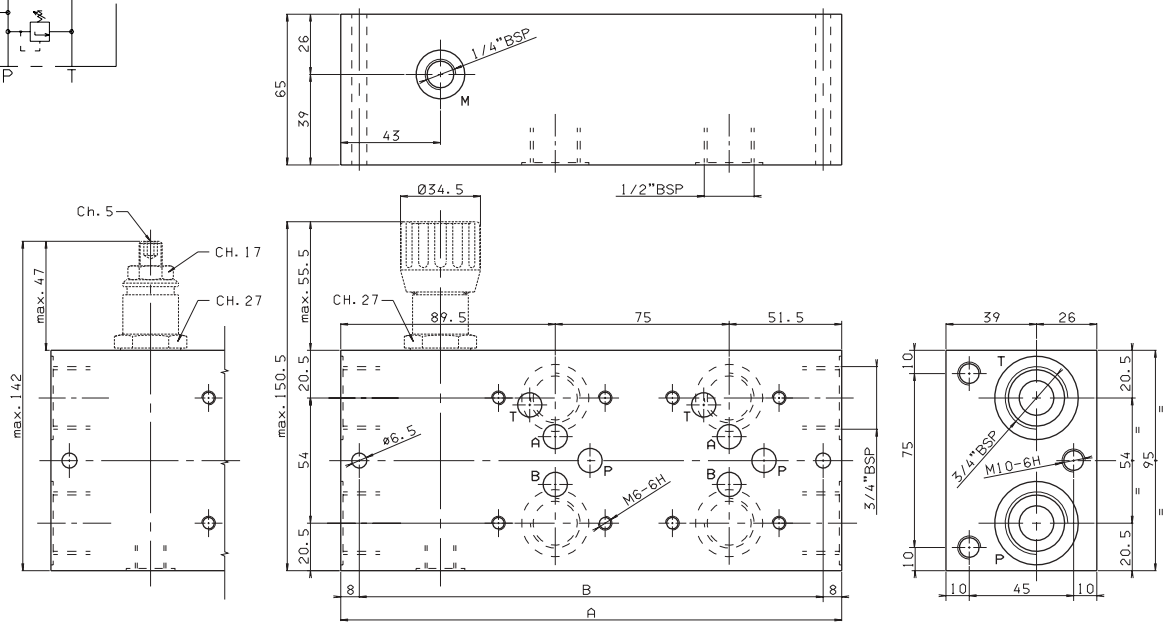
BM	Multi station subplate (standard versions are supplied in cast iron material)
5	CETOP 5/NG10
**	**50** = Connected in parallel with pressure relief valve and rear connectors **60** = Connected in parallel without pressure relief valve and side connectors **70** = Connected in parallel with pressure relief valve and 3/4" BSP P/T connectors and 1/2" BSP side A/B **80** = Connected in parallel with pressure relief valve and 1" BSP P/T connectors and 3/4" BSP side A/B
*	No. of valves seats (for BM.5.80... max 6)) **2 / 3 / 4 / 5 / 6 / 7 / 8**
*	Type of adjustment (omit for 60 version) **M** = Plastic knob **C** = Grub screw
*	Setting range (omit for 60 version) **1** = max. 50 bar **(white spring)** **2** = max. 140 bar **(yellow spring)** **3** = max. 350 bar **(green spring)**
**	**00** = No variant **AL** = in aluminium material (only for BM560 and BM570 versions)
1	Serial No.

• The minimum permissible setting pressure is the same for all spring: see cartridge valve type CMP.30...

BM.5.50 CONNECTED IN PARALLEL WITH PRESSURE RELIEF VALVE



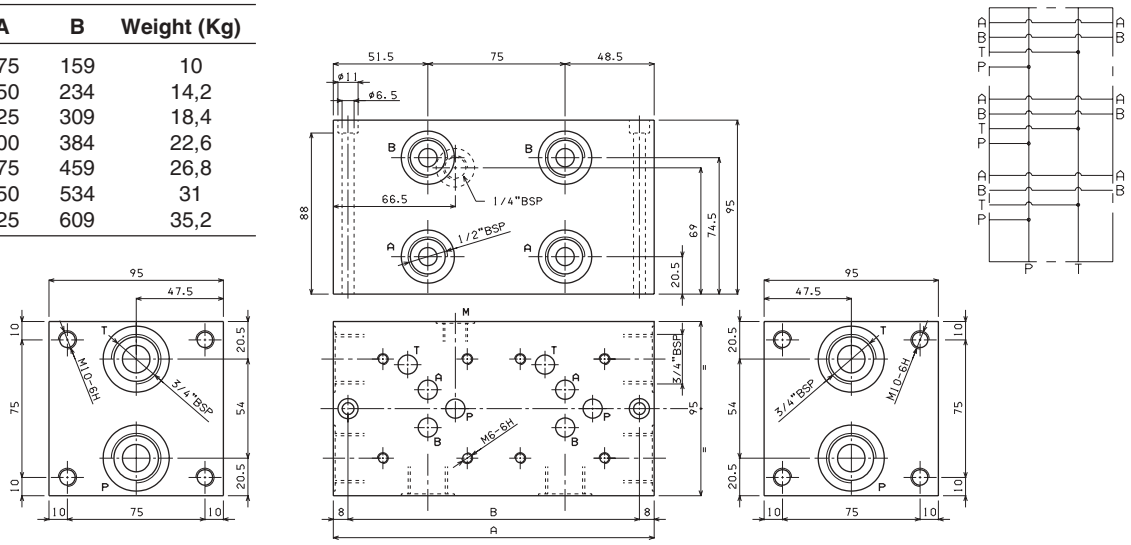
Type	A	B	Weight (Kg)
BM.5.50/2	216	200	8,5
BM.5.50/3	291	275	11,3
BM.5.50/4	366	350	14
BM.5.50/5	441	425	16,8
BM.5.50/6	516	500	19,5
BM.5.50/7	591	575	22,3
BM.5.50/8	666	650	25



Fixing screws M6x75 UNI 5931

BM.5.60 CONNECTED IN PARALLEL WITHOUT PRESSURE RELIEF VALVE

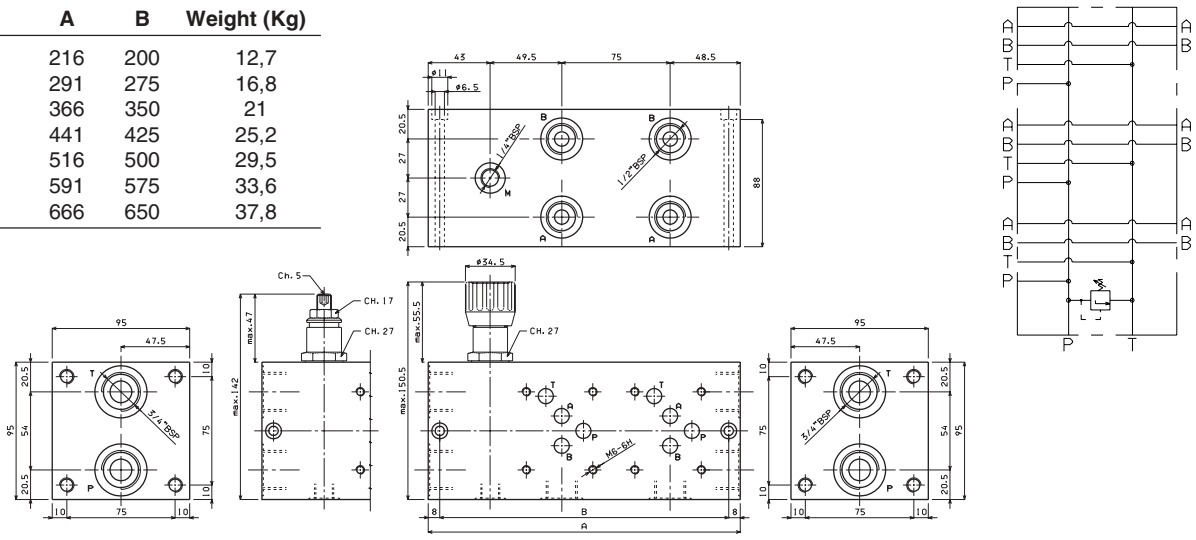
Type	A	B	Weight (Kg)
BM.5.60/2	175	159	10
BM.5.60/3	250	234	14,2
BM.5.60/4	325	309	18,4
BM.5.60/5	400	384	22,6
BM.5.60/6	475	459	26,8
BM.5.60/7	550	534	31
BM.5.60/8	625	609	35,2



Fixing screws M6x100 UNI 5931

BM.5.70 CONNECTED IN PARALLEL WITH PRESSURE RELIEF VALVE

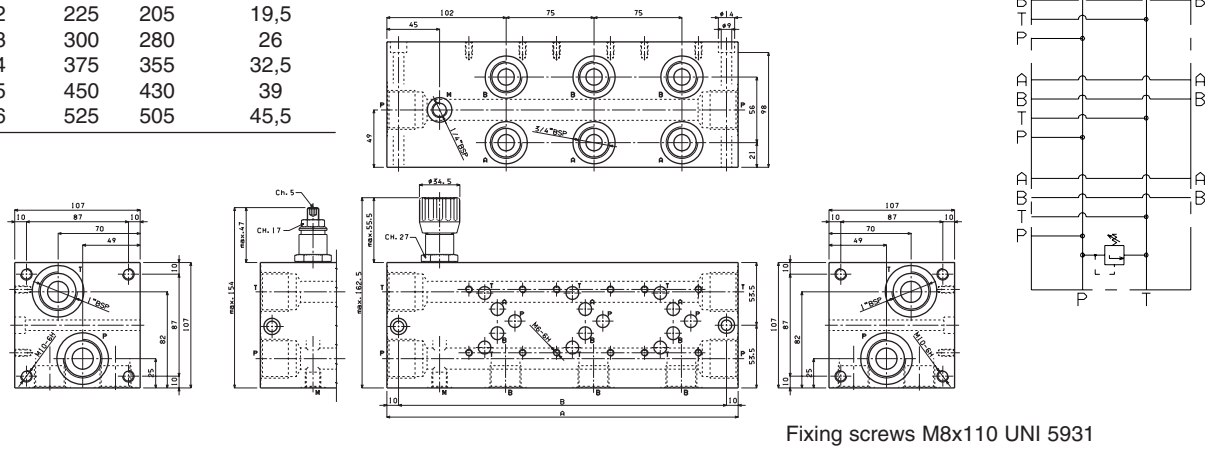
Type	A	B	Weight (Kg)
BM.5.70/2	216	200	12,7
BM.5.70/3	291	275	16,8
BM.5.70/4	366	350	21
BM.5.70/5	441	425	25,2
BM.5.70/6	516	500	29,5
BM.5.70/7	591	575	33,6
BM.5.70/8	666	650	37,8



Fixing screws M6x100 UNI 5931

BM.5.80 CONNECTED IN PARALLEL WITH PRESSURE RELIEF VALVE

Type	A	B	Weight (Kg)
BM.5.80/2	225	205	19,5
BM.5.80/3	300	280	26
BM.5.80/4	375	355	32,5
BM.5.80/5	450	430	39
BM.5.80/6	525	505	45,5



Fixing screws M8x110 UNI 5931

XD.3.A... / XD.3.C... SOLENOID OPERATING PROPORTIONAL VALVES CETOP 3

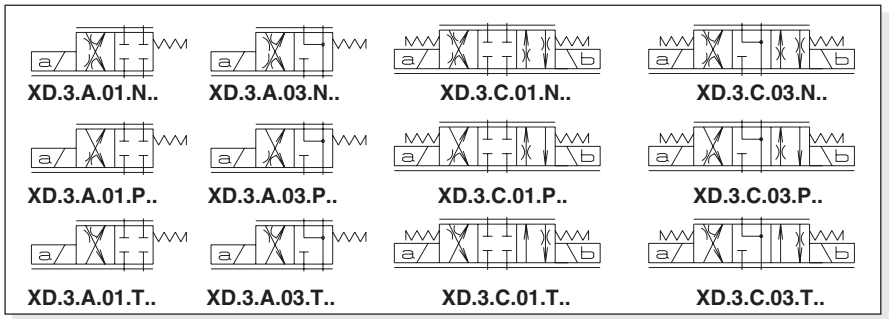
XD.3.A../XD.3.C.. series valves are used for controlling fluid direction and flow rate as a function of the supply current to the proportional control solenoid.

Any valve Δp variation causes a change in the set flow rate; however the valve itself ensure a high level internal compensation by limiting the controlled flow rate.

Performances shown in this catalogue are guaranteed only using 2 or 3 way modular assembly hydrostats type AM.3.H. ...

The shown flow rates are typical for one line operation (e.g. from P to B), while higher flow rates are obtainable by using the valve with our flow rate doubling sub-base type BC.3.07 (see diagram next page). This type of configuration extends considerably the flow rate limit.

XD.3...	
"D15P" PROPORT. SOLENOIDS	CH. VIII PAGE 3
REM.S.RA...	CH. IX PAGE 4
REM.D.RA...	CH. IX PAGE 7
SE.3.AN21.00...	CH. IX PAGE 11
AM.3.H...	CH. VIII PAGE 10
BC.3.07...	CH. VII PAGE 12

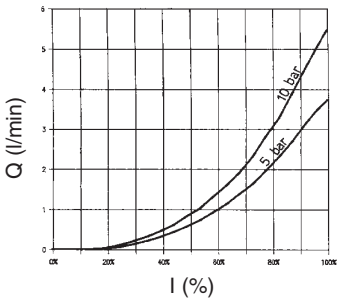


ORDERING CODE

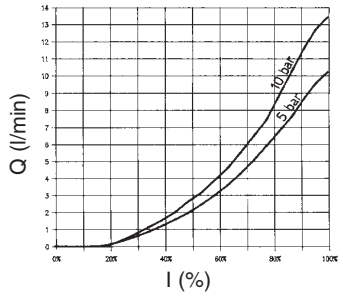
XD	Proportional valve
3	CETOP 3/NG6
*	**A** = Single solenoid **C** = Double solenoid
**	Type of spool **01** =  **03** = 
*	Flow path control (see symbols table) **N** = symmetrical **P** = meter in **T** = meter out
*	Flow rating l/min (Δp 5 bar) **1** = 3 l/min **2** = 10 l/min **3** = 15 l/min **4** = 18 l/min **5** = 25 l/min (at port T)
*	**E** = 9VDC (2.35 A) **F** = 12VDC (1.76 A) **G** = 24VDC (0.88 A)
**	**00** = No variant **V1** = Viton **P1** = Rotary emergency **P5** = Rotary emergency 180°
2	Serial No.

INPUT SIGNAL CURVES - FLOW RATE

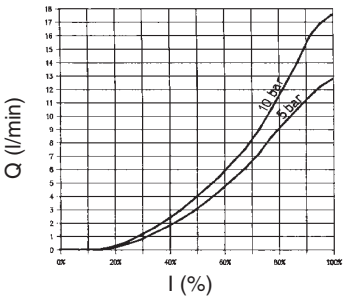
XD.3.*.01.N (3 l/min P → A/B)



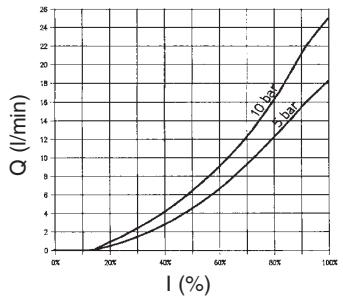
XD.3.*.01.N (10 l/min P → A/B)



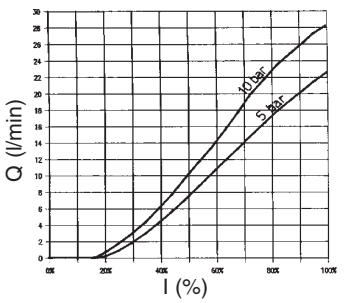
XD.3.*.01.N (15 l/min P → A/B)



XD.3.*.01.N (18 l/min P → A/B)



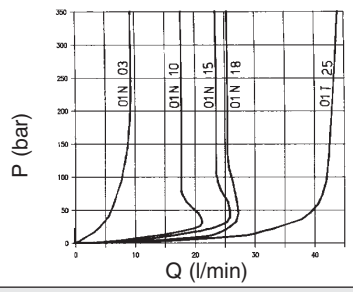
XD.3.*.01.T (25 l/min A/B → T)



POWER LIMITS TRANSMITTED

P→A / B →T

OR P→B / A→T



The fluid used is a mineral based oil with a viscosity of 46 mm²/s at 40°C.
The tests have been carried out at with a fluid of a 40°C.

OPERATING SPECIFICATIONS

Max. operating pressure ports P/A/B	350 bar
Max. operating pressure ports T - for dynamic pressure see note (*)	250 bar
Regulated flow rate	3 / 10 / 15 / 20 / 25 l/min
Relative duty cycle	Continuous 100% ED
Type of protection	IP 65
Flow rate gain	See diagrams
Hysteresis with connection P/A/B/T Δp = 5 bar (P/A)	≤7% of max. flow rate
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 8 in accordance with NAS 1638 with filter $ß_{10}≥75$
Weight XD.3.A... (single solenoid)	1,5 Kg
Weight XD.3.C... (double solenoid)	1,7 Kg

Type of voltage	9V	12V	24V
Max. current	2.35A	1.76 A	0.88 A
Solenoid coil resistance at 25°C (77°F)	2.25 Ohm	4.0 Ohm	16.0 Ohm

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

• Operating specifications are valid for fluid with 46 mm²/s viscosity at 40°C, using the specified ARON electronic control units.

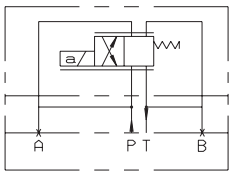
ELECTRONIC CONTROL UNIT

REM.S.RA.*.*. and REM.D.RA.*.*.
Card type control for single and double solenoid

SE.3.AN.21.00...
EUROCARD type control for single and double solenoid

AM.3.H.2V.P1 and AM.3.H.3V.P1
Hydrostats 2 or 3 way.

SCHEMA FOR DOUBLE FLOW RATE

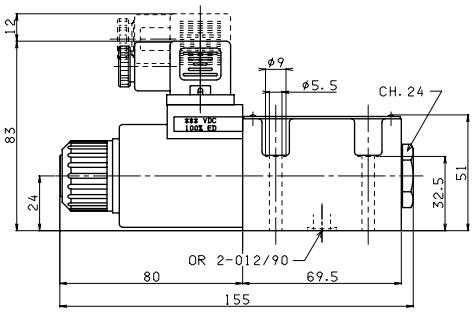


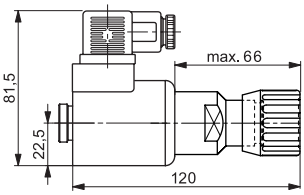
XD.3.A...

BC.3.07

Standard base

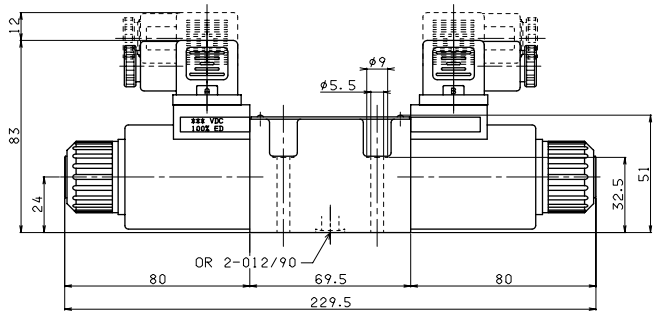
XD.3.A... OVERALL DIMENSIONS

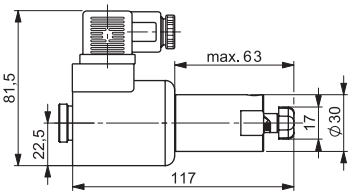




P1 Rotary emergency

XD.3.C... OVERALL DIMENSIONS

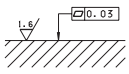


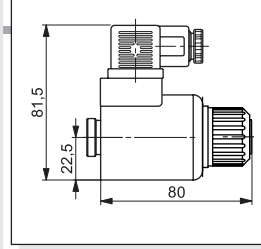


P5 Rotary emergency 180°

Fixing screws UNI 5931 M5x40 (min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specification





"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg

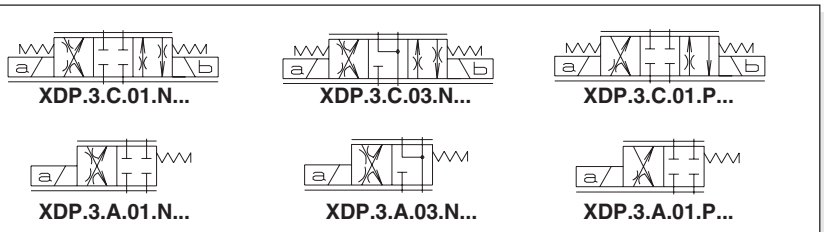
XDP.3.A... / XDP.3.C ...

PROPORTIONAL DIRECTIONAL VALVES OPEN LOOP

The open loop valves of series XDP... control the direction and the volume of the flow according to the feeding current to the proportional solenoid. By using a valve body equipped with increased passage channels it is possible to reach the highest capacity of its dimensions at a parity of pressure drops, (40 l/min with Δp of 10 bar).

Each Δp variation on the valve leads to the variation of the capacity which has been set, anyway the valve guarantees an high inner compensation grade and limits the adjustment capacity.

Performances shown in this catalogue are guaranteed only using 2 or 3 way modular assembly hydrostats type AM.3.H. ... By using the valve with the base for capacity doubling type BC.3.07 (see next page) a greater capacity cam be obtained.



XDP.3...	
D15P PROPORTIONAL SOLENOIDS	CH. VIII PAGE 5
REM.S.RA...	CH. IX PAGE 4
REM.D.RA...	CH. IX PAGE 7
SE.3.AN21.00...	CH. IX PAGE 11
AM.3.H...	CH. VIII PAGE 10
AM.5.H...	CH. VIII PAGE 11
BC.3.07...	CH. VII PAGE 12

ORDERING CODE

XDP — Open loop proportional directional valve

3 — CETOP 3/NG6

***** — **A** = Single solenoid
C = Double solenoid

****** — Type of spool (null position)
01 =  **03** = 

***** — Flow path control
(see hydraulic symbols table)
N = symmetrical
P = meter in (only with 01 spool)

***** — Flow rating
l/min (Δp 10 bar)
1 = 8 l/min
2 = 15 l/min
3 = 25 l/min
6 = 40 l/min ←

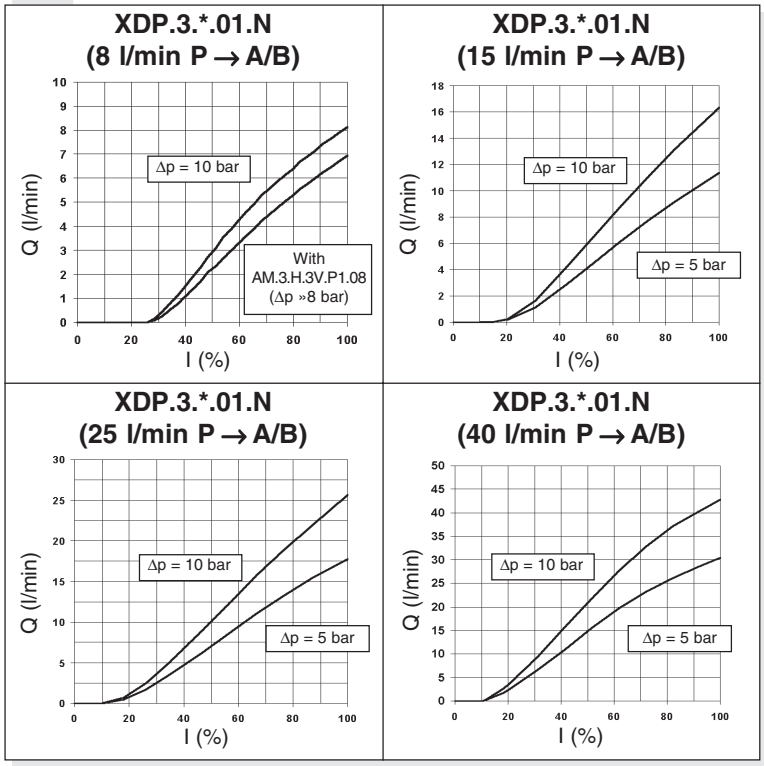
In order to reduced the unloading pressure for rated flow version at 40 l/min we advise to use the 3 way type AM.5.H.3V... hydrostat.

***** — Max. current to solenoid
E = 2.35 A
F = 1.76 A
G = 0.88 A

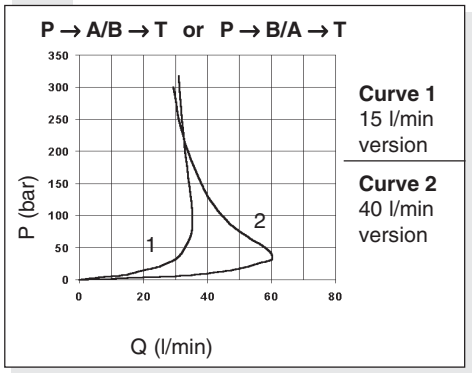
****** — **00** = No variant
P1 = Rotary emergency
P5 = Rotary emergency 180°
V1 = Viton

2 — Serial No.

INPUT SIGNAL CURVES - FLOW RATE



POWER LIMITS TRANSMITTED



XDP.3.A... / XDP.3.C ... PROPORTIONAL DIRECTIONAL VALVES OPEN LOOP

OPERATING SPECIFICATIONS

Max. operating pressure ports P/A/B	350 bar
Max. pressure port T - for dynamic pressure see note (*)	250 bar
Nominal flow	8 / 15 / 25 / 40 l/min
Duty cycle	Continuous 100% ED
Type of protection (depending on the connector used)	IP 65
Flow rate gain	See diagram
Power limits curves transmitted	See diagram
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 75°C
Ambient temperature	-20°C ÷ 70°C
Max. contamination level	from class 7 at 9 in accordance with NAS 1638 with filter $\beta_{10} \geq 75$
Weight XDP.3.A... (single solenoid)	1,7 Kg
Weight XDP.3.C... (double solenoid)	2,9 Kg

Max. current	**2.35A**	**1.76 A**	**0.88 A**
Solenoid coil resistance 25°C (77°F)	2.25 Ohm	4.0 Ohm	16.0 Ohm
Hysteresis P / A / B / T with a pressure compensator AM.3.H.3V...	≤5 %	<5%	<8%
Response to step Δp = 5 bar (P/A)			
0 ÷ 100%	32 ms	40 ms	85 ms
100% ÷ 0	33 ms	33 ms	33 ms
Frequency response -3db (Input signal 50% ±25% Vmax)	22Hz	22Hz	12Hz

(*) Pressure dynamic allowed for 2 millions of cycles

Operating specifications are valid for fluids with 46 mm²/s viscosity at 40°C, using the specified ARON electronic control units. Performance data carried out using the specified Aron power amplifier SE.3.AN... serie 1 - EUROCARD format.

AMPLIFIER UNIT AND CONTROL

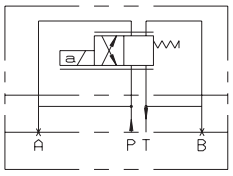
REM.S.RA.*.*. and REM.D.RA.*.*.
Electronic card control single and double proportional solenoid valve.

SE.3.AN.21.00...
Electronic card format EUROCARD for control and double proportional solenoid valve

AM.3.H.2V.P1 / AM.3.H.3V.P1 and AM.5.H.3V.P1 (*)

Hydrostats 2 or 3 way
(*) for rated flow XDP3 version at 40 l/min only

CONFIGURATION FOR DOUBLE FLOW RATE

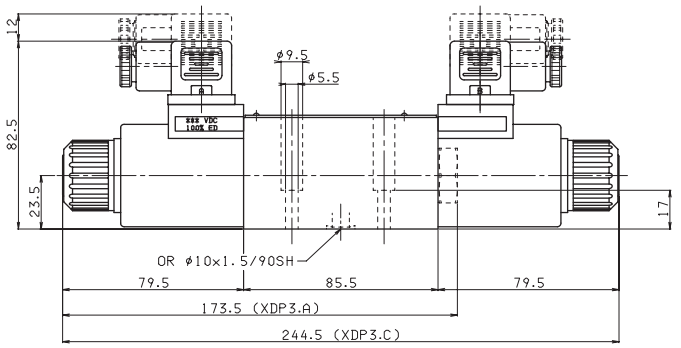


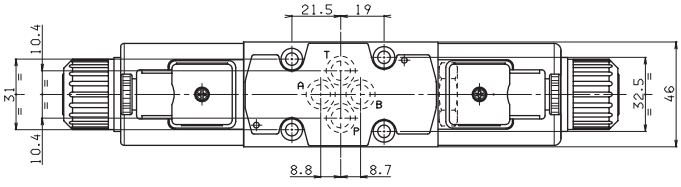
XDP.3.A...

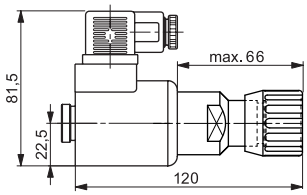
BC.3.07

Standard subplate

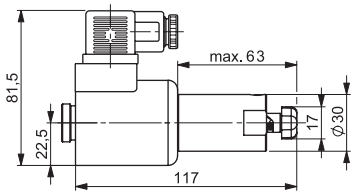
OVERALL DIMENSIONS







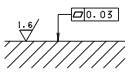
P1 Rotary emergency

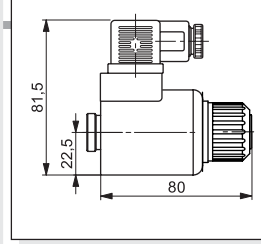


P5 Rotary emergency 180°

Fixing screws UNI 5931 M5x25
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specifications





"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg

XDC.3... PROPORTIONAL DIRECTIONAL VALVES

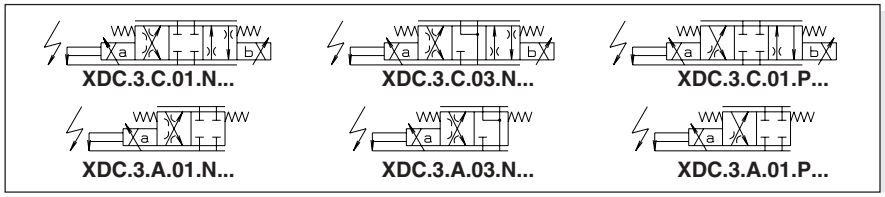
CLOSED LOOP POSITION CONTROL

The valves XDC serie 2 control the direction and the volume of the flow according to the feeding current to the proportional solenoid. The position transducer type LDVT (inductive position transducer) monitors the actual position of the spool.

In the electronic card (type SE.AN.21.RS...serie 3) the error between the actual position and the reference signal is used to obtain a greater precision of the spool positioning, reducing also considerably the hysteresis and the repeatibility error of the valve. For a more accurate flow control, 2 or 3-way pressure compensators modular plate design are available.

The shown flow rates are typical for one line operation (e.g. from P to B). By using the valve with the base for capacity doubling type BC.3.07 greater capacity can be obtained.

XDC.3...002	
PROPORTIONAL SOLENOID	CH. VIII PAGE 9
SE.3.AN21.RS...03	CH. IX PAGE 13
AM.3.H...	CH. VIII PAGE 10
AM.5.H...	CH. VIII PAGE 11
BC.3.07...	CH. VII PAGE 12



CE Registered mark for industrial environment with reference to the electromagnetic compatibility.
European norms: EN50082-2 - general safety norm - industrial environment;
EN50081-1 -emission general norm - residential environment

ORDERING CODE

XDC — Proportional directional valve with closed loop position control

3 — CETOP 3/NG6

***** — **A** = Single solenoid
C = Double solenoid

****** — Type of spool (null position)

01 =  **03** = 

***** — Flow path control
(see hydraulic symbols table)
N = symmetrical
P = meter in (only with 01 spool)

***** — Flow rating
l/min (Δp 10 bar)
1 = 8 l/min
2 = 15 l/min
3 = 25 l/min
6 = 40 l/min

In order to reduced the unloading pressure for rated flow version at 40 l/min we advise to use the 3 way type AM.5.H.3V... hydrostat.

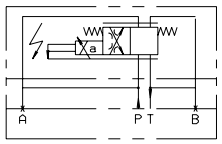
F — Max. current at solenoid: 1.76 A

00 — No variant

2 — Serial No.

Notice:
in order to control the valve XDC3...serie 2 it need to use the electronic card SE.AN.21.RS...serie 3, in exclusive way (See Ch. IX).

CONFIGURATION FOR DOUBLE FLOW RATE

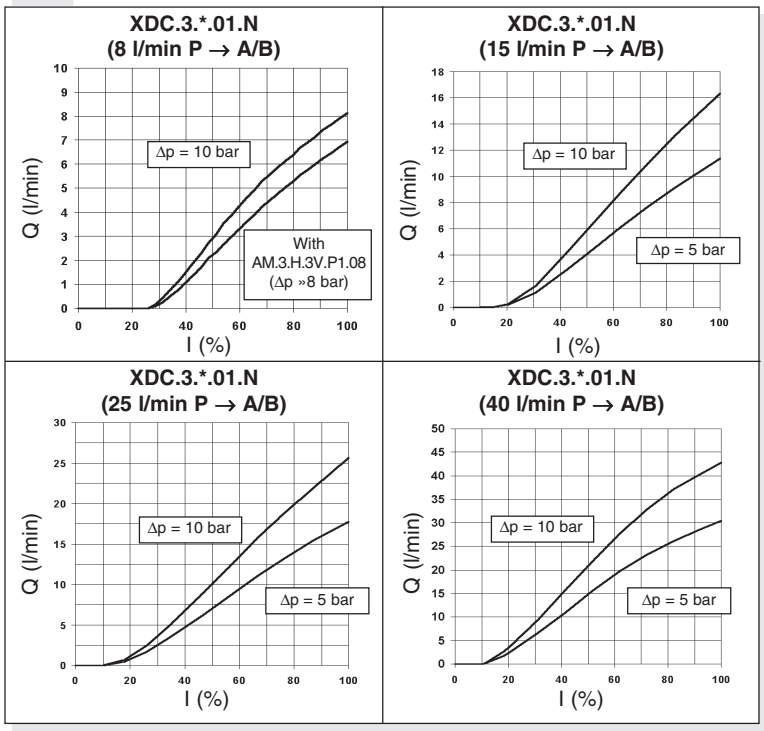


XDC.3.A...

BC.3.07

Standard subplate

INPUT SIGNAL CURVES - FLOW RATE



XDC.3... PROPORTIONAL DIRECTIONAL VALVES CLOSED LOOP POSITION CONTROL

OPERATING SPECIFICATIONS OF VALVE WITH TRANSDUCER

Max. operating pressure ports P/A/B	350 bar
Dynamic pressure port T	210 bar
Static pressure port T	210 bar
Nominal flow	8 / 15 / 25 / 40 l/min
Duty cycle	Continuous 100% ED
Type of protection (depending on the connectors used)	IP 65
Performance curves	See diagrams
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 75°C
Ambient temperature	-20°C ÷ 70°C
Max. contamination level	class 7 to 9 in accordance to NAS 1638 with filter $\beta_{10} \geq 75$
Weight XDC.3.A... (single solenoid)	1,94 Kg
Weight XDC.3.C... (double solenoid)	2,55 Kg
Max. current	**1.76 A**
Solenoid coil resistance at 20°C (68°F)	4.55 Ω
Solenoid coil resistance when hot	7.34 Ω
Hysteresis P/A/B/T with pressure compensator AM.3.H.3V...	<1%
Transient function with stepped electrical input signals Δp = 5 bar (P/A)	
0 ÷ 100%	65 ms
100% ÷ 0	75 ms
Repeatibility	<0,5%
Frequency response -3db (Input signal ±25% Vmax)	10 Hz
Insulation class	H
Weight of solenoid	0,6 Kg

Operating specifications are valid for fluids with 46 mm²/s viscosity at 40°C, using the SE3AN21RS... serie 3 ARON electronic control unit.

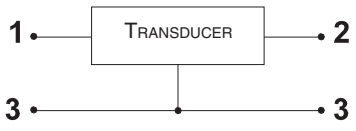
AMPLIFIER UNIT AND CONTROL

SE.3.AN.21.RS...serie 3 - Electronic card EUROCARD format for control of the proportional valve equipped with transducer

AM.3.H.2V.P1 / AM.3.H.3V.P1
AM.5.H.3V.P1 (*)

Hydrostats 2 or 3 way
(*) for rated flow XDC3 version at 40 l/min) only

TRANSDUCER ELECTRICAL CONNECTIONS



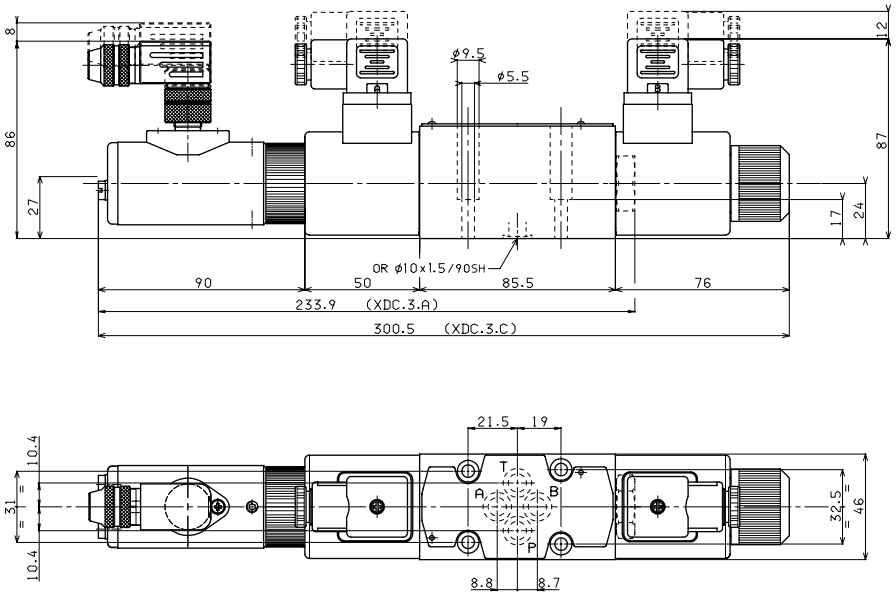
1 = Supply 18VDC ÷ 36VDC
3 = Mass
2 = Output 2V ÷ 10V

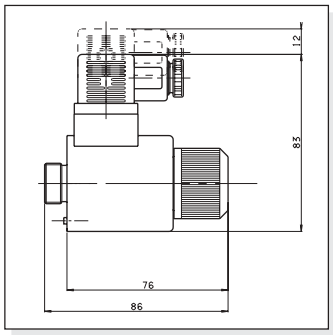
POSITION TRANSDUCER SPECIFICATION

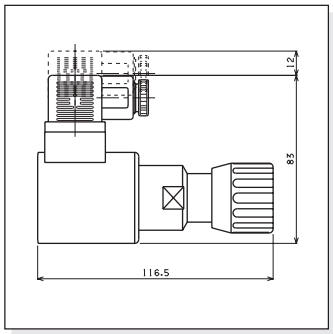
Electrical measuring system	LVDT
Nominal stroke	6 mm
Electrical connection	M12x1
Insulation (depending on the connector used)	IP65
Frequency response	500 Hz
Linearity tolerance	±1%

PROPORTIONAL SOLENOID

OVERALL DIMENSIONS

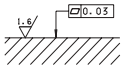


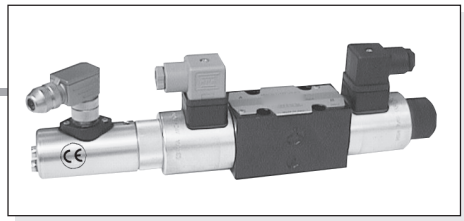




Fixing screws UNI 5931 M5x25
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specifications





XDC.3... PROPORTIONAL DIRECTIONAL VALVES

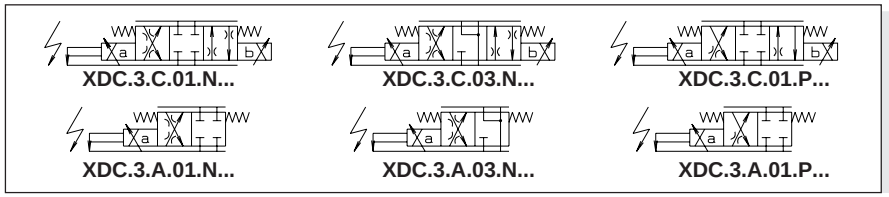
CLOSED LOOP POSITION CONTROL

The valves XDC...serie 1 control the direction and the volume of the flow according to the feeding current to the proportional solenoid. The position transducer type LDVT (inductive position transducer) monitors the actual position of the spool.

In the electronic card (type SE.AN.21.RS... serie 2) the error between the actual position and the reference signal is used to obtain a greater precision of the spool positioning, reducing also considerably the hysteresis and the repeatibility error of the valve. For a more accurate flow control, 2 or 3-way pressure compensators modular plate design are available.

The shown flow rates are typical for one line operation (e.g. from P to B). By using the valve with the base for capacity doubling type BC.3.07 greater capacity can be obtained.

XDC.3...001	
PROPORTIONAL SOLENOID	CH. VIII PAGE 9
SE.3.AN21.RS...02	CH. IX PAGE 11
AM.3.H...	CH. VIII PAGE 10
AM.5.H...	CH. VIII PAGE 11
BC.3.07...	CH. VII PAGE 12



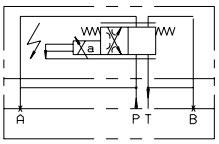
CE Registered mark for industrial environment with reference to the electromagnetic compatibility.
European norms: EN50082-2 - general safety norm - industrial environment;
EN50081-1 -emission general norm - residential environment

ORDERING CODE

XDC	Proportional directional valve with closed loop position control
3	CETOP 3/NG6
*	**A** = Single solenoid **C** = Double solenoid
**	Type of spool (null position) **01** =  **03** = 
*	Flow path control (see hydraulic symbols table) **N** = symmetrical **P** = meter in (only with 01 spool)
*	Flow rating l/min (Δp 10 bar) **1** = 8 l/min **2** = 15 l/min **3** = 25 l/min **6** = 40 l/min
F	Max. current at solenoid: 1.76 A
00	No variant
1	Serial No.

Notice:
in order to control the valve XDC3...serie 1 it need to use the electronic card SE.AN.21.RS...serie 2, in exclusive way.

CONFIGURATION FOR DOUBLE FLOW RATE

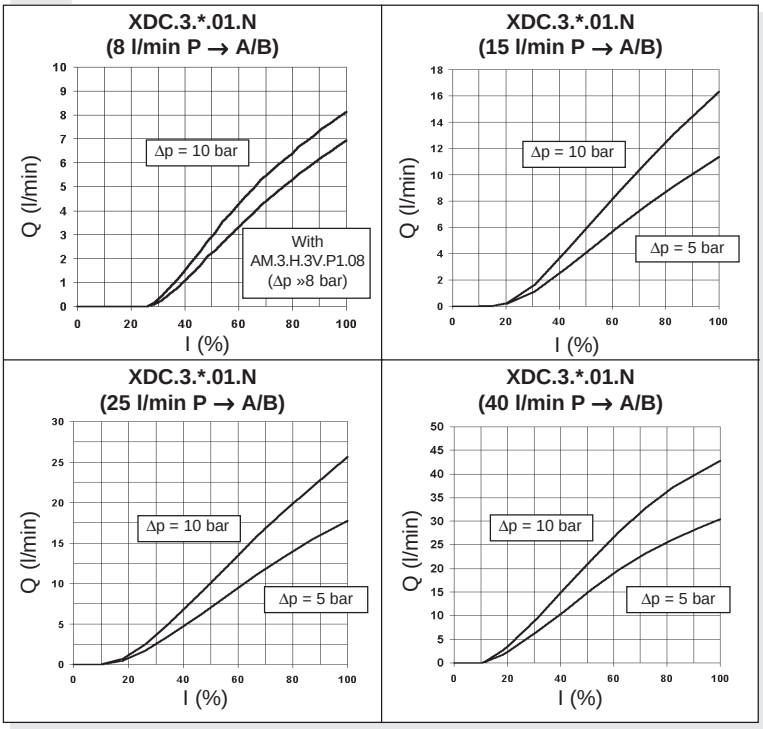


XDC.3.A...

BC.3.07

Standard subplate

INPUT SIGNAL CURVES - FLOW RATE



OPERATING SPECIFICATIONS OF VALVE WITH TRANSDUCER

Max. operating pressure ports P/A/B	350 bar
Dynamic pressure port T	210 bar
Static pressure port T	210 bar
Nominal flow	8 / 15 / 25 / 40 l/min
Duty cycle	Continuous 100% ED
Type of protection (depending on the connectors used)	IP 65
Performance curves	See diagrams
Frequency response	See Bode diagram
Fluid viscosity	10 ÷ 500 mm^2/s
Fluid temperature	-20°C ÷ 75°C
Ambient temperature	-20°C ÷ 70°C
Max. contamination level	class 7 to 9 in accordance to NAS 1638 with filter $ß_{10}≥75$
Weight XDC.3.A... (single solenoid)	1,94 Kg
Weight XDC.3.C... (double solenoid)	2,55 Kg
Max. current	**1.76 A**
Solenoid coil resistance at 20°C (68°F)	4.8 Ω
Solenoid coil resistance when hot	7.34 Ω
Hysteresis P/A/B/T with pressure compensator AM.3.H.3V...	<1%
Transient function with stepped electrical input signals Δp = 5 bar (P/A)	
0 ÷ 100%	-65 ms
100% ÷ 0	-75 ms
Repeatibility	<0,5%
Frequency response -3db (Input signal ±25% Vmax)	10 Hz
Insulation class	H
Weight of solenoid	0,6 Kg

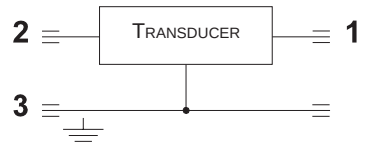
Operating specifications are valid for fluids with 46 mm^2/s viscosity at 40°C, using the SE3AN21RS.... serie 2 ARON electronic control unit.

AMPLIFIER UNIT AND CONTROL

SE.3.AN.21.RS...serie 2 Electronic card EUROCARD format for control of the proportional valve equipped with transducer

AM.3.H.2V.P1, AM.3.H.3V.P1 e AM.5.H.3V.P1
Hydrostats 2 or 3 way.

TRANSDUCER ELECTRICAL CONNECTIONS



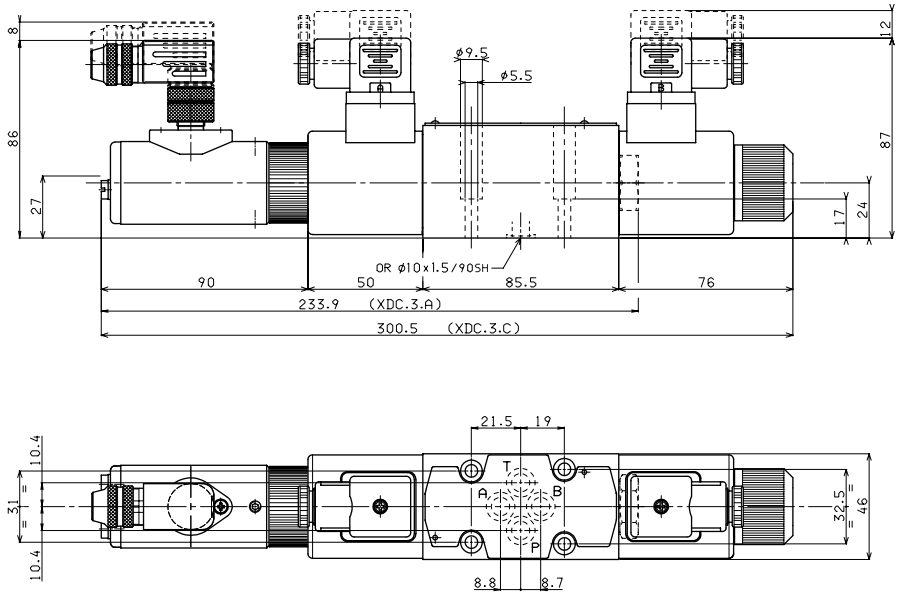
1 = Output	2,25VDC ÷ 12VDC
2 = Supply	18VDC ÷ 36VDC
3 = Mass	

POSITION TRANSDUCER SPECIFICATION

Electrical measuring system	LVDT
Nominal stroke	6,5 mm
Electrical connection	M12x1
Insulation (depending on the connector used)	IP65
Frequency response	500 Hz
Linearity tolerance	±1,5%

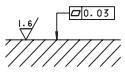
PROPORTIONAL SOLENOID

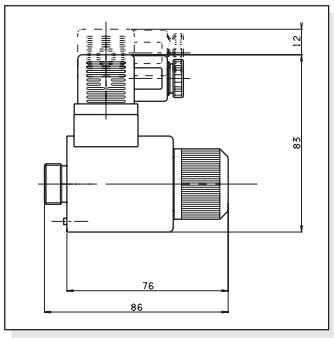
OVERALL DIMENSIONS

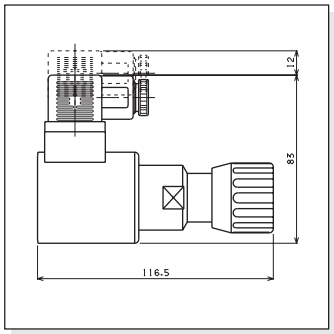


Fixing screws UNI 5931 M5x25
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specifications







XDP.5.A... / XDP.5.C ...

PROPORTIONAL DIRECTIONAL VALVES OPEN LOOP

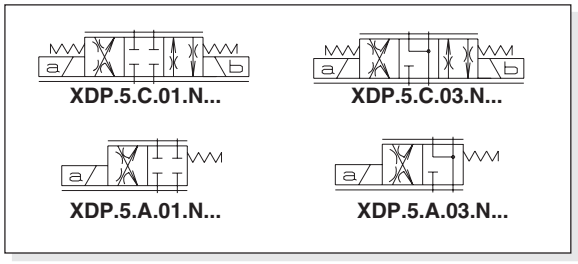
The open loop valves of series XDP control the direction and the volume of the flow according to the feeding current to the proportional solenoid.

Each Δp variation on the valve leads to the variation of the capacity which has been set, anyway the valve guarantees an high inner compensation grade and limits the adjustment capacity.

Performances shown in this catalogue are guaranteed only using 2 or 3 way modular assembly hydrostats type AM.3.H. ... (see note below in ordering code).

Q5 variant - This variant that consists of a solenoid chamber drainage separated from the T line and obtained on CETOP RO5 interface allows operation with up to 320 bar max. back pressure on the T line. To ensure maximum solenoid valve mounting safety and supplementary drainage, only 12.9 material fixing screws must be used with it.

XDP.5...	
"D19P" PROPORT. SOLENOIDS	CH. VIII PAGE 7
REM.S.RA...	CH. IX PAGE 4
REM.D.RA...	CH. IX PAGE 7
AM.5.H...	CH. VIII PAGE 11



ORDERING CODE

XDP — Open loop proportional directional valve

5 — CETOP 5/NG10

***** — **A** = Single solenoid
C = Double solenoid

****** — Type of spool (null position)
01 =  **03** = 

N — Symmetrical flow path control (see hydraulic symbols table)

***** — Flow rating (*) Δp 10 bar
2 = 45 l/min
3 = 60 l/min
5 = 100 l/min

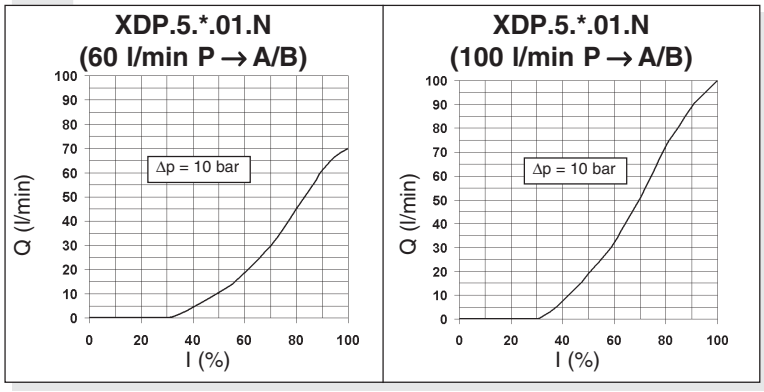
***** — Max. current to solenoid
F = 2.5 A
G = 1.25 A

****** — **00** = No variant
P1 = Rotary emergency
V1 = Viton
Q5 = External drainage

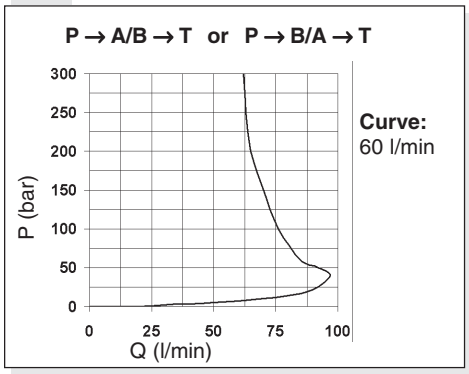
1 — Serial No.

(*) Guaranteed with 24Volt, 2.5Amps supply.

INPUT SIGNAL CURVES - FLOW RATE



POWER LIMITS TRANSMITTED



XDP.5.A... / XDP.5.C ... PROPORTIONAL DIRECTIONAL VALVES OPEN LOOP

OPERATING SPECIFICATIONS

Max. operating pressure ports P/A/B	320 bar
Max. pressure port T - for dynamic pressure see note (*)	250 bar
Max. pressure port T (with external drainage - Q5 variant)	320 bar
Nominal flow	45 / 60 / 100 l/min
Duty cycle	Continuous 100% ED
Type of protection (depending on the connector used)	IP 65
Flow rate gain	See diagram
Power limits curves transmitted	See diagram
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 75°C
Ambient temperature	-20°C ÷ 70°C
Max. contamination level from class 7 at 9 in accordance with NAS 1638 with filter $\beta_{10}\geq 75$	
Weight XDP.5.A... (single solenoid)	4,97 Kg
Weight XDP.5.C... (double solenoid)	6,55 Kg

	2.5 A	**1.25 A**
Max. current		
Solenoid coil resistance 20°C (68°F)	2.85 Ohm	11.4 Ohm
Hysteresis P/A/B/T with a pressure compensator AM.5.H.3V...	<5%	<8%
Response to step Δp = 10 bar (P/A)		
0 ÷ 100%	56 ms	118 ms
100% ÷ 0	32 ms	32 ms
Frequency response -3db (Input signal 50% ±25% Vmax)	10Hz	7Hz

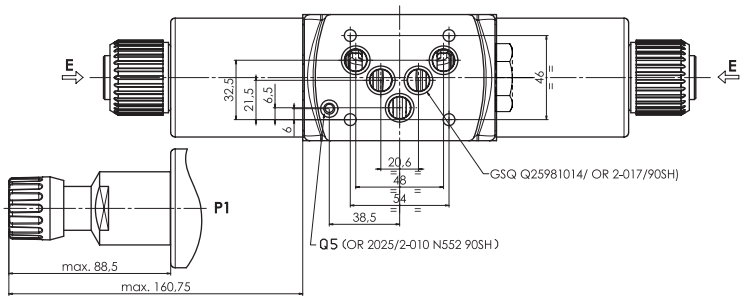
(*) Pressure dynamic allowed for 2 millions of cycles

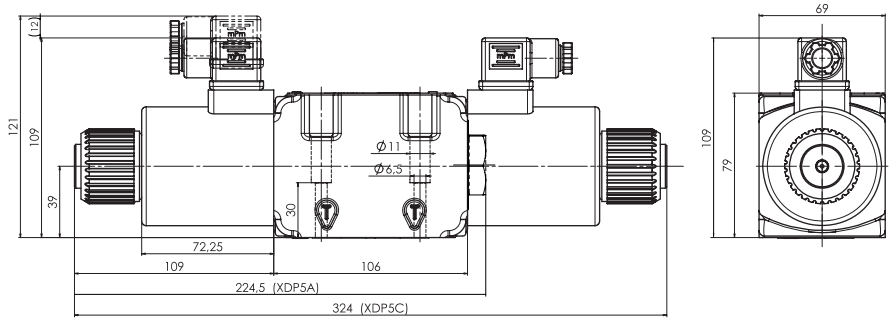
Operating specifications are valid for fluids with 46 mm²/s viscosity at 40°C, using the specified ARON electronic control units. Performance data carried out using the specified Aron power amplifier type REM.S.RA... power supplied at 24V.

AMPLIFIER UNIT AND CONTROL

REM.S.RA.*.*. and REM.D.RA.*.*.
Electronic card control single and double proportional solenoid valve.

AM.5.H.2V.P1 / AM.5.H.3V.P1(Δp=10bar)
Hydrostats 2 or 3 way.





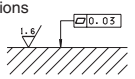
E = Manual override
P1 = Rotary emergency button

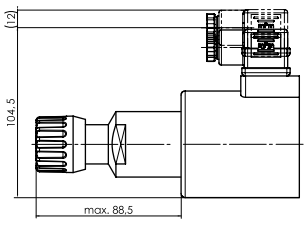
Q5 = External draining hole for XDP5 variante Q5 only **(Screws: material specifications 12.9 must be used)**

GSQ = Square section seal

Fixing screws UNI 5931 M6x40
(12.9 material screws are recommended)
Tightening torque 8 ÷ 10 Nm / 0.8 ÷ 1 Kgm

Support plane specifications





"D19P"
PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 65
Ambient temperature	-54°C ÷ 60°C
Duty cycle	100% ED
Insulation class	H
Weight	1,58 Kg

AM.3.H...

AM.3.H... 2 AND 3 WAY HYDROSTATS CETOP 3

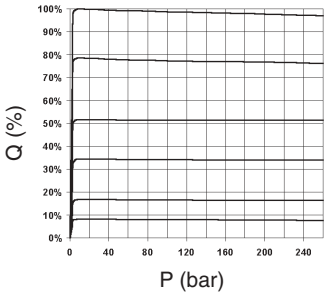
The 2 or 3 way pressure regulator type AM.3.H ensure the constant set flow rate in the presence of varying system load (pressure) by keeping constant the pressure drop (Δp = 4/8 bar) in relation to the flow rate regulation.
In order to achieve the direction and flow rate dual control function, it is normally used together with a proportional solenoid valve

Max. flow	25 l/min
Max. operating pressure	350 bar
Δp adjustment	4 bar
	8 bar
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 8 in accordance with NAS 1638 with filter $ß_{10} \geq 75$
Weight	1,4 Kg

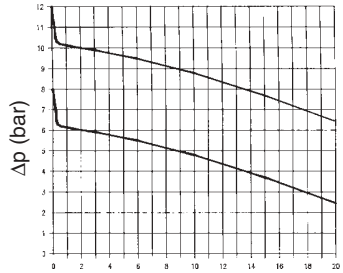
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
H	Hydrostat
******	**2V** = 2 way **3V** = 3 way
P1	Function at port P
******	Differential pressure (Δp) **04** = Δp 4 bar **08** = Δp 8 bar
******	**00** = No variant **V1** = Viton
1	Serial No.

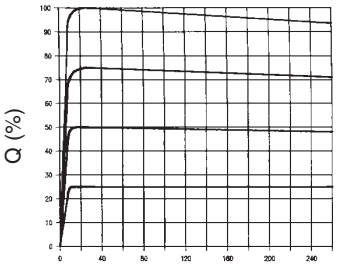
AM.3.H.2V.P1...
FLOW - LOAD PRESSURE CURVE



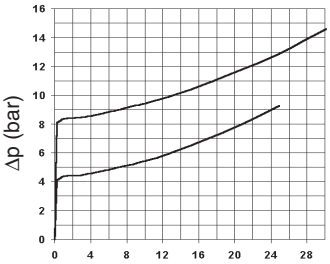
AM.3.H.2V.P1...
ΔP - REGULATED FLOW CURVE

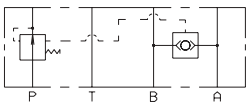


AM.3.H.3V.P1...
FLOW - LOAD PRESSURE CURVE

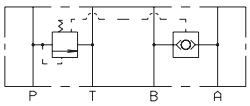


AM.3.H.3V.P1...
ΔP - PUMP FLOW

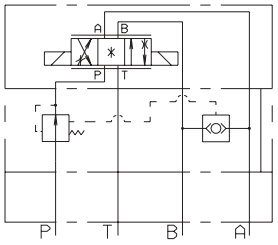




AM.3.H.2V.P1...



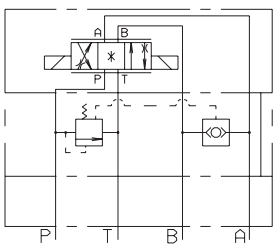
AM.3.H.3V.P1...



Proportional valve XD.3.C...

Hydrostat **AM.3.H.2V...**

BASE

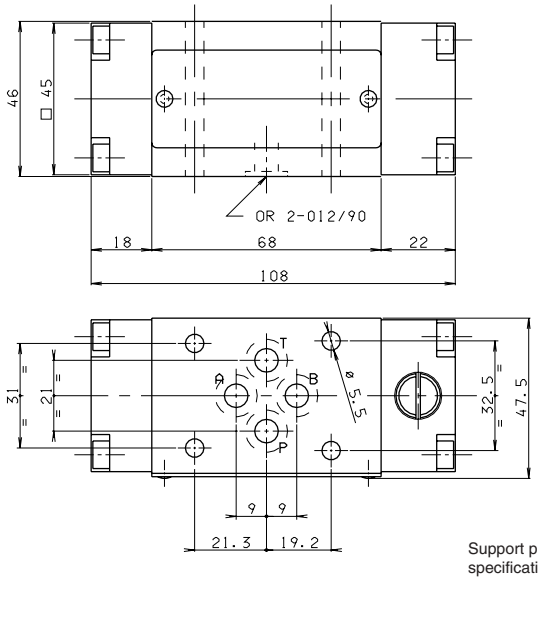


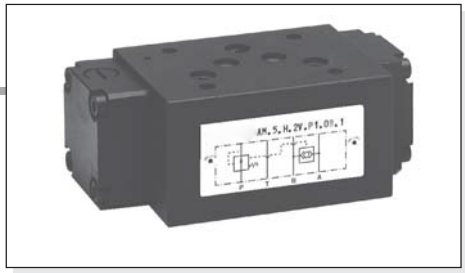
Proportional valve XD.3.C...

Hydrostat **AM.3.H.3V...**

BASE

OVERALL DIMENSIONS





AM.5.H...

AM.5.H... 2 AND 3 WAY HYDROSTATS CETOP 5

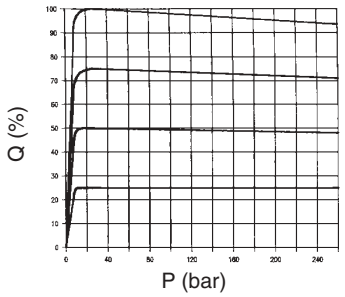
The 2 or 3 way pressure regulator type AM.5.H ensures a constant set flow rate in the presence of varying system load (pressure) by keeping constant the pressure drop (Δp =8 bar) in relation to the flow rate regulation.
In order to achieve the direction and flow rate dual control function, it is normally used together with a proportional solenoid valve.

Max. flow AM.5.H.2V...	65 l/min
Max. flow AM.5.H.3V...	70 l/min
Max. operating pressure	350 bar
Δp adjustment	8 bar
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 8 in accordance with NAS 1638 with filter $ß_{10}≥75$
Weight	2,7 Kg

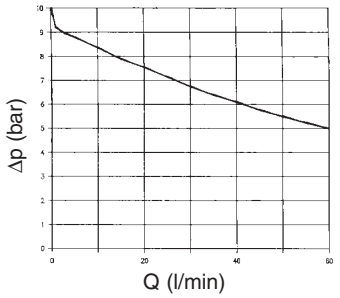
ORDERING CODE

AM	Modular valve
5	CETOP 5/NG10
H	Hydrostat
******	**2V** = 2 way **3V** = 3 way
P1	Function at port P
08	Differential pressure (Δp) Δp 8 bar
******	**00** = No variant **V1** = Viton
1	Serial No.

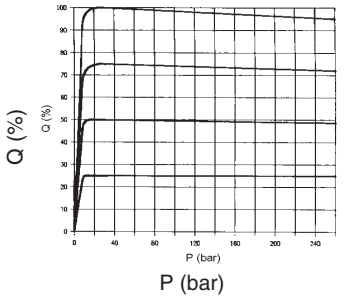
AM.5.H.2V.P1...
FLOW - LOAD PRESSURE CURVE



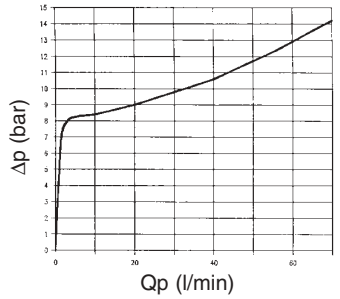
AM.5.H.2V.P1...
Δp - REGULATED FLOW CURVE

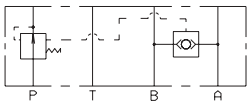


AM.5.H.3V.P1...
FLOW - LOAD PRESSURE CURVE

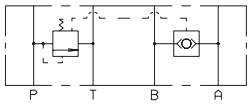


AM.5.H.3V.P1...
Δp - PUMP FLOW CURVE

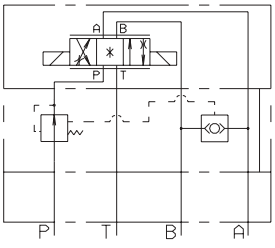




AM.5.H.2V.P1...



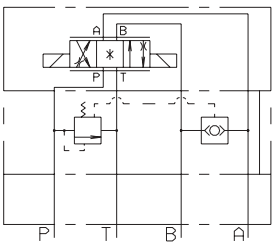
AM.5.H.3V.P1...



Proportional valve XD.5.C...

Hydrostat **AM.5.H.2V...**

BASE

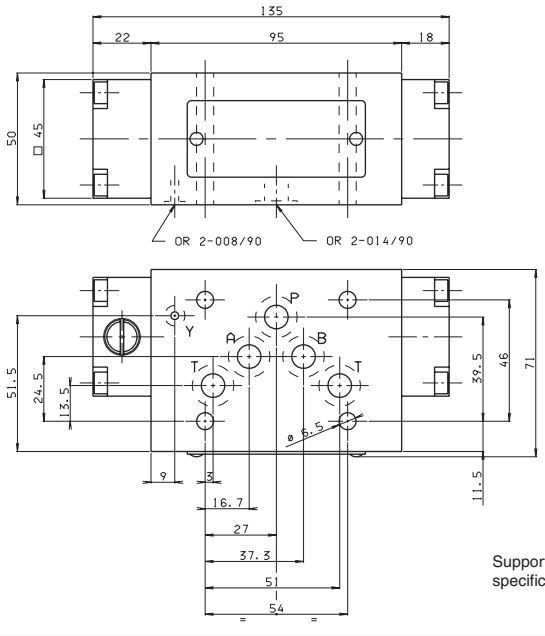


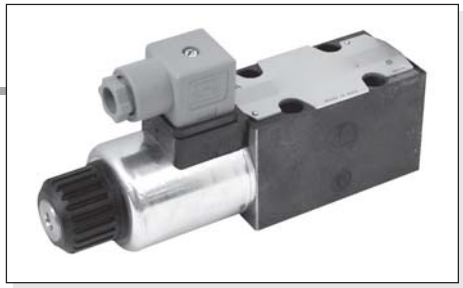
Proportional valve XD.5.C...

Hydrostat **AM.5.H.3V...**

BASE

OVERALL DIMENSIONS

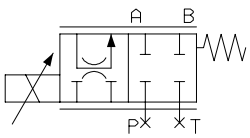




XQP.3... OPEN LOOP 2/3 WAY PROPORTIONAL PRESSURE COMPENSATED FLOW REGULATORS

The open loop proportional flow regulator is 2 and 3 way compensated with priority function. It is designed to regulate flow in proportion to an applied electrical current (REM or SE3AN power amplifier). Flow regulation is load independent - B port. Load compensation is achieved by a spool compensator which holds the pressure drop constant across the proportional spool.

Valves are available in the following versions (see hydraulic symbol):
- 2 way pressure compensated - 3 way pressure compensated with priority function.
- 3 way pressure compensated with priority and venting function.

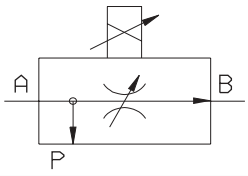


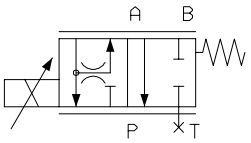
• In order to obtain the 2 way pressure compensated version the cavities P and T have be closed on the subplate.

XQP.3...	
"D15P" PROPORT. SOLENOIDS	CH. VIII PAGE 15
REM.S.RA...	CH. IX PAGE 4
SE.3.AN.21.00...	CH. IX PAGE 11
BC.06.XQP3...	CH. VII PAGE 13

HYDRAULIC SYMBOLS

SIMPLIFIED TYPE





• In order to obtain the 3 way pressure compensated version the cavity T have be closed on the subplate.

ORDERING CODE

XQP — Open loop 2/3 way proportional compensated flow regulator

3 — CETOP 3/NG6

C — 2/3 way compensation with priority function

3 — 3 way version (standard)
For to obtain 2-way version the P line must be closed on the subplate

***** — Nominal flow rates
F = 6 l/min
G = 12 l/min
H = 22 l/min
I = 32 l/min
L = 40 l/min

***** — **S** = without decompression
D = with decompression

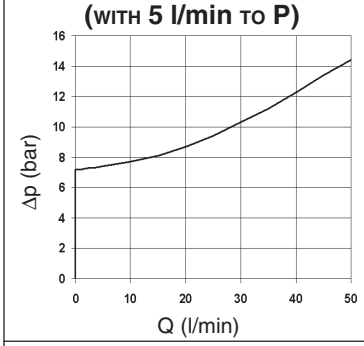
***** — Max. current to solenoid
E = 2.35 A
F = 1.76 A
G = 0.88 A

****** — **00** = No variant
P1 = Rotary emergency
P5 = Rotary emergency 180°
V1 = Viton

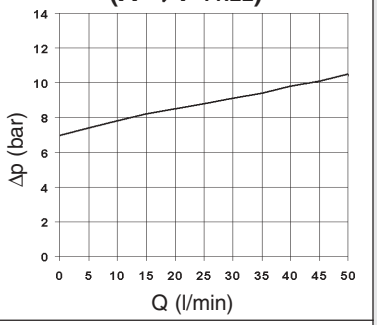
2 — Serial No.

DIAGRAMS

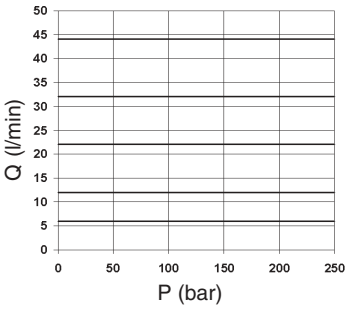
Δp - FLOW RATE A → B (WITH 5 l/min TO P)



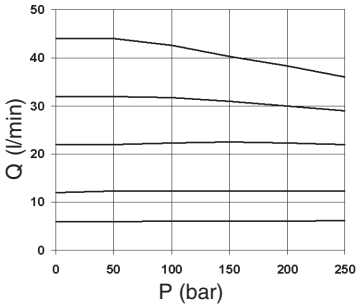
Δp - SECONDARY LINE FLOW (A → P FREE)



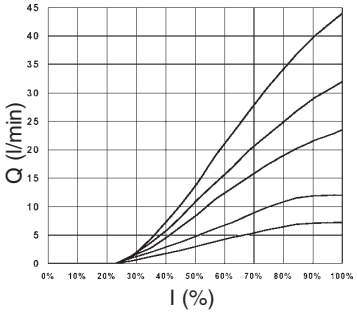
FLOW RATE
BACK PRESSURE ON PRIORITY LINE



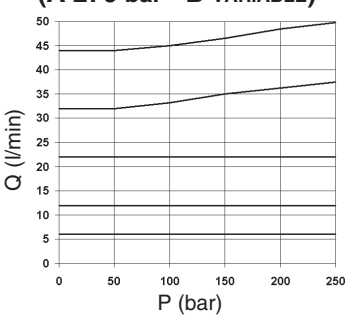
FLOW RATE
BACK PRESSURE ON SECONDARY LINE



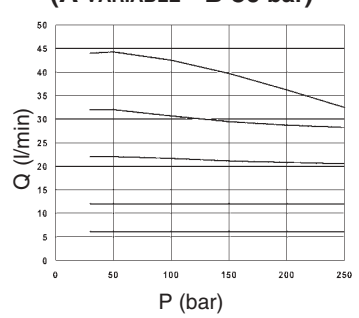
INPUT SIGNAL
FLOW



2 WAY COMPENSATION (A 270 bar - B VARIABLE)



2 WAY COMPENSATION (A VARIABLE - B 30 bar)



The fluid used is a mineral based oil with a viscosity of 46 mm²/s at 40°C.
The tests have been carried out at with a fluid of a 40°C.

XQP.3... OPEN LOOP 2/3 WAY PROPORTIONAL PRESSURE COMPENSATED FLOW REGULATORS

OPERATING SPECIFICATIONS

Max. operat. pressure ports A/B /P see note (*) With T port blocked on subplate	250 bar
Regulated flow rate	6 / 12 / 22 / 32 / 40 l/min
Decompression drain flow	max 0,7 l/min
Relative duty cycle	Continuous 100% ED
Type of protection (in relation to the connector used)	IP 65
Flow rate gain	See diagram "Input signal flow"
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 75°C
Ambient temperature	-20°C ÷ 70°C
Max. contamination level	from class 7 to 9 in accordance with NAS 1638 with filter $\beta_{10}\geq 75$
Weight	1,7 Kg

	2.33A	**1.76 A**	**0.88 A**
Max. current			
Solenoid coil resistance at 25°C (77°F)	2.25 Ohm	4.0 Ohm	16.0 Ohm
Hysteresis with Δp 7 bar	≤5%	<5%	<8%
Response to step Δp = 7 bar			
0 ÷ 100%	32 ms	40 ms	85 ms
100% ÷ 0	33 ms	33 ms	33 ms
Frequency response -3db (Input signal 50% ± 25% Vmax.)	22Hz	22Hz	12Hz

(*) Pressure dynamic allowed for 2 millions of cycles

Operating specifications are valid for fluids with 46 mm²/s viscosity at 40°C, using specified ARON electronic control units.

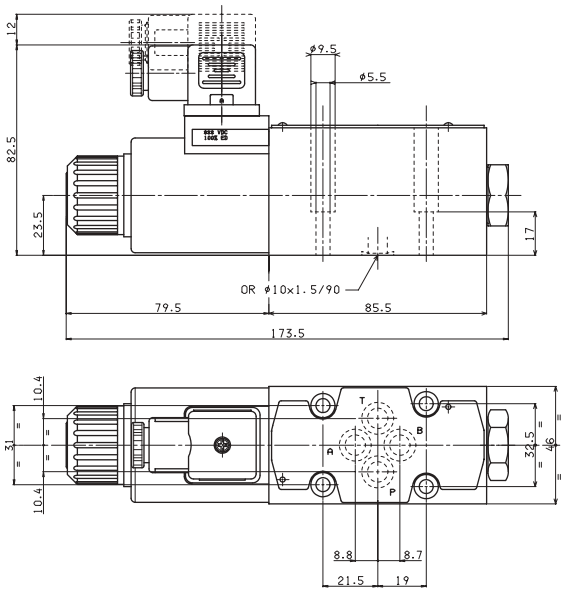
Performance data are carried out using the specified Aron power amplifier SE.3.AN...

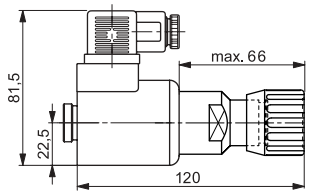
AMPLIFIER UNIT AND CONTROL

REM.S.RA.*.*...
Electronic card for control single proportional solenoid valve

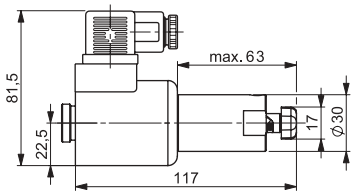
SE.3.AN.21.00...
Electronic card format EUROCARD for control single proportional solenoid valve

OVERALL DIMENSIONS





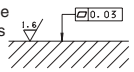
P1 Rotary emergency

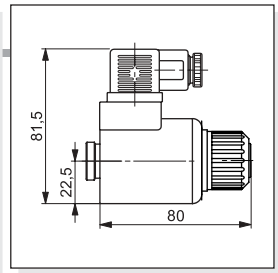


P5 Rotary emergency 180°

Fixing screws UNI 5931 M5x25
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

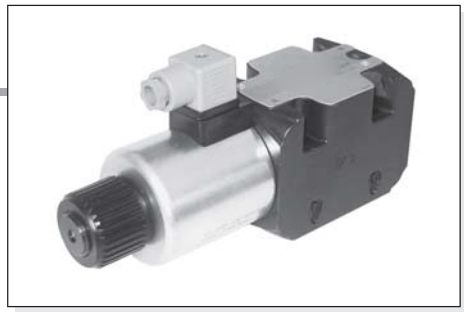
Support plane specifications





"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg



XQP.5. Open loop 2/3 way proportional pressure compensated flow regulators Cetop 5

The open loop proportional flow regulator is 2 and 3 way compensated with priority function. It is designed to regulate flow in proportion to an applied electrical current (REM power amplifier). Flow regulation is load independent - B port. Load compensation is achieved by a spool compensator which holds the pressure drop constant across the proportional spool.

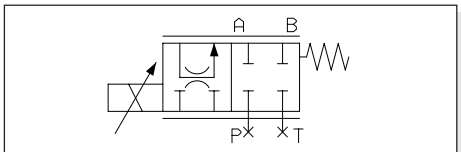
Valves are available in the following versions (see hydraulic symbol):
- 2 way pressure compensated
- 3 way pressure compensated with priority function.
- 3 way pressure compensated with priority and venting function.

XQP.5...
"D19P" Proport. Solenoids Ch. VIII page 17
REM.S.RA... Ch. IX page 4

Ordering code

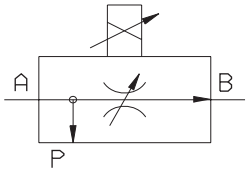
XQP	Open loop 2/3 way proportional compensated flow regulator
5	CETOP 5/NG10
C	2/3 way compensation with priority function
3	3 way version (standard) For to obtain 2-way version the P line must be closed on the subplate
*	Nominal flow rates **E** = 45 l/min **F** = 75 l/min **G** = 105 l/min
*	**S** = without decompression **D** = with decompression
*	Voltage **F** = 12V DC **G** = 24V DC
**	**00** = No variant **V1** = Viton
1	Serial No.

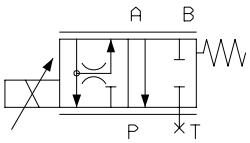
Symbols hydraulic



• In order to obtain the 2 way pressure compensated version the cavities P and T have be closed on the subplate.

Simplified type

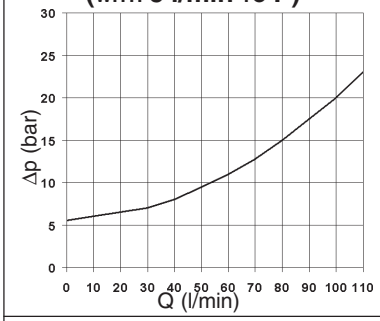




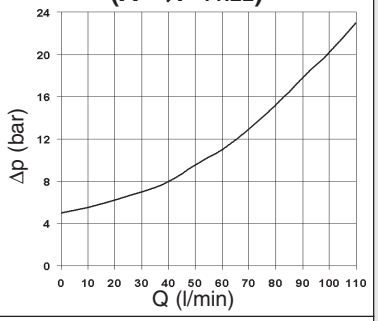
• In order to obtain the 3 way pressure compensated version the cavities T have be closed on the subplate.

Diagrams

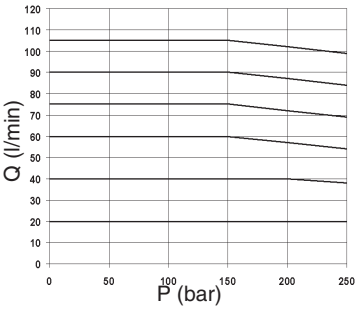
Δp - Flow rate A → B (with 5 l/min to P)



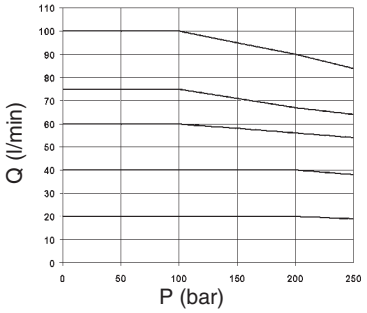
Δp - Secondary line flow (A → P free)



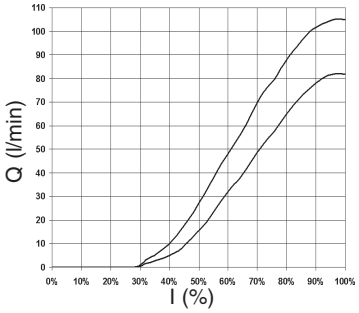
Flow rate
back pressure on priority line



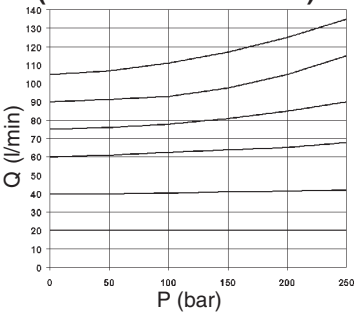
Flow rate
back pressure on secondary line



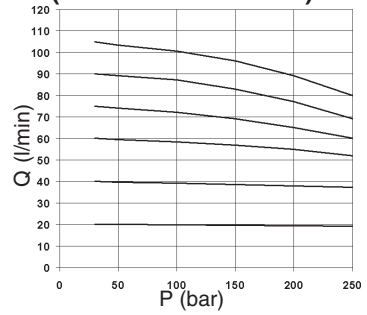
Input signal
flow



2 way pressure compensated (A 270 bar - B variable)



2 way pressure compensated (A variable - B 30 bar)



The fluid used is a mineral based oil with a viscosity of 46 mm²/s at 40°C.
The tests have been carried out at with a fluid of a 40°C.

XQP.5. OPEN LOOP 2/3 WAY PROPORTIONAL PRESSURE COMPENSATED FLOW REGULATORS CETOP 5

OPERATING SPECIFICATIONS

Max. operating pressure ports A/B /P (with T ports closed on the subplate)	250 bar
Regulated flow rate	75 / 105 l/min
Decompression drain flow	max 0,7 l/min
Relative duty cycle	Continuous 100% ED
Type of protection (in relation to the connector used)	IP 65
Flow rate gain	See diagram "Input signal flow"
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 75°C
Ambient temperature	-20°C ÷ 60°C
Max. contamination level	from class 7 to 9 in accordance with NAS 1638 with filter $\beta_{10} \geq 75$
Weight	4,97 Kg

	12V	**24V**
Type of voltage		
Max. current	2.5 A	1.25 A
Solenoid coil resistance at 20°C (68°F)	2.85 Ohm	11.4 Ohm
Hysteresis with Δp 7 bar	<5%	<8%
Response to step Δp = 7 bar (P/A)		
0 ÷ 100%	~ 65 ms	-
100% ÷ 0	~ 30 ms	-
Frequency response -3db (Input signal 50% ± 25% Vmax.)	7Hz	-

AMPLIFIER UNIT AND CONTROL

REM.S.RA.*.*...
Electronic regulator for control single proportional solenoid valve

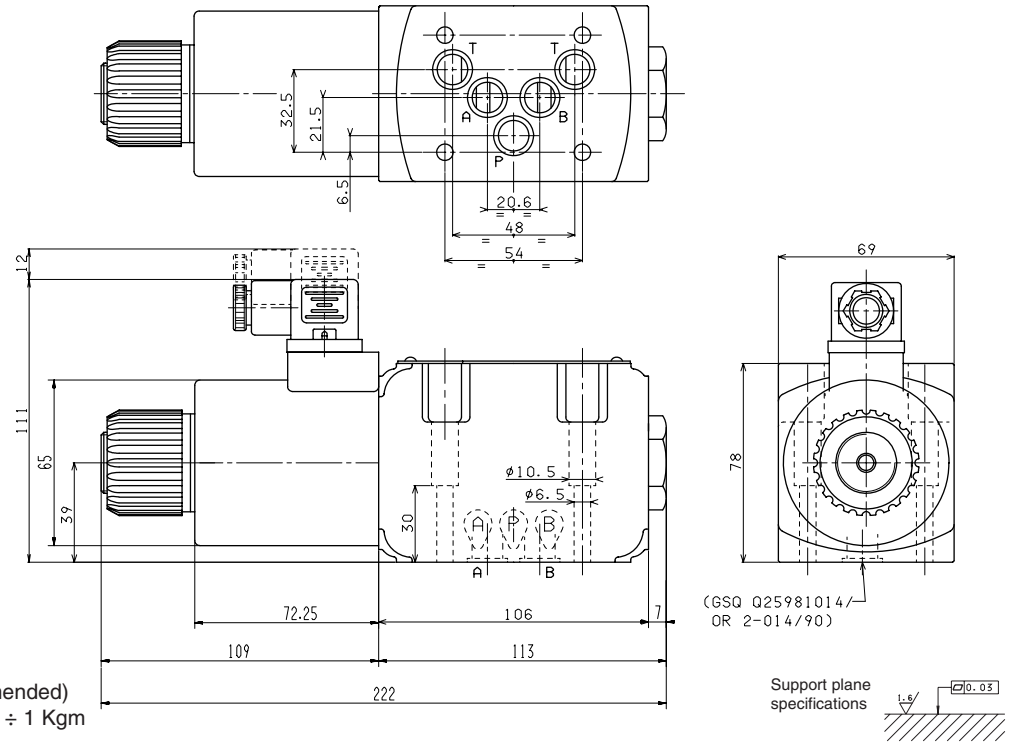
Operating specifications are valid for fluids with 46 mm²/s viscosity at 40°C, using specified ARON electronic control units.

Performance data are carried out using the specified Aron power amplifier type REM.S.RA... power supplied at 24V.

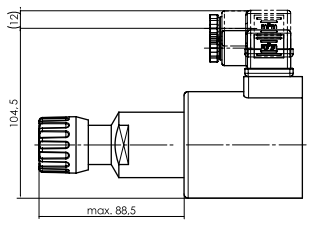
OVERALL DIMENSIONS

E = Manual override

GSQ = Square section seal



Fixing screws UNI 5931 M6x40
(12.9 material screws are recommended)
Tightening torque 8 ÷ 10 Nm / 0.8 ÷ 1 Kgm



"D19P"
PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 65
Ambient temperature	-54°C ÷ 60°C
Duty cycle	100% ED
Insulation class	H
Weight	1,58 Kg

XQ.3... PROPORTIONAL FLOW CONTROL VALVES PRESSURE COMPENSATED CETOP 3

This is a proportional valve where both the flow rate and pressure control flow functions have been integrated according to the 3 way regulation concept.

The interface UNI ISO 4401 - 03 - 02 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-03) allows for direct mounting on modular block or multiple sub-bases, which makes possible many advantageous and extremely compact application solution as a consequence of their simplicity of installation.

The 3 way type pressure compensator, inserted into the valve, holds the pressure drop across the flow rate proportional regulator constant (approx. 8 bar) independently from the controlled load variations, whereby ensuring proportional between the set flow rate and the electrical command signal.

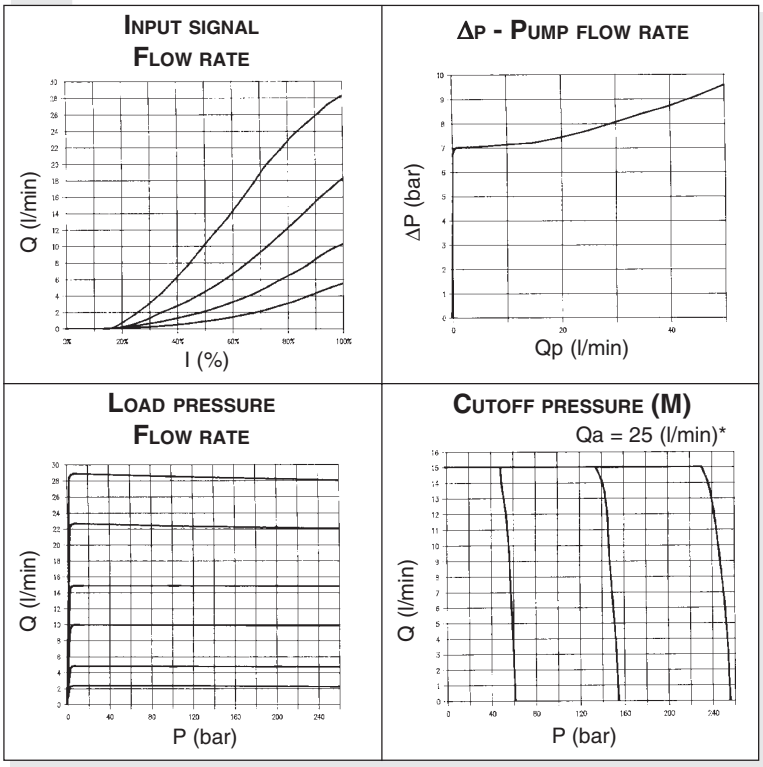
Additionally, the system maximum safety pressure can be regulated through a manual command. This valve, if mounted on the feed line to the manifold block, can be used to control several circuits which are not operating at the same time.

XQ.3...	
"D15P" PROPORT. SOLENOIDS	CH. VIII PAGE 13
REM.S.RA...	CH. IX PAGE 4
SE.3.AN21.00...	CH. IX PAGE 11
BC.3.08... / BC.3.09...	
BC.06.XQ3...	CH. VII PAGE 13

ORDERING CODE

XQ	Proportional flow control valve
3	No. of way
C	Pressure compensation
3	CETOP 3/NG6
*	Flow rates **F** = 5 l/min **G** = 10 l/min **H** = 16 l/min **I** = 28 l/min
*	**M** = With manual pressure limiter **S** = Without manual pressure limiter
*	Setting ranges **1** = 8 ÷ 50 bar **2** = 25 ÷ 170 bar **3** = 50 ÷ 315 bar Omit for **XQ.3.C.*.S** version
*	**E** = With rotary emergency (type **P1**) **S** = Without rotary emergency
*	Voltage **E** = 9VDC (2,35 A) **F** = 12VDC (1.76 A) **G** = 24VDC (0.88 A)
**	**00** = No variant **L5** = emergency lever **P5** = Rotary emergency180° **V1** = Viton
2	Serial No.

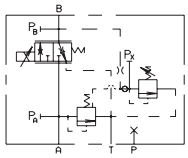
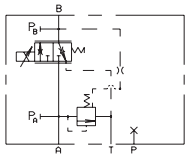
DIAGRAMS



The fluid used is a mineral based oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out at with a fluid of a 40°C.

(*) Tested with 25 l/min supply

TABLE 1 - FLOW / PRESSURE SPECIFICATIONS

Model / Hydraulic symbol	Max flow rate (l/min)	Max flow in P (l/min)	Max limiter pressure (bar)	Max load pressure (bar)	Δp Control (bar)
XQ.3.C.3.*.M 	5 10 16 28	40	8÷50 25÷170 50÷315	250	8
XQ.3.C.3.*.S 	5 10 16 28	40		250	8

XQ.3... PROPORTIONAL FLOW CONTROL VALVES PRESSURE COMPENSATED

Max. operat. pressure ports A/B / With P port blocked on subplate	315 bar
Max. operating pressure ports T - for dynamic pressure see note (*)	250 bar
Regulated flow rate	See diagram page before
Relative duty cycle	Continuous 100% ED
Type of protection	IEC 144 class IP 65
Flow rate gain	See diagrams
Hysteresis with connection P/A/B/T Δp = 5 bar (P/A)	≤4% of max. flow rate
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 8 in accordance with NAS 1638 with filter $\beta_{10} \geq 75$
Weight version XQ.3.C.*.M...	2,89 Kg
Weight version XQ.3.C.*.S...	2,39 Kg

Type of voltage	9V	12V	24V
Max. current	2.35A	1.76 A	0.88 A
Solenoid coil resistance at 25°C (77°F)	2.25 Ohm	4.0 Ohm	16.0 Ohm

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

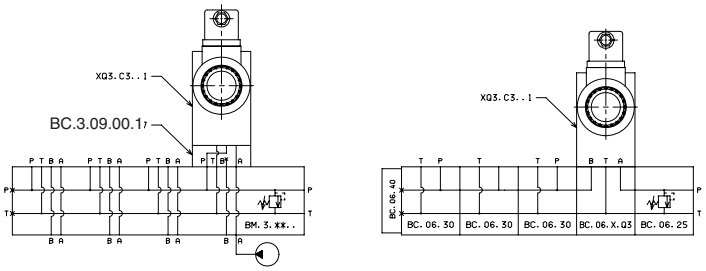
ELECTRONIC CONTROL UNIT

REM.S.RA.*.*.
Card type control for single solenoid

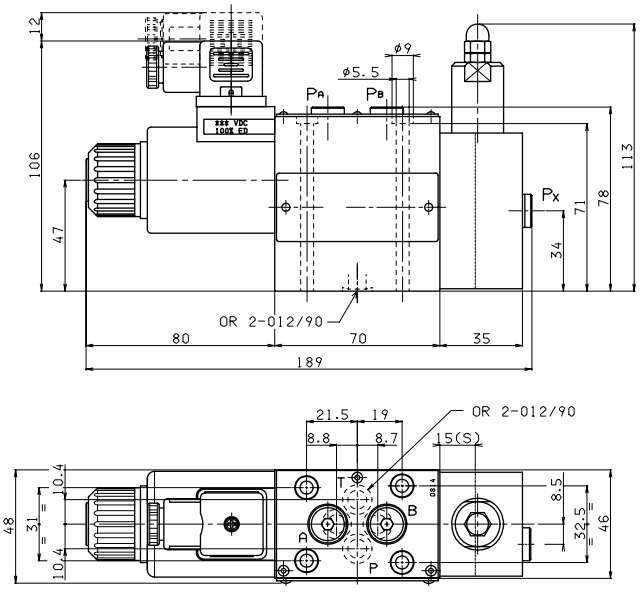
SE.3.AN.21.00...
EUROCARD type control for single solenoid

• Operating specifications are valid for fluid with 46 mm²/s viscosity at 40°C, using the specified ARON electronic control units

TYPICAL INSTALLATION

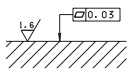


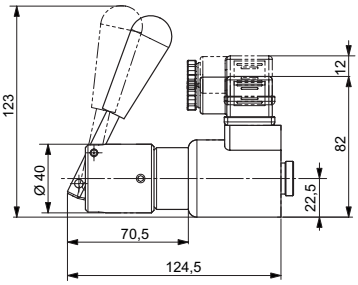
OVERALL DIMENSIONS



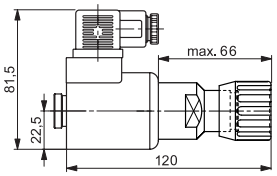
Fixing screws UNI 5931 M5x80
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specification

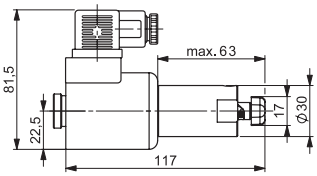




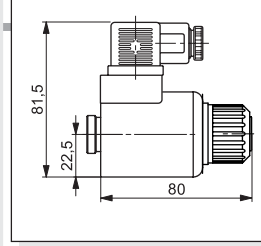
L5 Emergency lever



Rotary emergency
version XQ.3.C.*.*.***E**



P5 Rotary emergency 180°



"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg

XP.3... PROPORTIONAL PRESSURE CONTROL VALVES CETOP 3/NG6

Proportional maximum pressure valves type XP.3.*.. are used to regulate a hydraulic circuit pressure by means of a variable electric signal. Their precise implementation allows for high and constant operational standard up to a maximum 2,5 l/min flow rate. A manually pressure limit setting version is also available, to protect the system from uncontrolled electrical signals.

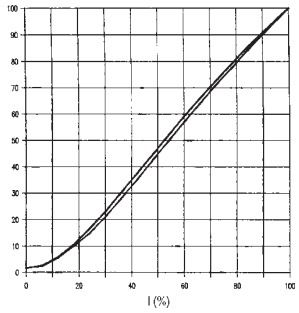
• Other valves (e.g. subplate or in-line mounted valves) should be ordered separately.

XP.3...	
REM.S.RA...	CH. IX PAGE 4
V.M.P... / V.M.L... / V.M.P.E...	CH. II PAGE 6

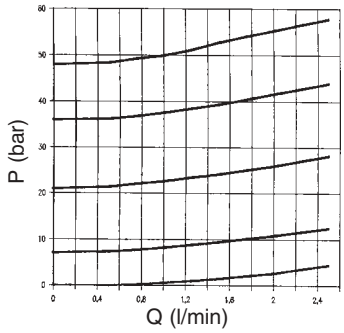
ORDERING CODE

XP	Max. pressure valve
3	CETOP 3/NG6
*	**1** = max. 50 bar **2** = max. 140 bar **3** = max. 320 bar
*	**E** = with manual limiter **S** = without manual limiter
*	Voltage: **F** =12V DC **G** =24V DC
**	**00** =No variant **V1** =Viton
1	Serial No.

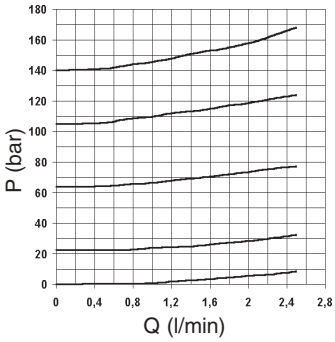
PRESSURE - SIGNAL
(tested with Q = 1 l/min)



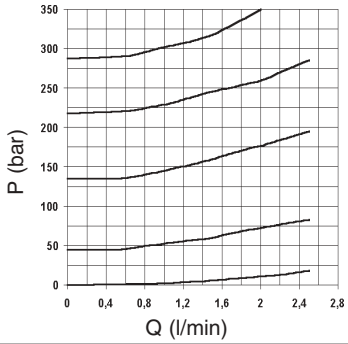
PRESSURE - FLOW RATE 1



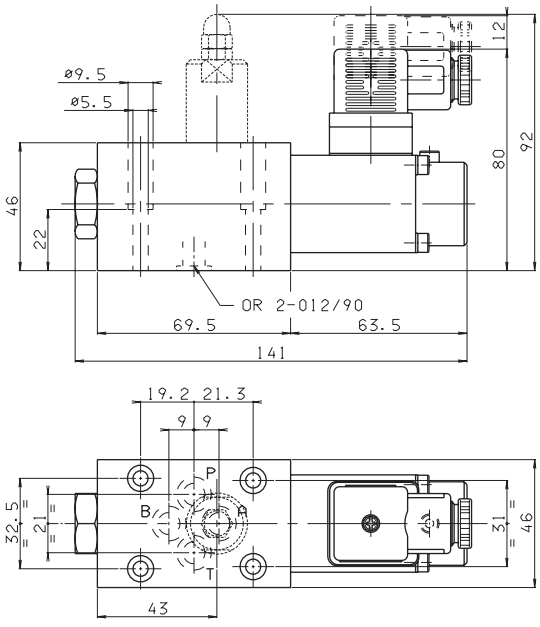
PRESSURE - FLOW RATE 2



PRESSURE - FLOW RATE 3

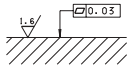


OVERALL DIMENSIONS



Fixing screws UNI 5931 M5x30
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specifications



XP.3... PROPORTIONAL PRESSURE CONTROL VALVES CETOP 3

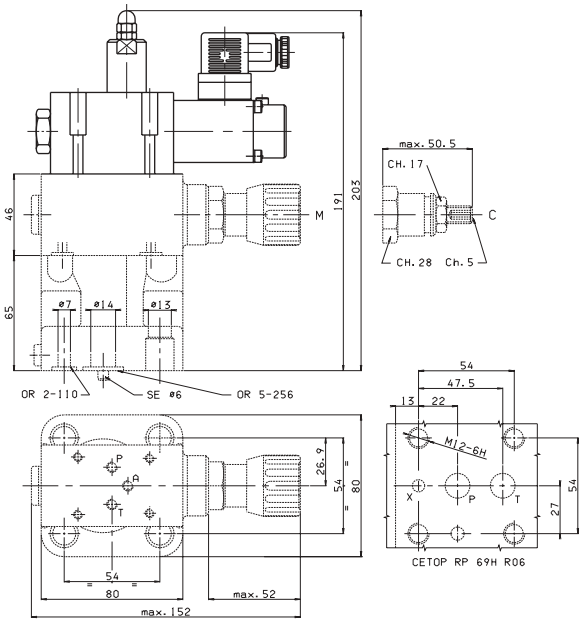
Max. operating pressure (depending on the flow rate)	350 bar
Max. flow	2,5 l/min
Max. ambient temperature	50° C
Linearity	See diagrams
Max. hysteresis	<3% of nominal value
Repeatibility error (between 150 and 680 mA)	<2%
Resistance at 20°C (24V)	24.6 Ohm
Resistance at 20°C (12V)	7.2 Ohm
Max. resistance (ambient 20°C) (24V) at op. temp.	31 Ohm
Max. resistance (ambient 20°C) (12V) at op. temp.	9 Ohm
Max. current at (24V)	0.68A
Max. current at (12V)	1.25A
Type of protection	IEC 144 class IP 65
Max. contamination level	class 8 in accordance with NAS 1638 with filter $\beta_{10} \geq 75$
Fluid temperature	-20°C÷75°C
Fluid viscosity	10÷500 mm²/s
Weight	1,4 Kg

• Operating specifications are valid for fluids with 33 mm²/s at 50°C, using specified ARON electronic control units.

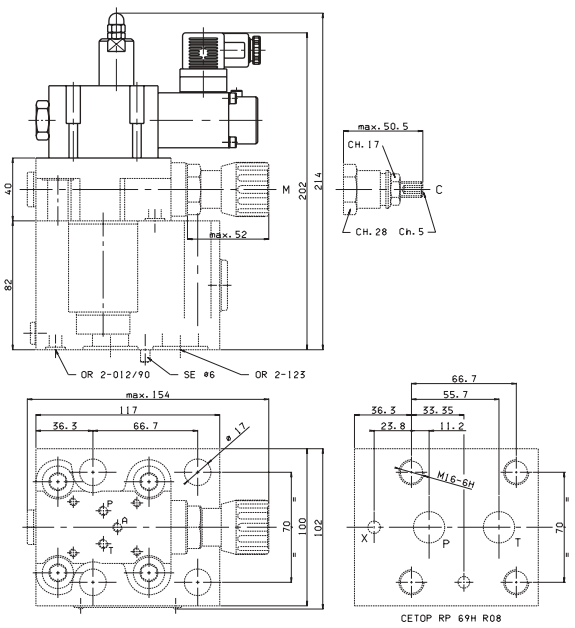
ELECTRONIC CONTROL UNITS

REM.S.RA.*.*.
Card type control for single solenoid 12V and 24V

TYPICAL INSTALLATION XP.3... + VMP.E.16...



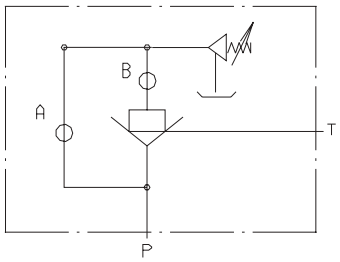
TYPICAL INSTALLATION XP.3... + VMP.E.25...



• WITH MOUNTING ON VMPE USE THE FOLLOWING CALIBRATED ORIFICES (SEE V.M.P.*.E VALVE AQ VARIANT)

VMP.E.16... A = Ø 1 mm
B = Ø 0,3 mm

VMP.E.25... A = Ø 1,2 mm
B = Ø 0,5 mm

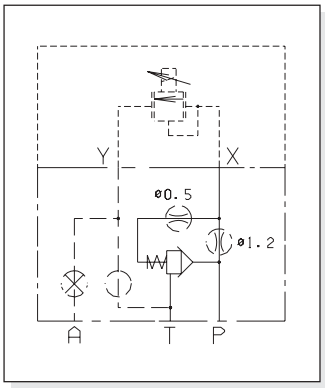


AM.3.XMP... AMPLIFIER VALVES

FOR PROPORTIONAL CONTROL VALVES

Max. operating pressure	320 bar
Max. flow	30 l/min
Min. flow	2 l/min
Max. ambient temperature	50° C
Linearity	See diagrams
Max. hysteresis	<3% of nominal value
Repeatibility error (150 ÷ 680 mA) XP3...	<3%
Max contamination level	class 8 in accordance with NAS 1638 with filter β_{10}≥75
Fluid temperature	-20°C÷75°C
Fluid viscosity	10÷500 mm²/s
Weight	0,8 Kg

Operating specifications are valid for fluids with 33 mm²/s viscosity at 40°C, using Aron control units



AM.3.XMP...

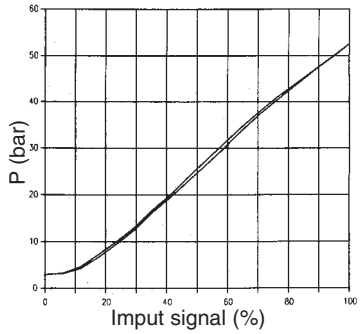
XP.3... CH. VIII PAGE 18

Modular valve type AM.3.XMP... used together with the pressure proportional pilot type XP.3.. becomes a pressure control valve piloted by proportional command for rates up to 30 lt/min. The possibility of external drainage on A ensures its correct operation even with back pressure on the discharge side. Other valves types should be ordered separately.

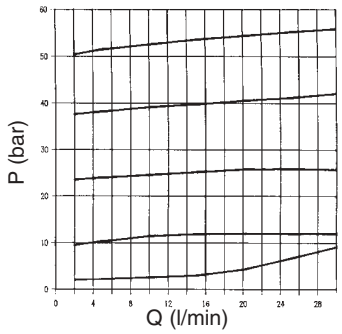
ORDERING CODE

AM	Modular valve
3	CETOP 3/NG6
XMP	maximum proportional pressure
2	Spring 2 bar (standard)
0	Standard dowels (∅ 1,2 dia supply ∅ 0,5 dia damper)
*	**I** = Internal drainage at T **E** = External draining at A
**	**00** =No variant **V1** =Viton
1	Serial No.

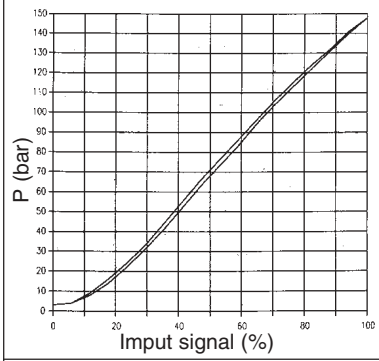
PRESSURE - SIGNAL 1 (Q=15L/MIN)



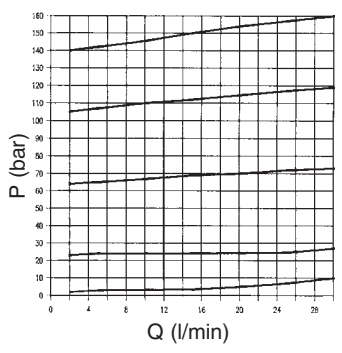
PRESSURE - FLOW RATE 1



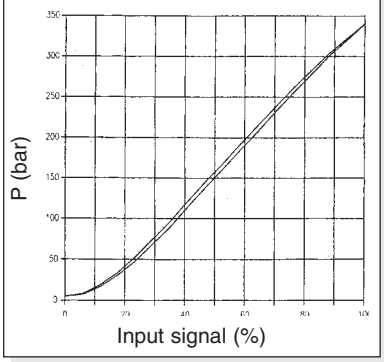
PRESSURE - SIGNAL 2 (Q=15L/MIN)



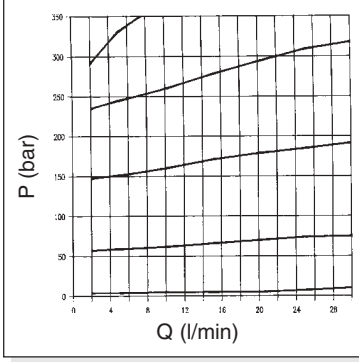
PRESSURE - FLOW RATE 2



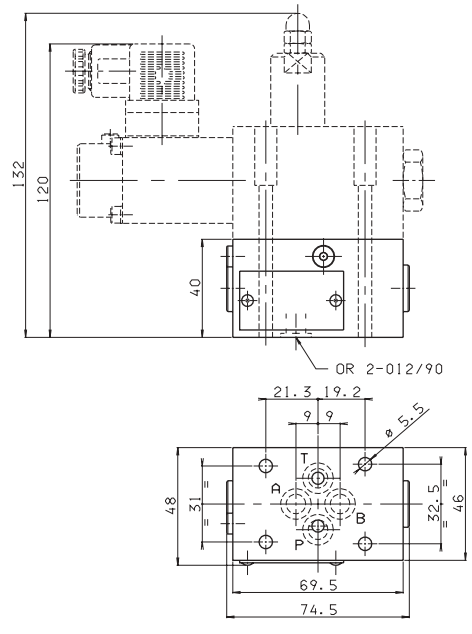
PRESSURE - SIGNAL 3 (Q=15L/MIN)



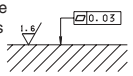
PRESSURE - FLOW RATE 3



OVERALL DIMENSIONS



Support plane specifications



Fixing screws UNI 593 M5x70
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

BS.5.RGA... / BS.5.RIA...

AD.5.I... CH. I PAGE 42

BS.5.R*A... SPECIAL SUBPLATE MOUNTINGS WITH AUTOMATIC EXCLUSION REGENERATING CIRCUIT

These special subplates, with relief valve, have integrated a regenerative circuit which disengages automatically with increasing load.

This circuit allows a fast movement of the cylinder with low working pressure followed by an automatic disengagement of the regenerative function at the set pressure, consequent a higher hydraulic force is available.

Furthermore in the BS.5.RIA version the automatic reciprocating valve allows a continuous movement of the cylinder till the stop of the pump.

The reciprocating valve has a preferential position which allows the cylinder to begin always in the same position at the start of the working cycle (P → B).

This systems are particularly useful for garbage compactors or small presses.

Max. pump flow (suggested)	30 l/min
Max. flow with regenerative connected	100 l/min
Max. operating pressure (relief valve)	350 bar
Max. operating pressure (exclusion)	200 bar
Hydraulic fluids	Mineral oils DIN 51524
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 BS.5.RGA... version	Kg 5,7
Weight BS.5.RIA... version	Kg 9,4

TYPICAL INSTALLATION VALUES

- Cylinder area ratio (α) **1,6 : 1**
- Pump flow (QP) **30 l/min**
- Type of oil **46 cSt a 40°**
- Regenerative flow (QR)
  80 l/min (for RGA standard subplate)
  75 l/min (for RIA standard subplate)
- Min. exclusion pressure setting **70 bar**
- Max exclusion pressure setting **200 bar**
- Exclusion pressure drops **6 bar**

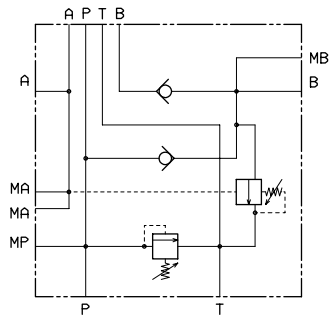
ORDERING CODE

BS	Single subplate mounting
5	CETOP 5/NG10
***	**RGA** = Automatic exclusion regenerating circuit with presetting for AD.5.E... **RIA** = Automatic exclusion regenerating circuit with AD.5.I.P.2T.1 included
U3	Exclusion range 20 ÷ 200 - see note (*)
*	Adjustment (relief valve) **M** = Plastic knob **C** = Grub screw
*	Max relief setting ranges **2** = max. 140 bar **(yellow spring)** **3** = max. 350 bar **(green spring)**
**	**00** = No variant
2	Serial No

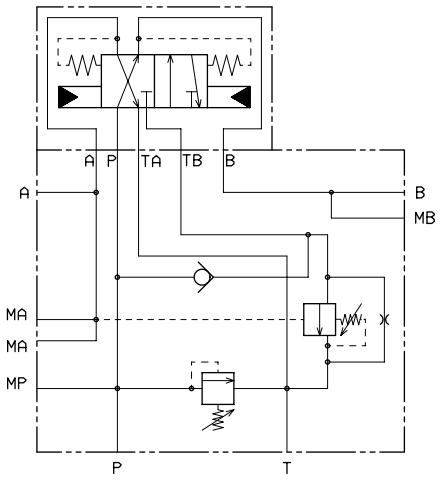
(*) These values depend on the hydraulic circuit configuration: flow, dimensions and system's frictions.

HYDRAULIC SYMBOLS

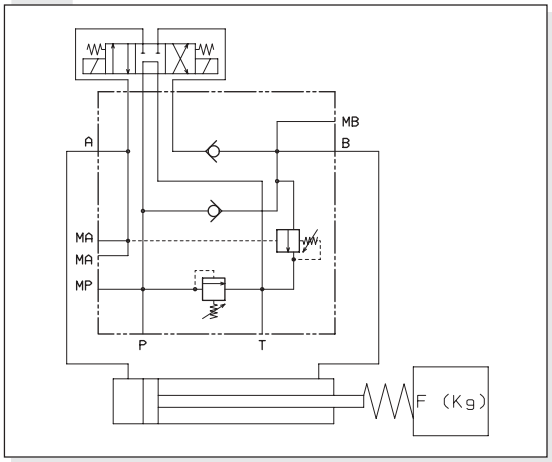
BS.5.RGA



BS.5.RIA... (WITH AD.5.I.P.2T.1)



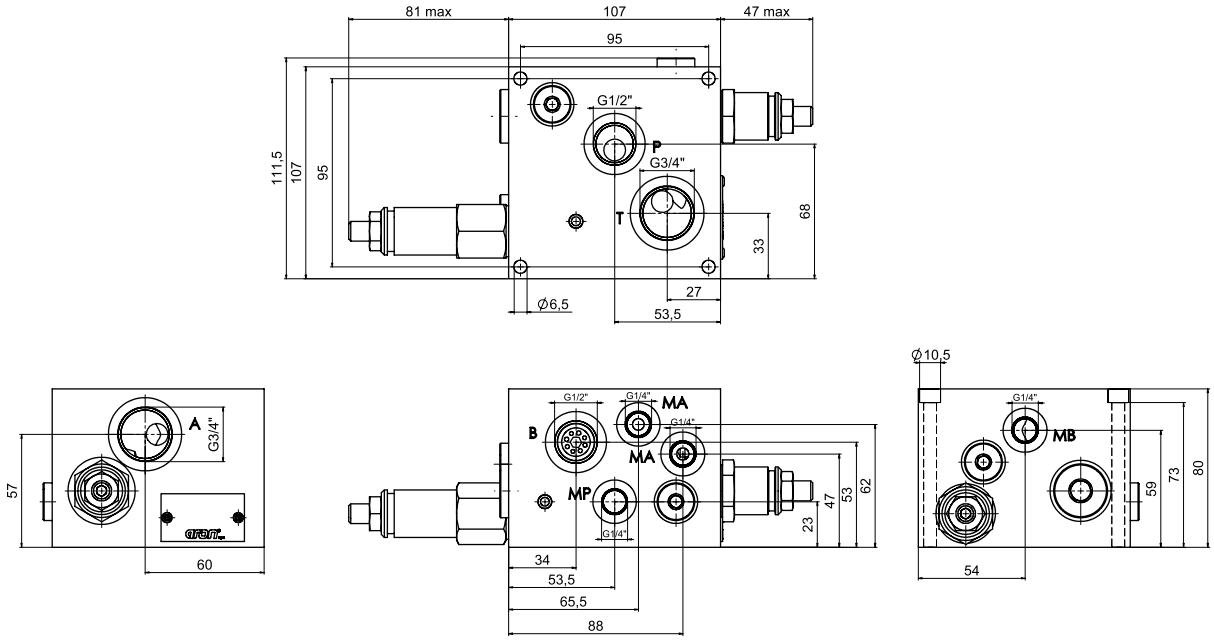
TYPICAL INSTALLATION FOR BS.5.RGA



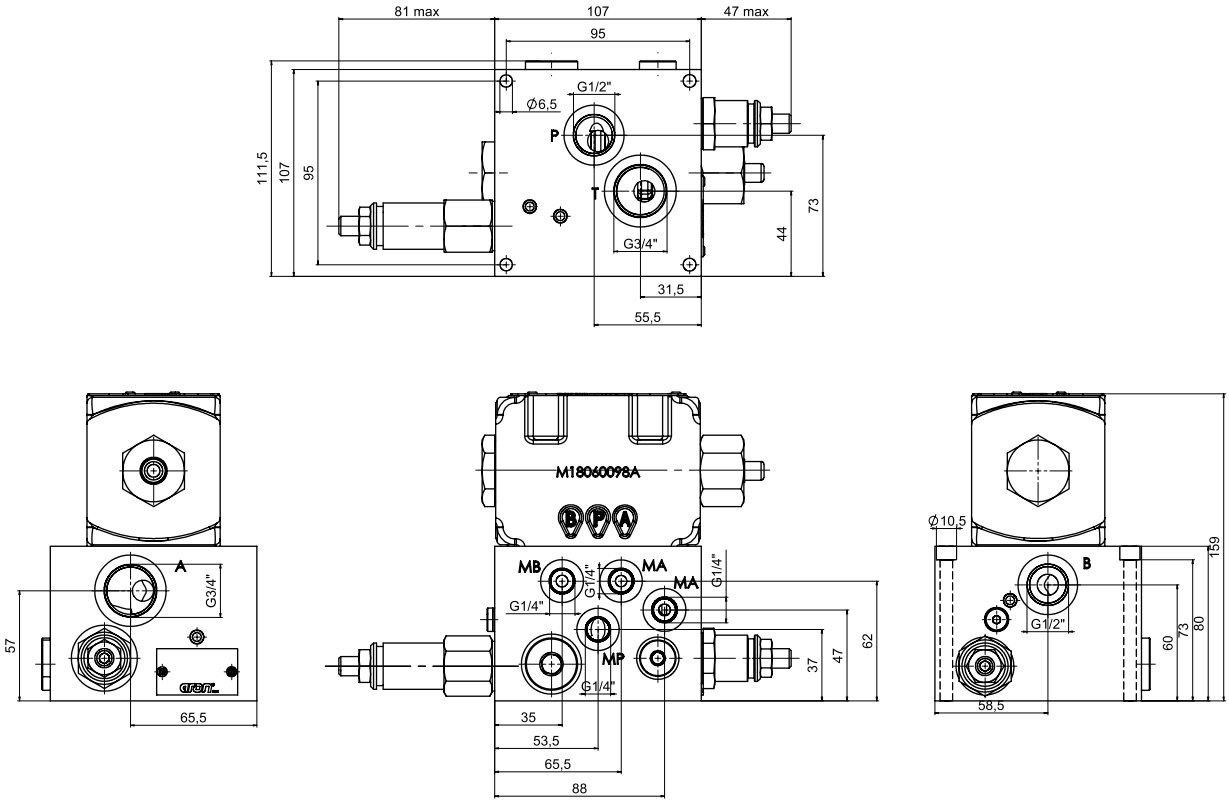
BS.5.RGA... / BS.5.RIA... SPECIAL SUBPLATE MOUNTINGS WITH AUTOMATIC EXCLUSION REGENERATING CIRCUIT

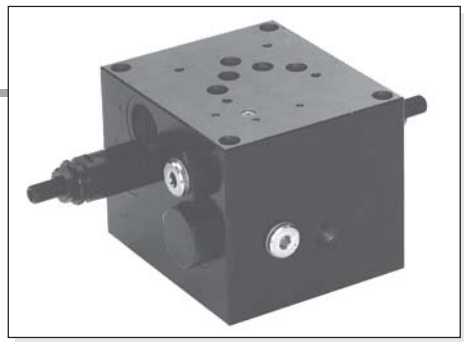
OVERALL DIMENSIONS

BS.5.RGA...



BS.5.RIA... WITH AD.5.I.P.2T.1





BA.130... LOW / HIGH PRESSURE UNITS

BA.130...	
BA.10...	CH.XI PAGE 2
CMP.10...	CH. V PAGE 19
BSC.5.69...	CH.XI PAGE 4
BC.5.30/32...	CH.VII PAGE 26
BC.5.40...	CH.VII PAGE 25
CETOP 5/NG10	CH. I PAGE 28
ADP.5.E...	CH. I PAGE 36

The low/high pressure groups are usually employed in hydraulic systems fed by dual pumps that form a single pressure circuit. The main feature of this system consists in being able to set a pressure value in correspondence of which one of the two pumping sections is changed over to drain.
These groups are fitted with an adjustable maximum pressure valve to protect the hydraulic system.
2 pressure adjustment ranges are available for the exclusion valve, which is fitted with a steel seat, while the maximum pressure valve type CMP10 is available with 3 adjustment ranges.

Minimum permissible setting pressure depending on the spring: see cartridge valve type CMP10.

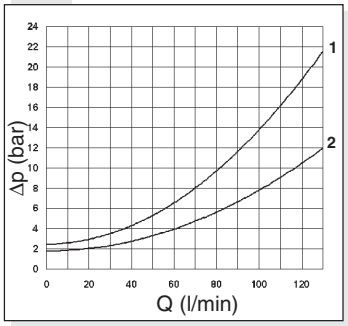
The series connection modular small block (BC.5.32) or the parallel connection type (BC.5.30) with blanking plate (BC.5.40) and the solenoid valve should be ordered separately.

For the subplate mounting ordering code see "Subplates" chapter; whilst for the valve ordering code see "Directional control valves" chapter.

The CETOP5/NG10 connector blocks have 3 rods.

Max. flow	130 l/min
Max. operating pressure	320 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	8 Kg

PRESSURE DROPS



Curve	1= P1 → T
	2 = P1 → P

ORDERING CODE

BA	Low/high pressure base
130	Capacity l/min
U*	Double pump exclusion valve setting **2** = 20 ÷ 90 bar **3** = 50 ÷ 190 bar
C	Type of adjustment: grub screw
*	Max. pressure valve setting **1** = max. 50 bar **2** = max. 150 bar **3** = max. 320 bar
00	No variant
1	Serial No.

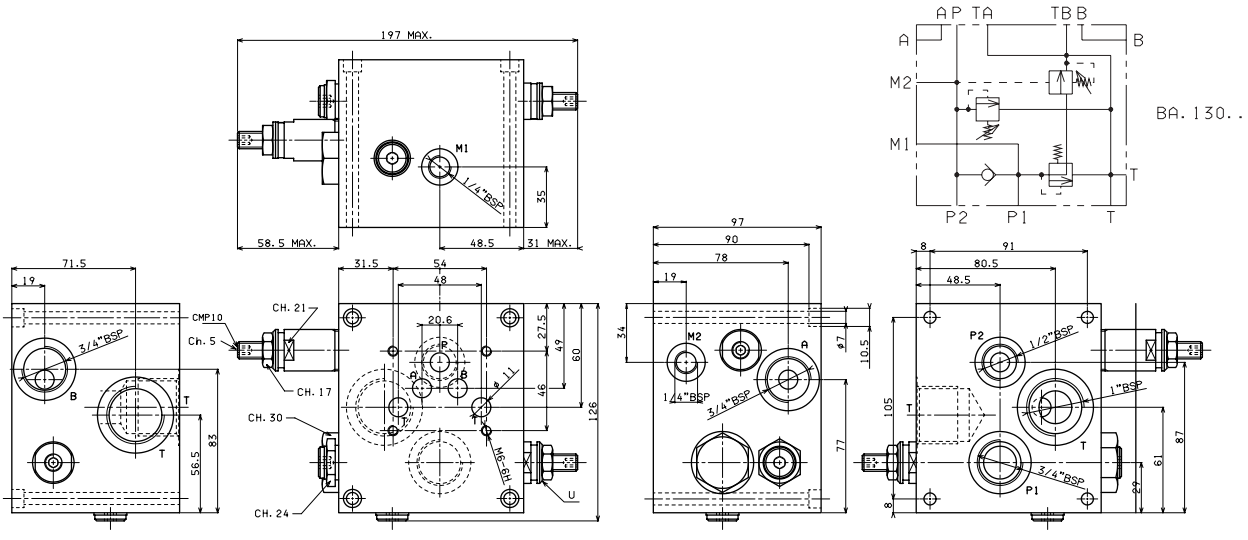
MODULE ORDERING CODE

BA	Subplate mounting
10	CETOP 5/NG10
**	Type of module: **62** = side CETOP interface **68** = with upper threaded connectors
00	No variant
1	Serial No.

OVERALL DIMENSIONS AND HYDRAULIC SYMBOL

Fixing screws M6x100 UNI 5931

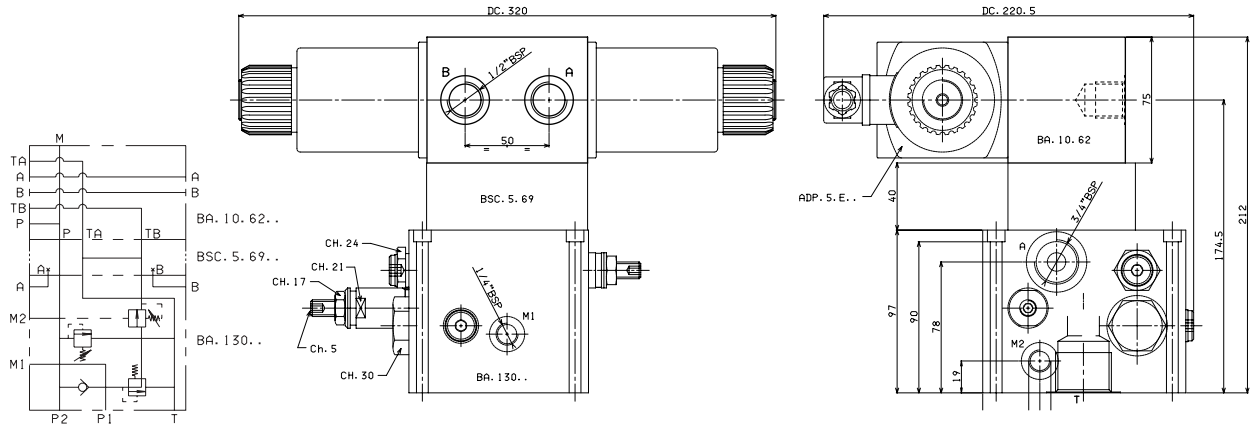
Pay attention please, max tightening torque for manometer (M2): 35 Nm / 3,5 Kgm



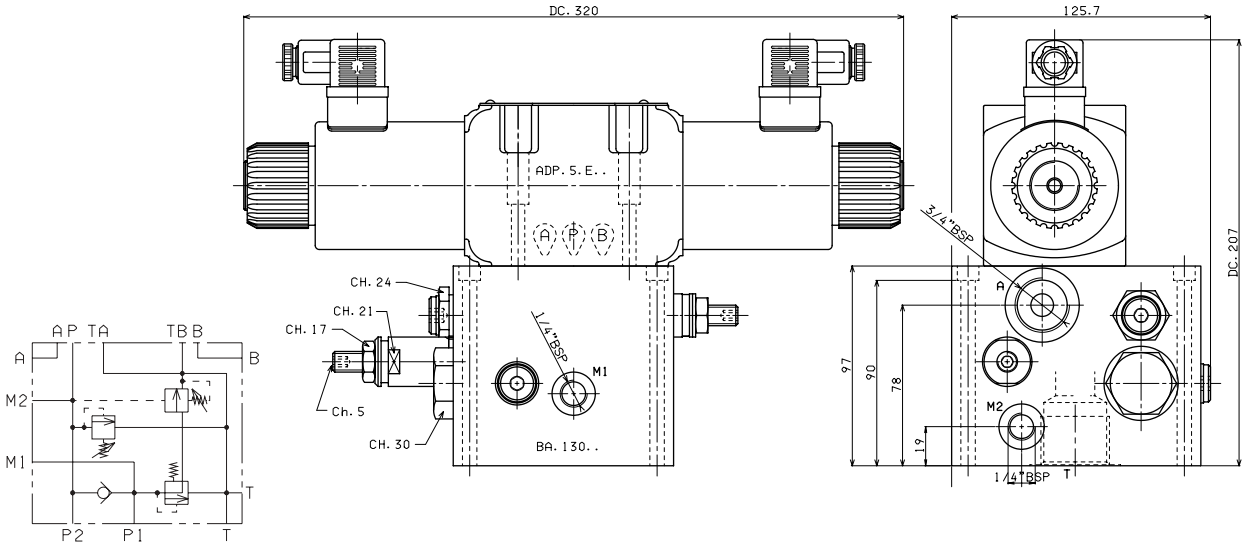
OVERALL DIMENSIONS AND HYDRAULIC SYMBOLS

SIDE MOUNTING FOR SINGLE SOLENOID VALVE CETOP5/NG10 (CONNECTOR BLOCK BA.10.62)

Fixing screws M10x80 UNI 5931

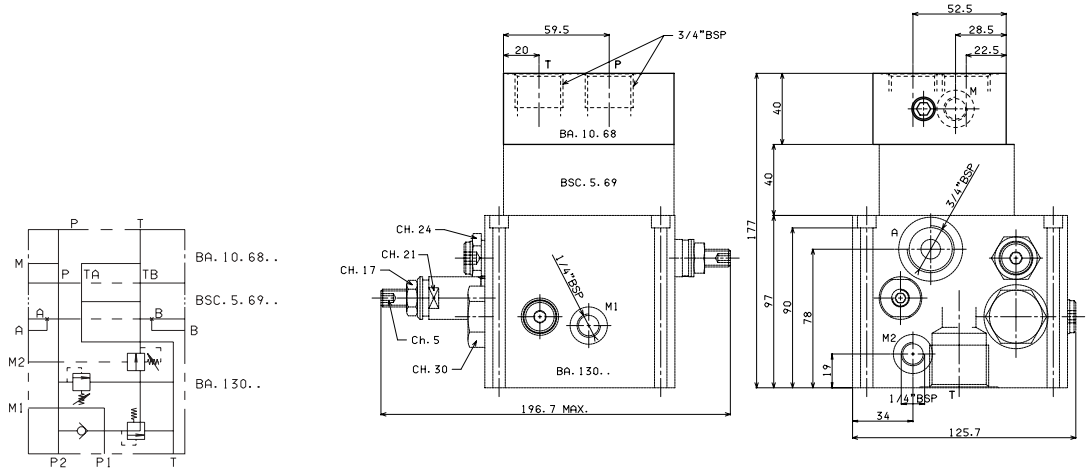


UPPER MOUNTING FOR SINGLE SOLENOID VALVE CETOP5/NG10



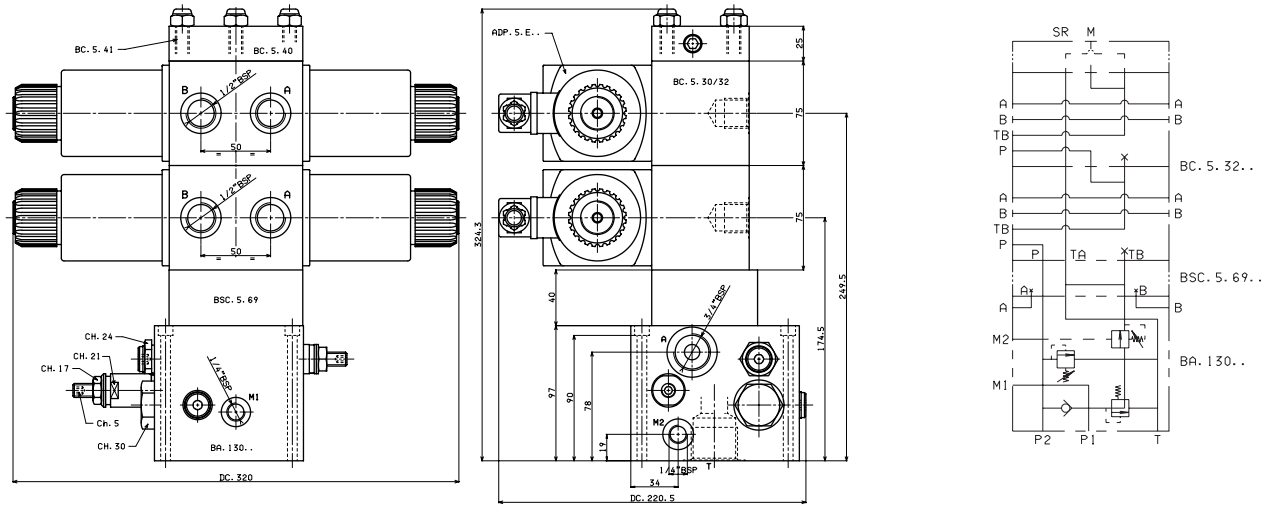
MOUNTING WITH THREADED CONNECTORS (CONNECTOR BLOCK BA.10.68)

Fixing screws M10x45 UNI 5931



OVERALL DIMENSIONS AND HYDRAULIC SYMBOL

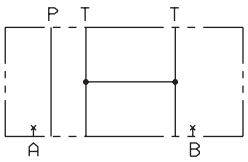
MULTIPLE MOUNTING WITH MODULAR COMPONENT CONNECTOR BLOCKS CONNECTED IN SERIES OR PARALLEL CETOP5/NG10



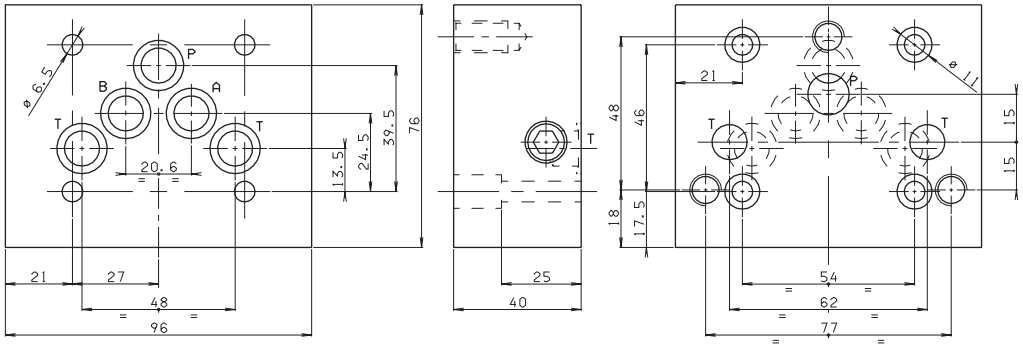
BSC.5.69... TRANSFORMATION MOUNTING CETOP 5 INTERFACE TO MODULAR COMPONENT BC.5...

BSC	Modular component subplate
5	CETOP 5/NG10
69	Type of module: to modular component BC5
00	No variant
1	Serial No.

Fixing srcews M6x35 UNI 5931
Weight 2,1 Kg



BSC. 5. 69..



CDC.3.*.E...

DIRECTIONAL CONTROL STACKABLE VALVE

Directional control stackable valve body is available in two different sizes: G3/8" or 9/16-18UNF (SAE 6).
The operation of the directional valve is electrical. The centring is achieved by means of calibrated length springs which immediately reposition the spool in the neutral position when the electrical signal is shut off. 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 electrical supply connectors meet DIN 43650 ISO 4400 standards. 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.

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

CDC.3.*.E...	
INDIVIDUAL VALVE	CH. XI PAGE 3
STACKABLE VALVES	CH. XI PAGE 4
"A09" DC COILS	CH. XI PAGE 8
"LE" VARIANTS	CH. XI PAGE 9
SCREWS AND STUDS	CH. XI PAGE 10
STANDARD CONNECTORS	CH. I PAGE 19

ORDERING CODE

CDC	Directional control stackable valve
3	Size
*	Body type (tab. 1)
E	Electrical operator
**	Spool (tab.2) For series connection use spool 04 only
*	Mounting (tab.3)
*	Voltage (tab.4)
**	Variants (tab.5)
1	Serial No.

For series connection configuration, a special individual stackable valve CDC.3.*.E.04..PT.1 (A B or G parallel body type only, with spool 04 type, PT variant) must always be used as first element. For other individual stackable valve must use body D E or H connector series type with spool 04 only.**

TAB.1 - BODY TYPE

A	Ports G3/8" parallel
B	Ports 9/16 - 18UNF parallel
D*	Ports G3/8" series
E*	Ports 9/16 - 18UNF series
G	Attachment style, parallel presetting for modular valves
H*	Attachment style, series presetting for modular valves

(*) For series connection configuration see note below ordering code

TAB.2 - STANDARD SPOOLS

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		+	

* SPOOL WITH PRICE INCREASING

TAB.4 - A09 - DC VOLTAGE

L	12V	
M	24V	115Vac/50Hz 120Vac/60Hz with rectifier
N	48V*	
P	110V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
X	205V*	
W	Without DC coils	

* Special voltage

- 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.

TAB.5 - VARIANTS TABLE

No variant	00
Viton	V1
Emergency button	E1
Rotary emergency button	P1
Rotary emergency button (180°)	P5
Solenoid valve without connectors	S1
First element for series connection	PT
Pilot light	X1
Rectifier	R1
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR
coils with flying leads (length 250 mm)	FL
coils with flying leads (length 130 mm) and integrated diode	LD
AMP Junior connection	AJ
Deutsch connection and bidr. diode	CX

Other variants relate to a special design

TAB.3 MOUNTING

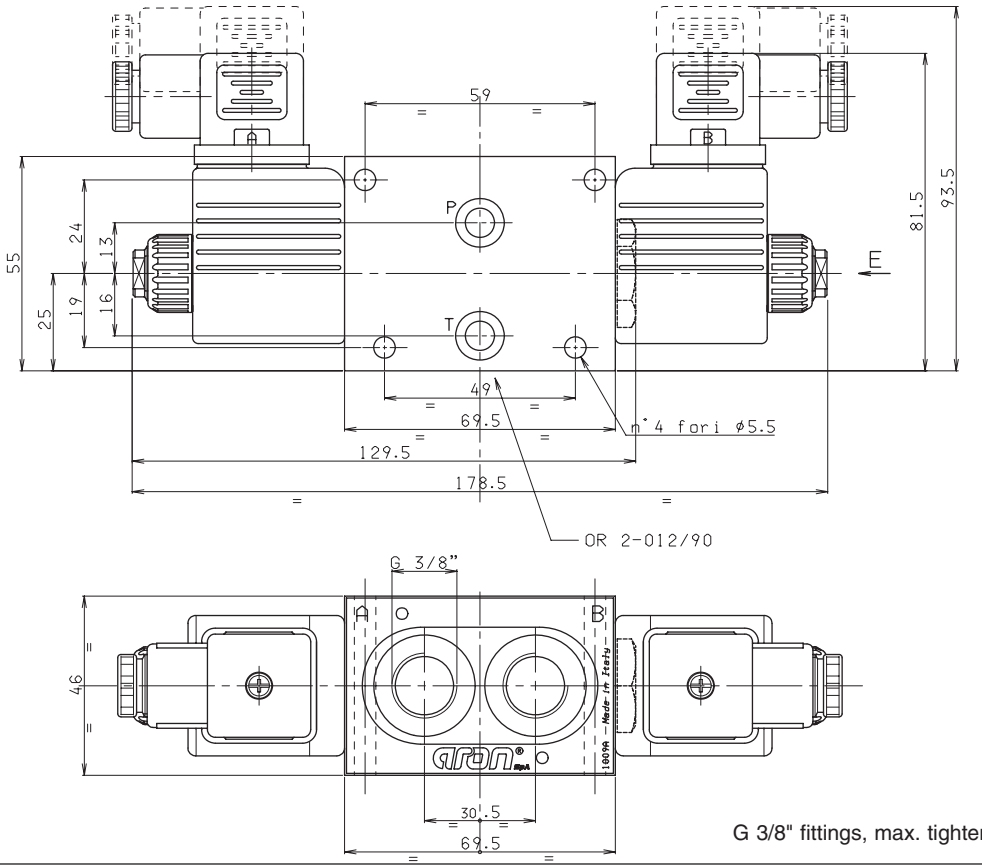
STANDARD	
C	
E	
F	
SPECIALS (WITH PRICE INCREASING)	
G	
H	

(*) **P1** and **P5 Emergency** tightening torque **max. 6÷9 Nm / 0.6 ÷ 0.9 Kgm** with CH n. 22

CDC.3.*.E... DIRECTIONAL CONTROL STACKABLE VALVE

OVERALL DIMENSIONS

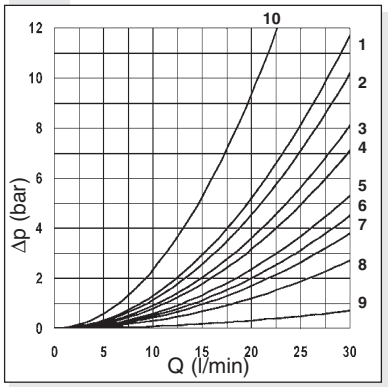
E = Manual override



G 3/8" fittings, max. tightening torque = **36 Nm / 3.6 kgm**

PRESSURE DROPS

DIRECTIONAL CONTROL STACKABLE VALVE

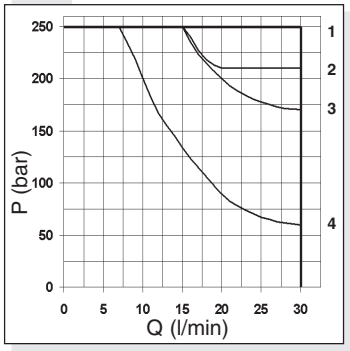


Spool type	Connections					
	P →A	P →B	A →T	B →T	P →T	P/ T passing
01	4	4	4	4	/	9
02 (p*)	7	7	6	6	7	9
02 (s*)	7	7	6	6	8	/
03	4	4	6	6	/	9
04 (p*)	2	2	1	1	5	9
04 (s*)	2	2	1	1	3	/
15-16 F	6	6	5	10	/	9
15-16 E	6	6	10	5	/	9
	Curve No.					

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°.

(p*) Parallel connections
(s*) Series connections

LIMITS



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

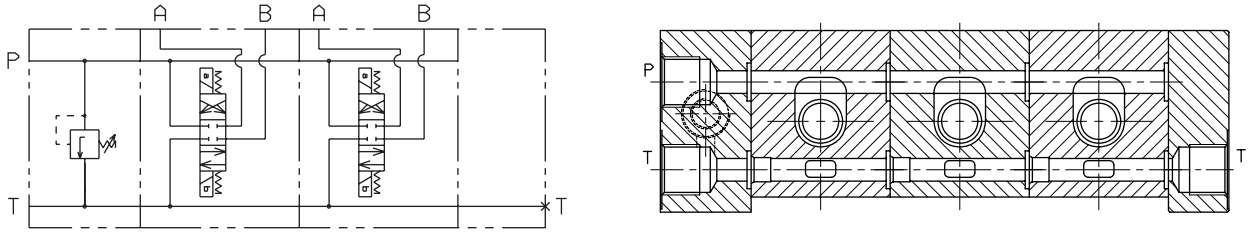
The tests have been carried out with solenoids at operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 50 C°. The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40 degrees C. The values in the diagram refer to tests carried out with the oil flow in 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 used as 2 or 3 ways). The tests were carried out with a counter-pressure of 2 bar at T port.

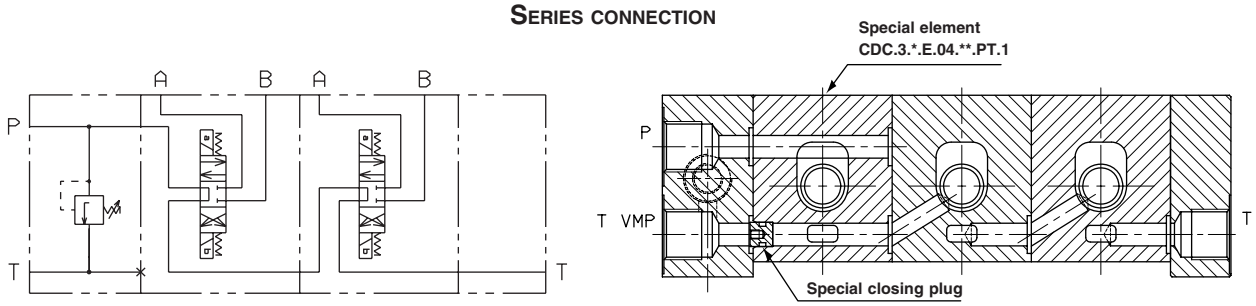
(4*) = 15 and 16 spools used as 2 or 3 way, follow the curve n°4

HYDRAULIC SYMBOLS AND INSTRUCTION OF CONNECTION

PARALLEL CONNECTION



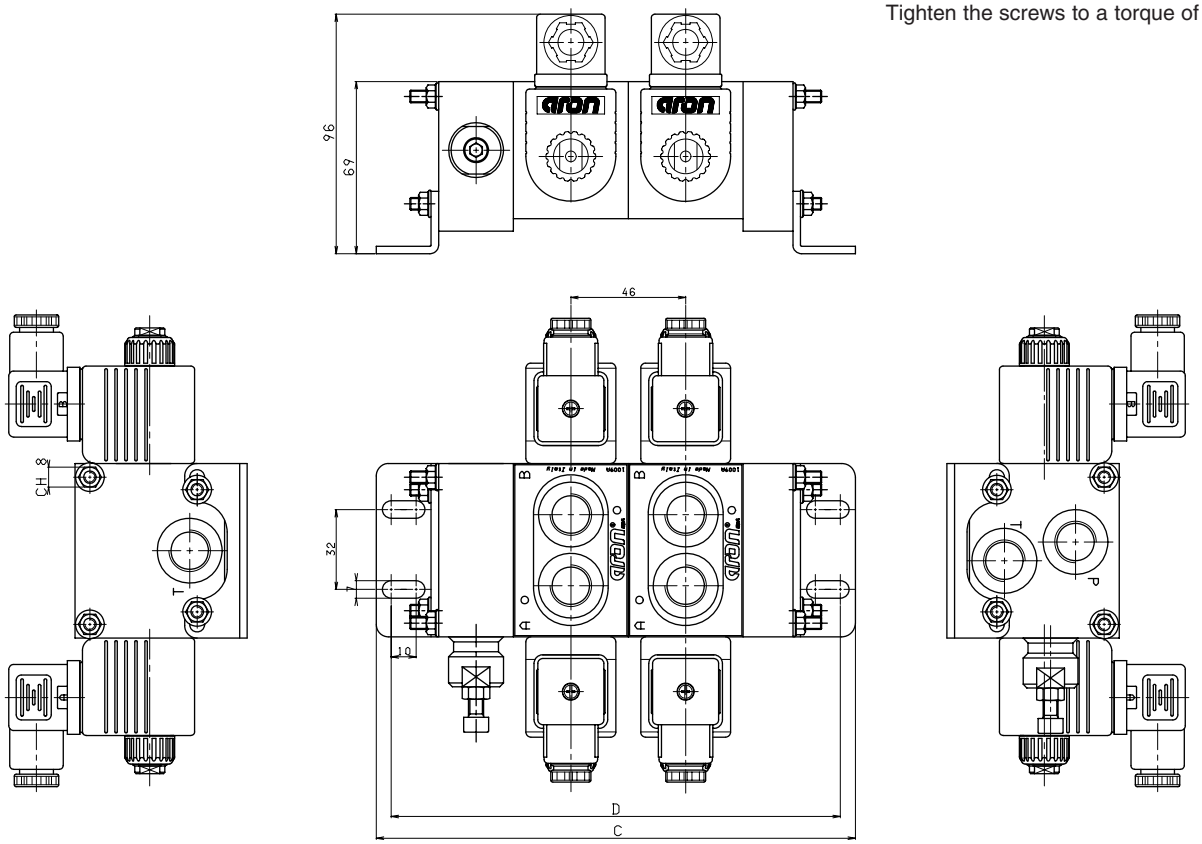
SERIES CONNECTION



For series connection configuration, a special individual valve bank section (CDC.3.*.E.04..PT.1) must always be used as first element (see ordering code)**

OVERALL DIMENSIONS

Tighten the screws to a torque of **5 Nm**



No. Elements	FE02-FE Inlet module C	Length (mm)	FE02-FE Inlet module D	FE 10 Inlet module C	Length (mm)	FE 10 Inlet module D
2	192		180	202		190
3	238		226	248		236
4	284		272	294		282
5	330		318	340		328
6	376		364	386		374

CD.3.*.E... DIRECTIONAL CONTROL STACKABLE VALVE WITH D15 COILS

Directional control stackable valve body is available in two different sizes: G3/8" or 9/16-18UNF (SAE 6).
The operation of the directional valve is electrical. The centring is achieved by means of calibrated length springs which immediately reposition the spool in the neutral position when the electrical signal is shut off. To improve the valve performance, different springs are used for each spool. The solenoids, constructed with a protection class of IP66 in accordance with DIN 40050 standards, are available in direct current form and different voltage. The electrical supply connectors meet DIN 43650 ISO 4400 standards; AMP Junior, AMP Junior and integrated diode, flying leads, Deutsch DT 04 - 2P coil type, connectors are also available with built in rectifiers or pilot lights.

Max. pressure ports P/A/B/T	250 bar
Max flow	40 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	1,389 Kg
Weight with two DC solenoids	1,778 Kg

ORDERING CODE

CD	Directional control stackable valve (with D15 coil)
3	Size
*	Body type (tab. 1)
E	Electrical operator
**	Spool (tab.2) For series connection use spool 04 only
*	Mounting (tab.3)
*	Voltage (tab.4)
**	Variants (tab.5)
1	Serial No.

For series connection configuration, a special individual stackable valve CD.3.*.E.04..PT.1 (A B or G parallel body type only, with spool 04 type, PT variant) must always be used as first element. For other individual stackable valve must use body D E or H connector series type with spool 04 only.**

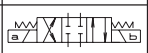
TAB.1 - BODY TYPE

A	Ports G3/8" parallel
B	Ports 9/16 - 18UNF parallel
D*	Ports G3/8" series
E*	Ports 9/16 - 18UNF series
G	Attachment style, parallel presetting for modular valves
H*	Attachment style, series presetting for modular valves
L	Ports G3/8" parallel - LS vers.
M	Attachment style, parallel-LS vers. presetting for modular valves

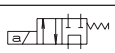
(*) For series connection configuration see note below ordering code

TAB.2 - STANDARD SPOOLS

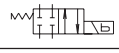
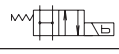
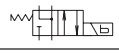
TWO SOLENOIDS, SPRING CENTRED "C" MOUNTING

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

ONE SOLENOID, SIDE A "E" MOUNTING

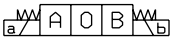
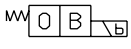
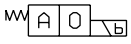
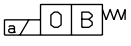
Spool type		Covering	Transient position
01		+	
02		-	
03		+	
04*		-	
15		-	
16		+	

ONE SOLENOID, SIDE B "F" MOUNTING

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

* SPOOL WITH PRICE INCREASING

TAB.3 MOUNTING

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

TAB.4 - D15 COIL (DC - 30W)

L	12V	115Vac/50Hz 120Vac/60Hz with rectifier
M	24V	
V	28V*	
N	48V*	
Z	102V*	230Vac/50Hz 240Vac/60Hz with rectifier
P	110V*	
X	205V*	
W	Without DC coils or connectors	

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

* Special voltage

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

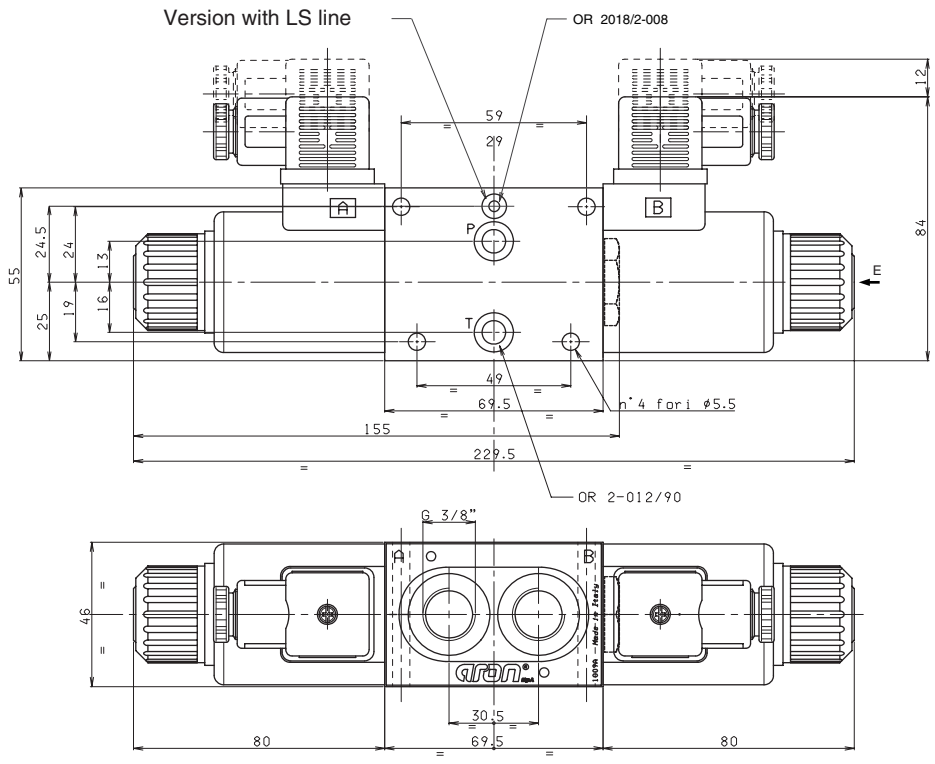
TAB.5 - VARIANTS TABLE

No variant	00
Viton	V1
Pilot light	X1
Rectifier	R1
Emergency button	E1
Rotary emergency button	P1
Rotary emergency button (180°)	P5
Solenoid valve without connectors	S1
First element for series connection	PT
AMP Junior connection	AJ
AMP Junior and integrated diode	AD
Coil with flying leads (length 175 mm)	SL
Coil with Deutsch DT04-2P conn.	CZ
Palstic type coil	BR
Viton + Pilot light	VX
Viton + Rectifier	VR
Pilot light + Rectifier	XR

Other variants relate to a special design

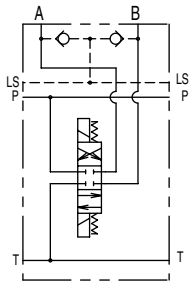
CD.3... DIRECTIONAL CONTROL STACKABLE VALVE WITH D15 COILS

OVERALL DIMENSIONS



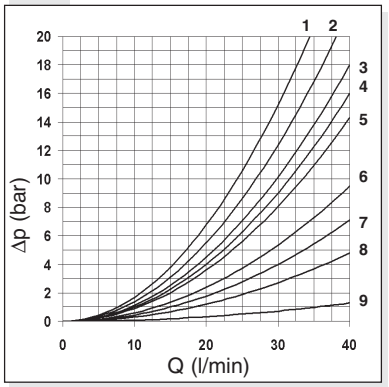
E = Manual override

Parallel body version with LS line



G 3/8" fittings, max. tightening torque = **36 Nm / 3.6 kgm**

PRESSURE DROPS
DIRECTIONAL CONTROL STACKABLE VALVE

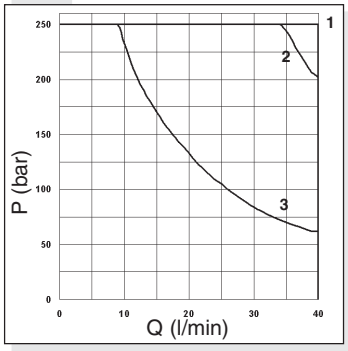


Spool type	Connections					
	P →A	P →B	A →T	B →T	P →T	P/ T passing
01	4	4	4	4	/	9
02 (p*)	5	5	5	5	7	9
02 (s*)	5	5	6	6	8	/
03	4	4	5	5	/	9
04 (p*)	1	1	2	2	5	9
04 (s*)	5	5	4	4	6	/
15-16 F	5	3	5	2	/	9
15-16 E	3	5	2	5	/	9
	Curve No.					

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°..

(p*) Parallel connections
(s*) Series connections

LIMITS



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

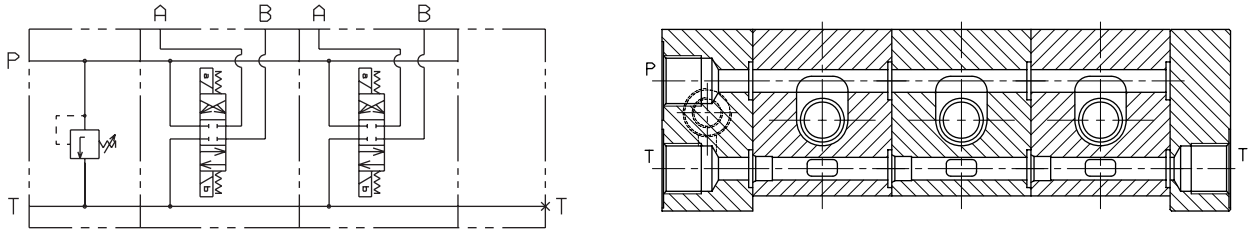
The tests have been carried out with solenoids at operating temperature and a voltage 10% less than rated voltage with a fluid temperature of 50 C°. The fluid used was a mineral oil with a viscosity of 46 mm²/s at 40 degrees C. The values in the diagram refer to tests carried out with the oil flow in 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 3 and Spool No 16 used as 2 or 3 ways). The tests were carried out with a counter-pressure of 2 bar at T port.

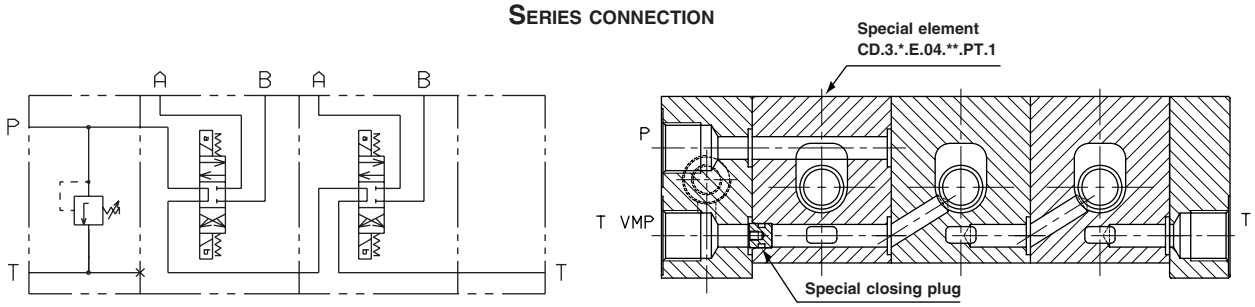
(3*) = 16 spools used as 2 or 3 way, follow the curve n°3

HYDRAULIC SYMBOLS AND INSTRUCTION OF CONNECTION

PARALLEL CONNECTION



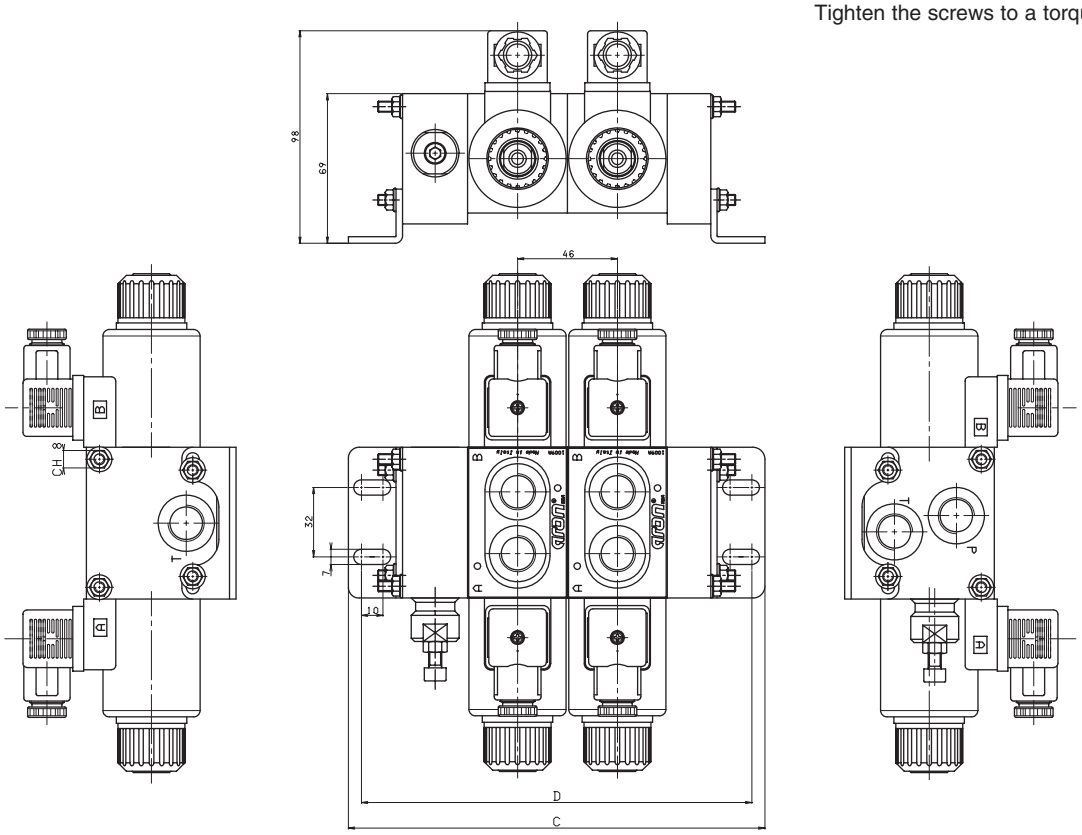
SERIES CONNECTION



For series connection configuration, a special individual valve bank section (CD.3.*.E.04..PT.1) must always be used as first element (see ordering code)**

OVERALL DIMENSIONS

Tighten the screws to a torque of **5 Nm**

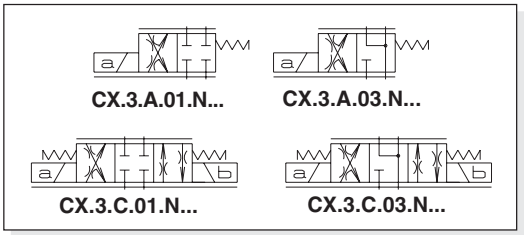


No. ELEMENTS	FE02-FE INLET MODULE C	LENGTH (mm)	FE02-FE INLET MODULE D	FE 10 INLET MODULE C	LENGTH (mm)	FE 10 INLET MODULE D
2	192		180	202		190
3	238		226	248		236
4	284		272	294		282
5	330		318	340		328
6	376		364	386		374

CX.3.A... / CX.3.C... SOLENOID OPERATING
PROPORTIONAL CONTROL STACKABLE VALVES

CX.3.A../CX.3.C.. series valves are used for controlling fluid direction and flow rate as a function of the supply current to the proportional control solenoid.

The individual valve is available in two different sizes: G3/8" or 9/16-18UNF.



CX.3...	
INDIVIDUAL VALVE	CH. XI PAGE 12
STACKABLE VALVES	CH. XI PAGE 13
"D15P" PROPORT. SOLENOIDS	CH. XI PAGE 13
SCREWS AND STUDS	CH. XI PAGE 10
REM.S.RA...	CH. IX PAGE 4
REM.D.RA...	CH. IX PAGE 7
SE.3.AN21.00...	CH. IX PAGE 11

OPERATING SPECIFICATIONS

Max. operating pressure ports P/A/B			250 bar
Max. operating pressure ports T - for dynamic pressure see note (*)			250 bar
Regulated flow rate			3 / 10 / 15 / 20 l/min
Relative duty cycle			Continuous 100% ED
Type of protection			IP 65
Fluid viscosity			10 ÷ 500 mm²/s
Fluid temperature			-20°C ÷ 75°C
Max. contamination level			class 8 in accordance with NAS 1638 with filter $ß_{10} \geq 75$
Weight CX.3.A... (single solenoid)			1,389 Kg
Weight CX.3.C... (double solenoid)			1,778 Kg
Max. current	2.35A	1.76 A	0.88 A
Solenoid coil resistance at 25°C (77°F)	2.25 Ohm	4.0 Ohm	16.0 Ohm

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

• Operating specifications are valid for fluid with 46 mm²/s viscosity at 40°C, using the specified ARON electronic control units.

ELECTRONIC CONTROL UNIT

REM.S.RA.*.*. and REM.D.RA.*.*.
Card type control for single and double solenoid

SE.3.AN.21.00...
EUROCARD type control for single and double solenoid

ORDERING CODE

CX — Proportional control stackable valve

3 — Size

***** — **A** = Single solenoid
C = Double solenoid

***** — Body type:
A = Ports G3/8" parallel
B = Ports 9/16 - 18UNF parallel
G = Presetting for modular valves (parallel)

****** — Type of spool
01 =  **03** = 

N — Symmetrical flow path control (see symbols table)

***** — Flow rating l/min (Δp 5 bar)
1 = 3 l/min
2 = 10 l/min
3 = 15 l/min
4 = 20 l/min

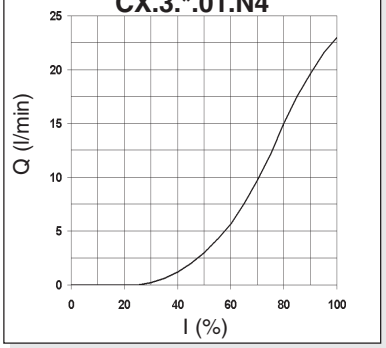
***** — Max. current at solenoid:
E = 2.35 A
F = 1.76 A
G = 0.88 A

****** — **00** = No variant
V1 = Viton
E1 = Emergency button
P1 = Rotary emergency
P5 = Rotary emergency 180°

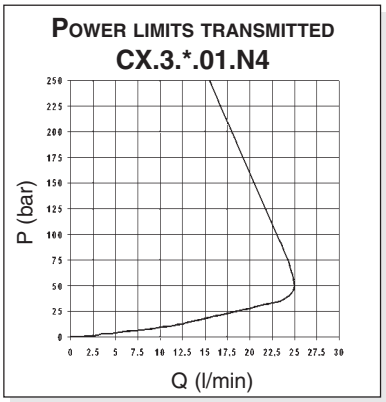
1 — Serial No.

DIAGRAMS

INPUT SIGNAL
CX.3.*.01.N4

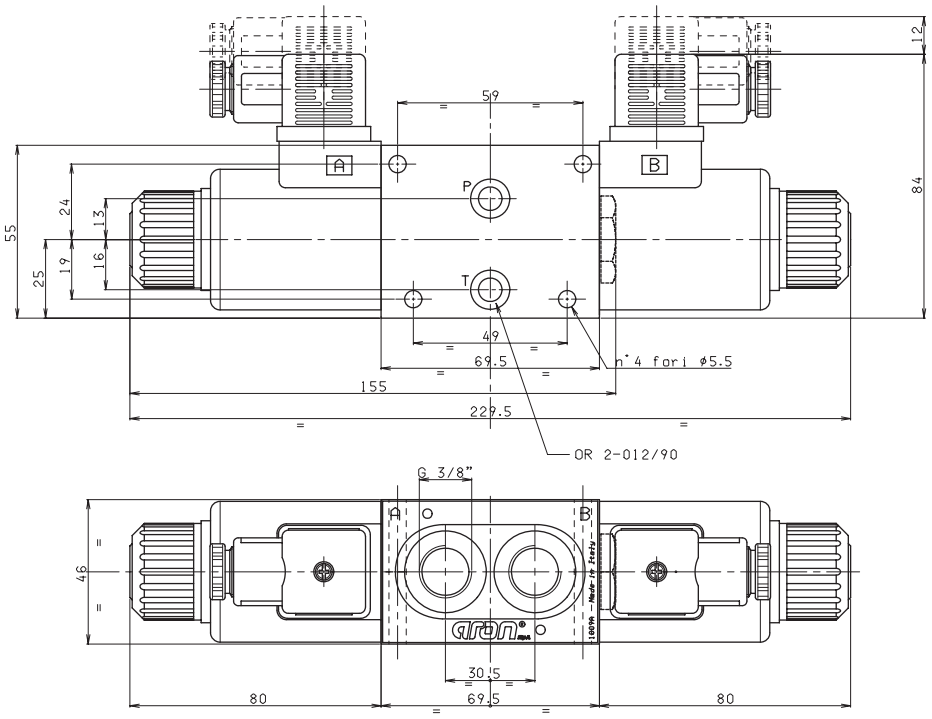


POWER LIMITS TRANSMITTED
CX.3.*.01.N4



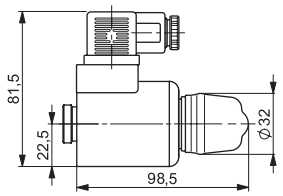
The fluid used is a mineral based oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out at with a fluid of a 40°C.

OVERALL DIMENSIONS

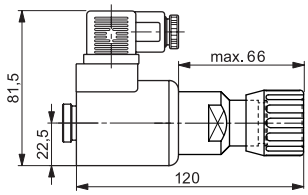


G 3/8" fittings, max. tightening torque = **36 Nm / 3.6 kgm**

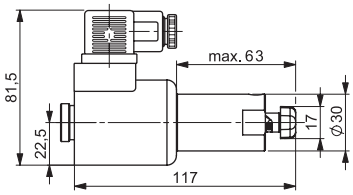
E1 MANUAL EMERGENCY



P1 ROTARY EMERGENCY

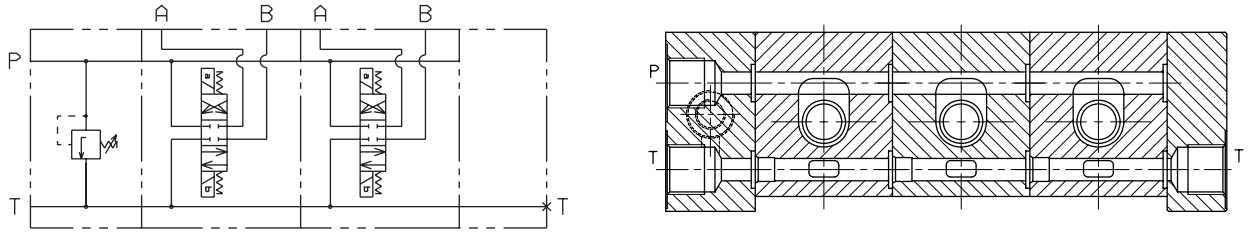


P5 ROTARY EMERGENCY 180°



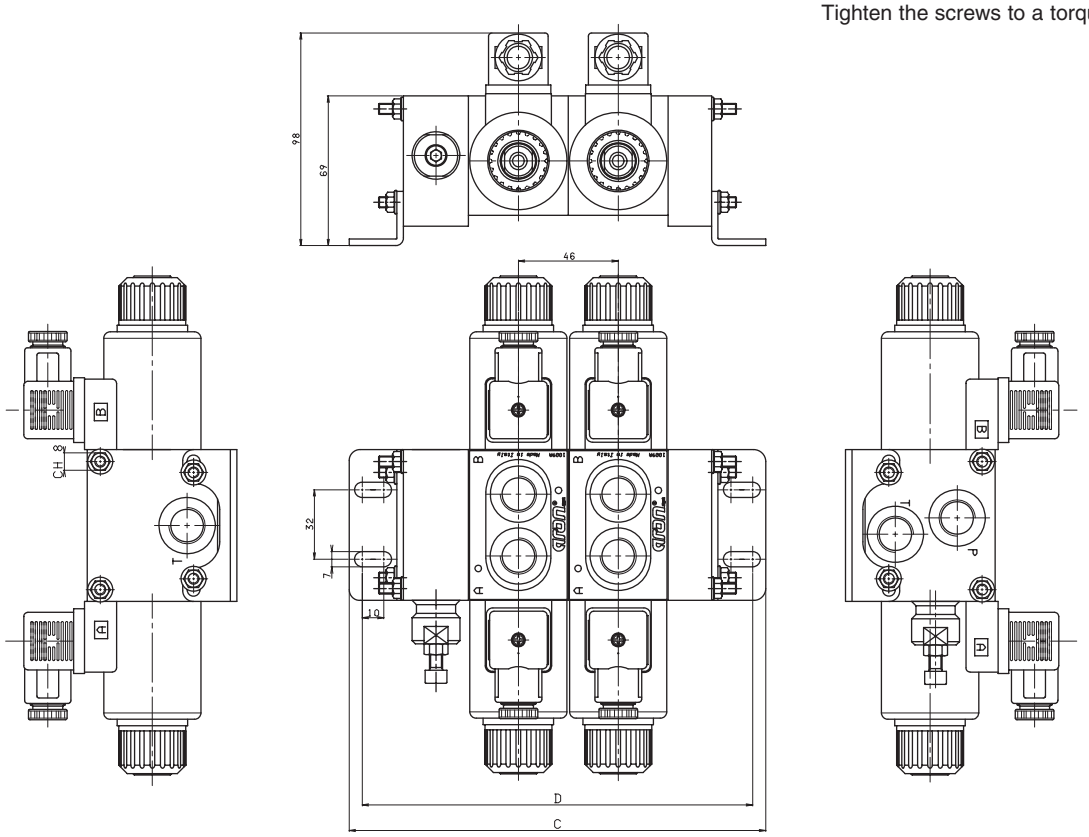
HYDRAULIC SYMBOLS AND INSTRUCTION OF CONNECTION

PARALLEL CONNECTION

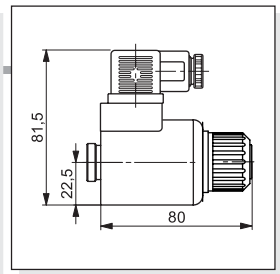


OVERALL DIMENSIONS

Tighten the screws to a torque of **5 Nm**



	FE02-FE INLET MODULE			FE 10 INLET MODULE		
NO. ELEMENTS	C	LENGTH (mm)	D	C	LENGTH (mm)	D
2	192		180	202		190
3	238		226	248		236
4	284		272	294		282
5	330		318	340		328
6	376		364	386		374



"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg

CXQ.3... OPEN LOOP PROPORTIONAL PRESSURE COMPENSATED STACKABLE FLOW REGULATORS

The open loop proportional flow regulator 3 way compensated with priority function is designed to regulate flow in proportion to an applied electrical current (REM or SE3AN power amplifier).

Flow regulation is independent both from load – P_{OUT} port – and pump flow variations. Load compensation is achieved by a spool compensator, which holds the pressure drop constant across the proportional spool.

Operating specifications and overall size make this valve suitable to interlock to module units and stackable valves in order to combine a proportional control with directional control typical of stackable systems.

CXQ.3...	
"D15P" PROPORT. SOLENOIDS	CH. XI PAGE 15
STUDS FOR MOUNTING	CH. XI PAGE 10

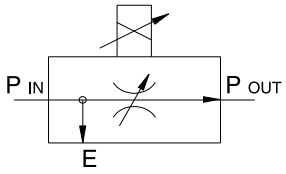
ORDERING CODE

CXQ	Open loop 3 way proportional compensated flow regulator for module units and stackable valves
3	Size
C	3 way compensation
*	**P** = 3 way priority function version **T** = 3 way version (with secondary line)
*	Nominal flow rates **H** = 15 l/min **I** = 25 l/min
D	with decompression
*	Max. current at solenoid **E** = 2.35 A **F** = 11.76 A **G** = 0.88 A
**	**00** = No variant **L5** = emergency lever **P1** = Rotary emergency **P5** = Rotary emergency 180°
1	Serial No.

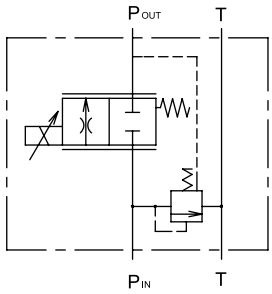
The fluid used is a mineral based oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out at with a fluid of a 40°C.

HYDRAULIC SYMBOLS

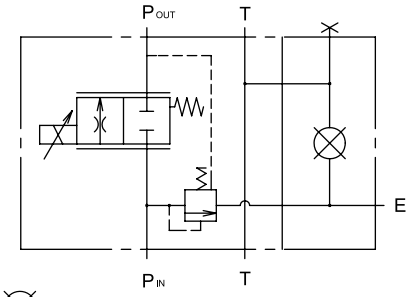
SIMPLIFIED



3 WAY WITH SECONDARY LINE
CXQ.3.C.T...

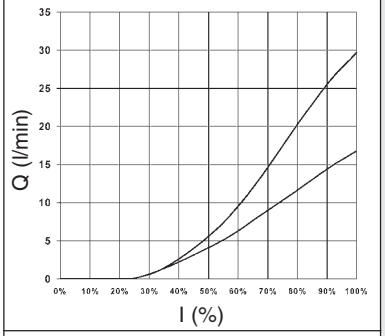


3 WAY WITH PRIORITY FUNCTION
CXQ.3.C.P...

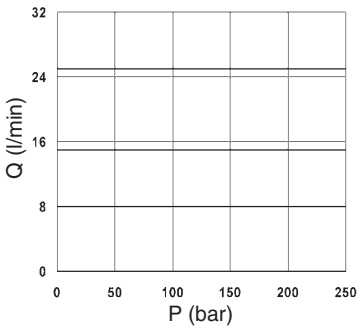


DIAGRAMS

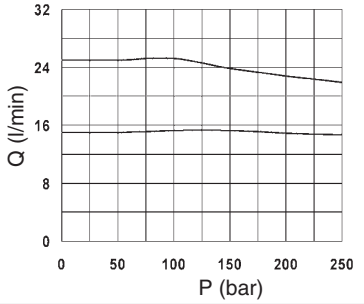
INPUT SIGNAL
FLOW



FLOW RATE BACK PRESSURE ON PRIORITY LINE

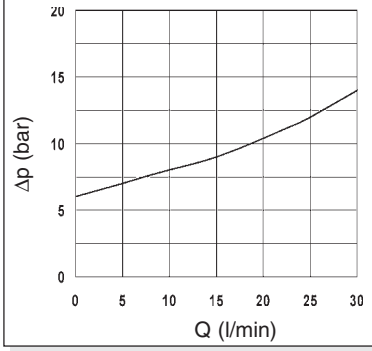


FLOW RATE BACK PRESSURE ON SECONDARY LINE

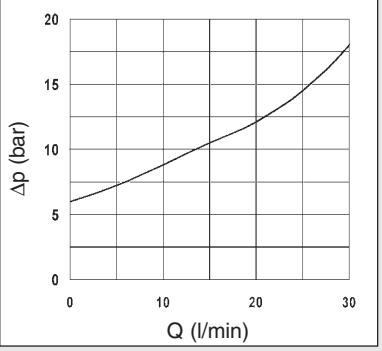


ΔP - PUMP FLOW
$P_{IN} \rightarrow T$

CXQ.3.C.T...



CXQ.3.C.P...



CXQ.3... OPEN LOOP PROPORTIONAL PRESSURE
COMPENSATED STACKABLE FLOW REGULATORS

OPERATING SPECIFICATIONS

Max. operating pressure ports P_{in} / P_{out} / E / T	250 bar
Regulated flow rate	15 / 25 l/min
Decompression drain flow	max 0,7 l/min
Relative duty cycle	Continuous 100% ED
Type of protection (in relation to the connector used)	IP 66
Flow rate gain	See diagram "Input signal flow"
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°C ÷ 75°C
Ambient temperature	-20°C ÷ 70°C
Max. contamination level	from class 7 to 9 in accordance with NAS 1638 with filter $\beta_{10} \geq 75$
Weight CXQ.3.C.P... version	Kg 2,25
Weight CXQ.3.C.T... version	Kg 1,75

Max. current at solenoid	2.35A	1.76 A	0.88 A
Solenoid coil resistance at 25°C (77°F)	2.25 Ohm	4.0 Ohm	16.0 Ohm

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

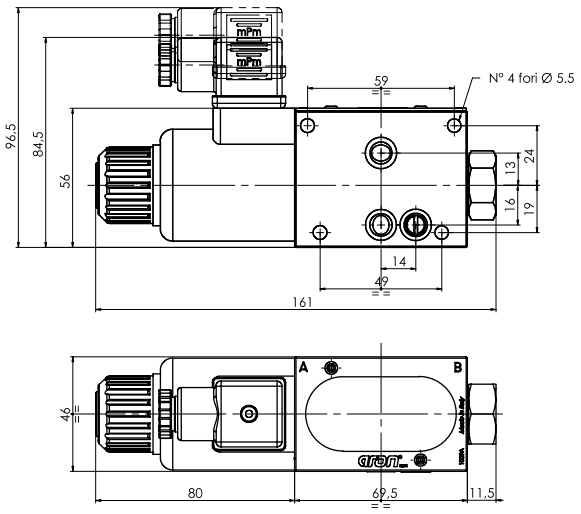
AMPLIFIER UNIT AND CONTROL

REM.S.RA.*.*...
electronic card for control single proportional solenoid valve

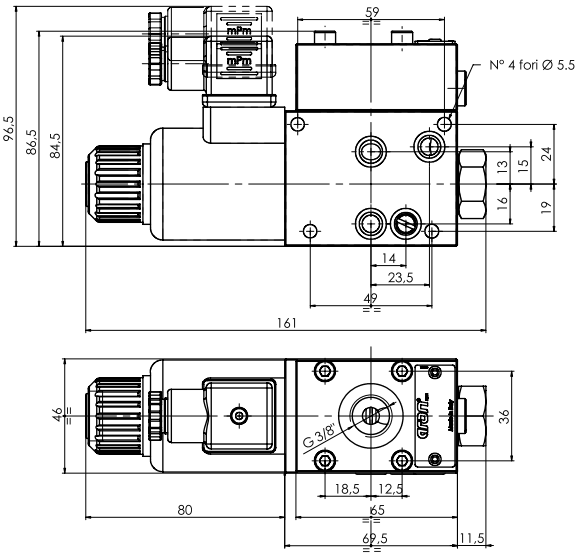
SE.3.AN.21.00...
EUROCARD type control for single solenoid

- **Operating specifications are valid for fluid with 46 mm²/s viscosity at 40°C, using the specified ARON electronic control units.**

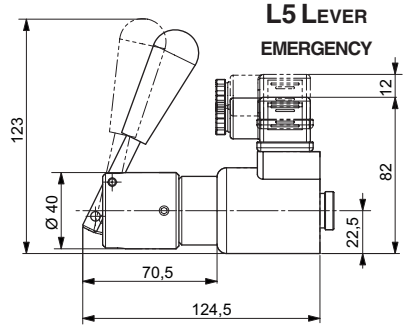
OVERALL DIMENSIONS CXQ.3.C.T...



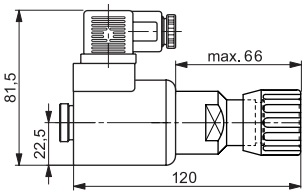
OVERALL DIMENSIONS CXQ.3.C.P...



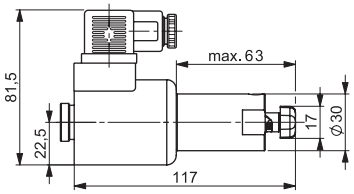
L5 LEVER EMERGENCY

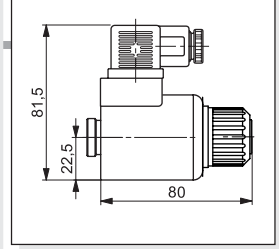


P1 ROTARY EMERGENCY



P5 ROTARY EMERGENCY 180°





"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg

CM02.3.P...

CM02.3.P... MODULAR PILOT OPERATED CHECK STACKABLE VALVES

CM02.3.P type modular check stackable valves allow one way free flow by raising a conical shutter, while in the opposite direction the fluid can return by means of a small piston piloted by the pressure in the other line.

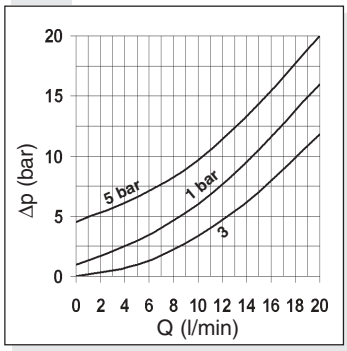
They are available on single A or B lines, and on double A and B lines (see hydraulic symbols).

Max. operating pressure	250 bar
Minimum opening pressure spring 1	1 bar
Minimum opening pressure spring 5	5 bar
Piloting ratio:	1:4
Max. flow	15 l/min
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm²/s a 50°C
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $ß_{25} \geq 75$
Weight	0,692 Kg

ORDERING CODE

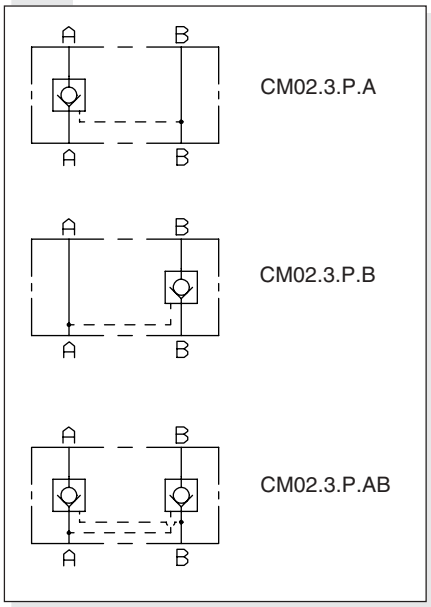
CM02	Modular stackable valve (Q max 15 l/min)
3	Size
P	Piloted check valve
*	Port sizes: **1** = G3/8" **2** = 9/16-18UNF
**	Control on lines **A / B / AB**
*	Minimum opening pressure **1** = 1 bar **5** = 5 bar
**	**00** = No variant **V1** = Viton
1	Serial No.

PRESSURE DROPS

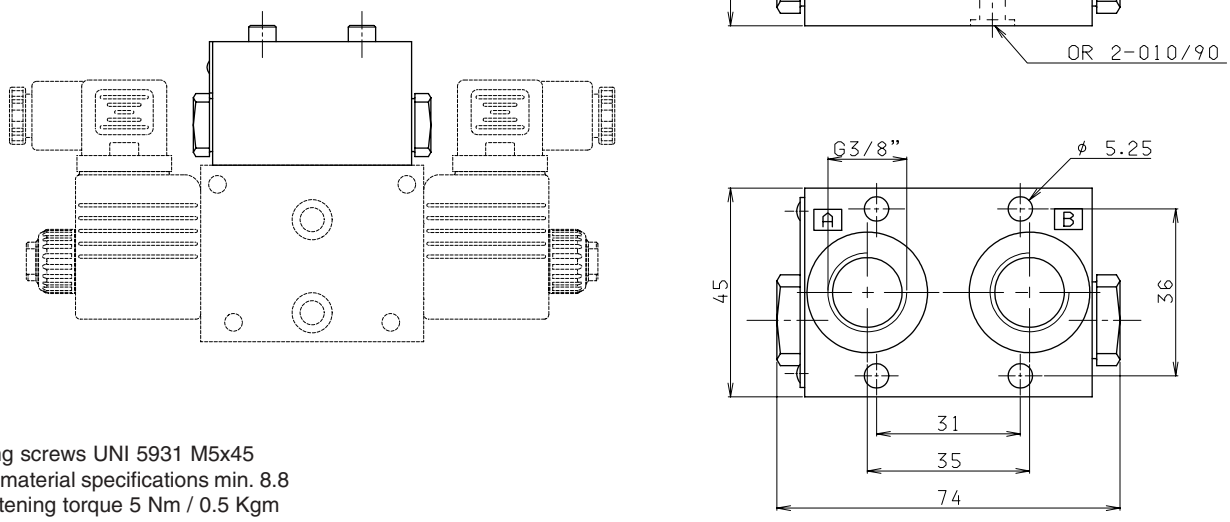


Curve n. 3 = Piloted side flow

HYDRAULIC SYMBOLS



OVERALL DIMENSIONS AND MOUNTING



Fixing screws UNI 5931 M5x45
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

CM.3.M... MODULAR MAX. PRESSURE STACKABLE VALVES

CM.3.M type pressure regulating valves are available with a pressure range of 1 ÷ 290 bar.

Adjustment is by means of a grub screw.

Single on A or B lines, and double on AB lines versions are available, with drainage to T.

All versions can accept three types of springs with calibrated ranges as shown in the specifications.

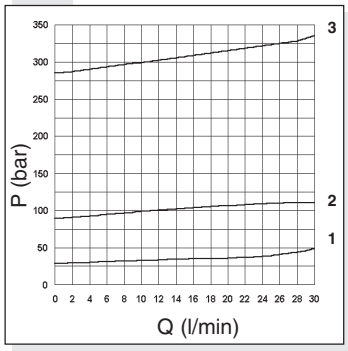
The cartridge, which is the same for all versions, is the direct acting type CMP06.

For the minimum permissible setting pressure depending on the spring, see minimum pressure setting curve.

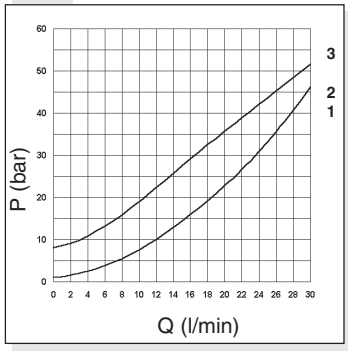
Max. operating pressure		290 bar
Setting ranges:	spring 1	max. 30 bar
	spring 2	max. 90 bar
	spring 3	max. 290 bar
Max. flow		30 l/min
Hydraulic fluids		Mineral oils DIN 51524
Fluid viscosity		10 ÷ 500 mm²/s
Fluid temperature		-25°C ÷ 75°C
Ambient temperature		-25°C ÷ 60°C
Max. contamination level		class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight CM.3.M.A/B...		0,698 Kg
Weight CM.3.M.AB...		0,926 Kg

CM.3.M...	
CMP.06...	CH. V PAGE 18

PRESSURE - FLOW RATE

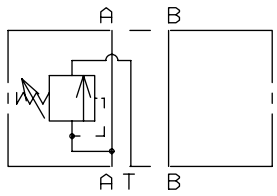


MINIMUM SETTING PRESSURE

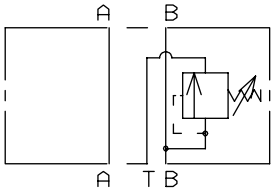


Curves n° 1 - 2 - 3 = setting ranges

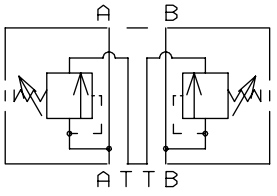
HYDRAULIC SYMBOLS



CM.3.M.A



CM.3.M.B

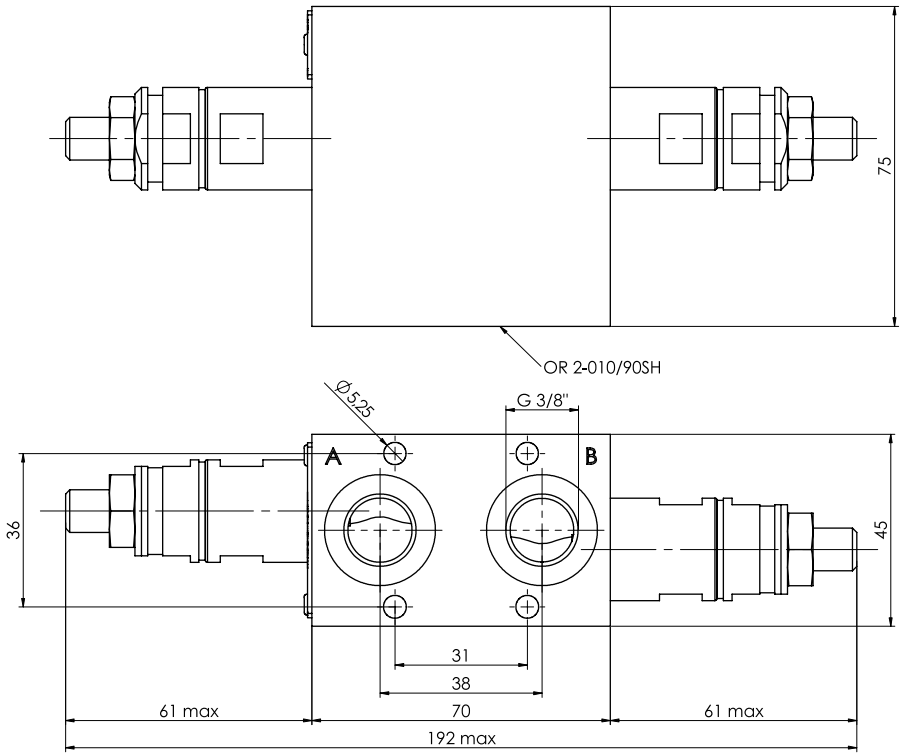


CM.3.M.AB

ORDERING CODE

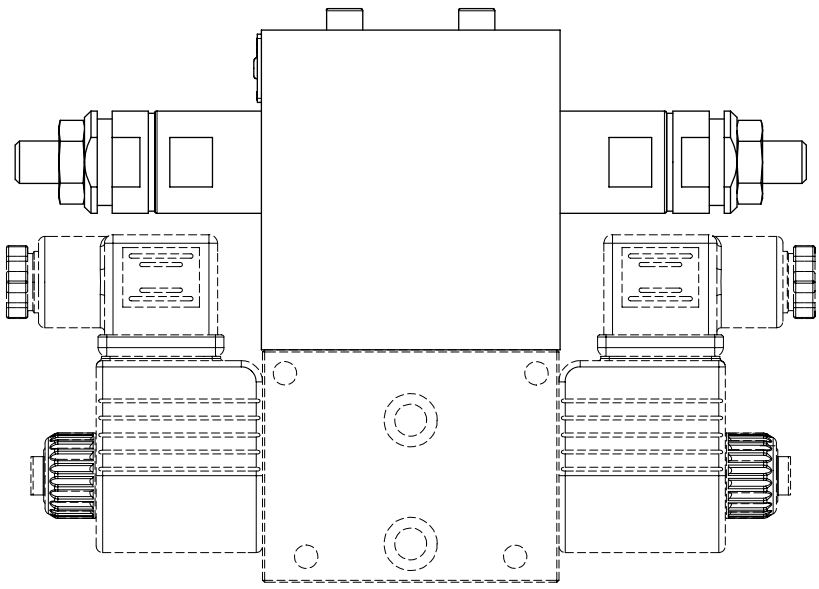
CM	Modular stackable valve
3	Size
M	Maximum pressure valve
*	Port sizes: **1** = G3/8" **2** = 9/16-18UNF
**	Adjustment on the lines: **A / B / AB**
C	Type of adjustment Grub screw
*	Setting ranges at port A **1** = max. 30 bar **(white spring)** **2** = max. 90 bar **(yellow spring)** **3** = max. 290 bar **(green spring)**
*	Setting ranges at port B **(Omit if the setting is same as that at port A)** **1** = max.30 bar **(white spring)** **2** = max. 90 bar **(yellow spring)** **3** = max. 290 bar **(green spring)**
**	**00** = No variant **V1** = Viton
1	Serial No.

OVERALL DIMENSIONS



Fixing screws UNI 5931 M5x85
with material specifications min. 8.8
Tightening torque 5 Nm / 0.5 Kgm

MOUNTING



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