



AM5QF...

SCREWS AND STUDS

CAP. IV • 36

AM5QF... 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.

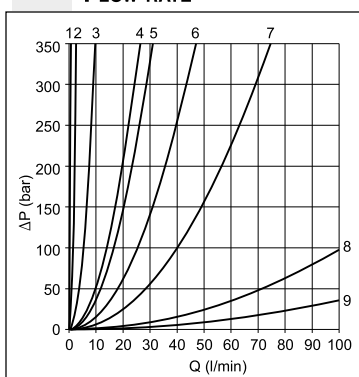
These valves are supplied with related hydraulic scheme. In case of inversion of rated flow direction, turn valve 180° right or left (attention: in this case the label will appear upside down with A and B inverted).

Max. operating pressure	350 bar
Flow rate regulation	on 9 screw turns
Max. flow	100 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 $\beta_{25} \geq 75$
Weight	3,5 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
5	Serial No.

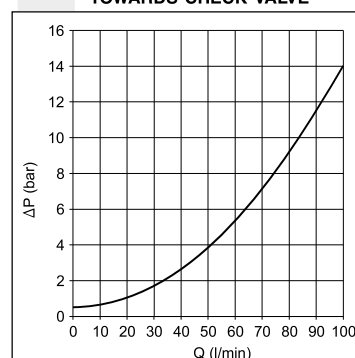
FLOW RATE



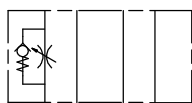
Each curve represents the flow rate adjustment for each screw turns, starting from the closed position.

FREE FLOW

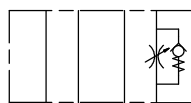
TOWARDS CHECK VALVE



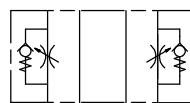
HYDRAULIC SYMBOLS



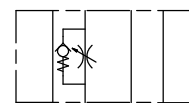
AM5QFA



AM5QFB



AM5QFAB

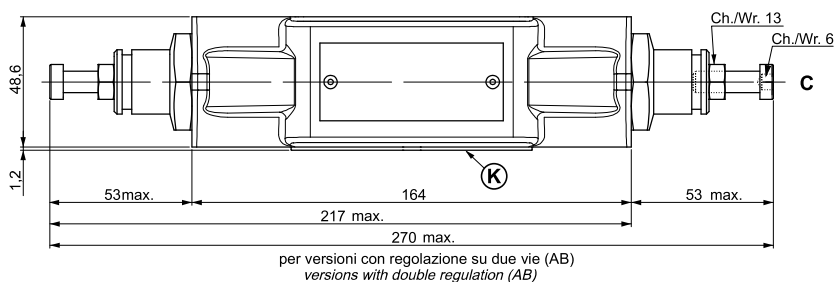


AM5QFP

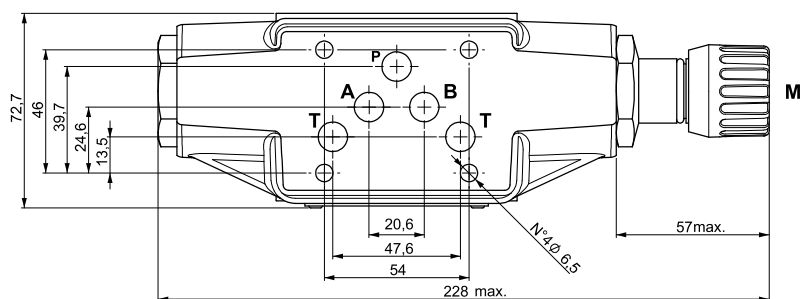
AM5QF... MODULAR FLOW REGULATOR CETOP 5

OVERALL DIMENSIONS

AM5QF/ A / B / AB

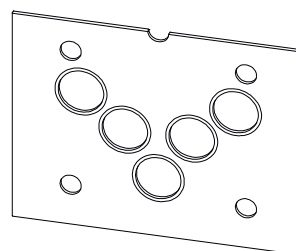


per versioni con regolazione su due vie (AB)
versions with double regulation (AB)



per versioni con regolazione su una singola via (A o B)
versions with single regulation (A or B)

K = OR plate

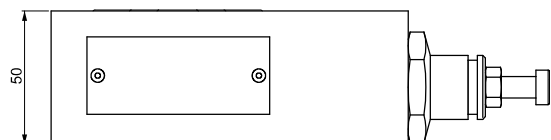
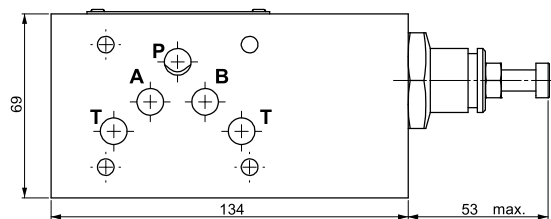


Type of adjustment

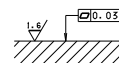
M Plastic knob

C Grub screw

AM5QF/ P



Support plane
specifications





AM88... MODULAR COMPENSATED FLOW CONTROL ASSEMBLY CETOP 5

This is an intermediate block (AM88) for modular mounting of one or two compensated flow rate regulators QC3...

The flow regulator type QC32 must be ordered separately.

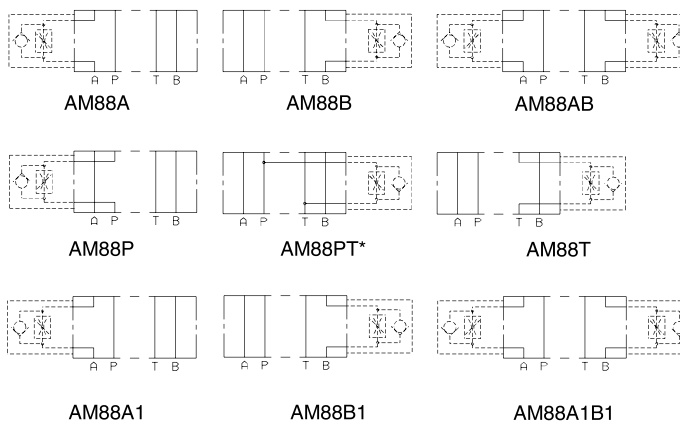
Max. operating pressure	320 bar
Hydraulic fluids	Mineral oils DIN 51524
Fluid viscosity	10 ÷ 500 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight	2,75 Kg

AM88...	
QC32...	CAP. III • 2
SCREWS AND STUDS	CAP. IV • 36

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.

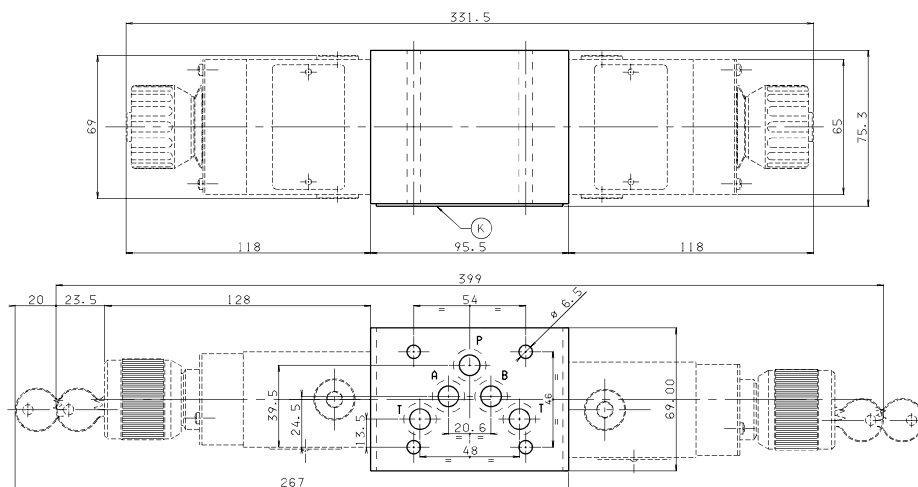
HYDRAULIC SYMBOLS



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

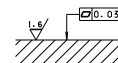
• In order to obtain versions A1, B1 and A1B1 the AM88B, AM88A or AM88AB regulators carrying block should be turned by 180°.

OVERALL DIMENSIONS



K = OR plate

Support plane
specifications





A88... 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 QC32 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 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$
Weight with a DC solenoid	4,2 Kg

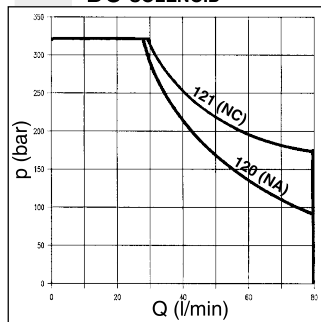
The test have been carried out at operating temperature, with a voltage 10% lower than rated voltage and with a fluid temperature of 50 degrees C. The fluid used was a mineral based oil with a viscosity of 46 mm²/sec at 40 degrees C.

A88...	
"A16" DC COILS	CAP. I • 40
STANDARD CONNECTORS	CAP. I • 20
QC32...	CAP. III • 2
SCREWS AND STUDS	CAP. IV • 36

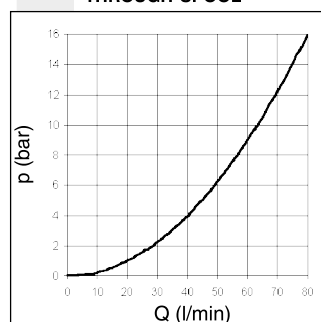
ORDERING CODE

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.

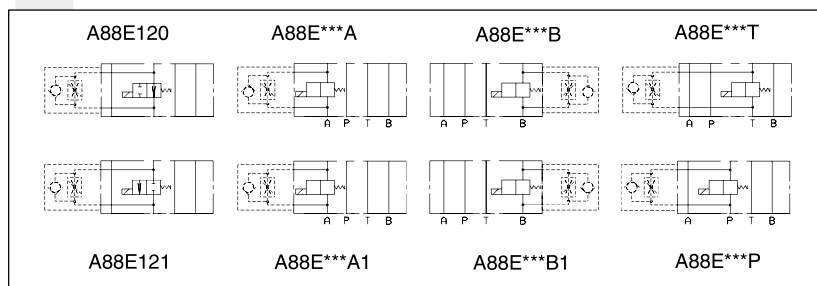
LIMITS OF USE DC SOLENOID



FREE FLOW THROUGH SPOOL



HYDRAULIC SYMBOLS



TAB.1 - A16 COIL (45W)

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

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

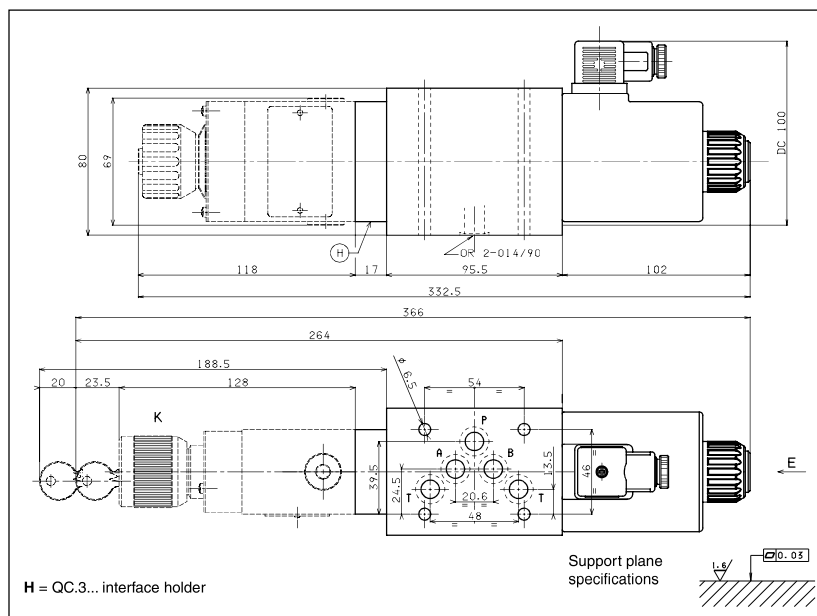
* Special voltage

** Technical data see Cap. VII • 7

TAB.2 - VARIANTS

No variant (without connectors)	S1(*)
Viton	SV(*)
Other variants available on request	

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





AM5RGT...

SCREWS AND STUDS

CAP. IV • 36

AM5RGT... MODULAR VALVES FOR REGENERATIVE CIRCUIT CETOP 5

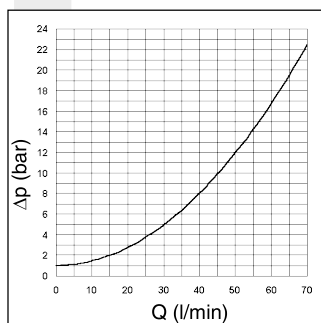
This modular system produces a regenerative circuit to increasing the actuator (differential cylinder) exit speed as shown in the diagram. In particular, if a cylinder is used with a 2:1 ratio for operating surfaces, the exit and re-entry speeds are the same.

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 mm ² /s
Fluid temperature	-25°C ÷ 75°C
Ambient temperature	-25°C ÷ 60°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} > 75$
Weight	2,1 Kg

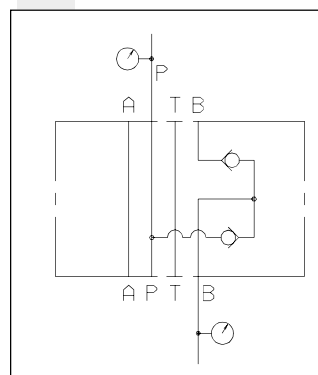
ORDERING CODE

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

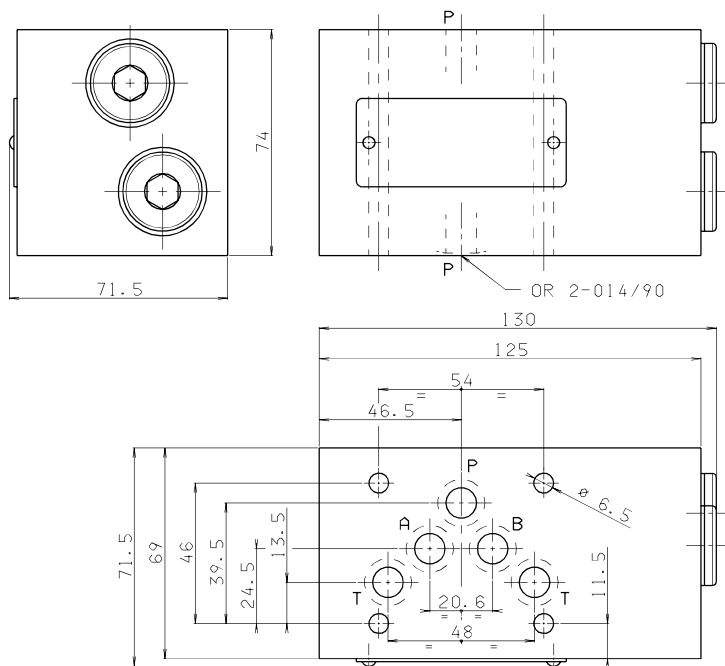


HYDRAULIC SYMBOL



4

OVERALL DIMENSIONS



Support plane specifications

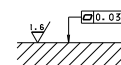
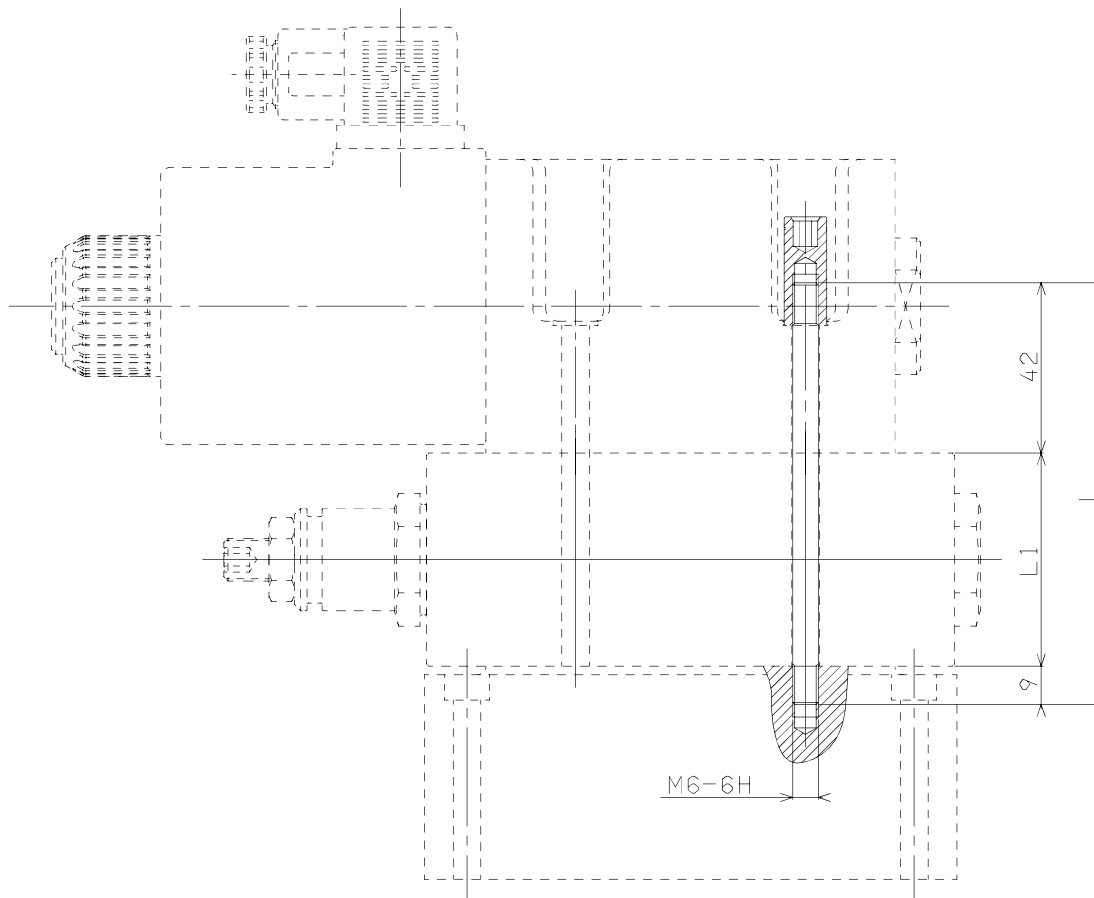


TABLE OF SCREW AND STUDS FOR MOUNTING CETOP 5/NG10

OVERALL DIMENSIONS

Tighten M27050002 to a torque of **8 Nm / 0.8 Kgm max.**



SCREWS T.C.E.I CODE	L mm	L1 * mm	COMPOSITION	Q.TY	SPECIAL NUTS CODE
Q26074090	40	—	AD5...	4	—
Q26074098	90	50	AD5... + 1 AM5... (ISO)	4	
Q26074301	100	60	AD5... + AM5VR	4	
Q26074302	110	70	AD5... + AM5VI	4	
Q26074099	120	80	AD5... + A88	4	
M80150004	150	100	AD5... + 2 AM5... (ISO)	4	V89250000 (No. 20 nuts kit)
M80150012	160	110	AD5... + AM5VR + AM5... (ISO)	4	
M80150010	180	130	AD5... + A88... + AM5... (ISO)	4	
M80150006	190	140	AD5... + A88... + AM5VR	4	
M80150011	200	150	AD5... + 3 AM5... (ISO)	4	

* Indicative overall dimensions valves composition



AM.7.UP...

AM7UP... MODULAR PILOT OPERATED CHECK VALVES CETOP 7

AM7UP 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 mm ² /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 $\beta_{25} > 75$
Weight	7,2 Kg

ORDERING CODE

AM

Modular valve

7

CETOP 7/NG16

UP

Piloted check valve

**

Control on lines
A / B / AB

2

Minimum opening pressure 2 bar

**

00 = No variant
V1 = Viton

1

Serial No.

Curve 1 = A1→A
B1→B



Curve 2 = A→A1
B→B1



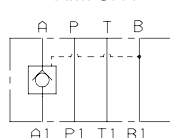
Curve 3 = A1→A (AM7UPB)
B1→B (AM7UPA)

Curve 4 = P1→T
T1→P

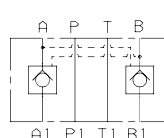
The fluid used is a mineral oil with a viscosity of 46 mm²/s at 40°C. The tests have been carried out at a fluid temperature of 50°C.

HYDRAULIC SYMBOLS

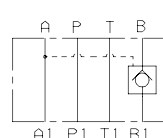
AM7UPA



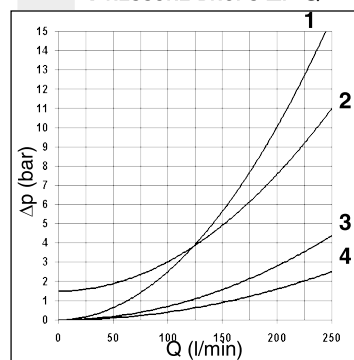
AM7UPAB



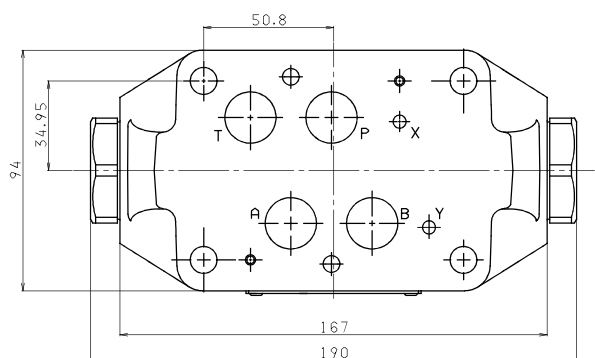
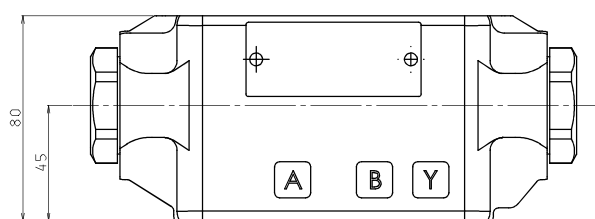
AM7UPB



PRESSURE DROPS $\Delta P-Q$



OVERALL DIMENSIONS



• Valve fixing:

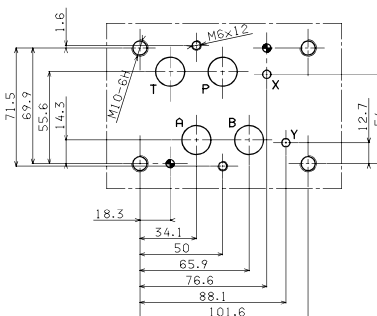
- n° 4 screws T.C.E.I. M10 - Tightening torque 40 Nm
- n° 2 screws T.C.E.I. M6 - Tightening torque 8 Nm

The longer of the screws depends on the type of assembly used. Fixing screws UNI 5931 with material specifications 12.9

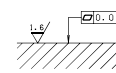
• Seals:

- 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



Support plane
specifications



AM7QF... MODULAR FLOW REGULATOR CETOP 7



AM7QF...

AM7QF type one way non-compensated throttle valve.

Adjustment is obtained by means of a grub screw. They are available in the three regulating configurations shown in the hydraulic diagrams.

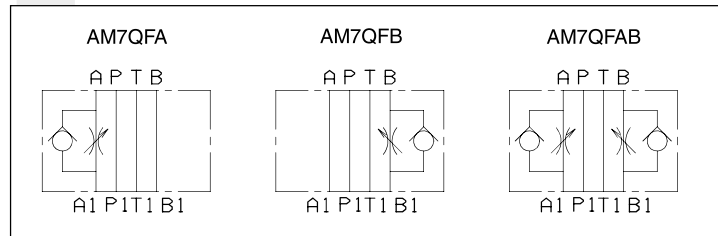
All configurations have a built in check valve that allows reserve free flow.

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 mm ² /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 AM7QF for A or B versions	7,35 Kg
Weight AM7QF for AB version	7,7 Kg

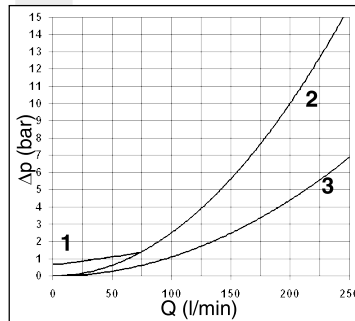
ORDERING CODE

AM	Modular valve
7	CETOP 7/NG16
QF	Non compensated throttle valve
**	Control on lines A / AB / B
*	Type of adjustment M = Plastic knob C = Grub screw
**	00 = No variant V1 = Viton
1	Serial No.

HYDRAULIC SYMBOLS

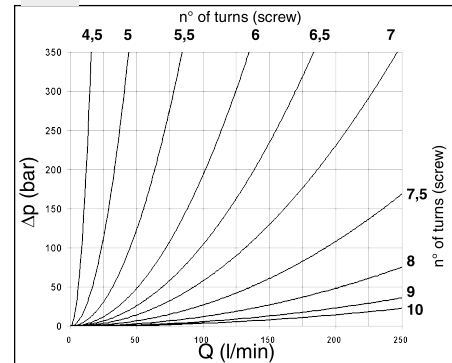


PRESSURE DROPS $\Delta P-Q$



Curve 1 = Regulator closed A → A1 / B → B1
Curve 2 = Regulator open A → A1 / B → B1
Curve 3 = Without regulator A → A1 (AM7QFB) B → B1 (AM7QFA)

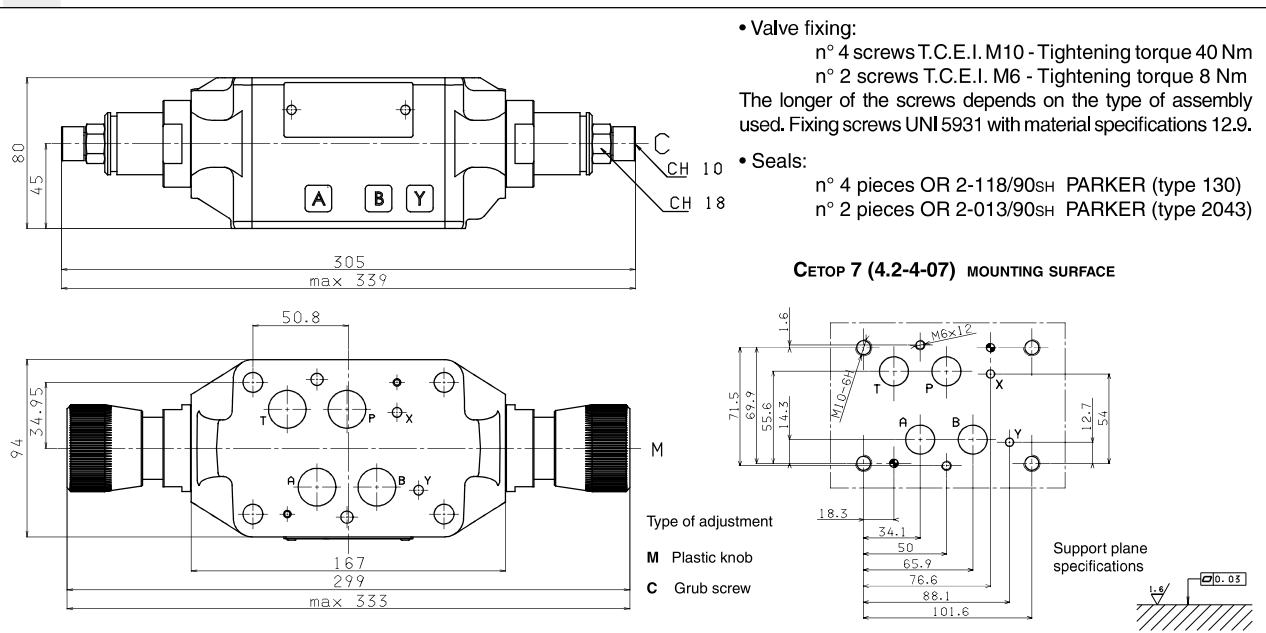
REGULATED FLOW RATE



Regulated flow rate depending on No. of turns: from 4,5 to 10 turns (unscrewing).

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



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

CARTRIDGE VALVES ISO 7368 (DIN 24342)



CARTRIDGE VALVES	CAP. V • 2
KEL 2/2 LOGIC ELEMENTS	CAP. V • 3
KEC COVERS	CAP. V • 5
COVERS WITH CMP	CAP. V • 10
KRA.16/25...	CAP. V • 13
PROXIMITY	CAP. V • 16

5

CARTRIDGE VALVES CARTRIDGE SOLENOID VALVES WITH CHECK VALVE CARTRIDGE SOLENOID VALVES

SEE ALSO CATALOGUE
CODE **DOC00044**



2/2 LOGIC ELEMENTS AND COVERS

KEL16/25...	CAP. V • 3
NG16/NG25 KEL SEATS	CAP. V • 4
KEC16/25	CAP. V • 5
KEC HYDRAULIC MOUNTING DIAGR.	CAP. V • 6
KEC16/25... WITH CMP	CAP. V • 10
C*P16/25...	CAP. V • 10
KRA16/25...	CAP. V • 13
KRA16/25... + AD3V...	CAP. V • 15
PROXIMITY FOR KRA	CAP. V • 16

2/2 CARTRIDGE VALVES LOGIC ELEMENTS ACCORDING TO ISO 7368 (DIN 24342)

Cartridge valves are basically composed of a cover and an operating unit insert in the ISO 7368 (DIN 24342) mounting frame. Each cartridge valve is characterized by 2 main way for the nominal flow (up to 350 l/min).

Nominal size (max. diameter)	16mm / 25mm
Max. opening pressure	350 bar
Max. nominal flow rate NG16	150 l/min
Max. nominal flow rate NG25	350 l/min
Fluid temperature	-20°C ÷ 75°C
Max. contamination level	class 10 in accordance with NAS 1638 with filter $\beta_{25} \geq 75$

By combining the various covers, operating units and connections within the block, many different functions can be obtained like: direct control, non-return, hydraulically piloted non-return, pressure control, flow rate regulation, as well as a combination of these same functions.

Thanks to their design features and operational flexibility, cartridge valves can be used to:

- speed-up machine cycles, and therefore increase productivity and efficiency (better response time compared to traditional valves);
- ensure minimum thermal dissipation (thanks to the passageway dimensions);
- reduce the hydraulic plant weight (thanks to the compact functions block);
- reduce to a minimum any internal leakages;
- provide ease of installation and serving.

The logic units 2/2 (Fig. 1) are formed by a cover (1), a functional unit (2), a spacer (3), a closure spring (4) and a guide bush (5) for each functional unit. Covers can be changed according to the required application and the functional unit can be combined with different springs in order to obtain various opening pressure.

Covers

Covers serve to enclose the functional unit and to house the piloting ports and any incorporated valves or manual adjustment devices. Inside the cover are housed also the seats for the calibrated orifice used to optimize the valve opening/closed response time in accordance to the type of hydraulic system being implemented.

CETOP 3 interface covers are available, ready to accept solenoid valves or other modular valves for the implementation of particular control functions.

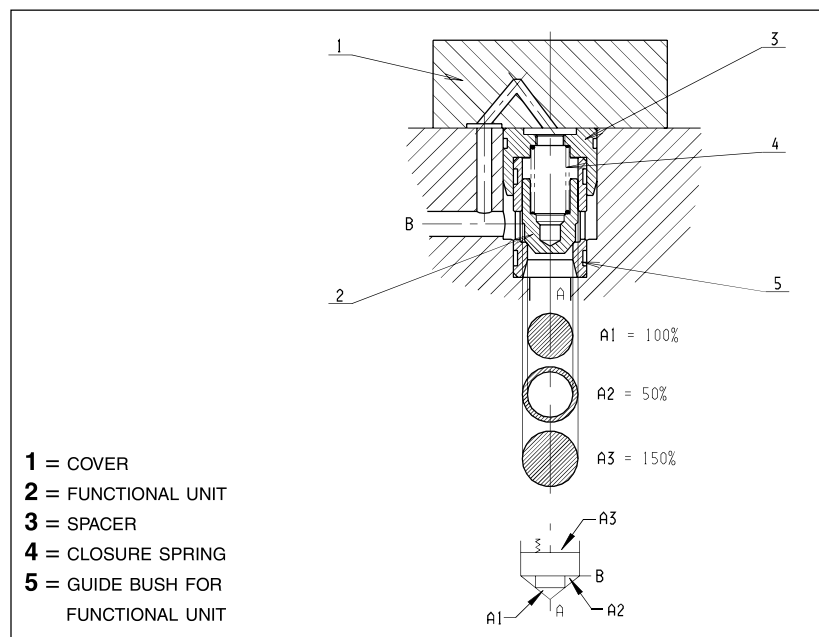
The maximum allowed pressure is a function of the flow rate (max.400 bar).

FIG. 1 - AREA RATIO

A	MAIN FLOW
B	MAIN FLOW
X	EXTERNAL PILOTING
Z1	EXTERNAL PILOTING
Z2	EXTERNAL PILOTING
Y	DRAINAGE
A1	A PORT EFFECTIVE CROSS SECTION
A2	B PORT EFFECTIVE CROSS SECTION
A3	SPRING CHAMBER EFFECTIVE CROSS SECTION

ORIFICE FUNCTIONAL SYMBOLS

	STANDARD ORIFICE (ALREADY INSERTED) Ø 1mm (DIAMETER)
	A GRUB SCREW ORIFICE CAN BE INSERTED IN THE THREADED SEAT
	BLIND



The logic unit operates as a function of the pressures acting on the relevant areas, and different opening pressures are obtained, depending on the dimensions of these areas.

A description of how to interpret the cartridge opening ratios is as follows:

- there are three relevant areas A1, A2, A3;
- area A1 is taken to represent 100%, i.e. it is the reference area;
- area A2, when a 2:1 ratio is shown, is equal to 50% of area A1 and all the other ratios shown in the Table 2 can be calculated on this basis.

As consequence of these area ratios there are different opening pressures whether proceeding from A → B or from B → A.

ORDERING CODE

KEL	Logic element 2/2
**	16 = NG16 25 = NG25
*	Function: see table 1 Areas ratio: U = 1 : 1 S = 12.5 : 1 B = 2 : 1 (for version with drilled poppet see CF variant) F = 2 : 1 R = 2 : 1
*	Opening pressure (bar) (Tab.1 pressure values) (Tab.2 spring's colour and code)
**	Calibrated orifices: 00 = blind 08 = 0.8 mm 09 = 0.9 mm 10 = 1.0 mm 12 = 1.2 mm 14 = 1.4 mm
**	00 = No variant V1 = Viton CF = With drilled poppet only for KEL**B
2	Serial No.

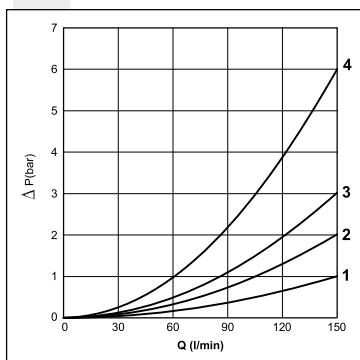
TAB. 1 - SYMBOL, FUNCTION, AREA RATIO AND OPENING PRESSURE

Function	Symbol	Area ratio	Code	Opening pressure (bar)	
				A→B	B→A
Directional (U) (normally used for relief valve)		A1 : A3 1 : 1	KEL**UL00 KEL**UM00 KEL**UH00 KEL**UJ00	L = 0.3 M = 1.6 H = 4 J = 9	
Directional (U) with orifice		A1 : A3 1 : 1	KEL**UL** KEL**UM** KEL**UH**	L = 0.3 M = 1.6 H = 4	
Directional (S)		A1 : A2 12.5 : 1	KEL**SL00 KEL**SM00 KEL**SH00	L = 0.3 M = 0.6 H = 1.5	L = 4 M = 8 H = 20
Directional (S) with orifice		A1 : A2 12.5 : 1	KEL**SL** KEL**SM** KEL**SH**	L = 0.3 M = 0.6 H = 1.5	L = 4 M = 8 H = 20
Directional (B) (normally used for check valve)		A1 : A2 2 : 1	KEL**BL00 KEL**BM00 KEL**BH00	L = 0.5 M = 1 H = 2.5	L = 1 M = 2 H = 5
Flow control (F)		A1 : A2 2 : 1	KEL**FL** KEL**FM** KEL**FH**	L = 0.5 M = 1 H = 2.5	L = 1 M = 2 H = 5
With sensitized cover (R)		A1 : A2 2 : 1	KEL**RL00 KEL**RM00 KEL**RH00 KEL**RJ00	A → B	
				NG16	NG25
				L = 0.7 M = 1.5 H = 4	L = 0.6 M = 1.5 H = 3.5 J = 9

TAB. 2 - SPRING'S COLOUR AND CODE

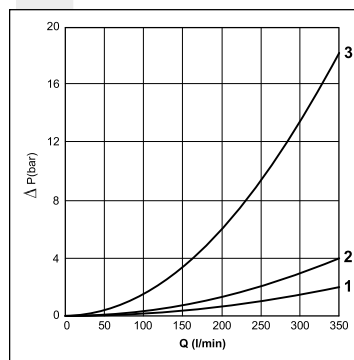
Spring type	U		S		B-F		R	
	NG16	NG25	NG16	NG25	NG16	NG25	NG16	NG25
Cod. L	without colour	red	without colour	red	without colour	red	without colour	red
Cod. M	green	yellow	red	green	red	green	red	green
Cod. H	blue	blue	yellow	yellow	green	yellow	green	yellow
Cod. J		without colour					blue	blue

NG 16 PRESSURE DROP



1 = KEL16U
KEL16S
2 = KEL16B
3 = KEL16R
4 = KEL16F

NG 25 PRESSURE DROP

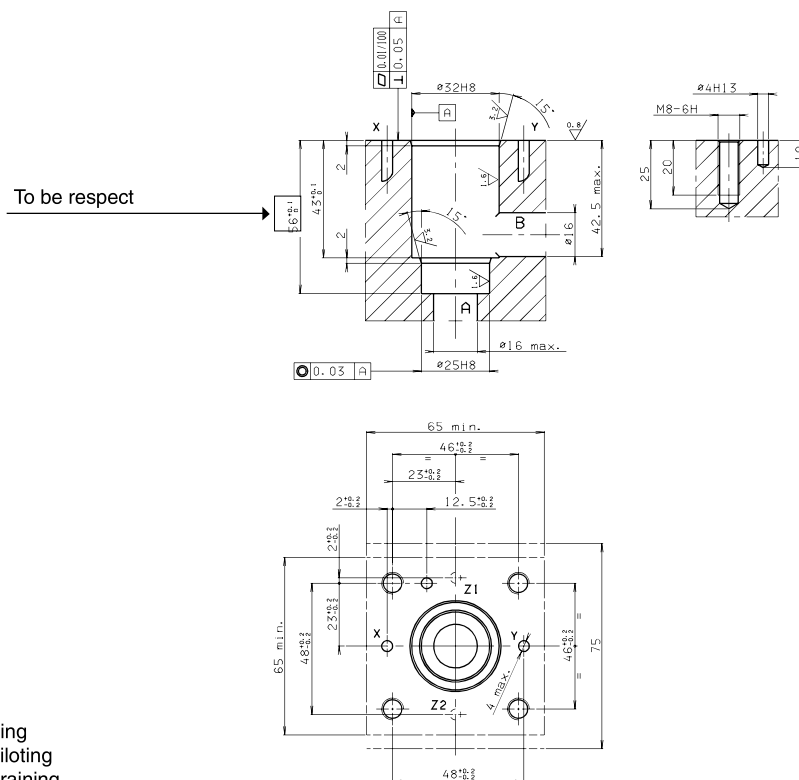


1 = KEL25U
KEL25B
KEL25R
2 = KEL25S
3 = KEL25F

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

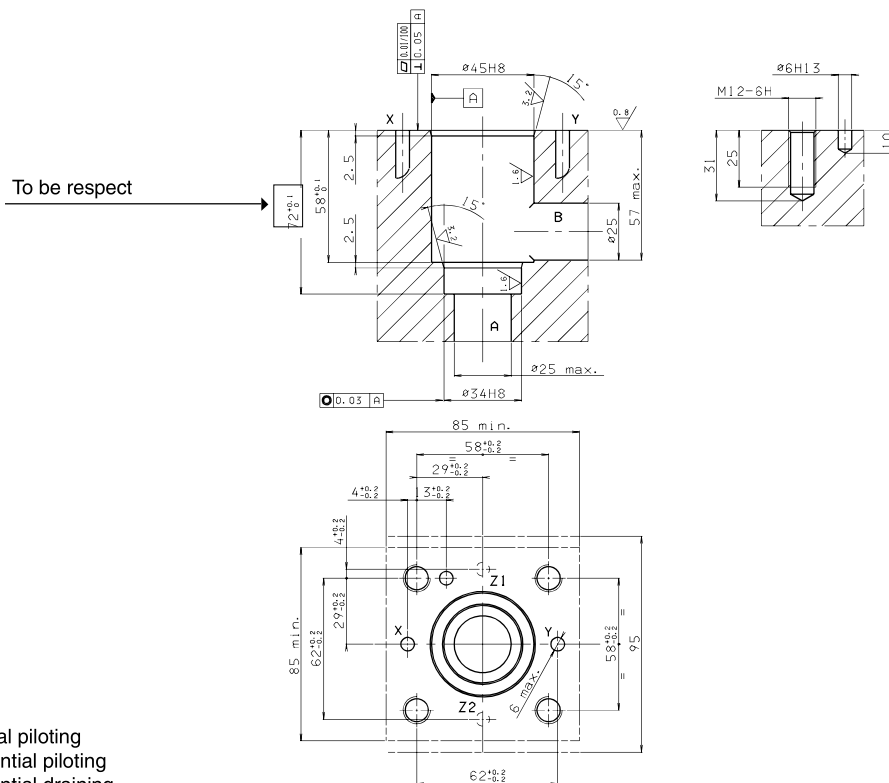
2/2 LOGIC ELEMENTS ACCORDING TO ISO 7368 (DIN 24342)

OVERALL DIMENSIONS OF TWO-WAY VALVE SEAT ISO 7368/BA-06-2-A NG16 (DIN 24342)



X = piloting
Y = draining
Z = additional piloting
Z1 = preferential piloting
Z2 = preferential draining

OVERALL DIMENSIONS OF TWO-WAY VALVE SEAT ISO 7368/BB-08-2-A NG25 (DIN 24342)



X = piloting
Y = draining
Z = additional piloting
Z1 = preferential piloting
Z2 = preferential draining