FOOD VALVE
FAMILY 01 - GROUP 30

Master handbook description: Guide to choice, use and maintenance of Food Valves (English)

Code : 9035
Category: 1720
Group : 900
Revision no: 02
Date: 18/07/2016
Drawn up by: MBL
Checked by: MB
Approved by: OS

Via Amendola 125 - 13836 Cossato (BI) ITALY
Phone (+39) 015980641 a.s.
Telefax (+39) 015926297

Home page: http://www.italvalvole.it
P.E.C.: italvalvole@cert.italvalvole.it
E-mail: itv@italvalvole.it

Table of Contents

1 Foreword

The microflow valve was designed to be used on sampling and/or laboratory machines, for which the low capacity values, which are necessary for processing, are particularly important.
Classification according to directive 2014/68/UE : Art. 4. Par 3 .
Materials used for the production of this set of valves allow their use above all in food sector. The use in chemical and pharmaceutical sector, after checking any application with our technical department, is not excluded.
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 when it is in the closed position (EN 7363).

- **Allowable temperature:** operating temperature limit, prescribed for safety reasons.

- **Allowable pressure:** operating pressure limits, normally at the top of each chamber 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 includes the ND letters followed by a non-dimensional whole number which is indirectly related to the physical dimension, expressed in millimeters, of the hole or the outer diameter of the final end of fittings (ISO 6708).

- **Kv**: flow rate, expressed in cubic meters/h, of water (from 10 to 25 °C with a volume equal to 1000 Kg/cubic meters), which goes through two ways of a valve, with a pressure drop Δp of 100 KPa (1 bar).

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

  where: Q is the capacity in m^3/h
  (UNI 9753).

- P_2: pressure measured on the valve outlet connection (value considered equivalent to 0 bar).

3 Requests

In case of request, indicate the following data:
- Serial number (printed on the label)
- Type, nominal diameter and version (also indicated on the label)
- 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

Connections: ⇒ to be butt and socket welded.

Pmax allowable: ⇒ 6 bar

Pmin allowable: ⇒ 0 bar.

Tmax allowable: ⇒ 150° C

Tmin allowable: ⇒ -10° C (in liquid state)

Flow direction: ⇒ unidirectional 2/3-way globe valve, with right angle pattern body.

Air connection: ⇒ 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.

P min. (supply): ⇒ 6 bar.

P max. (supply): ⇒ 6 bar.

Air consumption (NC): ⇒ 0.087 Nl/cycle at 6 bar pressure

Working materials: ⇒ see working drawing No. 060035 and relevant tables

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

Food micro-flow valve ND 8 with right angle body

4.1 Work Kv and Δp table of the micro-flow food valves

	NC
ND	8
$Kv_{teor.}$ [m^3/h]	1.2
Δp allowable with P_2=0 bar [bar]	6

4.2 Fluids compatible with micro-flow food valves

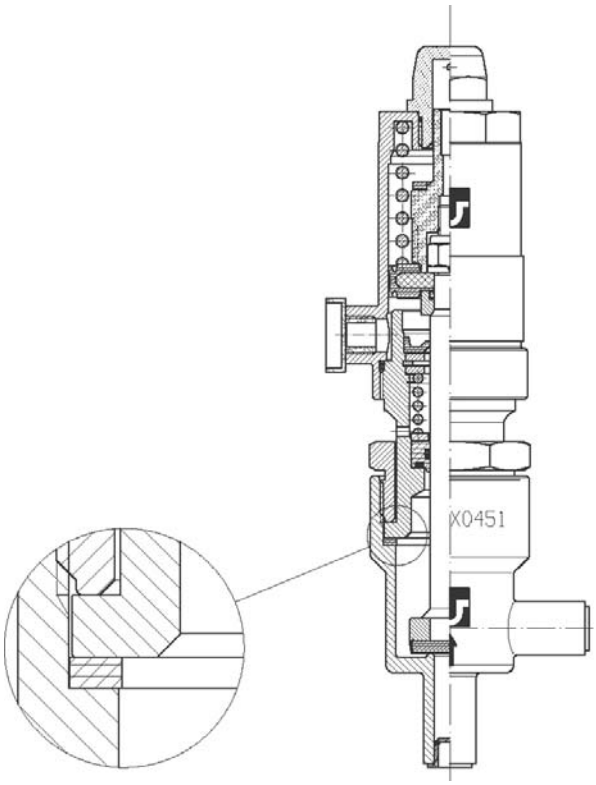
Table 1
Glycerol fatty acids
Phthalic acid
Gallic acid
Stearic acid
Methanol
Propanol
Sodium carbonate 20% max
Sodium carbonate
Sodium chloride 20% max
Potassium chloride 5% max
Ethylene glycol
Potassium sulphate 20% max at T=100 °C
Sodium sulphate
Zinc sulphate 40% max at T=100 °C
Potassium sulphite 10% max
Sodium sulphide
Steam (Tmax=140 °C)

All data indicated under table 1, if not otherwise specified, is relevant to a temperature of 21°C.
All data has a general meaning and is not valid for all possible working conditions. These data may considerably vary depending upon various conditions, such as: temperature, concentration, fluid speed.
For a deeper and thorough information, please get in touch with the 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, upon written request.

4.3 Safety Notes

- The valve body, under maximum operating temperature conditions, depending on 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.
- No fluid shall be present inside pipes, nor inside the valve itself during any operation carried out on the valve.

4.4 Micro-flow food valve historic data (DWG. No. 060041)



POS. 1

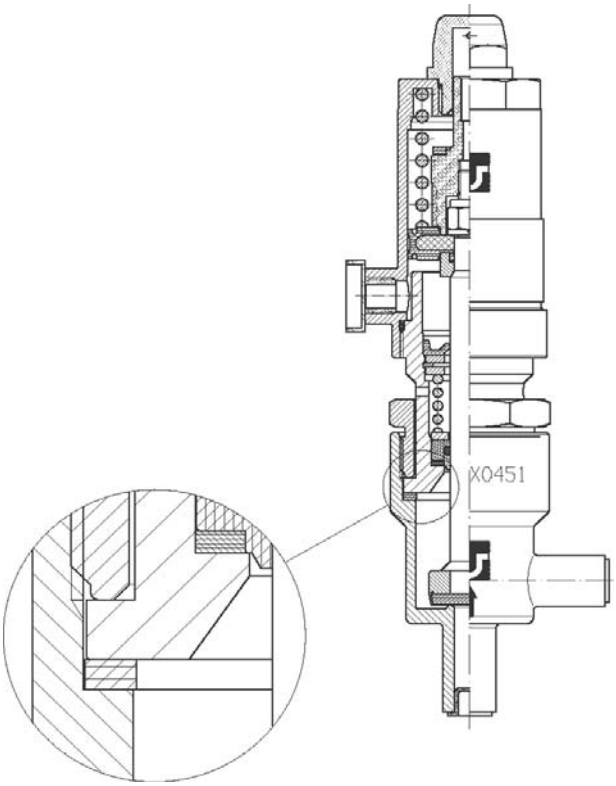
Spare parts : for spare parts two codes exist, the first one including the servo control side gaskets, the second one including the body side gaskets.

VALVES MANUFACTURED :

From 2002 to end 2005

From ND 8

Valve characterized by virgin PTFE and food silicon, with electro-polished valve body and intermediate body.



POS. 2

Spare parts: for spare parts two codes exist, the first one including the servo control side gaskets, the second one including the body side gaskets.

VALVES MANUFACTURED :

From beginning 2006

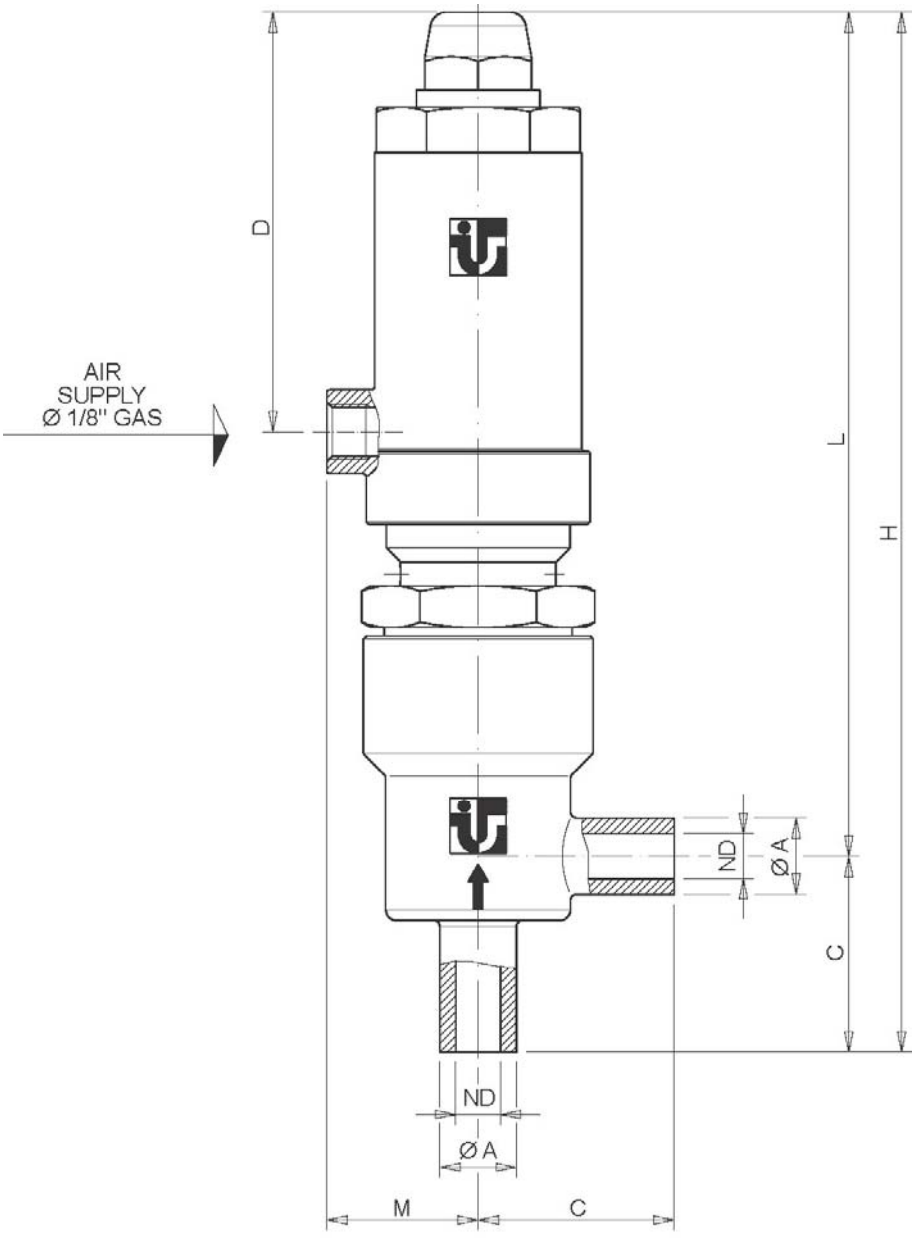
From ND 8

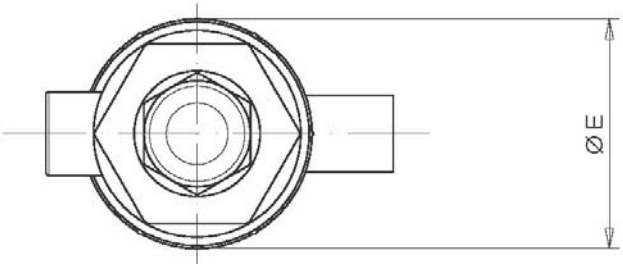
In this latter version a fundamental change of the intermediate body was made. As one can see from the drawing on the side, the food gasket, which seals below the stem, was moved to the lowest position of the intermediate body to reduce any residual deposit zone of product, which passes through the valve body. The spare parts of this latest series have not changed as regards the previous version.

4.5 Overall Dimensions of micro-flow food valves

4.5.1 IMS/0 FOOD D.V. N.C. ND 8 Cat. 1682

Globe valve with 2-way right angle pattern body.
Connections to be butt welded.
Normally closed servo control.
Visual device indicating the valve open status.





ND	8
Gasket	**7268**
Weight (Kg)	0.80
A	13.7
C	35
D	75
E	41
L	151
H	186
M	27

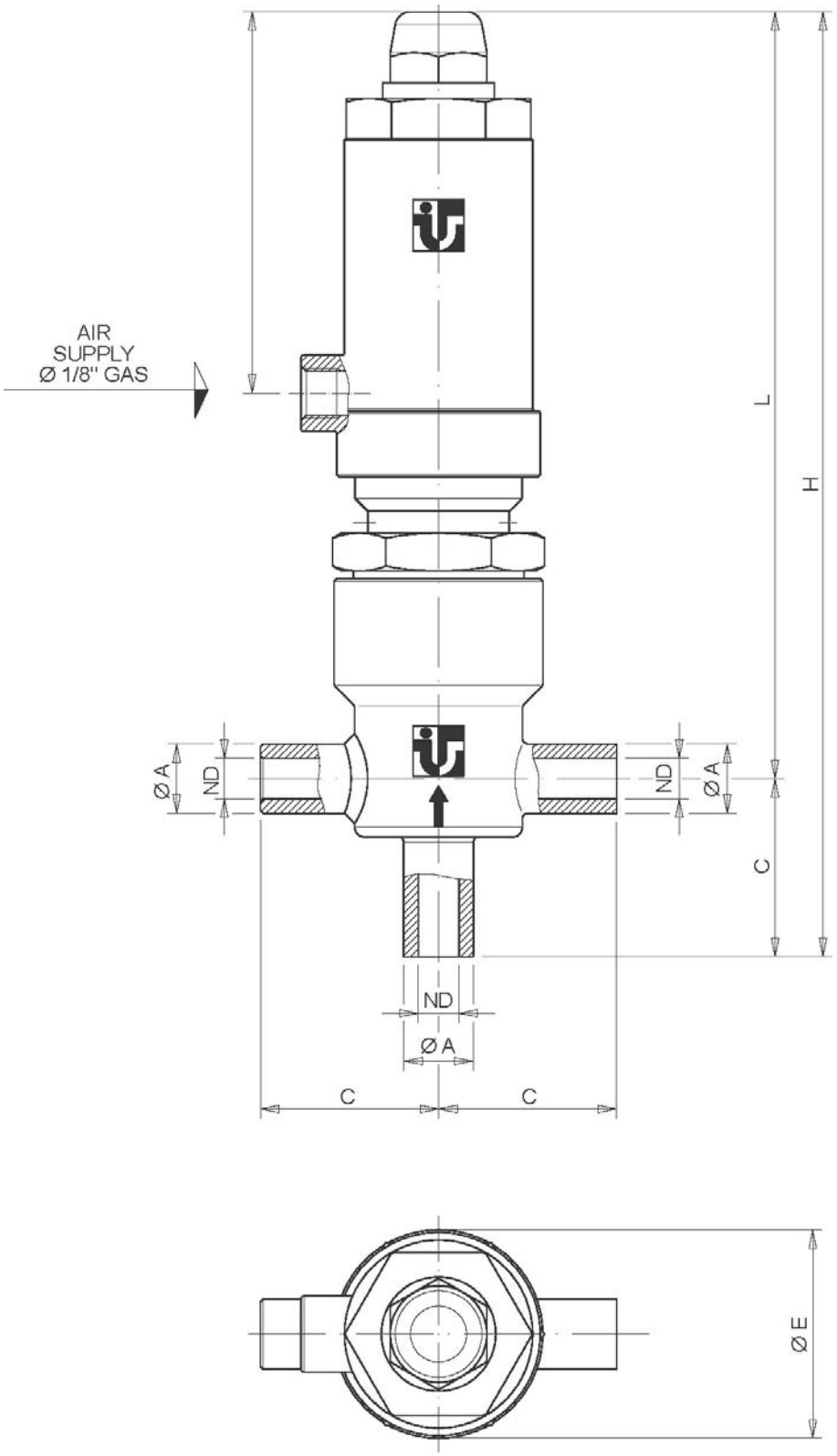
Main dimensioning parameters

Δp [bar]	6
Kv	1.2

DWG. No. 060038 Rev.:00

4.5.2 IMS/0 3-way FOOD D.V. N.C. ND 8 Cat. 2116

Globe valve with 3-way right angle pattern body.
Connections to be butt welded.
Normally closed servo control.
Visual device indicating the open valve status.



ND	8
Gasket	**8604**
Weight (Kg)	0.8
A	13.7
C	35
D	75
E	41
L	151
H	186

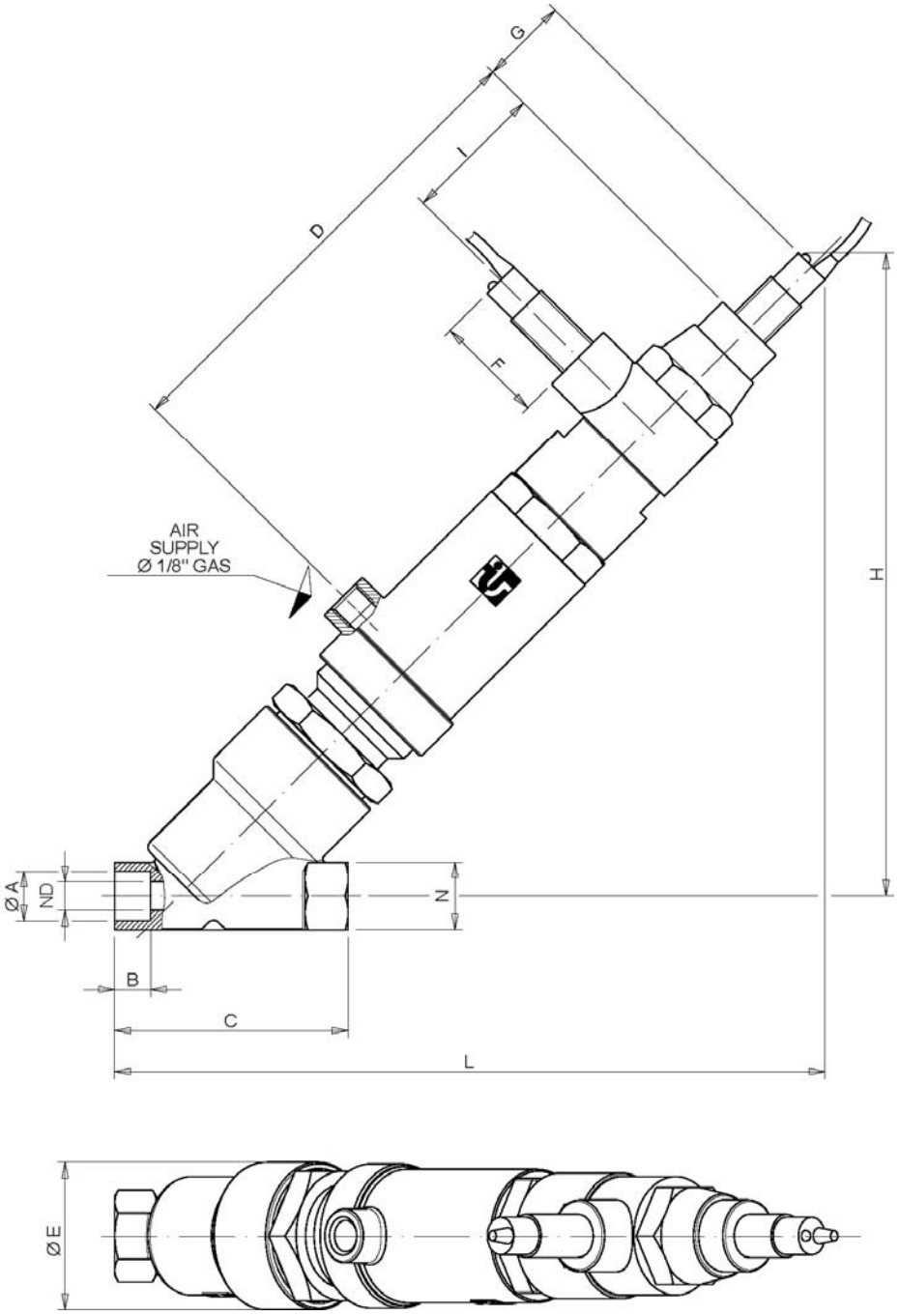
Main dimensioning parameters

Δp [bar]	6
Kv	1.2

DWG. No. 060039 Rev.:00

4.5.3 IMF/ST ND 8 N.C. 3-WIRE DC A/C IND. SENS. PTFE SILIC Cat. 2049

2-way globe valve with 2-way 45° angle pattern body.
Connections to be socket welded.
Normally closed servo control with 3-wires DC inductive sensors, indicating the open valve and closed valve status.



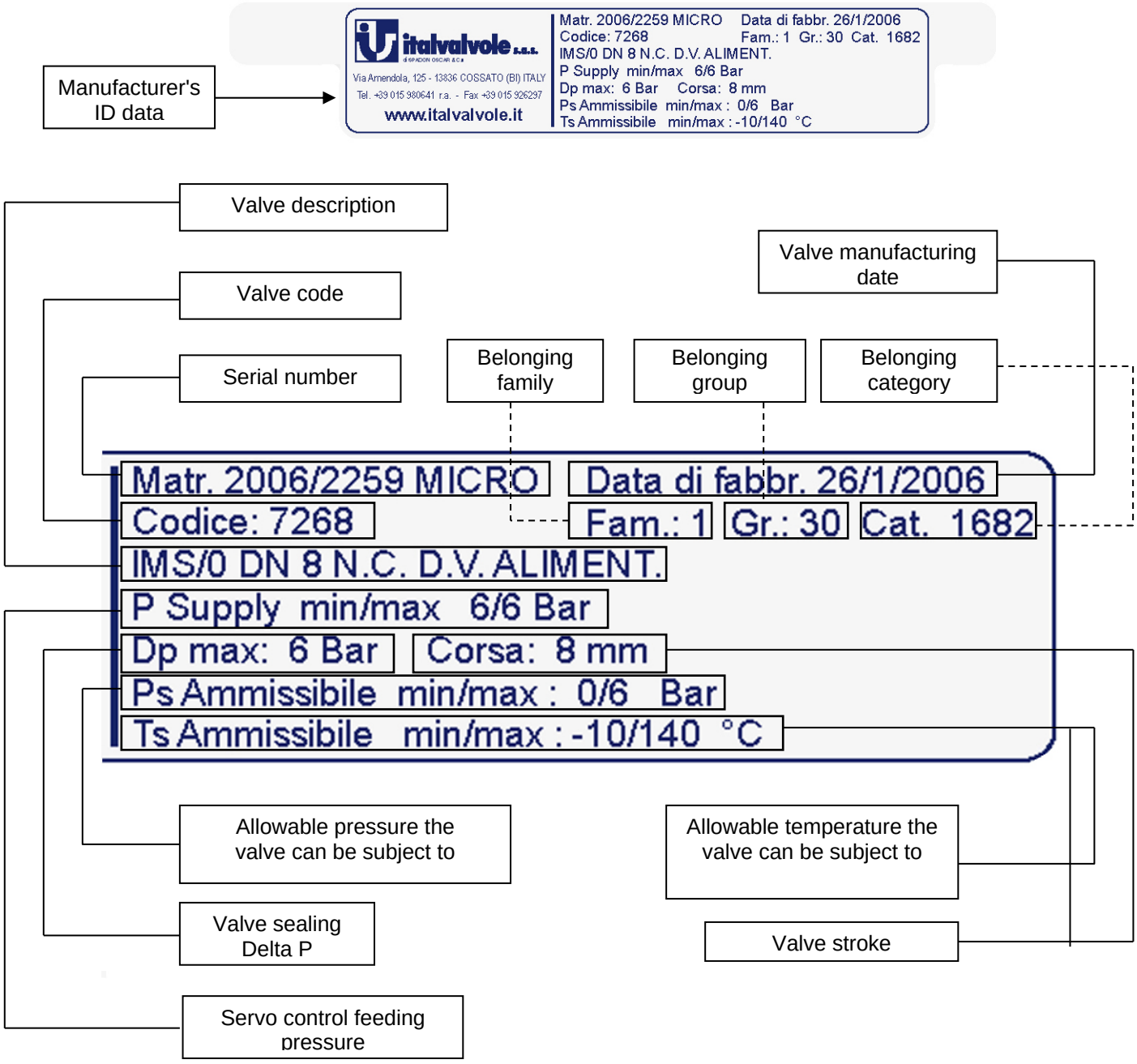
ND	8
Gasket	**8303**
Weight (Kg)	0.8
A	14
B	10
C	65
D	133
E	41
F	30.5
G	24.5
H	180
I	39.5
L	198
N	19

Main dimensioning parameters

Δp [bar]	6
Kv	1.2

DWG. No. 060040 Rev.:00

4.6 Micro-flow food valve label description



5 Storage, Assembly, Check And Maintenance

5.1 Transport, Storage And Handling

Micro-flow food valves shall be handled with the maximum care throughout the whole transport and assembly phase. Any crashes and anomalous stresses are to be avoided (do not grasp the valve by the servo control).
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 temperatures shall be included 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 hydraulic 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 any case the valve must not be disassembled or modified, under pain of revocation of each type of guarantee.
NOTE: A compression spring is included inside the valve.
Before installing, protections have to be moved from the valve body. Moreover, remove the lateral installed threaded cap.
Feeding has to be made from the lateral coupling.
The compressed air has to be instrument air, with 6 bar pressure, with feeding pipes inner ø = 4 mm. (see also chapter 4).
The air connections on the VALVE shall be made of 1/8" Gas male threaded couplings.
During the valve cleaning operations, do not blow compressed air into the inspection holes.

5.2.2 Assembly of valves with butt and socket welding ends

Before starting welding, remove the servo control complete with its gasket, to prevent it from being damaged during welding. To carry out correctly disassembly and re-assembly operations of the intermediate body, carry out the following operations (see the annexed drawing No. N° 060035):

1) Blow air inside the servo control (6 bar).
2) Unloosen the fastening nut of the intermediate body (20), by means of a 36 hexagon wrench.
3) Remove the servo control from the body.
4) Extract the gasket (10) from the body.

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 (welding slags, chips and others), present 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:

1) Send the fluid inside the valve under shutter at the operating pressure, (check that it is always lower than the maximum allowable pressure indicated 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.

5.4 Troubleshooting

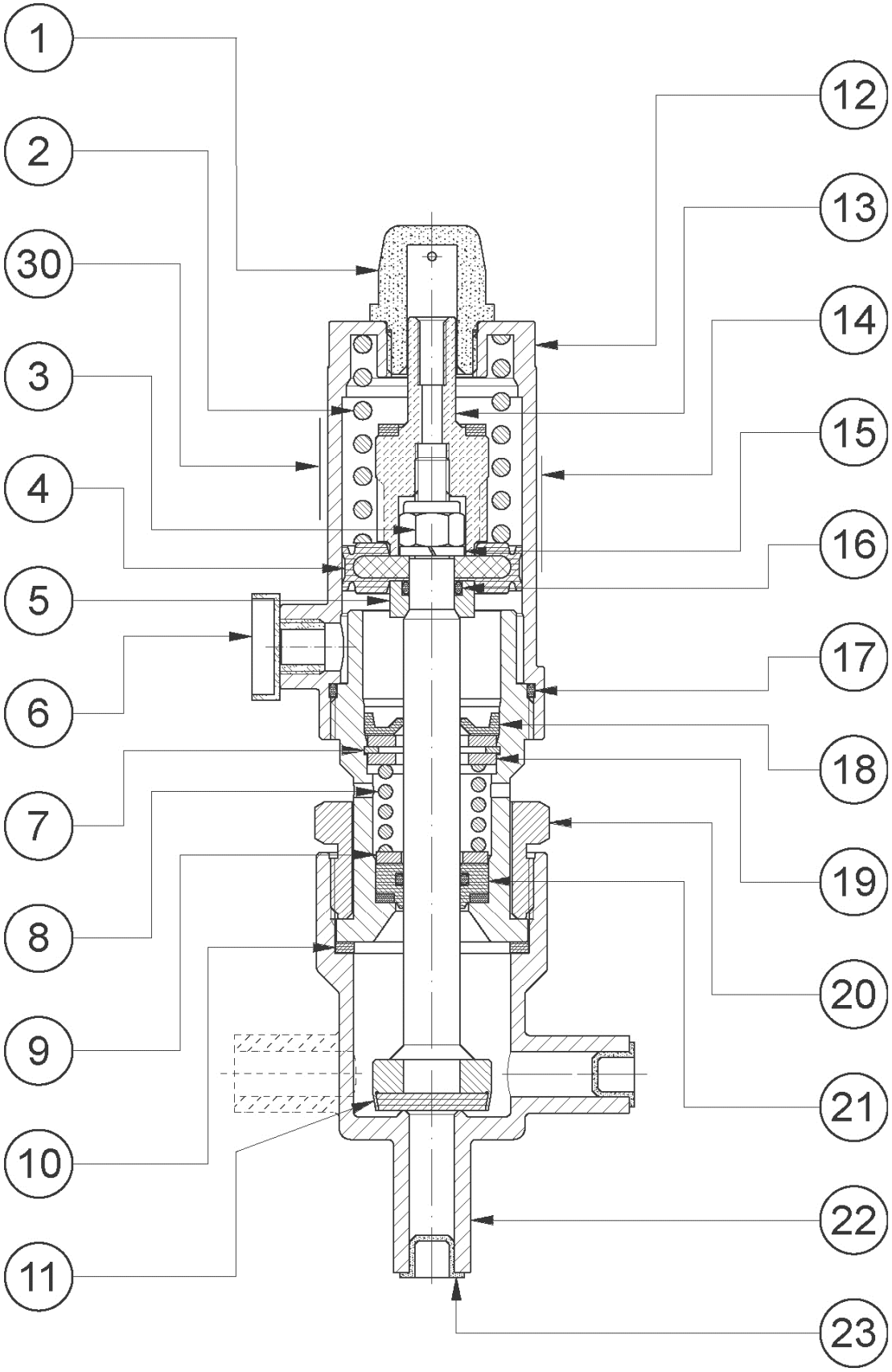
Troubleshooting operations shall be always carried out by qualified personnel only, adequately equipped for the hydraulic and pneumatic operations and provided with the proper safety clothing, paying particular attention to the protection of face, eyes and hands.

In case of anomalous operation or valve leakages, the valve operation shall be immediately stopped and the following operations 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 shall 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, shown on the label, provided 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, 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 Section plane IMS/0 N.C. D.V. FOOD VALVE ND 8



DWG. NO. 060035 Rev.:01

5.7 Instruction for disassembly, gasket replacement and re-assembly of the IMS/0 N.C. D.V. FOOD VALVE ND 8

Refer to the annexed Dwg. No. 060035 for the disassembly and assembly operations of the food valve.
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.

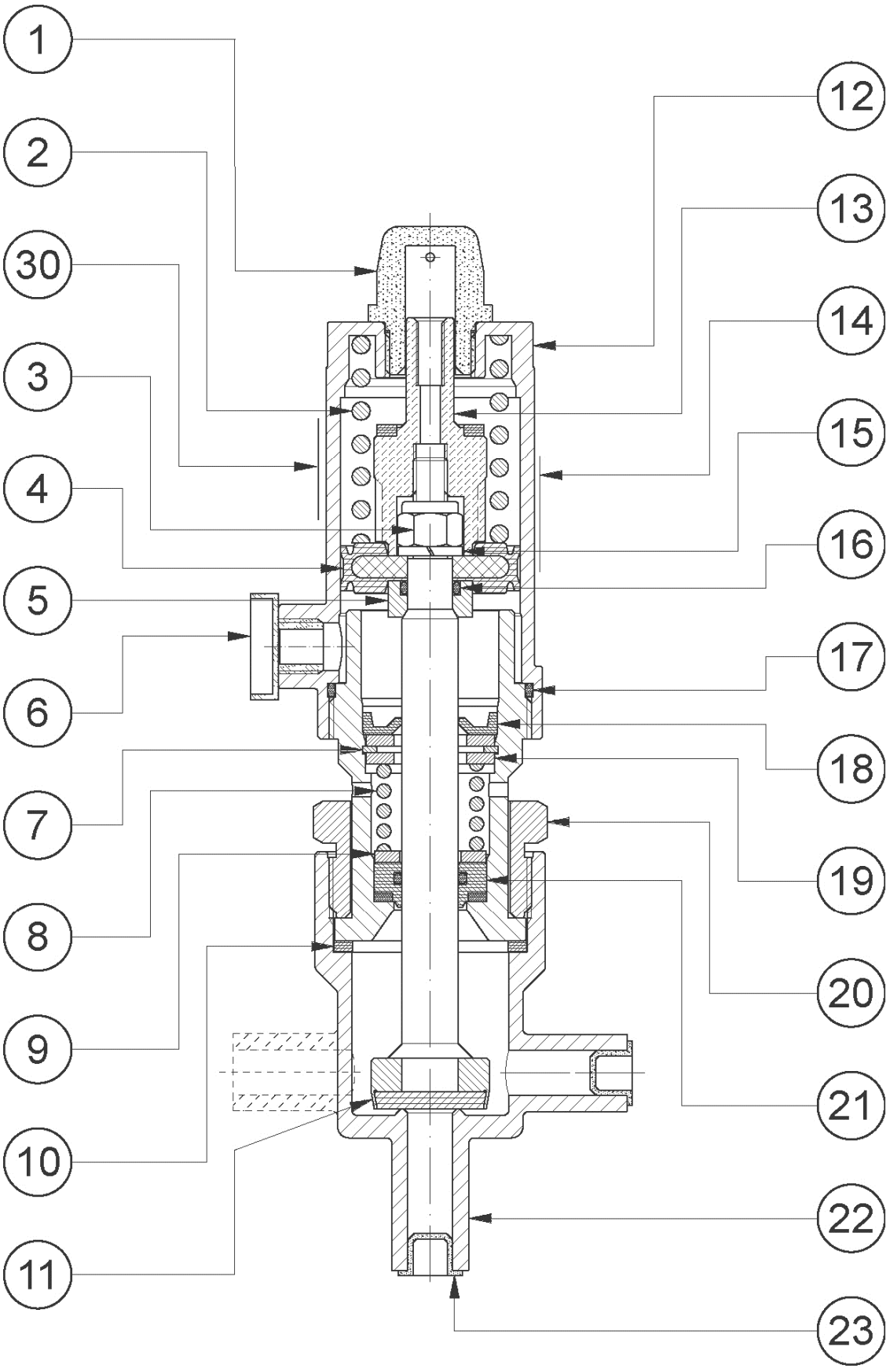
5.7.1 Food valve disassembly

1) Blow air inside the servo control (6 bar).
2) Unloosen the fastening nut of the intermediate body (20), by means of a 36 hexagon wrench.
3) Remove the servo control from the body (22).
4) Extract the gasket (10) from the body (22).
5) Blow air out of the servo control. **Caution!** The shaft (11) together with the relevant cap will jump out of its stroke.
6) Keeping locked the intermediate body (20): unscrew the spring housing cylinder (12)by means of a 32 hexagon wrench. **Caution! Inside the cylinder there is a compressed spring, as indicated on the label (30).** Therefore, it is recommended to provide yourself with suitable equipment not allowing the sudden expulsion of the spring housing cylinder (12) from the intermediate body, when the thread joining them together is no more tightened.
7) Unloosen from the cylinder the transparent cap (1), by means of a 19 hexagon wrench.
8) Extract the OR gasket (17) from the cylinder.
9) Extract the spring (2) from the cylinder.
10) Lock the shaft (11), gripping it between soft cheeks at the height of the cap holder and unscrew first the stroke indicator (13), with a 17 hexagon wrench, then the self-braking nut (3), with a 10 hexagon wrench.
11) Remove from the shaft (11), in sequence: the spring washer (15), the NADUOP gasket (4), the OR gasket (16), the bearing washer (5).
12) Remove the shaft from the intermediate body.
13) Extract from the intermediate body in sequence: the BA gasket (18), the first spacer washer (19).
14) Extract the snap ring (7). **Caution! The snap ring (7) keeps the packing gland spring (8) compressed**; the maximum care shall then be taken to prevent the spring from coming out suddenly during the disassembly operations.
15) Remove the second upper spac. washer of packing gland spring (19), the packing gland spring (8), the lower spac. washer of the lower packing gland spring (9), the food gasket (21).
16) Now the valve has been completely disassembled, so that the required components can be replaced.

5.7.2 Food valve assembly

1) Clean carefully all components.
2) Insert into the intermediate body (20), the food gasket (21), the lower spac. washer of the packing gland spring (9), the packing gland spring (8), the first spac. washer of the upper packing gland spring (19).
3) Compress everything and lock with the snap ring (7). Pay attention to the compressed spring. It must not have the opportunity of releasing itself suddenly.
4) Fit the upper packing gland spring second spacer washer (19).
5) Fit the BA gasket (18), into its seat (exerting a pressure on the external edge of the gasket to avoid damaging the seal lip).
6) Insert the shaft (11), into the intermediate body, complete with details and make it rotate, in order to facilitate the introduction and do not waste the food gasket (21) and the BA gasket (19).
7) Fit into the shaft: the bearing washer (5), the OR gasket (16), the NADUOP gasket (4), the spring washer (15).
8) Tighten to the prescribed torque (as specified in table No. 2) the self-braking nut (3), with a 10 hexagon wrench, on the shaft (11), locking this last by gripping it between soft cheeks at the height of the cap holder.
9) Screw, on the shaft, the stroke indicator (13), tightening it, but without forcing, to avoid damaging the PVC thread with a 17 hexagon wrench. Keep locked the shaft by gripping it between soft cheeks at the height of the cap holder.
10) Fit the OR gasket (17) into the cylinder (12).
11) Rest the spring (2) on the NADUOP gasket (4).
12) Lock the intermediate body (9) so as to prevent it from rotating and, with a 32 hexagon wrench, tighten to the prescribed torque the cylinder (12), (as specified in table No. 2) taking care to grease with a layer of silicone grease the NADUOP gasket lips (4) in compliance with USDA-H1 standard. **Caution! Inside the intermediate body there is a compressed spring, as specified on the label (30). Therefore, it is recommended to provide yourself with suitable equipment not allowing the sudden expulsion of the spring housing cylinder from the intermediate body (20).**
13) Screw the transparent cap (1) with a 19 hexagon wrench, on the cylinder (paying attention to tighten it, but without forcing to avoid breaking the piece).
14) Blow air into the servo control (6 bar). **Caution! The shaft (11) with relevant cap will come back into its stroke.**
15) Withdraw the body gasket (10) from the valve body (22).
16) Position the servo control (with air connection D. 1/8" gas in the desired position).
17) Screw to the desired torque the complete servo control (according to indications in table No. 2) to the valve body, by means of 36 hexagon wrench.
18) Blow air out of the servo control.

Section plane IMS/0 D.V. N.C. FOOD valve ND 8



DWG. NO. 060035 Rev.:01

5.8 IMS/0 D.V. N.C. FOOD valve ND 8 detail and spare part table

P.N°	Q.	DESCRIPTION	MATERIAL	GROUP	CODE
1	1	Transparent cap	Transparent plastic	840	INDC010160
2	1	Spring	AISI 302	552	MOLL010149
3	1	Self-braking nut	Steel	576	D06AUTOFE
4	1	NADUOP Gasket	NBR + Steel	566	NAD00321NB
5	1	Piston bearing washer	AISI 304	671	RAPI010154
6	1	Threaded cap	Polyethylene	505	TEP400G018
7	1	Snap ring	AISI 304	695	SEEF23304
8	1	Packing gland spring	AISI 316	552	MTD086110
9	1	Packing gland spacer washer	AISI 316	750	RDD086274
10	1	Food valve body gasket	PTFE	511	GUAR020496
11	1	Shaft complete with N. C. Cap	AISI 316 + PTFE	564	AINF010869
12	1	Spring housing cylinder	AISI 304	813	CLCIXX0449
13	1	Stroke indicator	PVC + EPDM	840	INDC010159
14	1	Rating plate	Polyester	506	ETAU020385
15	1	Spring washer	Steel	610	RE06000FE
16	1	O-Ring gasket	NBR	548	OR02031GA
17	1	O-Ring gasket	FPM	548	OR002131VI
18	1	BA gasket	FPM + Steel	567	BA0V10244
19	2	Packing gland spacer washer	AISI 304	586	RDD088148
20	1	Food valve intermediate body	AISI 316 + AISI 304	632	CINT020205
21	1	Food gasket	PTFE + SILICONE	511	GUAR020210
22	1	2-way electro-polished IVS/0 body ND 8	AISI 316	519	CUS0020211
		3-way electro-polished IVS/0 body ND 8		827	CUS3060010
23	2	Protective cap	Polyethylene	505	T01ST00085
30	1	Preloaded spring label	Polyester	506	ETAU050273

GROUP 94

N.C. micro-flow valve complete spare part set

Servo control spare parts

SPARE PART CODE		**7095**
Part No.	Q.ty	ND 8
4	1	NAD00321NB
16	1	OR02031GA
17	1	OR002131VI
18	1	BA0V10244

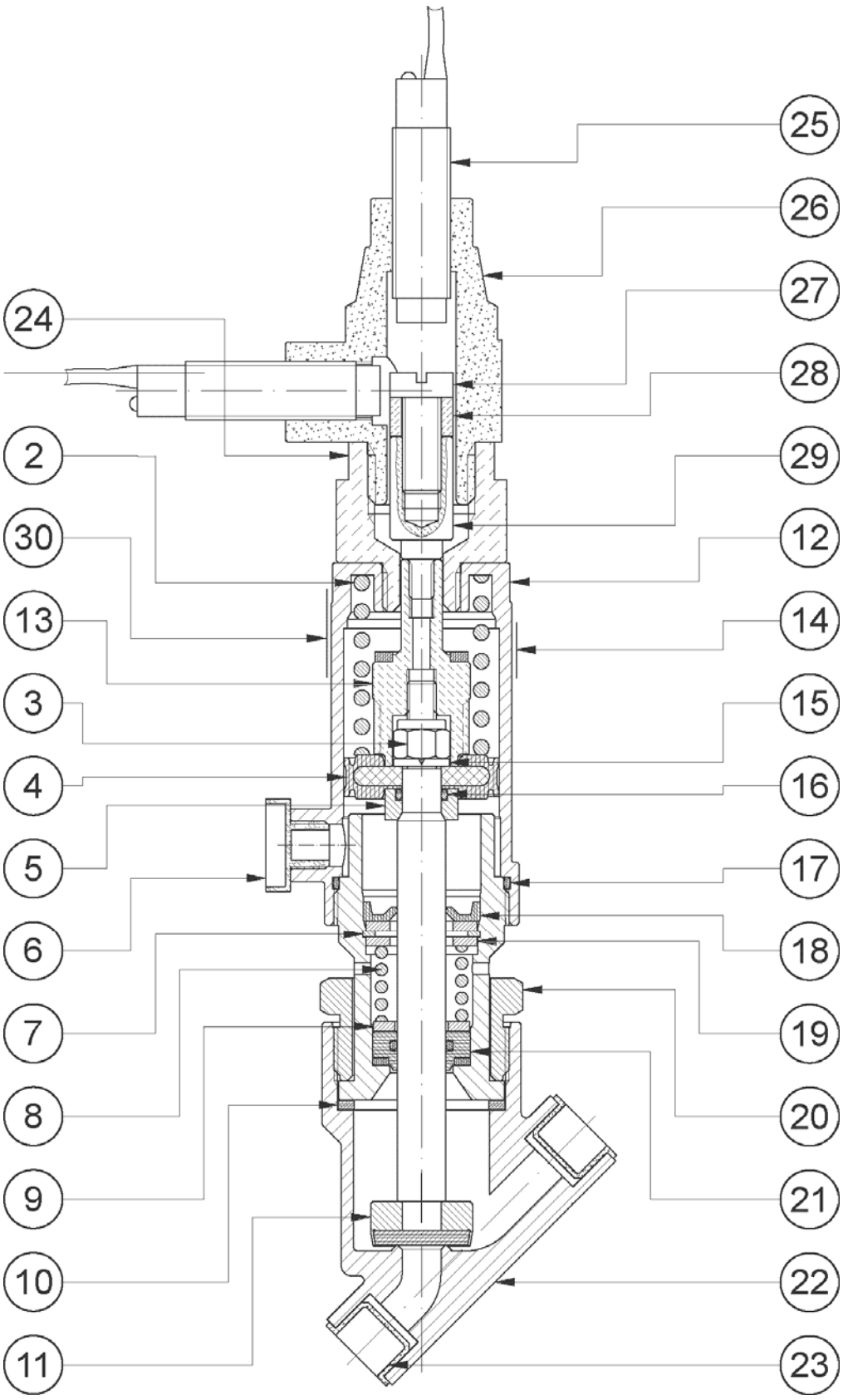
PRELOADED SPRING

Part No. 30 detail

Body spare parts

SPARE PART CODE		**7611**
Part No.	Q.ty	ND 8
10	1	GUAR020496
11	1	AINF010869
21	1	GUAR020210

5.9 Section plane IMF/ST N.C. 3-WIRE A/C DC IND. SENS. PTFE SILIC ND 8 Cat. 2049 SILIC



DWG. NO. 060042 Rev.:01

5.10 Detail and spare part table of IMF/ST N.C. 3-WIRE A/C DC IND. SENS. PTFE SILIC ND 8

P.N°	Q.	DESCRIPTION	MATERIAL	GROUP	CODE
2	1	Spring	AISI 302	552	MOLL010149
3	1	Self-braking nut	Steel	576	D06AUTOFE
4	1	NADUOP Gasket	NBR + Steel	566	NAD00321NB
5	1	Piston bearing washer	AISI 304	671	RAPI010154
6	1	Threaded cap	Polyethylene	505	TEP400G018
7	1	Snap ring	AISI 304	695	SEEF23304
8	1	Packing gland spring	AISI 316	552	MTD086110
9	1	Packing gland spacer washer	AISI 316	750	RDD086274
10	1	Food valve body gasket	PTFE	511	GUAR020496
11	1	Shaft complete with N. C. Cap	AISI 316 + PTFE	564	AINF010869
12	1	Spring housing cylinder	AISI 304	813	CLCIXX0449
13	1	Stroke indicator	PVC + EPDM	840	INDC010159
14	1	Rating plate	Polyester	506	ETAU020385
15	1	Spring washer	Steel	610	RE06000FE
16	1	O-Ring gasket	NBR	548	OR02031GA
17	1	O-Ring gasket	FPM	548	OR002131VI
18	1	BA gasket	FPM + Steel	567	BA0V10244
19	2	Packing gland spacer washer	AISI 304	586	RDD088148
20	1	Food valve intermediate body	AISI 316 + AISI 304	632	CINT020205
21	1	Food gasket	PTFE + SILICONE	511	GUAR020210
22	1	Socket welding FFF body ND 8	AISI 316	841	CLFFXX0439
23	2	Protective cap	Polyethylene	505	T01ST00145
24	1	Sensor cap adapter	PVC	840	INDC040350
25	2	3-wire inductive sensor P.S. D.C. N.A.		809	SENS970489
26	1	Sensor holding cap	Transparent plastic	840	INDC970496
27	1	Screw driver slot cheese head screw	Fe	551	VTCT08020F
28	1	Sensor spacer	PVC	522	DIST970488
29	1	Micro-flow stroke indicator spacer	PVC	840	INDC040351
30	1	Preloaded spring label	Polyester	506	ETAU050273

GROUP 94

N.C. micro-flow valve complete spare part set

Servo control spare parts

SPARE PART CODE		**7095**
Part	Q.ty	ND 8
4	1	NAD00321NB
16	1	OR02031GA
17	1	OR002131VI
18	1	BA0V10244

Body spare parts

SPARE PART CODE		**7611**
Part	Q.ty	ND 8
10	1	GUAR020496
11	1	AINF010869
21	1	GUAR020210

PRELOADED SPRING

Part No. 30 detail

5.11 Table for Tightening Torques

Table 2 – Closing torques for threaded couplings in micro-flow valves	
M 36 x 1.5 (part 12 and part 20)	C_{36} = 17.0 [$Kg_f \cdot m$]
M 36 x 1.5 (part 20 and part 22)	C_{36} = 17.0 [$Kg_f \cdot m$]
M 6 (part 3 and part 11)	C_6 = 0.59 [$Kg_f \cdot m$]
1/8" GAS (air couplings)	$C_{1/8"}$ = 1.36 [$Kg_f \cdot m$]

The torque to tight the plastic parts is the one necessary to achieve the 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.

NOTES:

- Safety conditions cannot be guaranteed and malfunctions cannot be laid on the valves and relevant accessories if:
  - the disassembly, re-assembly, maintenance 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 make modifications and / or amendment to its products and relevant documentation without giving notice.
- The use of the handbook does not exempt from the observance of the laws in force.