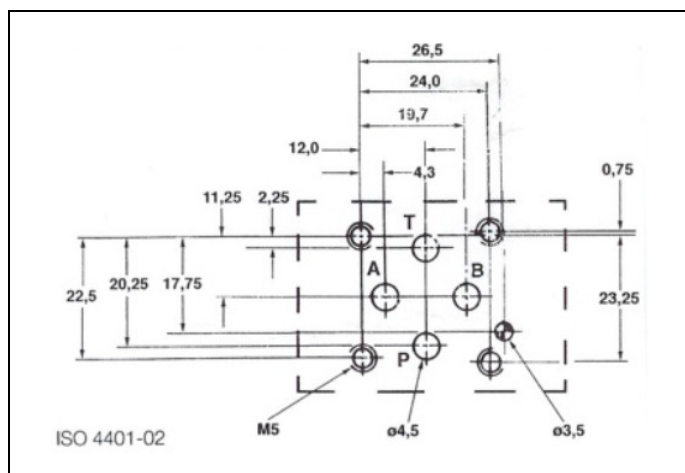
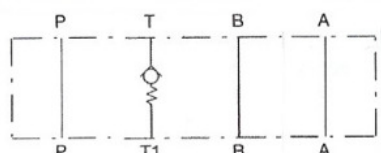


STACKABLE VALVES CETOP 02 CHECK VALVES TYPE AM2 – CO - * /20

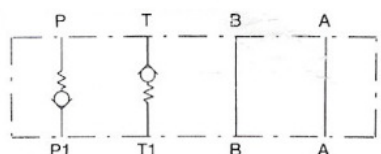


2 FUNCTIONAL SYMBOLS

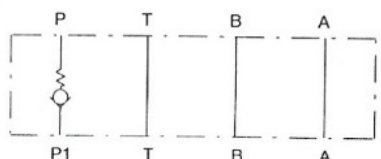
AM2-CO-T



AM2-CO-PT



AM2-CO-P



1 HOW TO READ THE MODEL CODE FOR VALVES AM2-CO.

AM2 – CO - (T) - * - ** / 20

① ② ③ ④ ⑤ ⑥

① **AM2** : stackable valve CETOP 02 – Pressure 32 MPa (320 bar)

② **CO** : check valve, spring operated

③ **(T)** : service lines where the control(s) operate(s);

see also functional symbols 2

T : check on T: flow T1 → T is blocked.

A, B and P:

free.

P : check on P: flow P → P1 is blocked

A, B and T:

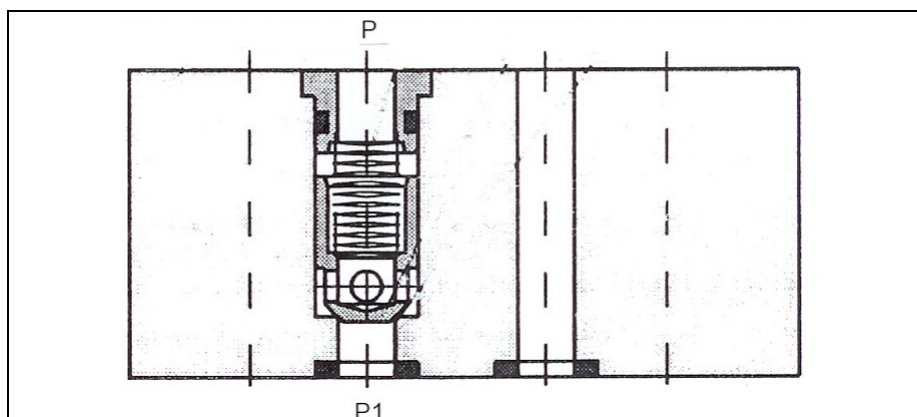
free.

PT: check on P and T: P → P1 and T1 → T are blocked. A and B: free.

④ check valve opening (cracking) pressure (Pm):
- (standard) : Pm approx 0,2 MPa (2 bar)

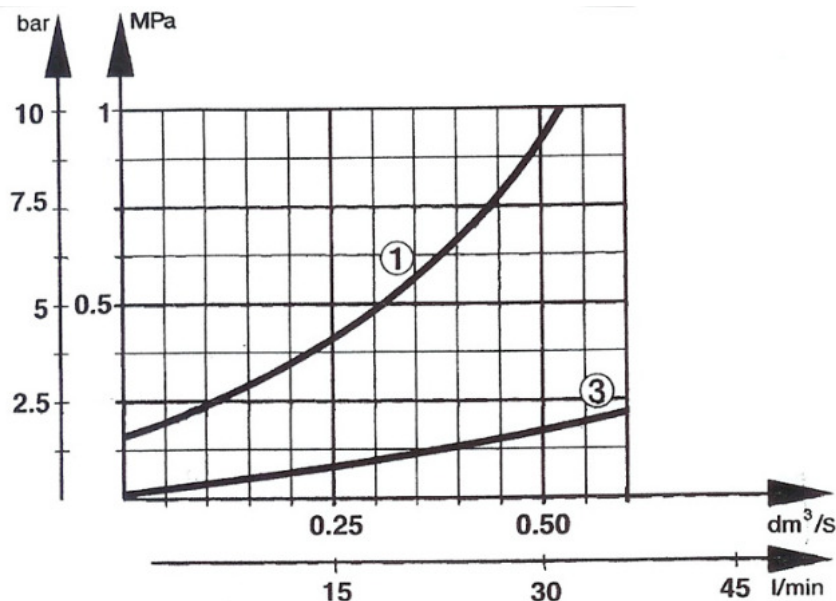
⑤ Code reserved for special variants (materials, seals, surface treatments etc.).

⑥ Design number (progressive) of the valves.



4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM2 – CO - /20 in standard configuration, with mineral oil at 36 cSt and at 50 °C.



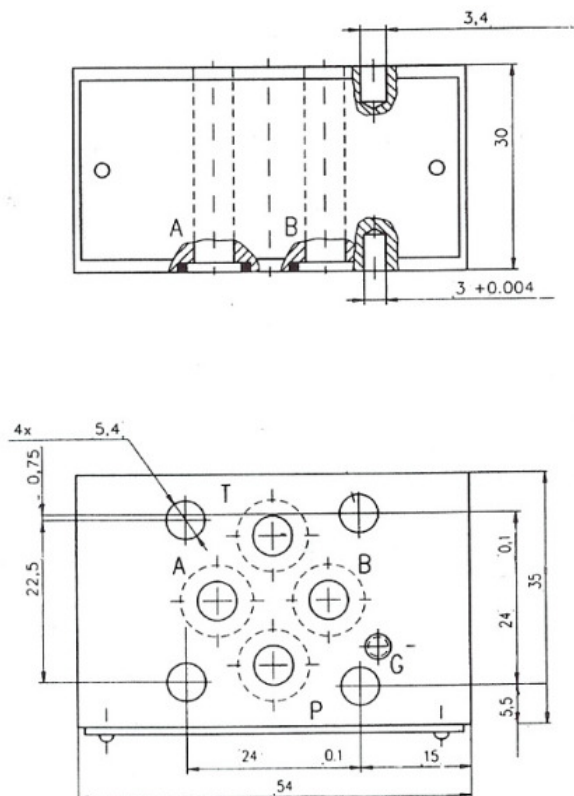
① P → P1 and T1 → T

③ Free channels

5 DATA AND OPERATING LIMITS

maximum	
rec. flow rate	0,5 dm³/s (30 l/min)
maximum	
nominal pressure	32 MPa (320 bar)
pressure drops	see ④
dimensions	see ⑦
installation	see ⑧
mass	approx 0,5 kg

7 INSTALLATION DIMENSIONS



All dimensions are mm.

8 INSTALLATION

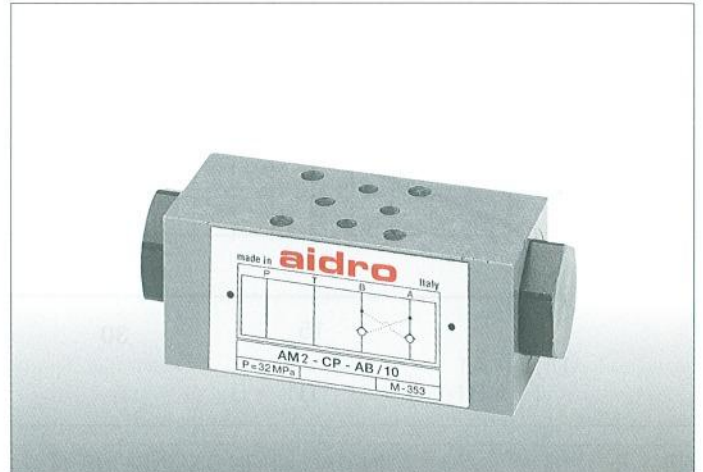
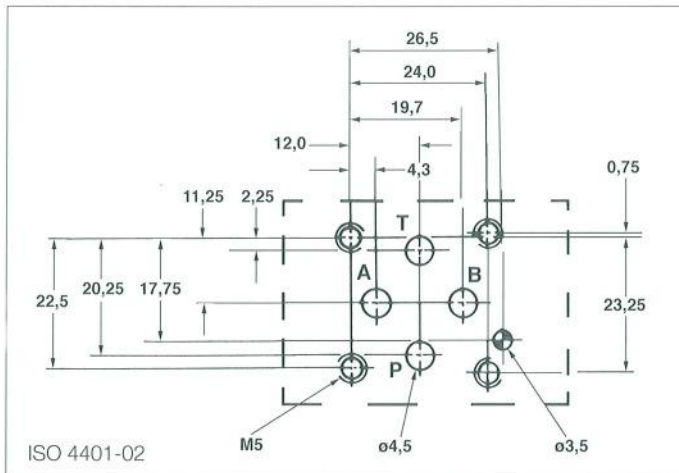
All stackable valves AM2 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page). Valves height 30 mm.

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals.

9 HYDRAULIC FLUIDS

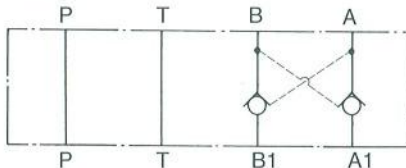
Seals and materials used on standard valves AM2 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents. The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 02 pilot operated check valves type AM2 - CP - *

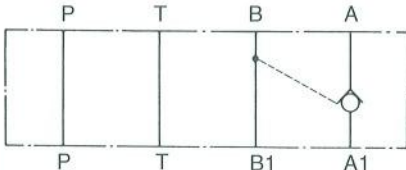


2 FUNCTIONAL SYMBOLS

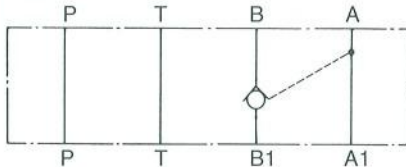
AM2-CP-AB



AM2-CP-A



AM2-CP-B



1 HOW TO READ THE MODEL CODE FOR VALVES AM2 - *

AM2 - CP - (AB) - * - ** / 10
① ② ③ ④ ⑤ ⑥

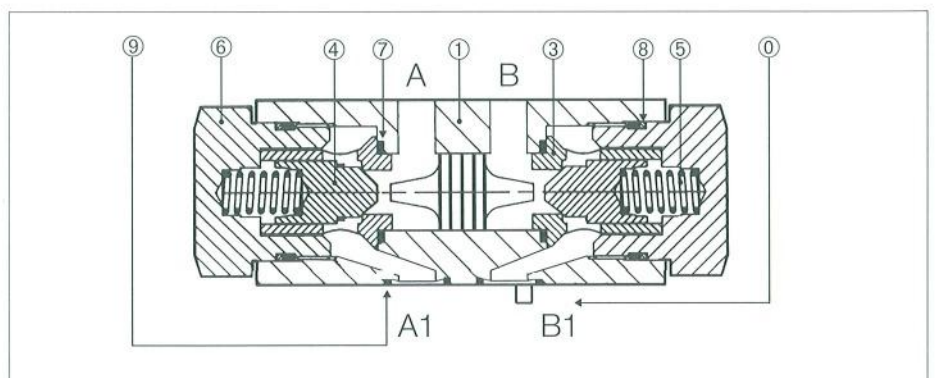
- ① AM2 : stackable valve CETOP 02 - Pressure 32 MPa (320 bar)
- ② CP : check valve, pilot operated (hydraulically)
- ③ (AB) : service lines where the control(s) operate(s); see also functional symbols 2
AB : p.o. checks on A and B. Fluid flows A → A1 and B → B1 and flow A1 → A (or B1 → B) is permitted only when B (or A) is pressurized
A : p.o. check on A; flow A1 → A is permitted only when B is pressurized
B : p.o. check on B; flow B1 → B is permitted only when A is pressurized
- ④ check valve opening (cracking) pressure (Pm) for free flow A → A1 and B → B1:
- (standard) : Pm approx 0.2 MPa (2 bar)
4 : Pm approx 0.4 MPa (4 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.)
- ⑥ design number (progressive) of the valves

3 DESCRIPTION

Fluid flows freely on P and T lines;

on service lines A and /or B with p.o. check, fluid flows from A → A1 (and/or B → B1) overcoming the force of spring ⑤ acting on poppet ④, and fluid is blocked from A1 → A (and/or B1 → B).

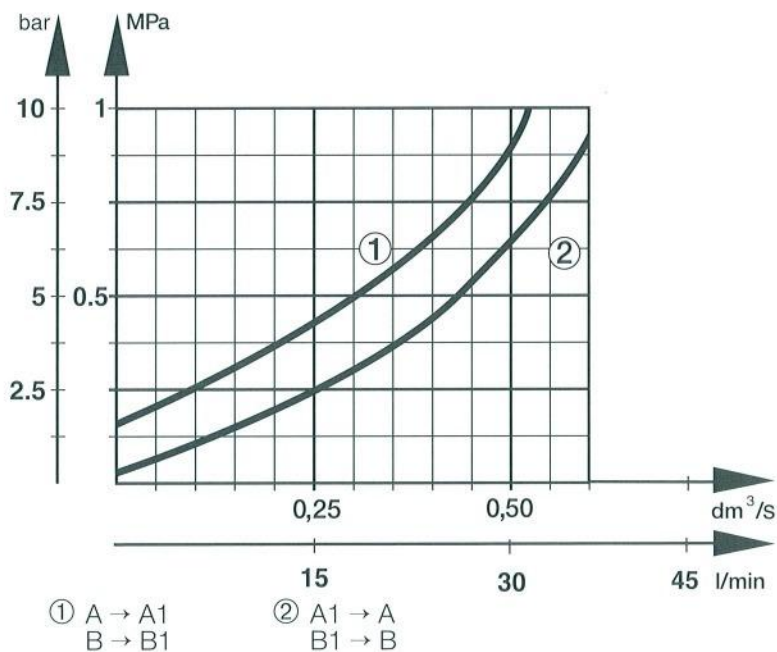
When, by switching the solenoid operated 4-way directional valve, pressure is made available at, for instance, port B fluid flows B → B1 and the pilot piston ②, shifting from its central position, forces poppet ④, on service line A, to open and permit flow A1 → A.



4

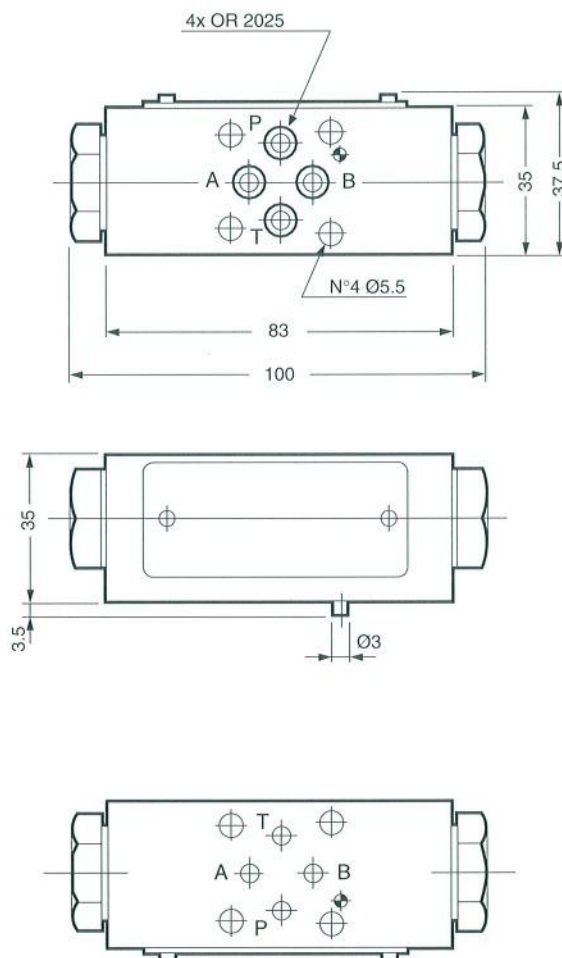
TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM2 - CP - AB in standard configuration, with mineral oil at 36 cSt and at 50° C.



7

INSTALLATION DIMENSIONS



All dimensions are mm

5 DATA AND OPERATING LIMITS

maximum rec. flow rate	0,5dm³/s (30 l/min)
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
pilot area ratio piston/check valve	approx 3.5
piloting pressure	see 6
dimensions	see 7
installation	see 8
mass	approx 0.75 kg

6 PILOTING PRESSURE

To shift the pilot piston and to open the check in A the piloting pressure must be, at B:

$$P_p = P_b = \frac{P_{a1} + P_m - P_a}{3.5} + P_a$$

where: P_p = piloting pressure;
 P_b = pressure in B;
 P_a = pressure in A;
 P_{a1} = pressure in A1;
 P_m = check valve opening pressure (spring)

or to open the check in B:

$$P_p = P_a = \frac{P_{b1} + P_m - P_b}{3.5} + P_b$$

8 INSTALLATION

All stackable valves AM2 - CP - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page). Valves height 35 mm.

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

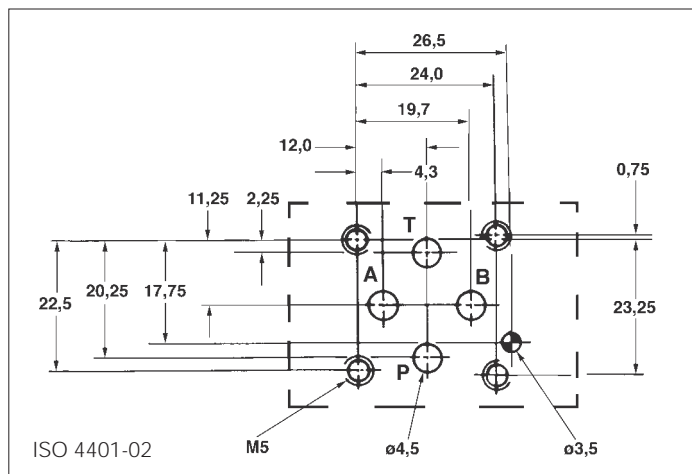
All valves have on their "mounting" surface a ϕ 4 mm cylindrical hole and are equipped on their "seals" surface by a ϕ 3 mm locating pin, to conform with the norms. In case of necessity, the pin can be easily removed.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM2 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

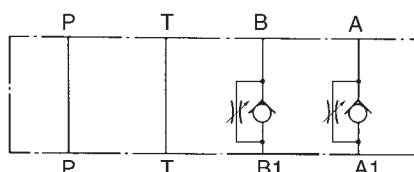
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 02 flow control valves type AM2 - FC - *

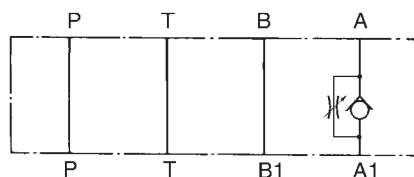


2 FUNCTIONAL SYMBOLS

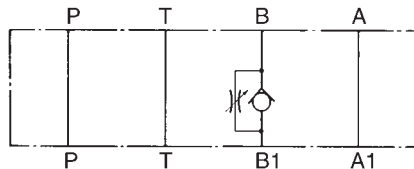
AM2-FC-AB



AM2-FC-A



AM2-FC-B



1 HOW TO READ THE MODEL CODE FOR VALVES AM2

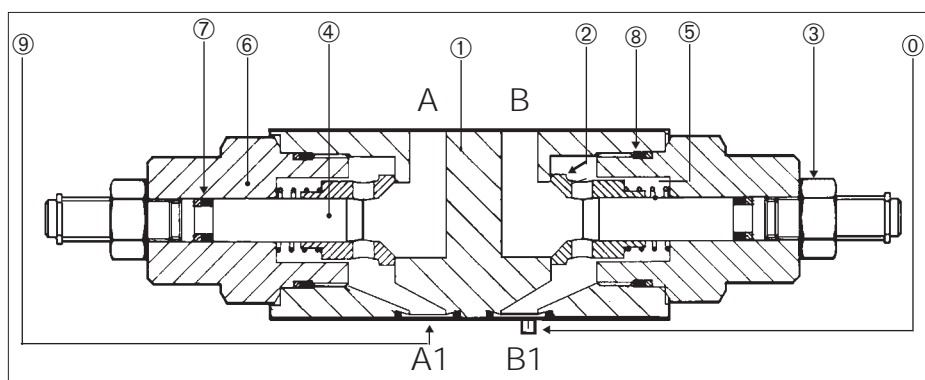
AM2 - FC - (AB) - * - ** / 10

① ② ③ ④ ⑤ ⑥

- ① AM2 : stackable valve CETOP 02 - Pressure 32 MPa (320 bar)
- ② FC : one-way flow control valves with meter-out control (referred to the hydraulic actuator)
- ③ (AB) : service lines where the control(s) operate(s); see also functional symbols 2
 AB : controls on A and B. Fluid flows unrestricted from A → A1 and flow is controlled from A1 → A and B1 → B
 A : flow is controlled from A1 → A, free on B
 B : flow is controlled from B1 → B, free on A
- ④ flow control characteristics for A1 → A and B1 → B (see also 6) and check valve opening pressure (Pm) for flow A → A1 and B → B1
 - : standard control and Pm approx 0.04 MPa (0.4 bar)
 W : fine and sensitive control
 4 : Pm approx 0.4 MPa (4 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves

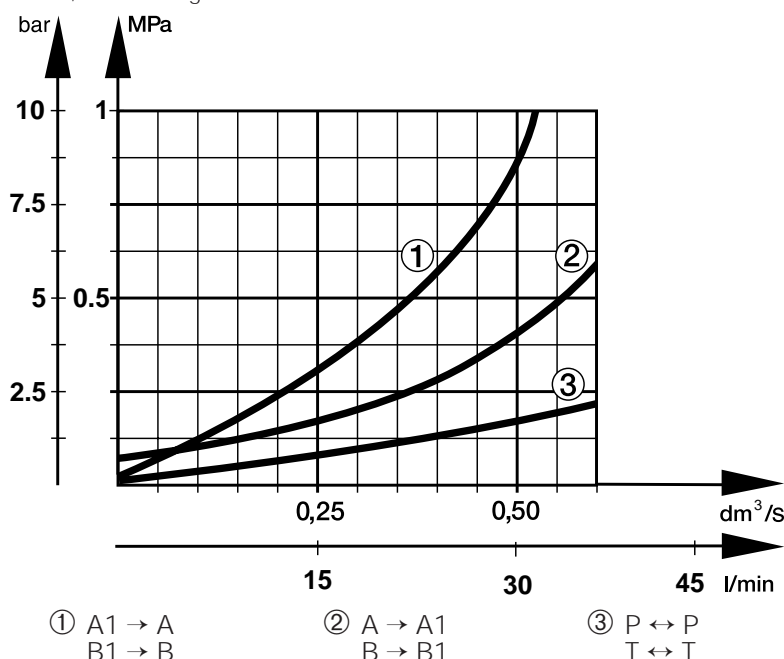
3 DESCRIPTION

Fluid flows freely on P and T lines; on service lines A and/or B with controls, fluid flows from A → A1 (and/or B → B1) overcoming the force of spring ⑤ acting on sleeve ②; fluid flows from A1 → A (and/or B1 → B) through orifices of sleeve ② which is pushed against its seat; the throttling axis ④, which is shifted by screwing it and locked by its nut ③, partially obstructs the control orifices, thus making the flow rate entirely dependent upon the available pressure drop.



4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM2 - FC - AB in standard configuration, with mineral oil at 36 cSt and at 50° C, with throttling axis at full retraction.



5 DATA AND OPERATING LIMITS

maximum rec. flow rate l/min)	0,5 dm³/s	(30)
maximum nominal pressure	32 MPa (320 bar)	
pressure drops	see 4	
adjustment	see 6	
dimensions	see 7	
installation	see 8	
mass	approx 0,8 kg	

6 CONTROL OF THE FLOW

The control is made by throttling from A1 → A (and/or B1 → B), through variable orifices.

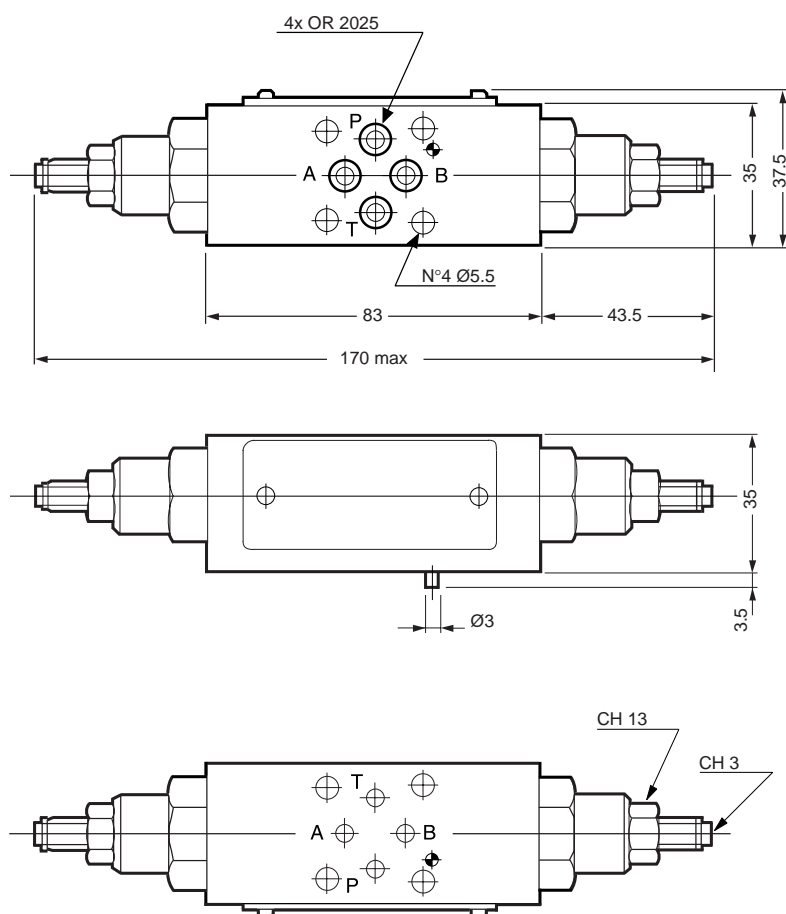
Depending on the various sleeve/axis combination, the control adjustment is:

- (standard) : orifices area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw.

W (fine and sensitive) : from 100% (*) to 0% with 8 complete turns - special variant

(*) 100% approx Q=0.5 dm³/s (30 l/min) at $\Delta P=1$ MPa (10 bar)

7 INSTALLATION DIMENSIONS



All dimensions are mm

The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clock wise the adjustment screw.

Suitable mechanical stops prevent dangerous manoeuvring.

8 INSTALLATION

All stackable valves AM2 - FC - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page). Valves height 35 mm.

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

All valves have on their "mounting" surface a \varnothing 4 mm cylindrical hole and are equipped on their "seals" surface by a \varnothing 3 mm locating pin, to conform with the norms.

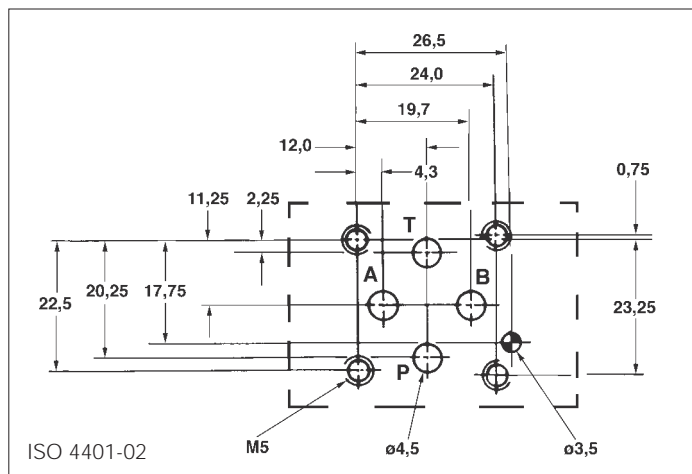
In case of necessity, the pin can be easily removed.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM2 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

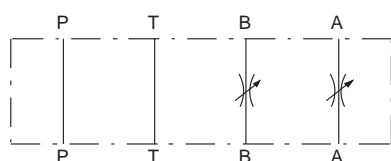
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 02
flow restrictor valves
type AM2 - FO - *

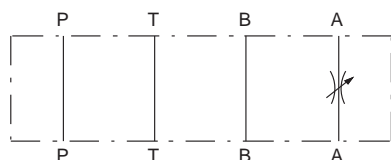


2 FUNCTIONAL SYMBOLS

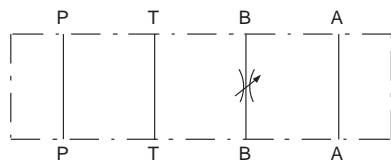
AM3-FO-AB



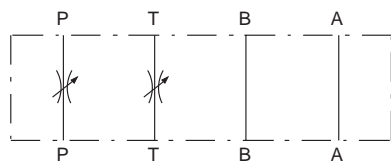
AM3-FO-A



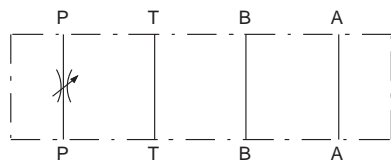
AM3-FO-B



AM3-FO-PT



AM3-FO-P

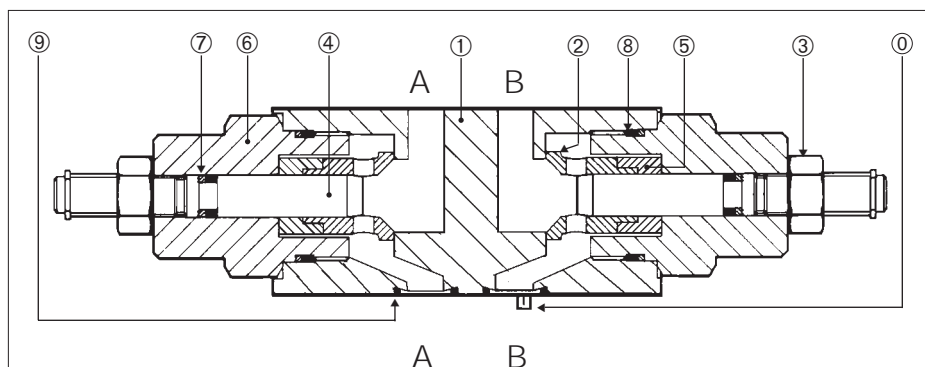


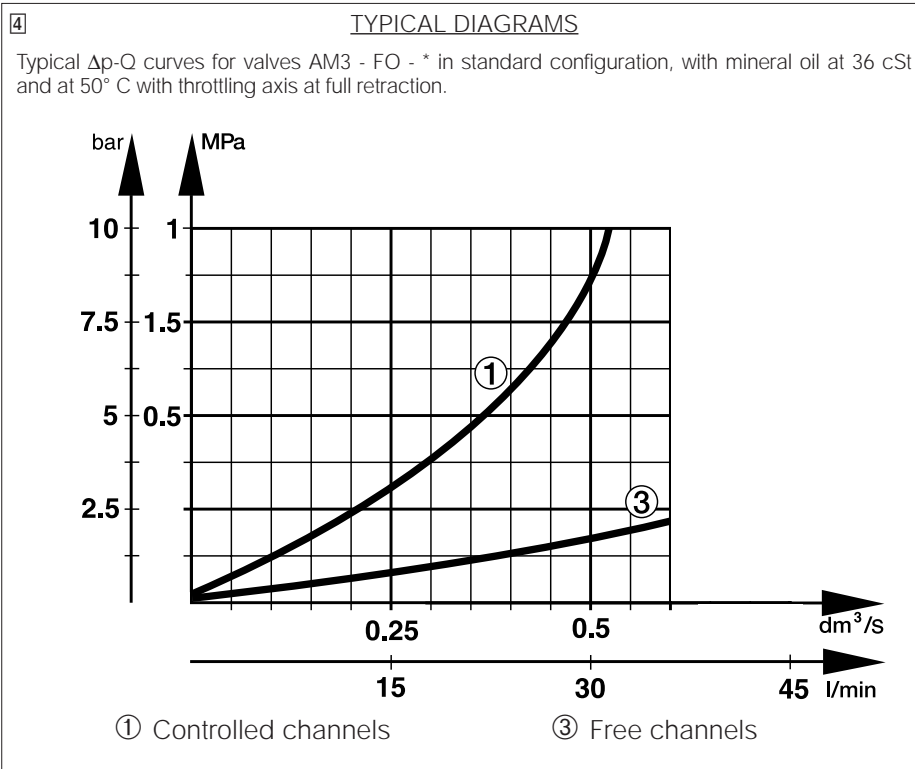
1 HOW TO READ THE MODEL CODE FOR VALVES AM2 - *

AM2 - FO - (AB) - * - ** / 10

① ② ③ ④ ⑤ ⑥

- ① **AM2** : stackable valve CETOP 02 - Pressure 32 MPa (320 bar)
- ② **FO** : flow restrictor valves with two-way control
- ③ **(AB)** : service lines where the control(s) operate(s); see also functional symbols ②
AB : controls on A and B. Fluid flows restricted A ↔ A, and B ↔ B
A : flow is restricted A ↔ A; free on B, P and T
B : flow is restricted B ↔ B; free on A, P and T
P : flow is restricted on P; free on A, B and T
PT : flow is restricted on P and T; free on A and B
- ④ flow control characteristics (see also ⑥)
- : standard control
W : fine and sensitive control
- ⑤ Code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves.



**5** DATA AND OPERATING LIMITS

maximum
rec. flow rate 0,5 dm³/s (30
l/min)

maximum
nominal pressure 32 MPa (320 bar)

pressure drops see ④

adjustment see ⑥

dimensions see ⑦

installation see ⑧

mass approx 0.8 kg

6 CONTROL OF THE FLOW

The control is made by throttling through variable orifices obtained on sleeve ② and partially obstructed by throttling axis ④. Depending on the various sleeve/axis combination, the control adjustment is:

- (standard) : orifices area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw.

W (fine and sensitive) : from 100% (*) to 0% with 8 complete turns - special variant

(*) 100% approx Q=0.5 dm³/s (30 l/min) at ΔP =1MPa (10 bar)

The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clock wise the adjustment screw.

Suitable mechanical stops prevent dangerous manoeuvring.

8 INSTALLATION

All stackable valves AM2 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page). Valves height 35 mm.

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

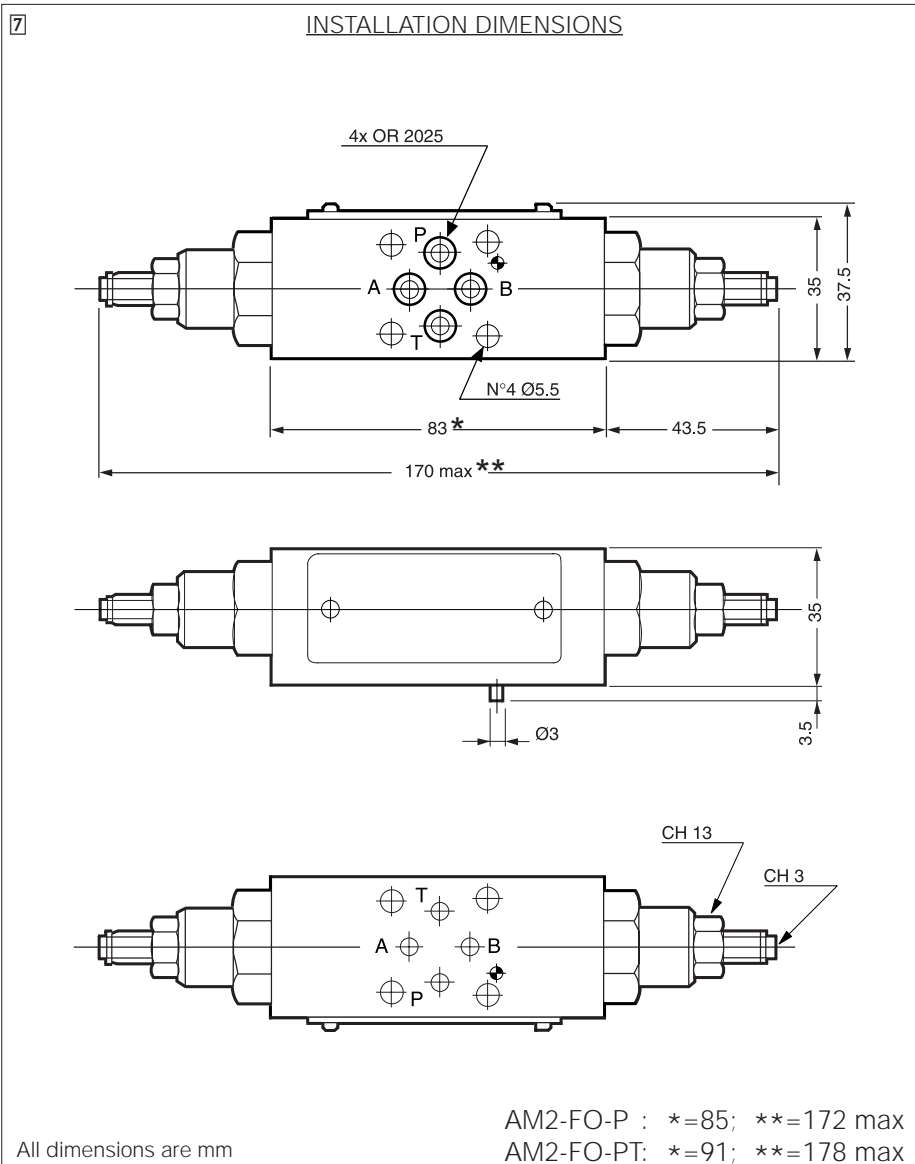
All valves have on their "mounting" surface a \varnothing 4 mm cylindrical hole and are equipped on their "seals" surface by a \varnothing 3 mm locating pin, to conform with the norms.

In case of necessity, the pin can be easily removed.

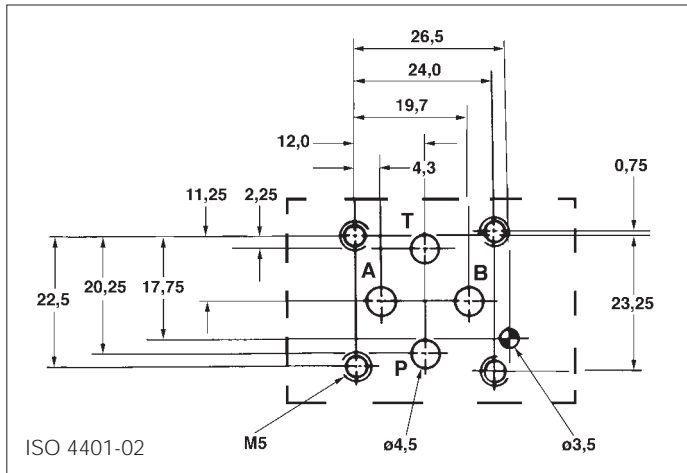
9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM2 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

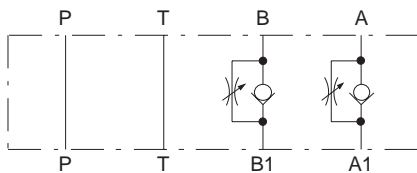


Stackable valves cetop 02 flow control valves type AM2 - FX - *

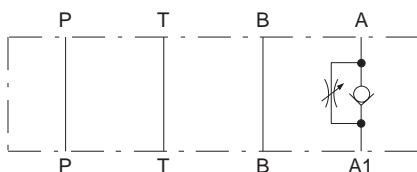


2 FUNCTIONAL SYMBOLS

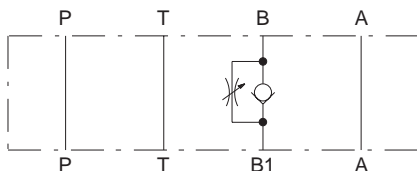
AM3-FX-AB



AM3-FX-A



AM3-FX-B



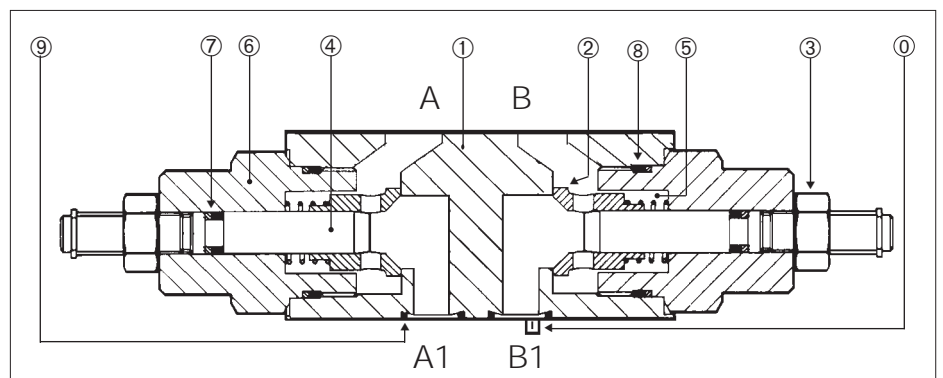
1 HOW TO READ THE MODEL CODE FOR VALVES AM2 - *

AM2 - FX - (AB) - * - ** / 10
① ② ③ ④ ⑤ ⑥

- ① AM2 : stackable valve CETOP 02 - Pressure 32 MPa (320 bar)
- ② FX : one-way flow control valves with meter-in control (referred to the hydraulic actuator)
- ③ (AB) : service lines where the control(s) operate(s); see also functional symbols 2
AB : controls on A and B. Fluid flows unrestricted from A1 → A and B1 → B and flow is controlled from A → A1 and B → B1.
A : flow is controlled from A → A1; free on B.
B : flow is controlled from B → B1; free on A.
- ④ flow control characteristics for A → A1 e B → B1 (see also 6) and check valve opening pressure (Pm) for flow A1 → A and B1 → B
- : standard control and Pm approx 0.04 MPa (0.4 bar)
W : fine and sensitive control
4 : Pm approx 0.4 MPa (4 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves.

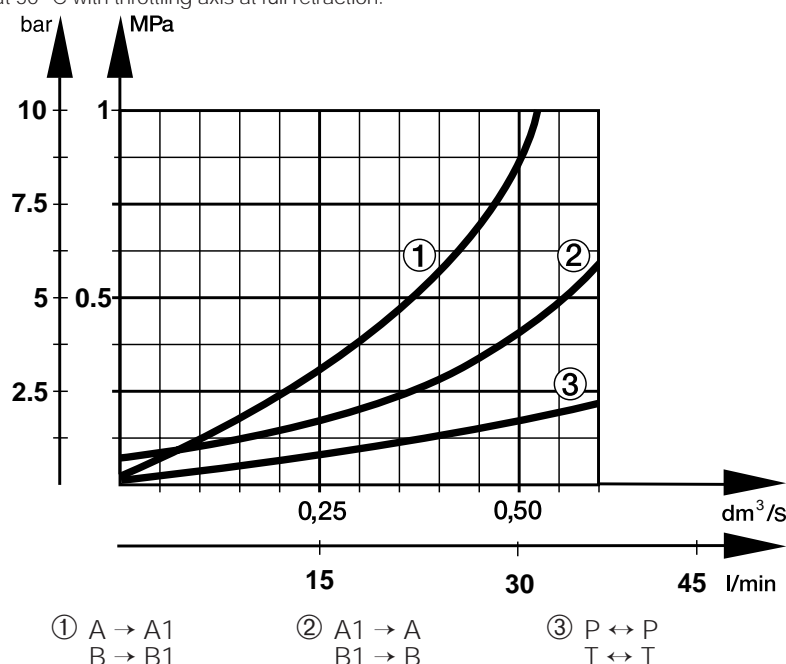
3 DESCRIPTION

Fluid flows freely on P and T lines; on service lines A and/or B with controls, fluid flows from A1 → A (and/or B1 → B) overcoming the force of spring ⑤ acting on sleeve ②; fluid flows from A → A1 (and/or B → B1) through orifices of sleeve ② which is pushed against its seat; the throttling axis ④ which is shifted by screwing it and locked by its nut ③, partially obstructs the control orifices, thus making the flow rate entirely dependent upon the available pressure drop.

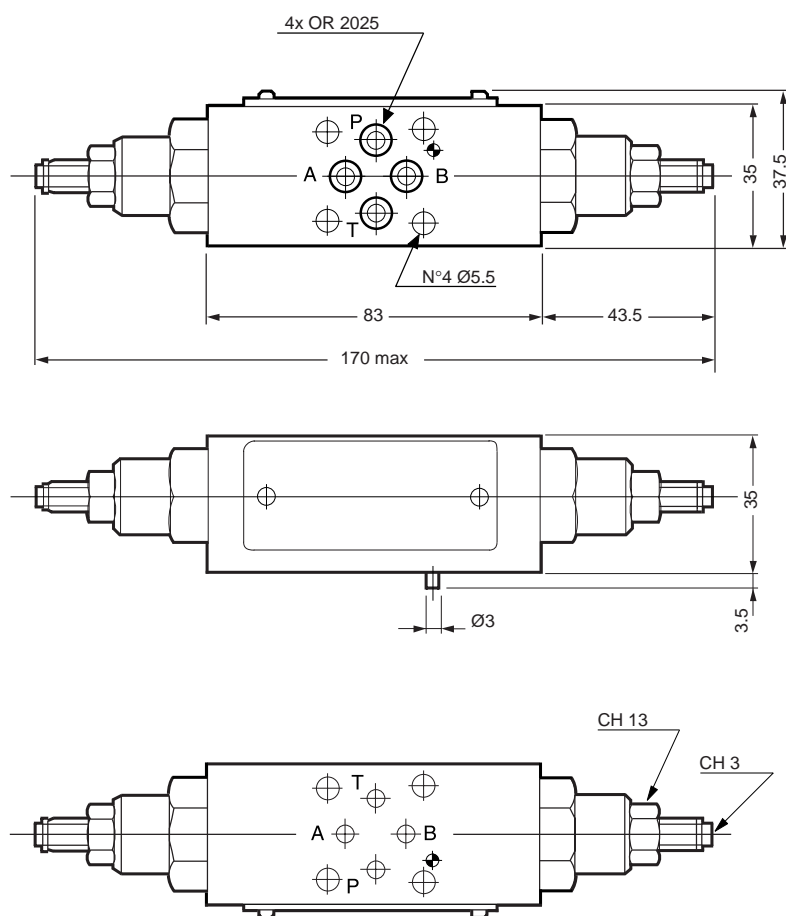


4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM2 - FX - AB in standard configuration, with mineral oil at 36 cSt and at 50° C with throttling axis at full retraction.



7 INSTALLATION DIMENSIONS



All dimensions are mm

5 DATA AND OPERATING LIMITS

maximum rec. flow rate l/min)	0,5 dm³/s	(30)
maximum nominal pressure	32 MPa (320 bar)	
pressure drops	see 4	
adjustment	see 6	
dimensions	see 7	
installation	see 8	
mass	approx 0.8 kg	

6 CONTROL OF THE FLOW

The control is made by throttling from A → A1 (and/or B → B1), through variable orifices.

Depending on the various sleeve/axis combination, the control adjustment is:

- (standard) : orifices area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw.

W (fine and sensitive) : from 100% (*) to 0% with 8 complete turns - special variant

(*) 100% approx Q=0.5 dm³/s (30 l/min) at ΔP =1MPa (10 bar)

The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clock wise the adjustment screw.

Suitable mechanical stops prevent dangerous manoeuvring.

8 INSTALLATION

All stackable valves AM2 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page). Valves height 35 mm.

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

All valves have on their "mounting" surface a \varnothing 4 mm cylindrical hole and are equipped on their "seals" surface by a \varnothing 3 mm locating pin, to conform with the norms.

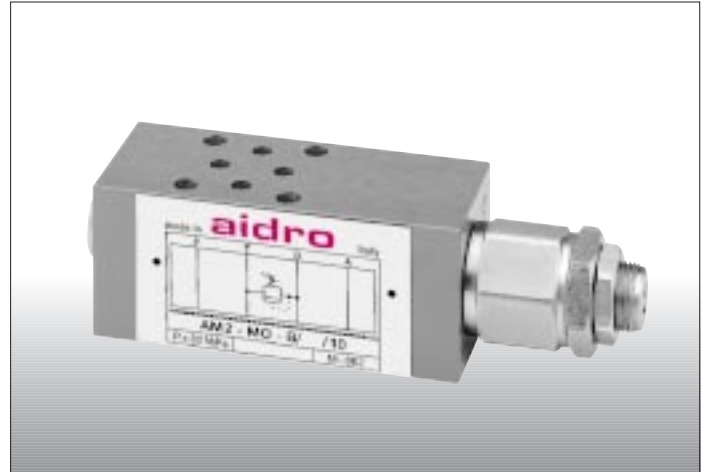
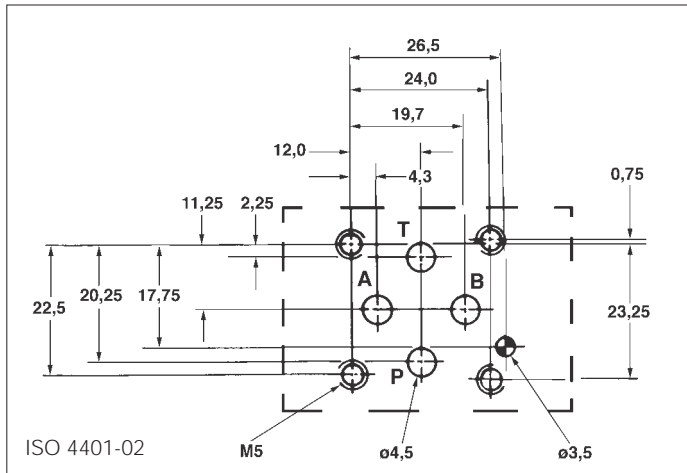
In case of necessity, the pin can be easily removed.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM2 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

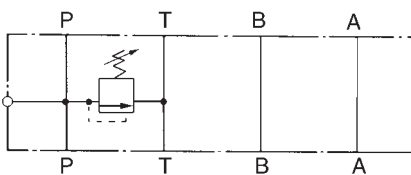
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 02 pressure relief valves type AM2 - MO - *

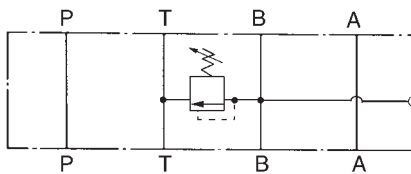


2 SIMBOLI FUNZIONALI

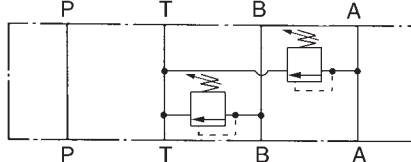
AM2-MO-P



AM2-MO-B



AM2-MO-BA



1 HOW TO READ THE MODEL CODE FOR VALVES AM2 - *

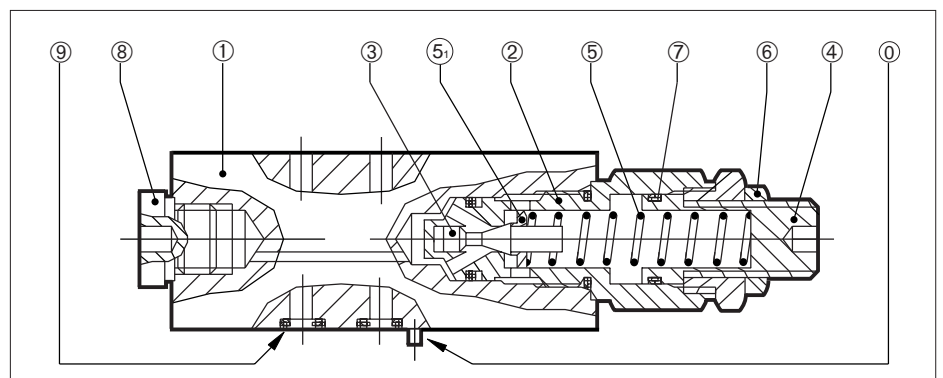
AM2 - MO - (P) / (20) - (10) - ** / 10

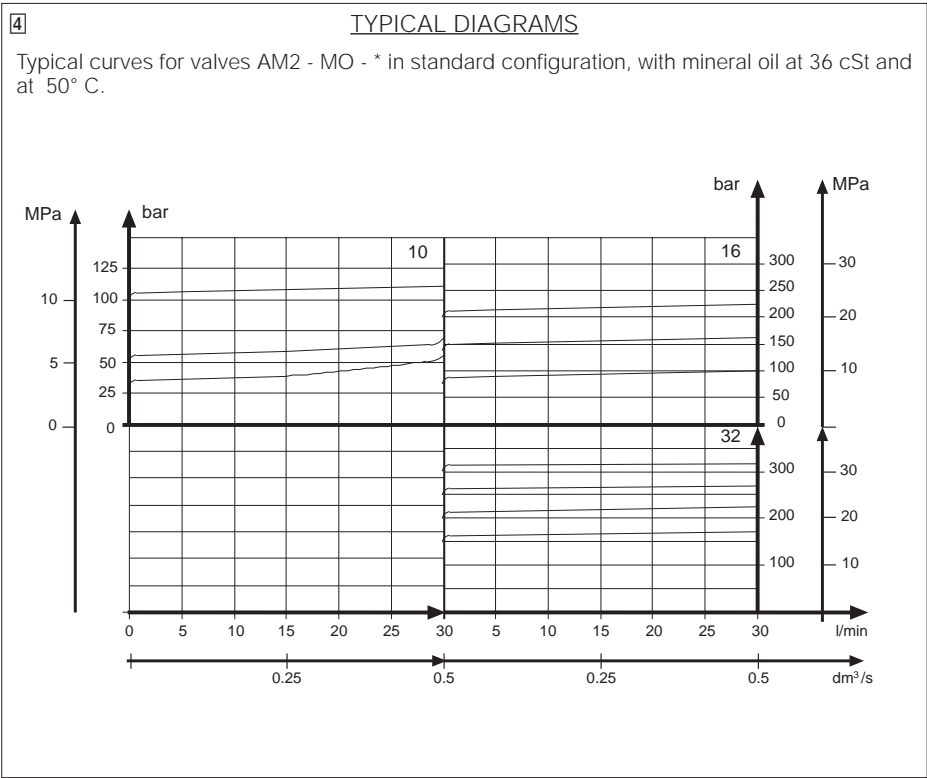
① ② ③ ④ ④a ⑤ ⑥

- ① AM2 : stackable valve CETOP 02 - Pressure 32 MPa (320 bar)
- ② MO : pressure relief, direct acting
- ③ (P) : service lines where the control(s) operate(s); see also functional symbols 2
P : relief on P and discharge to T
B : relief on B and discharge to T
BA : independent relief on B and on A and discharge to T
- ④ (20) : pressure adjustment ranges:
10 : from 2,5 MPa to 12,5 MPa (from 25 to 125 bar)
16 : from 4 MPa to 18 MPa (from 40 to 180 bar)
32 : from 6 MPa to 35 MPa (from 60 to 350 bar)
- ④a (10) : pressure adjustment range for relief on A (only for models AM2 - MO - BA): see ④
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.)
- ⑥ design number (progressive) of the valves.

3 DESCRIPTION

Fluid flows freely on A, B, P, and T lines; when on service line, protected by the relief valve, the pressure exceeds the settled value, the piston ③ is pushed by axial hydraulic forces, overcomes the force of spring ⑤, and shifts in its cylindrical seat and opens to the pressurized fluid annular passage to T, thus keeping the pressure level at the requested value. To read the value of the pressure remove plug ⑧ and apply a manometer.





5 DATA AND OPERATING LIMITS

maximum rec. flow rate	0,5dm³/s (30 l/min)
maximum nominal pressure	32 MPa (320 bar)
pressure relief curves	see 4
pressure adjustment	see 6
dimensions	see 7
masses:	
AM2 - MO - P or -B	approx 0.85 kg
AM2 - MO - BA	approx 1 kg

6 ADJUSTEMENT
OF THE RELIEF PRESSURE

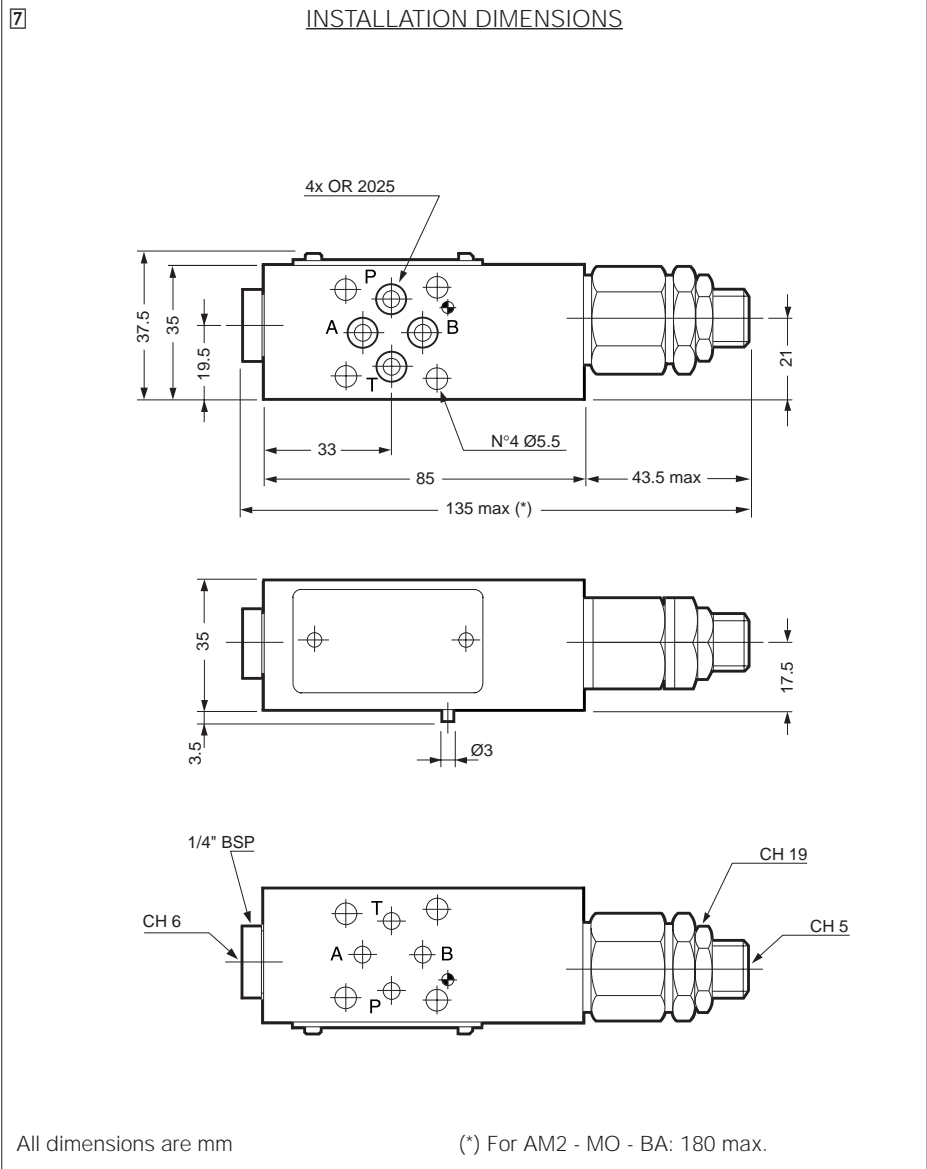
Relief pressure is reached when the axial hydraulic forces on piston **3** equal the force of spring **5**; the value of the relief pressure can be therefore changed, within the limits of the chosen adjustment range, by changing the compression of spring **5**.

To increase the relief pressure, turn clock wise the adjustment screw **4**, after having unlocked ist nut **6**.

For each pressure adjustment range, the pressure gradient is approx:

10	: 1.6	MPa/mm	(16 bar/turn)
16	: 2.6	MPa/mm	(26 bar/turn)
32	: 5	MPa/mm	(50 bar/turn)

When the required level of pressure is reached, lock the nut **6**.



8 INSTALLATION

All stackable valves AM2 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page). Valves height 35 mm.

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

All valves have on their "mounting" surface a ø 4 mm cylindrical hole and are equipped on their "seals" surface by a ø 3 mm locating pin, to conform with the norms.

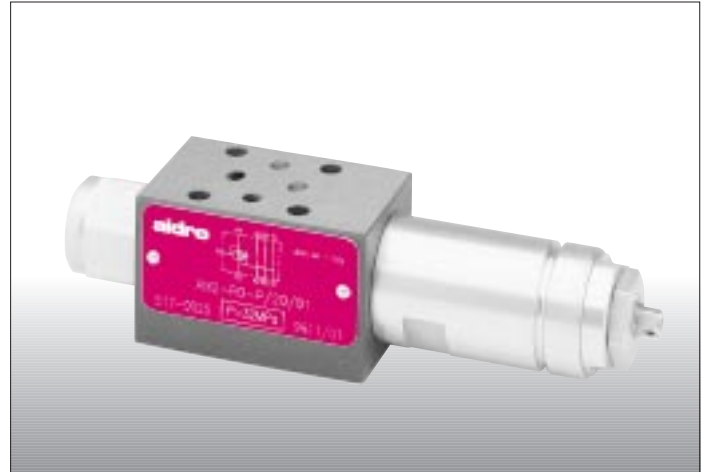
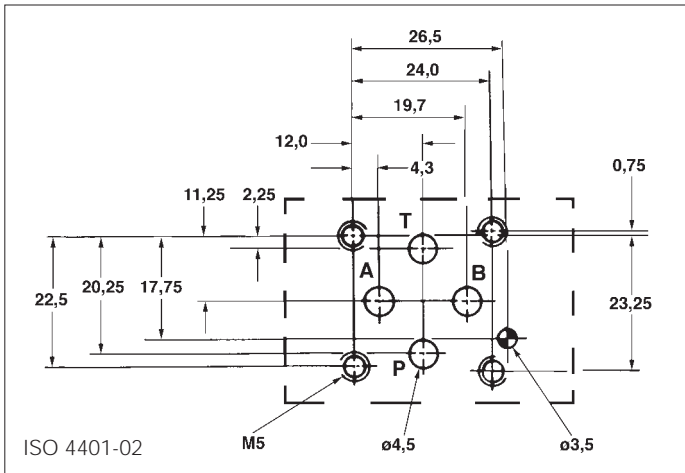
In case of necessity, the pin can be easily removed.

9 HYDRAULIC FLUIDS

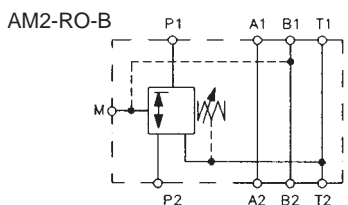
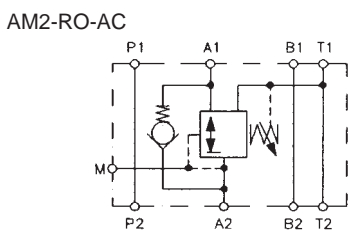
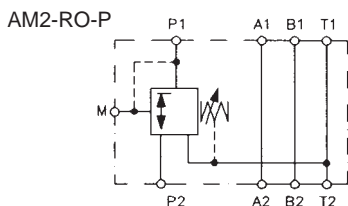
Seals and materials used on standard valves AM2 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Modular valves cetop 02
pressure reducing
type AM2 - RO - *



2 FUNCTIONAL SYMBOLS



1 HOW TO READ THE MODEL CODE FOR VALVES AM2-RO-*

AM2 - RO - (P) / (20) - ** / 10

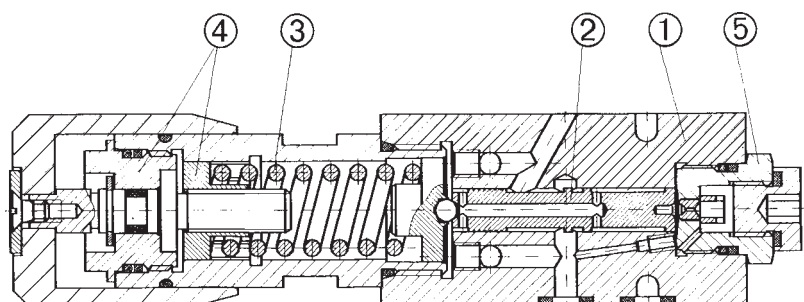
① ② ③ ④ ⑤ ⑥

- ① **AM2** : stackable valve CETOP 02 - Pressure 32 MPa (320 bar)
 - ② **RO** : pressure reducing, direct operated - 3 way valve
 - ③ **(P)** : service lines where the control operate; see also functional symbols **2**
P : control on P with 3^a way and drain to T line
AC : control on A with check valve
B : control on P with pressure reduced on B
 - ④ **(20)** : controlled pressure adjustment ranges
2.5 : from 0.4 to 3.2 MPa (from 4 to 32 bar)
6.3 : from 0.5 to 8 MPa (from 5 to 80 bar)
16 : from 1 to 20 MPa (from 10 to 200 bar)
20 : from 2.5 to 25 MPa (from 25 to 250 bar)
 - ⑤ Code reserved for special variants (materials, seals, surface, treatments, ecc...).
- V = adjustment hand knob
- ⑥ Design number (progressive) of the valve

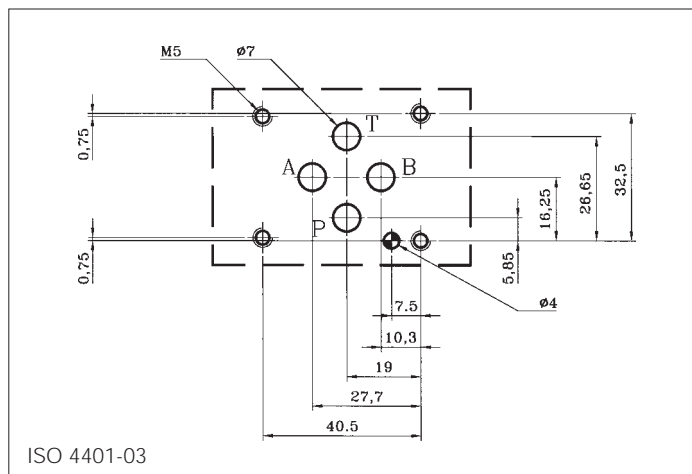
3	DESCRIPTION
---	-------------

Reduced pressure is obtained by throttling the flow on spool ② which is balanced, on one side, by the reduced pressure and, on the other side, by the spring ③. All valves AM2-RO-* are 3 way, direct operated:

If the pressure in the regulated chamber overcomes the value of the adjusted, reduced pressure, the valve discharges to T (at pressure value higher than the reduced pressure - see diagrams) thus acting as safety or relief valve.

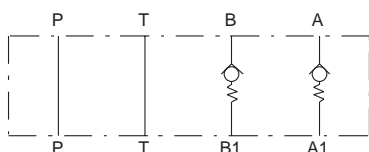


Stackable valves cetop 03 check valves type AM3 - CO - *

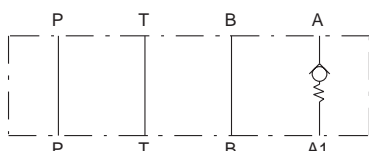


2 FUNCTIONAL SYMBOLS

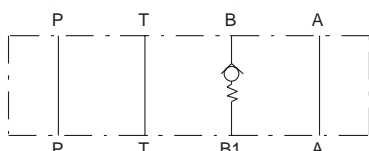
AM3-CO-AB



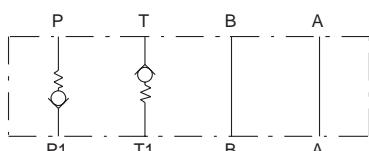
AM3-CO-A



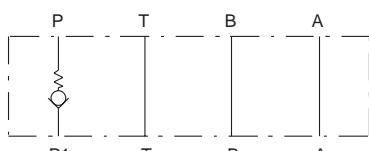
AM3-CO-B



AM3-CO-PT



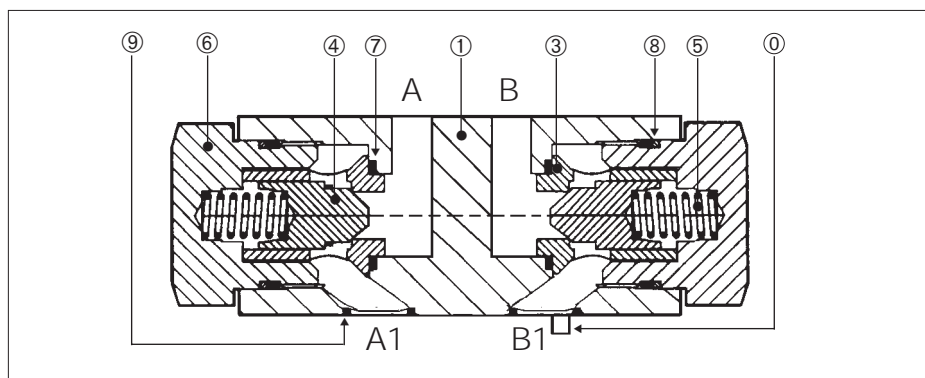
AM3-CO-P



1 HOW TO READ THE MODEL CODE FOR VALVES AM3-CO-*

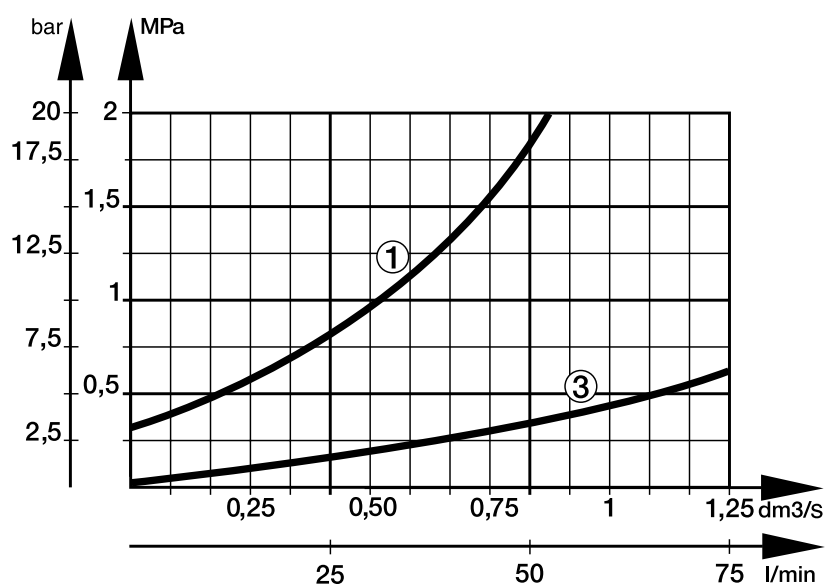
AM3 - CO - (AB) - * - ** / 10

- ① AM3 : stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
- ② CO : check valve, spring operated
- ③ (AB) : service lines where the control(s) operate(s); see also functional symbols 2
 AB : checks on A and B. Fluid flows A → A1 and B → B1 and cannot flow A1 → A, B1 → B.
 P and T: free.
 A : check on A: flow A1 → A blocked. B, P and T: free.
 B : check on B: flow B1 → B is blocked. A, P and T: free.
 P : check on P: flow P → P1 is blocked. A, B and T: free.
 PT : check on P and T: P → P1 and T1 → T are blocked. A and B: free.
- ④ check valve opening (cracking) pressure (Pm):
 - (standard) : Pm approx 0.2 MPa (2 bar)
 4 : Pm approx 0.4 MPa (4 bar)
- ⑤ Code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves.



4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM3 - CO in standard configuration, with mineral oil at 36 cSt and at 50° C.



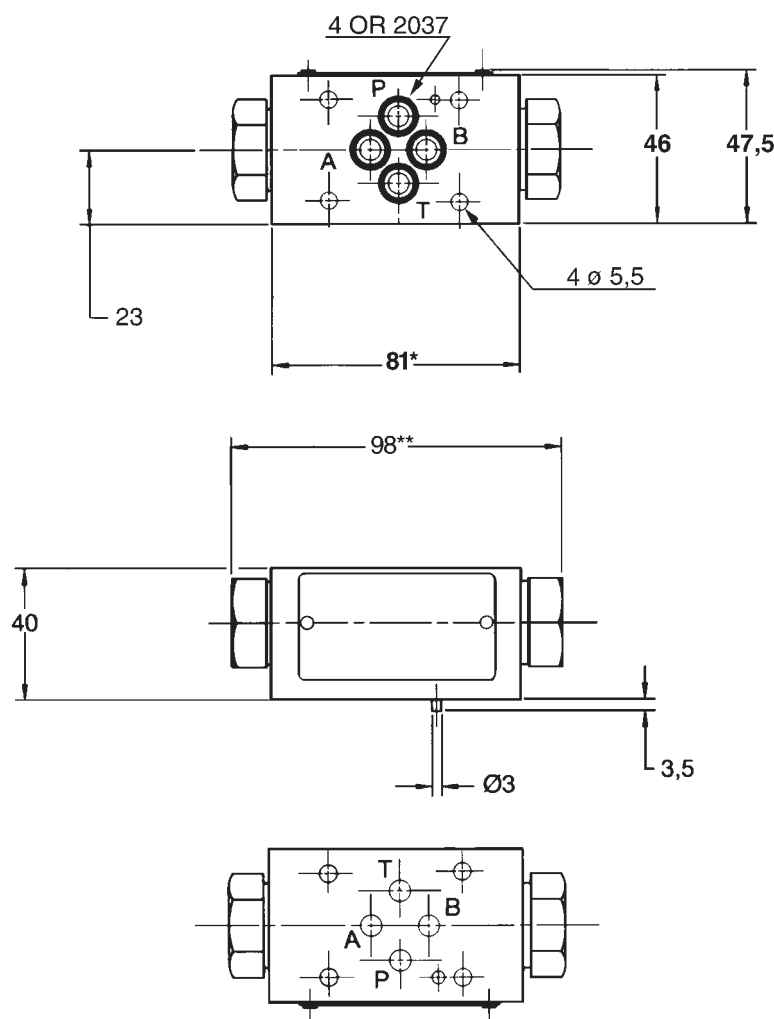
① A → A1; P1 → P
B → B1; T → T1

③ Free channels

5 DATA AND OPERATING LIMITS

maximum rec. flow rate	1 dm³/s (60 l/min)
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
dimensions	see 7
installation	see 8
mass	approx 1 kg

7 INSTALLATION DIMENSIONS



All dimensions are mm

AM3-CO-P : * = 85; ** = 102

AM3-CO-PT: * = 91; ** = 108

8 INSTALLATION

All stackable valves AM3 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (40 mm).

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

All valves have on their "mounting" surface a Ø 4 mm cylindrical hole and are equipped on their "seals" surface by a Ø 3 mm locating pin, to conform with the norms.

In case of necessity, the pin can be easily removed.

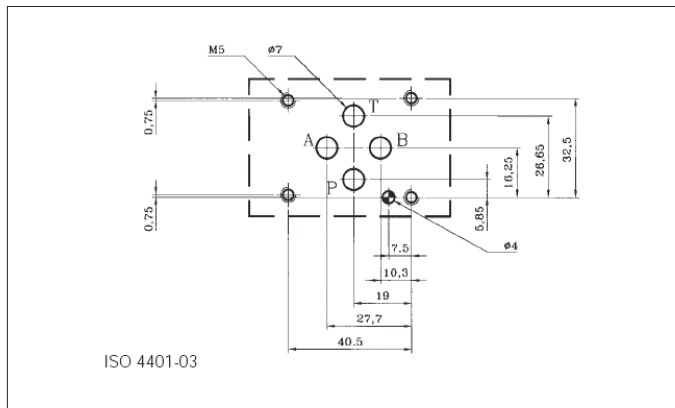
9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM3 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

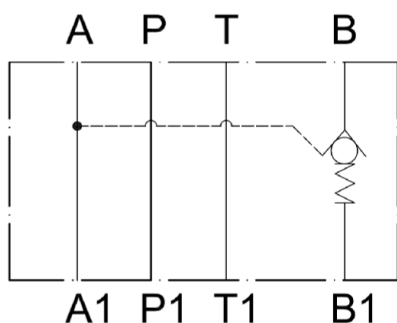
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

ГИДРОЗАМКИ МОДУЛЬНОГО МОНТАЖА ISO 03 С ПИЛОТОМ УПРАВЛЕНИЯ В ЛИНИИ В ТИПА AM3-CP-B-*/10A

P ном. = 32 МПа (320 бар)



2 УСЛОВНЫЕ ГРАФИЧЕСКИЕ ИЗОБРАЖЕНИЯ



1 РАСШИФРОВКА УСЛОВНЫХ ОБОЗНАЧЕНИЙ ДЛЯ AM3-CP-*

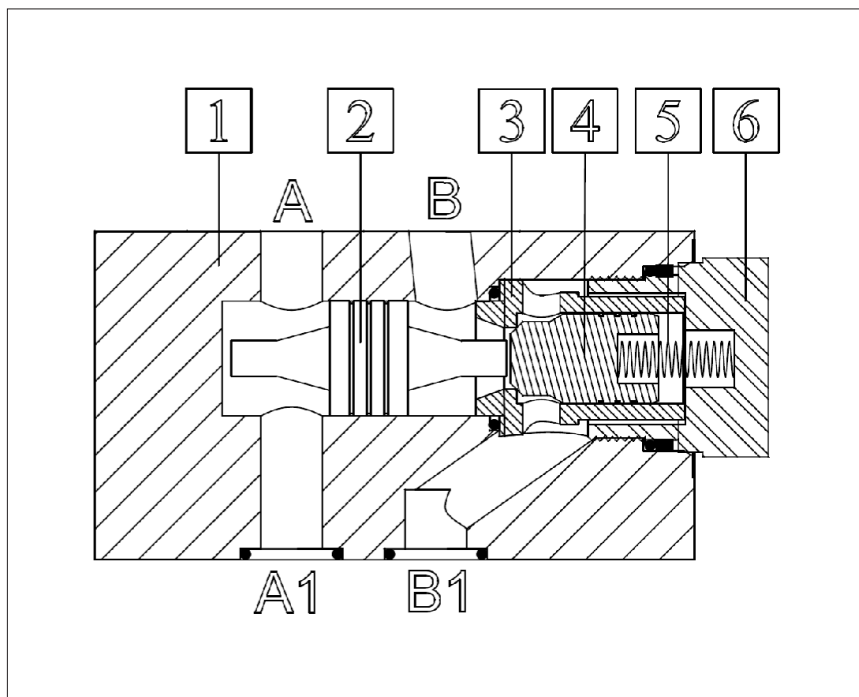
- | | | | | | | | | | |
|------------|---|-----------|---|----------|---|----------|---|----------|------------|
| AM3 | - | CP | - | B | - | * | - | / | 10A |
| ① | | ② | | ③ | | ④ | | | ⑤ |
- ① **AM3** : гидрозамок исполнение ISO 03
- ② **CP** : гидравлическое управление обратным клапаном
- ③ **B** : гидравлическое управление обратным клапаном в линии В
- ④ ***** : давление (Pm) открытия управляемого клапана для В → В1:
 - (стандарт) : Pm приблизительно 0,2 МПа (2 бар)
 4 : Pm приблизительно 0,4 МПа (4 бар)
 8 : Pm приблизительно 0,8 МПа (8 бар)
- ⑤ **10A** : Конструкторский номер (по нарастающей)

3 ОПИСАНИЕ

Свободное течение рабочей жидкости по каналам P, T и A.

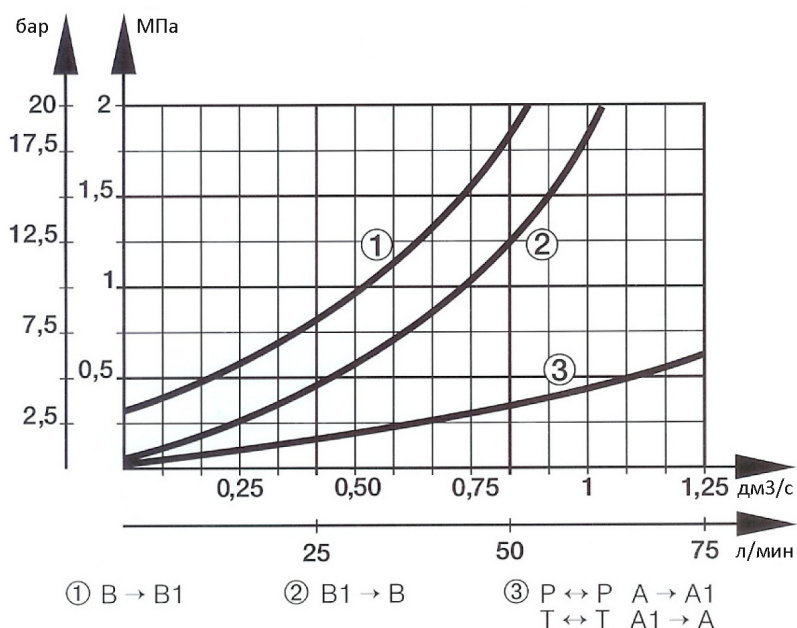
В канале В рабочая жидкость течет из В → В1 преодолевая силу пружины⑤, действует на конусный цилиндр④, канал В1 → В блокирован.

В случае подачи импульса от гидрораспределителя с электромагнитным управлением, давление на канал А управляющий поршень②, сдвигаясь с центральной позиции, передвигает конусный цилиндр④, таким образом открывая проход В1 → В.

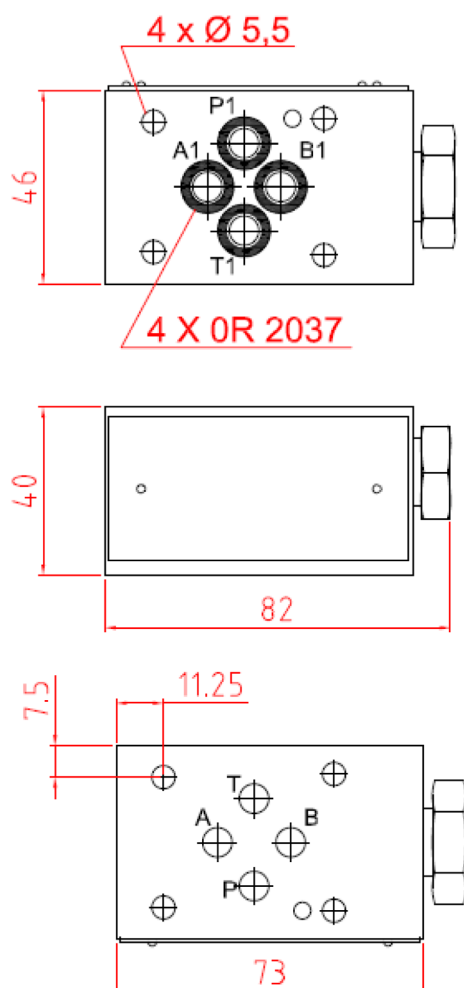


4 ТИПОВЫЕ ХАРАКТЕРИСТИКИ

Расходно-перепадные характеристики $\Delta p-Q$ гидрозамков AM3-CP-B в стандартной конфигурации, работающих на гидравлической жидкости при $\nu=36 \text{ мм}^2/\text{с}$ и температуре $T=50^\circ\text{C}$.



7 ПРИВЯЗОЧНЫЕ РАЗМЕРЫ



5 ЭКСПЛУАТАЦИОННЫЕ ОГРАНИЧЕНИЯ

Максимальное номинальное давление 32 МПа (320 бар)

Номинальный расход в линии В 50 л/мин

Максимальный рекомендуемый расход в линии В 60 л/мин

Максимальный рекомендуемый расход в свободных линиях 60 л/мин

Давление открытия в линии В (В → В1) см. 1

Соотношение площадей (управляющий поршень / обратный клапан) прим. 3,5

Размеры см. 7

Установка см. 8

Масса прим. 1 кг

6 ДАВЛЕНИЕ ПИЛОТА УПРАВЛЕНИЯ

Для перемещения управляющего поршня и открытия обратного клапана в канале В требуется следующее давление на А:

$$P_p = P_a = (P_{b1} + P_m - P_b) / 3,5 + P_b$$

Где: P_p = давление пилота управления
 P_b = давление в В
 P_a = давление в А
 P_{a1} = давление в А1
 P_m = давление открытия обратного клапана с помощью пружины

8 УСТАНОВКА

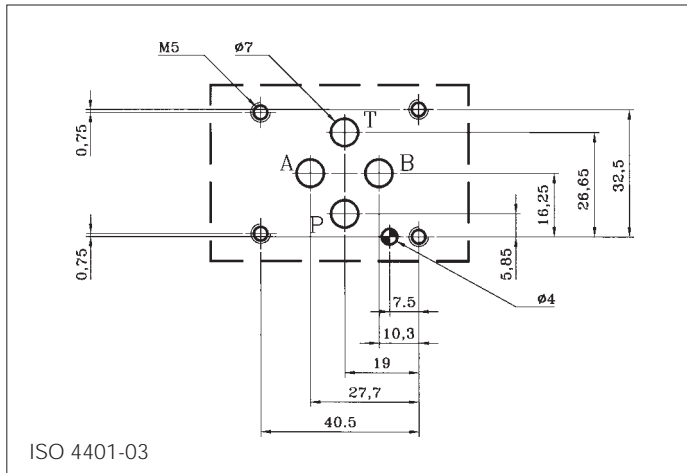
Все гидрозамки AM3 - * соответствуют стандартам ISO и CETOP по размерам стыковой поверхности.

Для предотвращения утечки между гидрозамком и плитой устанавливаются 4 уплотнения OR типа.

9 ГИДРАВЛИЧЕСКАЯ ЖИДКОСТЬ

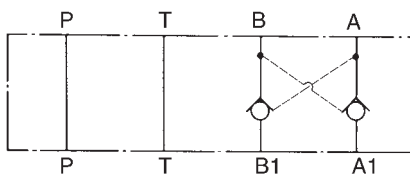
Уплотнения и материалы, используемые при изготовлении стандартных гидрозамков AM3 - * полностью совместимы с гидравлическими жидкостями на основе минеральных масел с противопенными и противоокислительными присадками. Гидравлическая жидкость должна соответствовать классу чистоты 19/17/14 по ISO 4406, или выше. Рекомендованная вязкость жидкости 10 - 60 сСт.

Stackable valves cetop 03 pilot operated check valves type AM3 - CP - *

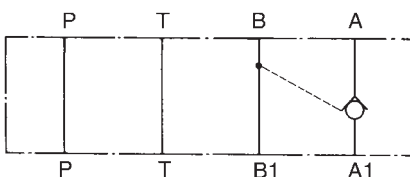


2 FUNCTIONAL SYMBOLS

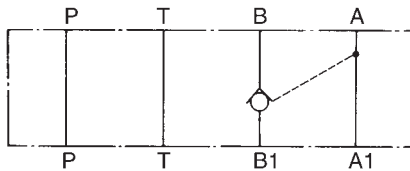
AM3-CP-AB



AM3-CP-A



AM3-CP-B



1 HOW TO READ THE MODEL CODE FOR VALVES AM3-CP-*

AM3 - CP - (AB) - * - ** / 10

① ② ③ ④ ⑤ ⑥

① AM3 : stackable valve CETOP 03 - Pressure 32 MPa (320 bar)

② CP : check valve, pilot operated (hydraulically)

③ (AB) : service lines where the control(s) operate(s);

see also functional symbols 2

AB : p.o. checks on A and B. Fluid flows A → A1 and B → B1 and flow A1 → A (or B1 → B) is permitted only when B (or A) is pressurized

A : p.o. check on A; flow A1 → A is permitted only when B is pressurized

B : p.o. check on B; flow B1 → B is permitted only when A is pressurized

④ check valve opening (cracking) pressure (Pm) for free flow A → A1 and B → B1:
- (standard) : Pm approx 0.2 MPa (2 bar)
4 : Pm approx 0.4 MPa (4 bar)

⑤ code reserved for special variants (materials, seals, surface treatments etc.)

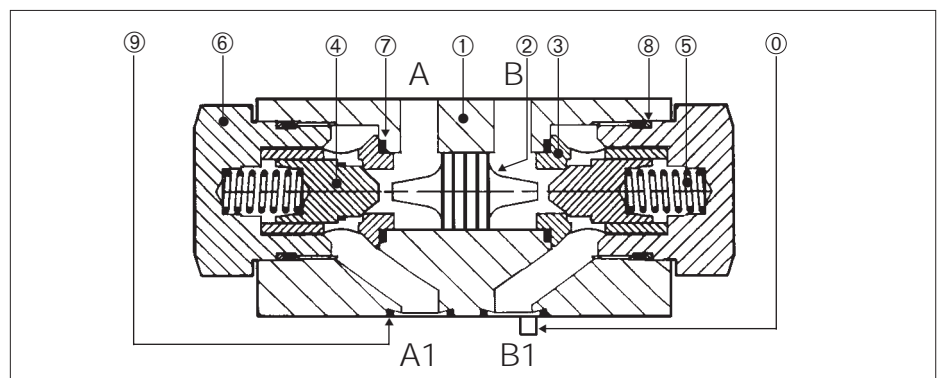
⑥ design number (progressive) of the valves

3 DESCRIPTION

Fluid flows freely on P and T lines;

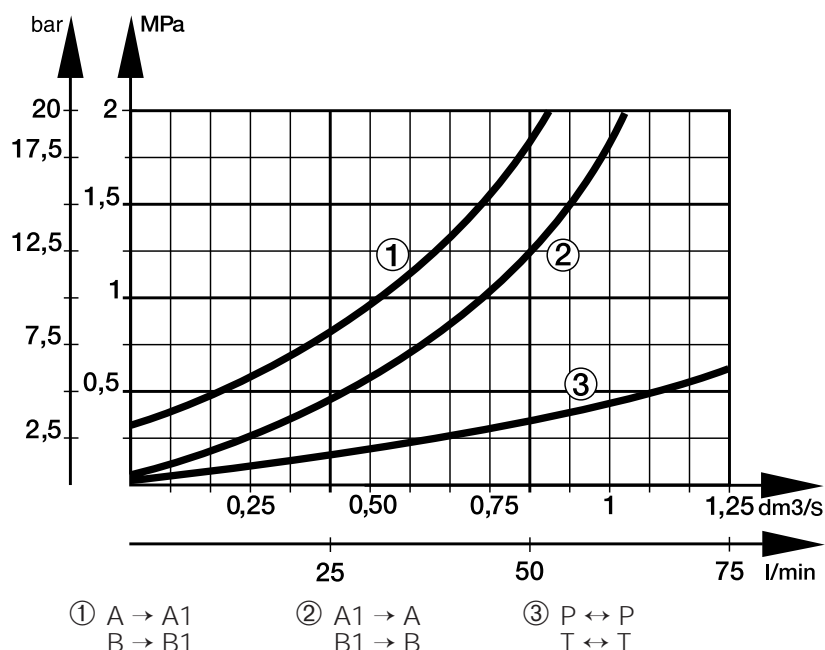
on service lines A and /or B with p.o. check, fluid flows from A → A1 (and/or B → B1) overcoming the force of spring ⑤ acting on poppet ④, and fluid is blocked from A1 → A (and/or B1 → B).

When, by switching the solenoid operated 4-way directional valve, pressure is made available at, for instance, port B fluid flows B → B1 and the pilot piston ②, shifting from its central position, forces poppet ④, on service line A, to open and permit flow A1 → A.



4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM3 - CP - AB in standard configuration, with mineral oil at 36 cSt and at 50° C.



5 DATA AND OPERATING LIMITS

maximum rec. flow rate	1 dm³/s (60 l/min)
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
pilot area ratio piston/check valve	approx 3.5
piloting pressure	see 6
dimensions	see 7
installation	see 8
mass	approx 1 kg

6 PILOTING PRESSURE

To shift the pilot piston and to open the check in A the piloting pressure must be, at B:

$$P_p = P_b = \frac{P_{a1} + P_m - P_a}{3.5} + P_a$$

where: P_p = piloting pressure;
 P_b = pressure in B;
 P_a = pressure in A;
 P_{a1} = pressure in A1;
 P_m = check valve opening pressure (spring)

or to open the check in B:

$$P_p = P_a = \frac{P_{b1} + P_m - P_b}{3.5} + P_b$$

8 INSTALLATION

All stackable valves AM3 - CP - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (40 mm).

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

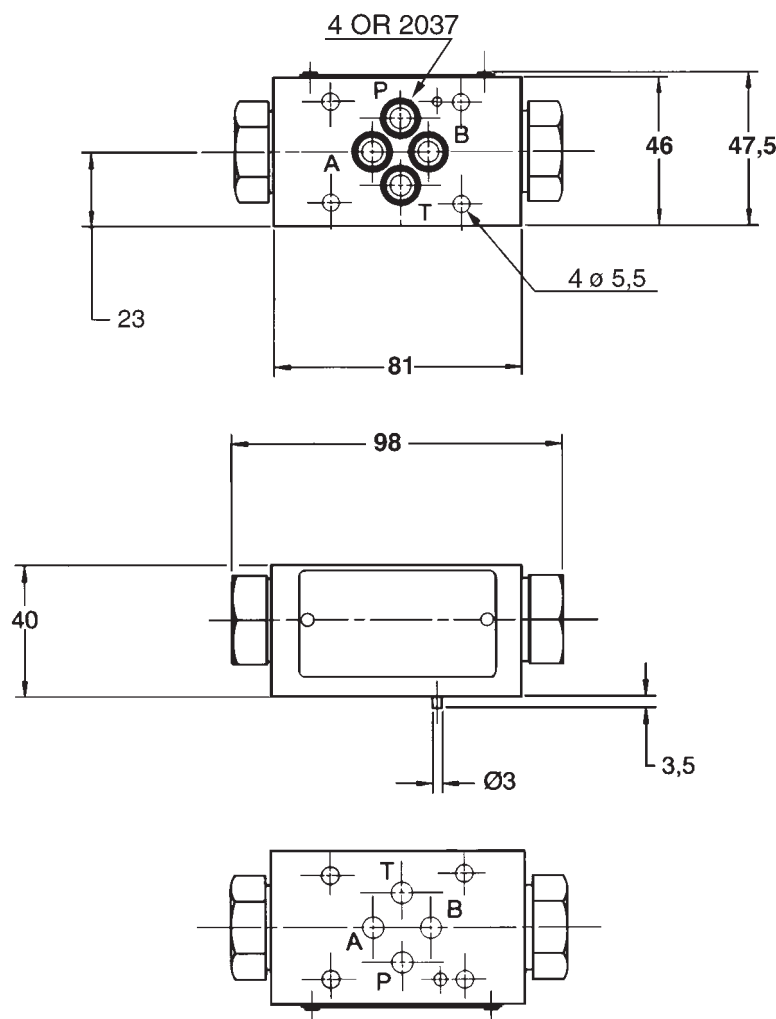
All valves have on their "mounting" surface a $\varnothing 4$ mm cylindrical hole and are equipped on their "seals" surface by a $\varnothing 3$ mm locating pin, to conform with the norms. In case of necessity, the pin can be easily removed.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM3 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

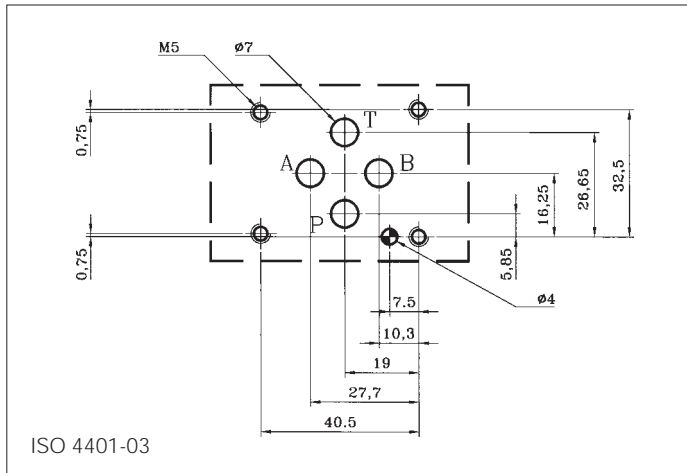
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

7 INSTALLATION DIMENSIONS



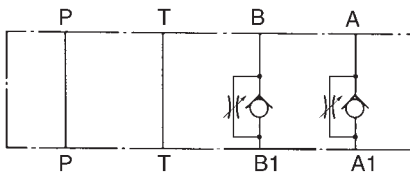
All dimensions are mm

Stackable valves cetop 03 flow control valves type AM3 - FC - *

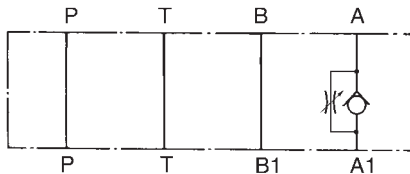


2 FUNCTIONAL SYMBOLS

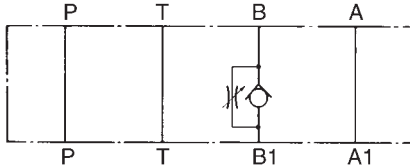
AM3-FC-AB



AM3-FC-A



AM3-FC-B



1 HOW TO READ THE MODEL CODE FOR VALVES AM3-FC-*

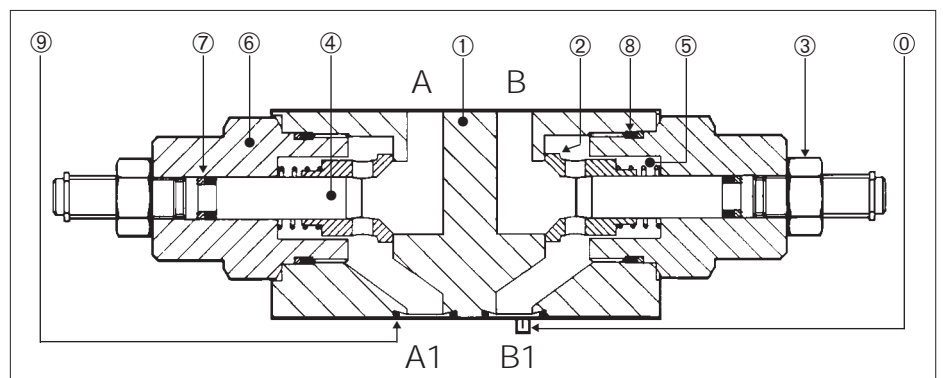
AM3 - FC - (AB) - * - ** / 10

① ② ③ ④ ⑤ ⑥

- ① **AM3** : stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
- ② **FC** : one-way flow control valves with meter-out control (referred to the hydraulic actuator)
- ③ **(AB)** : service lines where the control(s) operate(s); see also functional symbols 2
 AB : controls on A and B. Fluid flows unrestricted from A → A1 and flow is controlled from A1 → A and B1 → B
 A : flow is controlled from A1 → A, free on B
 B : flow is controlled from B1 → B, free on A
- ④ flow control characteristics for A1 → A and B1 → B (see also 6) and check valve opening pressure (Pm) for flow A → A1 and B → B1
 - : standard control and Pm approx 0.04 MPa (0.4 bar)
 V : fine control
 4 : Pm approx 0.4 MPa (4 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves

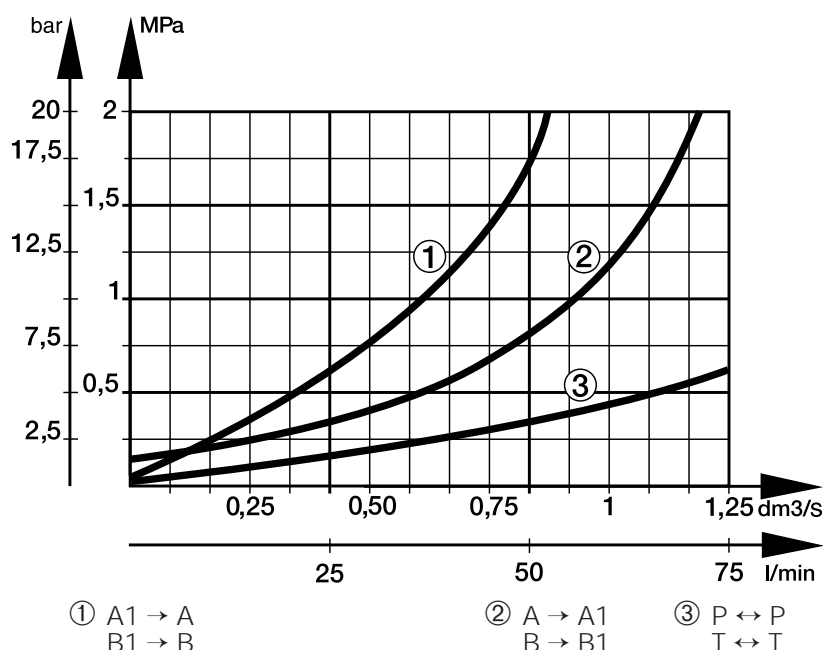
3 DESCRIPTION

Fluid flows freely on P and T lines; on service lines A and/or B with controls, fluid flows from A → A1 (and/or B → B1) overcoming the force of spring ⑤ acting on sleeve ②; fluid flows from A1 → A (and/or B1 → B) through orifices to sleeve ② which is pushed against its seat; the throttling axis ④, which is shifted by screwing it and locked by its nut ③, partially obstructs the control orifices, thus making the flow rate entirely dependent upon the available pressure drop.

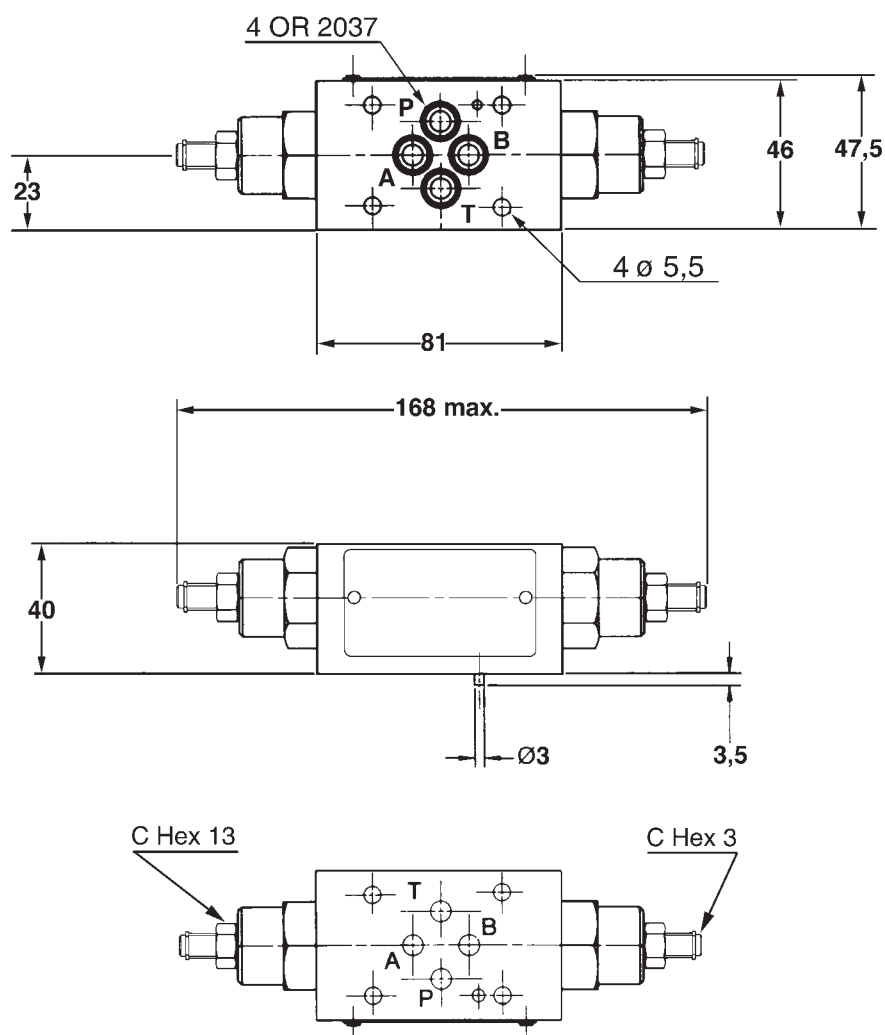


4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM3 - FC - AB in standard configuration, with mineral oil at 36 cSt and at 50° C, with throttling axis at full retraction.



7 INSTALLATION DIMENSIONS



All dimensions are mm

5 DATA AND OPERATING LIMITS

maximum rec. flow rate	1 dm³/s (60 l/min)
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
adjustment	see 6
dimensions	see 7
installation	see 8
mass	approx 1,2 kg

6 CONTROL OF THE FLOW

The control is made by throttling from A1 → A (and/or B1 → B), through variable orifices.

Depending on the various sleeve/axis combination, the control adjustment is:

- (standard) : orifices area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw.

V (fine) : from 100% (**) to 0% with 5 complete turns of the adjustment screw.

(*) 100% approx Q=1 dm³/s (60 l/min) at $\Delta P=2$ MPa (20 bar)

(**) 100% approx Q=0.5 dm³/s (30 l/min) at $\Delta P=2$ MPa (20 bar)

The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clockwise the adjustment screw.

Suitable mechanical stops prevent dangerous manoeuvring.

8 INSTALLATION

All stackable valves AM3 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (40 mm).

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

All valves have on their "mounting" surface a Ø 4 mm cylindrical hole and are equipped on their "seals" surface by a Ø 3 mm locating pin, to conform with the norms.

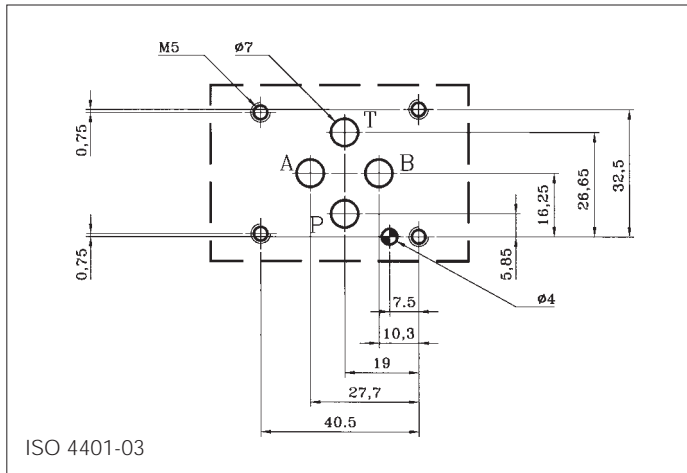
In case of necessity, the pin can be easily removed.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM3 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

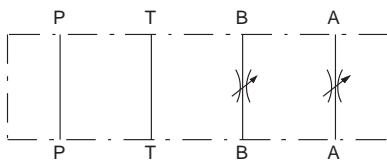
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 03 flow restrictor valves type AM3 - FO - *

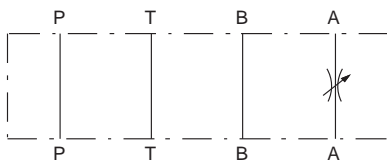


2 FUNCTIONAL SYMBOLS

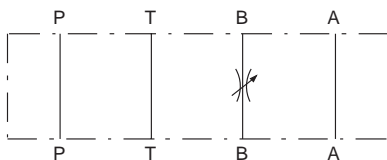
AM3-FO-AB



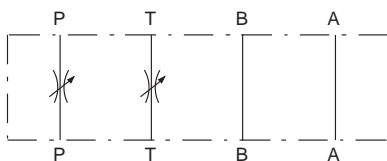
AM3-FO-A



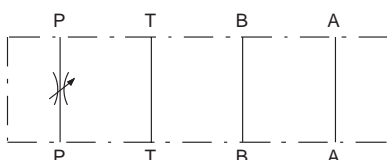
AM3-FO-B



AM3-FO-PT



AM3-FO-P

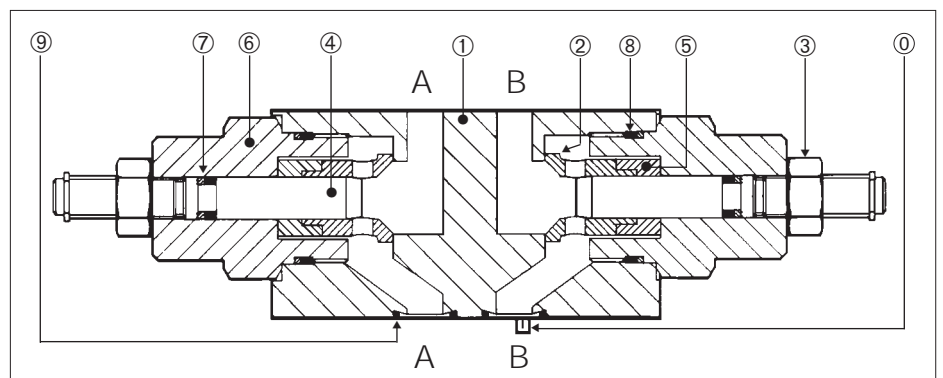


1 HOW TO READ THE MODEL CODE FOR VALVES AM3 -FO-*

AM3 - FO - (AB) - * - ** / 10

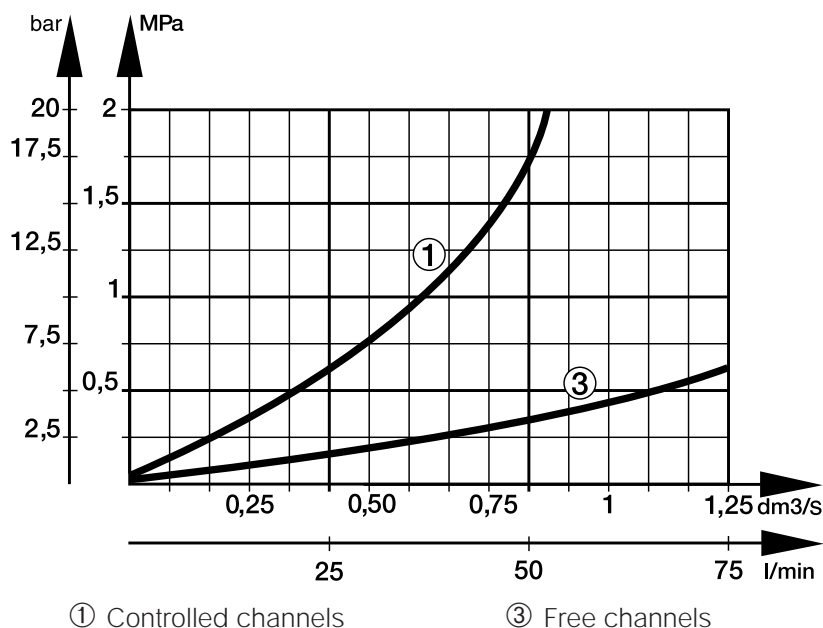
① ② ③ ④ ⑤ ⑥

- ① AM3 : stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
- ② FO : flow restrictor valves with two-way control
- ③ (AB) : service lines where the control(s) operate(s); see also functional symbols 2
 AB : controls on A and B. Fluid flows restricted A ↔ A, and B ↔ B
 A : flow is restricted A ↔ A; free on B, P and T
 B : flow is restricted B ↔ B; free on A, P and T
 P : flow is restricted on P; free on A, B and T
 PT : flow is restricted on P and T; free on A and B
- ④ flow control characteristics (see also 6)
 - : standard control
 V : fine control
- ⑤ Code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves.

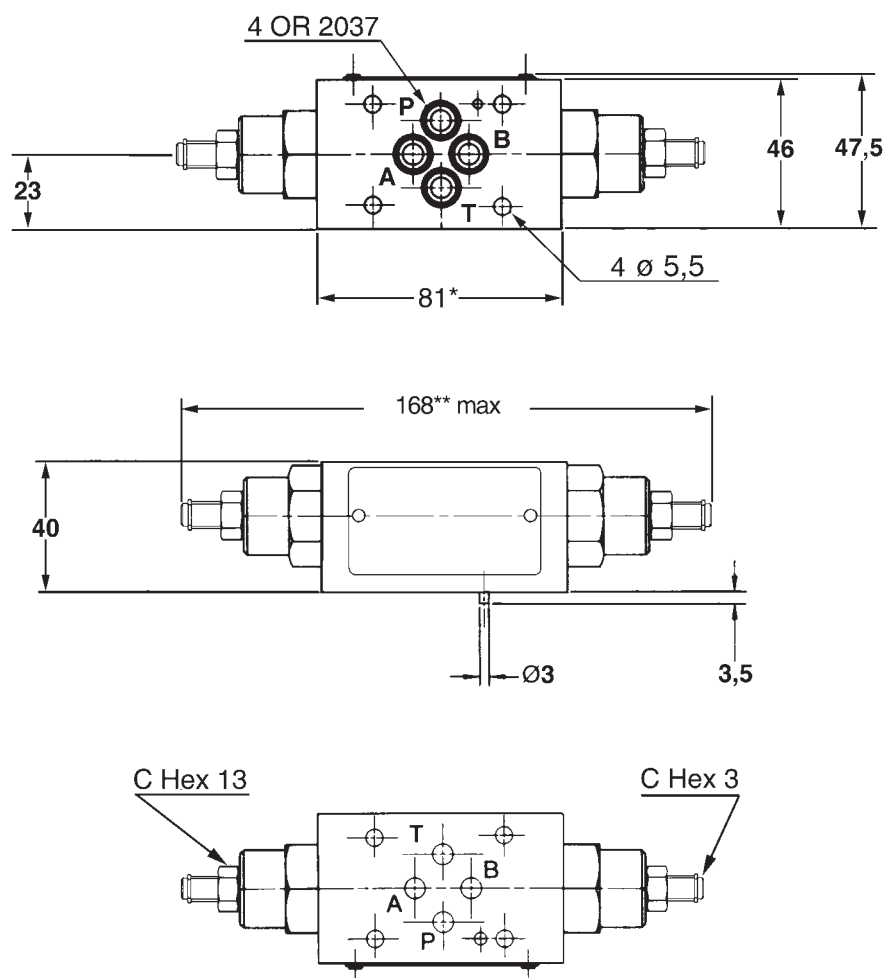


4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM3 - FO - * in standard configuration, with mineral oil at 36 cSt and at 50° C with throttling axis at full retraction.



7 INSTALLATION DIMENSIONS



AM3-FO-P : * = 85; ** = 172 max

AM3-FO-PT: * = 91; ** = 178 max

All dimensions are mm

5 DATA AND OPERATING LIMITS

maximum rec. flow rate	1 dm³/s (60 l/min)
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
adjustment	see 6
dimensions	see 7
installation	see 8
mass	approx 1,2 kg

6 CONTROL OF THE FLOW

The control is made by throttling through variable orifices obtained on sleeve ② and partially obstructed by throttling axis ④. Depending on the various sleeve/axis combination, the control adjustment is:

- (standard) : orifices area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw.
- V (fine) : from 100% (**) to 0% with 5 complete turns of the adjustment screw.
- (*) 100% approx Q=1 dm³/s (60 l/min) at $\Delta P=2$ MPa (20 bar)
- (**) 100% approx Q=0.5 dm³/s (30 l/min) at $\Delta P=2$ MPa (20 bar)

The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clockwise the adjustment screw. Suitable mechanical stops prevent dangerous manoeuvring.

8 INSTALLATION

All stackable valves AM3 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (40 mm). Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

All valves have on their "mounting" surface a $\varnothing 4$ mm cylindrical hole and are equipped on their "seals" surface by a $\varnothing 3$ mm locating pin, to conform with the norms.

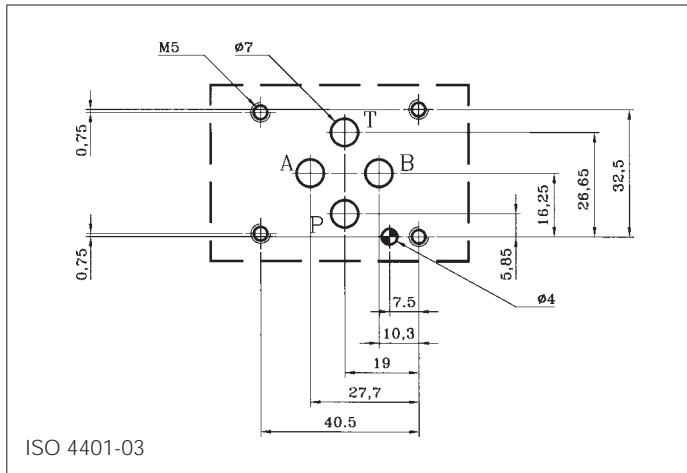
In case of necessity, the pin can be easily removed.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM3 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

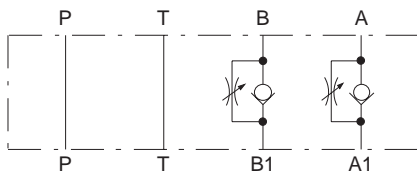
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 03 flow control valves type AM3 - FX - *

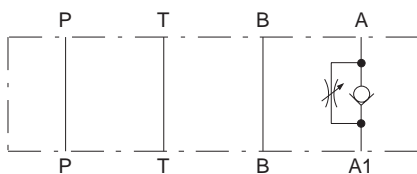


2 FUNCTIONAL SYMBOLS

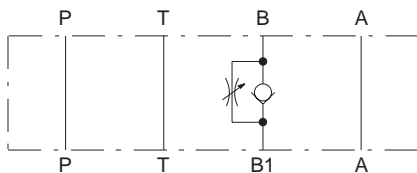
AM3-FX-AB



AM3-FX-A



AM3-FX-B



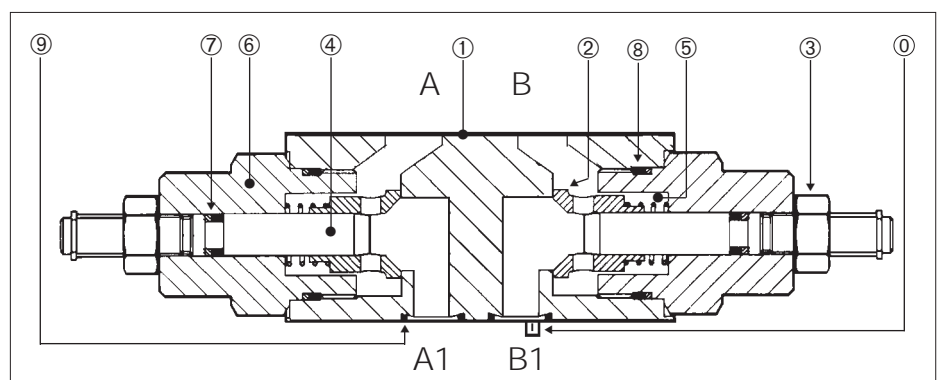
1 HOW TO READ THE MODEL CODE FOR VALVES AM3-FX-*

AM3 - FX - (AB) - * - ** / 10
① ② ③ ④ ⑤ ⑥

- ① **AM3** : stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
- ② **FX** : one-way flow control valves with meter-in control (referred to the hydraulic actuator)
- ③ **(AB)** : service lines where the control(s) operate(s); see also functional symbols 2
 AB : controls on A and B. Fluid flows unrestricted from A1 → A and B1 → B and flow is controlled from A → A1 and B → B1.
 A : flow is controlled from A → A1; free on B.
 B : flow is controlled from B → B1; free on A.
- ④ flow control characteristics for A → A1 e B → B1 (see also 6) and check valve opening pressure (Pm) for flow A1 → A and B1 → B
 - : standard control and Pm approx 0.04 MPa (0.4 bar)
 V : fine control
 4 : Pm approx 0.4 MPa (4 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves.

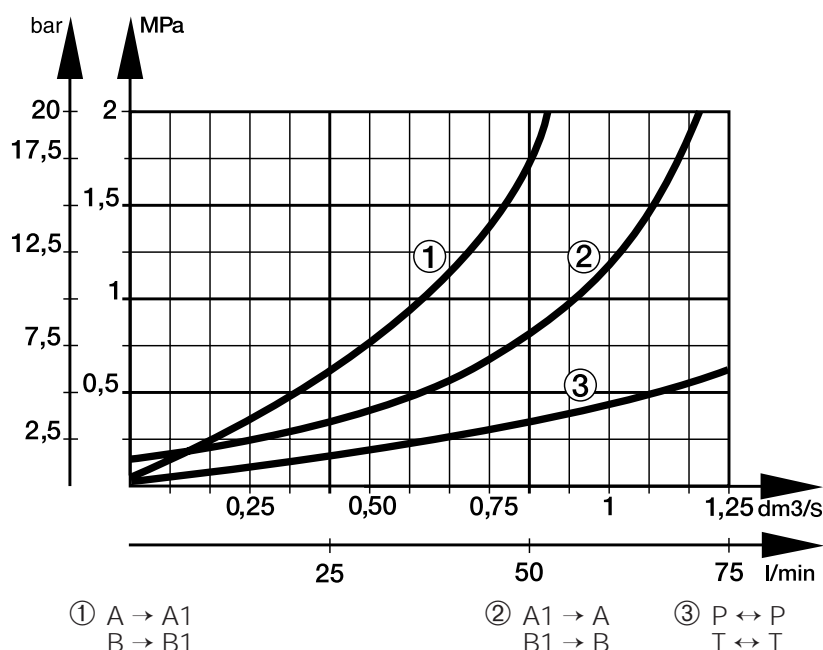
3 DESCRIPTION

Fluid flows freely on P and T lines; on service lines A and/or B with controls, fluid flows from A1 → A (and/or B1 → B) overcoming the force of spring ⑤ acting on sleeve ②; fluid flows from A → A1 (and/or B → B1) through orifices of sleeve ② which is pushed against its seat; the throttling axis ④ which is shifted by screwing it and locked by its nut ③, partially obstructs the control orifices, thus making the flow rate entirely dependent upon the available pressure drop.

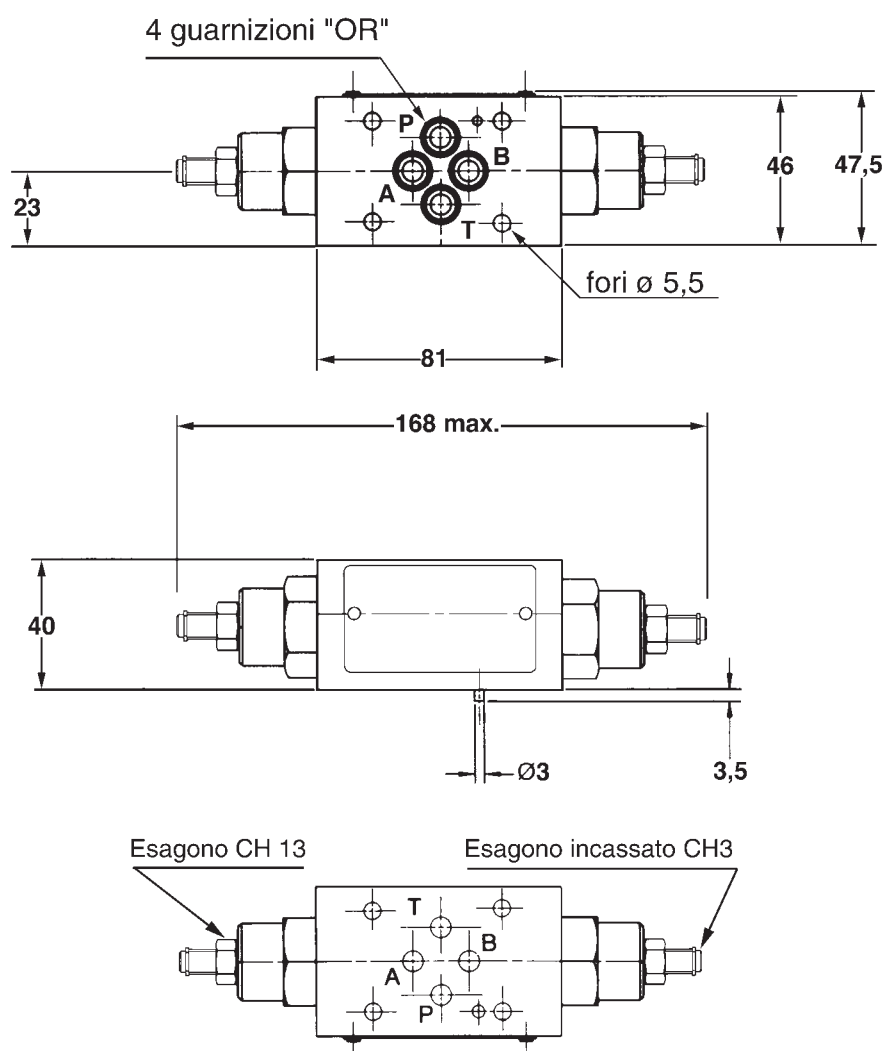


4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM3 - FX - AB in standard configuration, with mineral oil at 36 cSt and at 50° C with throttling axis at full retraction.



7 INSTALLATION DIMENSIONS



All dimensions are mm

5 DATA AND OPERATING LIMITS

maximum rec. flow rate	1 dm³/s (60 l/min)
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
adjustment	see 6
dimensions	see 7
installation	see 8
mass	approx 1,2 kg

6 CONTROL OF THE FLOW

The control is made by throttling from A → A1 (and/or B → B1), through variable orifices.

Depending on the various sleeve/axis combination, the control adjustment is:

- (standard) : orifices area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw.

V (fine) : from 100% (**) to 0% with 5 complete turns of the adjustment screw.

(*) 100% approx Q=1 dm³/s (60 l/min) at $\Delta P=2$ MPa (20 bar)

(**) 100% approx Q=0.5 dm³/s (30 l/min) at $\Delta P=2$ MPa (20 bar)

The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clockwise the adjustment screw.

Suitable mechanical stops prevent dangerous manoeuvring.

8 INSTALLATION

All stackable valves AM3 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (40 mm). Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of OR type.

All valves have on their "mounting" surface a Ø 4 mm cylindrical hole and are equipped on their "seals" surface by a Ø 3 mm locating pin, to conform with the norms.

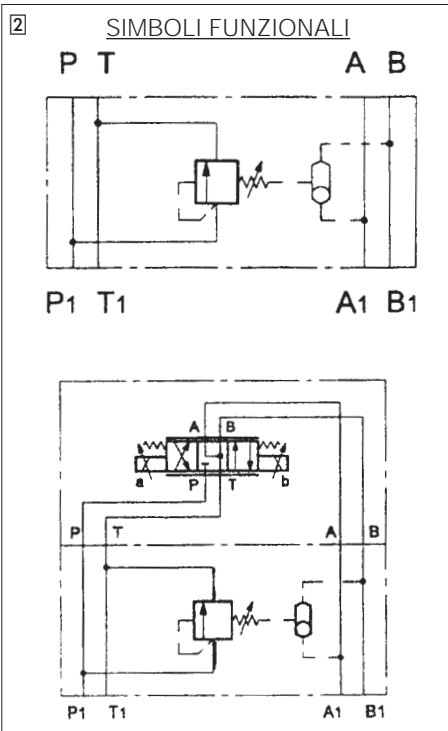
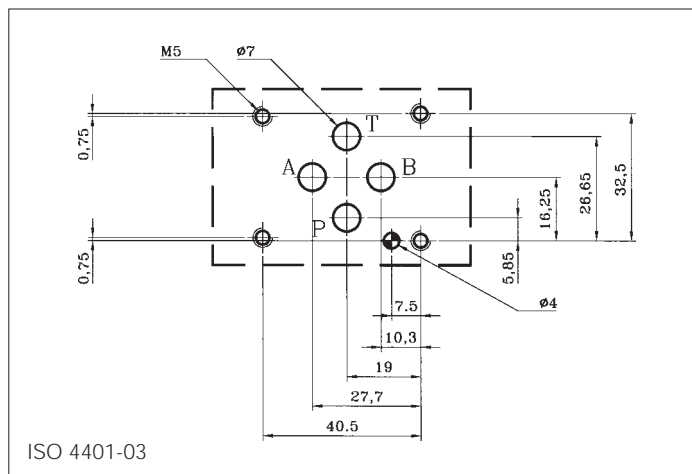
In case of necessity, the pin can be easily removed.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM3 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

VALVOLE MODULARI CETOP 03 COMPENSATORE DI PRESSIONE A 3 VIE CON FUNZIONE LOAD SENSING TIPO AM3 - LS-P3



1 LETTURA DEL CODICE DI DESIGNAZIONE DELLE VALVOLE AM3-LS-P3

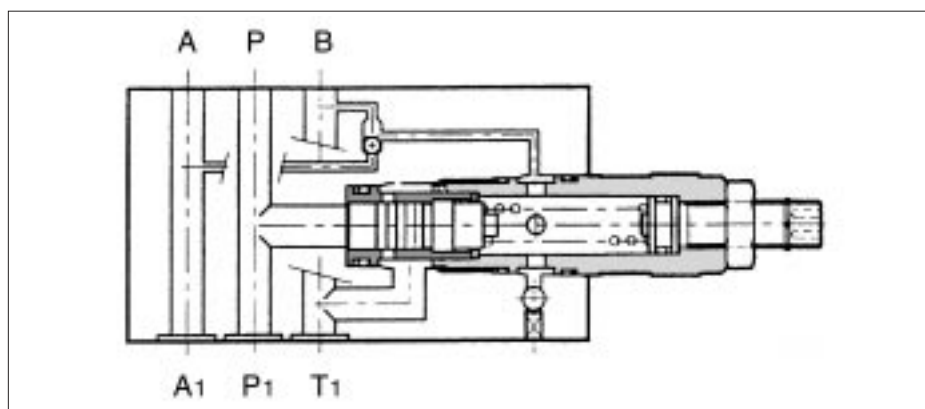
AM3 - LS - P 3 / ** / 10
① ② ③ ④ ⑤ ⑥

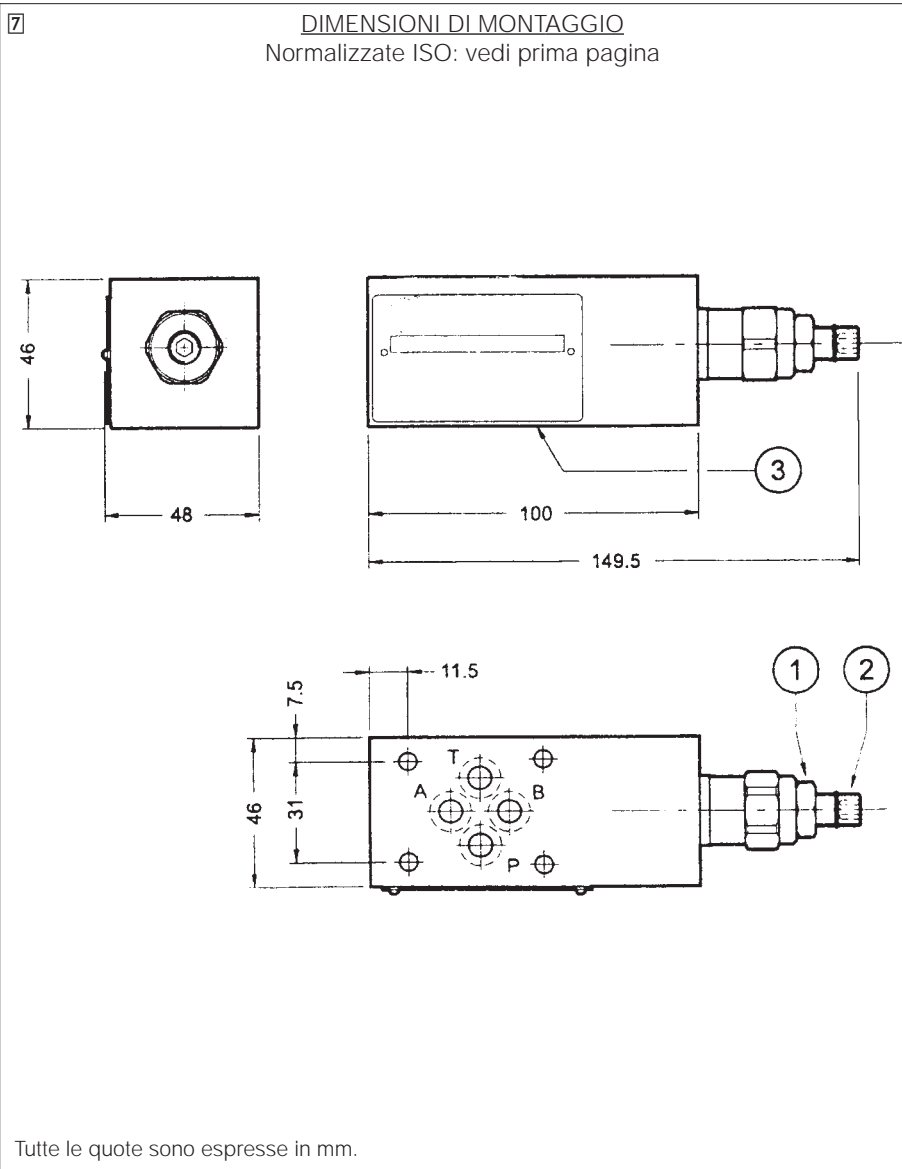
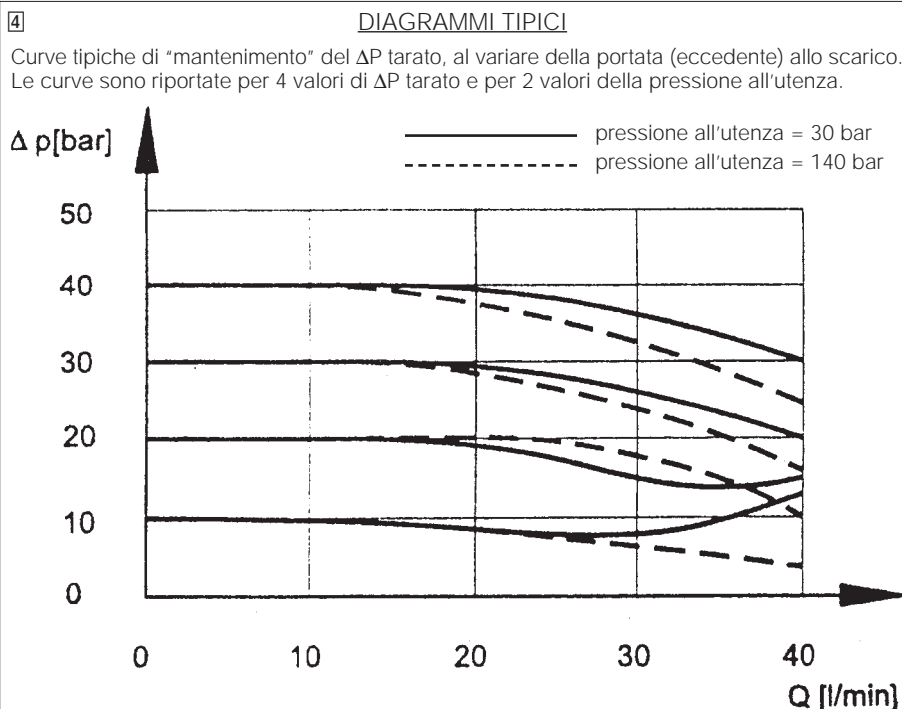
- ① AM3 : valvola modulare CETOP 03 - Pressione 32 MPa (320 bar)
- ② LS : compensatore con funzione "Load-sensing", con ΔP regolabile, vedi anche ⑥
- ③ P : linea su cui agisce il controllo - vedi anche simboli funzionali ②
- ④ 3 : compensatore a 3 vie con scarico in T della portata in eccesso
- ⑤ ** : posizione riservata per eventuali varianti speciali (guarnizioni, materiali, trattamenti superficiali, ecc.....).
V= volantino di regolazione
- ⑥ 10 : numero di disegno (progressivo) della valvola.

3 FUNZIONAMENTO

La valvola è un compensatore di pressione a tre vie, ad azione diretta, realizzato in versione modulare con superficie di attacco rispondente alle norme CETOP e ISO. Svolge la funzione di mantenere costante la caduta di pressione (Δp caratteristico) tra la via P e alternativamente le vie A e B. Viene normalmente utilizzato in abbinamento alle valvole direzionali a comando proporzionale in modo da realizzare controlli di portata indipendenti dalle variazioni di pressione.

La selezione della pressione di pilotaggio sulle vie A e B viene eseguita automaticamente mediante una valvola di ritegno bistabile incorporata nel compensatore.





5 CARATTERISTICHE E PRESTAZIONI

Portata massima raccomandata	0,66dm ³ /s (40 l/min)
Pressione massima nominale	32 MPa (320 bar)
Regolazione	vedi 4
Taratura ΔP	regolabile da 0,5 a 4 Mpa (da 5 a 40 bar) vedi 6
Dimensioni	vedi 7
Installazione	vedi 8
Massa:	circa 1,45 kg

6 TARATURA DEL ΔP

La taratura del ΔP efficace della valvola AM3-LS-P3 è operazione fondamentale per determinare la gamma di portate all'utenza. Aumentando il ΔP infatti aumenta, secondo una legge non lineare, il valore delle portate compensate che passano attraverso l'organo regolante (strozzatore a luce variabile) e questo indipendentemente dalla pressione di funzionamento del sistema.

Ad esempio in un sistema quale quello illustrato in **2**, composto da AM3-LS-P3 più valvola proporzionale HD3-PS-3RC-xx (vedi tabella HD-320), con ΔP utile alla valvola di 1MPa (10 bar) la portata all'attuatore varierà tra 0 e circa 16 l/min, con ΔP utile di 3MPa (30 bar) la portata all'attuatore varierà tra 0 e circa 28 l/min (sempre indipendentemente dal valore della pressione di funzionamento del sistema). È quindi essenziale, per ottimizzare il funzionamento del sistema, regolare il ΔP del compensatore. Tale operazione avviene agendo con CH5mm sul perno di regolazione **2**, dopo aver allentato il dado di bloccaggio **1** a CH17mm: si consiglia di liberare completamente la molla girando in senso antiorario, fino al fermo meccanico, il perno **2** che è filettato a passo 1,25mm. Dopodichè avvitando, in senso orario, si ottiene:

$\Delta P = 0,4$ MPa (4 bar)	corsa 2,5 mm* (2 giri)
$\Delta P = 1,2$ MPa (12 bar)	corsa 3,75mm* (3 giri)
$\Delta P = 2,1$ MPa (21 bar)	corsa 5 mm* (4 giri)
$\Delta P = 3$ MPa (30 bar)	corsa 6,25mm* (5 giri)
$\Delta P = 3,9$ MPa (39 bar)	corsa 7,5 mm* (6 giri)

* compresa una corsa "morta" iniziale di circa 2mm (1,5 giri)

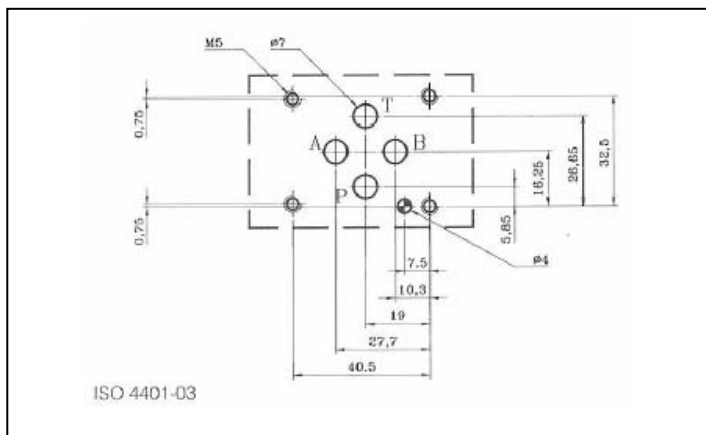
Effettuata la taratura desiderata, serrare il dado di bloccaggio **1** con CH17mm.

8 INSTALLAZIONE

Le valvole AM3-LS-P3* sono conformi a quanto prescritto delle norme ISO e CETOP per superfici di montaggio (vedi anche prima pagina) Altezza di impilaggio 46 mm.

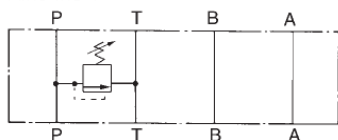
La tenuta tra valvola e superficie di montaggio è assicurata da 4 guarnizioni tipo OR 2037.

ГИДРОЗАМКИ МОДУЛЬНОГО МОНТАЖА СЕТОР 3, ПРЕДОХРАНИТЕЛЬНЫЕ КЛАПАНА ТИПА АМ3-МО-*

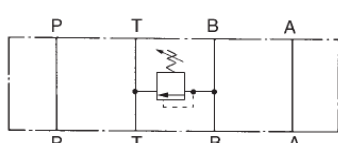


2 УСЛОВНЫЕ ГРАФИЧЕСКИЕ ОБОЗНАЧЕНИЯ

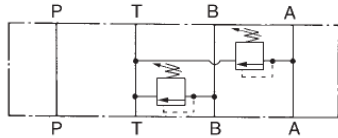
AM3-MO-P



AM3-MO-B



AM3-MO-BA



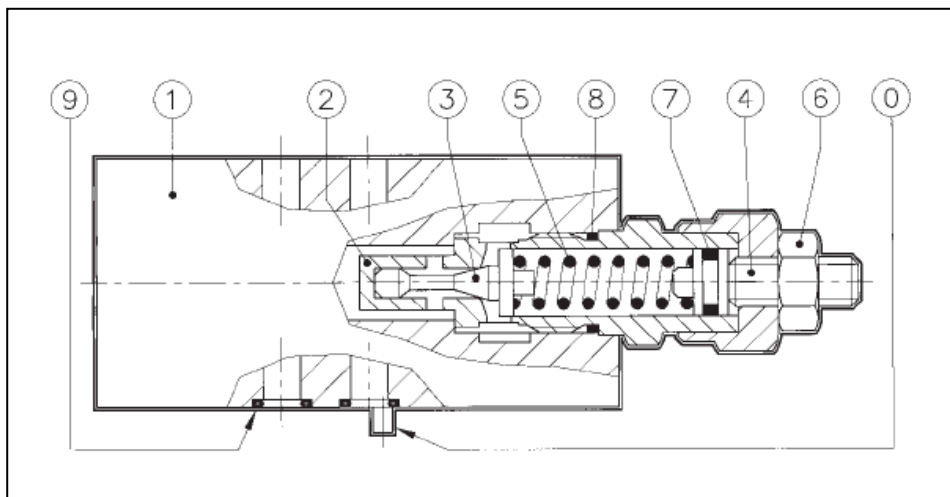
1 РАСШИФРОВКА УСЛОВНЫХ ОБОЗНАЧЕНИЙ ДЛЯ АМ3-МО-*

АМ3 - МО - (P) / (20) - (10) - ** / 10
 ① ② ③ ④ ④а ⑤ ⑥

- ① **АМ3** : гидрозамок исполнение СЕТОР 03 - на давление 32 МПа (320 бар).
- ② **МО** : предохранительные клапана, прямого действия.
- ③ **(P)** : линии по которым осуществляется измерение (см. также условные графические обозначения 2).
 P : макс => P в T.
 B : макс => B в T.
 BA : макс => A-B в T.
- ④ **(20)** : калибровка давления
 10 : 2,5 до 12,5 МПа (25 до 125 бар)
 20 : 4 до 25 МПа (40 до 250 бар)
 32 : 10 до 32 МПа (100 до 320 бар)
- ④а **(10)** : регулировка давления на А (только для моделей АМ3-МО-ВА) см. ④.
- ⑤ ****** : код зарезервирован для специальных вариантов (материалы, уплотнения, обработка поверхности и т. д.).
- ⑥ **10** : конструкторский номер (по нарастающей).

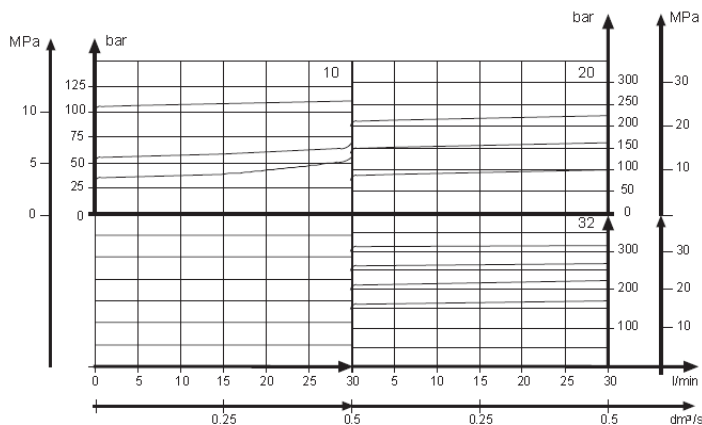
3 ОПИСАНИЕ

Гидравлическая жидкость проходит свободно в каналах А, В, Р и Т; когда на линии на которой действует предохранительный клапан давление поднимается больше чем значение на котором был калиброван клапан, поршень ③ получает от давления толчок преодолевая пружину ⑤ становится на своем месте ② и открывает проход к Т, сохраняя ограниченное давление на требуемом значении.



4 ТИПОВЫЕ ХАРАКТЕРИСТИКИ

Расходно-перепадные характеристики Δp -Q клапана AM3-МО, в стандартной конфигурации для систем, работающих на гидравлической жидкости при $v = 36 \text{ мм}^2/\text{с}$ при температуре $t = 50^\circ \text{C}$.



5 ОСНОВНЫЕ ТЕХНИЧЕСКИЕ ХАРАКТЕРИСТИКИ

Максимальный рекомендуемый расход:

- в свободных линиях 1 дм³/с (60 л/мин)
- в контрол. линиях 0,5 дм³/с (30 л/мин)

Максимальное номинальное давление

32 МПа (320 бар)

Потеря давления

см. 4

Регулировка

см. 6

Размеры

см. 7

Установка

см. 8

Массы

AM3-МО-Р или В

примерно 1.7 кг

AM3-МО-ВА

примерно 2.3 кг

6 КАЛИБРОВКА ДАВЛЕНИЯ

Давление слива устанавливается от толчка пружины ⑤ на поршень ③.

Значение давления может быть изменена в пределах выбранного значения калибровки, изменяя степень сжатия (длину) пружины ⑤.

Для увеличения давления, поверните по часовой стрелке регулировочный винт ④, только после разблокировки гайки ⑥.

Для регулировки давления см. 1 ④, градиент калибровки является примерно:

- 10 : 1,6 МПа/мм (24 бар/оборот)
- 20 : 3,2 МПа/мм (48 бар/оборот)
- 32 : 5 МПа/мм (75 бар/оборот)

Свинчивая поднимается давление.

После достигнутого значения давления (калибровки), следует воспользоваться контрагайкой ⑥.

8 УСТАНОВКА

Все гидрозамки AM3 – CP – * соответствуют стандартам ISO и CETOP по размерам стыковой поверхности и высоте (40 мм).

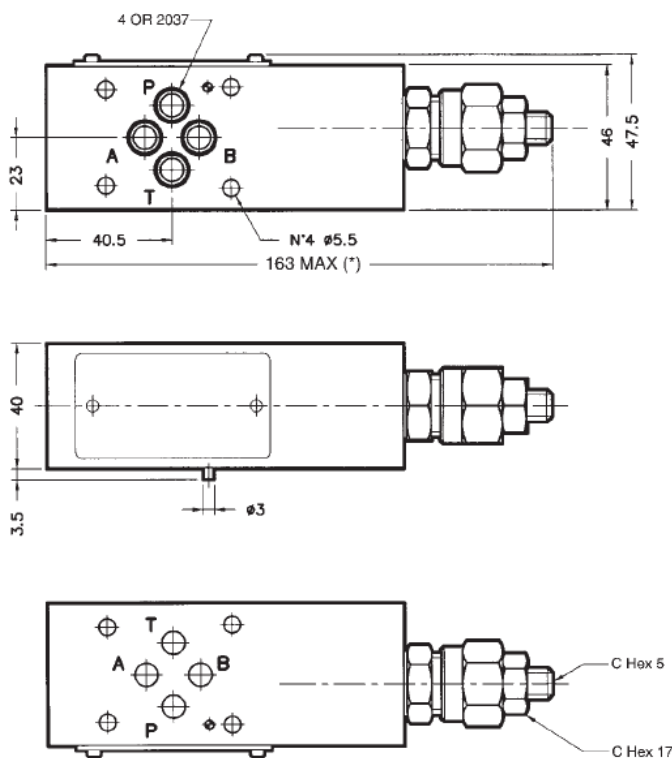
Чтобы предотвратить утечку между гидрораспределителем и монтажной плитой, устанавливаются 4 уплотнения типа OR.

Все гидрозамки на их «монтаж» поверхности имеют цилиндрическое отверстие Ø 4 мм и имеет установочный цилиндр Ø 3 мм, который в случае необходимости может быть легко удален.

9 ГИДРАВЛИЧЕСКАЯ ЖИДКОСТЬ

Уплотнения и материалы, используемые при изготовлении стандартных гидрозамков AM3-* полностью совместимы с гидравлическими жидкостями на основе минеральных масел с противопенными и противоокислительными присадками. Гидравлическая жидкость должна соответствовать классу чистоты 19/17/14 по ISO 4406, или выше. Рекомендованная вязкость жидкости составляет от 10 до 60 сСт.

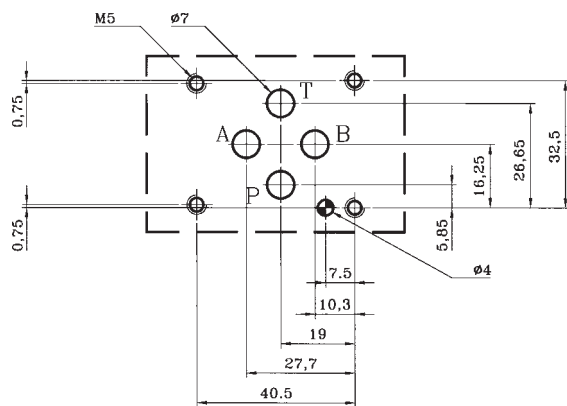
7 ПРИВЯЗОЧНЫЕ РАЗМЕРЫ



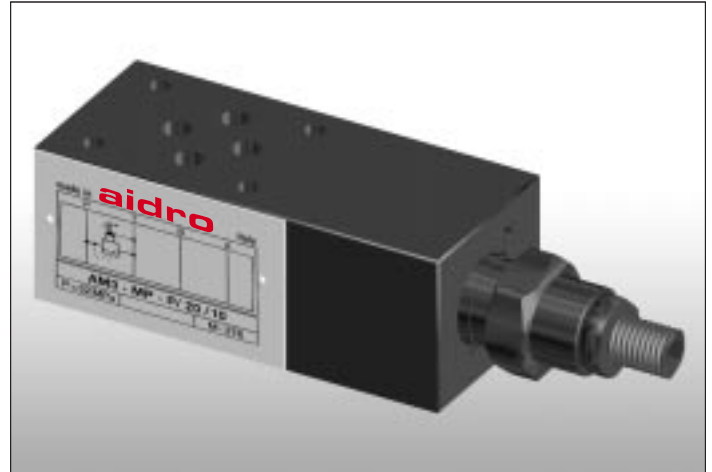
Все размеры в мм

(*) Для AM3-МО-ВА: 216 макс.

Stackable valves cetop 03 pressure relief valves type AM3-MP-*

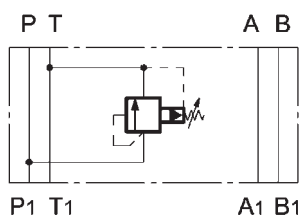


ISO 4401-03

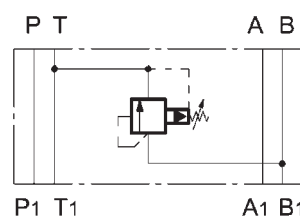


2 FUNCTIONAL SYMBOLS

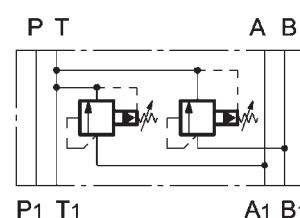
AM3-MP-P



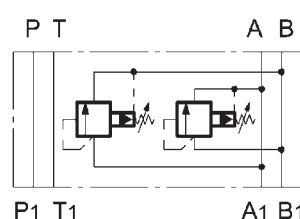
AM3-MP-B



AM3-MP-BA



AM3-MP-AB

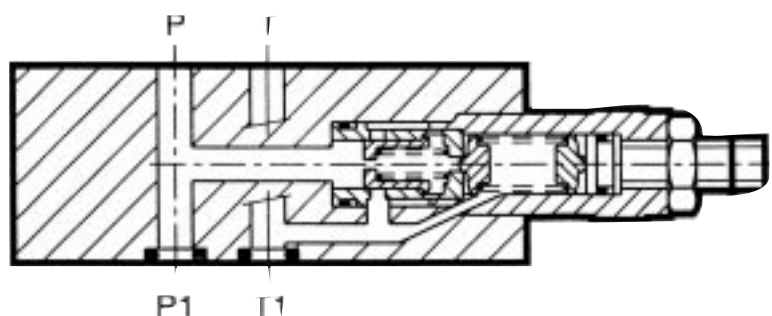


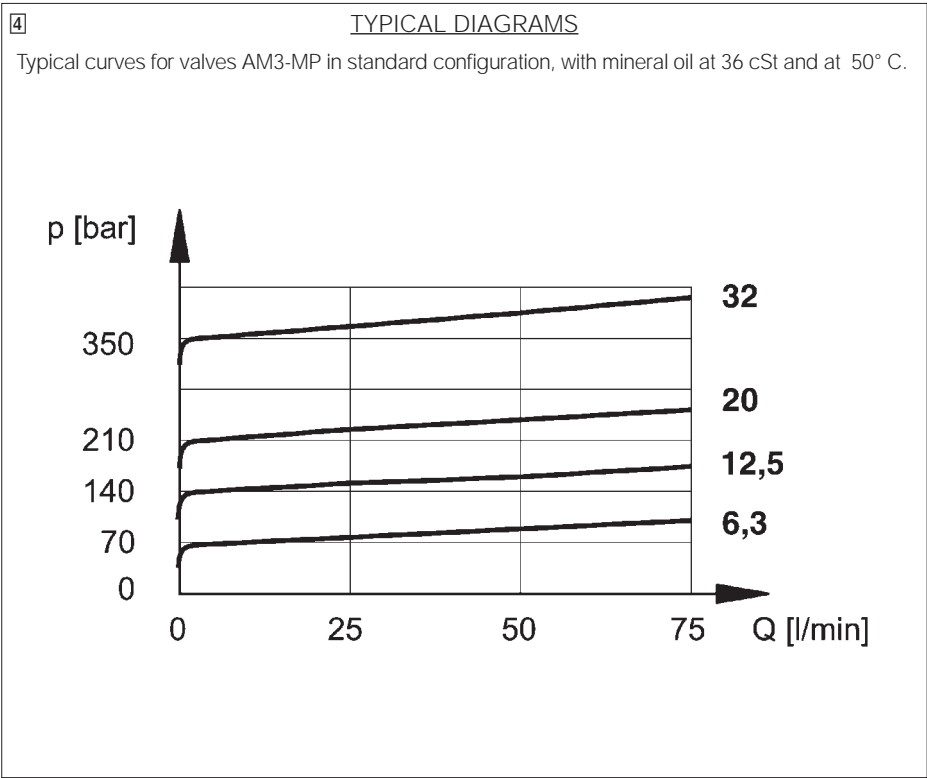
1 HOW TO READ THE MODEL CODE FOR VALVES AM3-MP-*

AM3 - MP - (P) / (20) - (32) - ** / 10

① ② ③ ④ ④a ⑤ ⑥

- ① AM3 : stackable valve Cetop 03 - Pressure 32 MPa (320 bar)
- ② MP : pressure relief - pilot operated
- ③ (P) : service lines where the control(s) operate(s); see also functional symbols 2
 P : relief on P and discharge to T
 B : relief on B and discharge to T
 BA : independent relief on B and on A and discharge to T
 AB : relief on A and B with crossed discharge
- ④ (20) : pressure adjustment ranges:
 6,3 : from 1 to 7 MPa (from 10 to 70 bar)
 12,5 : from 1 to 14 MPa (from 10 to 140 bar)
 20 : from 2 to 21 MPa (from 20 to 210 bar)
 32 : from 2 to 32 MPa (from 20 to 320 bar)
- ④a (32) : pressure adjustment range for relief on A
 (only for models AM3-MP-BA) or for relief on B for models AM5-MP-AB
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.....).
- ⑥ design number (progressive) on the valves.





5 DATA AND OPERATING LIMITS

maximum rec. flow rate	1 dm³/s (60 l/min)
maximum nominal pressure	32 MPa (320 bar)
pressure relief curves	see 4
pressure adjustment	see 6
dimensions	see 7
installation	see 8
mass:	
AM3-MP-P	approx 1,7 kg
AM3-MP-BA	approx 2,3 kg

6 ADJUSTEMENT OF THE RELIEF PRESSURE

Relief pressure is reached when the axial hydraulic forces on piston equal the force of spring; the value of the relief pressure can be therefore changed, within the limits of the chosen adjustment range, by changing the compression of spring . To increase the relief pressure, turn clock wise the adjustment screw CH5, after having unlocked ist nut CH17 mm.

For each pressure adjustment range - see **1** **4** - the pressure gradient is approx:

6,3 :	2 MPa/turn (20 bar/turn)
12,5 :	4 MPa/turn (40 bar/turn)
20 :	6,3 MPa/turn (63 bar/turn)
32 :	10 MPa/turn (100 bar/turn)

When the required level of pressure is reached, lock the nut CH17.

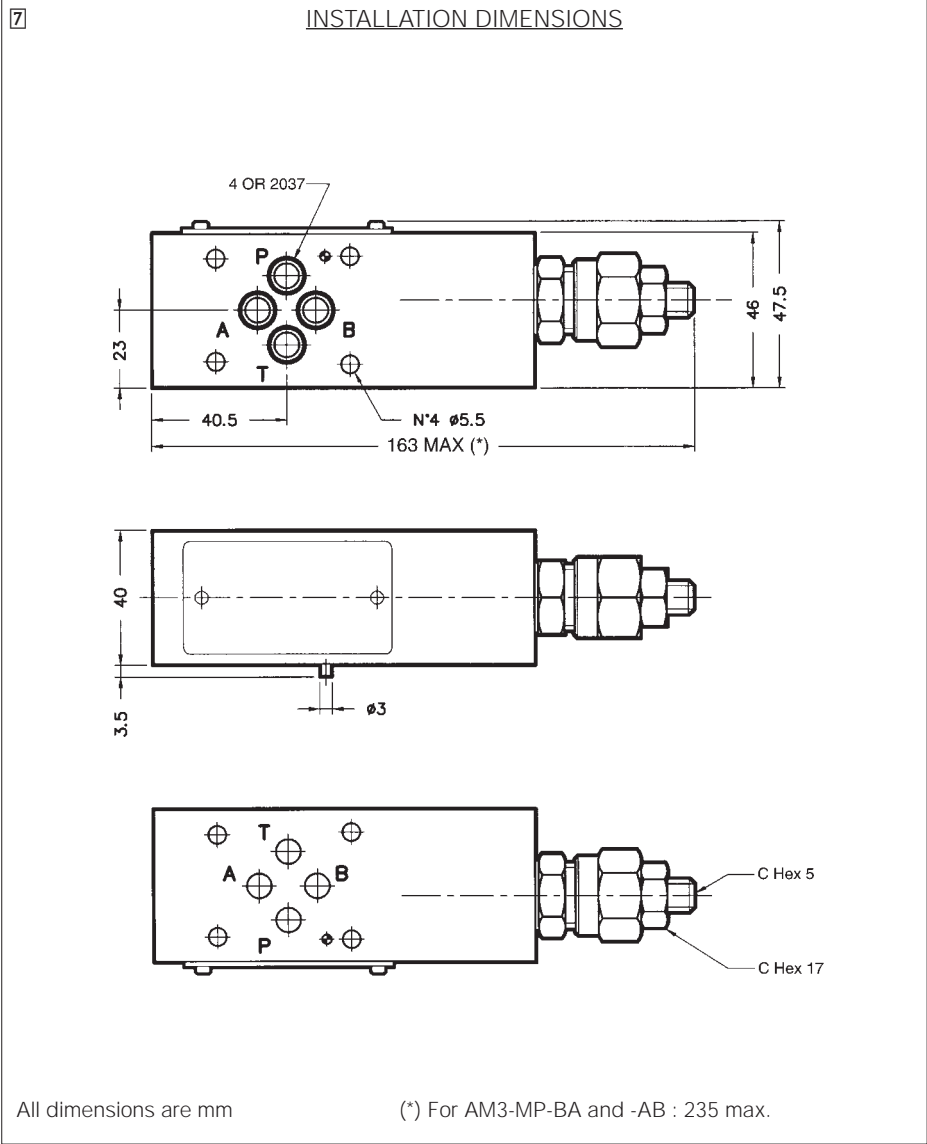
8 INSTALLATION

All stackable valves AM3 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (40 mm).

Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals type OR 2037.

9 HYDRAULIC FLUIDS

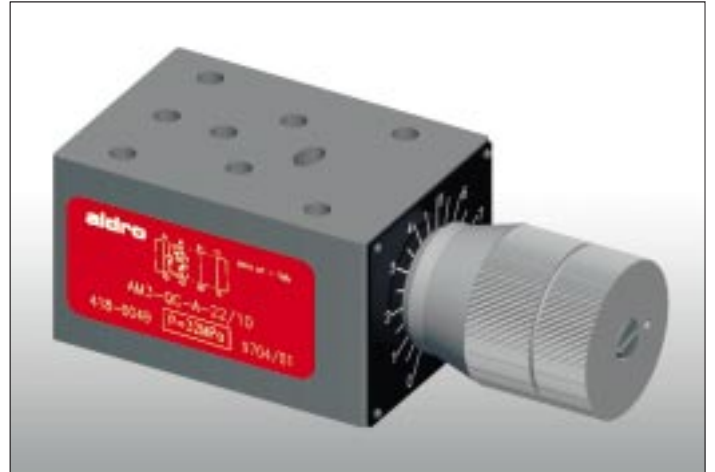
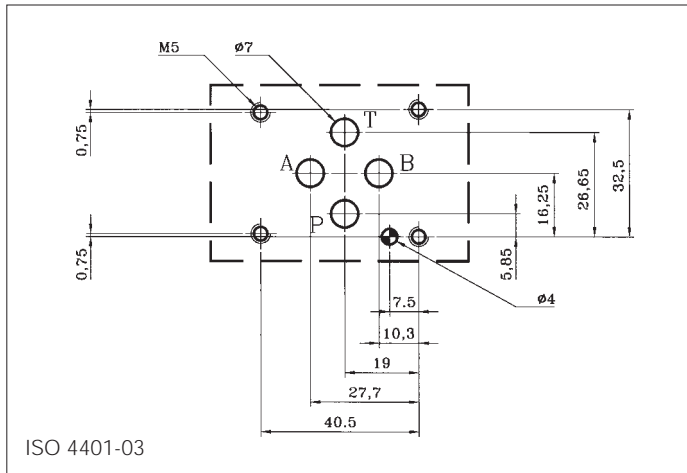
Seals and materials used on standard valves AM3 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents. The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.



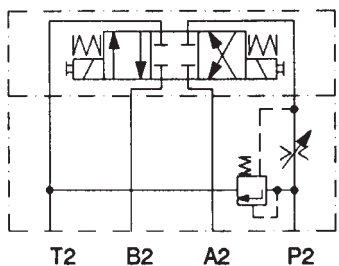
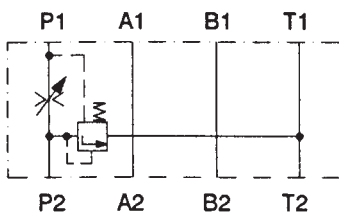
STACKABLE VALVES CETOP 03

FLOW CONTROL VALVES PRESSURE COMPENSATED

TYPE AM3 - Q3 - P



2 FUNCTIONAL SYMBOLS



1 HOW TO READ THE MODEL CODE FOR VALVES AM3-Q3-P

AM3 - Q3 - P / 16 - ** / 10

① ② ③ ④ ⑤ ⑥

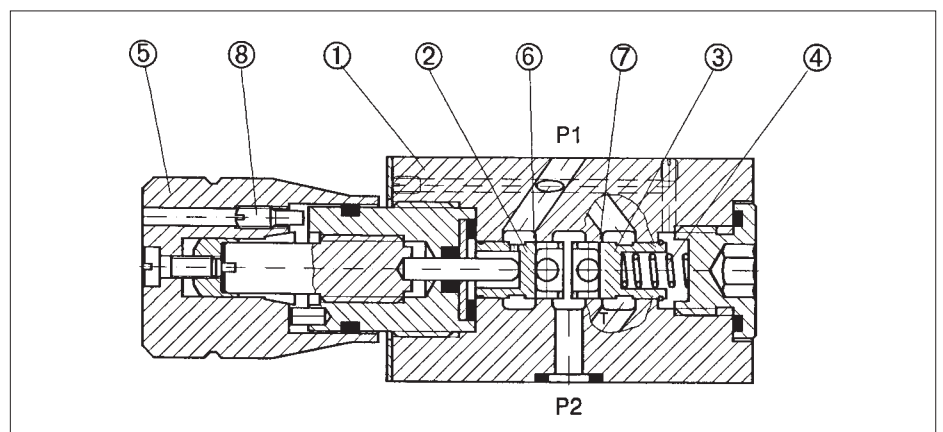
- ① AM3 : stackable valve Cetop 03 - Pressure 32 MPa (320 bar)
- ② Q3 : 3-way pressure compensated flow control valves
- ③ P : service line where the control operate; see also functional symbols 2
- ④ 16 : Flow control characteristics:
16 = 0,06 → 16 l/min max regulated flow control rate to P1.
When the inlet flow (at P2) is more than the regulated value, the excess is discharged at T line.
- ⑤ ** : code reserved for special variants (materials, seals, surface treatments, etc..)
- ⑥ 10 : design number (progressive) of the valves.

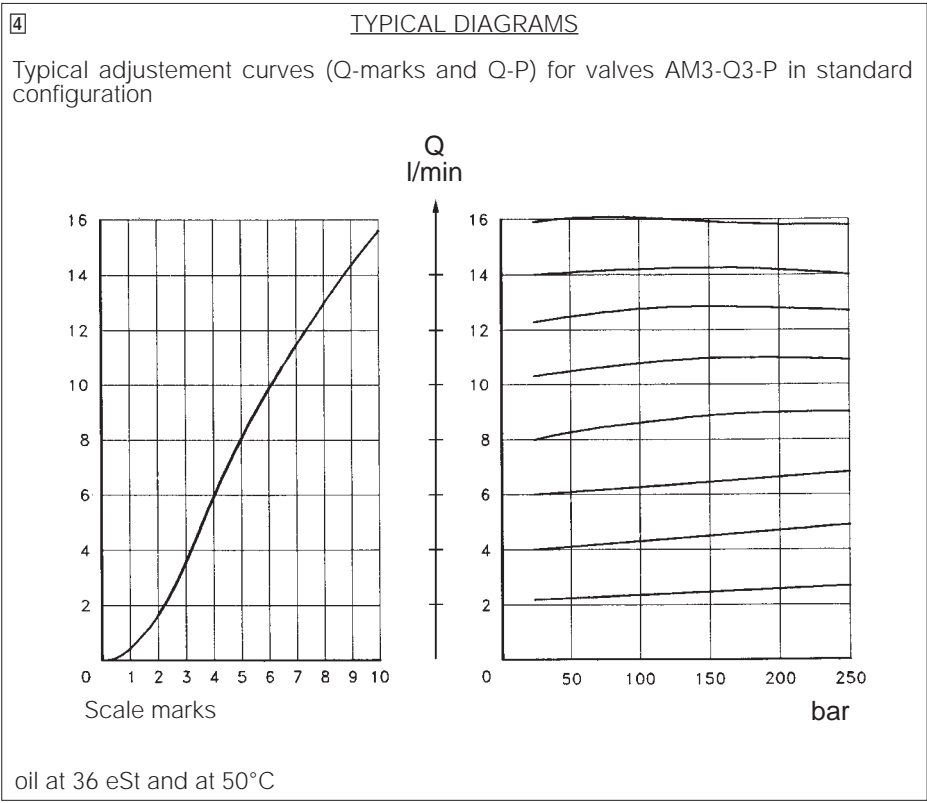
3 DESCRIPTION

3-way pressure compensated flow control valves are designed to provide adjustable controlled flow rates independent of changes in system pressure.

The flows control valve consists basically of housing ① throttling spool ②, pressure compensator ③, spring ④ and hand knob ⑤ with adjusting mechanism.

Fluid from port P2 is divided into two parts; one part passes through orifice area ⑥ of the throttling spool and onwards to port P1, the other part proceeds through orifice area ⑦ of the compensator to port T.

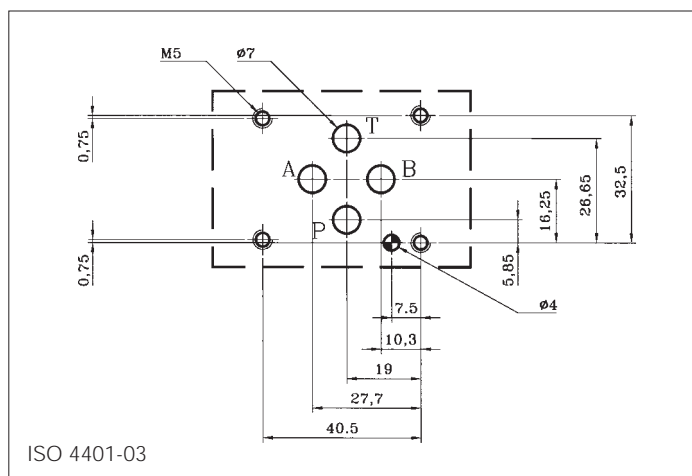




STACKABLE VALVES CETOP 03

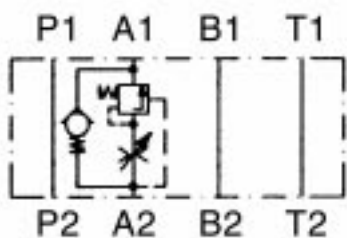
FLOW CONTROL VALVES PRESSURE COMPENSATED

TYPE AM3 - Q* - A

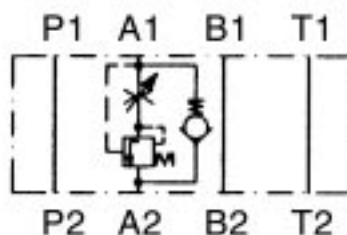


2 SIMBOLI FUNZIONALI

AM3-QC-A



AM3-QX-A



1 HOW TO READ THE MODEL CODE FOR VALVES AM3-Q*-A

AM3 - (Q C) - (A) / (1 2) - ** / 1 0

- ① AM3 : stackable valve Cetop 03 - Pressure 32 MPa (320 bar)
- ② (Q C) : one-way pressure compensated flow control valves with meter-out control (referred to the hydraulic actuator)
(Q X) : as above, with meter-in control
- ③ A : service line where the control operate; see also functional symbols 2
- ④ (12) : range of regulated flow: 06 = 0 → 6 l/min;
12 = 0 → 12 l/min;
22 = 0 → 22 l/min;
- ⑤ ** : code reserved for special variants
- ⑥ 10 : design number (progressive) of the valves.

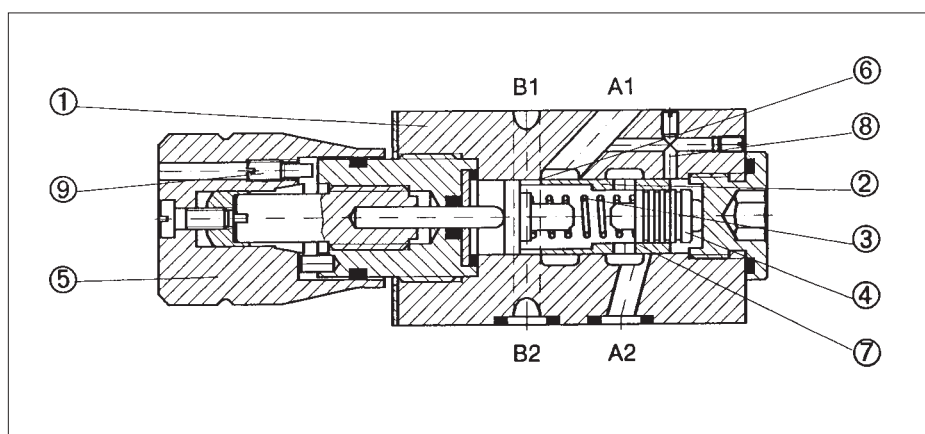
3 DESCRIPTION

Pressure compensated flow control valves are designed to provide adjustable controlled flow independent of changes of pressure.

2-way valves are used in meter-in, meter-out bleed-off applications.

The flow control valve consists basically of housing ① throttling spool ②, spring ③, pressure compensator ④ and a hand knob ⑤ with adjusting mechanism.

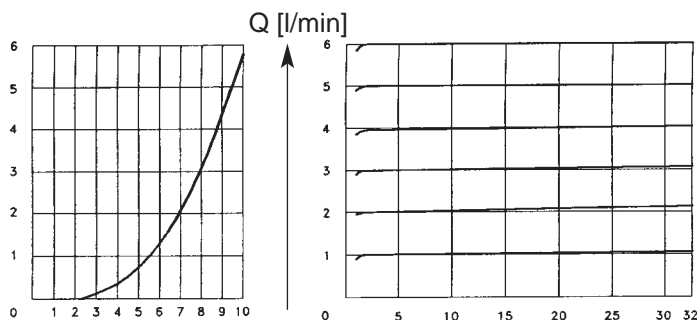
Fluid from port A1 passes through orifice area ⑥ of the throttling spool, proceeds through its internal bore to the orifice area ⑦ modulated via the metering edge of the pressure compensator ④ and onwards to port A2.



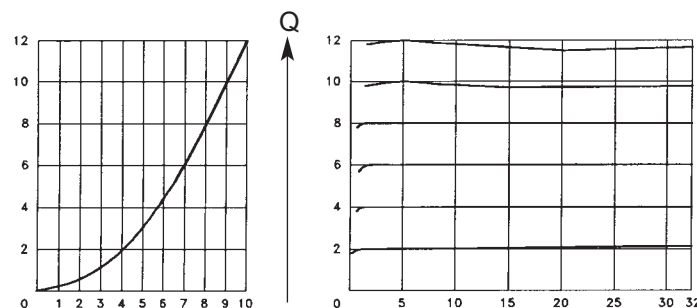
4

TYPICAL DIAGRAMS

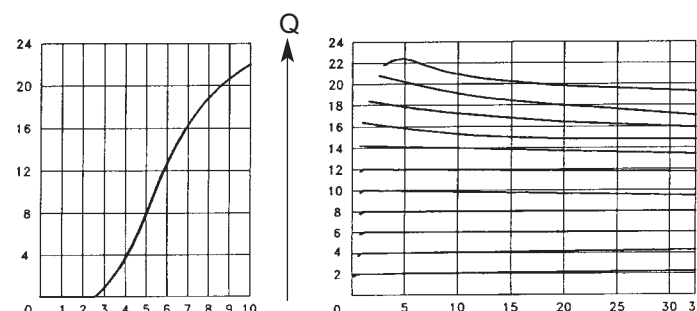
06



12



22



5 DATA AND OPERATING LIMITS

maximum rec. flow rate	40 l/min
max flow rate on A port (controlled line)	24 l/min
maximum nominal pressure	32 MPa (320 bar)
flow curves	see 4
adjustment	see 6
dimensions	see 7
installation	see 8
mass	approx 0,8 kg

6 CONTROL OF THE FLOW

By turning the knob 5, the value of the regulated flow changes.

For each range of flow (0 → 6,0 → 12,0 → 22 l/min) the scale/flow characteristics is approx linear (see 4) and the full range is covered by turning the knob by approx 320°.

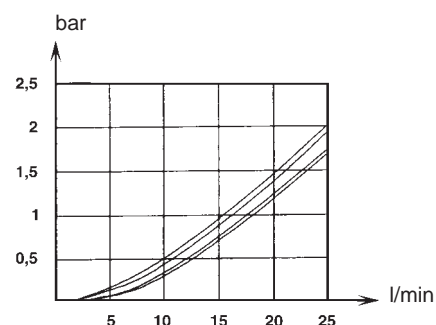
The scale is divided in 10 marks.

Clockwise: flow increases

Anticlockwise: flow decreases

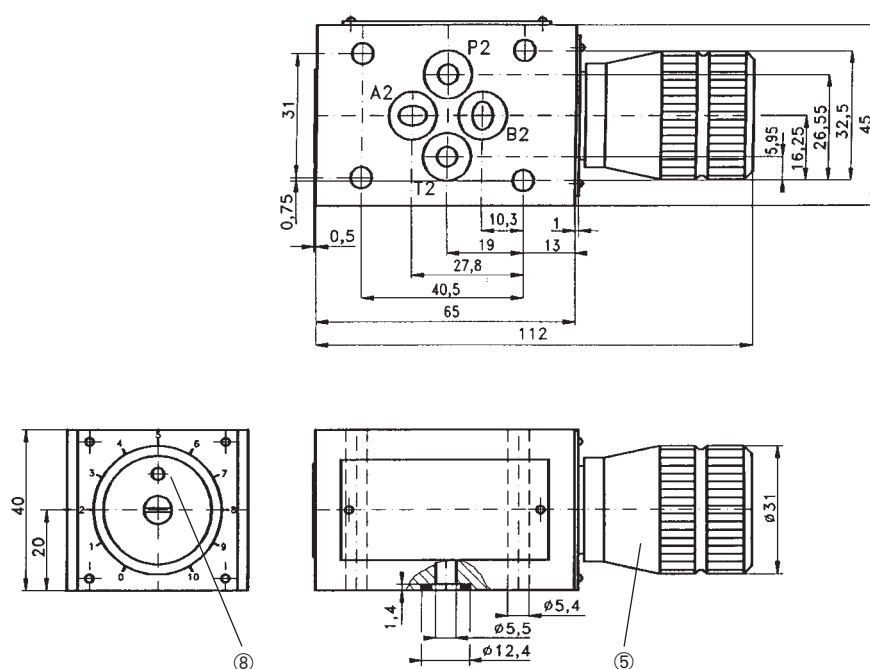
When the required value is reached, set the knob position by fixing screw 8.

Δp-Q characteristics
Pressure drops for reverse flow



7

INSTALLATION DIMENSIONS



All dimensions are mm

8 INSTALLATION

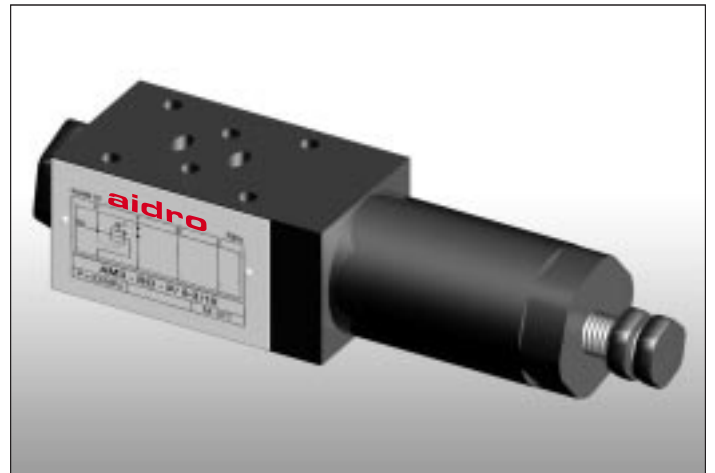
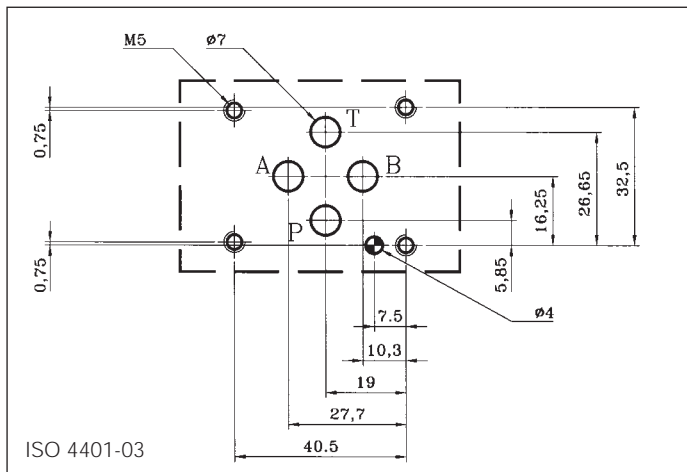
All stackable valves AM3-Q conform with ISO and CETOP specification for mounting surface dimensions (see also front page) and for valves height (40 mm). Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals type of O Ring 8 x 2 mm.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM3-* are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidant agents.

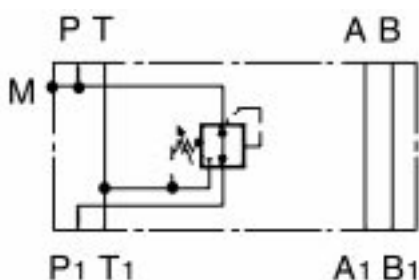
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 03 pressure reducing valves type AM3 - RO - *

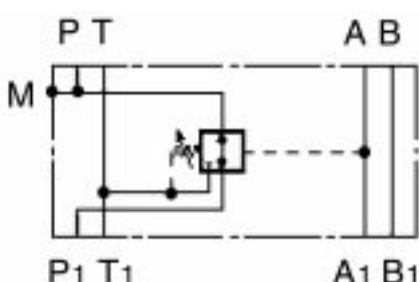


2 FUNCTIONAL SYMBOLS

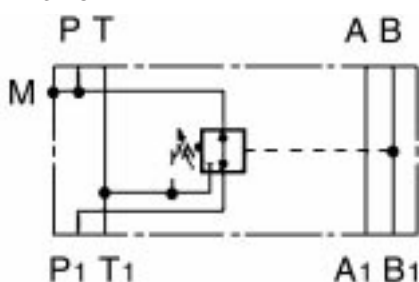
AM3-RO-P



AM3-RO-A



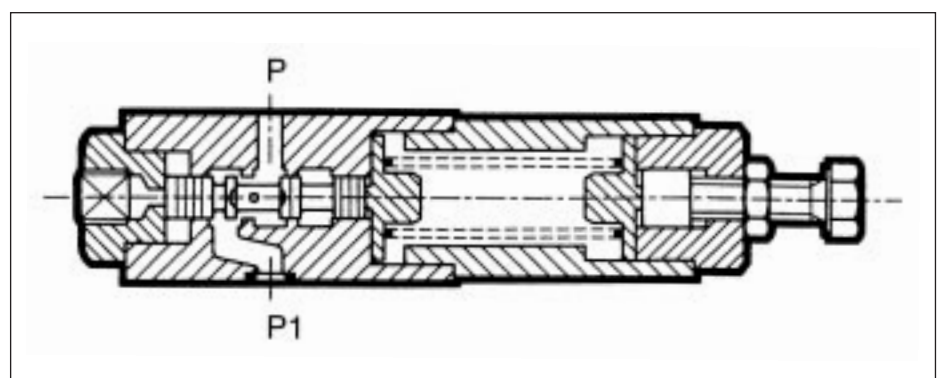
AM3-RO-B



1 HOW TO READ THE MODEL CODE FOR VALVES AM3-RO-*

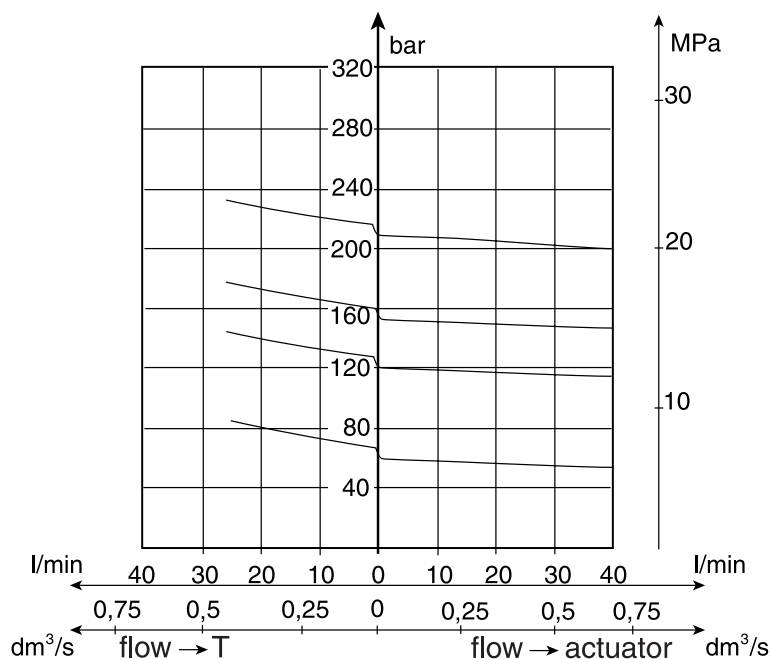
AM3 - RO - (P) / (25) - ** / 10

- ① AM3 : stackable valve Cetop 03 - Pressure 32 MPa (320 bar)
- ② RO : pressure reducing, direct operated - 3 way valve
- ③ (P) : service lines where the control operates; see also functional symbols 2
 P : control on P with 3^a way and drain to T line
 A : control on A with 3^a way and drain to T line
 B : control on B with 3^a way and drain to T line
- ④ (25) : controlled pressure adjustment ranges:
 3,2 : from 0.3 to 3,5 MPa (from 3 to 35 bar)
 6,3 : from 1 to 7 MPa (from 10 to 70 bar)
 12,5 : from 3 to 14 MPa (from 30 to 140 bar)
 25 : from 6 to 28 MPa (from 60 to 280 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.....).
 V = adjustment hand knob
- ⑥ design number (progressive) on the valves.



4 TYPICAL DIAGRAMS

Typical curves for valves AM3-RO in standard configuration, with mineral oil at 36 cSt and at 50° C.



5 DATA AND OPERATING LIMITS

maximum	
rec. flow rate	
on free lines	1 dm³/s (60 l/min)
on controlled lines	0.66 dm³/s (40 l/min)
maximum	
nominal pressure	32 MPa (320 bar)
maximum	
pressure on T	10 MPa (100 bar)
max drain	<1,2 cm³/s (0,07 l/min)
pressure curves	see 4
pressure adjustment	see 6
dimensions	see 7
masses:	
AM3-RO - *	approx 1.45 kg

6 ADJUSTEMENT OF THE PRESSURE

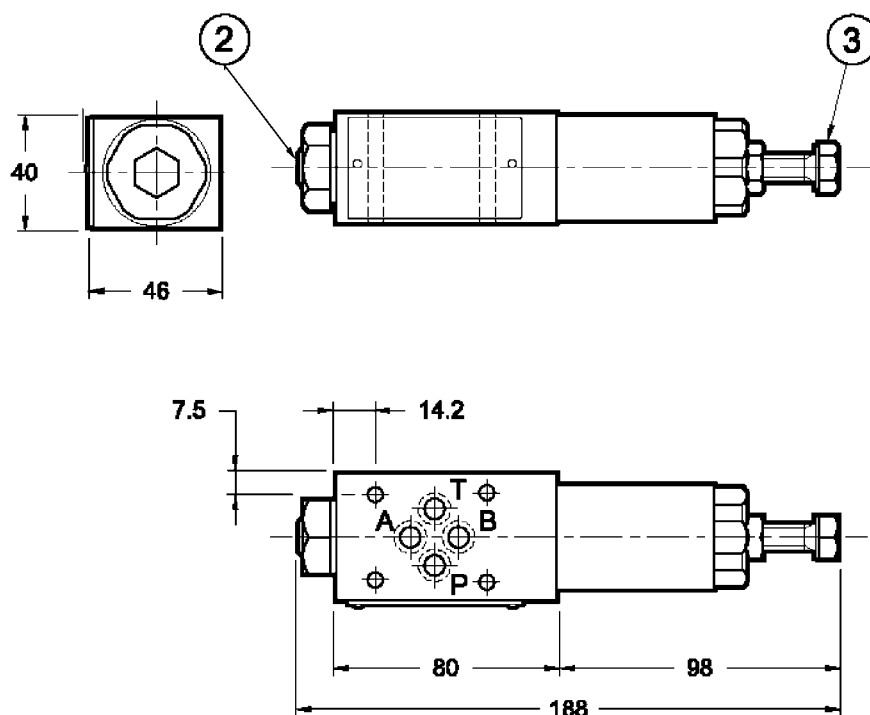
Reduced pressure is obtained by throttling the flow on spool which is balanced, on one side, by the reduced pressure and, on the other side, by the positioning spring.

The value of the reduced pressure, is changed by changing the compression of spring. To increase the value of the reduced pressure, turn clockwise the handknob or screw ③ by acting on ex. CH 17 mm, after having unlocked ist nut. When the required level of pressure is reached, lock the nut.

For each pressure adjustment range, the pressure gradient is approx:

3,2	:	0,7 MPa/turn	(7 bar/turn)
6,3	:	1,4 MPa/turn	(14 bar/turn)
12,5	:	2,5 MPa/turn	(25 bar/turn)
25	:	5 MPa/turn	(50 bar/turn)

7 INSTALLATION DIMENSIONS



All dimensions are mm

8 DESCRIPTION

All valves AM3-RO-* are 3 way, direct operated:

if the pressure in the regulated chamber overcomes the value of the adjusted, reduced pressure, the valve discharges to T (at pressure value higher than the reduced pressure - see diagrams) thus acting as safety or relief valve.

All valves type AM3-RO-* reduce pressure on port P of the solenoid valve as follows:

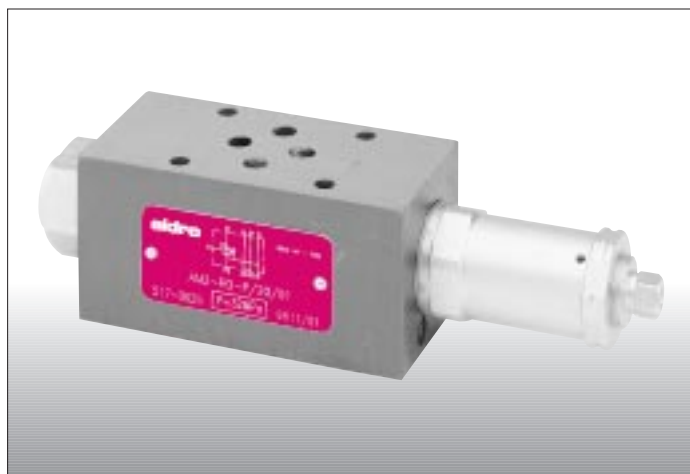
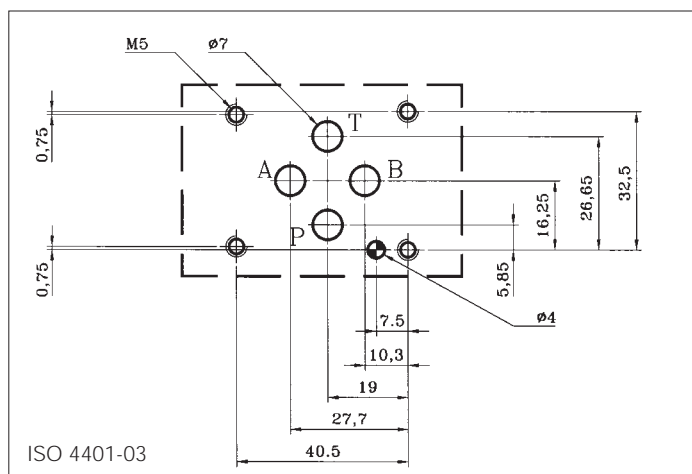
- on version P, the pilot pressure intake is on channel P and therefore the valve constantly reduces pressure at the set value
- on version A, the pilot pressure intake is on channel A and therefore the valve reduces pressure when the solenoid valve establishes the P->A and B->T connections
- on version B, the pilot pressure intake is on channel B and therefore the valve reduces pressure when the solenoid valve establishes the P->B and A->T connections.

All valves type AM3-RO-* have a 1/4" BSP manometer port ② for the direct reading of the reduced pressure value.

9 INSTALLATION

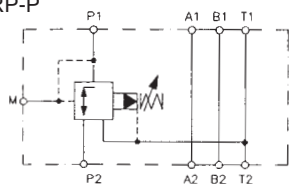
All stackable valves AM3-RO-* conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (40 mm). Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals type OR 2037.

Modular valves cetop 03 pressure reducing type AM3 - RP - *

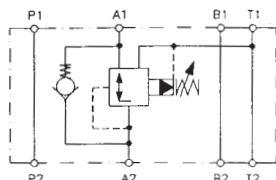


2 FUNCTIONAL SYMBOLS

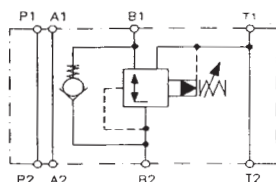
AM3-RP-P



AM3-RP-AC



AM3-RP-BC

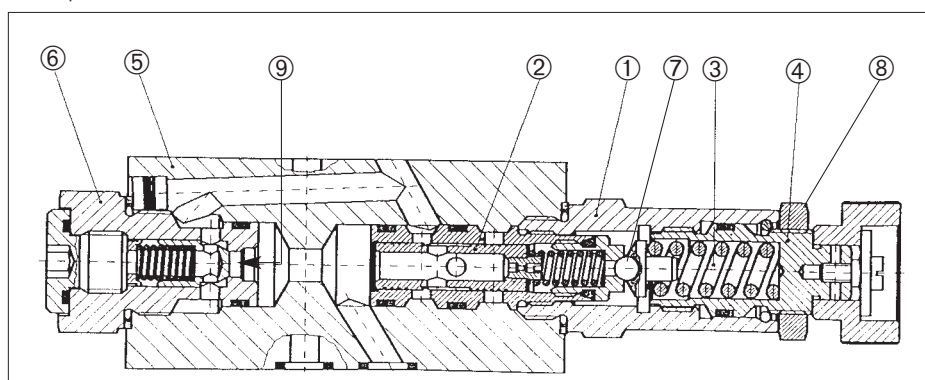


1 HOW TO READ THE MODEL CODE FOR VALVES AM3-RP-*

AM3 - RP - (P) / (20) - ** / 10

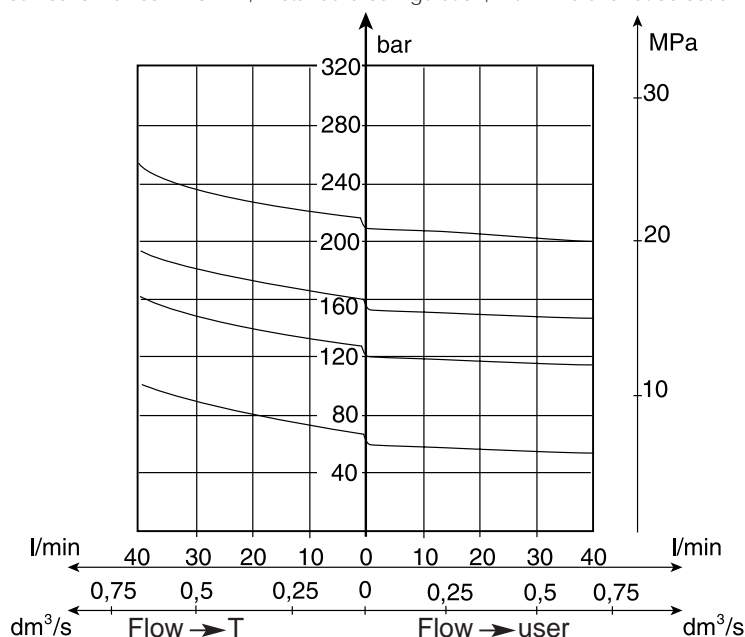
- ① AM3 : stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
- ② RP : pressure reducing, pilot operated - 3 way valve
- ③ (P) : service lines where the control operate; see also functional symbols 2
 P : control on P with 3^a way and drain to T line
 AC : control on A with check valve
 BC : control on B with check valve
- ④ (20) : controlled pressure adjustment ranges
 6.3 : from 0.5 to 7 MPa (from 5 to 70 bar)
 20 : from 1 to 21 MPa (from 10 to 210 bar)
- ⑤ Code reserved for special variants (materials, seals, surface treatments, ecc.....).
 V = adjustment hand knob
- ⑥ Design number (progressive) of the valve

Example of: AM3 - RP - AC



4 TYPICAL DIAGRAMS

Typical curves for valves AM3 - RP, in standard configuration, with mineral oil at 36 cSt and at 50° C.



5 DATA AND OPERATING LIMITS

maximum rec. flow rate	1 dm³/s (60 l/min)
on free lines	0.66 dm³/s (40 l/min)
on controlled lines	
maximum nominal pressure	32 MPa (320 bar)
maximum pressure on T	10 MPa (100 bar)
pilot flow rate	4 cm³/s (0.24 l/min)
pressure curves	see 4
pressure adjustment	see 6
dimensions	see 7
masses:	
AM3 - RP - P	approx 1.1 kg
AM3 - RP - AC	approx 1.45 kg

6 ADJUSTEMENT OF THE PRESSURE

Reduced pressure is obtained by throttling the flow on spool ② which is balanced, on one side, by the reduced pressure and, on the other side, by the positioning spring and by the pilot pressure.

Pilot pressure is established by the action of spring ③ on the pilot valve ⑦.

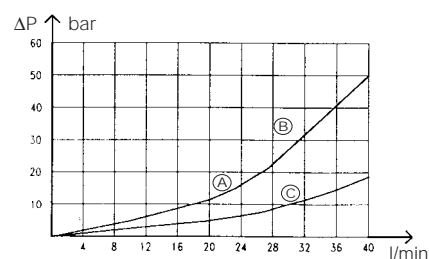
The value of the reduced pressure, is changed by changing the compression of spring ③. To increase the value of the reduced pressure, turn clockwise the handknob or screw by acting on ex.CH 10 mm, after having unlocked its nut ⑧ (CH 26 mm).

When the required pressure is reached, lock the nut ⑧.

8 DESCRIPTION

* All valves AM3-RP-* are 3 way, pilot operated: if the pressure in the regulated chamber overcomes the value of the adjusted, reduced pressure, the valve discharges to T (at pressure value higher than the reduced pressure - see diagrams) thus acting as safety or relief valve.

Valves reducing pressure on A or B lines are with integral check valve ⑥ (types AM3- RP-AC or BC) and they allow reverse flow to port A or B of the solenoid valve (see ΔP - C).



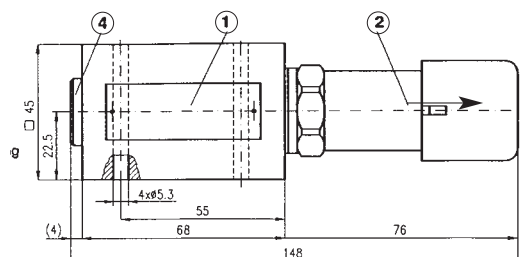
9 INSTALLATION

All stackable valves AM3 - RP conform with ISO and CETOP specifications for mounting surface dimensions (see also front page).

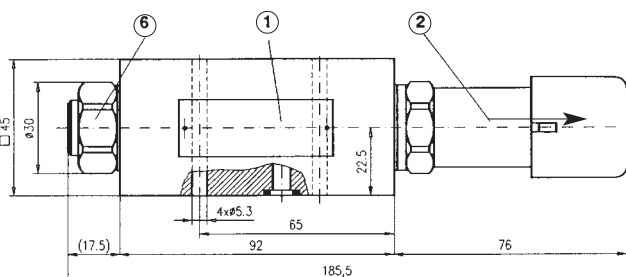
Valves height: 45 mm.
Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals.

7 INSTALLATION DIMENSIONS

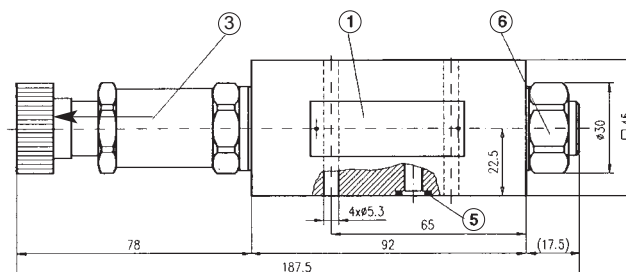
AM3-RP-P



AM3-RP-AC



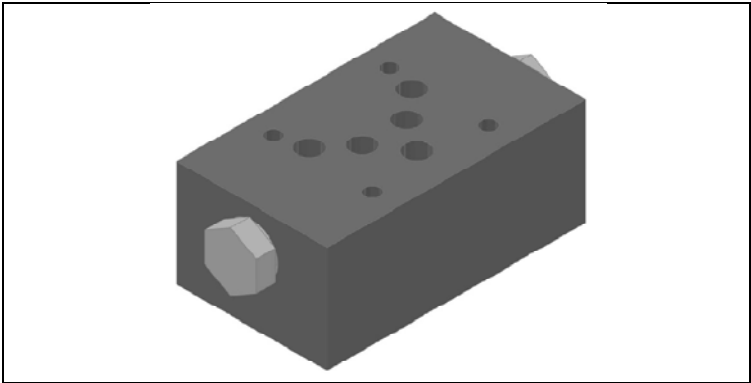
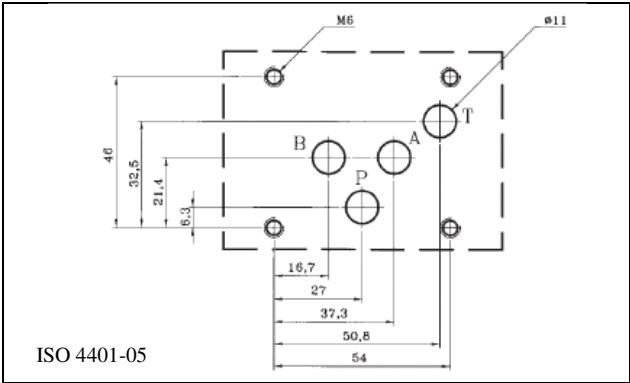
AM3-RP-BC-V



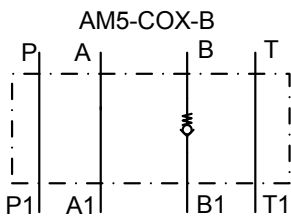
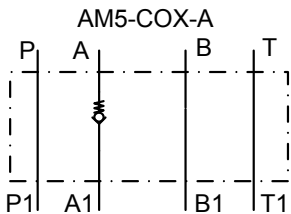
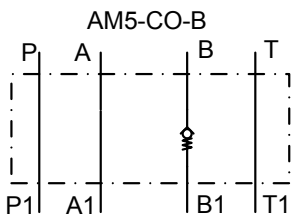
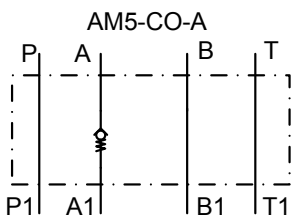
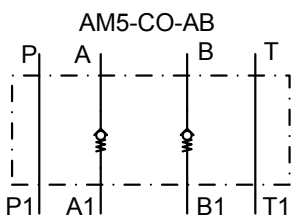
- ① : label
- ② : adjustment screw cover
- ③ : adjustment head knob (-V)
- ④ : 1/4" BSP port for manometer
- ⑤ : seals: 4 pieces 9.25 X 1.68 mm
- ⑥ : check valve

All dimensions are mm.

Stackable valves cetop 05 check valves type AM5-CO-*



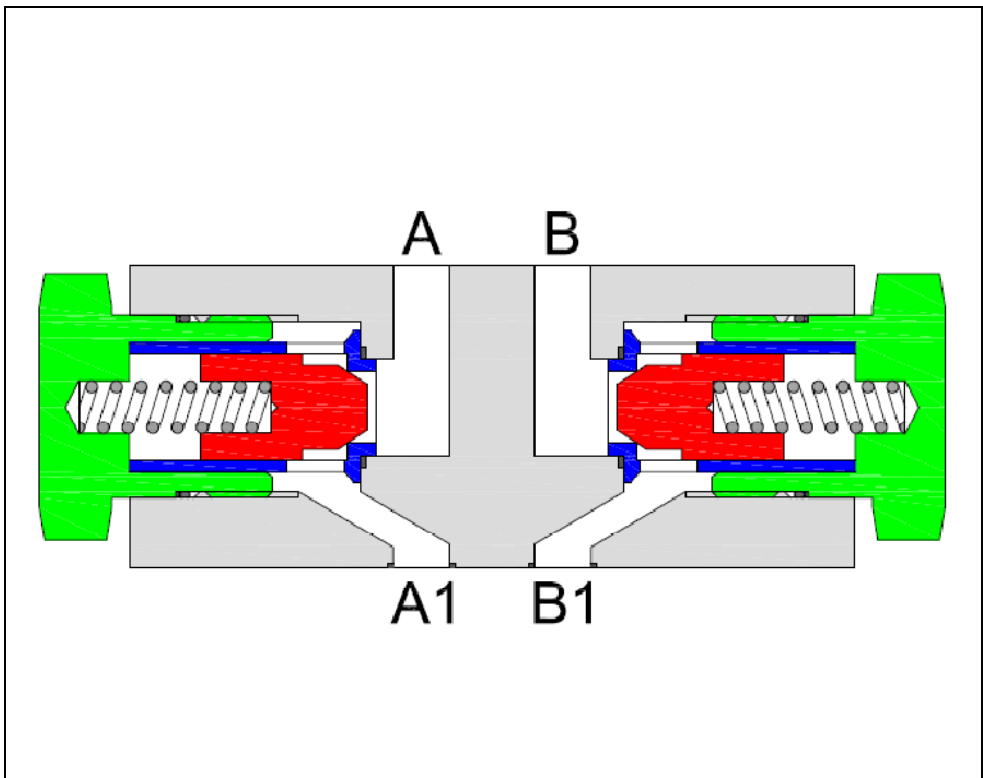
2 FUNCTIONAL SYMBOLS



1 HOW TO READ THE MODEL CODE FOR VALVES HD5-*

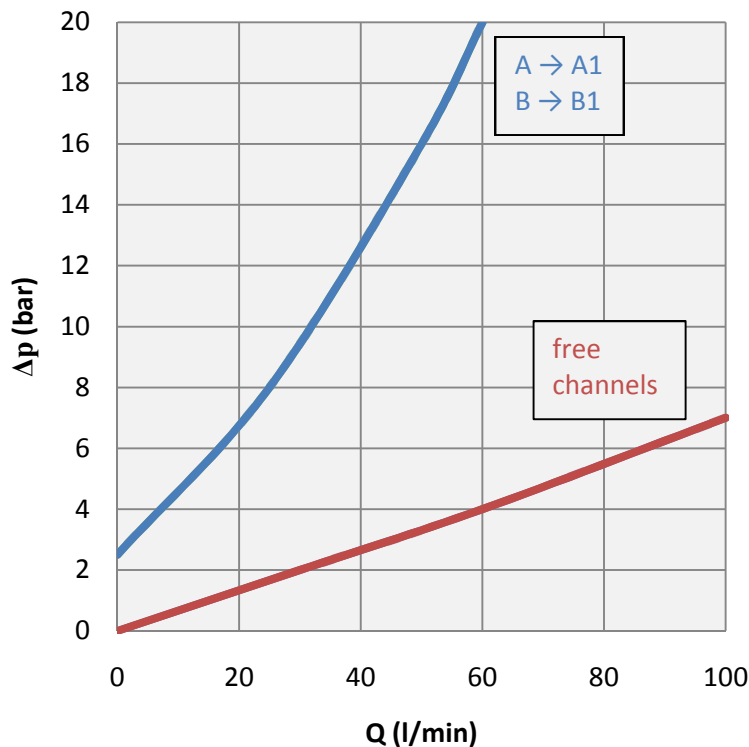
AM5	-	CO	(X)	-	(AB)	-	*	-	**	/	10
①		②	③		④		⑤		⑥		⑦

- ① **AM5** : stackable valve Cetop 05 – Pressure 32 MPa (320 bar)
- ② **CO** : check valve, spring operated
- ③ **(X)** : flow A1 → A (B1 → B), see functional symbols 2
- ④ **(AB)** : service lines where the control(s) operate(s) (see also 2)
- ⑤ ***** : check valve opening (cracking pressure)
 - : 0.2 MPa (2bar)
 - 4** : 0.4 MPa (4 bar)
- ⑥ ****** : code reserved for special variants (materials, seals, surface treatments, etc.=
- ⑦ **10** : design number (progressive) of the valve



3 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM5-CO-* in standard configuration, with mineral oil at 36 cSt and T=50°C.



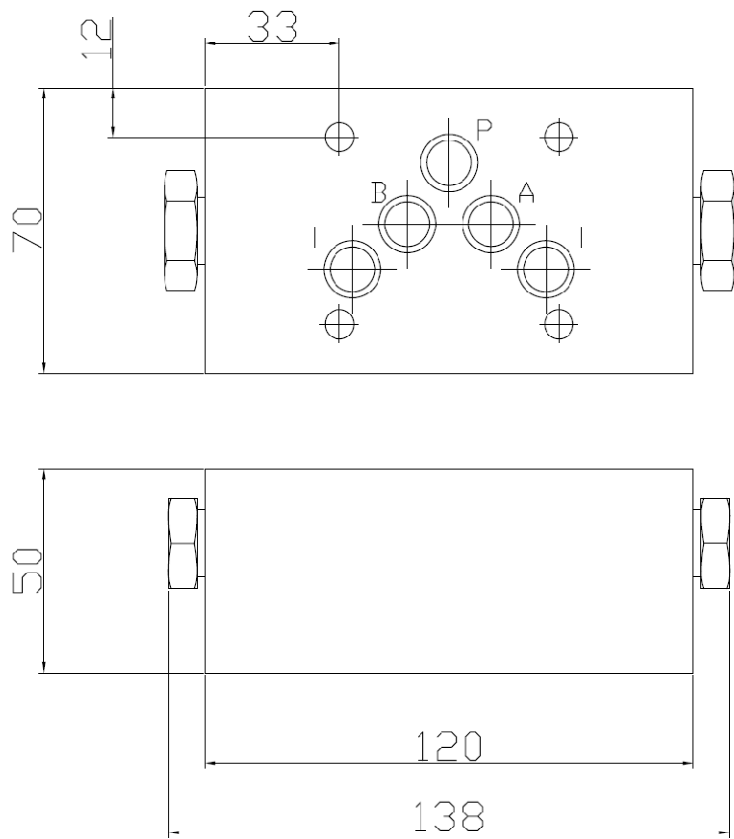
4 TECHNICAL DATA

max. rec. flow rate on controlled line(s)	60 l/min
max. rec. flow rate on free channels	100 l/min
max. nominal pressure	32 MPa (320 bar)
pressure drops	see 3
dimensions	see 6

5 INSTALLATION

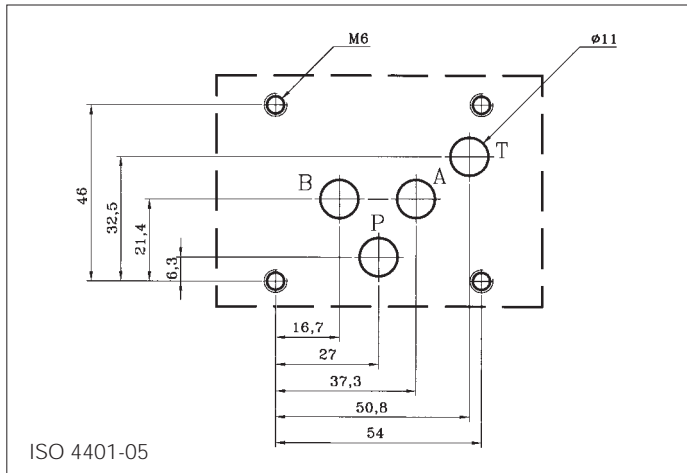
All stackable valves AM5-* conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (50 mm). Leakage between valve and mounting surface is prevented by the positive compression on their seats of 5 seals of Quad-Rings type 12,42 x 1,68 x 1,68 mm or 5 O-Rings type 12,5 x 1,68.

6 INSTALLATION DIMENSION



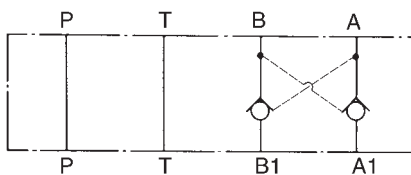
All dimensions are mm

Stackable valves cetop 05 pilot operated check valves type AM5 - CP - *

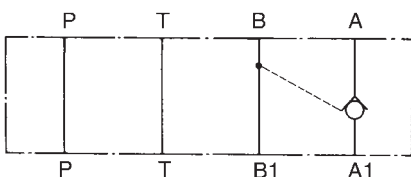


2 FUNCTIONAL SYMBOLS

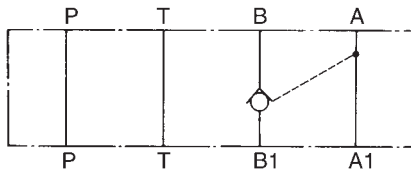
AM5-CP-AB



AM5-CP-A



AM5-CP-B



1 HOW TO READ THE MODEL CODE FOR VALVES AM5 - *

AM5 - CP - (AB) - * - ** / 10

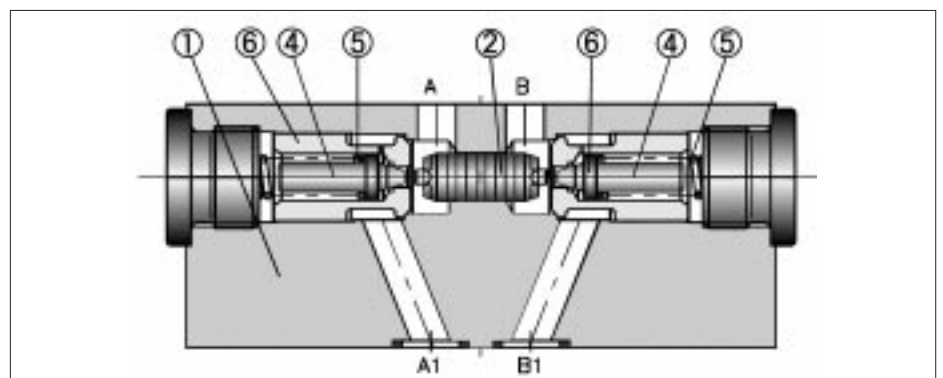
- ① AM5 : stackable valve CETOP 05 - Pressure 32 MPa (320 bar)
- ② CP : check valve, pilot operated (hydraulically)
- ③ (AB) : service lines where the control(s) operate(s);
see also functional symbols 2
AB : p.o. checks on A and B. Fluid flows A → A1 and B → B1 and
flow A1 → A (or B1 → B) is permitted only when B (or A) is
pressurized
A : p.o. check on A; flow A1 → A is permitted only when B is pressurized
B : p.o. check on B; flow B1 → B is permitted only when A is pressurized
- ④ check valve opening (cracking) pressure (Pm) for free flow A → A1 and B → B1:
- (standard) : Pm approx 0.2 MPa (2 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.)
- ⑥ design number (progressive) of the valves

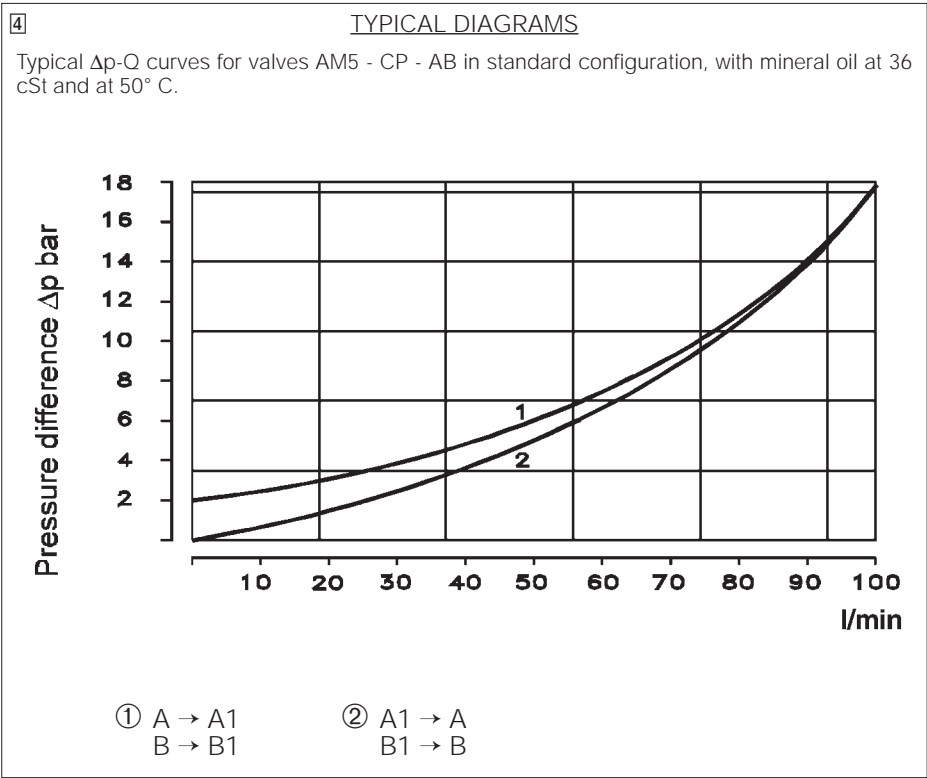
3 DESCRIPTION

Fluid flows freely on P and T lines;

on service lines A and /or B with p.o. check, fluid flows from A → A1 (and/or B → B1) overcoming the force of spring ⑤ acting on poppet ④, and fluid is blocked from A1 → A (and/or B1 → B).

When, by switching the solenoid operated 4-way directional valve, pressure is made available at, for instance, port B fluid flows B → B1 and the pilot piston ②, shifting from its central position, forces poppet ④, on service line A, to open and permit flow A1 → A by opening main poppet ⑥.





5 DATA AND OPERATING LIMITS

maximum rec. flow rate	100 l/min
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
pilot area ratio piston/poppet	approx 5,6
piloting pressure	see 6
dimensions	see 7
installation	see 8
mass	approx 3 kg

6 PILOTING PRESSURE

To shift the pilot piston and to open the check in A the piloting pressure must be, at B:

$$P_p = P_b = \frac{P_{a1} + P_m - P_a}{5,6} + P_a$$

where: P_p = piloting pressure;
 P_b = pressure in B;
 P_a = pressure in A;
 P_{a1} = pressure in A1;
 P_m = check valve opening pressure (spring)

or to open the check in B:

$$P_p = P_a = \frac{P_{b1} + P_m - P_b}{5,6} + P_b$$

8 INSTALLATION

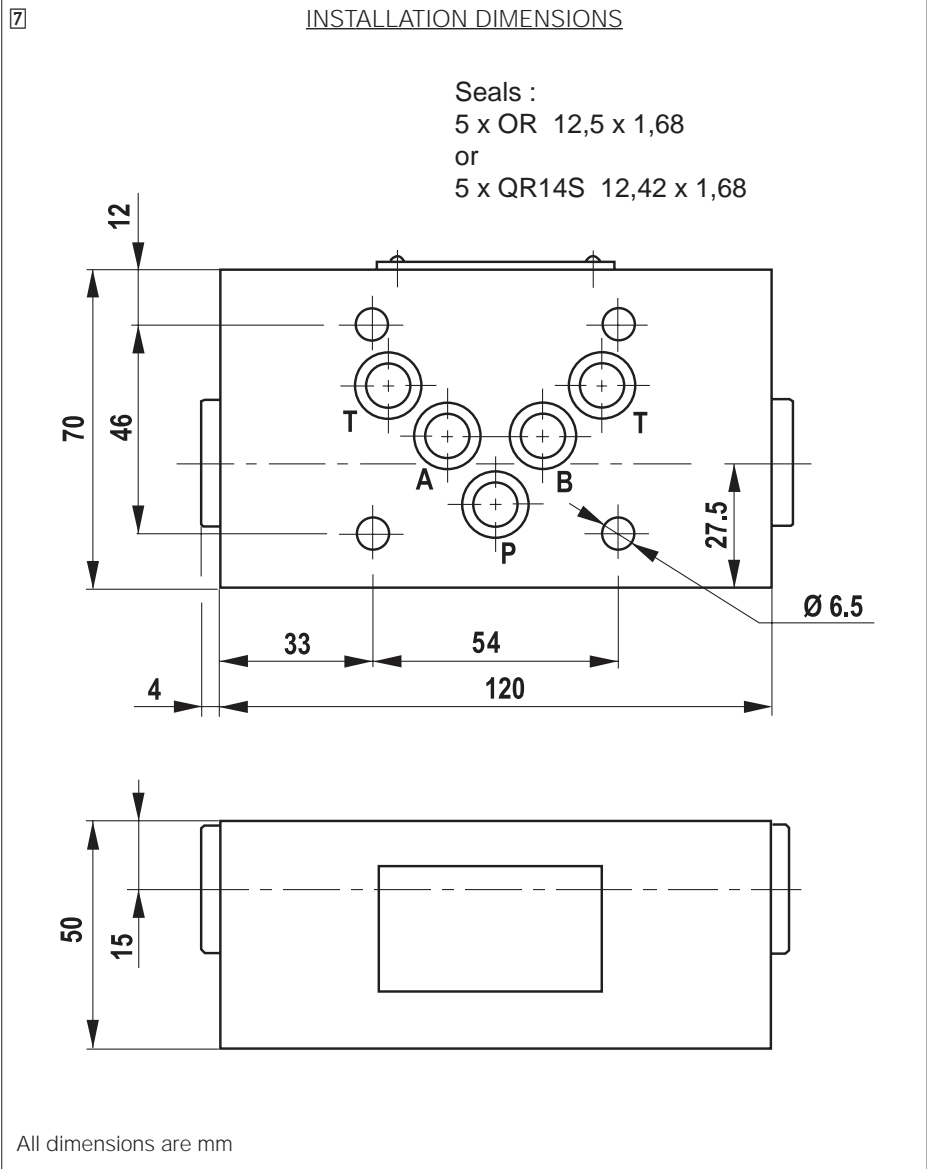
All stackable valves AM5 - CP - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (50 mm).

Leakage between valve and mounting surface is prevented by the positive compression on their seats (of OR type or Quadring type).

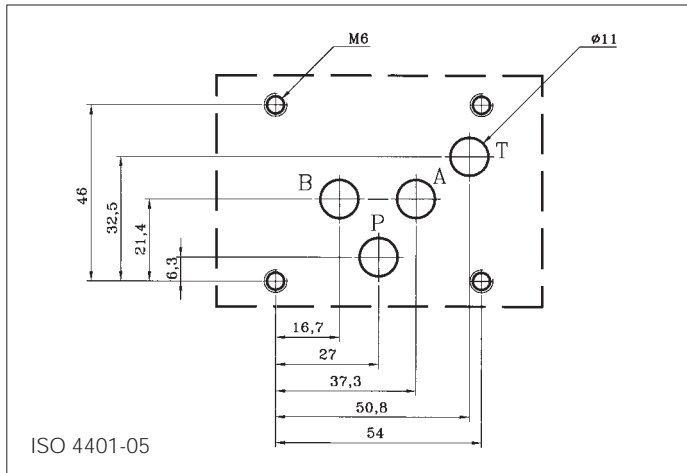
9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM5 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

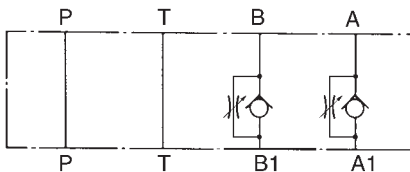


Stackable valves cetop 05 flow control valves type AM5 - FC - *

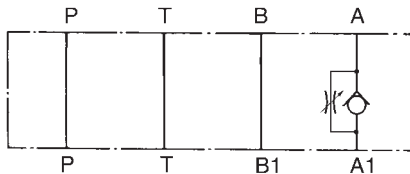


2 FUNCTIONAL SYMBOLS

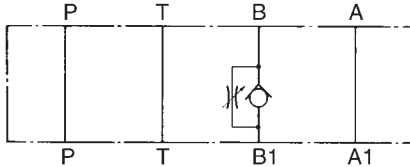
AM5-FC-AB



AM5-FC-A



AM5-FC-B



1 HOW TO READ THE MODEL CODE FOR VALVES AM5 - *

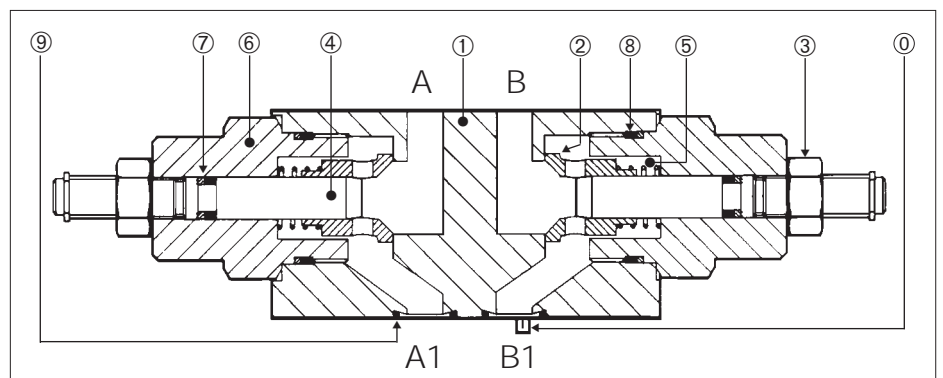
AM5 - FC - (AB) - * - ** / 10

① ② ③ ④ ⑤ ⑥

- ① **AM5** : stackable valve CETOP 05 - Pressure 32 MPa (320 bar)
- ② **FC** : one-way flow control valves with meter-out control (referred to the hydraulic actuator)
- ③ **(AB)** : service lines where the control(s) operate(s); see also functional symbols 2
 AB : controls on A and B. Flow unrestricted from A → A1 and B → B1, flow is controlled from A1 → A and B1 → B
 A : flow is controlled from A1 → A, free on B
 B : flow is controlled from B1 → B, free on A
- ④ flow control characteristics for A1 → A and B1 → B (see also 6) and check valve opening pressure (Pm) for flow A → A1 and B → B1
 - : standard control and Pm approx 0.04 MPa (0.4 bar)
 V : fine control
 4 : Pm approx 0.4 MPa (4 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves

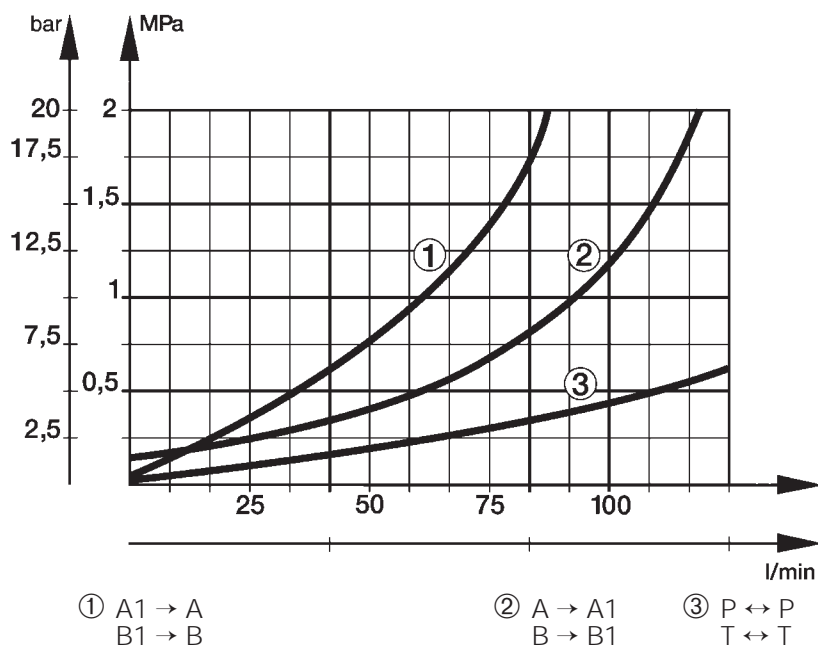
3 DESCRIPTION

Fluid flows freely on P and T lines; on service lines A and/or B with controls, fluid flows from A → A1 (and/or B → B1) overcoming the force of spring ⑤ acting on sleeve ②; fluid flows from A1 → A (and/or B1 → B) through orifices of sleeve ② which is pushed against its seat; the throttling axis ④, which is shifted by screwing it and locked by its nut ③, partially obstructs the control orifices, thus making the flow rate entirely dependent upon the available pressure drop.



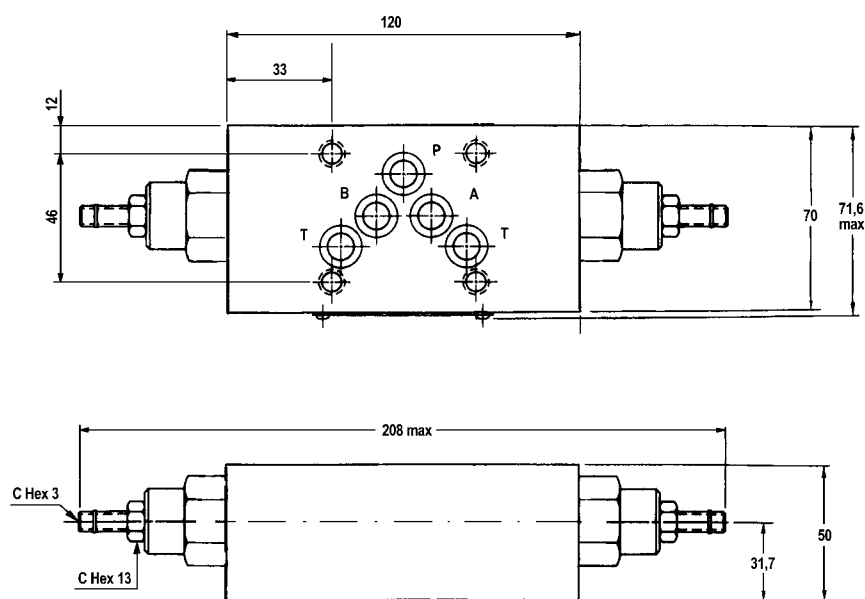
4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM5 - FC - AB in standard configuration, with mineral oil at 36 cSt and at 50° C, with throttling axis at full retraction.



7 INSTALLATION DIMENSIONS

Seals :
5 x OR 12,5 x 1,68
or
5 x QR14S 12,42 x 1,68



All dimensions are mm

5 DATA AND OPERATING LIMITS

maximum rec. flow rate	100 l/min
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
adjustment	see 6
dimensions	see 7
installation	see 8
mass	approx 3 kg

6 CONTROL OF THE FLOW

The control is made by throttling from A1 → A (and/or B1 → B), through variable orifices.

Depending on the various sleeve/axis combination, the control adjustment is:

- (standard) : orifices area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw.

V (fine) : from 100% (**) to 0% with 5 complete turns of the adjustment screw.

(*) 100% approx Q=1 dm³/s (60 l/min) at $\Delta P=2$ MPa (20 bar)

(**) 100% approx Q=0.5 dm³/s (30 l/min) at $\Delta P=2$ MPa (20 bar)

The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clockwise the adjustment screw.

Suitable mechanical stops prevent dangerous manoeuvring.

8 INSTALLATION

All stackable valves AM5 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (50 mm).

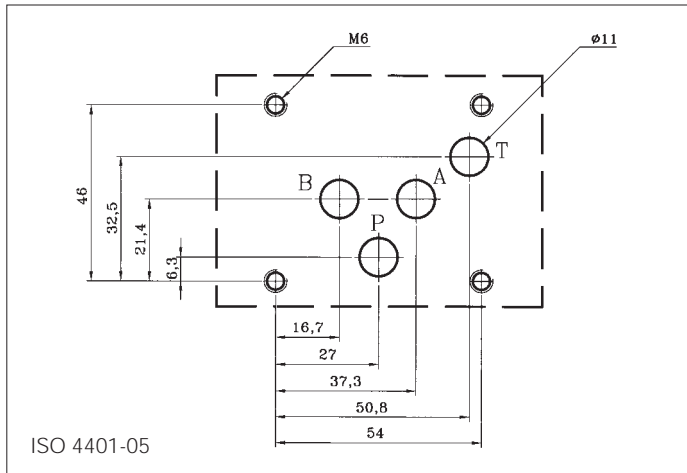
Leakage between valve and mounting surface is prevented by the positive compression on their seats of seals (of OR type or Quadring type).

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM5 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

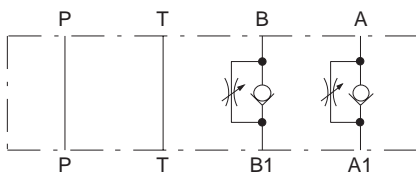
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 05 flow control valves type AM5 - FX - *

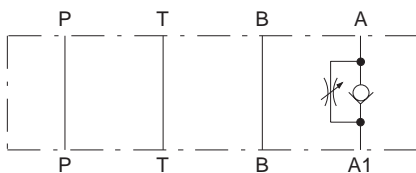


2 FUNCTIONAL SYMBOLS

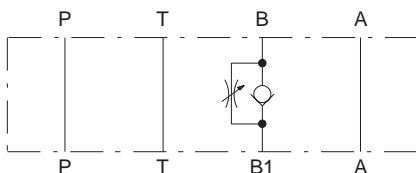
AM3-FX-AB



AM3-FX-A



AM3-FX-B



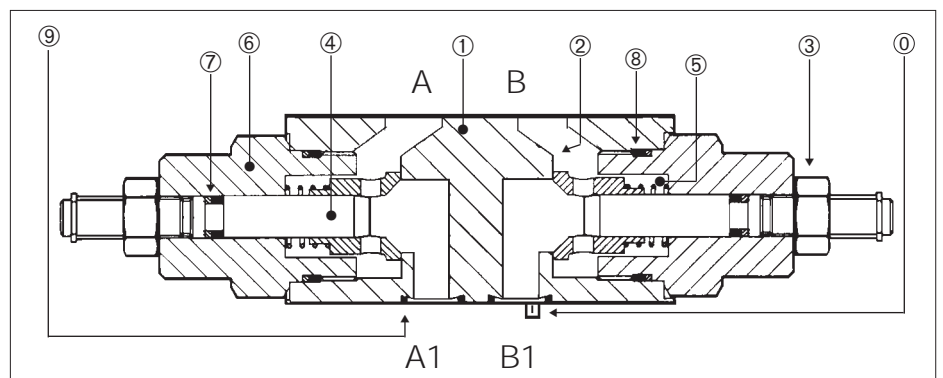
1 HOW TO READ THE MODEL CODE FOR VALVES AM5 - *

AM5 - FX - (AB) - * - ** / 10
① ② ③ ④ ⑤ ⑥

- ① **AM5** : stackable valve CETOP 05 - Pressure 32 MPa (320 bar)
- ② **FX** : one-way flow control valves with meter-in control (referred to the hydraulic actuator)
- ③ **(AB)** : service lines where the control(s) operate(s); see also functional symbols 2
 AB : controls on A and B. Flow unrestricted from A1 → A and B1 → B,
 flow is controlled from A → A1 and B → B1
 A : flow is controlled from A → A1, free on B
 B : flow is controlled from B → B1, free on A
- ④ flow control characteristics for A → A1 and B → B1 (see also 6) and check valve opening pressure (Pm) for flow A1 → A and B1 → B
 - : standard control and Pm approx 0.04 MPa (0.4 bar)
 V : fine control
 4 : Pm approx 0.4 MPa (4 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.).
- ⑥ design number (progressive) of the valves

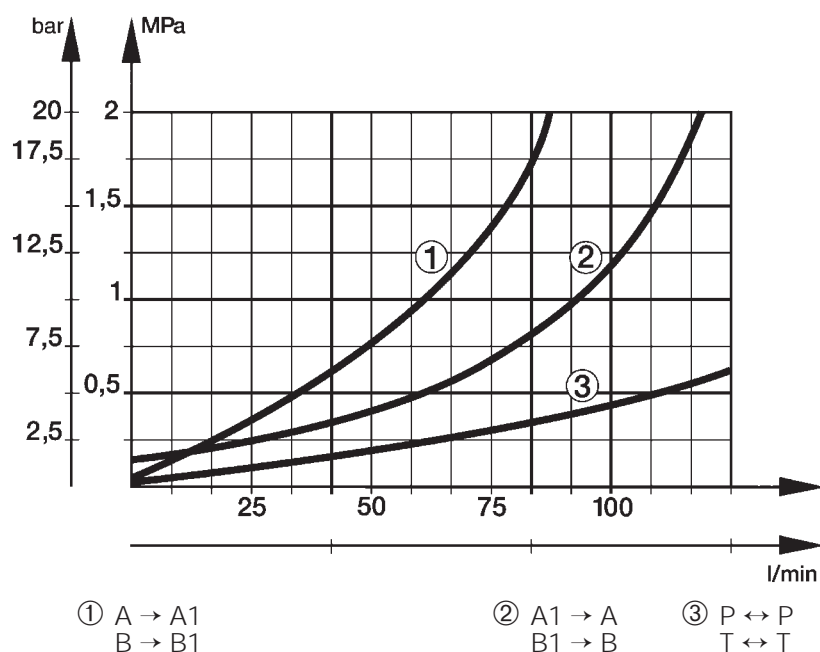
3 DESCRIPTION

Fluid flows freely on P and T lines; on service lines A and/or B with controls, fluid flows from A1 → A (and/or B1 → B) overcoming the force of spring ⑤ acting on sleeve ②; fluid flows from A → A1 (and/or B → B1) through orifices of sleeve ② which is pushed against its seat; the throttling axis ④, which is shifted by screwing it and locked by its nut ③, partially obstructs the control orifices, thus making the flow rate entirely dependent upon the available pressure drop.



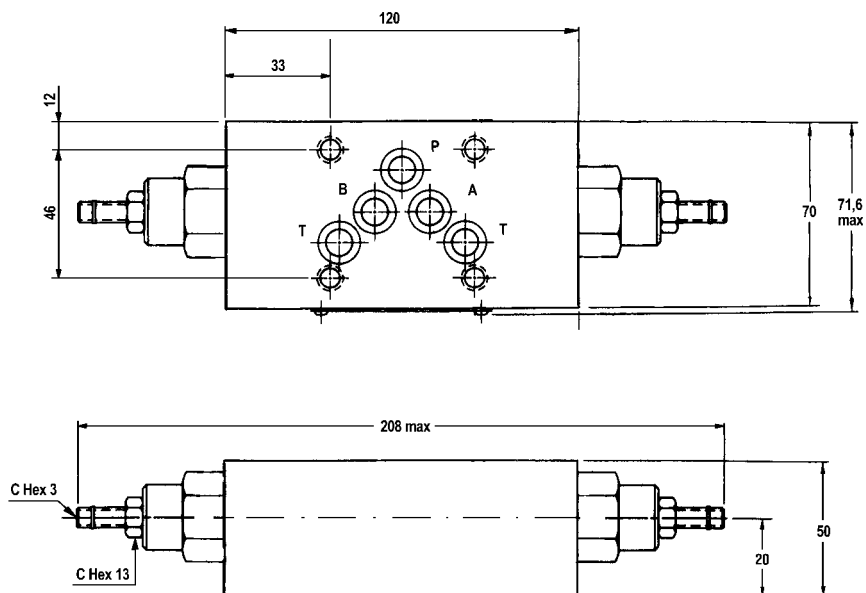
4 TYPICAL DIAGRAMS

Typical Δp -Q curves for valves AM5 - FX - AB in standard configuration, with mineral oil at 36 cSt and at 50° C, with throttling axis at full retraction.



7 INSTALLATION DIMENSIONS

Seals :
5 x OR 12,5 x 1,68
or
5 x QR14S 12,42 x 1,68



All dimensions are mm

5 DATA AND OPERATING LIMITS

maximum rec. flow rate	100 l/min
maximum nominal pressure	32 MPa (320 bar)
pressure drops	see 4
adjustment	see 6
dimensions	see 7
installation	see 8
mass	approx 3 kg

6 CONTROL OF THE FLOW

The control is made by throttling from A → A1 (and/or B → B1), through variable orifices.

Depending on the various sleeve/axis combination, the control adjustment is:

- (standard) : orifices area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw.

V (fine) : from 100% (**) to 0% with 5 complete turns of the adjustment screw.

(*) 100% approx Q=1 dm³/s (60 l/min) at $\Delta P=2$ MPa (20 bar)

(**) 100% approx Q=0.5 dm³/s (30 l/min) at $\Delta P=2$ MPa (20 bar)

The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clockwise the adjustment screw.

Suitable mechanical stops prevent dangerous manoeuvring.

8 INSTALLATION

All stackable valves AM5 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (50 mm).

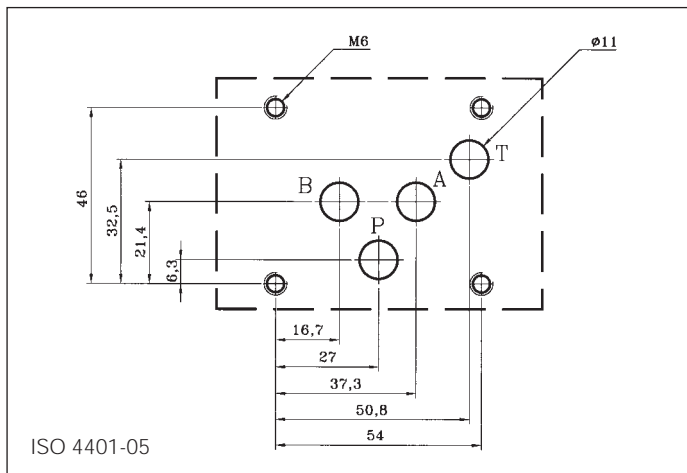
Leakage between valve and mounting surface is prevented by the positive compression on their seats of seals (of OR type or Quadring type).

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM5 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidantizing agents.

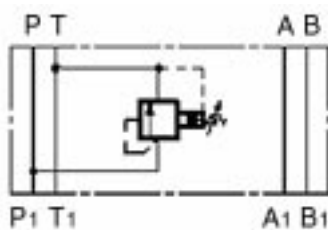
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

Stackable valves cetop 05 pressure relief valves type AM5-MP-*

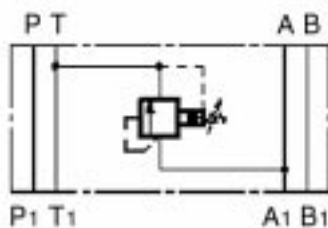


2 FUNCTIONAL SYMBOLS

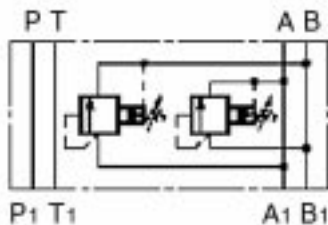
AM5-MP-P



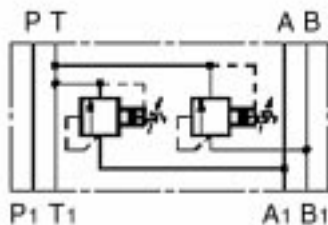
AM5-MP-A



AM5-MP-AB



AM5-MP-BA

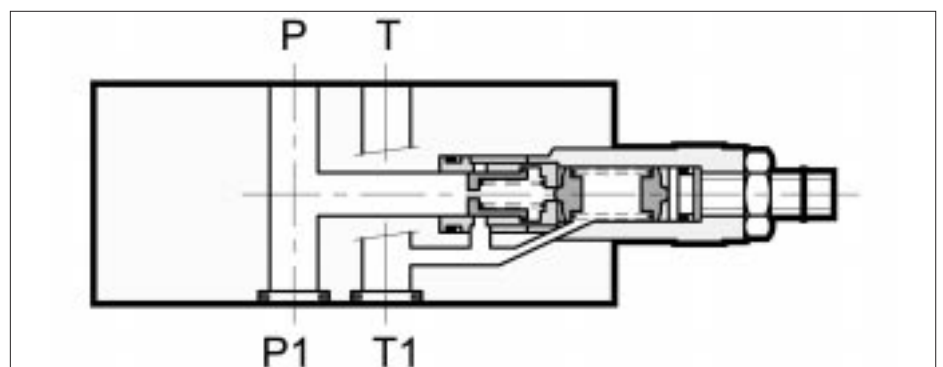


1 HOW TO READ THE MODEL CODE FOR VALVES AM5-MP-*

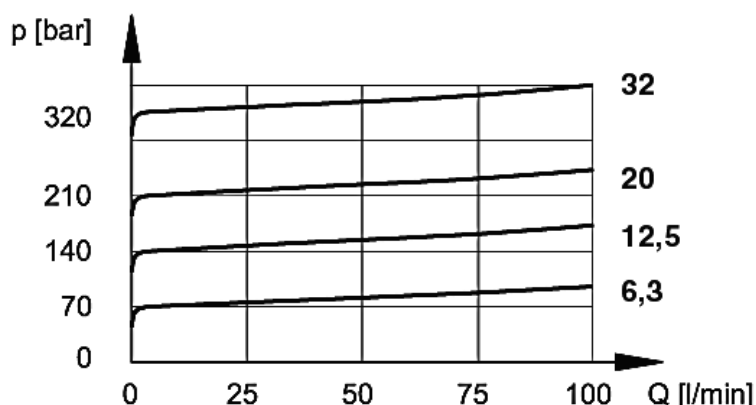
AM5 - MP - (P) / (20) - (32) - ** / 10

① ② ③ ④ ④a ⑤ ⑥

- ① AM5 : stackable valve Cetop 05 - Pressure 32 MPa (320 bar)
- ② MP : pressure relief - pilot operated
- ③ (P) : service lines where the control(s) operate(s); see also functional symbols 2
 P : relief on P and discharge to T
 A : relief on A and discharge to T
 BA : independent relief on B and on A and discharge to T
 AB : relief on A and B with crossed discharge
- ④ (20) : pressure adjustment ranges:
 6,3 from 1 to 7 MPa (from 10 to 70 bar)
 12,5 from 1 to 14 MPa (from 10 to 140 bar)
 20 from 2 to 21 MPa (from 20 to 210 bar)
 32 from 2 to 32 MPa (from 20 to 320 bar)
- ④a (32) : pressure adjustment range for relief on A
 (only for models AM5-MP-BA) or for relief on B for models AM5-MP-AB
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.....).
- ⑥ design number (progressive) on the valves.



4 TYPICAL DIAGRAMS
Typical curves for valves AM5-MP in standard configuration, with mineral oil at 36 cSt and at 50° C.



5 DATA AND OPERATING LIMITS

maximum rec. flow rate	100 l/min
maximum nominal pressure	32 MPa (320 bar)
pressure relief curves	see 4
pressure adjustment	see 6
dimensions	see 7
installation	see 8
mass:	
AM5-MP-P	approx 2,7 kg
AM5-MP-AB	approx 3,6 kg

6 ADJUSTEMENT OF THE RELIEF PRESSURE

Relief pressure is reached when the axial hydraulic forces on piston equal the force of spring; the value of the relief pressure can be therefore changed, within the limits of the chosen adjustment range, by changing the compression of spring. To increase the relief pressure, turn clockwise the adjustment screw CH5 ②, after having unlocked ist nut CH17 mm.

For each pressure adjustment range, - see ④ - the pressure gradient is approx:

6,3	: 2 MPa/turn (20 bar/turn)
12,5	: 4 MPa/turn (40 bar/turn)
20	: 6,3 MPa/turn (63 bar/turn)
32	: 10 MPa/turn (100 bar/turn)

When the required level of pressure is reached, lock the nut ①.

8 INSTALLATION

All stackable valves AM5 - * conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (50 mm).

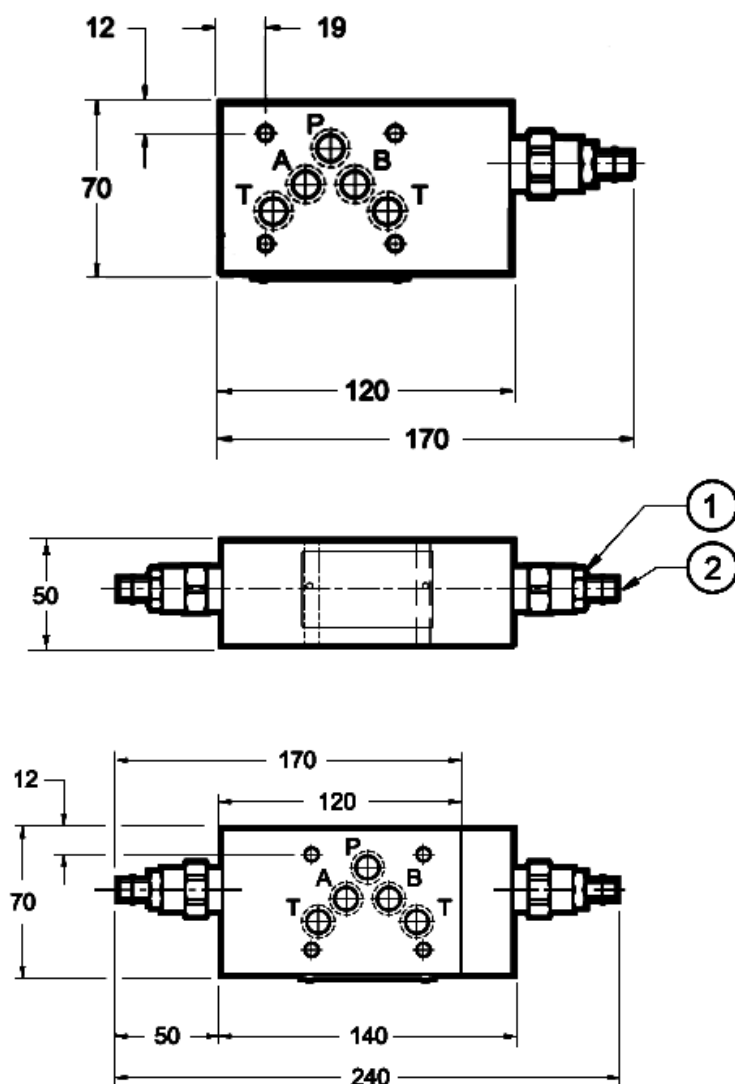
Leakage between valve and mounting surface is prevented by the positive compression on their seats of 5 seals type OR 2050.

9 HYDRAULIC FLUIDS

Seals and materials used on standard valves AM5 - * are fully compatible with hydraulic fluids of mineral oil base, upgraded with antifoaming and antioxidizing agents.

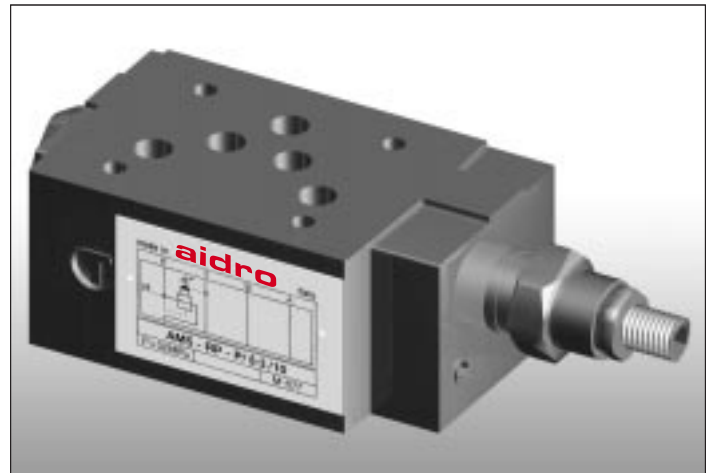
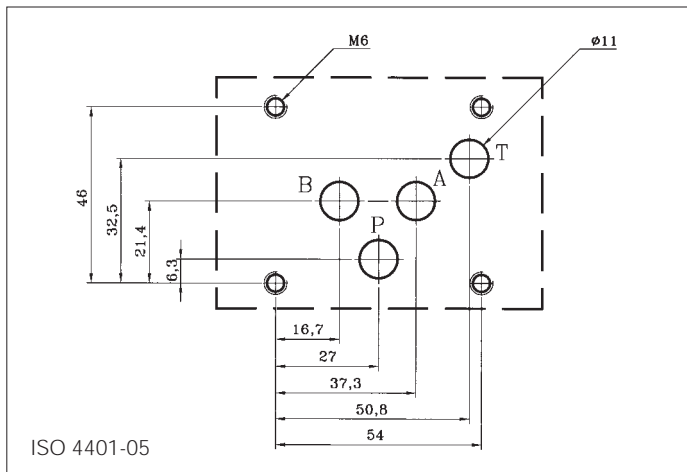
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

7 INSTALLATION DIMENSIONS



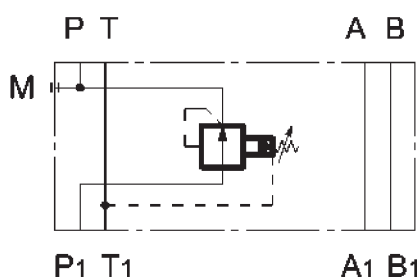
All dimensions are mm

Stackable valves cetop 05 pressure reducing valves type AM5 - RP - *

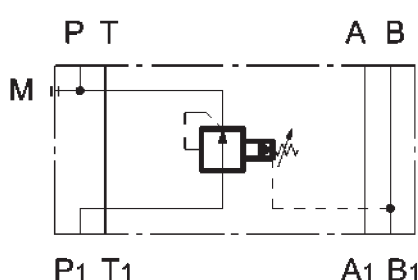


2 FUNCTIONAL SYMBOLS

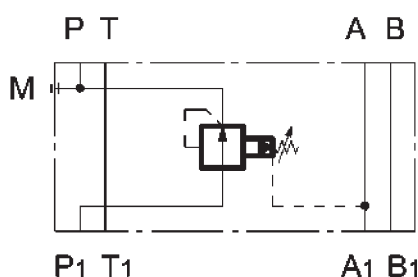
AM5-RP-P



AM5-RP-A



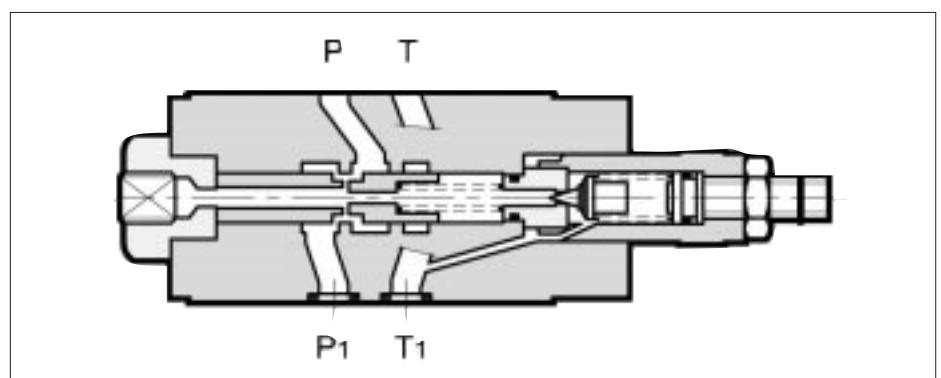
AM5-RP-B



1 HOW TO READ THE MODEL CODE FOR VALVES AM5-RP-*

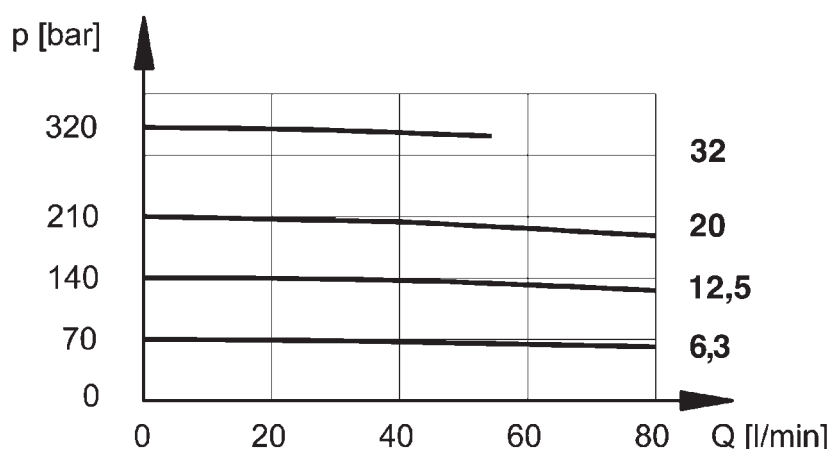
AM5 - RP - (P) / (20) - ** / 10

- ① AM5 : stackable valve Cetop 05 - Pressure 32 MPa (320 bar)
- ② RP : pressure reducing, pilot operated
- ③ (P) : service lines where the control operates; see also functional symbols 2
P : control on P with drain to T line
A : control on P → A
B : control on P → B
- ④ (20) : controlled pressure adjustment ranges:
6,3 : from 0,5 to 7 MPa (from 5 to 70 bar)
12,5 : from 0,8 to 14 MPa (from 8 to 140 bar)
20 : from 1 to 21 MPa (from 10 to 210 bar)
32 : from 1,6 to 32 MPa (from 16 to 320 bar)
- ⑤ code reserved for special variants (materials, seals, surface treatments etc.....).
V = adjustment hand knob
- ⑥ design number (progressive) on the valves.

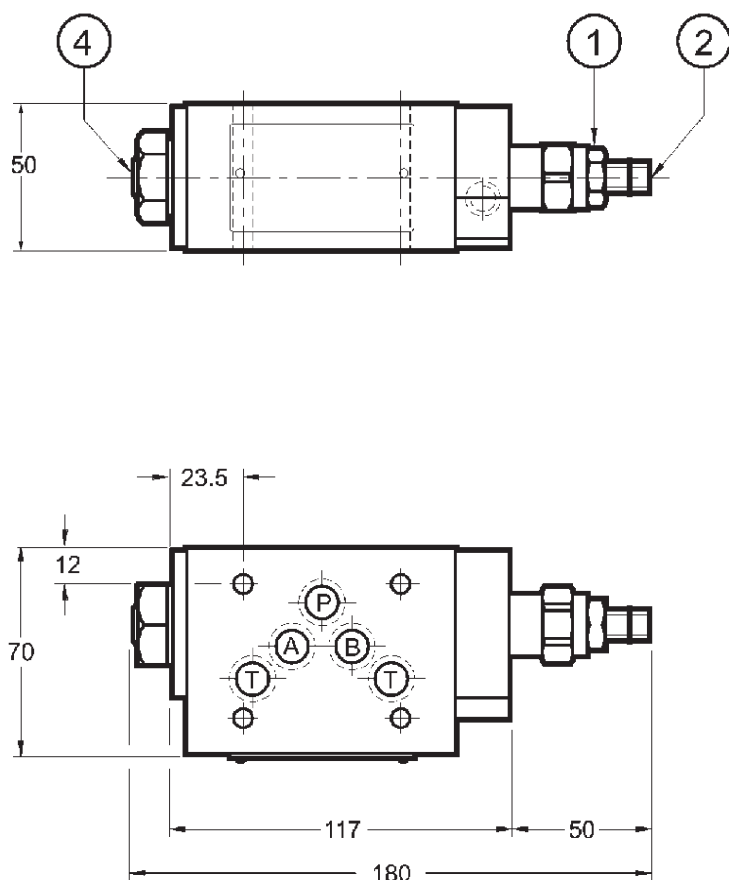


4 TYPICAL DIAGRAMS

Typical curves for valves AM5-RP in standard configuration, with mineral oil at 36 cSt and at 50° C.



7 INSTALLATION DIMENSIONS



All dimensions are mm

5 DATA AND OPERATING LIMITS

maximum	
rec. flow rate	
on free lines	100 l/min
on controlled lines	80 l/min
maximum	
nominal pressure	32 MPa (320 bar)
maximum	
pressure on T	10 MPa (100 bar)
pilot flow rate	<12cm³/s(0,7 l/min)
pressure curves	see 4
pressure adjustment	see 6
dimensions	see 7
installation	see 8
mass:	
AM5-RP - *	approx 2,7 kg

6 ADJUSTEMENT OF THE PRESSURE

Reduced pressure is obtained by throttling the flow on spool which is balanced, on one side, by the reduced pressure and, on the other side, by the positioning spring and by the pilot pressure.

Pilot pressure is established by the action of spring on the pilot valve.

The value of the reduced pressure is changed by changing the compression of spring. To increase the value of the reduced pressure, turn clockwise the screw by acting on ② CH 5 mm, after having unlocked ist nut CH 17 mm.

When the required pressure is reached, lock the nut ①.

For each pressure adjustment range, the pressure gradient is approx:

6,3	:	2	MPa/turn	(20 bar/turn)
12,5	:	4	MPa/turn	(40 bar/turn)
20	:	6,3	MPa/turn	(63 bar/turn)
32	:	10	MPa/turn	(100 bar/turn)

8 DESCRIPTION

All valves type AM5-RP-* reduce pressure on port P of the solenoid valve as follows:

- on version P, the drain is on channel T and therefore the valve constantly reduces pressure at the setted value
- on version A, the drain is on channel B and therefore the valve reduces pressure when the solenoid valve establishes the P->A and B->T connections
- on version B, the drain is on channel A and therefore the valve reduces pressure when the solenoid valve establishes the P->B and A->T connections

All valves type AM5-RP-* have a 1/4" BSP manometer port ④ for the direct reading of the reduced pressure value.

INSTALLATION

All stackable valves AM5 - RP conform with ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height (50 mm). Leakage between valve and mounting surface is prevented by the positive compression on their seats of 5 seals type OR 2050.