MICRO-FLOW VALVES
SERIES 01 - GROUP 30

Master Handbook Description: Guidebook to the choice, use and maintenance of micro-flow valves (English)

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1 Foreword

Microflow valves have been designed to be used on sampling and/or laboratory machines for which low capacity values, necessary for applications, are extremely important.
Classification about 2014/68/UE directive : Art. 4. Par 3.
The materials used to manufacture this type of valves allow their application mainly in the textile-dyeing sector and in the plant engineering field. They can also be used in the chemical and pharmaceutical sector, upon agreement with our technical department about each application.
Table 1 includes a list of fluids which are perfectly compatible with valves.
For any other fluid or use, which has not been expressly indicated in this manual, contact directly our service department.

2 Legend

- $\Delta p_{allowable}$ (allowable differential pressure): maximum allowable value, at a given temperature, of the static differential pressure of a valve in closed position (EN 7363).

- **Allowable temperature**: maximum operating temperature prescribed for safety reasons.

- **Allowable pressure**: maximum operating pressure, normally at the top of each department of the pressure equipment, prescribed for safety reasons (UNI EN 764).

- **ND**: is an alphanumeric designation of size for components of a pipework system, which is used for reference purposes.
  It comprises the ND letters followed by a dimensionless whole number which is indirectly related to the physical dimension, expressed in millimetres, of the hole or of the outer diameter of the ends of connection pipes (ISO 6708: 1995)

- **Kv**: capacity, expressed in m3/h, of water (10 to 25 °C with volumic mass equal to 1000 Kg/m3) passing through two ways of a valve with a Δp pressure drop of 100 KPa (1 bar).

$$Kv = \frac{Q}{\sqrt{\Delta p}}$$

  where: Q is the capacity in m3/h
  Uni 9753: 1990).

P2: pressure measured on the valve outlet connection (value equal to 0 bar).

3 Requests

In case of requests, indicate the following data:
- Serial number (printed on the rating plate)
- Type, nominal diameter and version (they are also specified on the rating plate)
- Fluid pressure and temperature
- Capacity in m3/h
- Installation drawing

4 Technical Characteristics

General notice:: ⇒ all the pressure values indicated hereinafter are gauge pressure values.
⇒ **valve destined to fluids of group 2 (directive 2014/68/UE).**

ND: ⇒ 8 – 11.

Connections: ⇒ 1/4”-3/8” GAS internal threaded (F).
⇒ 1/4”-3/8” GAS external threaded (M).
⇒ butt welding (0).
⇒ socket welding (ST).

Pmax allowable: ⇒ 40 bar.

Pmin allowable: ⇒ 0 bar.

Tmax allowable: ⇒ 150° C.

Tmin allowable: ⇒ - 10° C (liquid phase).

Flow direction: ⇒ 2-way globe valve, with angle and oblique body, unidirectional.

Attacco aria: ⇒ 1/8” GAS.

Supply fluid*:* ⇒ instrument air.

Supply pipes: ⇒ pipe inner diameter = 4 mm, min. outer diameter = 6 mm, able to bear the supply Pmax under the environmental conditions of the plant where the valve has to be assembled.

Supply Pmin: ⇒ 6 bar.

Supply Pmax: ⇒ 10 bar.

Air consumption (NC): ⇒ 0,087 Nl/cycle at a pressure of 6 bar.

Air Consumption (NO): ⇒ 0,072 Nl/cycle at a pressure of 6 bar.

Working materials: ⇒ See DWG.010652 – DWG.010652 and relevant tables.

Overall dimensions: ⇒ See overall dimensions drawings and relevant tables.

Micro-flow valve with right angle body

Micro-flow valve with 45° angle body

4.1 Table: Kv And Operating Δp For Microflow Valves

	NC		NO	
ND	8	11	8	11
$Kv_{teor.}$[m^3/h]	1,2	2,3	1,2	2,3
Δp allowable with P_2=0 bar [bar]	20	12	17	10

4.2 Fluids Compatible With Microflow Valves

Table 1	
Vinyl acetate	Potassium chlorate 30% max
Phenol acetylene	Sodium chloride 20% max
Glycerol fatty acids	Potassium chloride 5% max
Phenol	Butyl ether
Phosphoric acid 20% max..	Petroleum ether
Phthalic acid	Dibenzile ether
Gallic acid	Dibutyl ether
Nitric acid 5% - 65% max	Ethylene glycol
Oleic acid	Ammonium nitrate
Stearic acid	Copper nitrate
Tannic acid	Sodium nitrate
Butanol	Ethylene perchlorate
Ethanol	Potassium sulphate 20% max at T=100 °C
Methanol	Sodium sulphate
Propanol	Zinc sulphate 40% max at T=100 °C
Aniline	Potassium sulphite 10% max
Sodium carbonate 20% max	Sodium sulphide
Borax (sodium tetraborate)	Toluene
Sodium carbonate	Steam (T_{max}= 140 °C)

All data are general and are not valid for all possible working conditions. These data may considerably vary depending upon various conditions, such as: temperature, concentration, fluid speed.
For reliable and exhaustive information, please get in touch with the technical department.
Any use of the valve on explosive, easily inflammable, comburent and toxic gases is strictly forbidden.
Use of the valve on liquids based on: chlorine, fluorine, bromine, iodine and derivative elements is strictly forbidden.
Any deviation from such prohibitions may be issued for special applications, by our technical department, upon written request.

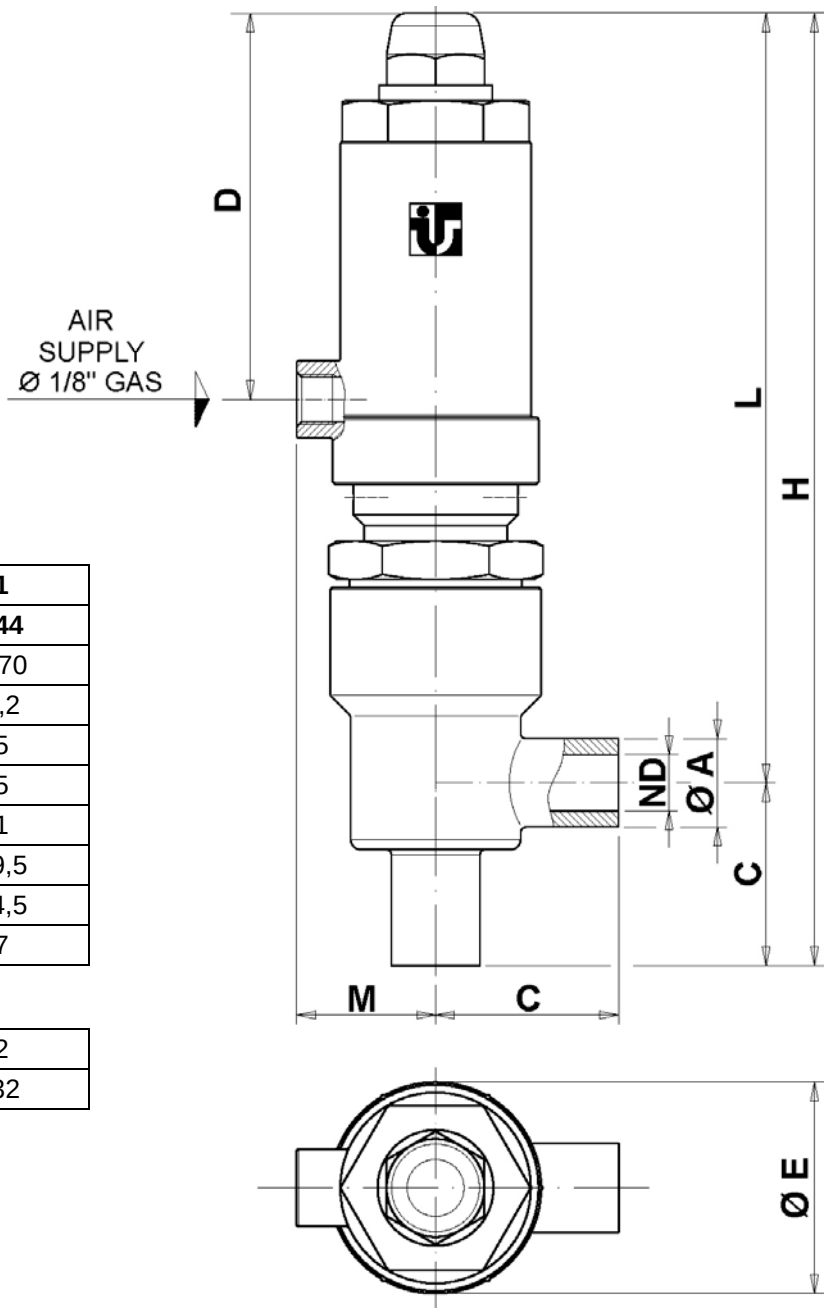
4.3 Safety Notes

- The valve body, under the maximum operating temperature conditions, depending upon the system, may reach a temperature T equal to 150 °C. It is up to the engineer to provide the system with the necessary safety guards and/or warning signals aiming at removing/indicating the risk of possible burns by the user.
- On each valve 2 inspection holes have been made (located on the intermediate body). Their scope is to signal any loss from the stem seal. They are extremely important as they limit the passage of fluid into the air circuit and warn about the loss, preventing the instrument air from being contaminated. It is up to the engineer to provide the system with the necessary safety guards and/or warning signals aiming at removing/indicating the risk of contact with the fluids (that might be dangerous) by the user.
- Whatever operation may be performed on the valve, the fluid must be present neither in pipes, nor inside the valve itself.

4.4 Microflow Valves Overall Dimensions

4.4.1 IMS/0 N.C. D.V. Cat. 21

Globe valve with right angle body.
Butt welding ends.
Servo control normally closed.
Visual device indicating that the valve is open.



ND	8	11
CODE	**6743**	**6744**
weight [Kg]	0,770	0,770
A	13,7	17,2
C	35	35
D	75	75
E	41	41
L	151	149,5
H	186	184,5
M	27	27

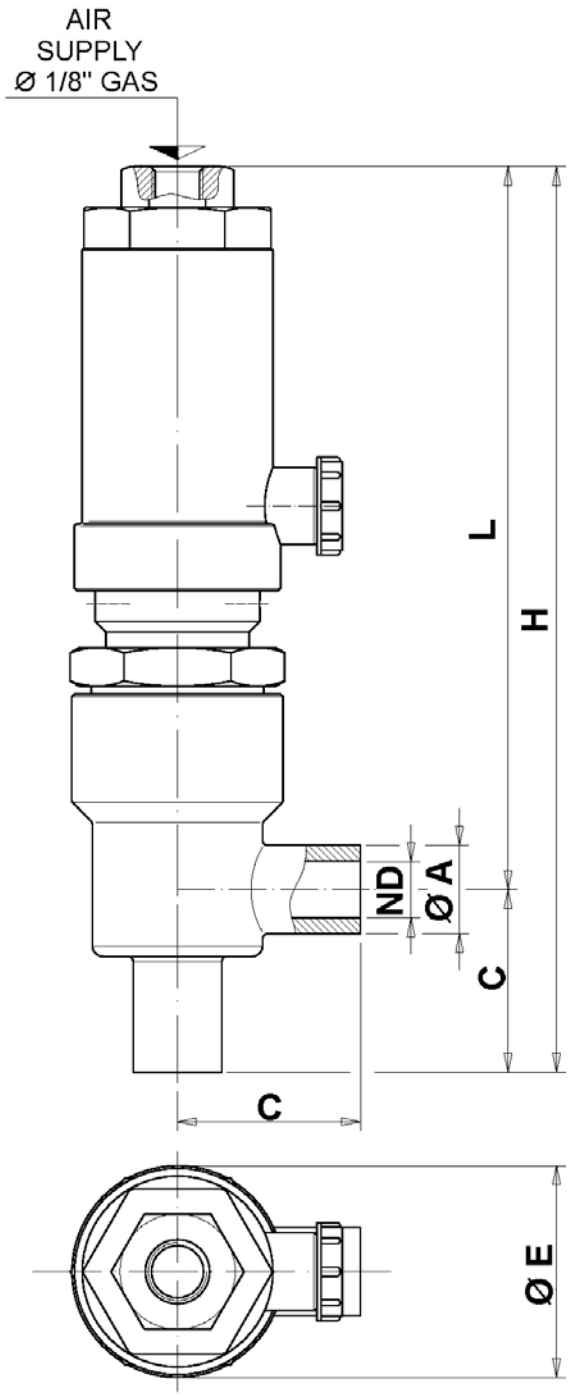
Main dimensioning parameters

Δp [bar]	20	12
Kv	1,22	2,32

Dwg. N° 010749 Rev.:00

4.4.2 IMS/0 N.O. Cat. 23

Globe valve with right angle body.
Butt welding ends.
Servo control normally open. The valve open or closed condition is not indicated



ND	8	11
CODE	**6755**	**6756**
Weight [Kg]	0,790	0,790
A	13,7	17,2
C	35	35
E	41	41
L	142	140,5
H	177	175,5

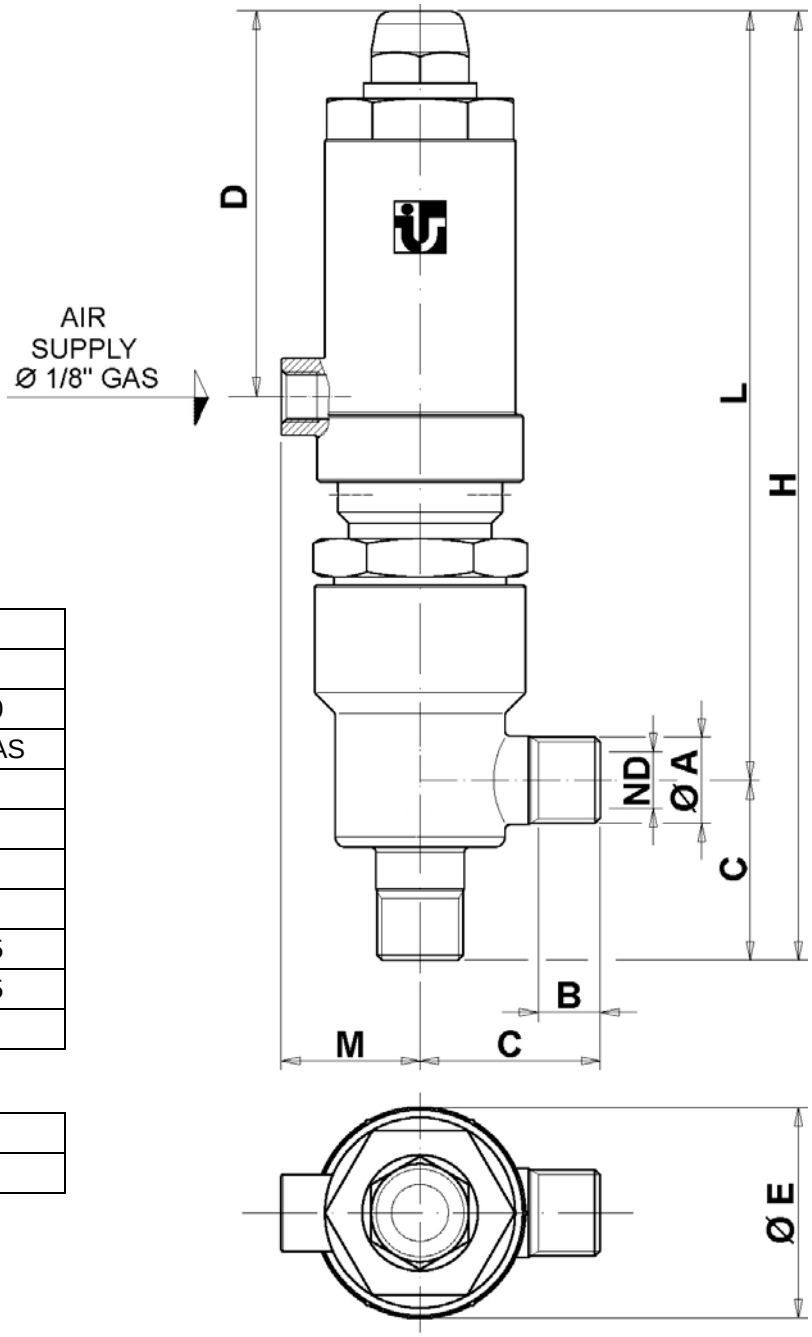
Main dimensioning parameters

Δp [bar]	17	10
Kv	1,22	2,32

Dwg. N° 010750 Rev.:00

4.4.3 IMS/M N.C. D.V. Cat. 24

Globe valve with right angle body.
Gas outside threaded ends.
Servo control normally closed.
Visual device indicating that the valve is open.



ND	8	11
CODE	**6745**	**6746**
Weight [Kg]	0,770	0,770
A	1/4" GAS	3/8" GAS
B	12	12
C	35	35
D	75	75
E	41	41
L	151	149,5
H	186	184,5
M	27	27

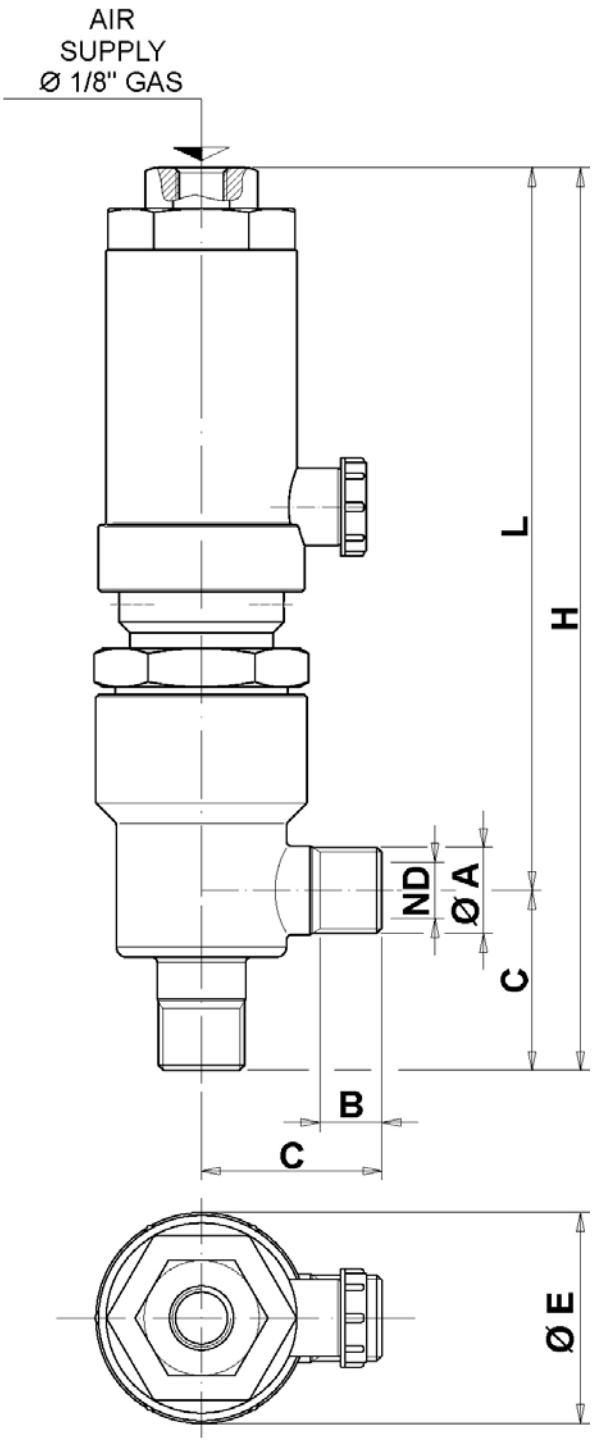
Main dimensioning parameters

Δp [bar]	20	12
Kv	1,22	2,32

Dwg. N° 010751 Rev.:00

4.4.4 IMS/M N.O. Cat. 26

Globe valve with right angle body.
Gas outside threaded ends.
Servo control normally open.
The valve open or closed condition is not indicated.



ND	8	11
CODE	**6757**	**6758**
Weight [Kg]	0,790	0,790
A	1/4" GAS	3/8" GAS
B	12	12
C	35	35
E	41	41
L	142	140,5
H	177	175,5

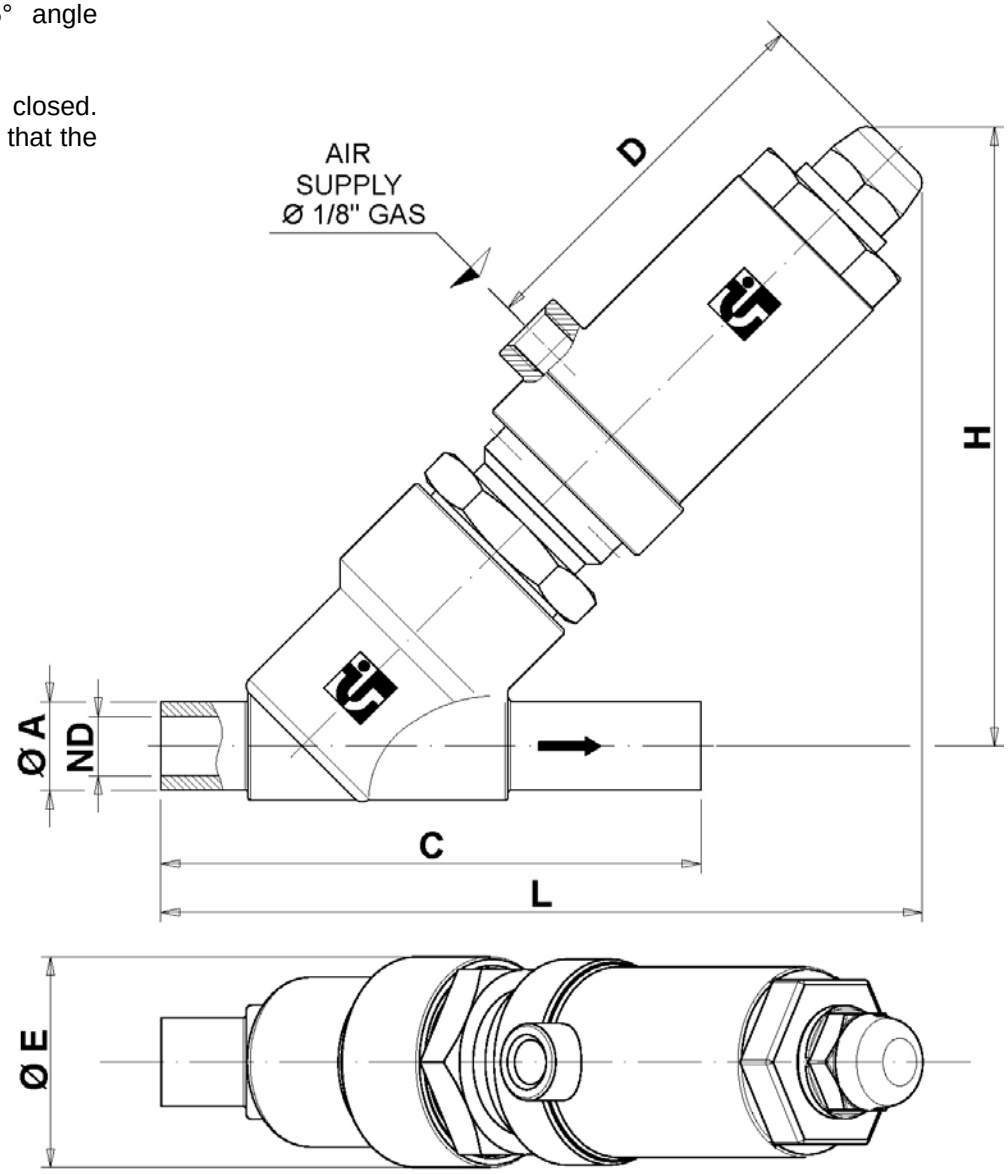
Main dimensioning parameters

Δp [bar]	17	10
Kv	1,22	2,32

Dwg. N° 010752 Rev.:00

4.4.5 IMF/0 N.C. D.V. Cat. 30

Globe valves with 45° angle body.
Butt welding ends.
Servo control normally closed.
Visual device indicating that the valve is open.



ND	8	11
CODE	**6747**	**6748**
Weight [Kg]	0,840	0,840
A	13,7	17,2
C	105	105
D	75	75
E	41	41
L	148	148
H	121	121

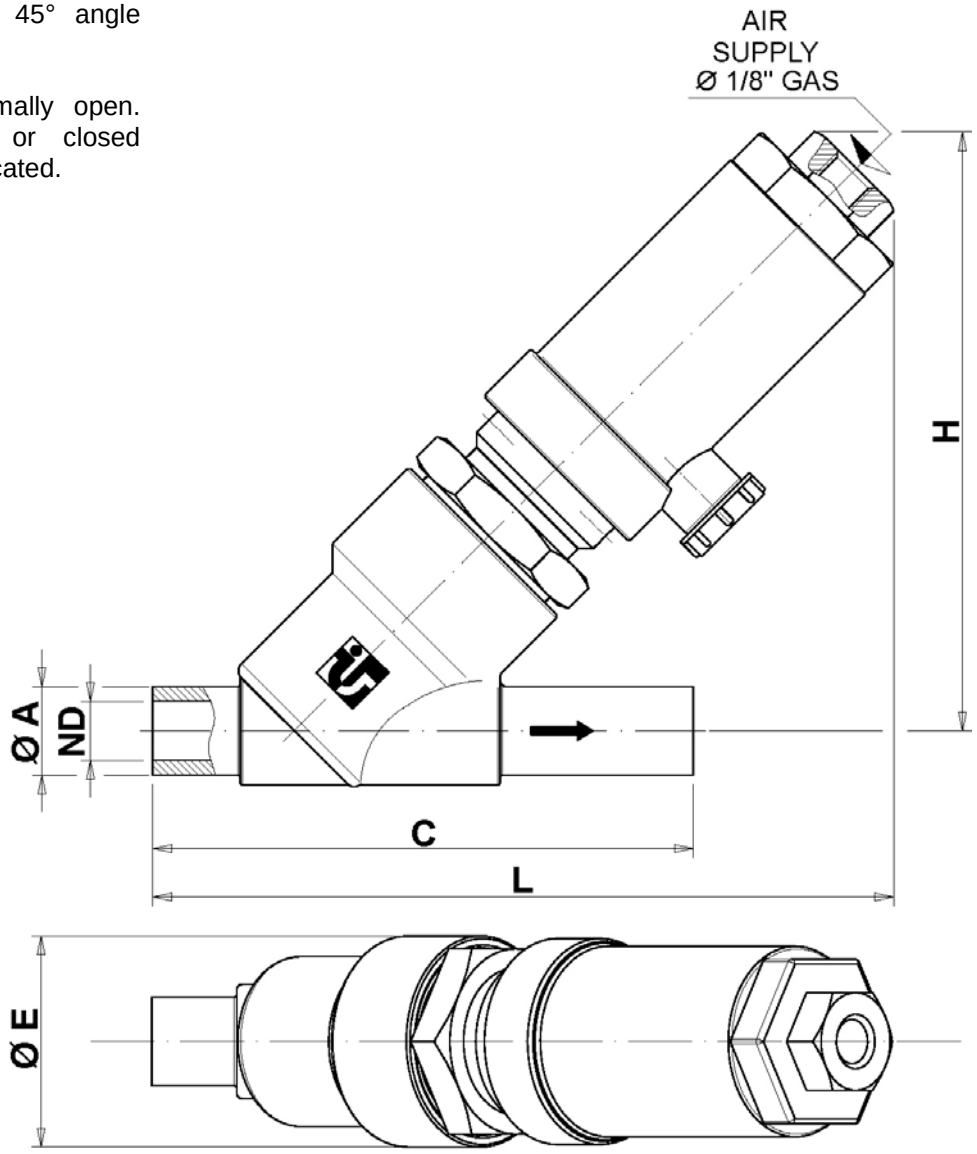
Main dimensioning parameters

Δp [bar]	20	12
Kv	1,22	2,32

Dwg. N° 010753 Rev.:00

4.4.6 IMF/0 N.O. Cat. 31

Globe valves with 45° angle body.
Butt welding ends.
Servo control normally open.
The valve open or closed condition is not indicated.



ND	8	11
CODE	**6759**	**6760**
Weight [Kg]	0,860	0,860
A	13,7	17,2
C	105	105
E	41	41
L	144	144
H	117	117

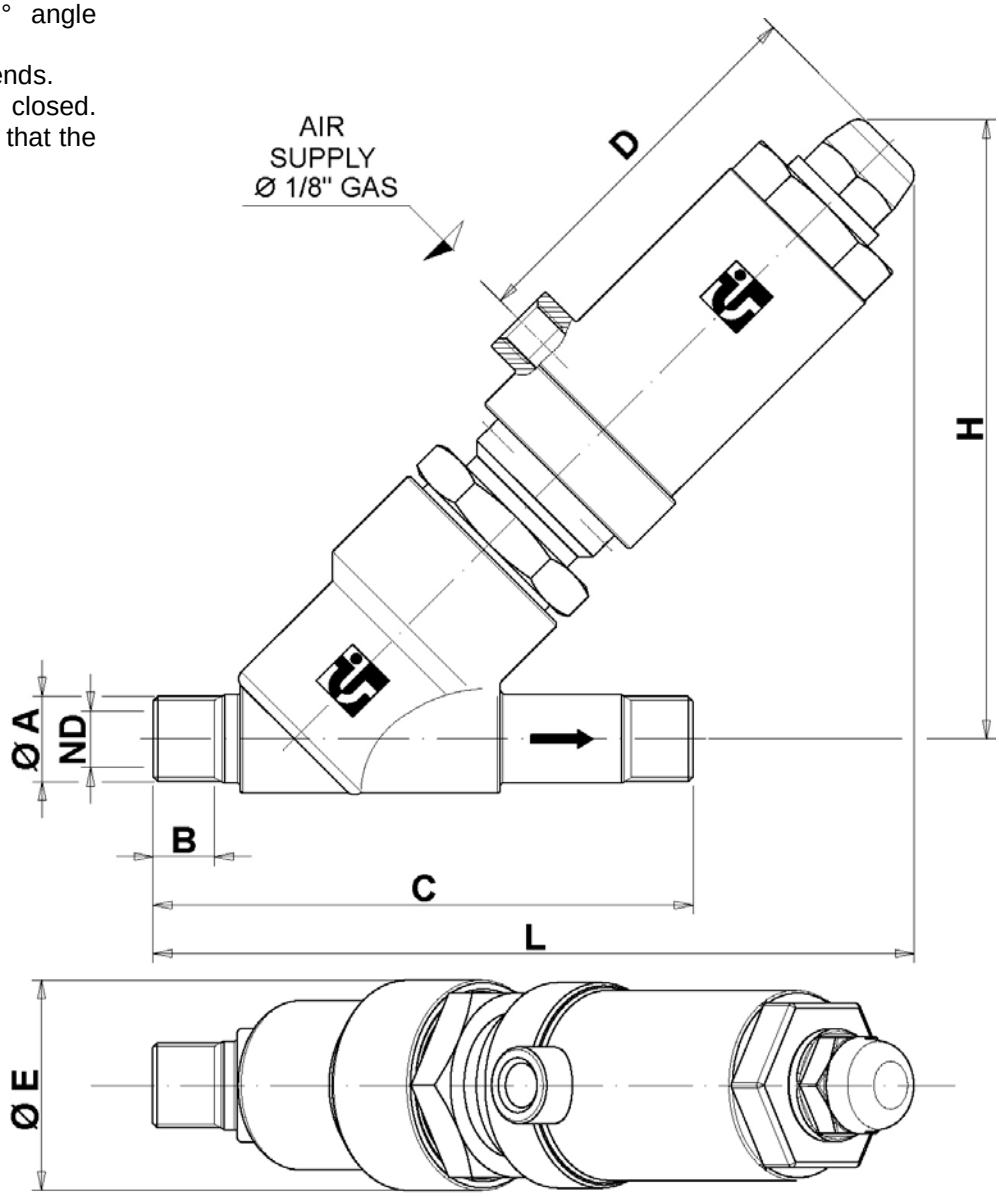
Main dimensioning parameters

Δp [bar]	17	10
Kv	1,22	2,32

Dwg. N° 010754 Rev.:00

4.4.7 IMF/M N.C. D.V. Cat. 32

Globe valves with 45° angle body.
Gas outside threaded ends.
Servo control normally closed.
Visual device indicating that the valve is open.



ND	8	11
CODE	**6749**	**6750**
Weight [Kg]	0,840	0,840
A	1/4" GAS	3/8" GAS
B	12	12
C	105	105
D	75	75
E	41	41
L	148	148
H	121	121

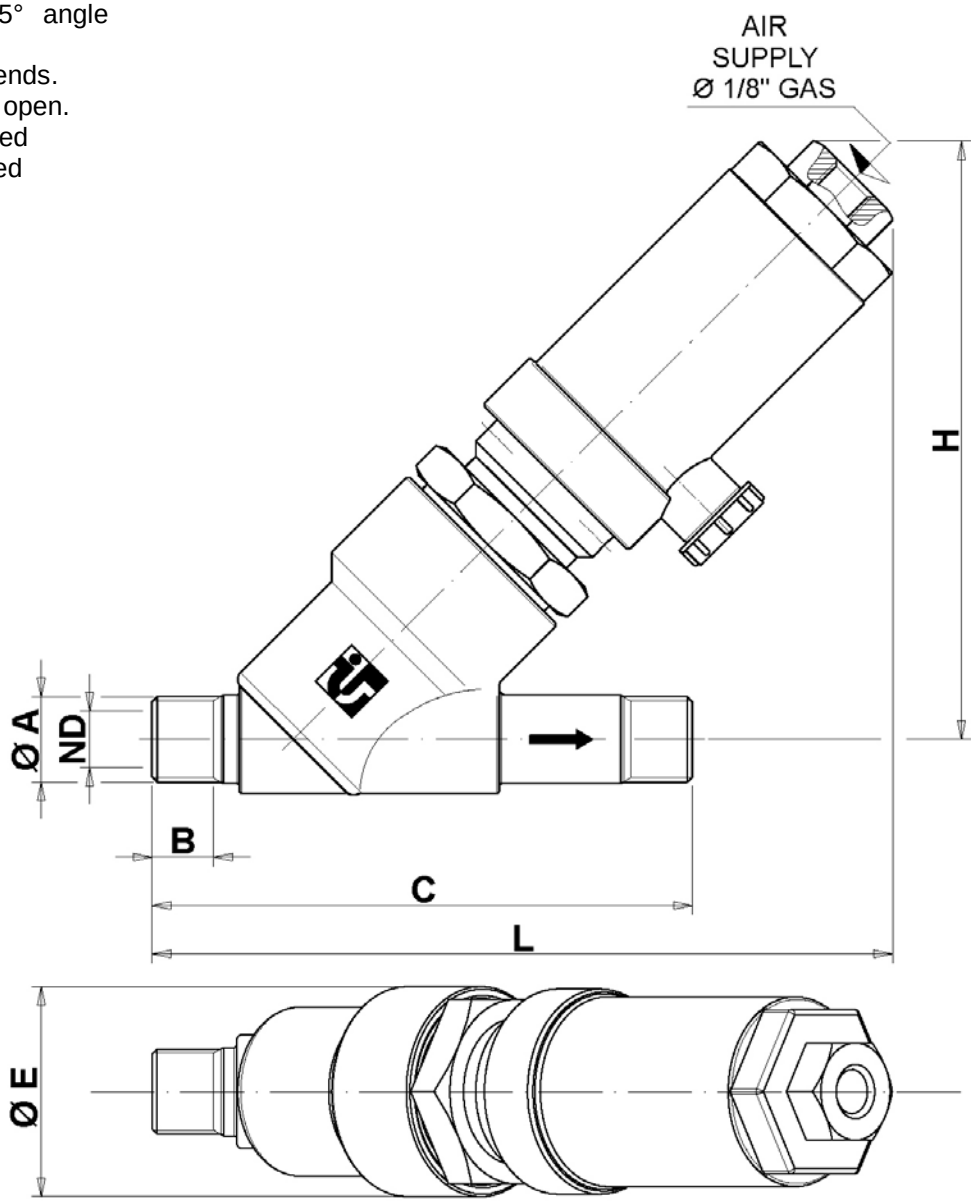
Main dimensioning parameters

Δp [bar]	20	12
Kv	1,22	2,32

Dwg. N° 010755 Rev.:00

4.4.8 IMF/M N.O. Cat. 33

Globe valves with 45° angle body.
Gas outside threaded ends.
Servo control normally open.
The valve open or closed condition is not indicated



ND	8	11
CODE	**6761**	**6762**
Weight [Kg]	0,860	0,860
A	1/4" GAS	3/8" GAS
B	12	12
C	105	105
E	41	41
L	144	144
H	117	117

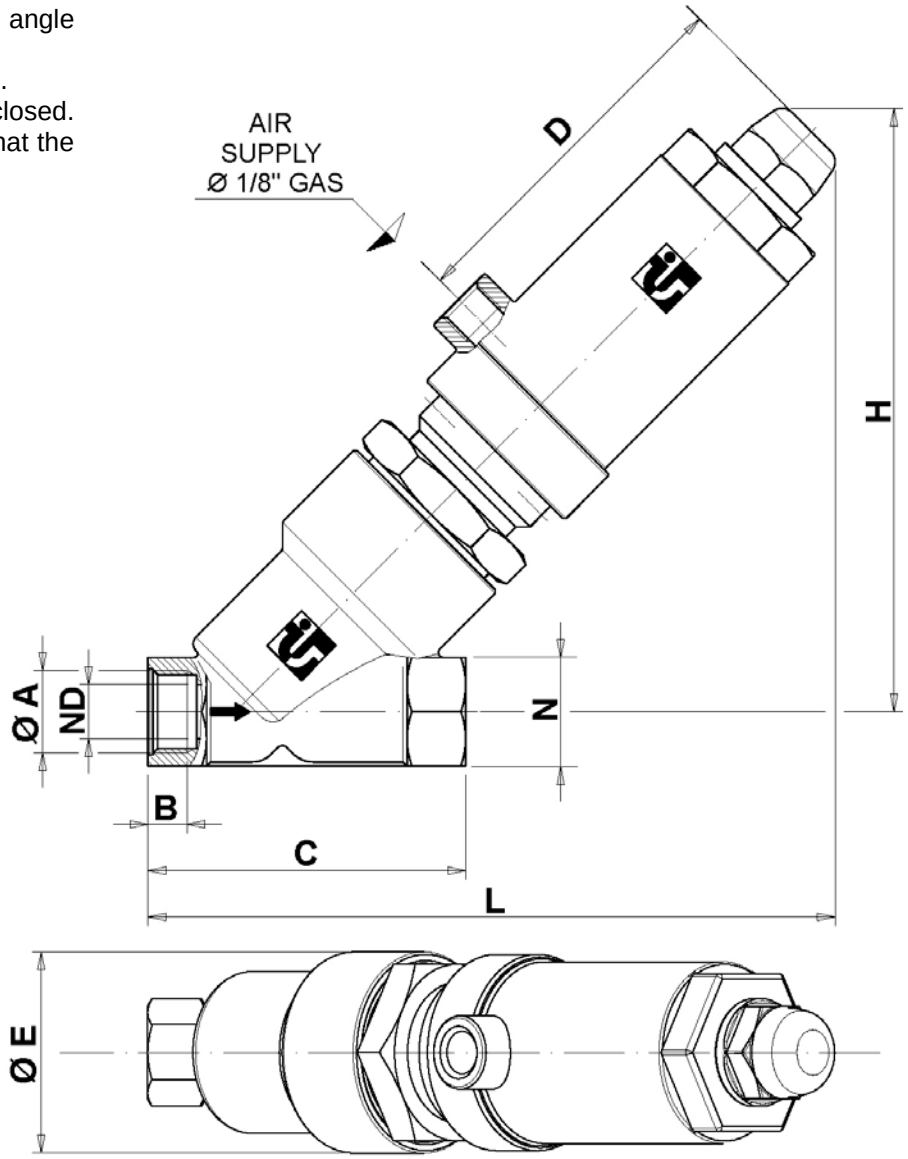
Main dimensioning parameters

Δp [bar]	17	10
Kv	1,22	2,32

Dwg. N° 010756 Rev.:00

4.4.9 IMF/F N.C. D.V. Cat. 44

Globe valves with 45° angle body.
Gas inside threaded ends.
Servo control normally closed.
Visual device indicating that the valve is open.



ND	8	11
CODE	**6751**	**6752**
Weight [Kg]	0,840	0,840
A	1/4" GAS	3/8" GAS
B	8	8
C	65	65
D	75	75
E	41	41
L	141	141
H	123	123
N	22	22

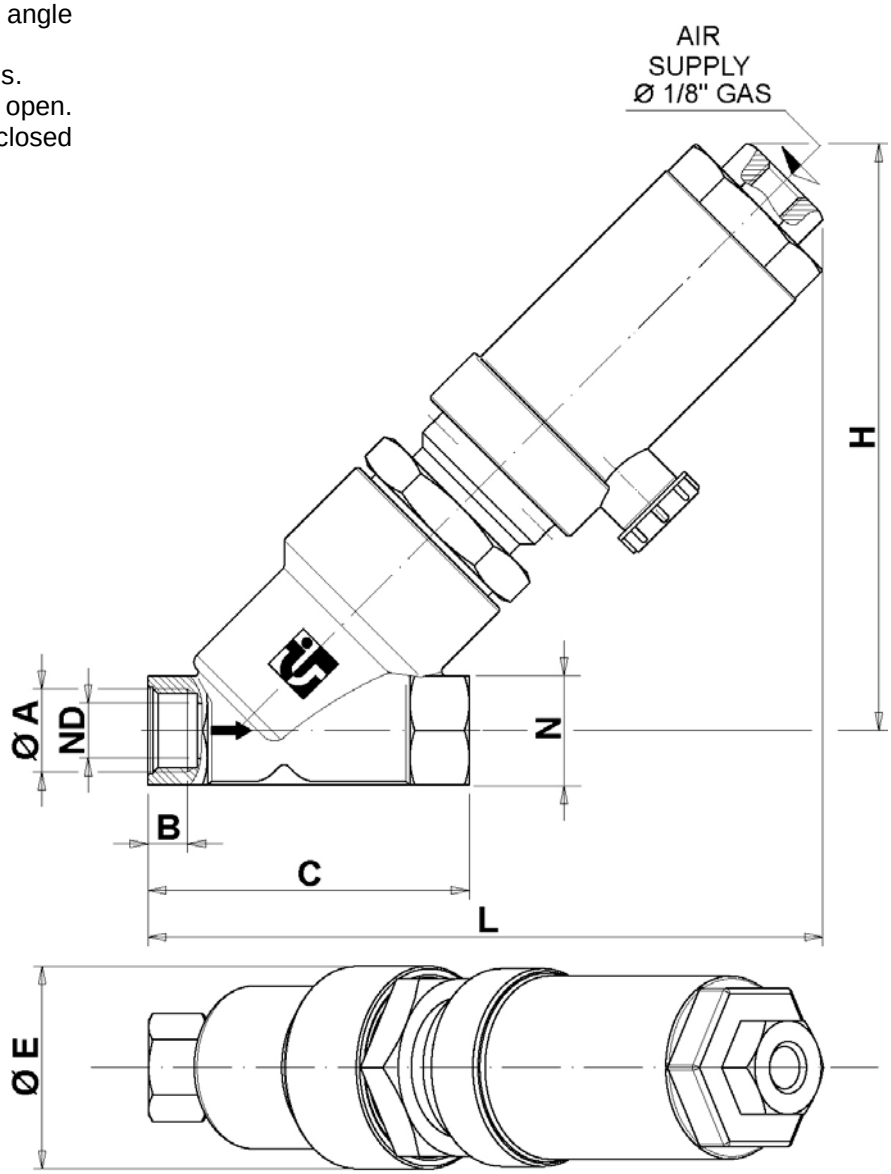
Main dimensioning parameters

Δp [bar]	20	12
Kv	1,22	2,32

Dwg. N° 010757 Rev.:00

4.4.10 IMF/F N.O. Cat. 45

Globe valves with 45° angle body.
Gas outside threaded ends.
Servo control normally open.
The valve open or closed condition is not indicated.



ND	8	11
CODE	**6763**	**6764**
Weight [Kg]	0,860	0,860
A	1/4" GAS	3/8" GAS
B	8	8
C	65	65
E	41	41
L	137	137
H	119	119
N	22	22

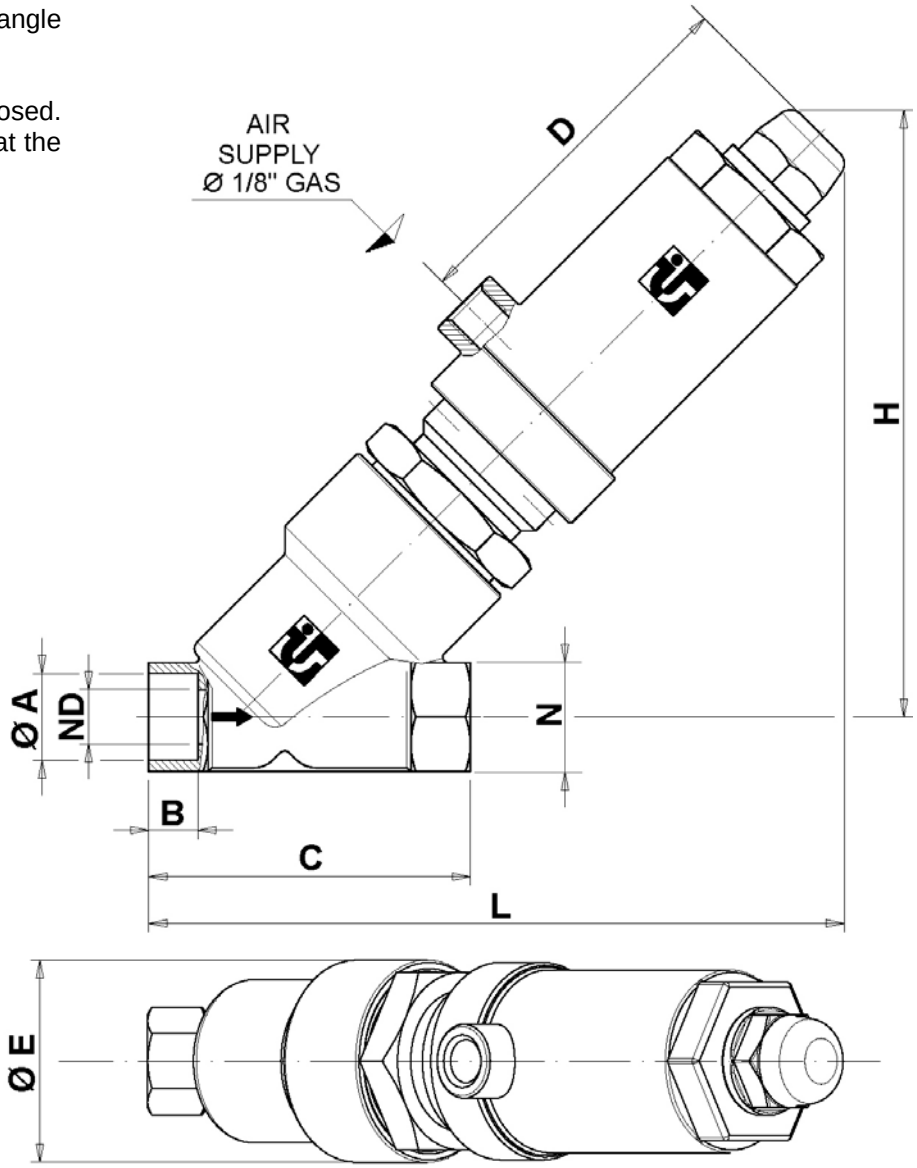
Main dimensioning parameters

Δp [bar]	17	10
Kv	1,22	2,32

Dwg. N° 010758 Rev.:00

4.4.11 IMF/ST N.C. D.V. Cat. 46

Globe valves with 45° angle body.
Socket welding ends.
Servo control normally closed.
Visual device indicating that the valve is open.



ND	8	11
CODE	**6753**	**6754**
Weight [Kg]	0,840	0,840
A	14	17,5
B	10	10
C	65	65
D	75	75
E	41	41
L	141	141
H	123	123
N	22	22

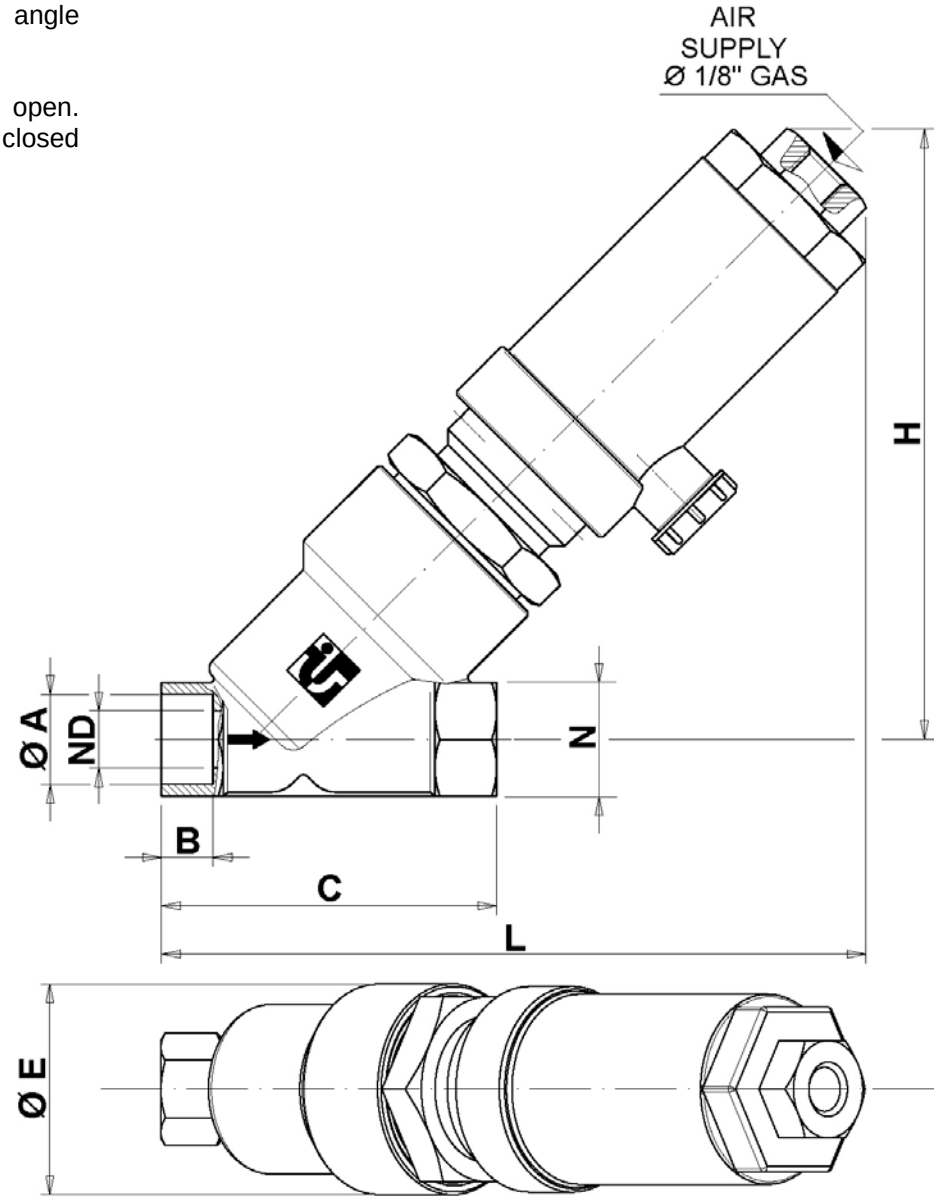
Main dimensioning parameters

Δp [bar]	20	12
Kv	1,22	2,32

Dwg. N. 010759 Rev.:00

4.4.12 IMF/ST N.A. Cat. 47

Globe valves with 45° angle body.
Socket welding ends.
Servo control normally open.
The valve open or closed condition is not indicated



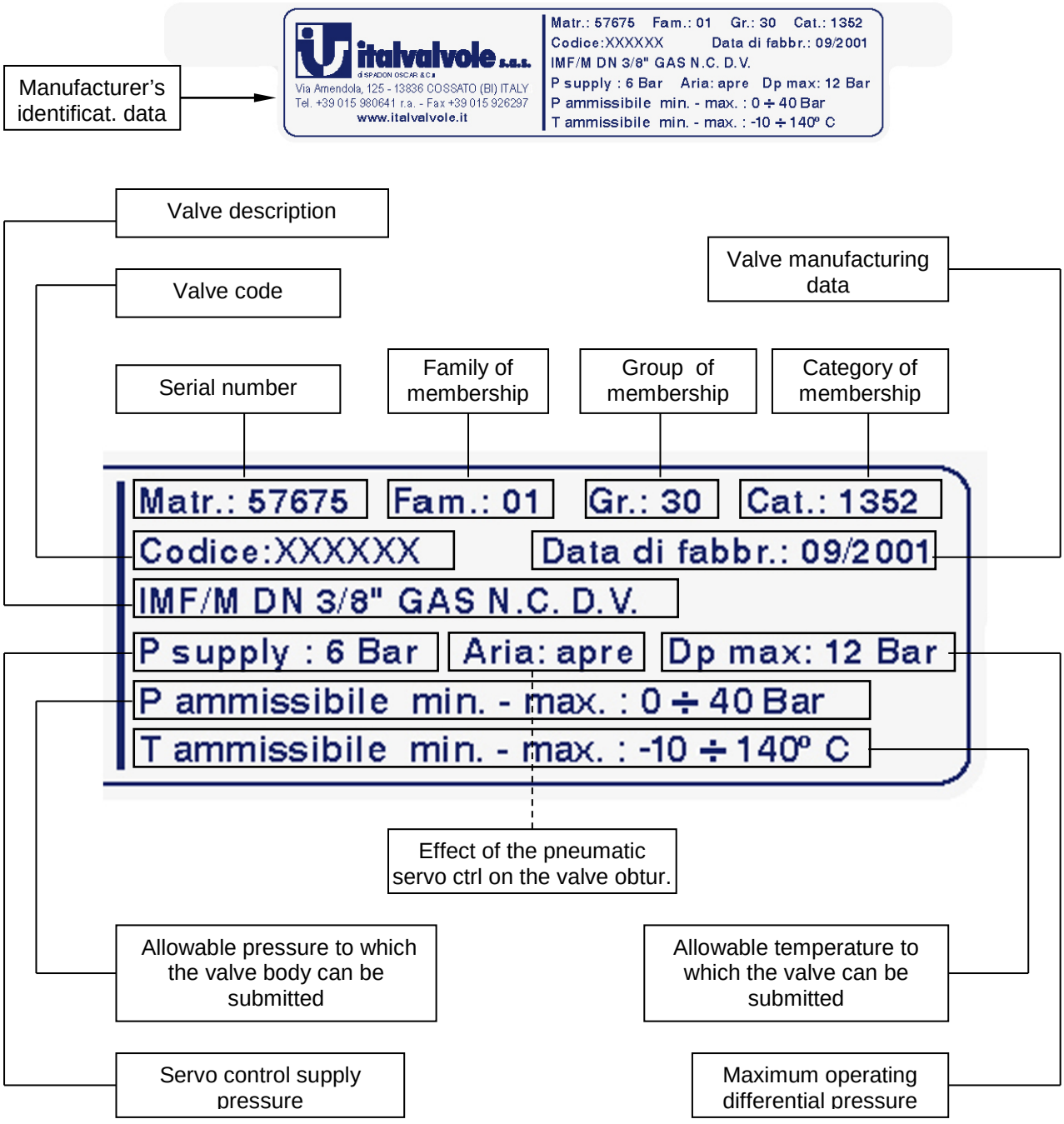
ND	8	11
CODE	6765	6766
Weight [Kg]	0,860	0,860
A	14	17,5
B	10	10
C	65	65
E	41	41
L	137	137
H	119	119
N	22	22

Main dimensioning parameters

Δp [bar]	17	10
Kv	1,22	2,32

Dwg. N. 010760 Rev.:00

4.5 Description Of The Microflow Valve Rating Plate



5 Storage, Assembly, Check And Maintance

5.1 Trasport, Storage and Handling

Microflow valves, during transport and assembly, must be handled very carefully. Shocks as well as anomalous stresses must be avoided, (do not handle, in case of normally closed servo control, the valve by the transparent cap).

Valves are delivered with dust-proof protections on all connections and these protections must not be removed until they are installed.

Valves shall be stored in areas which are not exposed to the sunshine to prevent inner gaskets from getting dry and old before time.

Storage temperatures shall range between 0 °C and + 50 °C.

5.2 Assembly Instructions

5.2.1 General

The valve installation on the system shall be carried out by qualified personnel only, within the mechanical and pneumatic fields, provided with all the equipment normally used in the industrial hydraulic and pneumatic plant engineering. The personnel shall always wear proper accident prevention garments, taking particular care to the protection of face, eyes and hands.
In no case the valve must be disassembled or modified, under pain of revocation of each type of guarantee.
NOTE: A compression spring is included inside the valve.
Before assembly, all protections shall be removed from the valve body. In case of servo control normally closed, remove the threaded cap located sideways. In case of servo control normally open, remove the threaded cap located on the upper side.
In case of normally closed servo control, the supply shall be carried out from the side connection.
In case of normally open servo control, the supply shall be carried out from the coupling located on the cylinder head; the side threaded cap must not be removed to prevent dust or foreign matters from entering the cylinder.
The compressed air shall be instrument air, with a pressure ranging between 6 bar and 10 bar, with $Ø_{inner}$ = 4 mm. supply pipes (See also chap. 4).
The air inlets on the valve shall be made of 1/8” Gas screw tap couplings.
During the valve cleaning operations, do not blow compressed air into the inspection holes.

5.2.2 Assembly of valves with screw tap connections

In case the body is provided with screw tap couplings, said areas are to be sealed with a PTFE tape so as to guarantee a perfect seal; besides, it is necessary to torque tighten the couplings as indicated hereinafter, table 2. Caution: the assembler shall verify that all the parts connected to the valve can support the required torque.

5.2.3 Assembly of valves with female screw connections

In case the body is provided with female screw couplings, the ends of connection pipes are to be sealed with PTFE tape, so as to guarantee a perfect seal; besides, it is necessary to torque tighten the couplings as indicated hereinafter, table 2. Caution: the assembler shall verify that all the parts connected to the valve can support the required torque.

5.2.4 Assembly of Valves with Butt and Socket Welding Ends

In case of bodies having butt and socket welding ends, with servo control normally closed N.C., before starting welding, the whole servo control complete with its seal shall be removed, so as not to damage it during the welding. In order to properly bring to end the assembly and disassembly operations, the following steps shall be carried out:

1) Blow air inside the servo control (6 bar for normally closed N.C. valves only).
2) Unscrew the lock nut of the intermediate body (9), using a 36 Allen wrench
3) Withdraw the servo control from the body.
4) Withdraw the gasket (11) from the body.

The welding must be carried out considering the material of the valve body and the required thickness, as ruled by the provisions in force for the whole system.

In order to prevent foreign matters (slags, chips and others), present in the pipes, from damaging the valve seat, before setting the valve at work, open it completely and make the fluid go through at the maximum operating pressure, so as to clean the pipe.

5.3 Operation Test

Before starting up the system and after any repair or overhaul, the following operation test shall be carried out:

On valves with normally closed N.C. servo control:

1) Send the fluid under obturator into the valve at the operating pressure, (check that the operating pressure is always lower than the maximum allowable pressure, specified on the rating plate, present on the cylinder).
2) Blow air inside the servo control and check the occurred opening from the fluid passage.
3) Blow air out of the servo control.
4) Repeat this operation 5 times.
5) Check, with air off, that there are no valve leakages.
6) Check, with air on, that there are no air leakages from the servo control.

On valves with normally open N.O. servo control:

1) Send the fluid under obturator into the valve at the operating pressure, (check that the operating pressure is always lower than the maximum allowable pressure, specified on the rating plate, present on the cylinder).
2) Blow air inside the servo control and check the occured opening from the failed fluid passage.
3) Blow air out of the servo control.
4) Repeat this operation 5 times.
5) Check, with air off, that there are no valve leakages.
6) Check, with air on, that there are no air leakages from the servo control.

5.4 Troubleshooting

Troubleshooting operations shall be always carried out by qualified personnel only, adequately equipped for the hydraulic and pneumatic operations and provided with the proper safety clothing, paying particular attention to the protection of face, eyes and hands.

5.4.1 N.C. Valves

In case of anomalous operation or valve leakage, the operation shall be immediately stopped and the following checks shall be carried out:
disconnect the air circuit; disconnect the air supplying pipe (with air off), to make sure that no air is present inside the piping.
Caution: during troubleshooting, the valve must not be removed, nor placed elsewhere. No components of the valve shall be disassembled or unloosened.
Check , by means of a pressure gauge, that the pressure of the valve inlet fluid (before the valve) is not higher than the maximum allowable pressure specified on the rating plate, present on the cylinder.
Should anomalies still be present after this check, valve inner parts are to be verified, disassembling the valve as indicated under the “Instructions for disassembly, gasket replacement and re-assembly of N. C. valves” of this manual.
Should leakages still persist, please contact our technical department.

5.4.2 N.O. Valves

In case of anomalous operation or valve leakage, the operation shall be immediately stopped and the following checks shall be carried out:
blow air (at a pressure value equal to that specified for a proper operation) into the servo control so as to make the valve close.
Caution: during troubleshooting, the valve must not be removed, nor placed elsewhere. No components of the valve shall be disassembled or unloosened.
Check, by means of a pressure gauge, that the pressure of the valve inlet fluid (before the valve) is not higher than the maximum allowable pressure, specified on the rating plate, present on the cylinder.
Should anomalies still be present after this check, valve inner parts are to be verified, disassembling the valve as indicated under the “Instructions for disassembly, gasket replacement and re-assembly of N. O. valves” of this manual.
Should leakages still persist, please contact our technical department.

5.5 Scheduled Maintenance

Scheduled maintenance operations shall be carried out apart from the ones due to possible failures, which always need an immediate intervention.
The time interval between one maintenance operation and the following shall be included in the lower time interval between the one corresponding to 60.000 cycles and three years; it consists of a complete disassembly of the valve, replacement of all the gaskets and a complete cleaning of all other components. For disassembly and re-assembly operations, make reference to the relevant paragraphs of this manual.

5.6 Instructions For Disassembly, Gasket Replacement And Reassembly of N. C. Valves

For the disassembly and assembly operations of the N.C. valve, refer to the annexed Dwg. no. 010651.
All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.
Whenever operations are to be carried out on valves, remove the fluid completely.
NOTE: Read the procedures thoroughly before starting any operation.

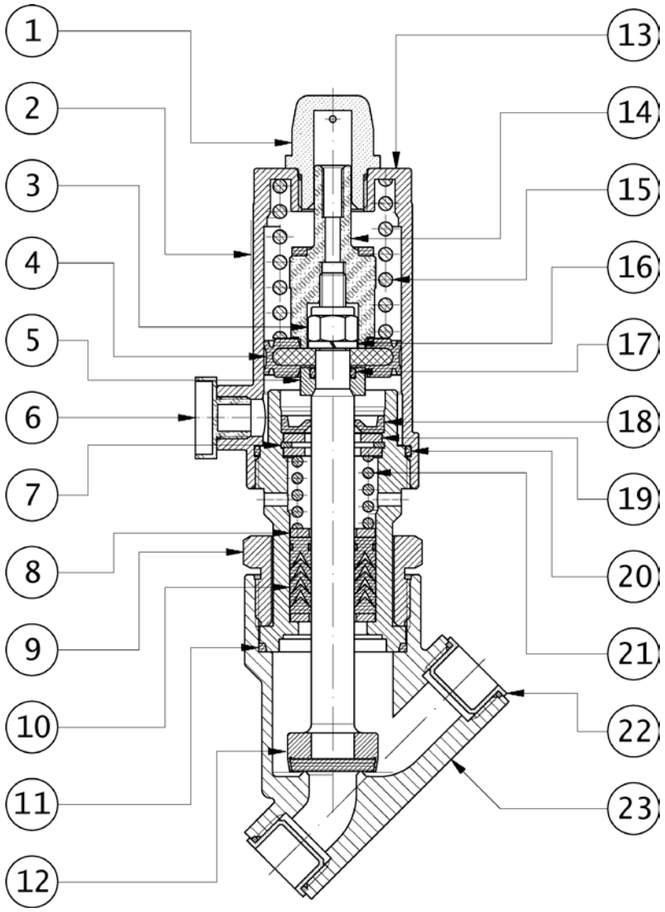
5.6.1 Disassembly Of N. C. Valves

1) Blow air inside the servo control (6 bar).
2) Unscrew the lock nut from the intermediate body (9), using a 36 Allen wrench.
3) Withdraw the servo control from the body.
4) Withdraw the gasket (11) from the body.
5) Remove air from the servo control. **Caution!** The shaft (12) and relevant bonnet will come out of its stroke.
6) Keeping the intermediate body locked (9): unscrew the spring housing cylinder (13), using a 36 Allen wrench. **Caution! a compressed spring is placed inside the cylinder**. Adequate fixture shall then be used preventing the spring housing cylinder from (13) leaving the intermediate body too quickly, once the thread connecting them is no longer tightened.
7) Unscrew the transparent bonnet from the cylinder (1), using a 19 Allen wrench.
8) Withdraw the O-Ring (20) from the cylinder.
9) Withdraw the spring (15) from the cylinder.
10) Tighten the shaft (12), fastening it between soft jaws at the level of the bonnet holder and unscrew the stroke indicator first (14), with a 17 Allen wrench, then the self-locking nut (3), with a 10 Allen wrench.
11) Remove from the shaft (12), one after the other: the spring washer (16), the NADUOP gasket (4), the O-Ring (17), the bearing washer (5).
12) Withdraw the shaft from the intermediate body.
13) Withdraw from the intermediate body, one after the other: the BA gasket (18), the upper packing gland distance nut (19).
14) Remove the hole snap ring (7). **Caution! The snap ring (7) keeps the packing gland spring (21) compressed**; operate then carefully so as to prevent the spring from suddenly breaking during disassembly.
15) Withdraw the lower packing gland distance nut (19), the packing gland spring (21), the upper packing gland distance nut (8), the packing gland (10), the lower packing gland distance nut (8).
16) Now the valve has been completely disassembled, so that the required components can be replaced.

5.6.2 Assembly of N.C. Valves

1) Carefully clean all components.
2) Insert into the intermediate body (9), one after the other: the lower packing gland distance nut (8), the packing gland (10), the upper packing gland distance nut (8), the packing gland spring (21), the lower packing gland distance nut (19).
3) Compress all components and lock the hole snap ring (7). Pay attention to the spring compression. It shall not be able to spring out suddenly.
4) Insert the upper packing gland distance nut (19).
5) Insert the BA gasket (18), up to beat (pushing on its outside edge, so as not to damage the lip seal.
6) Insert the shaft (12), after lubricating its cone-shaped part and the surrounding area with silicone grease, into the intermediate body, provided with all components, rotating it so as to enable the insertion and not to damage the packing gland.
7) Insert the spring bearing washer (5), the O-ring (17), the NADUOP gasket (4), the spring washer (16) into the shaft.
8) Torque tighten (as indicated under table 2) the self-lock nut (3), with a 10 Allen wrench, on the shaft (12), fastening it between soft jaws at the level of the bonnet holder.
9) Torque tighten the stroke indicator (14),(as indicated under table 2) to the shaft with a 17 Allen wrench. Fastem the shaft between soft jaws at the level of the bonnet holder
10) Insert the O-ring (20) inside the cylinder (13).
11) Place the spring(15) on the NADUOP gasket (4).
12) Lock the intermediate body so as it cannot rotate and torque tighten the cylinder (13) with a 32 Allen wrench (as indicated under table 2), carefully lubricating the NADUOP gasket lips (4) lips with silicone grease. **Caution! Inside the intermediate body there is a compressed spring. Therefore, it is recommended to provide yourself with suitable equipment not allowing the sudden expulsion of the spring housing cylinder from the intermediate body (9).**
13) Screw the transparent bonnet (1), with a 19 Allen wrench on the cylinder (paying attention to go to the beat, without forcing, not to break the component).
14) Blow air into the servo control (6 bar). **Caution! During this operation the stem will come back to its stroke.**
15) Insert the gasket (11) into the valve body.
16) Place the servo control into the required position (with the 1/8" gas air inlet).
17) Torque tighten the complete servo control (as indicated under table 2) onto the valve body, using a 36 Allen wrench.
18) Blow air out of the servo control.

5.7 Section Plane, Details and Spare Parts of N.C. Valves



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Group 94

Spare parts complete series for N.C micro-flow valves

Servo control spare parts

SPARE PART CODE		7095	
Detail nr.	Q.ty	ND 8	ND 11
4	1	NAD00321NB	
17	1	OR02031GA	
18	1	BA0V10244	
20	1	OR002131VI	

Body spare parts

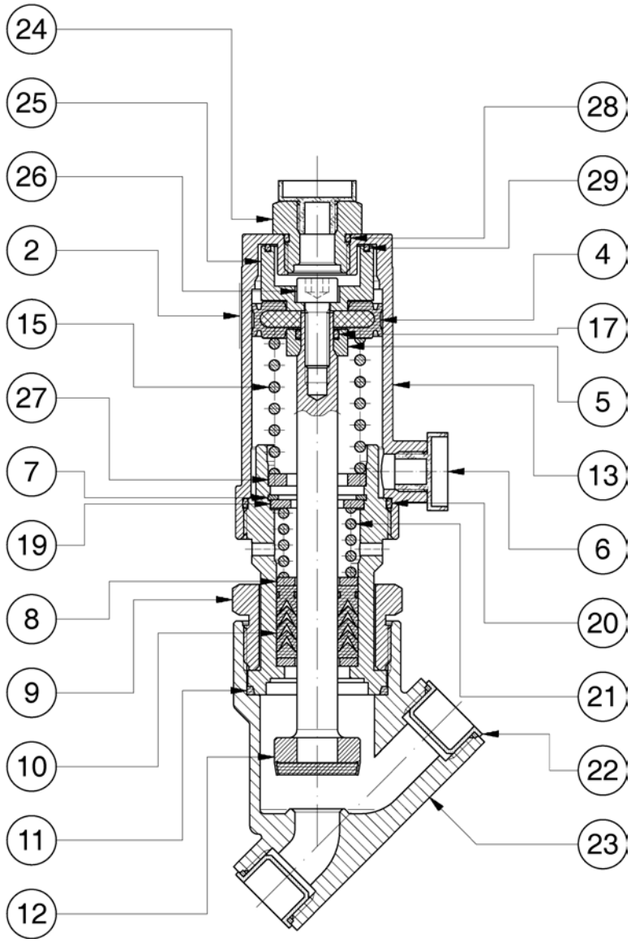
SPARE PART CODE		7097	
Detail nr.	Q.ty	ND 8	ND 11
10	1	PT01020TT	
11	1	GCVF950946	
12	1	ALBE010162	

CODE	NAME	DETAIL	Q.ty	DESCRIPTION	MATERIAL	GROUP	CODE
	COMPNENTS IN COMMON TO ALL VALVES	1	1	Transparent bonnet	PVC	840	INDC010160
		2	1	Detail label	Polyester	506	ETAU010347
		3	1	Self-lock nut	Acciaio	576	D06AUTOFE
		4	1	NADUOP gasket	NBR+Acciaio	566	NAD00321NB
		5	1	Piston holder washer	AISI 304	671	RAPI010154
		6	1	Threaded bonnet	Polyethylene	505	TEP400G018
		7	1	Snap ring	AISI 304	695	SEEF23304
		8	2	Packet gland distance washer	AISI 316	750	RDD086274
		9	1	Intermediate body	AISI 316 + AISI 304	632	CINT010153
		10	1	Packet gland	PTFE+FPM	587	PT01020TT
		11	1	Body gaket	PTFE	817	GCVF950946
		12	1	Shaft with N.C. bonnet	AISI 316 + PTFE	564	ALBE010162
		13	1	Spring bearing cylinder	AISI 304	813	CLCIXX0449
		14	1	Stroke indicator	PVC+EPDM	840	INDC010159
		15	1	Spring	AISI 302	552	MOLL010149
		16	1	Spring washer	Acciaio	610	RE06000FE
		17	1	OR gasket	NBR	548	OR02031GA
		18	1	BA gasket	FPM+Acc.	567	BA0V10244
		19	2	Packet gland distance washer	AISI 304	586	RDD088148
		20	1	OR gasket	FPM	548	OR002131VI
		21	1	Packet gland washer	AISI 316	552	MTD086110
6743	IMS/0 DN 8 N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	T01ST00085
		23	1	Body IVS/0 DN 8	AISI 316	813	CLSQXX0447
6744	IMS/0 DN 11 N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	TPTC970501
		23	1	Body IVS/0 DN 11	AISI 316	813	CLSQXX0448
6745	IMS/M DN 1/4” GAS N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	T01ST00085
		23	1	Body IVS DN 1/4”stud pipes	AISI 316	813	CLSQXX0445
6746	IMS/M DN 3/8” GAS N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	TPTC970501
		23	1	Body IVS DN 3/8” stud pipes	AISI 316	813	CLSQXX0446
6747	IMF/0 DN 8 N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	T01ST00085
		23	1	Body IVFL/0 DN 8	AISI 316	813	CLFLXX0441
6748	IMF/0 DN 11 N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	TPTC970501
		23	1	Body IVFL/0 DN 11	AISI 316	813	CLFLXX0442
6749	IMF/M DN 1/4” GAS N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	T01ST00085
		23	1	Body IVFL DN 1/4” stud pipes	AISI 316	813	CLFLXX0443
6750	IMF/M DN 3/8” GAS N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	TPTC970501
		23	1	Body IVFL DN 3/8” stud pipes	AISI 316	813	CLFLXX0444
6751	IMF/F DN 1/4” GAS N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	T01ST00120
		23	1	Body FFF DN 1/4” box coupling	AISI 316	813	CLFFXX0437
6752	IMF/F DN 3/8” GAS N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	T01ST00160
		23	1	Body FFF DN 3/8” box coupling	AISI 316	813	CLFFXX0438
6753	IMF/ST DN 8 N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	T01ST00145
		23	1	Body FFF DN 8 socket welding	AISI 316	813	CLFFXX0439
6754	IMF/ST DN 11 N.C. D.V.	22	2	Protection bonnet	Polyethylene	505	T01ST00180
		23	1	Body FFF DN 11 socket welding	AISI 316	813	CLFFXX0440

VALVE NAMES:

IMS = Right angle valve
IMF = Straightway valve
/0 = Butt welding connectors
/M = Male threaded connectors
/F = Female threaded connectors
/ST = Socket welding connectors

5.8 Section Plane, Details and Spare Parts of N.O. Valves



DWG. N° 010652 Rev.:01

Group 94

Spare parts complete series for N.O. micro-flow valves

Servo control spare parts

SPARE PART CODE		7096	
Detail nr.	Q.ty	ND 8	ND 11
4	1	NAD00321NB	
17	1	OR02031GA	
20	1	OR002131VI	
28	1	OR002050GA	
29	1	OR002087GA	

Servo control spare parts

SPARE PART CODE		7098	
Detail nr.	Q.ty	ND 8	ND 11
10	1	PT01020TT	
11	1	GCVF950946	
12	1	ALBE010163	

		DETAIL	Q.ty	DESCRIPTION	MATERIAL	GROUP	CODE
COMPNENTS IN COMMON TO ALL VALVES		2	1	Detail label	Polyester	506	ETAU010347
		4	1	NADUOP gasket	NBR+Acc.	566	NAD00321NB
		5	1	Piston bearing washer	AISI 304	671	RAPI010154
		6	2	Threaded bonnet	Polyethylene	505	TEP400G018
		7	1	Snap ring	AISI 304	695	SEEF23304
		8	2	Rondella distanz. premistoppa	AISI 316	750	RDD086274
		9	1	Intermediate body	AISI 304 + AISI 316	632	CINT010153
		10	1	Packing gland	PTFE+PFM	587	PT01020TT
		11	1	Body gasket	PTFE	817	GCVF950946
		12	1	Shaft complete with N.O.	AISI 316 + PTFE	564	ALBE010163
		13	1	Spring housing cylinder	AISI 304	813	CLCIXX0449
		15	1	Spring	AISI 302	552	MOLL010164
		17	1	Guarnizione OR	NBR	548	OR02031GA
		19	1	Rondella distanz. premistoppa	AISI 304	586	RDD088148
		20	1	OR gasket	PFM	548	OR002131VI
		21	1	Packing gland spring	AISI 316	552	MTD086110
		24	1	Air inlet coupling	AISI 420	811	RACC010165
		25	1	Buffer washer	AISI 304	703	RDST010167
		26	1	Socket head screw	AISI 304	551	TCCE06164
		27	1	Spring bearing washer	AISI 304	703	RDST010168
		28	1	OR gasket	NBR	548	OR002050GA
		29	1	OR gasket	NBR	548	OR002087GA
6755	IMS/0 DN 8 N.A.	22	2	Protection bonnet	Polyethylene	505	T01ST00085
		23	1	Body IVS/0 DN 8	AISI 316	813	CLSQXX0447
6756	IMS/0 DN 11 N.A.	22	2	Protection bonnet	Polyethylene	505	TPTC970501
		23	1	Body IVS/0 DN 11	AISI 316	813	CLSQXX0448
6757	IMS/M DN 1/4” GAS N.A.	22	2	Protection bonnet	Polyethylene	505	T01ST00085
		23	1	Body IVS DN 1/4”stud pipes	AISI 316	813	CLSQXX0445
6758	IMS/M DN 3/8” GAS N.A.	22	2	Protection bonnet	Polyethylene	505	TPTC970501
		23	1	Body IVS DN 3/8” stud pipes	AISI 316	813	CLSQXX0446
6759	IMF/0 DN 8 N.A.	22	2	Protection bonnet	Polyethylene	505	T01ST00085
		23	1	Body IVFL/0 DN 8	AISI 316	813	CLFLXX0441
6760	IMF/0 DN 11 N.A.	22	2	Protection bonnet	Polyethylene	505	TPTC970501
		23	1	Body IVFL/0 DN 11	AISI 316	813	CLFLXX0442
6761	IMF/M DN 1/4” GAS N.A.	22	2	Protection bonnet	Polyethylene	505	T01ST00085
		23	1	Body IVFL DN 1/4” stud pipes	AISI 316	813	CLFLXX0443
6762	IMF/M DN 3/8” GAS N.A.	22	2	Protection bonnet	Polyethylene	505	TPTC970501
		23	1	Body IVFL DN 3/8” stud pipes	AISI 316	813	CLFLXX0444
6763	IMF/F DN 1/4” GAS N.A.	22	2	Protection bonnet	Polyethylene	505	T01ST00120
		23	1	Body FFF DN 1/4” box coupling	AISI 316	813	CLFFXX0437
6764	IMF/F DN 3/8” GAS N.A.	22	2	Protection bonnet	Polyethylene	505	T01ST00160
		23	1	Body FFF DN 3/8” box coupling	AISI 316	813	CLFFXX0438
6765	IMF/ST DN 8 N.A.	22	2	Protection bonnet	Polyethylene	505	T01ST00145
		23	1	Body FFF DN 8 socket welding	AISI 316	813	CLFFXX0439
6766	IMF/ST DN 11 N.A.	22	2	Protection bonnet	Polyethylene	505	T01ST00180
		23	1	Body FFF DN 11 socket welding	AISI 316	813	CLFFXX0440
CODE	NAME						

VALVE NAMES:

IMS = Right angle valve
IMF = Straightway valve
/0 = Butt welding connectors
/M = Male threaded connectors
/F = Female threaded connectors
/ST = Socket welding connectors

5.9 Instructions For Disassembly, Gasket Replacements And Reassembly of N.O. Valves

For the disassembly and assembly operations of the N.C. valve, refer to the annexed Dwg. no. 010652.
All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.
Whenever operations are to be carried out on valves, remove the fluid completely.
NOTE: Read the procedures thoroughly before starting any operation.
NOTE: Disconnect the air circuit from the valve before starting any disassembly operation.

5.9.1 Disassembly of N.O. Valves

1) Unscrew the lock nut of the intermediate body (9) using a 36 Allen wrench.
2) Withdraw the servo control from the body.
3) Withdraw the gasket (11) from the body.
4) Keeping the intermediate body locked (9), unscrew the spring housing cylinder (13), using a 32 Allen wrench. **Caution! A compressed spring is placed inside the cylinder**. Adequate fixture shall then be used preventing the spring housing cylinder (13) from leaving the intermediate body too quickly, once the thread connecting them is no longer tightened.
5) Unscrew the air inlet connection (24) from the cylinder using a 19 Allen wrench.
6) Withdraw the O-ring (28) from the air inlet connection.
7) Withdraw the threaded bonnet (6) from the cylinder.
8) Withdraw the O-ring (20) from the cylinder.
9) Tighten the shaft (12) fastening it between soft jaws at the level of the bonnet holder and withdraw the socket head screw (3) with a 5 mm. Allen wrench.
10) Withdraw the O-ring (29) from the buffer washer (25).
11) Remove from the shaft (12) one after the other: the buffer washer (25), the NADUOP gasket(4), the O-ring (17), the bearing washer (5).
12) Withdraw the shaft (12) from the intermediate body.
13) Withdraw from the intermediate body, one after the other: the spring (15), the spring bearing washer (27).
14) Remove the hole snap ring (7).**Caution! The hole snap ring (7) keeps the packing gland spring (21) compressed**; operate then carefully so as to prevent the spring from suddenly breaking during disassembly.
15) Withdraw on after the other: the packing gland distance nut (19), the packing gland spring (21), the upper packing gland distance nut (8), the packing gland (10), the lower packing gland distance nut (8).
16) Now the valve has been completely disassembled, so that the required components can be replaced.

5.9.2 Assembly of N.O. Valves

1) Carefully clean all components.
2) Insert into the intermediate body(9), one after the other: the lower packing gland distance nut (8), the packing gland (10), the upper packing gland distance nut (8), the packing gland spring (21), the lower packing gland distance nut (19).
3) Compress all components and lock the hole snap ring (7). Pay attention to the spring compression. It shall not be able to spring out suddenly.
4) Insert the shaft (12), after lubricating its cone-shaped part and the surrounding area with silicone grease, into the intermediate body, provided with all components, rotating it so as to enable the insertion and not to damage the packing gland.
5) Insert the spring bearing washer (27) and the spring (15) into the intermediate body (9).
6) Insert the bearing washer (5), the O-ring (17), the NADUOP gasket (4), the buffer washer (25) into the shaft.
7) Torque tighten (as indicated under table 2) the socket head screw (26), by means of a 5 mm. Allen wrench, to the shaft (12), fastening it between soft jaws at the level of the bonnet holder.
8) Insert the O-ring (29) into the buffer washer seat (25).
9) Insert the O-ring (20) into the spring housing cylinder seat (13).
10) Lock the intermediate body (9) so as it cannot rotate and torque tighten the cylinder (13) with a 36 Allen wrench (as indicated under table 2), carefully lubricating the NADUOP gasket lips (4) with silicone grease. **Caution! Inside the intermediate body there is a compressed spring. Therefore, it is recommended to provide yourself with suitable equipment not allowing the sudden expulsion of the spring housing cylinder from the intermediate body (9).**
11) Insert the O-ring (28) into the air inlet connection seat (24).
12) Torque tighten the air inlet connection (24) by means of a 19 Allen wrench (as indicated under table 2), fastening the cylinder (13) by means of a 32 Allen wrench.
13) Screw the threaded bonnet (6) on the cylinder, making sure that it has a hole for the air inlet.
14) Insert the gasket (11) into the valve body.
15) Place the servo control into the required position (with the 1/8” gas air inlet).
16) Torque tighten the complete servo control (as indicated under table 2) onto the valve body, using a 36 Allen wrench.

5.10 Tables For Tightening Torques

Table 2 – Tightening Torques for Threaded Eonnections in Micro-flow Valves		
N.C. valve torques	M 36 x 1.5 (part 9 and part 23)	C_{36} = 17.0 [$Kg_f \cdot m$]
	M 36 x 1.5 (part 13 and part 9)	C_{36} = 17.0 [$Kg_f \cdot m$]
	M 6 (part 3 and part 12)	C_6 = 0,59 [$Kg_f \cdot m$]
N.O. valve torques	M 36 x 1.5 (part 10 and part 24)	C_{36} = 17.0 [$Kg_f \cdot m$]
	M 36 x 1.5 (part 19 and part 10)	C_{36} = 17.0 [$Kg_f \cdot m$]
	M 16 x 1.5 (part 1 and part 19)	C_{16} = 5,7 [$Kg_f \cdot m$]
	M 6 (part 3 and part 13)	C_6 = 0,59 [$Kg_f \cdot m$]
N.C. and N.O. common torques	Ø 1/ 8” GAS (air connections)	$C_{1/8”}$ = 1,36 [$Kg_f \cdot m$]
	Ø 1/ 4” GAS (M/F pipe connections)	$C_{1/4”}$ = 2,32 [$Kg_f \cdot m$]
	Ø 3/ 8” GAS (M/F pipe connections)	$C_{3/8”}$ = 3,99 [$Kg_f \cdot m$]

Plastic parts shall be beat tightened and the required torque is the one required to reach such a beat.

6 Disposal

After use, for the valve disposal, it is necessary to disassemble the valve and separate the different materials the valve is composed of, according to the tables annexed to the valve working drawings, then dispose of the different materials in compliance with the laws in force.

WARNINGS:

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