ON-OFF VALVES
SERIES IVS/10-IVFL/10
FAMILY 01 – GROUP 8,9,10,12

Master handbook description: Guide to selection, use and maintenance of ON - OFF valves, series IVS/10-IVFL/10 (English)

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1 Foreword

The on-off valves are designed to meet several current and future use requirements. Their features make them suitable for dyeing textile industry, tanneries, chemical industries, food industries and for all those environments which, due to humidity and aggressiveness can accept only stainless steel.

Their maintenance is easy, their stem is provided with teflon seal, and they are mainly made of pressed and microfused components. All the ON-OFF valves series IVS/10-IVFL/10 are available with microsfused body. The code IVS applies to the valve with T-square body, the code IVFL applies to the valve with body with 45° angle.

The difference among the valves /07 - /08 series and /10 series are:

- Type of cover: in the previous series it was made by a plug holder + plug, they were locked by a plug retaining washer closed by a nut.
  In the /10 series the plug is locked in the plug holder by pressing.
  This solution has been resorted for ND 20 – 25 – 32 – 40 – 50.
- The piston: befor it was a classic plunger with a TDUOP gasket. Now it is a technopolymer piston + a DE gasket.
  This last solution is perfectly interchangeable with the previous one.

Classification according to directive 2014/68/UE : Art. 4. Par 3 .

Table 4 includes a list of fluids which are perfectly compatible with these valves.

For any other fluid or use, which has not been expressly indicated in this manual, contact directly our service department.

2 Technical features

IVS valve with T-square body, with visual device

General notice:	⇒ all the pressure values indicated hereinafter are relative pressure values. Normal operation with pressure under shutter
	⇒ **valve designed for fluids of group 2 (directive 2014/68/UE).**
DN:	⇒ 15 ÷ 50
Connections:	⇒ for butt welding
	⇒ flanged according to UNI PN 6, PN 10, PN 16, (flanges can be flat, pressed or press-forged)
	⇒ GAS threaded both male and female
Pmax amm. (PS):	⇒ 16 bar
Pmin all.:	⇒ 0 bar
Seal:	⇒ EPDM, PTFE
Tmax amm.:	⇒ +150 °C with EPDM seal; +155 °C with EPDM coated EPDM seal +200 °C with PTFE seal
Tmin all.:	⇒ -10 °C (liquid phase)
Flow direction:	⇒ unidirectional 2-way globe valve, with straight and oblique body
Air connection:	⇒ quick joint for plastic pipes Ø 6
Supply fluid:	⇒ industrial air
Supply pipes:	⇒ pipe inner diameter = 4 mm, outer diameter = 6 mm
Supply pressure:	⇒ 6 bar
Air consumption (NC):	⇒ see table 2
Versions:	⇒ with visual device, with inductive sensors, with magnetic sensors, with pneumatic limit switches, with mechanical limit switches
Manufacturing mater.:	⇒ see drawings and relevant tables
Overall dimensions:	⇒ see overall dimensions drawings and relevant tables

2.1 Table 1: Kv of the valves IVS/10-IVFL10

DN		ΔP [bar]	Kv [m^3/h]
15	IVS	1	6
	IVFL		4,9
20	IVS	1	11,2
	IVFL		6
25	IVS	1	17,7
	IVFL		14,9
32	IVS	1	26,2
	IVFL		24
40	IVS	1	37,9
	IVFL		34,5
50	IVS	1	54,1
	IVFL		45,8

2.2 Table 2: Air consumption of the valves IVS/10-IVFL10

CONTROL PRESSURE	AIR CONSUMPTION OF STAINLESS STEEL VALVES [Nl / cycle]		
	Servo Control ∅ 70	Servo Control ∅ 80	Servo Control ∅ 125
6 bar	0,824	1,182	4,982

Note: cycle is meant as complete opening/closing operation.

2.3 Table 3: Tightness Δp of valves IVS/10-IVFL10

∅ Servcontrol	Δseal pressureof valves IVS/10-IVFL/10 [bar]					
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50
70	5	5	3,5	3,2	2,3	1,5
	16	14	9,5			
80			16	14	10	6,5
125					16	14

VALVE WITH STANDARD ΔP

VALVE WITH REDUCED ΔP

VALVE WITH ENHANCED ΔP

2.4 Table 4: Compatible Fluids

Type of fluid	Type of seal	
	EPDM	PTFE
Vinyl acetate	YES	YES
Glycerol fat acids	NO	YES
Phenol	NO	YES
Phosphoric acid 20% max.	YES	YES
Phthalic acid	YES	YES
Gallic acid	NO	YES
Nitric acid 5% - 65% max	NO	YES
Tannic acid	YES	YES
Ethanol	YES	YES
Methanol	YES	YES
Propanol	YES	YES
Aniline	NO	YES
Sodium carbonate 20% max	YES	YES
Borax (sodium tetraborate)	YES	YES
Sodium carbonate	YES	YES
Potassium chlorate 30% max	YES	YES
Sodium chloride 20% max	YES	YES
Potassium chloride 5% max	YES	YES
Ethylene glycol	YES	YES
Ammonium nitrate	YES	YES
Copper nitrate	YES	YES
Sodium nitrate	YES	YES
Potassium sulphate 20% max at T=100 °C	YES	YES
Sodium sulphate	YES	YES
Zinc sulphate 40% max at T=100 °C	YES	YES
Potassium sulphite 10% max	YES	YES
Sodium sulphide	YES	YES
Toluene	NO	YES
Water Steam T_{max}=130 °C P = 2.7 bar	YES	YES
Water Steam T_{max}=150 °C P = 4.8 bar	NO	YES

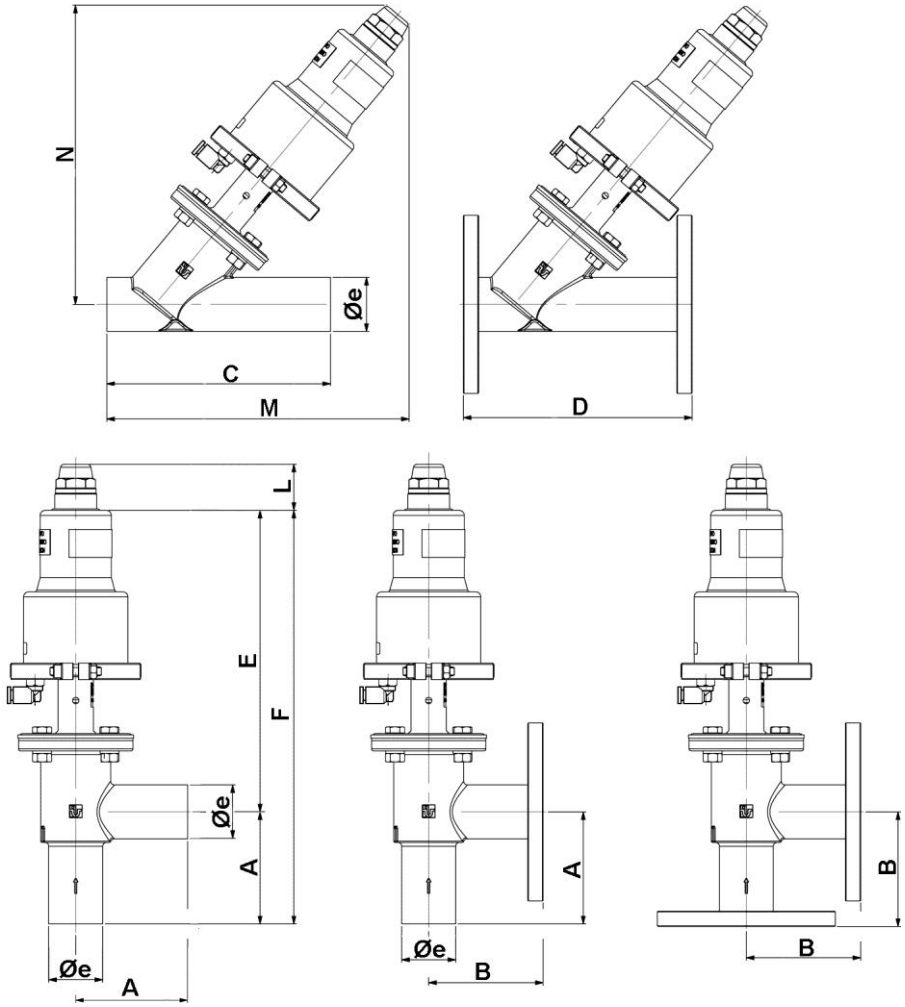
All data in table 4, if not otherwise specified, are relevant at a temperature of 21°C.
All data have a general meaning and are not valid for all possible working conditions. These data may considerably vary depending upon various conditions, such as: temperature, concentration, fluid speed.
For detailed information, please get in touch with our technical department.
Any use of the valve on explosive, easily inflammable, comburent and poison gases is strictly forbidden.
Any 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, in writing.

2.5 Safety Notes

- The valve body, under maximum operating temperature conditions, depending on the system, may reach a T=200°C. It is up to the engineer to provide the system with the necessary safety guards and/or warning signals with the purpose to remove/indicate the risk of possible burns to the user.
- Each valve is provided with 2 inspection holes (located on the intermediate body). Their purpose 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 industrial air from being contaminated. It is up to the engineer to provide the system with the necessary safety guards and/or warning signals with the purpose to remove/indicate the risk of contact of the user with dangerous fluids (if any).
- Important note: never blow air or fluids inside the 2 inspection holes. Should they, for any reason, be clogged, disassemble the valve for a complete maintenance.
- During any operation on the valve, the fluid shall not be present inside the piping or the valve.

2.6 Overall dimensions of the valves IVS/10-IVFL/10

2.6.1 IVS/10-IVFL/10 with visual device; group: 8-9-10-12

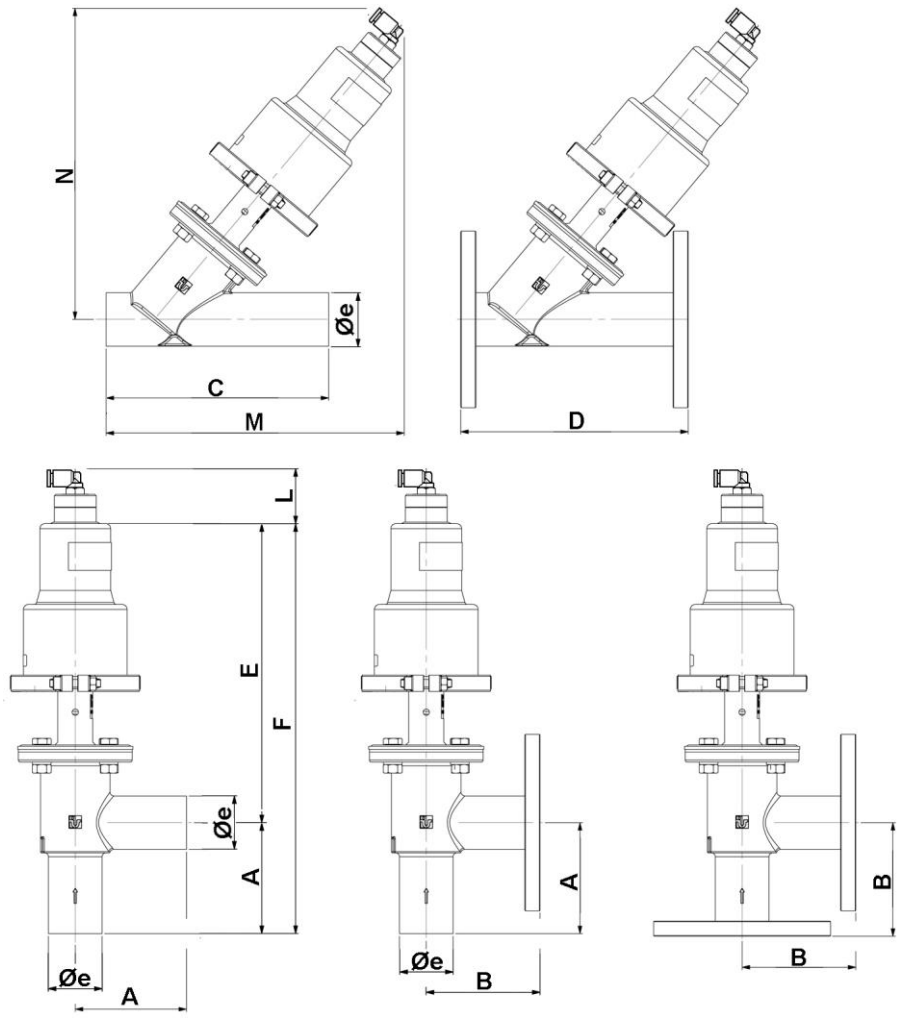


Drawing no. 100630 Rev.:00

DN	15	20	25	32	40	50
∅and pipe	21.3	26.9	33.7	42.4	48.3	60.3
A	68	68	78	88	98	113
B	70	70	80	90	100	115
C	146	146	156	176	196	226
D	150	150	160	180	200	230
E	204	204	204	237	237	259
F	272	272	282	325	335	372
L	36	36	36	36	36	36
M	221	215	206	238	254	284
N	206	211	205	235	342	357

Dimensions are in millimetres

2.6.2 IVS/10-IVFL/10 normally open; group: 8-9-10-12



Drawing no. 100631 Rev.:00

DN	15	20	25	32	40	50
∅and pipe	21.3	26.9	33.7	42.4	48.3	60.3
A	68	68	78	88	98	113
B	70	70	80	90	100	115
C	146	146	156	176	196	226
D	150	150	160	180	200	230
E	204	204	204	237	237	259
F	272	272	282	325	335	372
L	23	23	23	23	23	23
M	216	210	201	233	249	279
N	199	204	198	228	235	250

Dimensions are in millimetres

3 Tags description

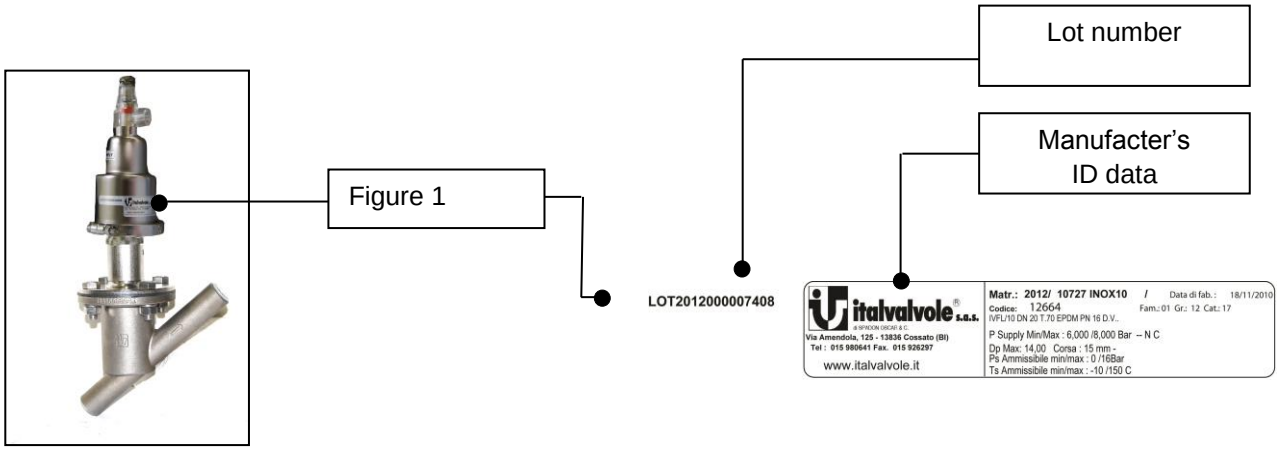
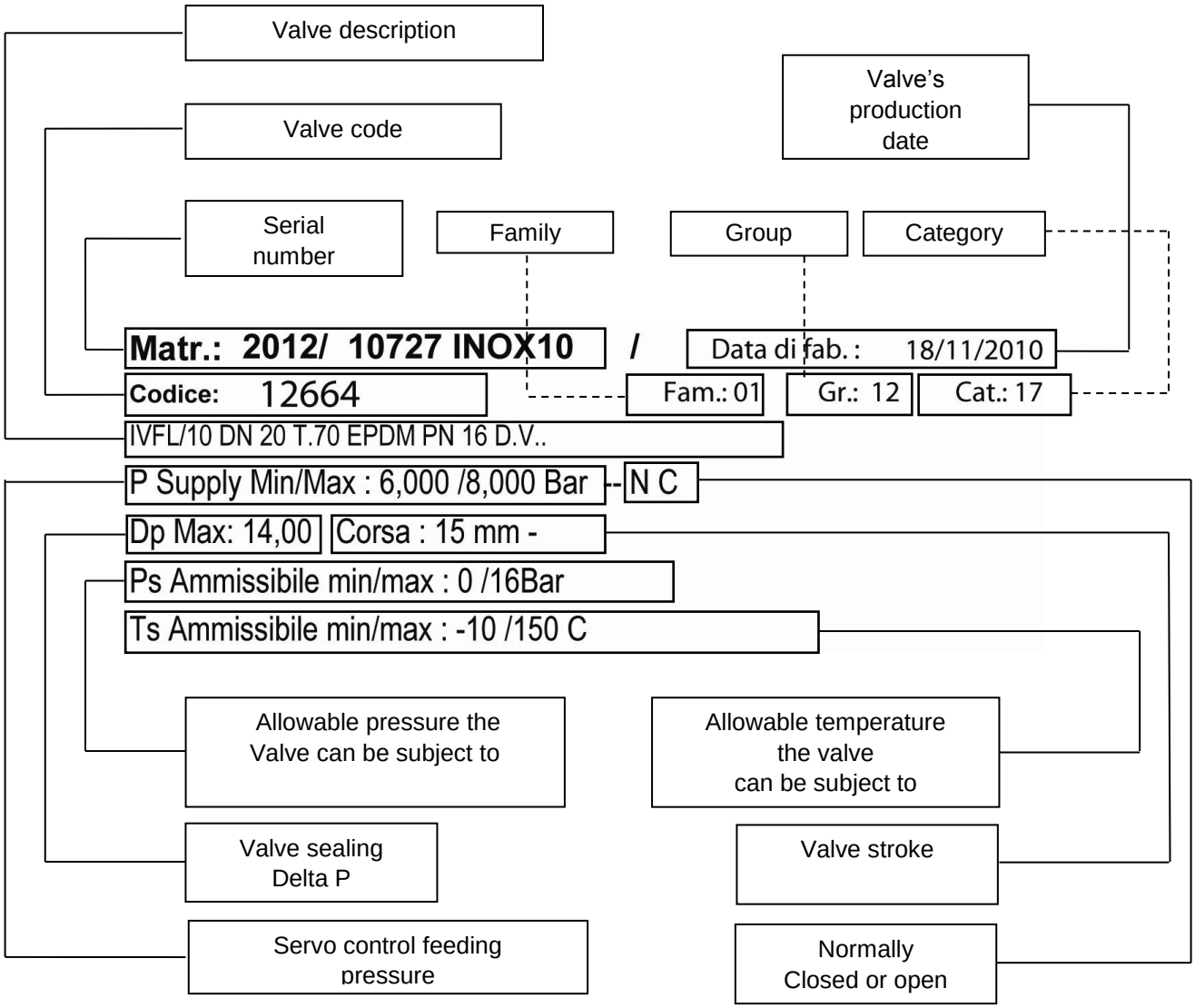


Fig.1 : Technical data of the valves

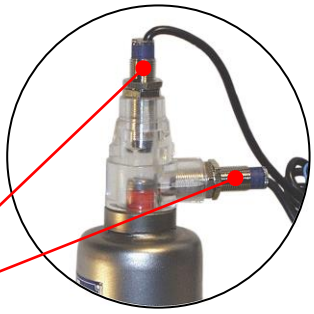


4 Fittings

The stainless steel valves can be supplied with several fittings to satisfy the different needs of the customer.

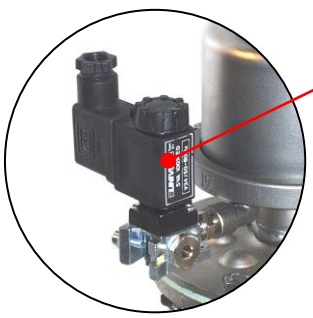
STROKE LIMITING DEVICE
The stroke limiting device enables to limit the valve stroke to the required value.

MAGNETIC SENSOR
This sensor enables to detect valve opening or closing: it is activated by a magnet moving with the shutter.



INDUCTIVE SENSOR
This sensor enables to detect the valve on/off condition.

SENSOR BOX
The sensor box is fitted on the upper part of the servo control: electric or pneumatic limit switches can be fitted inside it.



SOLENOID VALVE
The solenoid valve enables to control the opening and closing of the valve by means of an electric input.

EMERGENCY HANDWHEEL
The emergency handwheel enables to open the valve in case of lack of air.

5 Storage, Assembly, Check And Maintenance

5.1 Transport, Storage And Handling

IVS/10-IVFL/10 ON-OFF valves, during transport and assembly, must be handled very carefully. Shocks as well as anomalous stresses must be avoided (do not handle the valve by the transparent cap, in case of servo control normally closed).
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, so as to prevent inner gaskets from getting dry and old before time.
Storage temperature shall be between 0°C and + 50°C.

5.2 Assembly Instructions

5.2.1 General information

Valve installation on the system shall be carried out only by personnel qualified in in hydraulics and pneumatics, 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 protect face, eyes and hands.
The valve must never be disassembled or modified. Otherwise, warranty is voided.
N.B. A compression spring is included inside the valve.
Before assembly, dust-proof 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 provided from the side connection.
In case of normally open servo control, the supply shall be carried out from the connection located on the cylinder head; the side threaded cap must not be removed to prevent dust or foreign matters from entering the cylinder.
Compressed air shall be industrial air, with a pressure between 6 and 7 bar, with supply pipes with $_{\text{inner diameter}}$ = 4 mm.
The air connections on the valve shall be made of 1/8" gas male threaded couplings.
During valve cleaning operations, do not blow compressed air or pressurized fluids into the inspection holes.

5.2.2 Installation of flanged valves

In case the body has flanges connections, it is necessary to put a seal between the valve flanges and the pipes flanges, in order to ensure a perfect seal; moreover, it is necessary to torque tighten the flange closing screws, according to the equipment features, in compliance with mechanic constraints due to the valve PS

5.2.3 Assembly of valves with butt welding ends

In case of bodies having butt welding ends, with normally closed servo control, before starting welding, the whole servo control complete with its gasket shall be removed, so as not to damage it during welding.
In order to properly perform intermediate body assembly and disassembly operations, operate as follows:
for N. C. VALVES
1) Blow air inside the servo control (6 bar).
for all valves
2) Unscrew the screws which fasten the servo control to the valve body.
3) Remove the servo control from the body.
4) Extract the gasket from the body.

Welding must be carried out considering the material of the valve body and the required thickness, according to the provisions in force for the whole system.

5.2.4 Assembly of valves with female threaded connections

In case the body has female threaded connections, it is necessary to coat the connection pipe terminals with PTFE seal tape to ensure a perfect seal; moreover, it is necessary to tighten connections to the prescribed torque, as specified later on, in table 5.

Caution: the installer must verify that all parts connected to the valve bear the required tightening torque.

5.2.5 Assembly of valves with male threaded connections

In case the body has male threaded connections, it is necessary to coat such areas with PTFE seal tape to ensure a perfect seal; moreover, it is necessary to torque tighten the connections, as specified in table 5.
Caution: the installer must verify that all parts connected to the valve bear the required tightening torque.

In order to prevent foreign matters (welding slags, chips and others), located in the pipes, from damaging the valve seat, before operating the valve, open it completely and make the fluid pass through at the maximum operating pressure of the system, 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 NC servo control:

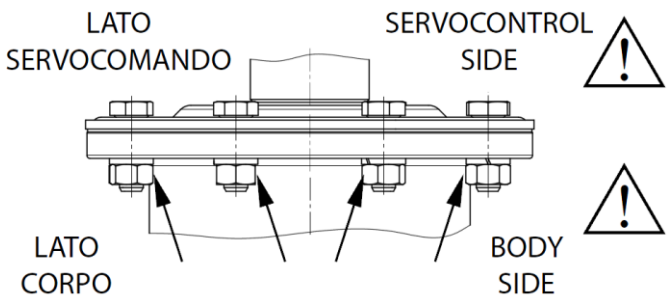
1) Send the fluid inside the valve under shutter at the operating pressure (check that it is always lower than the maximum allowable pressure of the valve).
2) Blow air inside the servo control and check for opening, observing fluid passage.
3) Switch off air from the servo control.
4) Repeat this operation 5 times.
5) Check, with air off, that there is no leak from the valve.
6) Check, with air on, that there is no air leak from the servo control.

On valves with normally open NO servo control:

1) Send the fluid inside the valve under shutter at the operating pressure (check that it is always lower than the maximum allowable pressure of the valve).
2) Blow air inside the servo control and check for closure, observing fluid passage
3) Switch off air from the servo control.
4) Repeat this operation 5 times.
5) Check, with air on, that there is no leak from the valve.
6) Check, with air on, that there is no air leak from the servo control

5.3.1 First check of the valve seal

FOR PTFE VALVES SEAL



THE FIRST HOURS OF USE MUST BE AT HOT TEMPERATURE (Tmin.: 130 °C).
After some hours of hot use, screw down the nuts indicated by the arrow

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 leakages, the valve operation shall be immediately stopped and the following checks shall be carried out:
disconnect the air circuit; disconnect the air supply pipe (with air off), and make sure that no air is inside the line.
Caution: during troubleshooting, the valve shall not be removed, nor placed elsewhere. No component of the valve shall be disassembled or loosened.
Check, by means of a pressure gauge, that the pressure of the valve inlet fluid (upstream) is not higher than the maximum allowable pressure or, if $\Delta p < PS$, Δp. is not exceeded
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.
In case of doubts, or before performing operations which have not been expressly indicated in this manual, contact our service 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 shall not be removed, nor placed elsewhere. No component of the valve shall be disassembled or loosened.
Check, by means of a pressure gauge, that the pressure of the valve inlet fluid (upstream) is not higher than the maximum allowable pressure or, if $\Delta p < PS$, Δp. is not exceeded
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.
In case of doubts, or before performing operations which have not been expressly indicated in this manual, contact our service department.

5.5 Scheduled Maintenance

Scheduled maintenance operations shall be carried out independently of the ones due to possible failures, which always require 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 300,000 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, reassembly of IVS/10-IVFL/10 with visual device

Refer to annexed Dwg. N° 100633 for disassembly and assembly operations of valves.
Assembly and disassembly operations shall be carried out only personnel qualified in in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty
NOTE: Read the procedures thoroughly before starting any operation.

5.6.1 Disassembly

1) Blow air in the servo control (6 bar).
2) Unscrew the nuts (31), extract the washers (30) and the screws (28).
3) Separate the servo control from the valve body (34).
4) Extract the body gasket (29).
5) Blow air out of the servo control. **Be careful about the movement of the shutter stem (32) due to air output!**
6) Unscrew screws (24), remove nuts (25) and remove the two clamps (26). **Caution! A compression spring is inside the cylinder.** Adequate fixture shall then be used preventing the spring housing cylinder (22) from leaving the intermediate body (27), once the two clamps are separated.
7) Remove the spring housing piston. The spring (1) will be free for extraction.
8) Screw down the transparent cap (2).
9) Extract the O-Ring (11).
10) Remove the spring (1).
11) Lock the shutter stem (32) between the soft jaws. Screw the stroke indicator (3) and the self-locking nut (5).

TDUOP gasket version

12) Remove the first piston bearing washer (6), remove the first piston bearing (4).
13) Remove the first O-ring (8), remove the piston with TDUOP gasket (7), remove the second O-ring (8).
14) Remove the second piston bearing (4), remove the second piston bearing washer (6).

Technopolimery piston version

15) Remove the plane washer (74), remove the piston (75) with the DE gasket (76) inserita, remove the DE gasket (76) from the piston (75).
16) Remove the O-ring (77) and the piston bearing washer (6).

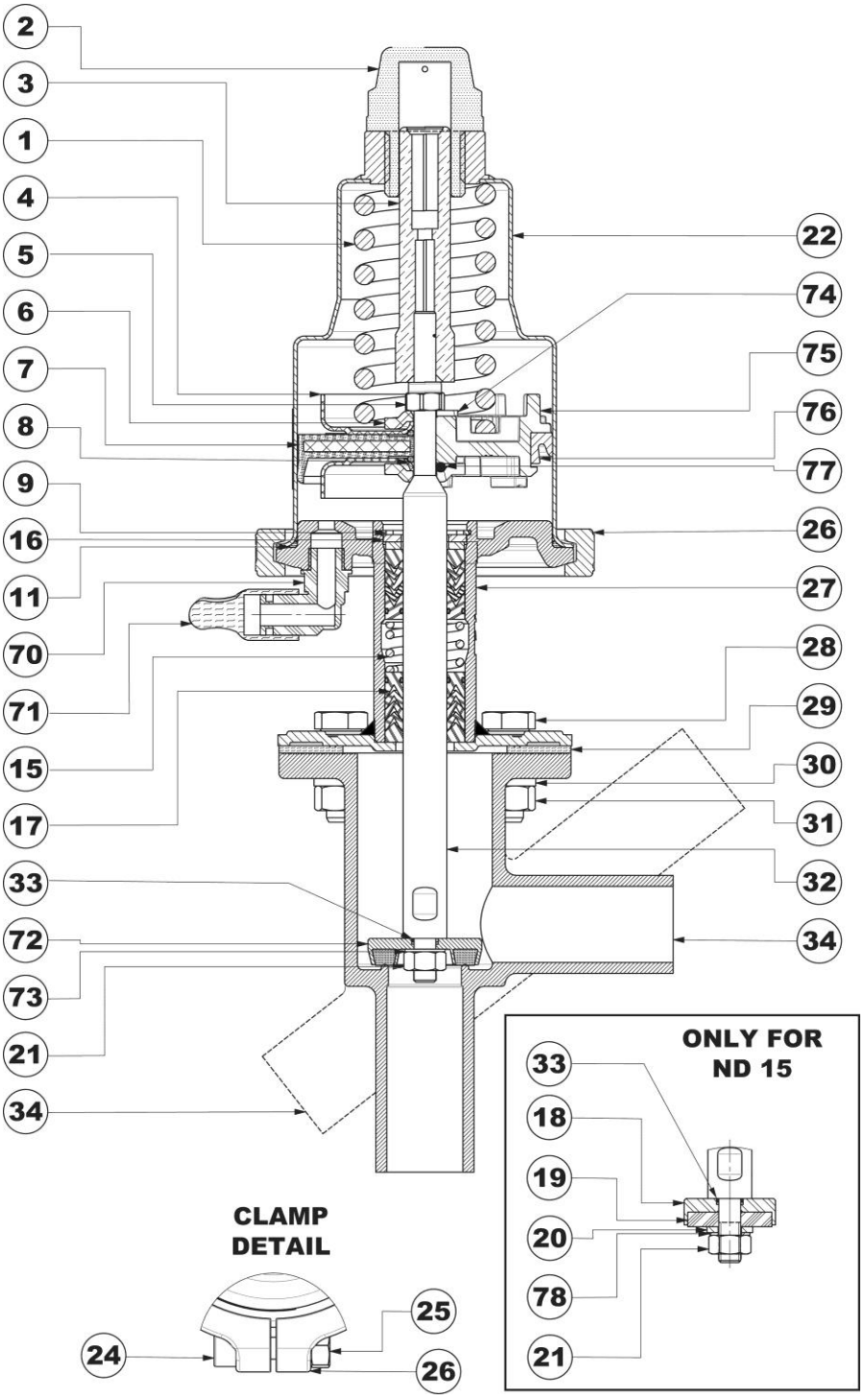
17) Remove the shutter stem (32) from the intermediate body (27).
18) Extract from the intermediate body the seeger ring for holes (9). **Caution! The seeger ring (9) keeps the packing gland spring (15) compressed**; maximum care shall then be taken to prevent the spring from coming out suddenly during the disassembly operations.
19) Remove the packing gland washer (16), the first packing gland (17), the the spring (15), the second packing gland (17).
20) Unscrew the nuts (21).
21) Remove the elastic washer (78), the cap stop washer (20), the cap (19), remove the cap holder (18) an the O-ring (33) (for the all ND 15)
22) Remove the elastic washer (73), remove the cap holder with pressed cap (73) and the O-ring (33) (ND 20#50).
23) Now the valve has been completely disassembled, so that the required components can be replaced.

5.6.2 Assembly

1) Insert the O-ring (33), the cap holder (18), the cap (19), the cap stop washer (20) and the elastic washer (78) on the shutter stem (32) and torque tighten nut and counternut (21) according to table 5 (for the all ND 15).
2) Insert the O-ring (33), the cap holder with pressed cap (73) and the elastic washer (73) on the shutter stem (32) and torque tighten nut and counternut (21) according to table 5 (ND 20#50).
3) Insert into the intermediate body (27), the first packing gland (17) the spring (15), the second packing gland (17) the packing gland washer (16).
4) Compress the assembly and fix with the seeger ring for holes (9). **Caution! The seeger ring (9) keeps the packing gland spring (15) compressed**; maximum care shall then be taken to prevent the spring from coming out suddenly during the assembly operations.
5) Insert the previously assembled shutter stem (32) into the intermediate body.
6) Insert on the shutter stem the piston bearing washer (6), the O-ring (77).
7) Insert on the Technopolimery piston (75) the DE gasket (76).
8) Insert on the shutter stem the piston, the plane washer (74). Tighten the assembly with the self-locking nut (5) closing the component package but without torque tightening.
9) Screw the stroke indicator (3).
10) Insert the O-Ring (11) into the intermediate body.
11) Insert spring (1) into its seat.
12) Insert on the intermediate body the spring housing piston (22).
13) Using proper instruments, approach the spring bearing piston to the intermediate body and lock it with the two clamps (26). **Caution! A compression spring is inside the cylinder.**
14) Insert the nuts (25) into the clamps and tighten the screws (24) on them according to table 5. Take care that the clamp closing sides are perfectly parallel.
15) Screw the transparent cap (2) on the spring housing piston (22), without forcing its closing.

16) Blow air in the servo control (6 bar). **Caution! When the air actuates the servocontrol, the shutter will move for its entire stroke.**
17) Rest the body gasket (29) on the valve body (34). Fit the servo control into the valve body.
18) Insert the screws (28) in the servocontrol intermediate body in correspondence with the valve body holes.
19) Insert the spring washers (30) on the screws and torque tighten the nuts (31) according to table 5.
20) Blow air out of the servo control.

5.6.3 Exploded View IVS/10-IVFL/10 with visual device



Drawing no. 100633 Rev.:00

5.7 Instructions for disassembly, gasket replacement, reassembly of IVS/10-IVFL/10 normally open

For the disassembly and assembly operations of the valves, refer to annexed Dwg No. 100632.
Assembly and disassembly operations shall be carried out only personnel qualified in in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

5.7.1 Disassembly

1) Unscrew the nuts (31), extract the washers (30) and the screws (28).
2) Separate the servo control from the valve body (34).
3) Extract the body gasket (29).
4) Unscrew screws (24), remove nuts (25) and remove the two clamps (26). **Caution! A compression spring is inside the cylinder.** Adequate fixture shall then be used preventing the spring housing cylinder (22) from leaving the intermediate body (27), once the two clamps are separated.
5) Remove the spring housing piston.
6) Unscrew the air inlet fitting (70), unscrew the fitting (49) and extract the O-ring (50) from it.
7) Lock the shutter stem (32) between the soft jaws. Unscrew the self-locking nut (5).

TDUOP gasket version

8) Remove the first piston bearing washer (6), remove the first piston bearing (4).
9) Remove the first O-ring (8), remove the piston with TDUOP gasket (7), remove the second O-ring (8).
10) Remove the second piston bearing (4), remove the second piston bearing washer (6).

Technopolimery piston version

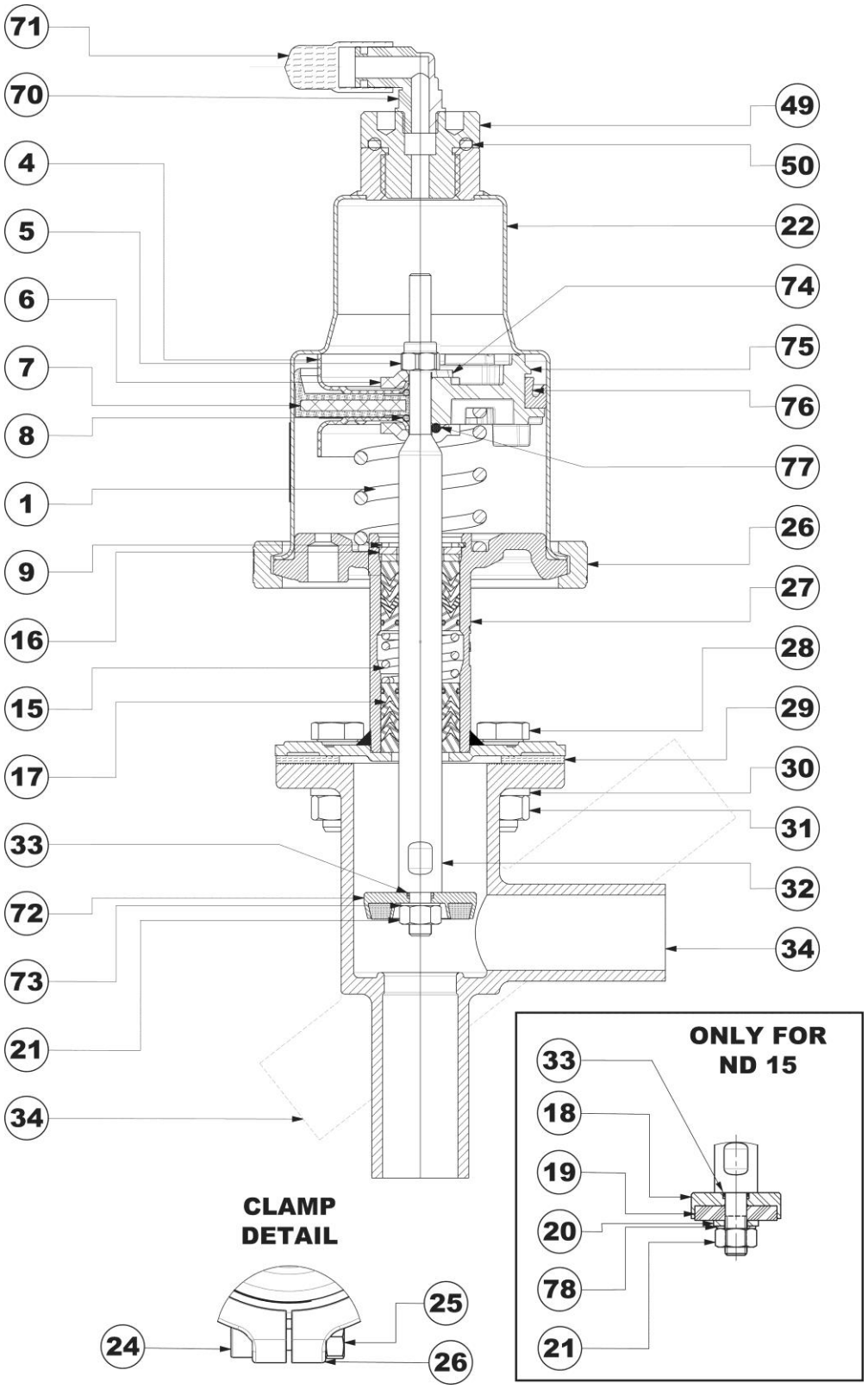
11) Remove the plane washer (74), remove the piston (75) with the DE gasket (76) inserita, remove the DE gasket (76) from the piston (75).
12) Remove the O-ring (77) and the piston bearing washer (6).

13) Remove the shutter stem (32) from the intermediate body (27).
14) Extract the spring (1) from the intermediate body.
15) Extract the seeger ring for holes (9). **Caution! The seeger ring (9) keeps the packing gland spring (15) compressed**; maximum care shall then be taken to prevent the spring from coming out suddenly during the disassembly operations.
16) Remove the packing gland washer (16), the first packing gland (17), the the spring (15), the second packing gland (17).
17) Unscrew the nuts (21).
18) Remove the elastic washer (78), the cap stop washer (20), the cap (19), remove the cap holder (18) an the O-ring (33) (for the all ND 15)
19) Remove the elastic washer (73), remove the cap holder with pressed cap (73) and the O-ring (33) (ND 20#50).
20) Now the valve has been completely disassembled, so that the required components can be replaced.

5.7.2 Assembly

1) Insert the O-ring (33), the cap holder (18), the cap (19), the cap stop washer (20) and the elastic washer (78) on the shutter stem (32) and torque tighten nut and counternut (21) according to table 5 (for the all ND 15).
2) Insert the O-ring (33), the cap holder with pressed cap (73) and the elastic washer (73) on the shutter stem (32) and torque tighten nut and counternut (21) according to table 5 (ND 20#50).
3) Insert into the intermediate body (27), the first packing gland (17) the spring (15), the second packing gland (17) the packing gland washer (16).
4) Compress the assembly and fix with the seeger ring for holes (9). **Caution! The seeger ring (9) keeps the packing gland spring (15) compressed**; maximum care shall then be taken to prevent the spring from coming out suddenly during the assembly operations.
5) Insert the spring (1) into the intermediate body (27).
6) Insert the previously assembled shutter stem (32) into the intermediate body.
7) Insert on the Technopolimery piston (75) the DE gasket (76).
8) Insert on the shutter stem the piston, the plane washer (74). Tighten the assembly with the self-locking nut (5) closing the component package but without torque tightening.
9) Insert on the intermediate body the spring housing piston (22).
10) Using proper instruments, approach the spring bearing piston to the intermediate body and lock it with the two clamps (26). **Caution! A compression spring is inside the cylinder.**
11) Insert the nuts (25) into the clamps and tighten the screws (24) on them according to table 5. Take care that the clamp closing sides are perfectly parallel.
12) Insert the O-ring gasket (50) into the fitting (49).
13) Screw the fitting (49) on the spring bearing piston (22).
14) Rest the body gasket (29) on the valve body (34). Fit the servo control into the valve body.
15) Insert the screws (28) in the servocontrol intermediate body in correspondence with the valve body holes.
16) Insert the spring washers (30) on the screws and torque tighten the nuts (31) according to table 5.
17) Screw on fitting (49) rhe air inlet fitting (70)

5.7.3 Exploded View IVS10-IVFL/10 normally open



Drawing no. 100632 Rev.:00

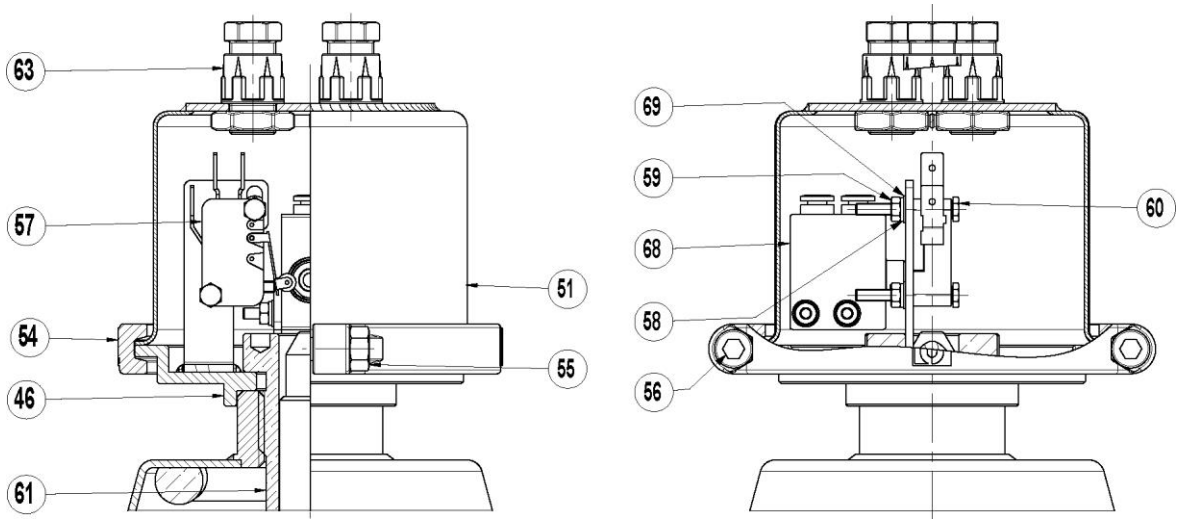
5.8 Instructions for disassembly, gasket replacement, reassembly of IVS/10-IVFL/10 with micro holding box

For the disassembly and assembly operations of the valves, refer to annexed Drw. No. 080380.
Assembly and disassembly operations shall be carried out only personnel qualified in in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

5.8.1 Micro holding box removal and refitting

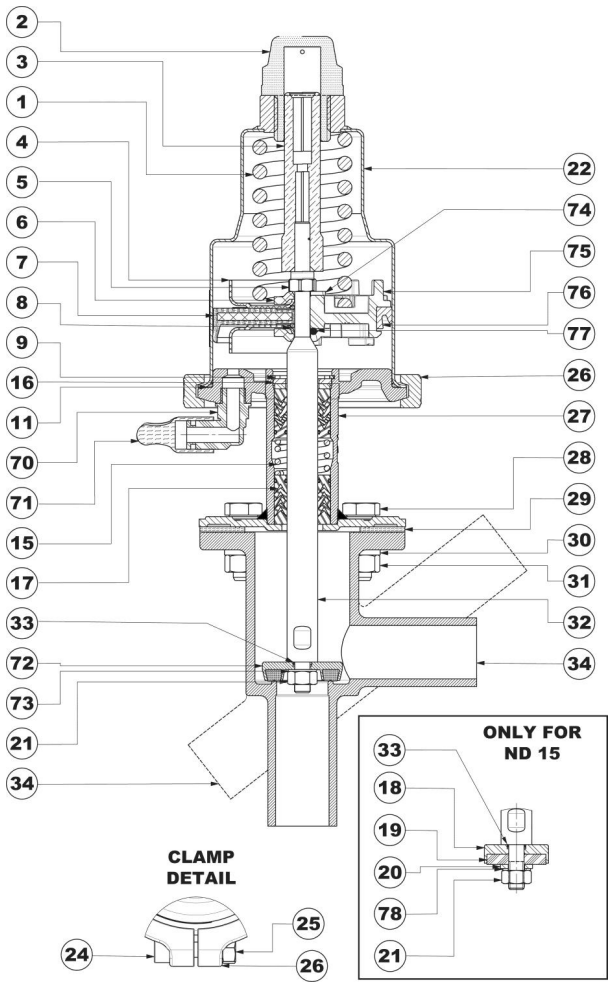
1) Unscrew the Hex. con. head screws (56) from the nuts (55).
2) Separate the clamps (54).
3) Remove the micro holding cover (51) and remove from it the cable holder (63).
4) Then insert the electric cables and the pneumatic hoses in the cable holders (63).
5) Fasten again the cable holders (63) in the micro holding cover (51).
6) Connect the electric cables to the electropneumatic limit switch (57) (see the technical specifications of the limit switch in the final section of the manual).
7) Connect the pneumatic hoses to the pneumatic limit switch (68) (see the technical specifications of the limit switch in the final section of the manual).
8) Reposition the micro holding cover (51) on the micro holding plate (46), then fasten all of them with the clamps (54).
9) Insert the hex. nuts (55) into the clamps (54) and tighten the hex. con. screws (56).

5.8.2 Exploded view of micro holding box for IVS-IVFL/07-08



5.9 Parts and spare parts IVS/10-IVFL/10 with visual device

PART	Q.ty	DESCRIPTION	MATERIAL
1	1	Spring	STEEL 55iCr6
2	1	Transparent cap	PLASTIC
3	1	Stroke indicator	RED PVC
4	2	Piston bearing	Fe 360
5	1	Self- locking nut	Fe 360
6	2	Piston bearing washer	Fe 360
7	1	TDUOP gasket	NBR Fe 360
8	2	O-Ring gasket	GACO
9	1	Seeger ring	1.4301
11	1	O-Ring gasket	GACO
15	1	Packing gland spring	1.4401
16	2	Packing gland washer	1.4401
17	2	Packing gland	PTFE+PTFE GRAPHITE
18	1	Cap holder	1.4401
19	1	Cap	EPDM
			PTFE
20	1	Cap stop washer	1.4401
21	(1)	Hexagon nut	1.4401
22	1	Spring housing piston	1.4301
24	2	Hex sunken conical Screw	1.4301
25	2	Hexagon nut	1.4301
26	2	Clamp	1.4308
27	1	Intermediate body	1.4308/1.4401
28	(2)	Hex. head screw	1.4301
29	1	Body gasket	FASIT 400
30	(2)	Spring washer	1.4301
31	(2)	Hexagon nut	1.4301
32	1	Shaft	1.4401
33	1	O-Ring gasket	FPM
34	1	Valve body	1.4408
70	1	Air fitting	TECHNOPOLYMER
71	1	Protection cap	POLYETHYLENE
72	1	Cap holding with pressed cap	1.4401-EPDM
			1.4401-PTFE
73	1	Elastic washer	1.4401
74	1	Flat washer	Fe 360
75	1	piston	PA 66 FV 30
76	1	DE gasket	NBR
77	1	O-ring	GACO
78(3)	1	Elastic washer	1.4401



(1) Nr 1 ND 15, Nr 2 ND 20#50 - (2) Nr 4 ND 15#32, Nr 8 ND 40#50 - (3) Only ND 15

Body side spare parts

ND	SPARE PART CODE (4)(Part. N°15-17-19-29-33-78-18-21) (5)(Part. N° 15-17-33-72-73-29-21)	
	PTFE	EPDM
15	12684	12683
20	12510	12508
25	12511	12509
32	12876	12831
40	12877	12863
50	12878	12864

Air side spare parts

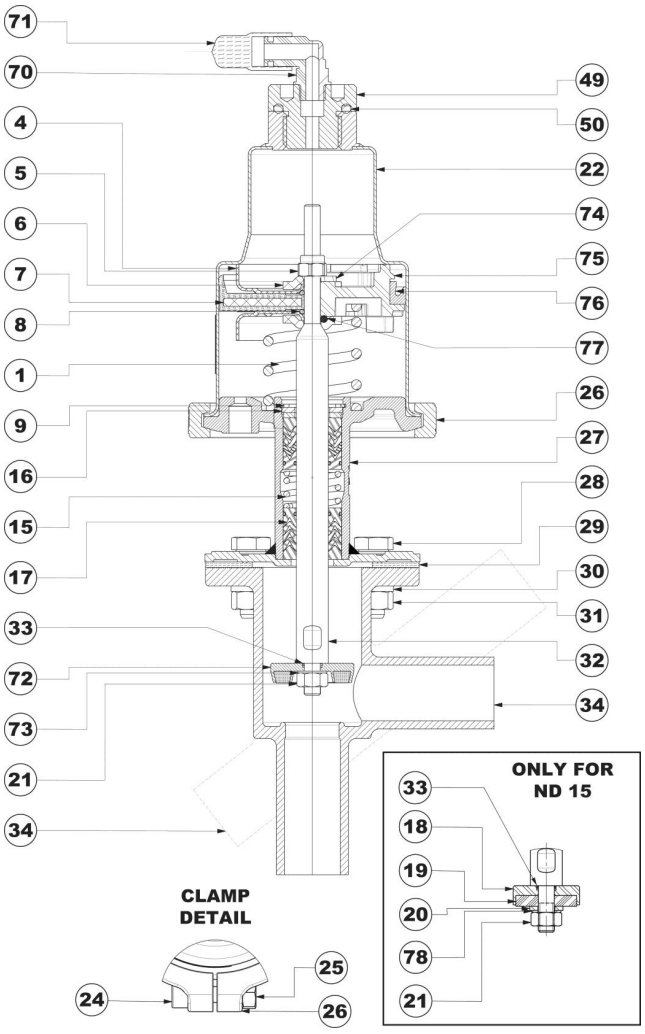
Ø SERV.	SPARE PART CODE (Part No. 11-74-75-76-77)
Ø 70	3945
Ø 80	7896

(4) Only ND 15

(5) For ND 20#50 EPDM and PTFE valves

5.10 Parts and spare parts IVS/10-IVFL/10 normaly open

PART	Q.ty	DESCRIPTION	MATERIAL
1	1	Spring	STEEL 55iCr6
4	2	Piston bearing	Fe 360
5	1	Self- locking nut	Fe 360
6	2	Piston bearing washer	Fe 360
7	1	TDUOP gasket	NBR Fe 360
8	2	O-Ring gasket	GACO
9	1	Seeger ring	1.4301
15	1	Packing gland spring	1.4401
16	2	Packing gland washer	1.4401
17	2	Packing gland	PTFE+PTFE GRAPHITE
18	1	Cap holder	1.4401
19	1	Cap	EPDM
			PTFE
20	1	Cap stop washer	1.4401
21	(1)	Hexagon nut	1.4401
22	1	Spring housing piston	1.4301
24	2	Hex sunken conical Screw	1.4301
25	2	Hexagon nut	1.4301
26	2	Clamp	1.4308
27	1	Intermediate body	1.4308/1.4401
28	(2)	Hex. head screw	1.4301
29	1	Body gasket	FASIT 400
30	(2)	Spring washer	1.4301
31	(2)	Hexagon nut	1.4301
32	1	Shaft	1.4401
33	1	O-Ring gasket	FPM
34	1	Valve body	1.4408
70	1	Air fitting	TECHNOPOLYMER
71	1	Protection cap	POLYETHYLENE
72	1	Cap holding with pressed cap	1.4401-EPDM
			1.4401-PTFE
73	1	Elastic washer	1.4401
74	1	Flat washer	Fe 360
75	1	piston	PA 66 FV 30
76	1	DE gasket	NBR
77	1	O-ring	GACO
78(3)	1	Elastic washer	1.4401



(1) Nr 1 ND 15, Nr 2 ND 20#50 - (2) Nr 4 ND 15#32, Nr 8 ND 40#50 - (3) Only ND 15

Body side spare parts

ND	SPARE PART CODE 4(Part. N° 15-17-19-29-33-78-18-21) 5(Part. N° 15-17-33-72-73-29-21)	
	PTFE	EPDM
15	12684	12683
20	12510	12508
25	12511	12509
32	12876	12831
40	12877	12863
50	12878	12864

Air side spare parts

Ø SERV.	SPARE PART CODE (Part No. 11-50-74-75-76-77)
Ø 70	6380
Ø 80	6381

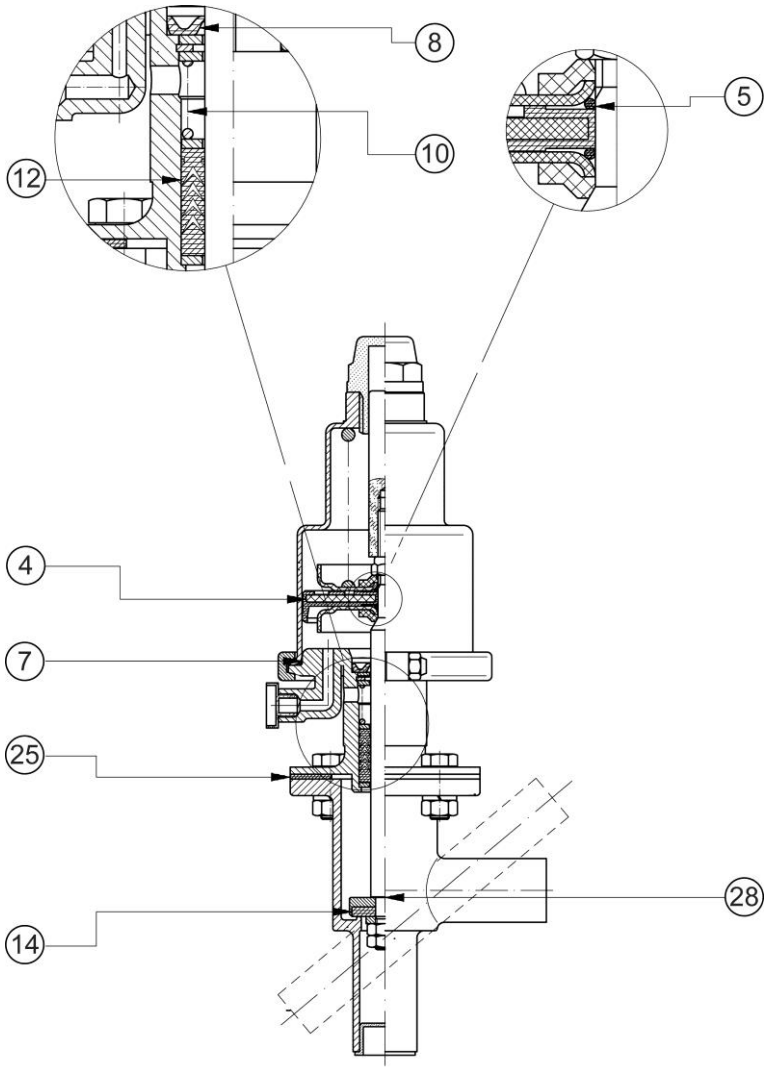
(4) Only ND 15
(5) For ND 20#50 EPDM and PTFE valves

5.11 Types of previous IVS-IVFL valves

There are two spare part codes: one includes the servocontrol side gaskets; one includes the body side gaskets.

The valves produced since the beginning of 2007 differ from the valves of the previous version only for the components fitted inside the intermediate body and for the intermediate body. Moreover, all the DN from 15 to 100 are no longer provided with oscillating cap holder (it is fixed).

5.11.1 Spare parts IVS-IVFL DN 15 ÷ 50 with visual device



Body side spare parts

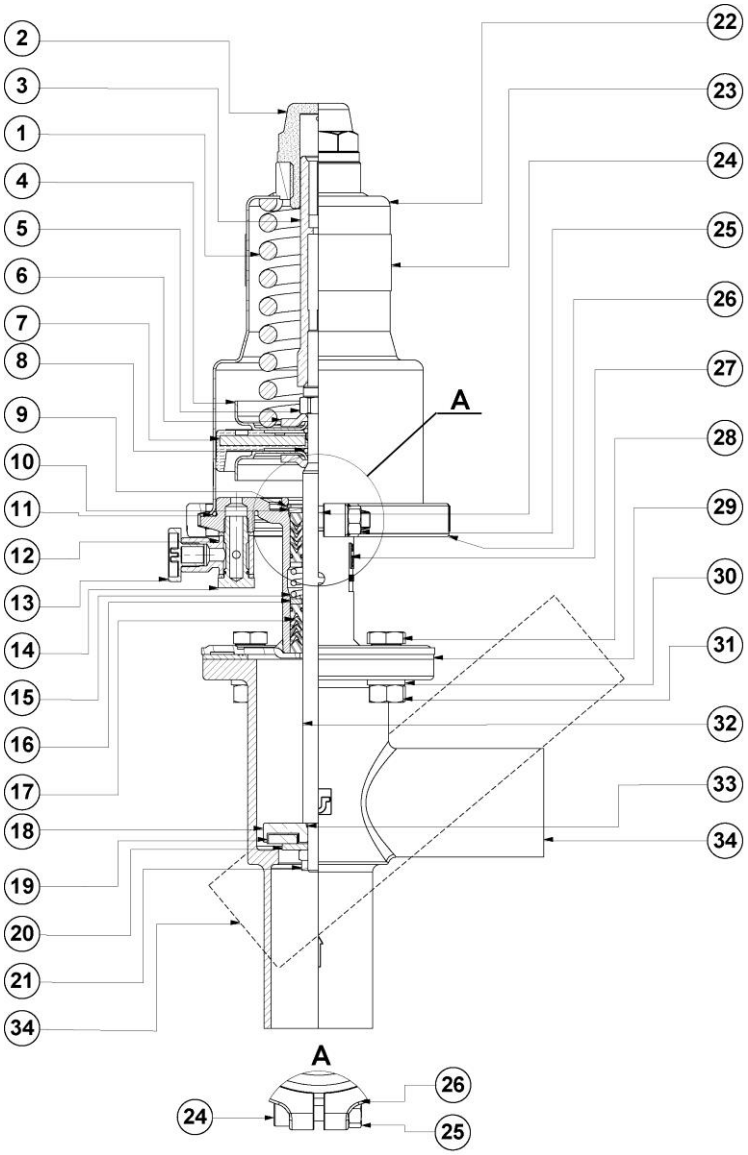
ND	SPARE PART CODE (Part N° 8-10-12-14-25-28)		
	PTFE	EPDM PTFE-coated	EPDM
15	5351	4190	2820
20			
25	5352	4191	2821
32	5353	4192	2822
40	5354	4193	2823
50	5355	4194	2824

Air side spare parts

Ø SERV.	SPARE PART CODE (Part No. 4-5-7)
Ø 70	3945
Ø 80	7896

Drawing no. 080409 Rev.:00

5.11.2 Parts and spare parts IVS/10-IVFL/10 with visual device



Drawing no 080379 Rev.:00

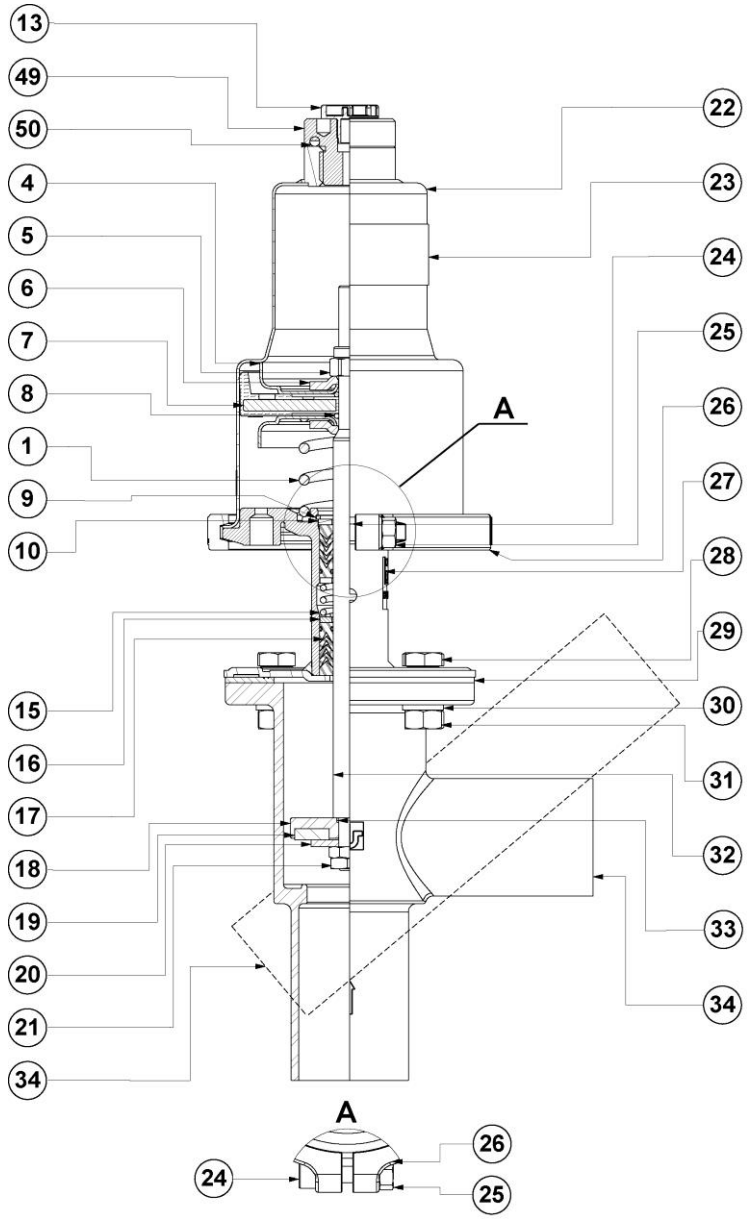
Body side spare parts

ND	SPARE PART CODE (Part. N° 15-17-19-29-33)		
	PTFE	EPDM riv. PTFE	EPDM
15	10682	10679	10676
20			
25	10683	10680	10677
32	10560	10558	10556
40	10684	10681	10678
50	10561	10559	10557

Air side spare parts

Ø SERV.	SPARE PART CODE (Part. N° 7-8-11)
Ø 70	3945
Ø 80	7896

5.11.3 Parts and spare parts IVS/10-IVFL/10 normaly open



Drawing no 080381 Rev.:00

Body side spare parts

ND	SPARE PART CODE (Part. N° 15-17-19-29-33)		
	PTFE	EPDM riv. PTFE	EPDM
15	10682	10679	10676
20			
25	10683	10680	10677
32	10560	10558	10556
40	10684	10681	10678
50	10561	10559	10557

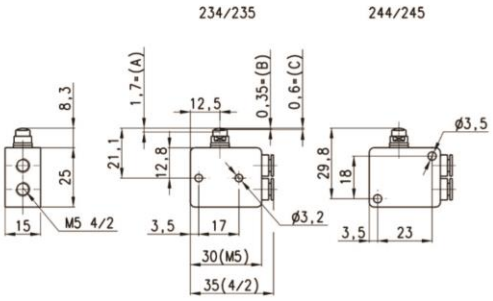
Air side spare parts

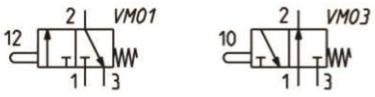
Ø SERV.	SPARE PART CODE (Part. N° 7-8-50)
Ø 70	6380
Ø 80	6381

Annex 1 – Pneumatic limit switch type FINC000234

Minivalves

234-945





Code properties

Mod.	SYMBOL
234-945	VM01

Series general data

Construction	poppet - type (closed centre)
Valve group	3/2 way/pos., normally closed
Materials	aluminium body, OT58 (brass) plunger, NBR seals
Mounting	by through - holes in valve body
Ports	M5, cartridge dia. 4
Ambient temperature	0°C ÷ 60°C
Medium temperature	0°C ÷ 50°C
Operating pressure	see models
Fluid	Filtered air, without lubrication. If lubricated air is used, it is recommended to use ISO VG32 oil. Once applied the lubrication should never be interrupted.

Annex 2 – Pneumatic limit switch type FINCVME201

METAL WORK® PNEUMATIC

MINIVALVES, MECHANICALLY AND HAND OPERATED SERIES VME

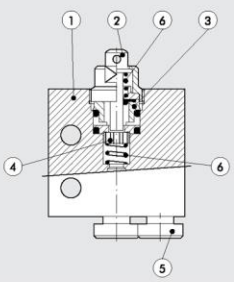
- Minivalves with 3/2 NO NC poppet,
- Installation in any position
- Push-in fittings for pipe Ø 4 mm and M5 on the valve body
- Low actuation force
- Rapid, accurate signal
- Mechanical actuation
- The 2 places adapter allows manual actuation of 1 or 2 VME valves with manual Ø 22 panel actuators. Thus it is possible to obtain 3/2, 5/2, 5/3 open centre and 5/3 pressure centre pneumatic functions.
- On request, it is possible to place a NC-NO electric switch next to VME valve for mixed solenoid/pneumatic signals.

TECHNICAL DATA

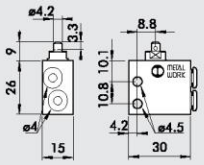
Valve fitting port		Push-in fitting for pipe diam. 4 and M5 (axial or side)
Fluid		Filtered air without lubrication; lubrication, if used, must be continuous
Type		With poppet
Versions		Mechanical and manual
Operators:		
• mechanical		With Plunger – Plunger for wall-mounting – Roller lever – Unidirectional roller lever
• manual		Depending on the type of actuation panel selected
Operating pressure	bar	0.5 to 10
Operating temperature range	°C	-10° to +60
Nominal diameter	mm	2.5
Conductance C	Nl/min · bar	16.5
Critical ratio b	bar/bar	0.03
Flow rate at 6 Bar ΔP 0.5 Bar	Nl/min	35
Flow rate at 6 Bar ΔP 1 Bar	Nl/min	60
Actuation force – Plunger at 6 Bar	N	8
Recommended lubricant		ISO and UNI FD22
Installation		In any position
Compatibility with oils		Please refer to page 6-7 of the tecnical documentation

COMPONENTS

① VALVE BODY: Aluminium
② BUTTON: chemically nickel-plated brass
③ DISTANCE PLATES: Brass
④ GASKETS: NBR
⑤ PUSH-IN FITTING CARTRIDGES: stainless steel, brass and plastic
⑥ SPRINGS: stainless steel



Ø 4



Code	Description
W3501001101	VME2-01 NC Ø 4

Annex 3 – Electromechanic limit switch type FINC00E100

ERSCE Position switches

Technical data

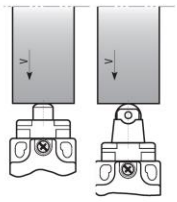
Insulation resistance			500 V DC	MΩ	100
Dielectric strength			50/60 Hz per 1' *	V AC	2500
Rated insulation voltage	Ui	IEC947-5-1		V AC	500
Rated thermal current	Ithe	IEC947-5-1		A	10
Rated operating current		IEC947-5-1/EN60947-5-1			
Category AC15	Ie		24 V	A	10
A300			125 V	A	6
			230 V	A	6
			400 V	A	3
Category DC13	Ie		24 V	A	6
Q300			48 V	A	4
			120 V	A	1
			250 V	A	0,4
Contact resistance		IEC255-7 cat.3	initial value	mΩ	25
Short circuit protective devices		IEC269 (IEC947-5-1) gI or gG type fuse		A	10
Rated conditionals short circuit current		IEC947-5-1		A	1000
Pollution degree		IEC947-5-1			3
Protection degree		EN 60529		IP	66
Protection against electric shock			plastic	class	II
			metal	class	I
Vibration resistance		IEC68-2-6	mm		0,35 ± 15% (10 ÷ 55 Hz ± 1 Hz)
Shock resistance		IEC68-2-27	11 ms	g	30
Mechanical life				cycles	15.000.000
Electrical life		a 250 V AC 6A with resistance load cos φ=1		cycles	500.000
		a 250 V AC 6A with resistance load cos φ=0,4		cycles	500.000
Distance between contacts		snap action type		mm	2x1,25
		slow action type		mm	2x2
Terminals		Type			Screw with combined notch and retactable plate (notch Ph. Size 1)
		Screw		M	3,5
		Protection degree		IP	20 A
		Material			Steel class 8,8/ Galvanized
		Max. screw tightening torque		cNm (Kg cm)	120 (12,24)
		Max connecting capacity	rigid cable	mm²	2x1,5
			flexible cable	mm²	2x1,5
		Terminal numbering			In accordance with EN50013

Condition of use

Air ambient temperature	operational	°C	-35 ÷ +85 (without formation of ice)
Relative humidity	operational		95% max

* between terminals of the same polarity: between terminals with different polarity: between live mechanical parts and ground; between live mechanical parts and non-current-carrying metal parts

Operating features



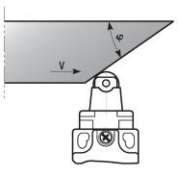
Plunger, Roller plunger, vertical travel
Actuators: A-B

Drive cam operating parameters

	V max (m/s)
Act. A	0,5
Act. B	0,5

Drive forces

Minimum command force	9 N
Minimum forced opening force	28 N



Roller plunger, side travel
Actuator: B

Drive cam operating parameters

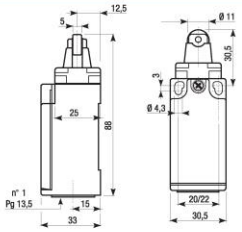
φ	V max (m/s)
30°	0,5
20°	1

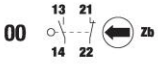
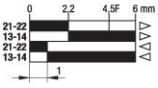
Drive forces

Minimum command force	9 N
Minimum forced opening force	28 N

Steel roller plunger

Thermoplastic



Part no.	Contact block	Circuit diagram	Contact travel
E10000BI	Snap action 1NO+1NC		

Annex 4 – Electromechanic limit switch type FINC00161E

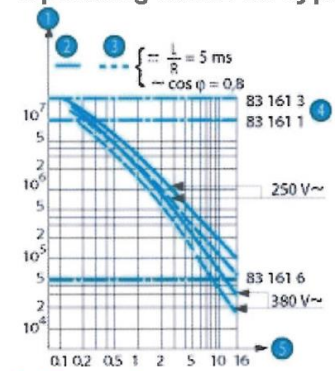
V3 - Standard83 161 3

The strengths of the family

- Nominal ratings 0.1 A to 20 A / 250 VAC
- Operating temperature up to +125°C
- Conforming to EN 61058 and UL 1054
- Choice of actuators with 4 possible fixing positions

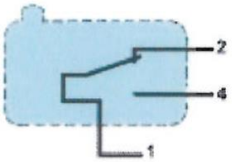
Reference characteristics	83 161 338
Function	I (changeover)
Connections	W3
Electrical characteristics	
Rating nominal / 250 VAC (A)	16
Rating thermal / 250 VAC (A)	20
Mechanical characteristics	
Maximum operating force (N)	0,8
Min. Release force (N)	0,2
Maximum total travel force (N)	2
Max. permitted overtravel force (N)	20
Maximum rest position (mm)	16,2
Operating position (mm)	$14,7^{\pm 0,3}$
Maximum differential travel (mm)	0,35
Min. overtravel CRA (mm)	1,2
Ambient operating temperature (°C)	-20 →+125
Mechanical life for 2/3 CRA (operations)	2×10^7
Contact gap (mm)	0,4
Weight (g)	5,6

Operating curve for types 831611 / 831613



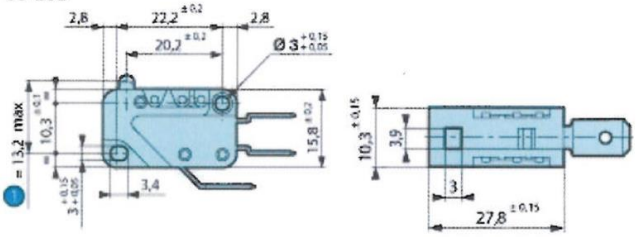
N°	Legend
1	Number of cycles
2	Resistive circuit
3	Inductive circuit
4	Mechanical life limit
5	Current in Amps

Single break changeover switch



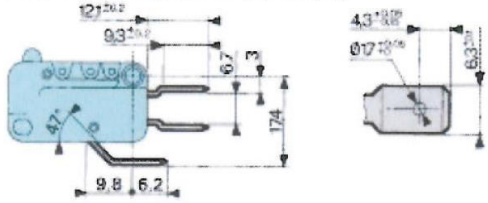
→ *Encombrements

83 161

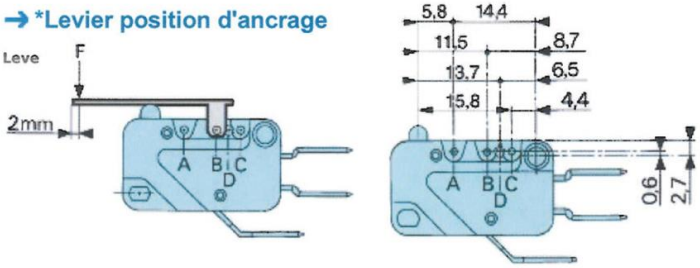


→ *Connexions

W3 per faston 6,35 mm (6,3 x 0,8)

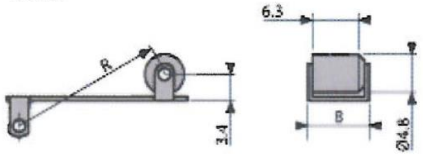


→ *Levier position d'ancrage



→ *Accessoires de manoeuvre

161 E



Annex 5 – 2-wire inductive proximity switch A.C. N.O.

Proximity Sensors
XS6 Extended Range and Auto-Adaptable Inductive Sensor
Metal Tubular, DC and AC/DC

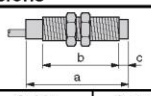
XS6 ••B1••L2

Features

Entire range of fully shielded metal body tubular inductive proximity sensors

- Increased sensing range, fully shielded
- 2-wire AC/DC and 3-wire DC
- Normally open or normally closed outputs available
- Cable and connector versions
- PNP or NPN, DC
- Self-Teach available on 12–30 mm versions

Dimensions



	Cable		Connector	
	a	b	a	b
∅ 8	1.9 (50)	1.6 (42)	2.4 (61)	1.6 (40)
∅ 12	1.9 (50)	1.6 (42)	2.4 (61)	1.6 (42)
∅ 18	2.3 (60)	0.09 (51)	2.8 (72.2)	2.0 (51)
∅ 30	2.3 (60)	0.09 (51)	2.8 (72.2)	2.0 (51)

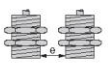
in. (mm)

Nominal Sensing Distance	Circuit Type	Output Mode	Voltage Range	Load Current Maximum	Operating Frequency DC	Operating Frequency AC	Catalog Number
12 mm Diameter, 2 m (6.6 ft) cable ▲							
4 mm	2-wire	N.O.★	12–48 Vdc	1.5–100 mA	4,000 Hz	25 Hz	**XS612B1MAL2**

★ To order a normally closed (N.C.) version, change the A to B. Example: XS518B1PAL2 to XS518B1PBL2.
◆ Self-teach version only
▲ For a 5 m (16.4 ft) cable length, add suffix **L5**. For a 10 m (32.8 ft) cable length, add suffix **L10**.

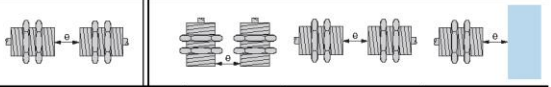
Minimum Mounting Clearances, in. (mm)

Auto-Adaptable



	Side by Side		Face to Face	
—	Flush	Not Flush	Flush	Not Flush
∅ 12	e ≥ 0.55 (14)	1.9 (50)	e ≥ 1.9 (50)	3.9 (100)
∅ 18	e ≥ 1.1 (28)	3.9 (100)	e ≥ 3.9 (100)	7.9 (200)
∅ 30	e ≥ 1.9 (48)	7.1 (180)	e ≥ 7.1 (180)	14.1 (360)

Extended Range



	Side by Side	Face to Face	Face to Metal Object
∅ 8	e ≥ 0.1 (3)	e ≥ 0.7 (18)	e ≥ 0.17 (4.5)
∅ 12	e ≥ 0.2 (4)	e ≥ 0.9 (24)	e ≥ 0.2 (6)
∅ 18	e ≥ 0.4 (10)	e ≥ 2.4 (60)	e ≥ 0.6 (15)
∅ 30	e ≥ 0.8 (20)	e ≥ 4.7 (120)	e ≥ 1.2 (30)

Wiring

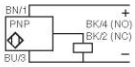
3-Wire Selectable

Connector M12

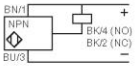
Cable

Blue BU –
Brown BN +
Black BK Output

PNP



NPN

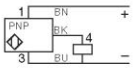


Connector M12

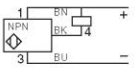
Cable

Blue BU –
Brown BN +
Black BK Output

PNP



NPN



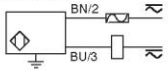
2-Wire AC/DC

Connector U20

Cable

Blue BU –
Brown BN +
Black BK Output

2-Wire Non-Polarized



Specifications

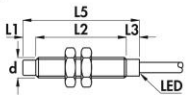
Mechanical		Extended Range	Auto-Adaptable Shielded	Auto-Adaptable Non-Shielded
Fine Detection Zone	12 mm	0–3.2 mm	1.7–3.4 mm	1.7–5 mm
Sn	12 mm	—	0–3.4 mm	0–5 mm
Temperature Rating	Storage	-40 to +185 °F (-40 to +85 °C)		
	Operation	-13 to +158 °F (-25 to +70 °C)		
Enclosure Rating	NEMA Type	3, 4X, 6P, 12, 13		
	IEC	IP68 cable versions (IP67 connector versions)		
Enclosure Material	Case	Nickel-plated brass		
	Face	PBT		
Maximum Tightening Torque	12 mm	15 N•m (11 lb-ft)		
Vibration		25 g, ±2 mm amplitude (10–55 Hz)		
Shock Resistance		50 g, 11 ms duration		
Differential (%of Sr)		15%		
Repeatability (% of Sr)		3%		
LED Indicator	Power and Teach	—	Green	
	Output	Yellow		
Cable		PVR 3 x 0.34 mm² / PVR2 x 0.5 mm²	PVR – 4.2 mm (0.17 in.) O.D.	
Connector		M12 4-pin / U20 3-pin micro-style	M12 micro-style 4-pin	
Electrical		**2-wire AC/DC**	**3-wire DC**	**Auto-adaptable DC**
Voltage Range		24–240 Vac; 24–210 Vdc	12–48 Vdc	12–24 Vdc
Voltage Limit (Including Ripple)		20–264 Vac/Vdc	10–58 Vdc	10–36 Vdc
Voltage Drop		5.5 V	2 V	2 V
Maximum Leakage (Residual) Current—Open State		0.8 mA	—	—
Current Consumption		—	10 mA	10 mA
Maximum Current Limit		AC: 5–300 mA; DC: 5–200 mA	200 mA	100 mA
Power-up Delay (Maximum)		20 ms—12 mm; 25 ms—18/30 mm	5 ms	5 ms
On Delay (Maximum)	12 mm	0.5 ms	0.2 ms	0.3 ms
Off Delay (Maximum)	12 mm	0.2 ms	0.2 ms	0.7 ms
Operating Frequency, Maximum	12 mm	AC: 25 Hz / DC: 1,000 Hz	2,500 Hz	1,000 Hz
Protective Circuitry	Short Circuit Protection	No	Yes	Yes
	Overload Protection	Yes	Yes	Yes
	Reverse Polarity Protection	Yes	Yes	Yes
Agency Listings				

Annex 6 – 3-wire inductive proximity switch D.C. N.O.

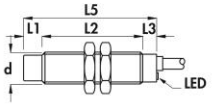
CYLINDRICAL INDUCTIVE SENSORS IN METAL HOUSING

Voltage 20 ÷ 240 V≂ •
Amplified in d.c. + a.c. 2 wires •
Cable output •

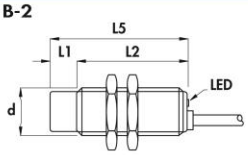
Housing B-6



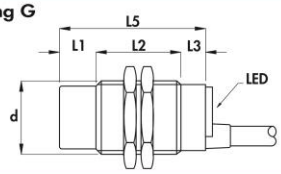
Housing B-3



Housing B-2

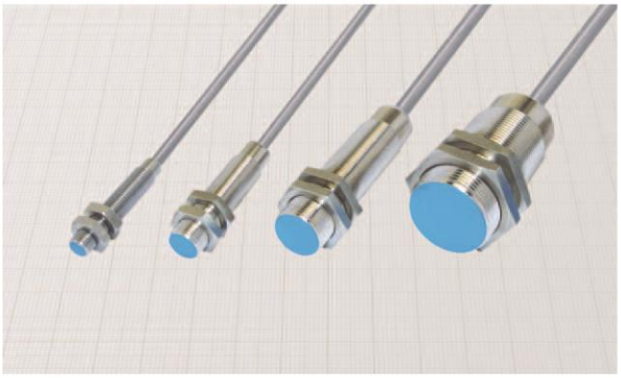


Housing G



Diameter		M8 x 1	M12 x 1	M18 x 1	M30 x 1,5
Nut	Size	SW13	SW17	SW24	SW36
	Thickness mm	4	4	4	5
Max tightening torque Nm		10	15	35	80

Materials:
- Cable: 2 m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
- Housing 8 mm: stainless steel
- Housing 12 -18 - 30 mm: nickel plated brass
- Sensing face: plastic



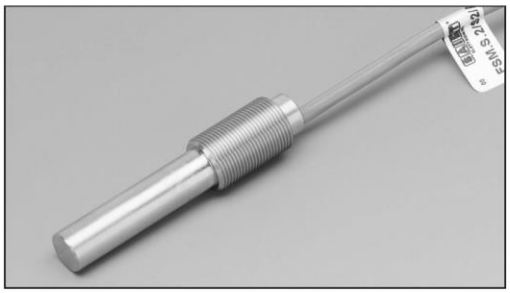
General Features:
These sensors are able to work with either direct or alternate current. Voltage drop and residual current are very low. They are not polarized and the load can be connected on both the leads. In many applications they can used to replace mechanical microswitches.

Technical data:
- Supply voltage (U_B): 20 ÷ 240 Vdc/Vac
- Electrical system frequency: 40 ÷ 60 Hz
- Off-state current (I_r) at 24 V: ≤ 1 mA
- Off-state current (I_r) at 220 V: ≤ 1,5 mA
- Minimum operational current (I_m): 5 mA
- Voltage drop (U_d): ≤ 5 V
- Temperature range: - 25° ÷ + 70°C
- Max thermal drift of sensing distance S_r: ± 10%
- Repeat accuracy (R): 2%
- Switching hysteresis (H): 10%
- Degree of protection: IP67
- Switch status indicator: yellow LED
- Cable conductor cross section: 0,35 mm² on 8 and 12 mm; 0,50 mm² on 18 mm; 0,75 mm² on 30 mm
- Protected against short-circuit and overload (versions with letter K)
- Suppression of initial false impulse
- Class 2 equipment according to IEC 536
- Shock and vibration according to EN60068-2-27 EN60068-2-6
- Electromagnetic compatibility (EMC) according to EN60947-5-2 CE

Housing	Flush mounting / Non flush mounting	L1	L2	L3	L4	L5	Cable diameter	Body diameter (d)	Max switching frequency (f) in d.c.	Max switching frequency (f) in a.c.	Rated operational current (I_e)	Nominal sensing distance (S_n) ± 10%	ORDERING REFERENCES NO	ORDERING REFERENCES NC
		mm	mm	mm	mm	mm	mm	mm	Hz	Hz	mA	mm		
B - 6	•	-	40	5	-	45	3,5	M8 x 1	1000	25	100	1,5	**AX8/4609S**	**AX8/4619S**
B - 6	•	5	35	5	-	45	3,5	M8 x 1	800	25	100	2,5	**AX8/5609S**	**AX8/5619S**
B - 3	•	-	43	7	-	50	4	M12 x 1	800	25	100	2	**AX12/4609KS**	**AX12/4619KS**
B - 3	•	7	36	7	-	50	4	M12 x 1	600	25	100	4	**AX12/5609KS**	**AX12/5619KS**
B - 2	•	-	50	-	-	50	5	M18 x 1	800	25	200	5	**AX18/4A09KS**	**AX18/4A19KS**
B - 2	•	10	40	-	-	50	5	M18 x 1	400	25	200	8	**AX18/5A09KS**	**AX18/5A19KS**
G	•	-	50	10	-	60	6	M30 x 1,5	400	25	200	10	**AX30/4609KS**	**AX30/4619KS**
G	•	15	35	10	-	60	6	M30 x 1,5	200	25	200	15	**AX30/5609KS**	**AX30/5619KS**

Annex 7 – 2-wire magnetic sensor A.C. N.O.

Proximity Magnetic Sensors Cylindrical Body, FSM Series



- Cylindrical case
- Brass or nickel plated brass body
- M12 or M16 diameter
- NO or CO output functions
- Front side switching

Product Description

The cylindrical proximity magnetic sensors of the FSM series are available in different versions with brass or nickel-plated brass body, different dimensions and output contacts and can be mounted directly on ferromagnetic supports. FSM.A.7 model is provided with output function status LED, while FSM.S.2/S2/AT can resist to temperatures up to 180 °C.

Ordering Key

FSM.S.2/S2/AT

- Type
- Output Function
- Reed Contact Type
- Special Versions
- Special Applications

Type Selection

Dimensions	Output function	High temperature applications	Reference
M12 x 1	NO	-	FSM.A.2
	Change-over	-	FSM.A.7 FSM.S.2
M16 x 1		-	FSM.S.2/S2
		Yes	FSM.S.2/S2/AT

General specification

Case		**Output connection**	
FSM.A.2 FSM.A.7 FSM.S.2	Nickel-plated brass	FSM.A.2 FSM.S.2 FSM.S.2/S2	PVC Cable
FSM.S.2/S2 FSM.S.2/S2/AT	Brass	FSM.A.7 FSM.S.2/S2/AT	Silicone Cable
Protection degree	IP67		
Operating temperature	-25 to +75°C		
FSM.S.2/S2/AT	-25 to +180°C		

Electrical specifications

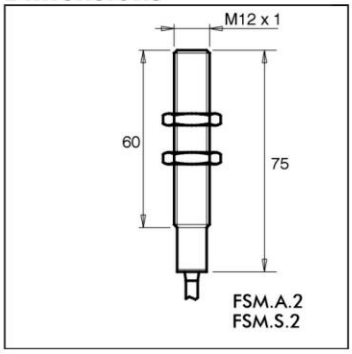
Contacts	2	7	S.2
Max switching voltage	250 Vac	-	220 Vac
Max switching current	3 A	50 mA	1 A
Max switching power	100 VA	-	60 VA

Operating distance

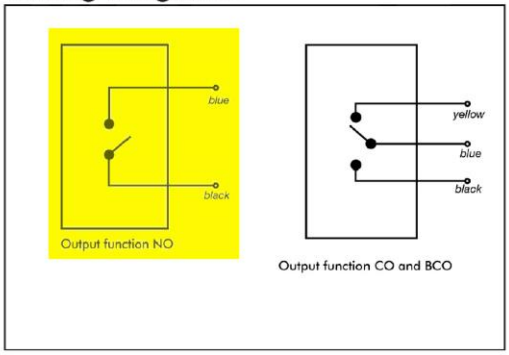
Magnetic Units	CL.10	CL.11	CL.18	CL.20/S1	CL.20/S3	CL.23	CL.31	CL.50
FSM.A.2	-	16	2	14	13	11	19	-
FSM.S.2	-	9	-	-	-	-	-	19
FSM.A.7*	-	-	-	-	-	-	-	-
FSM.S.2/S2/AT	-	-	-	-	8	-	-	-

** ≥ 7 mm with Neodimium REN 35, 5x5x1,5 magnetic unit mounted on iron*

Dimensions



Wiring Diagrams



6 Table 5: Tightening Torques

Part match	Tightening torque for stainless steel valve threaded couplings [N·m]					
	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
P. 21	9			19		
P. 25 P. 24	7					
P. 28 P. 31	17					

7 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.
Assembly and disassembly operations shall be carried out by qualified personnel only, equipped with all the work and safety tools. **ATTENTION! Compressed springs are included inside the servo control.** Thus, during valve disassembly, components are disposed of by using all safety equipment necessary to prevent sudden separation of upper head from lower head when all servo control head fastening screws have been removed.

8 Warranty

Every valve is checked before leaving the factory. On request of customer a certificate of control can be issued. The customer himself can inspect and check the material at our factory before shipment. Such inspection is considered definitive.
All expenses relative to special checks or requirements by the customer are at the customers expense.
Our responsability (for damage to person or/and properties during installation and/or maintenance) lapses when the valve is removed from its original packaging.
Our responsibility is limited to the replacement or repair of parts which develop material or manufacturing defects within 12 months from shipment and which have been used in normal working conditions. This use exclude every and any other obligation. All transport and additional costs are at the customer expense.
ITALVALVOLE® reserved the right to stop, change or modify the characteristics of any of its products without being obliged to replace or mount the modified parts on products already supplied.

WARNINGS:

- The safety conditions shall not be guaranteed and malfunctions shall not be subjected to valves in case:
  - disassembly, re-assembly, maintenance operations are not carried out in compliance with the use and maintenance manual.
  - original spare parts are not used.
- It is forbidden to remove pages from this document or to make any correction.
- In case of doubt, make reference to Italian version of the manual.
- ITALVALVOLE® S.A.S. reserves the right to change its products and the relevant documentation without prior notice.
- The use of the handbook does not exempt from the observance of the laws in force.
- We notify some components may not be of Italian origin.