ON-OFF GATE VALVES SERIES FFF

FAMILY 01 - GROUP 30 (ND 8-11) – GROUP 66 (ND 15-50)

Master handbook description: Guide to selection, operation and maintenance of FFF ON-OFF gate Valves (English)

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DECLARATION OF CONFORMITY

Cod.: **DPED00633** REV. 00 Date: 01/03/2002

Family no. 1 **FFF GATE VALVES**

Groups: **66**

We ITALVALVOLE S.A.S. of Spadon Oscar & C., via Amendola 125, 13836 Cossato (BI), declare that:
the product FFF gate Valve in the following diameters, ND 15 PS 16 - ND 20 PS 16 - ND 25 PS 16 - ND 32 PS 16 - ND 40 PS 16 - ND 50 PS 16, is in compliance with the directive 97/23/CE (directive PED) with classification under Art. 3.3.

ITALVALVOLE S.A.S.

Legale rappresentante
Legal representative
Firmato digitalmente da
OSCAR SPADON
SerialNumber = IT:SPDSCR44M19L436J
C = IT

UNI EN ISO 9001:2008 - Cert. n° 0302

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1 Foreword

Our company policy, aiming at the continuous research of a higher and higher quality and at the study of new products, brought us to the construction of FFF series valves. We have tried to combine in this product high quality and cost cutting.
FFF gate valves, offered in a wide range of models with threaded fittings or to be socket welded, are able to provide the best solution to on-off problems of fluids, liquids, gases and vapours.
Since they are manufactured with limited overall dimensions, they make assembly operations and the requested maintenance easier.
The particular ease of maintenance, the teflon seal on the stem, the use of pressed and microfused components make these valves be one of the most industrialised products of the sector. FFF series on-off gate valves are available in ND 8 – 50 with microfused body.
Table 3 includes a list of fluid which are perfectly compatible with valves.
For any other fluid or use, which has not been expressly indicated in this manual, contact directly our technical 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.
- **Allowable temperature:** maximum operating temperature, prescribed for safety reasons.
- **Allowable pressure:** maximum operating pressure, normally at the top of each compartment of the pressure equipment, prescribed for safety reasons.
- **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.
- Kv: capacity, expressed in m^3/h, of water (10 to 25 °C with volumic mass equal to 1000 Kg/m^3) passing through two ways of a valve with a Δp pressure drop of 100 KPa (1 bar).

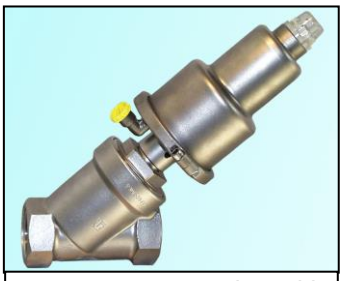
$$Kv = \frac{Q}{\sqrt{\Delta p}}$$

  where: Q is the capacity in m^3/h.

3 Technical Characteristics

General notice:	⇒	all the pressure values indicated hereinafter are gauge pressure values.
	⇒	**valve destined to fluids of group 2 (directive 97/23/CE).**
ND:	⇒	8 - 50
Connections:	⇒	GAS external threaded.
	⇒	to be socket welded.
Pmax allowable:	⇒	40 bar (ND 8-11), 16 bar (ND 15-50).
Pmin allowable:	⇒	0 bar.
Seal:	⇒	PTFE coated EPDM, PTFE
Tmax allowable:	⇒	150 °C with seal in PTFE-coated EPDM, 170 °C with seal in PTFE.
Tmin allowable:	⇒	-10 °C (liquid phase).
Flow direction:	⇒	2-way globe valve, with angle pattern body, unidirectional.
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.
Air consumption (NC):	⇒	see table 1.
Versions:	⇒	with visual device, with inductive sensors, with magnetic sensors, with pneumatic ends of stroke, with mechanical ends of stroke and with solenoid valves.
Working materials:	⇒	See working drawings and relevant tables.
Overall dimensions:	⇒	See overall dimensions drawings and relevant tables.

N. C. V.D. FFF valve with Ø 32 servo control



N. C. V.D. FFF valve with Ø 80 servo control

3.1 Table 1: FFF Valve Air Consumption

CONTROL PRESSURE	STAINLESS STEEL VALVE AIR CONSUMPTION [Nl / cycle]		
	Servo Control ∅ 32	Servo Control ∅ 70	Servo Control ∅ 80
6 bar	0.085	0.787	1.098

3.2 Table 2: Δp Of FFF Valve Seal (bar)

∅ Servo Control	ND 8	ND 11	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
32	20	12	7	4	2.5			
70			16	14	9.5	6.5	4	2.5
80					16	16	11	7

3.3 Table 3: Compatible Fluids

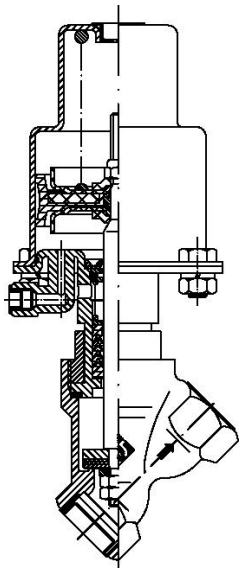
Type of fluid	Type of seal		Type of fluid	Type of seal	
	PTFE-coated EPDM	PTFE		PTFE-coated EPDM	PTFE
Vinyl acetate	YES	YES	Potassium chlorate 30% max	YES	YES
Phenol acetylene	YES	YES	Sodium chloride 20% max	YES	YES
Glycerol fatty acids	YES	YES	Potassium chloride 5% max	YES	YES
Phenol	YES	YES	Butyl ether	YES	YES
Phosphoric acid 20% max.	YES	YES	Petroleum ether	YES	YES
Phthalic acid	YES	YES	Dibenzile ether	YES	YES
Gallic acid	YES	YES	Dibutyl ether	YES	YES
Nitric acid 5% - 65% max	YES	YES	Ethylene glycol	YES	YES
Oleic acid	YES	YES	Ammonium nitrate	YES	YES
Stearic acid	YES	YES	Copper nitrate	YES	YES
Tannic acid	YES	YES	Sodium nitrate	YES	YES
Butanol	YES	YES	Ethylene perchlorate	YES	YES
Ethanol	YES	YES	Potassium sulphate 20% max at T=100 °C	YES	YES
Methanol	YES	YES	Sodium sulphate	YES	YES
Propanol	YES	YES	Zinc sulphate 40% max at T=100 °C	YES	YES
			Potassium sulphite 10% max	YES	YES
Aniline	YES	YES	Sodium sulphide	YES	YES
Sodium carbonate 20% max	YES	YES	Toluene	YES	YES
Borax (sodium tetraborate)	YES	YES	Steam Tmax=130 °C P= 2,7 bar	YES	YES
Sodium carbonate	YES	YES	Steam Tmax=150 °C P= 4,8 bar	YES	YES

All data indicated under table 3, if not otherwise indicated, are relevant to a temperature of 21°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.
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.

3.4 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 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.

3.5 Typologies Of FFF Valves Manufactured From 1990 (Dwg. No. 980486)



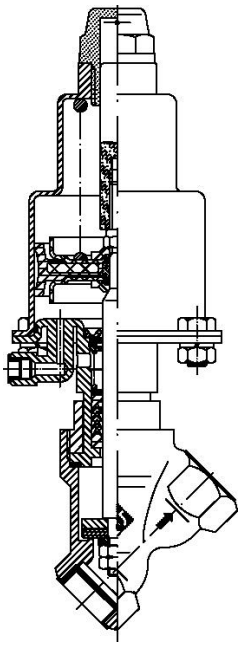
POS. 1

VALVES MANUFACTURED:

From 1990 to 1993

From ND 15 to ND 50

Valves manufactured from 1990 to 1993 were characterized by the spring housing cylinder without upper hub. The spring housing cylinder was fastened to the intermediate body by 4 bolts.
These valves had no type of visual device.



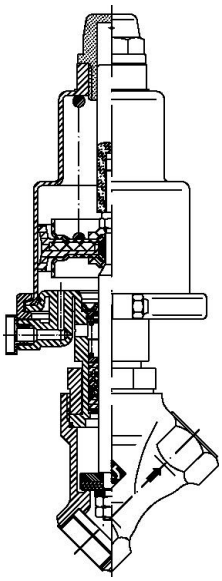
POS. 2

VALVES MANUFACTURED :

From 1993 to 1996

From ND 15 to ND 50

Valves manufactured from 1993 to 1996 were characterized by the visual device positioned on top of the spring housing cylinder, consisting of a red-coloured PVC end-of-stroke indicator which is visible inside a transparent plastic cap.
The spring housing cylinder was fastened to the intermediate body by 4 bolts.



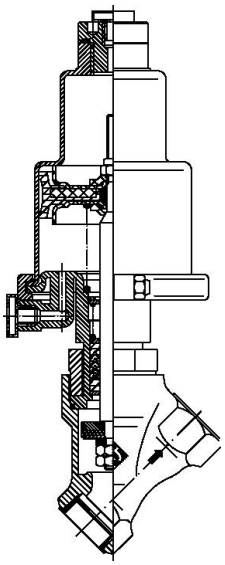
POS. 3

VALVES MANUFACTURED :

From 1996 to 2002

From ND 15 to ND 50

Valves manufactured from 1996 to 2002 on are characterized by the locking system of the spring housing cylinder to the intermediate body, which is no more obtained by means of bolts, but thanks to a system of clamps



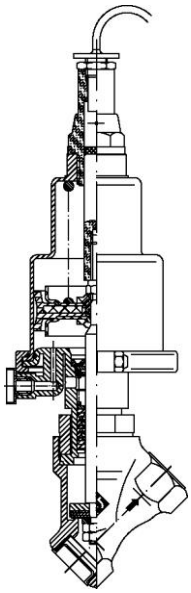
POS. 4

VALVES MANUFACTURED :

From 1996 to 2002

From ND 15 to ND 50

From 1996 to 2002 a series of valves, characterized by the fact that this type of valve is normally open, has been manufactured.
In the upper part of the spring housing cylinder the visual device is not present, but an air fitting appears.



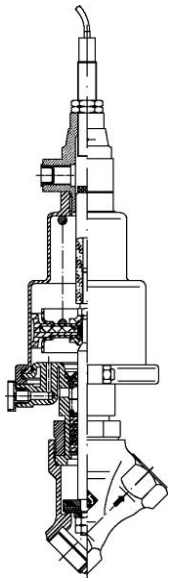
POS. 5

VALVES MANUFACTURED :

From 1996 to 1998

From ND 15 to ND 50

From 1996 to 1998 a series of valves has been manufactured. This last is characterized by the presence of a transparent cap with a PVC stuck sleeve, to which it is possible to screw a magnetic sensor detecting the valve opening condition.



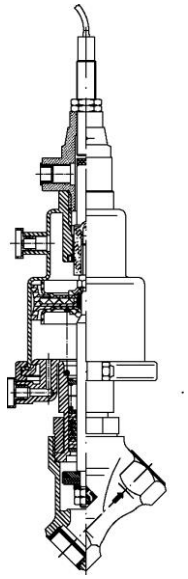
POS. 6

VALVES MANUFACTURED :

From 1998 to 2002

From ND 15 to ND 50

From 1998 to 2002 a series of valves has been produced, which is characterized by the presence of a transparent cap arranged for the application of sensors to detect the valve on/off position.



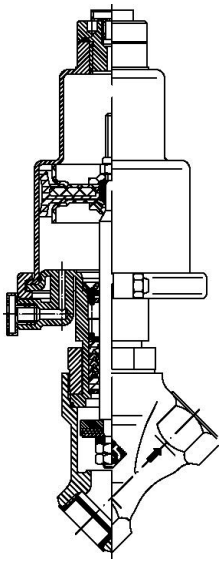
POS. 7

VALVES MANUFACTURED :

From 1998 to 2002

From ND 15 to ND 50

From 1998 to 2002 a series of normally open valves equipped with visual device or sensors has been manufactured. The air fitting is installed laterally in the upper part of the spring housing cylinder.



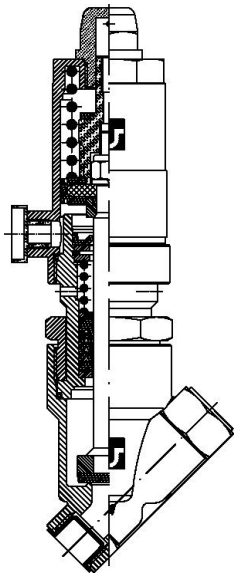
POS. 8

VALVES MANUFACTURED :

From 1998 to 2002

From ND 15 to ND 50

From 1998 to 2002 a series of double-acting valves has been manufactured. Double-acting valve means that both valve opening and closure are governed by a pneumatic control.



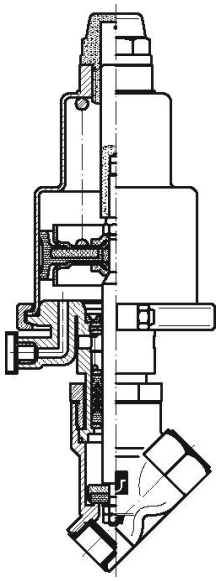
POS. 9

VALVES MANUFACTURED :

From 2001

From ND 8 to ND 25

From 2001 a FFF series of valves has been manufactured. It is characterized by a servo control of reduced diameter (32 mm) available in NC (Normally Closed) and NO (Normally Open) versions.



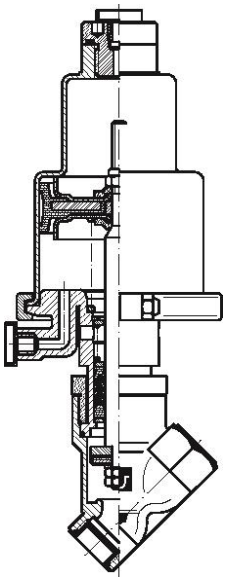
POS. 10

VALVES MANUFACTURED :

From 2003 to start 2004

From ND 15 to ND 50

The valves produced from 2003 to start 2004 have same characteristics than the valves produced from 1996 of the position 3 further modification has been achievement of the intermediate body with the upper part of the same realised in microfusion.



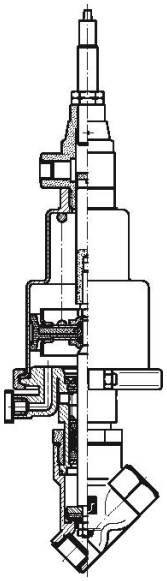
POS. 11

VALVES MANUFACTURED :

From 2003 to start 2004

From ND 15 to ND 50

The valves produced from 2003 to start 2004 have same characteristics than the valves produced from 1996 of the position 4 further modification has been achievement of the intermediate body with the upper part of the same realised in microfusion.



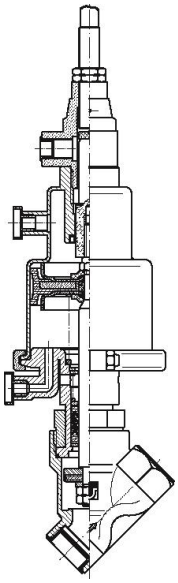
POS. 12

VALVES MANUFACTURED :

From 2003 to start 2004

From ND 15 to ND 50

The valves produced from 2003 to start 2004 have same characteristics than the valves produced from 1998 of the position 6 further modification has been achievement of the intermediate body with the upper part of the same realised in microfusion.



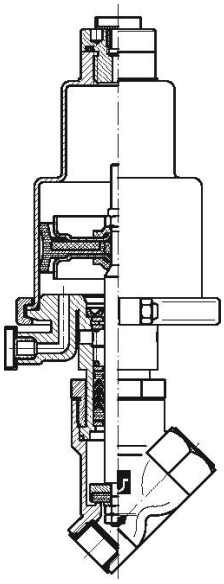
POS. 13

VALVES MANUFACTURED:

From 2003 to start 2004

From ND 15 to ND 50

The valves produced from 2003 to start 2004 have same characteristics than the valves produced from 1998 of the position 7 further modification has been achievement of the intermediate body with the upper part of the same realised in microfusion.



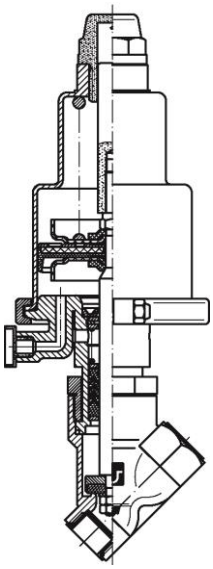
POS. 14

VALVES MANUFACTURED:

From 2003

From ND 15 to ND 50

The valves produced from 2003 have same characteristics than the valves produced from 1998 of the position 8 further modification has been achievement of the intermediate body with the upper part of the same realised in microfusion.



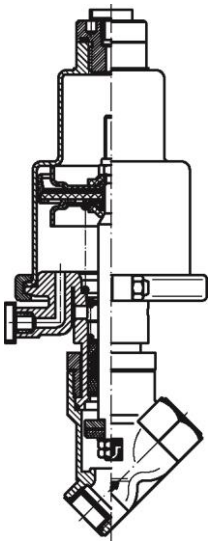
POS. 15

VALVES MANUFACTURED:

From start 2004

From ND 15 to ND 50

The valves produced since beginning 2004, in position 10 differ from previous version, because they assemble ONE LIP TDUOP instead of the previous TWO LIPS TDUOP



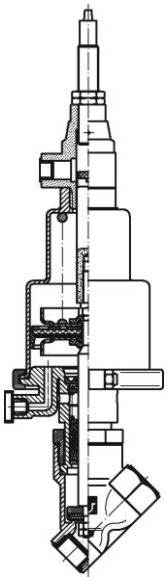
POS. 16

VALVES MANUFACTURED:

From start 2004

From ND 15 to ND 50

The valves produced since beginning 2004, in position 11 differ from previous version, because they assemble ONE LIP TDUOP instead of the previous TWO LIPS TDUOP



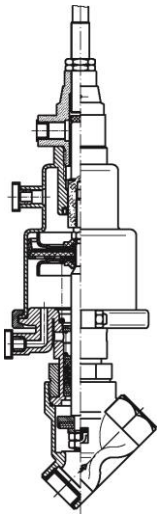
POS. 17

VALVES MANUFACTURED:

From start 2004

From ND 15 to ND 50

The valves produced since beginning 2004, in position 12 differ from previous version, because they assemble ONE LIP TDUOP instead of the previous TWO LIPS TDUOP



POS. 18

VALVES MANUFACTURED:

From start 2004

From ND 15 to ND 50

The valves produced since beginning 2004, in position 13 differ from previous version, because they assemble ONE LIP TDUOP instead of the previous TWO LIPS TDUOP

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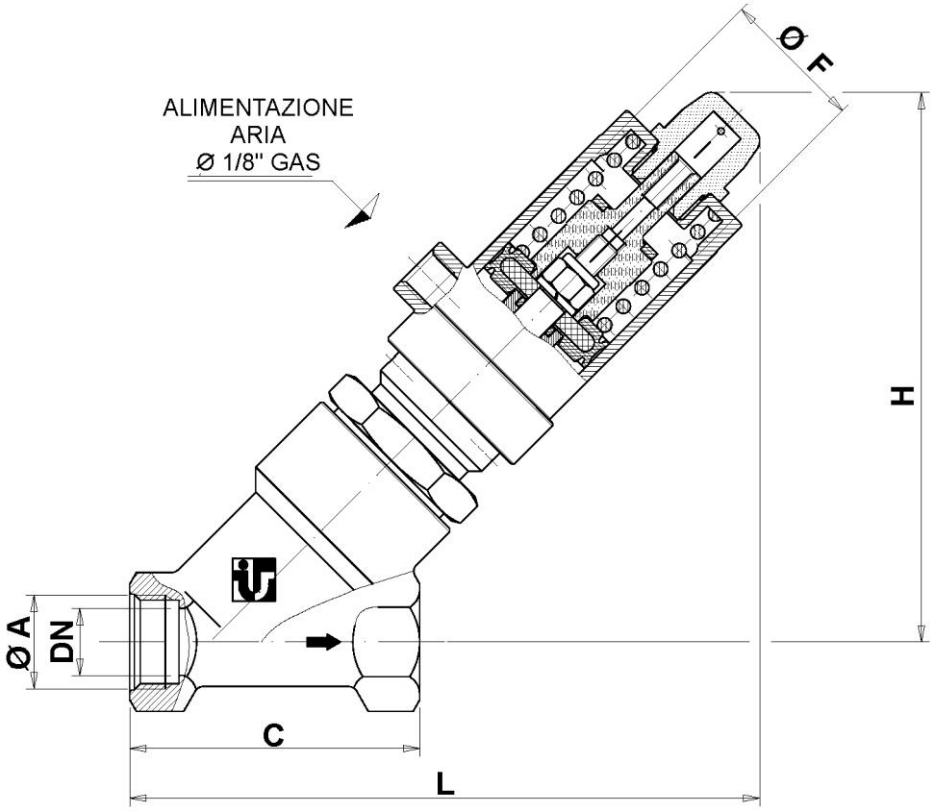
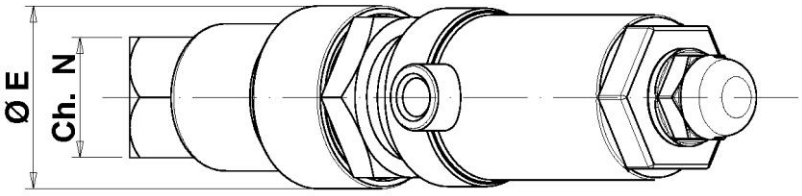
3.6 Overall Dimensions Of FFF Valves

3.6.1 FFF N. C. V.D. Female Thread. With Ø 32 Serv.; Group: 30 (ND 8-11) 66 (ND 15-25)



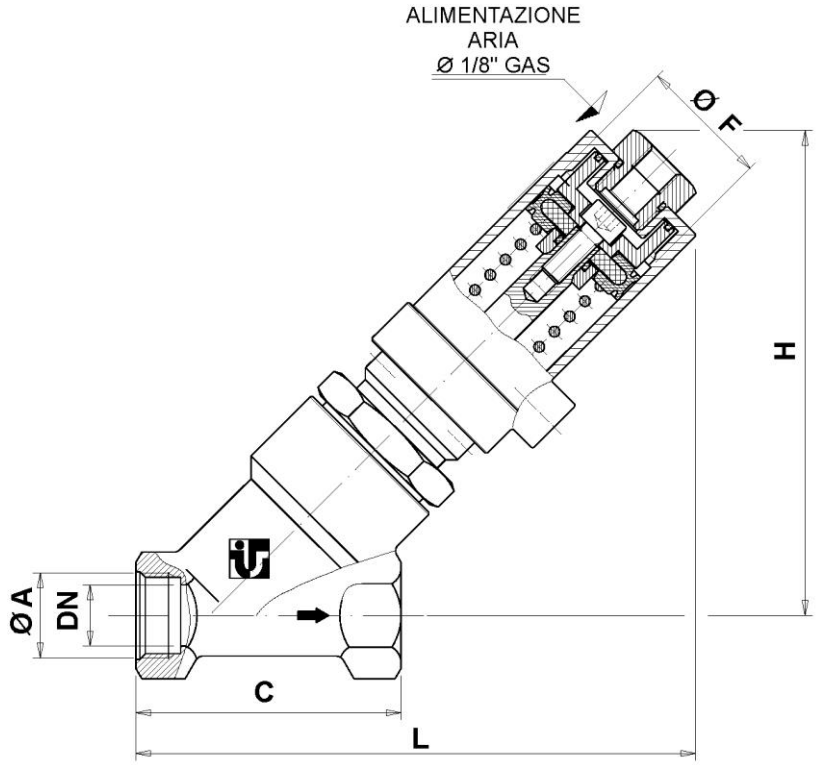


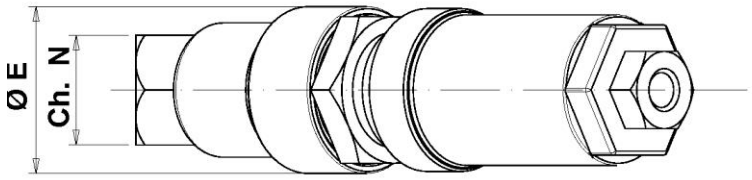
Drawing No. 020162 Rev.: 00

ND	A	C	E	F	H	L	N	Δp [bar]	WEIGHT [Kg]	Kv	Seal CODE CT
8	1/4"	65	41	32	123	141	22	20	0.84	1.2	**6751**
11	3/8”	65	41	32	119	141	22	12	0.84	2.3	**6752**
15	1/2"	65	41	32	122.5	140.5	27	7	0.84	4.0	**7036**
20	3/4"	75	48	32	126.5	146.5	32	4	0.96	7.5	**7037**
25	1”	90	52	32	131	157.5	39	2.5	1.14	12	**7038**

Dimensions are in millimetres
CT= carbon teflon

3.6.2 FFF N. O. Female Thread. With Ø 32 Serv.; Group: 30 (ND 8-11) 66 (ND 15-25)



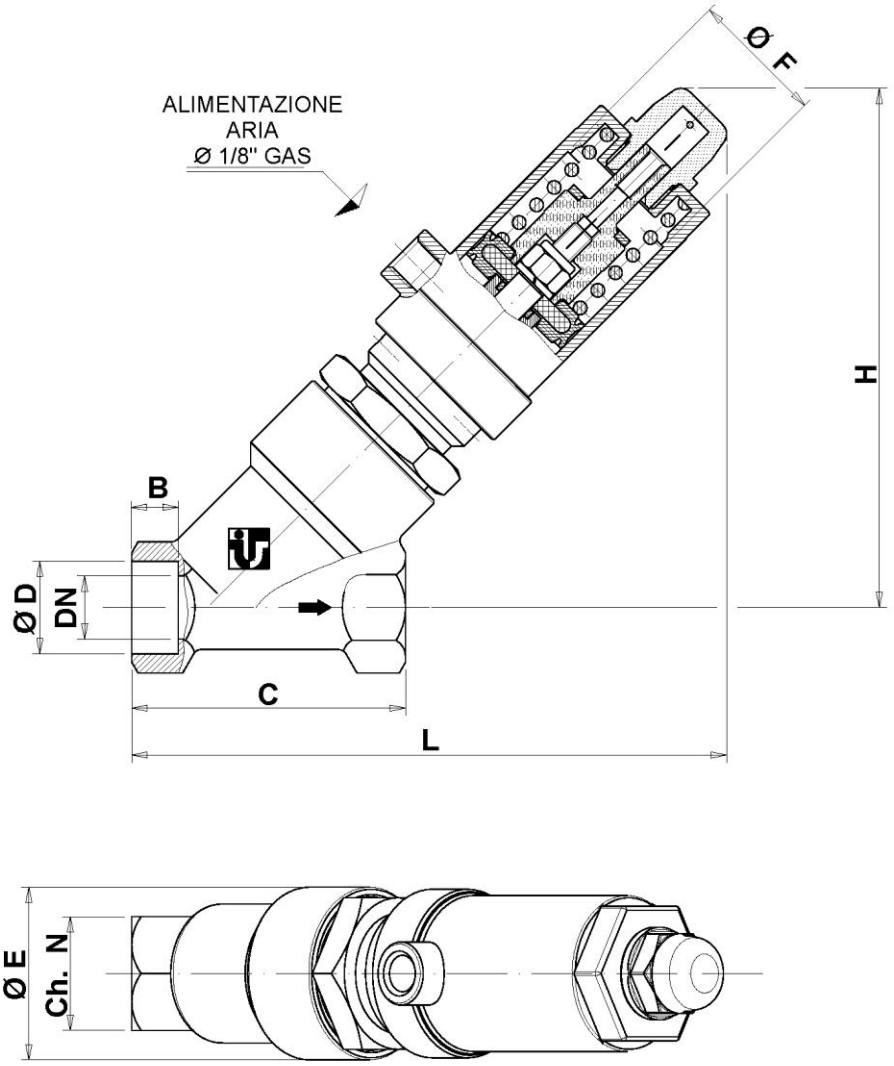


Drawing No. 020183 Rev.: 00

ND	A	C	E	F	H	L	N	Δp [bar]	WEIGHT [Kg]	Kv	Seal CODE CT
8	1/4"	65	41	32	119	137	22	20	0.86	1.2	**6763**
11	3/8”	65	41	32	119	137	22	12	0.86	2.3	**6764**
15	1/2"	65	41	32	118.5	136.5	27	7	0.86	4.0	**7042**
20	3/4"	75	48	32	122.5	142.5	32	4	0.98	7.5	**7043**
25	1”	90	52	32	127	153.5	39	2.5	1.16	12	**7044**

Dimensions are in millimetres
CT= carbon teflon

3.6.3 FFF N. C. V.D. To Be Socket Welded With Ø 32 Serv.; Group: 30 (ND 8-11) 66 (ND 15-25)

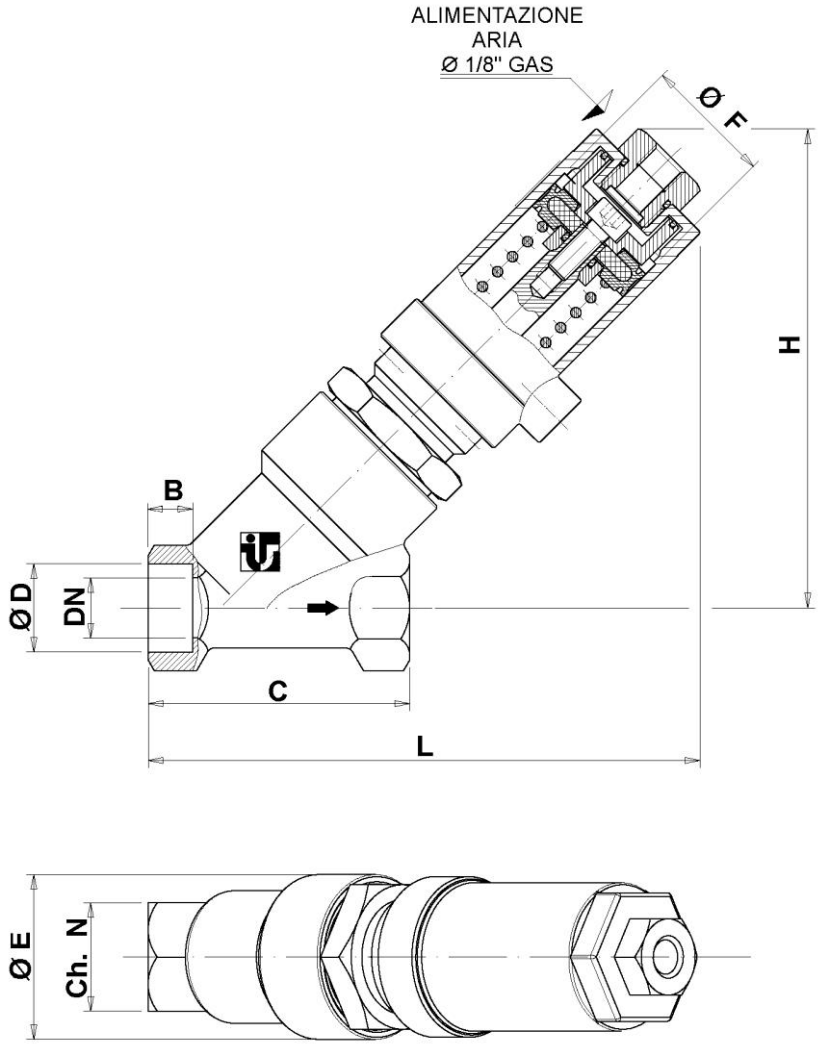


Drawing No. 020184 Rev.: 00

ND	B	C	D	E	F	H	L	N	Δp [bar]	WEIGHT [Kg]	Kv	Seal CODE CT
8	10	65	14	41	32	123	141	22	20	0.84	1.2	**6753**
11	10	65	17.5	41	32	119	141	22	12	0.84	2.3	**6754**
15	11	65	22	41	32	122.5	140.5	27	7	0.84	4.0	**7039**
20	12	75	27.5	48	32	126.5	146.5	32	4	0.96	7.5	**7040**
25	15	90	34	52	32	131	157.5	39	2.5	1.14	12	**7041**

Dimensions are in millimetres
CT= carbon teflon

3.6.4 FFF N. O. To Be Socket Welded With Ø 32 Serv.; Group: 30 (ND 8-11) 66 (ND 15-25)



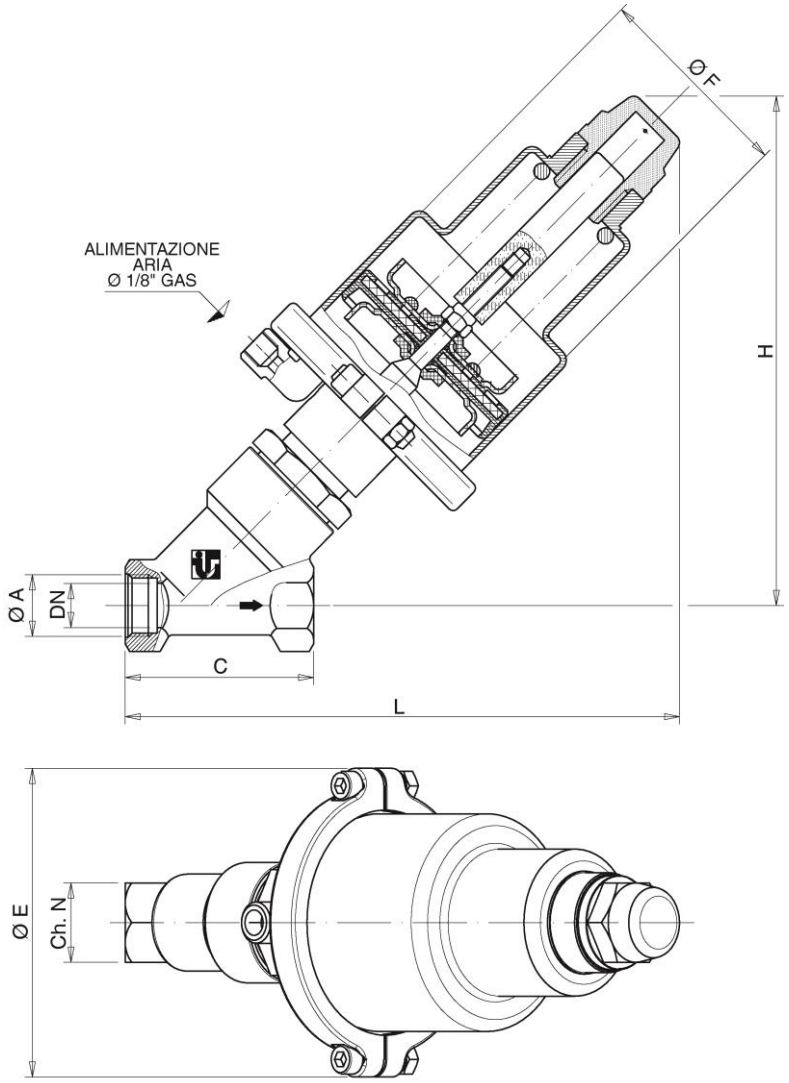
Drawing No. 020185 Rev.: 00

ND	B	C	D	E	F	H	L	N	Δp [bar]	WEIGHT [Kg]	Kv	Seal CODE CT
8	10	65	14	41	32	119	137	22	20	0.86	1.2	**6765**
11	10	65	17.5	41	32	119	137	22	12	0.86	2.3	**6766**
15	11	65	22	41	32	118.5	136.5	27	7	0.86	4.0	**7045**
20	12	75	27.5	48	32	122.5	142.5	32	4	0.98	7.5	**7046**
25	15	90	34	52	32	127	153.5	39	2.5	1.16	12	**7047**

Dimensions are in millimetres

CT= carbon teflon

3.6.5 FFF N. C. V.D. Female Threaded With Ø 70-80 Servo Control; Group: 66



Drawing No. 020186 Rev.: 01

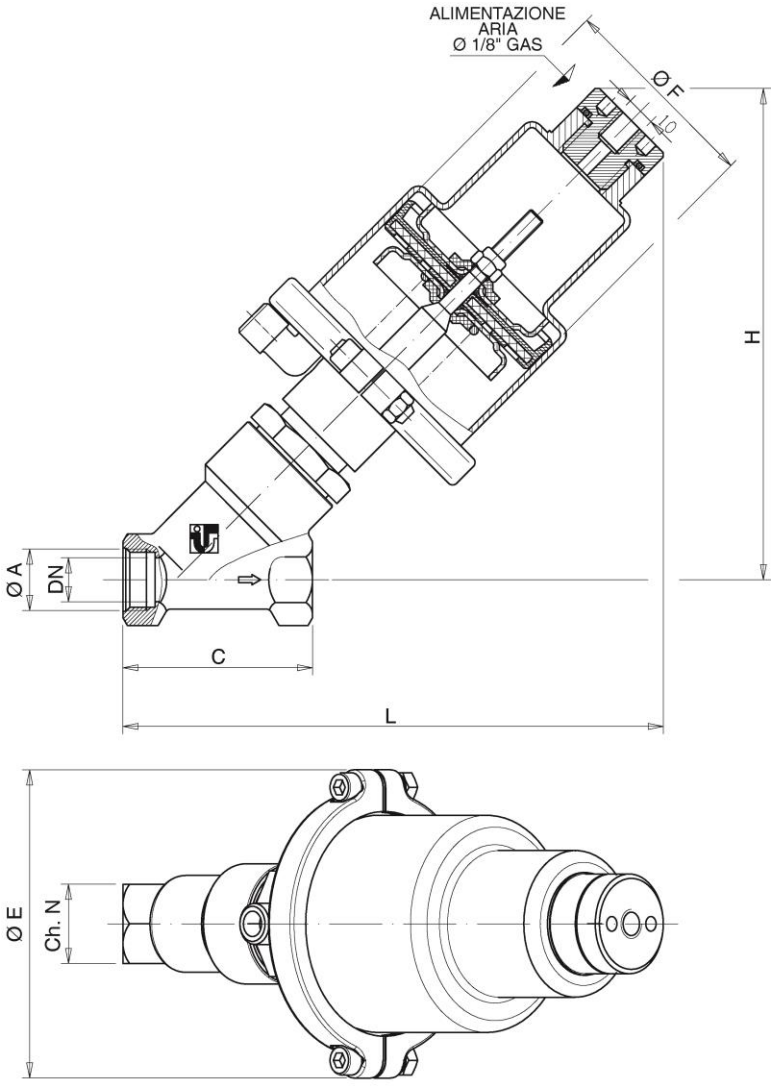
ND	A	C	E	F	H	L	N	Δp [bar]	WEIGHT [Kg]	Kv	Seal CODE CT	Seal CODE TC
15	1/2"	65	105	70	172.5	190.5	27	16	1.65	4.0	**4651/96**	**3834/96**
20	3/4"	75	105	70	176.5	196.5	32	14	1.85	7.5	**2175/96**	**3835/96**
25	1”	90	105	70	181	207.5	39	9.5	2.05	12	**4652/96**	**3836/96**
			115	80	198	224.5		16	2.80		**4653/96**	**3837/96**
32	1”1/4	110	105	70	193	228	49	6.5	2.70	19	**4654/96**	**3838/96**
			115	80	210	245		16	3.30		**4655/96**	**3839/96**
40	1”1/2	120	105	70	198.5	232.5	55	4	3.10	30	**4656/96**	**3840/96**
			115	80	215.5	249.5		11	3.85		**4657/96**	**3841/96**
50	2”	150	105	70	209.5	247.5	68	2.5	3.95	45	**4658/96**	**3842/96**
			115	80	226.5	264.5		7	4.85		**4659/96**	**3843/96**

Dimensions are in millimetres

CT= carbon teflon

TC= teflon coated

3.6.6 FFF N. O. Female Threaded With Ø 70-80 Servo Control; Group: 66



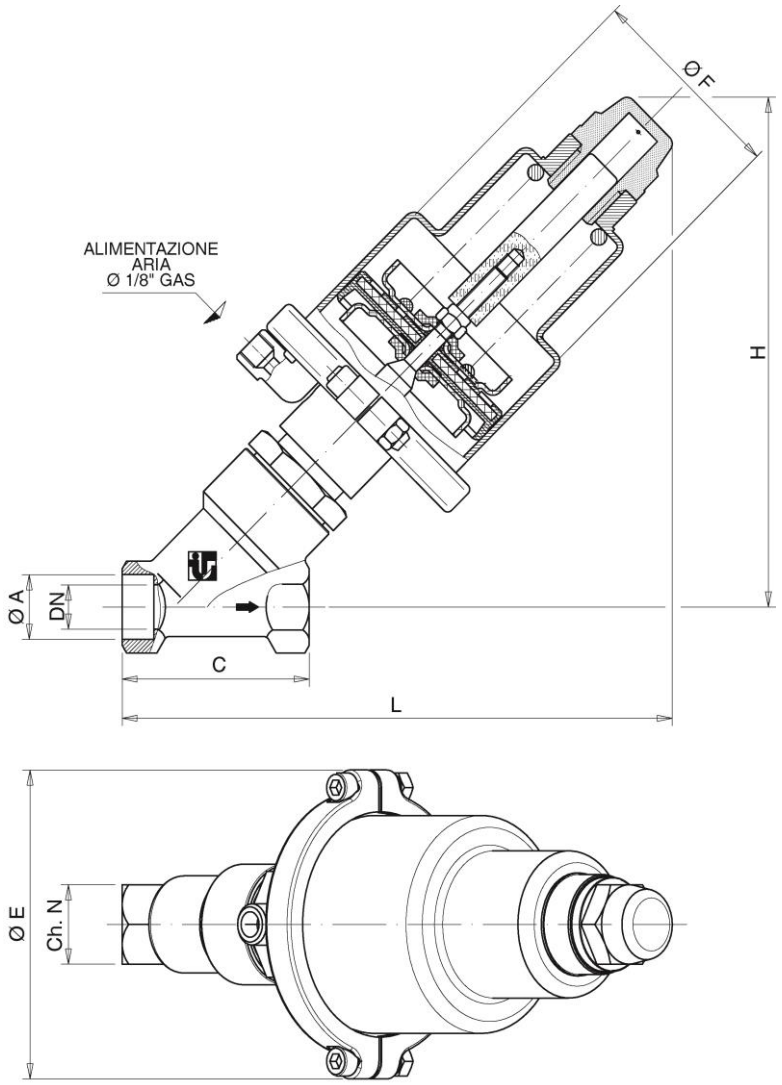
Drawing No. 020187 Rev.: 01

ND	A	C	E	F	H	L	N	Δp [bar]	WEIGHT [Kg]	Kv	Seal CODE CT	Seal CODE TC
15	1/2"	65	105	70	166.5	184.5	27	16	1.73	4.0	**3834NATC**	**3834/96NA**
20	3/4"	75	105	70	170.5	190.5	32	14	1.93	7.5	**3835NATC**	**3835/96NA**
25	1”	90	105	70	175	201.5	39	9.5	2.13	12	**3836NATC**	**3836/96NA**
			115	80	192	218.5		16	2.90		**3837NATC**	**3837/96NA**
32	1”1/4	110	105	70	187	222	49	6.5	2.78	19		
			115	80	203	239		16	3.40		**3839NATC**	**3839/96NA**
40	1”1/2	120	105	70	192.5	226.5	55	4	3.18	30	**3840NATC**	**3840/96NA**
			115	80	209.5	243.5		11	3.95		**3841NATC**	**3841/96NA**
50	2”	150	105	70	203.5	241.5	68	2.5	4.03	45	**3842NATC**	**3842/96NA**
			115	80	220.5	258.5		7	4.95		**3843NATC**	**3843/96NA**

Dimensions are in millimetres

CT= carbon teflon
TC= teflon coated

3.6.7 FFF N. C. V.D. To Be Socket Welded With Ø 70-80 Servo Control; Group: 66



Drawing No. 020163 Rev.: 01

ND	B	C	D	E	F	H	L	N	Δp [bar]	WEIGHT [Kg]	Kv	Seal CODE CT	Seal CODE TC
15	11	65	22	105	70	172.5	190.5	27	16	1.65	4.0	**4206TCDVST**	**4206/96**
20	12	75	27.5	105	70	176.5	196.5	32	14	1.85	7.5	**4207TCDVST**	**4207/96**
25	15	90	34	105	70	181	207.5	39	9.5	2.05	12	**4208TCDVST**	**4208/96**
				115	80	198	224.5		16	2.80		**4209TCDVST**	**4209/96**
32	17	110	43	105	70	193	228	49	6.5	2.70	19	**4210TCDVST**	**4210/96**
				115	80	210	245		16	3.30		**4211TCDVST**	**4211/96**
40	17	120	49	105	70	198.5	232.5	55	4	3.10	30	**4212TCDVST**	**4212/96**
				115	80	215.5	249.5		11	3.85		**4213TCDVST**	**4213/96**
50	19	150	61	105	70	209.5	247.5	68	2.5	3.95	45	**4214TCDVST**	**4214/96**
				115	80	226.5	264.5		7	4.85		**4215TCDVST**	**4215/96**

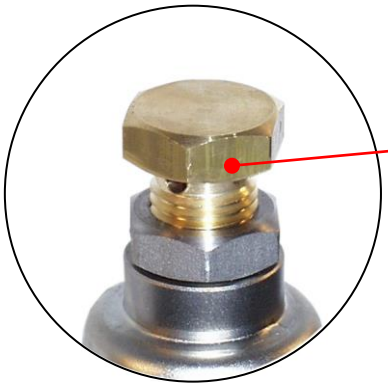
Dimensions are in millimetres

CT= carbon teflon

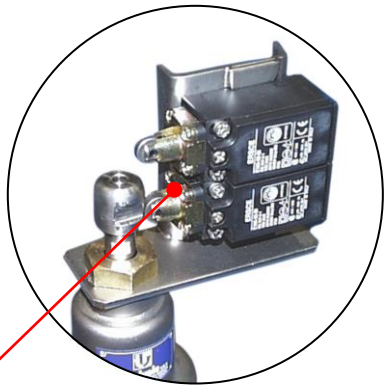
TC= teflon coated

4 Fittings

FFF valves can be supplied with several fittings to satisfy multiple customer's needs.



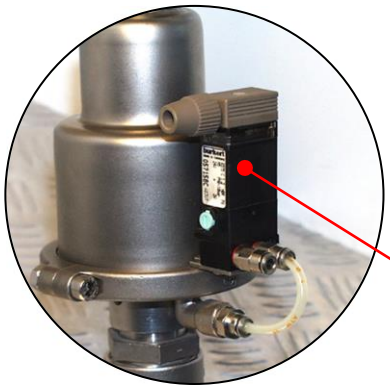
STROKE LIMITING DEVICE
The stroke limiting device permits to limit the valve stroke to the required value.



ELECTRIC LIMIT SWITCH (G 809)
It is operated from the movement of the obturator stem and detects the valve on/off condition.

MAGNETIC SENSOR (G 809)
This sensor permits to detect the valve opening: it is activated by a magnet translating together with the obturator.

INDUCTIVE SENSOR (G 809)
This sensor permits to detect the valve on/off condition.



SOLENOID VALVE (G 852)
The solenoid valve allows to control the valve opening and closure thanks to an electric signal. They can also be hand-operated.

5 Storage, Assembly, Check And Maintenance

5.1 Transport, Storage And Handling

FFF 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 servo control normally closed, 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 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 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 connection 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 7 bar, with $ø_{inner}$ = 4 mm. supply pipes.
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 Female Threaded Connections

In the event that the body has female threaded connections, it is necessary to seal the ends of connection pipes with PTFE tape to ensure a perfect seal; moreover, it is necessary to tighten connections to the prescribed torque, as specified hereinafter, in table 4. **Caution:** the installer shall verify that the parts connected to the valve support the required tightening torque.

5.2.3 Assembly Of Valves With 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 gasket shall be removed, so as not to damage it during welding. In order to properly perform the assembly and disassembly operations, operate as follows:

1) Blow air inside the servo control (6 bar only for valves normally closed N.C.).
2) Unscrew the fastening screw fixing the intermediate body of the servo control to the valve body.
3) Remove the servocontrol 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 thicknesses, 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 setting the valve at work, open it completely and make the fluid pass 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 of the valve) and that it satisfies the Δp condition.
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 of the valve) and that it satisfies the Δp condition.
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 and that it satisfies the Δp condition.
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 and that it satisfies the Δp condition.
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.

5.5 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 500.000 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 FFF ND 8-25 N. C. V.D. Valves With Ø 32 mm Servo Control

For the disassembly and assembly operationS of the N.C. valve, refer to the annexed Dwg. no. 020164.
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. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

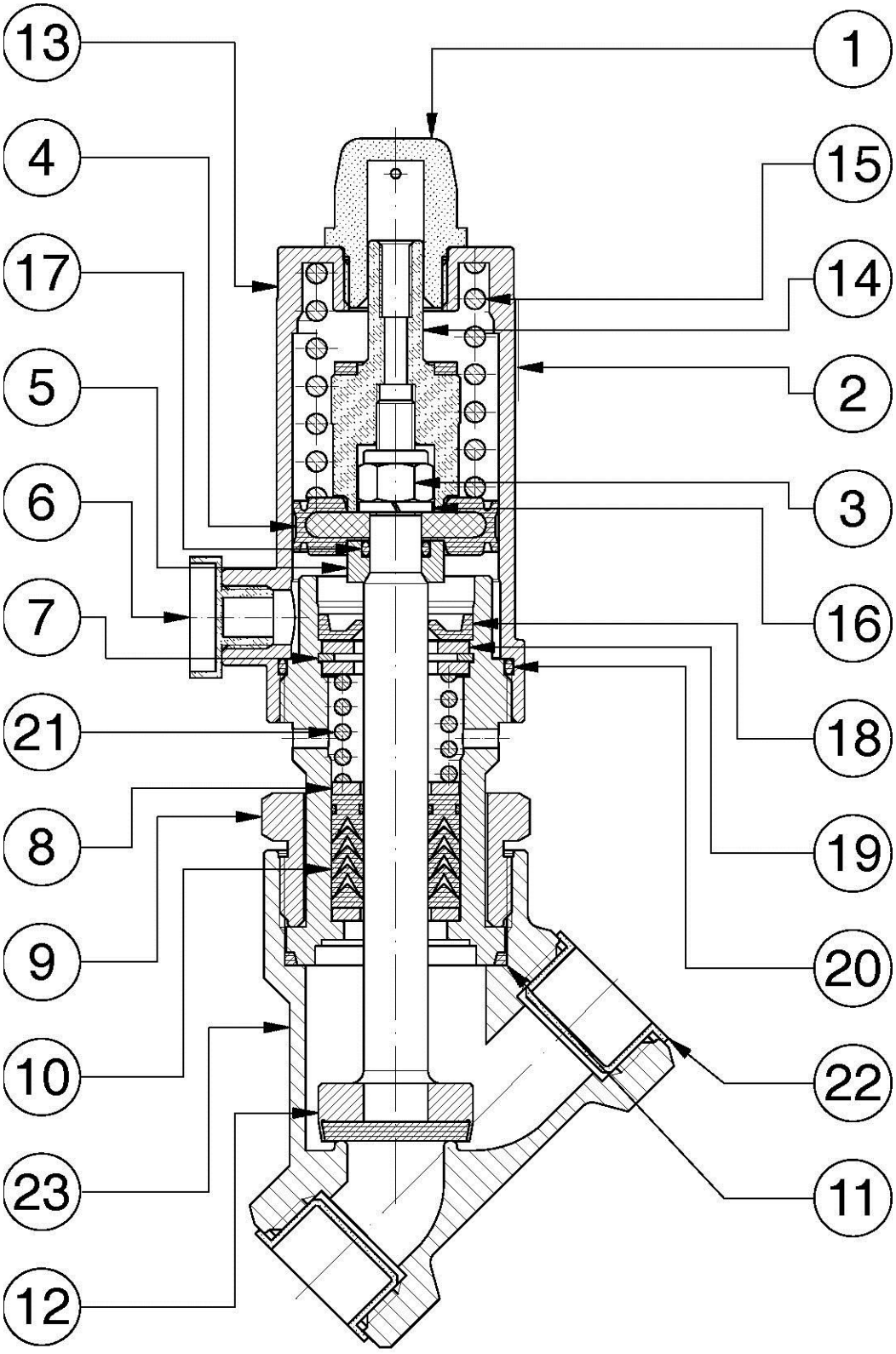
5.6.1 Disassembly

1) Blow air inside the servo control (6 bar).
2) Unscrew the fastening screw of the intermediate body (9).
3) Remove the servo control from the valve body (23).
4) Extract the gasket (11) from the valve body.
5) Blow air out of the servo control. **Caution!** The shaft (12) together with the relevant cap will jump out of its stroke.
6) Keeping locked the intermediate body (9): unscrew the spring housing cylinder (13). **Caution! Inside the cylinder 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 (13) from the intermediate body, when the thread joining them together is no more tightened.
7) Unscrew the transparent cap (1) from the cylinder.
8) Extract the OR gasket (20) from the cylinder.
9) Extract the spring (15) from the cylinder.
10) Lock the shaft (12), gripping it between soft cheeks at the height of the cap holder and unscrew first the stroke indicator (14), then the self-braking nut (3).
11) Remove from the shaft (12), in sequence: the spring washer (16), the NADUOP gasket (4), the OR gasket (17), 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 (21) compressed**; the maximum care shall then be taken to prevent the spring from coming out suddenly during the disassembly operations.
15) Extract the second spacer washer (19), the packing gland spring (21), the first packing gland spacer washer (8), the packing gland pack (10), the second packing gland spacer washer (8).
16) Now the valve has been completely disassembled, so that the required components can be replaced.

5.6.2 Assembly

1) Clean carefully all components.
2) Fit in the intermediate body (9) in sequence: the first packing gland spacer washer (8), the packing gland pack (10), the second packing gland spacer washer (8), the packing gland spring (21), the first spacer washer (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 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) Fit the shaft (12), after spreading the tapered part and that immediately following with a layer of silicone grease, into the intermediate body, together with its components, making it rotate, so as to install it more easily and to avoid damaging the packing gland pack.
7) Fit into the shaft: the bearing washer (5), the OR gasket (17), the NADUOP gasket (4), the spring washer (16).
8) Screw the self-braking nut (3), fastening it, but without tightening to torque, on the shaft (12), locking this last by gripping it between soft cheeks at the height of the cap holder.
9) Screw, on the shaft, the stroke indicator (14), tightening it, but without forcing, to avoid damaging the PVC thread. Keep locked the shaft by gripping it between soft cheeks at the height of the cap holder.
10) Fit the OR gasket (20) into the cylinder (13).
11) Rest the spring (15) on the NADUOP gasket (4).
12) Lock the intermediate body so as it is prevented from rotating and tighten to the prescribed torque the cylinder (13) (as specified in table No. 4), paying attention to grease with a layer of silicone grease the NADUOP gasket lips (4).
13) Screw the transparent cap (1) 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 (12) with relevant cap will come back into its stroke.**
15) Fit the gasket (11) into the valve body (23). Fit the servo control into the valve body.
16) Tighten the fastening screw of the intermediate body (9) to the prescribed torque (as specified in table No. 2), on the valve body (23).
17) Blow air out of the servocontrol.

5.6.3 Exploded View Of FFF ND 8-25 N. C. V.D. Valves With Ø 32 mm Servo Control



Drawing No. 020164 Rev.: 00

5.7 Instructions For Disassembly, Gasket Replacement, Reassembly OF FFF ND 8-25 N. O. Valves With Ø 32 mm Servo Control

For the disassembly and assembly operations of the N. O. valves, refer to the annexed Dwg. no. 020188.
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. The valve body shall be completely empty.

NOTE: Read the procedures thoroughly before starting any operation.

NOTE: Disconnect the air circuit from the valve before starting any disassembly operation.

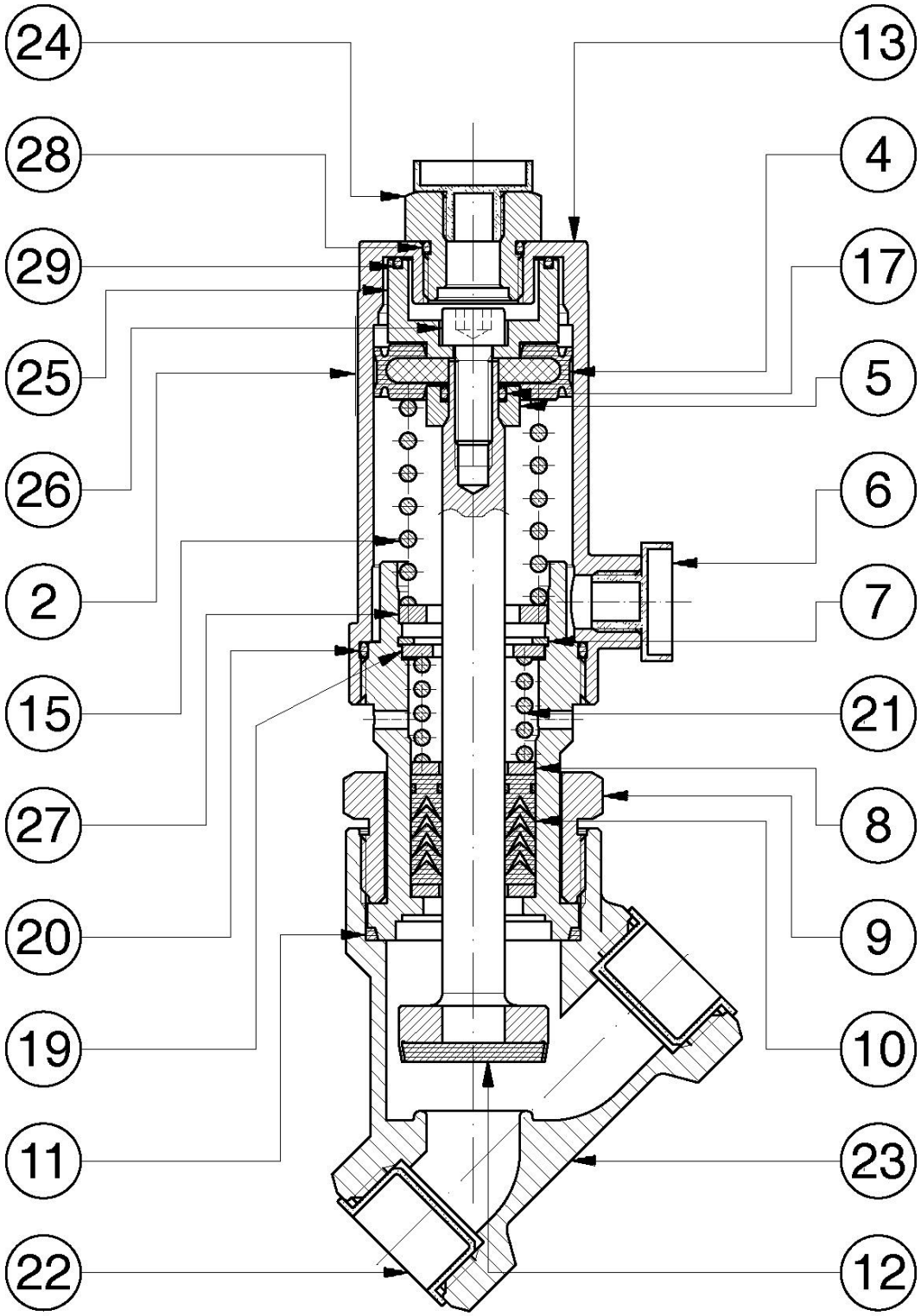
5.7.1 Disassembly

1) Unscrew the fastening screw of the intermediate body (9).
2) Remove the servo control from the valve body (23).
3) Extract the gasket (11) from the valve body.
4) Keeping locked the intermediate body (9), unscrew the spring housing cylinder (13). **Caution! Inside the cylinder, 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 (13) from the intermediate body, when the thread joining them together is no more tightened.
5) Unscrew the air inlet fitting (24) from the cylinder.
6) Extract the OR gasket (28) from the air inlet fitting.
7) Unscrew the threaded cap (6) from the cylinder.
8) Extract the OR gasket (20) from the cylinder.
9) Lock the shaft (12), by gripping it between soft cheeks at the height of the cap holder and unscrew the TCEI screw (26).
10) Extract the OR gasket (29) from the shockproof washer (25).
11) Remove from the shaft (12), in sequence: the shockproof washer (25), the NADUOP gasket (4), the OR gasket (17), the bearing washer (5).
12) Remove the shaft (12) from the intermediate body (9).
13) Extract from the intermediate body in sequence: the spring (15), the spring bearing washer (27).
14) Extract the snap ring (7**). Caution! The snap ring (7) keeps the packing gland spring (21) compressed**; therefore, proceed with caution to avoid the sudden spring release, during disassembly.
15) Extract in sequence: the spacer washer (19), the packing gland spring (21), the first packing gland spacer washer (8), the packing gland pack (10), the second packing gland spacer washer (8).
16) Now the valve has been completely disassembled, so that the required components can be replaced.

5.7.2 Assembly

1) Clean carefully all components.
2) Fit into the intermediate body (9) in sequence: the packing gland spacer washer (8), the packing gland pack (10), the second packing gland spacer washer (8), the packing gland spring (21), the packing gland spacer washer (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. Then, use suitable equipment.
4) Fit the shaft (12), after spreading the tapered part and that immediately following with a layer of silicone grease, into the intermediate body together with its components, making it rotate, so as to install it more easily and to avoid damaging the packing gland pack.
5) Fit the spring bearing washer (27), the spring (15) into the intermediate body (9).
6) Fit, on the shaft complete with its components, the bearing washer (5), the OR gasket (17), the NADUOP gasket (4), the shockproof washer (25).
7) Tighten to the prescribed torque (as specified in table No. 4) the TCEI screw (26), on the shaft (12), locking this last by gripping it between soft cheeks at the height of the cap holder.
8) Fit the OR gasket (29) into the shockproof washer seat (25).
9) Fit the OR gasket (20) into the spring housing cylinder seat (13).
10) Lock the intermediate body (9) so as to prevent it from rotating and tighten to the prescribed torque the cylinder (13), (as specified in table No. 4) taking care to grease with a layer of silicone grease the NADUOP gasket lips (4) and the OR gasket (29). **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) Fit the OR gasket (28) into the air inlet fitting seat (24).
12) Tighten to the prescribed torque the air inlet fitting (24) (as specified in table No. 4), keeping locked the cylinder (13).
13) Screw the threaded cap (6), on the cylinder, making sure that it has a little hole for the air passage.
14) Fit the gasket (11), into the valve body (23). Fit the servo control into the valve body.
15) Tighten to the prescribed torque the fastening screw of the intermediate body (9) (as specified in table No. 4) on the valve body (23).

5.7.3 Exploded View Of FFF ND 8-25 N. O. Valves With Ø 32 mm Servo Control



Drawing No. 020188 Rev.: 00

5.8 Instructions For Disassembly, Gasket Replacement, Reassembly Of FFF ND 15-50 N. C. V.D. Valves With Ø 70-80 mm Servo Control

For the disassembly and assembly operations of the N. C. valves, refer to the annexed Dwg. no. 020189.
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. The valve body shall be completely empty.

NOTE: Read the procedures thoroughly before starting any operation.

5.8.1 Disassembly

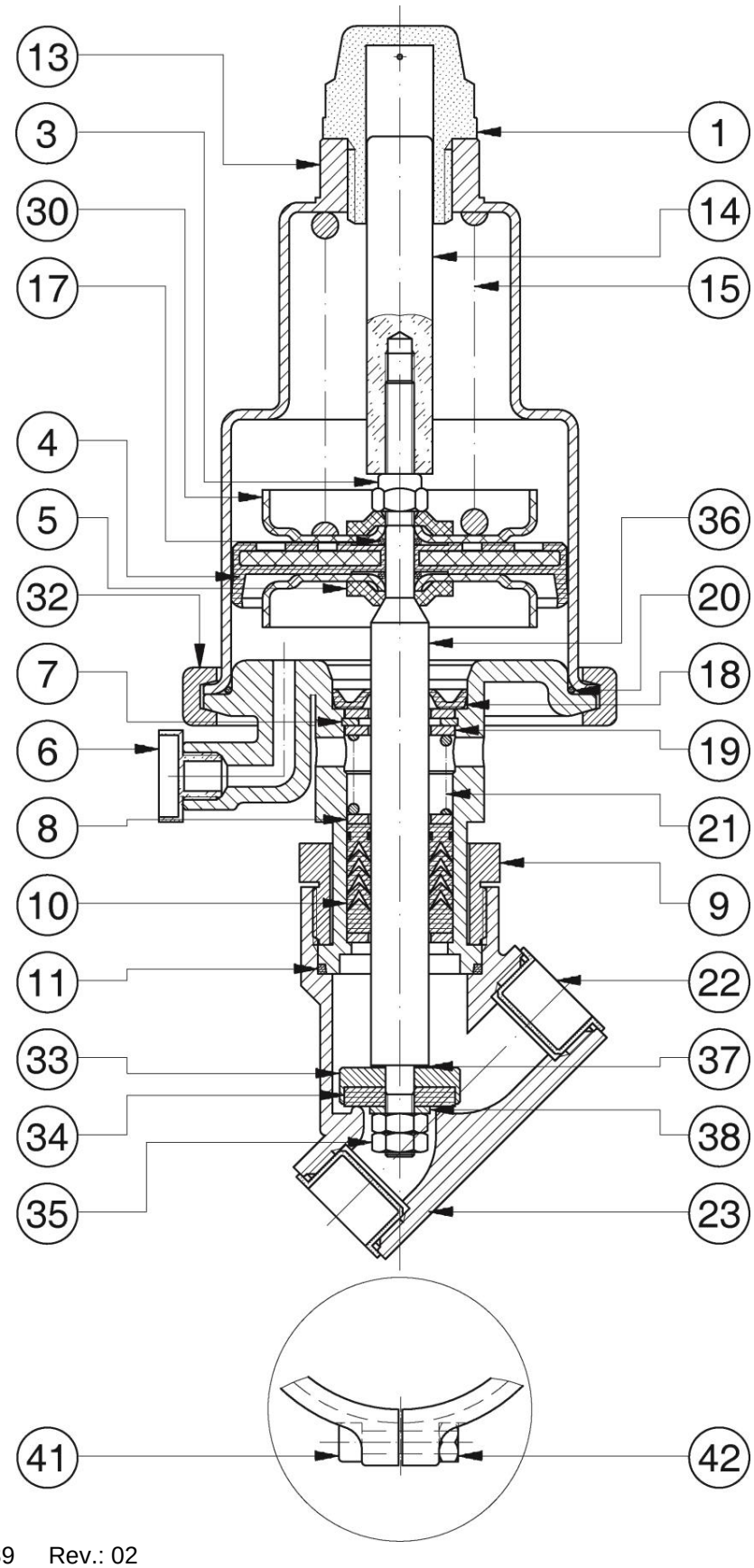
1) Blow air inside the servo control (6 bar).
2) Unscrew the stop nut of the intermediate body (9).
3) Remove the servo control from the valve body (23).
4) Extract the gasket (11) from the body.
5) Blow air out of the servo control. **Caution! When air is blown out of the servocontrol, the obturator shall have a movement equal to its stroke.**
6) Unloosen screws (41), remove nuts (42) then separate the two clamps (32). **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 (9), once the two clamps are separated.
7) Remove the spring housing piston.
8) Unscrew the transparent cap (1).
9) Extract the OR gasket (20).
10) Remove the spring (15).
11) Lock the obturator stem between soft cheeks (36). Unscrew the stroke indicator (14) and the self-braking nut (3).
12) Extract the first piston bearing washer (5), remove the first piston bearing (30), positioned in the upper part.
13) Extract the first O-Ring (17), remove the piston with TDUOP gasket (4), extract the second O-ring (17).
14) Remove the second piston bearing (30), extract the second piston bearing washer (5).
15) Extract the obturator stem (36) from the intermediate body (9).
16) Extract the BA gasket (18) and the first spacer washer (19) from the intermediate body.
17) Remove the snap ring (7). **Caution! The snap ring (7) keeps the packing gland spring (21) compressed**; the maximum care shall then be taken to prevent the spring from coming out suddenly during the disassembly operations.
18) Extract the second spacer washer (19), the spring (21), the first packing gland washer (8), the packing gland pack (10) and the second packing gland washer (8).
19) Unscrew nuts (35).
20) Extract the cap holder washer (38), the cap (34).
21) Remove the cap holder (33) and the gasket (37) [Item 21 refers to ND 15 to 40 only].
22) Now the valve has been completely disassembled, so that the required components can be replaced.

5.8.2 Assembly

1) Insert the gasket (37) and the cap holder (33) onto the obturator stem (36) [Item 1 refers to ND 15 to 40 only].
2) Fit, on the cap holder, the cap (34), the cap holder washer (38) and tighten to the prescribed torque nuts (35) (as specified in table 4).
3) Fit, into the intermediate body, (9) the first packing gland washer (8), the packing gland pack (10), the second packing gland washer (8), the spring (21) and the first spacer washer (19).
4) Compress everything and lock with the snap ring (7). **Caution! The snap ring (7) keeps the packing gland spring (21) compressed;** then, be extremely careful to avoid the sudden expulsion of the spring, during assembly.
5) Insert the second spacer washer (19) and the BA gasket (18) into the intermediate body.
6) Fit the obturator stem (36), previously assembled and spread with a layer of silicone grease, into the intermediate body (9) making it rotate, so as to install it more easily and to avoid damaging the packing gland pack.
7) Insert, on the obturator stem, the first piston bearing washer (5), the first piston bearing (30), the first O-ring (17).
8) Install, on the obturator stem, the TDUOP gasketed piston (4), be careful to place it with lip down, the second O-Ring (17), the second piston bearing (30) and the second piston bearing washer (5). Secure everything with the self-braking nut (3) fastening the pack of components, but without tightening to torque the stop nut.
9) Screw the stroke indicator (14).
10) Fit the O-ring (20) onto the intermediate body.
11) Insert spring (15) into its seat.
12) Fit the spring housing piston (13) onto the intermediate body, taking care to grease with a layer of silicone grease the TDUOP gasket lips.
13) Using proper instruments, approach the spring bearing piston to the intermediate body and lock it with the two clamps (32). **Caution! A compressed spring is placed inside the piston**.
14) Fit nuts (42) into the clamps and tighten to torque screws (41) on them (as specified in table 4).
15) Screw the transparent cap (1) on the spring housing piston (13).
16) Blow air into the servo control (6 bar). **Caution! Once the air activates the servo control, the obturator shall have a movement equal to its stroke.**
17) Insert the body gasket (11) into the valve body (23). Fit the servo control into the valve body.

18) Tighten to the prescribed torque the fastening screw of the intermediate body (9) (as specified in table 4), on the valve body (23).
19) Blow air out of the servo control.

5.8.3 Exploded View Of FFF ND 15-50 N. C. V.D. Valves With Ø 70-80 mm Servo Control



Drawing No. 020189 Rev.: 02

5.9 Instructions For Disassembly, Gasket Replacement, Reassembly Of FFF ND 15-50 N. O. Valves With Ø 70-80 mm Servo Control

For the disassembly and assembly operations of the N. O. valves, refer to the annexed Dwg. no. 020190.
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. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

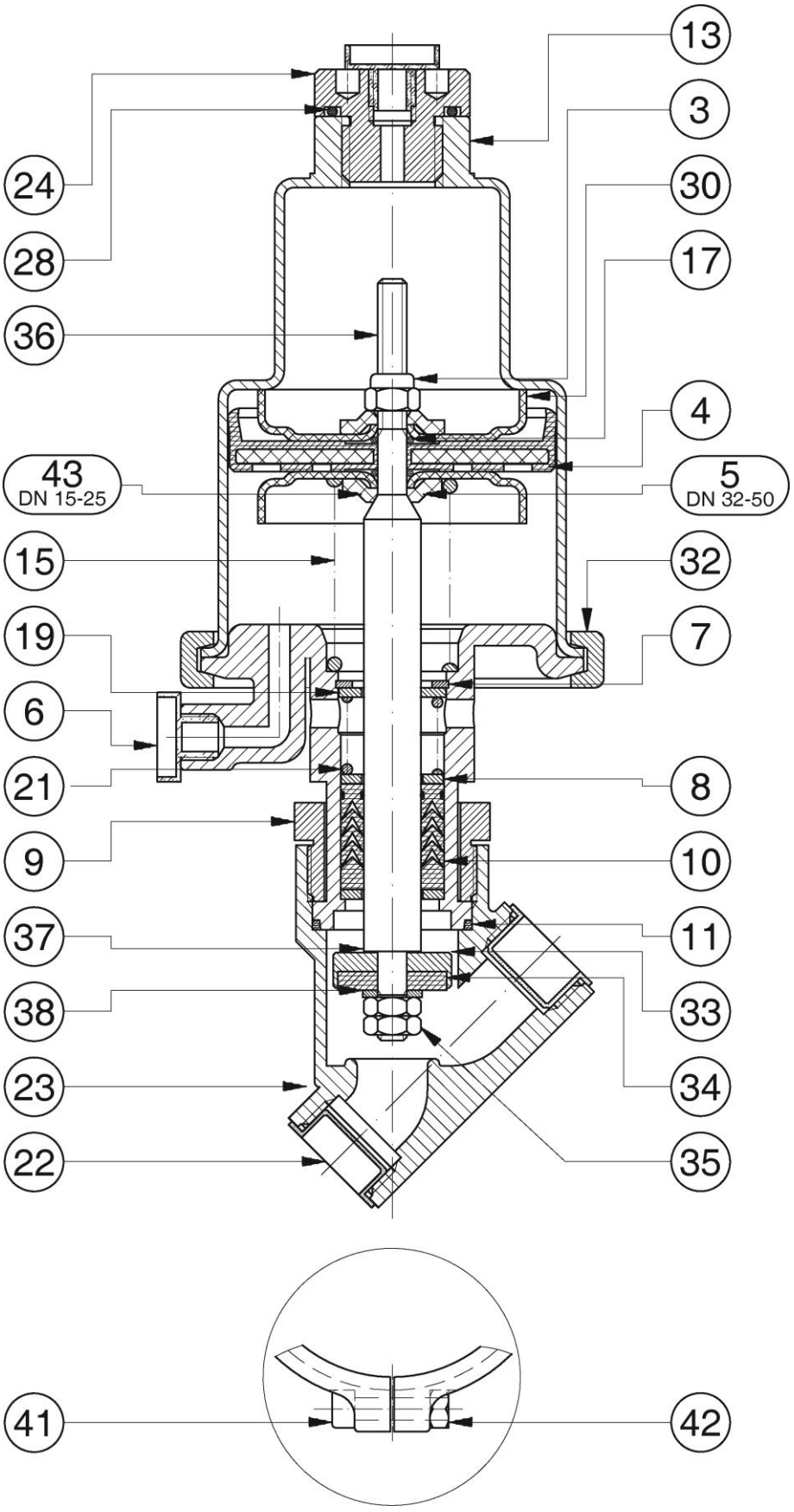
5.9.1 Disassembly

1) Unscrew the stop nut of the intermediate body (9).
2) Remove the servo control from the valve body (23).
3) Extract the gasket (11) from the body.
4) Unloosen screws (41), remove nuts (42) then separate the two clamps (32). **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 (9), once the two clamps are separated.
5) Remove the spring housing piston.
6) Unscrew the air inlet fitting (24) and extract the O-ring (28) from it.
7) Lock the obturator stem (36) between soft cheeks. Unscrew the self-braking nut (3).
8) Extract the first piston bearing washer (5), remove the first piston bearing (30), positioned in the upper part.
9) Extract the first O-Ring (17), remove the piston with TDUOP gasket (4), extract the second O-rings (17).
10) Remove the second piston bearing (30), extract the second piston bearing washer (5) [for ND 32 - 50] and (43) [for ND 15 - 25].
11) Remove the obturator stem (36) from the intermediate body (9).
12) Extract the spring (15) from the intermediate body.
13) Extract the snap ring (7). **Caution! The snap ring (7) keeps the packing gland spring (21) compressed**; the maximum care shall then be taken to prevent the spring from coming out suddenly during the disassembly operations.
14) Extract the spacer washer (19), the spring (21), the first packing gland washer (8), the packing gland pack (10) and the second packing gland washer (8).
15) Unscrew nuts (35).
16) Remove the cap retaining washer (38), the cap (34).
17) Remove the cap holder (33) and the gasket (37) [Item 22 refers to ND 15 to 40 only].
18) Now the valve has been completely disassembled, so that the required components can be replaced.

5.9.2 Assembly

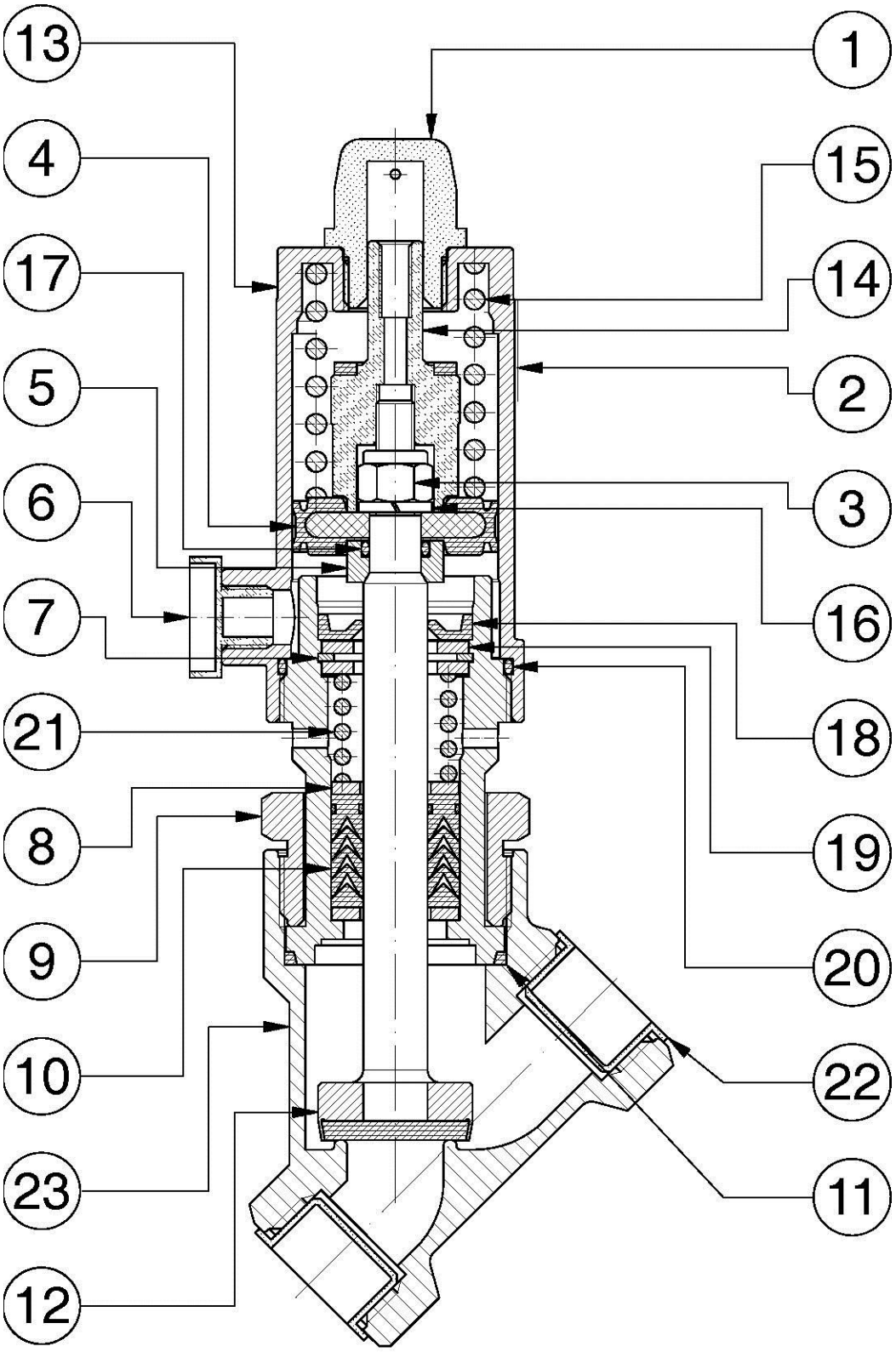
1) Insert the gasket (37) and the cap holder (33) onto the obturator stem (36) [Item 1 refers to ND 15to 40 only].
2) Fit the cap (34), the cap retaining washer (38) onto the cap holder and tighten to the prescribed torque nuts (35) (as specified in table 4).
3) Fit, into the intermediate body (9), the first packing gland washer (8), the packing gland pack (10), the second packing gland washer (8), the spring (21) and the spacer washer (19).
4) Compress everything and lock with the snap ring (7). **Caution! The snap ring (7) keeps the packing gland spring (21) compressed;** then, be extremely careful to avoid the sudden expulsion of the spring, during the assembly operations.
5) Fit the obturator stem (36), previously assembled and spread with a layer of silicone grease into the intermediate body (9) making it rotate, so as to install it more easily and to avoid damaging the packing gland pack.
6) Insert, onto the obturator stem, the spring (15), the first piston bearing washer (5) [for ND 32 - 50] and (43) [for ND 15 - 25], the first piston bearing (30), the first O-ring (17).
7) Fit, onto the obturator stem, the TDUOP gasketed piston (4), be careful to place it with lip up, the second O-Ring (17), the second piston bearing (30) and the second piston bearing washer (5). Secure everything with the self-braking nut (3) fastening the pack of components, but without tightening to torque the stop nut.
8) Install the spring housing piston (13) on the intermediate body, taking care to grease with a layer of silicone grease the TDUOP gasket lips.
9) Using proper instruments, approach the spring bearing piston to the intermediate body and lock it with the two clamps (32). **Caution! A compressed spring is placed inside the piston**.
10) Insert nuts (42) into the clamps and tighten to the prescribed torque screws (41) on them (as specified in table 4).
11) Inser the O-ring gasket (28) into the air inlet fitting (24).
12) Tighten to the prescribed torque the air inlet fitting (24) on the spring housing piston (13), (as specified in table 4).
13) Fit the body gasket (11) into the valve body (23). Install the servo control in the valve body.
14) Tighten to the prescribed torque the fastening screw of the intermediate body (9), (as specified in table 4), on the valve body (23).

5.9.3 Exploded View Of FFF ND 15-50 N. O. With Ø 70-80 mm Servo Control



Drawing No. 020190 Rev.: 02

Exploded View Of FFF ND 8-25 N. C. D.V. With Ø 32 mm Servo Control



Drawing No. 020164 Rev.: 00

5.10 Components And Spare Parts For FFF ND 8-25 N. C. V.D. Valves With Ø 32 mm Servo Control.

PART	Q.ty	DESCRIPTION	MATERIAL	GROUP	CODES				
					ND 8	ND 11	ND 15	ND 20	ND 25
1	1	Transparent cap	PVC	840	INDC010160				
2	1	Rating plate	Polyester	506	ETAU010347				
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	Polyester	505	TEP400G018				
7	1	Snap ring	AISI 304	695	SEEF23304				
8	2	Packing gland spacer washer	AISI 316	703	RDD086274				
9	1	Intermediate body	AISI 316 + AISI 304	632	CINT010153			CINT010855	CINT010856
10	1	Packing gland	PTFE+FPM	587	PT01020TT				
11	2	Body gasket	PTFE	817	GCVF950946			GCVF950947	GCVF950948
12	1	Shaft complete with N. C. Cap	AISI 316 + PTFE	564	ALBE010162		AINF010869	AINF010870	AINF010871
13	1	Spring housing cylinder	AISI 304	813	CLCIXX0449				
14	1	Stroke indicator	PVC+EPDM	840	INDC010159				
15	1	Spring	AISI 302	552	MOLL010149				
16	1	Spring washer	Steel	610	RE06000FE				
17	1	O-Ring gasket	NBR	548	OR02031GA				
18	1	BA gasket	FPM + Steel	567	BA0V10244				
19	2	Spacer washer	AISI 304	703	RDD088148				
20	1	O-Ring gasket	FPM	548	OR002131VI				
21	1	Packing gland spring	AISI 316	552	MTD086110				
22	2	Protective cap	Polyethylene	505	T01ST00120	T01ST00160	T01ST00190	T01ST00250	T01ST00310
23	1	Female threaded valve body	AISI 316	813	CLFFXX0437	CLFFXX0438	FFCD90247	FFCD90248	FFCD90249
		Valve body to be socket weld.			CLFFXX0439	CLFFXX0440	CVFF950445	CVFF950446	CVFF950447

GROUP 94 (ND 8-11) - **GROUP 104** (ND 15-25)
Position 9
Valves manufactured from 2001

Air side spare parts (without spring)

SPARE PART CODE		7095				
Part No.	Q.ty	ND 8	ND 11	ND 15	ND 20	ND 25
4	1	NAD00321NB				
17	1	OR02031GA				
18	1	BA0V10244				
20	1	OR002131VI				

Body side spare parts

SPARE PART CODE		7097		7261	7262	7263
Part No.	Q.ty	ND 8	ND 11	ND 15	ND 20	ND 25
10	1	PT01020TT				
11	1	GCVF950946			GCVF950947	GCVF950948
12	1	ALBE010162		AINF010869	AINF010870	AINF010871

5.11 Components And Spare Parts For FFF ND 8-25 N. O. Valves With Ø 32 mm Servo Control.

PART	Q.ty	DESCRIPTION	MATERIAL	GROUP	CODES				
					ND 8	ND 11	ND 15	ND 20	ND 25
2	1	Rating plate	Polyester	506	ETAU010347				
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	2	Packing gland spacer washer	AISI 316	703	RDD086274				
9	1	Intermediate body	AISI 316 + AISI 304	632	CINT010153			CINT010855	CINT010856
10	1	Packing gland	PTFE+FPM	587	PT01020TT				
11	2	Body gasket	PTFE	817	GCVF950946			GCVF950947	GCVF950948
12	1	Shaft complete with N. O. cap	AISI 316 + PTFE	564	ALBE010163		AINF010872	AINF010873	AINF010874
13	1	Spring housing cylinder	AISI 304	813	CLCIXX0449				
15	1	Spring	AISI 302	552	MOLL010164				
17	1	O-Ring gasket	NBR	548	OR02031GA				
19	1	Spacer washer	AISI 304	503	RDD088148				
20	1	O-Ring gasket	FPM	548	OR002131VI				
21	1	Packing gland spring	AISI 316	552	MTD086110				
22	2	Protective cap	Polyethylene	505	T01ST00120	T01ST00160	T01ST00190	T01ST00250	T01ST00310
23	1	Female threaded valve body	AISI 316	813	CLFFXX0437	CLFFXX0438	FFCD90247	FFCD90248	FFCD90249
		Valve body to be socket weld.			CLFFXX0439	CLFFXX0440	CVFF950445	CVFF950446	CVFF950447
24	1	Air inlet fitting	AISI 420	811	RACC010165				
25	1	Shockproof washer	AISI 304	703	RDST010167				
26	1	TCEI Screw	AISI 304	551	TCCE06164				
27	1	Spring bearing washer	AISI 304	703	RDST010168				
28	1	O-Ring gasket	NBR	548	OR002050GA				
29	1	O-Ring gasket	NBR	548	OR002087GA				

GROUP 94 (ND 8-11) - **GROUP 104** (ND 15-25)
Position 9
Valves manufactured from 2001

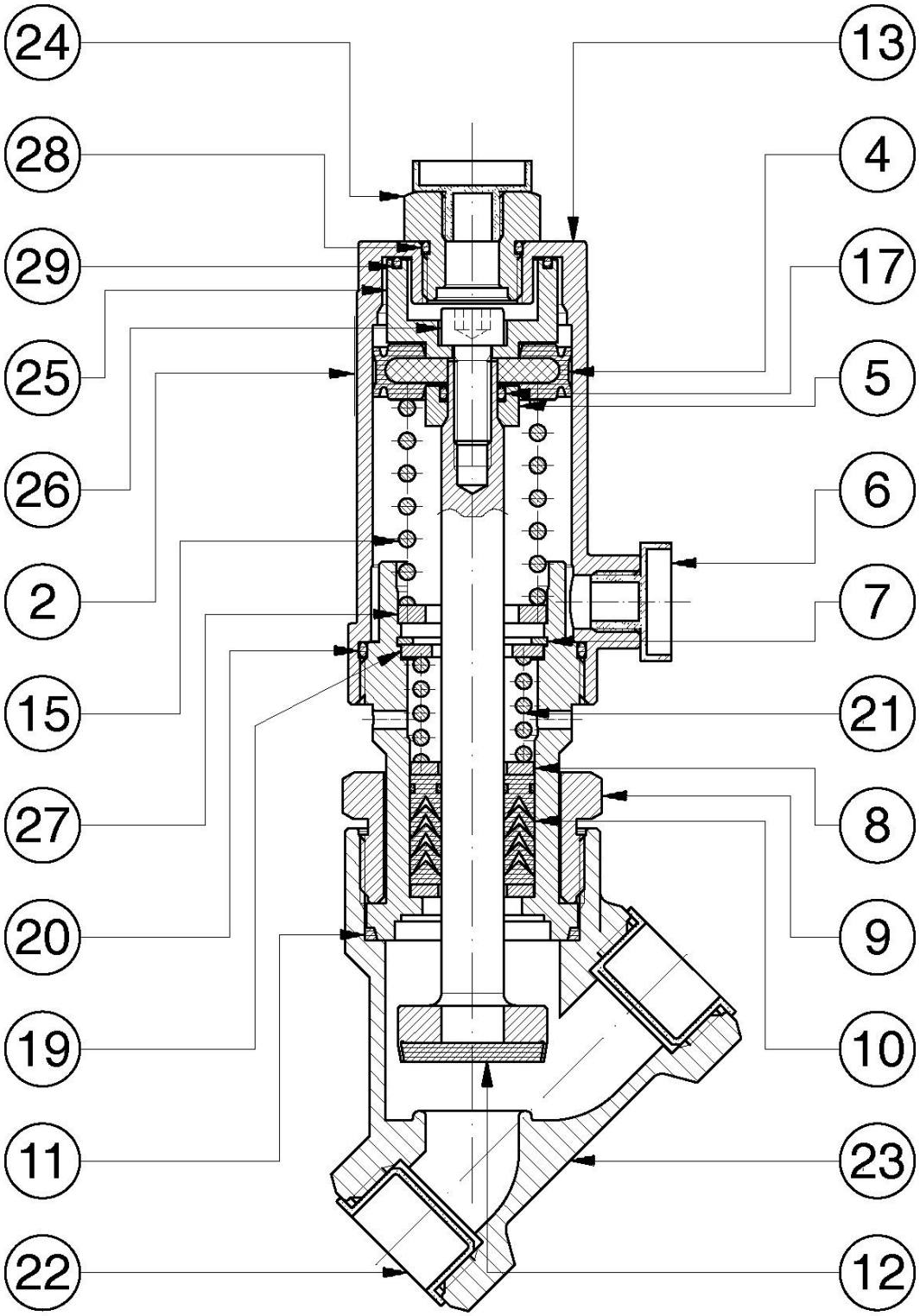
Air side spare parts (without spring)

SPARE PART CODE		7096				
Part No.	Q.ty	ND 8	ND 11	ND 15	ND 20	ND 25
4	1	NAD00321NB				
17	1	OR02031GA				
20	1	OR002131VI				
28		OR002050GA				
29	1	OR002087GA				

Body side spare parts

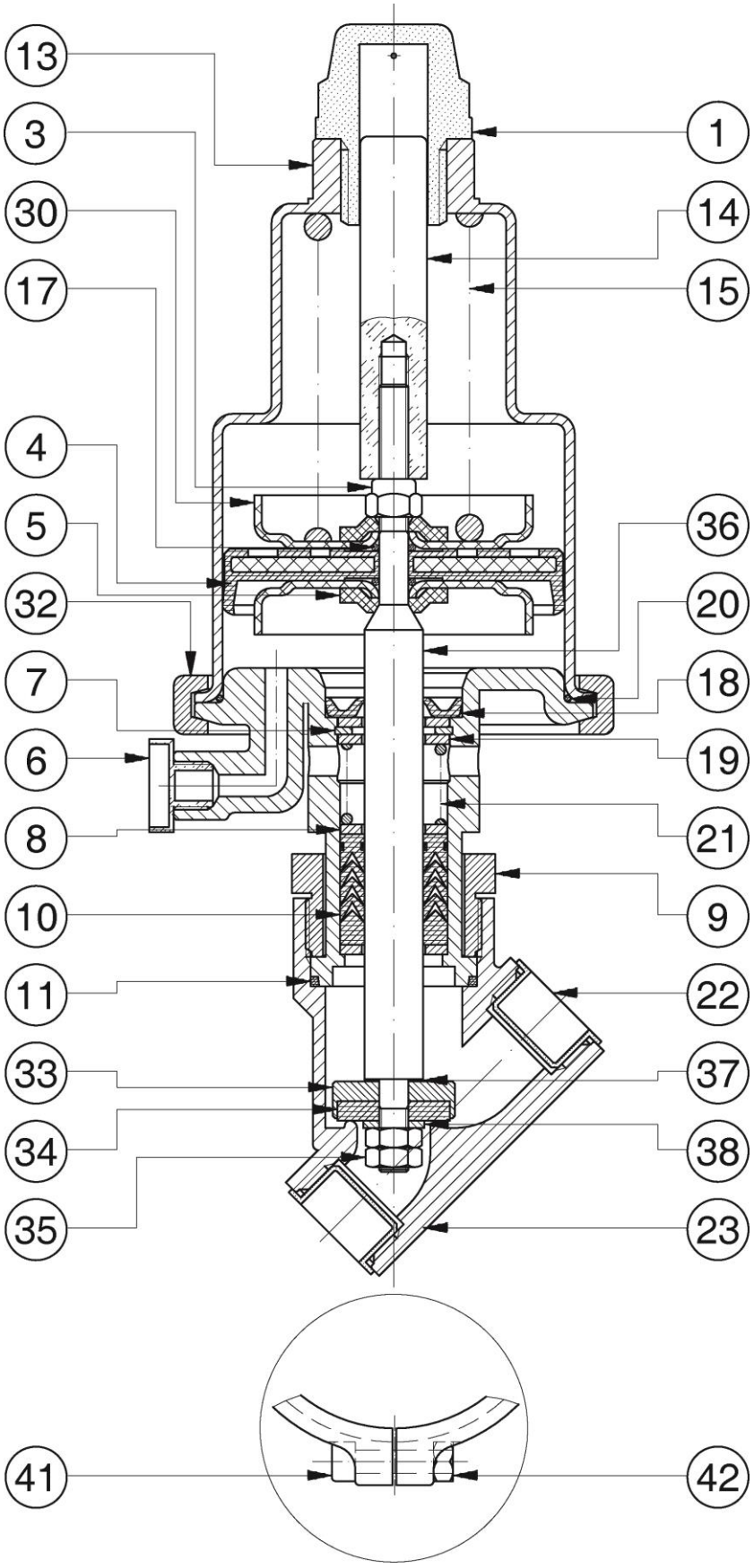
SPARE PART CODE		7098		7264	7265	7266
Part No.	Q.ty	ND 8	ND 11	ND 15	ND 20	ND 25
10	1	PT01020TT				
11	1	GCVF950946			GCVF950947	GCVF950948
12	1	ALBE010163		AINF010872	AINF010873	AINF010874

Exploded View Of FFF ND 8-25 N. O. Valves With Ø 32 mm Servo Control



Drawing No. 020188 Rev.: 00

Exploded View Of FFF ND 15-50 N. C. V.D. Valves With Ø 70-80 mm Servo Control



Drawing No. 020189 Rev.: 02

5.12 Components And Spare Parts For FFF ND 15-50 N. C. V.D. Valves With Ø 70-80 mm Servo Control.

PART	Q.ty	DESCRIPTION	MATERIAL	GROUP	Ø Serv	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
1	1	Transparent cap	PLASTIC	840	70÷80	ICD091467					
3	1	Self-braking nut	Fe 360	576	70	D06AUTOFE					
					80			DO8AUTOFE			
4	1	TDUOP gasket	NBR/STEEL	566	70	TDUOP7065					
					80			TDUOP8073			
5	2	Piston bearing washer	Fe 360	671	70	RAD087233					
					80			RAD087234			
6	1	Threaded cap	POLYETH.	505	70÷80	TEP400G018					
7	1	Snap ring	AISI 304	695	70÷80	SEEF23304					
8	2	Packing gland washer	AISI 316	703	70÷80	RDD086297					
9	1	Intermediate body	AISI 304 AISI 316	632	70	CIFI950952	CIFI950953	CIFI950954	CIFI950955	CIFI950956	CIFI950957
					80			CIFI950958	CIFI950959	CIFI950960	CIFI950961
10	1	Packing gland	PTFE/GRAPH	587	70÷80	PT01222TG					
11	1	Body gasket	PTFE	817	70÷80	GCVF950946	GCVF950947	GCVF950948	GCVF950949	GCVF950950	GCVF950951
13	1	Spring bearing piston	AISI 304	651	70	PAMC941010					
					80			PAMC950781			
14	1	Stroke indicator	RED PVC	840	70÷80	ICD091255			ICD091256		
15	1	Servo control spring	STEEL	552	70	557					
					80			MTD087091			
17	2	O-Ring gasket	GACO	548	70	OR02025GA					
					80			OR02031GA			
18	1	BA gasket	VITON	567	70÷80	BA0V12284					
19	2	Flat washer	AISI 316	703	70÷80	RDD088148					
20	1	O-Ring gasket	GACO	548	70	OR03256GA					
					80			OR002300GA			
21	1	Packing gland spring	AISI 316	552	70÷80	MTD088149					
22	2	Cylindrical cap	Polyethylene	505	70÷80	T01ST00190	T01ST00250	T01ST00310	T01ST00395	T01ST00460	T01ST00575
23	1	Fem. thread. valve body	AISI 316	813	70÷80	FFCD90247	FFCD90248	FFCD90249	FFCD90250	FFCD90251	FFCD90252
		Valve body to be socket welded				CVFF950445	CVFF950446	CVFF950447	CVFF950448	CVFF950449	CVFF950450
30	2	Piston bearing	Fe 360	545	70	AFD087239					
					80			AFD087240			
32	2	Clamps	AISI 304	841	70	M304940071					
					80			M304940072			
33	1	Cap holder	AISI 316	527	70÷80	TTD090253	TTD001229	TTD001251	TTD001255	TTD001257	
34	1	Cap	PTFE-coated EPDM	818	70÷80	TDRD90331	TDRD90332	TDRD90333	TDRD90334	TDRD90335	TDRD90336
			CARB./PTFE	839		TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
35	2	Hexagon nut	AISI 316	501	70÷80	D06055896	D08055896	D08055896	D08055896	D08055896	D10055896
36	1	Shaft	AISI 316	657	70	AINF950970	AINF950971	AINF950972	AINF950973	AINF950974	ACPT960062
					80			AINF950976	AINF950977	AINF950978	ACPT960063
37	1	Shaft gasket	PTFE	511	70÷80	GD0090275	GD0001465				
38	1	Cap holder spring	AISI 316	**(1)**	70÷80	RPU6592066	RFD000127	RFD000116	RFD000117	RFD000118	RFD000119
41	2	TCCE Screw	AISI 304	551	70÷80	TCCE06254					
42	2	Hexagon nut	AISI 304	501	70÷80	D06055884					

(1) Group 502 for ND 15; Group 526 for ND 20-50

GROUP 104 (ND 15-50)
Position 10 – 12 – 15 – 17
Valves manufactured from 2003

Ø 70 Piston air side spare parts (without spring)

SPARE PART CODE		3424					
P. N°	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP7065					
17	2	OR02025GA					
20	1	OR03256GA					

Ø 80 Piston air side spare parts (without spring)

SPARE PART CODE		7899			
P. N°	Q.ty	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP8073			
17	2	OR02031GA			
20	1	OR002300GA			

Body side spare parts

SPARE PART CODE	TC	5246	5247	5248	5249	5250	5251
	CT	5252	5253	5254	5255	5256	5257
P. N°	Q.	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
10	1	PT01222TG					
11	1	GCVF950946	GCVF950947	GCVF950948	GCVF950949	GCVF950950	GCVF950951
18	1	BA0V12284					
21	1	MTD088149					
34 TC	1	TDRD90331	TDRD90332	TDRD90333	TDRD90334	TDRD90335	TDRD90336
34 CT	1	TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
37	1	GD0090275	GD0001465				

TC= seal with cap in PTFE-coated EPDM
CT= seal with cap in carbon-loaded PTFE

5.13 Components And Spare Parts For FFF ND 15-50 N. O. Valves With Ø 70-80 mm Servo Control.

PART	Q.ty	DESCRIPTION	GROUP	MATERIAL	Ø Serv	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
3	1	Self-braking nut	576	Fe 360	70	D06AUTOFE					
					80			DO8AUTOFE			
4	1	TDUOP gasket	566	NBR/STEEL	70	TDUOP7065					
					80			TDUOP8073			
5	**(1)**	Piston bearing washer	671	Fe 360	70	RAD087233					
					80			RAD087234			
6	2	Threaded cap	505	POLYETH.	70÷80	TEP400G018					
7	1	Snap ring	695	AISI 304	70÷80	SEEF23304					
8	2	Packing gland washer	703	AISI 316	70÷80	RDD086297					
9	1	Intermediate body	632	AISI 304 AISI 316	70	CIFI950952	CIFI950953	CIFI950954	CIFI950955	CIFI950956	CIFI950957
					80			CIFI950958	CIFI950959	CIFI950960	CIFI950961
10	1	Packing gland	587	PTFE/GRAP.	70÷80	PT01222TG					
11	1	Body gasket	817	PTFE	70÷80	GCVF950946	GCVF950947	GCVF950948	GCVF950949	GCVF950950	GCVF950951
13	1	Spring bearing piston	651	AISI 304	70	PAMC941010					
					80			PAMC950781			
15	1	Servo control spring	552	STEEL		MTD092510					
17	2	O-Ring gasket	548	GACO	70	OR02025GA					
					80			OR02031GA			
19	1	Flat washer	703	AISI 316	70÷80	RDD088148					
21	1	Packing gland spring	552	AISI 316	70÷80	MTD088149					
22	2	Cylindrical cap	505	Polyethylene	70÷80	T01ST00190	T01ST00250	T01ST00310	T01ST00395	T01ST00460	T01ST00575
23	1	Fem. thread. valve body	813	AISI 316	70÷80	FFCD90247	FFCD90248	FFCD90249	FFCD90250	FFCD90251	FFCD90252
		Valve body to be socket welded				CVFF950445	CVFF950446	CVFF950447	CVFF950448	CVFF950449	CVFF950450
24	1	Air fitting	811	AISI 304	70÷80	RRDD93955					
28	1	O-Ring gasket	548	GACO	70÷80	533					
30	2	Piston bearing	545	Fe 360	70	AFD087239					
					80			AFD087240			
32	2	Clamps	841	AISI 304	70	M304940071					
					80			M304940072			
33	1	Cap holder	527	AISI 316	70÷80	TTD090253	TTD001229	TTD001251	TTD001255	TTD001257	
34	1	Cap	818	PTFE-coated EPDM	70÷80	TDRD90331	TDRD90332	TDRD90333	TDRD90334	TDRD90335	TDRD90336
			839	CARB./PTFE		TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
35	2	Hexagon nut	501	AISI 316	70÷80	D06055896	D08055896	D08055896	D08055896	D08055896	D10055896
36	1	Shaft	657	AISI 316	70	AINF950970	AINF950971	AINF950972	AINF950973	AINF950974	ACPT960062
					80			AINF950976	AINF950977	AINF950978	ACPT960063
37	1	Shaft gasket	511	PTFE	70÷80	GD0090275	GD0001465				
38	1	Cap holder spring	526	AISI 316	70÷80	RPU6592066	RFD000127	RFD000116	RFD000117	RFD000118	RFD000119
41	2	TCCE Screw	551	AISI 304	70÷80	TCCE06254					
42	2	Hexagon nut	501	AISI 304	70÷80	D06055884					
43	1	Cas. low. bear.g washer	671	Fe 360	70	RAD092502					

(1) No. 1 for ND 15-50 with Ø 70 servo control; No. 2 for ND 25-50 with Ø 80 servo control

GROUP 104 (ND 15-50)
Position 4 – 11 – 16
Valves manufactured from 1996

Ø 70 Piston air side spare parts (without spring)

SPARE PART CODE		3422					
P. N°	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP7065					
17	2	OR02025GA					
28	1	533					

Ø 80 Piston air side spare parts (without spring)

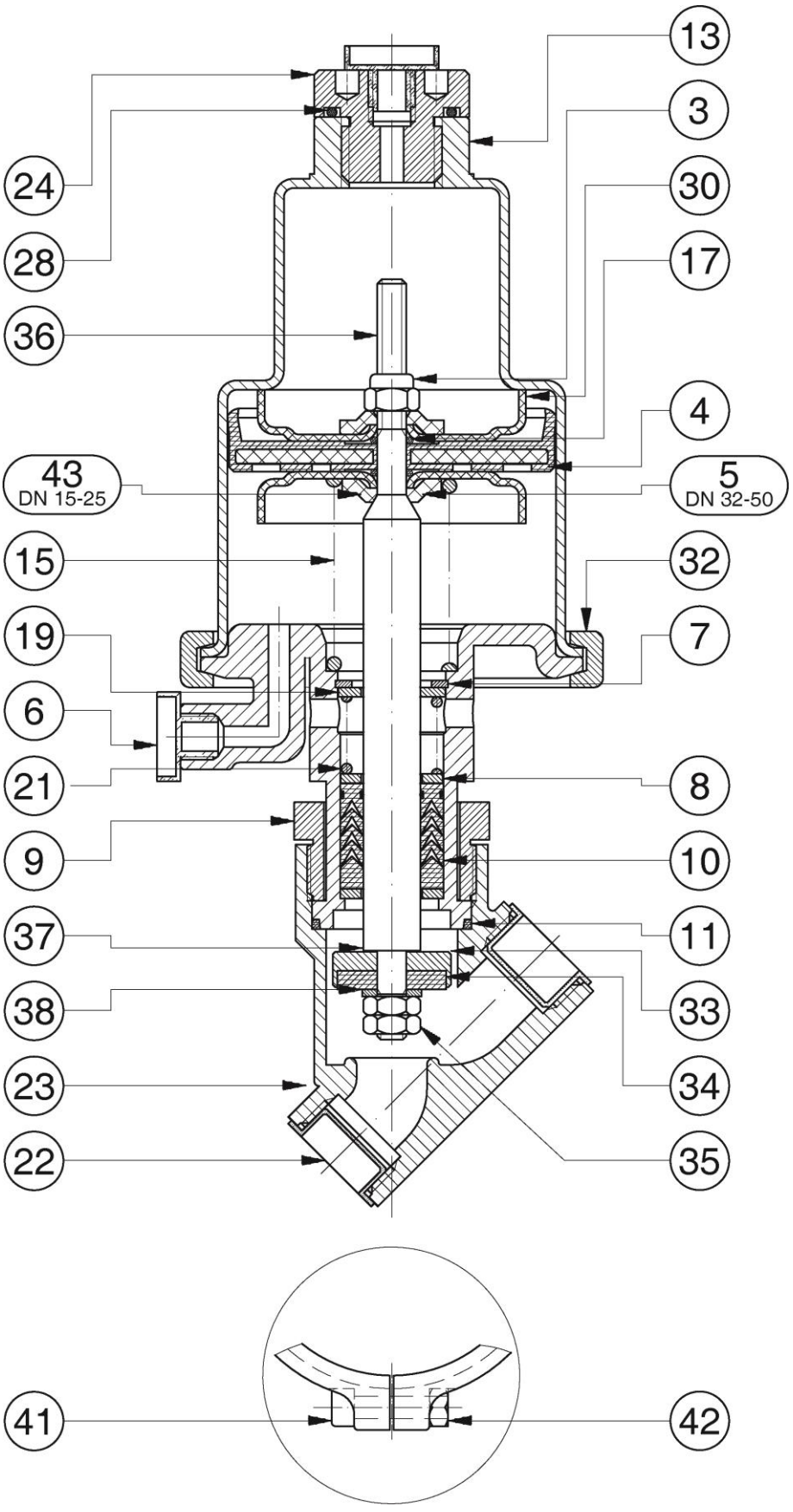
SPARE PART CODE		3423			
P. N°	Q.ty	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP8073			
17	2	OR02031GA			
28	1	533			

Body side spare parts

SPARE PART CODE	TC	5376	5377	5378	5379	5380	5381
	CT	5240	5241	5242	5243	5244	5245
P. N°	Q.	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
10	1	PT01222TG					
11	1	GCVF950946	GCVF950947	GCVF950948	GCVF950949	GCVF950950	GCVF950951
21	1	MTD088149					
34 TC	1	TDRD90331	TDRD90332	TDRD90333	TDRD90334	TDRD90335	TDRD90336
34 CT	1	TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
37	1	GD0090275	GD0001465				

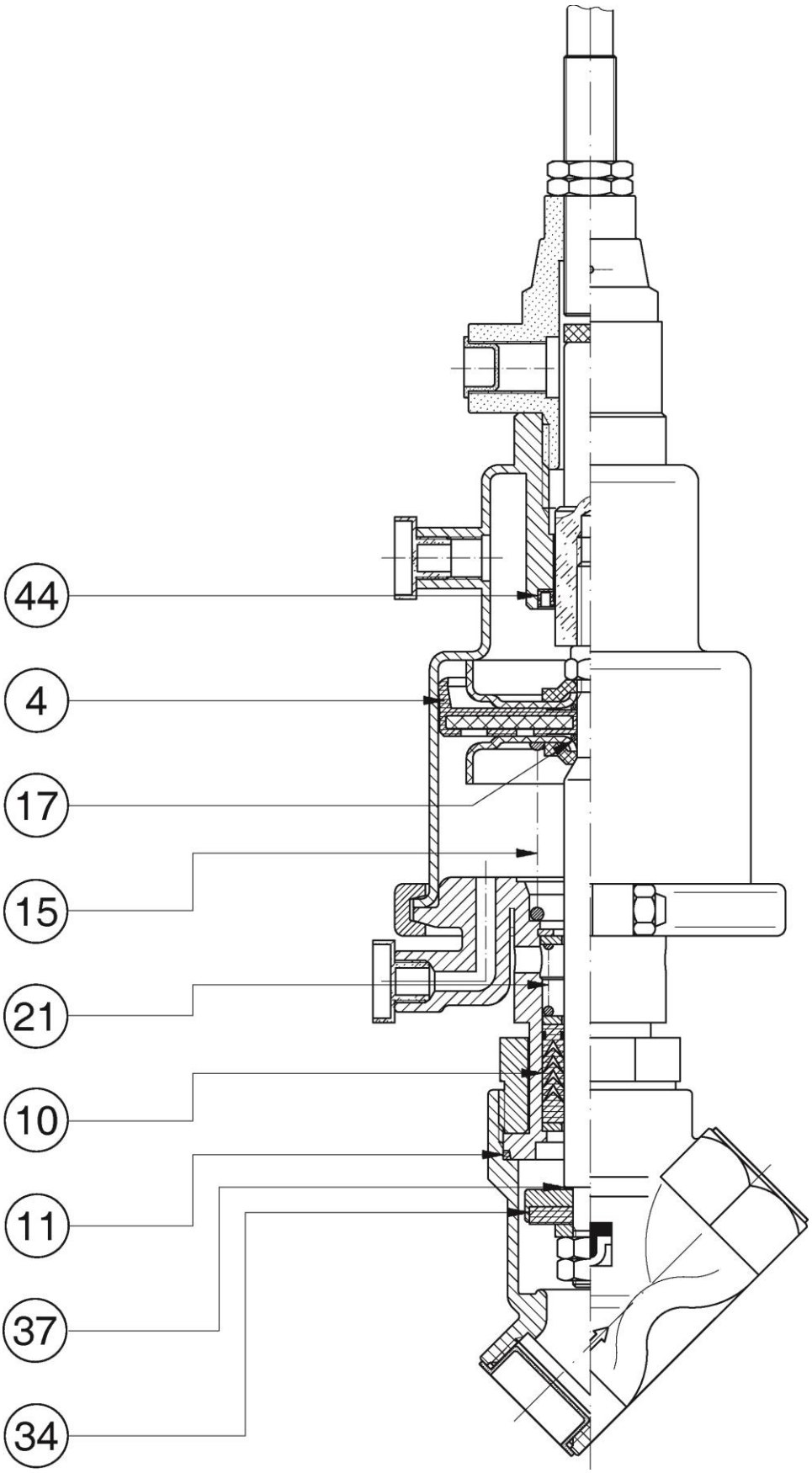
TC= seal with cap in PTFE-coated EPDM
CT= seal with cap in carbon-loaded PTFE

Exploded View Of FFF ND 15-50 N. O. Valves With Ø 70-80 mm Servo Control



Drawing No. 020190 Rev.: 02

Exploded View Of FFF ND 15-50 N. O. Valves with Ø 70-80 mm Servo Control, With Sensors Manufactured From 1998



Dwg. No. 980491 Rev.: 01

5.14 Spare Parts For FFF N. O. Valves With Sensors Manufactured From 1998.

GROUP 104 (ND 15-50)
Position 7 – 13 – 18
Valves manufactured from 1998

Ø 70 Piston air side spare parts (without spring)

SPARE PART CODE		**5372**					
P. N°	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP7065					
17	2	OR02025GA					
44	1	BA0016244					

Ø 80 Piston air side spare parts (without spring)

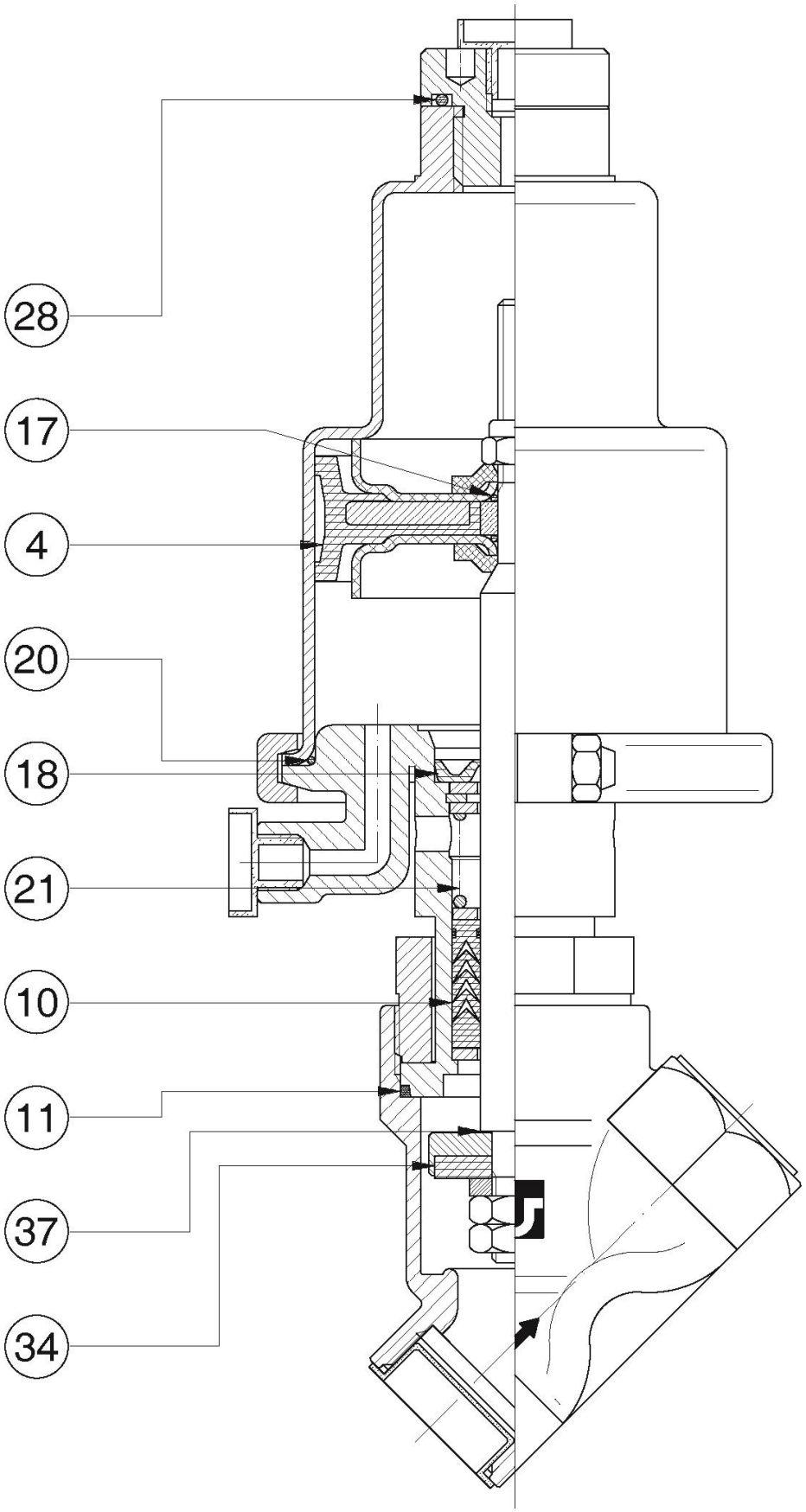
SPARE PART CODE		**5373**			
P. N°	Q.ty	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP8073			
17	2	OR02031GA			
44	1	BA0016244			

Body side spare parts

SPARE PART CODE	**TC**	**5376**	**5377**	**5378**	**5379**	**5380**	**5381**
	CT	**5240**	**5241**	**5242**	**5243**	**5244**	**5245**
P. N°	Q.	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
10	1	PT01222TG					
11	1	GCVF950946	GCVF950947	GCVF950948	GCVF950949	GCVF950950	GCVF950951
21	1	MTD088149					
34 **TC**	1	TDRD90331	TDRD90332	TDRD90333	TDRD90334	TDRD90335	TDRD90336
34 **CT**	1	TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
37	1	GD0090275	GD0001465				

TC= seal with cap in PTFE (Teflon)-coated EPDM
CT= seal with cap in carbon-loaded PTFE (Teflon)

Exploded View Of FFF ND 15-50 Double Acting Valves With Ø 70-80 mm Servo Control Manufactured From 2003



Dwg. No. 030815 Rev.: 00

5.15 Spare parts For FFF Double Acting Valves From 2003

GROUP 104 (ND 15-50)
Position 14
Valves manufactured from 2003

Ø 70 Piston air side spare parts (without spring)

SPARE PART CODE		**5374**					
P. N°	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
4	1	TDU070DLNB					
17	2	OR02025GA					
20	1	OR03256GA					
28	1	533					

Ø 80 Piston air side spare parts (without spring)

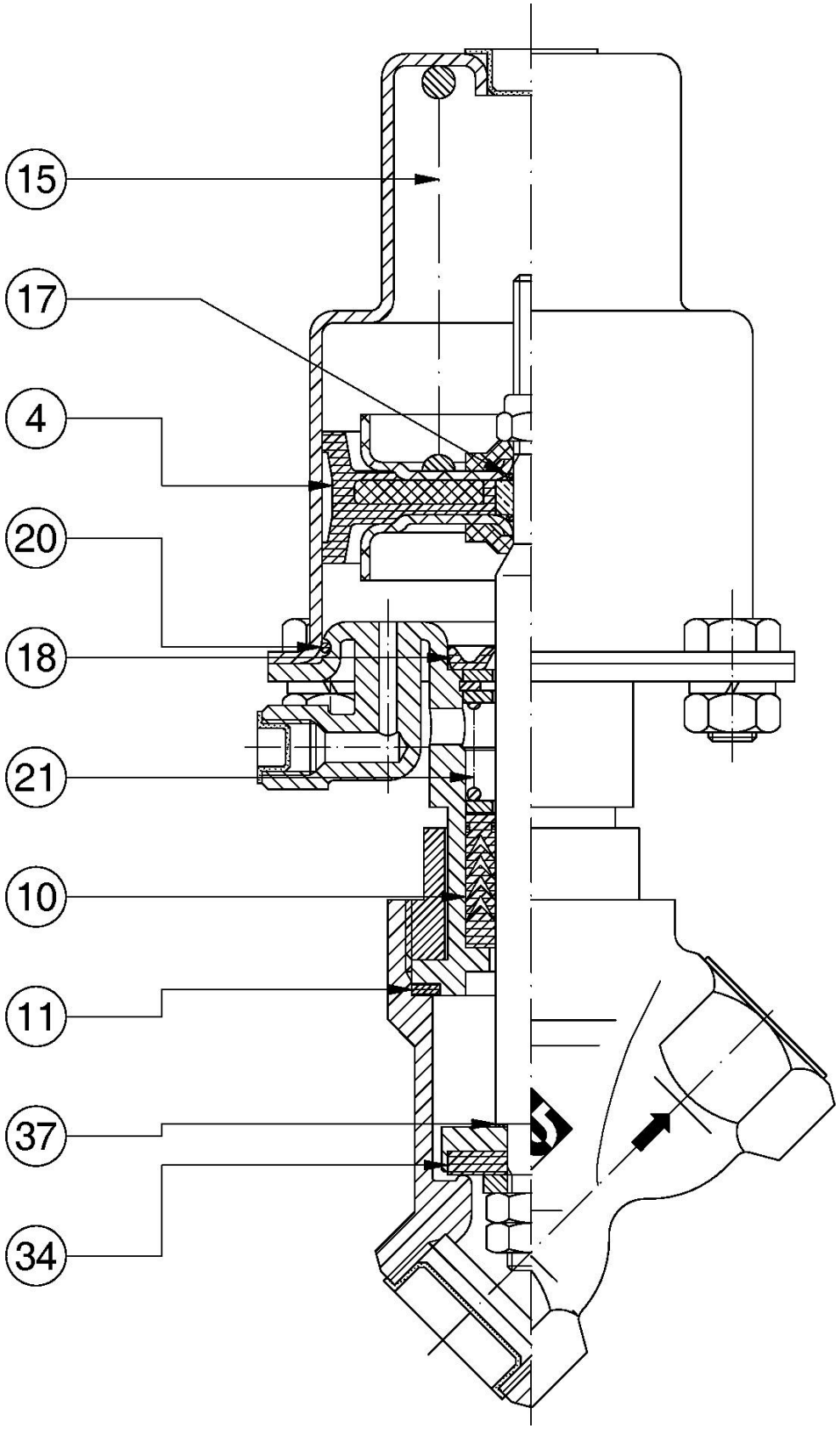
SPARE PART CODE		**7900**			
P. N°	Q.ty	ND 25	ND 32	ND 40	ND 50
4	1	TDU080DLNB			
17	2	OR02031GA			
20	1	OR002300GA			
28	1	533			

Body side spare parts

SPARE PART CODE	**TC**	**5376**	**5377**	**5378**	**5379**	**5380**	**5381**
	CT	**5240**	**5241**	**5242**	**5243**	**5244**	**5245**
P. N°	Q.	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
10	1	PT01222TG					
11	1	GCVF950946	GCVF950947	GCVF950948	GCVF950949	GCVF950950	GCVF950951
21	1	MTD088149					
34 **TC**	1	TDRD90331	TDRD90332	TDRD90333	TDRD90334	TDRD90335	TDRD90336
34 **CT**	1	TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
37	1	GD0090275	GD0001465				

TC= seal with cap in PTFE (Teflon)-coated EPDM
CT= seal with cap in carbon-loaded PTFE (Teflon)

Exploded View Of FFF ND 15-50 Valves With Ø 70-80 mm Servo Control Manufactured Up To 1993



Dwg. No. 980487 Rev.: 00

5.16 Spare Parts For FFF Valves Manufactured Up To 1996.

GROUP 104 (ND 15-50)
Position 1 – 2
Valves manufactured up to 1996

Ø 70 Piston air side spare parts (without spring)

SPARE PART CODE		**3424**					
P. N°	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP7065					
17	2	OR02025GA					
20	1	OR03256GA					

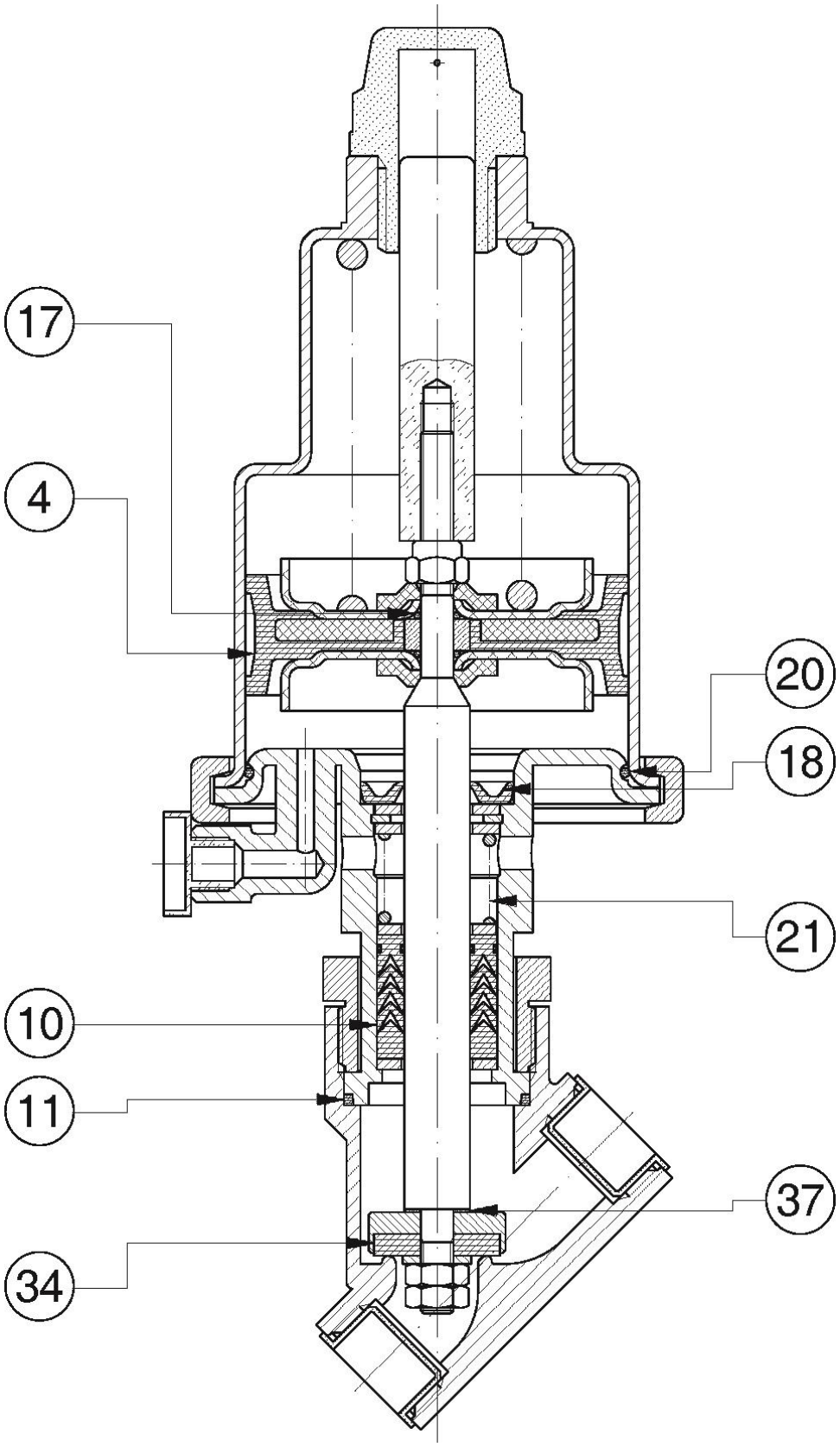
Ø 80 Piston air side spare parts (without spring)

SPARE PART CODE		**3425**			
P. N°	Q.ty	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP8073			
17	2	OR02031GA			
20	1	OR03300GA			

Body side spare parts

SPARE PART CODE		**5252**	**5253**	**5254**	**5255**	**5256**	**5257**
P. N°	Q.	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
10	1	PT01222TG					
11	1	GCVF950046	GCVF950047	GCVF950048	GCVF950049	GCVF950050	GCVF950051
18	1	BA0V12284					
21	1	MTD088149					
34	1	TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
37	1	GD0090275	GD0001465				

Exploded View Of FFF ND 15-50 Valves With Ø 70-80 mm Servo Control Manufactured From 1996 to 2002



Dwg. No. 030809 Rev.: 00

5.17 Spare Parts For FFF ND 15-50 N. C. V.D. Valves With Ø 70-80 mm Servo Control From 1996 to 2002.

GROUP 104 (ND 15-50)
Position 3 – 5 – 6
Valves manufactured from 1996 to 2002

Ø 70 Piston air side spare parts (without spring)

SPARE PART CODE		**3424**					
P. N°	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP7065					
17	2	OR02025GA					
20	1	OR03256GA					

Ø 80 Piston air side spare parts (without spring)

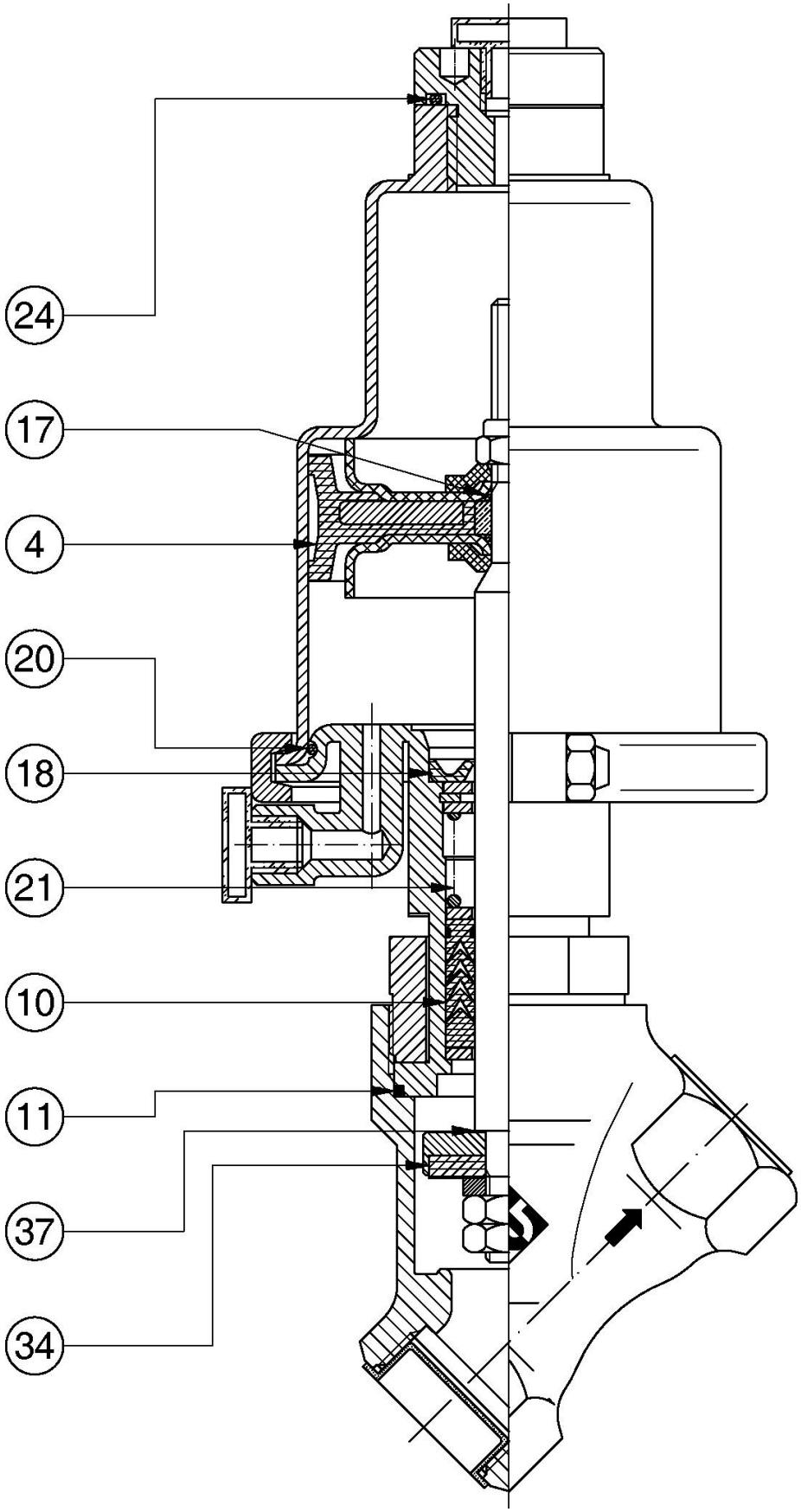
SPARE PART CODE		**3425**			
P. N°	Q.ty	ND 25	ND 32	ND 40	ND 50
4	1	TDUOP8073			
17	2	OR02031GA			
20	1	OR03300GA			

Body side spare parts

SPARE PART CODE		**TC**	**5246**	**5247**	**5248**	**5249**	**5250**	**5251**
		CT	**5252**	**5253**	**5254**	**5255**	**5256**	**5257**
P. N°		Q.	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
10		1	PT01222TG					
11		1	GCVF950946	GCVF950947	GCVF950948	GCVF950949	GCVF950950	GCVF950951
18		1	BA0V12284					
21		1	MTD088149					
34	**TC**	1	TDRD90331	TDRD90332	TDRD90333	TDRD90334	TDRD90335	TDRD90336
	CT	1	TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
37		1	GD0090275	GD0001465				

TC= seal with cap in PTFE-coated EPDM
CT= seal with cap in carbon-loaded PTFE

Exploded View Of FFF ND 15-50 Double Acting Valves With Ø 70-80 mm Servo Control Manufactured From 1998 to 2002



Dwg. No. 980492 Rev.: 00

5.18 Spare parts For FFF Double Acting Valves From 1998 to 2002.

GROUP 104 (ND 15-50)
Position 8
Valves manufactured from 1998 to 2002

Ø 70 Piston air side spare parts (without spring)

SPARE PART CODE		**5374**					
P. N°	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
4	1	TDU070DLNB					
17	2	OR02025GA					
20	1	OR03256GA					
28	1	533					

Ø 80 Piston air side spare parts (without spring)

SPARE PART CODE		**5375**			
P. N°	Q.ty	ND 25	ND 32	ND 40	ND 50
4	1	TDU080DLNB			
17	2	OR02031GA			
20	1	OR03300GA			
28	1	533			

Body side spare parts

SPARE PART CODE	**TC**	**5376**	**5377**	**5378**	**5379**	**5380**	**5381**
	CT	**5240**	**5241**	**5242**	**5243**	**5244**	**5245**
P. N°	Q.	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
10	1	PT01222TG					
11	1	GCVF950946	GCVF950947	GCVF950948	GCVF950949	GCVF950950	GCVF950951
21	1	MTD088149					
34 **TC**	1	TDRD90331	TDRD90332	TDRD90333	TDRD90334	TDRD90335	TDRD90336
34 **CT**	1	TTEF960052	TTEF960053	TTEF960054	TTEF960055	TTEF960056	TTEF960057
37	1	GD0090275	GD0001465				

TC= seal with cap in PTFE (Teflon)-coated EPDM
CT= seal with cap in carbon-loaded PTFE (Teflon)

6 Table 4: Tightening Torques

Combination of components		Tightening torque for FFF valve threaded couplings [$Kg_f \cdot m$]							
		ND 8	ND 11	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50
P. 9 and P. 13		17.0							
P. 9 and P. 23		17.0			28.0	36.5	50.0		
P. 26 and P. 12		0.40							
P. 24 and P. 13	SERV. Ø 32	5.7							
	SERV. Ø 70 - 80			10					
P. 35 and P. 36				0.6	1.4				2.8
P. 42 and P. 51				0.6					
System connections		1.6	2.6	4.2	7.0	12.0	20.0	25.0	50.0

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.

WARNINGS:.

- Safety conditions ca not be warranted and wrong workings can not be attributed to our valves if:
  - Disassembly, assembly and maintenance operations are not carried out following the instructions described in this manual.
  - Original spare parts are not used.
- It is forbidden to remove pages from this document or to make any correction.
- ITALVALVOLE® S.A.S. reserves the right to make modification 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.