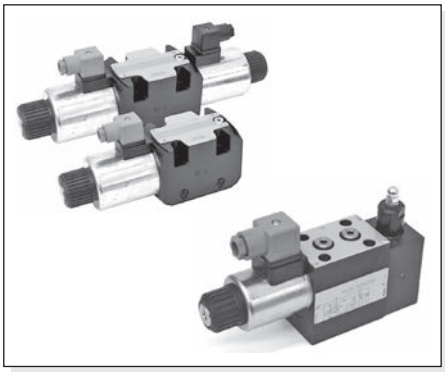
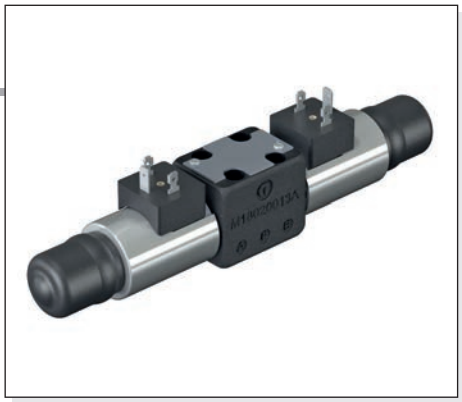
ABBREVIATIONS

AP	HIGH PRESSURE CONNECTION
AS	PHASE LAG (DEGREES)
BP	LOW PRESSURE CONNECTION
C	STROKE (MM)
CH	ACROSS FLATS
Ch	INTERNAL ACROSS FLATS
DA	AMPLITUDE DECAY (DB)
Dp	DIFFERENTIAL PRESSURE (BAR)
F	FORCE (N)
I%	INPUT CURRENT (A)
M	MANOMETER CONNECTION
NG	KNOB TURNS
OR	SEAL RING
P	LOAD PRESSURE (BAR)
PARBAK	PARBAK RING
PL	PARALLEL CONNECTION
Pr	REDUCED PRESSURE (BAR)
Q	FLOW (L/MIN)
Qp	PUMP FLOW (L/MIN)
SE	ELASTIC PIN
SF	BALL
SR	SERIES CONNECTION
X	PILOTING
Y	DRAINAGE

PROPORTIONAL VALVES



8



XD2A... / XD2C... Solenoid operating proportional valves Cetop 2

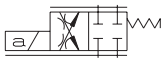
XD2A../XD2C.. series valves are used for controlling fluid direction and flow rate as a function of the supply current to the proportional control solenoid.

Any valve Δp variation causes a change in the set flow rate; however the valve itself ensures a high level internal compensation maintaining constant a regulated flow.

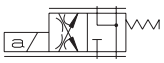
The XD2 cetop valve could be used for accurate proportional controls with compact size, reducing weight.
These valves can be also combined with Mini Powerpacks type MR/MC/FP creating compact solutions. Il can be also used on a Cetop 3 interface using a reduction plate type BS32001.

XD2...	
Standard connectors	Cap. I • 20
REMSRA...	Cap. IX • 4
REMDRA...	Cap. IX • 7
CEPS	Cap. IX • 2
AM3H...	Cap. VIII • 12
BS32001	Cap. VII • 3

XD2A01N..



XD2A03N..



XD2C01N..

XD2C03N..

Ordering code

XD	Proportional valve
2	CETOP 2/NG04
*	**A** = Single solenoid **C** = Double solenoid
**	Type of spool (null position) **01** =  **03** = 
N	Flow path control (see symbols table) **N** = symmetrical
*	Flow rating l/min (Δp 5 bar) P → A/B (Δp 10 bar) P → A/B → T or P → B/A → T **1** = 1 l/min **3** = 3 l/min
*	Max. spool current **F** = 1.3 A **G** = 0.65 A
**	Variant: see Tab.1
2	Serial No.

Tab.1 - Variants

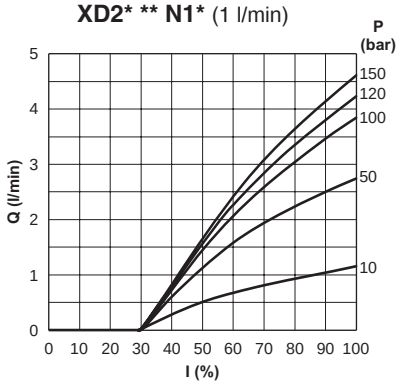
No variant (without connectors)	S1(*)
Emergency button	ES
Viton	SV

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

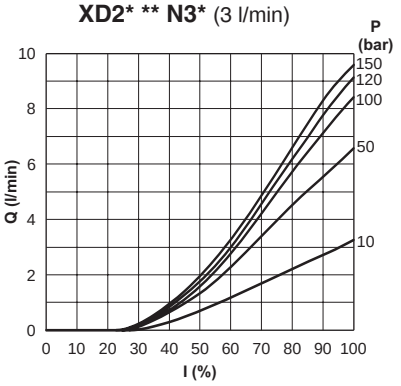
Input signal curves - flow rate

Characteristic curves Q/I: P→A/B →T or P→B/A→T

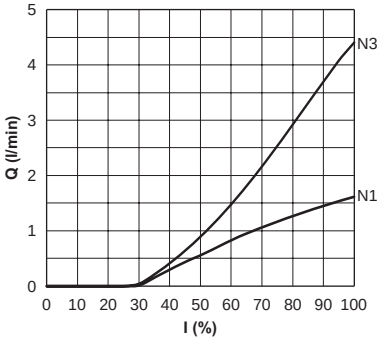
XD2* ** N1* (1 l/min)



XD2* ** N3* (3 l/min)

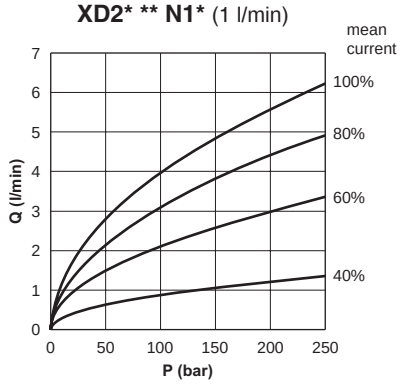


With compensator AM3H3VP108002

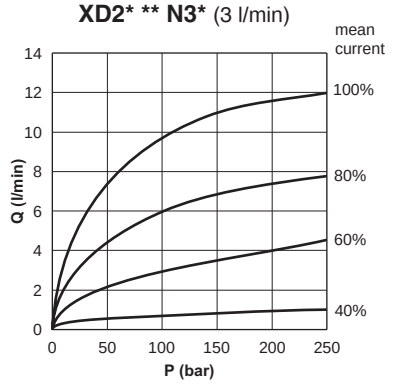


Power limits transmitted: P→A/B →T o P→B/A→T

XD2* ** N1* (1 l/min)



XD2* ** N3* (3 l/min)



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

OPERATING SPECIFICATIONS

Max. operating pressure ports P/A/B *(1)*	250 bar
Max. operating pressure port T - for dynamic pressure see note *(2)*	250 bar
Nominal flow rate:(Δp 5 bar: P→ A/B) (Δp 10 bar: P→A/B→T or P→B/A→T)	1/3 l/min
Maximum regulated flow rate: (Δp 150 bar: P→A/B→T or P→B/A→T)	4.5/9.5 l/min
Flow rate gain	See diagrams
Hysteresis with connection P/A/B/T Δp = 5 bar (P/A)	≤ 13% of max. flow rate
Fluid viscosity	10 ÷ 500 mm²/s
Fluid temperature	-20°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 XD.2.A... (single solenoid)	1.0 Kg
Weight XD.2.C... (double solenoid)	1.37 Kg

• Operating specifications are valid for fluid with 46 mm²/s viscosity at 40°C, using the specified electronic control units.

Supply voltage	12VDC	24VDC
Supply tolerance	+/- 10%	
Supply voltage type	PWM (pulse width modulation)	
Frequence PWM or Dither	100-150 Hz	
Relative duty cycle	Continuous 100% ED	
Max. current	1.3A	0.65A
Solenoid coil resistance at 20°C (68°F)	5.5 Ohm	21.8 Ohm

ELECTRONIC CONTROL UNIT

REMSRA and REMDRA****
Card type control for single and double solenoid.
Recommended dither frequency 100 Hz.

CEPS
Electronic amplifier plug version
for single solenoid proportional valve (150Hz PWM frequency setting)

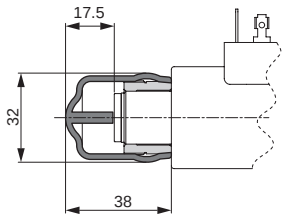
(1) **With AM3H compensator:** hysteresist guaranteed up to 150 bar on ports A and B.

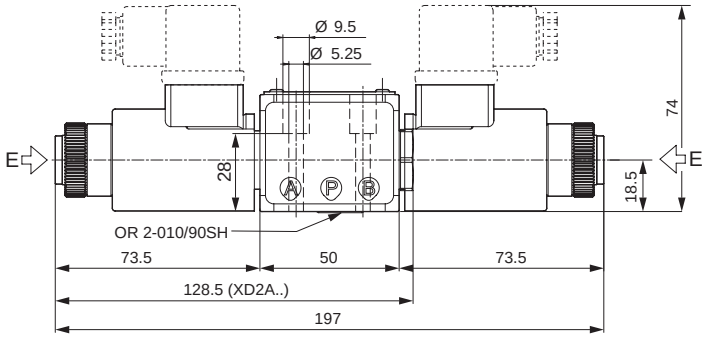
Without compensator: use of the valve allowed up to 150 bar.

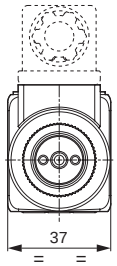
(2) Dynamic pressure allowed for 500000 cycles.

OVERALL DIMENSIONS

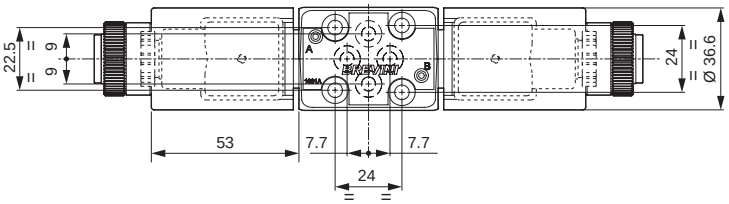
Variant ES: Emergency button.





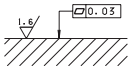


E: Manual emergency: if necessary, use a tool that does not damage the brass button.



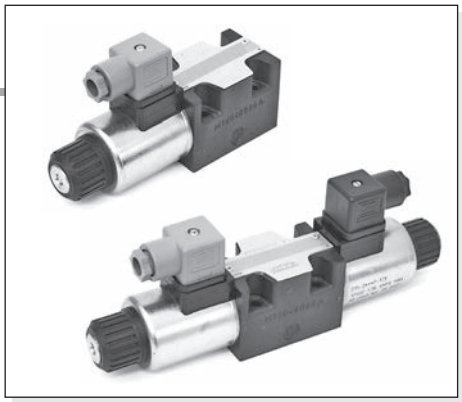
Fixing screws UNI 5931 M5x35 (min. 8.8 material screws are recommended)
Tightening torque 5 Nm / 0.5 Kgm

Support plane specification



PROPORTIONAL SOLENOID

Type of protection (in relation to connector used)	IP 65
Insulation class wire	H
Weight	0,22 Kg
Surface treatment	FeZn5 UNI ISO 2081



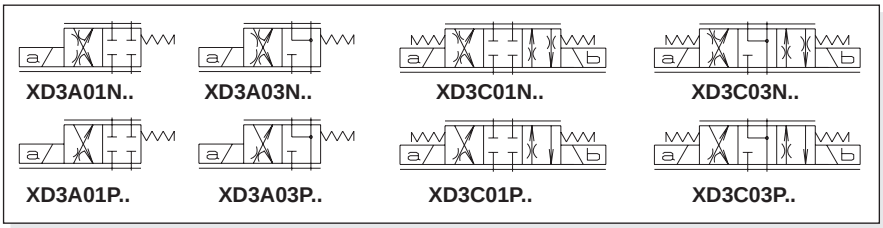
XD3A... / XD3C... SOLENOID OPERATING PROPORTIONAL VALVES CETOP 3

XD3A../XD3C.. 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.
To ensures a constant flow rate and reduce leakage, we recommend to use AM3H2V or AM3H3V hydrostats.

Performances shown in this catalogue are guaranteed only using 2 or 3 way modular assembly hydrostats type AM3H. ...

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 BC307 (see diagram next page). This type of configuration extends considerably the flow rate limit.

XD3...	
STANDARD CONNECTORS	CAP. I • 20
"D15P" PROPORT. SOLENOIDS	CAP. VIII • 5
REMSRA...	CAP. IX • 4
REMRA...	CAP. IX • 7
AM3H...	CAP. VIII • 12
BC307...	CAP. VII • 12



ORDERING CODE

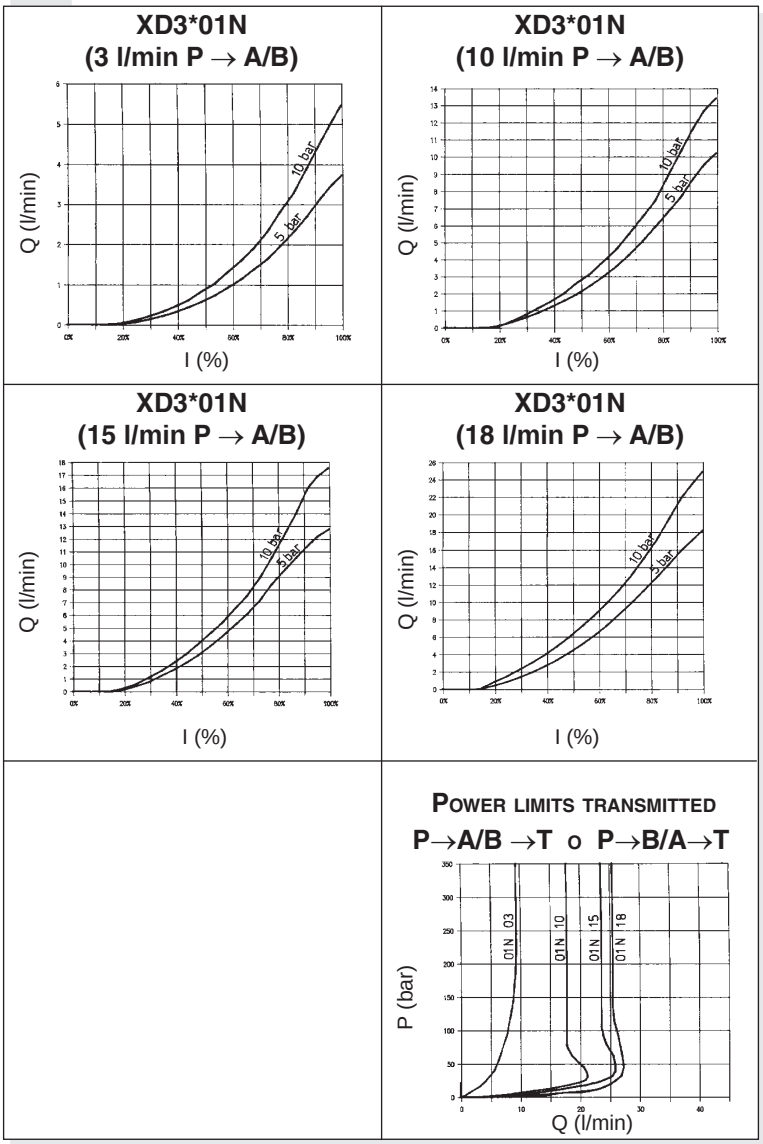
XD	Proportional valve
3	CETOP 3/NG06
*	**A** = Single solenoid **C** = Double solenoid
**	Type of spool (null position) **01** =  **03** = 
*	Flow path control (see symbols table) **N** = symmetrical **P** = meter in
*	Flow rating l/min (Δp 5 bar) **1** = 3 l/min **2** = 10 l/min **3** = 15 l/min **4** = 18 l/min
*	**E** = 2.35 A **F** = 1.76 A **G** = 0.88 A
**	Variant: see Tab.1
2	Serial No.

TAB.1 - VARIANTS (*)

No variant (without connectors)	S1
Viton	SV
Rotary emergency	P2
Rotary emergency 180°	R5
Deutsch DT04-2P Coil type	CZ

(*) All variants are considered without connectors.
The connectors must be order separately.
See Cap. I • 20.

INPUT SIGNAL CURVES - FLOW RATE



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 / 18 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.

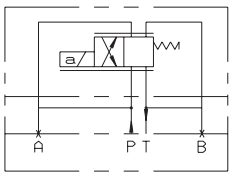
• Operating specifications are valid for fluid with 46 mm²/s viscosity at 40°C, using the specified electronic control units.

ELECTRONIC CONTROL UNIT

REMSRA and REMDRA****
Card type control for single and double solenoid.
Recommended dither frequency 100 Hz.

AM3H2VP1 and AM3H3VP1
Hydrostats 2 or 3 way.

SCHEMA FOR DOUBLE FLOW RATE

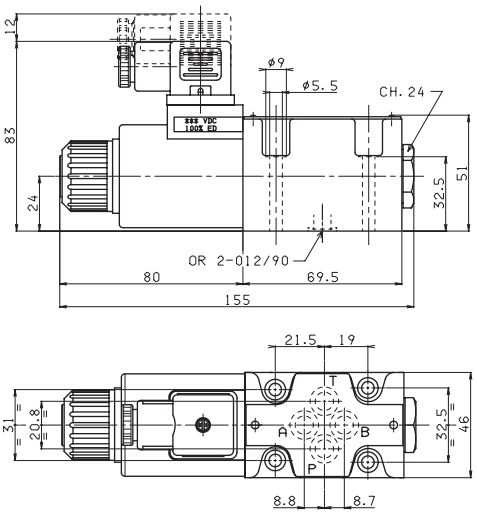


XD3A...

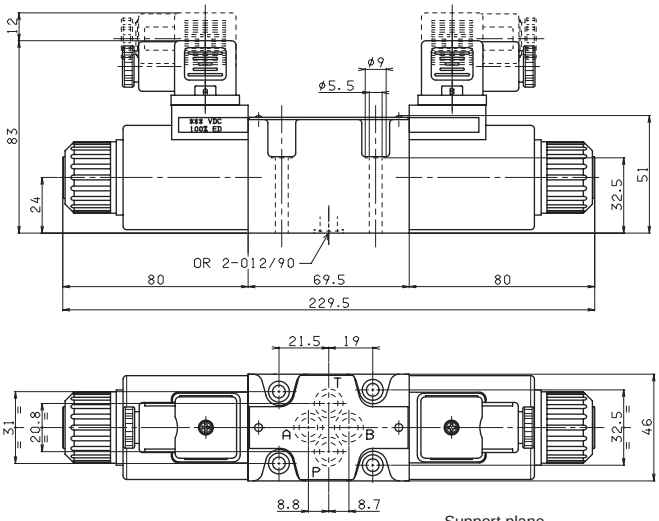
BC307

Standard base

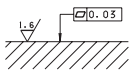
XD3A... OVERALL DIMENSIONS



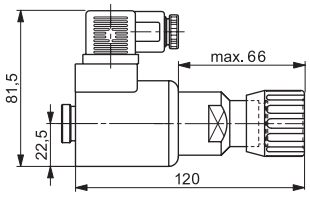
XD3C... OVERALL DIMENSIONS



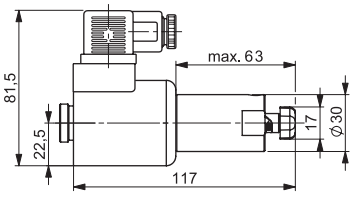
Support plane specification



Fixing screws UNI 5931 M5x40 (min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm



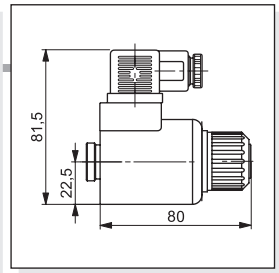
P2 Rotary emergency *(1)*



R5 Rotary emergency 180° *(2)*

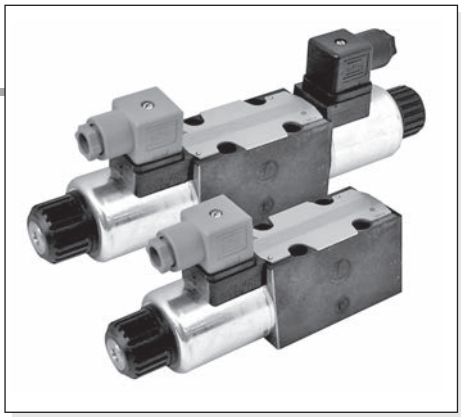
(1) **P2** - Adjustable hand emergency.

(2) **R5** - Two positions hand emergency. The regulated flow with emergency actuated can be less than nominal value.



"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class wire	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg



XDP3A... / XDP3C ...

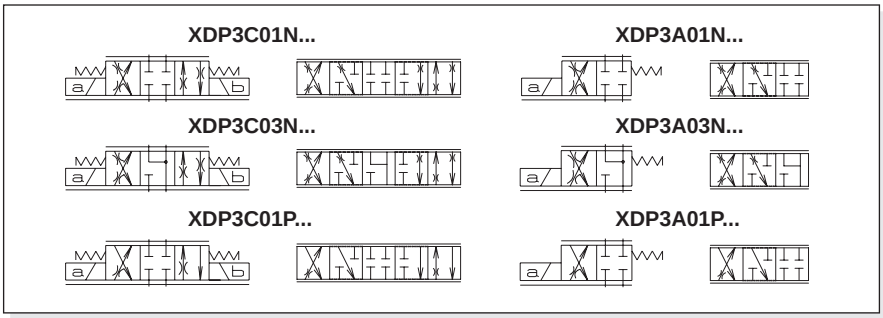
PROPORTIONAL DIRECTIONAL VALVES OPEN LOOP

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 AM3H. ... By using the valve with the base for capacity doubling type BC307 (see next page) a greater capacity cam be obtained.

XDP3...	
STANDARD CONNECTORS	CAP. I • 20
D15P PROPORTIONAL SOLENOIDS	CAP. VIII • 7
REMSRA...	CAP. IX • 4
REMDRA...	CAP. IX • 7
AM3H...	CAP. VIII • 12
AM5H...	CAP. VIII • 13
BC307...	CAP. VII • 12



ORDERING CODE

XDP — Open loop proportional directional valve

3 — CETOP 3/NG06

***** — **A** = Single solenoid; **C** = Double solenoid

****** — Type of spool (null position)

01 =  **03** = 

***** — Flow path control (see hydraulic symbols table)
N = simmetrico
P = in mandata (solo con cursori 01)

***** — Flow rating l/min (Δp 10 bar)
A = 4 l/min
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 AM5H3V... hydrostat

***** — Max. current to solenoid
E = 2.35 A
F = 1.76 A
G = 0.88 A

****** — Varianti: see Table 1

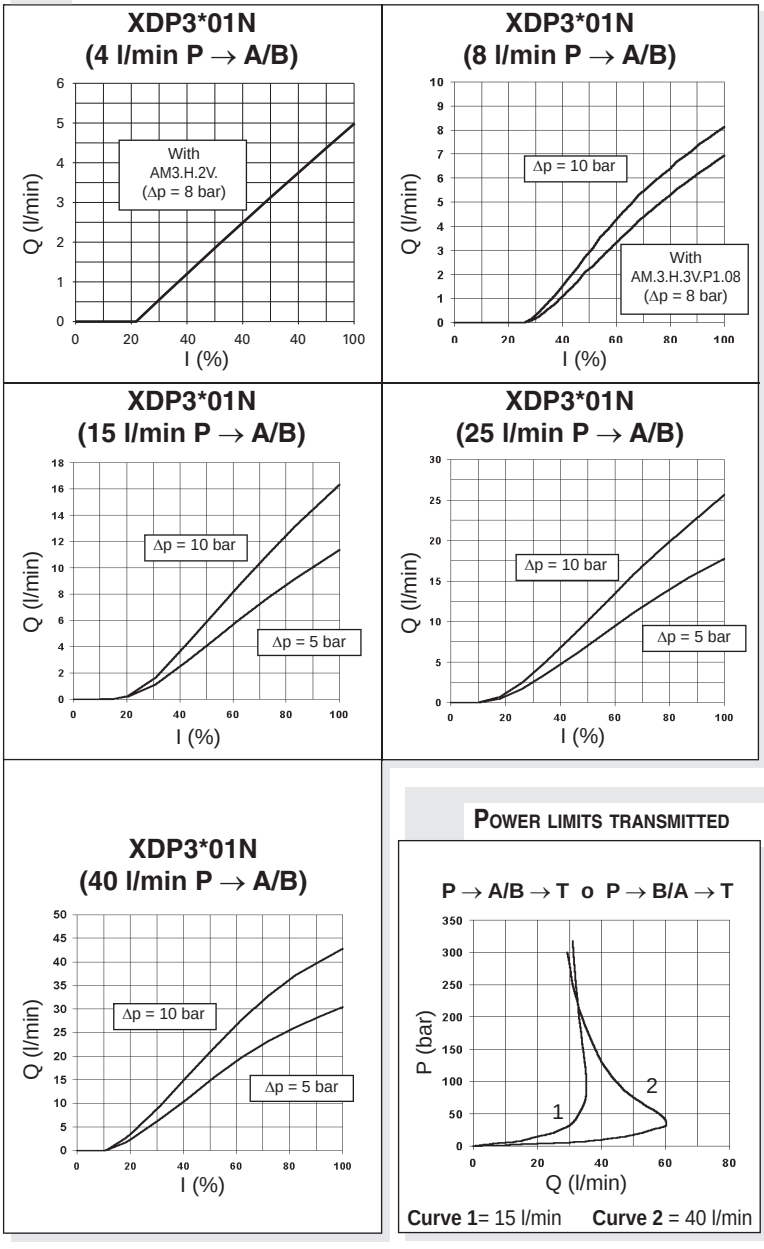
2 — Serial No.

TAB.1 - VARIANTS (*)

No variant (without connectors)	S1
Viton	SV
Rotary emergency	P2
Rotary emergency 180°	R5
Deutsch DT04-2P Coil type	CZ

(*) All variants are considered without connectors.
The connectors must be order separately.
See Cap. I • 20.

INPUT SIGNAL CURVES - FLOW RATE



POWER LIMITS TRANSMITTED

Curve 1= 15 l/min **Curve 2** = 40 l/min

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 mm^2/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 $ß_{10}≥75$
Weight XDP3A... (single solenoid)	1,7 Kg
Weight XDP3C... (double solenoid)	2,9 Kg

	2.35A	**1.76 A**	**0.88 A**
Max. current			
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 mm^2/s viscosity at 40°C, using the specified electronic control units. Performance data carried out using the specified power amplifier SE3AN... serie 1 - EUROCARD format - powered to 24V.

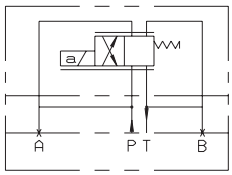
AMPLIFIER UNIT AND CONTROL

REMSRA and REMDRA****
Electronic card control single and double proportional solenoid valve.
Recommended dither frequency 100 Hz.

AM3H2VP1 / AM3H3VP1 and AM5H3VP1 (*)

Hydrostats 2 or 3 way
(*) for rated flow XDP3 version at 40 l/min only

CONFIGURATION FOR DOUBLE FLOW RATE

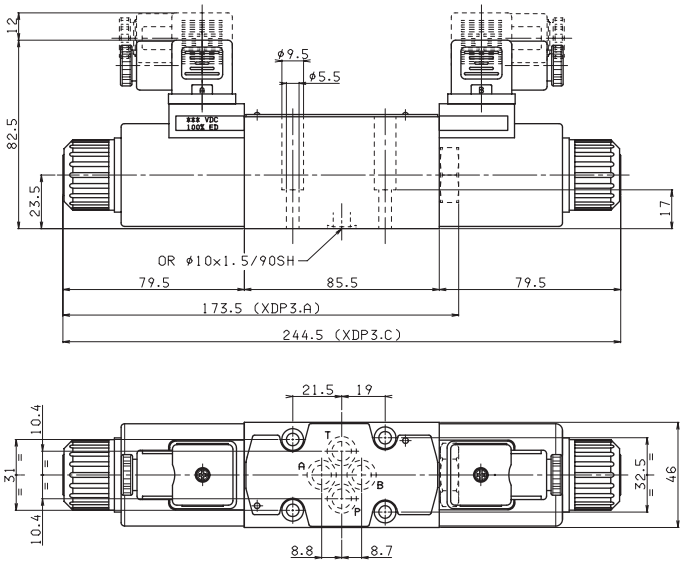


XDP3A

BC307

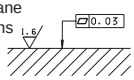
Standard subplate

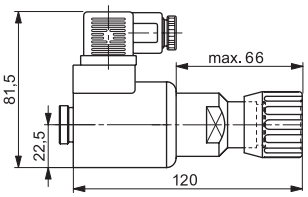
OVERALL DIMENSIONS



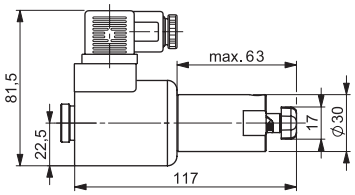
Fixing screws UNI 5931 M5x25
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 5 Kgm

Support plane specifications





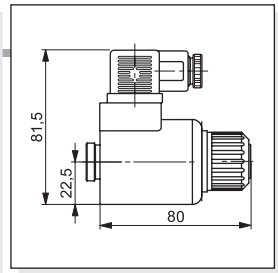
P2 Rotary emergency *(1)*



R5 Rotary emergency 180° *(2)*

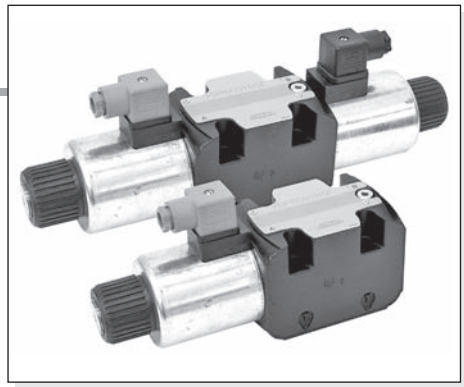
(1) **P2** - Adjustable hand emergency.

(2) **R5** - Two positions hand emergency. The regulated flow with emergency actuated can be less than nominal value.



"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class wire	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg



XDP5A... / XDP5C ...

PROPORTIONAL DIRECTIONAL VALVES OPEN LOOP

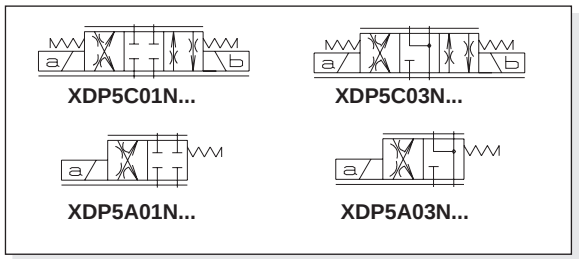
The open loop valves of series XDP control the direction and the volume of the flow according to the feeding current to the proportional solenoid.

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 AM5H. ... (see note below in ordering code).

S5 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...	
STANDARD CONNECTORS	CAP. I • 20
"D19P" PROPORT. SOLENOIDS	CAP. VIII • 9
REMSRA...	CAP. IX • 4
REMDRA...	CAP. IX • 7
AM5H...	CAP. VIII • 13

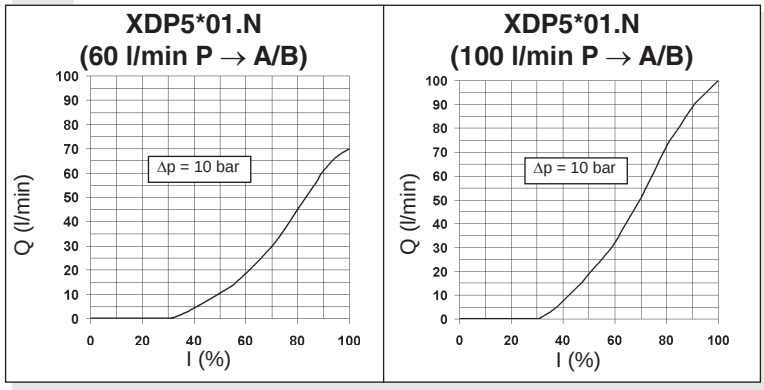


ORDERING CODE

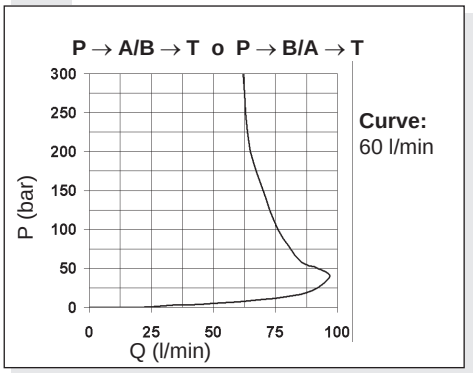
XDP	Open loop proportional directional valve
5	CETOP 5/NG10
*	**A** = Single solenoid **C** = Double solenoid
**	Type of spool (null position) **01** =  **03** = 
N	Symmetrical flow path control (see hydraulic symbols table)
*	Flow rating (*) Δp 10 bar **2** = 45 l/min **3** = 60 l/min **5** = 100 l/min
*	Max. current to solenoid **F** = 2.5 A **G** = 1.25 A
**	Variants: see table 1
1	Serial No.

(*) Guaranteed with 24Volt, 2.5Amps supply.

INPUT SIGNAL CURVES - FLOW RATE



POWER LIMITS TRANSMITTED



TAB.1 - VARIANTS (**)

No variant (without connectors)	S1
Viton	SV
Rotary emergency	P2
External drainage	S5

(**) All variants are considered without connectors.
The connectors must be order separately.
See Cap. I • 20.

8

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 - S5 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 $ß_{10}≥75$	
Weight XDP5A... (single solenoid)	4,97 Kg
Weight XDP5C... (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

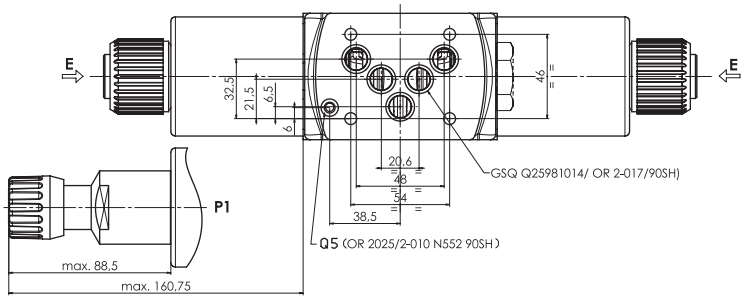
Operating specifications are valid for fluids with 46 mm²/s viscosity at 40°C, using the specified electronic control units. Performance data carried out using the specified power amplifier type REMSRA... power supplied at 24V.

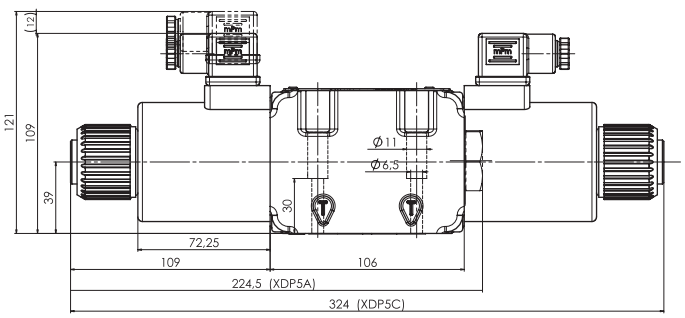
AMPLIFIER UNIT AND CONTROL

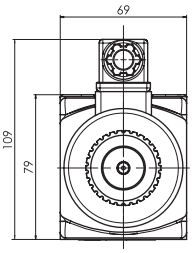
REMSRA.*.*. and REMDRA.*.*.
Electronic card control single and double proportional solenoid valve.
Recommended dither frequency 100 Hz.

AM5H2VP1 / AM5H3VP1(Δp=10bar)
Hydrostats 2 or 3 way.

OVERALL DIMENSIONS







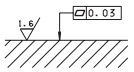
E = Manual override
P2 = Rotary emergency button

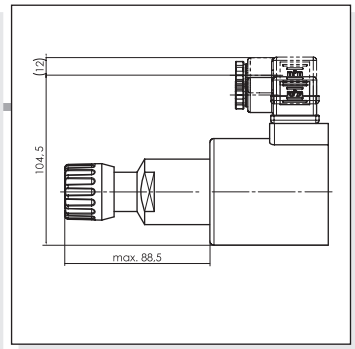
S5 = External draining hole for XDP5 variante S5 only **(Screws: material specifications 12.9 must be used)**

GSQ = Square section seal

Fixing screws UNI 5931 M6x40
(12.9 material screws are recommended)
Tightening torque 8 ÷ 10 Nm / 0.8 ÷ 1 Kgm

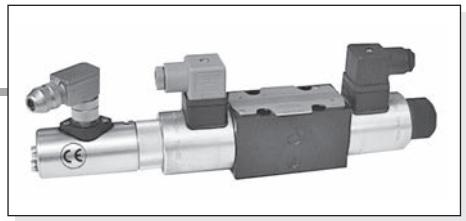
Support plane specifications





"D19P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 65
Ambient temperature	-25°C ÷ 60°C
Duty cycle	100% ED
Insulation class wire	H
Weight	1,58 Kg



XDC3... Proportional directional valves

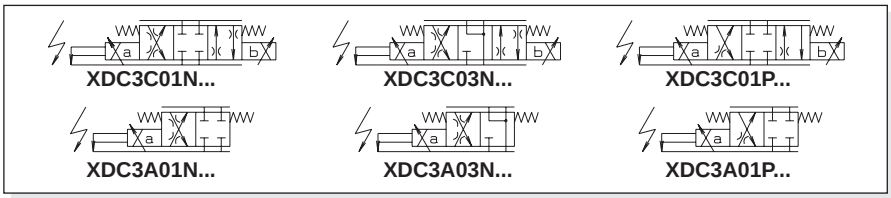
Closed loop position control

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 repeatability 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.

XDC3...2	
Standard connectors	Cap. I • 20
Proportional solenoid	Cap. VIII • 11
SE3AN21RS...3	Cap. IX • 11
AM3H...	Cap. VIII • 12
AM5H...	Cap. VIII • 13
BC307...	Cap. VII • 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
N = symmetrical
P = meter in (only with 01 spool)

***** — Flow rating l/min (Δp 10 bar)
A = 4 l/min
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 AM5H3V... hydrostat.

F — Max. current at solenoid: 1.76 A

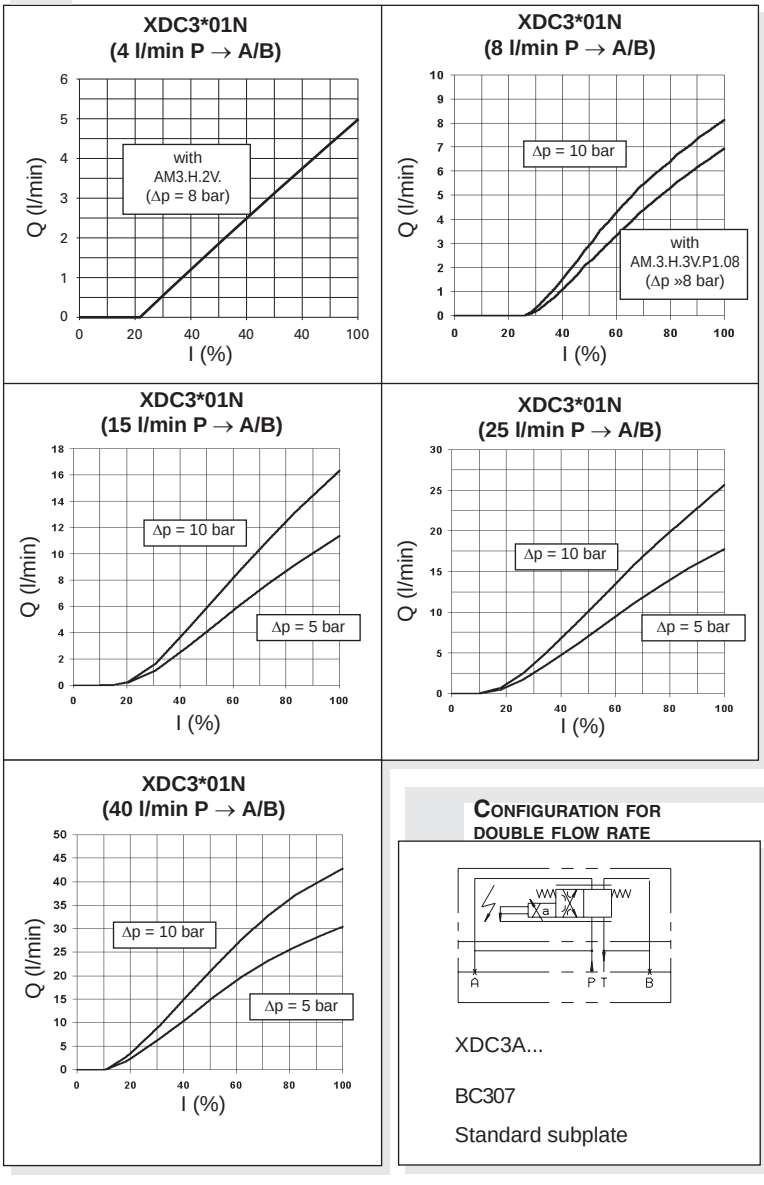
S1 — No variant (without connectors)*

2 — Serial No.

Notice:
in order to control the valve XDC3...serie 2 it need to use the electronic card SEAN21RS...serie 3, in exclusive way (See Ch. IX).

(*) All variants are considered without connectors.
The connectors must be order separately.
See Cap. I • 20.

Input signal curves - flow rate



Configuration for double flow rate

XDC3A...

BC307

Standard subplate

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 $ß_{10}≥75$
Weight XDC3A... (single solenoid)	1,94 Kg
Weight XDC3C... (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 AM3H3V...	<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 wire	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 electronic control unit powered to 24V.

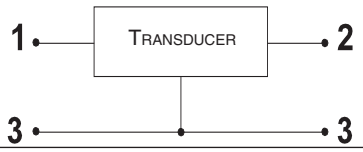
AMPLIFIER UNIT AND CONTROL

SE3AN21RS...serie 3 - Electronic card EURO-CARD format for control of the proportional valve equipped with transducer

AM3H2VP1 / AM3H3VP1
AM5H3VP1 (*)

Hydrostats 2 or 3 way
(*) for rated flow XDC3 version at 40 l/min) only

TRANSDUCER ELECTRICAL CONNECTIONS

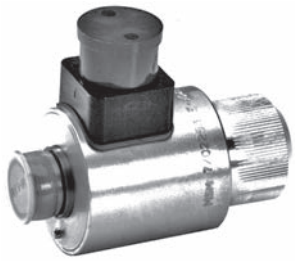


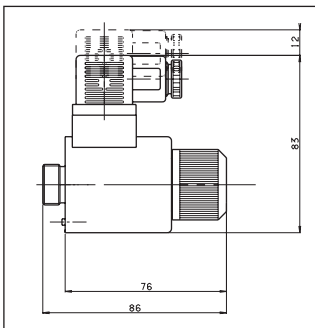
1 = Supply 18VDC ÷ 36VDC
3 = Mass
2 = Output 2V ÷ 10V

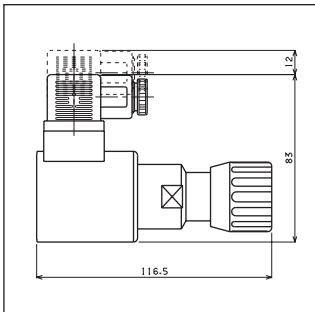
POSITION TRANSDUCER SPECIFICATION

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%

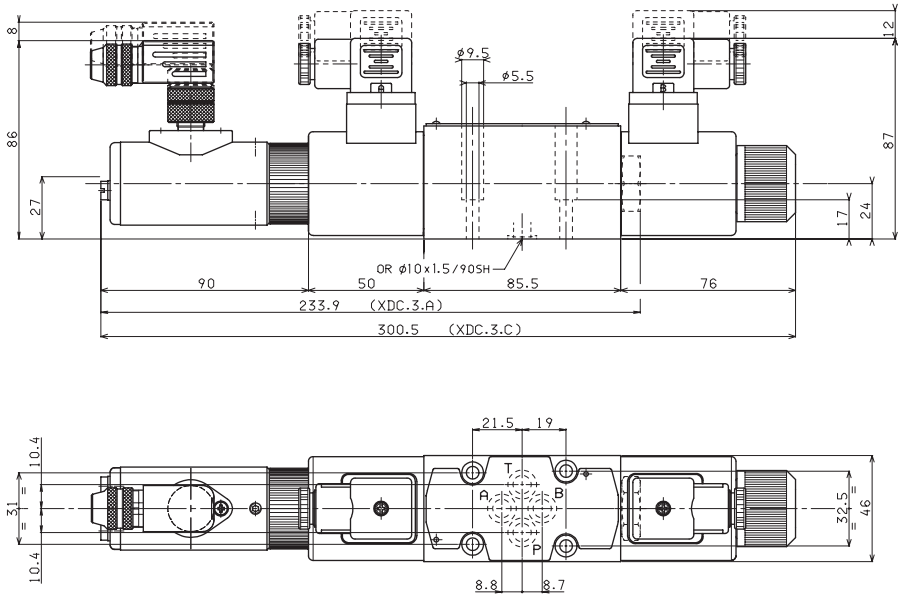
PROPORTIONAL SOLENOID





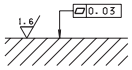


OVERALL DIMENSIONS

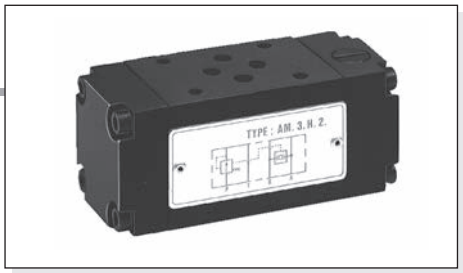


Fixing screws UNI 5931 M5x25
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specifications



8



AM3H...

AM3H... 2 AND 3 WAY HYDROSTATS CETOP 3

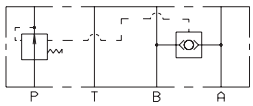
The 2 or 3 way pressure regulator type AM3H ensure the constant set flow rate in the presence of varying system load (pressure) by keeping constant the pressure drop (Δp = 4/8 bar) in relation to the flow rate regulation.
In order to achieve the direction and flow rate dual control function, it is normally 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 $ß_{10}≥75$
Weight	1,4 Kg

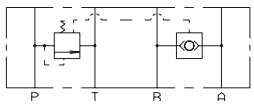
ORDERING CODE

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
2	Serial No.

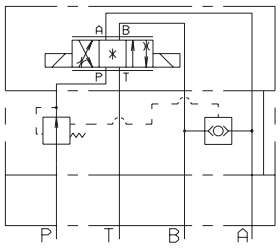
8



AM3H2VP1...



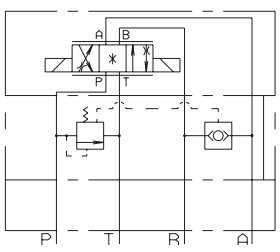
AM3H3VP1...



Proportional valve XD3C...

Hydrostat **AM3H2V...**

BASE

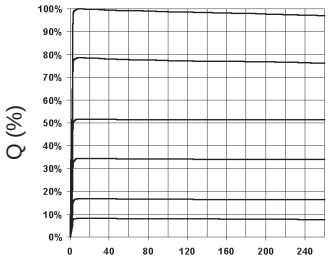


Proportional valve XD3C...

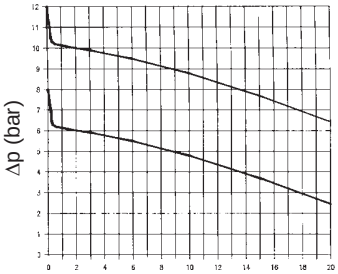
Hydrostat **AM3H3V...**

BASE

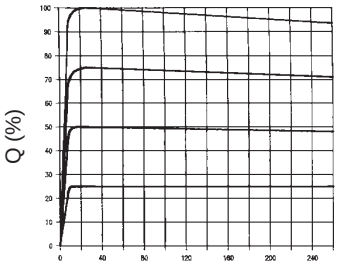
AM3H2VP1... FLOW - LOAD PRESSURE CURVE



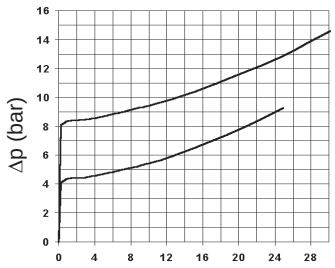
AM3H2VP1... Δp - REGULATED FLOW CURVE



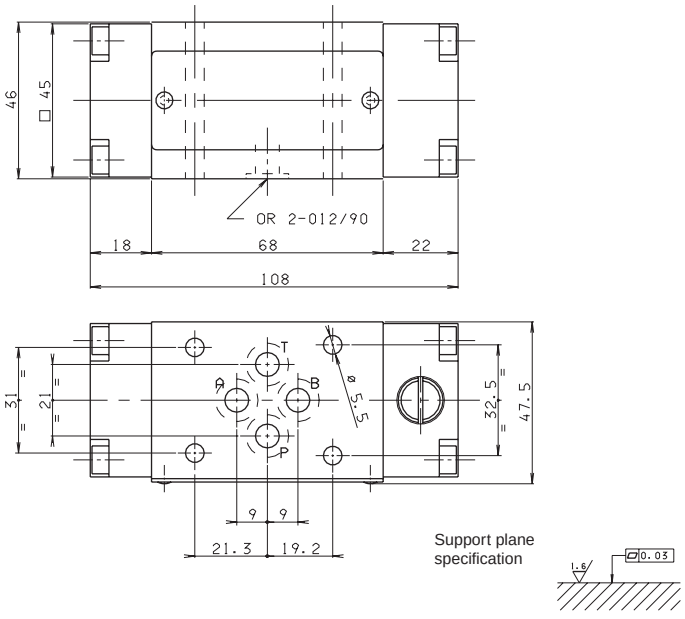
AM3H3VP1... FLOW - LOAD PRESSURE CURVE

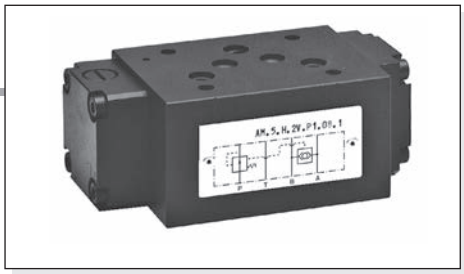


AM3H3VP1... Δp - PUMP FLOW



OVERALL DIMENSIONS





AM5H...

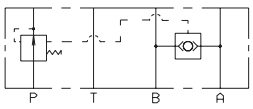
AM5H... 2 AND 3 WAY HYDROSTATS CETOP 5

The 2 or 3 way pressure regulator type AM5H 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.

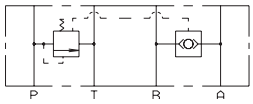
Max. flow AM5H2V...	65 l/min
Max. flow AM5H3V...	70 l/min
Max. operating pressure	350 bar
Δp adjustment	8 bar
Fluid viscosity	10 ÷ 500 mm^2/s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 8 in accordance with NAS 1638 with filter $ß_{10}≥75$
Weight	2,7 Kg

ORDERING CODE

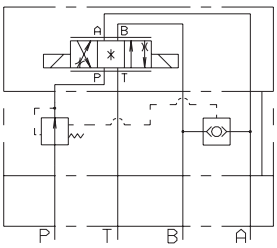
AM	Modular valve
5	CETOP 5/NG10
H	Hydrostat
**	**2V** = 2 way **3V** = 3 way
P1	Function at port P
08	Differential pressure (Δp) Δp 8 bar
**	**00** = No variant **V1** = Viton
2	Serial No.



AM5H2VP1...



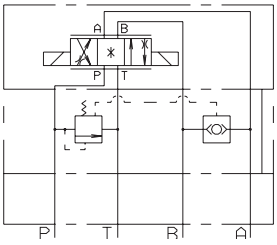
AM5H3VP1...



Proportional valve XD5C...

Hydrostat **AM5H2V...**

BASE

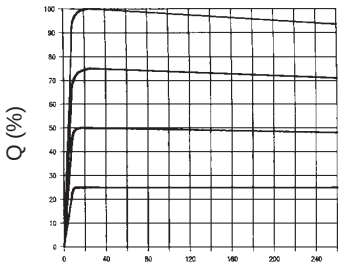


Proportional valve XD5C...

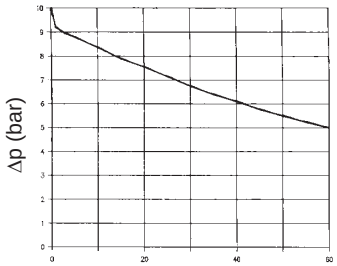
Hydrostat **AM5H3V...**

BASE

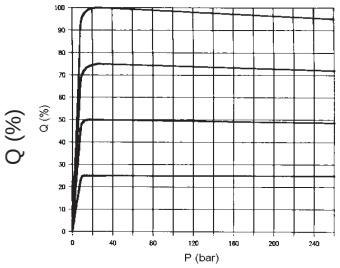
AM5H2VP1... FLOW - LOAD PRESSURE CURVE



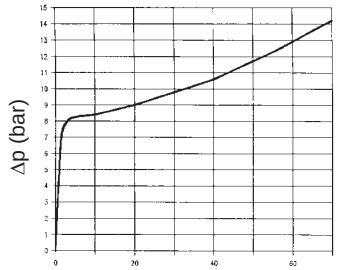
AM5H2VP1... Δp - REGULATED FLOW CURVE



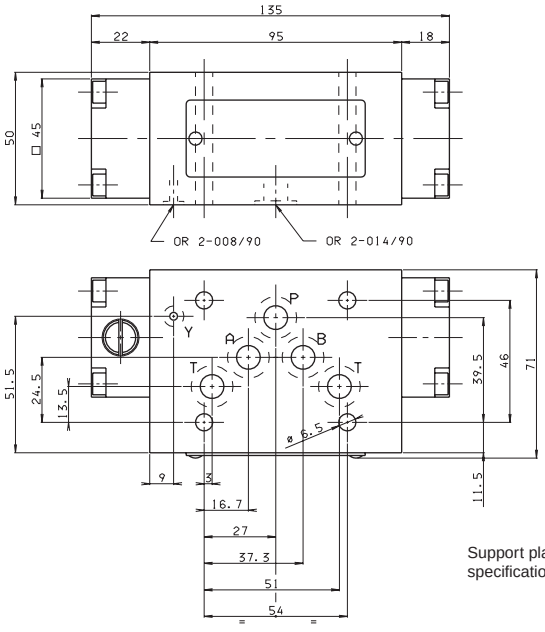
AM5H3V.P1... FLOW - LOAD PRESSURE CURVE



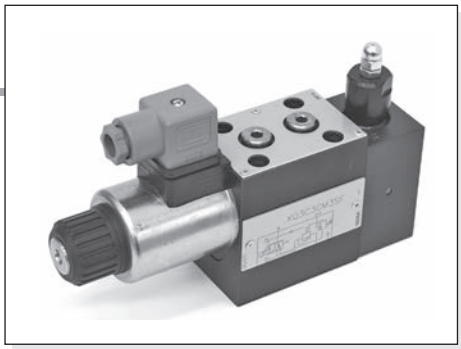
AM5H3VP1... Δp - PUMP FLOW



OVERALL DIMENSIONS



8



XQ3... 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.

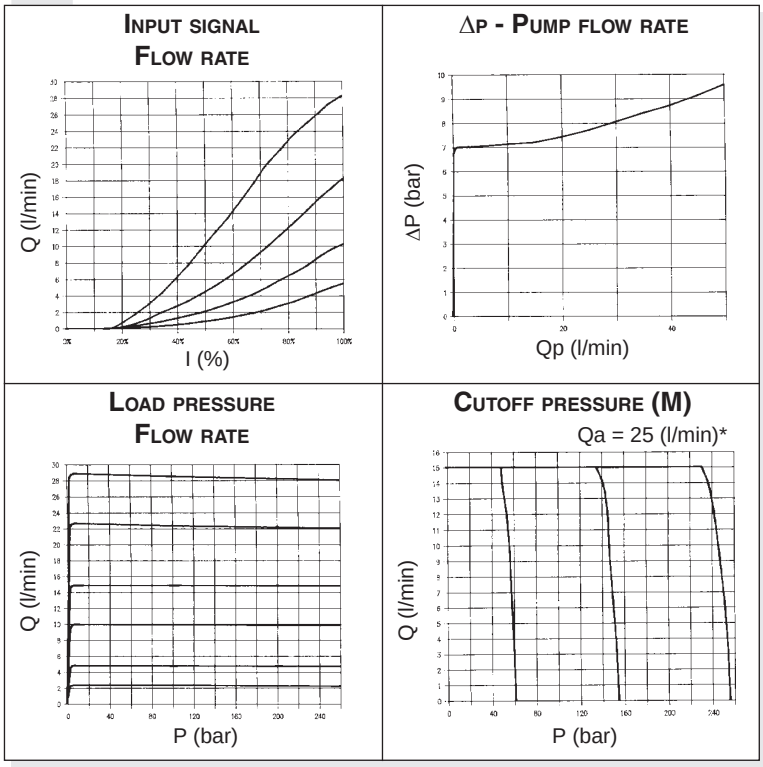
The interface UNI ISO 4401 - 03 - 02 - 0 - 94 standard (ex CETOP R 35 H 4.2-4-03) allows for direct mounting on modular block or multiple sub-bases, which makes possible many advantageous and extremely compact application solution as a consequence of their simplicity of installation.

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.

XQ3...	
Standard connectors	Cap. I • 20
"D15P" Proport. solenoids	Cap. VIII • 15
REMSRA...	Cap. IX • 4
BC308. / BC309. / BC06XQ3.	Cap. VII • 13

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

Ordering code

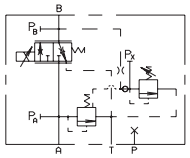
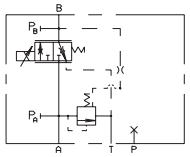
XQ	Proportional flow control valve
3	No. of way
C	Pressure compensation
3	CETOP 3/NG6
*	Flow rates **F** = 5 l/min **G** = 10 l/min **H** = 16 l/min **I** = 28 l/min
*	**M** = With manual pressure limiter **S** = Without manual pressure limiter
*	Setting ranges **1** = 8 ÷ 50 bar **2** = 25 ÷ 170 bar **3** = 50 ÷ 315 bar Omit for **XQ3C*S** version
*	**E** = With rotary emergency (type **P2**) **S** = Without rotary emergency
*	Voltage **E** = 9VDC (2,35 A) **F** = 12VDC (1.76 A) **G** = 24VDC (0.88 A)
**	Variant (*):
2	Serial No.

Tab.1 - Variants (*)

No variant (without connectors)	S1
Viton	SV
Emergency lever	L5
Rotary emergency180°	R5

(*) All variants are considered without connectors.
The connectors must be order separately.
See Cap. I • 20.

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)
XQ3C3*M		5 10 16 28	40	8÷50 25÷170 50÷315	250	8
XQ3C3*S		5 10 16 28	40		250	8

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 $ß_{10}≥75$
Weight version XQ3C*M...	2,89 Kg
Weight version XQ3C*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.

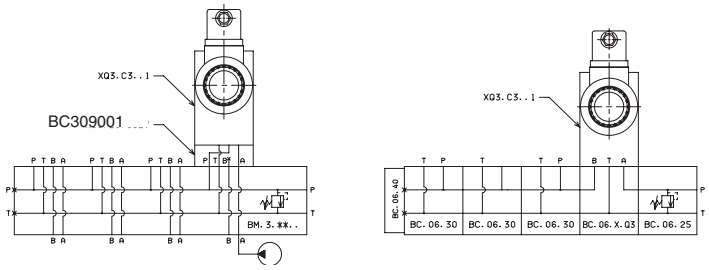
ELECTRONIC CONTROL UNIT

REMSRA**
Card type control for single solenoid.
Recommended dither frequency 100 Hz.

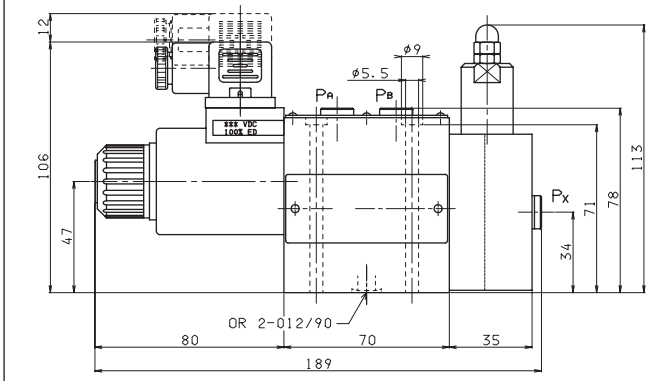
SE3AN2100...
EUROCARD type control for single solenoid

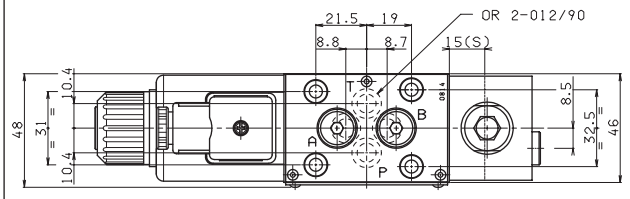
• Operating specifications are valid for fluid with 46 mm²/s viscosity at 40°C, using the specified electronic control units

TYPICAL INSTALLATION



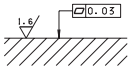
OVERALL DIMENSIONS

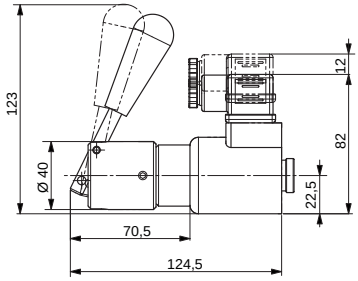




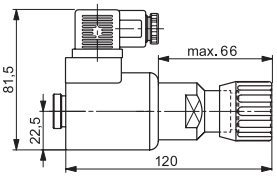
Fixing screws UNI 5931 M5x80 (min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specification

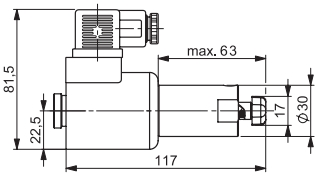




L5 Emergency lever

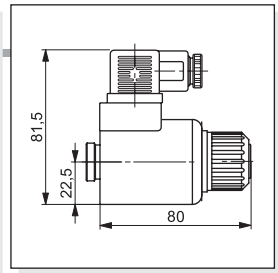


Rotary emergency version XQ3C3****E**



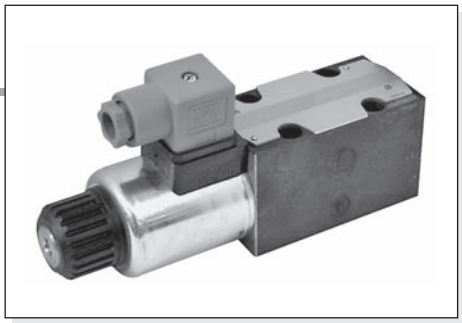
R5 Rotary emergency 180° *(1)*

(1) Two positions hand emergency. The regulated flow with emergency actuated can be less than nominal value.



"D15P" PROPORTIONAL SOLENOIDS

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class wire	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg



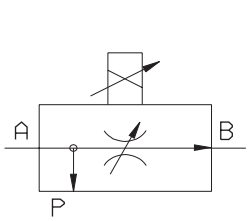
XQP3... Open loop 2/3 way proportional
pressure compensated flow regulators

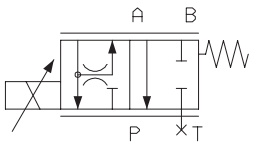
The open loop proportional flow regulator is 2 and 3 way compensated with priority function. It is designed to regulate flow in proportion to an applied electrical current (REM or SE3AN power amplifier). Flow regulation is load independent - B port. Load compensation is achieved by a spool compensator 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.

XQP3...	
Standard connectors	Cap. I • 20
"D15P" Proport. Solenoids	Cap. VIII • 17
REMSRA...	Cap. IX • 4
BC06XQP3...	Cap. VII • 13

Hydraulic symbols





• In order to obtain the 2 way pressure compensated version the cavities P and T have be closed on the subplate.

• In order to obtain the 3 way pressure compensated version the cavity T have be closed on the subplate.

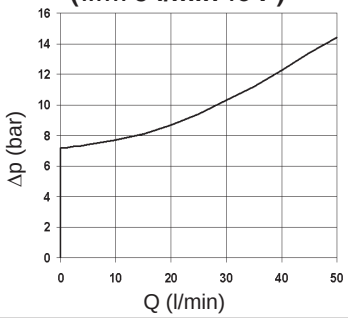
Ordering code

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
**	Variants (*): **S1** = No variant **P2** = Rotary emergency **R5** = Rotary emergency 180° **SV** = Viton
2	Serial No.

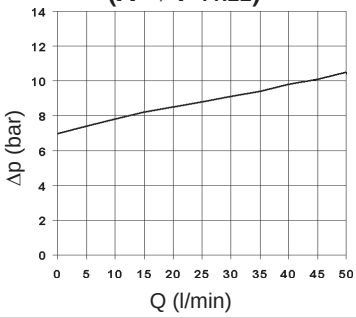
(*) All variants are considered without connectors. The connectors must be order separately.
See Cap. I • 20.

Diagrams

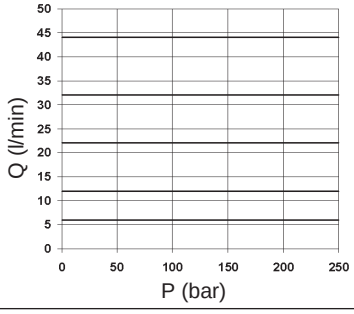
Δp - Flow rate A → B (with 5 l/min to P)



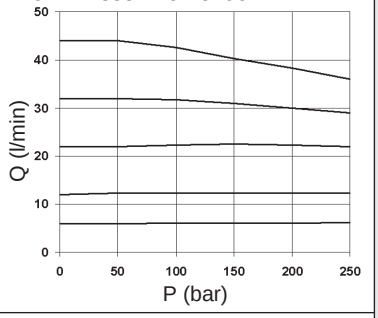
Δp - Secondary line flow (A → P free)



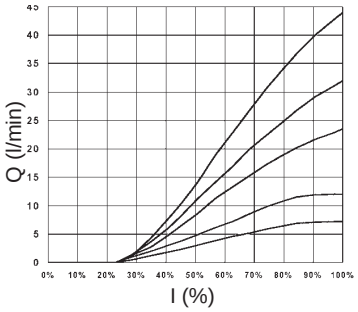
Flow rate
back pressure on priority line



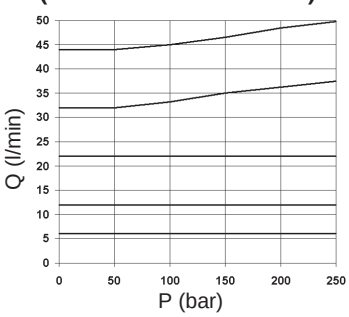
Flow rate
back pressure on secondary line



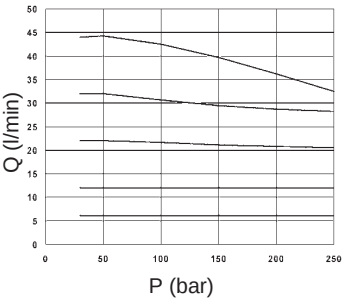
Input signal
Flow



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.

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 $ß_{10} \geq 75$		
Weight	1,7 Kg		
Max. current	**2.33A**	**1.76 A**	**0.88 A**
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

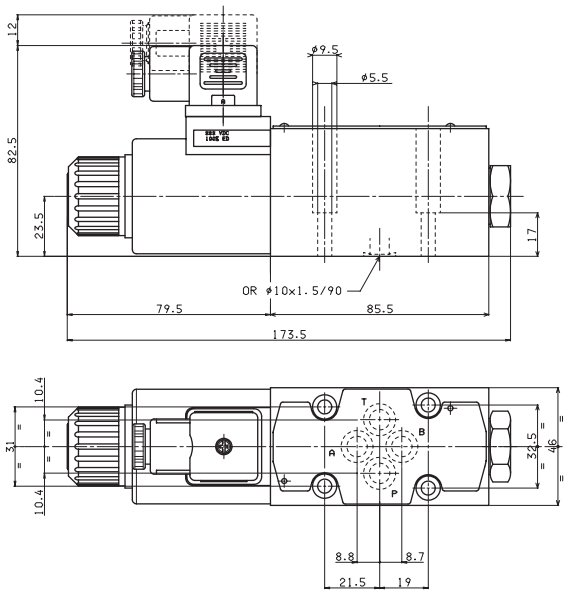
Operating specifications are valid for fluids with 46 mm²/s viscosity at 40°C, using specified electronic control units.

Performance data are carried out using the specified power amplifier SE3AN... powered to 24V.

Amplifier unit and control

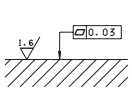
REMSRA...**
Electronic card for control single proportional solenoid valve.
Recommended dither frequency 100 Hz.

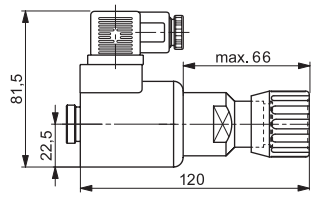
Overall dimensions



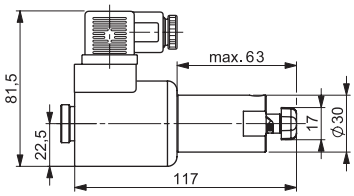
Fixing screws UNI 5931 M5x25
(min. 8.8 material screws are recommended)
Tightening torque 4 ÷ 5 Nm / 0.4 ÷ 0.5 Kgm

Support plane specifications





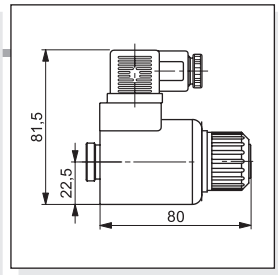
P2 Rotary emergency *(1)*



R5 Rotary emergency 180° *(2)*

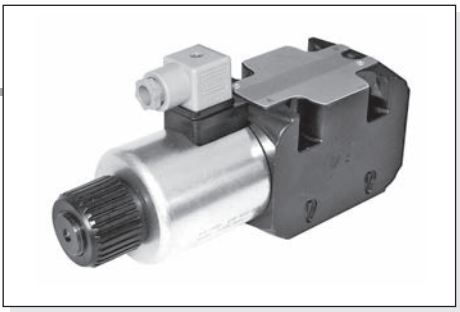
(1) **P2** - Adjustable hand emergency.

(2) **R5** - Two positions hand emergency. The regulated flow with emergency actuated can be less than nominal value.



"D15P" Proportional solenoids

Type of protection (in relation to connector used)	IP 66
Duty cycle	100% ED
Insulation class wire	H
Weight (coil)	0,354 Kg
Weight (solenoid)	0,608 Kg



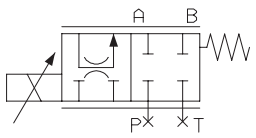
XQP5 Open loop 2/3 way proportional pressure compensated flow regulators Cetop 5

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.

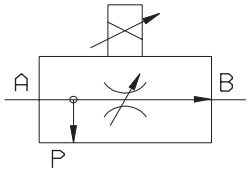
XQP5...	
Standard connectors	Cap. I • 20
"D19P" Proport. Solenoids	Cap. VIII • 19
REMSRA...	Cap. IX • 4

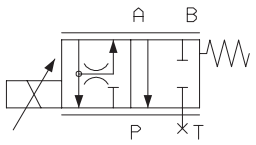
Symbols hydraulic



• **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.**

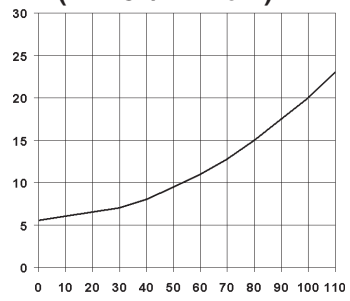
Ordering code

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
**	Variant (*): **S1** = No variant (without connectors) **SV** = Viton **P2** = Rotary emergency
1	Serial No.

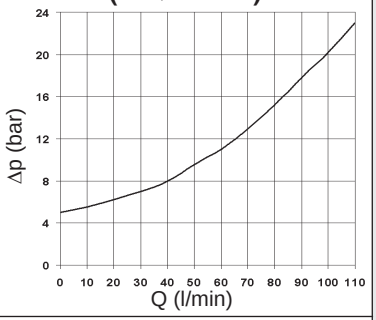
(*) All variants are considered without connectors. The connectors must be order separately.
See Cap. I • 20.

Diagrams

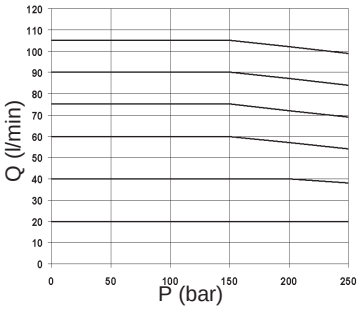
Δp - Flow rate A → B (with 5 l/min to P)



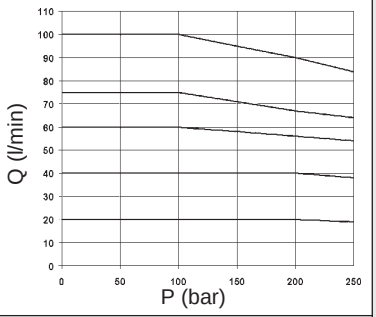
Δp - Secondary line flow (A → P free)



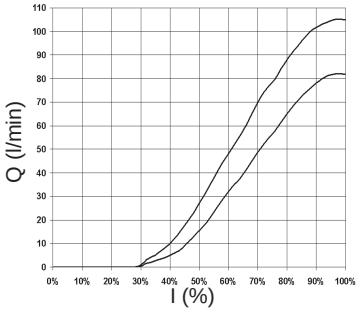
Flow rate back pressure on priority line



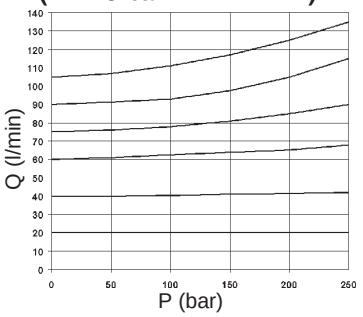
Flow rate back pressure on secondary line



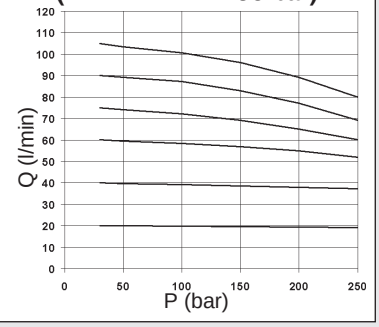
Input signal flow



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.

OPERATING SPECIFICATIONS

Max. operating pressure ports A/B /P (*)	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 $ß_{10} \geq 75$
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

REMSRA...**
Electronic regulator for control single proportional solenoid valve.
Recommended dither frequency 100 Hz.

(*) Pressure dynamic allowed for 2 millions of cycles. T ports closed on the subplate.

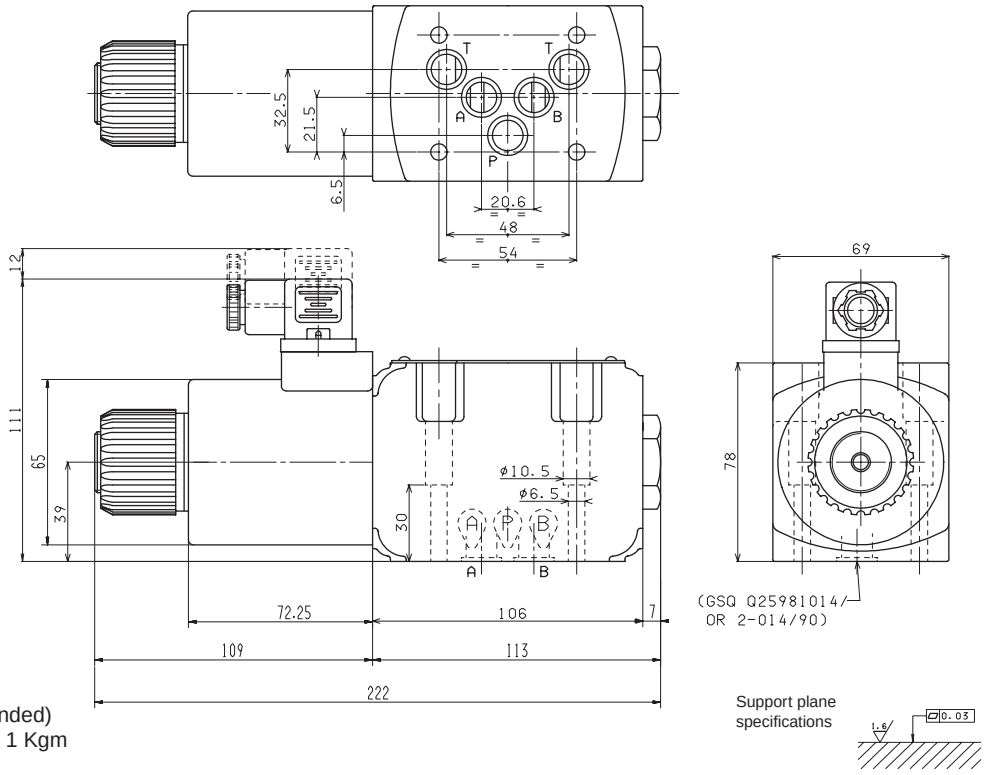
Operating specifications are valid for fluids with 46 mm²/s viscosity at 40°C, using specified electronic control units.

Performance data are carried out using the specified power amplifier type REMSRA... power supplied at 24V.

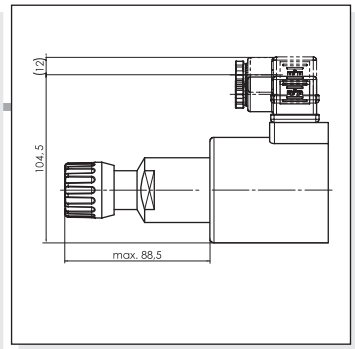
OVERALL DIMENSIONS

E = Manual override

GSQ = Square section seal

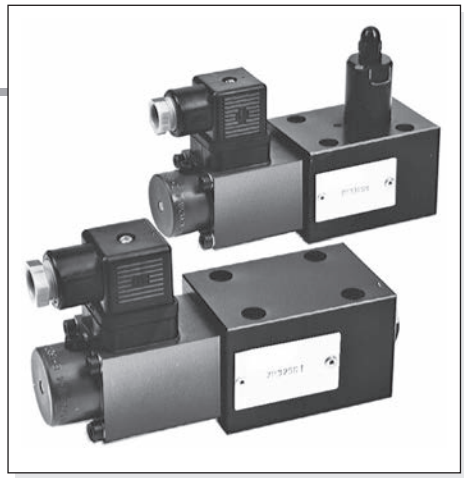


Fixing screws UNI 5931 M6x40
(12.9 material screws are recommended)
Tightening torque 8 ÷ 10 Nm / 0.8 ÷ 1 Kgm



"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 wire	H
Weight	1,58 Kg



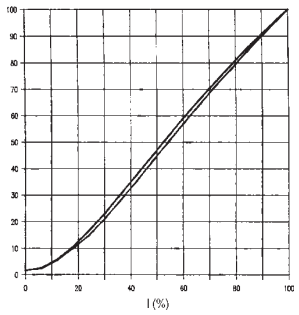
XP3... Proportional pressure control valves CETOP 3/NG6

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.

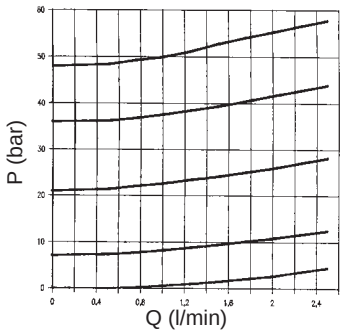
• **Other valves (e.g. subplate or in-line mounted valves) should be ordered separately.**

XP3...	
Standard connectors	Cap. I • 20
VMP / VML / VMPE	Cap. II • 6
REMSRA...	Cap. IX • 4

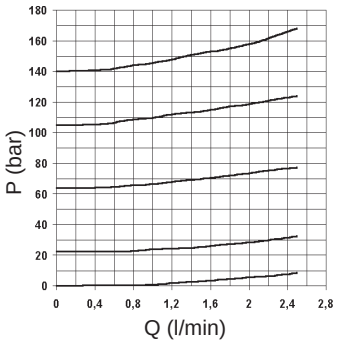
Pressure - Signal
(tested with Q = 1 l/min)



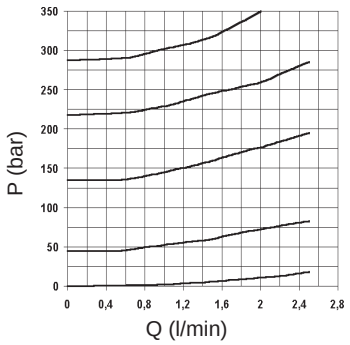
Pressure - Flow rate 1



Pressure - Flow rate 2



Pressure - Flow rate 3

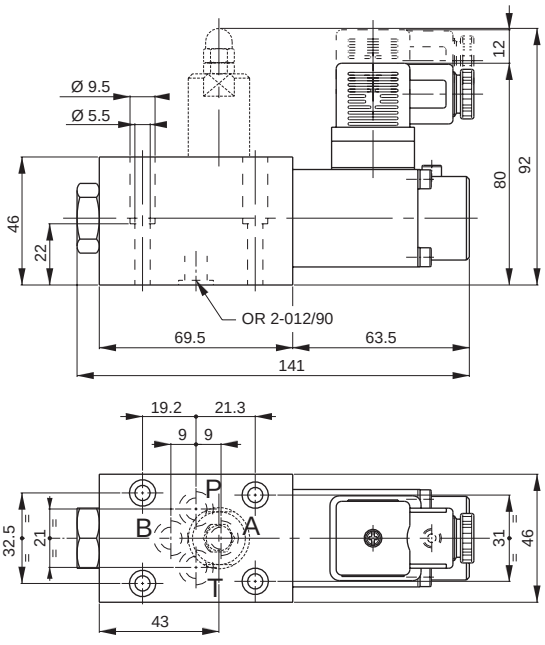


Ordering code

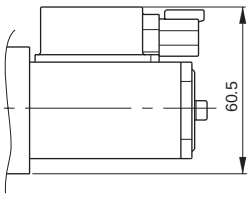
XP	Max. pressure valve
3	CETOP 3/NG6
*	**1** = max. 50 bar **2** = max. 140 bar **3** = max. 320 bar ← About pressure range 3 it's suggested to add a modular filter with 5µm cartridge
*	**E** = with manual limiter **S** = without manual limiter
*	Voltage: **F** =12V DC **G** =24V DC
**	Variant (*): **S1** =No variant **SV** =Viton **CZ** =Deutsch connection
1	Serial No.

(*) All variants are considered without connectors. The connectors must be order separately. See Ch. I Page 20

Overall dimensions

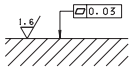


CZ Variant
Deutsch
connection DT04-2P



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



8

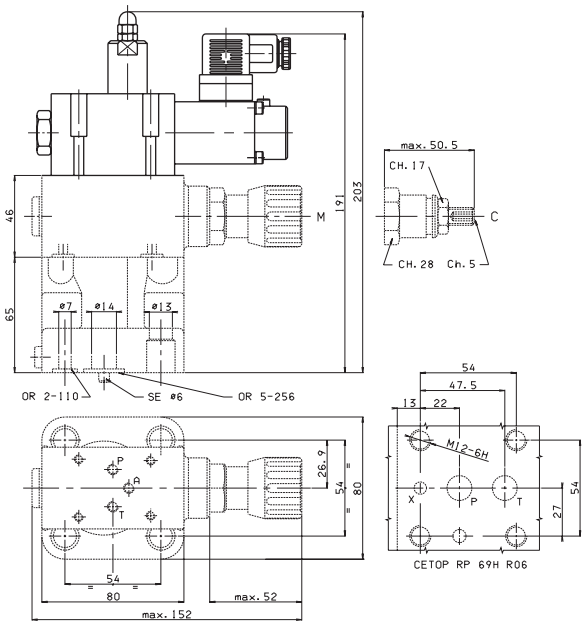
Max. operating pressure (depending on the flow rate)	350 bar
Max. flow	2,5 l/min
Max. ambient temperature	50° C
Linearity	See diagrams
Max. hysteresis	<3% of nominal value
Repeatibility error (between 150 and 680 mA)	<2%
Resistance at 20°C (24V)	24.6 Ohm
Resistance at 20°C (12V)	7.2 Ohm
Max. resistance (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 $ß_{10}≥75$
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 electronic control units.

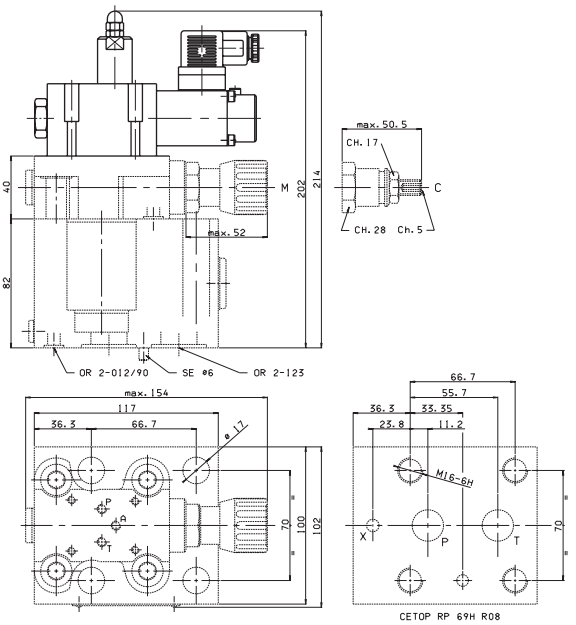
ELECTRONIC CONTROL UNITS

REMSRA**
Card type control for single solenoid 12V and 24V.
Recommended dither frequency 330 Hz.

TYPICAL INSTALLATION XP3... + VMPE16...



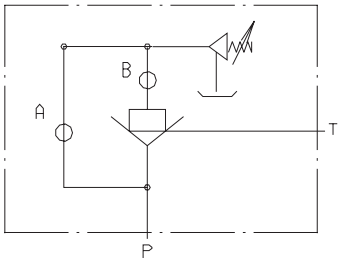
TYPICAL INSTALLATION XP3... + VMPE25...



WITH MOUNTING ON VMPE USE THE FOLLOWING CALIBRATED ORIFICES (SEE VMP*E VALVE AQ VARIANT)

VMPE16... **A = ∅ 1 mm**
B = ∅ 0,3 mm

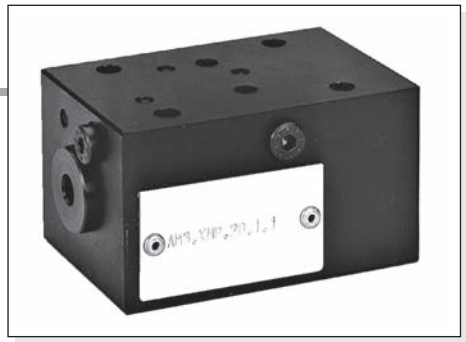
VMPE25... **A = ∅ 1,2 mm**
B = ∅ 0,5 mm



8

AM3XMP... AMPLIFIER VALVES

FOR PROPORTIONAL CONTROL VALVES

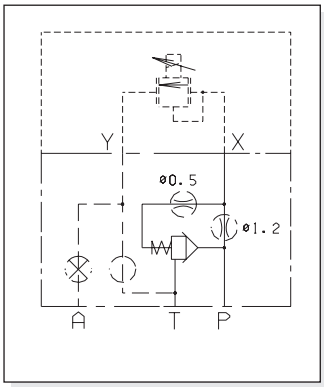


AM3XMP...

XP3... CAP. VIII • 20

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 $ß_{10}$ 375
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 control units

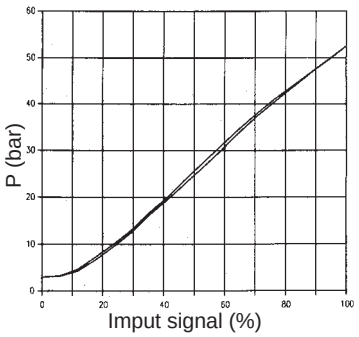


Modular valve type AM.3.XMP... used together with the pressure proportional pilot type XP.3.. becomes a pressure control valve piloted by proportional command for rates up to 30 lt/min. The possibility of external drainage on A ensures its correct operation even with back pressure on the discharge side. Other valves types should be ordered separately.

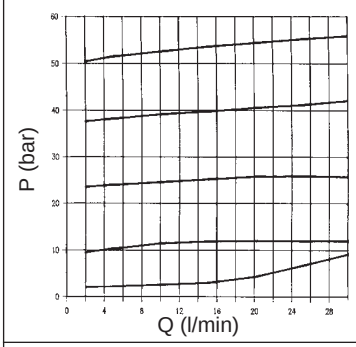
ORDERING CODE

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.

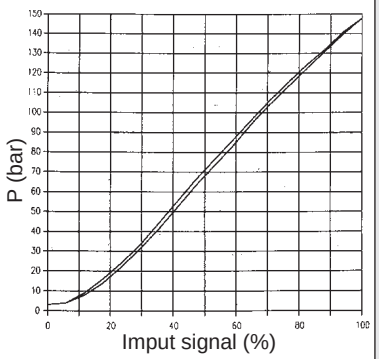
PRESSURE - SIGNAL 1 (Q=15L/MIN)



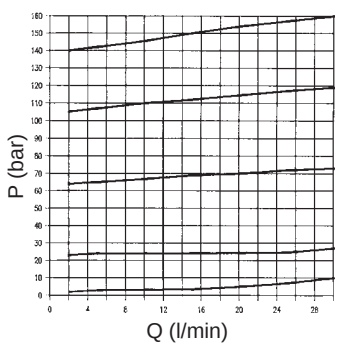
PRESSURE - FLOW RATE 1



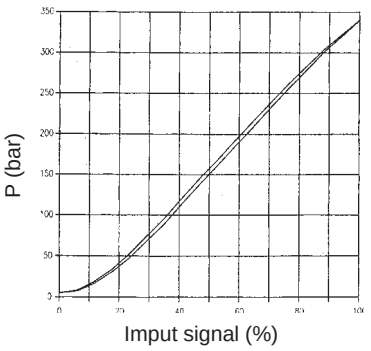
PRESSURE - SIGNAL 2 (Q=15L/MIN)



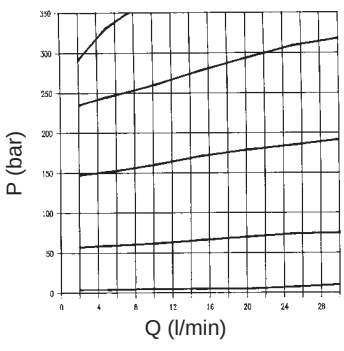
PRESSURE - FLOW RATE 2



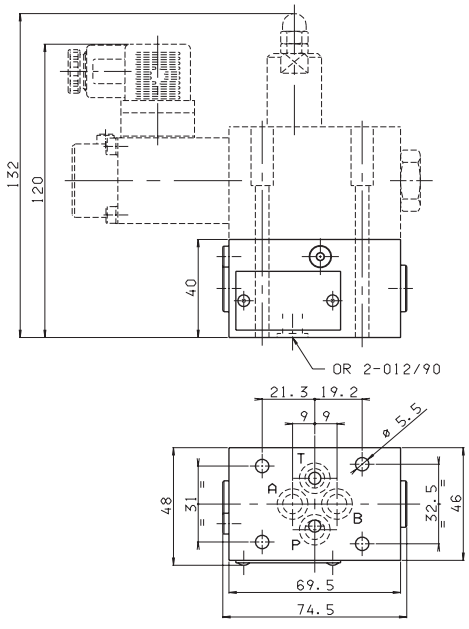
PRESSURE - SIGNAL 3 (Q=15L/MIN)



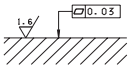
PRESSURE - FLOW RATE 3



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

8