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HYDRAULIC NEUMATIC COMPONENTS

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SO WE MAY BE BETTER KNOWN



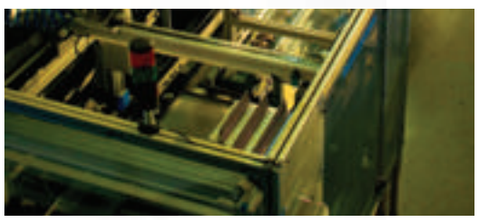
It was in 1957 when Vittorino and Dorino Tognella decide to set up the "F.lli Tognella S.d.f.", after years of experience acquired in a well-known local firm which operated in the aeronautics field. In creating this new company they invested their skills in the most sophisticated mechanical concepts, their knowledge of the variegated problematics of the economic and productive field, their entrepreneurial spirit, will power, determination, technique and great technical experience.
They started mainly as sub-suppliers to firm operating in the pneumatics field.
Then they gradually made a place for themselves in the hydraulic fields which became, through a winning choice, the predominant sector of their activity.

"TECHNOLOGY IS FIRMLY ROOTED IN THE PAST, DOMINATES THE PRESENT AND IS PROJECTED TOWARDS THE FUTURE"

"To offer quality products at the right price": it was not an easy-to win challenge, the one "Tognella" wanted to try.
But even in the competition with international colossuses, their precision, firmness, well-balanced administration and a complete reinvestment of the returns rapidly transformed this firm into a protagonist of the market.
Never much influenced by the rapid changes this sector has usually undergone, being always able instead to forward the requirements of its clientele, day after day the firm grew and in the Seventies it gained widespread consensus all over the world.
The circulation of "Tognella" products has by now reached a worldwide scale, being present in over 35 countries and in various industrial, commercial and service sectors: from the field of mechanics to that of machine tools, earthwork, agriculture, plastics, marble working, material handling, wood working and many else... The success achieved does not however represent for the company a final point, but it is rather considered as an element of endless evolution that leads to new ways and ideas, new products and projects in harmony with the most advanced technologies.



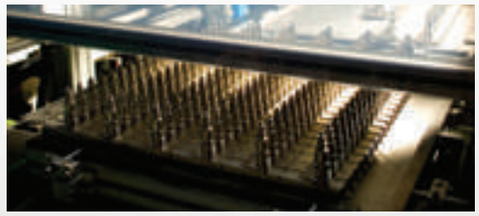






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NOT JUST A CATALOGUE

It is a modern-style publication which we consider more than a simple catalogue. Therein are described specific data of each product, as well as the technical data necessary for a correct choice of the various components depending on the different applications that they are intended for. It is composed of various chapters according to the different valve types and the initial index allows rapid consultation. The intention was to provide the catalogue with a dual purpose: technical and advertising so as to be a valid means of consultation as much for the technical offices, as for the users and the distributors who will find satisfaction to their obviously different requirements. We would be sincerely grateful to all those who would kindly like to pass on to us any criticism, suggestions, advice or whatever else might be useful to the improvement of this publication with the aim of making it apt to find the appreciation of our clientele.

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BIG ENOUGH TO DARE A CHALLENGE WORLDWIDE; FAIRLY LITTLE TO SATISFY OUR CUSTOMERS' REQUESTS AT THE RIGHT TIME.

The **TOGNELLA Spa**, conscious of the difficulty of remaining competitive on the market with just one product, in order to widen its offers and proposals and convinced of the necessity of satisfying its clientele with products and services, has created a team which is able to comply with the ever more varied demands from a always growing market. This team includes, besides Tognella SpA, other five companies.

The **SPECIAL SERVICE SEPRIO S.r.l.**, a little-sized- but flexible company, which deals with the production of "special" components, made according to the customer's requirements, or modifying a standard-built item or producing ex-novo, starting from a design created by the customer or by the partner Technical Study **TECNOVI S.r.l.**

The technical study has been conceived according to the most modern technologies provided with CAD CAM stations and disposing of highly experienced professionals in the mechanical sector as well as in that of oleo-hydro-pneumatics. Besides a wide range of "external "customers, Tecnovi is concerned with all technical problems of the group and offers its support by choosing the most suitable solutions. The integration with Special Service Seprio allows the supply of "turnkey" solutions.

In 2002 pursuing its aim Tognella S.p.A. acquires the 50% of the share quota of **COSTANTE SESINO S.p.A.**, leader in the production of standard and special water-oil and air-oil heat exchangers.
The company begins its activity in 1919 with the production of car radiators for customers like FIAT and Autobianchi and, thanks to successful technological entrepreneurial choices its present production consists of exchangers. The recent difficulties of the market had caused a stagnation in the activity. But at the right time Tognella S.p.A. has decided to invest not only in the new building but also in new machines and equipment. It has also taken into consideration the commercial aspect and has tried to give a new image of itself by taking part to exhibitions and by increasing the range of its products. All this has contributed to better further on its image on the market.

NATIONAL SYSTEM S.r.l., is a quite new company which offers its advice in the field of instruments for non-distributive analyses by planning and realizing automatic test stations, systems or acoustic analyses for measuring, control, setting and data logging also on distributive systems.

Recently it has acquired **LAMETARS 2005 S.r.l**, factory that produces plastic components for the electrical appliances industry and metallic ones for other sectors of industry.



The acquisition of this structure is a part of our "mission" whose aim is to satisfy our customer's needs and this is possible thanks to our efficiency and dynamism.
We are in a position to maintain that the clue of our policy is the diligence of the owners who have always reinvested the profits and have always believed in the capacities of the company, in the validity of the products and in the promotion of the image of the group.



50 years, but it does not show its age. 50 years of efficiency, dynamism, flexibility, courtesy offered to our customers.

For over 50 years we have been making valves, which have not gone unnoticed. That which has always characterised the Tognella has been its originality, essentiality, and reliability: in other words, the quality of its products. This has always proceeded hand-in-hand with an intense productive activity always keeping market requirements well in mind, continuously trying out new directions, developing products able to satisfy customer demands and expectations.
Proof of all this is the additional contribution, which the second generation of the entrepreneurial Tognella family has provided to the development of the firm. The new company site has in fact been recently built on an area of over 3.700 sq.m. with practically total replacement of all machinery and with the introduction of automated systems and equipment, the most updated assembly and monitoring systems. These are all factors, which project the firm into the XXI century with all the requirements indispensable to achieve future business success and not to be carried along in the wake of events but to have the determination to direct them.

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Double-acting control valves
In line



FT 257/8 p. 36
Pilot operated double control valves



FT 247/2 p. 60
Cartridge mounted double-acting microfine control valves



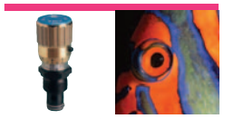
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Double-acting control valves
90° angle



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Two-way ball valves



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Single-acting flow control



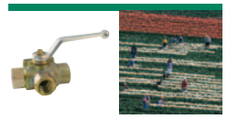
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Stackable valves CETOP 03
Max. pressure control



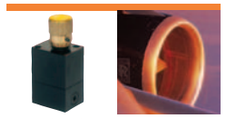
FT3 PC p. 138
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Two-way pressure compensator



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in line male/female



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Double-acting control valves
90° angle female-female



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Double-acting control valves
90°angle male-female



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in line female-female



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Directional control valves
solenoid operated - CETOP 02
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FT 202 p. 258
Ring nut K.M. for FT 257



FT 204 p. 258
Hexagonal steel ring nut
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FT 205 p. 258
Hexagonal steel ring nut
for FT 290 - FT 291



FT 3206-3207 p. 259
Plate FT 3206 for FT 292
FT 3207 for FT 293



FT 1203 p. 259
Hexagonal ring nut
in OT 58 for FT 1250



FT MA p. 260
Handwheel for FT 257 - FT 1250
Equipped with plug and dowel



FT MP p. 260
Handwheel for FT 257 - FT 1250
Equipped with plug and dowel



FT CH p. 260
Handwheel with wrench



FT LC p. 260
Handwheel with padlock



FORMULE p. 262
Calculation formulas and charts

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CODING LOGIC

FT1251 /	2	- 02	- 18	- G-V-T-mp-ch-lc

VALVE CODE

FUNCTION CODE

- **2** = Double - acting control
- **5** = Single - acting control
- **6** = Single - acting in line
- **7-8-9** = Pylot sistem

CONNECTION CODE

- **01** = Female/Female
- **02** = Male/Female
- **04** = Connection to rigid pipes DIN 2353
- **05** = Connection to flexible pipes DIN 3861

SIZE CODE

- **18** = 1/8" GAS
- **14** = 1/4" GAS
- **38** = 3/8" GAS
- **12** = 1/2" GAS
- **34** = 3/4" GAS
- **100** = 1" GAS
- **114** = 1 1/4" GAS
- **112** = 1 1/2" GAS
- **200** = 2" GAS

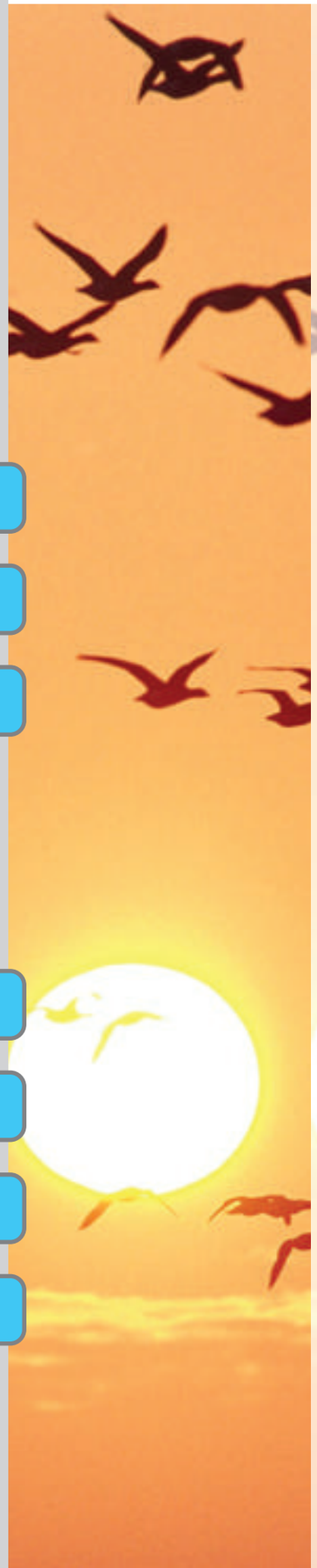
OPTIONAL FITTING CODE

- **G** = Panel ring nut
- **V** = Viton seal
- **T** = Plate
- **mp** = Knob in ABS
- **ch** = Wrench
- **lc** = Padlock

NB For special order it is necessary to put the identification number (01, 02, 03....) before the valve code

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FT 258/2
FT 257/8
FT 257/5
FT 257/9
FT 257/6
FT 277/2
FT 260/6
FT 277/5
FT 257/7
FT 270/2
FT 270/5



SHUT-OFF, CHECK, ACTING IN LINE, PILOT OPERATED AND PRESSURE COMPENSATED VALVES

FT 257/2
Double-acting control valves in line

FT 258/2
Double-acting control valves 90° angle

FT 257/5
Single-acting control valves in line

FT 257/6
Check valves in line (piston)

FT 260/6
Check valves in line (ball)

FT 257/7
Check operated control valves

FT 257/8
Double pilot operated control valves

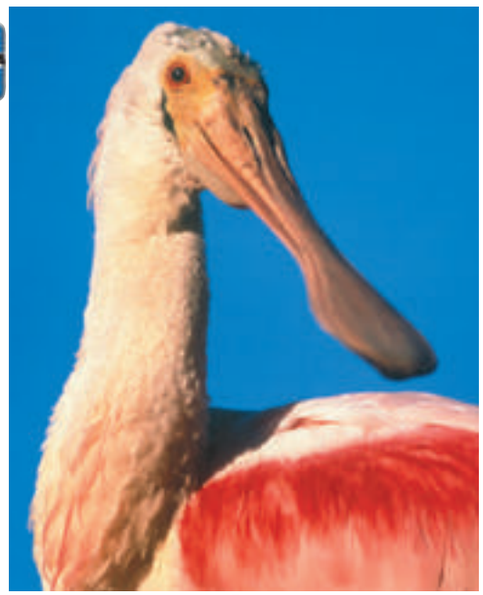
FT 257/9
Simple pilot operated control valves

FT 277/2
Double-port pressure compensated flow control valves (in line)

FT 277/5
Single-acting pressure compensated flow control valves (in line)

FT 270/2
Double-port pressure compensated control valves (in line)

FT 270/5
Single acting pressure compensated double-port control valves (in line)

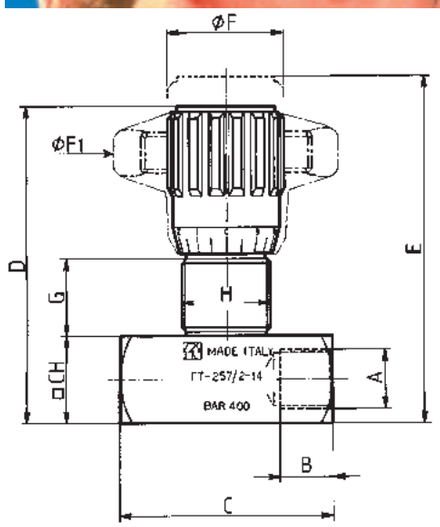


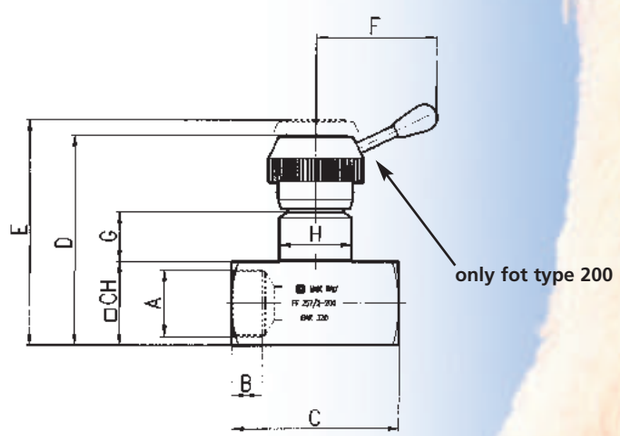
MATERIALS

BODY	9 S MN PB 23 - UNI 5105
NEEDLE	1 C 40 - UNI 8373
O R	NITRILE
ANTIEXTRUSION RINGS	PTFE
KNOB	GD - AL SI 12 - UNI 5706
KNOB (MP)	ABS

EXAMPLE FOR ORDERING

	CODE	TYPE	PANNEL RING NUT	VITON SEAL	KNOB IN PLASTIC
STEEL	FT 257/2	18	G	V	MP
STAINLESS STEEL	FT 2257/2	38	G	–	MP





DIMENSIONS

TYPE	A UNI 338	B	C	D	E	ØF	ØF1	G	H	CH	WEIGHT KG
18	1/8"G	8,5	38	59	64	22	40	13,5	M17x1	16	0,110
14	1/4"G	12,5	49	71	78	27	50	17	M20x1	20	0,200
38	3/8"G	12,5	59	84	93	33	70	19,5	M25x1,5	25	0,375
12	1/2"G	15,5	68	97	107	38	80	21	M30x1,5	30	0,600
34	3/4"G	17	86	120,5	132,5	47	100	26,5	M40x1,5	40	1,250
100	1"G	20	105	151,5	167,5	58	120	35	M50x1,5	50	2,550
114	1 1/4"G	22	120	156,5	172,5	58	120	35	M50x1,5	55	3,000
112	1 1/2"G	24	134	167	181	58	120	35	M55x2	65	4,217
200	2"G	27	150	188	202	108	/	44	M65x2	75	7,300

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DOUBLE-ACTING SHUT-OFF

They allow flow control in both directions.
They are equipped with a needle so to obtain:
- metallic seal;
- flow linearity at the opening;
- accurate control for a wide range of flow rate.

A double reference system made up of a decimal scale on the handle and of a keyed metal ring with graduated fractional scale and divided into sectors allows the identification of flow conditions.
A locking screw in the handle ensures stable flow values preventing accidental adjustments or movements due to vibrations.
A ring nut (G) is used to carry out the panel mounting, on request.

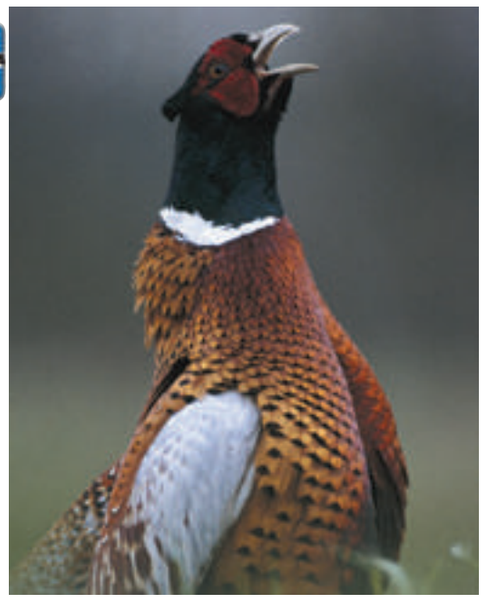
On request
- Versions AISI 316 code FT 2257/2
- Viton seals (V)
- NPT Threads
- Equipped with ring nuts (G)
- Handlewheel in ABS (mp)



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TECHNICAL DATA

TYPE	FLOW SECTION CM²	WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE	FILTRATION GRADE µM
18	0,12	400	1600	-20°/+100°	25
14	0,19	400	1600	-20°/+100°	25
38	0,39	400	1600	-20°/+100°	25
12	0,68	400	1600	-20°/+100°	25
34	1,13	400	1600	-20°/+100°	25
100	2,09	320	1300	-20°/+100°	25
114	2,09	320	1300	-20°/+100°	25
112	3,14	320	1300	-20°/+100°	25
200	4,91	320	1300	-20°/+100°	25

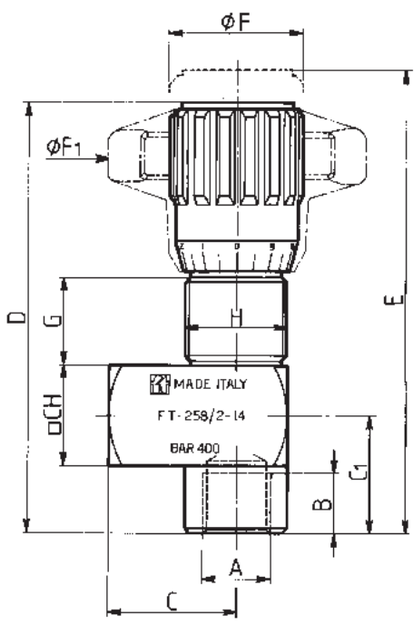


MATERIALS

Body	9 S Mn Pb 23 - UNI 5105
Needle	1 C 40 - UNI 8373
O R	Nitrile
Antiextrusion rings	PTFE
Knob	GD - Al Si 12 - UNI 5706
Knob (mp)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Pannel ring nut	Viton seal	Knob in plastic
Steel	FT 258/2		G	V	mp
Stainless steel	FT 2258/2	12	G	–	mp



DIMENSIONS

TYPE	A UNI 338	B	C	C1	D	E	ØF	ØF1	G	H	CH	Weight kg
18	1/8"G	8,5	19	20	71	76	22	40	14,5	M17x1	16	0,108
14	1/4"G	13,5	25	27	86,5	93,5	27	50	17	M20x1	20	0,200
38	3/8"G	12,5	29,5	31,5	101,5	110,5	33	70	19,5	M25x1,5	25	0,360
12	1/2"G	15,5	35	37	117	127	38	80	21	M30x1,5	30	0,580
34	3/4"G	17	42	46	142,5	154,5	47	100	26,5	M40x1,5	40	1,265
100	1"G	20	53	56	182,8	198,8	58	120	35	M50x1,5	50	2,500

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90° ANGLE DOUBLE-ACTING SHUT-OFF CONTROL VALVES

They allow flow control in both directions.
They are equipped with a needle so to obtain:
- metallic seal;
- flow linearity at the opening;
- accurate control for a wide range of flow rate.

A double reference system made up of a decimal scale on the handle and of a keyed metal ring with graduated fractional scale and divided into sectors allows the identification of flow conditions. A locking screw in the handle ensure stable flow values preventing accidental adjustments or movements due to vibrations. A ring nut (G) is used to carry out the panel mounting, on request.



On request
- Versions AISI 316 code FT 2258/2
- Viton seals (V)
- NPT threads
- Equipped with ring nuts (G)
- Handlewheel in ABS (mp)

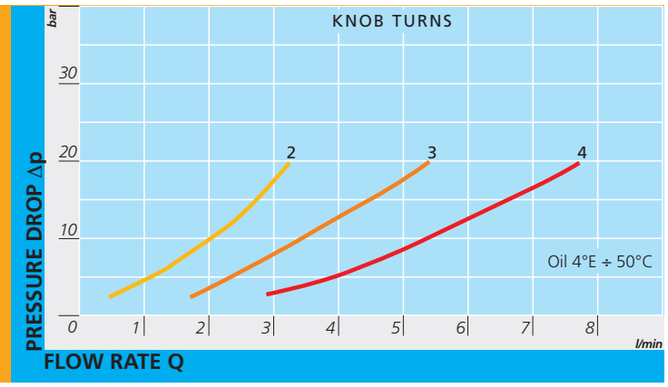
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TECHNICAL DATA

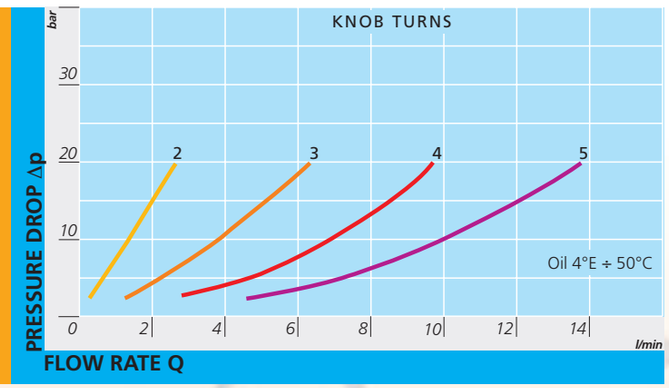
TYPE	FLOW SECTION CM²	WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE	FILTRATION GRADE µM
18	0,12	400	1600	-20°/+100°	25
14	0,19	400	1600	-20°/+100°	25
38	0,39	400	1600	-20°/+100°	25
12	0,68	400	1600	-20°/+100°	25
34	1,13	400	1600	-20°/+100°	25
100	2,09	320	1300	-20°/+100°	25

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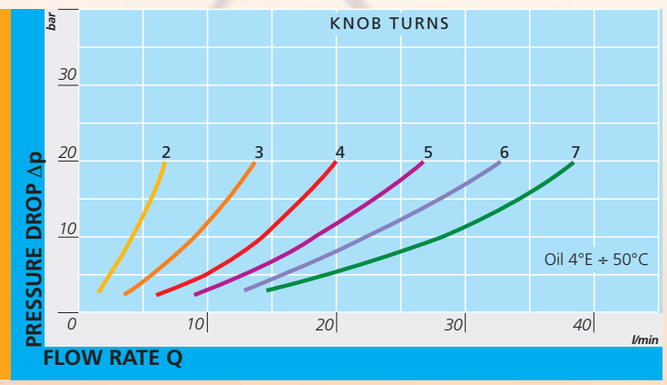
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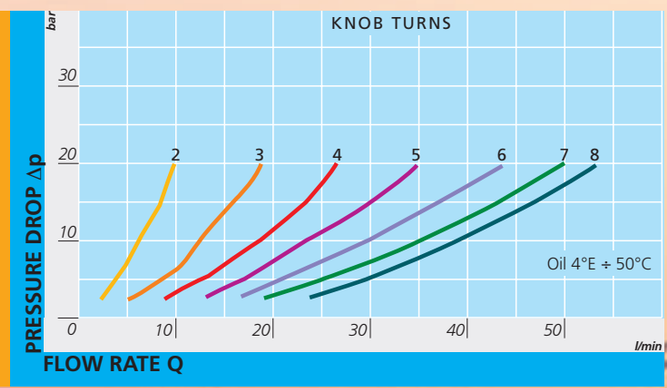
FT 257/2-FT 258/2 - 14



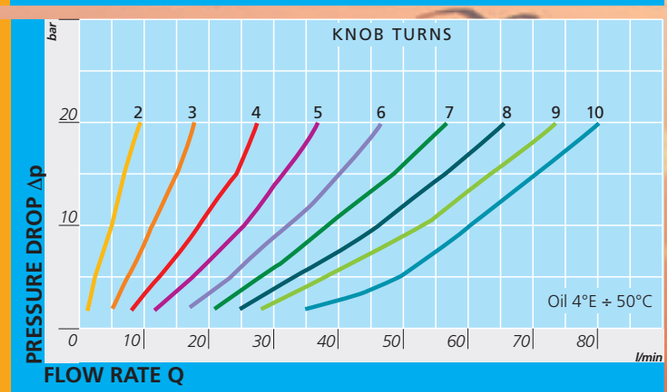
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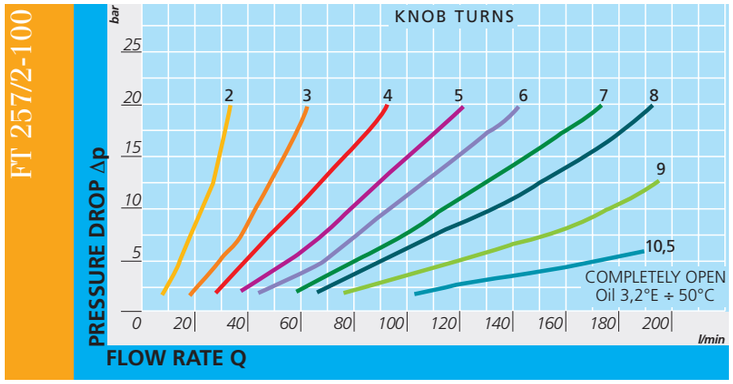
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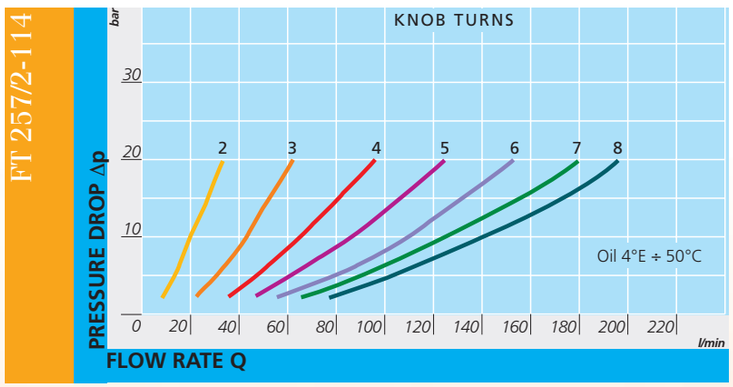


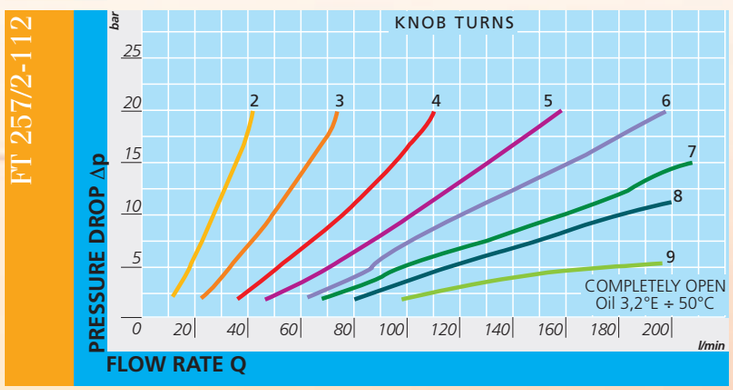
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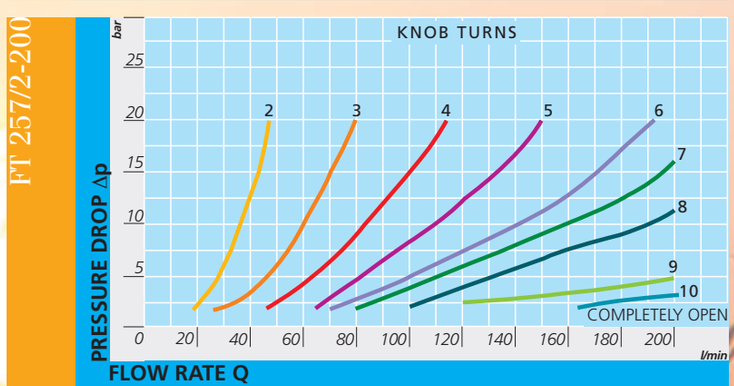


FLOW RATE CURVES







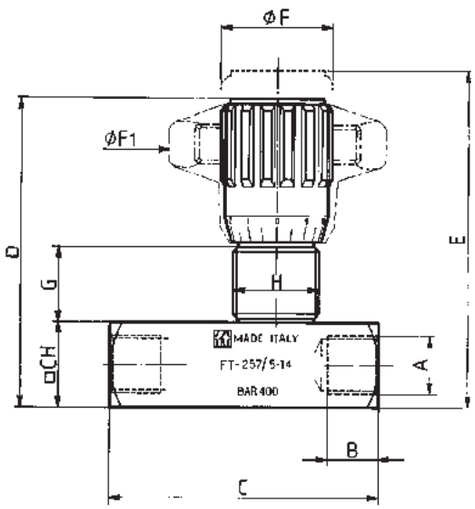


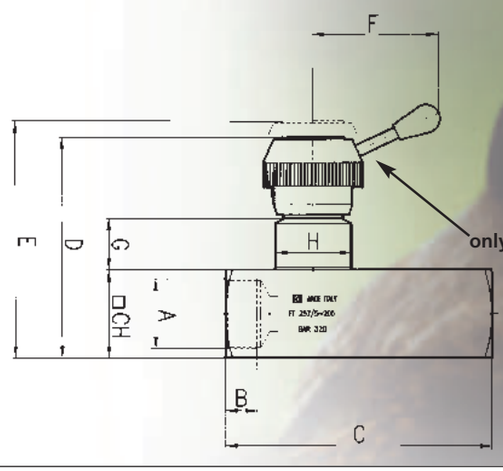
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MATERIALS

Body	9 S Mn Pb 23 - UNI 5105
Needle	1 C 40 - UNI 8373
O R	Nitrile
Antiextrusion rings	PTFE
Check valves	38 Ni Cr Mo 4 UNI - EN 10083
Spring	C72 UNI 3545
Threaded found	35 S Mn Pb 10 - UNI 5105
Knob	GD Al Si 12 - UNI 5706
Knob (mp)	ABS





DIMENSIONS

TYPE	A UNI 338	B	C	D	E	ØF	ØF1	G	H	CH	Weight kg
18	1/8"G	8,5	50	59	64	22	40	13,5	M17x1	16	0,130
14	1/4"G	12,5	66	71	78	27	50	17	M20x1	20	0,250
38	3/8"G	12,5	79	84	93	33	70	19,5	M25x1,5	25	0,500
12	1/2"G	15,5	94,5	97	107	38	80	21	M30x1,5	30	0,750
34	3/4"G	17	115	120,5	132,5	47	100	26,5	M40x1,5	40	1,600
100	1"G	20	138,5	151,5	167,5	58	120	35	M50x1,5	50	3,050
114	1 1/4"G	22	157	156,5	172,5	58	120	35	M50x1,5	55	3,750
112	1 1/2"G	24	190	167	181	58	120	35	M55x2	65	5,760
200	2"G	27	228	188	202	108	–	44	M65x2	75	10,000

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IN LINE SINGLE-ACTING CONTROL VALVES



Their function is to control and, if necessary, to shut-off the flow in one direction, allowing a free return flow in the opposite direction. Appreciated for their aesthetic characteristics, they are a reliable solution.
The suitable dimensioning has made possible to obtain, in a little space, a great mechanic resistance of the components. The spring in high-resistance material is housed in such a way that it does not close as a pack during the opening of the single-acting conical valve poppet.
Like all the valves of the series FT 257 they ensure:

- metallic seal;
- flow linearity at the opening;
- accurate control for a wide range of flow rate, thanks to the double reference system
- wide range of the flow rate control;
- impossibility for the needle to leave its seat even in the max. opening position;
- stable positioning thanks to a dowel inside the knob;
- quickness in the assembling of the panel (the ring nuts (G) are supplied on request).

The check valve is calibrated at 0,5 bar.

On request

- Versions AISI 316 code FT 2257/5
- Viton seals (V)
- NPT threads
- Equipped with ring nuts (G)
- Knob in ABS (mp)

FT 257/5

EXAMPLE FOR ORDERING

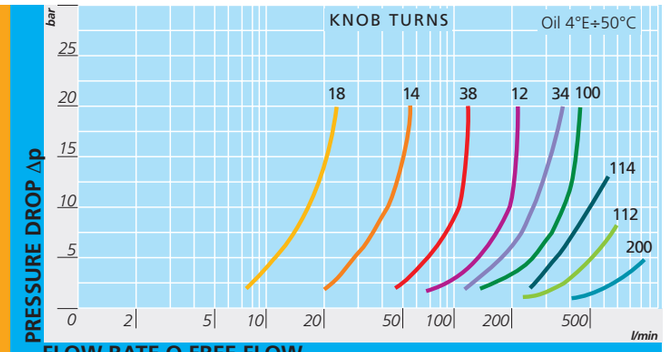
	Code	Type	Pannel ring nut	Viton seal	Knob in plastic
Steel	FT 257/5	18	G	V	mp
Stainless steel	FT 2257/5	34	G	–	mp

TECHNICAL DATA

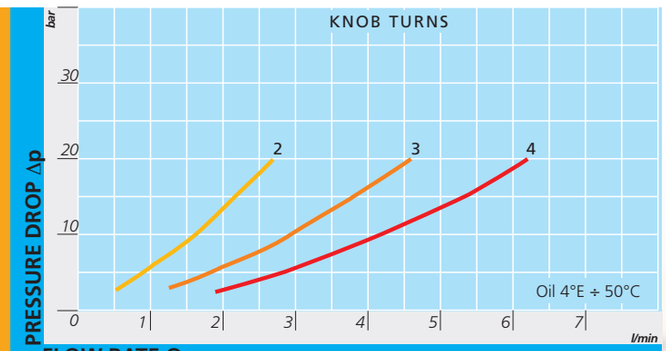
Type	Flow section cm²	Working pressure bar	Min. bursting pressure bar	Working temperature	Filtration grade µm
18	0,12	400	1600	-20°/+100°	25
14	0,19	400	1600	-20°/+100°	25
38	0,39	400	1600	-20°/+100°	25
12	0,68	400	1600	-20°/+100°	25
34	1,13	400	1600	-20°/+100°	25
100	2,09	320	1300	-20°/+100°	25
114	2,09	320	1300	-20°/+100°	25
112	3,14	320	1300	-20°/+100°	25
200	4,91	320	1300	-20°/+100°	25

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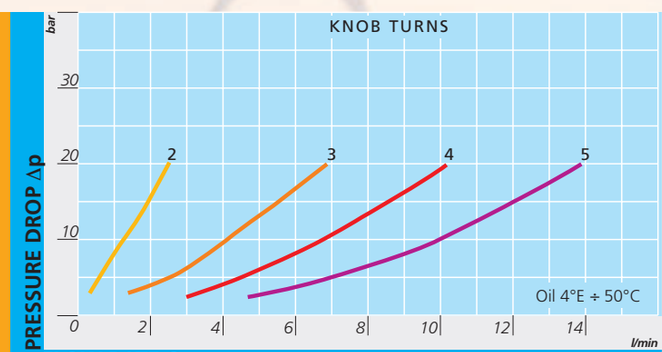
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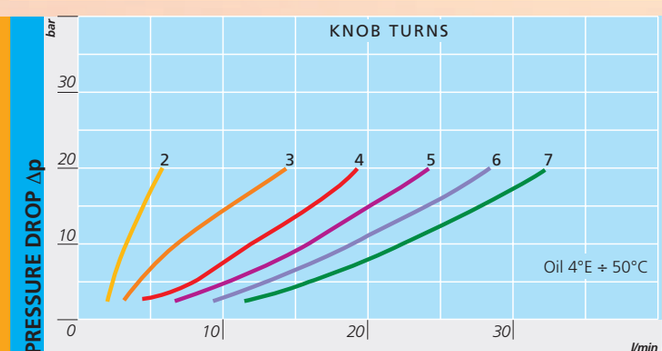
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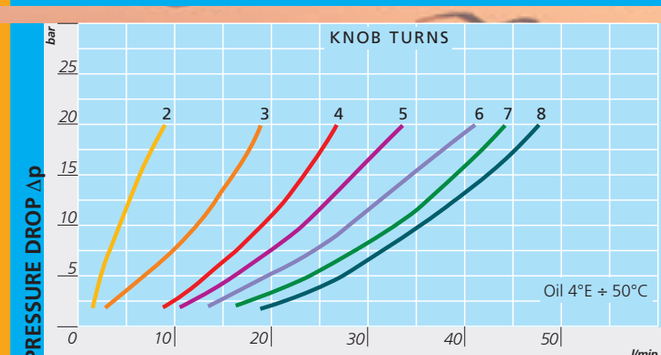
FT 257/5-14



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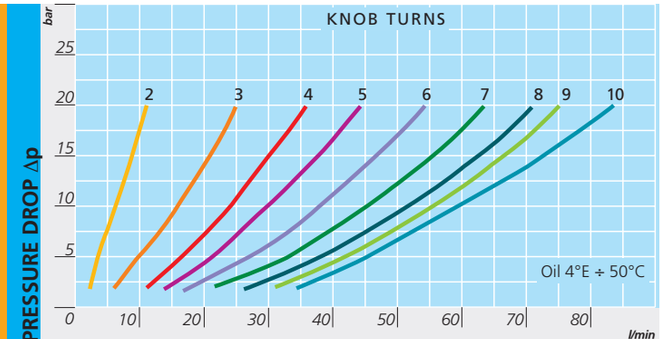


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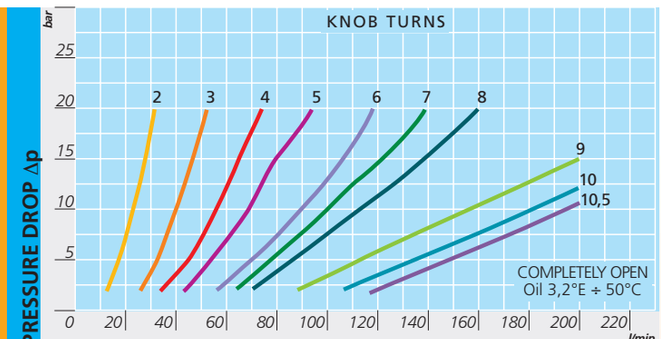


FLOW RATE CURVES

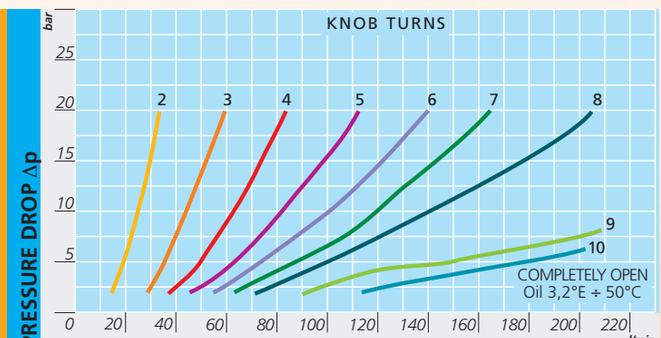
FT 257/5 -34



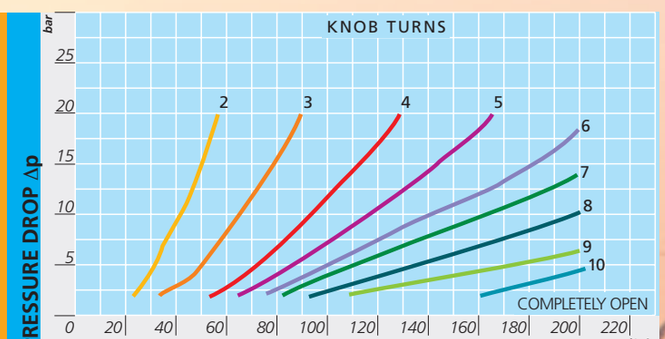
FT 257/5 -114



FT 257/5 -112

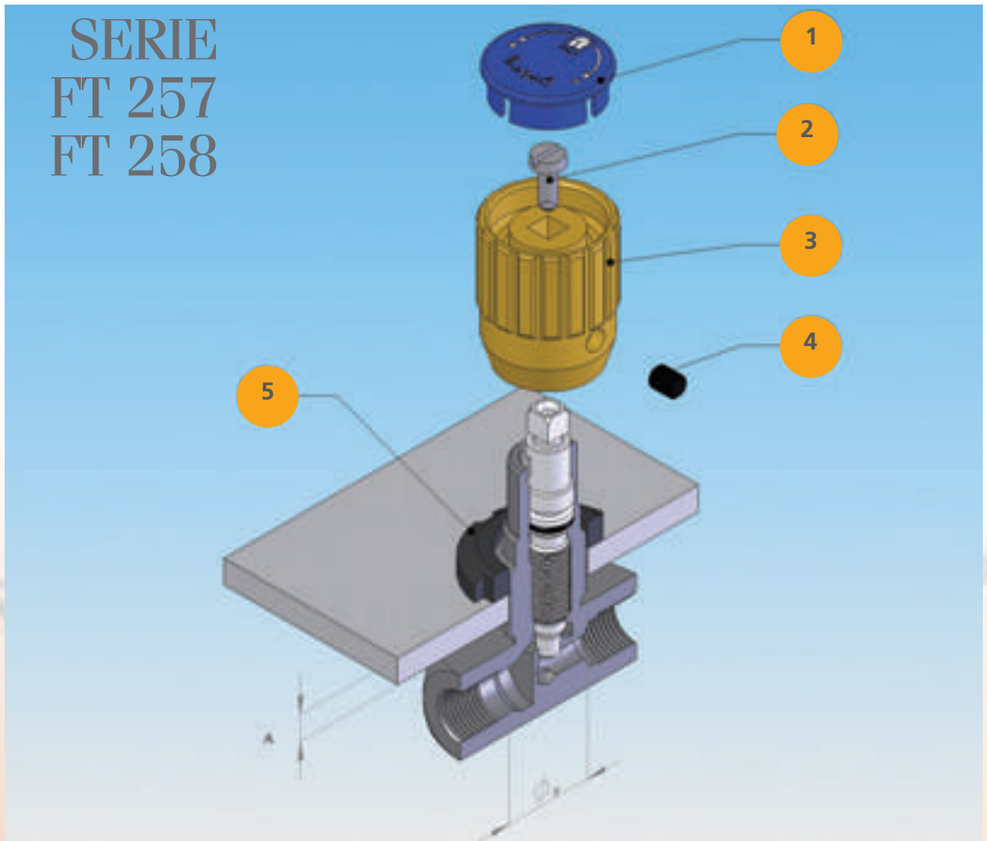


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SERIE FT 257 FT 258

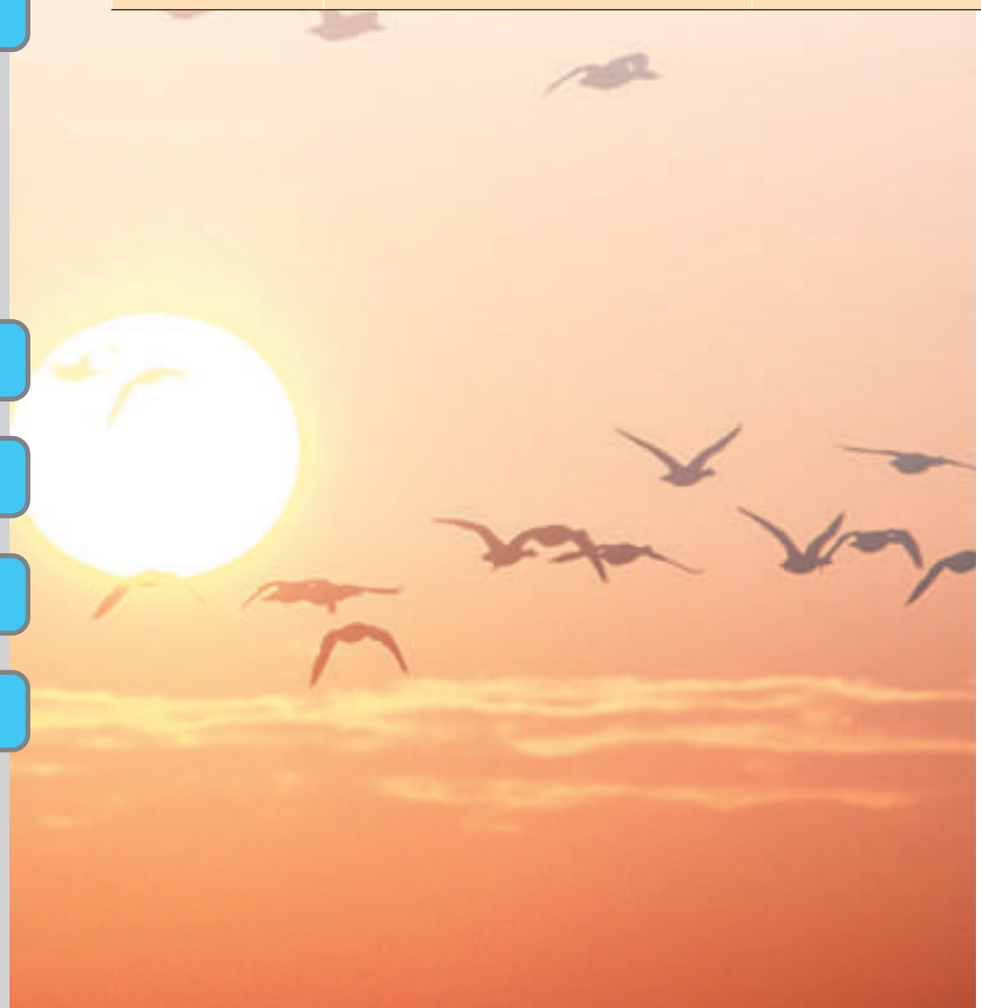


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PANEL MOUNTING

1°	Unscrew lock screw (4)
2°	Remove cover plate (1)
3°	Unscrew screw (2)
4°	Pull off handle (3)
5°	Insert ring nut (5), on request it is supplied with the valve

Type valve	Panel thickness A max	Bore for panel mounting ØB
18	6	18
14	8	21
38	10	26
12	10	31
34	10	41
100	10	51
114	10	51
112	12	56
200	12	66



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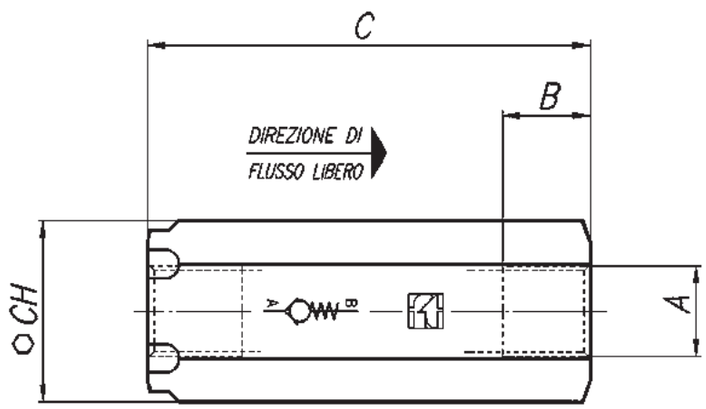


MATERIALS

Body	9S Mn Pb 23 - UNI 5105
Check valve	38 Ni Cr Mo 4 - UNI - EN 10083
Spring	C72 UNI 3545
Threaded found.	35 S Mn Pb 10 - UNI 5105

EXAMPLE FOR ORDERING

	Code	Type	Calibration
Steel	FT 257/6	14	–
Stainless steel	FT 2257/6	12	–
Steel	FT 257/6/8	34	8



DIMENSIONS

TYPE	A UNI 338	B	C	CH	Weight kg
18	1/8"G	8,5	46	17	0,075
14	1/4"G	12,5	63	22	0,165
38	3/8"G	12,5	68	27	0,260
12	1/2"G	15,5	80,5	32	0,415
34	3/4"G	17	99,5	36	0,605
100	1"G	20	117	46	1,170
114	11/4"G	22	134,5	55	1,850
112	1 1/2"G	24	159	65	3,130
200	2"G	27	198	75	4,900

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CHECK VALVES (PISTON)

They are inserted in branches of the circuit where the free flow in one direction is allowed and the return flow in the opposite direction is not possible. A lasting and hermetic seal is ensured by the conical valve poppet, which is a reliable mechanical solution.
The spring in high-resistance material is housed in such a way that it does not close as a pack during the opening phase. The external configuration of the body makes it easy to seize the piece during the assembling.
They are available with different calibrations of the load pressure (0,5 standard and 2-4-6-8-10 bars).



On request
- Versions AISI 316 code FT 2257/6
- NPT threads

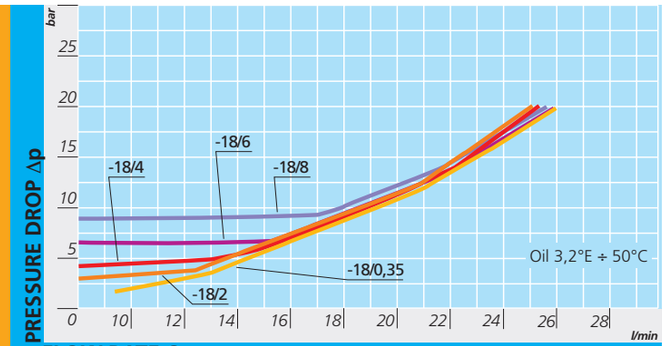
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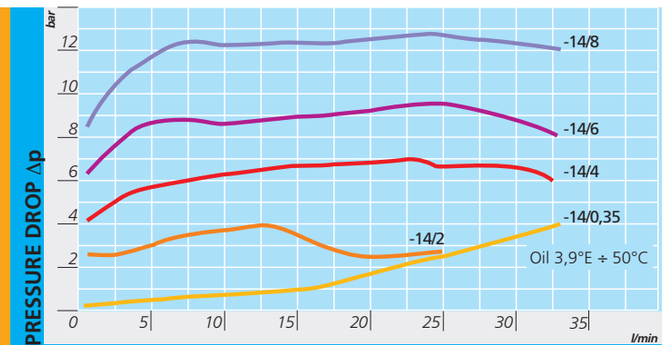
TYPE	WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE C°	FILTRATION GRADE µM
18	400	1600	-20°/+100°	25
14	400	1600	-20°/+100°	25
38	400	1600	-20°/+100°	25
12	400	1600	-20°/+100°	25
34	400	1600	-20°/+100°	25
100	320	1300	-20°/+100°	25
114	320	1300	-20°/+100°	25
112	320	1300	-20°/+100°	25
200	320	1300	-20°/+100°	25

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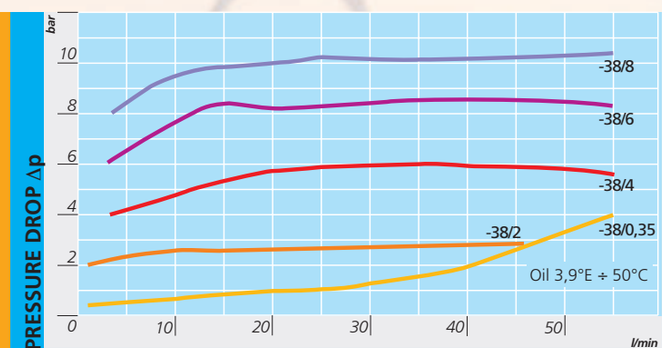
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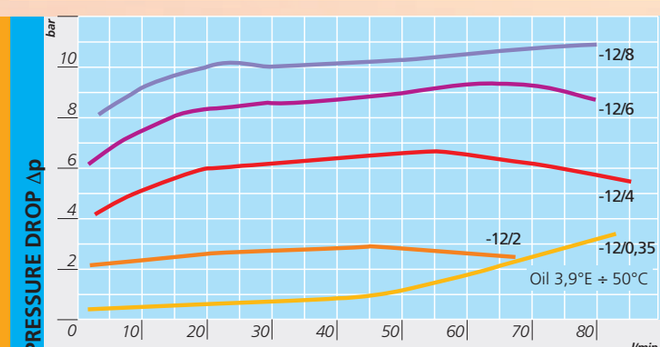
FT 257/6 - 14



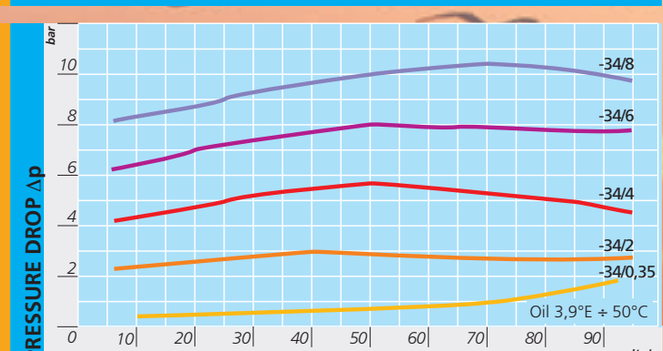
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FT 257/6 - 12

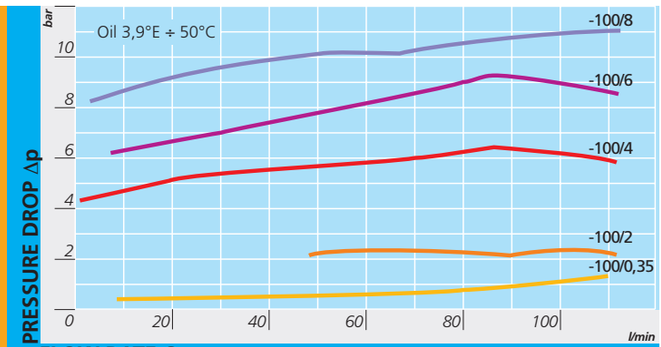


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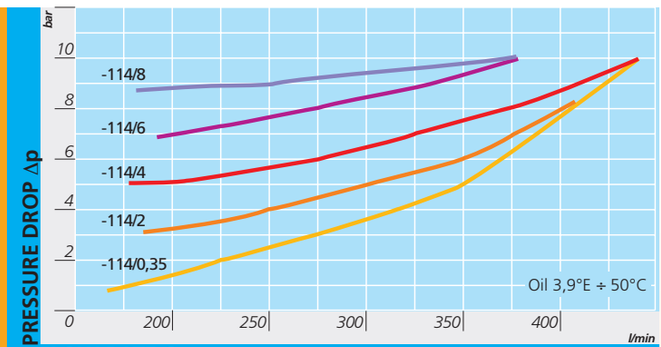


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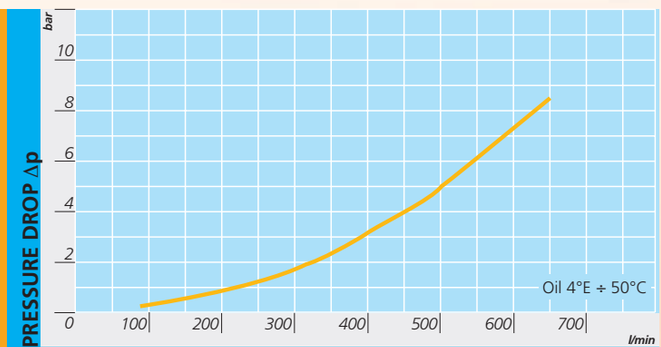
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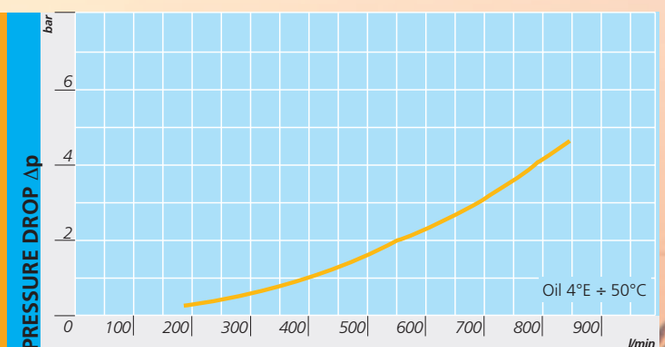
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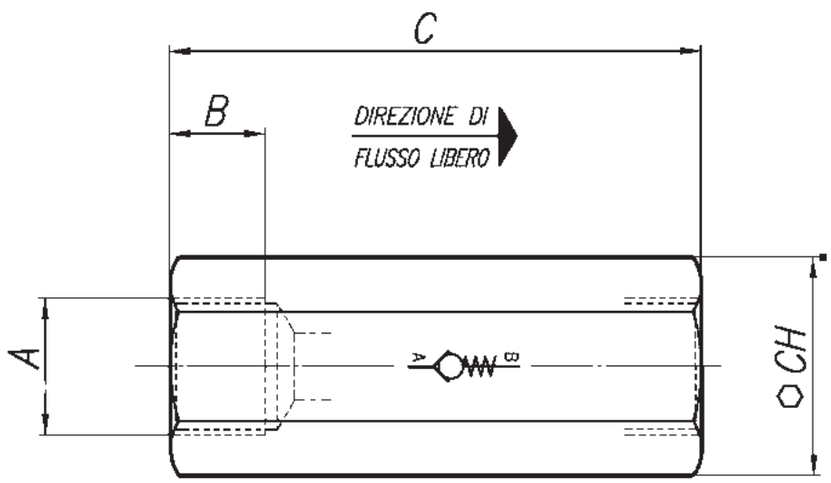


MATERIALI

Body	9 S Mn Pb 23 - UNI 5105
Spring	AISI 302
Ball	UNI 100 C 6
Ball guide	Nylon 66 + fibra carbonio

EXAMPLE FOR ORDERING

	Code	Type
Steel	FT 260/6	14



DIMENSIONS

TYPE	A UNI 338	B	C	CH	Weight kg
18	1/8"G	8,5	41	16	0,054
14	1/4"G	12,5	54	19	0,089
38	3/8"G	13	65	24	0,175
12	1/2"G	16	77	30	0,310
34	3/4"G	20	88	36	0,450
100	1"G	23	108,5	46	0,965

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IN LINE SINGLE-ACTING VALVES (BALL)

They are inserted in branches of the circuit where the free flow in one direction is allowed and the return flow in the opposite direction is not possible.
The single-acting valves (in line) are of ball type with alignment guide made of composite high resistance material which allows a total passage and a great breaking strength and wear resistance. All this has been confirmed by numerous tests.
They are available with two different calibrations of the opening pressure (0,35 standard e 4.5 bar).

On request
- Version AISI 316 code FT 2260/6 **with seal**



FT 260/6

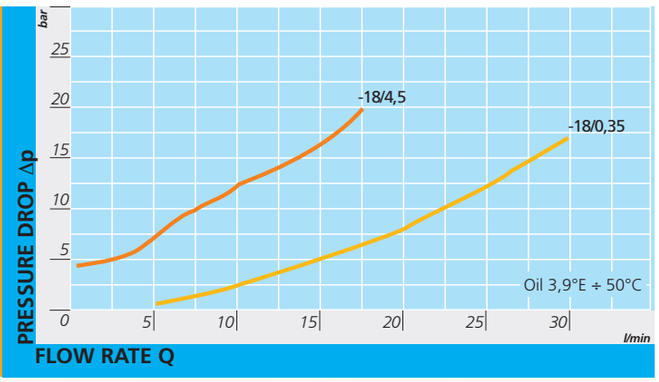
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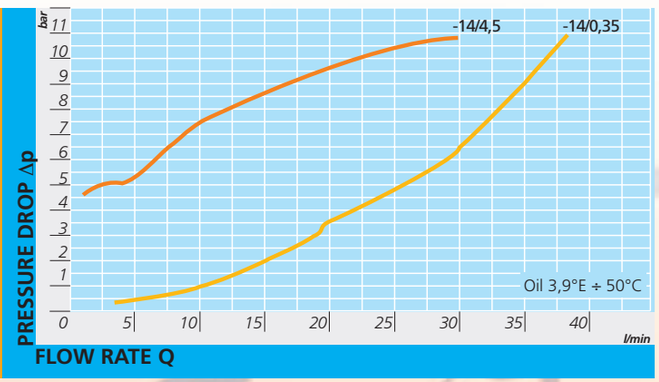
TYPE	WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE C°	FILTRATION GRADE µM
18	400	1600	-20°/+100°	25
14	400	1600	-20°/+100°	25
38	400	1600	-20°/+100°	25
12	400	1600	-20°/+100°	25
34	400	1600	-20°/+100°	25
100	320	1300	-20°/+100°	25

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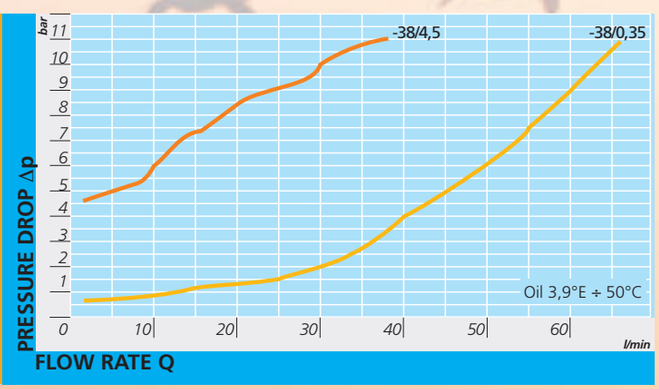
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FT 260/6 - 14

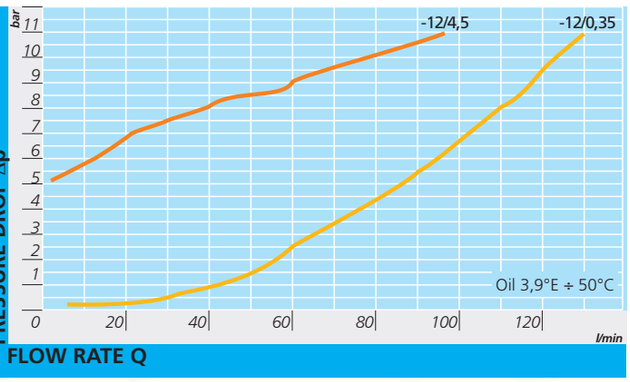


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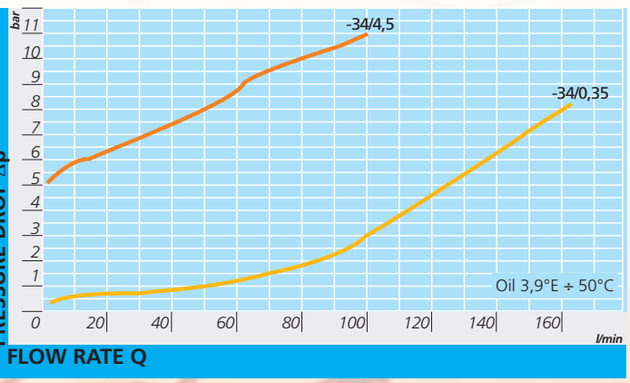


FLOW RATE CURVES

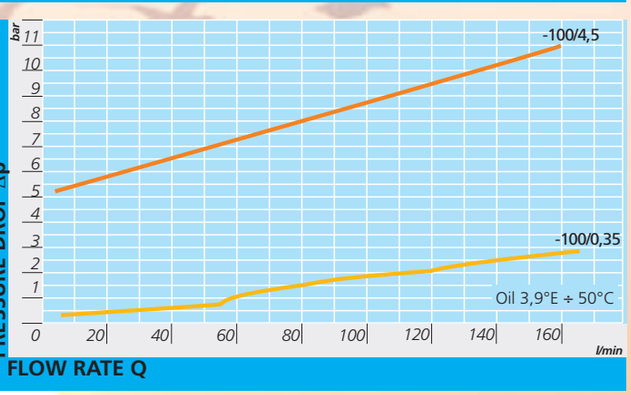
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FT 260/6 - 100



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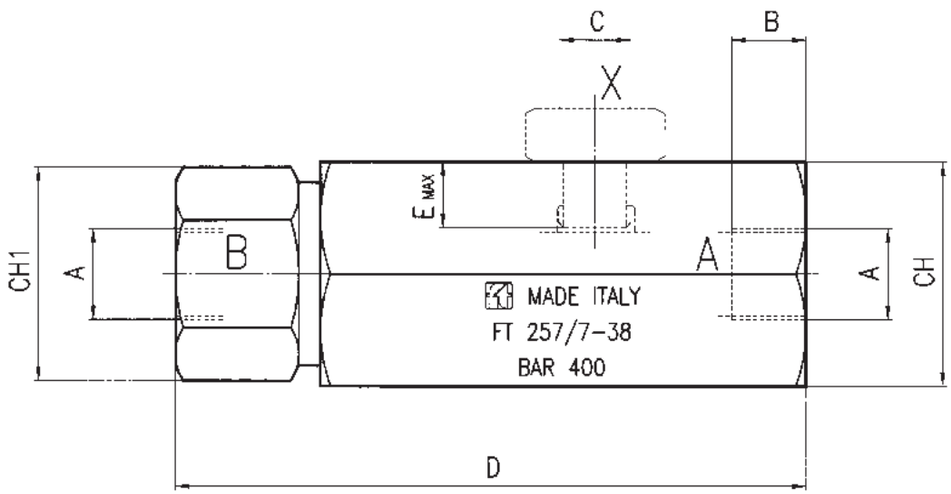


MATERIALS

Body	Ps Mn Pb 23 - UNI 5105
Check valve	38 Ni Cr Mo 4 - UNI - EN 10083
Spring	C72 UNI 3545

EXAMPLE FOR ORDERING

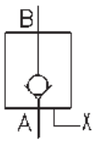
	Code	Type
Steel	FT 257/7	14
Stainless steel	FT 2257/7	14



DIMENSIONS

TYPE	A UNI 338	B	C UNI 338	D	E	CH	CH1	Weight kg
14	1/4"G	12,5	1/4"G	100	12	38	28	0,771
38	3/8"G	12,5	1/4"G	115	12	41	34	1,012
12	1/2"G	15,5	1/4"G	139	12	46	41	1,553
34	3/4"G	17	1/4"G	168	12	55	46	2,596
100	1"G	20	1/4"G	197	12	65	55	4,161

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SINGLE PILOT CHECK VALVES



Belonging to the same range of the in line single-acting valves, but different in that they allow the valve to open in the direction that is normally closed thanks to a particular signal of pilot operated pressure. The high level of pilot ratio, realized in the design phase, enables rapid and complete opening for the whole duration of the desired cycle.
The construction material used for the seal pistons, the hardened treatment that these are subjected to, as well as the finish-grinding guarantee a perfect seal even in particularly adverse working conditions.

Uses
The above mentioned valves are generally used for blocking work circuits under pressure, such as guarding against falling loads in the event of pipe braking or against creeping movements for hydraulically blocks systems.

On request
Version AISI 316 code FT 2257/7.

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TECHNICAL DATA

TYPE	Working pressure bar	Min. bursting pressure bar	Working temperature C°	Filtration grade µm	Pilotage ratio	Min. opening pressure bar
14	400	1600	-20°/+100°	25	1-5.3	0,5
38	400	1600	-20°/+100°	25	1-5	0,5
12	400	1600	-20°/+100°	25	1-5.3	0,5
34	400	1600	-20°/+100°	25	1-4.4	0,5
100	320	1300	-20°/+100°	25	1-4.2	0,5

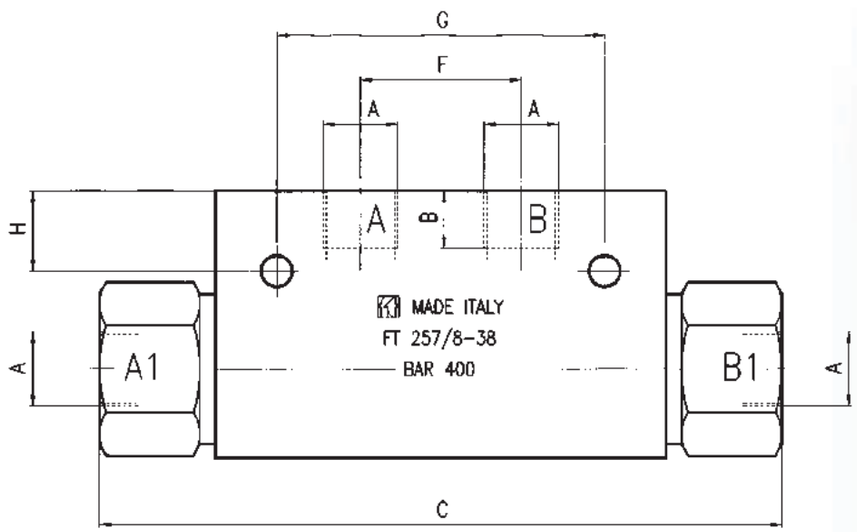


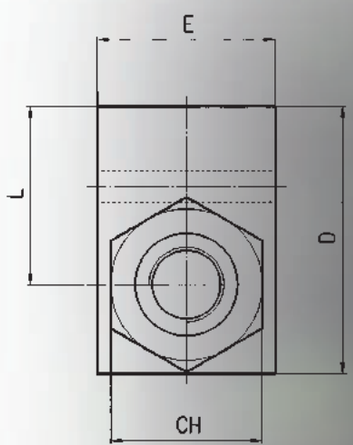
MATERIALS

Body	Ps Mn Pb 23 - UNI 5105
Check valve	38 Ni Cr Mo 4 - UNI - EN 10083
Spring	C72 UNI 3545

EXAMPLE FOR ORDERING

	Code	Type
Steel	FT 257/8	14
Stainless steel	FT 2257/8	14

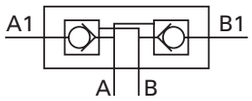




DIMENSIONS

Type	A UNI338	B	C	D	E	F	G	H	L	CH	Viti	Weight kg
14	1/4"G	12,5	126	45	35	27	60	10	29	28	M6X45	1,088
38	3/8"G	12,5	153	60	40	36	73,5	18	40	34	M6X50	1,360
12	1/2"G	15,5	193	65	50	46	94	15	40	41	M6X60	3,321

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DOUBLE PILOT CHECK VALVES

Belonging to the same range of the in line single-acting valves, but different in that they allow the valve to open in the direction that is normally allowed thanks to a particular signal of pilot operated pressure. The high level of pilot ratio, realized in the design phase, enables rapid and complete opening for the whole duration of the desired cycle. The construction material used for the seal pistons, the hardened treatment that these are subjected to, as well as the finish-grinding guarantee a perfect seal even in particularly adverse working conditions.



Uses
The above mentioned valves are generally used for blocking work circuits under pressure, such as guarding against falling loads in the event of pipe braking or against creeping movements for hydraulically blocks systems.

On request
Version AISI 316 code FT 2257/8.

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TECHNICAL DATA

TYPE	WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE C°	FILTRATION GRADE µM	PILOTAGE RATIO	MIN. OPENING PRESSURE BAR
14	400	1600	-20°/+100°	25	1-7,6	0,5
38	400	1600	-20°/+100°	25	1-7	0,5
12	400	1600	-20°/+100°	25	1-7,4	0,5

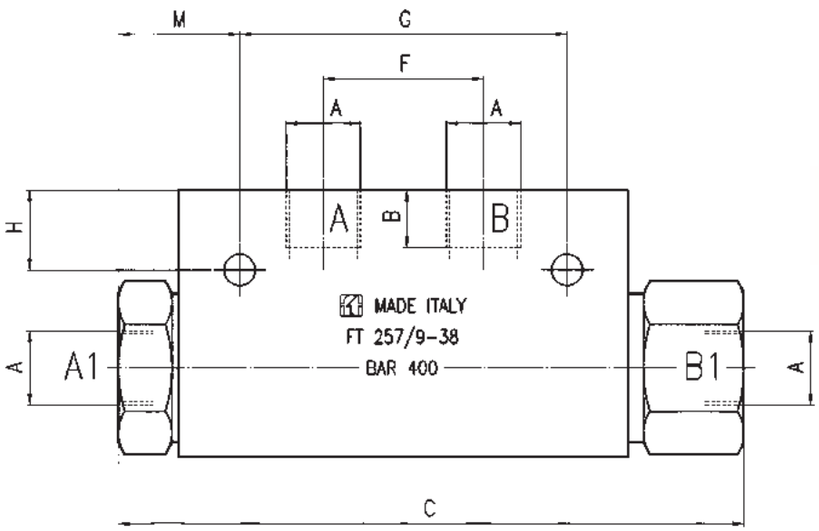


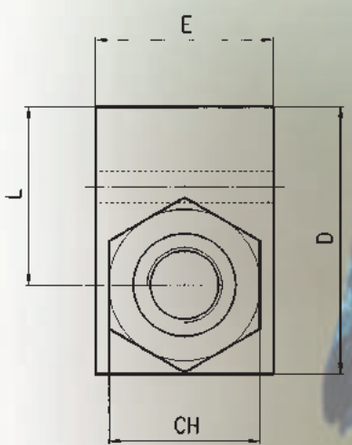
MATERIALS

Body	Ps Mn Pb 23 - UNI 5105
Check valve	38 Ni Cr Mo 4 - UNI - EN 10083
Spring	C72 UNI 3545

EXAMPLE FOR ORDERING

	Code	Type
Steel	FT 2257/9	14

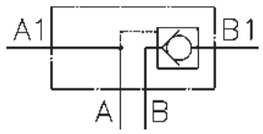




DIMENSIONS

Type	A UNI338	B	C	D	E	F	G	H	L	M	CH	Viti	Weight kg
14	1/4"G	12,5	115	45	35	27	60	10	29	22	28	M6X45	1,016
38	3/8"G	12,5	140,5	60	40	36	73,5	18	40	27,25	34	M6X50	1,860
12	1/2"G	15,5	173,5	65	50	46	94	15	40	30	41	M6X60	3,100

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SINGLE PILOT CHECK VALVES

Belonging to the same range as the in-line check valves, but different in that they allow the valve to open in the direction that is normally allowed. The high level of pilot ratio, realized in the design phase, enables rapid and complete opening for the whole duration of the desired cycle.
The construction material used for the seal pistons, the hardened treatment that these are subjected to, as well as the finish-grinding guarantee a perfect seal even in particularly adverse working conditions.



Uses
The above mentioned valves are generally used for blocking work circuits under pressure, such as guarding against falling loads in the event of pipe braking or against creeping movements for hydraulically blocks systems.

On request
Version in AISI 316 code FT 2257/9

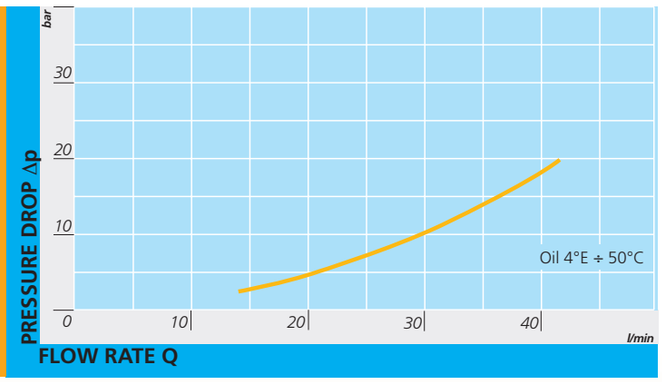
FT 2579

TECHNICAL DATA

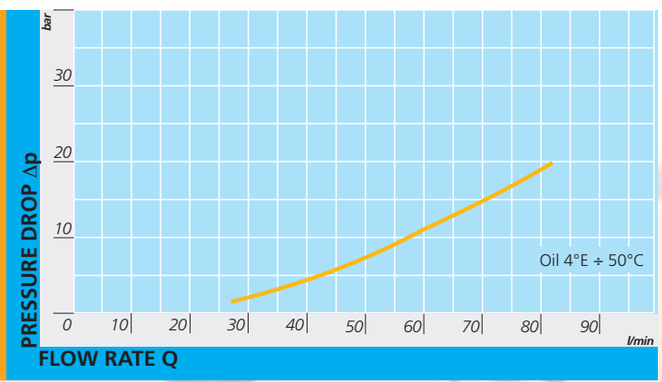
TYPE	WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE C°	FILTRATION GRADE µM	PILOTAGE RATIO	MIN. OPENING PRESSURE BAR
14	400	1600	-20°/+100°	25	1-7,6	0,5
38	400	1600	-20°/+100°	25	1-7	0,5
12	400	1600	-20°/+100°	25	1-7,4	0,5

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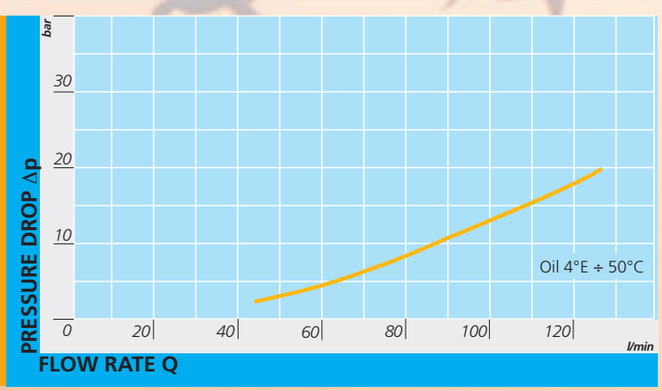
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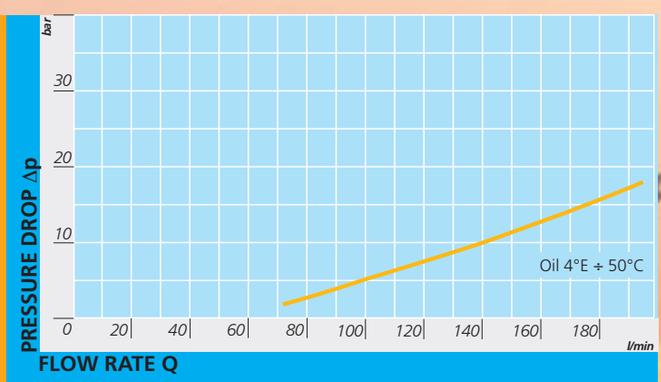
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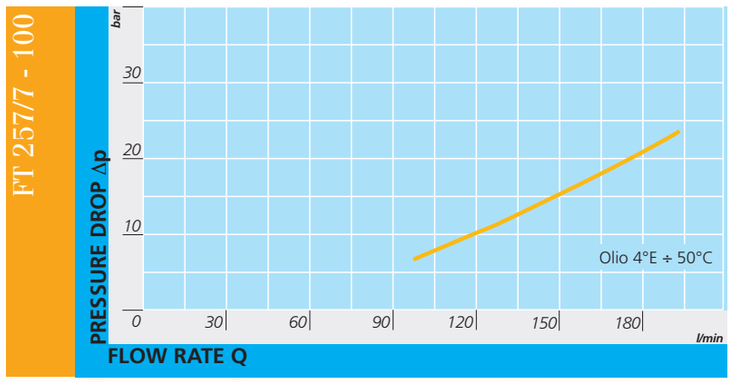
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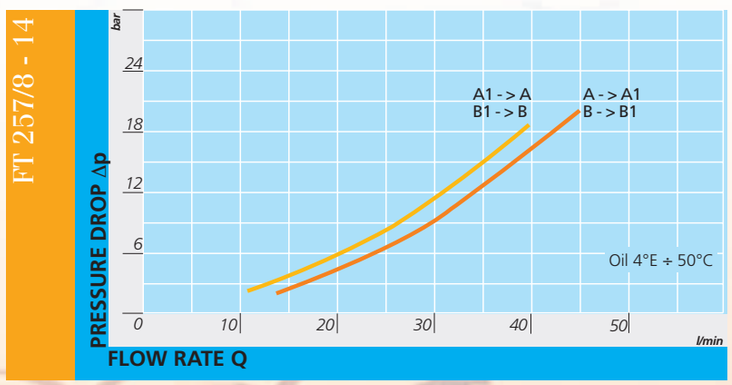


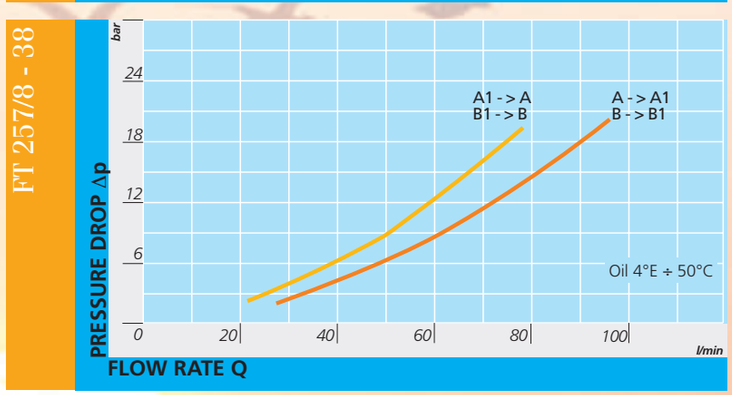
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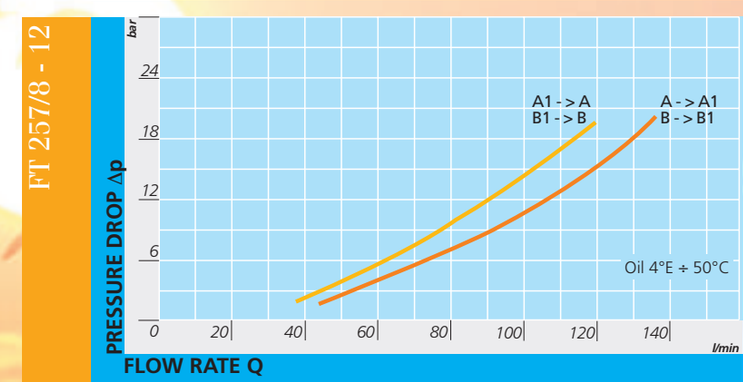


FLOW RATE CURVES

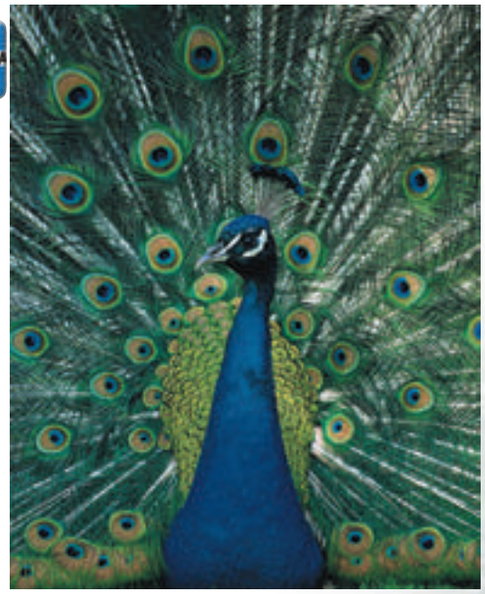








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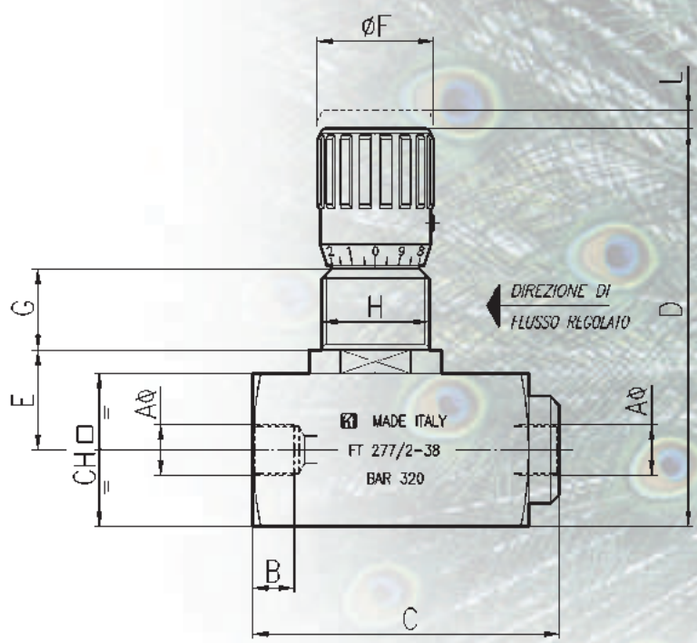


MATERIALS

Base body	9 S Mn Pb 23 - UNI 5105
Cartridge body	35 S Mn Pb 10 - UNI 5105
Compensating unit	38 Ni Cr Mo 4 UNI - EN 10083
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD - Al Si 12 - UNI 5706

EXAMPLE FOR ORDERING

		Accessoires on request	
Code	Type	Panel ring nut	Viton seal
FT 277/2	34	G	V



DIMENSIONS

Type	A UNI338	B	C	D	E	ØF	G	H	L	CH	Weight kg
14	1/4"G	12,5	81	107	28	33	17	M30x1,5	4,5	45	1,300
38	3/8"G	12,5	100	129.5	32	38	27	M35x1,5	6	50	2,000
12	1/2"G	15,5	119	150	38	47	28,5	M40x1,5	6,5	60	3,300
34	3/4"G	17	142	182.5	45	58	35	M50x1,5	7,5	70	6,700

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DOUBLE-ACTING PRESSURE COMPENSATED FLOW CONTROL VALVES



FT 277/2

Double-port pressure compensated control valves
They include two necks in series:
- the first one with port section definable by an external control;
- the second one with automatically variable section in relation with counter pressure variations on use.

The choice of the adjustable neck situated upstream is that which best ensures the precision of the valve towards variations of the fluid temperature.
Regarding the structure of the valve, the following points must be underlined:
- the rigorous symmetry of the internal components such as to impede unforeseen perturbations of the static and dynamic balances;
- the optimisation of the arrangement of internal spring controlling the intervention of the automatic throttling, with variable preload with throttling fixed setting, useful to improve the behaviour at medium-high flow rates;
- the geometry of the passage across which the flow is automatically throttled, designed to minimize the effect of the flow hydromechanics forces on the total balance of the moving element;
- the accuracy of the machining which enabled to cancel any hysteresis effect of mechanical origin;
- the original aesthetic feature, underlined by the particular form of the control knob;
- the easiness to reset the flow value thanks to reference pointers.

Moreover we believe important to underline the choice of the constructive solution fitting to the concept of "double valence", according to which the central body, configurated as a threaded cartridge and insertable in the two different bodies at the base or directly in standard modular units, brings about the three marketed versions:
- FT 277/2 two-way
- FT 277/5 two-way with single-acting valve
- FT 287/2 with threaded cartridge mounted.

This solution enables the user to request the single modular components to be assembled according to the application.

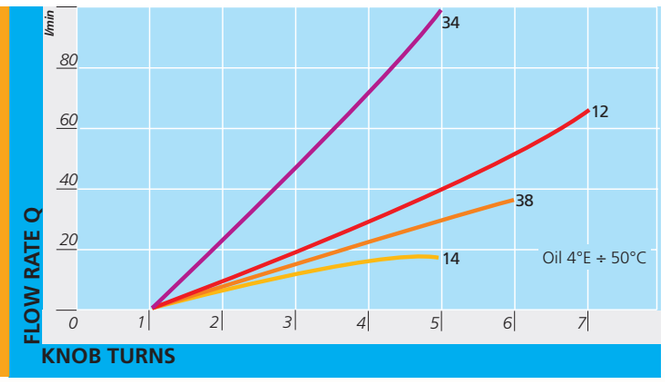
On request
- equipped with ring nuts (G)
- Viton seals (V)

TECHNICAL DATA

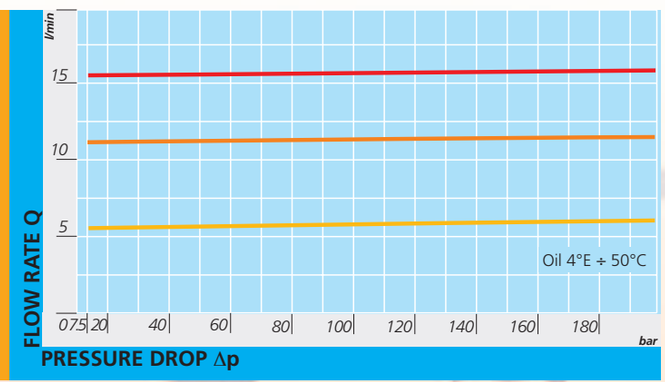
Type	Max Working pressure bar	Min. Δp working bar	Working temperature C°	Filtration grade μm absolute
14	320	7,5	-20°/+70°	25
38	320	10	-20°/+70°	25
12	320	12	-20°/+70°	25
34	320	15	-20°/+70°	25

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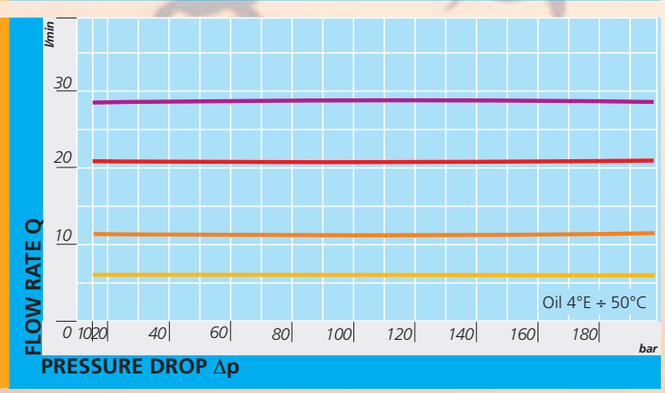
FT 277



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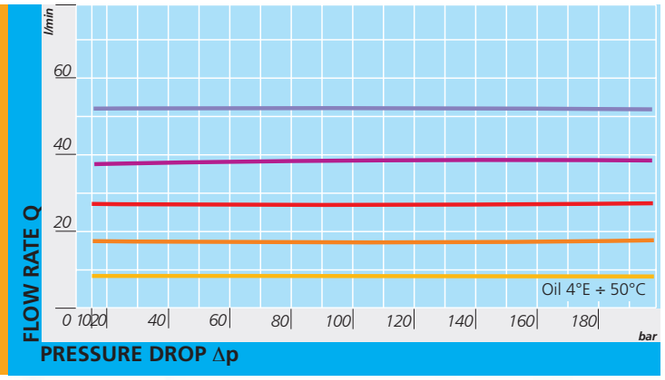


FT 277/38

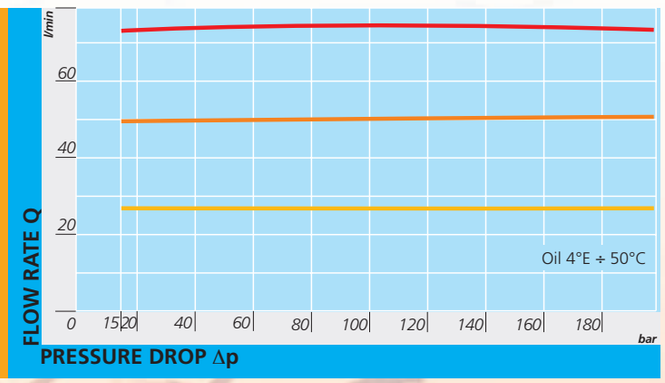


FLOW RATE CURVES

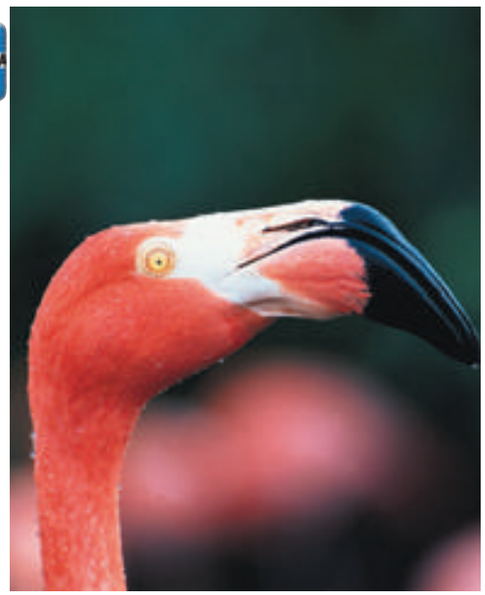
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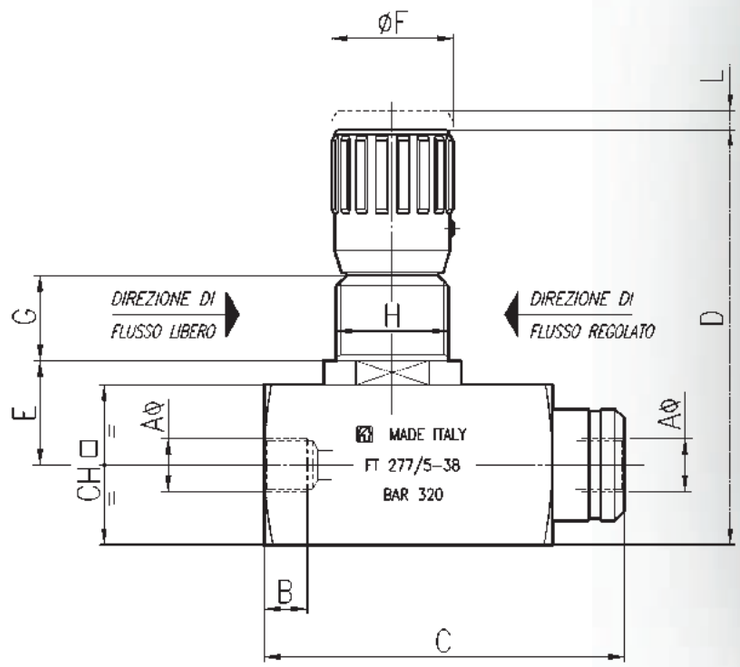


MATERIALS

Base body	9 S Mn Pb 23 - UNI 5105
Cartridge body	35 S Mn Pb 10 - UNI 5105
Compensating unit	38 Ni Cr Mo 4 UNI - EN 10083
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD - Al Si 12 - UNI 5706

EXAMPLE FOR ORDERING

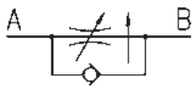
		Accessoires on request	
Code	Type	Panel ring nut	Viton seal
FT 277/5	12	G	V



DIMENSIONS

Type	A UNI338	B	C	D	E	ØF	G	H	L	CH	Weight kg
14	1/4"G	12,5	93,5	107	28	33	17	M30x1,5	4,5	45	1,400
38	3/8"G	12,5	112,5	129.5	32	38	27	M35x1,5	6	50	2,000
12	1/2"G	15,5	136	150	38	47	28,5	M40x1,5	6,5	60	3,500
34	3/4"G	17	163	182.5	45	58	35	M50x1,5	7,5	70	7,000

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SINGLE-ACTING PRESSURE COMPENSATED FLOW CONTROL VALVES



The double-port control valves, pressure compensated and including high capacity single acting valve to allow the free flow in one direction.
They include two necks in series:

- the first one with port section definable by an external control;
- the second one with automatically variable section in relation with counter pressure variations on use.

The choice of the adjustable neck situated upstream is that which best ensures the precision of the valve towards variations of the fluid temperature.
Regarding the structure of the valve, the following points must be underlined:

- the rigorous symmetry of the internal components such as to impede unforseen perturbations of the static and dynamic balances;
- the optimisation of the arrangement of internal spring controlling the intervention of the automatic throttling, with variable preload with throttling fixed setting, useful to improve the behaviour at medium-high flow rates;
- the geometry of the passage across which the flow is automatically throttled, designed to minimize the effect of the flow hydromechanics forces on the total balance of the moving element;
- the accuracy of the machining which enabled to cancel any hysteresis effect of mechanical origin;
- the original aesthetic feature, underlined by the particular form of the control knob;
- the easiness to reset the flow value thanks to reference pointers.

Moreover we believe important to underline the choice of the constructive solution fitting to the concept of “double valence”, according to which the central body, configurated as a threaded cartridge and insertable in the two different bodies at the base or directly in standard modular units, brings about the three marketed versions:

- FT 277/2 two-way
- FT 277/ 5 two-way with single-acting valve
- FT 287/2 with cartridge mounted.

This solution enables the user to request the single modular components to be assembled according to the application.

On request

- equipped with ring nuts (G)
- Viton seals (V)

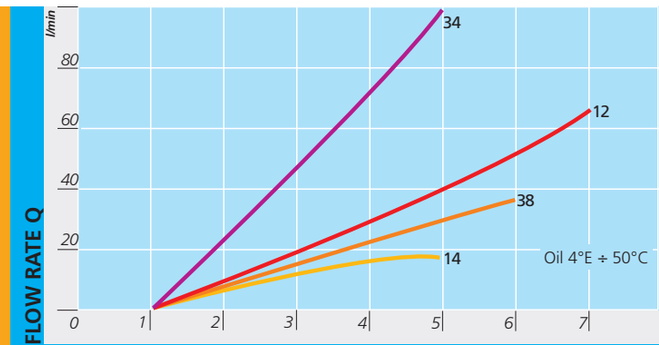
FT 277/5

TECHNICAL DATA

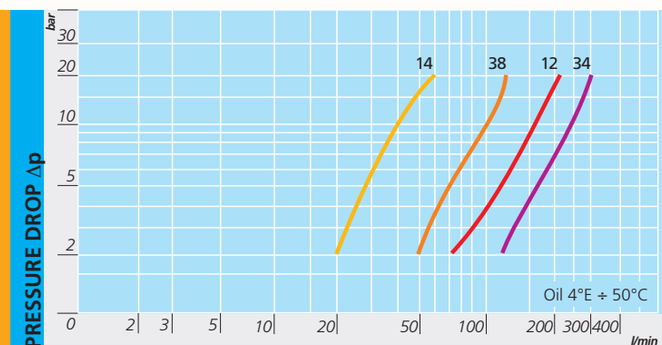
Type	Max Working pressure bar	Min. Δp working bar	Working temperature C°	Filtration grade μm absolute
14	320	7,5	-20°/+70°	25
38	320	10	-20°/+70°	25
12	320	12	-20°/+70°	25
34	320	15	-20°/+70°	25

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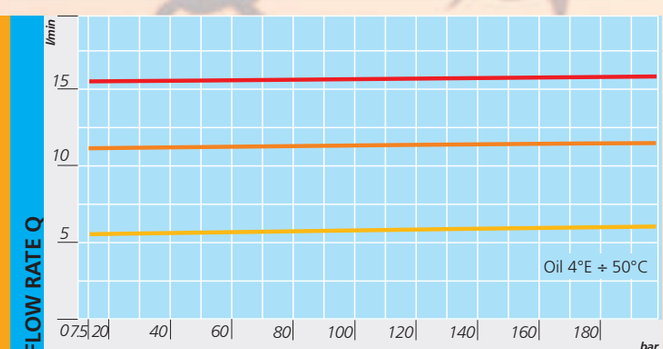
FT 277/5

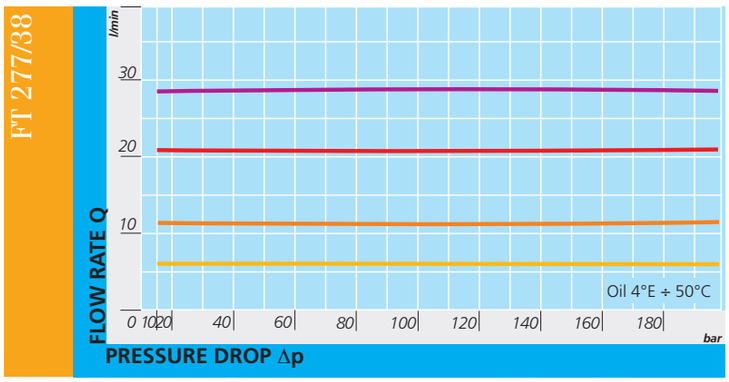


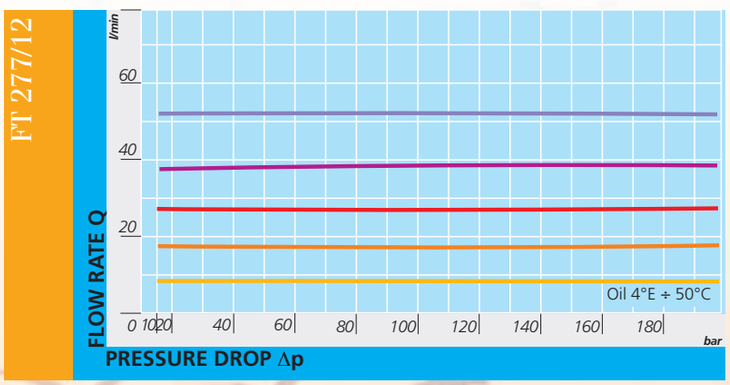
FT 277/5

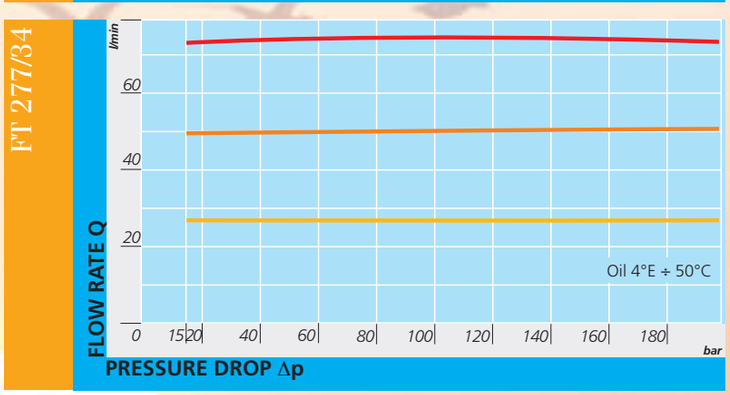


FT 277/14



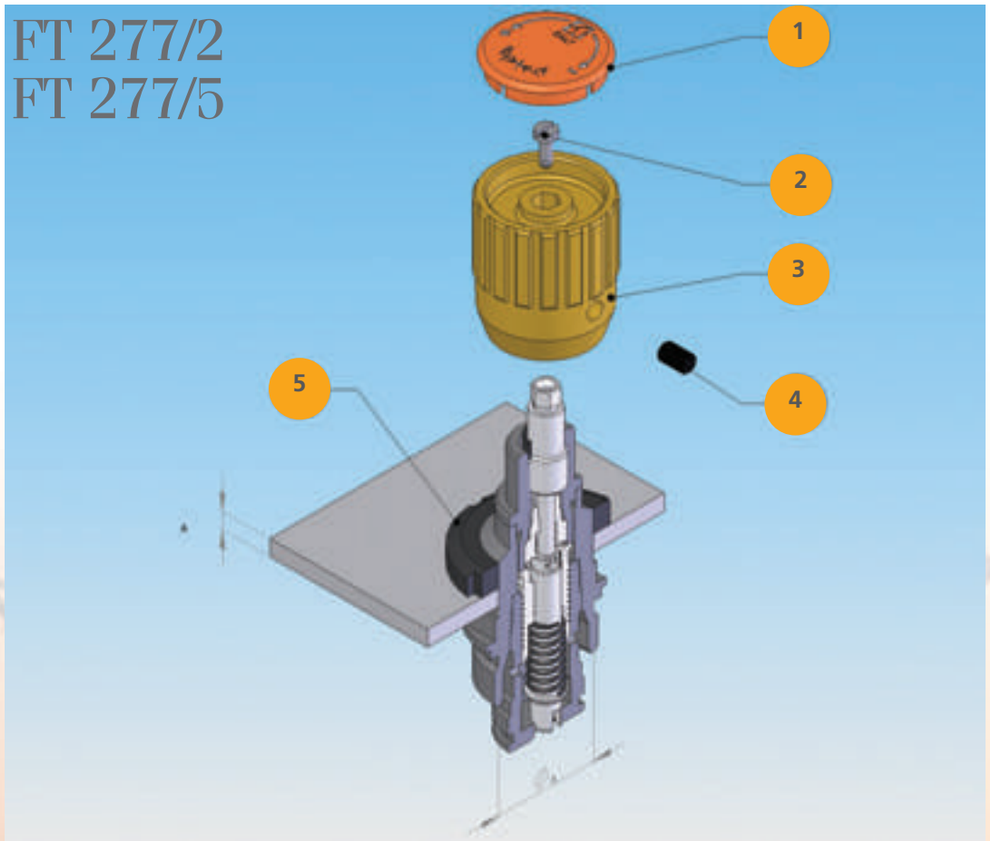






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FT 277/5

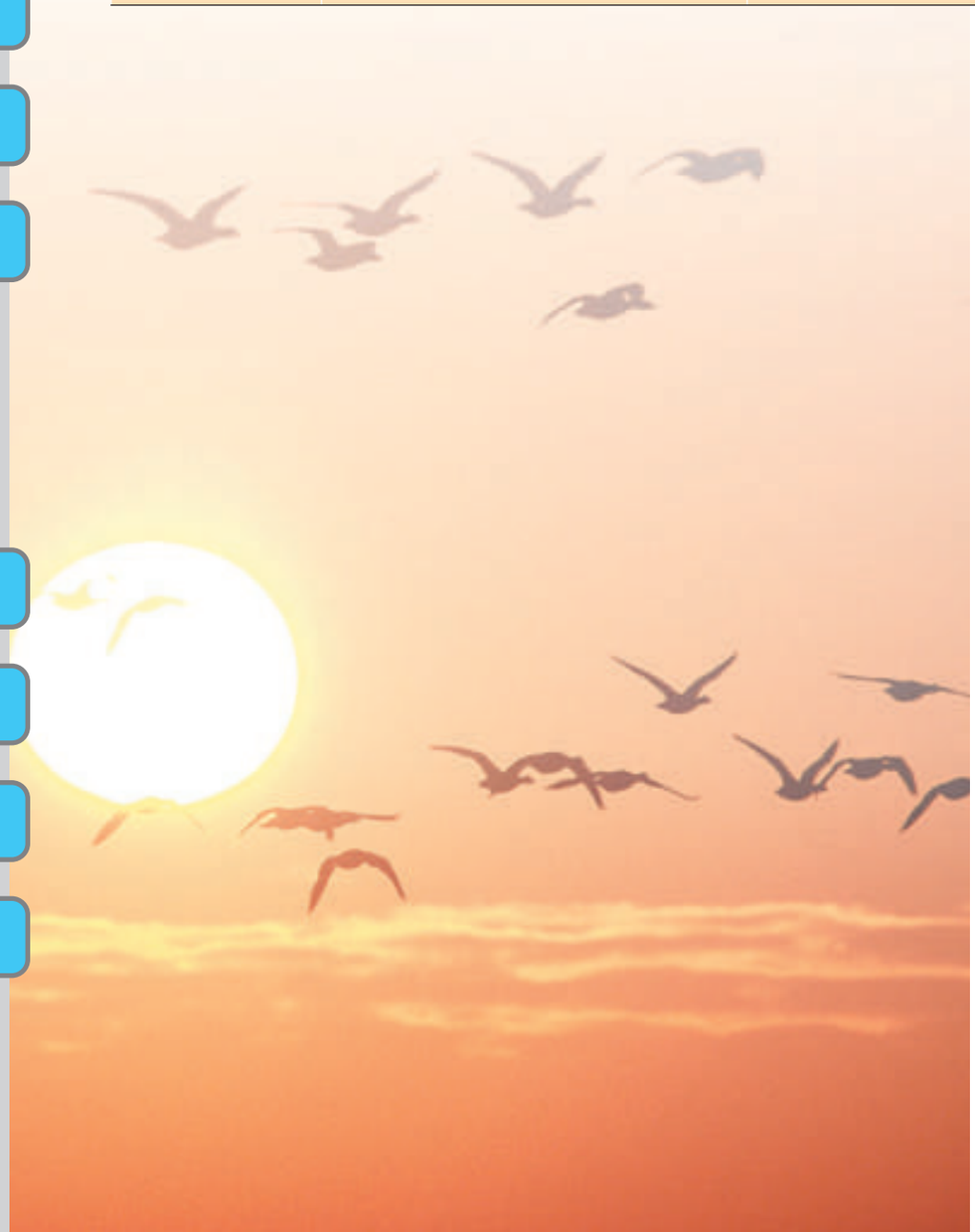


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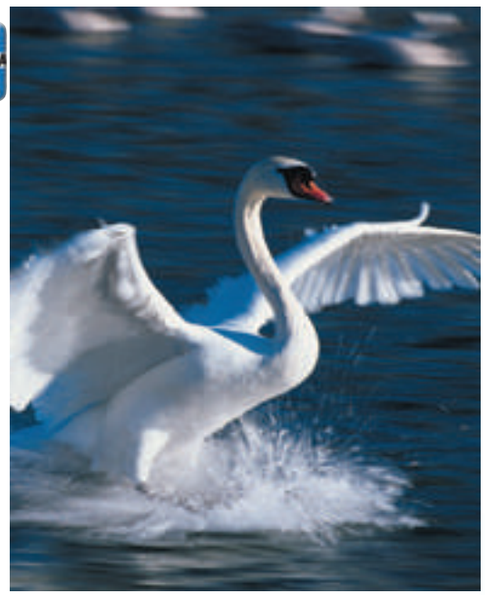
PANEL MOUNTING

1°	Unscrew lock screw (4)
2°	Remove cover plate (1)
3°	Unscrew screw (2)
4°	Pull off handle (3)
5°	Insert ring nut (5), on request it is supplied with the valve

Type valve	panel thickness A max	bore for panel mounting ØB
18	10	31
38	10	36
12	10	41
34	10	51



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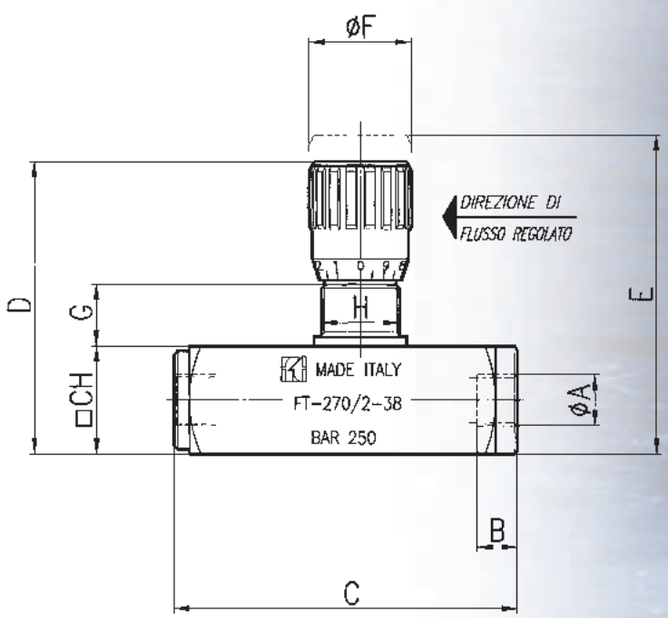


MATERIALS

Base body	9 S Mn Pb 28 - UNI 5105
Cartridge body	38 Ni Cr Mo 4 UNI - EN 10083
Compensating unit	Nitrile
O R	PTFE
Antiextrusion ring	GD - Al Si 12 - UNI 5706

EXAMPLE FOR ORDERING

	Code	Type	Accessoires on request Panel ring nut	Viton seal
	FT 270/2	14	G	V
Stainless steel	FT 2270/2	14	G	V



DIMENSIONS

Type	ØA UNI 338	B	C	D	E	ØF	G	H	CH	Weight kg
14	1/4"G	12,5	94	81,5	88,5	27	15	M20x1	30	0,580
38	3/8"G	13	110,5	94,5	103	33	17	M25x1,5	35	0,940
12	1/2"G	15,5	137	112	122	38	18	M30x1,5	45	1,830
34	3/4"G	17	163	138	150	47	24	M40x1,5	55	3,350
100	1"G	21	214	175	192	58	32	M50x1,5	70	7,000

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DOUBLE-PORT PRESSURE COMPENSATED CONTROL VALVES

The compensated valves are made up of an adjustable orifice and of a pressure compensator piston.
Inside they are equipped with wide transversal sections which reduce the loss of pressure.
The accuracy of the component processing ensures a very low hysteresis.
The accurate checks carried out on the products ensure a good working of the valves also in bad working conditions.

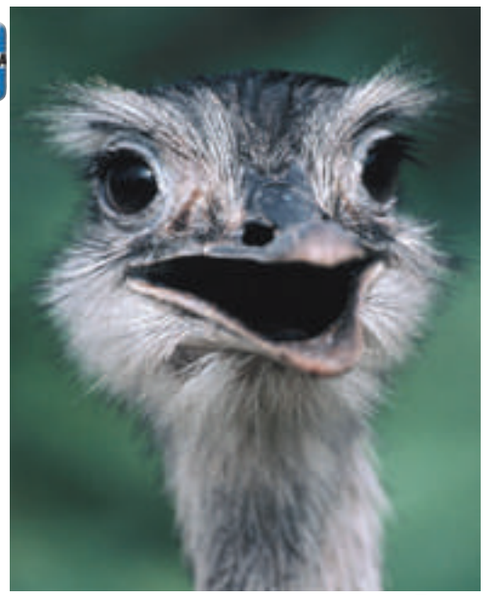
On request
- Fixing panel ring nut
- Viton seals (V)
- Version AISI 316 code FT 2270/2



FT 270/2

TECHNICAL DATA

Type	Max Working pressure bar	Min. Δp working bar	Working temperature C°	Filtration grade μm absolute
14	250	5	-20°/+70°	25
38	250	7	-20°/+70°	25
12	250	10	-20°/+70°	25
34	250	10	-20°/+70°	25
100	250	16	-20°/+70°	25

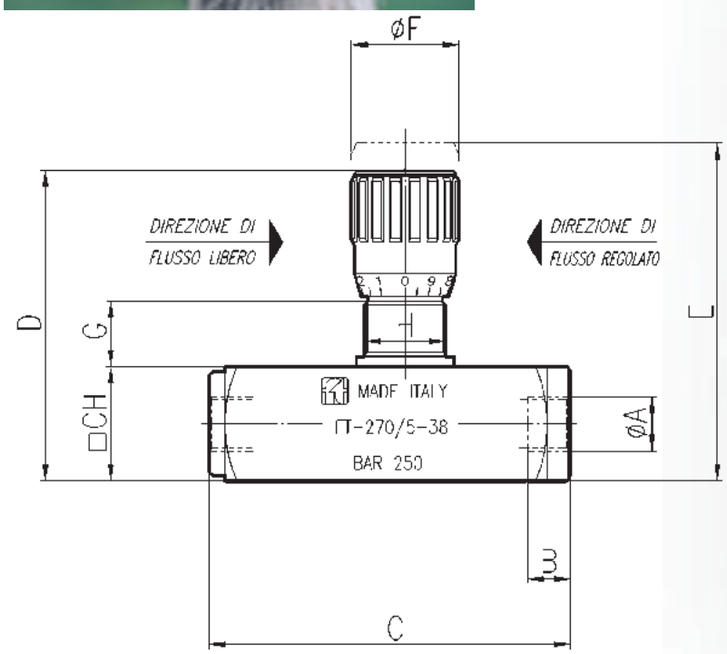


MATERIALS

Base body	9 S Mn Pb 28 - UNI 5105
Cartridge body	38 Ni Cr Mo 4 UNI - EN 10083
Compensating unit	Nitrile
OR	PTFE
Antiextrusion ring	GD - Al Si 12 - UNI 5706

EXAMPLE FOR ORDERING

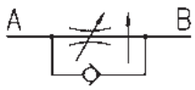
	Code	Type	Accessori a richiesta Panel ring nut	Viton seal
	FT 270/5	14	G	V
Stainless steel	FT 2270/5	14	G	V



DIMENSIONS

Type	øA UNI 338	B	C	D	E	øF	G	H	CH	Weight kg
14	1/4"G	12,5	94	81,5	88,5	27	15	M20x1	30	0,580
38	3/8"G	13	110,5	94,5	103	33	17	M25x1,5	35	0,940
12	1/2"G	15,5	137	112	122	38	18	M30x1,5	45	1,830
34	3/4"G	17	163	138	150	47	24	M40x1,5	55	3,350
100	1"G	21	214	175	192	58	32	M50x1,5	70	7,000

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SINGLE-ACTING PRESSURE COMPENSATED DOUBLE-PORT CONTROL VALVES



The pressure compensated valves are essentially composed of an adjustable orifice and of a pressure compensator.
The check valves, realized through a valve poppet, reduce the number of the components in movement.
Inside the base there are wide transverse sections which appreciably reduce the loss of pressure.
The accuracy of the machining of the internal components ensures a very low hysteresis.
The accurate checks carried out on the products ensure a good working of the valves also in bad working conditions.

On request
- Complete with panel mounting ring nut
- Viton (V) seals
- Version AISI 316 code FT 2270/5

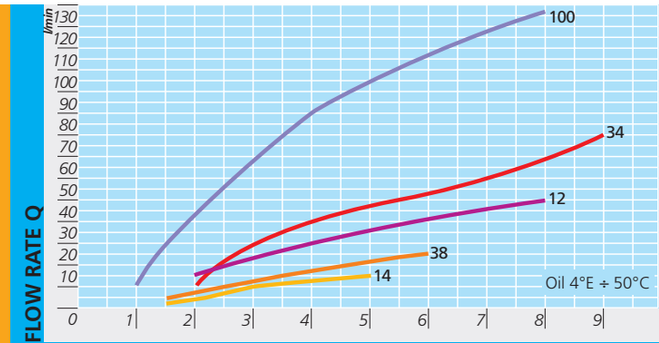
FT 270/5

TECHNICAL DATA

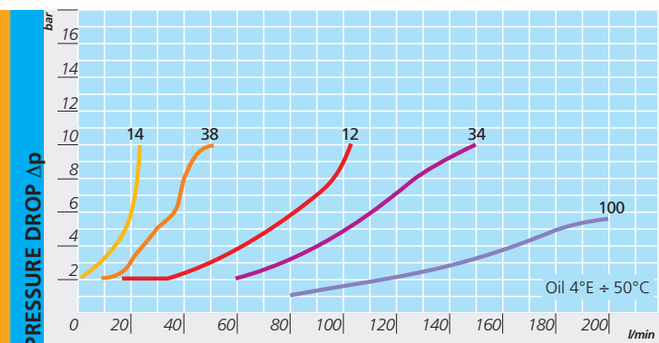
Type	Max Working pressure bar	Min. Δp working bar	Working temperature C°	Filtration grade μm absolute
14	250	5	-20°/+70°	25
38	250	7	-20°/+70°	25
12	250	10	-20°/+70°	25
34	250	10	-20°/+70°	25
100	250	16	-20°/+70°	25

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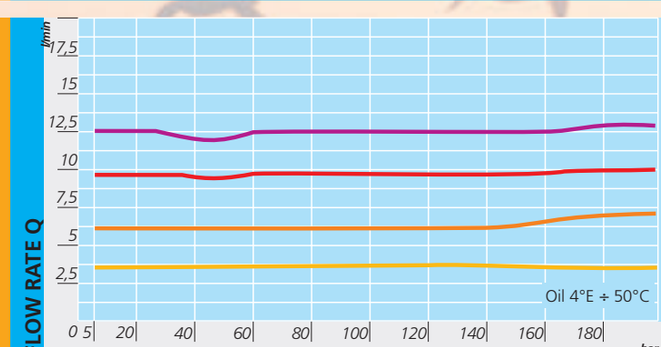
FT 270/2 - 270/5



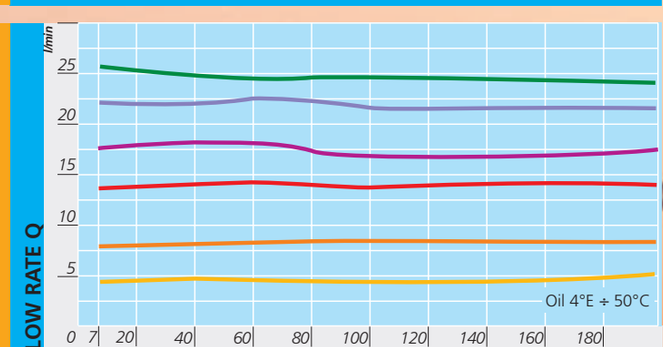
FT 270/5

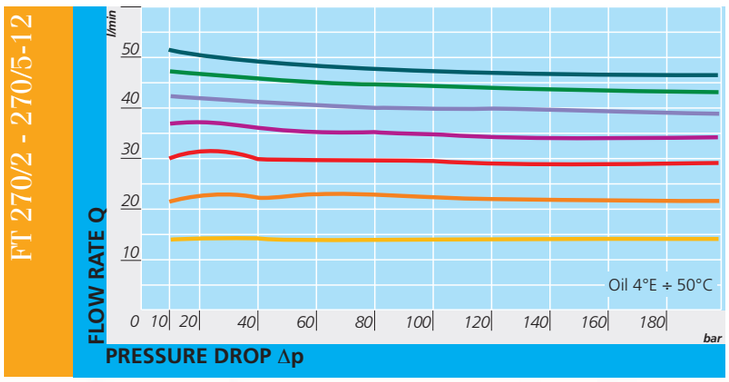


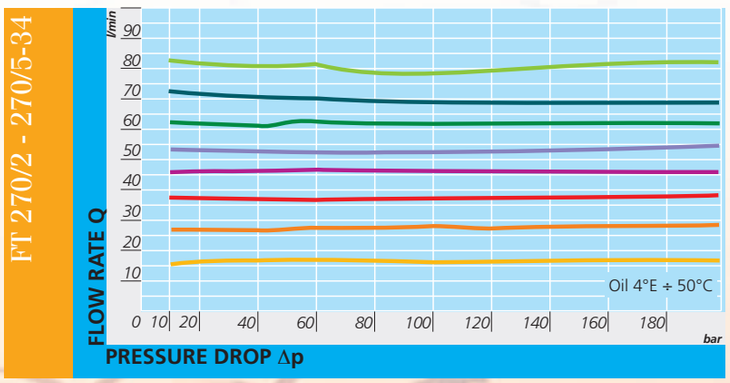
FT 270/2 - 270/5-14

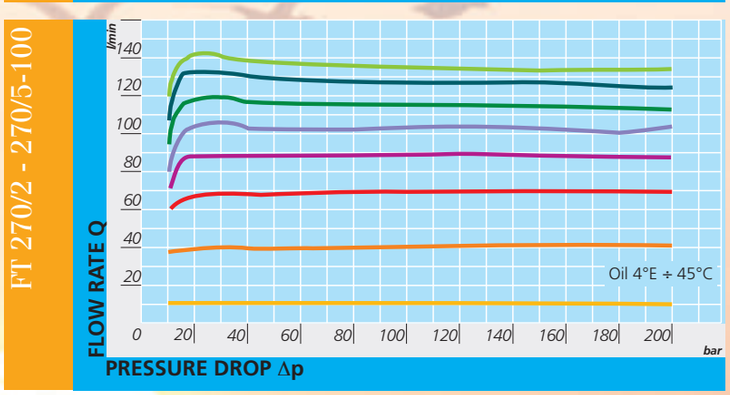


FT 270/2 - 270/5-38





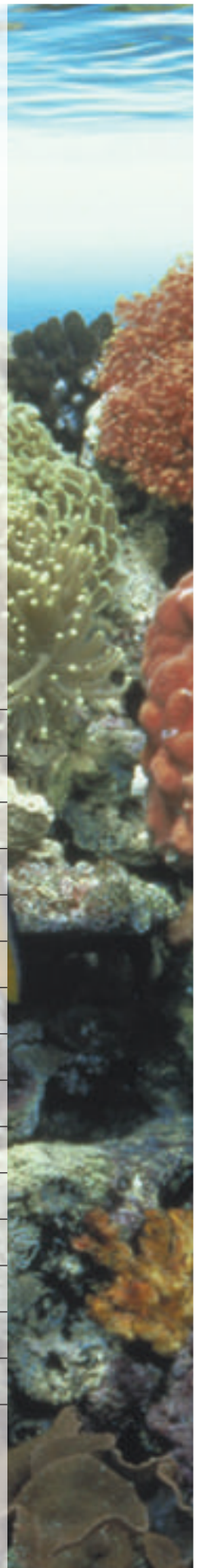




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CARTRIDGE MOUNTED SINGLE-ACTING AND SHUT-OFF METRIC-UNF-CYLINDRICAL CONTROL VALVES



FT 247/2
Cartridge mounted double-acting microfine control valves

FT 264/2
Cartridge mounted double-acting control valves (cylindrical thread)

FT 267/2
Cartridge mounted double-acting control valves

FT 267/5
Cartridge mounted single-acting control valves

FT 267/6
Cartridge mounted single-acting valves

FT 287/2
Cartridge mounted pressure compensated flow control valves

FT 297/2
Cartridge mounted pressure compensated microfine flow control valves

FT 265/2 UNF
High flow rate threaded cartridge mounted double-acting control valves

FT 266/2 UNF
Cartridge mounted double-acting control valves

FT 266/5 UNF
Cartridge mounted single-acting control valves

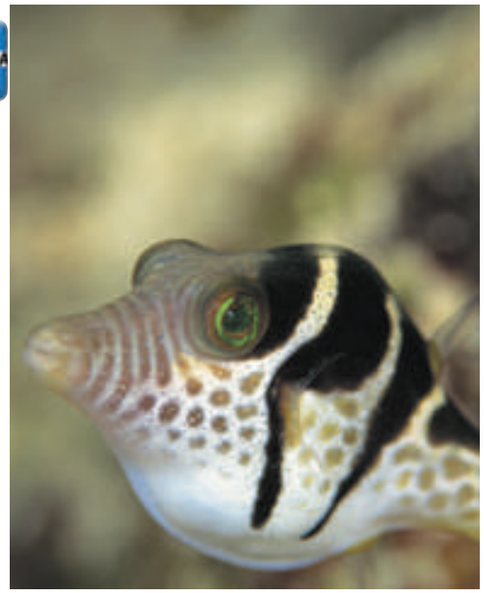
FT 266/6 UNF
Cartridge mounted single-acting valves

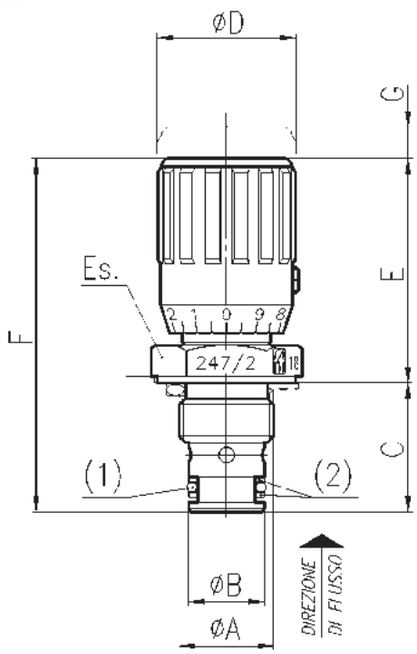
FT 268/2 UNF
Two-way pressure compensated control valves- low friction

FT 243/2
Double-acting braking valves

FT 243/5
Single-acting braking valves

FT 243/5-S
Single-acting braking valves with breather





MATERIALS

Body	9 S Mn Pb 28 - UNI 5105
Needle	AISI 303
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD AISI 12 - UNI 5706

EXAMPLE FOR ORDERING

	Code	Type	Viton seal
	FT 247/2	18	V
Stainless steel	FT 2247/2	18	V

SEAL KIT ON THE SEATING

Type	1(OR)	2(BK)
18	108	Not standard 267/2.022.00.1-18

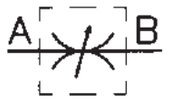
SEAL KIT ON THE NEEDLE

Type	OR	BK
18	2018	2018

DIMENSIONS

Type	ØA UNI 4534	Ø B	C	Ø D	E	F	G	Es.	Weight kg
18	M15x1	12	20,5	22	34,5	55	8	22	0,069

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THREADED CARTRIDGE MOUNTED MICROFINE CONTROL VALVES



Appreciated for their little sizes, suitable for their placing in control blocks.
They have maintained the other characteristics of the series FT 257; they ensure:

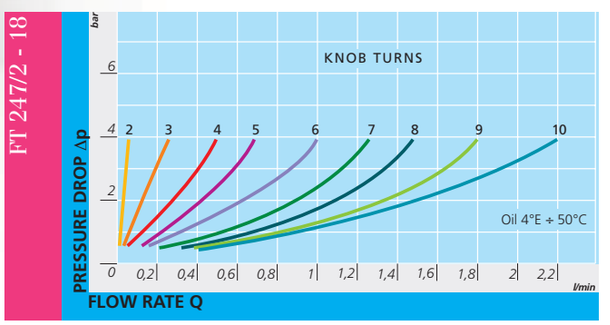
- efficient metallic sealing
- mechanical secure against accidental needle withdrawal

On request

- Complete with Viton seals (V)
- Version in AISI 316 code FT 2247/2
- Knob in ABS (mp)

FT 247/2

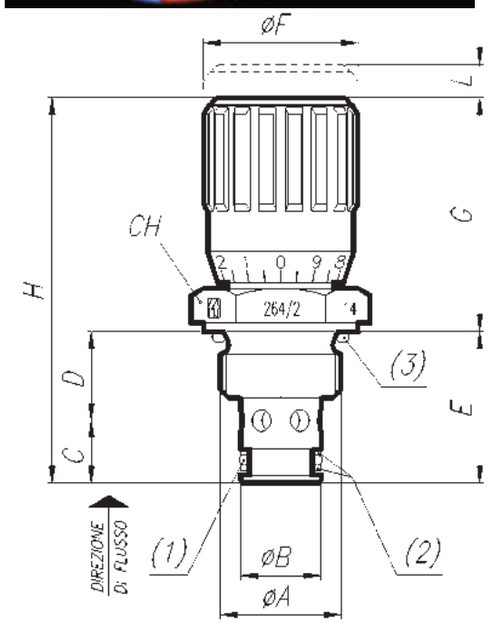




TECHNICAL DATA

Tipo	max working pressure bar	Min. bursting pressure bar	flow section cm^2	working temperature °C	Filtration grade µm absolute
18	320	1300	0,0314	-20°/+100°	25





MATERIALS

Body	9 S Mn Pb 28 - UNI 5105
Needle	1 C 40 - UNI 8373
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706
Knob (mp)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Viton seal	Plastic knob
Steel	FT 264/2	38	V	mp
Stainless steel	FT 2264/2	12	-	mp

DIMENSIONS

Tipe	ØA UNI 4534	Ø B	C	D	E	ØF	G	H	L	CH	(3)
18	1/2" Gas	14	12,5	14	26,5	22	36,8	63,3	5,6	27	ORM 0180-25
14	1/2" Gas	14	11	15,5	26,5	27	40.8	67,3	4,9	27	ORM 0180-25
38	1/2" Gas	16	13	17,5	30,5	33	47	77,5	8,3	27	ORM 0180-25
12	3/4" Gas	19	15,5	24,5	40	38	54,6	94,6	9,9	32	ORM 0250-25
34	1" Gas	27	18	26	44	47	64,6	108,6	12	41	ORM 0300-30

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THREADED CARTRIDGE MOUNTED DOUBLE-ACTING CONTROL VALVES

They allow for regulation of flow in both directions.

On request
- Version AISI 316 Code FT 2264/2
- Complete with Viton seals (V)
- Knob in ABS (mp)



FT 264/2

TECHNICAL DATA

Tipo	Type flow section cm²	Max. working pressure bar	Min. bursting pressure bar	Working temperature °C	Filtration grade µm absolute
18	0,12	320	1300	-20°/+100°	25
14	0,19	320	1300	-20°/+100°	25
38	0,39	320	1300	-20°/+100°	25
12	0,68	320	1300	-20°/+100°	25
34	1,13	320	1300	-20°/+100°	25

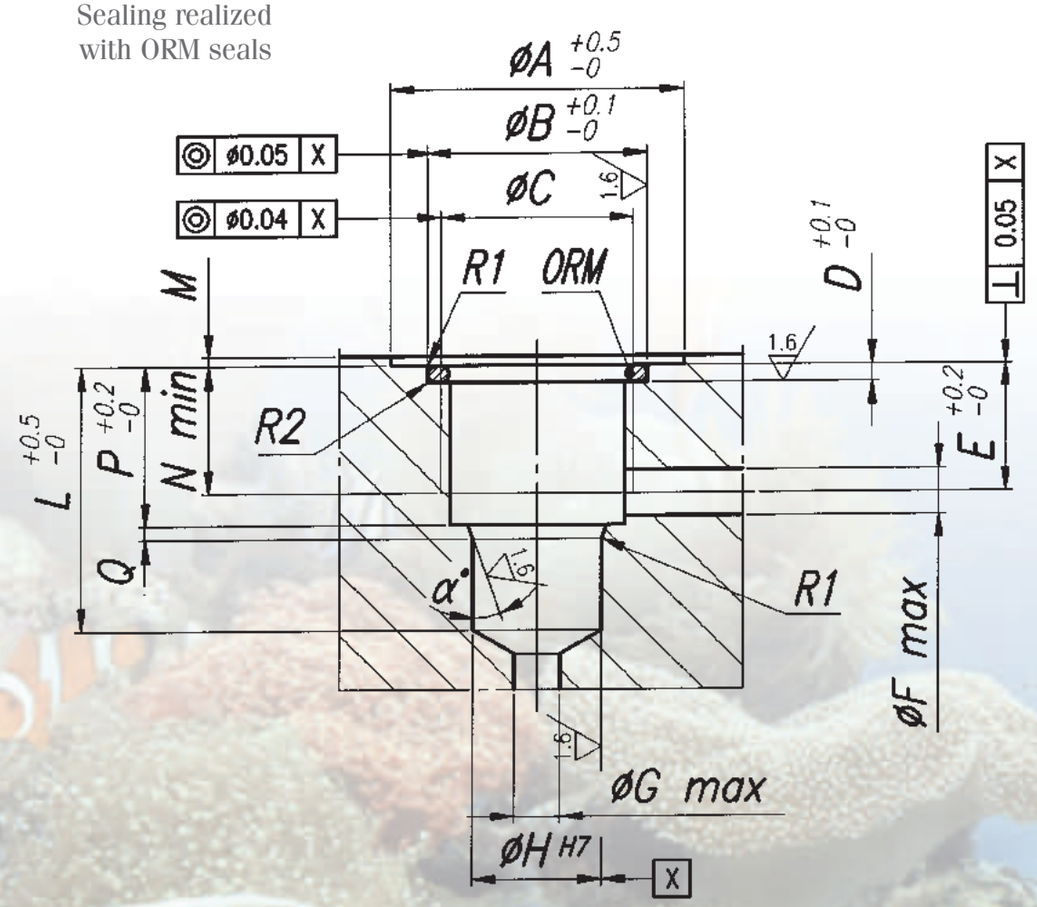
SEAL KIT ON THE NEEDLE

Type	OR	BK
18	2018	2018
14	2021	2021
38	108	108
12	2043	2043
34	115	115

SEAL KIT ON THE SEATING

Type	(1) OR	(2) BK
18	2043	BK 14 (FT)
14	2043	BK 14 (FT)
38	2050	BK 38 (FT)
12	2062	BK 12 (FT)
34	130	BK 34 (FT)

Sealing realized
with ORM seals



General machining
General tolerance: 3,2

linears ± 0,1
angular ± 1°

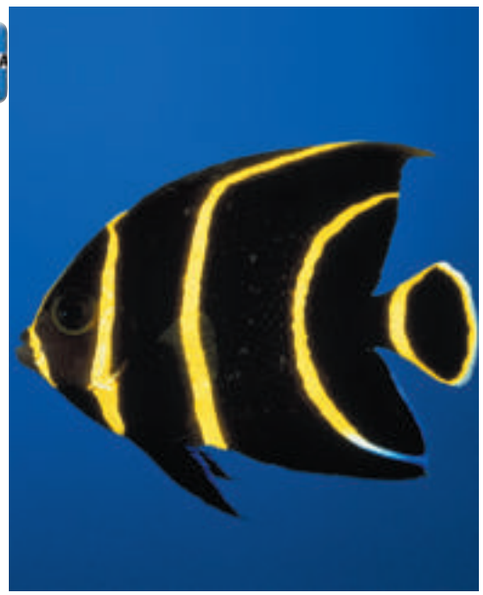
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SEATING MACHINING DRAWINGS FOR GAS THREADED VALVES

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TYPE	ORM	ØA	ØB	ØC	D	E	ØF	ØG	ØH	L	M	N	P	Q	R1	R2	α°
18	0180-25	32	24	1/2" GAS	1,9	14	5	5	14	29	1	14	17,5	1,5	0,1	0,75	70°
14	0180-25	32	24	1/2" GAS	1,9	14	5	5	14	29	1	14	17,5	1,5	0,1	0,75	70°
38	0180-25	32	24	1/2" GAS	1,9	16,5	8	8	16	33	1	14	20,5	1,5	0,1	0,75	70°
12	0250-25	37	30	3/4" GAS	1,9	24	10	10	19	42	1	21	29	1,5	0,1	0,75	70°
34	0300-30	47	36	1" GAS	2,4	24,5	12	12	27	46	1	21	30	1,5	0,1	0,75	70°

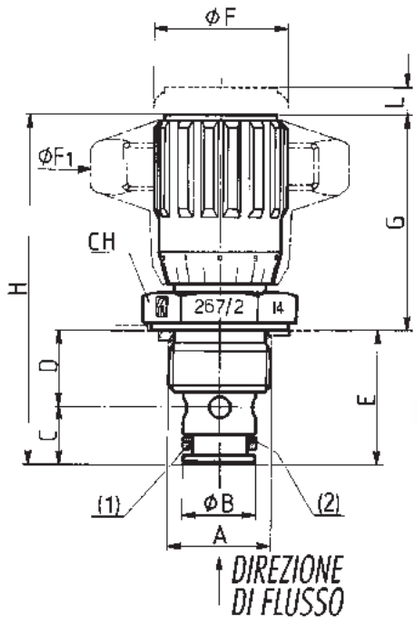


MATERIALS

Body	9 S Mn Pb 28 - UNI 5105
Needle	1 C 40 - UNI 8373
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706
Knob (MP)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Viton seal	Plastic knob
Steel	FT 267/2	38	V	MP
Stainless steel	FT 2267/2	12	-	MP

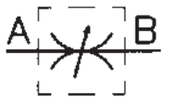




DIMENSIONS

Type	A UNI4534	ØB	C	D	E	ØF	ØF1	G	H	L	CH	Weight kg
18	M15x1	12	9,3	11,2	20,5	22	40	35	55,5	5	22	0,064
14	M20x1,5	14	11	15,5	26,5	27	50	42,5	68,5	7	27	0,125
38	M20x1,5	16	13	17,5	30,5	33	70	48,5	78,5	9	27	0,180
12	M27x2	19	15,5	24,5	40	38	80	56	96	10,5	32	0,305
34	M33x2	27	18	26	44	47	100	63,5	109	13	41	0,580
100	M42x2	35	22	30,5	52,5	58	120	82	134,5	20	50	1,185

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THREADED CARTRIDGE MOUNTED DOUBLE-ACTING CONTROL VALVES

They allow for regulation of flow in both directions.

On request
- Version AISI 316 Code FT 2267/2
- Complete with Viton seals (V)
- Knob in ABS (mp)



FT 267/2

TECHNICAL DATA

Tipo	Type flow section cm²	Max. working pressure bar	Min. bursting pressure bar	Working temperature °C	Filtration grade µm absolute
18	0,12	320	1300	-20°/+100°	25
14	0,19	320	1300	-20°/+100°	25
38	0,39	320	1300	-20°/+100°	25
12	0,68	320	1300	-20°/+100°	25
34	1,13	320	1300	-20°/+100°	25
100	2,09	320	1300	-20°/+100°	25

SEAL KIT ON THE NEEDLE

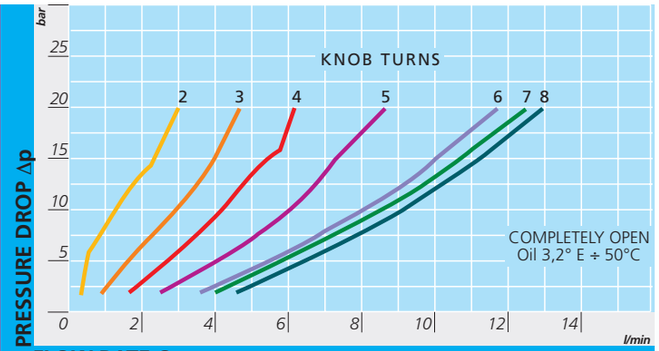
Type	OR	BK
18	2018	2018
14	2021	2021
38	108	108
12	2043	2043
34	115	115
100	123	123

SEAL KIT ON THE SEATING

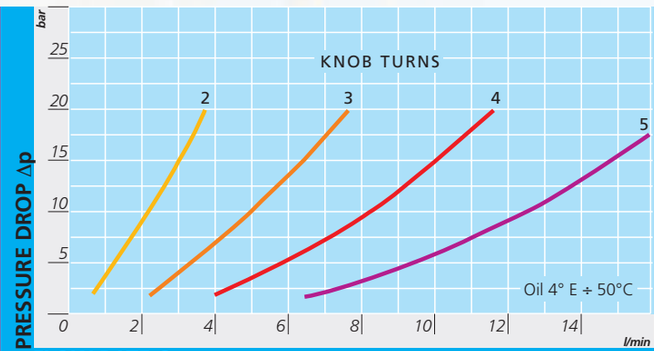
Type	1(OR)	2(BK)
18	108	267/2-022.00.1-18
14	2043	267/2-022.00.1-14
38	2050	267/2-022.00.1-38
12	2062	267/2-022.00.1-12
34	130	267/2-022.00.1-34
100	3118	267/5-022.00.1-34

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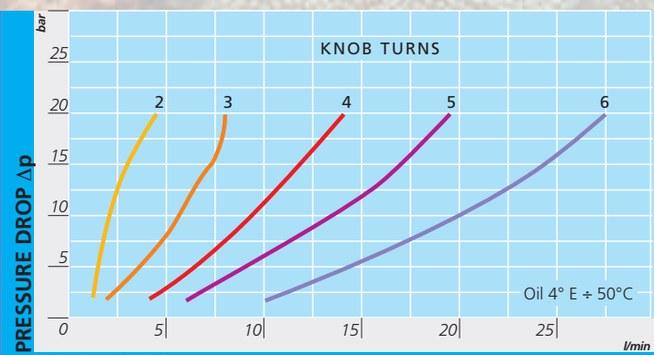
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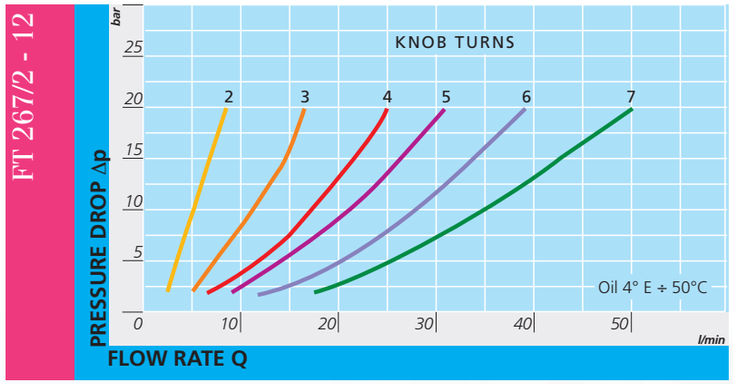


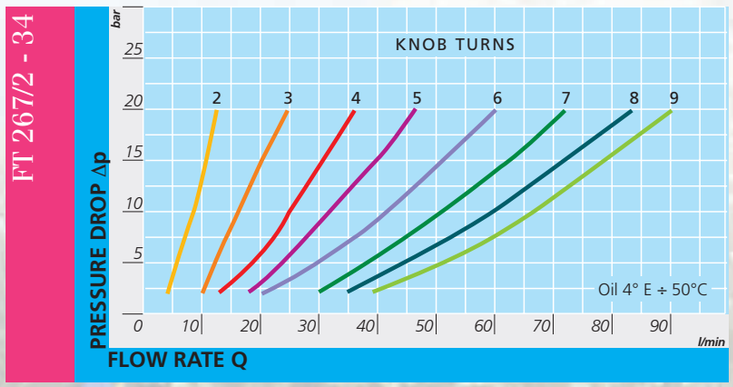
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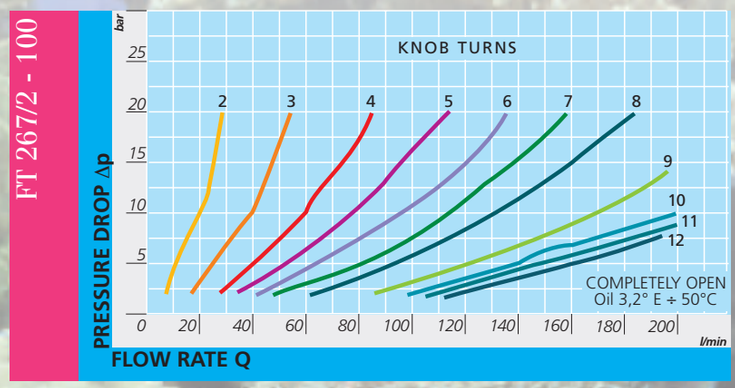


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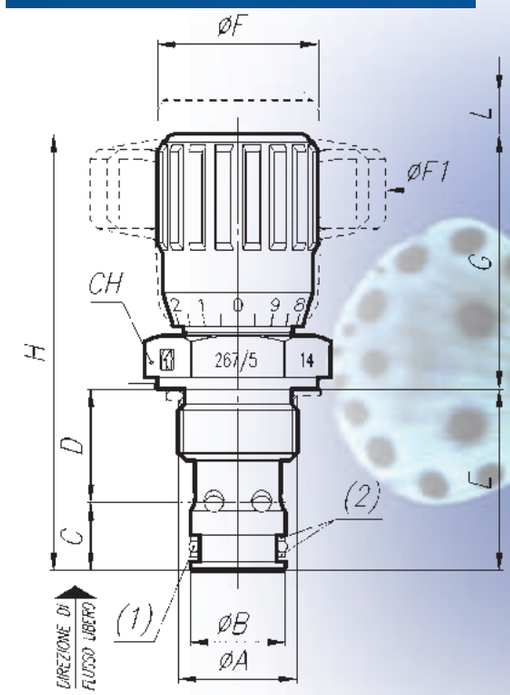


MATERIALS

Body	9 S Mn Pb 23 - UNI 5105
Needle	38 Ni Cr Mo4 - UNI EN 10083
O R	Nitrile
Antiextrusion rings	PTFE
Check valve	38 Ni Cr Mo4 - UNI EN 10083
Spring	C72 - UNI 3545
Knob	GD Al Si 12 - UNI 5706
Knob (MP)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Viton seal	Plastic knob
Steel	FT 267/5	38	V	MP
Stainless steel	FT 2267/5	12	-	MP



DIMENSIONS

Type	ØA UNI 4534	ØB	C	D	E	ØF	ØF1	G	H	L	CH	Weight kg
14	M20x1,5	16	11,5	19	30,5	27	50	43	73,5	4	27	0,130
38	M27x2	19	14	26	40	33	49	52,5	92,5	6	32	0,250
12	M33x2	27	17	27,5	44,5	38	60	60	104,5	7	41	0,340
34	M42x2	35	19,5	33	52,5	47	70	69,5	122	8	50	0,620
100	M52x2	45	22,5	42	64,5	58	120	85	149,5	12	60	1,632

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CARTRIDGE MOUNTED SINGLE-ACTING CONTROL VALVES



They control and, in case, shut-off the flow in one direction and allow the full free flow in the opposite direction.

- Check valve calibrated at 0,35 bar

On request

- Version in AISI 316 code FT 2267/5
- Complete with Viton seals (V)
- Knob in ABS (mp)

FT 267/5

TECHNICAL DATA

Type	Type flow section cm²	Max. working pressure bar	Min. bursting pressure bar	Working temperature °C	Filtration grade µm absolute
14	0,07	320	1300	-20°/+100°	25
38	0,15	320	1300	-20°/+100°	25
12	0,37	320	1300	-20°/+100°	25
34	1,56	320	1300	-20°/+100°	25
100	3,80	320	1300	-20°/+100°	25

SEAL KIT ON THE NEEDLE

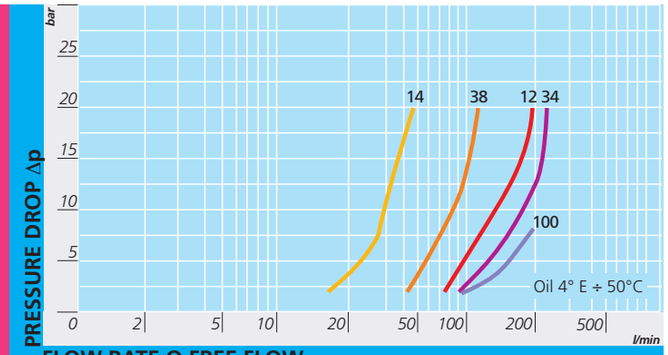
Type	OR	Antiextrusion rings
14	2021	200-801
38	2018	2018
12	106	106
34	108	108
100	112	112

SEAL KIT ON THE SEATING

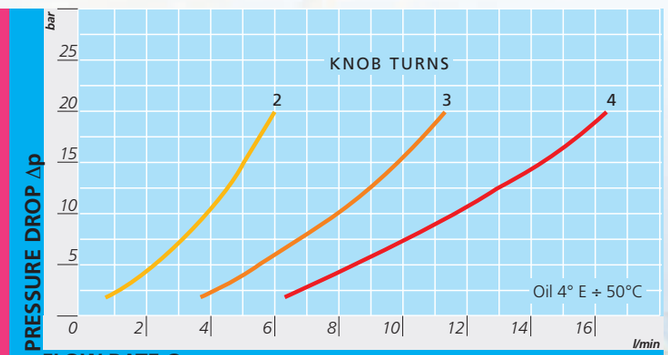
Type	1(OR)	(2) BK special
14	2050	267/2.022.00.1-38
38	2062	267/2.022.00.1-12
12	130	267/2.022.00.1-34
34	3118	267/5.022.00.1-34
100	3156	3156

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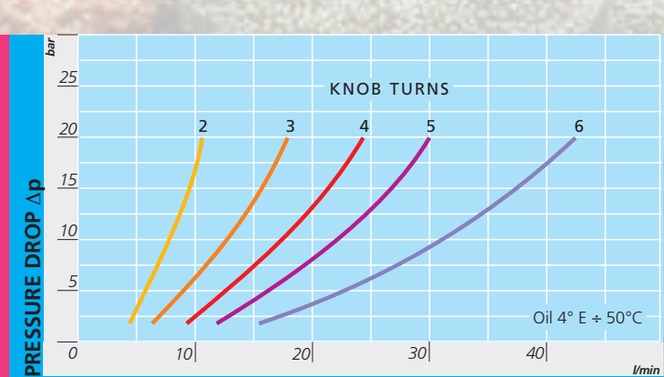
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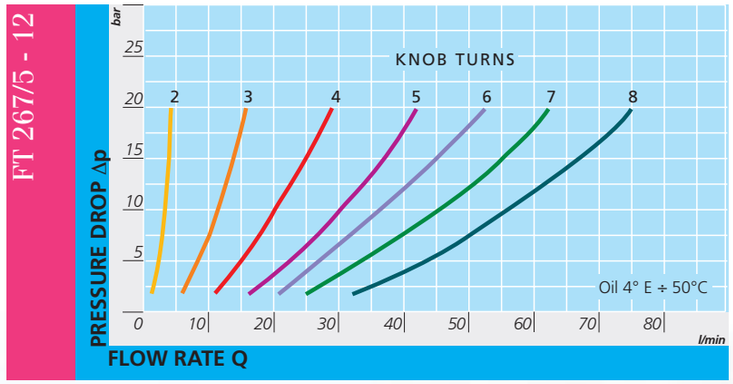


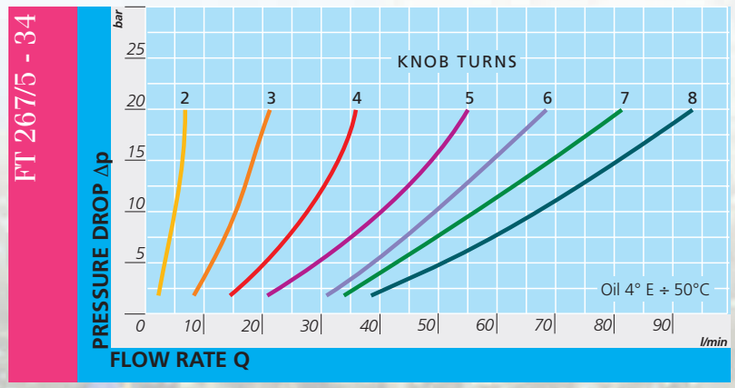
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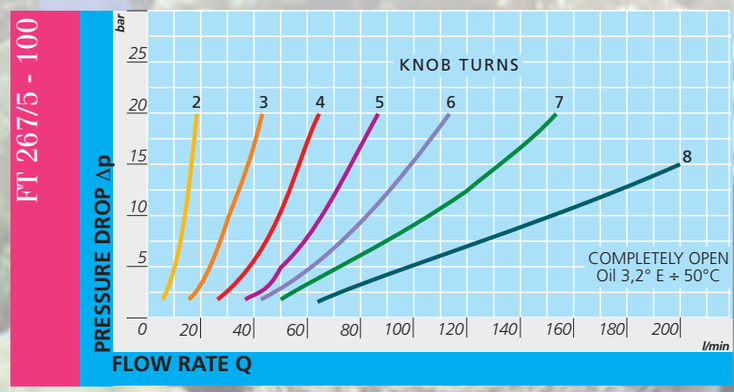


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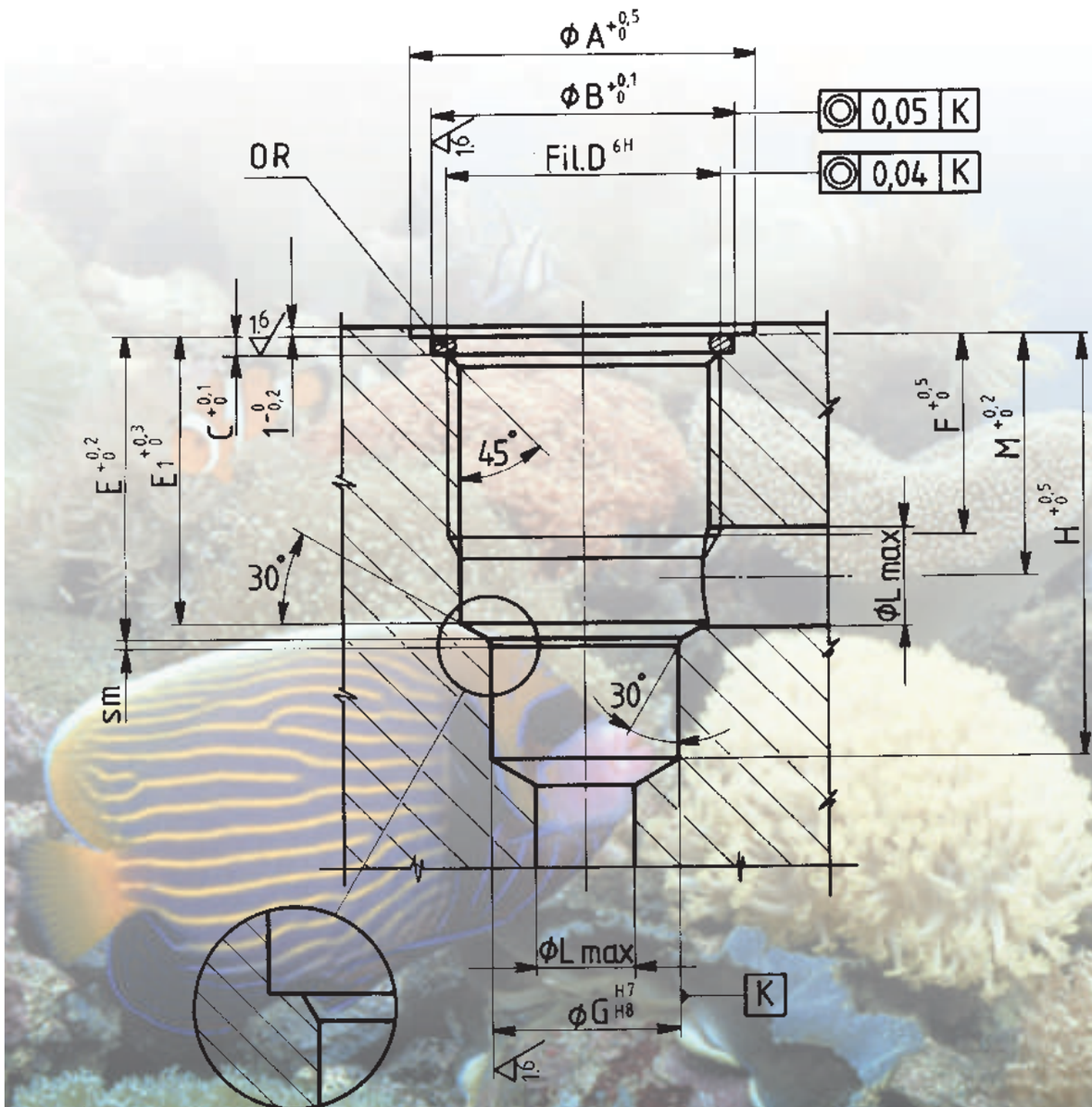






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Sealing realized
with OR seals
on flat seating



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SEATING MACHINING DRAWINGS FOR THREADED CARTRIDGE MOUNTED VALVES

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FLAT SEATING FOR OR - FT 247/2 - 267/2

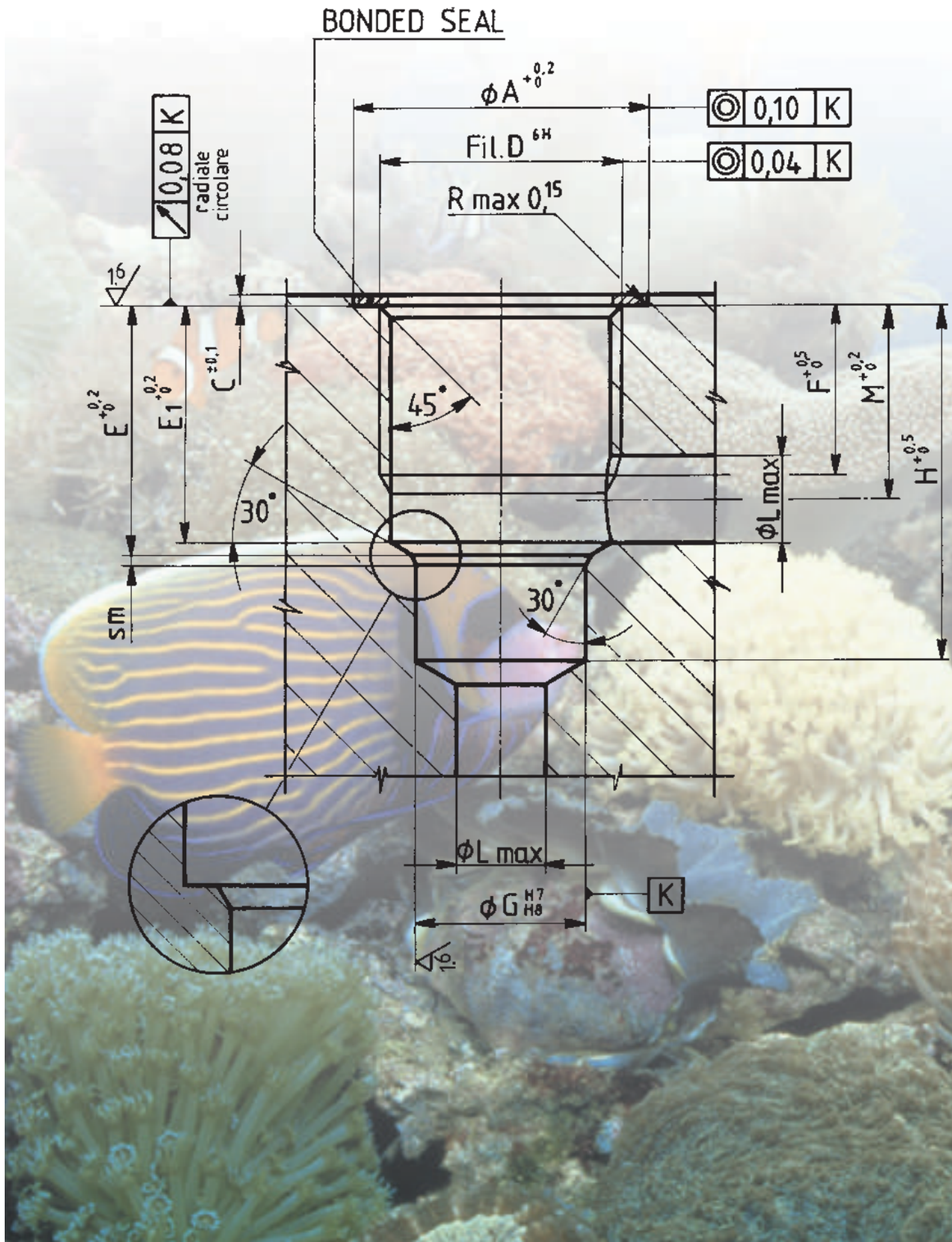
TYPE	ØA	ØB	C	D UNI 4534	E	E1	F	ØG	H	ØL	M	SM	OR
18	23	19	2	M15x1	14	13	11	12	21,5	4	11,5	0,5	3056
14	28	24	2	M20x1,5	17,5	16,5	13,5	14	28,5	5	14,5	1	3075
38	28	24	2	M20x1,5	21	20,5	13,5	16	33,5	8	16,2	1,2	3075
12	34	30	2	M27x2	30	28,5	20	19	43	10	24	1,2	3100
34	43	36	2	M33x2	32,5	32	20	27	47,5	13	25	1,2	3125
100	60	45	2	M42x2	38,5	37	23,5	35	57	16	30,5	1,5	3162

FLAT SEATING FOR OR - FT 267/5

TYPE	ØA	ØB	C	D UNI 4534	E	E1	F	ØG	H	ØL	M	SM	OR
14	28	24	2	M20x1,5	21	20,5	13,5	16	33,5	8	16,2	1	3075
38	34	30	2	M27x2	30	28,5	20	19	43	10	24	1,2	3100
12	43	36	2	M33x2	32,5	32	20	27	47,5	12	25,5	1,2	3125
34	60	45	2	M42x2	38,5	37	23,5	35	57	16	30,5	1,5	3162
100	61	55	2,2	M52x2	46	45	27	45	67,5	20	34,5	1,5	3200

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Sealing realized
with Bonded seal



SEATING MACHINING DRAWINGS FOR THREADED CARTRIDGE MOUNTED VALVES

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SEATING FOR BONDED SEAL - FT 247/2 - 267/2

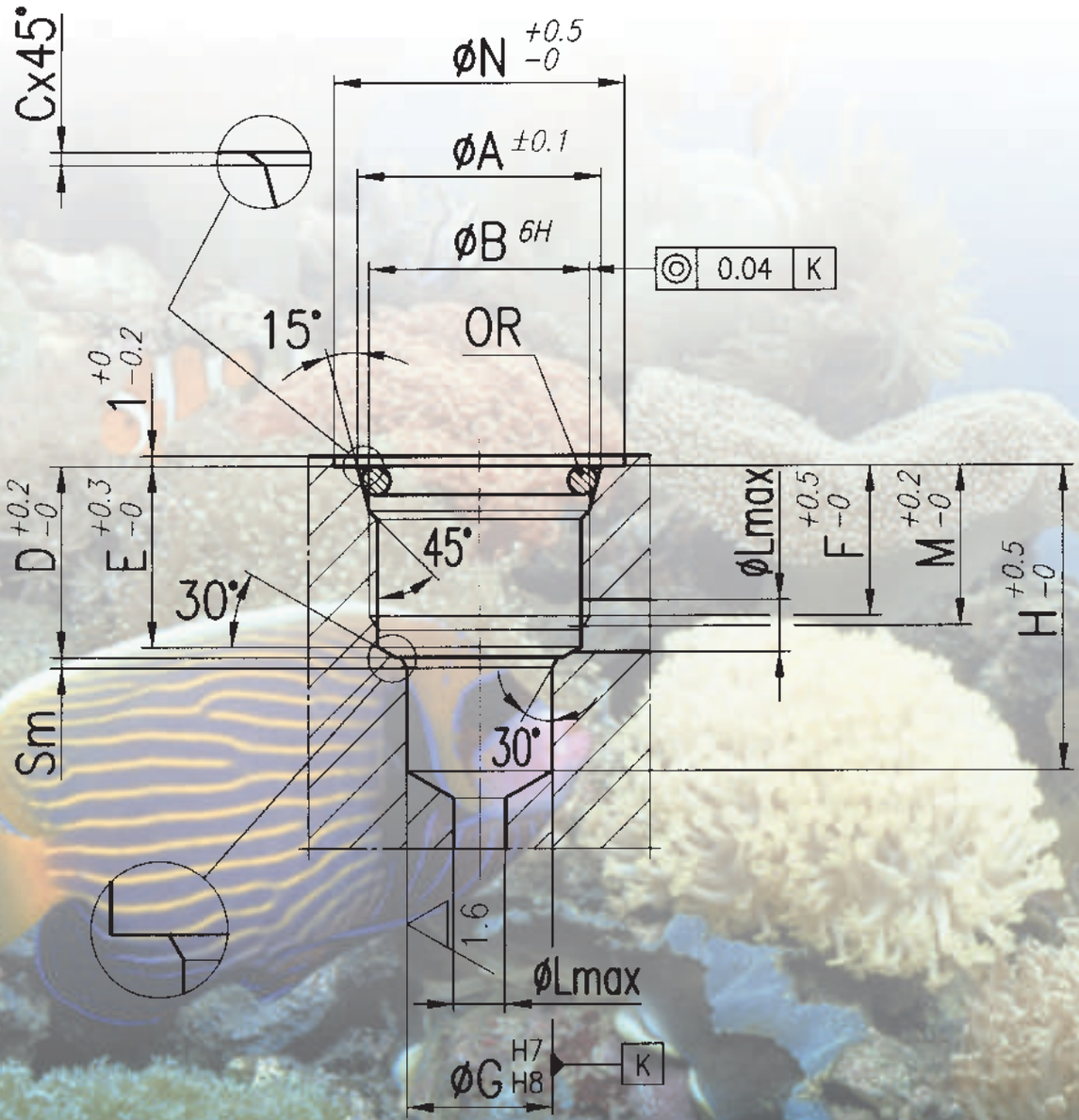
Type	ØA	C	D UNI 4534	E	E1	F	ØG	H	ØL	M	Sm	Bonded seal
18	23	1	M15x1	13	12	9	12	20	4	10,3	0,5	400-512
14	27	1	M20x1,5	16,5	15,5	12	14	27	5	13,3	1	400-513
38	27	1	M20x1,5	20	19,5	12	16	32	8	15,2	1,2	400-513
12	33	1,3	M27x2	28	26,5	18	19	41	10	22	1,2	400-520
34	40	1,3	M33x2	30,5	30	18	27	45,5	13	23	1,2	400-515
100	50	1,3	M42x2	36,5	35	21,5	35	55	16	28,5	1,5	400-516

SEATING FOR BONDED SEAL - FT 267/5

Type	ØA	C	D UNI 4534	E	E1	F	ØG	H	ØL	M	Sm	Bonded seal
14	27	1	M20x1,5	20	19,5	12	16	32	8	15,2	1	400-513
38	33	1,3	M27x2	28	26,5	18	19	41	10	22	1,2	400-520
12	40	1,3	M33x2	30,5	30	18	27	45,5	12	23	1,2	400-515
34	50	1,3	M42x2	36,5	35	21,5	35	55	16	28,5	1,5	400-516

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SEATING MACHINING DRAWINGS FOR THREADED CARTRIDGE MOUNTED VALVES

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CONICAL SEATING FOR OR - FT 247/2 - FT 267/2

TYPE	ØA	ØB UNI 4534	C	D	E	F	ØG	H	ØL	M	ØN	SM	OR
18	16,5	M15x1	0,25	14	13	11	12	21,5	4	11,5	23	0,5	2050
14	22,3	M20x1,5	0,25	17,5	16,5	13,5	14	28,5	5	14,5	28	1	3068
38	22,3	M20x1,5	0,25	21	20,5	13,5	16	33,5	8	16,2	28	1,2	3068
12	29,1	M27x2	0,3	30	28,5	20	19	43	10	24	34	1,2	132
34	36	M33x2	0,3	32,5	32	20	27	47,5	13	24	43	1,2	4112
100	45	M42x2	0,3	38,5	37	23,5	35	57	16	29	60	1,5	4150

CONICAL SEATING FOR OR - FT 267/5

TYPE	ØA	ØB UNI4534	C	D	E	F	ØG	H	ØL	M	ØN	SM	OR
14	22,3	M20x1,5	0,25	21	20,5	13,5	16	33,5	8	16,2	28	1,2	3068
38	29,1	M27x2	0,3	30	28,5	20	19	43	10	24	34	1,2	132
12	36	M33x2	0,3	32,5	32	20	27	47,5	13	25	43	1,2	4112
34	45	M42x2	0,3	38,5	37	23,5	35	57	16	29	60	1,5	4150
100	55	M52x2	0,3	46	45	27	45	67,5	20	34,5	61	1,5	4187

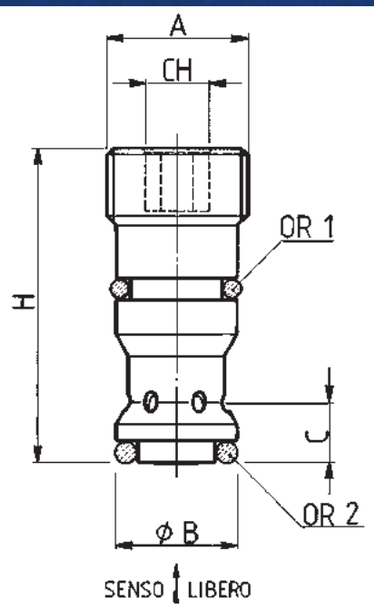


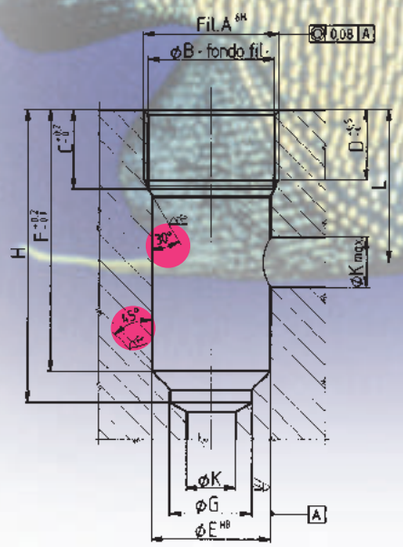
MATERIALS

Body	9 S Mn Pb 23 - UNI 5105
Check valve	38 Ni Cr Mo4 - UNI EN 10083
Spring	C72 - UNI 3545
Screw plug	9 S Mn Pb 23 - UNI 5105

EXAMPLE FOR ORDERING

	Code	Type	Seal Viton
Steel	FT 267/6	14	V
Stainless steel	FT 2267/6	12	-



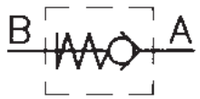


SEATING MACHINING DRAWING FOR VALVE

DIMENSIONS

Type	A UNI4534	ØB	C	H	CH	OR 1	OR 2	Weight kg
14	M22x1,5	19	9,5	49	8	3056	115	0,80
38	M27x2	24	10,5	56	10	3075	3068	0,140
12	M33x2	29	13	67	10	3093	3087	0,265
34	M42x2	38	17	80,5	12	4125	4112	0,545

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THREADED CARTRIDGE MOUNTED SINGLE-ACTING VALVES

They allow free flow in one direction, shutting-off the return flow in the opposite direction. Release pression 0,35 bar.
On request calibration at 2, 4, 6, 8, 10 bar.

On request
- Version in AISI 316 code FT 2267/6
- Complete with Viton seals (V)



FT 267/6

VALVE SEATING SIZE TABLE

TYPE	A UNI 4534	ØB	C	D	ØE	F	ØG	H	ØK	L MIN	L MAX
14	M22x1,5	20,5	16,5	13,5	19	45,5	10	52	8	33,5	36
38	M27x2	25	18	16	24	52,5	15	59	10	36,5	40
12	M33x2	31	21	17	29	63,5	20	71	12	45	49
34	M42x2	40	25	20	38	76	26	85,5	15	52	59

TECHNICAL DATA

TYPE	MAX. WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE °C	FILTRATION GRADE µM ABSOLUTE
14	320	1300	-20°/+100°	25
38	320	1300	-20°/+100°	25
12	320	1300	-20°/+100°	25
34	320	1300	-20°/+100°	25
100	320	1300	-20°/+100°	25

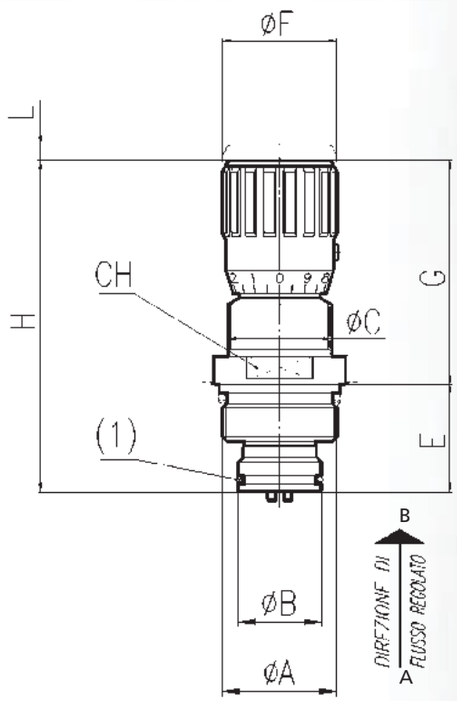


MATERIALS

Body base	Body base
Compensation unit	Compensation unit
O R	Nitrile
Antiextrusion ring	Antiextrusion ring
Knob	Knob

EXAMPLE FOR ORDERING

	Code	Type	Viton seal
Steel	FT 287/2	38	V





DIMENSIONS

Type	øA UNI 4534	ø B	ø C	E	G	ø F	H	L	CH	(1) OR	Weight kg
14	M33x1,5	24	M30x1,5	31	64,5	33	95,5	4,5	32	2081	0,350
38	M39x1,5	30	M35x1,5	34,5	82	38	116,5	6	38	2106	0,580
12	M48x2	35	M40x1,5	42	92,5	47	134,5	6,5	45	3118	0,960
34	M55x2	40	M50x1,5	49	115	58	164	7,5	55	3137	1,700

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CARTRIDGE PRESSURE COMPENSATED FLOW CONTROL VALVES



Pressure compensated flow control valves, to insert in modular units in line.
They are essentially composed of the central body of valves series FT 277/2 which may be screwed in units preset by the user.
The construction and functional characteristics reflect exactly those described for the two inlet valves.
It is recommended to keep them in their protective wrapping until the mounting, in order to avoid possible drawbacks caused by eventual entry of particles into the delicate and essential parts for a good working.
On page 88 is proposed a machining scheme for the embedding seat, which has to be observed to ensure the necessary accuracy of the valve.
The constructive system allows the user, already provided with those versions, either to request the two inlet base bodies only, so as to allow their quick transformation, or to store the single standard components to assemble in the various types according to the need.

On request
- Viton seals (V)
- Knob in ABS (mp)

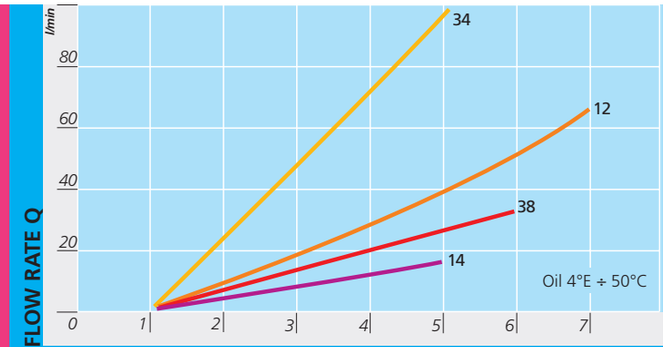
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TECHNICAL DATA

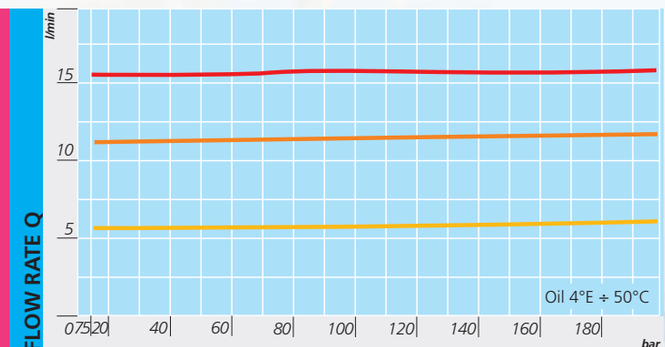
Type	Max. working pressure bar	Min. bursting pressure bar	Working temperature °C	Filtration grade µm absolute
14	320	7,5	-20°/+70°	25
38	320	10	-20°/+70°	25
12	320	12	-20°/+70°	25
34	320	15	-20°/+70°	25

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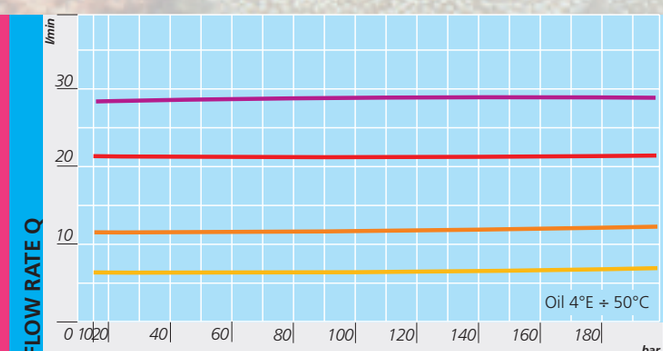
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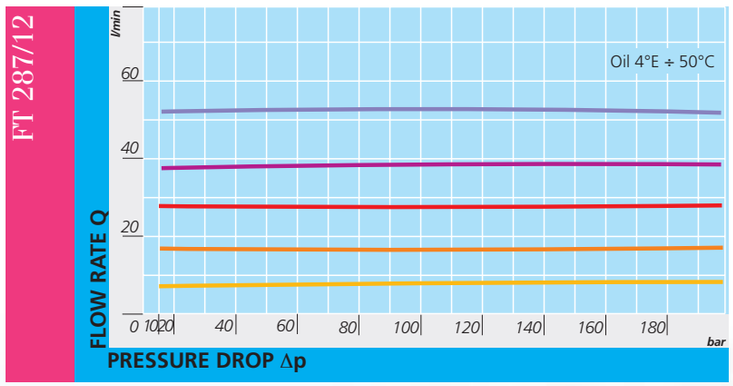
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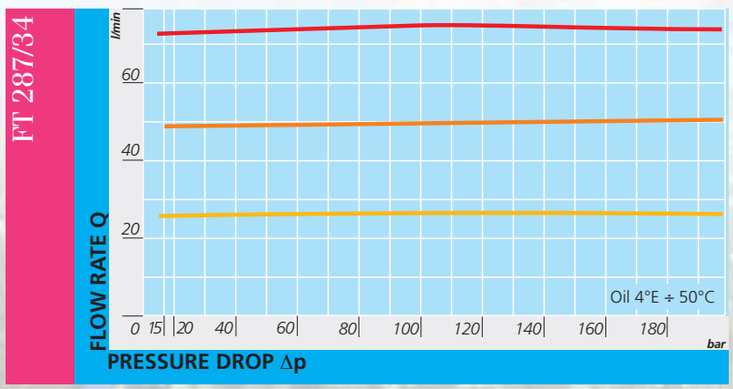


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FLOW RATE CURVES





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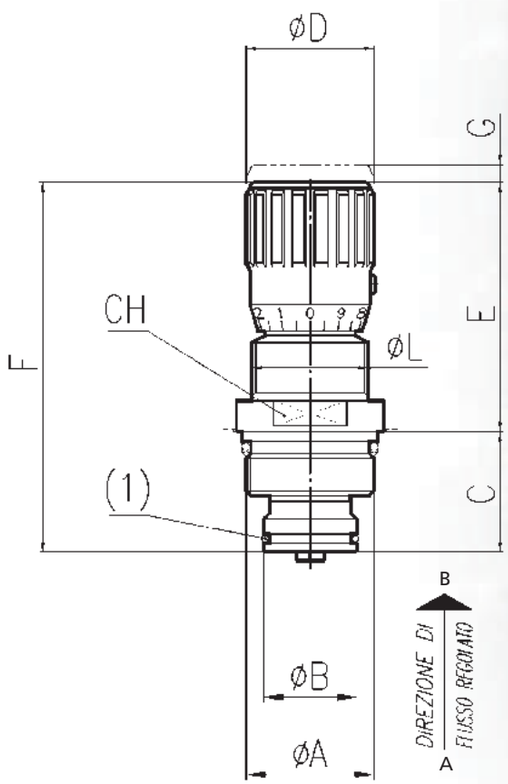


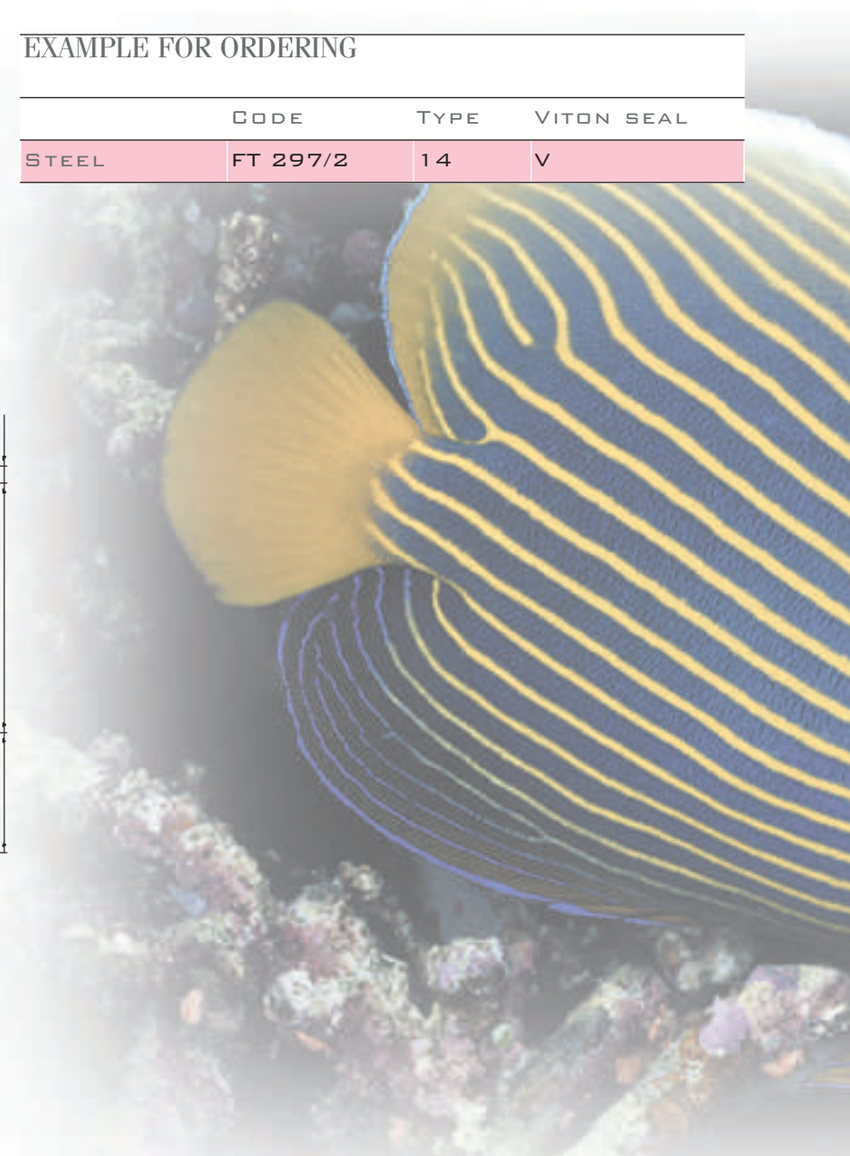
MATERIALS

Body base	9 S Mn Pb 23 - UNI 5105
Compensation unit	38 Ni Cr Mo 4
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706

EXAMPLE FOR ORDERING

	Code	Type	Viton seal
Steel	FT 297/2	14	V





DIMENSIONS

Type	Ø A UNI 4534	Ø B	C	Ø D	E	F	G	Ø L	CH	(1) OR	Weight kg
14	M33x1,5	24	31	33	64,5	95,5	4,5	M30x1,5	32	2081	0,350

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CARTRIDGE MOUNTED PRESSURE COMPENSATED MICROFINE FLOW CONTROL VALVES

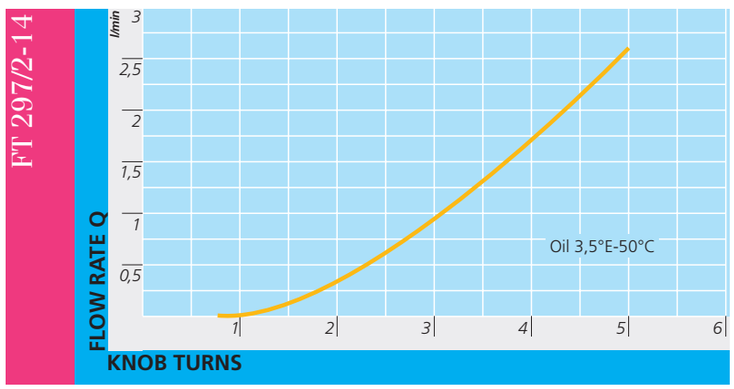
Pressure compensated flow control valves, to insert in modular units in line.
They are essentially composed of a central body which may be screwed in units preset by the user.
The construction and functional characteristics reflect exactly those of valves series FT 287.
It is recommended to keep them in their protective wrapping until the mounting, in order to avoid possible drawbacks caused by eventual entry of particles into the delicate and essential parts for a good working.

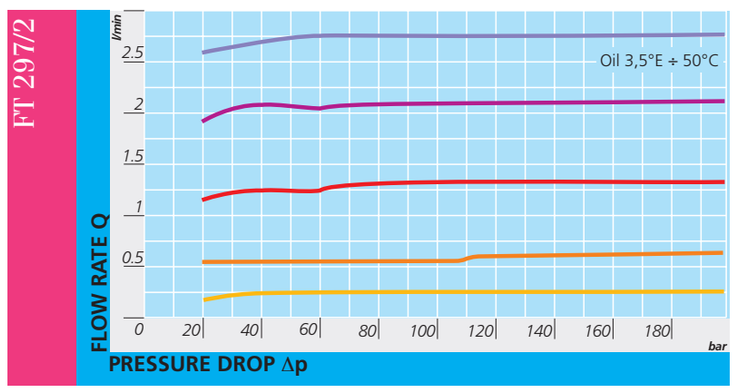
On request
- Viton seals (V)
- Knob in ABS (mp)



FT 297/2





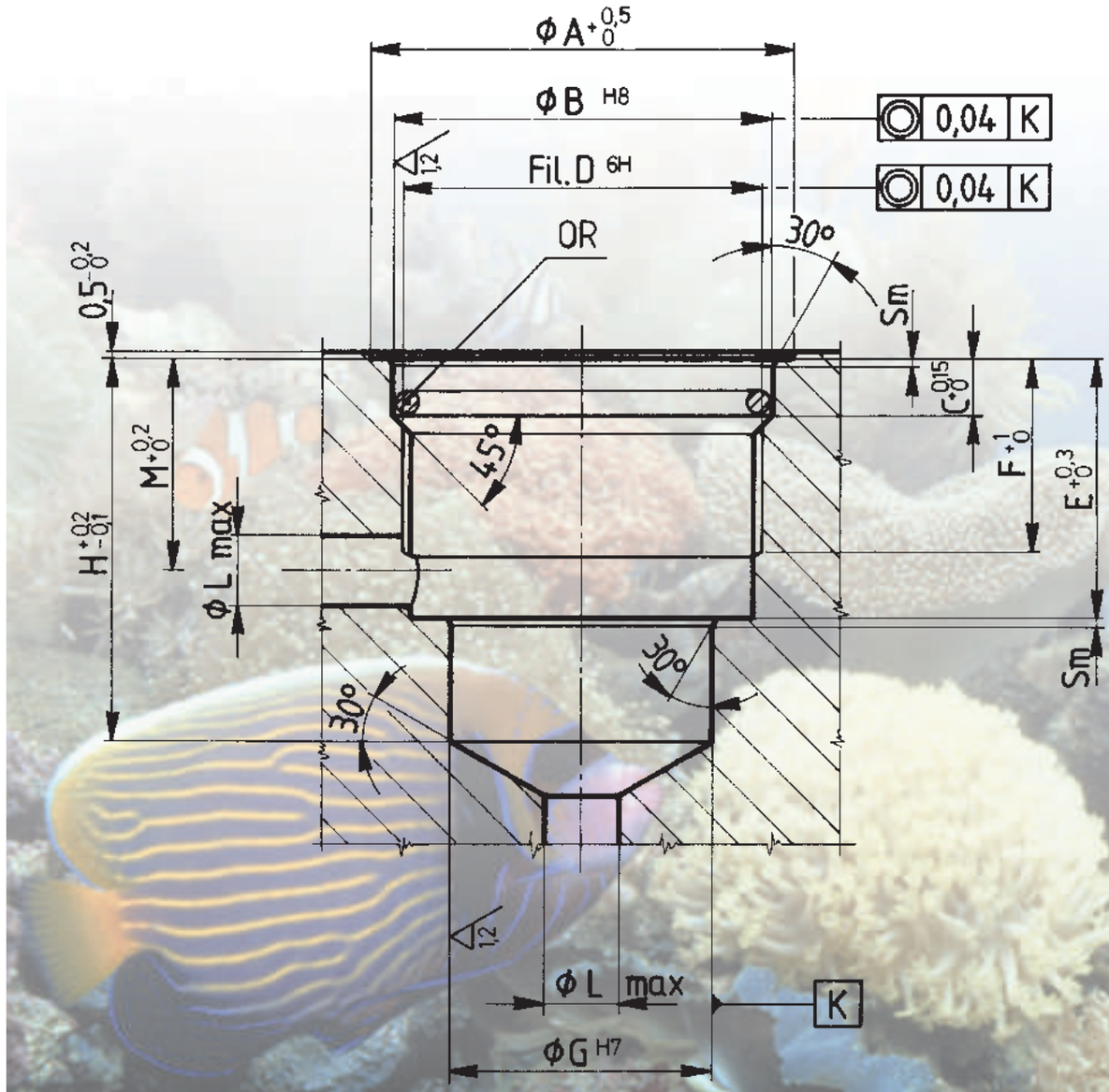


TECHNICAL DATA

Type	Max. working pressure bar	Min. bursting pressure bar	Working temperature °C	Filtration grade μm absolute
14	320	7,5	-20°/+70°	25

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Sealing realized with OR seals on conical seating



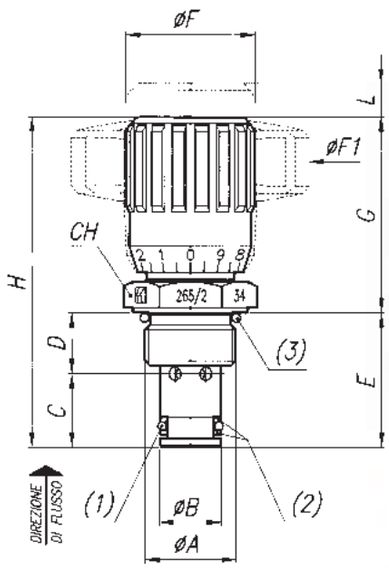
DRAWING OF CAVITY MACHINE FOR CARTRIDGE MOUNTED VALVES

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TYPE	ØA	ØB	C	D UNI 4535	E	F	ØG	H	ØL	M	OR	SM
14	39	35	5,2	M33x1,5	24	18	24	35,2	6,5	20	3118	0,8
38	44	40,5	5,2	M39x1,5	27,5	19	30	40	9	22,5	3143	0,8
12	53	49	6,5	M48x2	33,5	23,5	35	49	11	27,5	3175	0,8
34	63	58	7	M55x2	40	27	40	57	13,5	32,5	155	1





MATERIALS

Body	9 S Mn Pb 28 - UNI 5105
Needle	1 C 40 - UNI 8373
O R	Nitrile
Antiextrusion rings	PTFE
Knob	GD Al Si 12 - UNI 5706
Knob (mp)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Viton seal	Knob in plastic
Steel	FT 265/2	34	V	mp

SEAL KIT ON THE SEATING

Type	1 (O R)	2(BK)	(3)
34	2037	266/6.022.00.1-34	2068
78	2050	267/2.022.00.1-38	3075

DIMENSIONS

Type	ØA UNI 4534	ØB	C	D	E	ØF	ØF1	G	H	L	CH	Weight kg
34	3/4"-16 UNF	12,7	15,3	12,7	28	27	50	40,7	68,7	6	24	0,112
78	7/8"-14 UNF	15,9	17,5	15	32,5	33	70	46	78,5	8	27	0,115

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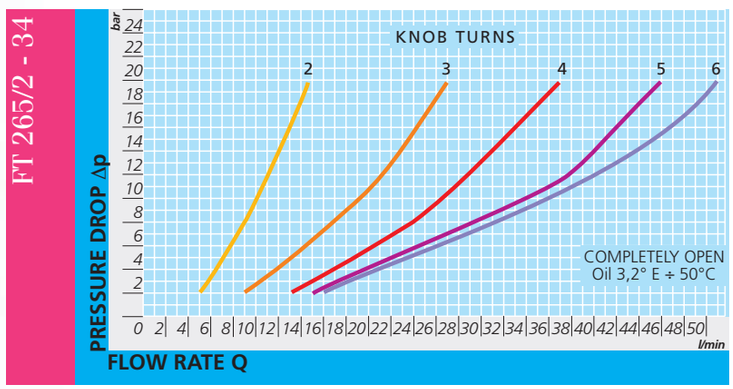


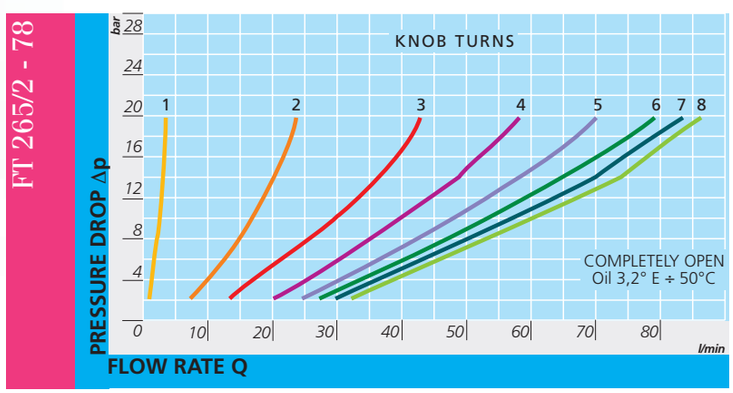
HIGH FLOW RATE CARTRIDGE MOUNTED DOUBLE-ACTING CONTROL VALVES MAX 350 BAR

They control a free flow in both directions.

On request
- Complete with Viton seals (V)
- Knob in ABS (mp)
- Version in AISI 316 code FT 2265/2







TECHNICAL DATA

TYPE	FLOW SECTION CM²	MAX. WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE °C	FILTRATION GRADE µM ABSOLUTE
34	0,20	320	1300	-20°/+100°	25
78	0,50	320	1300	-20°/+100°	25



MATERIALS

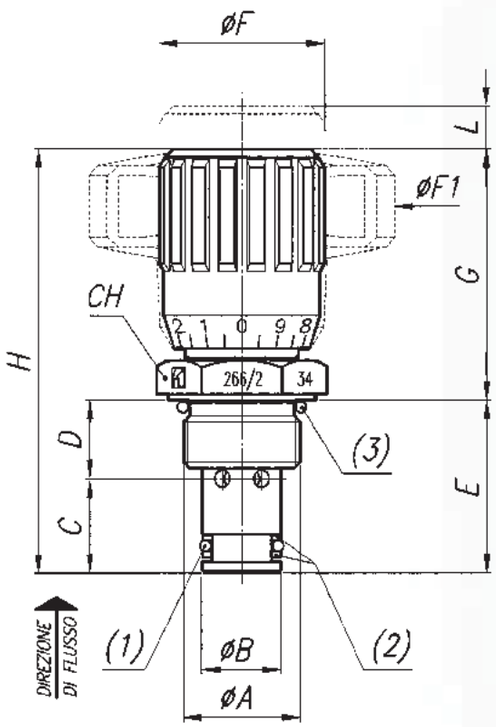
Body	9 S Mn Pb 28 - UNI 5105
Needle	1 C 40 - UNI 8373
O R	Mescola nitrica
Antiextrusion rings	PTFE
Knob	GD Al Si 12 - UNI 5706
Knob (mp)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Viton seal	Plastic knob
Steel	FT 266/2	34	V	mp

SEAL KIT ON THE SEATING

Type	1(OR)	2(BK)	(3)
34	2037	266/6.022.00.1-34	2068
78	2050	267/2.022.00.1-38	3075



DIMENSIONS

Type	ØA UNI 4534	Ø B	C	D	E	Ø F	Ø F1	G	H	L	C H	Weight kg
34	3/4"-16 UNF	12,7	15,3	12,7	28	27	50	40,7	68,7	6	24	0,112
78	7/8"-14 UNF	15,9	17,5	15	32,5	33	70	46	78,5	8	27	0,115

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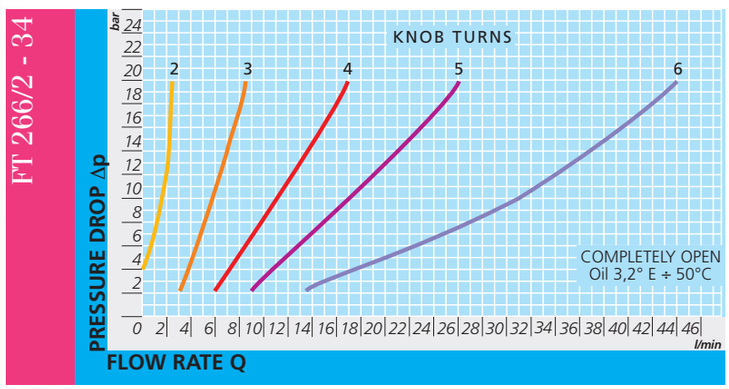


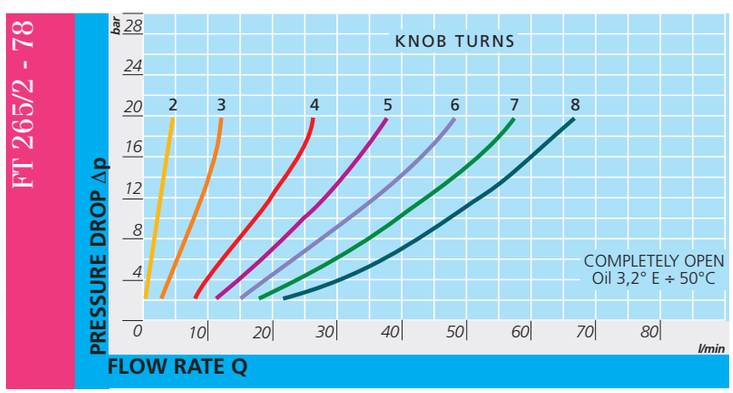
CARTRIDGE MOUNTED DOUBLE-ACTING CONTROL VALVES MAX 350 BAR

They control a free flow in both directions.

On request
- Complete with Viton seals (V)
- Knob in ABS (mp)
- Version in AISI 316 code FT 2266/2







TECHNICAL DATA

Type	Flow section cm²	Max. working pressure bar	Min. bursting pressure bar	Working temperature °C	Filtration grade µm absolute
34	0,20	320	1300	-20°/+100°	25
78	0,50	320	1300	-20°/+100°	25

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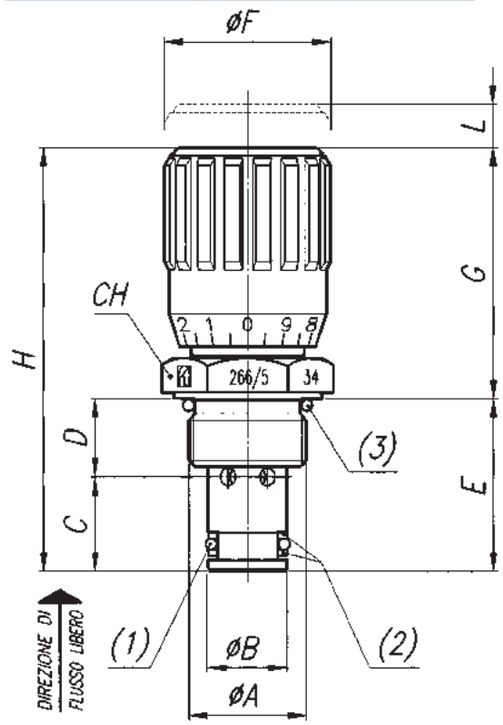


MATERIALI

Body	9 S Mn Pb 23 - UNI 5105
Needle	38 Ni Cr Mo 4 - UNI - EN 10083
O R	Nitrile
Antiextrusion ring	PTFE
Check valve	38 Ni Cr Mo 4 - UNI - EN 10083
Spring	C72 - UNI 3545
Knob	GD Al Si 12 - UNI 5706
Knob (mp)	ABS

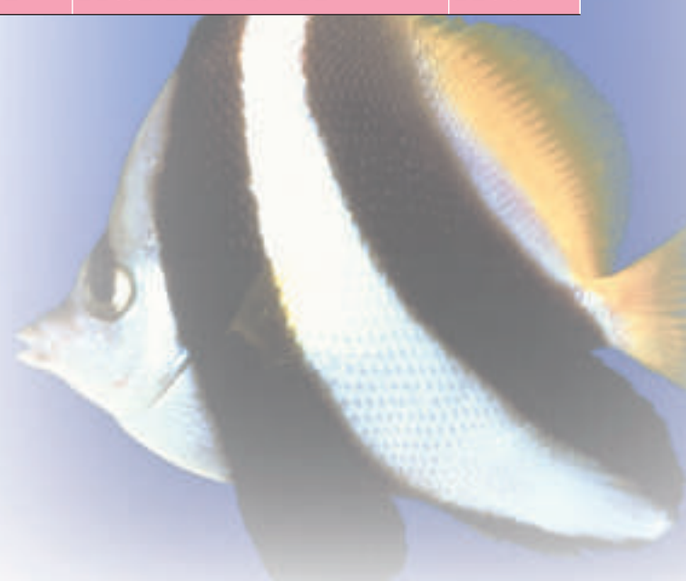
EXAMPLE FOR ORDERING

	Code	Type	Viton seal	Knob in plastic
Steel	FT 266/5	34	V	mp



SEAL KIT ON THE SEATING

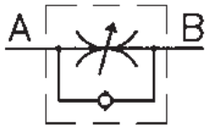
Type	1(OR)	2(BK)	(3)
34	2037	266/6.022.00.1-34	2068
78	2050	267/2.022.00.1-38	3075



DIMENSIONS

Type	øA UNI 4534	øB	C	D	E	øF	G	H	L	CH	Weight kg
34	3/4"-16 UNF	12,7	15,3	12,7	28	27	40,7	68,7	6	24	0,112
78	7/8"-14 UNF	15,9	17,5	15	32,5	33	46	78,5	8	27	0,115

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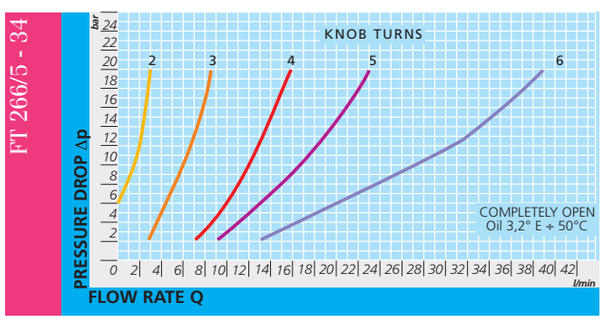


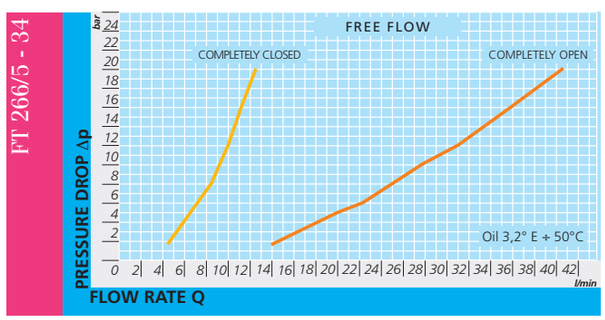
CARTRIDGE MOUNTED SINGLE-ACTING CONTROL VALVES MAX 350 BAR

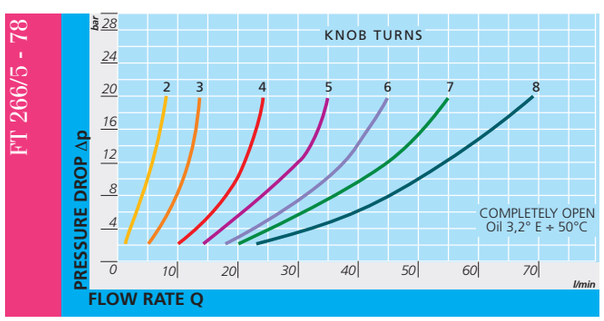
They control and eventually shut-off the flow in one direction, allowing a free return in the opposed direction.

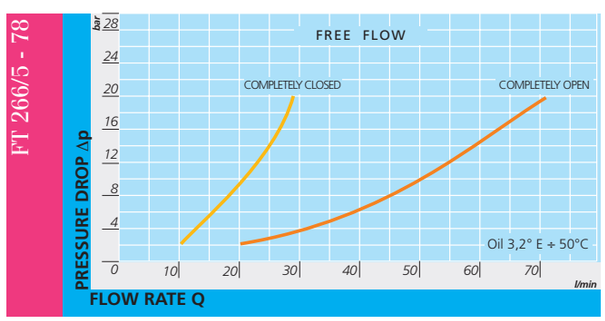
On request
- Complete with Viton seals (V)
- Knob in ABS (mp)





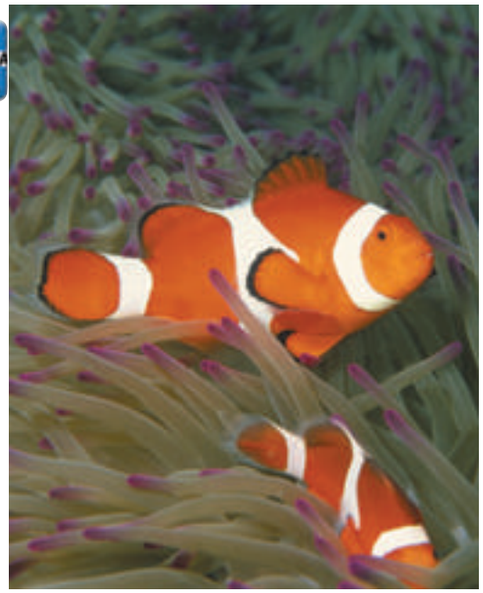






TECHNICAL DATA

TYPE	FLOW SECTION CM²	MAX. WORKING PRESSURE BAR	MIN. BURSTING PRESSURE BAR	WORKING TEMPERATURE °C	FILTRATION GRADE μM ABSOLUTE
34	0,20	320	1300	-20°/+100°	25
78	0,50	320	1300	-20°/+100°	25



MATERIALS

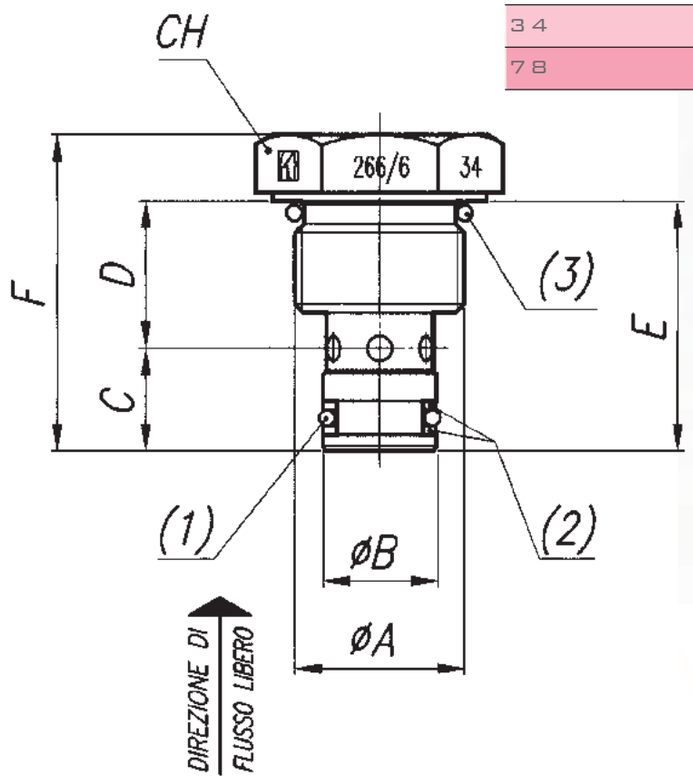
Body	9 S Mn Pb 23 - UNI 5105
Ball	UNI 100 C 6
Spring	AISI 302
Ball guide	Nylon 66 + Carbon fibre

EXAMPLE FOR ORDERING

	Code	Type	Viton seal
Steel	FT 266/6	34	V

SEAL KIT ON THE SEATING

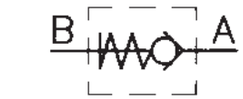
Type	1(OR)	2(BK)
34	2037	266/6.022.00.1-34
78	2050	267/2.022.00.1-38



DIMENSIONS

Type	øA UNI 4534	øB	C	D	E	F	CH	(3)
34	3/4"-16 UNF	12,7	11,5	16,5	28	35,5	24	2068
78	7/8"-14 UNF	15,9	12,5	20	32,5	40	27	3075

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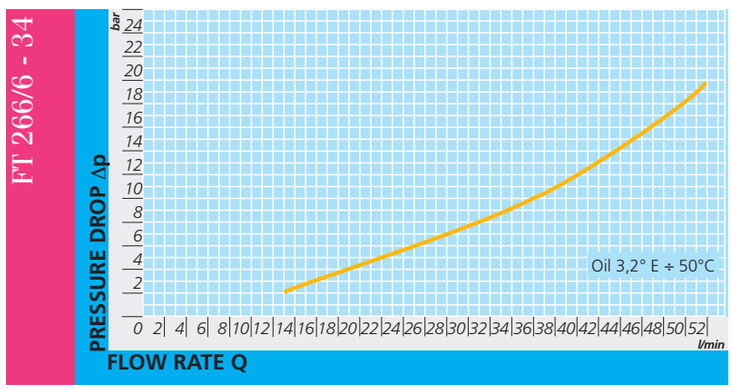
CARTRIDGE MOUNTED SINGLE-ACTING CONTROL VALVES MAX 350 BAR

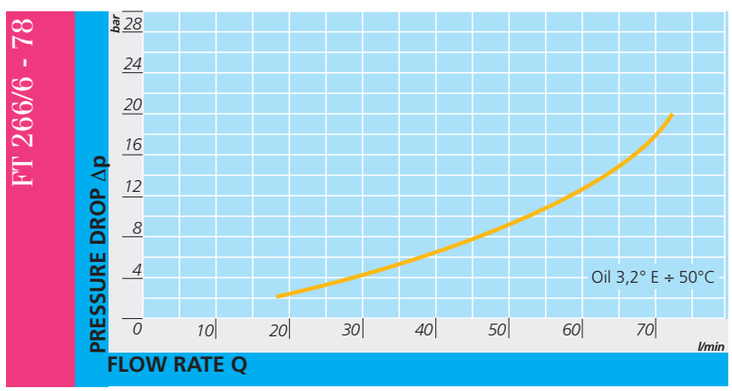
They allow the flow in one direction, shutting-off the same in the opposed direction.

On request
- Complete with Viton seals (V)
- Knob in ABS (mp)



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TECHNICAL DATA

Type	Max. working pressure bar	Min. bursting pressure bar	Working temperature °C	Filtration grade µm absolute
34	320	1300	-20°/+100°	25
78	320	1300	-20°/+100°	25



MATERIALS

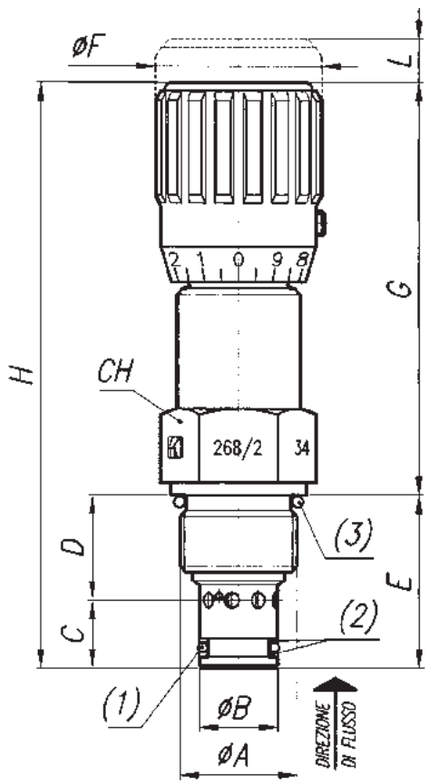
Body	9 S Mn Pb 28 - UNI 5105
Needle	1C 40 - UNI 8373
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD - Al Si 12 - UNI 5706
Knob (mp)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Viton seal	Knob in plastc
Steel	FT 268/2	34	V	mp

SEAL KIT ON THE SEATING

Type	1(OR)	2(BK)
34	2037	266/6.022.00.1-34
78	2050	267/2.022.00.1-38



DIMENSIONS

Type	ØA UNI 4534	Ø B	C	D	E	ØF	G	H	L	CH	(3)
34	3/4"-16 UNF	12,7	11	17	28	27	67	95	7	22	2068
78	7/8"-14 UNF	15,9	11,7	20,8	32,5	33	80	112,5	10	27	3075

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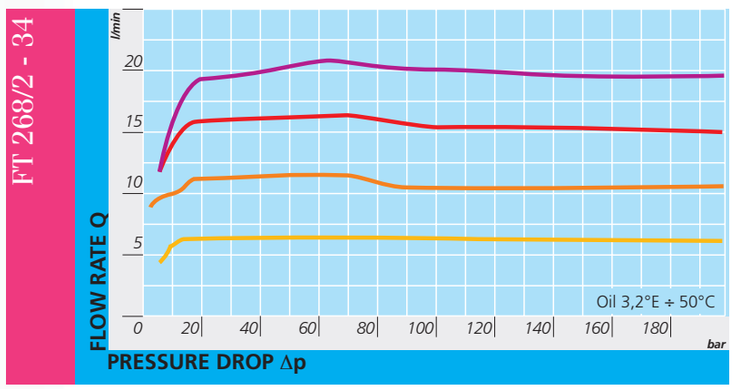


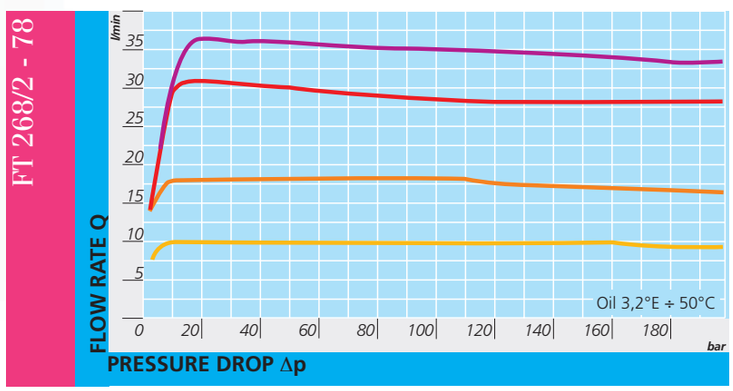
CARTRIDGE MOUNTED PRESSURE COMPENSATED TWO-WAY LOW FRICTION CONTROL VALVES MAX 350 BAR

Pressure compensated flow control valves, to insert in modular units in line.
The construction and functional characteristics reflect exactly those described for the two inlet valves.
It is recommended to keep them in their protective wrapping until the mounting, in order to avoid possible drawbacks caused by eventual entry of particles into the delicate and essential parts for a good working.
On page 100 is proposed a machining scheme for the embedding seat, which has to be observed to ensure the necessary accuracy of the valve.

On request
- Viton seals (V)
- Knob in ABS (mp)







TECHNICAL DATA

Type	Flow section cm²	Max. working pressure bar	Min. bursting pressure bar	Working temperature °C	Filtration grade µm absolute
34	0,10	320	1300	-20°/+100°	25
78	320	320	1300	-20°/+100°	25

Sealing realized
with OR seals
on conical seating



DRAWING OF CAVITY MACHINE FOR CARTRIDGE MOUNTED VALVES

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CONICAL SEATING FOR OR FT 265/2 - FT 266/2 FT 266/5 - FT266/6 - 268/2

TYPE	ØA	ØB	C UNI 4534	D	E	F	G	ØH	ØL
34	$32^{\pm 0,4}$	$20,65^{\pm 0,1}$	3/4"-16UNF-2B	2,75	9,5	18,9	28,6	11,7	$12,7^{+0,05}_{-0}$
78	$32^{\pm 0,4}$	$24^{\pm 0,1}$	7/8"-14UNF-2B	2,75	12,35	24,25	31,85	15	$15,875^{+0,05}_{-0}$

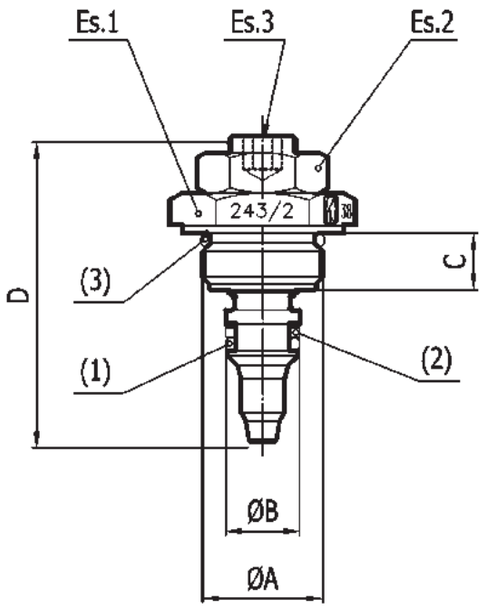
CONICAL SEATING FOR OR FT 265/2 - FT 266/2 FT 266/5 - FT266/6 - 268/2

TYPE	M	N	P	Q	R	S	T	α°	OR
34	0,5	14,3	$19,05^{\pm 0,13}$	$1,53^{\pm 0,08}$	$0,1^{+0,15}_{-0}$	$29^{\pm 0,4}$	29,8	70°	2068
78	0,5	15,75	$24,45^{\pm 0,1}$	$1,4^{\pm 0,1}$	$0,1^{+0,15}_{-0}$	$33,75^{\pm 0,4}$	34,5	60°	3075



MATERIALS

BODY	ETG 100
NEEDLE	35SMNPB10 - AISI 303
OR	NITRILE
NUT	35SMNPB10
BK	PTFE



DIMENSIONS

TYPE	ØA	ØB	C	D	Es.1	Es.2	Es.3	(1) OR	(2) BK	(3) OR	ØF	ØG
14	M17x1	10	8.5	44.5	22	17	4	106	106	2056	26	17.5
38	M18x1	11	8.5	45.5	24	17	5	2031	2031	2062	28	18.5
12	M22x1.5	14	13.5	66.5	27	19	7	2043	2043	2075	33	22.5
34	M27x1.5	18	18	82	32	22	9	2056	2056	3093	35	28

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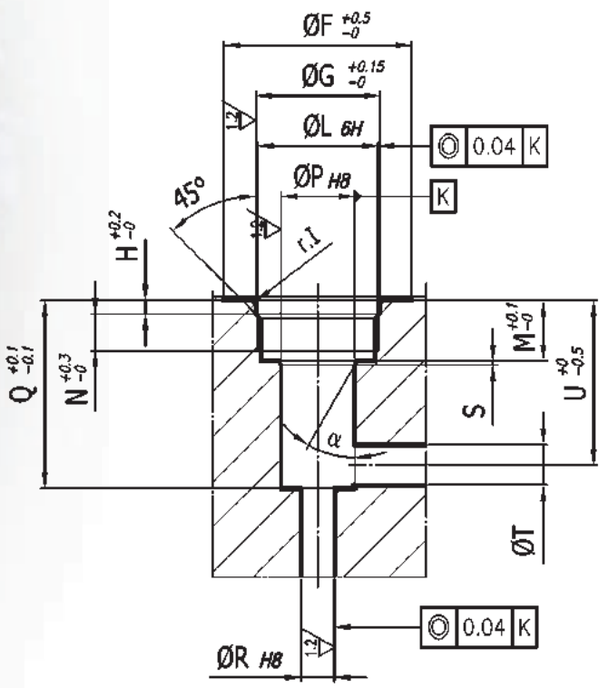
DOUBLE-ACTING BRAKING VALVES

They are composed of a needle throttling which allows a very sensitive control.
They can be used in the assembling in manifolds and integrated blocks
and are also used as cylinder braking valves.

Recommended filtration: 60 micron or inferior.
Max. working pressure: 300 bar

On request
Version in AISI 316 code FT 2243/2



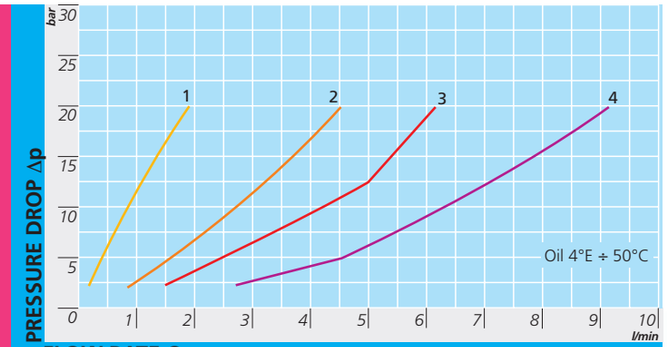


DIMENSIONS

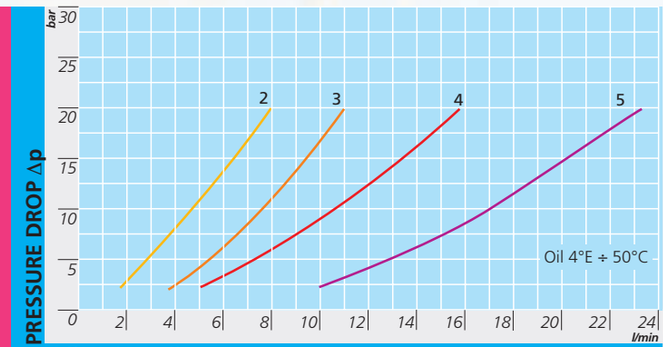
TYPE	H	ØL	M	N	ØP	Q	ØR	S	ØT	U	R.I	α°
14	2	M17x1	9	5.5	10	28	4	0.6	4.5	25	0.3	30°
38	2	M18x1	9	5	11	28	5	0.6	6	24.5	0.3	30°
12	2.5	M22x1.5	15	10	14	40.5	8	1	8	36	0.3	20°
34	3.5	M27x1.5	21	15	18	54.5	10	1.5	10	48.5	0.5	20°

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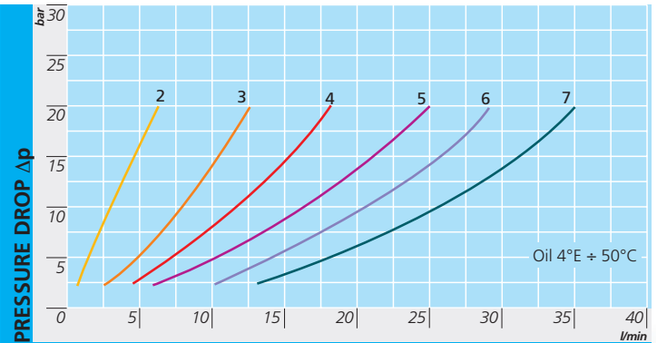


FT 243/2 - 38

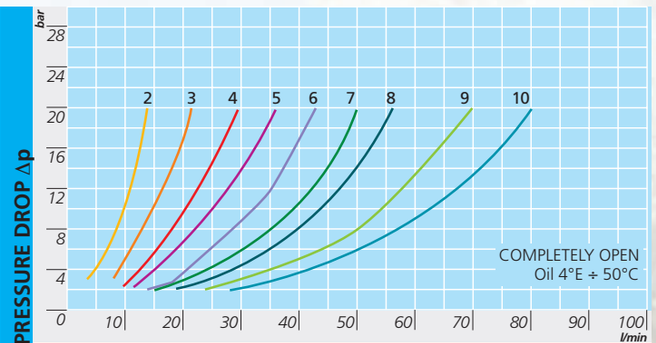


FLOW RATE CURVES

FT 243/2 - 12



FT 243/2 - 34

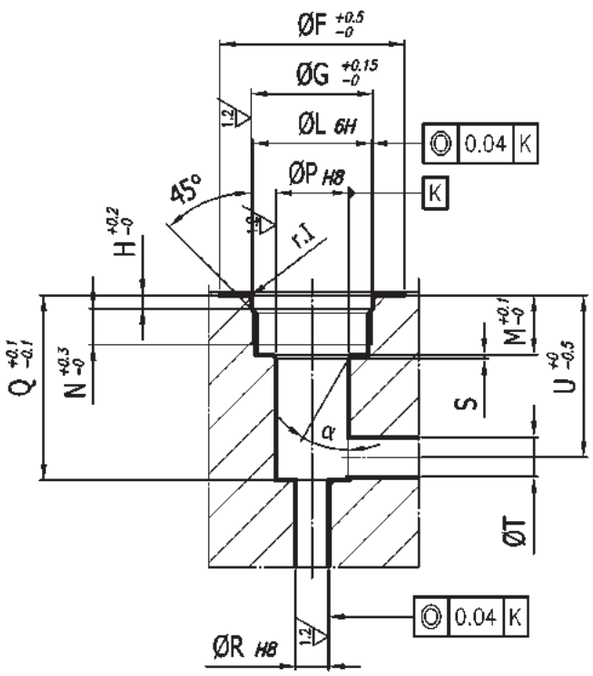


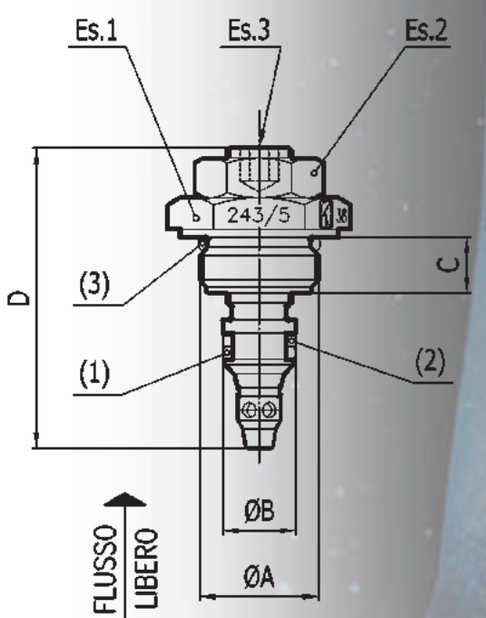
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MATERIALS

BODY	ETG 100
NEEDLE	35SMNPB10 - AISI 303
OR	NITRILE
NUT	35SMNPB10
BK	PTFE





DIMENSIONS

TYPE	ØA	ØB	C	D	Es.1	Es.2	Es.3	(1) OR	(2) BK	(3) OR	ØF	ØG
14	M17x1	10	8.5	44.5	22	17	4	106	106	2056	26	17.5
38	M18x1	11	8.5	45.5	24	17	5	2031	2031	2062	28	18.5
12	M22x1.5	14	13.5	66.5	27	19	7	2043	2043	2075	33	22.5
34	M27x1.5	18	18	82	32	22	9	2056	2056	3093	35	28

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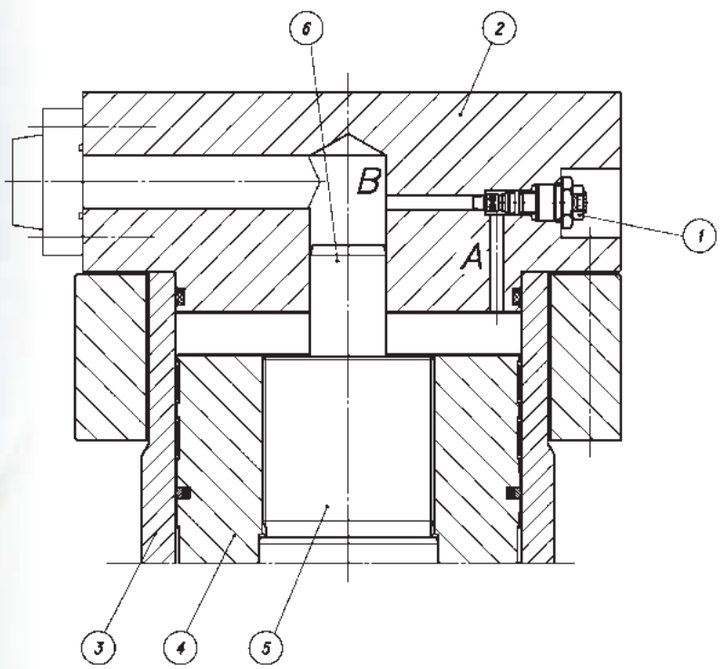
SINGLE-ACTING BRAKING VALVES

They are composed of a needle throttling, inside which there is a ball single-acting valve. They can be used in the assembling in manifolds and integrated blocks and are also used as cylinder braking valves.

Recommended filtration: 60 micron or inferior.
Max. working pressure: 300 bar



FT 243/5



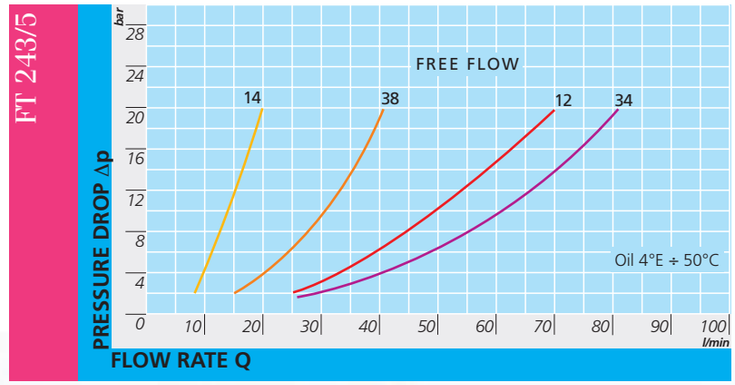
	Description
1	Valve FT 243/5
2	Cylinder head
3	Barrel
4	Piston
5	Stem
6	Pink of brake

DIMENSIONS

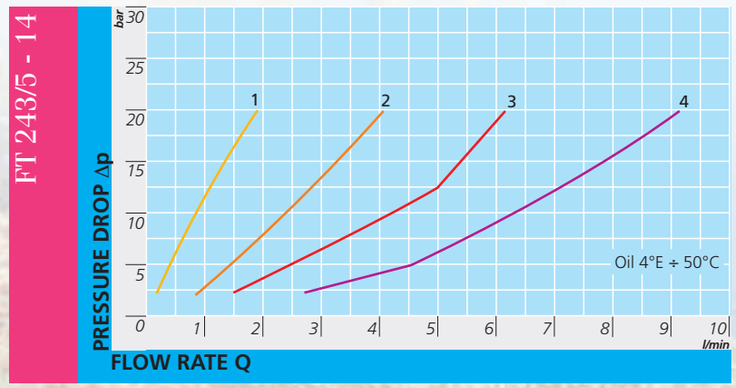
TYPE	H	ØL	M	N	ØP	Q	ØR	S	ØT	U	R.I	α°
14	2	M17x1	9	5.5	10	28	4	0.6	4.5	25	0.3	30°
38	2	M18x1	9	5	11	28	5	0.6	6	24.5	0.3	30°
12	2.5	M22x1.5	15	10	14	40.5	8	1	8	36	0.3	20°
34	3.5	M27x1.5	21	15	18	54.5	10	1.5	10	48.5	0.5	20°

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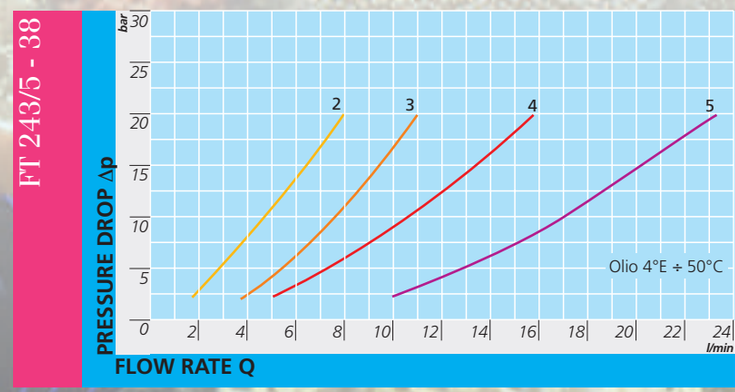
FT 243/5



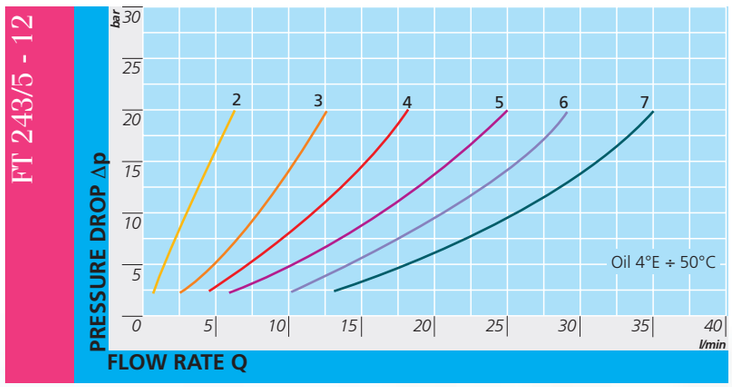
FT 243/5 - 14

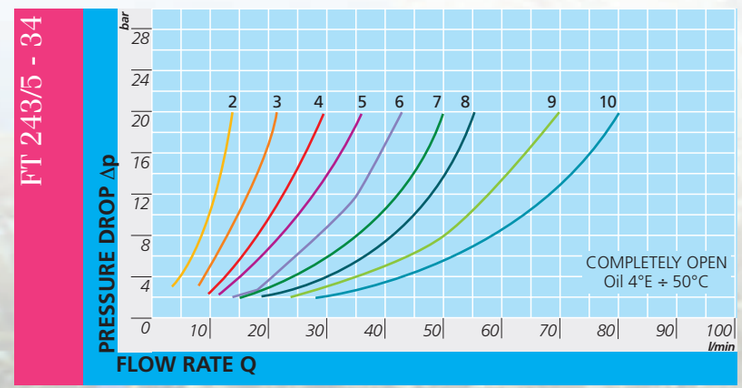


FT 243/5 - 38

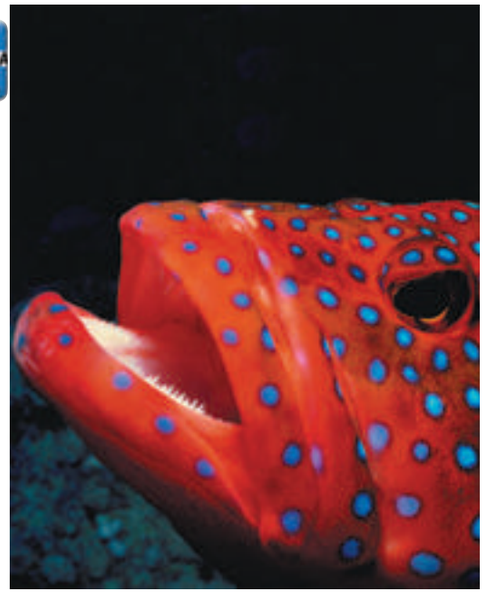


FLOW RATE CURVES



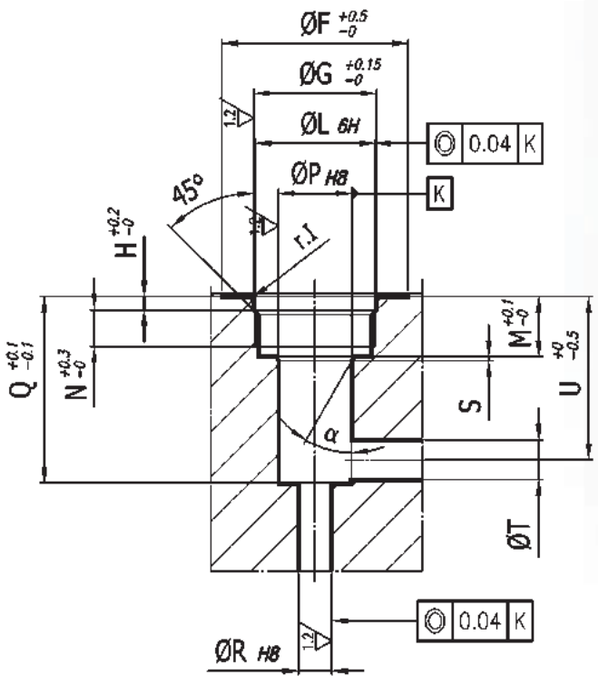


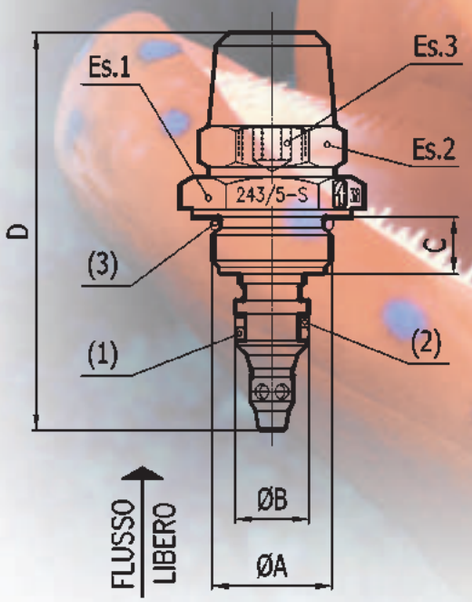
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MATERIALS

BODY	ETG 100
NEEDLE	35SMnPb10 - AISI 303
OR	NITRILE
NUT	35SMnPb10
BK	PTFE





DIMENSIONS

TYPE	A	ØB	C	D	Es.1	Es.2	Es.3	(1) OR	(2) BK	(3) OR	ØF	ØG	H
14	M17x1	10	8.5	59	22	17	4	106	106	2056	26	17.5	2
38	M18x1	11	8.5	59	24	19	5	2031	2031	2062	28	18.5	2
12	M22x1.5	14	13.5	87	27	22	7	2043	2043	2075	33	22.5	2.5
34	M27x1.5	18	18	106	32	27	9	2056	2056	3093	35	28	3.5

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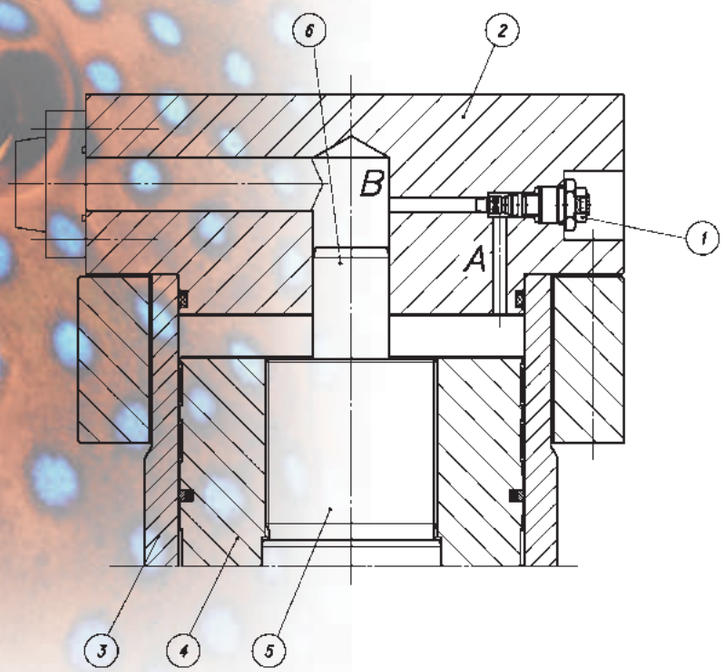
SINGLE-ACTING BRAKING VALVES BLEED-AIR

They are composed of a needle throttling, inside which there is a ball single-acting valve. They can be used in the assembling in manifolds and integrated blocks and are also used as cylinder braking valves. This kind of valve can be used also as air breather. By removing the cap nut it is possible to unscrew the needle and uncover the coaxial passage which allows the breather of the underlying chamber.

Recommended filtration: 60 micron or inferior.
Max. working pressure: 300 bar



FT 243/5



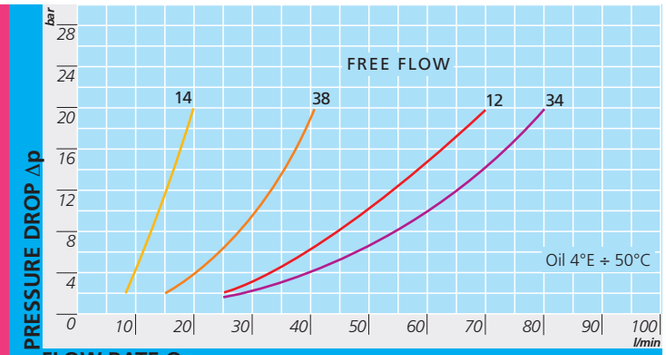
	DESCRIPTION
1	VALVE FT 243/5-S
2	CYLINDER HEAD
3	BARREL
4	PISTON
5	STEM
6	PINK OF BRAKE

DIMENSIONS

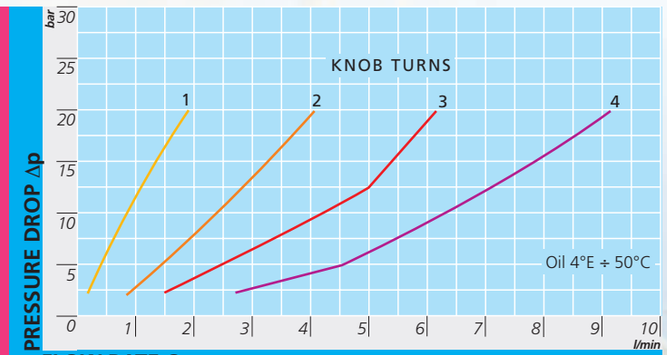
TYPE	ØL	M	N	ØP	Q	ØR	S	ØT	U	R.I	α°
14	M17x1	9	5.5	10	28	4	0.6	4.5	25	0.3	30°
38	M18x1	9	5	11	28	5	0.6	6	24.5	0.3	30°
12	M22x1.5	15	10	14	40.5	8	1	8	36	0.3	20°
34	M27x1.5	21	15	18	54.5	10	1.5	10	48.5	0.5	20°

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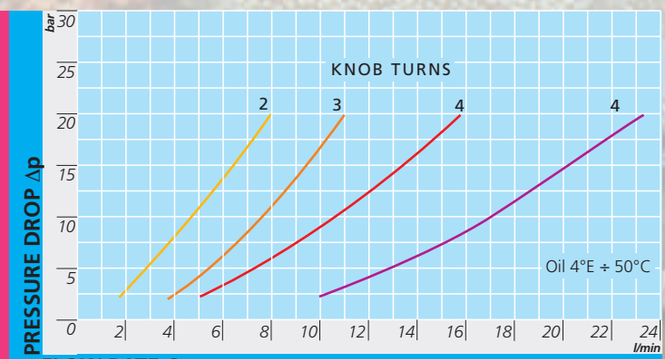
FT 243/5 - S



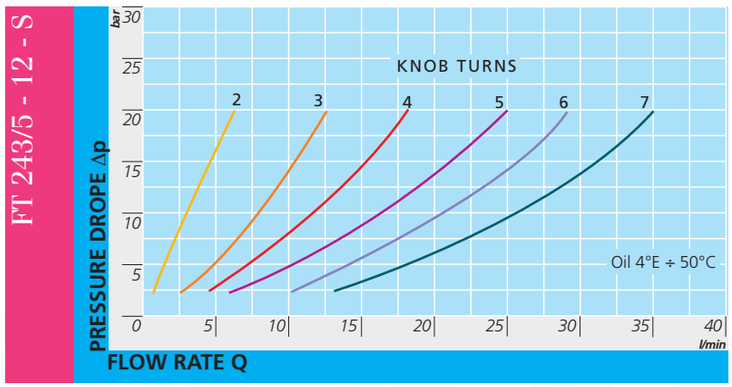
FT 243/5 - 14 - S

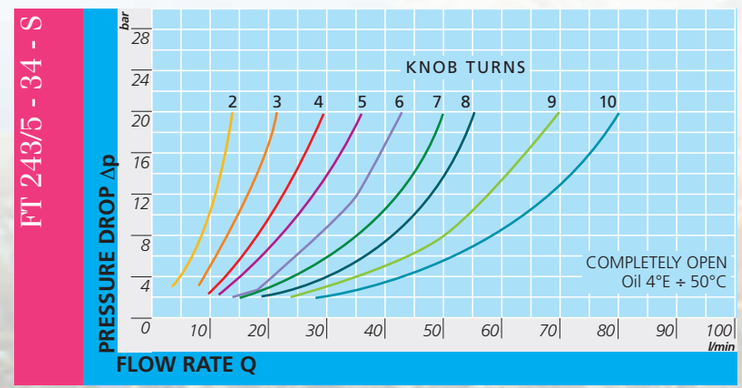


FT 243/5 - 38 - S



FLOW RATE CURVES





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STACKABLE VALVES

FT3 FC
Stackable valves cetop 03 flow control valves

FT3 FX
Stackable valves cetop 03 flow control valves

FT3 CO
Stackable valves cetop 03 check valves

FT3 CP
Stackable valves cetop 03 pilot operated check valves

FT3 MO
Stackable valves cetop 03 pressure relief valves

FT3 MP
Stackable valves cetop pressure relief valves

FT3 FO
Stackable valves cetop 03 flow restrictor valves

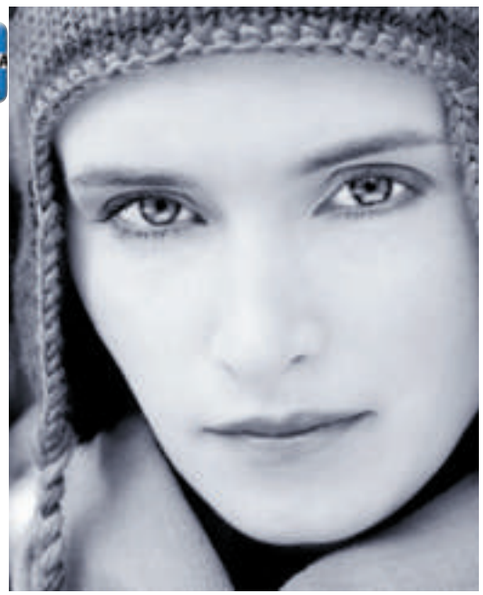
FT3 RO
Stackable valves cetop 03 pressure reducing valves

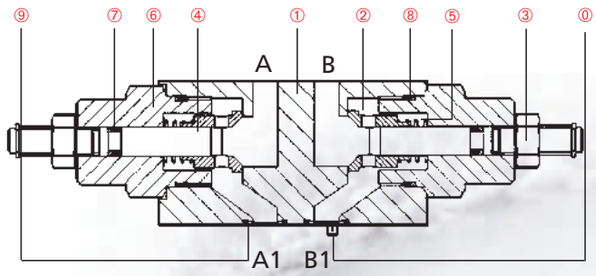
FT3 RP
Stackable valves cetop 03 pressure reducing valves

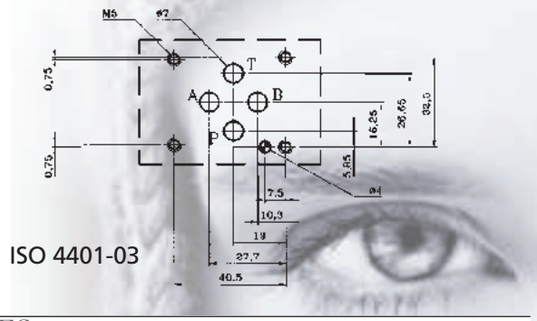
FT3 LSP3
Stackable valves cetop 03 3-way pressure compensator with load sensing function

FT3 Q3P
Stackable valves cetop 03 pressure compensated flow control valves

FT3 PC
Stackable valves cetop 03 2-way pressure compensator





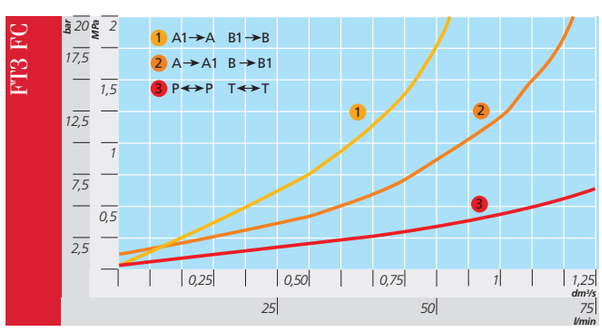


A HOW TO READ THE MODEL CODE FOR VALVES FT3-FC

FT3 - FC - (AB) - * - ** / 10
1 2 3 4 5 6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	FC	one-way flow control valve
3		(AB) service lines where the control operates; see also functional symbols A AB Flow controlled from A1 → A and from B1 → B A Flow controlled from A1→ A, free on B B Flow controlled from B1 → B, free on A
4		Flow control characteristics for A1 → A and B1 → B - See B and opening pressure (Pm) for flow A → A1 and B → B1 - standard control and e Pm approx. 0.04 MPa (0.4 bar) V fine flow control 4 Pm approx. 0.4 MPa (4 bar)
5		Code reserved for special variants (seals, materials, surface treatments, etc.).
6		Design number (progressive) of the valve.

B TYPICAL DIAGRAMS



Typical _p-Q curves for valves FT3 - FC - AB,
in standard configuration, with mineral oil at 36 cSt at 50° C,
with throttling axis at full retraction.

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STACKABLE VALVES CETOP 03 FLOW CONTROL VALVES

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 orifice of sleeve ②; 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 on the available pressure drop



C PRESSURE ADJUSTMENT

The control is made by throttling from A1→ A (e/o 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
(*) approx.	Q=1 dm3/s (60 l/min) at ΔP=2MPa (20 bar)
(**) approx.	Q=0.5 dm3/s (30 l/min) at ΔP=2MPa (20 bar)

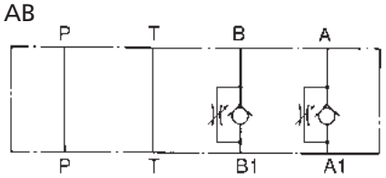
The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clockwise the adjustment screw. Suitable mechanical stops prevent dangerous manoeuvring.

D DATA AND OPERATING PRESSURE

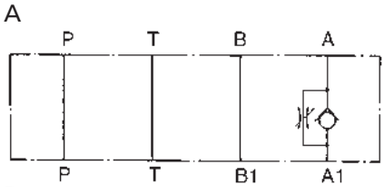
Recommended max. flow rate	1dm³/s (60 l/min)
Max. nominal pressure	32 MPa (320 bar)
Loss of pressure	see **B**
Adjustment	see **C**
Dimensions	see **F**
Mass about	circa 1,2 kg

E FUNCTIONAL SYMBOLS

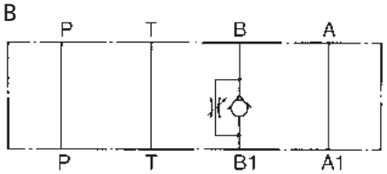
FT3 - FC - AB



FT3 - FC - A

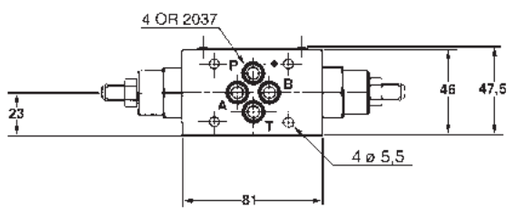


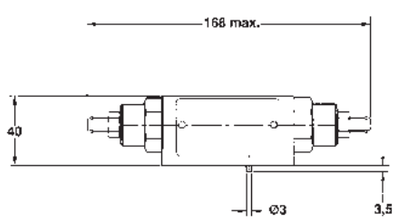
FT3 - FC - B

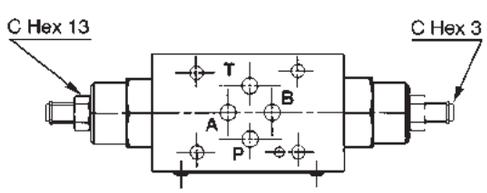


F INSTALLATION DIMENSION

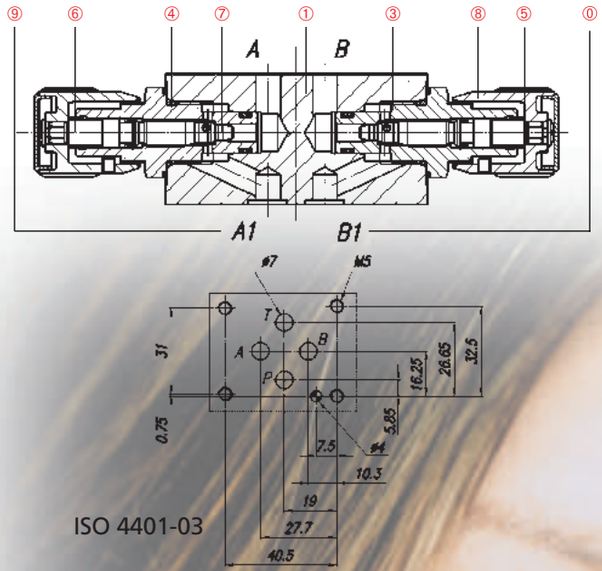
All data are expressed in mm











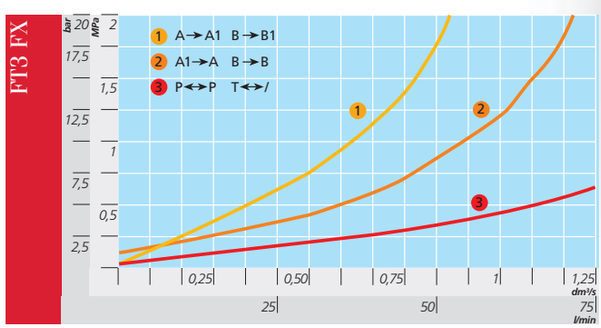
A HOW TO READ THE MODEL CODE FOR VALVES FT3- FX

FT3 - FX - (AB) - * - ** / 10

1 2 3 4 5 6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	FX	one-way flow control valve
3	(AB)	Services lines where the control operate; see also functional symbols **A** AB Flow controlled from A1 → A and from B1 → B A Flow controlled from A1→ A, free on B B Flow controlled from B1 → B, free on A
4		Flow control characteristics for A1 → A and B1 → B - see also **B** and check valve opening pressure (Pm) for flow A1 → A e B → B1 - standard control and e Pm approx. 0.04 MPa (0.4 bar) V fine flow control W extrafine flow control 4 Pm approx. 0.4 MPa (4 bar)
5		Code reserved for special variants (seals, materials, surface treatments, etc.).
6		Design number (progressive) of the valve.

B TYPICAL DIAGRAMS



Typical Δp-Q curves for valves FT3 - FX, in standard configuration, with mineral oil at 36 cSt at 50° C, with throttling axis at full retraction.

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STACKABLE VALVES CETOP 03 FLOW CONTROL VALVES

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 A1→ A (and/or B1→ B) through orifice of sleeve ②; the throttling axis ④, which is shifted by screwing it and locked by handle rotation, partially obstructs the control orefices, thus making the flow rate entirey dependent on the available pressure drop.

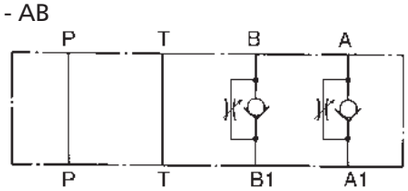


D DATA AND OPERATING PRESSURE

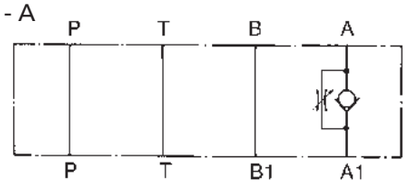
Recommended max. flow rate	1dm3/s (60 l/min)
Max. nominal pressure	32 MPa (320 bar)
Loss of pressure	see **B**
Dimensions	see **F**
Mass about	1,2 kg

E FUNCTIONAL SYMBOLS

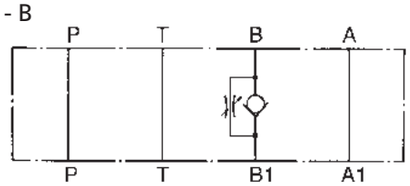
FT3 - FX - AB



FT3 - FX - A

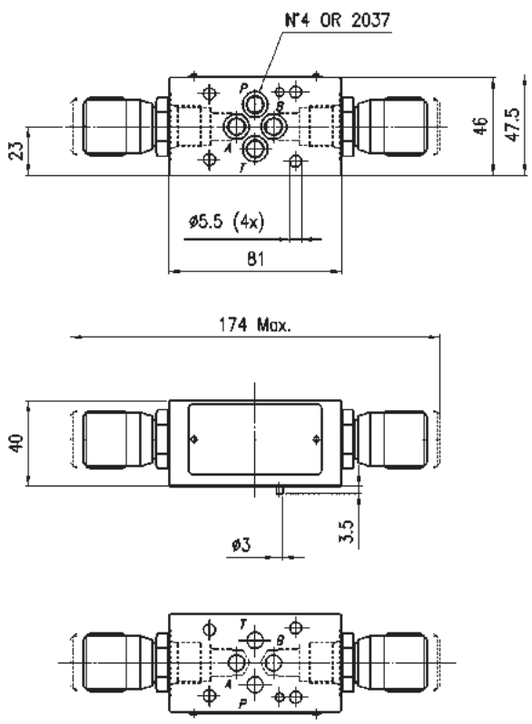


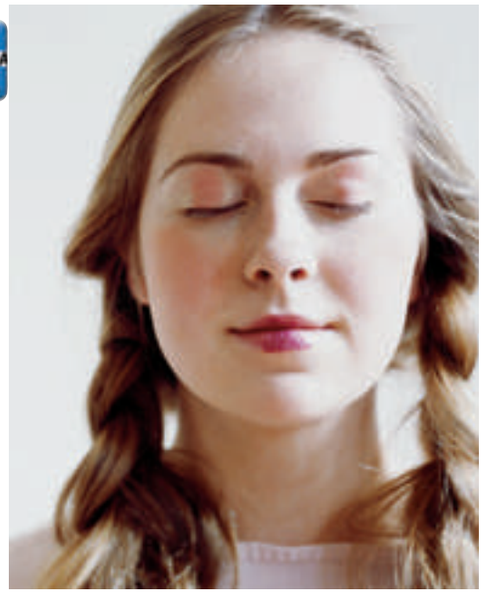
FT3 - FX - B

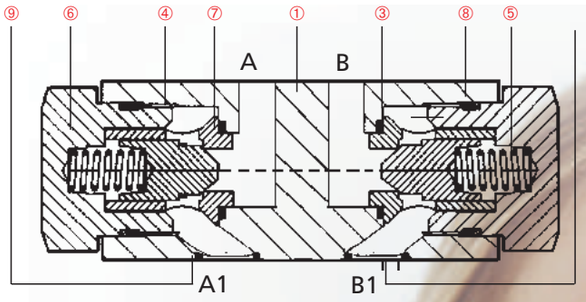


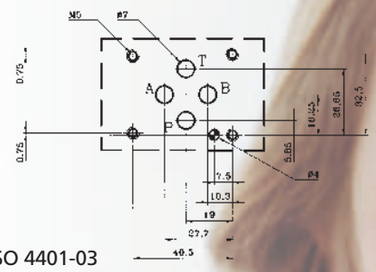
F INSTALLATION DIMENSION

All data are expressed in mm









ISO 4401-03

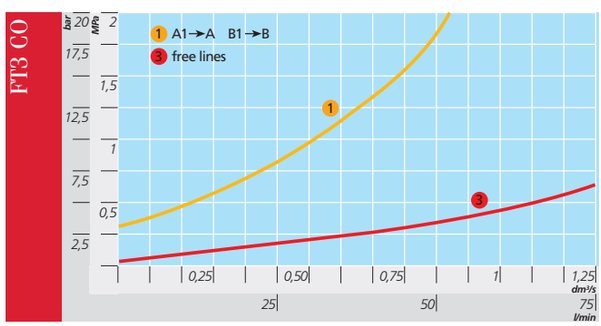
A HOW TO READ THE MODEL CODE FOR VALVES FT3-CO

FT3 - CO - (AB) - * - ** / 10

1 2 3 4 5 6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	CO	one-way flow control valve
3	(AB)	Services lines where the control operate; see also functional symbols **A** AB Flow blocked from A1 → A free on P e T B Flow blocked from B1 → B, free on A, P and T P Flow blocked from P → P1, free on A, B and T
4	Opening pressure (Pm) of the one-way valve: - (no indication): Pm approx. 0.2 MPa (2 bar) 4 Pm approx. 0.4 MPa (4 bar)	
5	Code reserved for special variants (seals, materials, surface treatments, etc.).	
6	Design number (progressive) of the valve.	

B TYPICAL DIAGRAMS



Typical Δp-Q curves for valves FT3-CO, in standard configuration, with mineral oil at 36 cSt and at 50° C.

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STACKABLE VALVES CETOP 03
CHECK VALVES

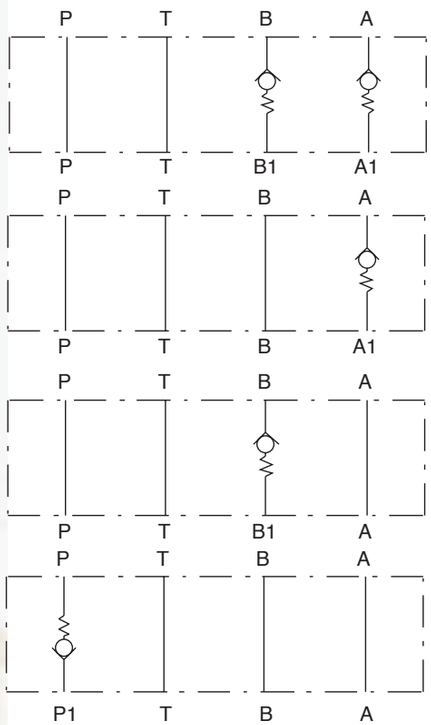
Fluid flows freely on P and T lines; on service lines A and/or B with p.o. check, fluid flows from A→A1 (and/or B→B1) overcoming the force of spring ⑤ acting on poppet ④ and fluid is blocked from A1→A (and/or B1→B).



D DATA AND OPERATING PRESSURE

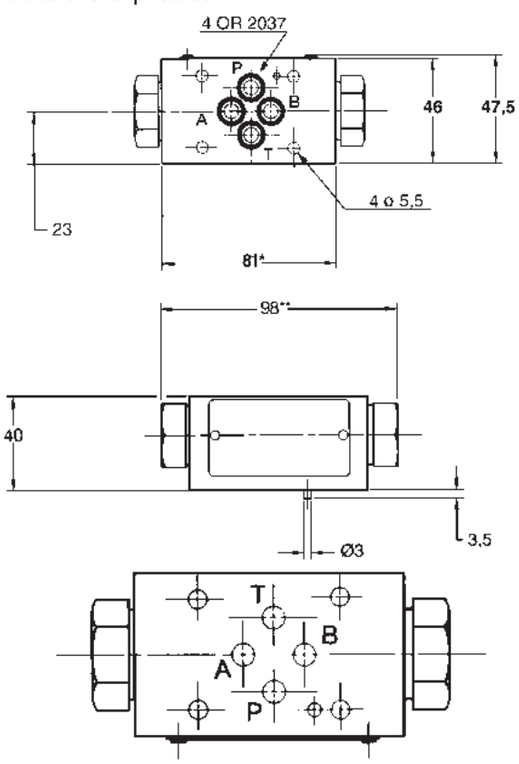
Recommended max. flow rate	1dm3/s (60 l/min)
Max. nominal pressure	32 MPa (320 bar)
Loss of pressure	see **B**
Dimensions	see **F**
Mass about	1,2 kg

E HOW TO READ THE MODEL CODE

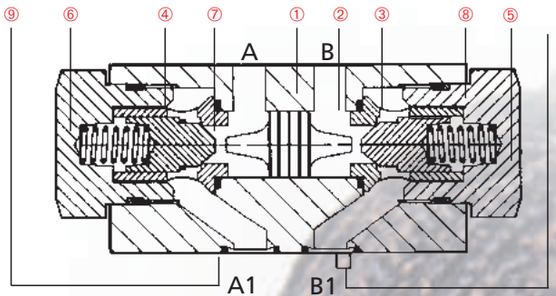


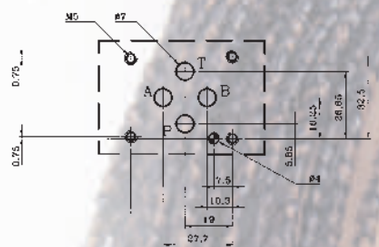
F INSTALLATION DIMENSION

All data are expressed in mm









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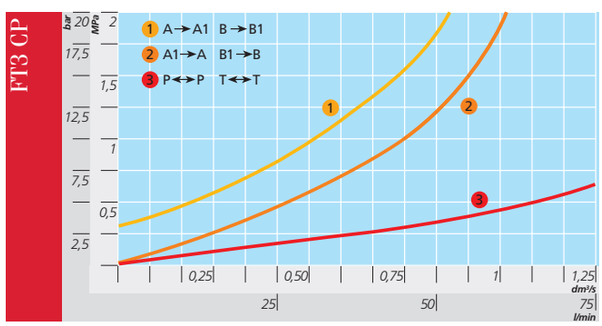
A HOW TO READ THE MODEL CODE FOR VALVES FT3-CP

FT3 - CP - (AB) - * - ** / 10

1 2 3 4 5 6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	CO	one-way flow control valve, pilot operated (hydraulically)
3	(AB)	service lines where the control operates; without piloting pressure see also functional symbols A AB Flow blocked from A1 → A and from B1 → B A Flow blocked from A1 → A, free on B B Flow blocked from B1 → B, free on A
4	Opening pressure (Pm) of the one-way valve, for flow A → A1 and B → B1without piloting - (no indication): Pm approx. 0.2 MPa (2 bar) 4 Pm approx. 0.4 MPa (4 bar)	
5	Code reserved for special variants (seals, materials, surface treatments, etc.).	
6	Design number (progressive) of the valve.	

B TYPICAL DIAGRAMS



Typical Δp-Q curves for valves FT3 - CP - AB, in standard configuration, with mineral oil at 36 cSt and at 50° C.

STACKABLE VALVES CETOP 03
PILOT OPERATED CHECK VALVES

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 ⑤ on service line A to open and permit flow A1→A.



C PILOTING PRESSURE

To open the check valve through the action of the pilot piston, the piloting pressure must be equal or superior to the resulting value, ex. To release a check in A:

Pa1 + Pm - Pa
Pp = Pb = + Pa
3.5

Where:

Pp = piloting pressure;
Pb = pressure in B;
Pa = pressure in A;
Pa1 = pressure in A1;
Pm = check valve opening pressure (spring) or to open the check in B:

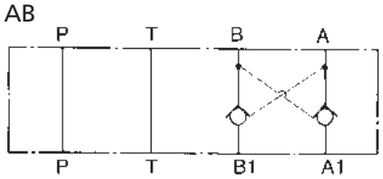
Pb1 + Pm - Pb
Pp = Pa = + Pb
3.5

D DATA AND OPERATING PRESSURE

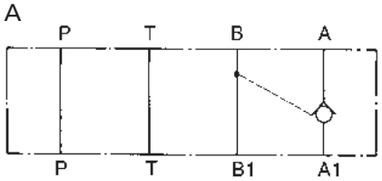
Recommended max. flow rate	1dm3/s (60 l/min)
Max. nominal pressure	32 MPa (320 bar)
Loss of pressure	see B
Pilot area ration piston/check valve	approx. 3,5
Piloting pressure	see C
Dimensions	see F
Mass	about 1 kg

E FUNCTIONAL SYMBOLS

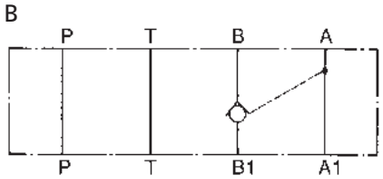
FT3 - CP - AB



FT3 - CP - A

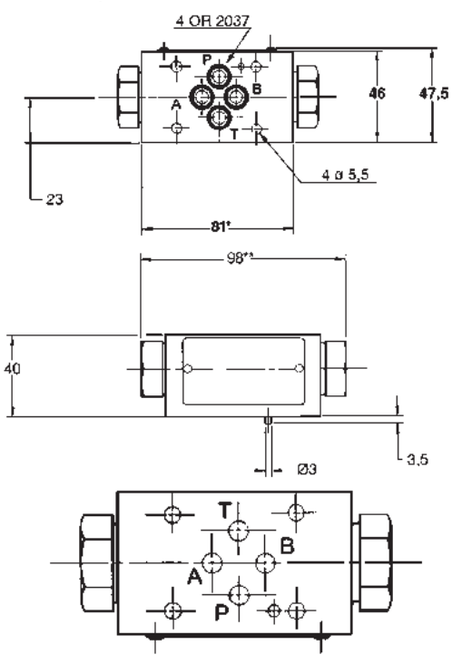


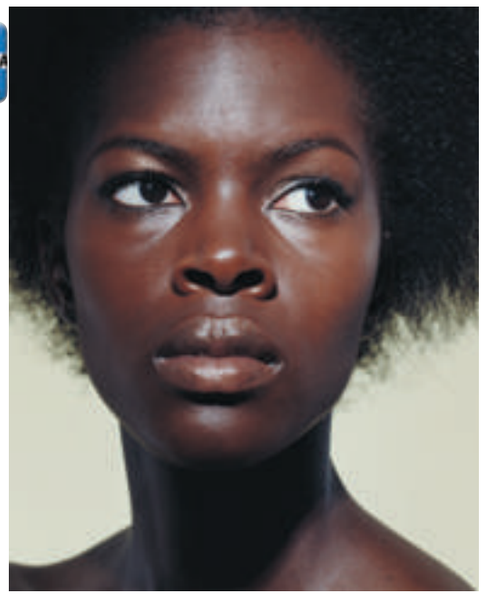
FT3 - CP - B

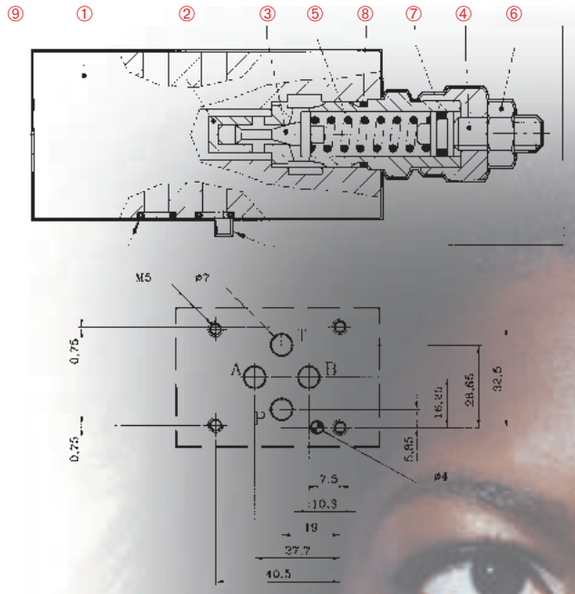


F INSTALLATION DIMENSION

All data are expressed in mm





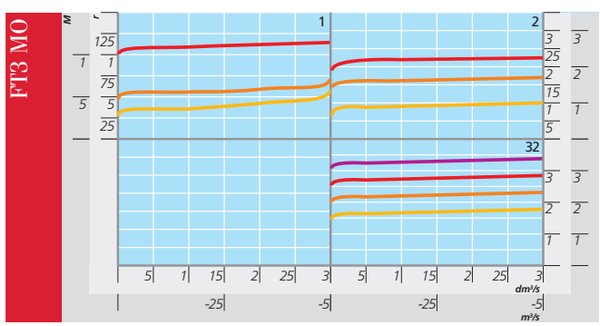


A HOW TO READ THE MODEL CODE FOR VALVES FT3-MO

FT3 - MO - (P) / (20) - (10) - ** / 10
1 2 3 4 4a 5 6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	MO	one-way flow control valve, pilot operated (hydraulically)
3	(P)	service line where the control operates - see also functional symbols A P: relief on P and discharge to T B: relief on B and discharge to T BA: independent relief on B and A and discharge to T
4	(20)	pressure adjustment ranges: 10: from 2,5 to 12,5 Mpa (from 25 to 125 bar) 20: from 4 to 25 Mpa (from 40 to 250 bar) 32: from 40 to 32 Mpa (from 100 to 320 bar)
4a	(10)	pressure adjustment range for relief on A (only for models FT3-MO-BA) see 4
5	Code reserved for special variants (seals, materials, surface treatments, etc.).	
6	Design number (progressive) of the valve.	

B TYPICAL DIAGRAMS



Typical P-Q curves for valves FT3-MO, in standard configuration, with mineral oil at 36 cSt and at 50° C.

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STACKABLE VALVES CETOP 03
PRESWSURE RELIEF VALVES

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 ② and opens to the pressurized fluid annular passage to T, thus keeping the pressure level at the requested value.



C ADJUSTMENT 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 the spring ⑤.
To increase the relief pressure, turn clockwise the adjustment screw ④, After having unlocked the nut ⑥. For each pressure adjustment range, the pressure gradient is approximate:

10	1,6 MPa/mm (24 bar/turn)
20	3,2 Mpa/mm (48 bar/ turn)
32	5 Mpa/mm (75 bar/ turn)

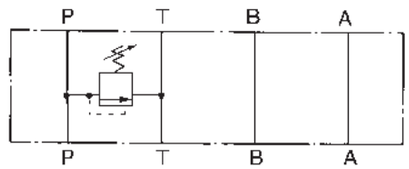
By screwing pressure increases. When the required level of pressure is reached, lock the nut ⑥.

D DATA AND OPERATING PRESSURE

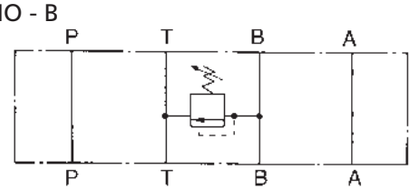
Recommended max. flow rate	
in free lines	1dm³/s (60 l/min)
in controlled lines	0,5dm³/s (30 l/min)
Max. nominal pressure	32 MPa (320 bar)
Adjustment	see **B**
Pressure adjustment	see **C**
Dimensions	see **F**
Mass	
FT3-MO-P e B	approx. 1,7 kg
FT3-MO-BA approx. 2,3 kg	

E FUNCTIONAL SYMBOLS

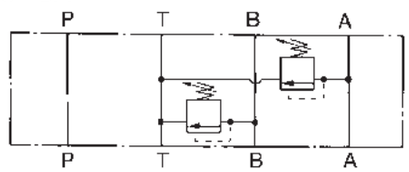
FT3 - MO - P



FT3 - MO - B

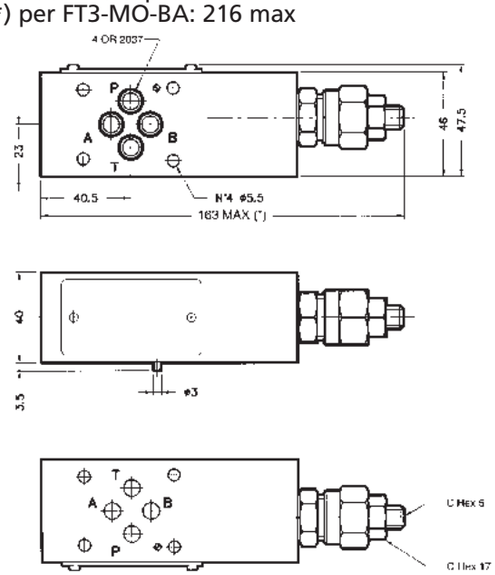


FT3 - MO - BA

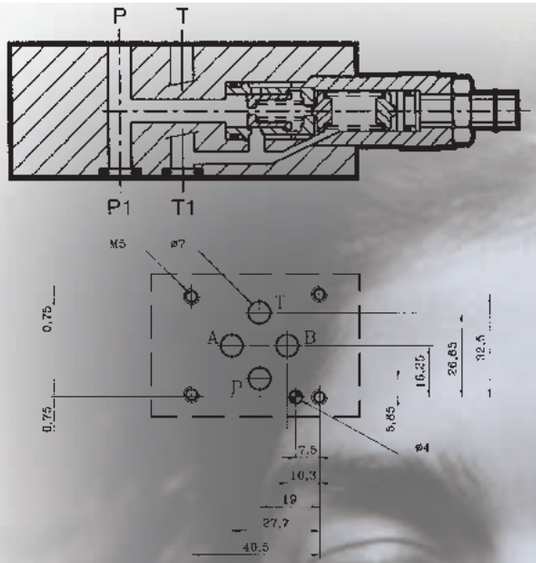


F INSTALLATION DIMENSION

All data are expressed in mm
(*) per FT3-MO-BA: 216 max







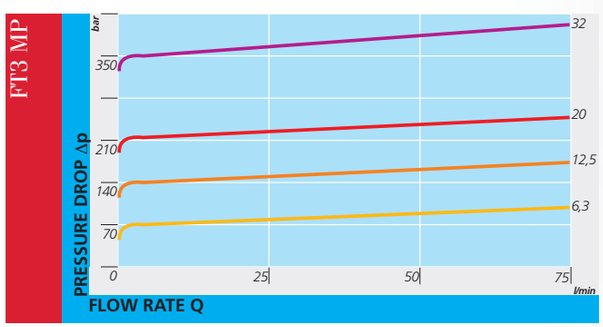
A HOW TO READ THE MODEL CODE FOR VALVES FT3-MP

FT3 - FC - (P) / (20) - (32) - ** / 10

1 2 3 4 4a 5 6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	MP	pressure relief - pilot operated
3	(P)	service lines where the control operate, see also functional symbols A P relief on P and discharge to T B relief on B and discharge to T BA independent relief on B and A and discharge to T AB relief on B and A 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 FT5 - MP - BA) or on B for FT5 - MP - AB
5		Code reserved for special variants (seals, materials, surface treatments, etc.).
6		Design number (progressive) of the valve.

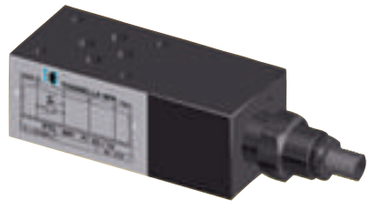
B TYPICAL DIAGRAMS



Typical P-Q curves for valves FT3-MP, in standard configuration, with mineral oil at 36 cSt and at 50° C.

STACKABLE VALVES CETOP 03
PRESSURE RELIEF VALVES

The hydraulic fluid crosses freely into service lines A, B, P and T. The control valve includes a piston and an adjustment and setting pilot valve with a compression of spring. When in the line where control works pressure overcomes the settled valve pressure value, the piston opens because not balances and opens a way through T maintaining the pressure level at the requested value.



C RELIEF PRESSURE ADJUSTMENT

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 the spring. To increase the relief pressure, turn clock wise the adjustment screw CH5, after having unlocked the nut CH17mm.

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

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)

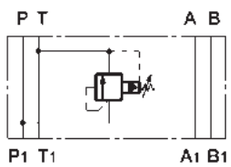
By screwing the pressure increases.
When the required level of pressure is reached, lock the nut with CH17.

D DATA AND OPERATING PRESSURE

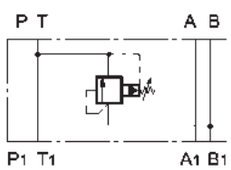
Recommended max. flow rate	1dm3/s (60 l/min)
Max. nominal pressure	32 MPa (320 bar)
Loss of pressure	see **B**
Adjustment	see **C**
Dimensions	see **F**
Mass	approx. 1,2kg

E FUNCTIONAL SYMBOLS

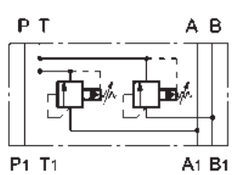
FT3 - MP - P



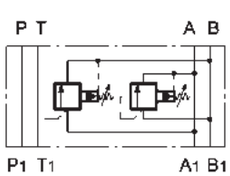
FT3 - MP - B



FT3 - MP - BA

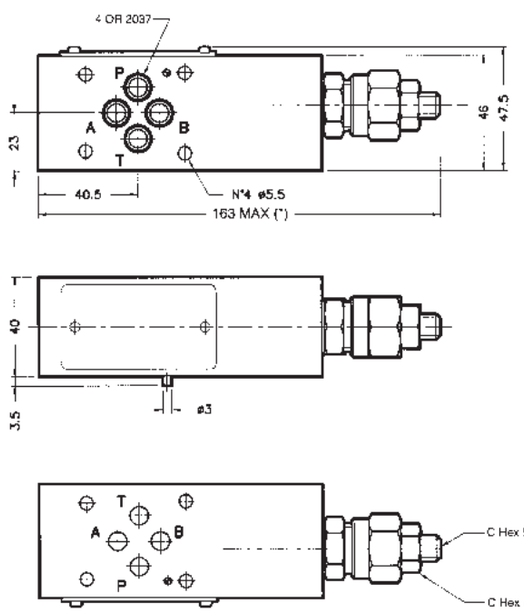


FT3 - MP - AB



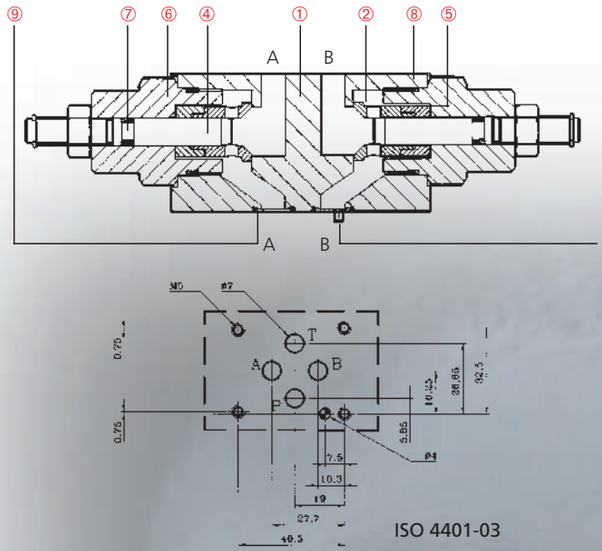
F INSTALLATION DIMENSION

All data are expressed in mm
(*) for FT3-MP-BA and AB: 235 max



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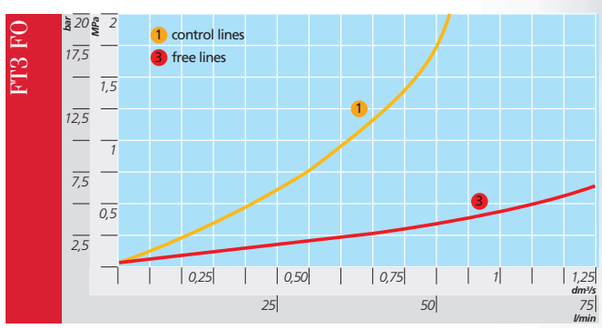
A HOW TO READ THE MODEL CODE FOR VALVES FT3-FO

FT3 - FO - (AB) - * - ** / 10

1 2 3 4 5 6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	FO	flow restrictor valve with two-way control
3	(AB) service lines where the control operates , see also FUNCTIONAL SYMBOLS A AB controlled flow on A and on B A controlled flow on A, free on l B, P and T B controlled flow on B, free on A, P and T P controlled flow on P, free on A, B e T	
4	Flow control characteristics See F - standard control V fine control W fine and sensitive control	
5	Code reserved for special variants (seals, materials, surface treatments, etc.).	
6	Design number (progressive) of the valve.	

B TYPICAL DIAGRAMS



Typical Δp-Q curves for valves FT3 - FO, in standard configuration, with mineral oil at 36 cSt and at 50° C with throttling axis at full retraction.

STACKABLE VALVES CETOP 03
FLOW RESTRICTOR VALVES

Fluid flows freely on P and T lines; on service lines A and/or B with c.o. valve, fluid flows from A→A1 (and/or B→B1) through orifices of sleeve ②; the throttling axis ④ which is shifted by handle rotation, partially obstructs the orifices, thus making the flow rate entirely dependent upon the available pressure drop.



C RELIEF PRESSURE ADJUSTMENT

The adjustment is made by throttling through variable orifice. Depending on the various sleeve/axis combination, the control adjustment is:

- (standard)	orifice area is reduced from 100% (*) to 0% with 6 complete turns of the adjustment screw
V (fine)	from 100% (**) a 0% with 5 complete turns of the adjustment screw
W (fine and sensitive)	(from 100% (**) a 0% with 8 complete turns of the adjustment screw
(*) corresponding to	Q=1 dm³/s (60 l/min) with ΔP=2MPa (20 bar)
(**) corresponding to	Q=0.5 dm³/s (30 l/min) with ΔP=2MPa (20 bar)

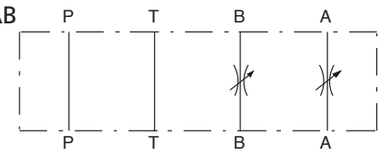
The axis ④ is shifted to increase throttling by unlocking its nut ③ and turning clock wise the adjustment screw. Suitable mechanical stops prevent dangerous manoeuvring.

D DATA AND OPERATING PRESSURE

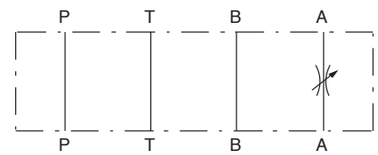
Recommended max. flow rate	1dm3/s (60 l/min)
Max. nominal pressure	32 MPa (320 bar)
Loss of pressure	see **B**
Adjustment	see **C**
Dimensions	see **F**
Mass	approx. 1,2kg

E FUNCTIONAL SYMBOLS

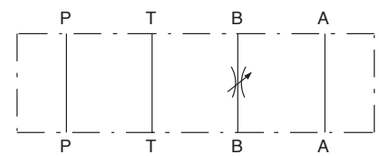
FT3 - FO - AB



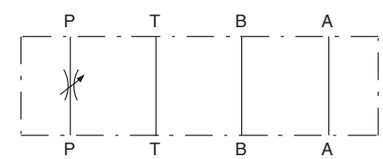
FT3 - FO - A



FT3 - FO - B

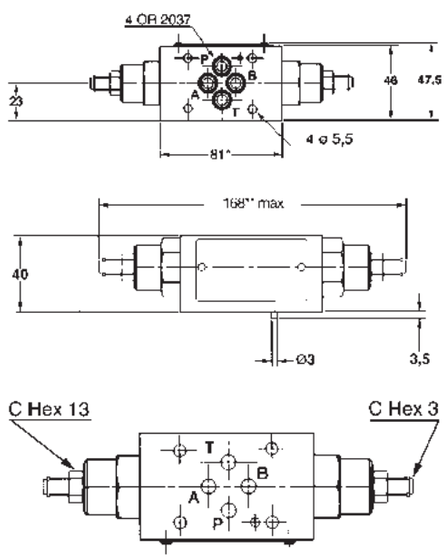


FT3 - FO - P

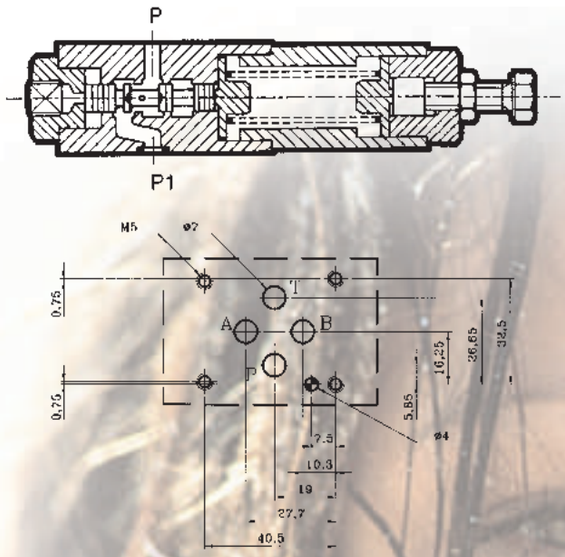


F INSTALLATION DIMENSION

All data are expressed in mm





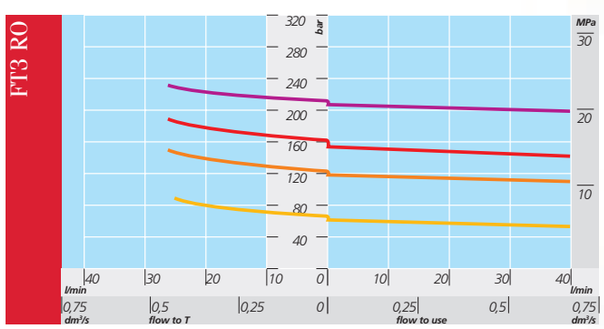


A HOW TO READ THE MODEL CODE FOR VALVES FT3-RO

FT3 - RO - (P) / (2 5) - ** / 10
1 2 3 4 5 6

1	FT3	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 A P control on P with 3° way and drain to T A control on A with 3° way and drain to T B control on B with 3° way and drain to T
4	(25)	adjustment range of reduced pressureC 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 (seals, materials, surface treatments, etc.).	
6	Design number (progressive) of the valve 131	

B TYPICAL DIAGRAMS



Typical P_Q curves for valves FT3 - RO, in standard configuration, with mineral oil at 36 cSt and at 50° C.

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STACKABLE VALVES CETOP 03
PRESSURE REDUCING VALVES

All valves FT3-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 FT3-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 settled value;
• on version A the pilot pressure intake is on channel A: the valve reduces pressure in A when the solenoid valve connects PA and BT; when the solenoid valve connects PB and AT, there is full pressure in B.
• on version B the pilot pressure intake is on channel B: there is full pressure in A when the solenoid valve connects PA and BT; the valve reduces pressure in B when the solenoid valve connects PB and AT.
All valves type FT3-RO-* are equipped with 1/4"BSP 2 manometer port for the direct reading of the reduced pressure.

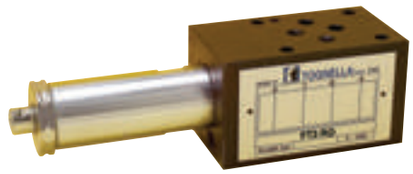
C ADJUSTMENT OF REDUCED PRESSURE

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 its nut. When the required level of pressure is reached, lock the nut.
For each adjustment range see **E** ④ the adjustment 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)

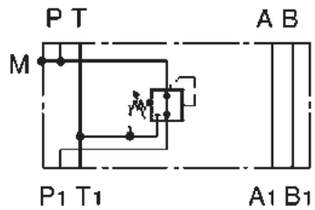
D DATA AND OPERATING PRESSURE

Recommended max. flow rate	
in free lines	1dm3/s (60 l/min)
in controlled lines	0,66 dm3/s (40 l/min)
Max. nominal pressure	32 MPa (320 bar)
Max. pressure on T line	10 MPa (100 bar)
Drain	<1,2 cm3/s (0,07 l/min)
Calibration	see **C**
Adjustment	see **B**
Dimensions	see **F**
Mass	approx. 1,45kg

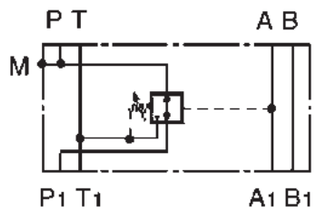


E FUNCTIONAL SYMBOLS

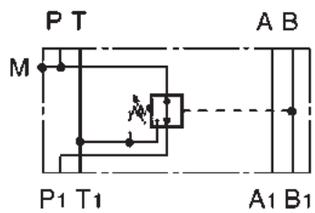
FT3 - RO - P



FT3 - RO - A

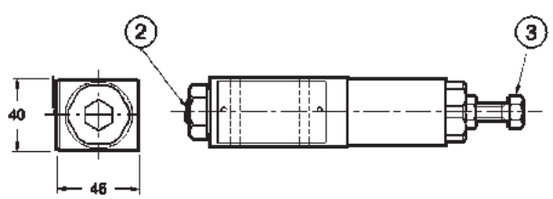


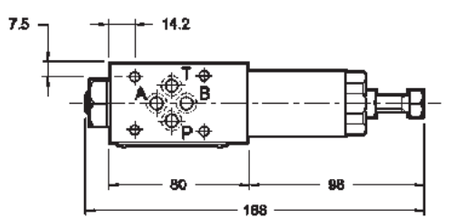
FT3 - RO - B



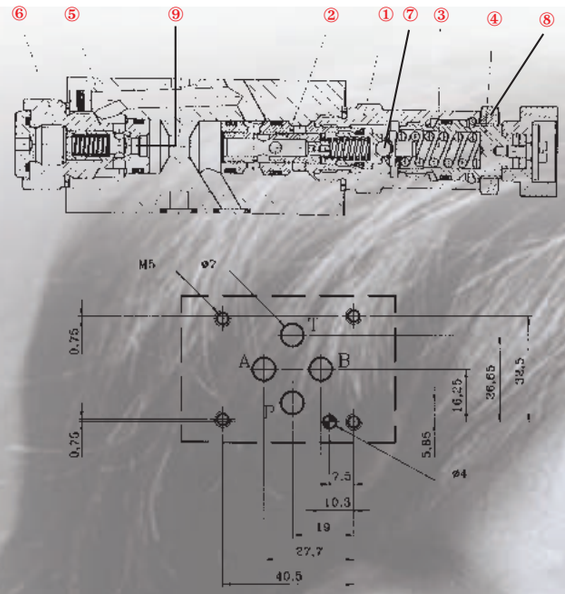
F INSTALLATION DIMENSION

All data are expressed in mm





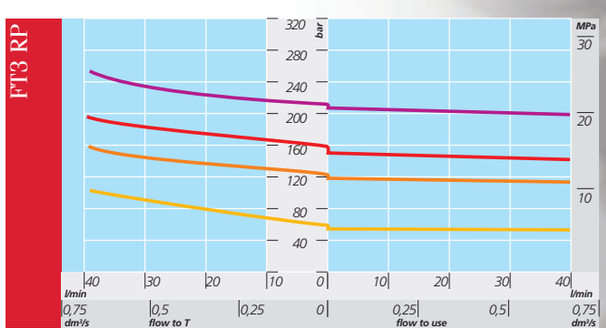




A HOW TO READ THE MODEL CODE FOR VALVES FT3-RP

FT3 - RP - (P) / (20) - ** / 10		
1	2	3 4 5 6
1	FT3	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 operates , see also functional symbols **A** P control on P with 3° way and drain to T line AC control on A with check valve BC control on B with check valve
4	(25)	adjustment range of reduced pressure **C** 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 (seals, materials, surface treatments, etc.). V adjustment handwheel	
6	Design number (progressive) of the valve.	

B TYPICAL DIAGRAMS



Typical curves for valves FT3 RP, in standard configuration, with mineral oil at 36 cSt and at 5p° C.

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MODULAR VALVE CETOP 03
PRESSURE REDUCING

All valves FT3-RP-* 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 pressure regulating valves on A or B lines are (types FT3-RP-AC or -BC) equipped with check valve _through and they allow reverse flow to port A or B of the solenoid valve. (See ΔP - C).



C ADJUSTMENT OF REDUCED PRESSURE

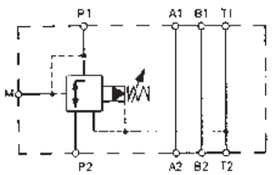
Reduced pressure is obtained by throttling the flow on spool ② which is balanced, on one side, by the reduced pressure and, on the other side, by the positioning spring.
The value of the pilot pressure is determined by the force of spring ③ on the pilot valve ⑦.
The change of the value of the reduced pressure is obtained by changing the compression of the spring ③. To increase the value of the reduced pressure, turn clockwise the handwheel 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.

D DATA AND OPERATING PRESSURE

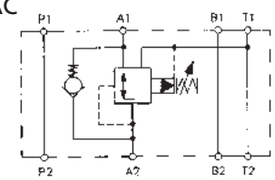
Recommended max. flow rate	
in free lines	1dm3/s (60 l/min)
in controlled lines	0,66 dm3/s (40 l/min)
Max. nominal pressure	32 MPa (320 bar)
Max. pressure on T line	10 MPa (100 bar)
Pilot flow rate	4 cm3/s (0.24 l/min)
Adjustment	see B
Calibration	see C
Dimensions	see F
Mass	
FT3-MO-P e B	approx. 1,1 Kg
FT3-MO-BA	approx. 1,45 Kg

E FUNCTIONAL SYMBOLS

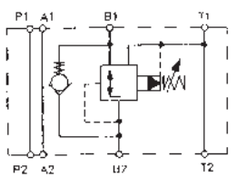
FT3 - RP - P



FT3 - RP - AC

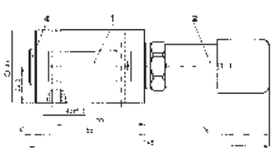


FT3 - RP - BC

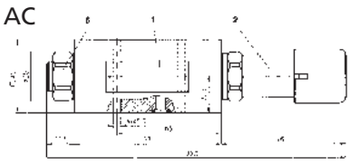


F INSTALLATION DIMENSION

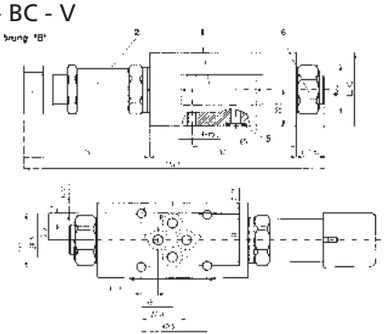
FT3 - RP - P



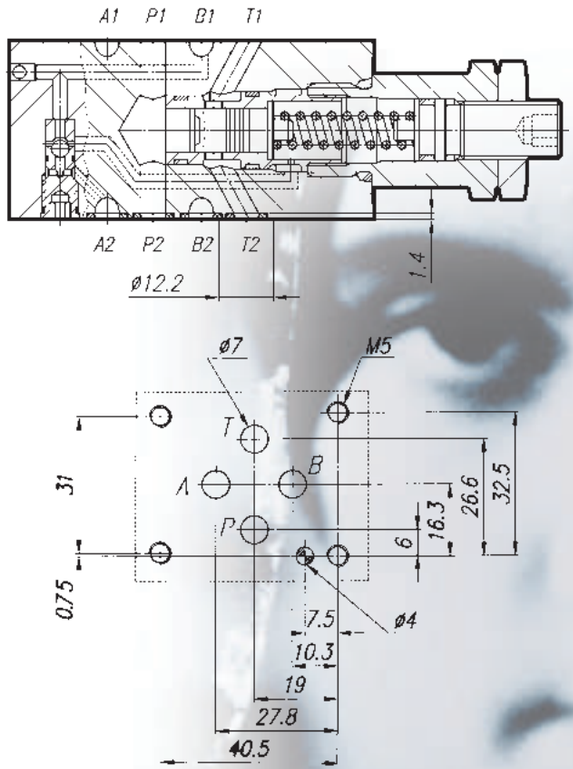
FT3 - RP - AC



FT3 - RP - BC - V







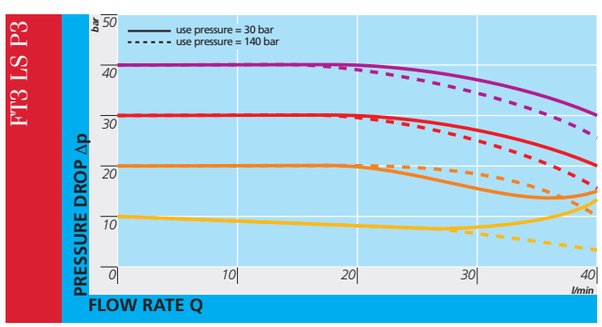
A HOW TO READ THE MODEL CODE FOR VALVES FT3-LS P3

FT3 - LS - (P) - (3) / ** / 10

1	2	3	4	5	6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	LS	compensator with “load-sensing” function, with adjustable DP, see also **F**
3	(P)	service line where the control operates - see also functional symbols **A**
4	(3)	3-way compensator with exhaust in T of the flow rate in excess
5	Code reserved for special variants (seals, materials, surface treatments, etc.). V adjustment handwheel	
6	Design number (progressive) of the valve.	

B TYPICAL DIAGRAMS



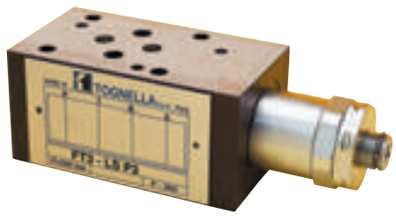
Typical “holding” curves of the calibrated DP when the flow rate in excess changes at the exhaust. The curves are quoted for 4 values of calibrated DP and for 2 values of the use pressure.

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STACKABLE VALVES CETOP 03
3-WAY PRESSURE COMPENSATOR
WITH LOAD SENSING FUNCTION

The valve is a 3-way pressure compensator, with direct action, realized in modular version with interface surface corresponding to CETOP and ISO standards.
When using this kind of valve, a constant pressure drop (characteristic Dp) between the P-way and alternately the A-way and B-way is held. It is normally used in combination with the directional valves with proportional control so that it is possible to realize flow rate controls, which are independent from pressure changes.
The selection of the pilot pressure on the A-way and B-way is carried out automatically through a bistable check valve inside the compensator.



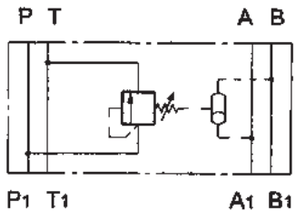
C ADJUSTMENT OF REDUCED PRESSURE

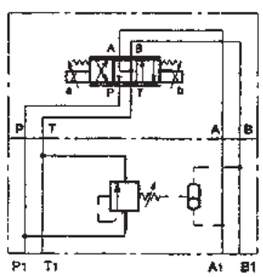
The calibration of the valve FT3-LS-P3 is useful to calculate the range of the use flow rate.
According to a non-linear law, if DP increases, the value of the compensated flow rates, which pass through the adjusting mechanism increases too, and this does not depend on the operating pressure of the system. Ex. In a system like that shown in A, consisting of FT3-LS-P3 plus proportional valve HD3-PS-3RC-xx (see table HD-320), with DP of 1MPa (10 bar), the flow rate to the actuator changes between 0 and 16 l/min, with DP of 3MPa (30 bar) the flow rate to the actuator changes between 0 and 28 l/min (this does non depend on the value of the system working pressure).
To improve the system operation it is essential to adjust the DP of the compensator.
By operating with CH5mm on the adjusting pin ②, after loosing the check nut ① at CH17mm the DP of the compensator is adjusted. It is recommended to loose completely the spring, by turning (anticlockwise till the mechanical lock) the threaded pin ② at pitch 1,25mm. By screwing clockwise:
DP = 0,4 MPa (4 bar) stroke 2,5 mm* (2 rev.)
DP = 1,2 MPa (12 bar) stroke 3,75mm* (3 rev.)
DP = 2,1 MPa (21 bar) stroke 5 mm* (4 rev.)
DP = 3 MPa (30 bar) stroke 6,25mm* (5 rev.)
DP = 3,9 MPa (39 bar) stroke 7,5 mm* (6 rev.)
* including an initial "dead" stroke of about 2mm (1,5 rev.). When the required calibration is reached, tighten the check nut with CH17mm.

D DATA AND OPERATING PRESSURE

Recommended max. flow rate	0,66 dm³/s (40 l/min)
Max. nominal pressure	32 MPa (320 bar)
Adjustment	see **B**
Calibration ΔP adjustable	from 0,5 to 4
Adjustment	see **C**
Calibration	Mpa (from 5 to 40 bar)
Dimensions	see **F**
Mass	approx. 1,45 kg

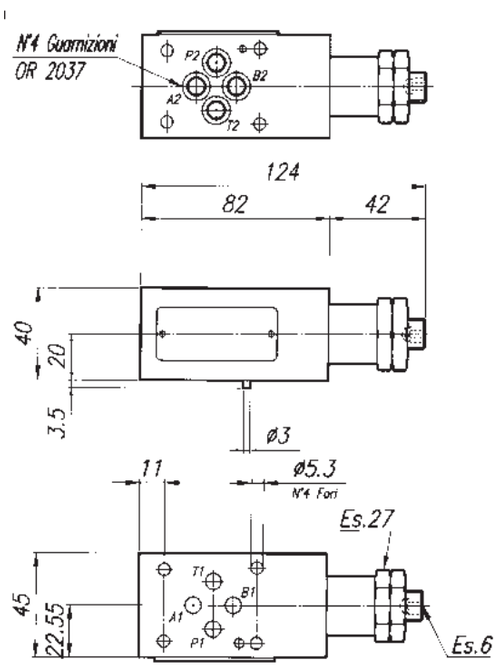
E FUNCTIONAL SYMBOLS



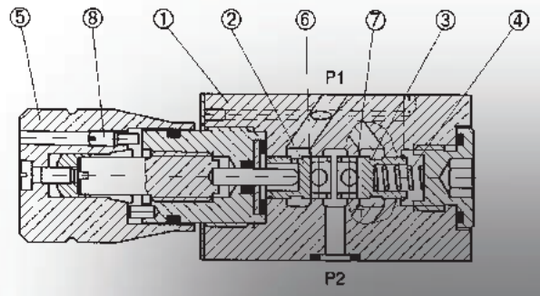


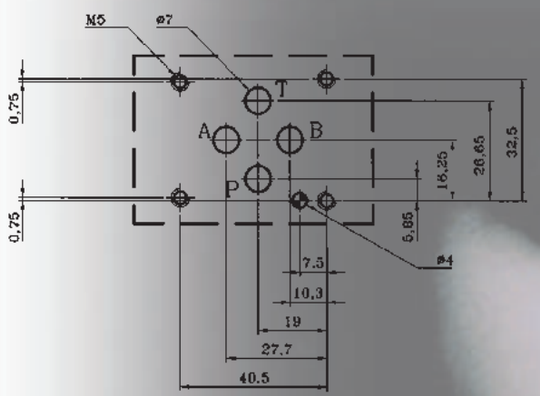
F INSTALLATION DIMENSION

Standardized ISO - All data are expressed in mm





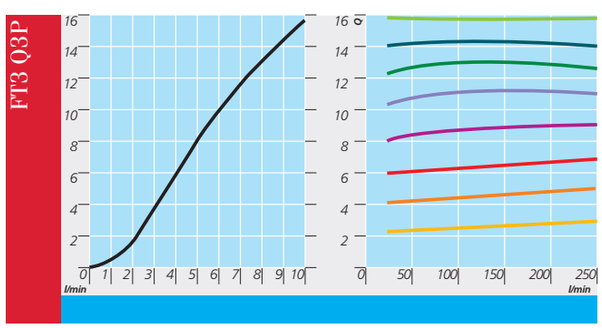




A HOW TO READ THE MODEL CODE FOR VALVES FT3-Q3P

FT3 - Q3 - (P) - (16) / ** / 10		
1	2	3	4	5	6	
1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	Q3	pressure reduced, pilot operated - 3-way valve
3	(P)	service line where the control operates - see also functional symbols **A**
4	(16)	Flow control characteristics 16=0,06 (16 l/min max. regulated flow control rate to P1. When the inlet flow (atP2) is higher than the required value, the excess is discharged in T.
5	Code reserved for special variants (seals, materials, surface treatments, etc.).
6	Design number (progressive) of the valve.

B TYPICAL DIAGRAMS



Typical holding curves (Q e Q-P) for valves AM3-Q3-P
Oil at 36 eSt and at 50°C

STACKABLE VALVES CETOP 03
FLOW CONTROL VALVES
PRESSURE COMPENSATED

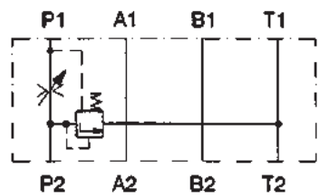
3-way pressure compensated flow control valves are designed to provide adjustable controlled flow rates independent of changes in system pressure.
The flow control valve consists basically housing throttling spool ②, pressure compensator ③, spring handknob ⑤ with adjusting parts.
Fluid from port P2 is divided into two parts; one part passes through orifice area of the throttling spool and onwards to port P1, the other part proceeds through orifice area of the compensator to port T.

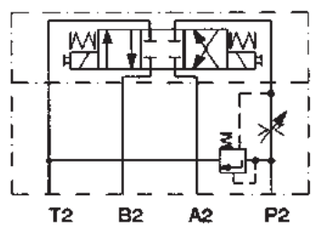


C CONTROL OF THE FLOW

By turning the knob the value of the regulated flow changes.
The scale/flow characteristics is approx. linear 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 the screw.

E FUNCTIONAL SYMBOLS



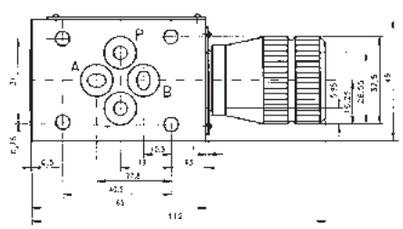


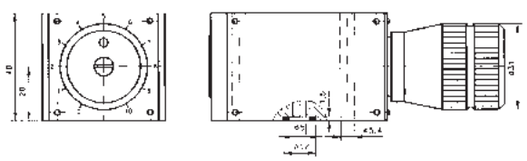
D DATA AND OPERATING PRESSURE

Recommended max. flow rate	42 l/min
Max. flow rate on	P1 16 l/min
Max. nominal pressure	32 MPa (320 bar)
Adjustment	see B
Correction	see C
Mass dimensions	see F
Weight	approx. 0,8 kg

F INSTALLATION DIMENSION

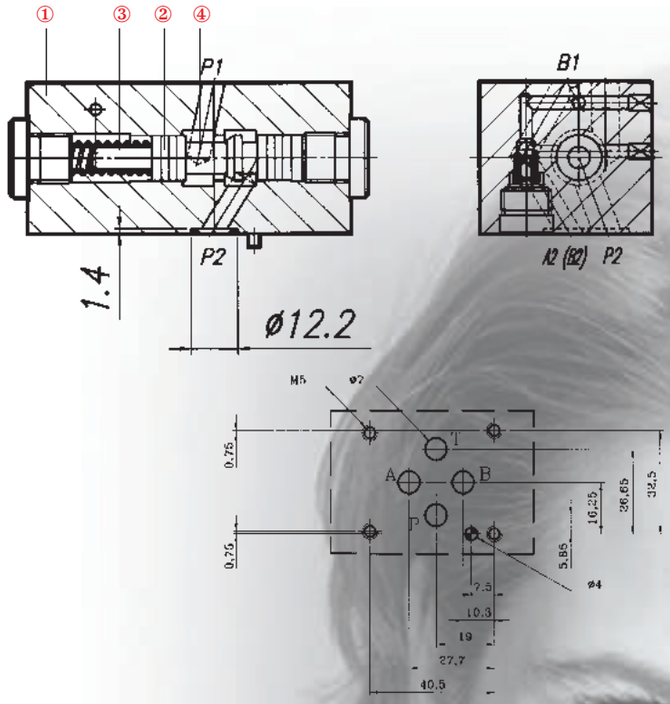
Standardized ISO - Alla data are expressed in mm





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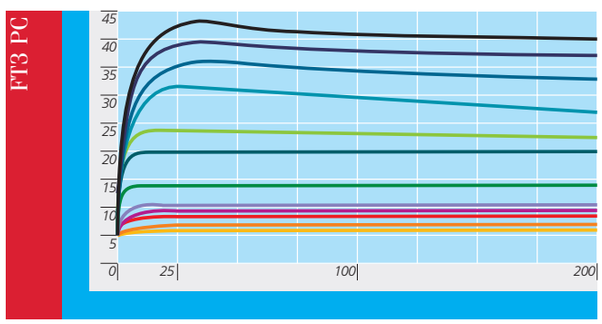
A HOW TO READ THE MODEL CODE FOR VALVES FT3-PC

FT3 - PC - (P) - (*) - (**) / 10

1 2 3 4 5 6

1	FT3	stackable valve CETOP 03 - Pressure 32 MPa (320 bar)
2	PC	2-way pressure compensator
3	(P)	service line where the control operates - see also functional symbols **A** P control on P with selection A, B A control on A B control on BC
4	(*)	(*) pressure compensator ΔP ΔP standard = 1 MPa (10 bar)
5	(**)	Code reserved for special variants (seals, materials, surface treatments, etc.).
6		Design number (progressive) of the valve.

B TYPICAL DIAGRAMS



Typical curves for valves FT3-PC in standard configuration,
with mineral oil at 36 cSt at 50° C
Flusso (l/min)

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STACKABLE VALVES CETOP 03
2-WAY PRESSURE COMPENSATOR

2-way pressure compensator. When using the 2-way pressure compensator, a constant pressure difference across the metering edge of the proportional direction valve is held. In this case, the pressure variations due to loading changes, as well as pump pressure changes, are compensated.
This means that an increase in pump pressure cannot result in any flow increase.
Provided that there is no preloading of the outlet port, the use of a meter-in pressure compensator is limited only to drives with exclusively positive load direction



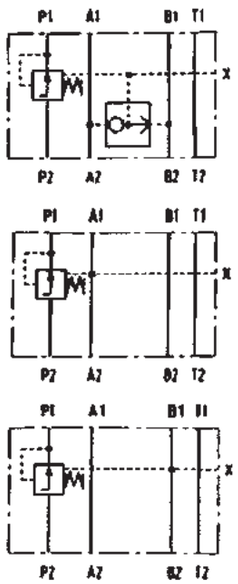
C CONTROL OF THE FLOW

Valves FT3-PC-* are directly operated 2-way pressure compensators. The main parts of these valves are the housing (1), control spool (2), spring (3) and logic valve (4). The spring (3) holds the spool in the open position from P2 to P1, provided that the pressure difference between P1 and A (P1 - B) is less than (P = 10 bar. When the pressure difference exceeds the value (P = 10 bar, the spool shifts against spring until the requested pressure difference has been restored.

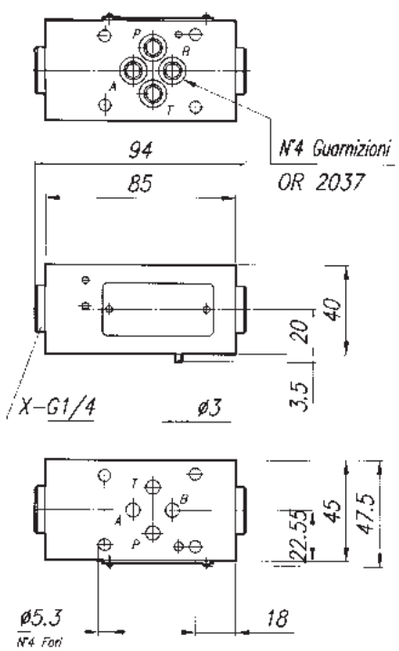
D DATA AND OPERATING PRESSURE

Recommended max. flow rate	32 l/min
Max. nominal pressure	32 MPa (320 bar)
Adjustment	see **B**
Mass dimensions	see **F**
Weight	approx. 1,4 kg

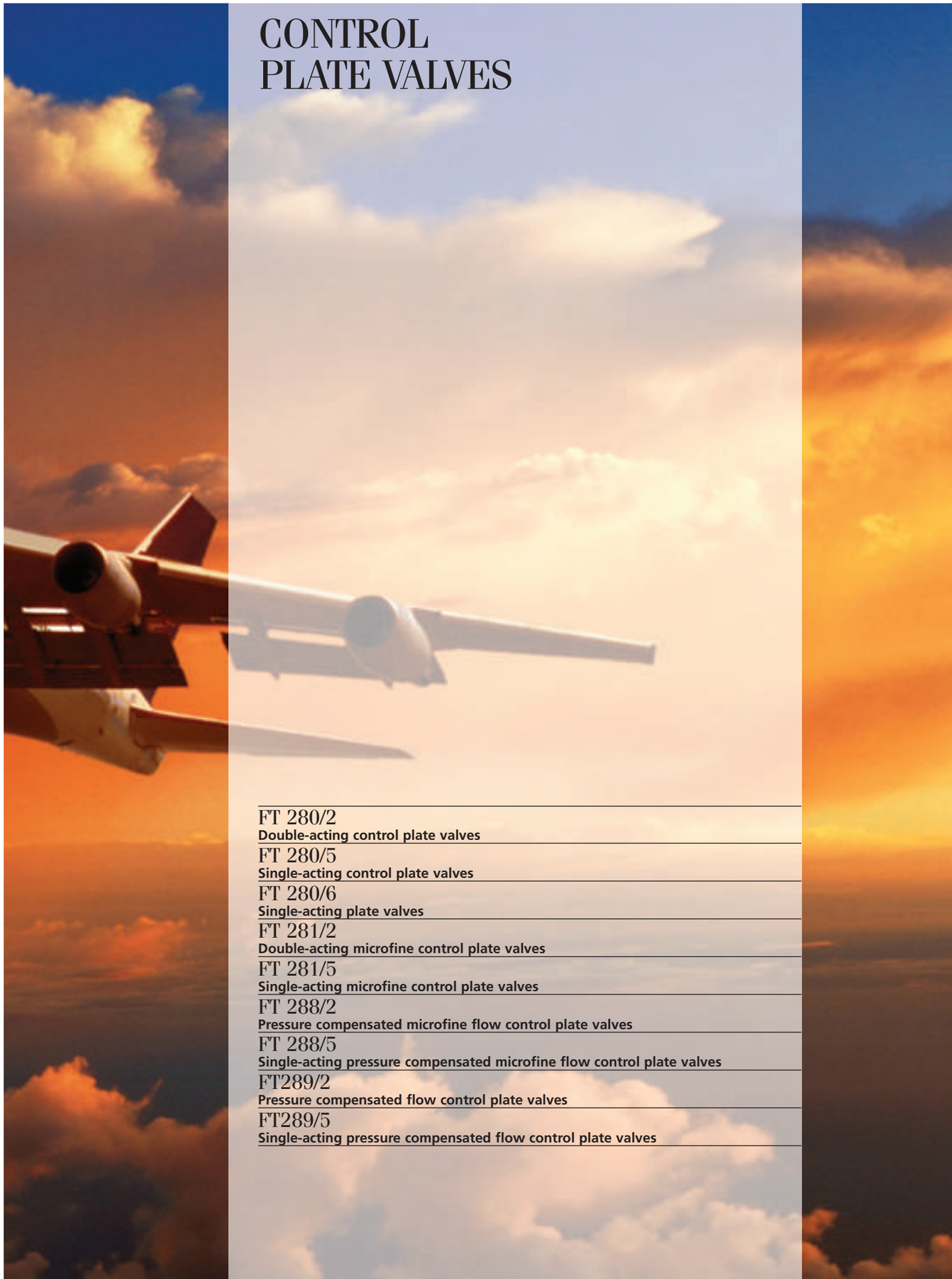
E FUNCTIONAL SYMBOLS



F INSTALLATION DIMENSION



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CONTROL PLATE VALVES

FT 280/2
Double-acting control plate valves

FT 280/5
Single-acting control plate valves

FT 280/6
Single-acting plate valves

FT 281/2
Double-acting microfine control plate valves

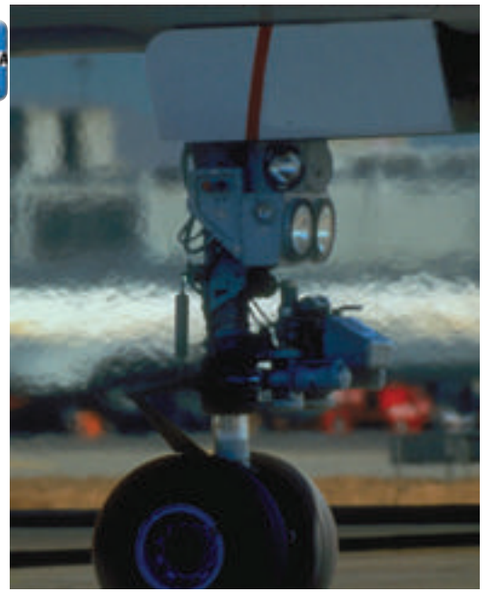
FT 281/5
Single-acting microfine control plate valves

FT 288/2
Pressure compensated microfine flow control plate valves

FT 288/5
Single-acting pressure compensated microfine flow control plate valves

FT289/2
Pressure compensated flow control plate valves

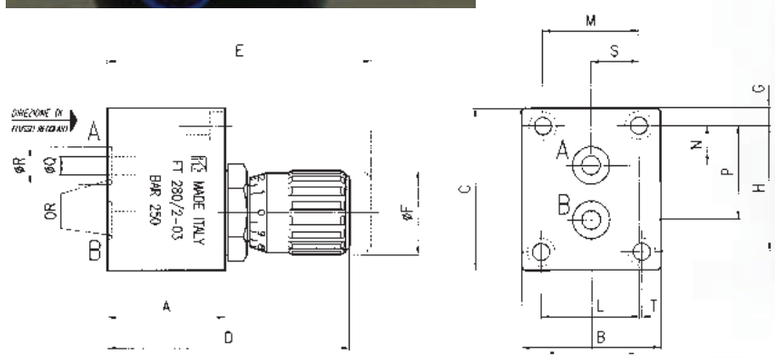
FT289/5
Single-acting pressure compensated flow control plate valves



MATERIALS

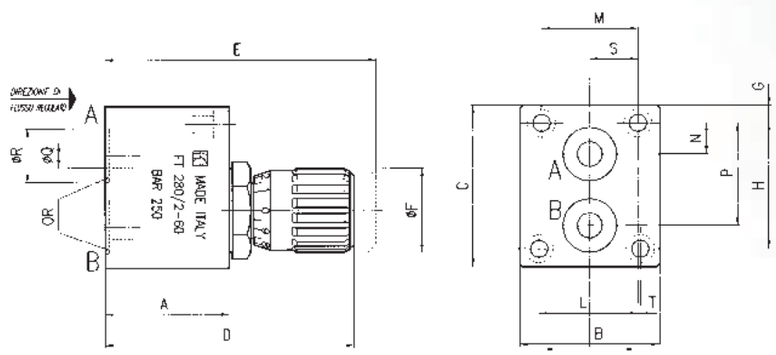
Terminal strip body	Steel 9 S Mn Pb 28 - UNI 5105
Cartridge body	Steel 9 S Mn Pb 28 - UNI 5105
Needle	Steel 1 C 40 - UNI 8373
Handwheel	Aluminium GD Al Si 12 - UNI 5706
Nipple	Nylon 6
O R	Mescola nitrilica
Antiextrusion rings	PTFE

All components are surface treated and protected



DIMENSIONS

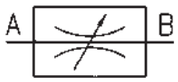
Type	A	B	C	D	E	ØF	G	H	L	M	N	P	ØQ	ØR	S	T	O R	Screw	Weight kg
03	38	45	52	78,3	85,3	27	5,75	40,5	31,75	31	12,7	30,2	6	12	15,5	0,75	108	M5x40	0,700



DIMENSIONS

Type	A	B	C	D	E	ØF	G	H	L	M	N	P	ØQ	Ø R	S	T	O R	Screw	Weight kg
60	40	45	52	80,3	87,3	27	5,75	40,5	31,75	31	10	33	8	17,2	15,5	0,75	2056	M5x45	0,720

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DOUBLE-ACTING CONTROL PLATE VALVES

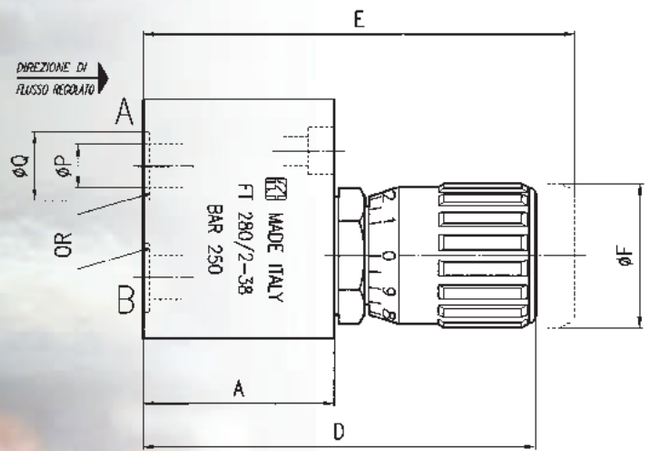
They allow flow control in both directions.
Needle adjustment to give:
- efficient metallic sealing;
- flow linearity during opening;
- accurate flow control for a wide range of flow rates.

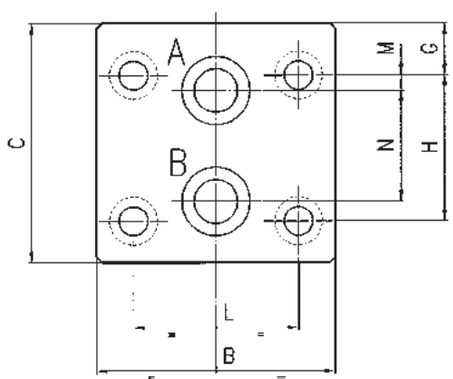
A double reference device consisting of a graduated scale on the handle and of a metallic ring, with a graduated scale, and divided in sectors allows identifying the flow rate conditions.
A locking screw in the handle ensures the stability of flow rate values preventing accidental adjustment or movement due to vibrations.
They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series.
Max. working pressure 250 bar.

On request
- Complete with Viton seals (V)
- Knob in ABS (mp)



FT 280/2





DIMENSIONS

TYPE	A	B	C	D	E	ØF	G	H	L	M	N	ØP	ØQ	OR	SCREW	WEIGHT KG
18	32	42	35	66,8	71,8	22	8	19	28,5	1,5	16	4	9,5	2025	M6x40	0,350
14	38	50	50	78,3	85,3	27	7,5	35	33,5	5	25,5	6	12,7	2037	M6x45	0,730
38	44	55	55	90,5	99,5	33	12	33,5	38	3,5	25,5	8	15,7	2050	M6x50	1,040
12	55	60	70	109,1	119,6	38	18	38	44,5	4	30	11	19,7	119	M6x60	1,810

EXAMPLE FOR ORDERING

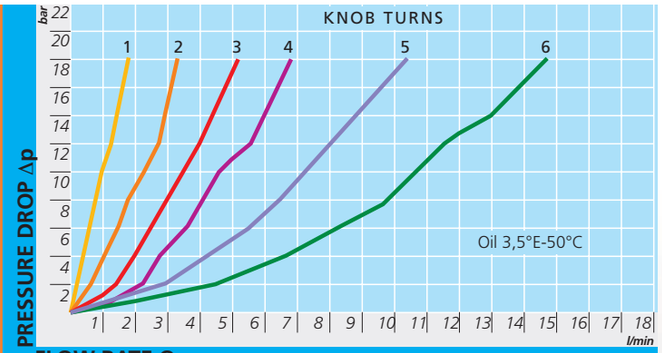
CODE	TYPE
FT 280/2	18
FT 280/2	38

EXAMPLE FOR ORDERING

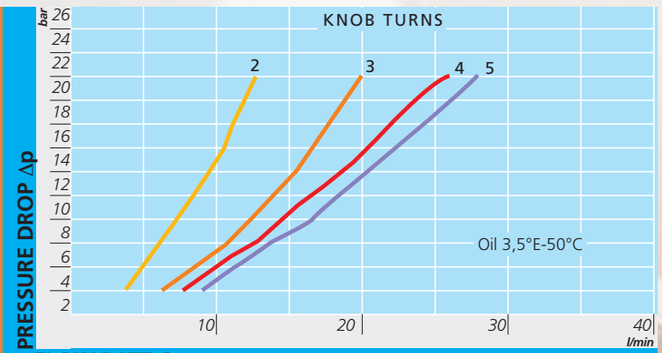
CODE	TYPE
FT 280/2	03
FT 280/2	60

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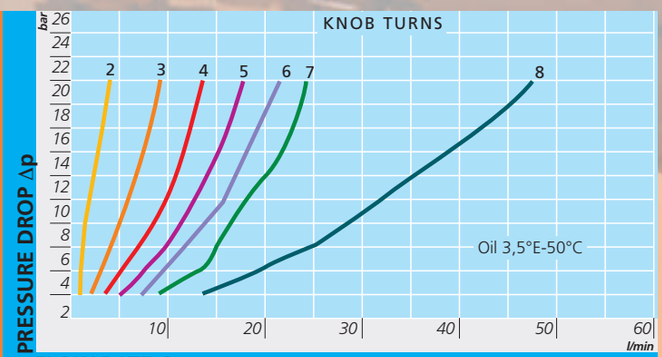
FT 280/2 - 18



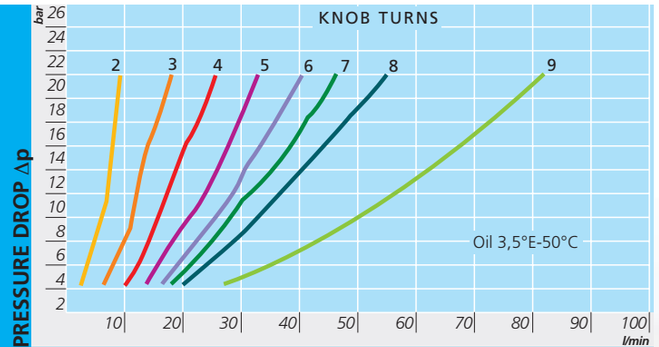
FT 280/2 - 14



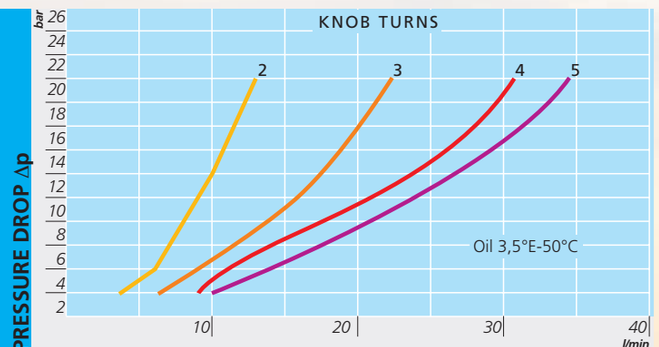
FT 280/2 - 38



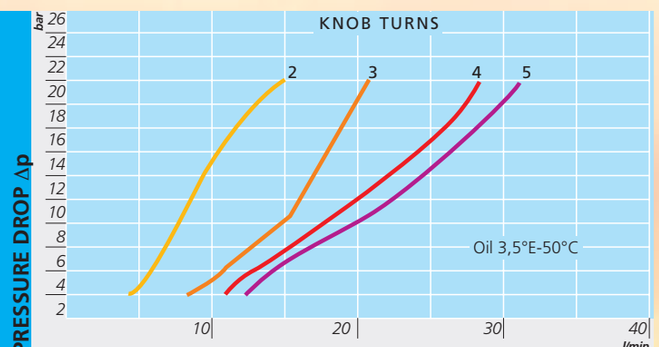
FT 280/2 - 12



FT 280/2 - 60



FT 280/2 - 03



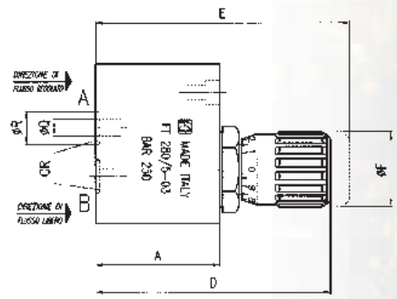
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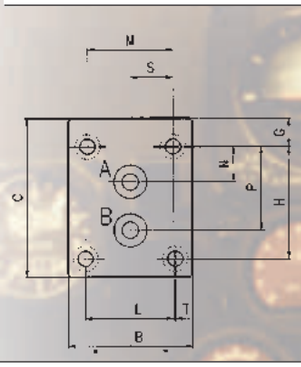


MATERIALS

TERMINAL STRIP BODY	STEEL 9 S MN PB 28 - UNI 5105
CARTRIGE BODY	STEEL 9 S MN PB 28 - UNI 5105
NEEDLE	STEEL 1 C 40 - UNI 8373
HANDWHEEL	ALUMINIUM GD AL SI 12 UNI 5706 - PAINTED
NIPPLE	NYLON 6
GUIDE CAGE	NYLON 66 + CARBON FIBRE
BALL	STAINLESS STEEL - UNI 100 C 6
SPRING	STEEL INOX AISI 302
PLUG	ACCIAIO 35 S MN PB 10 - UNI 5105
O R	NITRILE
ANTIEXTRUSION RING	PTFE
OBTURATOR	ACCIAIO C 15 PB

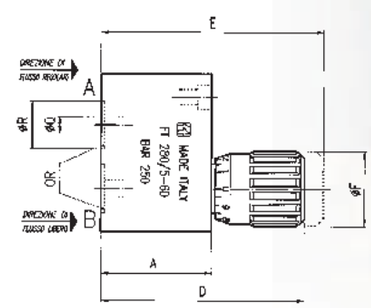
All components are surface treated and protected

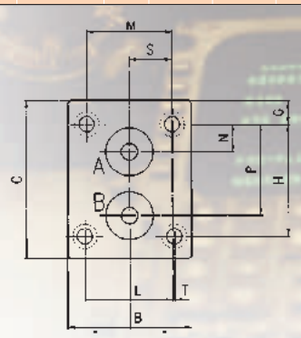




DIMENSIONS

TYPE	A	B	C	D	E	ØF	G	H	L	M	N	P	ØQ	ØR	S	T	O R	SCREW	WEIGHT KG
03	45	45	57,5	85,3	92,3	27	10,3	40,5	31,75	31	12,7	30,2	6	12	15,5	0,75	108	M5x50	0,885

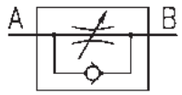




DIMENSIONS

TYPE	A	B	C	D	E	ØF	G	H	L	M	N	P	ØQ	ØR	S	T	O R	SCREW	WEIGHT KG
60	45	45	57	73,8	80,8	27	8,5	40,5	31,75	31	10	33	6	17,2	15,5	0,75	2056	M5x45	0,785

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SINGLE-ACTING CONTROL PLATE VALVES

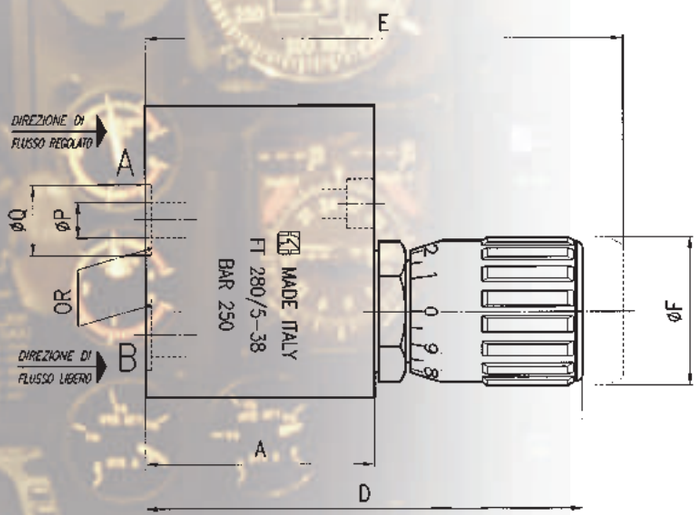
They control and eventually shut-off the flow in one direction, allowing a free return in the opposed direction.
The suitable dimensions allow to obtain in reduced spaces a remarkable mechanical resistance of components.

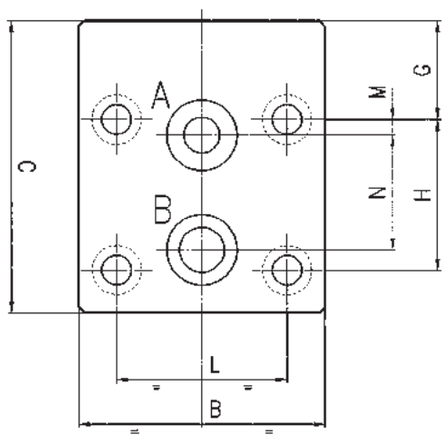
As all valves pertaining to series FT 257 they ensure:
- efficient metallic sealing;
- flow linearity during opening;
- accurate flow control, made well visible by the double reference device;
- wide control range of specific flow rate;
- absolute safety against needle withdrawal also in the maximum opening position;
- positioning stability, thanks to the dowel inserted in knob.

They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series.
Max. working pressure 250 bar.

On request
- Complete with Viton seals (V)
- Knob in ABS (mp)







DIMENSIONS

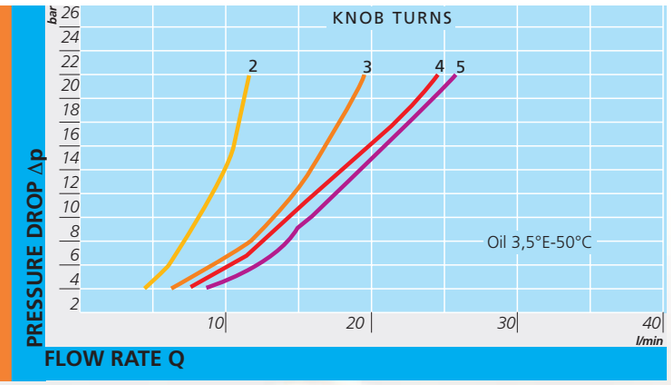
TYPE	A	B	C	D	E	ØF	G	H	L	M	N	ØP	ØQ	OR	SCREW	WEIGHT KG
14	45	50	60,5	85,3	92,3	27	18	35	33,5	5	25,5	6	12,7	2037	M6x50	1,020
38	51	55	65	97,5	106,5	33	22	33,5	38	3,5	25,5	8	15,7	2050	M6x55	1,380
12	65	65	82,5	119,1	129,6	38	30,5	38	44,5	4	30	11	19,7	119	M6x70	2.620

EXAMPLE FOR ORDERING

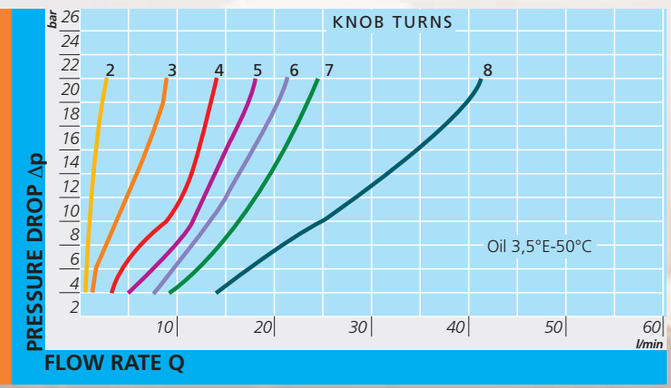
CODE	TYPE
FT 280/5	14

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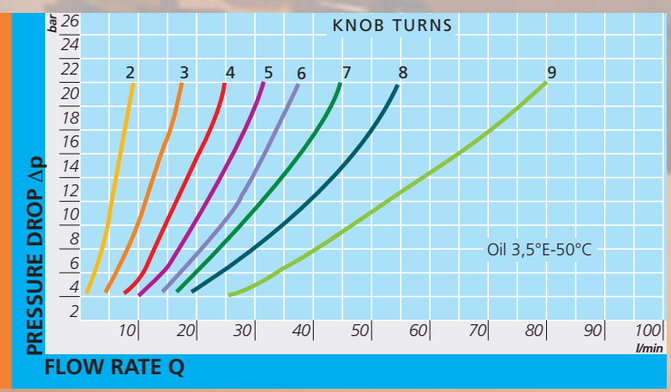
FT 280/5 - 14



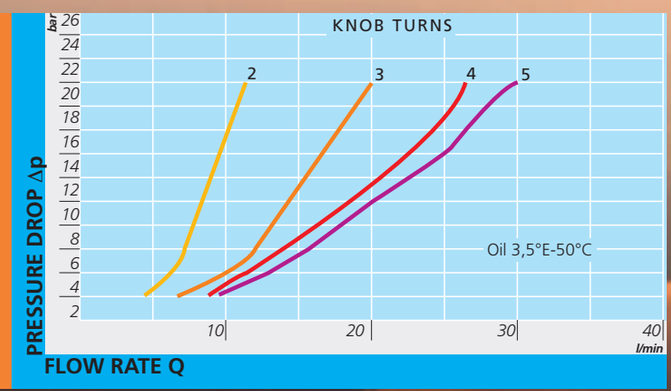
FT 280/5 - 38



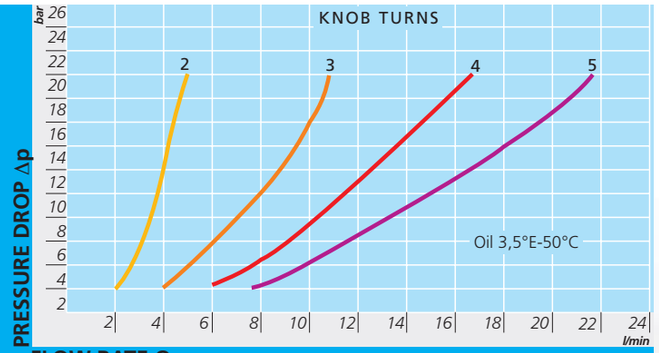
FT 280/5 - 12



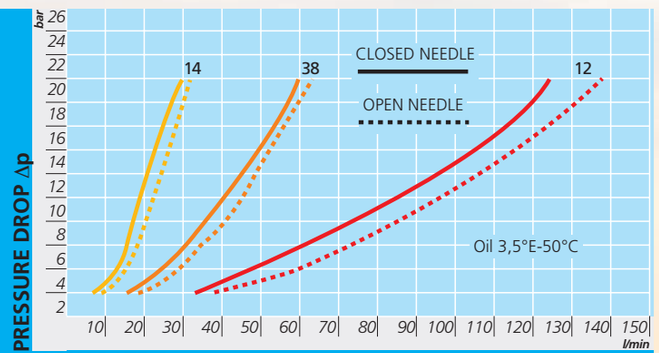
FT 280/5 - 03



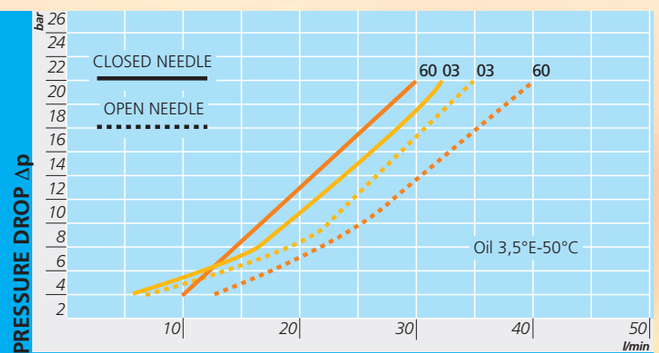
FT 280/5 - 60



FLUSSO LIBERO
FT 280/5 - 14-38-12



FLUSSO LIBERO
FT 280/5 - 03-60



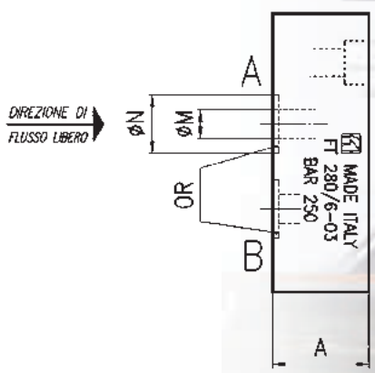
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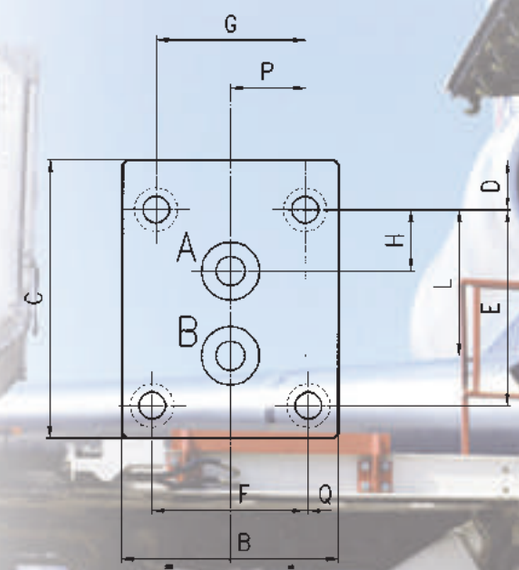


MATERIALS

VALVE BODY	STEEL 9 S MN PB 28 - UNI 5105
GUIDE CAGE	NYLON 66 + CARBON FIBER
BALL	STEEL - UNI 100 C 6
SPRING	STEEL INOX AISI 302
PLUG	STEEL 35 S MN PB 10 - UNI 5105

All components are surface treated and protected

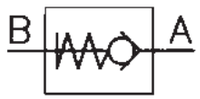




DIMENSIONS

TYPE	A	B	C	D	E	F	G	H	L	ØM	ØN	P	Q	OR	SCREW	WEIGHT KG
03	20	45	57,5	10,3	40,5	31,75	31	12,7	30,2	6	12	15,5	0,75	108	M5x25	0,350

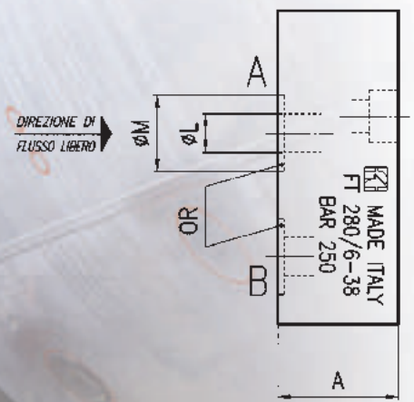
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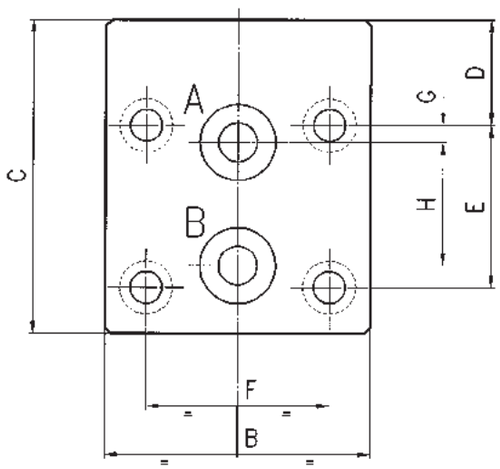


SINGLE-ACTING PLATE VALVES

They are inserted in circuit branches where a free flow circulation is required in one direction and passage obstruction in the opposite direction.
The single-acting valves are both of ball type with guide housing and cantering, made of composite
Material with very high mechanical resistance, which allows a total passage and exceptional resistance to wear and breakage, shown by the numerous high stress and varied tests to which they were subjected.
They may be supplied with two different setting values of the realised pressure (0,35 standard and 4,5 bar).
They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series.
Max. working pressure 250 bar.





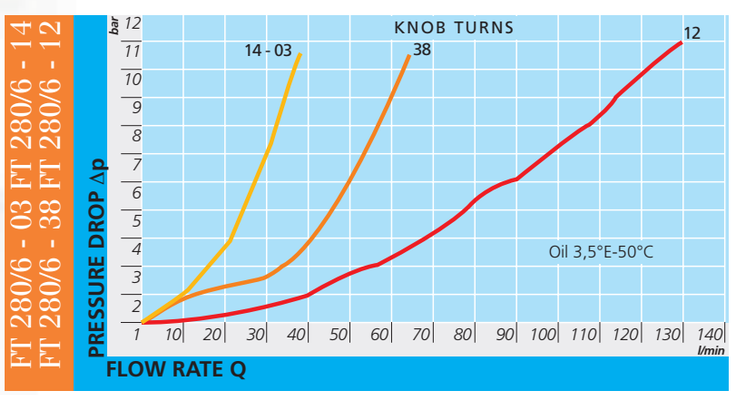


DIMENSIONS

TYPE	A	B	C	D	E	F	G	H	ØL	ØM	OR	SCREW	WEIGHT KG
14	20	50	60,5	18	35	33,5	5	25,5	6	12,7	2037	M6x25	0,410
38	25	55	65	22	33,5	38	3,5	25,5	8	15,7	2050	M6x30	0,605
12	30	65	82,5	30,5	38	44,5	4	30	11	19,7	119	M6x35	1,010

EXAMPLE FOR ORDERING

CODE	TYPE
FT 280/6	03



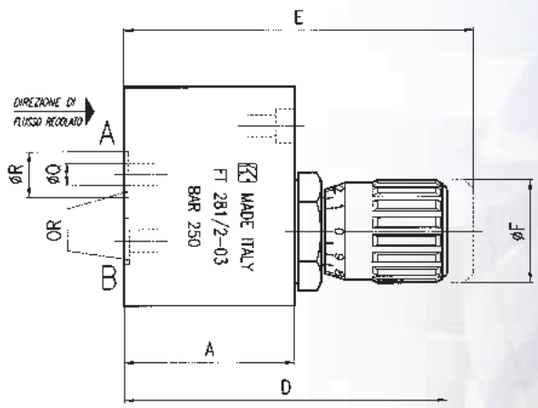
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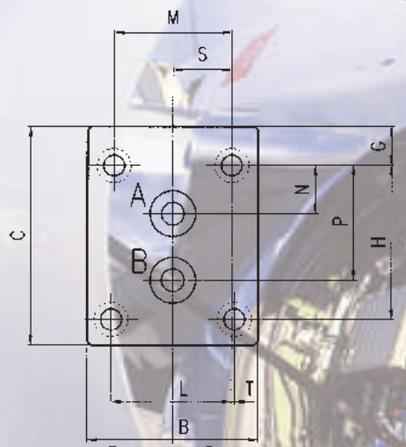


MATERIALS

TERMINAL STRIP BODY	STEEL 9 S MN PB 28 - UNI 5105
CARTRIDGE BODY	STEEL 9 S MN PB 28 - UNI 5105
NEEDLE	STAINLESS STEEL AISI 303 - UNI 6900
HANDWHEEL	ALUMINIUM GD AL SI 12 UNI 5706 - PAINTED
NIPPLE	NYLON 6
CLAMP DISK	ALUMINIUM P ALP - UNI 4507
O R	NITRILE
ANTIEXTRUSION RINGS	PTFE

All components are surface treated and protected





DIMENSIONS

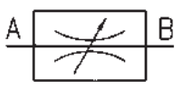
TYPE	A	B	C	D	E	ØF	G	H	L
03	32	45	52	66	74	22	5,75	40,5	31,75
60	32	45	52	66	74	22	5,75	40,5	31,75

DIMENSIONS

TYPE	M	N	P	ØQ	ØR	S	T	O R	SCREW	WEIGHT KG
03	31	12,7	30,2	5	12	15,5	0,75	108	M5x40	0,570
60	31	10	33	5	17,2	15,5	0,75	2056	M5x40	0,570

EXAMPLE FOR ORDERING

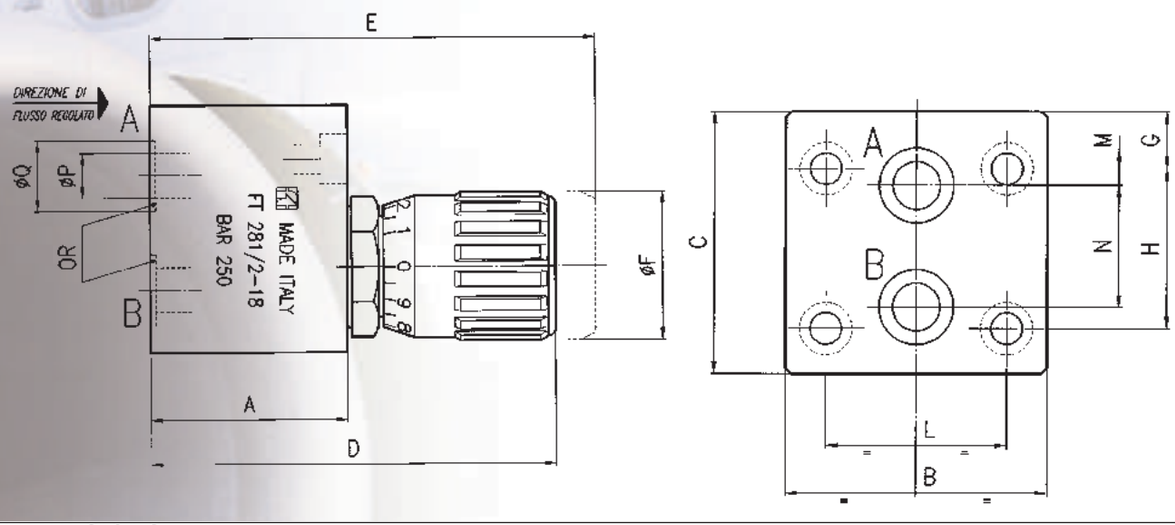
CODE	TYPE
FT 281/2	60



DOUBLE-ACTING MICROFINE CONTROL PLATE VALVES

They are the most suitable solution for those applications requiring precise adjustment characteristics or for reduced rate of flow.
They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series.
Max. working pressure 250 bar.



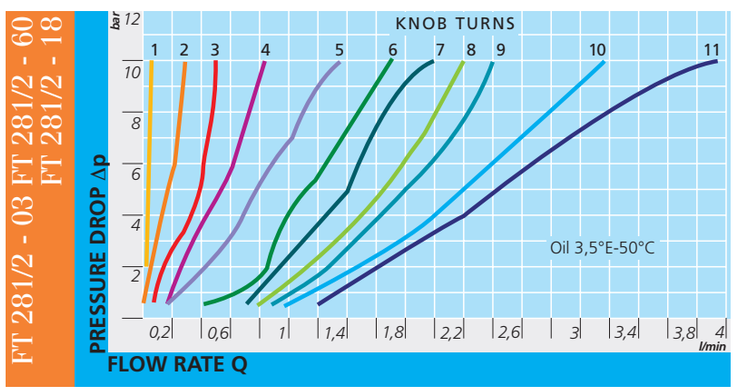


DIMENSIONS

TYPE	A	B	C	D	E	ØF	G	H	L	M	N	ØP	ØQ	OR	SCREW	WEIGHT KG
18	32	42	35	66	74	22	8	19	28,5	1,5	16	4	9,5	2025	M6x40	0,350

EXAMPLE FOR ORDERING

CODE	TYPE
FT 281/2	18

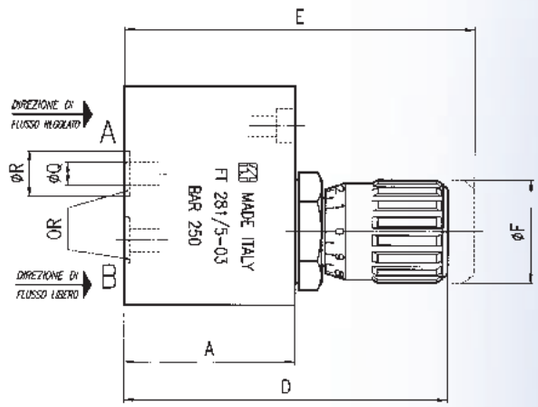


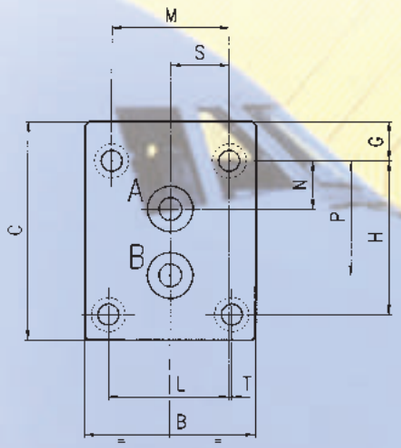


MATERIALS

TERMINAL STRIP BODY	STEEL 9 S MN PB 28 - UNI 5105
CARTRIDGE BODY	STEEL 9 S MN PB 28 - UNI 5105
NEEDLE	STAINLESS STEEL AISI 303 - UNI 6900
HANDWHEEL	ALUMINIUM GD AL SI 12 - UNI 5706
NIPPLE	NYLON 6
O R	NITRILE
ANTIEXTRUSION RINGS	PTFE

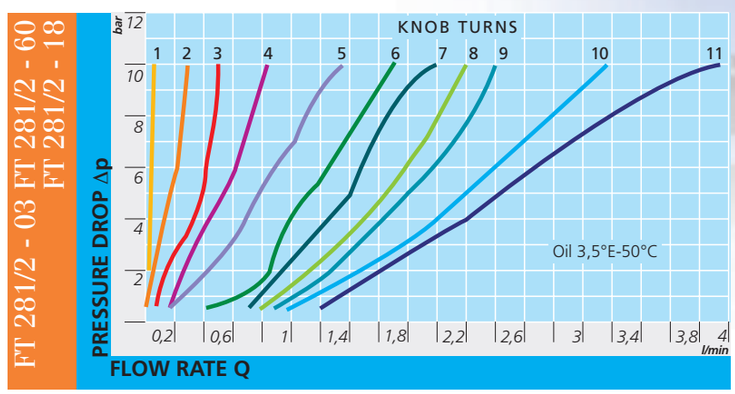
All components are surface treated and protected



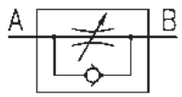


DIMENSIONS

TYPE	A	B	C	D	E	ØF	G	H	L	M	N	P	ØQ	ØR	S	T	O R	SCREW	WEIGHT KG
03	38	45	55,5	72	80	22	9,25	40,5	31,75	31	12,7	30,2	5	12	15,5	0,75	108	M5x45	0,710



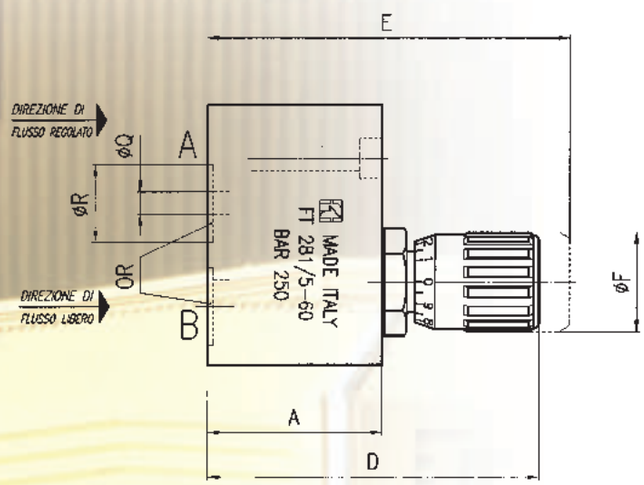
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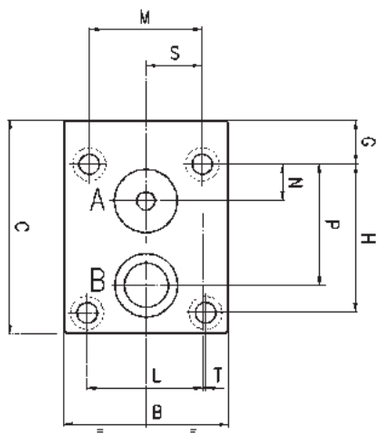


SINGLE-ACTING MICROFINE CONTROL PLATE VALVES

They are the most suitable solution for those applications requiring precise adjustment characteristics or for reduced rate of flow.
They are characterised by a great flow rate section in the direction of free flow.
They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series.
Max. working pressure 250 bar.





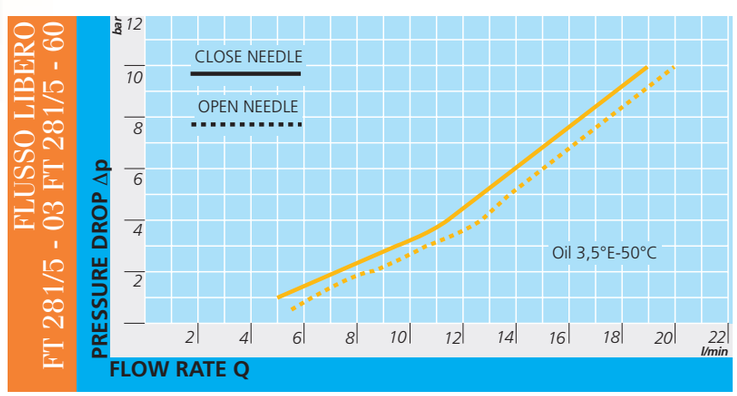


DIMENSIONS

TYPE	A	B	C	D	E	øF	G	H	L	M	N	P	øQ	øR	S	T	OR	SCREW	WEIGHT KG
60	39	45	58	73	81	22	12	40,5	31,75	31	10	33	5	17,2	15,5	0,75	2056	M5x45	0,760

EXAMPLE FOR ORDERING

CODE	TYPE
FT 281/5	03
FT 281/5	60



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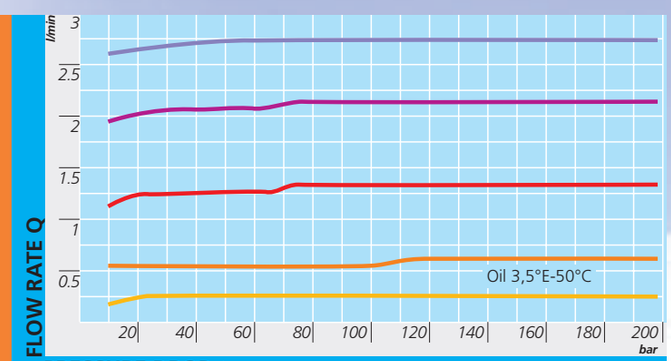


MATERIALS

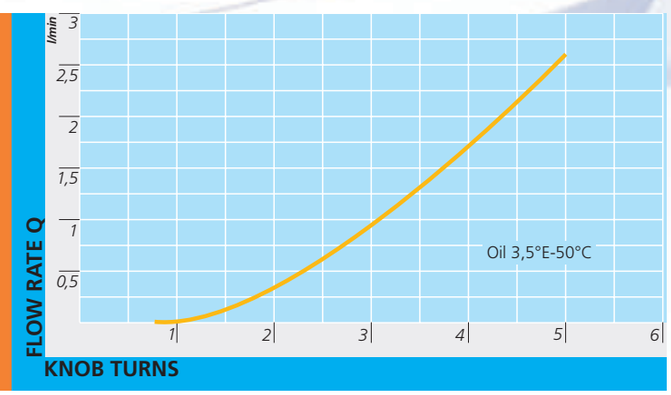
VALVE BODY	STEEL 9 S MN PB 28 - UNI 5105
ADJUSTING MEMBERS	STEEL 35 S MN PB 10 - UNI 5105
COMPENSATION PISTON	STEEL 38 NI CR MO 5 - UNI 5332 HEAT TREATED
HANDWHEEL	ALLUMINIO GD AL SI - UNI 5706 PAINTED
NIPPLE	NYLON 6
O R	NITRILE
ANTIEXTRUSION RINGS	PTFE

All components are surface treated and protected

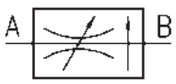
FT 288/2-03 FT 288/2-60



FT 288/2 - 03 FT 288/2 - 60



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PRESSURE COMPENSATED MICROFINE FLOW CONTROL PLATE VALVES

They are the equivalent version with panel mounting as the regulators series FT 297/2 with threaded cartridge.
Suitable for the adjustment of reduced flow rate with a high precision and stability level. They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series. The sealings are supplied in series.
Max. working pressure 250 bar.



FT 288/2

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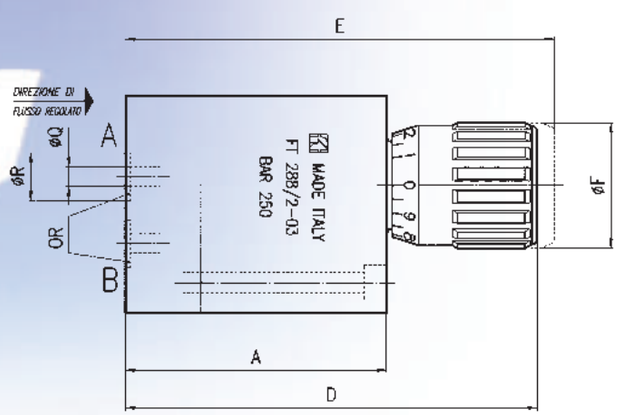
WHOLE PAGE

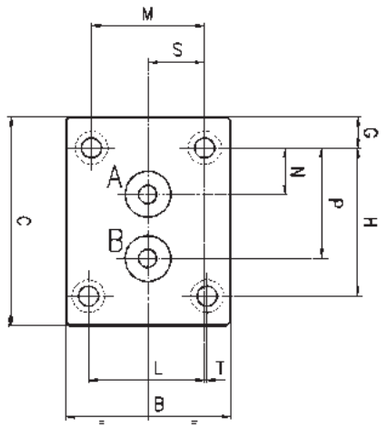
PRINT

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EXAMPLE FOR ORDERING

CODE	TYPE
FT 288/2	60





DIMENSIONS

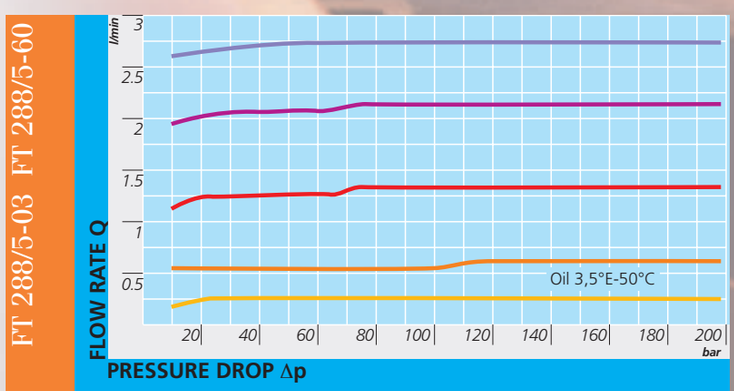
TYPE	A	B	C	D	E	ØF	G	H	L	M	N	P	ØQ	ØR	S	T	OR	SCREW	WEIGHT KG
03	69	45	57	109	113,5	33	8,5	40,5	31,75	31	12,7	30,5	5	12,5	15,5	0,75	2037	M5x75	1,285
60	69	45	57	109	113,5	33	8,5	40,5	31,75	31	10	33	6	17,2	15,5	0,75	2056	M5x75	1,270

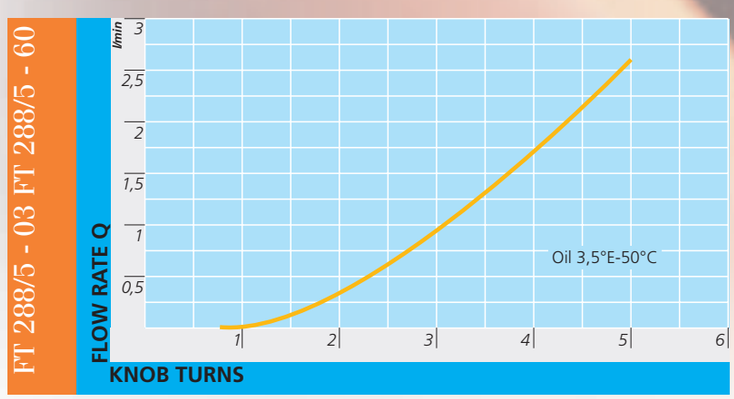


MATERIALS

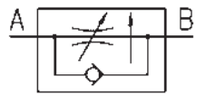
VALVE BODY	STEEL 9 S MN PB 28 - UNI 5105
ADJUSTING MEMBERS	STEEL 35 S MN PB 10 - UNI 5105
COMPENSATION PISTON	STEEL 38 NI CR MO 5 - UNI 5332 HEAT TREATED
HANDWHEEL	ALUMINIUM GD AL SI - UNI 5706 PAINTED
NIPPLE	NYLON 6
BALL GUIDE	NYLON 66 + CARBON FIBER
BALL	STEEL - UNI 100 C 6
SPRING	STAINLESS STEEL AISI 302
PLUG	STEEL 35 S MN PB 10 - UNI 5105
O R	NITRILE
ANTIEXTRUSION RINGS	PTFE

All components are surface treated and protected





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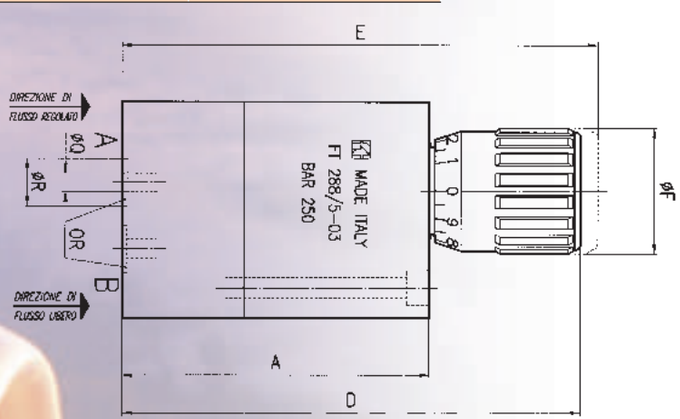
SINGLE-ACTING PRESSURE COMPENSATED MICROFINE FLOW CONTROL PLATE VALVES

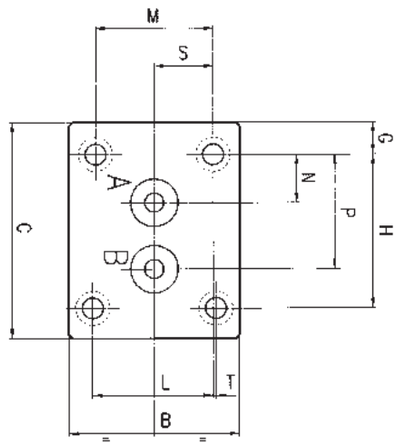
They are "single-acting" version of the valves series FT 288/2 while principal characteristics are maintained. The single-acting device, of ball type, allows a flow rate section.
They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series.
The sealings are supplied in series.
Max. working pressure 250 bar.



EXAMPLE FOR ORDERING

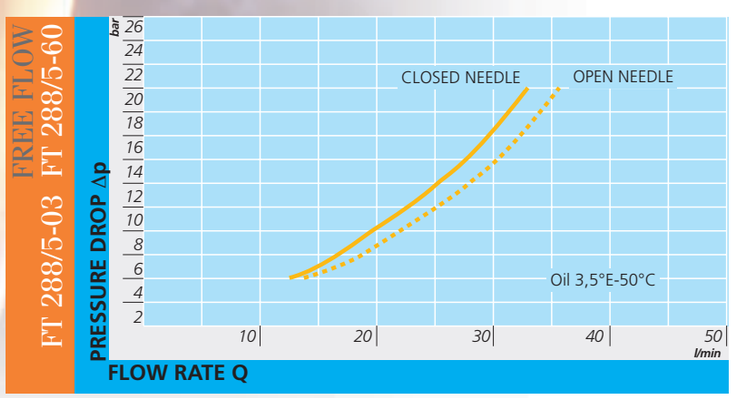
CODE	TYPE
FT 288/5	60





DIMENSIONS

TIPO	A	B	C	D	E	ØF	G	H	L	M	N	P	ØQ	ØR	S	T	OR	SCREW	WEIGHT KG
03	81	45	57	121	125,5	33	8,5	40,5	31,75	31	12,7	30,2	5	12,5	15,5	0,75	2037	M5x85	1,490
60	84	45	57	124	128,5	33	8,5	40,5	31,75	31	10	33	6	17,2	15,5	0,75	2056	M5x90	1.530



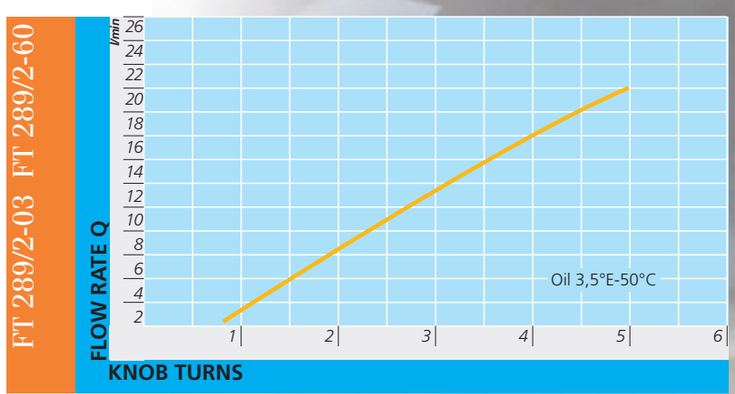
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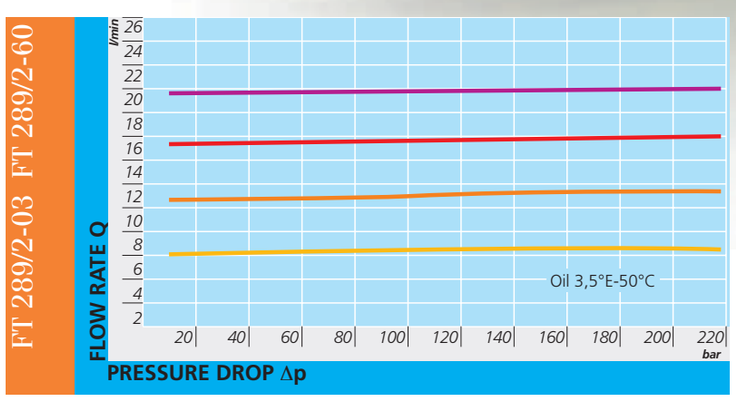


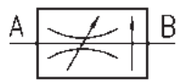
MATERIALS

VALVE BODY	STEEL 9 S MN PB 28 - UNI 5105
ADJUSTING MEMBERS	STEEL 35 S MN PB 10 - UNI 5105
COMPENSATION PISTON	STEEL 38 NI CR MO 5 - UNI 5332 HEAT TREATED
HANDWHEEL	ALUMINIUM GD AL SI - UNI 5706 PAINTED
NIPPLE	NYLON 6
O R	NITRILE
ANTIEXTRUSION RINGS	PTFE

All components are surface treated and protected







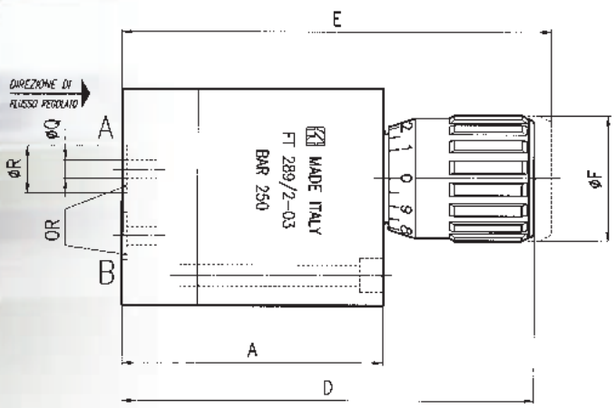
PRESSURE COMPENSATED FLOW CONTROL PLATE VALVES

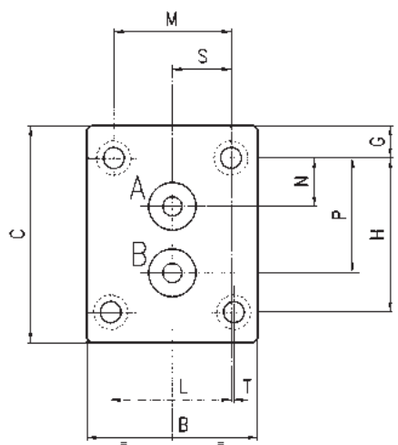
They are provided with plate connections of two-port flow regulators (in line) series FT 287/2 whose main characteristics are maintained.
Appreciated for the high precision level.
They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series.
The sealings are supplied in series.
Max. working pressure 250 bar.



EXAMPLE FOR ORDERING

CODE	TYPE
FT 289/2	03





DIMENSIONS

TYPE	A	B	C	D	E	øF	G	H	L	M	N	P	øQ	øR	S	T	OR	SCREW	WEIGHT KG
03	69	45	57	109	113,5	33	8,5	40,5	31,75	31	12,7	30,5	5	12,5	15,5	0,75	2037	M5x75	1,285
60	69	45	57	109	113,5	33	8,5	40,5	31,75	31	10	33	6	17,2	15,5	0,75	2056	M5x75	1,270

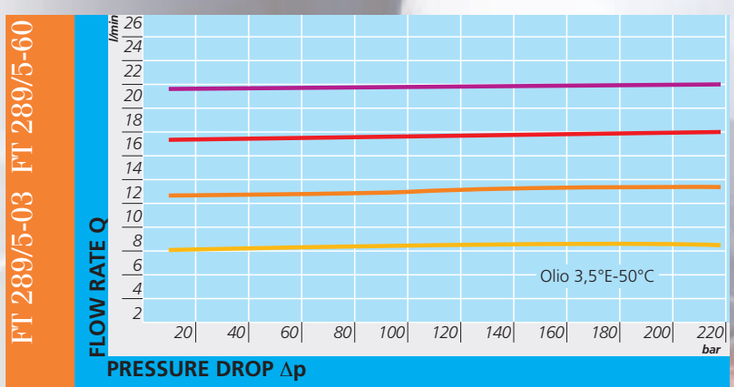
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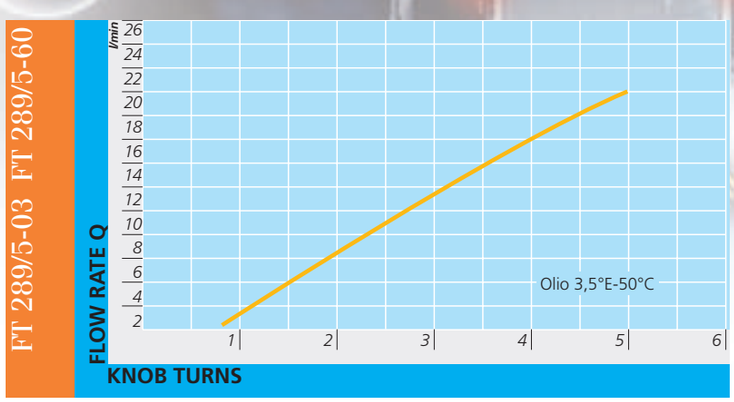


MATERIALS

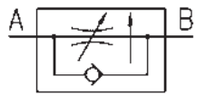
VALVE BODY	STEEL 9 S MN PB 28 - UNI 5105
ADJUSTING MEMBERS	STEEL 35 S MN PB 10 - UNI 5105
COMPENSATION PISTON	STEEL 38 NI CR MO 5 - UNI 5332 HEAT TREATED
HANDWHEEL	ALLUMINIO GD AL SI - UNI 5706 PAINTED
NIPPLE	NYLON 6
BALL GUIDE	NYLON 66 + CARBON FIBER
BALL	STEEL - UNI 100 C 6
SPRING	STAINLESS STEEL AISI 302
PLUG	STEEL 35 S MN PB 10 - UNI 5105
O R	NITRILE
ANTIEXTRUSION RINGS	PTFE

All components are surface treated and protected





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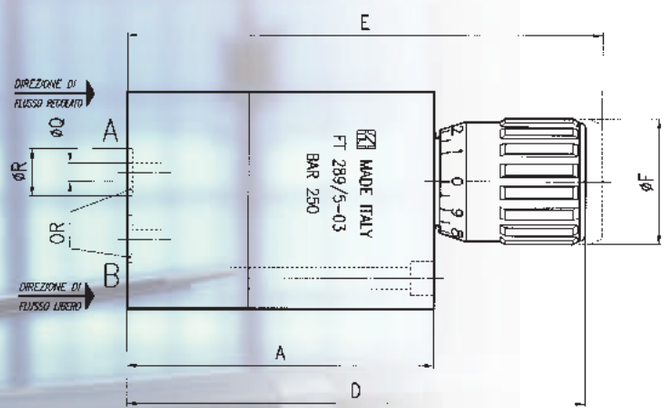
SINGLE-ACTING PRESSURE COMPENSATED MICROFINE FLOW CONTROL PLATE VALVES

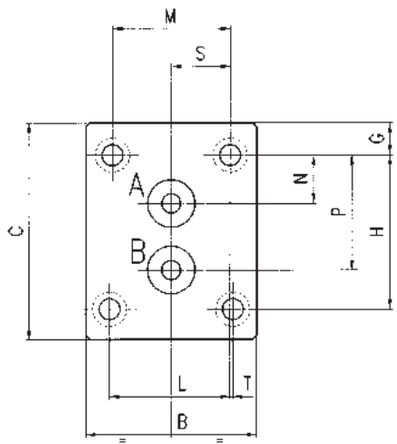
They are the "single-acting" version of the valve series FT 289/2 whose main characteristics are maintained.
They are provided with plate connections mod. CETOP 03 or interchangeable with the broadly used valves. The connection seals are equipped in series.
The sealings are supplied in series.
Max. working pressure 250 bar.



EXAMPLE FOR ORDERING

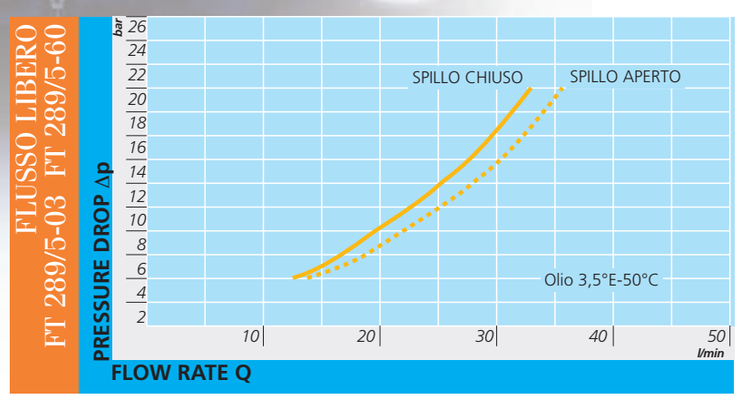
CODICE	TYPE
FT 289/5	60





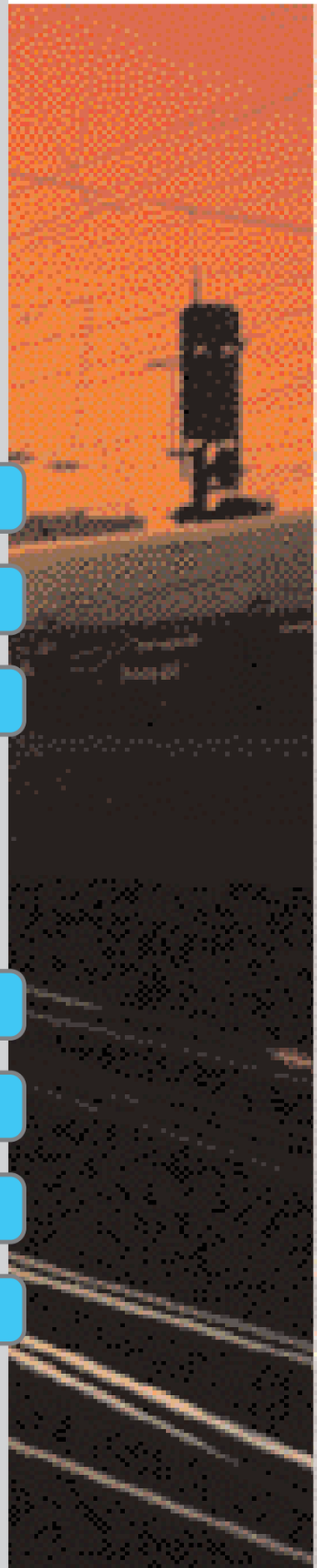
DIMENSIONS

TYPE	A	B	C	D	E	øF	G	H	L	M	N	P	øQ	øR	S	T	OR	SCREW	WEIGHT KG
03	81	45	57	121	125,5	33	8,5	40,5	31,75	31	12,7	30,2	5	12,5	15,5	0,75	2037	M5x85	1.490
60	84	45	57	124	128,5	33	8,5	40,5	31,75	31	10	33	6	17,2	15,5	0,75	2056	M5x90	1.530



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FT 290
FT 01-290
FT 291
FT 01-291
FT 292
FT 293
FT 299
FT 1201



GAUGE ISOLATOR
-NEEDLE
-PUSH-BUTTON
-IN LINE AND 90° ANGLE
-PLATE VALVES

ACCESSORIES

FT 290
Gauge isolator needle valves in line

FT 01-290
Gauge isolator needle valves in line with lateral connection of 1/2

FT 291
Gauge isolator needle valves 90° angle

FT 01-291
Gauge isolator needle valves 90° angle with lateral connection of 1/2

FT 292
Gauge isolator push-button valves

FT 293
Esclusori per manometro a pulsante attacchi a piastra

FT 299
Connectors

FT 1201
Copper washers

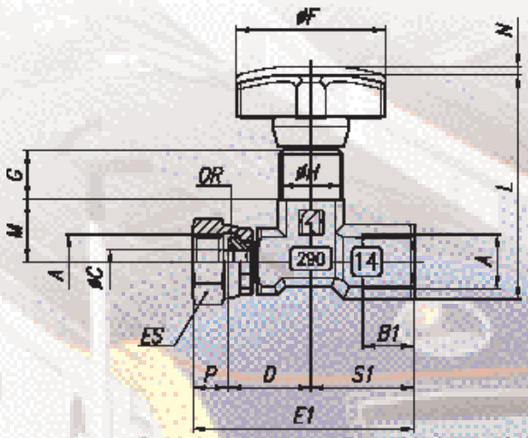


MATERIALS

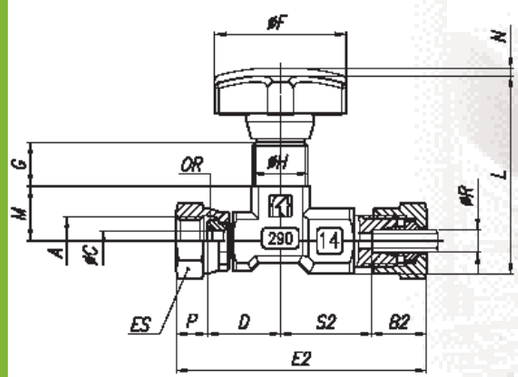
BODY	9 S MN PB 23 - UNI 5105 - PRESS FORG.
NEEDLE	35 S MN PB 23 - UNI 5105 - BURNISHED
O R	NITRILE
ANTIEXTRUSION RING	PTFE
HANDWHEEL	NYLON 66

All components are surface treated and protected

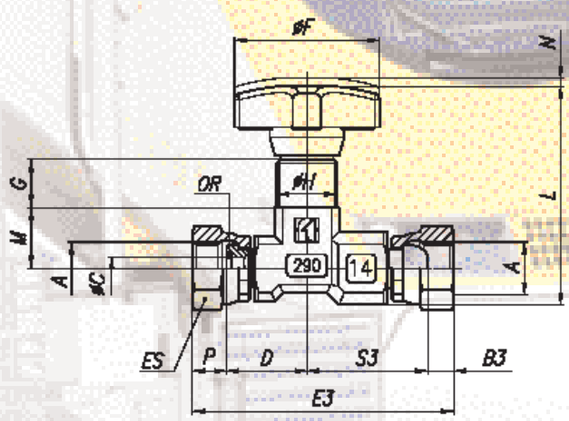
SPECIAL VERSIONS
ONLY FOR TYPE 14
SUPPLIED ON REQUEST
FOR QUANTITIES OF
AT LEAST 200 PIECES



CODE FT 290-01
CONNECTION: FEMALE-FEMALE



CODE FT 290-04
CONNECTION RIGID PIPES - DIN 2353



CODE FT 290-05
CONNECTION FLEXIBLE PIPES DIN 3861 - DIN 7611

DIMENSIONS

	A	B1	B2	B3	ØC	D	E1	E2	E3	ØF	G	H	L	M	N	P	R	S1	S2	S3	OR	ES	WEIGHT KG
1/4"G	11	15	6,5	5,6	20	54,5	69,5	66	34	12	M15x1	53	15	2	8,5	6	25	25	30	2108	18	01	0,125
																						04	0,150
																						05	0,145

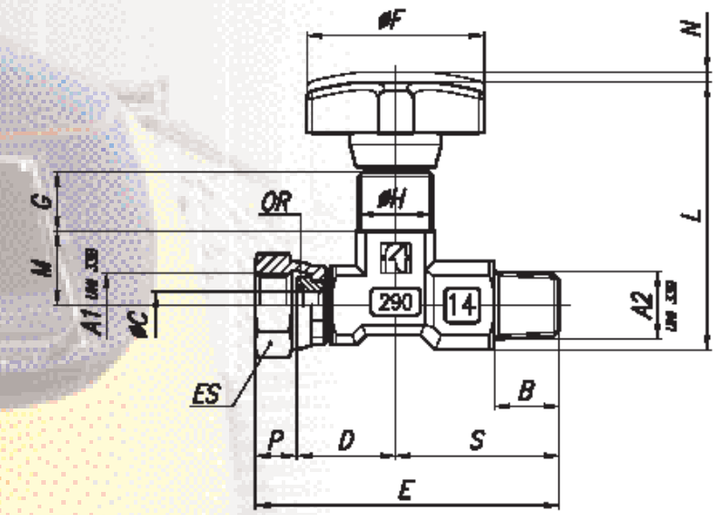
GAUGE ISOLATOR NEEDLE VALVES IN LINE

The FT290 isolator needle valves (in line) are normally used to protect the pressure gauge since they have the double function of dampening pressure surge during opening and of isolating the pressure gauge entirely. Pressed in high-resistance steel, protected by an accurate treatment, subjected to strict tests, they ensure reliability and long life.
A rotating swivel nut allows for accurate pressure gauge orientation.
The sealing, standard supplied, and inserted in the nut, prevents any drawing between the connection and the gauge.
For pressure gauge with taper threads, it will be necessary to use copper washers FT 1201 shown on page 182 of this catalogue (to be requested separately). Suitable for pressure up to 400 bar and temperature from -20° to +100° they can be panel mounted by use of log nut (G), supplied on request.



On request

- Versions with connections female/female (01)
- For rigid pipes (04)
- For flexible pipes (05)
- Seals in Viton (V)
- Complete with lock nut (G). Indicate whether KM or hexagonal
- Version in AISI 316 code FT 2290



DIMENSIONS

Type	A1 UNI 338	A2 UNI 339	B	ØC	D	E	ØF	G	H	L	M	N	P	S	OR	ES	Weight kg
14	1/4"G	1/4"Gc	13	5,6	20	61,5	34	12	M15x1	53	15	2	8,5	33	2018	18	0,125
12	1/2"G	1/2"Gc	16	6,5	32	83	40	12,5	M20x1	82,5	19	6	11	40	2021	27	0,413

EXAMPLE FOR ORDERING

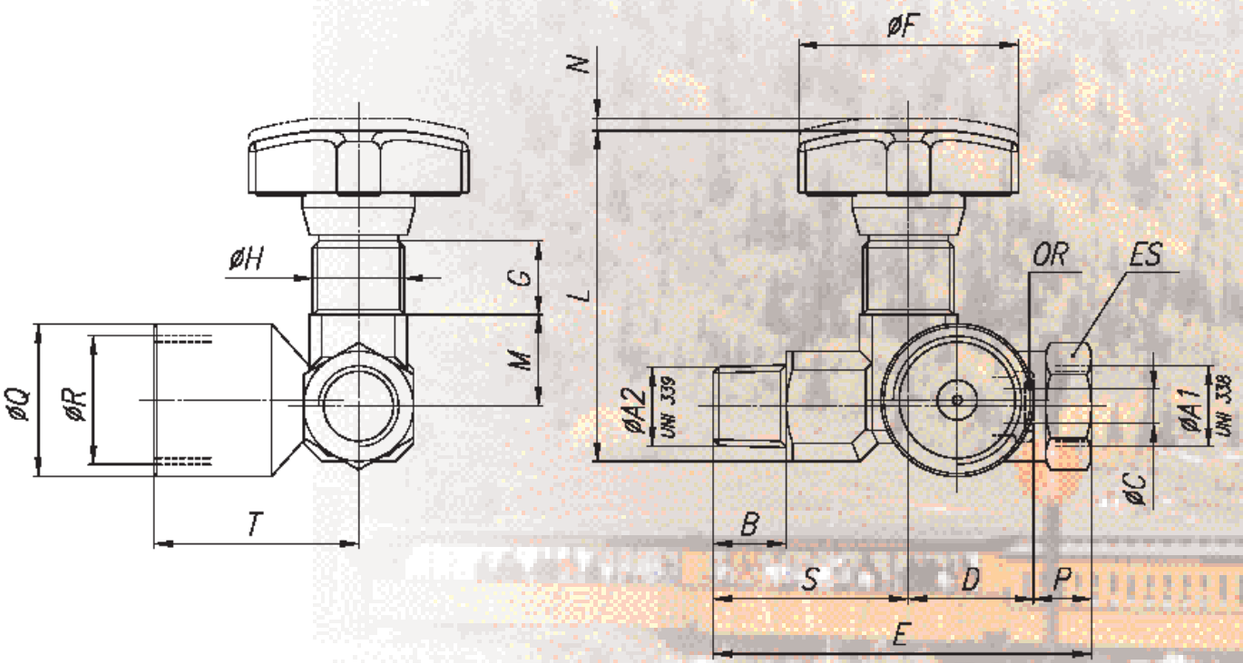
Code	Type F/F	Connection	Panel lock nut	Viton seal
FT 290	14	01	G	V
FT 290	12	-	G	-



MATERIALS

BODY	9 S MN PB 23 - UNI 5105 - PRESS FORG.
NEEDLE	35 S MN PB 23 - UNI 5105 - BURNISHED
O R	NITRILE
ANTIEXTRUSION RING	PTFE
HANDWHEEL	NYLON 66

All components are surface treated and protected



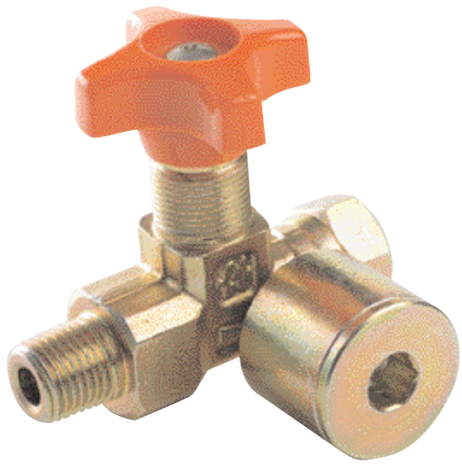
DIMENSIONS

TYPE	ØA1	ØA2	B	ØC	D	E	ØF	G	ØH	L	M	N	P	ØQ	ØR	S	T	OR	ES	WEIGTH KG
14	1/4"G	1/4"Gc	12	5,6	20,5	62	34	12	M15x1	53	15	2	9,5	25	1/2"G	32	33,5	2018	18	_

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GAUGE ISOLATOR NEEDLE VALVES IN LINE WITH LATERAL INTERFACE OF 1/2



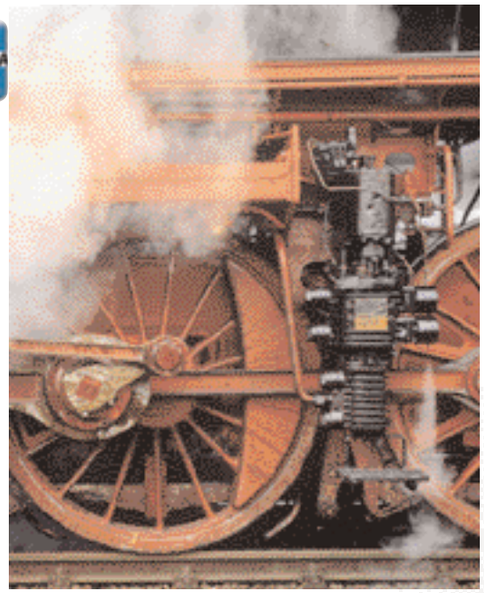
They are generally used for hydraulic-pneumatic elevators subjected to initial and periodical tests by the institution in charge.
They are normally used to protect the pressure gauge since they have the double function of dampening pressure surge during opening and of isolating the pressure gauge entirely.
Pressed in high-resistance steel, protected by an accurate treatment, subjected to strict tests, they ensure reliability and long life.
A rotating swivel nut allows for accurate pressure gauge orientation.
The sealing, standard supplied, and inserted in the nut, prevents any drawing between the connection and the gauge.
For pressure gauge with taper threads, it will be necessary to use copper washers FT 1201 shown on page ??? of this catalogue (to be requested separately).
Suitable for pressure up to 400 bar and temperature from -20° to +100° they can be panel mounted by use of log nut (G), supplied on request.

On request

- Versions with connections female/female (01)
- For rigid pipes (04)
- For flexible pipes (05)
- Seals in Viton (V)
- Complete with lock nut (G). Indicate whether KM or hexagonal



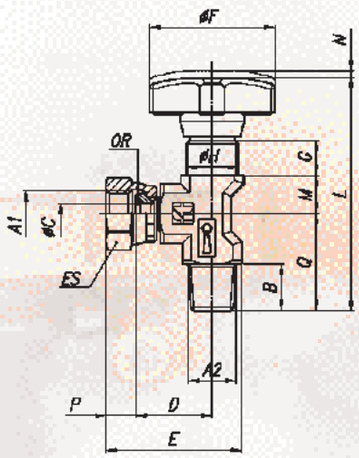
FT 01-290



MATERIALS

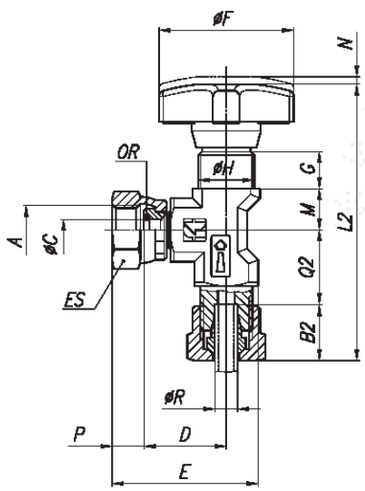
BODY	9 S MN PB 23 - UNI 5105 - PRESS FORG.
NEEDLE	35 S MN PB 23 - UNI 5105 - BURNISHED
O R	NITRILE
ANTIEXTRUSION RING	PTFE
HANDWHEEL	NYLON 66

All components are surface treated and protected

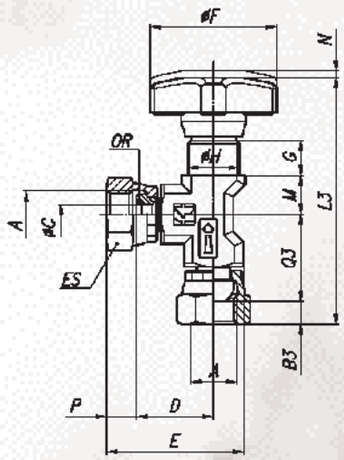


CODE FT 291-01
CONNECTION FEMALE/FEMALE

SPECIAL VERSIONS
SUPPLIED ON REQUEST
FOR QUANTITIES OF
AT LEAST 200 PIECES



CODE FT 291-04
CONNECTION RIGID PIPES - DIN 2353



CODE FT 291-05
CONNECTION FLEXIBLE PIPES DIN 3861 - DIN 7611

DIMENSIONS

A	B1	B2	B3	ØC	D	E	ØF	G	H	L1	L2	L3	M	N	P	Q 1	Q 2	Q 3	R	ES	OR	PESO KG
1/4"G	11	15	6,5	5,6	22	40	34	10	M15x1	65	73	69,5	11	2	9,5	27	20	25	6	18	2018	01 0,125
																						04 0,135
																						05 0,130

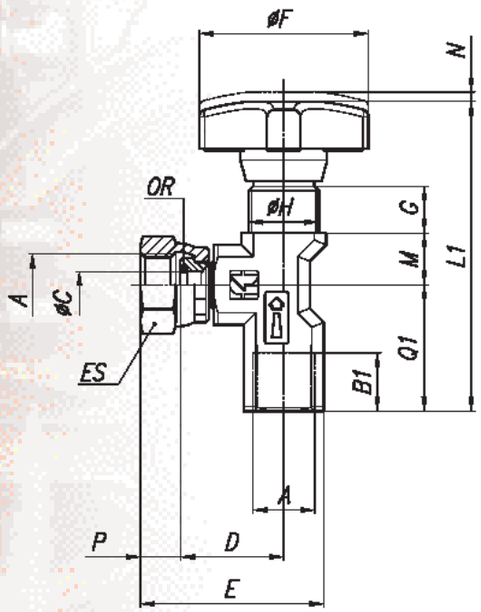
GAUGE ISOLATOR NEEDLE VALVES 90° ANGLE

The isolator needle valves FT 291 (90° angle) are normally used to protect the pressure gauge since they have the double function of dampening pressure surge during opening and of isolating the pressure gauge entirely.
Pressed in high-resistance steel, protected by an accurate treatment, subjected to strict tests, they ensure reliability and long life.
A rotating swivel nut allows for accurate pressure gauge orientation.
The sealing, standard supplied, and inserted in the nut, prevents any drawing between the connection and the gauge.
For pressure gauge with taper threads, it will be necessary to use copper washers FT 1201 shown on page ??? of this catalogue (to be requested separately).
Equipped with connectors Ft 299-24 (see page 103), they also allow the connection with attack of 1/2" Gas (as alternative it is advisable the use of the series FT 290-12).
Suitable for pressure up to 400 bar and temperature from -20° to +100° they can be panel mounted by use of log nut (G), supplied on request.



On request

- Versions with connections female/female (01)
- For rigid pipes (04)
- For flexible pipes (05)
- Seals in Viton (V)
- Complete with lock nut (G). Indicate whether KM or hexagonal
- Version in AISI 316 code FT 2291



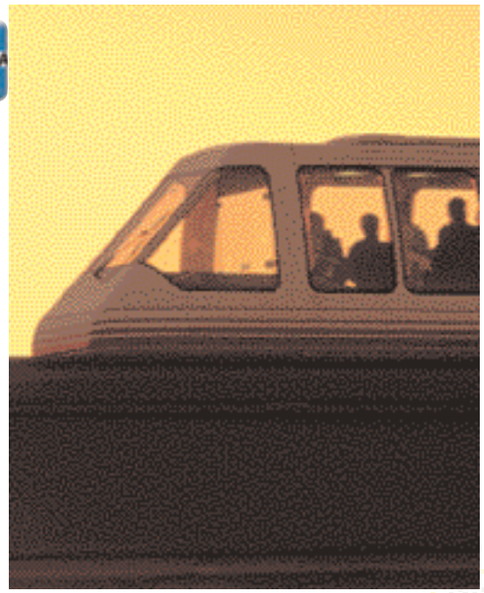
DIMENSIONS

Type	A1 UNI 338	A2 UNI 339	B	øC	D	E	øF	G	H	L	M	N	P	Q	ES	OR	Weight kg
14	1/4"G	1/4"Gc	13,5	5,6	22	40	34	10	M15x1	66	11	2	8,5	28	18	2018	0,105

EXAMPLE FOR ORDERING

Code	Connection female female	Panel ring nut	Viton seal
FT 291	01	G	V

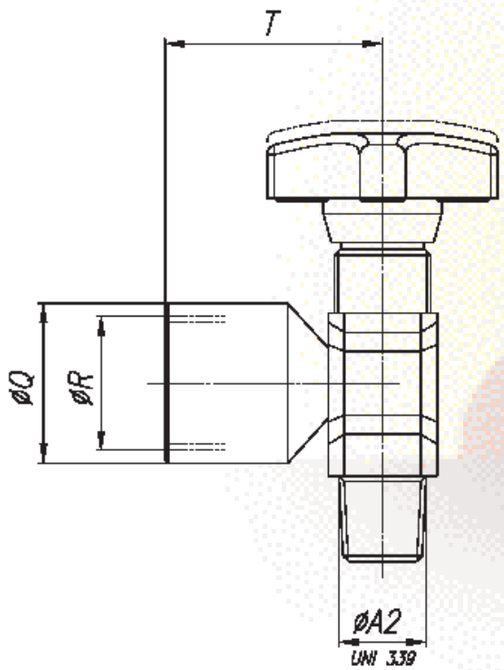
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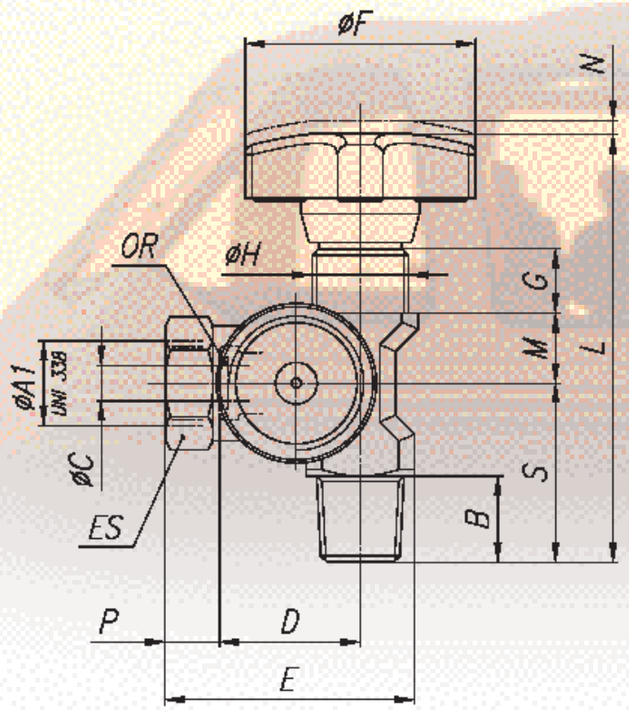


MATERIALS

BODY	9 S MN PB 23 - UNI 5105 - PRESS FORG.
NEEDLE	35 S MN PB 23 - UNI 5105 - BURNISHED
O R	NITRILE
ANTIEXTRUSION RING	PTFE
HANDWHEEL	NYLON 66

All components are surface treated and protected





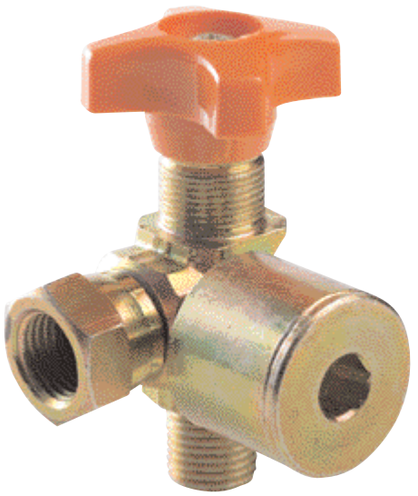
DIMENSIONS

TYPE	ØA1	ØA2	B	ØC	D	E	ØF	G	ØH	L	M	N	P	ØQ	ØR	S	T	OR	ES	WEIGHT KG
14	1/4"G	1/4"Gc	13,5	5,6	22	39	34	10	M15x1	66	11	2	8,5	25	1/2"G	28	34	2018	18	_

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GAUGE ISOLATOR NEEDLE VALVES 90° ANGLE WITH LATERAL CONNECTION OF 1/2



They are generally used for hydraulic-pneumatic elevators subjected to initial and periodical tests by the institution in charge.
They are normally used to protect the pressure gauge since they have the double function of dampening pressure surge during opening and of isolating the pressure gauge entirely.
Pressed in high-resistance steel, protected by an accurate treatment, subjected to strict tests, they ensure reliability and long life.
A rotating swivel nut allows for accurate pressure gauge orientation.
The sealing, standard supplied, and inserted in the nut, prevents any drawing between the connection and the gauge.
For pressure gauge with taper threads, it will be necessary to use copper washers FT 1201 shown on page ??? of this catalogue
(to be requested separately). Equipped with connectors FT 299-24 (see page 103), they also allow the connection with attack of 1/2" Gas
(as alternative it is advisable the use of the series FT 290-12).
Suitable for pressure up to 400 bar and temperature from -20° to +100° they can be panel mounted by use of log nut (G), supplied on request.

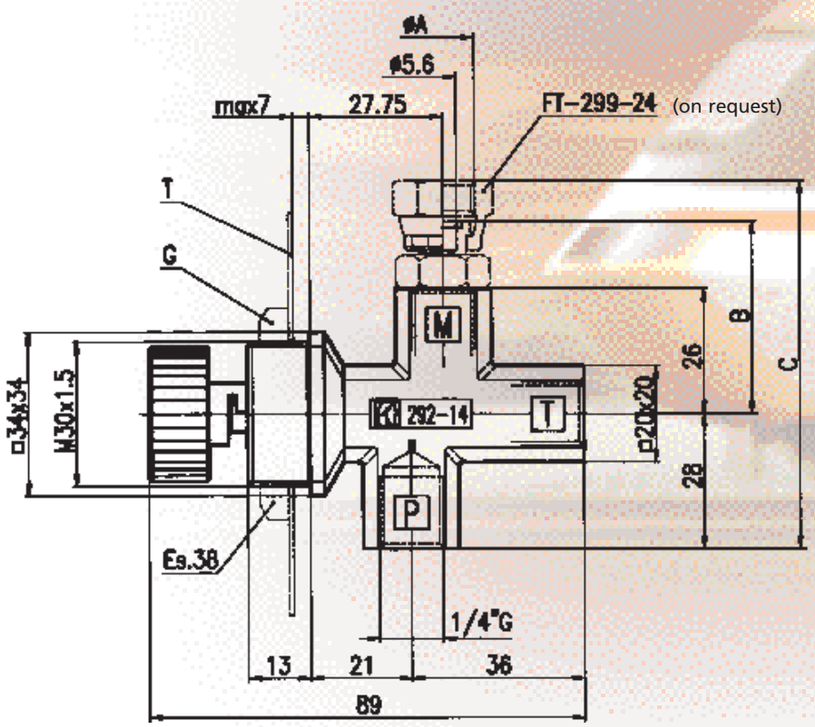
FT 01-291



MATERIALS

BODY	9 S MN PB 23 - UNI 5105 - PRESS FORG.
NEEDLE	35 S MN PB 23 - UNI 5105 - HEAT TREATMENT
O R	NYLON 66
ANTIEXTRUSION RING	NITRILE
HANDWHEEL	KG. 0,265

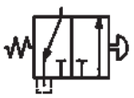
All components are surface treated and protected



DIMENSIONS

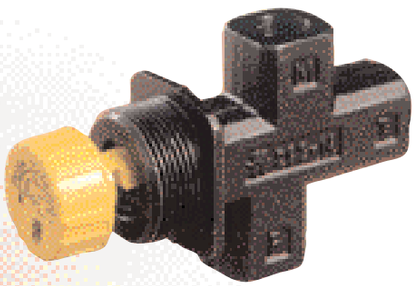
Ø A	B	C
1/4"G	45	80
1/2"G	50	85

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GAUGE ISOLATOR PUSH-BUTTON VALVES

Gauge isolator push-button valves series FT 292 are normally used to protect the pressure gauge since they have the double function of dampening pressure surge during opening and of isolating the pressure gauge entirely.
A reading is obtained by depressing the button. Releasing the button shuts off the flow to the gauge with residual pressure being automatically drained.
The button can be locked to give a continuous reading.
The maximum release pressure is 50 kg/sq cm.
Panel mounting facility. Panel mounting fixtures are supplied only if expressly requested, indicate whether KM or hexagonal.
The accurate study of components, of working conditions and of materials has contributed to obtain high quality levels, also confirmed by the results, which they are regularly subjected to.
Equipped with connectors FT 299 (see page 180), they also allow full location orientation for ease of reading.
They may be used for working pressure up to 400 bar.



On request
• without lecture block

FT 292

EXAMPLE FOR ORDERING

CODE	PANEL RING NUT	PANEL PLATE
FT 292	G	T



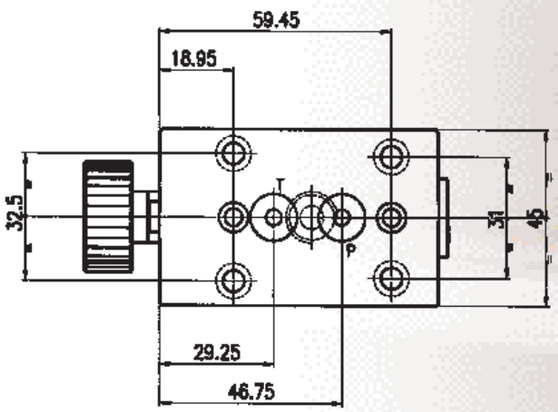
MATERIALS

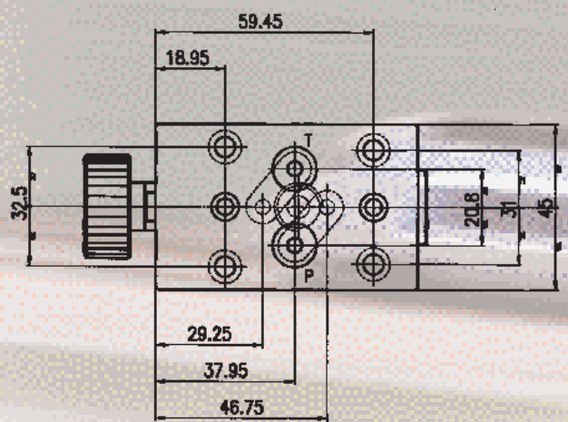
BODY	9 S MN PB 23 - UNI 5105 - PRESS FORG.
CURSOR	35 S MN PB 23 - UNI 5105 HEAT TREATMENT
PUSH BUTTON	NYLON 66
O R	NITRILE
WEIGHT	KG. 0,890

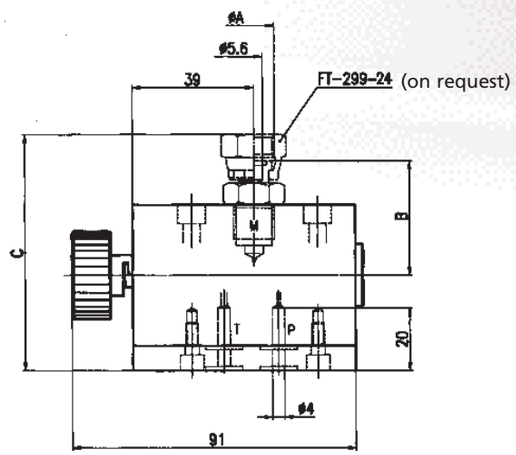
All components are surface treated and protected

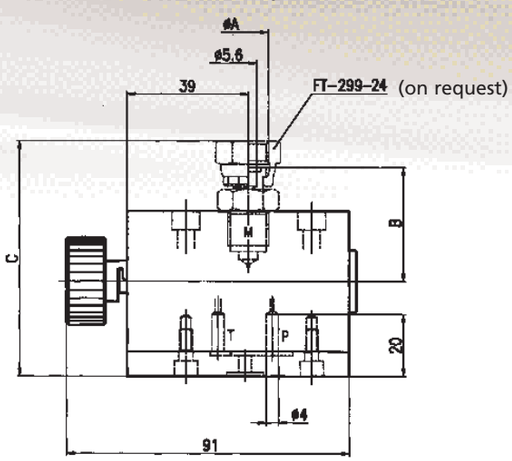
ON REQUEST

CODICE FT 293-03

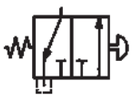




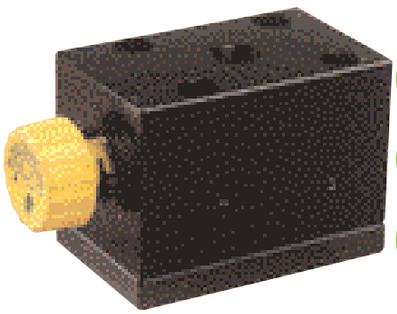




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GAUGE ISOLATOR PUSH-BUTTON VALVES WITH PLATE INTERFACE



The new gauge isolator push-button valves series FT 293 are normally used to protect the pressure gauge since they have the double function of dampening pressure surge during opening and of isolating the pressure gauge entirely.
A release is obtained by depressing the button. Releasing the button shuts off the flow to the gauge with residual pressure being automatically drained.
The button can be locked to give a continuous reading.
Locking screws are not supplied.
The accurate study of components, of working conditions and of materials has contributed to obtain high quality levels, also confirmed by the results, which they are regularly subjected to.
Equipped with connectors FT 299 (see page 180), they also allow full location orientation for ease of reading.
They may be used for working pressure up to 400 bar.

FT 293

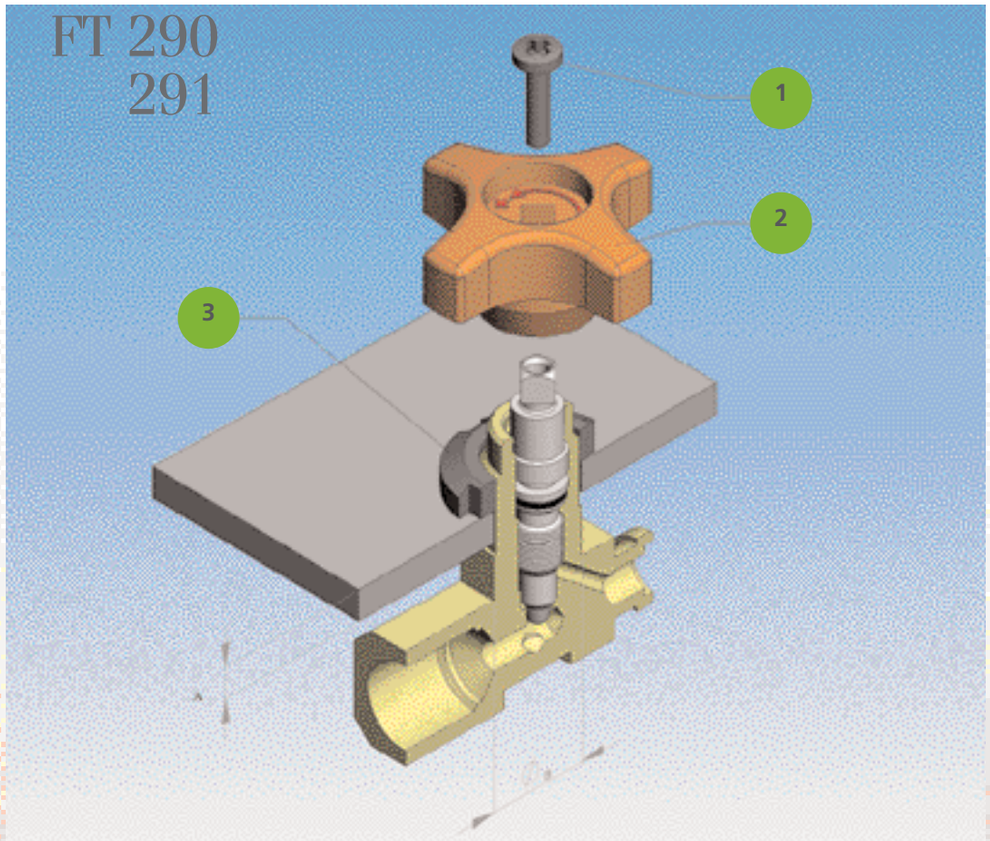
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DIMENSIONS

Ø A	1/4"G	1/2"G
B	36,5	40,5
C	75,5	82

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FT 290
291



ASSEMBLY INSTRUCTION

1°	Remove screw (1)
2°	Pull off handwheel (2)
3°	Insert ring nut (3) Type KM or hexagonal

Panel A thickness max	Panel hole ØB
5	16

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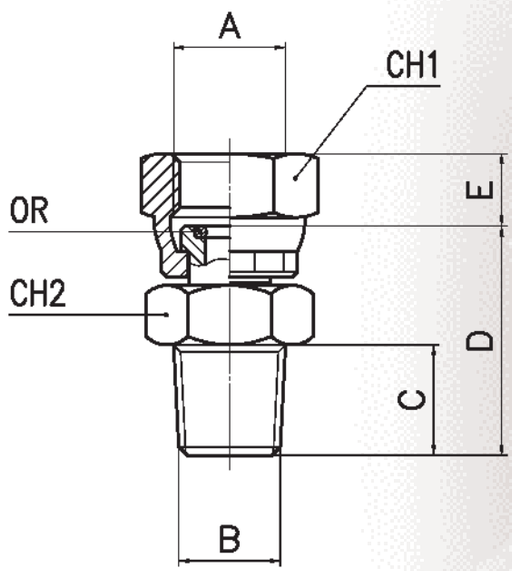


MATERIALS

Body	9 S Mn Pb 23 - UNI 5105
Nut	9 S Mn Pb 23 - UNI 5105
O R	Nitrile

EXAMPLE FOR ORDERING

Code	Type
FT 299	44



DIMENSIONS

Type	A UNI 338	B UNI 339	C	D	E	O R	CH1	CH2	Weight kg
88	1/8"G	1/8"Gc	9	22	7,5	2010	14	12	0,021
44	1/4"G	1/4"Gc	13	27	9,5	2018	18	17	0,040
42	1/4"G	1/2"Gc	16	31	9,5	2018	18	22	0,068
24	1/2"G	1/4"Gc	13	31	11	108	27	22	0,090
22	1/2"G	1/2"Gc	16	34	11	108	27	22	0,100

On request with cilindrical B thread

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CONNECTORS

The connectors FT 299 allow the connection of a pressure gauge direct to the system or in addition to the gauge isolator push button valves they allow the locking and the orientation of the pressure gauge or the connection of pressure gauges with attack of 1/2" Gas. They consist of a threaded attack bar hold and a locking nut; they are equipped with an orifice for the oil flow passage. A gasket, supplied as current product and inserted in the rotating nut, prevents any blow-by between fitting and pressure gauge.In case the pressure gauge is provided with a taper thread, it is necessary to use copper washers FT 1201 of the present catalogue, to be requested separately.
Max. working pressure is 400 bar.

On request
• Version in AISI 316 FT 2299



FT 299



MATERIALS

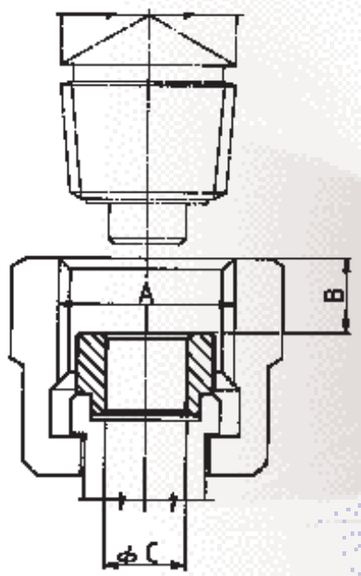
Cu - DHP - UNI 5649

EXAMPLE FOR ORDERING

Code	Type
FT 1201	14

DIMENSIONS

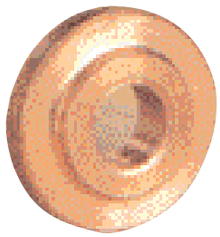
Type	A UNI 338	B	Ø C	Weight kg x 100 pieces
14	1/4"G	6,5	5,5	0,200
12	1/2"G	8	6,5	0,700



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COPPER WASHERS

Copper washers FT 1201 are used as replacement of the toroidal sealings, supplied as current product, when the assembling of a pressure gauge or of a conical threaded nipple, with a gauge isolator valve series FT 290, FT 291 or with a connector series FT 299 is requested.
FT 1201

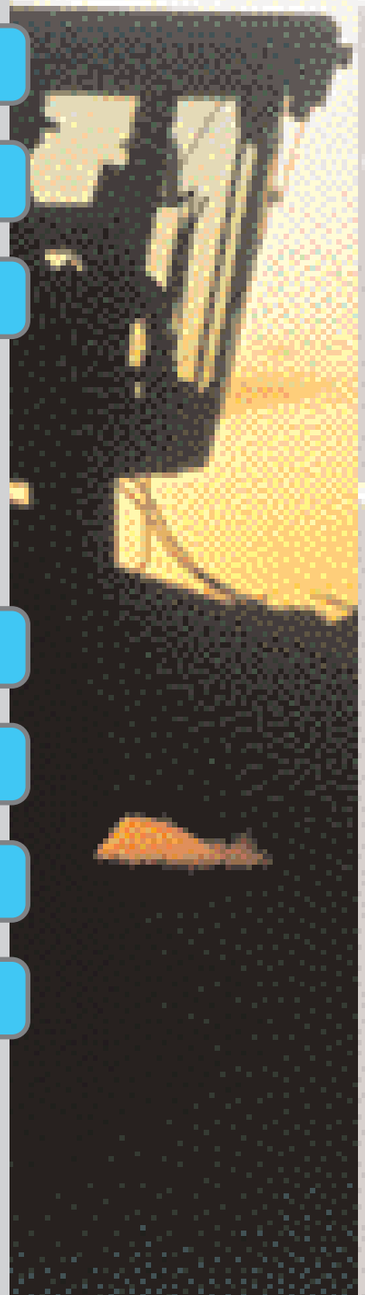


FT 1201



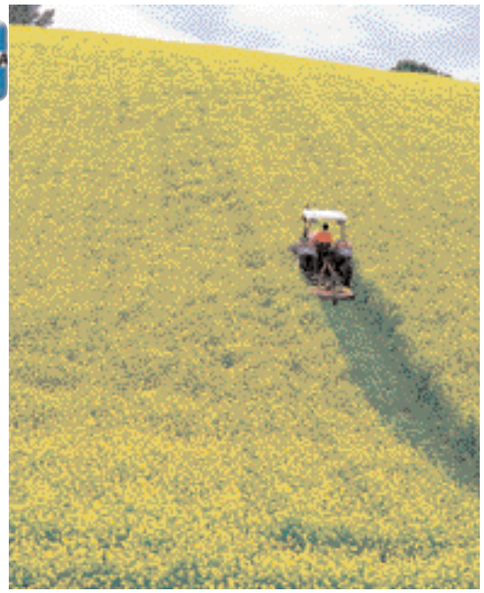

FT 221/1
FT 221/3

TWO-WAY AND THREE-WAY BALL VALVES



FT 221/1
Two-way ball valves

FT 221/3
Three-way ball valves

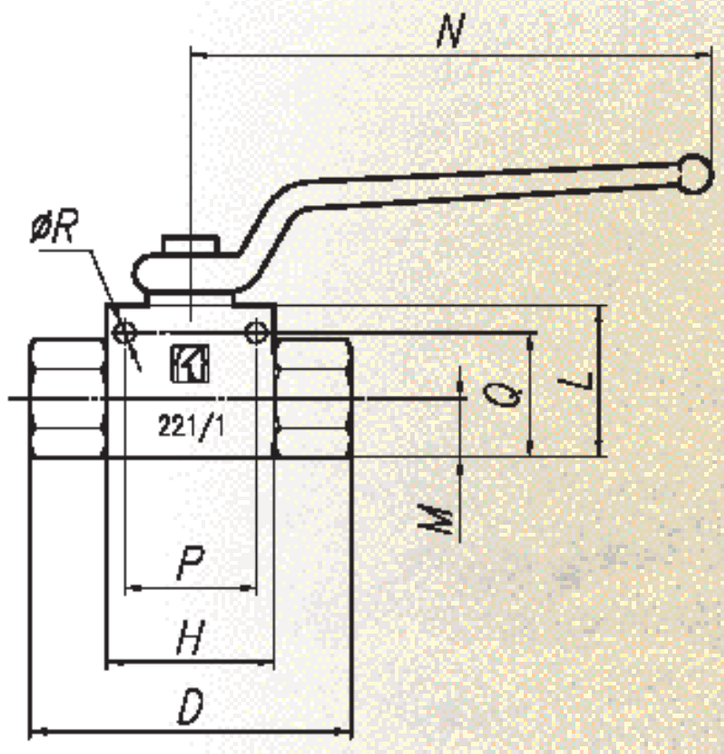


MATERIALS

Body	Carbon steel
Control stem	Chrome-plated steel
Ball	Chrome-plated steel
Stem seal	Nitrile
Ball seal	PTFE

EXAMPLE FOR ORDERING

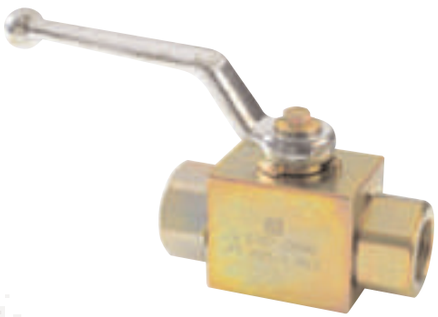
Code	Type
FT 221/1	34



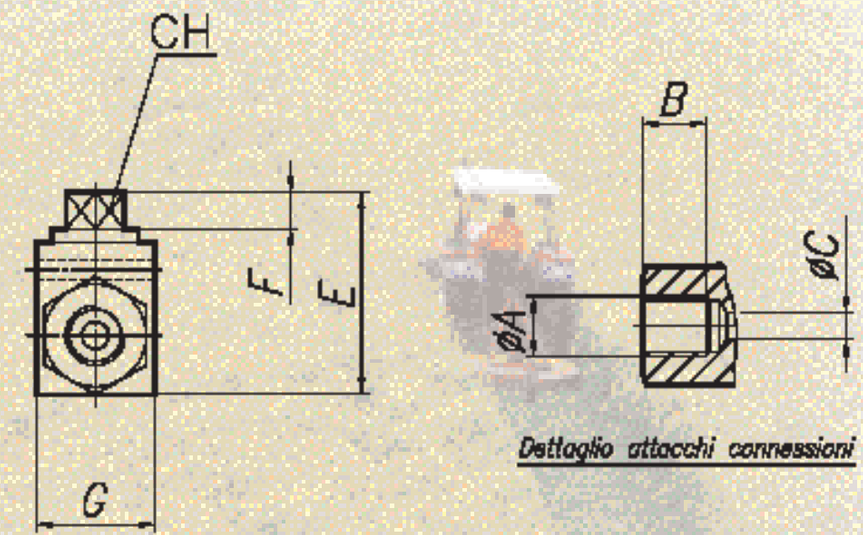
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HIGH PRESSURE TWO-WAY BALL VALVES

Used to obtain a quick flow shut-off, avoiding noticeable pressure drop, the FT 221/1 ball valves are designed to obtain perfect sealing, easy and quick operation under high pressure conditions.
Working pressure up to 500 bar and with every kind of fluids, such as: hydraulic oil, fuel, emulsions and liquids in general.



On request
• Version in AISI 316 FT 2221\1

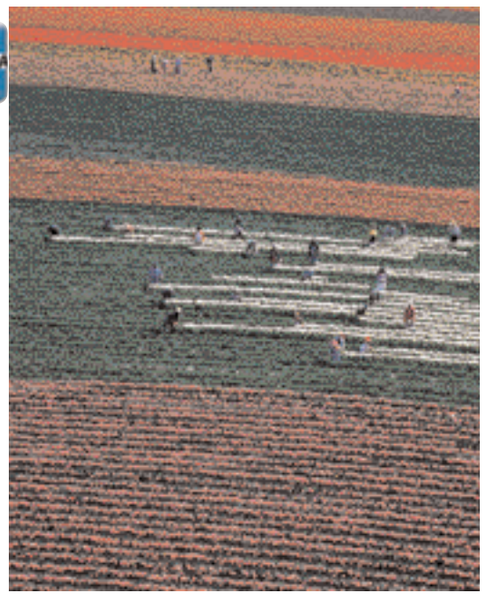


Dettaglio attacchi connessioni

DIMENSIONS

TYPE	DN	PN (BAR)	ØA	B	ØC	D	E	F	G	H	L	M	N	CH	WEIGHT KG	FIXING HOLES ON REQUEST P	Q	ØR
18	4	500	1/8"G	14	5	71	44,5	8	26	37	33,5	13	115	9	0,300	29	27,5	4,5
14	6	500	1/4"G	14	6	71	44,5	8	26	37	33.5	13	115	9	0,374	29	27,5	4,5
38	10	500	3/8"G	14	10	72	50	8	33	43	39	16.5	115	9	0,559	35	35	5,5
12	13	500	1/2"G	16	13	85	51	8	35	48	40	17	115	9	0,655	39	35,5	6,5
34	20	320	3/4"G	18	20	97	71,5	11	50	63	57	24	160	14	1,564	50	49,5	6,5
100	25	320	1"G	20	24	113	76	11	60	67	60	26,5	160	14	2,082	54	54	6,5
114	32	320	1 1/4"G	22	32	110	106	20	78	80	85	35	200	17	2,107	BOREST FIX NOT SUPPLIED		
112	38	320	1 1/2"G	24	38	130	112,5	15	83	85	92	41,5	200	17	3,698	BOREST FIX NOT SUPPLIED		
200	48	320	2"G	28	48	140	132	20	100	100	111	50	200	19	6,070	BOREST FIX NOT SUPPLIED		

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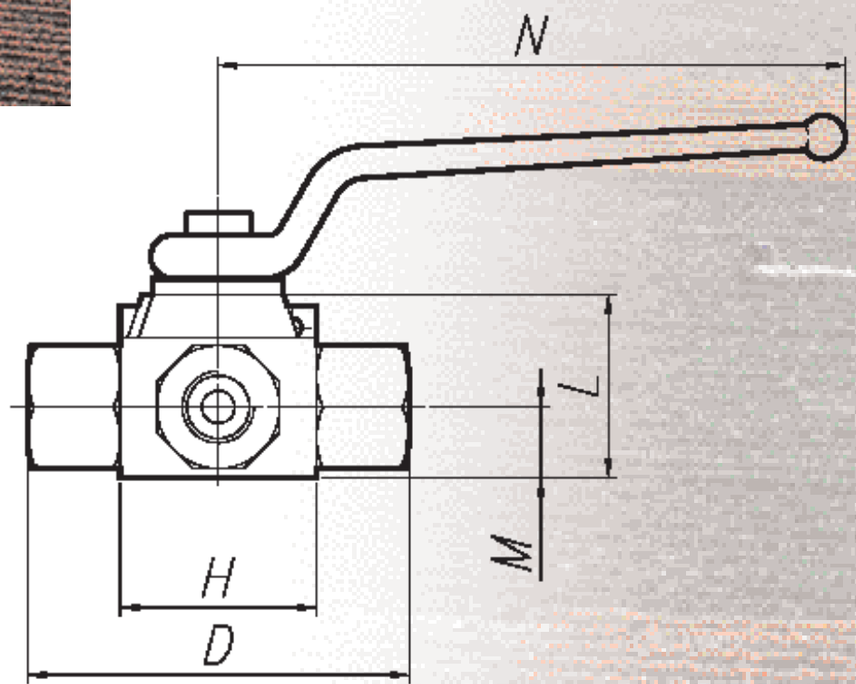


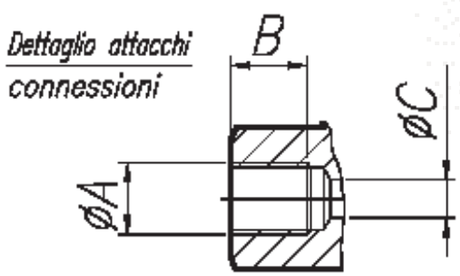
MATERIALS

Body	Carbon steel
Control stem	Chrome-plated steel
Ball	Chrome-plated steel
Stem seal	Nitrile
Ball seal	PTFE

EXAMPLE FOR ORDERING

Code	Type
FT 221/3	34





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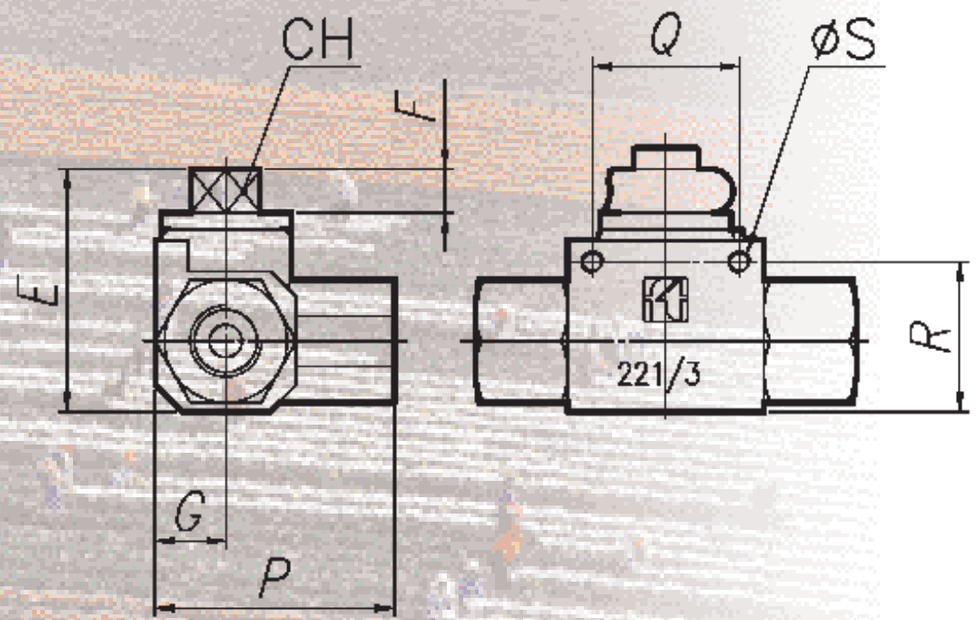
THREE-WAY BALL VALVES

Used to obtain a quick flow shut-off, avoiding noticeable pressure drop, the FT 221/3 ball valves are designed to obtain perfect sealing, easy and quick operation under high pressure conditions.
The noticeable solidity, the material selection and the accurate machining allow their use at working
pressure up to 315 bar and with every kind of fluids, such as: hydraulic oil, fuel, emulsions and liquids in general.

Standard version: at L
Requested: at T



On request
• Version in AISI 316 FT 2221\3



DIMENSIONS

TYPE	DN	PN (BAR)	ØA	B	ØC	D	E	F	G	H	L	M	N	P	CH	WEIGHT KG	FIXING HOLES ON REQUEST Q	R	ØS
18	4	500	1/8"G	14	5	71	44,5	8	13	36	33,5	13	115	44	9	0,450	27	27,5	M4
14	6	500	1/4"G	14	7	71	44,5	8	13	36	33.5	13	115	44	9	0,400	27	27,5	M4
38	10	500	3/8"G	14	10	72	50	8	16,5	43	39	16.5	115	51,5	9	0,600	33	35	M4
12	13	500	1/2"G	16	13	85	51.5	8	17,5	48	40,5	17,5	115	55	9	0,650	38	36	M5
34	20	320	3/4"G	18	20	97	72	11	24,5	63	56,5	24,5	160	70	14	1,600	50	49,5	M6
100	25	320	1"G	20	24	113	79,5	11	30	67	63,5	30	160	87,5	14	2,400	54	54	M6

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HYDRAULIC PNEUMATIC CONTROL VALVES



FT 1237/2
Double-acting fine control valves

FT 1237/5
Single-acting fine control valves

FT 1247/2
Double-acting cartridge mounted fine control valves

FT 1251/2-01
Double-acting control valves Female-Female in line

FT 1251/2-02
Double-acting control valves Male-female in line

FT 1252/2-01
Double-acting control valves 90° angle Female-Female

FT 1252/2-02
Double-acting control valves 90° angle Male-Female

FT 1251/5-01
Single-acting control valves Female-Female

FT 1253/5
Single-acting needle control valve in line

FT 1254/5
Single-acting needle control valve 90° angle

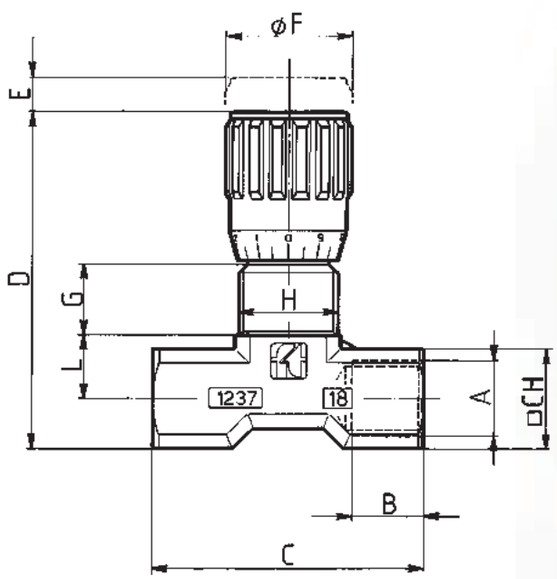


MATERIALS

Body	OT 58 - UNI 5705 - Passivated
Needle	X 10 Cr Ni S 1809 - UNI 6900
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706

EXAMPLE FOR ORDERING

	Code	Type	Panel ring nut	Viton seal
Brass	FT 1237/2	18	G	V



DIMENSIONS

Type	A UNI 338	B	C	D	E	ØF	G	H	L	□CH	Weight kg
18	1/8"G	8	40	55	4	22	12	M15x1	9,5	15	0,105

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DOUBLE-ACTING FINE CONTROL VALVES IN LINE

It is the solution for application requiring special adjustment of small flow rates. For both hydraulic-pneumatic applications with flow rate up to max. 3 l/min. They can be used also with fluids different from oil, such as: gas and liquids in general.
This version has the same characteristics as the series FT 1250 and it maintains its main characteristics:

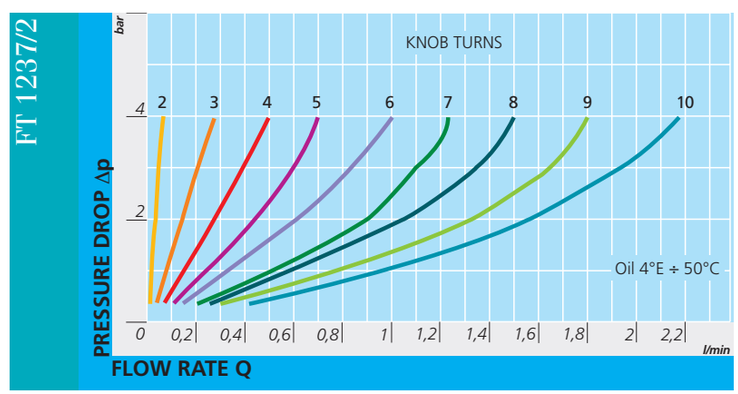
- metallic sealing;
- provision for panel mounting;
- security against accidental needle withdrawal.

On request

- NPT threads
- Viton (V) seals
- Version in AISI 316 FT 2237\2

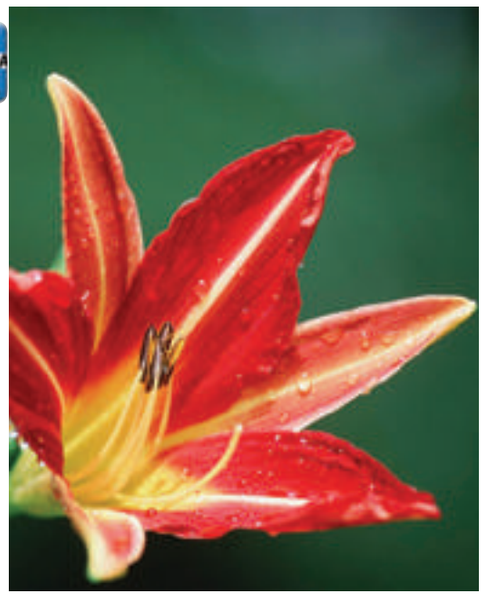


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TECHNICAL DATA

TYPE	FLOW SQ MM²	MAX WORKING PRESSURE BAR	WORKING TEMPERATURE °C	FILTRATION GRADE µM
18	3,14	210	-20°/+100°	25

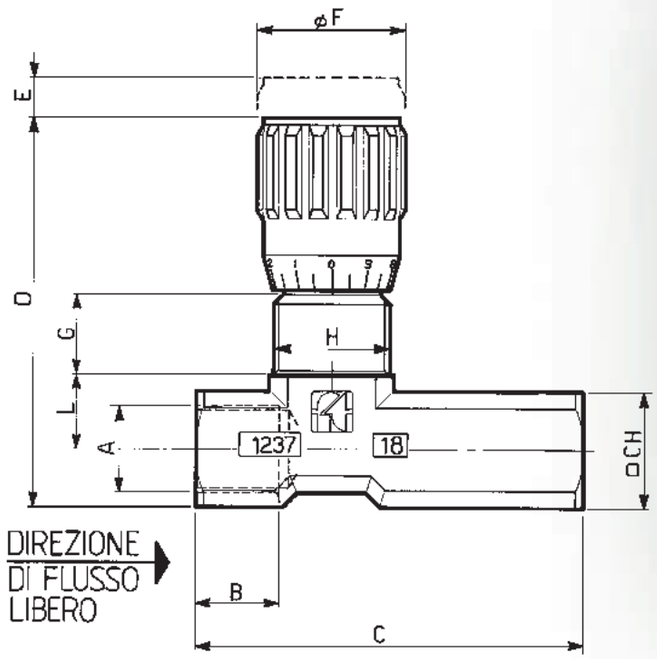


MATERIALS

Body	OT 58 - UNI 5705 - Passivated
Needle	X 10 Cr Ni S 1809 - UNI 6900
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706
Spring	AISI 302
Ball	UNI 100 C 6
Ball guide	Nylon 66 + Carbon fiber

EXAMPLE FOR ORDERING

	Code	Type	Panel ring nut	Viton seal
Brass	FT 1237/5	18	G	V



DIMENSIONS

Type	A UNI 338	B	C	D	E	ØF	G	H	L	□CH	Weight kg
18	1/8"G	8	46,5	55	4	22	12	M15x1	9,5	15	0,110



SINGLE-ACTING FINE CONTROL VALVES IN LINE

It is the solution for application requiring special adjustment of small flow rates. For both hydraulic-pneumatic applications with flow rate up to max. 3 l/min. They can be used also with fluids different from oil, such as: gas and liquids in general.
This version has the same characteristics as the series FT 1250 and it maintains its main characteristics:

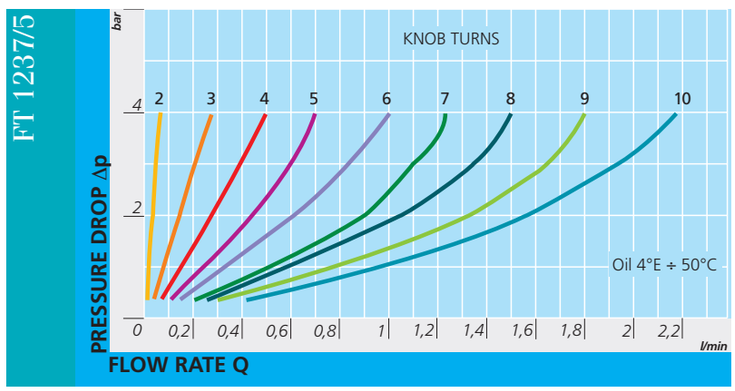
- metallic sealing;
- provision for panel mounting;
- security against accidental needle withdrawal.

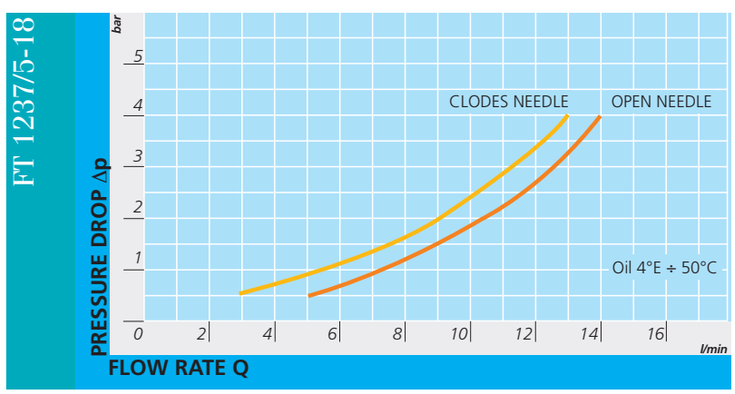
On request

- NPT threads
- Viton (V) seals



FT 1237/5





TECHNICAL DATA

TYPE	FLOW SQ MM²	MAX WORKING PRESSURE BAR	WORKING TEMPERATURE °C	FILTRATION GRADE µM
18	3,14	210	-20°/+100°	25

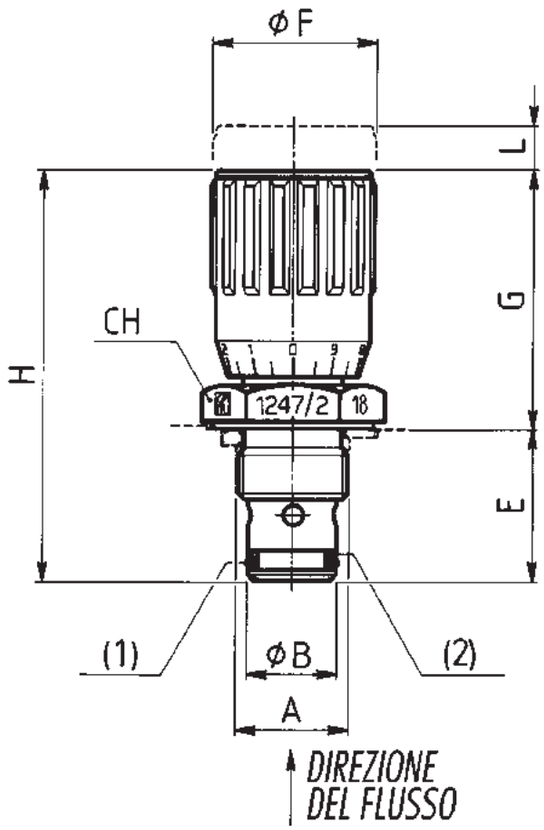


MATERIALS

Body	OT 58 - UNI 5705 - Passivated
Needle	X 10 Cr Ni S 1809 - UNI 6900
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706

EXAMPLE FOR ORDERING

	Code	Type	Viton seal
	FT 1247/2	18	V
Stainless steel	FT 2247/2	18	V



DIMENSIONS

Type	A UNI 4534	ØB	E	ØF	G	H	L	CH	Weight kg	(1)OR	(2)BK
18	M15x1	12	20,5	22	34,5	55	8	22	0,069	108	108

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DOUBLE-ACTING CARTRIDGE MOUNTED FINE CONTROL VALVES



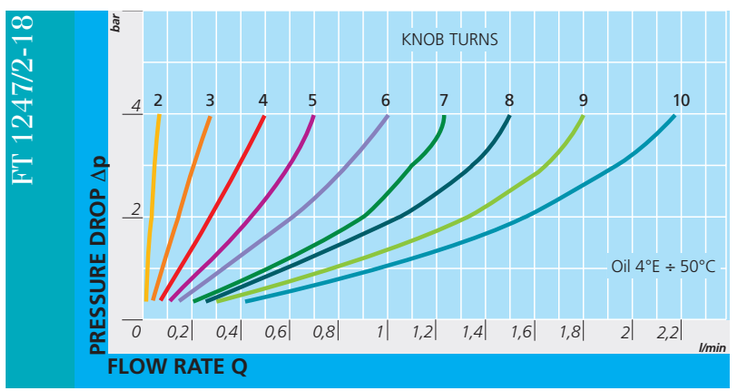
It is the solution for application requiring special adjustment of small flow rates. For both hydraulic-pneumatic applications with flow rate up to max. 3 l/min. They can be used also with fluids different from oil, such as: gas and liquids in general.
This version has the same characteristics as the series FT 1250 and it maintains its main characteristics:

- metallic sealing;
- provision for panel mounting;
- security against accidental needle withdrawal.

On request

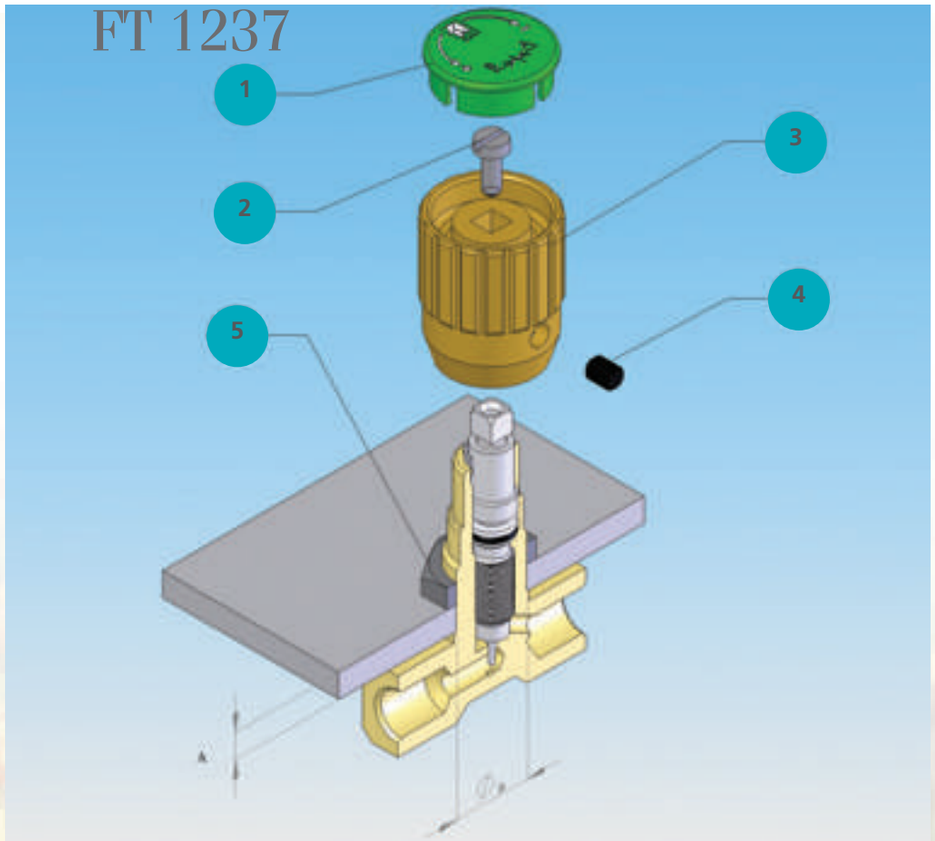
- NPT threads
- Version AISI 316 Code FT 2247/2

FT 1247/2



TECHNICAL DATA

TYPE	FLOW SQ MM²	MAX WORKING PRESSURE BAR	WORKING TEMPERATURE °C	FILTRATION GRADE µM
18	3,14	210	-20°/+100°	25



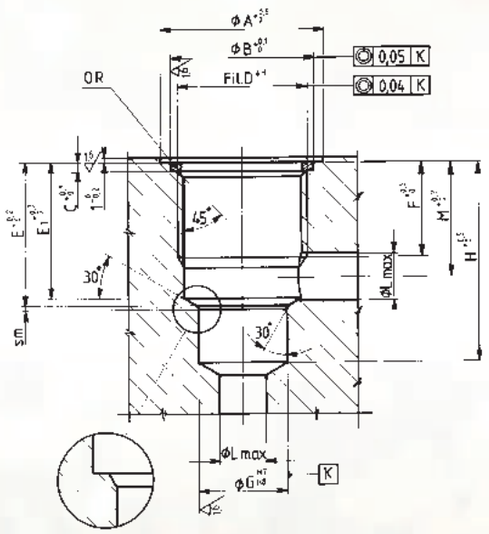
PANEL MOUNTING

1°	Unscrew the lock screw (4)
2°	Remove cover plate (1)
3°	remove screw (2)
4°	Pull off knob (3)
5°	Insert ring nut (5), on request it is supplied with the valve

Type valve	Thickness panel A max	Panel orifice Ø B
18	5	16

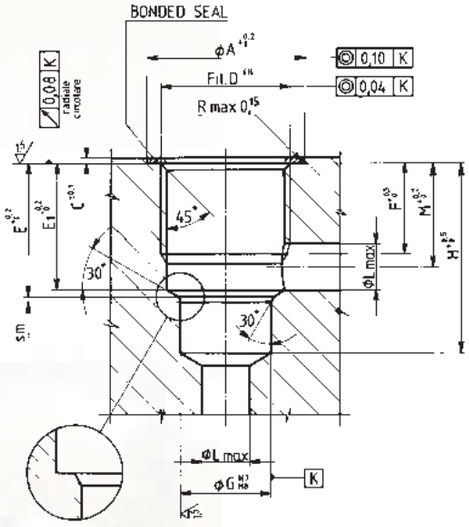
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MACHINING DIAGRAMS FOR SEATS OF FT 1247/2 CARTRIDGE VALVE



Detail of machining which may be executed in alternative to the conical one, eliminating dimension E1

FLAT SEA



Detail of machining which may be executed in alternative to the conical one, eliminating

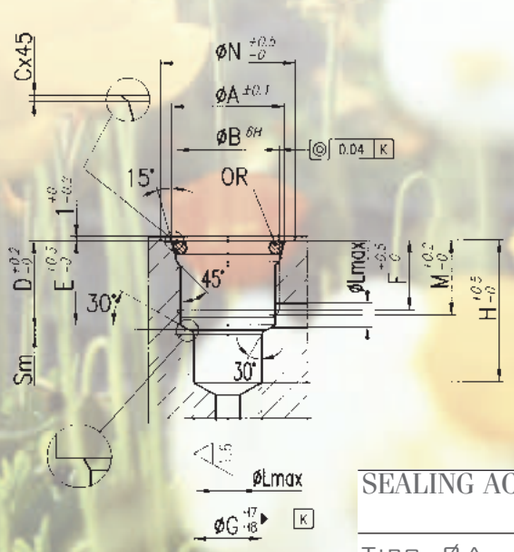
BONDED SEAL

SEALING ACHIEVED WITH O-RING ON FLAT SEAT

TYPE	ØA	ØB	C	D UNI 4534	E	E1	F	ØG	H	ØL	M	Sm	OR
18	23	19	2	M15x1	14	13	11	12	21,5	4	11,5	0,5	3056

SEALING ACHIEVED BY BONDED SEALS

TYPE	ØA	C	D UNI 4534	E	E1	F	ØG	H	ØL	M	Sm	BONDED SEAL
18	23	1	M15x1	13	12	9	12	20	4	10,3	0,5	400-512



CONICAL SEAT

SEALING ACHIEVED WITH O-RING ON CONICAL SEAT

TIPO	ØA	B UNI 4534	C	D	E	F	ØG	H	ØL	M	Sm	OR
18	16,2	M15x1	0,25	14	13	11	12	21,5	4	11,5	0,5	205

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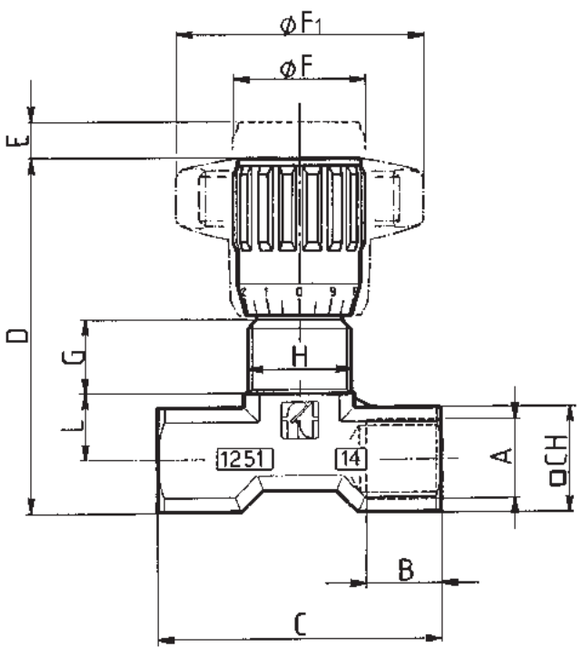
MATERIALS

Body	OT 58 - UNI 5705 - Nickel-plated
Needle	X 10 Cr Ni S 1809 - UNI 6900
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706
Knob (MP)	ABS

EXAMPLE FOR ORDERING

Accessories by request

	Code	Type	Panel ring nut	Viton seal	Knob ABS
Brass	FT 1251/2-01	38	G	V	MP
Stainless steel	FT 2251/2-01	14	G	V	MP



DIMENSIONS

Type	A UNI 338	B	C	D	E	ØF	ØF1	G	H	L	□CH	Weight kg
18	1/8"G	8	40	55	4	22	40	12	M15x1	9,5	15	0,105
14	1/4"G	12	46	57	4,5	22	40	11,5	M17x1	11,5	18	0,122
38	3/8"G	13	55	69	7	27	50	12,5	M20x1	15	22	0,233
12	1/2"G	16	70	82	10	33	70	13	M25x1,5	19	27	0,455
34	3/4"G	20	91	100	12	38	80	15	M30x1,5	22	34	0,860

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DOUBLE-ACTING CONTROL VALVES FEMALE-FEMALE IN LINE



They allow the regulation of flow in both directions.
Notable from an aesthetical point of view they are built with materials which are suitable also for applications with fluids different from oil (such as: water, gas and liquids in general).
As an alternative to FT 257/2 (suitable up to 400 bar) where the working pressure does not exceed 210 bar and where ferrous materials cannot be used.
They have the same characteristics as the FT 257 series:

- accurate flow regulation;
- efficient metallic sealing;
- simple setting of flow rates;
- secure against accidental needle withdrawal;
- secure needle position with locking screw inserted in the knob;
- provision for panel mounting, for which special lock nut (G) is supplied on request.

For use with pressure up to 210 bar.

On request

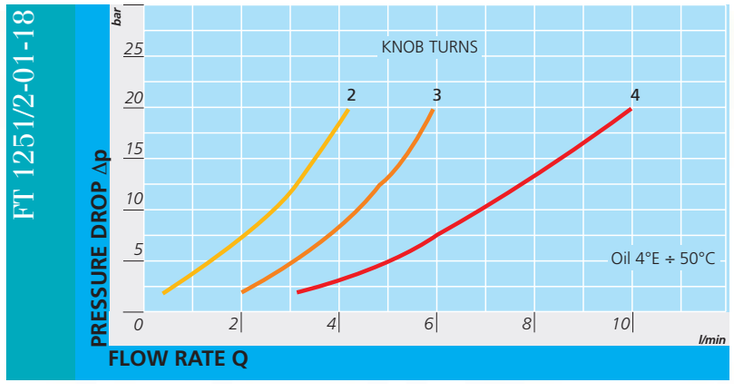
- Versions AISI 316 Code FT 2251/2-01
- Viton (V) seals
- NPT threads
- ABS (mp)Knob
- Complete with lock nut (G)

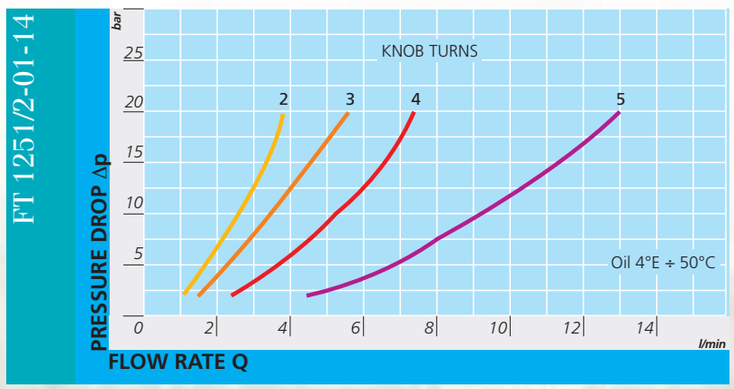
FT 1251/2-01

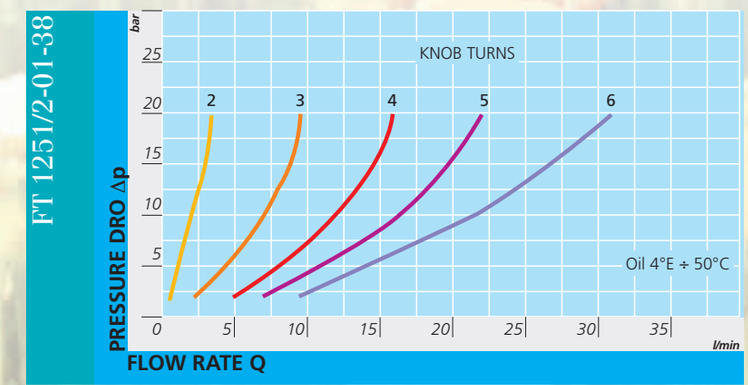
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TECHNICAL DATA

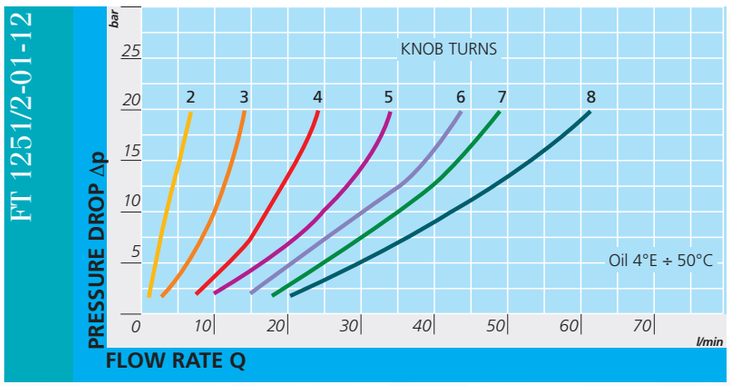
Type	Flow sq mm²	Max working pressure bar	Working temperature °C	Filtration grade µm
1 8	7,07	210	-20°/+100°	25
1 4	12,57	210	-20°/+100°	25
3 8	19,64	210	-20°/+100°	25
1 2	50,27	210	-20°/+100°	25
3 4	78,54	210	-20°/+100°	25

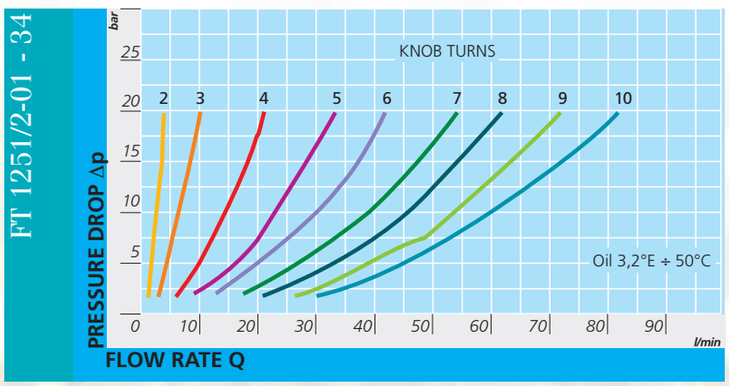

FT 1251/2-01-18
PRESSURE DROP Δp
bar
25
20
15
10
5
0
KNOB TURNS
2
3
4
Oil 4°E ÷ 50°C
2
4
6
8
10
l/min
FLOW RATE Q


FT 1251/2-01-14
PRESSURE DROP Δp
bar
25
20
15
10
5
0
KNOB TURNS
2
3
4
5
Oil 4°E ÷ 50°C
2
4
6
8
10
12
14
l/min
FLOW RATE Q


FT 1251/2-01-38
PRESSURE DRO Δp
bar
25
20
15
10
5
0
KNOB TURNS
2
3
4
5
6
Oil 4°E ÷ 50°C
5
10
15
20
25
30
35
l/min
FLOW RATE Q

FLOW RATE CURVES





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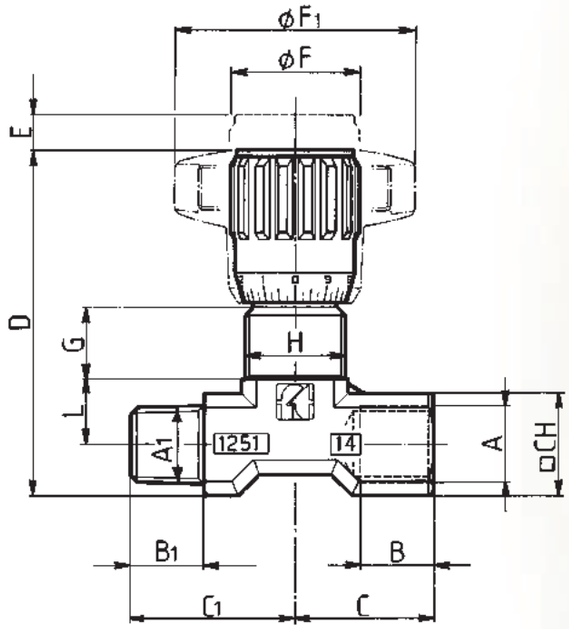


MATERIALS

BODY	OT 58 - UNI 5705 - NICKEL PLATED
NEEDLE	X 10 CR NI S 1809 - UNI 6900
O R	NITRILE
ANTIEXTRUSION RING	PTFE
KNOB	GD AL SI 12 - UNI 5706
KNOB (MP)	ABS

EXAMPLE FOR ORDERING

			Accessories on request		
	Code	Type	Panel ring nut	Viton seal	Knob ABS
BRASS	FT 1251/2-02	12	G	V	MP
STAINLESS STEEL	FT 2251/2-02	14	G	V	MP



DIMENSIONS

TYPE	A UNI338	A1 UNI339	B	B1	C	C1	D	E	ØF	ØF1	G	H	L	□CH	WEIGTH KG
18	1/8"G	1/8"Gc	8	9	20	24	55	4	22	40	12	M15x1	9,5	15	0,105
14	1/4"G	1/4"Gc	12	12	23	27	57	4,5	22	40	11,5	M17x1	11,5	18	0,130
38	3/8"G	3/8"Gc	13	13	27,5	32,5	69	7	27	50	12,5	M20x1	15	22	0,246
12	1/2"G	1/2"Gc	16	16	35	39,5	82	10	33	70	13	M25x1,5	19	27	0,448
34	3/4"G	3/4"Gc	20	20	45,5	49,5	100	12	38	80	15	M30x1,5	22	34	0,845

DOUBLE-ACTING CONTROL VALVES MALE-FEMALE IN LINE



They allow the regulation of flow in both directions.
Notable from an aesthetical point of view they are built with materials, which are suitable also for applications with fluids different from oil (such as: water, gas and liquids in general).
As an alternative to FT 257/2 (suitable up to 400 bar) where the working pressure does not exceed 210 bar and where ferrous materials cannot be used.
They have the same characteristics as the FT 257 series:

- accurate flow regulation;
- efficient metallic sealing;
- simple setting of flow rates;
- secure against accidental needle withdrawal;
- secure needle position with locking screw inserted in the knob;
- provision for panel mounting, for which special lock nut (G) is supplied on request.

For use with pressure up to 210 bar.

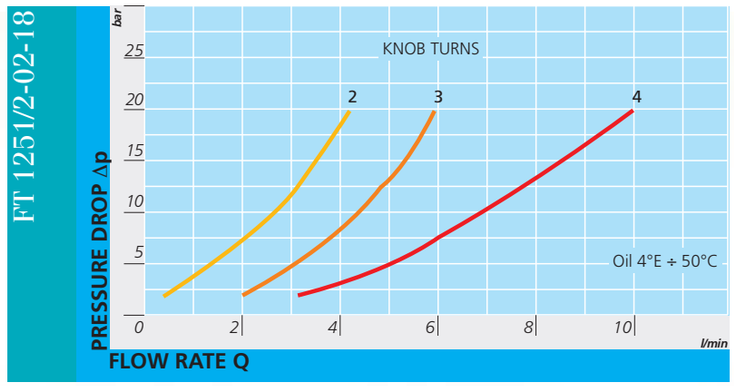
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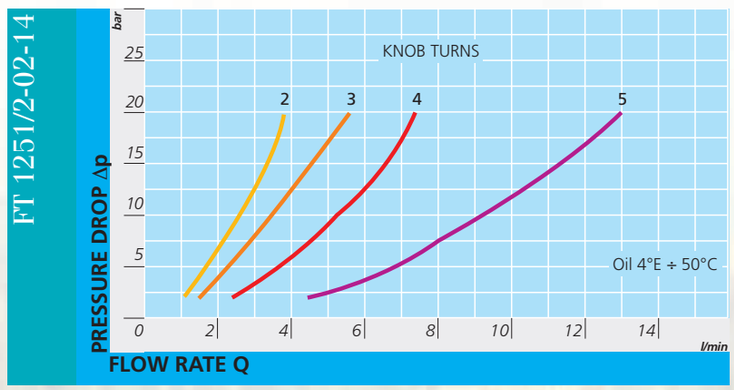
- Versions AISI 316 Code FT 2251/2-01
- Viton (V) seals
- NPT threads
- ABS (mp)Knob
- Complete with lock nut (G)

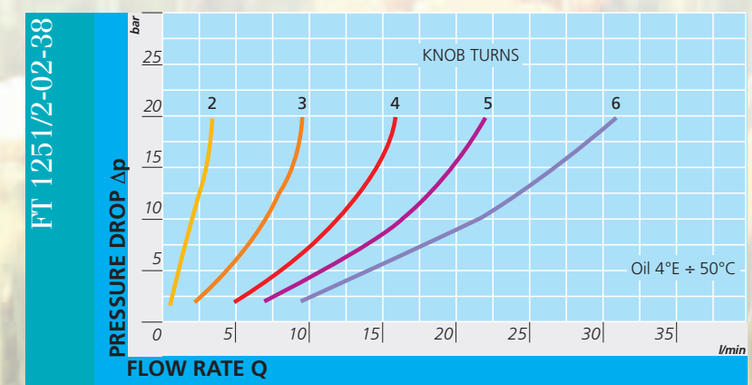
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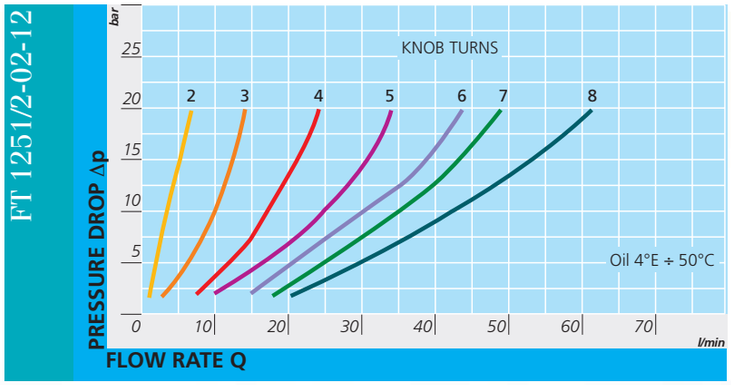
Type	Flow sq mm²	Max working pressure bar	Working temperature °C	Filtration grade µm
18	7,07	210	-20°/+100°	25
14	12,57	210	-20°/+100°	25
38	19,64	210	-20°/+100°	25
12	50,27	210	-20°/+100°	25
34	78,54	210	-20°/+100°	25

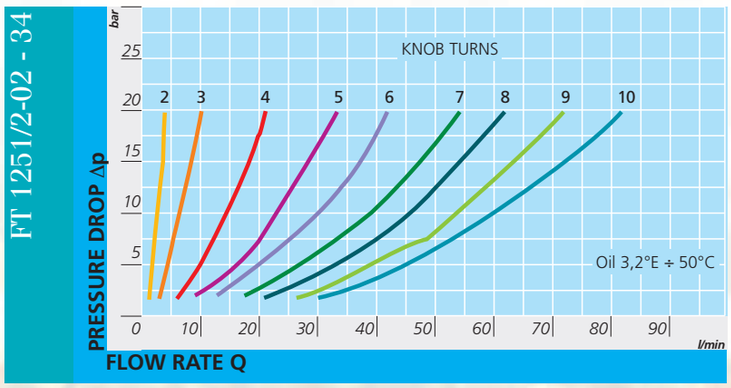






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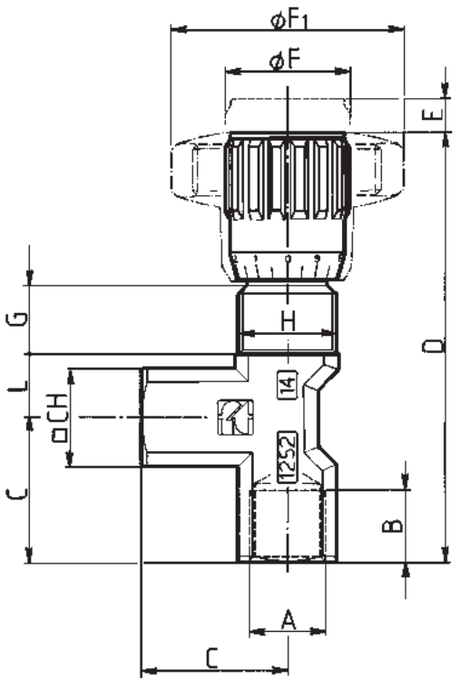


MATERIALS

BODY	OT 58 - UNI 5705 - NICKEL PLATED
NEEDLE	X 10 CR NI S 1809 - UNI 6900
OR	NITRILE
ANTIEXTRUSION RING	PTFE
KNOB	GD AL SI 12 - UNI 5706
KNOB (MP)	ABS

ESEMPIO PER L'ORDINAZIONE

	ACCESSORIES ON REQUEST				
	CODE	TYPE	PANEL RING NUT	VITON SEAL	KNOB ABS
BRASS	FT 1252/2-01	38	G	V	MP



DIMENSIONS

TYPE	A UNI 338	B	C	D	E	ØF	ØF1	G	H	L	□CH	WEIGHT KG
18	1/8"G	8	21	69	4	22	40	12	M15x1	9,5	15	0,105
14	1/4"G	12	25	74	4,5	22	40	11	M17x1	11,5	18	0,136
38	3/8"G	13	29,5	88	7	27	50	12,5	M20x1	15	22	0,248
12	1/2"G	16	36	105	10	33	70	13	M25x1,5	19	27	0,454

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DOUBLE-ACTING CONTROL VALVES 90° ANGLE FEMALE-FEMALE

They allow the regulation of flow in both directions.
Notable from an aesthetical point of view they are built with materials, which are suitable also for applications with fluids different from oil (such as: water, gas and liquids in general).
As an alternative to FT 257/2 (suitable up to 400 bar) where the working pressure does not exceed 210 bar and where ferrous materials cannot be used.
They have the same characteristics as the FT 257 series:

- accurate flow regulation;
- efficient metallic sealing;
- simple setting of flow rates;
- secure against accidental needle withdrawal;
- secure needle position with locking screw inserted in the knob;
- provision for panel mounting, for which special lock nut (G) is supplied on request.

For use with pressure up to 210 bar

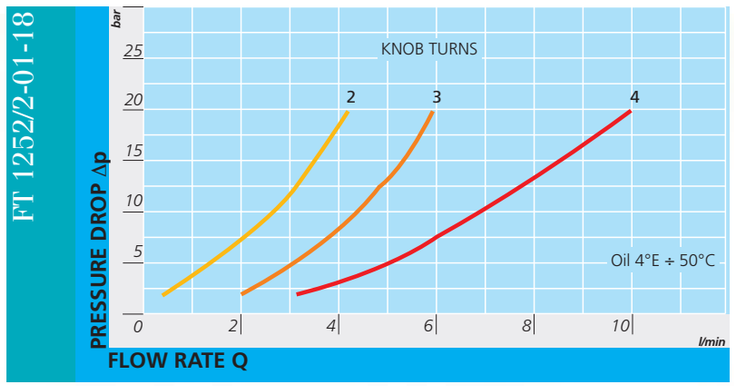
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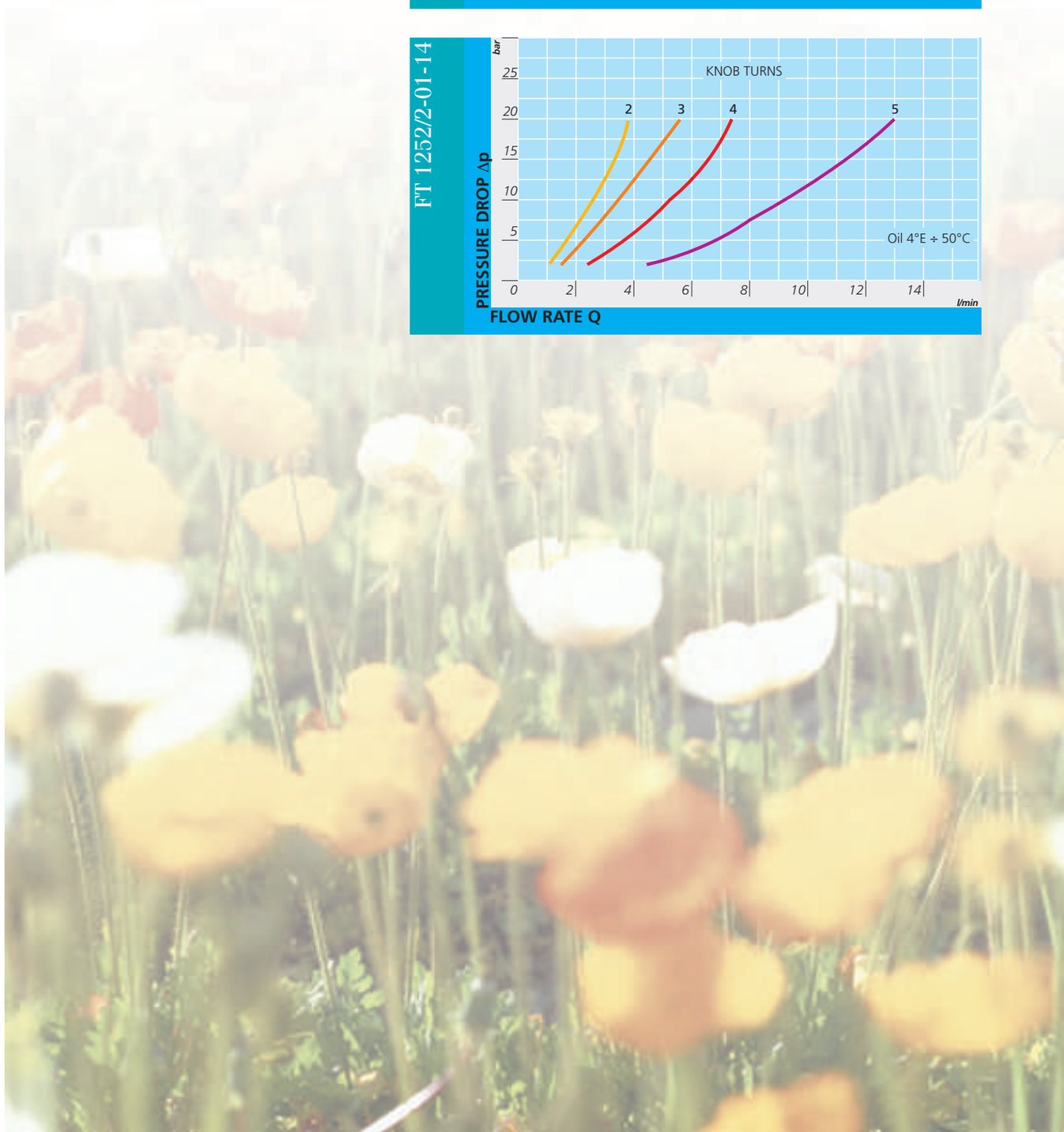
- Viton (V) seals
- NPT threads
- ABS (mp)Knob
- Complete with lock nut (G)

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TECHNICAL DATA

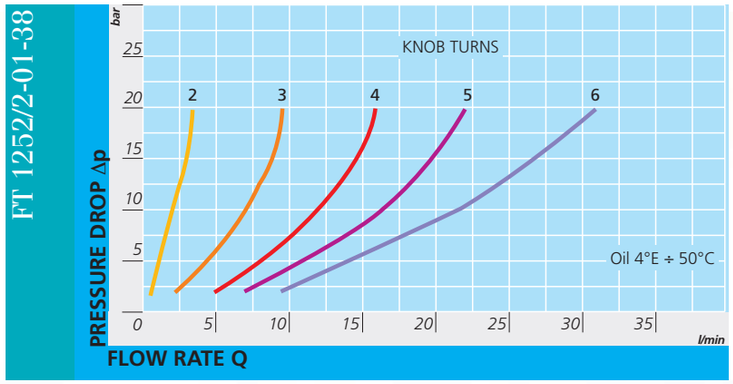
Type	Flow sq mm²	Max working pressure bar	Working temperature °C	Filtration grade µm
18	7,07	210	-20°/+100°	25
14	12,57	210	-20°/+100°	25
38	19,64	210	-20°/+100°	25
12	50,27	210	-20°/+100°	25

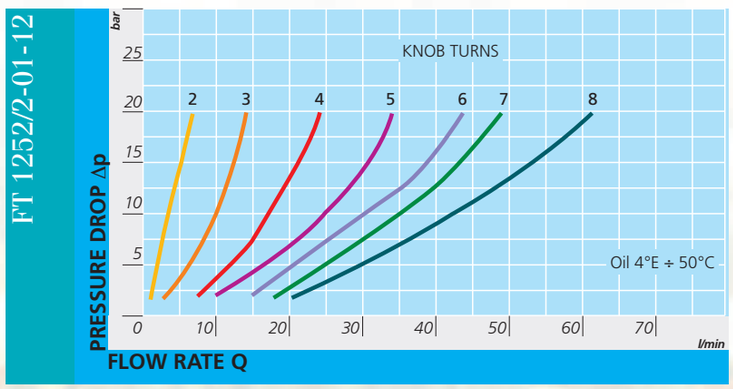




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FLOW RATE CURVES





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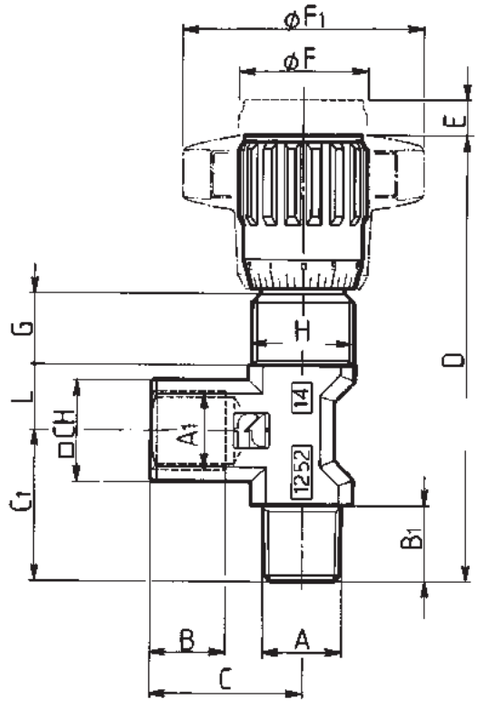


MATERIALS

Body	OT 58 - UNI 5705 Nickel plated
Needle	X 10 Cr Ni S 1809 - UNI 6900
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706
Knob (mp)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Panel ring nut	Viton seal	Knob ABS
			Accessories on request		
Brass	FT 1252/2-02	12	G	V	mp



DIMENSIONS

Type	A UNI 339	A1 UNI 338	B1	B	C	C1	D	E	øF	F1	G	H	L	□CH	Weight kg
18	1/8"Gc	1/8"G	9	8	21	21	70	4	22	40	12	M15x1	9,5	15	0,102
14	1/4"Gc	1/4"G	12	12	25	25	74	4,5	22	40	11	M17x1	11,5	18	0,132
38	3/8"Gc	3/8"G	13	13	29,5	29,5	88	7	27	50	12,5	M20x1	15	22	0,245
12	1/2"Gc	1/2"G	16	16	36	36	105	10	33	70	13	M25x1,5	19	27	0,440

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DOUBLE-ACTING CONTROL VALVES 90° ANGLE MALE-FEMALE



They allow the regulation of flow in both directions.
Notable from an aesthetical point of view they are built with materials, which are suitable also for applications with fluids different from oil (such as: water, gas and liquids in general).
As an alternative to FT 257/2 (suitable up to 400 bar) where the working pressure does not exceed 210 bar and where ferrous materials cannot be used.
They have the same characteristics as the FT 257 series:

- accurate flow regulation;
- efficient metallic sealing;
- simple setting of flow rates;
- secure against accidental needle withdrawal;
- secure needle position with locking screw inserted in the knob;
- provision for panel mounting, for which special lock nut (G) is supplied on request.

For use with pressure up to 210 bar

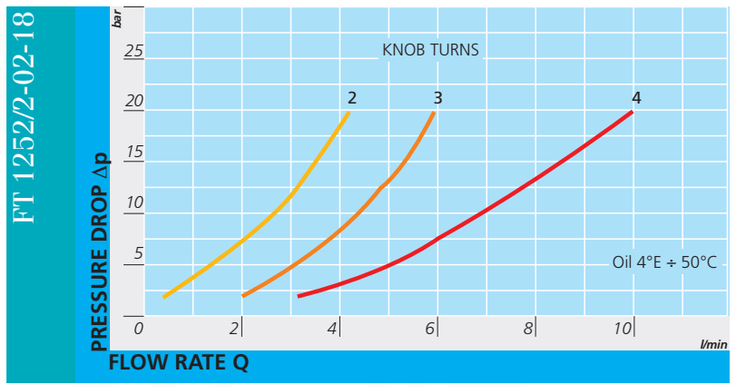
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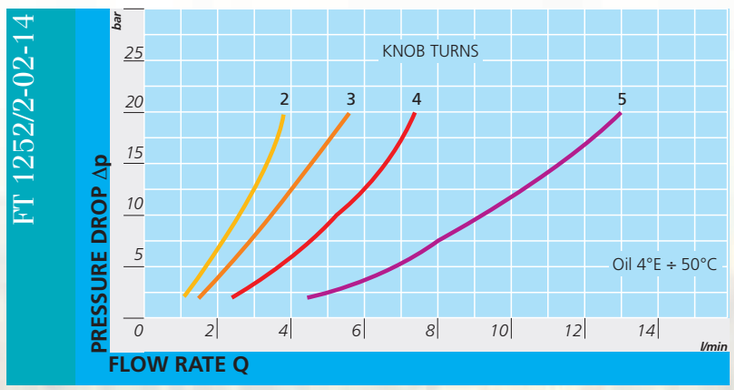
- Viton (V) seals
- NPT threads
- ABS (mp)Knob
- Complete with lock nut (G)

FT 252/2-02

TECHNICAL DATA

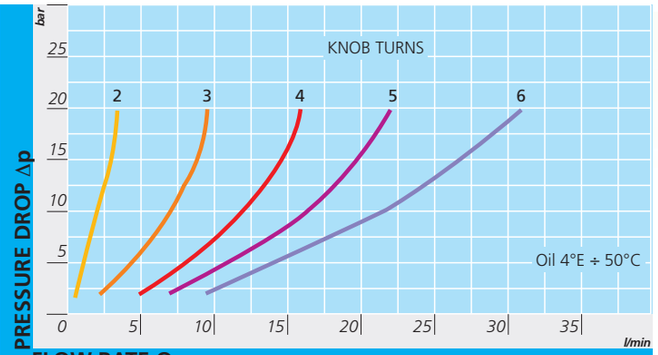
Type	Flow sq mm²	Max working pressure bar	Working temperature °C	Filtration grade µm
18	7,07	210	-20°/+100°	25
14	12,57	210	-20°/+100°	25
38	19,64	210	-20°/+100°	25
12	50,27	210	-20°/+100°	25



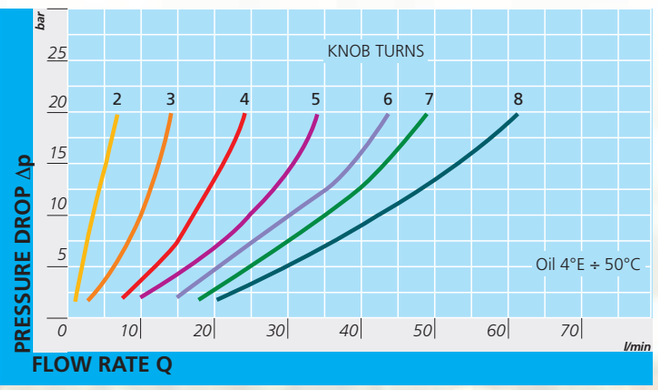


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FT 1252/2-02-38



FT 1252/2-02-12



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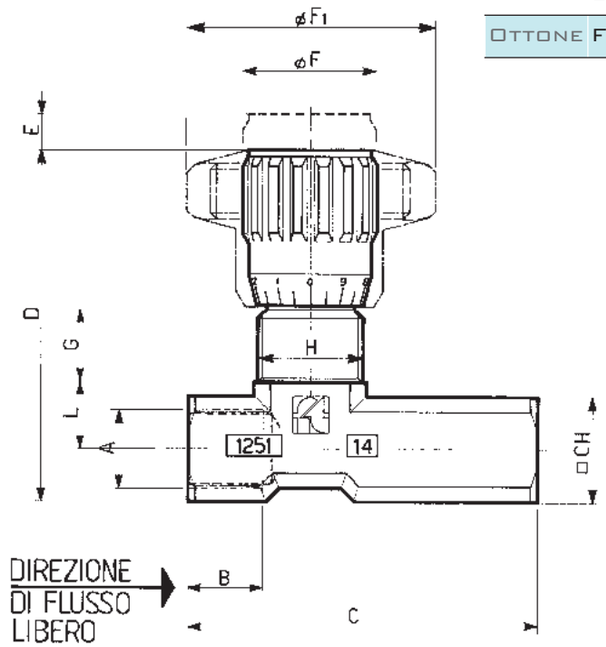


MATERIALS

Body	OT 58 - UNI 5705 Nickel plated
Needle	X 10 Cr Ni S 1809 - UNI 6900
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706
Spring	ABS
Ball	AISI 302
Ball guide	UNI 100 C 6
Guida sfera	Nylon 66 + Carbon fiber

EXAMPLE FOR ORDERING

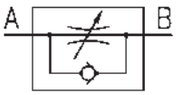
			Accessories on request		
	Code	Type	Panel ring nut	Viton seal	Knob ABS
Ottone	FT 1251/5-01	38	G	V	MP



DIMENSIONS

Type	A UNI 338	B	C	D	E	ØF	ØF1	G	H	L	□CH	Weight kg
14	1/4"G	12	56	57	4,5	22	40	11	M17x1	11,5	18	0,138
38	3/8"G	13	64,5	69	7	27	50	12,5	M20x1	15	22	0,259
12	1/2"G	16	87	82	10	33	70	13	M25x1,5	19	27	0,499
34	3/4"G	20	115	100	12	38	80	15	M30x1,5	22	34	0,975

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SINGLE-ACTING CONTROL VALVES FEMALE-FEMALE IN LINE

They allow regulation of flow in one direction and full free flow in opposite direction
thanks to the single-acting unit of ball type with guide cage they are equipped with.
As an alternative to FT 257/5 (suitable up to 400 bar) where the working pressure does not exceed 210 bar and where ferrous materials cannot be used.
They have the same characteristics as the FT 257 series:

- accurate flow regulation;
- efficient metallic sealing;
- simple setting of flow rates;
- secure against accidental needle withdrawal;
- secure needle position with locking screw inserted in the knob;
- provision for panel mounting, for which special lock nut (G) is supplied on request.

For use with pressure up to 210 bar



On request

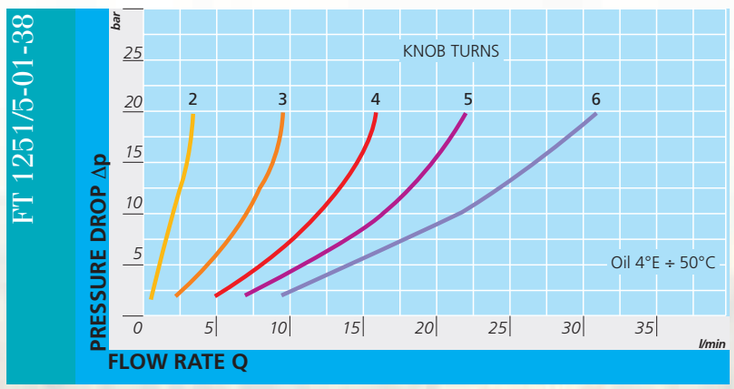
- Viton (V) seals
- NPT threads
- ABS (mp)Knob
- Complete with lock nut (G)

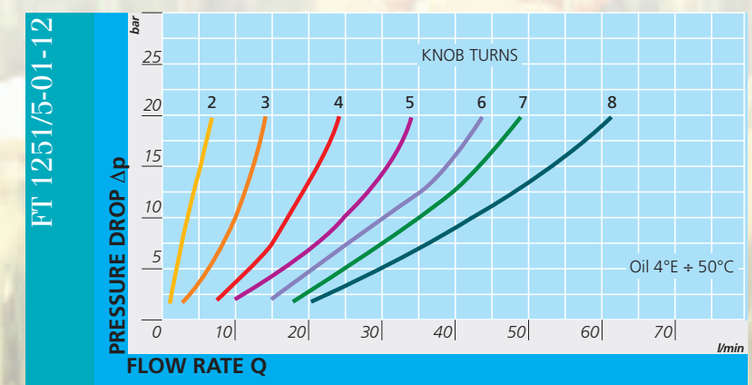
FT 1251/5-01

TECHNICAL DATA

Type	Flow sq mm²	Max working pressure bar	Working temperature °C	Filtration grade µm
14	12,57	210	-20°/+100°	25
38	19,64	210	-20°/+100°	25
12	50,27	210	-20°/+100°	25
34	78,54	210	-20°/+100°	25

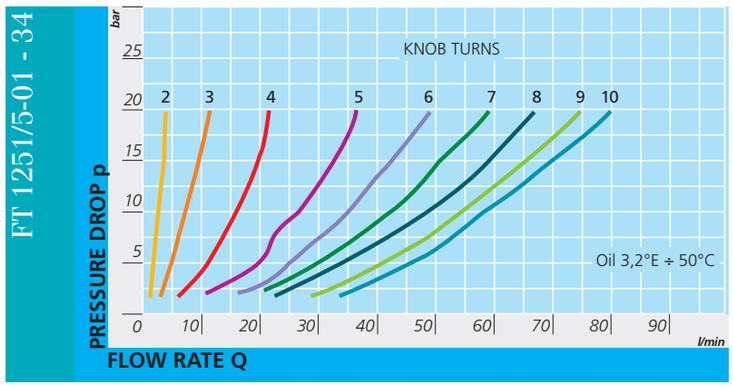


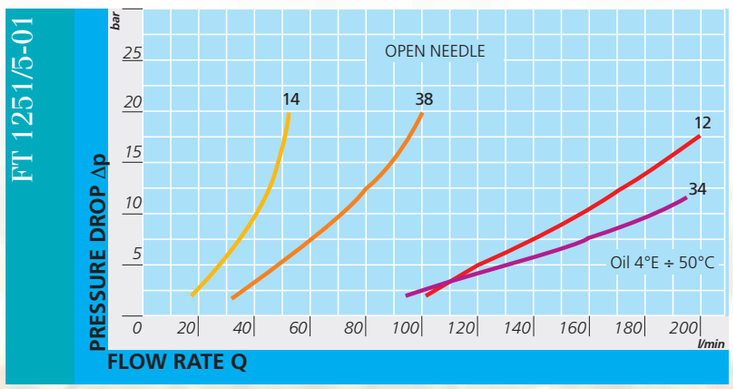




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FLOW RATE CURVES





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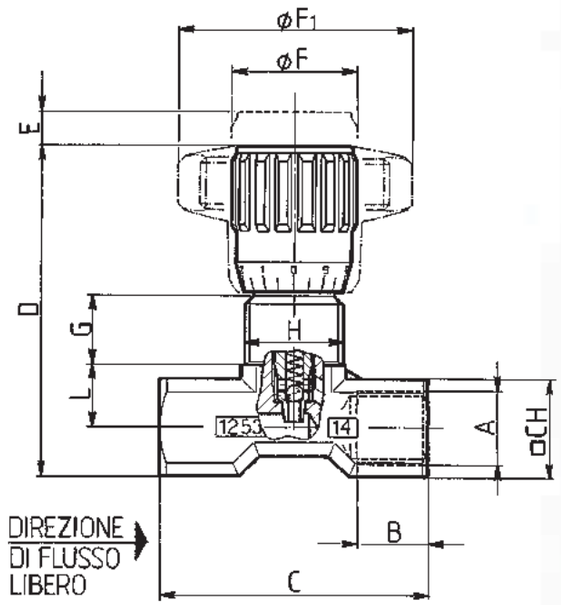


MATERIALS

Body	OT 58 - UNI 5705 - Nickel plated
Needle	X 10 Cr Ni S 1809 - UNI 6900
O R	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706
Knob (mp)	ABS

EXAMPLE FOR ORDERING

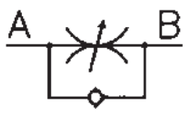
	Code	Type	Panel ring nut	Viton seal	Knob ABS
	Accessories on request				
Brass	FT 1253/5-02	12	G	V	mp
Stainless steel	FT 2253/5-02	18	G	V	mp



DIMENSIONS

Type	A UNI 338	B	C	D	E	ØF	ØF1	G	H	L	□CH	Weight kg
18	1/8"G	8	40	55	4	22	40	12	M15x1	9,5	15	0,105
14	1/4"G	12	46	57	4,5	22	40	11,5	M17x1	11,5	18	0,135
38	3/8"G	13	55	69	7	27	50	12,5	M20x1	15	22	0,250
12	1/2"G	16	70	82	10	33	70	13	M25x1,5	19	27	0,460
34	3/4"G	20	91	100	12	38	80	15	M30x1,5	22	34	0,860

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SINGLE-ACTING NEEDLE CONTROL VALVE IN LINE

Derived from the pressing of series **FT 1251/2** they allow regulation of flow in one direction and full free flow in opposite direction thanks to the needle unit with incorporated ball they are equipped with.
As an alternative to FT 257/5 (suitable up to 400 bar) where the working pressure does not exceed 210 bar and where ferrous materials cannot be used.
They have the same characteristics as the FT 257 series:

- accurate flow regulation;
- efficient metallic sealing;
- simple setting of flow rates;
- secure against accidental needle withdrawal;
- secure needle position;
- provision for panel mounting, for which special lock nut (G) is supplied on request.

For use with pressure up to 210 bar



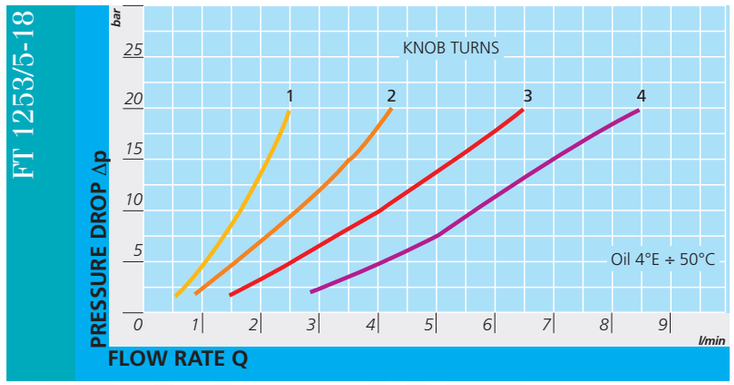
On request

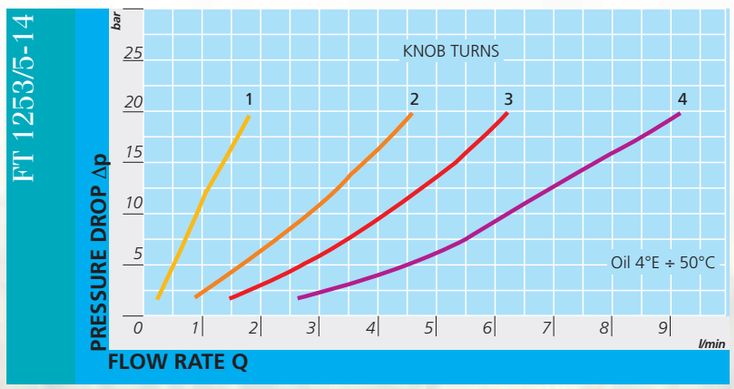
- Versions AISI 316 Code FT 2253/5
- Viton (V) seals
- NPT threads
- ABS (mp)Knob
- Complete with lock nut (G)

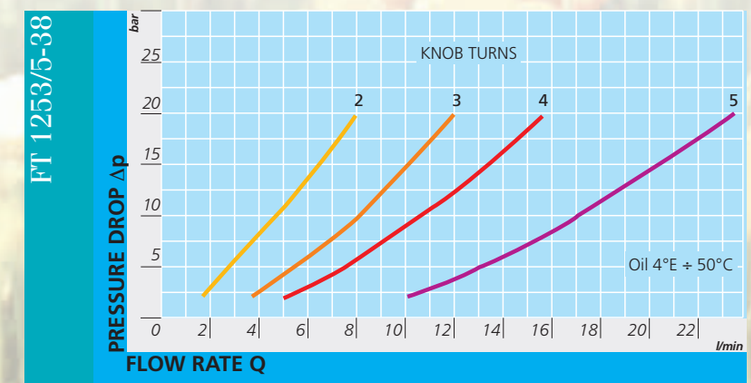
FT 1253/5

TECHNICAL DATA

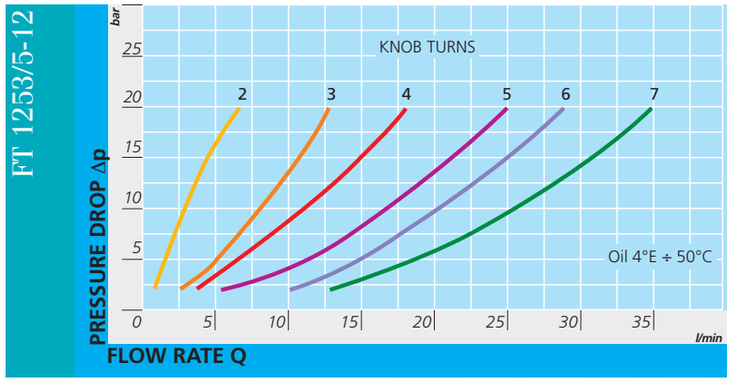
Type	Flow sq mm²	Max working pressure bar	Working temperature °C	Filtration grade µm
18	7,07	210	-20°/+100°	25
14	12,57	210	-20°/+100°	25
38	19,64	210	-20°/+100°	25
12	50,27	210	-20°/+100°	25
34	78,54	210	-20°/+100°	25

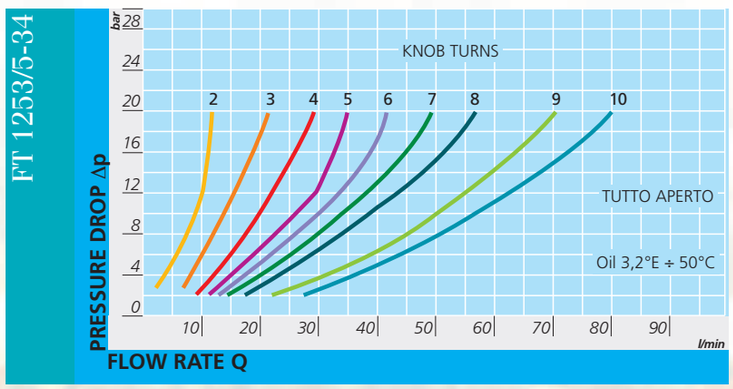


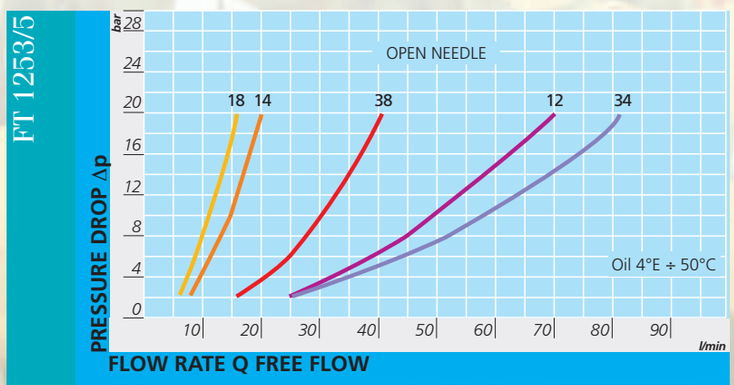




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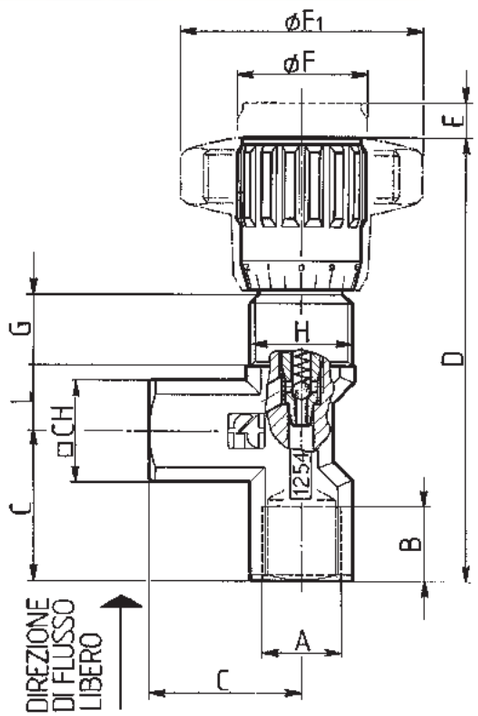


MATERIALS

Body	OT 58 - UNI 5705 - Nickel plated
Needle	X 10 Cr Ni S 1809 - UNI 6900
OR	Nitrile
Antiextrusion ring	PTFE
Knob	GD Al Si 12 - UNI 5706
Knob (MP)	ABS

EXAMPLE FOR ORDERING

	Code	Type	Panel ring nut	Viton seal	Knob ABS
		Accessories on request			
Brass	FT 1254/5-02	38	G	V	MP



DIMENSIONS

Type	A UNI 338	B	C	D	E	ØF	ØF1	G	H	L	□CH	Weight kg
18	1/8"G	8	21	69	4	22	40	12	M15x1	9,5	15	0,105
14	1/4"G	12	25	74	4,5	22	40	11	M17x1	11,5	18	0,137
38	3/8"G	13	29,5	88	7	27	50	12,5	M20x1	15	22	0,251
12	1/2"G	16	36	105	10	33	70	13	M25x1,5	19	27	0,450

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SINGLE-ACTING NEEDLE CONTROL VALVE 90° ANGLE

Derived from the pressing of series FT 1252/2 they allow regulation of flow in one direction and full free flow in opposite direction thanks to the needle unit with incorporated ball they are equipped with.
As an alternative to FT 257/5 (suitable up to 400 bar) where the working pressure does not exceed 210 bar and where ferrous materials cannot be used.
They have the same characteristics as the FT 257 series:

- accurate flow regulation;
- efficient metallic sealing;
- simple setting of flow rates;
- secure against accidental needle withdrawal;
- secure needle position;
- provision for panel mounting, for which special lock nut (G) is supplied on request.

For use with pressure up to 210 bar

On request

- Viton (V) seals
- NPT threads
- ABS (mp)Knob
- Complete with lock nut (G)

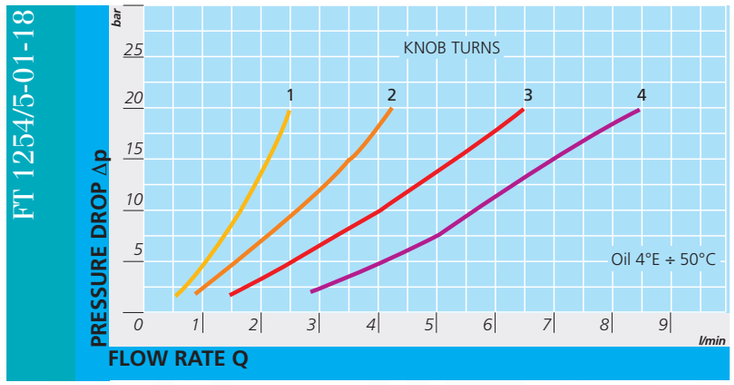


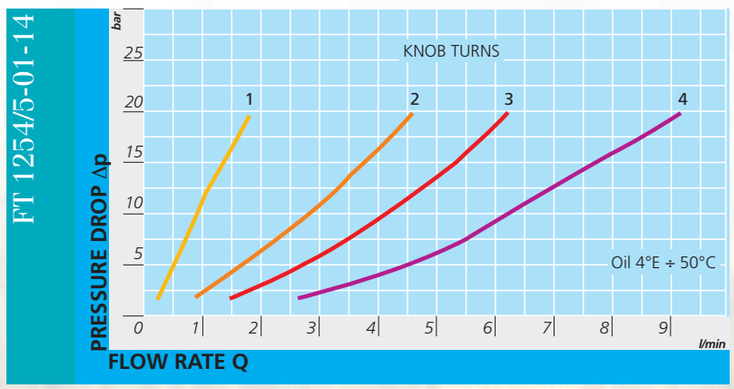
FT 1254/5-01

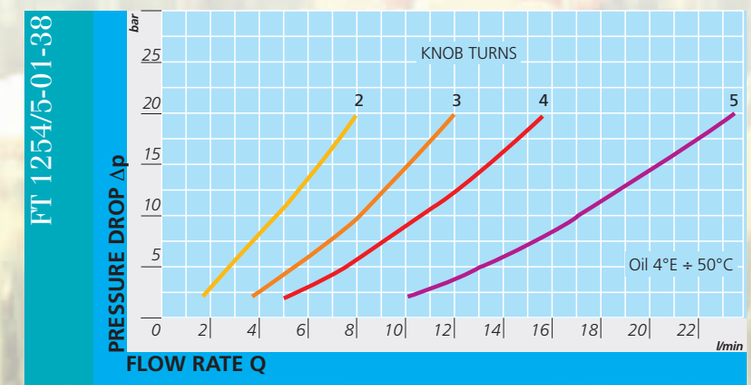
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TECHNICAL DATA

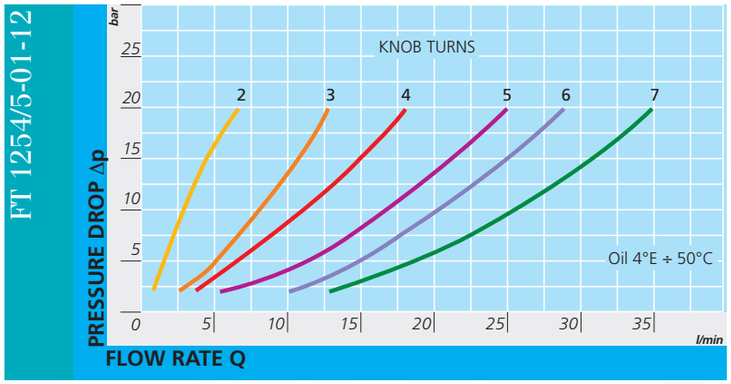
Type	Flow sq mm²	Max working pressure bar	Working temperature °C	Filtration grade µm
18	7,07	210	-20°/+100°	25
14	12,57	210	-20°/+100°	25
38	19,64	210	-20°/+100°	25
12	50,27	210	-20°/+100°	25

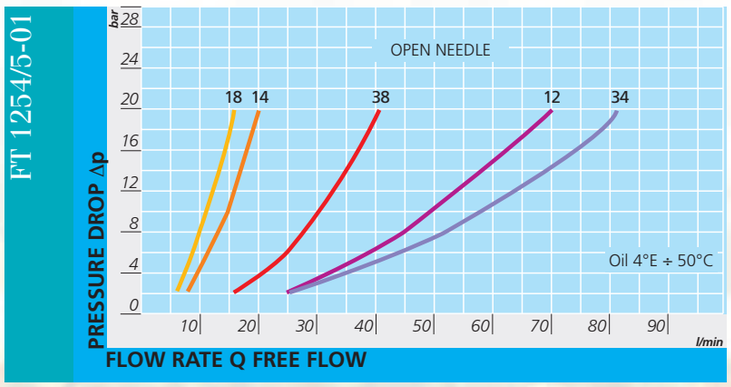




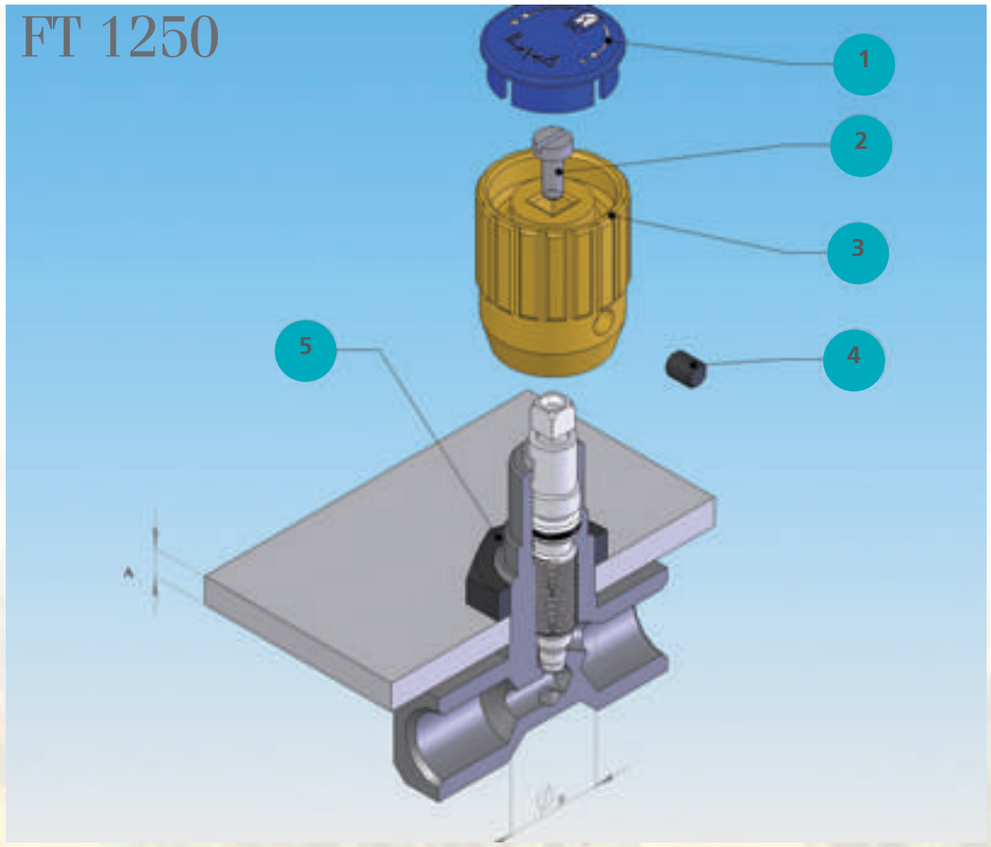


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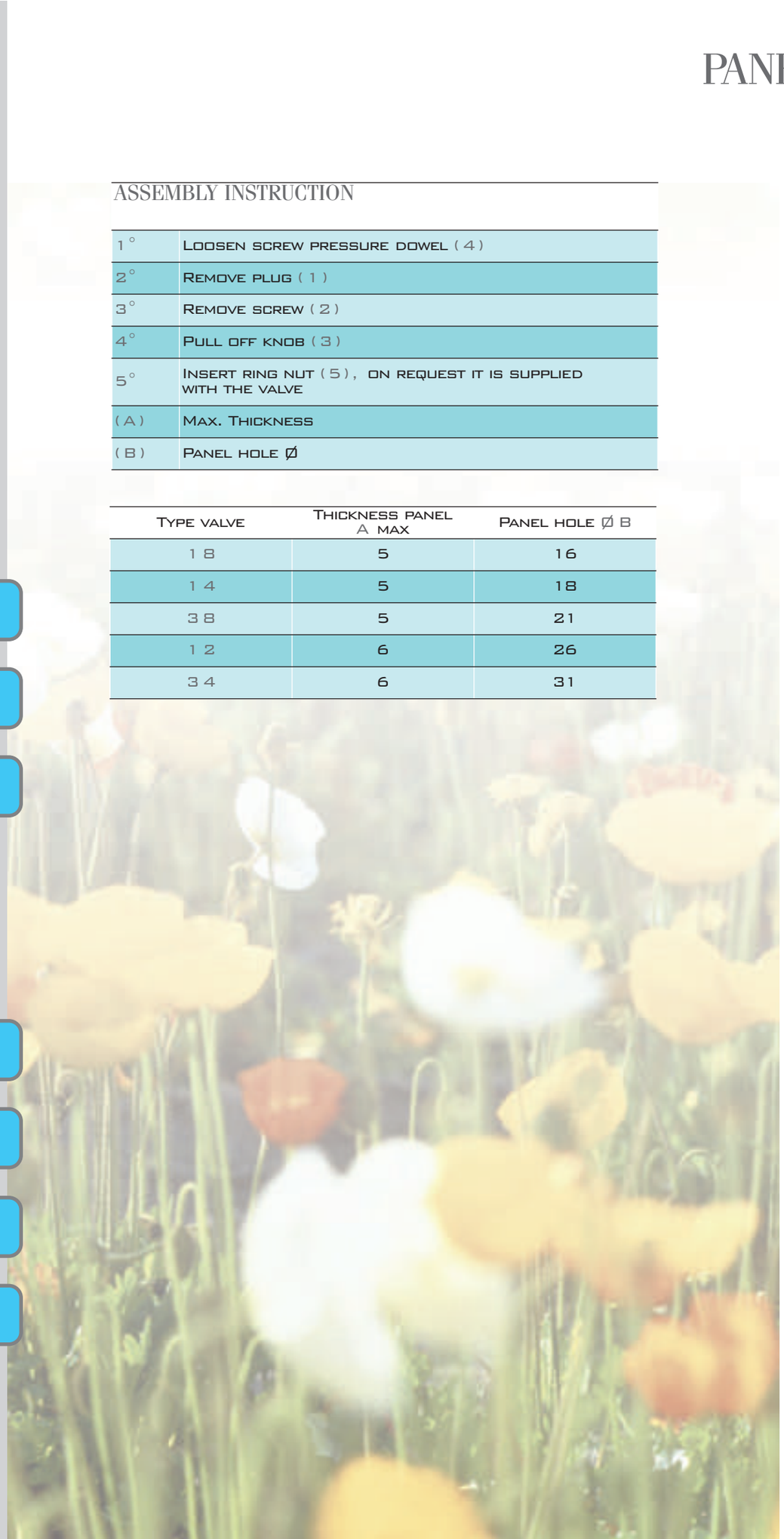


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ASSEMBLY INSTRUCTION

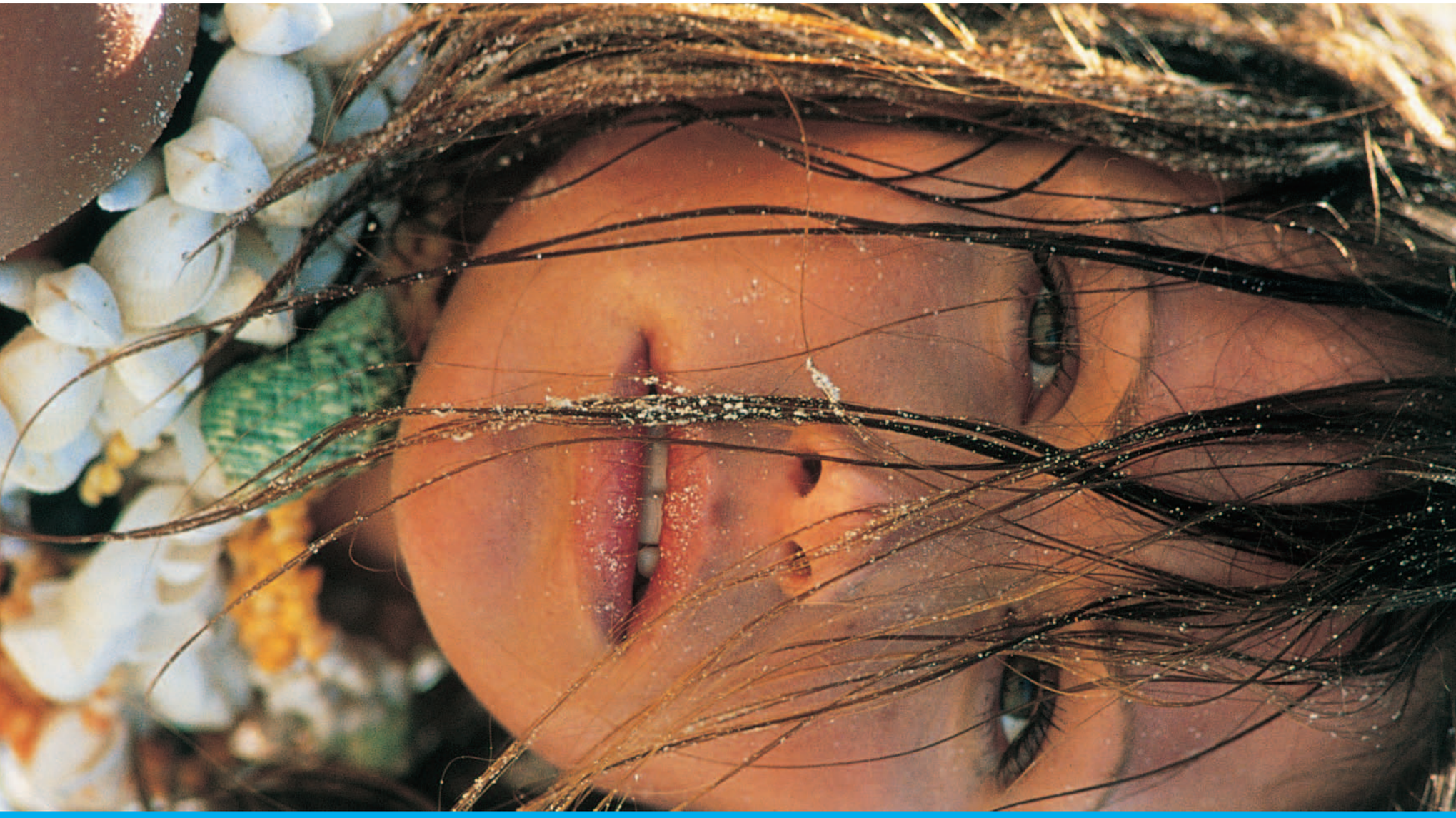
1°	LOOSEN SCREW PRESSURE DOWEL (4)
2°	REMOVE PLUG (1)
3°	REMOVE SCREW (2)
4°	PULL OFF KNOB (3)
5°	INSERT RING NUT (5), ON REQUEST IT IS SUPPLIED WITH THE VALVE
(A)	MAX. THICKNESS
(B)	PANEL HOLE Ø

TYPE VALVE	THICKNESS PANEL A MAX	PANEL HOLE Ø B
1 8	5	16
1 4	5	18
3 8	5	21
1 2	6	26
3 4	6	31



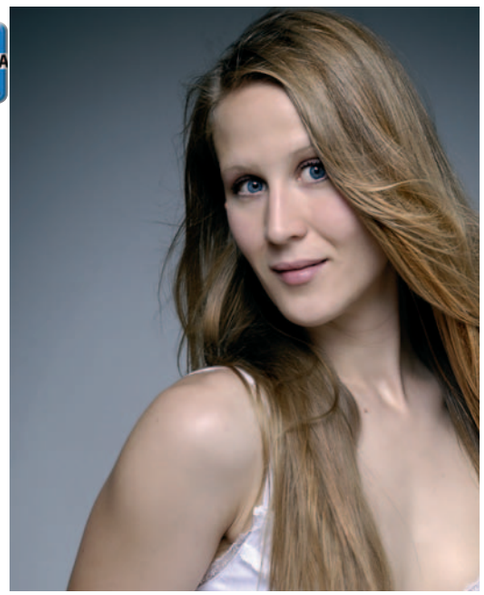
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VALVES SOLENOID

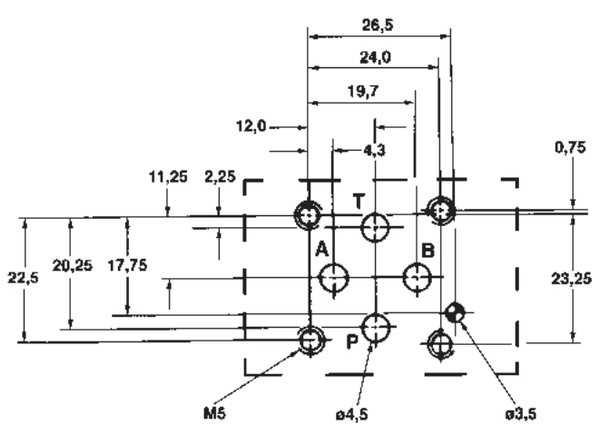


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New generation of solenoid valves devise
with the purpose to meet all the
technical problems about machines tool,
moving and agricultural machines.
The estimated manufacture is with 5
chambers with the tight spool in different points,
so it is possible to: stand better
the hydraulic thrusts, be more steady,
be less exposed to mechanic wear
and tear on the regulating edge, in this way
the hydraulic working turn out much more reliable.
Besides the inside passages arrange
the addressing of the fluid so that
the negative effect of the hydrodynamic force
is reduced at minimum.
The last generation of solenoid has
two main characteristic:
the magnetic part has a big diameter
so that it hasn't a too much high magnetic
flux density;
the supplied solenoids are interchangeable
in the different versions:
12/24/110/115/230 Volt.







ISO 4401-02



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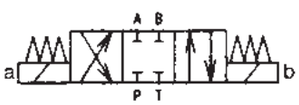
1 HOW TO READ THE MODEL CODE FOR VALVES FT2 - ES - *

FT2 - ES - (1) (C) - * - (024C) / 11

1	2	3	4	5	6	7

1	FT2	4-way directional control valve Cetop 02 - Pressure 32 Mpa (320 bar)
2	ES	electrically controlled, standard
3	(1)	spool type (see 7)
4	(C)	solenoid(s) and spring(s) arrangement, see also functional symbols 2 C 2 sol., spool is spring centered (3 positions) N 2 sol., spool is detented (2 positions) LL 1 sol. (a), spool is spring offset (2 positions, end to end) ML 1 sol. (a), spool is spring offset (2 positions, middle to end) LM 1 sol. (a), spool is spring offset (2 positions, end to middle)
5	*	Code reserved for option and variants b only for version LL, ML, LM sol. b installed (instead of sol. a) K protruding emergency pins, protected by rubber caps (see 13) S* calibrated orifice on P port (see 14)
6	(024C)	Electric voltage and standard solenoid coils 0000 no coil(s) 012C coil(s) for V12DC 024C coil(s) for V24DC 110RAC coil(s) for V110/50 - V115/60 AC 220RAC coil(s) for V220/50 - V230/60 AC AMP solenoid coils with electric terminals according to AMP-Timer (see 15)
7	Design number (progressive) of the valves	

2 FUNCTIONAL SYMBOLS

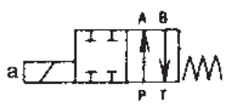
1C 

1ML 

1N 

1MLb 

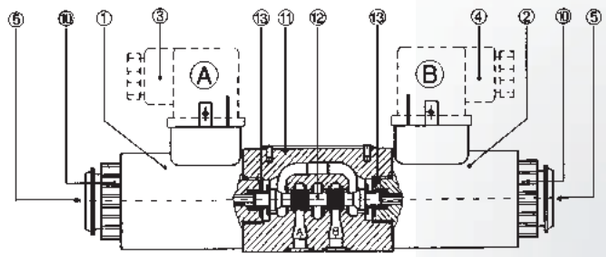
1LL 

1LM 

1LLb 

1LMb 

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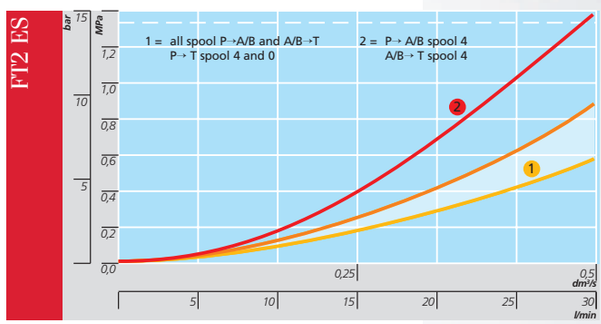


3 DESCRIPTION

DIRECTIONAL CONTROL VALVES SOLENOID OPERATED - CETOP 02 TYPE FT2 - ES - *

The spool ⑫ shifts in to valves body ⑪ subject to the action of springs ⑬ and solenoids ① and ②.
Spool ⑫, depending from its shape and its position in the valves body ⑪, opens and/or closes passages between P, A, B, T ports, thus controlling the direction of the hydraulic flow.
Solenoids ① and ② are energized by electric current flowing-in through connectors ③ and ④; in case of electrical cut-offs, the spool can be manually shifted by acting on the emergency pins ⑤, located at the end of the solenoids and accessible through the retaining nuts ⑩.

4 TYPICAL DIAGRAMS

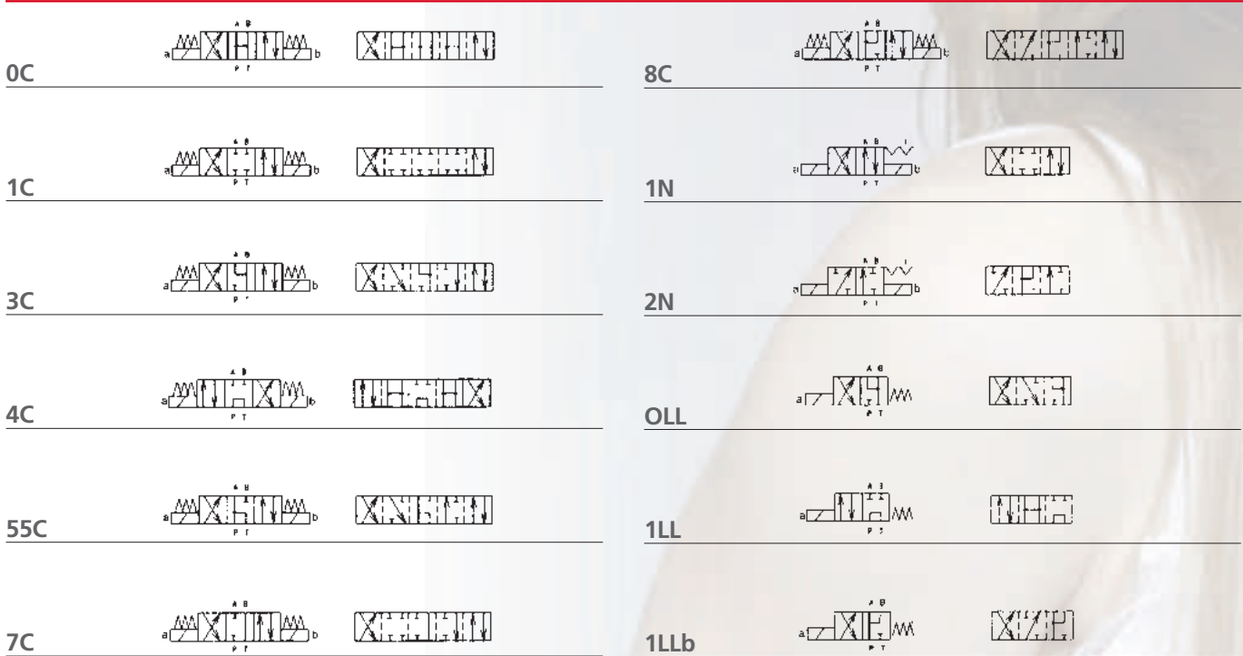


Typical Δp-Q curves for valves FT2 - ES - *, in standard configuration, with mineral oil at v = 36 mm²/s and t = 50° C.

5 TECHNICAL DATA

maximum nominal flow	0,5 dm³/s (30 l/min)
maximum rec. flow rate	see 9
maximum nominal pressure (P, A, B)	32 MPa (320 bar)
maximum pressure at T port	16 MPa (160 bar)
pressure drops	see 4
electric characteristics	see 6
protection to DIN 40050	IP 65
duty cycle	100%
service life	≥ 107 cycles
dimensions	see 10
installation	see 11
mass	approx 1,0/1,4 kg

7 SPOOL IDENTIFICATION AND INTERMEDIATE POSITION TRANSISTORIES



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6 ELECTRIC CHARACTERISTICS

Valves type FT2 - ES - * are operated by solenoid that are energized:

- Directly from a D.C. voltage supply:
  V12DC = 012 C
  V24DC = 024 C
- By the use of coils that incorporate a full wave bridge rectifier, from A.C. voltage supply:
  V110/50 (V115/60) = 110 RAC
  V220//50 (V230/60) = 220 RAC

All standard valves are to be fitted with connectors conform to ISO 4400 (DIN 43650) and alectric circuitry must be able to carry the following rated current values:

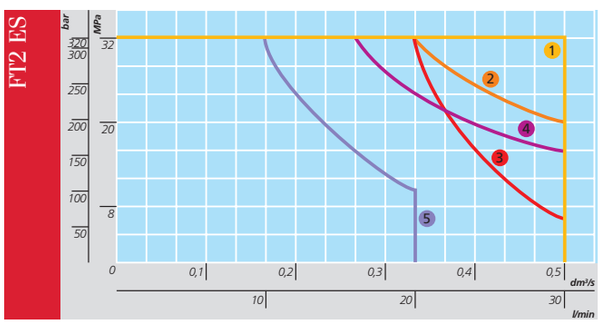
V12DC	= 2,4 A
V24DC	= 1.2 A
V110/50	= 0,30 A
V220/50	= 0,15 A

Permissible supply voltage variation:
+ 5% - 10%

8 FUNCTIONAL SYMBOLS

Spools, springs and solenoids combination permit to obtain almost every type of ports (P, A, B, T) connection and sequence.
For almost all types of solenoids/springs combination and for all type of spools (with the exception of spool 4), when solenoid "a" is energized, hydraulic connections are P → B and A → T; to obtain P → A and B → T solenoid "b" must be energized.
The hydraulic connections that are obtained in the "central" (neutral) position when solenoids are not energized is the characteristic mark of the spool shape and from it derives its identification number:
0 = P, A, B, T connected
1 = P, A, B, T closed
3 = P closed, A, B, T connected
For other type see 7

9 HYDRAULIC LIMITS OF USE



① = FT2 - ES - 0C; - 1C; - 1N; - 3C; - 8C; - 0ML; - 1LL; - 1ML; - 3ML; - 8ML
② = FT2 - ES - 2N; - 7C
③ = FT2 - ES - 0LL
④ = FT2 - ES - 4C; - 4ML
⑤ = FT2 - ES - 55C; - 2LL

P/Q characteristic limits for safe use of FT2 - ES - * solenoid operated valves.
Limit curves apply to solenoid valves energized with rated voltage - 5% and flushed with hydraulic fluid with properties according to 12

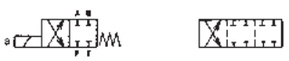
2LL



0ML



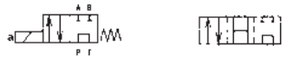
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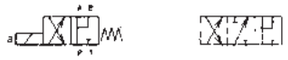
3ML



4ML

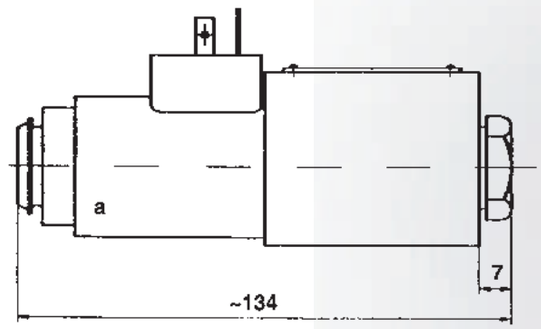


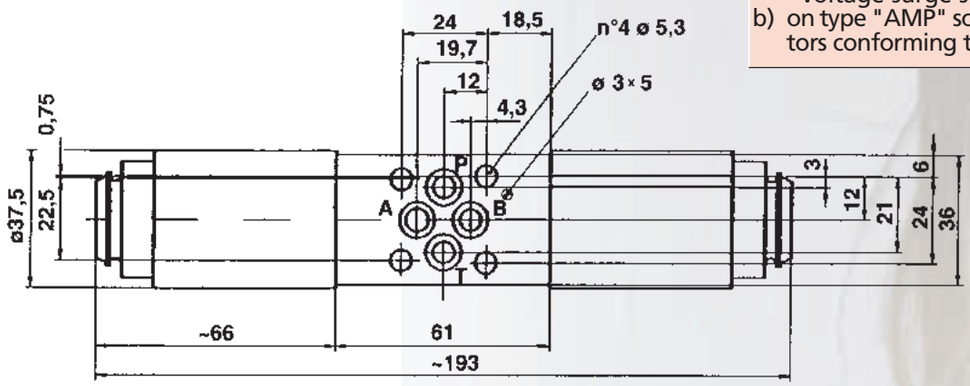
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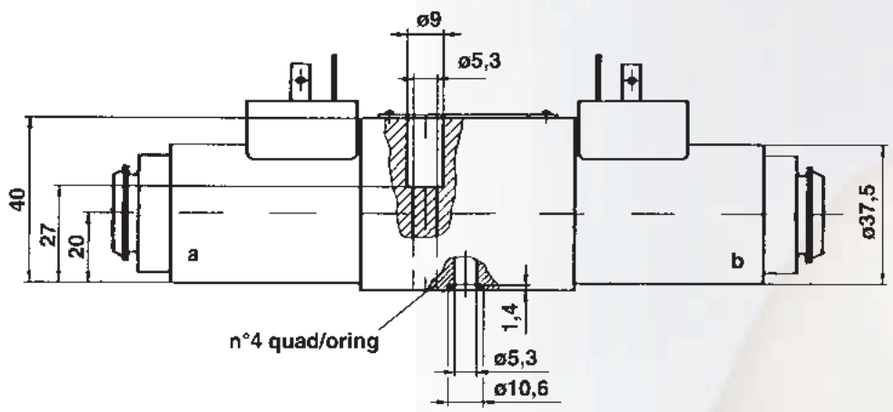


10 INSTALLATION DIMENSIONS

All dimensions are mm







11 INSTALLATION

All valves FT2 - * conform with ISO and CETOP specifications for mounting surface dimensions and for valves height. When assembled to its mounting plate valve FT2 - * must be fastened with 4 bolts M5 x 35 mm (or M5 x ** according to the number of modules) tightened at 8 Nm torque. Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of QUAD/O Ring type.
Connections to the electric supply is made:

a) on standard solenoid coils by standard 3-PIN connectors, according to ISO 4400 (DIN 43650).
   Connectors can be with different cable exit size (PG9, PG11) and beside of the plain connecting function they may incorporate various features like
   - signal led
   - voltage surge suppressor, etc.

b) on type "AMP" solenoid coils, by connectors conforming to AMP-Timer (see 15).

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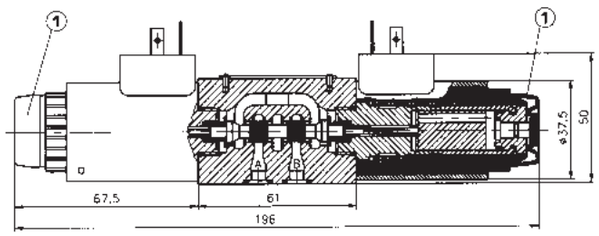
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12 HYDRAULIC FLUID

Seals and materials used on standard valves FT2 - * 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.

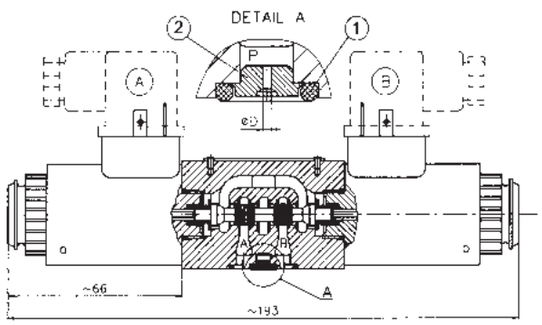
13 VERSION "K": EXTENDED EMERGENCY PIN

Solenoid valves according to "K" version have extended emergency actuator pins protruding from the solenoid shape, that permit a quick and easy "hand operation" of the valves, without the need of any tool.
The actuator pin and the end solenoid are protected by a flexible rubber cap 1 that makes easy operation and protects from moisture and water splashes.



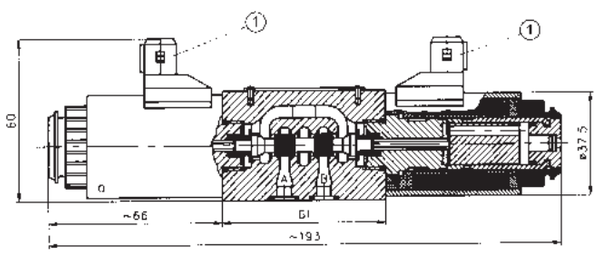
14 VERSION "S": CALIBRATED ORIFICE ON P PORT

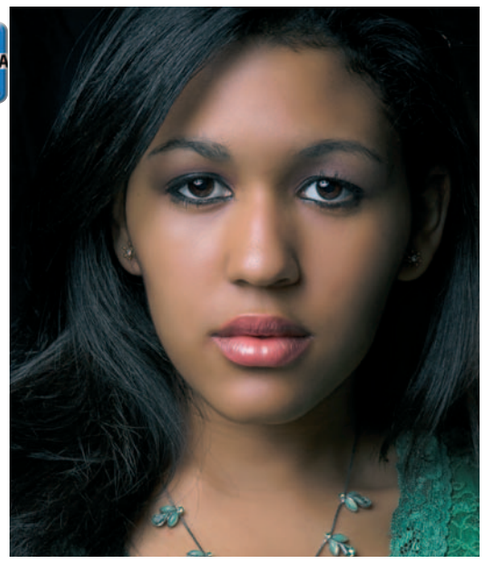
Option "S" is represented by elements 2, suitably shaped to be inserted on P port of the solenoid valve, having a calibrated orifice (of various sizes) able to restrict, at the requested _P value, the flow rate entering the solenoid valve.
Those elements have following orifice diameter:
2S - 08 → D = 0,8 mm
2S - 10 → D = 1 mm
2S - 12 → D = 1,2 mm
2S - 15 → D = 1,5 mm
and are kept sealed on the P port of the valve by an OR 1 of 7,65 x 1,78 mm size (example =R 107-2031).

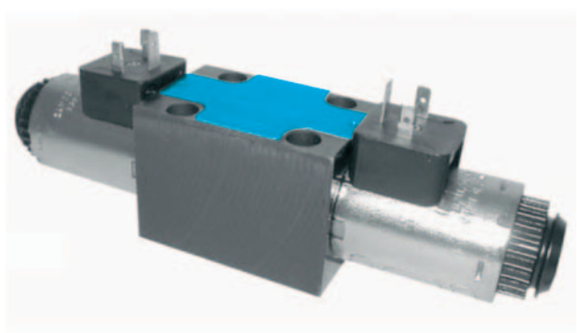


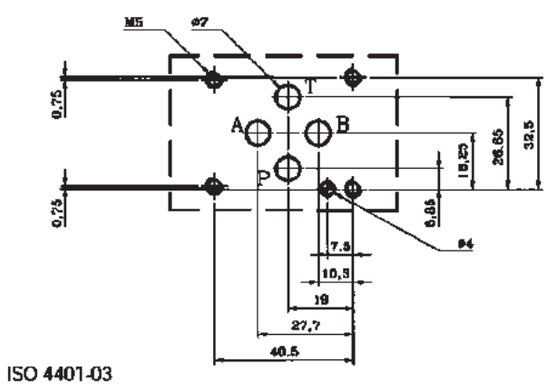
15 VERSION "AMP": SOLENOID COILS WITH AMP-TIMER PINS

Coils of this type have 2 electric pins 1 conforming for AMP-Timer connectors.
They are typically used on DC mobile application and they are available for the following voltages:
B02 - 012 C AMP = V 12 DC
B02 - 024 C AMP = V 24 DC









ISO 4401-03

The series FT3-E2 is characterized by the following peculiarities unlike the series FT3-ES:

- the flow rate is almost the same of the series CETOP 2;
- the maximum working pressure is 250 Bar;
- the body is practically the same of the series CETOP 3;
- the coil is the same of the series CETOP 2;
- dimensions, technical peculiarities, performances, all has been designed with the purpose to reach the aim of the maximum rationalization of use.

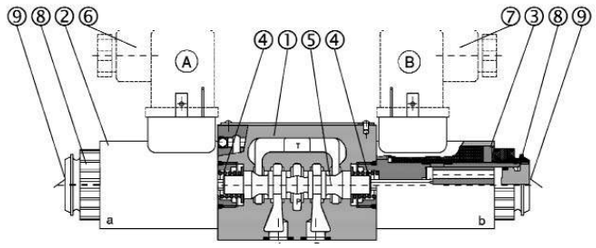
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1 HOW TO READ THE MODEL CODE FOR VALVES FT3 - E2 - *

FT3 - E2 - (1) (C) - * - (024C) / 20

1	2	3	4	5	6	7

1	FT3	4-way directional control valve CETOP 03 - Pressure 25 Mpa (250 bar)
2	E2	electrically controlled,
3	(1)	spool type (see 4)
4	(C)	solenoid(s) and spring(s) arrangement (see 4) C 2 solenoidas, spool is spring centered (3 position) LL 1 solenoidas, spool is offset (2 position) ML 1 solenoidas, spool is spring offset (2 position)
5	*	Code reserved for option and variants S-* calibrated orifice on P (see 13) K water proof caps on emergency pin (see 12) ZT zinc plated valve (see 14)
6	(024C)	Electric voltage and solenoid coils 0000 no coil(s) 012C coil(s) for V12DC 024C coil(s) for V24DC 115A coil(s) for V110/50 - V115/60 AC 230A coil(s) for V220/50 - V 230/60 AC
7	Design number (progressive) of the valves	

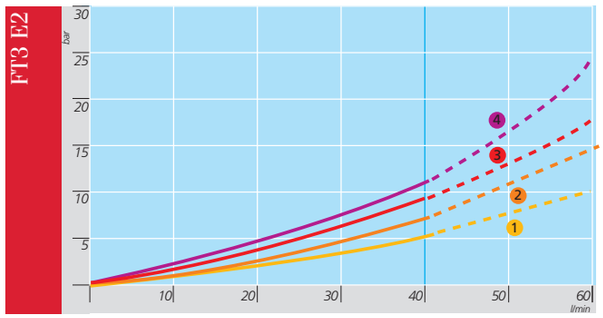


2 DESCRIPTION

DIRECTIONAL CONTROL VALVES SOLENOID OPERATED - CETOP 05 TYPE FT3 - E2 - *

The spool ⑤ shifts in to the valves body ① subject to the action of springs ④ and solenoids ⑨.
Spool ⑤, depending from its shape and its position in the valves body ①, opens and/or closes passages between P, A, B, and T ports, thus controlling the direction of the hydraulic flow.

3 TYPICAL DIAGRAMS

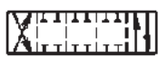
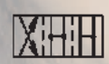
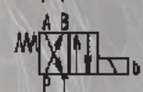
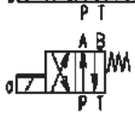
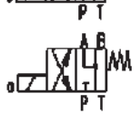
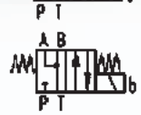


Typical Δp-Q curves for valves FT3 - E2 - *, in standard configuration, with mineral oil at v = 32 mm²/s and t = 40° C.

Configuration	P-A	P-B	A-T	B-T	P-T
1C	2	2	2	2	
4C	4	4	4	4	2
0C	2	2	3	3	2
3C	2	2	3	3	
1LL	3	3	4	4	
1LLb	3	3	4	4	
1ML		2	2		
4ML	4			4	2
0ML	2			3	2
3ML	2			2	

4 SPOOL IDENTIFICATION AND INTERMEDIATE POSITION TRANSISTORIES

Functional symbols

Designation	Symbol	Interposition	Designation	Symbol	Interposition
1C			1ML		
4C			OML		
0C			1MLb		
3C			1LLb		
1LL			4MLb		
3ML			0MLb		
4ML			3MLb		

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5 TECHNICAL DATA

Maximum nominal flow	40 l/min
Maximum rec. flow rate	see 7
Maximum nominal pressure (P, A, B)	25 Mpa (250 bar)
Maximum pressure at T port	21 Mpa (210 bar)
Pressure drops	see 3
Electric characteristics	see 6
Protection to DIN 40050	IP 65
Duty cycle	100%
Dimensions	see 11
Installation	see 8
Mass	1,4/1,6 kg

6 ELECTRIC CHARACTERISTICS

Valves type FT3 - E2 - * are operated by solenoid that are energized:

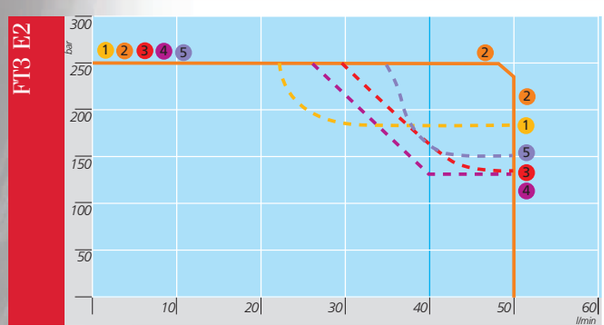
- directly from a D.C. voltage supply:
  V12 DC = 012 C
  V24 DC = 024 C
- by the use of coils that incorporate a full wave bridge rectifier, from A.C. voltage supply:
  V 110/50-V 115/60 = 115 A
  V 220/50-V 230/60 = 230 A

All connectors must conform to ISO 4400 (DIN 43650) and electric circuitry must be able to carry the following rated current values:
V 12 DC = 2,4 A V 115/50 = 0,26 A
V 24 DC = 1,2 A V 230/50 = 0,14 A

Coils with 2 electric pins, conforming with AMP connectors, are only available for DC supply (example of code: BO2 - 012C AMP).

Permissible supply voltage variation (10%

7 HYDRAULIC LIMITS OF USE



p-Q characteristics limits for safe of FT3 - E2 - * solenoid operated valves. Measured at v=32 mm_/s and t=40°C

1C	**2**
4C	5
0C	1
3C	3
1LL	4
3ML	3
4ML	5
1ML	2
0ML	1
1MLb	2
1LLb	4
4MLb	5
0MLb	1
3MLb	3

8 INSTALLATION

All valves FT5 - * conform with ISO and CETOP specifications for mounting surface dimensions (see 11) and for valves height.
When assembled to its mounting plate valve FT3 - * must be fastened with 4 bolts M5x45 mm (or M5 x * according to the number of modules) tightened at 8 Nm torque.
Leakage between valve and mounting surface is prevented by the positive compression on their seats o 4 seals of Quad/O-Ring type 9,25 x 1,68 x 1,68.

10 HYDRAULIC FLUID

Seals and materials used on standard valves FT3 - * are fully compatible with hydraulics fluids of mineral base, upgrade with antifoaming and oxidizing agents.
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/19/14, or better, and ised in a recommended viscosity range from 10 cSt to 60 cSt.

9 SOLENOID

Solenoid valves can be supplied without electric coils as FT3 - E2 - **** - 0000.
Coils are supplied separately; standard, 3 electric pins, coils are

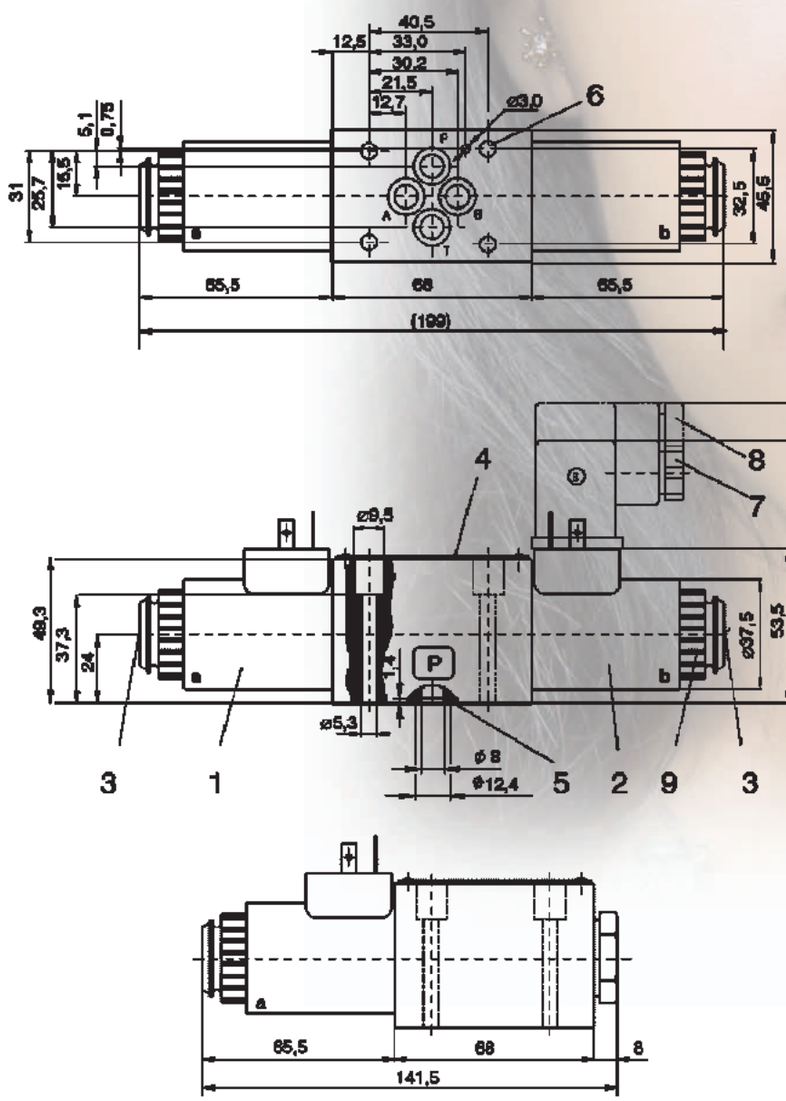
- B02-012C
- B02-024C
- B02-115A
- B02-230A

Connections to the electric supply is made by standard 3-PIN connectors, according to ISO 4400 (DIN 43650).
Connectors can be with different cable exit size (PG9, PG11) and beside of the plain connecting function they may incorporate various features like

- Signal led
- Voltage surge suppressor, etc.

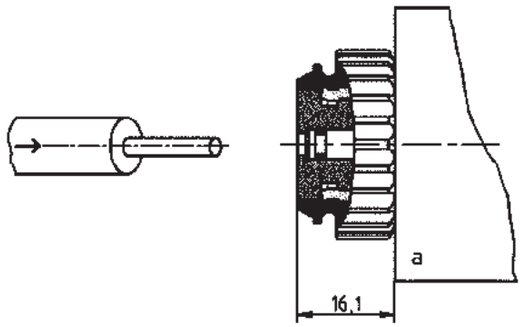
11 INSTALLATION DIMENSIONS

All dimensions are mm



12 MANUAL OVERRIDE

In case of electric cut-offs, the spool can be manually shifted by acting on the emergency pins, located at the end of the solenoids and accessible through the retaining nuts.
Solenoids valves according to "K" version have extended emergency actuator pins protruding from the solenoids shape, that permit a quick and easy "hand operation" of the valves, without the need of any tool. The actuator pin and the end of the solenoid are protected by a flexible rubber cap that makes easy operation and protects from moisture and water splashes.



Standard model of the standard override

13 VERSION "S": CALIBRATED ORIFICE ON P PORT

Option "S" is represented by element ②, suitably to be inserted on P port of the solenoid valve, having a calibrated orifice (of various sizes) able to restrict, depending on the Δp value, the flow rate entering the solenoid valve.
Those elements have the following orifice diameters:

- 3S-10 → D = 1 mm
- 3S-20 → D = 2 mm
- 3S-25 → D = 0 2,5 mm

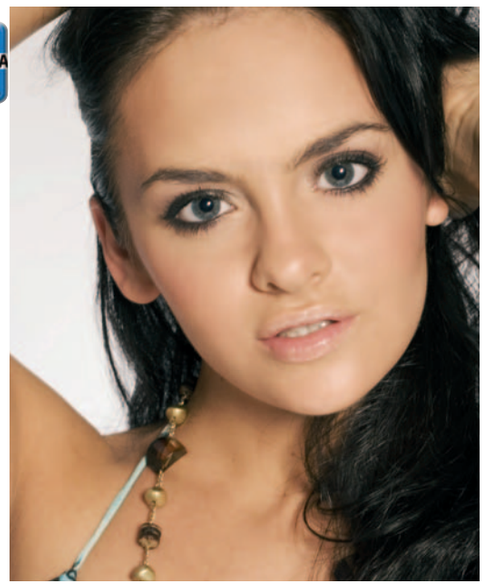
and are kept sealed on the P port of the valve by an OR of 9,25x1,78 mm sizes (example OR 110-2037)

14 VERSION "ZT": ZINC PLATED VALVES

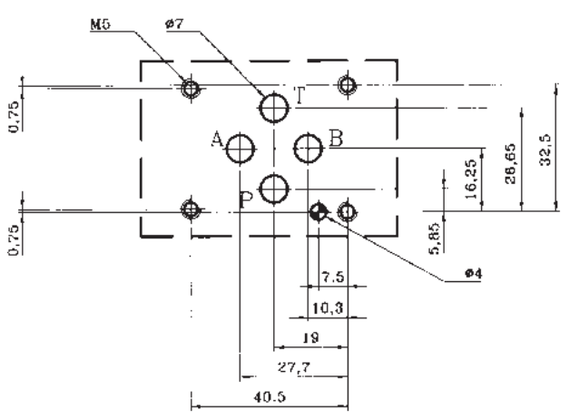
Solenoids valves according to "ZT" version are completely (body, solenoid tubes and coils) zinc trivalent plated protected against corrosion due to saline ambiance or other aggressive chemicals.

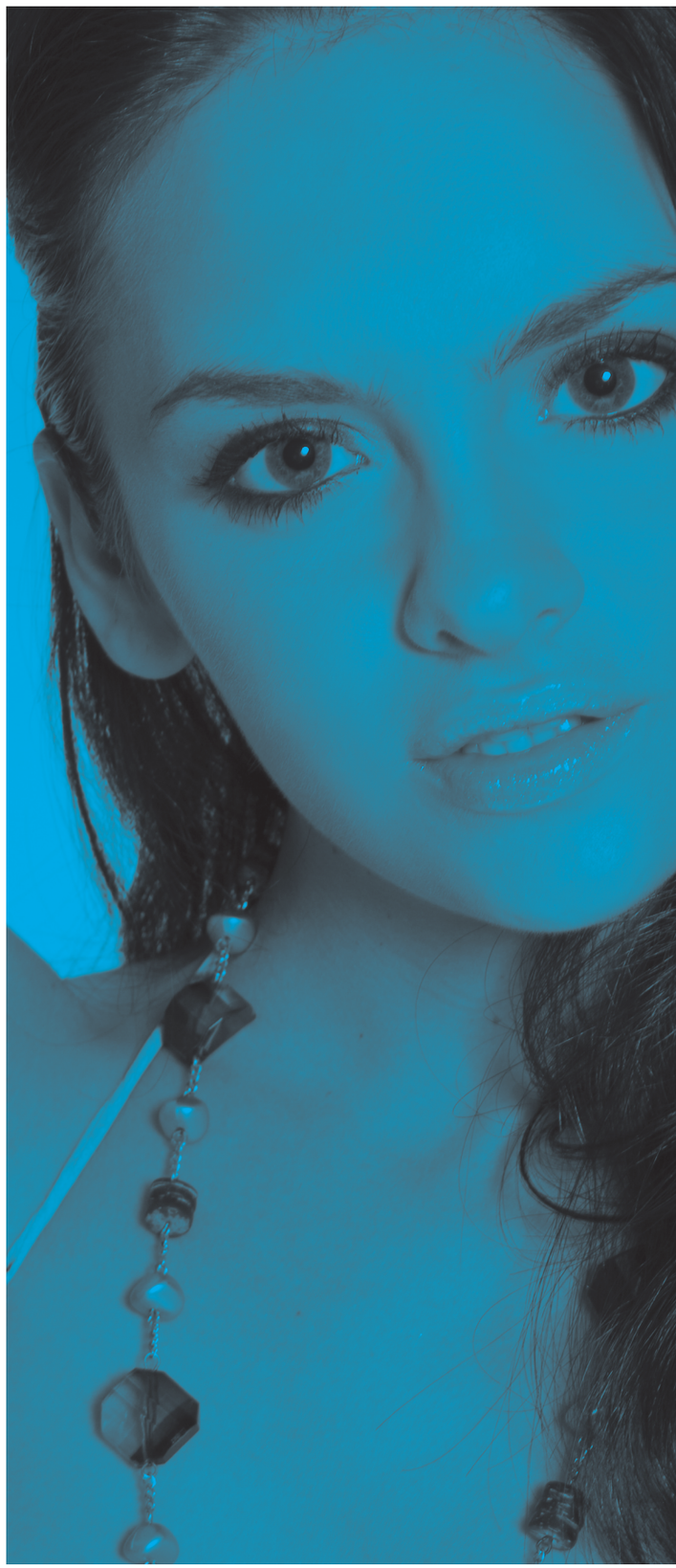
Zinc thickness are:	on the valve body	10-15 µm;
	on the solenoids tubes	8-12 µm;
	on the solenoid coils	8-12 µm.

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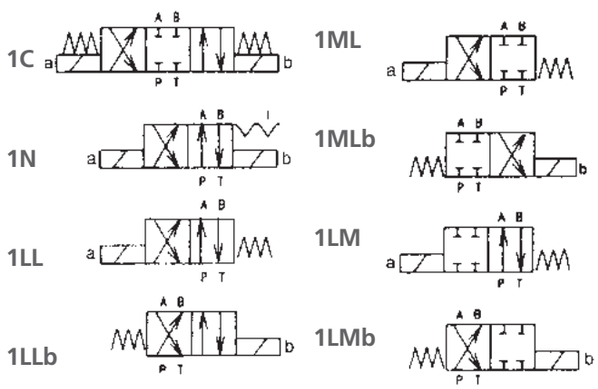
1 HOW TO READ THE MODEL CODE FOR VALVES FT3 - ES - *

FT3 - ES - (1) (C) - * - (024C) / 10

1	2	3	4	5	6	7

1	FT3	4-way directional control valve Cetop 03 - Pressure 32 Mpa (320 bar)
2	ES	electrically controlled, standard
3	(1)	spool type (see 7)
4	(C)	solenoid(s) and spring(s) arrangement, see also functional symbols 2 C 2 sol., spool is spring centered (3 position) N 2 sol., spool is detented(2 position) see 13 LL 1 sol. (a), spool is spring offset (2 position, end to end) ML 1 sol. (a), spool is spring offset (2 position, middle to end) LM 1 sol. (a), spool is spring offset (2 position, end to middle)
5	*	Code reserved for option and variants b only for version LL, ML, LM sol. b installed (instead of sol. a) T soft shifting device, see 14 S-** calibrated orifice on P port, see 15 K water proof caps on emergency pin, see 16 ZC zinc plated valve, see 17
6	(024C)	Electric voltage and solenoid coils 0000 no coil(s) 012C coil(s) for V12DC 024C coil(s) for V24DC 115A coil(s) for V110/50 - V 115/60 AC 230A coil(s) for V220/50 - V 230/60 AC See also electric characteristics 6
7	Design number (progressive) of the valves	

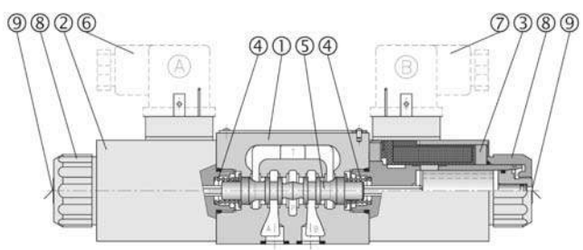
2 FUNCTIONAL SYMBOLS



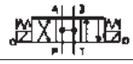
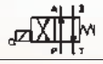
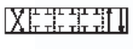
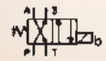
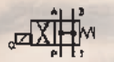
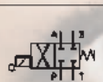
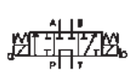
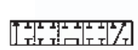
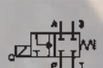
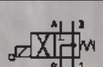
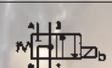
3 DESCRIPTION

DIRECTIONAL CONTROL VALVES SOLENOID OPERATED - CETOP 03 TYPE FT3 - ES - *

The spool ⑫ shifts in to the valves body ⑪ subject to the action of springs ⑬ and solenoids ① ②.
Spool ⑫, depending from its shape and its position in the valves body ⑪, opens and/or closes passages between P, A, B, T ports, thus controlling the direction of the hydraulic flow.
Solenoids ① and ② are energized by electric current flowing-in through connectors ③ and ④; in case of electric cut-offs, the spool can be manually shifted by acting on the emergency pins ⑤, located at the end of the solenoids and accessible through the retaining nuts ⑩.



4 SPOOL TYPE AND INTERMEDIATE POSITION TRANSITORIES

0C			0LL		
1C			1LL		
3C			1LLb		
4C			2LL		
55C			0ML		
7C			1ML		
8C			3ML		
1N			4ML		
2N			8ML		
19C			18ML		
42C			13ML		
56C			56ML		
38C			56MLb		

5 TECHNICAL DATA

Maximum nominal flow	1dm³/s (60 l/min)
Maximum rec. flow rate	see 9
Maximum nominal pressure (P, A, B)	32 Mpa (320 bar)
Maximum pressure at T port	16 Mpa (160 bar)
Pressure drops	see 4
Electric characteristics	see 6
Protection to DIN 40050	IP 65
Duty cycke	100%
Service life	≥ 107 cycles
Dimensions	see 10
Installation	see 11
Mass	approx. 1,6/2,1 kg

6 INSTALLATION

All valves FT3 - * conform ISO and CETOP specifications for mounting surface dimensions (see also front page) and for valves height. When assembled to its mounting plate valve FT3 - * must be fastened with 4 bolts M5 x 45 mm (or M5 x ** according to the number of modules) tightened at 8 Nm torque. Leakage between valve and mounting surface is prevented by the positive compression on their seats of 4 seals of QUAD/O Ring type 9,25x1,68x1,68. Solenoid valves can be supplied without electric coils, as FT3 - ES - ** - 0000 -.
Coils are supplied separately; standard, 3 electric pins, coils are BO3 - 012C, BO3 - 024C, BO3 - 115A and BO3 - 230A.
Connections to the electric supply is made by standard 3-PIN connectors, according to ISO 4400 (DIN 43650).
Connectors can be with different cable exit size (PG9, PG11) and beside of the plain connecting function they may incorporate various features like
- signal led
- voltage surge suppressor, etc.

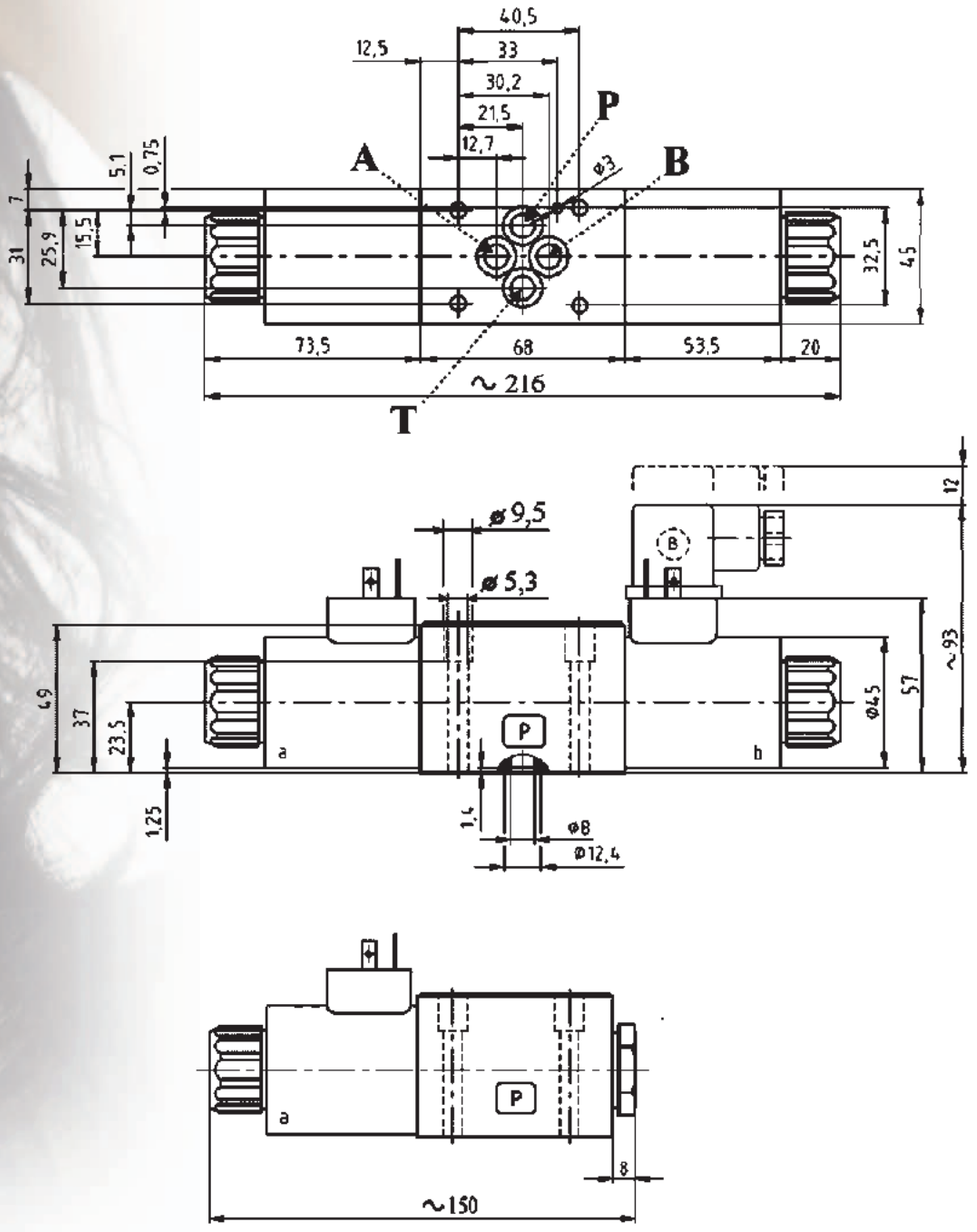
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7 HYDRAULIC FLUIDS

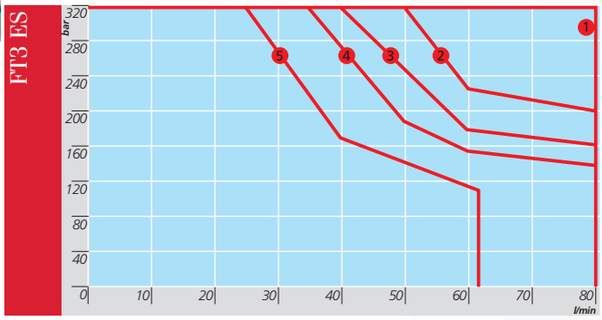
Seals and materials used on standard valves FT3 - * are fully compatible with hydraulics fluids of mineral oil base, upgrade with antifoaming and antioxidant agents.
The hydraulic fluid must be kept clean and filtered to ISO 4406 class 19/17/14, or better, and used in a recommended viscosity range from 10 cSt to 60 cSt.

8 INSTALLATION DIMENSIONS

All dimensions are mm



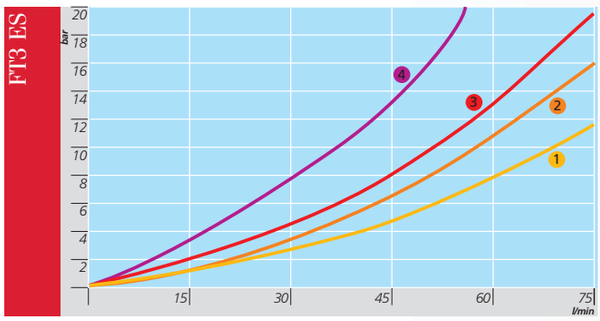
9 HYDRAULIC LIMITS OF USE



P/Q characteristics limits for safe use of FT3 - ES - * solenoid operated valves.
Limit curves apply to sol. valves energized with rated voltage - 5% and flush

1 = FT3 - ES - 0C; - 1C; - 1N; - 1ML; - 8C
2 = FT3 - ES - 3C; - 2
3 = FT3 - ES - 1LL; - 1LLb
4 = FT3 - ES - 0LL
5 = FT3 - ES - 4C

10 TYPICAL DIAGRAMS



Typical Δp-Q curves for valves HD3-ES in standard configuration with mineral oil at υ=32mm²/s and t=40°C.

Spool	P-A	P-B	A-T	B-T	P-T
0C	1	1	2	2	1
0LL	1	1	2	2	-
0ML	-	1	2	-	1
1C	1	1	2	2	-
1LL	1	1	2	2	-
1LLb	1	1	2	2	-
1ML	-	1	2	-	-
1N	1	1	2	2	-
3C	1	1	2	2	-
4C	3	3	4	4	1
8C	1	1	2	2	-

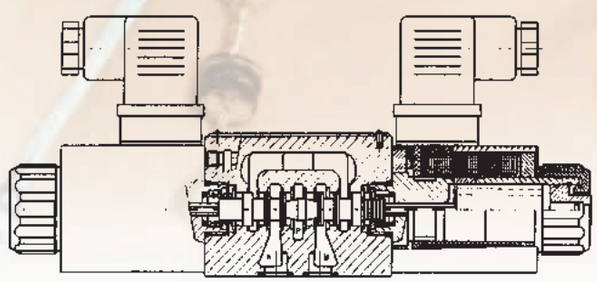
11 SOLENOIDS

Solenoid valves can be supplied without electric coils, as HD3-ES-*-0000.
Coils are supplied separately ; standard, 3 electric pins, coils are :
BO3 - 012 C
BO3 - 024C
BO3 - 115A
BO3 - 230A

Connections to the electric supply is made by standard 3-PIN connectors, according to ISO 4400 (DIN 43650).
Connectors can be with different cable exit size (PG9, PG11) and beside of the plain connecting function they may incorporate various features like :
- Signal led
- Voltage surge suppressor, etc…

12 VERSION "N": MECHANICAL DETENT ON SPOOL

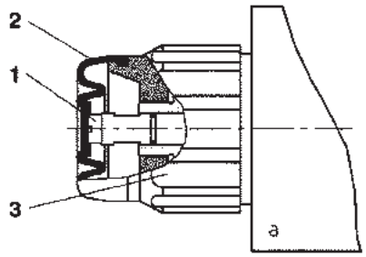
Solenoid valves with detent typically are 2 position, 2 solenoid, no-spring valve where the spool is kept at the extreme ends of its stroke by a mechanical device. This permits that solenoids are energized by its position regardless of forces due to hydrodinamics or gravitation/inertial effects (vibrations).



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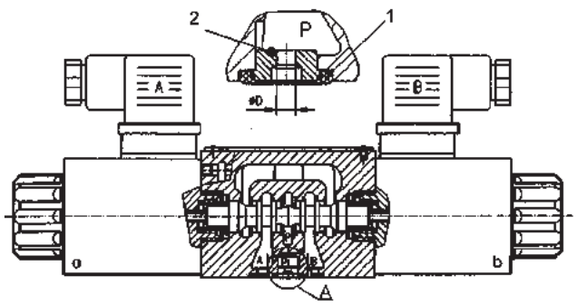
13 VERSION "T": SOFT SHIFTING

Solenoid valves with "soft shifting" devices are 2 or 3 position valves controlled by solenoids Å and Ç which incorporate calibrated orifices in the armature plungers.
The hydraulic controls on the shifting speed of the plunger, and therefore of the spool (129 in the valve's body, permit progressive transitories, thus reducing, thus reducing or eliminating qater hammer effects in the circuit. Typically the shifting time of a "T" version solenoid valve is, when energized, in the order of 300_500 ms (versus 30_50 ms of a standard valve) provided that the armature plunger properly works in the bleeding the air from the solenoid acting on purge's valve Ö, which is protected by cover (15), and by assuring a minimum counter pressure on T line.



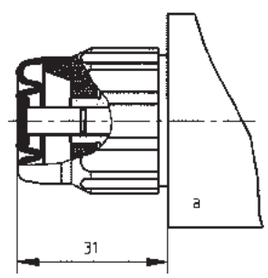
14 VERSION "S": CALIBRATED ORIFICE ON P PORT

Option "S*" is represented by elements ②, suitably shaped to be inserted on p port of the solenoid valve, having a calibrated orifice (of various sizes9 able to restrict, at the requested ΔP value, the flow rate entering the solenoid valve.
Those elements have following orifice diameter:
3S - 10 →D = 1 mm
3S - 20 →D = 2 mm
3 S - 25→D = 2,5 mm
and are kept sealed on the P port of the valve by an OR ① of 9,25x1,78 mm sizes (example OR 110 - 2037).



15 VERSION "K": EXTENDED EMERGENCY PIN

Solenoid valves according to "K" version have extended emergency actuator pins protruding from the solenoid shape, that permit a quick and easy "hand operation" of the valves, without the need of any tool. The actuator pin and the end of the solenoid are protected by a flexible rubber cap that makes easy operation and protects from moisture and water splashes.



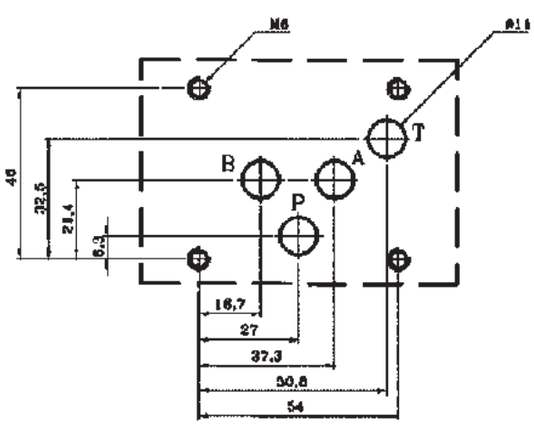
16 ANTICORROSION OPTIONS

On HD3-ES-* standard valves the body is phosphate coated, the solenoid tubes are
not treated and coils mantel and irons are zinc trivalent plated.
To increase the resistance to corrosive agents different variants are available :
ZT Body, solenoid tubes and coils irons are zinc trivalent plated
ZL Body is coated with special TEMADUR 40 zinc painting
Solenoids have 8-12 µm zinc plating
ZK Body is coated with special TEMADUR 40 zinc painting
Solenoids tube and coils irons are "zinc-nickel" plated

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1 HOW TO READ THE MODEL CODE FOR VALVES FT5 - ES - *

FT5 - ES - (1) (C) - * - (024C) / 20

1	2	3	4	5	6	7

1	FT5	4-way directional control valve Cetop 05 - Pressure 32 Mpa (320 bar)
2	ES	electrically controlled, standard
3	(1)	spool type (see 4)
4	(C)	solenoid(s) and spring(s) arrangement, see also functional symbols 2 C 2 sol., spool is spring centered (3 position) N 2 sol., spool is detented(2 position) LL 1 sol. (a), spool is spring offset (2 position, end to end) ML 1 sol. (a), spool is spring offset (2 position, middle to end) LM 1 sol. (a), spool is spring offset (2 position, end to middle)
5	*	Code reserved for option and variants b only for version LL, ML, LM sol. b installed (instead of a) T* soft shifting device (see 14 and 15) K water proof caps on override pin (see 16) Z* anti corrosion variants (see 17) DR solenoid (s9 chamber draining (see 17)
6	(024C)	Electric voltage and solenoid coils (see 10, 11 and 12)
7	Design number (progressive) of the valves	

2 FUNCTIONAL SYMBOLS

1C 

1ML 

1N 

1MLb 

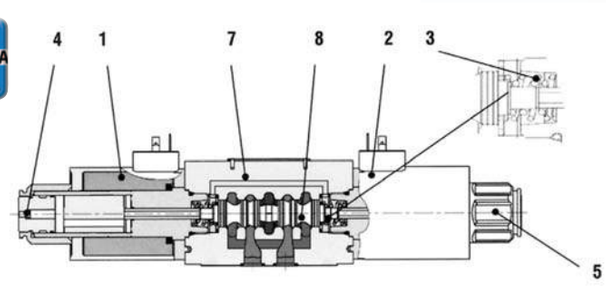
1LL 

1LM 

1LLb 

1LMb 

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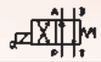
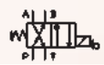
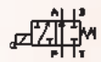
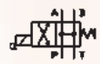
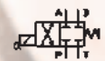


3 DESCRIPTION

DIRECTIONAL CONTROL VALVES SOLENOID OPERATED - CETOP 05 TYPE FT5 - ES - *

The spool ⑧ shifts in to the valves body ⑦ subject to the action of springs ③ and solenoids ①②.
Spool ⑧, depending from its shape and its position in the valves body ⑦, opens and/or closes passages between P, A, B, T ports, thus controlling the direction of the hydraulic flow.
In case of electric cut-offs, the spool can be manually shifted by acting on the override pins ④, located at the end of the solenoids and accessible through the retaining nuts ⑤.

4 SPOOL TYPE AND INTERMEDIATE POSITION TRANSITORIES

0C			0LL		
1C			1LL		
3C			1LLb		
4C			2LL		
55C			0ML		
7C			1ML		
8C			3ML		
1N			4ML		
2N			8ML		

5 TECHNICAL DATA

Nominal flow	120 l/min
Maximum rec. flow	see
Nominal pressure (P, A, B)	32 Mpa (320 bar)
Maximum rec. pressure (P, A, B)	35 Mpa (350 bar)
Maximum rec. pressure at T port	21 Mpa (210 bar)
Pressure drops	see
Protection to DIN 40050	IP 65
Duty cycle	100%
Service life	≥ 107 cycles
Mass	1 sol. 3,9 kg 2 sol. 5,4 kg

6 INSTALLATION

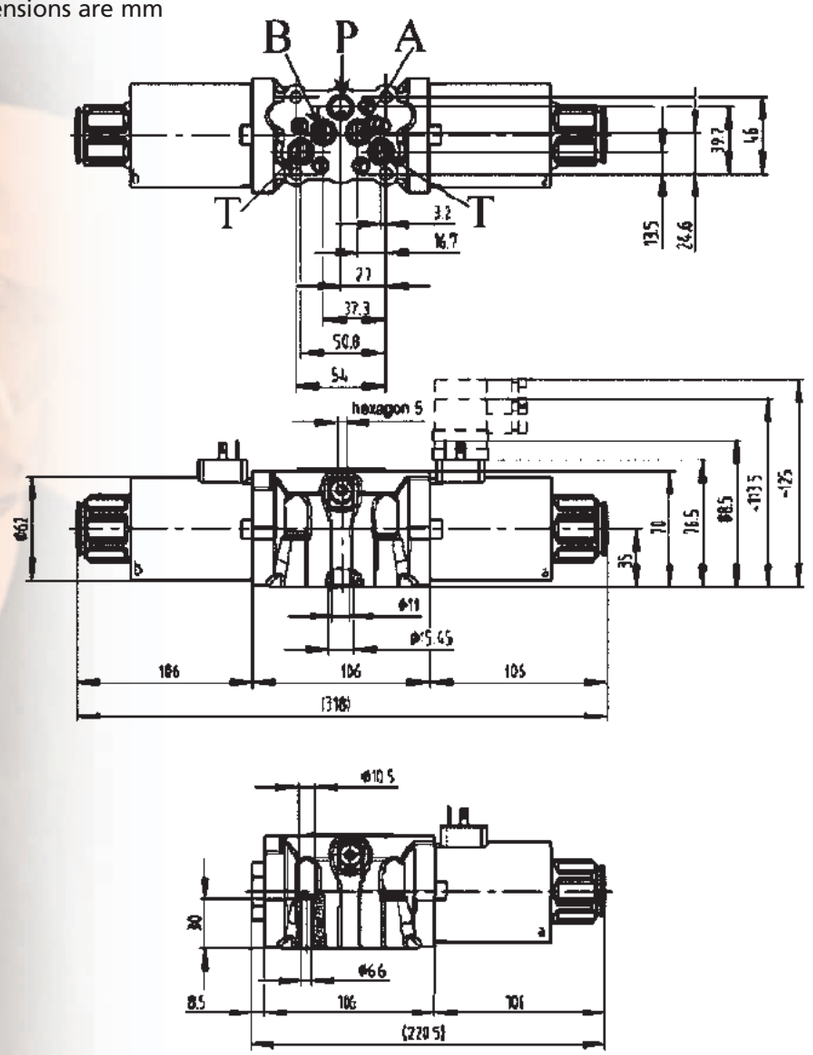
All valves FT5 - ES - * conform with ISO and CETOP specifications for mounting surface dimensions and for valves height.
When assembled to its mounting plate valve FT5 - ES - * must be fastened with 4 bolts M6x40 mm (or M6 x * according to the number of modules) tightened at 12 Nm torque.
Leakage between valve and mounting surface is prevented by the positive compression on their seats o 5 seals of Quad-Ring type 12,42 x 1,68 x 1,68 mm.

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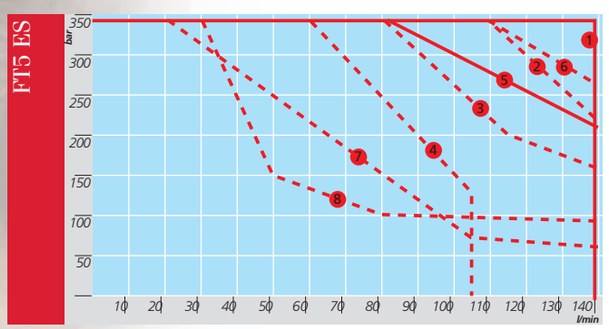
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7 INSTALLATION DIMENSIONS

All dimensions are mm



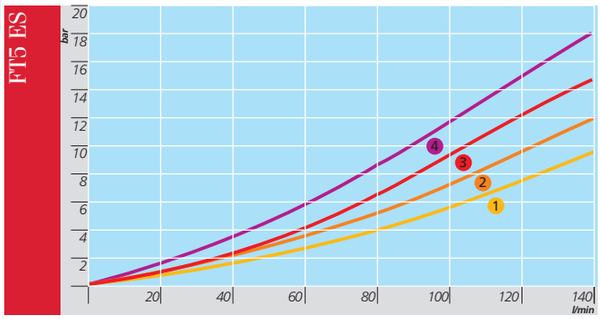
8 HYDRAULIC LIMITS OF USE



p/Q characteristics limits for safe use of FT5 - ES - * solenoid operated valves. Limit curves apply to solenoid valves energized with rated voltage - 5% and flushed with hydraulic fluid with properties according to.

Spool type	Limits
OC	1
1C	
8C	
0ML	
1ML	
8ML	
3C	5
3ML	
4C	3
55C	7
7C	4
1N	6
2N	8
0LL	2
1LL	2
1LLb	2
2LL	8
4ML	3

9 TYPICAL DIAGRAMS



Typical Δp curves for valves FT5 - ES - *, with mineral oil at v = 32 mm²/s and t = 40° C, for flow P→A/B, A/B→T and P→T

Spool type	P-A	P-B	A-T	B-T	P-T
OC	1	1	2	2	1
1C	1	1	2	2	-
3C	1	1	2	2	-
4C	3	3	4	4	1
55C	1	1	1	2	2
7C	1	1	2	2	-
8C	1	1	2	2	-
1N	1	1	2	3	-
2N	1	1	-	-	-
OLL	1	1	1	3	-
1LL	1	1	2	2	-
1LLb	1	1	2	2	-
2LL	1	1	-	-	-
0ML	-	1	2	-	1
1ML	-	1	2	-	-
3ML	-	1	2	-	-
4ML	3	-	-	4	1
8ML	-	1	2	-	-

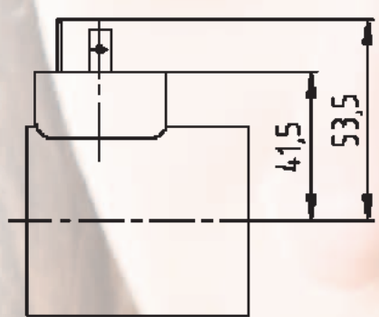
10 SOLENOID COILS, WITH STANDARD ELECTRIC CONNECTION TO ISO 4400/DIN 43650, FOR DC SUPPLY

Standard valves type FT5 - ES - * are operated by solenoid that are energized directly from a D.C. voltage supply. Solenoid valves can be supplied without electric coils as FT5 - ES - * - 0000 and coils can be supplied separately as B05 - ***C

DIRECTLY FROM D.C. SUPPLY

Voltage	*Valve code*	*Coil code*	*Nominal current (A)*
V12 DC	**FT5 - ES - * - * - 012C**	**B05-012C**	3,17
V24 DC	**FT5 - ES - * - * - 024C**	**B05- 024C**	1,73

Permissible supply voltage variation: +5% -10%
Special voltages available: V 48 DC, V 106 DC, V 205 DC



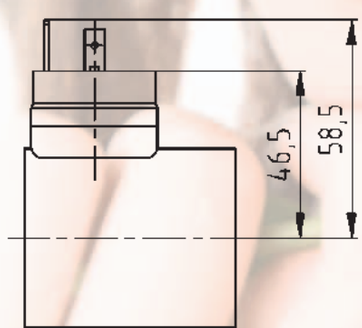
11 SOLENOID COILS, WITH STANDARD ELECTRIC CONNECTION TO ISO 4400/DIN 43650, FOR AC SUPPLY

Valves type FT5 - ES - * can be operated from A.C. supply by the use of coils that incorporate a full wave bridge rectifier. Coils with rectifier can be supplied separately as B05 - ***A.

DIRECTLY D.C. SUPPLY

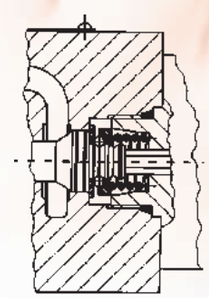
Voltage	*Valve code*	*Coil code*	*Nominal Current (A)*
V115 AC/50(60) Hz	**FT5-ES-*-*-115A**	**B05-115A**	0,40
V230 AC/50(60) Hz	**FT5-ES-*-*-230A**	**B05- 230A**	0,20

Permissible supply voltage variation: +5% -10%



12 VERSION "N": MECHANICAL DETENT ON SPOOL

Solenoids valves with detent typically are 2 positions, 2 solenoid, no-spring valves where the spool is kept at the extreme ands of its stroke by a mechanical device. This permits that solenoids are energized by short time current pulses and the spool remains at its position regardless of forces due to hydrodinamics or gravitational/inertia effects (vibrations).



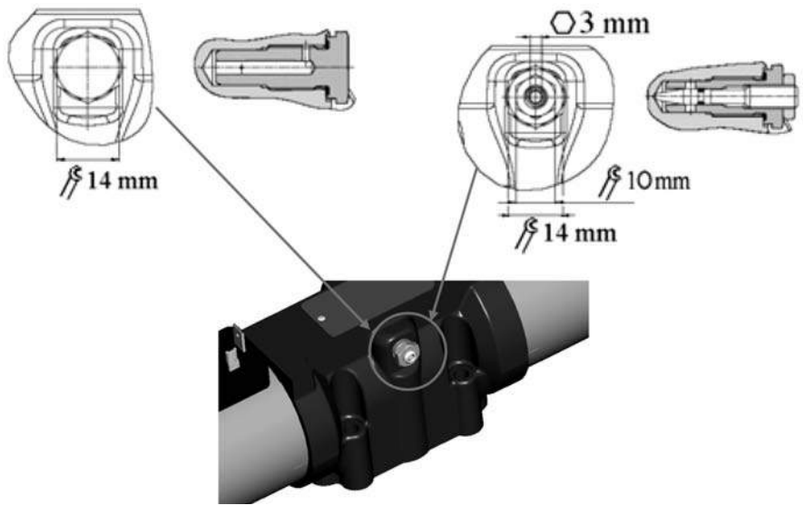
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13 VERSION "T": SOFT SHIFTING

Solenoid valves with soft shifting devices are 2 or 3 positions valves, controlled by 2 solenoids, which incorporated a fixed throttling orifice ((0,6) on the channel that connects the extreme hydraulic chambers of the valve.
The throttling effect control the spool shifting time, therefore eliminating unwanted hydraulic shocks.

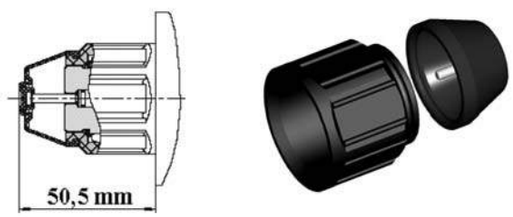
14 VERSION "TR": ADJUSTABLE SOFT SHIFTING

In version "TR" valves, the fixed orifice is replaced by an adjustable, variable throttle valve that permit a fine precise adjustment of the spool shifting time.
To increase the throttling (and therefore the shifting time) turn clock-wise the adjusting screw, after having unlocked its retaining nut.



15 VERSION "K": EXTENDED OVERRIDE PIN

Solenoid valves according to "K" version have extended override actuator pins that permit a quick and easy "hand operation" of the valves, without the need of any tool. The actuator pin and the end of the solenoid are protected by a flexible rubber cap that makes operation and protects from moisture and water splashes.



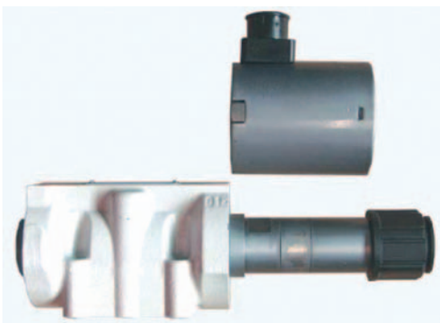
16 ANTICORROSION PROTECTION

On FT5 - ES - * standard valves the body is phosphate coated, the solenoid tubes are treated and coils mantel and irons are zinc trivalent plated.
To increase the resistance to corrosive agents different variants are available:

ZT • body, solenoid tubes and coils irons are zinc trivalent plated

ZL • body is coated with special TEMADUR 40 zinc painting
• solenoids have 8-12 µm zinc plating

ZK • body is coated with special TEMADUR 40 zinc painting
• solenoid tube and coils irons are "zinc-nickel" plated



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FT 202
FT 204
FT 205
FT 3206
FT 3207
FT MA
FT 1203
FT MP
FT CH
FT LC



ACCESSORIES AND SPARE PARTS

FT 202
KM ring nut for valves series FT 257

FT 204
Steel hexagonal ring nut for gauge isolator series FT 292

FT 205
Steel hexagonal ring nut for gauge isolators series FT 290 and FT 291

FT 3206 - FT 3207
Panel plate for gauge isolator series FT 292

FT 1203
Brass hexagonal ring nut for valve series FT 1250

FT MA
Aluminium handwheel for valves series FT 257 and FT 1250

FT MP
ABS handwheel for valves series FT 257 and FT 1250

FT CH
Handwheel with key

FT LC
Handwheel with padlock



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FT 202



Nut FT 202		Valve type	Dimensions
FT 202	KM 2	Series FT 290-FT 291	14
FT 202/2	KM 2	Series FT 1237	18
FT 202/3	KM 3	Series FT 257-FT258	18
FT 202/4	KM 4	Series FT 257-FT258	14
		Series FT 270	14
FT 202/5	KM 5	Series FT 257-FT 258	38
		Series FT 270	38
FT 202/6	KM 6	Series FT 257-FT 258	12
		Series FT 270	12
		Series FT 277-FT 287-FT 297	14
FT 202/7	KM7	Series FT277-FT 287-FT 297	38
FT 202/8	KM8	Series FT 257-FT 258	34
		Series FT 270	34
		Series FT 277-FT 287-FT 297	12
FT 202/10	KM10	Series FT 257-FT 258	100
		Series FT 270	100
		Series FT 277-FT 287-FT 297	34
	KM11	Series FT 257	112
	KM13	Series FT 257	200

FT 204



Nut FT 204	valve type
FT 204	Serie FT 292

FT 205



Nut FT 205		valve type
FT 205	Exagon type	Series FT 290-FT 291



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FT 3206
FT 3207
Panel plate for gauge isolator series
FT 292 FT 293



FT 1203



Ghiere FT 1253	Valve type	Dimensions
FT 1203/18	Series FT 1250	18
FT 1203/14	Series FT 1250	14
FT 1203/38	Series FT 1250	38
FT 1203/12	Series FT 1250	12
FT 1203/34	Series FT 1250	34

On request
Version AISI 316 code FT 2251-016



FT MA
Aluminium handwheel
for valves series FT 257
and FT 1250



FT MP
ABS handwheel
for valves series FT 257
and FT 1250



FT CH
Handwheel with key



FT LC
Handwheel with padlock

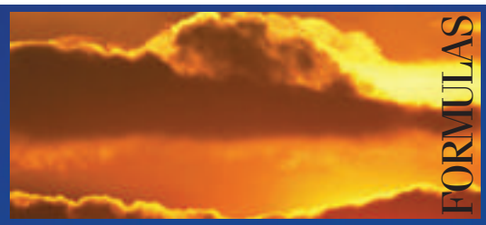
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SEALS

Type	18	14	38	12	34	100	114	112	200
OR	2018	2021	108	2043	115	123	123	128	3106
Antiextrusion ring	2018	2021	108	2043	115	123	123	128	3106


FORMULAS

FORMULAS CALCULATION



1) LOW VISCOSITY LIQUIDS

$$Q = Kv \cdot \sqrt{\frac{\Delta P}{\gamma}}$$

FORMULA TO OBTAIN THE VALVE FLOWRATE

$\Delta P = P1 - P2$	Difference between downstream and upstream valve pressure (bar)
γ	Relative water density
Kv	Valve coefficient depending on inner valve geometry. This value is obtained experimentally.

EXAMPLE

To determine the water flow rate in L/min with a valve FT 1251/2-12 with Kv = 15.4

$Kv = 15.4 \cdot \frac{L}{min} \cdot \frac{1}{\sqrt{bar}}$		Valve coefficient L/min
P1 = 8 . bar		Downstream pressure
P2 = 5 . bar		Upstream pressure
$\Delta P = (P1 - P2)$		Pressure difference
γ water = 1		Relative water density
$Q = Kv \cdot \sqrt{\frac{\Delta P}{\gamma \text{ acqua}}}$	$Q = 26.674 \cdot \frac{L}{min}$	Portata in L/min

2) VISCOUS LIQUIDS

Il coefficiente Kv della valvola deve essere moltiplicato per un fattore F>1 quando siamo in presenza di un liquido viscoso.
F viene ricavato in funzione di un parametro Z.

$$Z = \frac{2100 \cdot Q}{\nu \cdot \sqrt{Kv}}$$

Z PARAMETER

ν	Kinematic viscosity in centistokes
Q	Valve flow rate in mc/h
Kv	Valve coefficient in mc/h

EXAMPLE

To determine the suitable valve to let in 80 l/min oil with 2 bar ΔP

$\nu = 23 \cdot$ centistokes		Kinematic viscosity in centistokes
γ water = 1 Kg/dm³		Water density
$\Delta P = 2 \cdot$ bar		Pressure difference between downstream and upstream
$Q = 8O \cdot \frac{L}{min} = 4.8$ m³/h		Requested valve flowrate
$Kv1 = \frac{Q}{\sqrt{\frac{\Delta P}{\gamma \text{ acqua}}}}$	$Kv1 = 56.57 \cdot \frac{L}{min} \cdot \frac{1}{\sqrt{bar}}$	Valve coefficient for low viscosity liquids expressed in L/min
Kv2 = Kv1	$Kv2 = 3.39 \cdot \frac{m^3}{h} \cdot \frac{1}{\sqrt{bar}}$	Valve coefficient expressed in mc/h
$Z = \frac{2100 \cdot Q}{\nu \cdot \sqrt{Kv2}}$	z = 238	Z parameter

From the graphic it is possible to obtain F value:

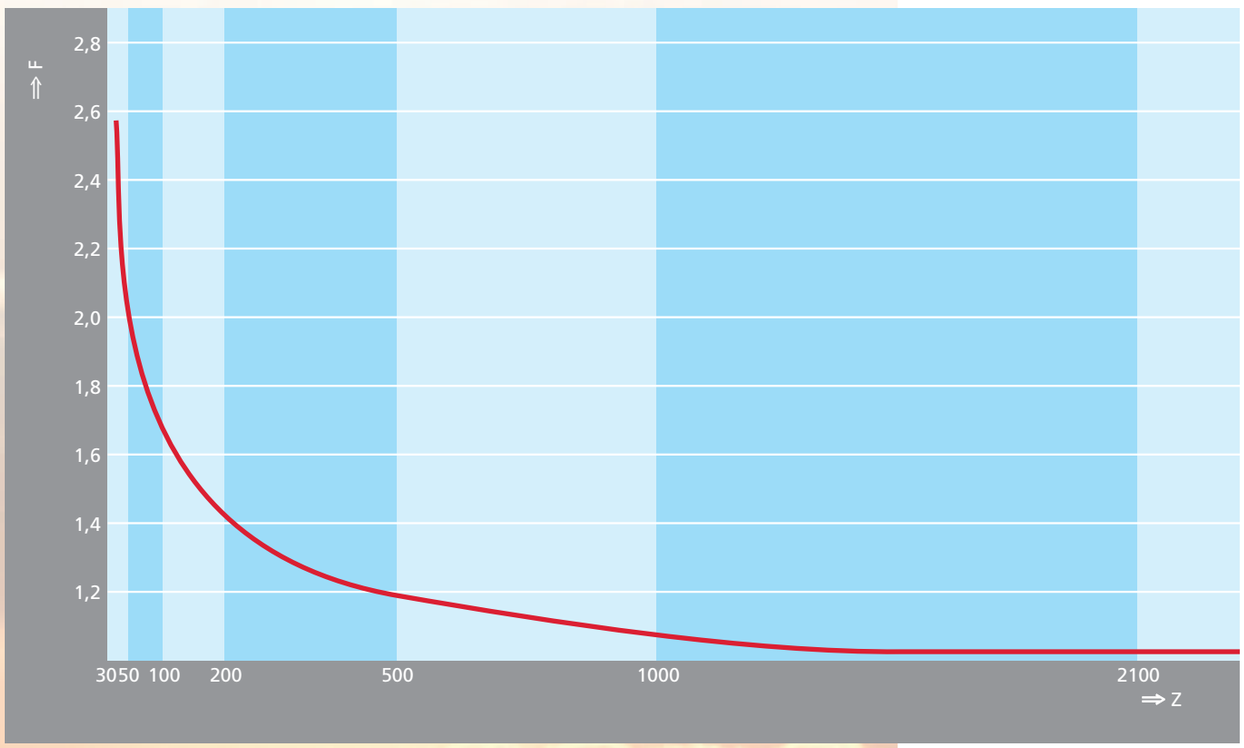
F = 1.25 Corrective factor

Then the suitable Kv is obtained my multiplying Kv1 by F:
Kv = F . Kv1

$$Kv = 65.192 \cdot \frac{L}{min} \cdot \frac{1}{\sqrt{bar}}$$

Coefficient of the valve suitable to le 80 l/min oil with ν= 23 centistokes in presence of 2 bar ΔP

CORRECTIVE F FACTOR IN FUNCTION OF Z PARAMETER



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3) GAS

FORMULA TO OBTAIN THE STANDARD VALVE FLOW RATE (N-LITER/MIN)

$$Qn = 28.81 \cdot Kv \cdot \sqrt{\frac{P1 - P2}{\gamma\ relat.}} \cdot \sqrt{\frac{P2}{T1}}$$

The formula is valid till the ratio P2/P1 does not go under the value P2crit./P1, corresponding to the sonic flow.
For ratio of P2/P1 inferior to such a value, flow remains constant.
As the value P2crit./P1 is about 0.5: the formula of the max. flow rate for gas is obtained through the following formula

FORMULA PER RICAVARE LA PORTATA MASSIMA DELLA VALVOLA (N-LITRI/MIN)

$$Qnmax = 14.41 \cdot Kv \cdot P1 \cdot \sqrt{\frac{1}{\gamma\ relat. \cdot T1}}$$

$\Delta P = P1 - P2$	Difference between downstream and upstream valve pressure (bar)
$T1$	Absolute gas temperature upstream the valve
γ	Gas density
γ air	Air density
γ relat.	Relative gas/air density

EXAMPLE

To determine nitrogen flow rate at 20 °C with P1 = 7 bar and P2 = 5 bar on the valve FT 1251/2-12

$Kv = 15.4 \cdot L \cdot \frac{\sqrt{K}}{min \cdot bar}$		Valve coefficient
$T1 = 273 \cdot K + t$	$T1 = 293 \cdot K$	Absolute temperature
$\gamma\ nitrogen = 1.1451 \cdot \frac{kg}{m^3}$		Nitrogen density
$\gamma\ air = 1.1839 \cdot \frac{kg}{m^3}$		Air density
$\gamma\ relat. = \frac{\gamma\ nitrogen}{\gamma\ air}$	$\gamma\ relat. = 0.967$	Relative density
$P\ crit. = \frac{P2}{P1}$	$P\ crit. = 0.714$	Critical pressure (for values superior to 0.5 use the following formula)
$Qn = 28.81 \cdot Kv \cdot \sqrt{\frac{P1 - P2}{\gamma\ relat.}} \cdot \sqrt{\frac{P2}{T1}}$	$Qn = 83.342 \cdot \frac{L}{min}$	Flow rate in NL/min
$Qn1 = Qn \times 60/1000 = Nmc/h$	$Qn1 = 5 \cdot \frac{Nmc}{h}$	Flow rate in Nmc/h

MASS FLOW RATE

FORMULA TO DETERMINE THE VALVE MASS FLOW RATE

$G = Qn1 \cdot \gamma$

So we obtain

$G = Qn1 \cdot \gamma\ nitrogen$	$G = 5.726 \cdot \frac{kg}{h}$	Valve flow rate kg/h

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AIR DENSITY UNDER RSA

RSA = REFERENCE STANDARD ATMOSPHERE ACCORDING TO UNI - ISO 8778

$P = 1 \cdot bar$	Pressure
$Ta = 293 \cdot K$	Absolute temperature
$\tau = 0.65$	Relative humidity
$\gamma \text{ air} = 1.1839 \cdot \frac{kg}{m^3}$	Air density under RSA conditions

Gas denomination	Chemical formula	Density kg/m^3	Relative density
Acetylene	C_2H_2	1.0721	0.9056
Ammonia	NH_3	0.7058	0.5962
Carbon dioxide	CO_2	1.8092	1.5282
Sulphur dioxide	SO_2	2.68	2.2637
Air		1.1839	1
Nitrogen	N_2	1.1451	0.9672
Standard butane	C_4H_{10}	2.4473	2.0672
Chlorine	CL_2	2.9455	2.488
Helium	He	0.1634	0.138
Hydrogen	H_2	0.0823	0.0695
Methane	CH_4	0.6565	0.5545
Neon	Ne	0.8242	0.6962
Carbon monoxide	CO	1.1445	0.9667
Oxigen	O_2	1.3083	1.1051
Ozone	O_3	2.0326	1.7169
Propane	C_3H_8	1.8495	1.5622

MIDDLE SPECIFIC GRAVITY OF SOME LIQUIDS AT A PRESSURE OF KG/CM2

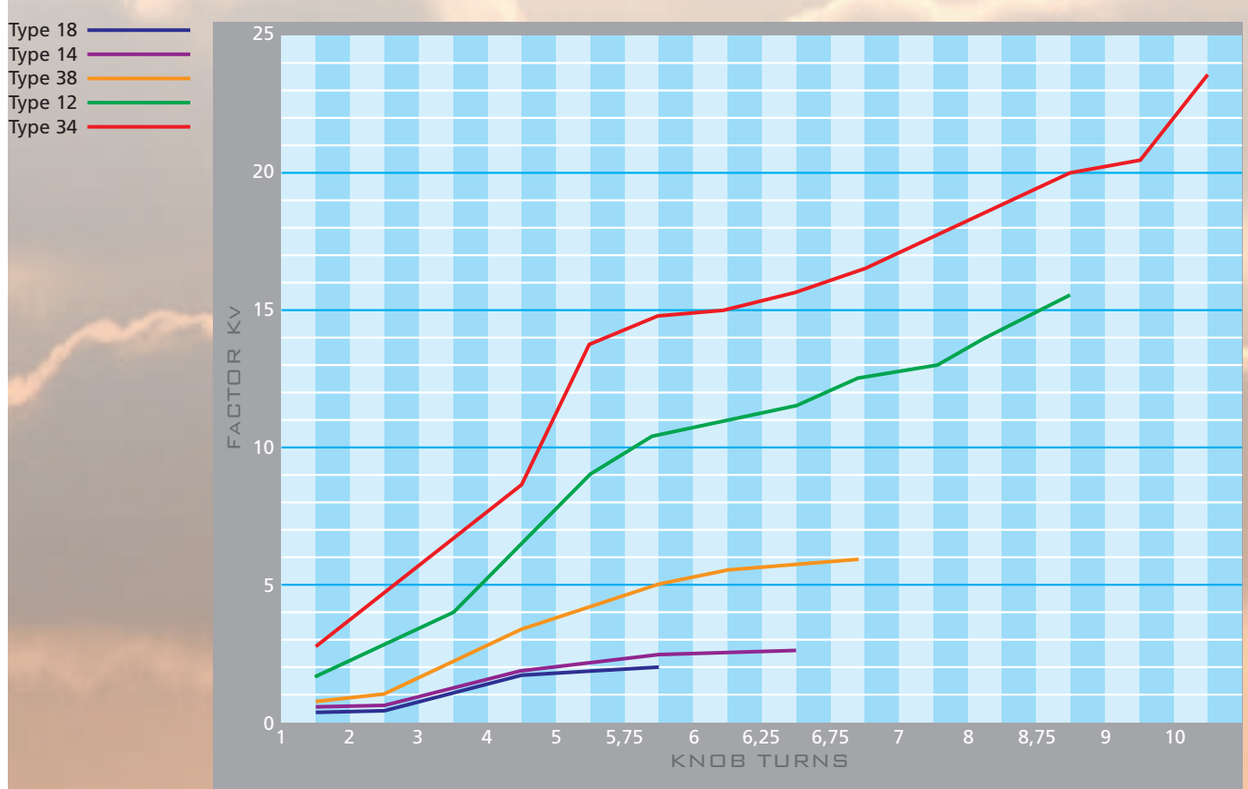
Substance	Specific gravity	Grades centrigrade
Acetone	0.79	20
Hydrochloric HCl	1.05	15
Nitric acid HNO_3	1.15	15
Sulphuric acid H_2SO_4	1.05	15
Sea water	1.03	15
Gasoline	0.7	15
Benzol	0.9	0
Ethyl ether	0.74	0
Pure glycerine	1.26	0
Oil	0.76	19
Wine	0.98	15

KV GRAPHIC FOR VALVES FT 1251/2 FT 1251/5

Knob turns	Type 18	Type 14	Type 38	Type 12	Type 34
1	0.447	0.45	0.585	1.48	2.7
2	0.767	0.87	1.02	2.7	4.5
3	1.145	1.26	2.25	4.11	6.42
4	1.43	1.65	3.33	6.48	8.76
5	1.8	1.95	3.81	9.06	13.5
5.75	2.05	2.265	5	10.365	14.62
6		2.37	5.4	10.8	15
6.25		2.58	5.5	11.37	15.6
6.75			5.7	12.51	16.8
7				13.08	17.4
8				14.52	18.48
8.75				15.6	19.92
9					20.4
10				23.7	

KV FACTOR FREE FLOW FOR VALVE FT 1251/5

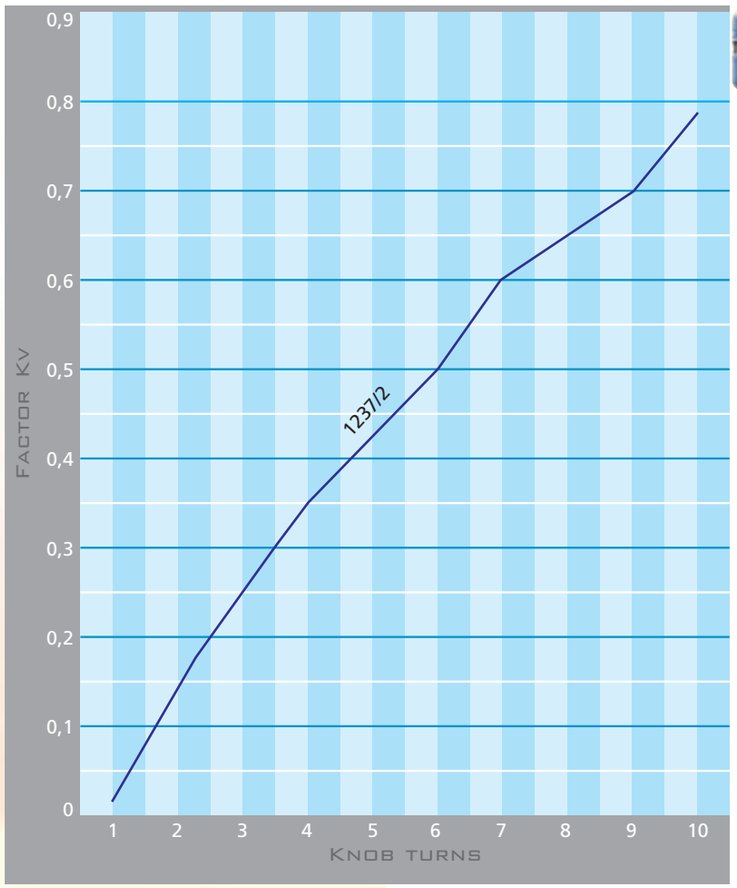
Type	Kv
14	10.8
38	20.72
12	43.97
34	53.94



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KV GRAPHIC FOR VALVES FT 1237/2 MICROFINE

KNOB TURNS	1237/2
1	0.01
2	0.136
3	0.245
4	0.35
5	0.431
6	0.512
7	0.6
8	0.642
9	0.693
10	0.775

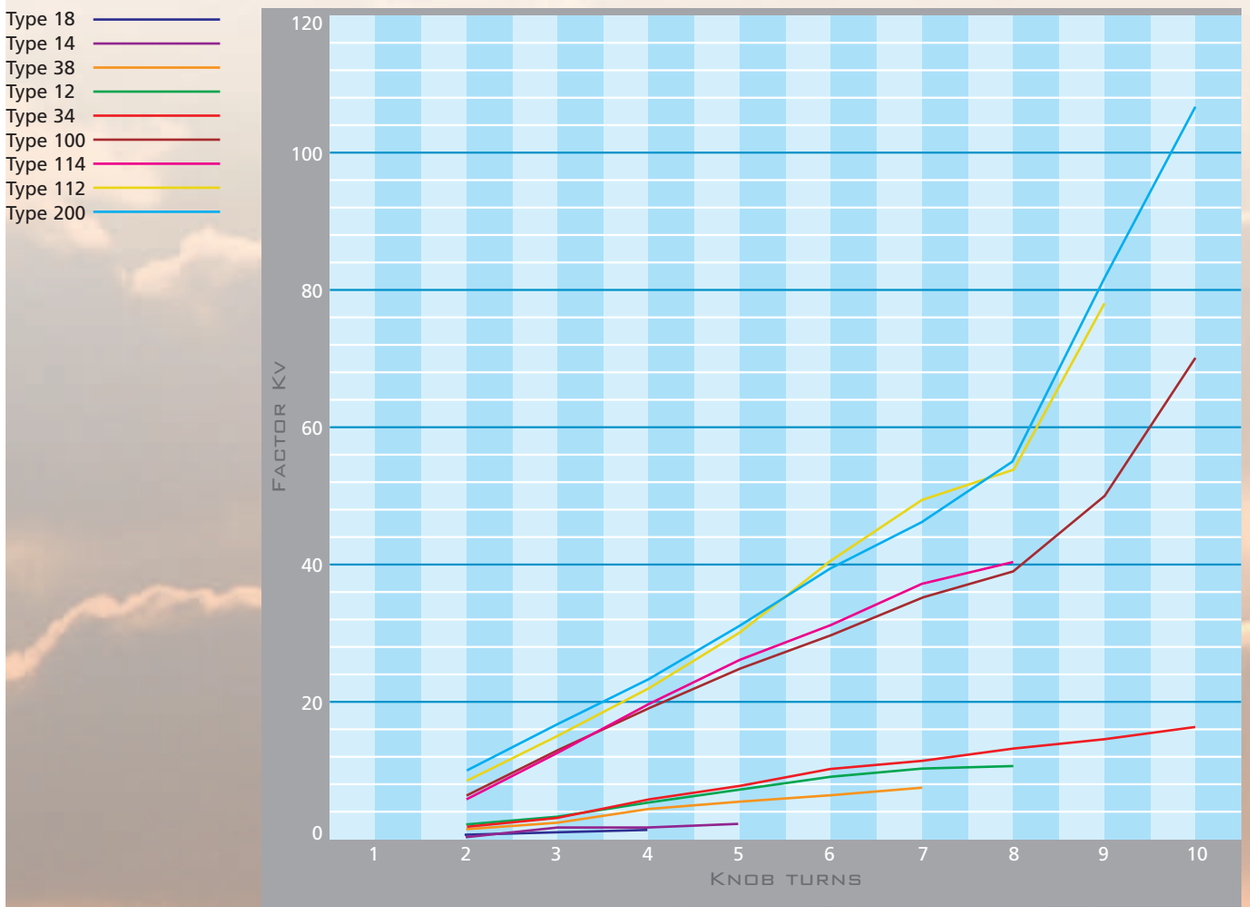


FLOW RATE CALCULATION IN FUNCTION OF THE VALVE KV COEFFICIENT

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KV GRAPHIC FOR VALVES FT 257/2

Knob turns	Type 18	Type 14	Type 38	Type 12	Type 34	Type 100	Type 114	Type 112	Type 200
1									
2	0.66	0.47	1.4	2.06	1.85	6.6	6.2	8.7	9.7
3	1.12	1.27	2.72	3.71	3.61	12.9	12.7	15.6	16.5
4	1.59	1.81	4.12	5.57	5.67	18.9	19.05	22.7	23.5
5		2.63	5.57	7.21	7.71	24.8	25.9	30.4	31.1
6			6.97	8.93	9.57	30.2	31.3	40.4	39.7
7			7.77	10.31	11.65	35.7	37.1	49	46.6
8				10.93	13.5	39.4	40.2	54.2	55.4
9					15.2	50.2		78.3	82.5
10					16.5	70			107.3

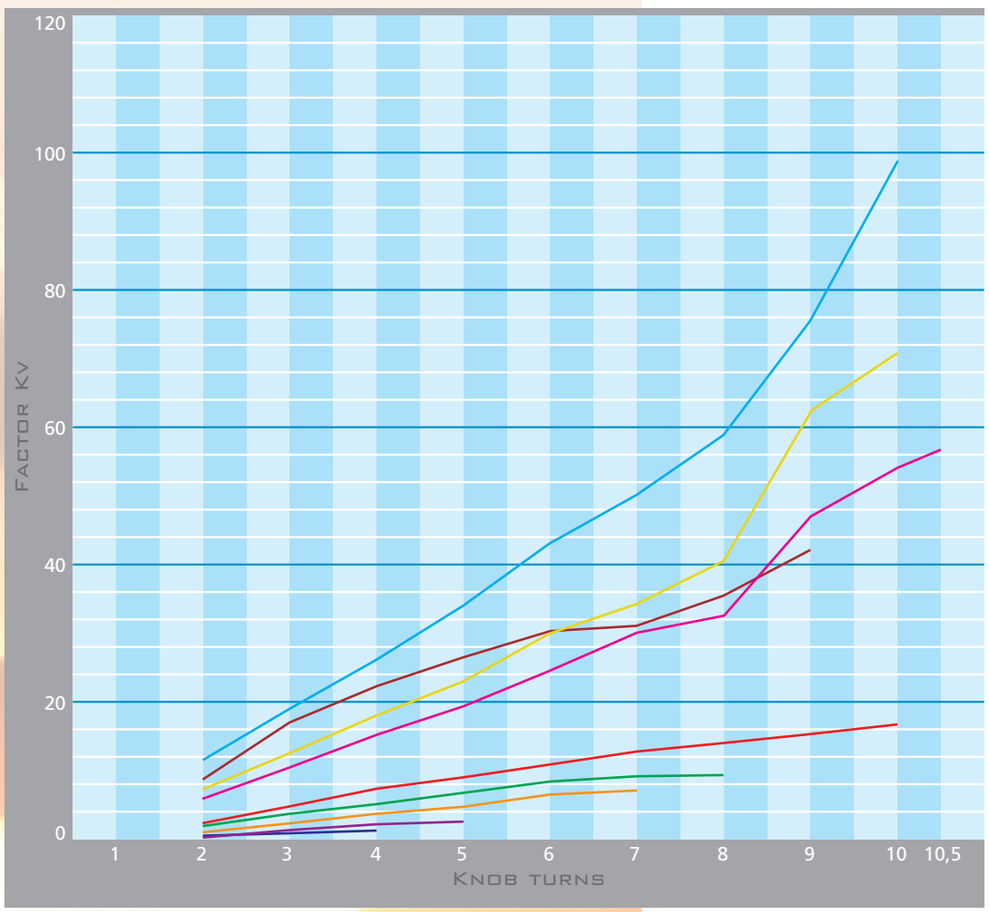


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KV GRAPHIC OF VALVES FT 257/5

KNOB TURNS	TYPE 18	TYPE 14	TYPE 38	TYPE 12	TYPE 34	TYPE 100	TYPE 114	TYPE 112	TYPE 200
1									
2	0.57	0.49	1.11	1.85	2.3	8.97	6.4	7	11.8
3	0.95	1.4	2.84	3.92	5.1	17.2	10.9	12.3	18.8
4	1.3	2.1	3.92	5.48	7.4	22.8	15.2	17.8	26.3
5		2.84	4.95	6.95	9.2	26.8	19.8	23.3	34.4
6			5.83	8.39	11.2	29.9	24.4	28.9	43.5
7			6.68	9.03	13.2	31.7	29.1	34.2	49.9
8				9.73	14.6	35.8	32.5	40.1	57.7
9					15.5	42.06	47.6	62.9	75.9
10					17.1		53.3	71.1	99.1
10,5							56.3		

Type 18
Type 14
Type 38
Type 12
Type 34
Type 100
Type 114
Type 112
Type 200



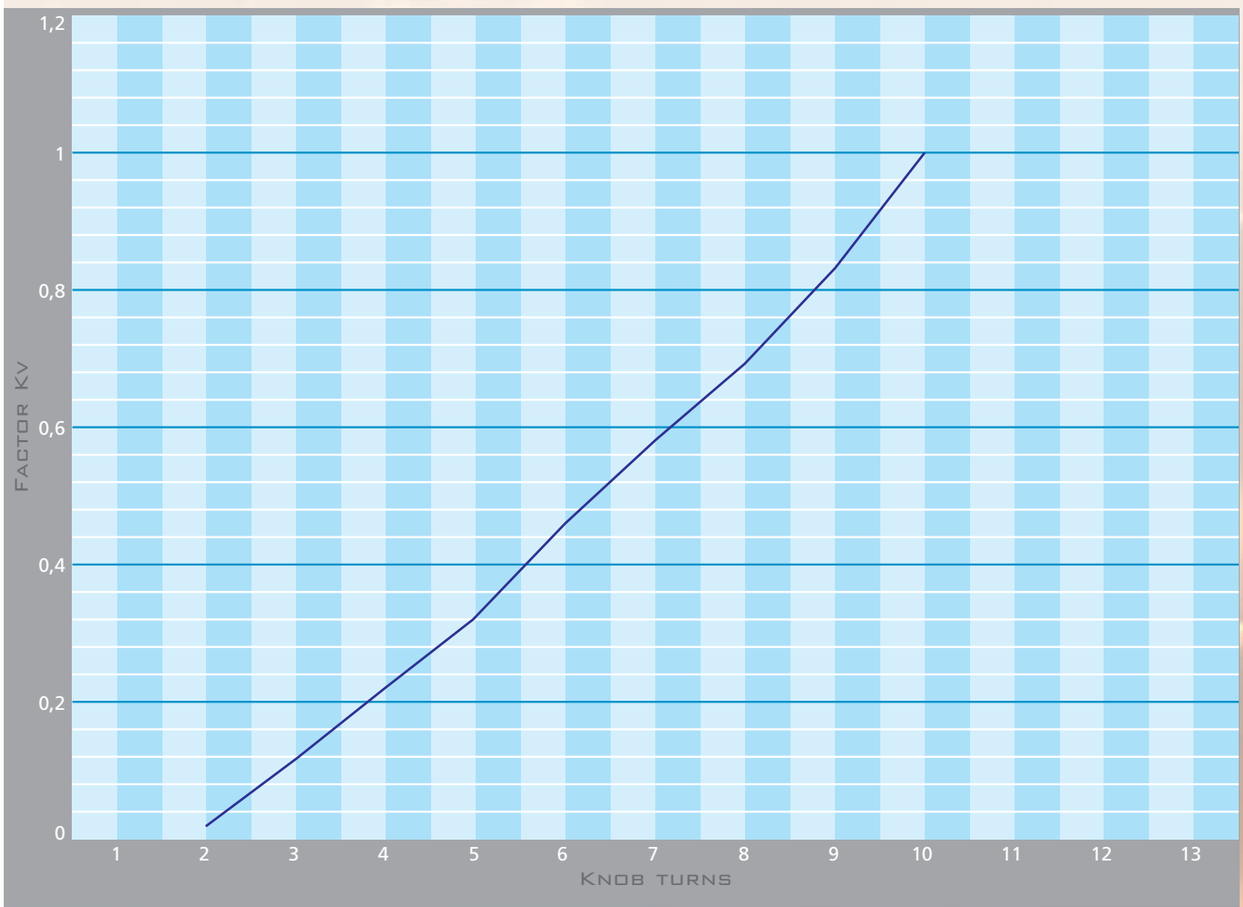
KV FACTOR FREE FLOW FOR VALVE FT 1251/5

TIPO	KV
18	4.23
14	10.9
38	27.74
12	48.98
34	63.5
100	77.5
114	153.5
112	205
200	360

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KV FACTOR ON VALVES FT 247/2

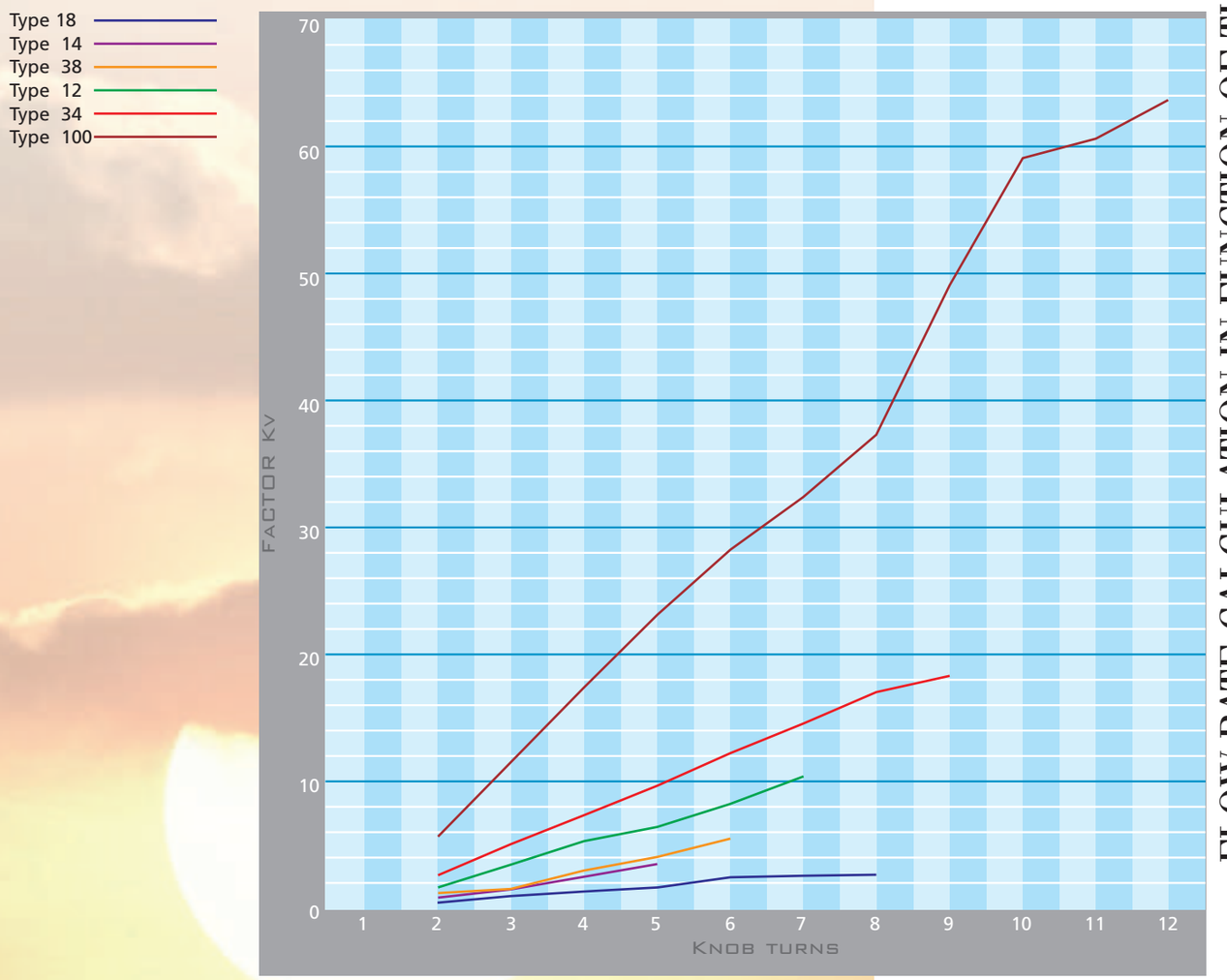
Knob turns	Type 18 Microfine
1	
2	0.023
3	0.124
4	0.226
5	0.323
6	0.468
7	0.567
8	0.691
9	0.830
10	1



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KV GRAPHIC FOR VALVES FT 267/2

Knob turns	Type 18	Type 14	Type 38	Type 12	Type 34	Type 100
1						
2	0.62	0.72	0.93	1.69	2.62	5.98
3	0.95	1.56	1.69	3.5	5.01	11.75
4	1.28	2.38	2.91	5.15	7.4	17.32
5	1.77	3.52	4	6.37	9.69	23.2
6	2.41		5.65	8.04	12.16	28.04
7	2.6			10.31	14.93	32.6
8	2.7				17.32	37.5
9					18.64	49
10						58.3
11						61.3
12						63.96



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KV GRAPHIC FOR VALVES FT 267/5

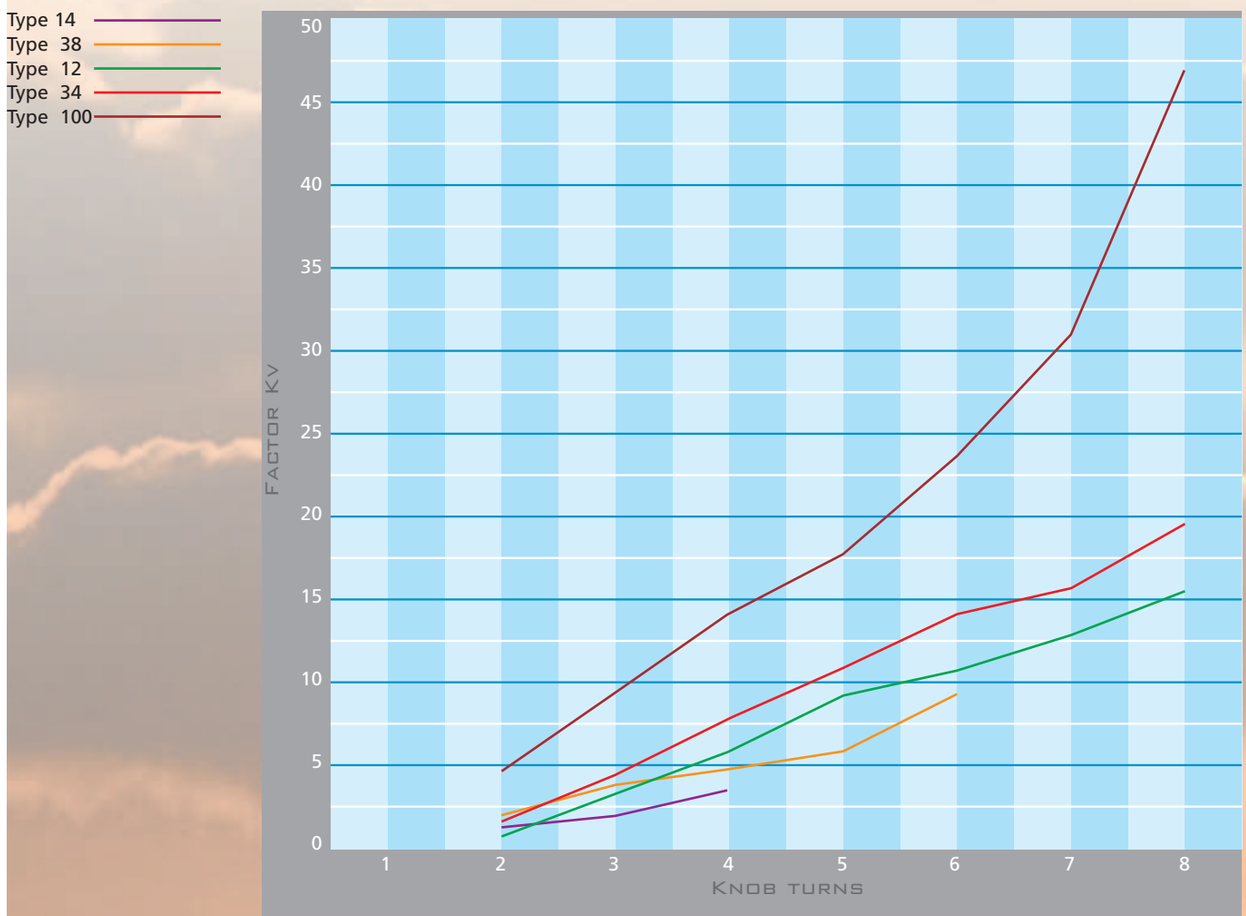
Knob turns	Type14	Type 38	Type 12	Type 34	Type 100
1					
2	1.24	2.16	0.87	1.54	3.92
3	2.31	3.71	3.13	4.35	8.76
4	3.35	4.91	6	7.68	13.36
5		6.18	8.7	11.32	17.73
6		8.82	10.8	13.98	23.7
7			12.9	16.74	31.5
8			15.6	19.09	47.1

KV FACTOR FREE FLOW FOR VALVE FT 267/5

Tipo	Kv
14	9.7
38	23.7
12	40.2
34	51.5
100	67

KV FACTOR FREE FLOW FOR VALVE FT 267/6

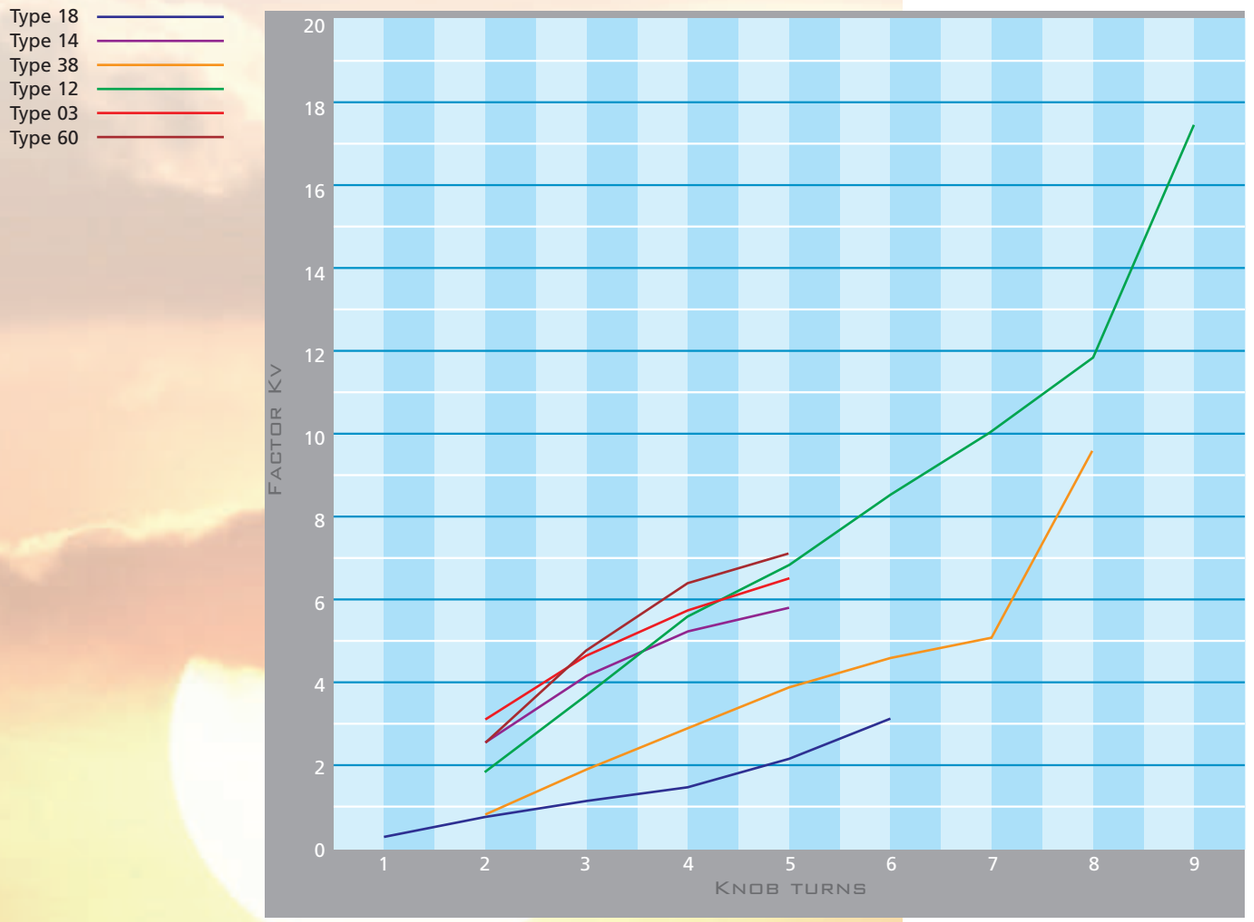
Tipo	Kv
14	17.9
38	26.7
12	49.4
34	69.9



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KV GRAPHIC FOR VALVESFT 280/2

Knob turns	Type 18	Type 14	Type 38	Type 12	Type 03	Type 60
1	0.39					
2	0.72	2.68	0.82	1.9		2.68
3	1.11	4.12	1.94	3.7	3.09	4.64
4	1.48	5.24	2.89	5.6	4.33	6.39
5	2.23	5.71	3.71	6.8	5.85	7.05
6	3.23		4.6	8.5	6.49	
7			5.07	10		
8			9.73	11.8		
9				17.5		



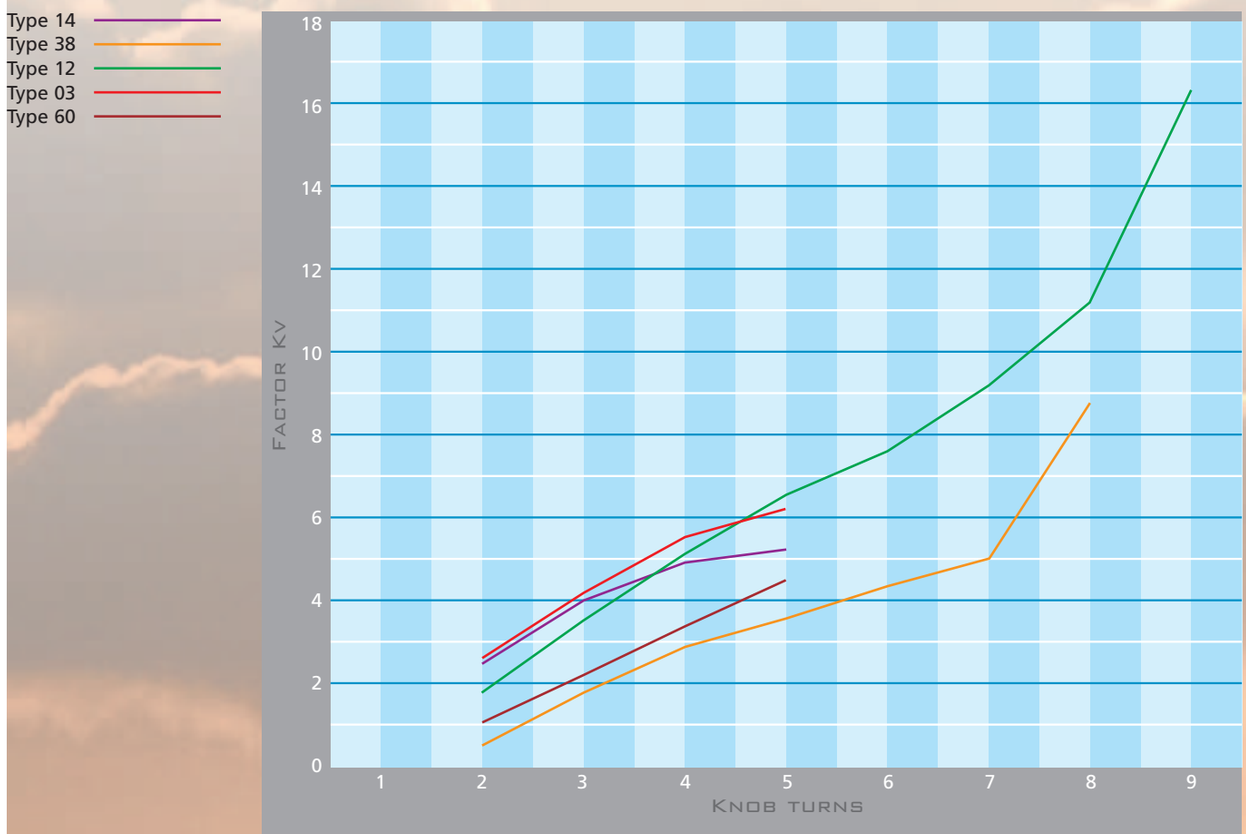
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KV GRAPHIC FOR VALVES FT 280/5

Knob turns	Type 14	Type 38	Type 12	Type 03	Type 60
1					
2	2.47	0.62	1.85	2.51	1.03
3	4	1.85	3.52	4.15	2.23
4	4.95	2.9	5.15	5.54	3.4
5	5.24	3.5	6.64	6.18	4.45
6		4.3	7.59		
7		5	9.28		
8		8.7	11.3		
9			16.29		

KV FACTOR FREE FLOW FOR VALVE FT 280/5

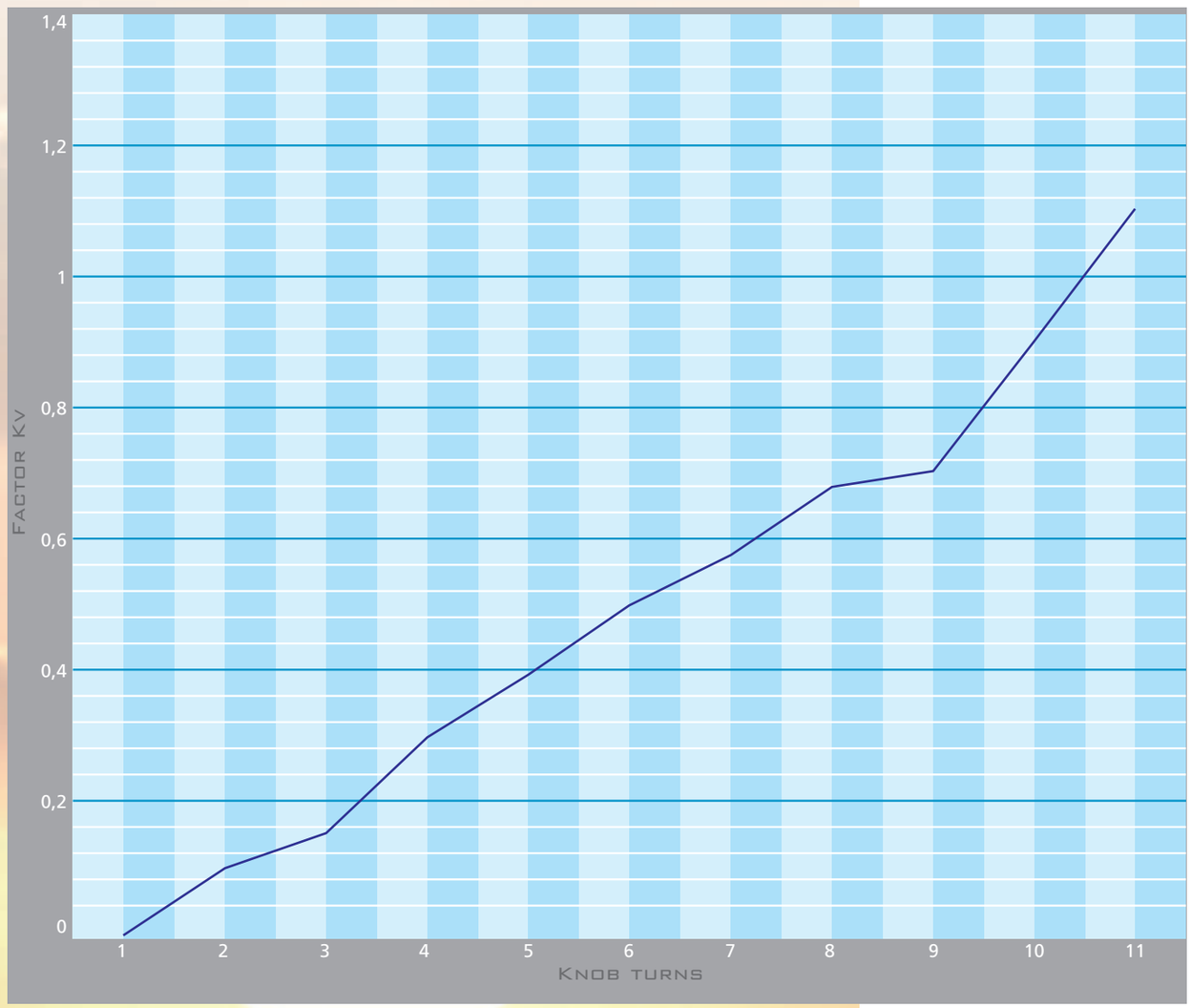
Tipo	Kv
14	6.8
38	13.15
12	28.45
03	7.21
60	8.25



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KV FACTOR ON VALVES FT 281/5

Knob turns	Factor Kv
1	0.0087
2	0.087
3	0.152
4	0.248
5	0.394
6	0.493
7	0.574
8	0.641
9	0.7
10	0.92
11	1.152



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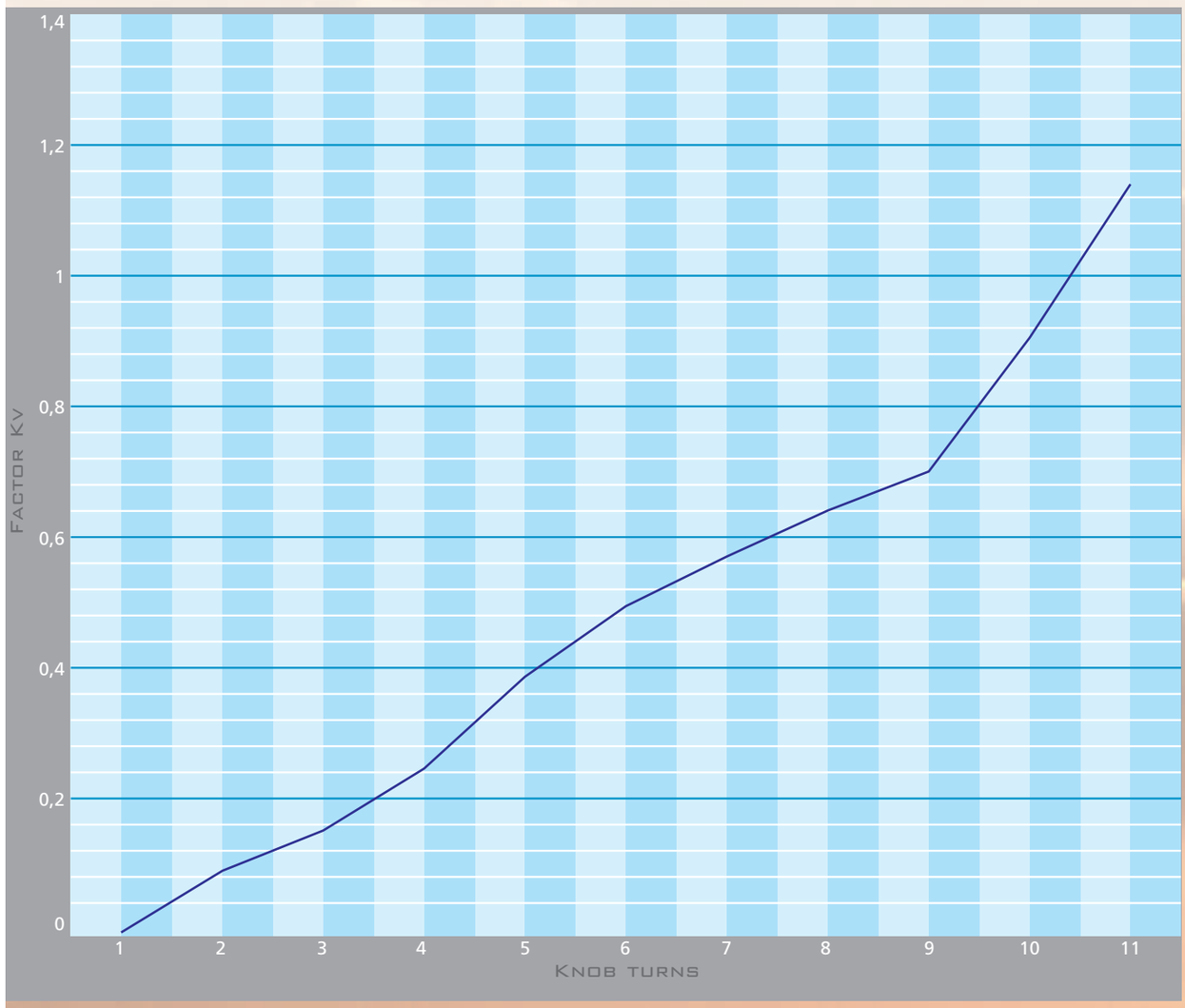
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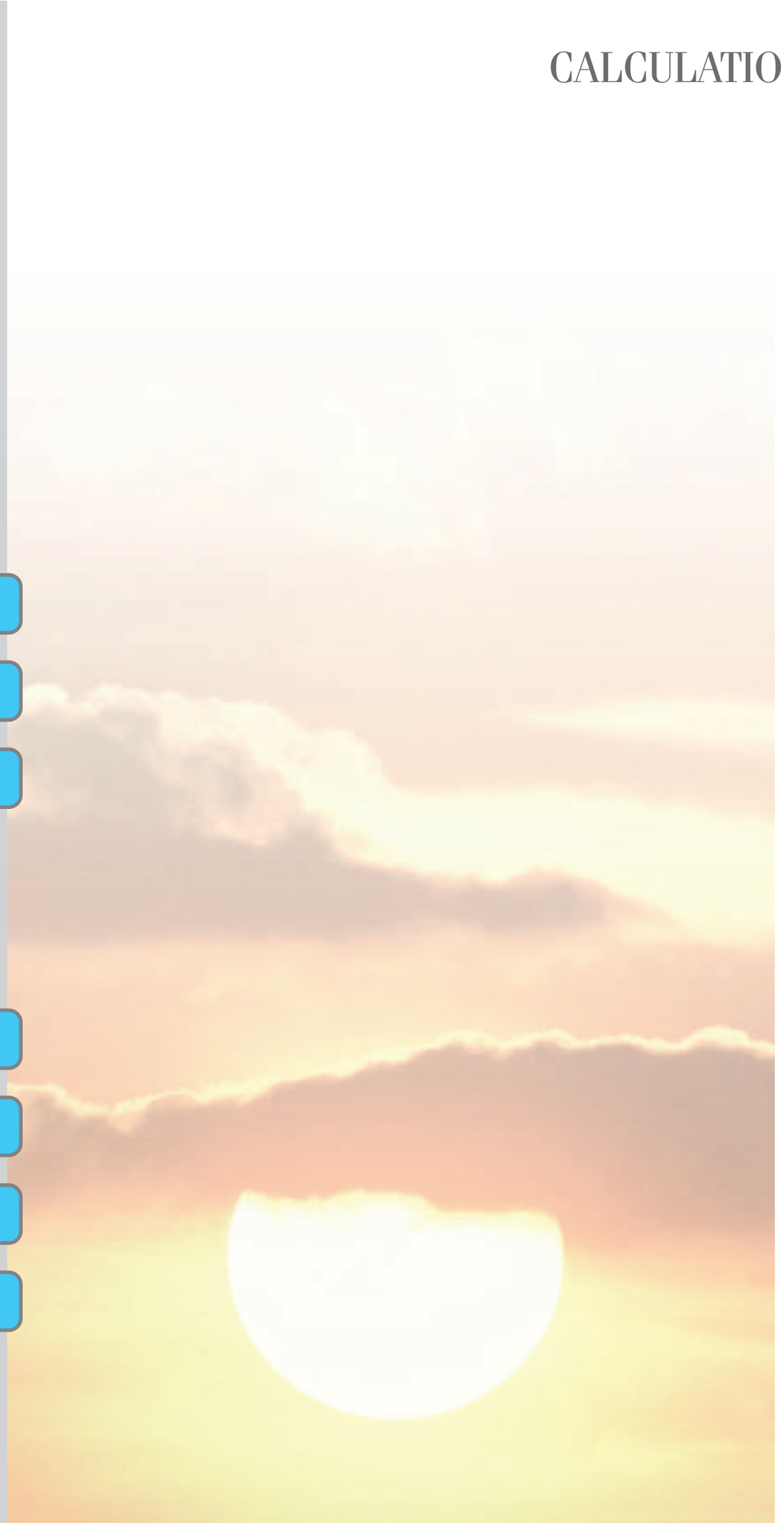
KV FACTOR FLOW FOR VALVE FT 281/5

Knob	Fattore Kv
1	0.012
2	0.087
3	0.152
4	0.248
5	0.394
6	0.493
7	0.571
8	0.641
9	0.7
10	0.912
11	1.146

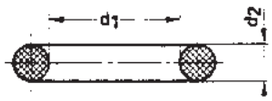
KV FACTOR FREE FLOW FOR VALVE FT 281/5

Type	Kv
03	5.58





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Ref. n.	code	O - Ring size		
		Ød 1	Ød 2	A Øext.
OR 2007	004	1,78	1,78	5,34
OR 2010	005	2,57	1,78	6,13
OR 2012	006	2,90	1,78	6,46
OR 2015	007	3,69	1,78	7,25
OR 2018	008	4,48	1,78	8,04
OR 2021	009	5,28	1,78	8,84
OR 2025	010	6,07	1,78	9,63
OR 106	–	6,75	1,78	10,31
OR 2031	011	7,66	Ø1,78	11,22
OR 108	–	8,73	1,78	12,29
OR 2037	012	9,25	1,78	12,81
OR 2043	013	10,82	1,78	14,38
OR 114	–	11,11	1,78	14,67
OR 2050	014	12,42	1,78	15,98
OR 2056	015	14,00	1,78	17,56
OR 2062	016	15,60	1,78	19,16
OR 2068	017	17,17	1,78	20,73
OR 2075	018	18,77	1,78	22,33
OR 2081	019	20,35	1,78	23,91
OR 2087	020	21,95	1,78	25,51
OR 2093	021	23,52	1,78	27,08
OR 2100	022	25,12	1,78	28,68
OR 2106	023	26,70	1,78	30,26
OR 2112	024	28,30	1,78	31,86
OR 2118	025	29,87	1,78	33,43
OR 2125	026	31,47	1,78	35,03
OR 2131	027	33,05	1,78	36,61
OR 2137	028	34,65	1,78	38,21
OR 2150	029	37,82	1,78	41,38
OR 2162	030	41,00	1,78	44,56
OR 2175	031	44,17	1,78	47,73
OR 2187	032	47,35	1,78	50,91
OR 2200	033	50,52	1,78	54,08
OR 2212	034	53,70	1,78	57,26
OR 2224	035	56,87	1,78	60,43
OR 2237	036	60,05	1,78	63,61
OR 2250	037	63,22	1,78	66,78
OR 2262	038	66,40	1,78	69,96
OR 2275	039	69,57	1,78	73,13
OR 2287	040	72,75	1,78	76,31
OR 3021	107	5,23	2,62	10,47
OR 3024	108	6,02	2,62	11,26
OR 3030	109	7,59	2,62	12,83
OR 109	–	9,13	2,62	12,83
OR 3037	110	9,19	2,62	14,43
OR 112	–	9,92	2,62	15,16
OR 3043	111	10,78	2,62	16,02
OR 115	–	11,91	2,62	17,15
OR 3050	112	12,37	2,62	17,61
OR 117	–	13,10	2,62	18,34
OR 3056	113	13,95	2,62	19,19
OR 119	–	15,08	2,62	20,32
OR 3062	114	15,54	2,62	20,78
OR 121	–	15,88	2,62	21,12
OR 3068	115	17,13	2,62	22,37
OR 123	–	17,86	2,62	23,10
OR 3075	116	18,72	2,62	23,96
OR 3081	117	20,24	2,62	25,48
OR 128	–	20,63	2,62	25,87
OR 3087	118	21,89	2,62	27,24

Ref. n.	code	O - Ring size		
		Ød 1	Ød 2	A Øext.
OR 130	–	22,22	2,62	27,46
OR 3093	119	23,47	2,62	28,71
OR 132	–	23,81	2,62	29,05
OR 3100	120	25,07	2,62	30,31
OR 3106	121	26,65	2,62	31,89
OR 3112	122	28,25	2,62	33,49
OR 3118	123	29,82	2,62	35,06
OR 3125	124	31,42	2,62	36,66
OR 3131	125	32,99	2,62	38,23
OR 3137	126	34,60	2,62	39,84
OR 3143	127	36,14	2,62	41,38
OR 3150	128	37,77	2,62	43,01
OR 3156	129	39,34	2,62	44,58
OR 3162	130	40,95	2,62	46,19
OR 3168	131	42,52	2,62	47,76
OR 3175	132	44,12	2,62	49,36
OR 3181	133	45,69	2,62	50,93
OR 3187	134	47,30	2,62	52,54
OR 3193	135	48,89	2,62	54,13
OR 3200	136	50,47	2,62	55,71
OR 4028	203	7,51	3,53	14,57
OR 4036	204	9,12	3,53	16,18
OR 4050	206	12,29	3,53	19,35
OR 4055	207	13,87	3,53	20,93
OR 4061	208	15,47	3,53	22,53
OR 4067	209	17,04	3,53	24,10
OR 4075	210	18,64	3,53	25,70
OR 4081	211	20,22	3,53	27,28
OR 4087	212	21,82	3,53	28,88
OR 4093	213	23,40	3,53	30,46
OR 4100	214	24,99	3,53	32,05
OR 134	–	25,80	3,53	32,86
OR 4106	215	26,58	3,53	33,64
OR 4112	216	28,17	3,53	35,23
OR 4118	217	29,75	3,53	36,81
OR 4125	218	31,34	3,53	38,40
OR 4131	219	32,93	3,53	39,99
OR 4137	220	34,52	3,53	41,58
OR 4143	221	36,10	3,53	43,16
OR 4150	222	37,69	3,53	44,75
OR 144	–	39,69	3,53	46,75
OR 4162	223	40,86	3,53	47,92
OR 146	–	41,28	3,53	48,34
OR 147	–	42,86	3,53	49,92
OR 4175	224	44,04	3,53	51,10
OR 149	–	44,45	3,53	51,51
OR 150	–	46,04	3,53	53,10
OR 4187	225	47,22	3,53	54,28
OR 152	–	47,63	3,53	54,69
OR 153	–	49,21	3,53	56,27
OR 4200	226	50,39	3,53	57,45
OR 155	–	50,80	3,53	57,86
OR 156	–	52,39	3,53	59,45
OR 4212	227	53,57	3,53	60,63
OR 158	–	53,98	3,53	61,04
OR 159	–	55,56	3,53	62,62
OR 4225	228	56,74	3,53	63,80
OR 161	–	57,15	3,53	64,21
OR 162	–	58,74	3,53	65,80
OR 4237	229	59,92	3,53	66,98

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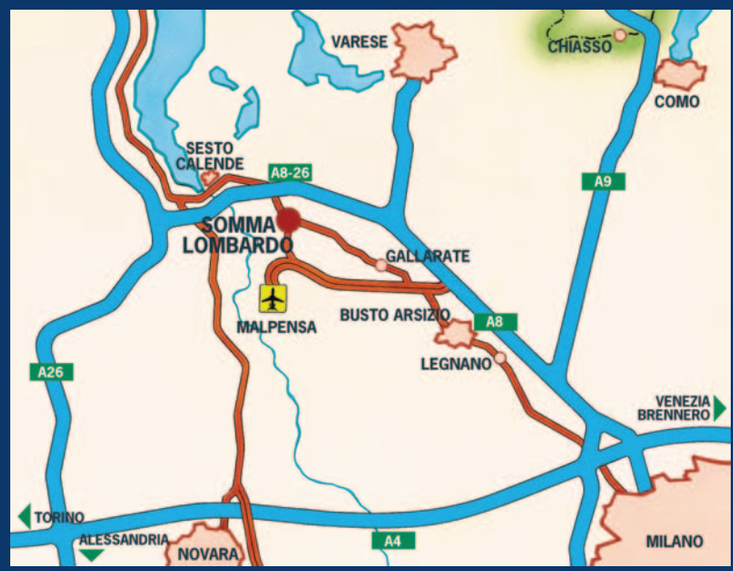
SALES ORGANIZATION

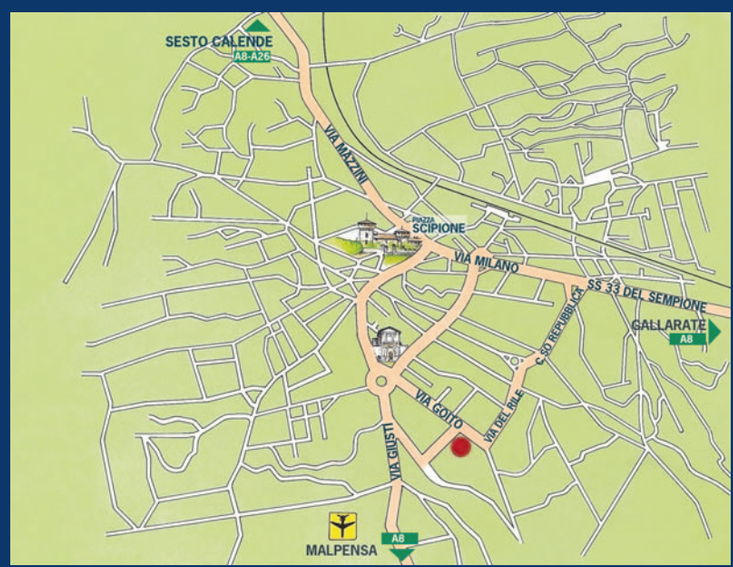
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BERGAMO
BOLOGNA
BOLZANO
BRESCIA
CAGLIARI
CAMPOBASSO
CASERTA
CATANIA
CHIETI
COMO
COSENZA
CREMONA
CUNEO
FERRARA
FIRENZE
FORLÌ
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GENOVA
LA SPEZIA
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LIVORNO
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