GRS/10 VALVES
FAMILY 01 – GROUP 130 - 131 - 132 - 133

Master handbook description: Guide to selection, use and maintenance of GRS/10 cast iron valves (English)

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DICHIARAZIONE DI CONFORMITA' UE

DECLARATION OF UE CONFORMITY

Mod: 704
Rev: 00
Data: 05/07/2016

VALVOLE PNEUMATICHE SERIE GRS

GRS SERIES PNEUMATIC VALVES

(in tutte le sue configurazioni / *in all their configurations*)

ITALVALVOLE® s.a.s. di Spadon Oscar & C. dichiara che l'intera gamma dei prodotti è stata progettata e costruita in accordo a quanto indicato nell'ALLEGATO I della direttiva UE:

ITALVALVOLE® *s.a.s. of Spadon Oscar & C. declare that all products it was engineered and built in according as indicated on Annex 1 of the directive UE:*

2014/68/UE

CLASSIFICAZIONE DELLE VALVOLE / *CLASSIFICATION OF THE VALVES*

CATEGORIA I per fluidi del gruppo **II** - ***CATEGORY I*** *for fluids group* ***II***

Secondo valutazione di conformità descritte dall' allegato III (MODULO A)
With respect to the conformity described in annex III (MODULE A)

NORME TECHICHE ARMONIZZATE e SPECIFICHE UTILIZZATE:
HARMONISED TECHNICAL STANDARDS and SPECIFICATIONS USED:

UNI EN 1092-1-2 / UNI EN 12266-1-2 / UNI EN 1561 / UNI EN 1563 / UNI EN 10213

ALTRE DIRETTIVE EUROPEE APPLICATE:
OTHER EUROPEAN STANDARDS APPLIED:

2014/34/UE

Marcatura dell'apparecchiatura:
Marking of equipments:

CE Ex II 2 GD c Tx

Certificato numero:
Certification No:

0425 ATEX 1318

ENTE NOTIFICATO – *NOTIFIED BODY*

ICIM S.p.a

Via Don Enrico Mapelli, 75 – 20099 Sesto San Giovanni (MI)

Numero Identificativo dell'Organismo Notificato
Notified Body Identification Number:

0425

LUOGO e DATA - *Place and Date*
Cossato, 19/07/2016

Legale rappresentante
Legal representative

Firmato digitalmente da
OSCAR SPADON
SerialNumber
IT:SPDSCR44M19L436J
C = IT

Table of contents

1 Foreword

GRS/10 valves have been created to further improve a product already consolidated in versions /93 and /06.
With the support of analysis programs such as FLOWorks and COSMOSWorks, our technical staff has been committed in improving fluid-dynamic properties of new valves, re-designing their bodies and shutters to improve their final Kv and provide for better performance to customers.
Valves series GRS/10 are used to shut on/off the flow of overheated water, liquids, gas and steam in pipes.
The opening/closing action of the valve is generated by the pneumatic signal reaching the servomotor (valve pneumatic head) whose inner springs have been calculated to ensure different Δp.
Even though the valve operating principle and its main features are the same (manufacturing structure, dimensions,power and control forces in servo control have remained unchanged) (ΔP), ITALVALVOLE® has focused on the quality of materials.

- **The special feature of the new version is the integration of intermediate body into the frame, to reduce possible misalignment between seat and shutter.**
- **Stroke indicator, microfused in AISI 304, replaces the pressed washer and indication arrow provides clearer and immediate reading of valve stroke.**
- **2-way version of this series is delivered with guided shutter in both upper (intermediate body) and lower (seat) part. This measure ensures a longer life of sealing components, also in heavy-duty conditions.**
- **Shutters have been fully renewed and calculated by FloWorks program. This study has allowed improving performance of typical flow rate curve according to different (linear and equipercentage) profiles as shown in the following diagrams.**

ITALVALVOLE® GRS/10 series on/off valves supplied are normally closed (N.C.) (air opening) or normally open (N.O.) (air closing).
Anyway, since servomotor is reversible, it can transform a N.C. valve into N.O. valve or viceversa by simply replacing the spring and a few parts.

2 Legend

- $\Delta p_{allowable}$ (allowable differential pressure): maximum allowable value, at a given temperature, of the static differential pressure of a valve in closed position (EN 7363 : 1997).
- **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 (UNI EN 764 : 1997).
- **DN:** is an alphanumeric designation of size for components of a pipework system, which is used for reference purposes.
  It comprises the letters DN followed by a dimensionless whole number which is indirectly related to the physical dimension, expressed in millimetres, of the hole or of the outer diameter of the ends of connection pipes (ISO 6708: 1995).
- **Kv**: flow rate, expressed in cubic m^3/h, of water (10 to 25 °C with a volume equal to 1000 Kg/m^3), 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 flow rate in m^3/h (UNI 9753: 1990).

3 Inquiries

In case of specific needs or doubts, please contact our technical office after filling in the form below and the suitable type of valve to be used will be communicated to you.

DATA REQUIRED:

DN_____ PN 16
Two-way☐ Three-way deviation☐
Control pressure_____
Shutter ☐ linear
☐ same percentage
☐ with silencer
Body material ☐ grey cast iron ☐ spheroid cast iron
Valve action ☐ normally closed
☐ normally open
Operating fluid_____ Specific weight_____Kg/m^3
Maximum flow rate_____ Kg/h _____m^3/h
Pressure upstream the valve _____bars
Pressure downstream the valve _____bars
Fluid temperature in °C _____
Intermediate body ☐ standard
☐ with bellows
With handwheel ☐

4 Technical features

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

DN: ⇒ 15 – 20 – 25 – 32 – 40 – 50 – 65 – 80

Connections: ⇒ flanged according to PN 16 under EN 1092-2

Pmax all.: ⇒ 16 bars

Pmin all.: ⇒ 0 bar

Seal: ⇒ PEEK, metal and stellited (the stellited seat is suggested for $\Delta p>10$ bar)

Seal class: ⇒ Level A for PEEK seal, Level B for metal and stellited seal

Shutter features: ⇒ linear

Body material: ⇒ EN-GJL-250 and EN-GJS-500-7

Tmax all.: ⇒ +200°C with all seal (standard version)
+250°C with PEEK with safety bellows and body in EN-GJS-500-7
+300°C with metal and/or stellited seal, with safety bellows and body in EN-GJS-500-7.

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

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

Air connection: ⇒ quick joint for RILSAN pipes Ø 6/4

Supply fluid: ⇒industrial air

Supply pipes: ⇒pipe inner diameter = 4 mm, min. outdoor diameter = 6 mm, able to bear the supply Pmax under the environmental conditions of the plant where the valve is fitted.

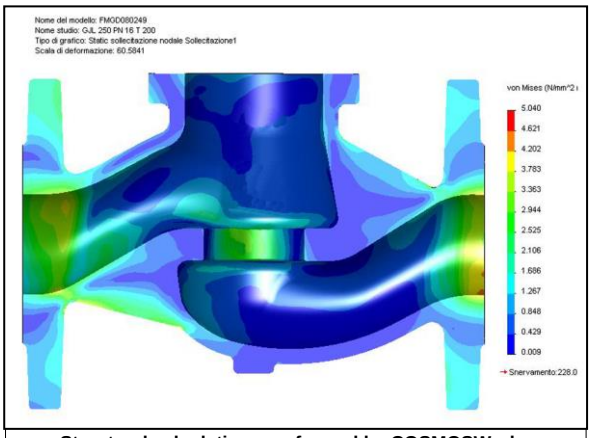
Supply P (supply): ⇒ 6 bar

Versions: ⇒ normally closed, normally open (for three-way, it is considered as normally open when square way is open), with or without bellows, with or without emergency handwheels, with cage on shutter to reduce noise level

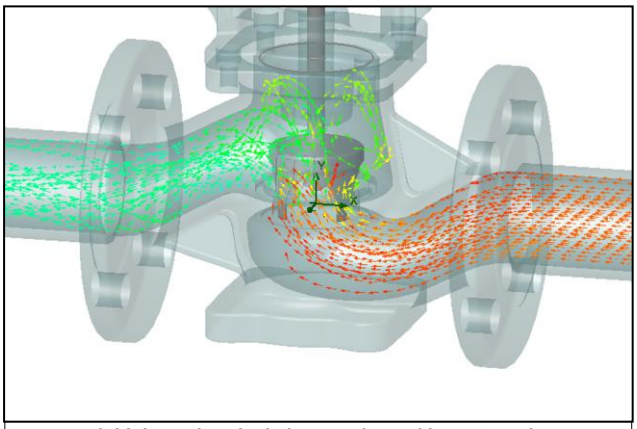
Manufacturing materials: see drawings and relevant tables

Overall dimensions: ⇒ see overall dimensions drawings and relevant tables

4.1 Examples of design calculations



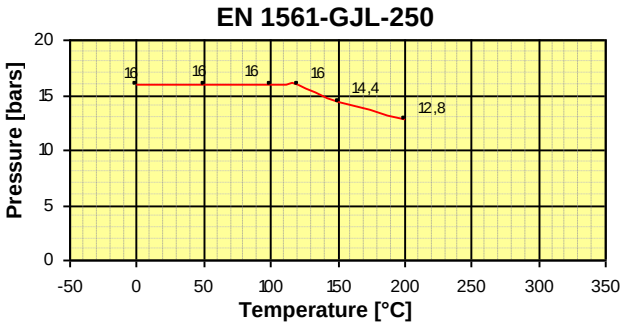
Structural calculations performed by COSMOSWorks

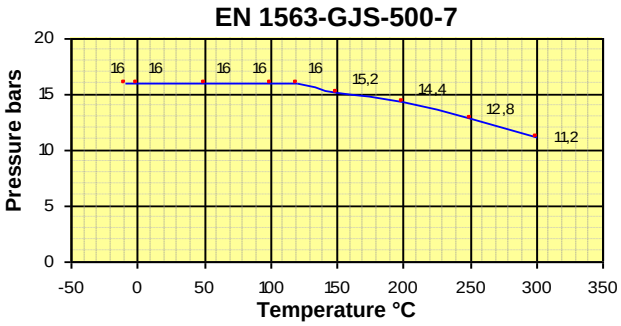


Fluid dynamic calculations performed by FLOWorks

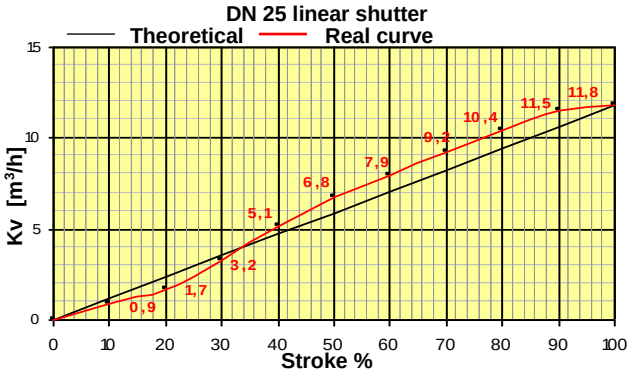
4.2 Pressures/Temperatures diagram

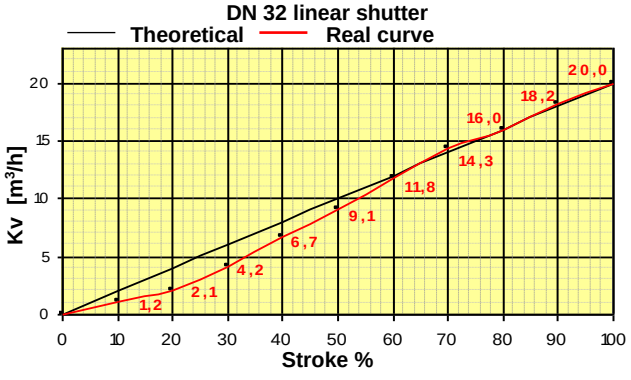
Pressure/temperature ratios of GRS/10 cast iron bodies

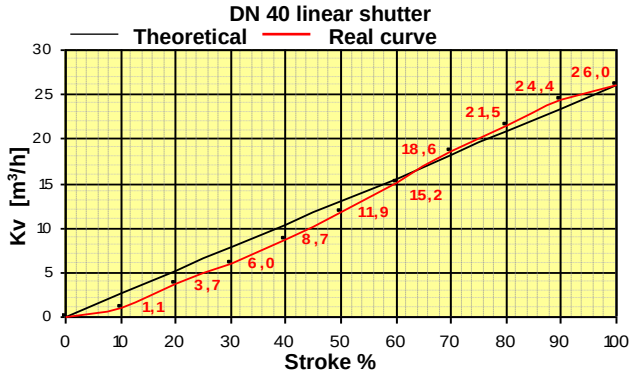


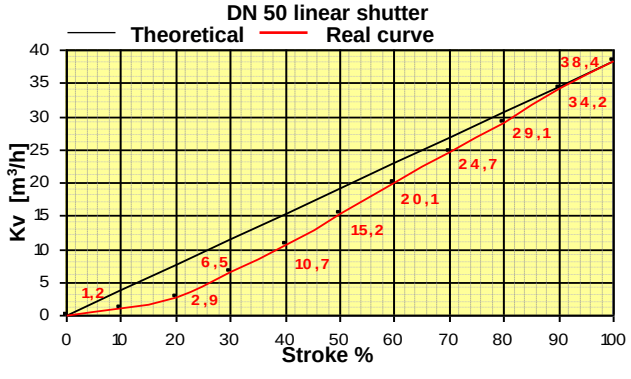


4.3 Example of linear shutters features of SBS/10 valves stroke 15









4.4 Table 1: Compatible Fluids

Type of fluid	Comp.	Type of fluid	Comp.
Linoleic acid	YES	Magnesium hydroxide	YES
Nitric acid HNO_3 anhydrous	YES	Animal oil	YES
Fresh water H_2O	YES	Lubricating oil	YES
Ammonia NH_3 aqueous	YES	Caustic soda NaOH 5%	YES
Ammonia NH_3 solution	YES	Caustic soda NaOH 20% E (1)	YES
Air	YES	Caustic soda NaOH 50% E (1)	YES
Nitrogen N liquid	YES	Caustic soda NaOH 75% E (1)	YES
Magnesium bisulphate	YES	Sodium carbonate Na_2CO_3 5%	YES
Ethylene glycol	YES	Steam 200° (2)	YES
Propylene glycol	YES		

(1) "E" means "ebollizione", i.e. boiling

(2) In versions where temperature cannot reach such value

All data in table 1, if not otherwise specified, is relevant at a temperature of 21°C.
All data have a general meaning and are not valid for all possible working conditions. These data may considerably vary depending upon various conditions, such as: temperature, concentration, fluid speed.
For detailed information, please get in touch with the technical department.
Any use of the valve on explosive, easily inflammable, comburant 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.

4.5 T able 2: Δp of GRS/10 2-way valves without bellows

DN	Φ seat [mm]	Stroke [mm]	Linear shutter Kvs(1)	Linear shutter CV	Φi Servocontrol [mm]	Δp Valve N.C. VALVES Min control pressure BAR 2	Δp Valve N.C. VALVES Min control pressure BAR 4	Δp Valve N.C. VALVES Min control pressure BAR 6	Δp Valve N.O. VALVES Min control pressure BAR 2	Δp Valve N.O. VALVES Min control pressure BAR 4	Δp Valve N.O. VALVES Min control pressure BAR 6	VALVE DEFINITION No
						Valve definition letters A	Valve definition letters B	Valve definition letters C	Valve definition letters M	Valve definition letters N	Valve definition letters O	
15	3	15	UT	UT	70	16	16	16	16	16	16	1
	6	15	UT	UT		16	16	16	16	16	16	2
	15	15	4,3	5		16	16	16	16	16	16	3
	20	15	5	5,8		11	15	15	13	16	16	30
20	8	15	UT	UT	70	16	16	16	16	16	16	4
	15	15	6	7		16	16	16	16	16	16	5
	20	15	8	9,3		11	15	15	13	16	16	6
25	15	15	5,4	6,3	70	16	16	16	16	16	16	7
	20	15	9,3	10,8		11	15	15	13	16	16	8
	26	15	11,8	13,7		7	10	10	8	16	16	9
32	20	15	9,6	11,2	80	14	16	16	16	16	16	10
	26	15	14,5	16,9		12	16	16	14	16	16	11
	31	15	20	23,3		7,5	15	16	8	16	16	12
40	26	15	16,5	19,2	80	12	16	16	14	16	16	13
	31	15	21,9	25,5		7,5	15	16	8	16	16	14
	38	15	26	30,2		5	10	14	5,5	14	16	15
50	31	15	22,1	25,7	80	7,5	15	16	8	16	16	16
	38	15	27,6	32,1		5	10	14	5,5	14	16	17
	48	15	38,4	44,7		3	6	9	2	7	11.5	18
65	38	15	27,9	32,4	125		14	16		14	16	19
	48	15	45,5	53,5			9	16		11	16	20
	63	20	74,8	87,1			3,8	11.5		6,7	12,8	21
80	48	15	43,2	50,3	125		9	16		11	16	22
	63	20	76,6	89,2			3,8	11,5		6,7	12,8	23
	78	20	85,8	99,9			2,2	7,3		4,1	8,1	24

Note: Δp Max symbol has been obtained with no air in head (only NC valves).

(1) The kv has been calculated using the FLOWSimulation fluid dynamics program in accordance with the UNI EN 1267:2001 standard and refers to a 2-way valve

UT: contact our technical deparment.

4.6 T able 3: Δp of GRS/10 2-way valves with bellows

DN	Φ seat [mm]	Stroke [mm]	Linear shutter Kvs(1)	Linear shutter CV	Φi Servocontrol [mm]	Δp Valve N.C. VALVES 2	N.C. VALVES 4	N.C. VALVES 6	Δp Valve N.O. VALVES 2	N.O. VALVES 4	N.O. VALVES 6	VALVE DEFINITION No
						Valve definition letters						
						A	B	C	M	N	O	
15	3	15	UT	UT	70	6,4	7	7	2	9,7	16	1
	6	15	UT	UT		6,4	7	7	2	9,7	16	2
	15	15	4,3	5		6,3	6,8	6,8	1,8	9,5	16	3
	20	15	5	5,8		6,1	6,8	6,8	1,7	9,5	16	30
20	8	15	UT	UT	70	6,4	7	7	2	9,7	16	4
	15	15	6	7		6,3	6,9	6,9	1,9	9,6	16	5
	20	15	8	9,3		6,1	6,8	6,8	1,7	9,5	16	6
25	15	15	5,4	6,3	70	6,3	6,9	6,9	1,9	9,6	16	7
	20	15	9,3	10,8		6,1	6,8	6,8	1,7	9,5	16	8
	26	15	11,8	13,7		5,5	6	6	1,5	8,5	16	9
32	20	15	9,6	11,2	80	14	16	16	16	16	16	10
	26	15	14,5	16,9		12	16	16	14	16	16	11
	31	15	20	23,3		7,5	15	16	8	16	16	12
40	26	15	16,5	19,2	80	12	16	16	14	16	16	13
	31	15	21,9	25,5		7,5	15	16	8	16	16	14
	38	15	26	30,2		5	10	14	5,5	14	16	15
50	31	15	22,1	25,7	80	7,5	15	16	8	16	16	16
	38	15	27,6	32,1		5	10	14	5,5	14	16	17
	48	15	38,4	44,7		3	6	8,1	3,5	9	14	18
65	38	15	27,9	32,4	125		14	16		14	16	19
	48	15	45,5	53,5			9	16		11	16	20
	63	15	61	71			4,6	12,3		7,5	13,6	21
80	48	15	43,2	50,3	125		9	16		11	16	22
	63	15	62,2	72,4			4,6	12,3		7,5	13,6	23
	78	15	61,9	72,1			3,5	8,1		4,9	8,9	24

Note: Δp Max symbol has been obtained with no air in head.

(1) The kv has been calculated using the FLOWSimulation fluid dynamics program in accordance with the UNI EN 1267:2001 standard and refers to a 2-way valve

UT: contact our technical deparment.

4.7 T able 4: Δp of GRS/10 2-way, enhanced

						Δp Valve		VALVE DEFINITION No
						N.C. VALVES	N.O. VALVES	
Min control pressure BAR						6	6	
DN	**Φ seat [mm]**	**Stroke [mm]**	**Linear shutter**		**Φi** Servocontrol **[mm]**	Valve definition letters		
			Kvs(1)	**CV**		C	O	
15	3	15	UT	UT	80	16	16	1M
	6	15	UT	UT		16	16	2M
	15	15	4,3	5		16	16	3M
	20	15	5	5,8		16	16	30M
20	8	15	UT	UT	80	16	16	4M
	15	15	6	7		16	16	5M
	20	15	8	9,3		16	16	6M
25	15	15	5,4	6,3	80	16	16	7M
	20	15	9,3	10,8		16	16	8M
	26	15	11,8	13,7		16	16	9M
32	20	15	9,6	11,2	125	16	16	10M
	26	15	14,5	16,9		16	16	11M
	31	15	20	23,3		16	16	12M
40	26	15	16,5	19,2	125	16	16	13M
	31	15	21,9	25,5		16	16	14M
	38	15	26	30,2		16	16	15M
50	31	15	22,1	25,7	125	16	16	16M
	38	15	27,6	32,1		16	16	17M
	48	15	38,4	44,7		16	16	18M
65	38	15	27,9	32,4	160	16	16	19M
	48	15	45,5	53,5		16	16	20M
	63	20	74,8	87,1		16	16	21M
80	48	15	43,2	50,3	160	16	16	22M
	63	20	76,6	89,2		16	16	23M
	78	20	85,8	99,9		13	16	24M

Note: Δp Max symbol has been obtained with no air in head.

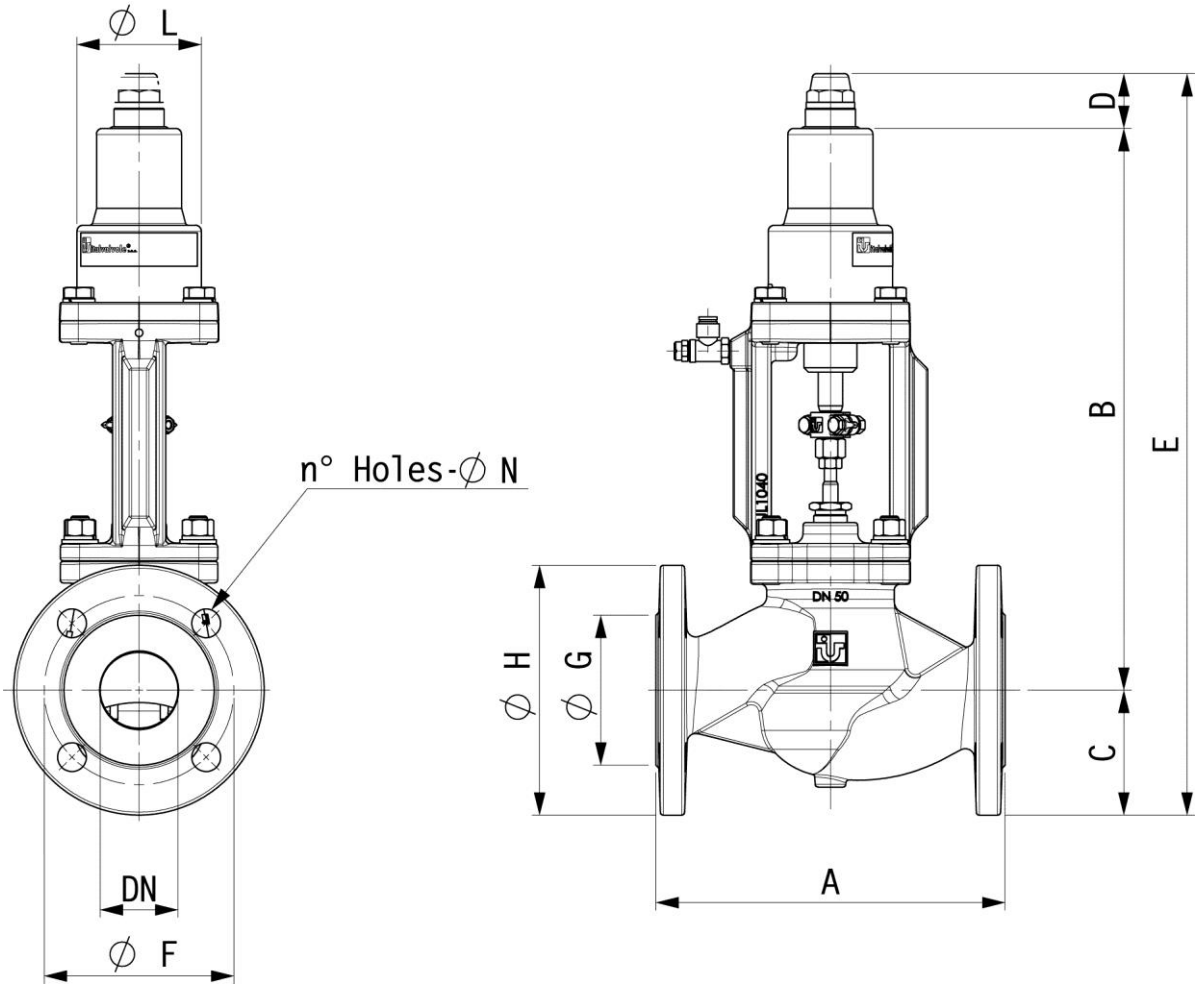
(1) The kv has been calculated using the FLOWSimulation fluid dynamics program in accordance with the UNI EN 1267:2001 standard and refers to a 2-way valve

4.8 Safety Notes

- The valve body, under maximum usage temperature conditions depending on the plant, can reach T=200°C (GJL-250) or T=300°C (GJS-500-7). It is up to the engineer to provide the system with the necessary safety guards and/or warning signals with the purpose to remove/indicate the risk of any burns to the user (if any).
- During any operation on the valve, the fluid shall not be present inside the piping or the valve.

4.9 Overall dimensions of GRS/10 CAST IRON VALVES

4.9.1 GRS/10 2 WAY D.V.

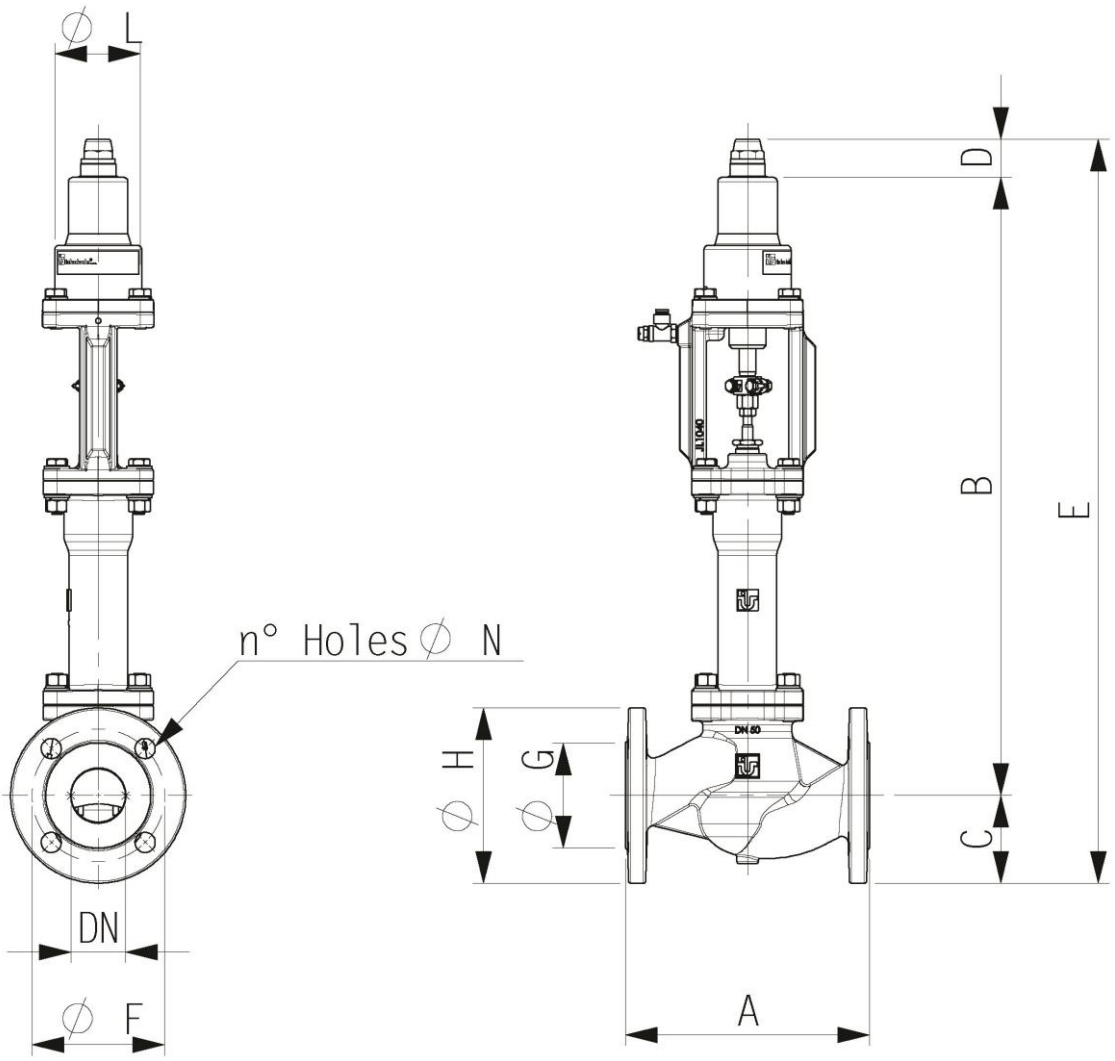


Drawing No. 090183 Rev.:00

DN	A	B				C	D				E				Ø F	Ø G	Ø H	Ø N	No. of holes
		L					L				L								
		70	80	125	160		70	80	125	160	70	80	125	160					
15	130	327	370			47,5	36	36			410,5	453,5			65	45	95	14	4
20	150	327	370			52,5	36	36			415,5	458,5			75	58	105	14	4
25	160	327	370			57,5	36	36			420,5	463,5			85	65	115	14	4
32	180		375	435		70		36	60,5			481	565,5		100	76	140	19	4
40	200		372	432		75		36	60,5			483	567,5		110	84	150	19	4
50	230		372	432		82,5		36	60,5			490,5	575		125	99	165	19	4
65	290			486	516	92,5			60,5	60,5			639	669	145	118	185	19	4
80	310			485	515	100			60,5	60,5			645,5	675,5	160	132	200	19	8

Dimensions are in millimetres

4.9.2 GRS/10 2 WAY D.V. with bellows

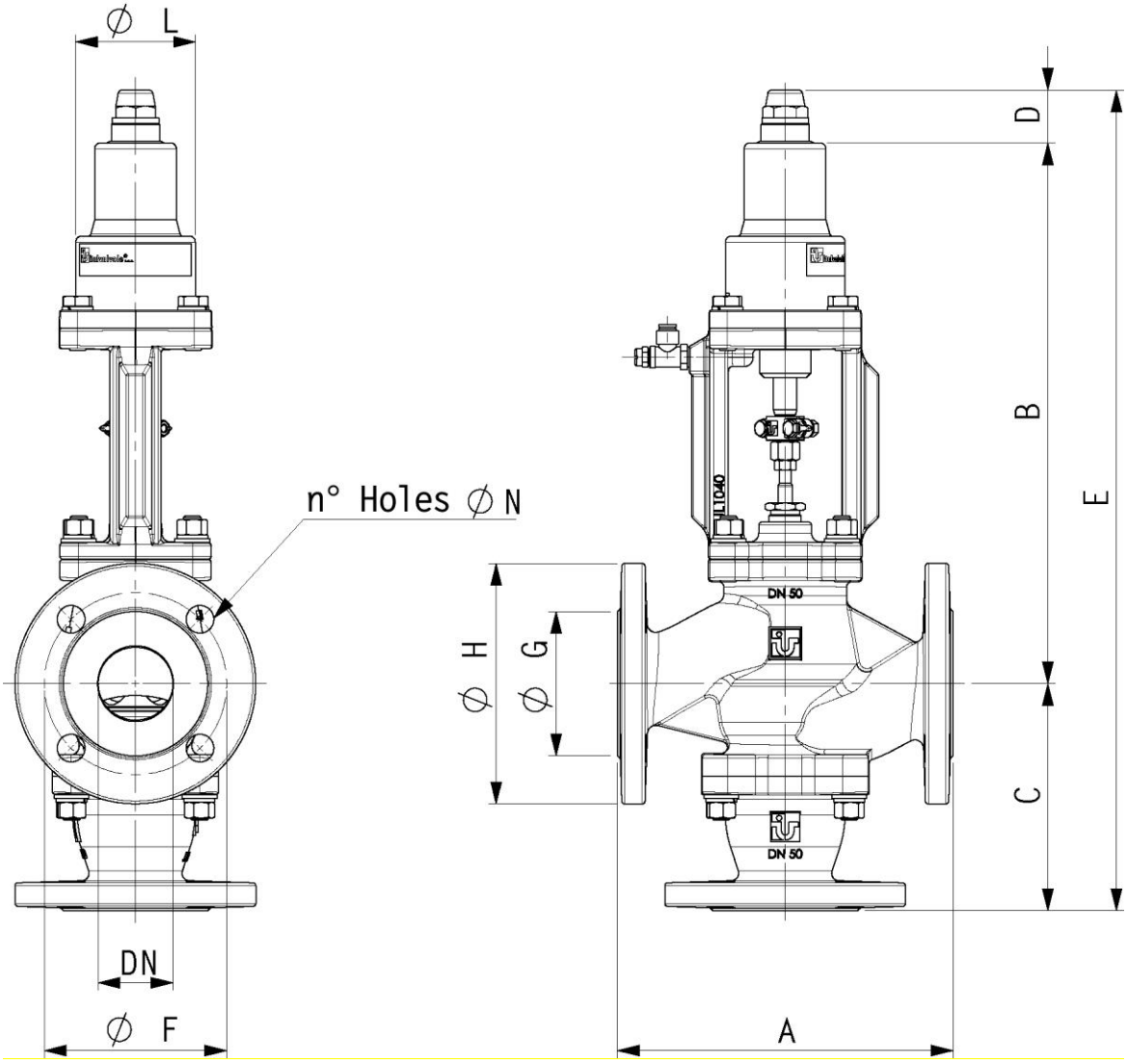


Drawing No. 090942 Rev.:00

DN	A	B				C	D				E				Ø F	Ø G	Ø H	Ø N	No. of holes
		L					L				L								
		70	80	125	160		70	80	125	160	70	80	125	160					
15	130	527	570			47,5	36	36			610,5	653,5			65	45	95	14	4
20	150	527	570			52,5	36	36			615,5	658,5			75	58	105	14	4
25	160	527	570			57,5	36	36			620,5	663,5			85	65	115	14	4
32	180		585,5	645,5		70		36	60,5			691,5	776		100	76	140	19	4
40	200		582,5	642,5		75		36	60,5			693,5	778		110	84	150	19	4
50	230		582,5	642,5		82,5		36	60,5			701	785,5		125	99	165	19	4
65	290			697	727	92,5			60,5	60,5			850	880	145	118	185	19	4
80	310			696	726	100			60,5	60,5			856,5	886,5	160	132	200	19	8

Dimensions are in millimetres

4.9.3 GRS/10 3 D D.V.

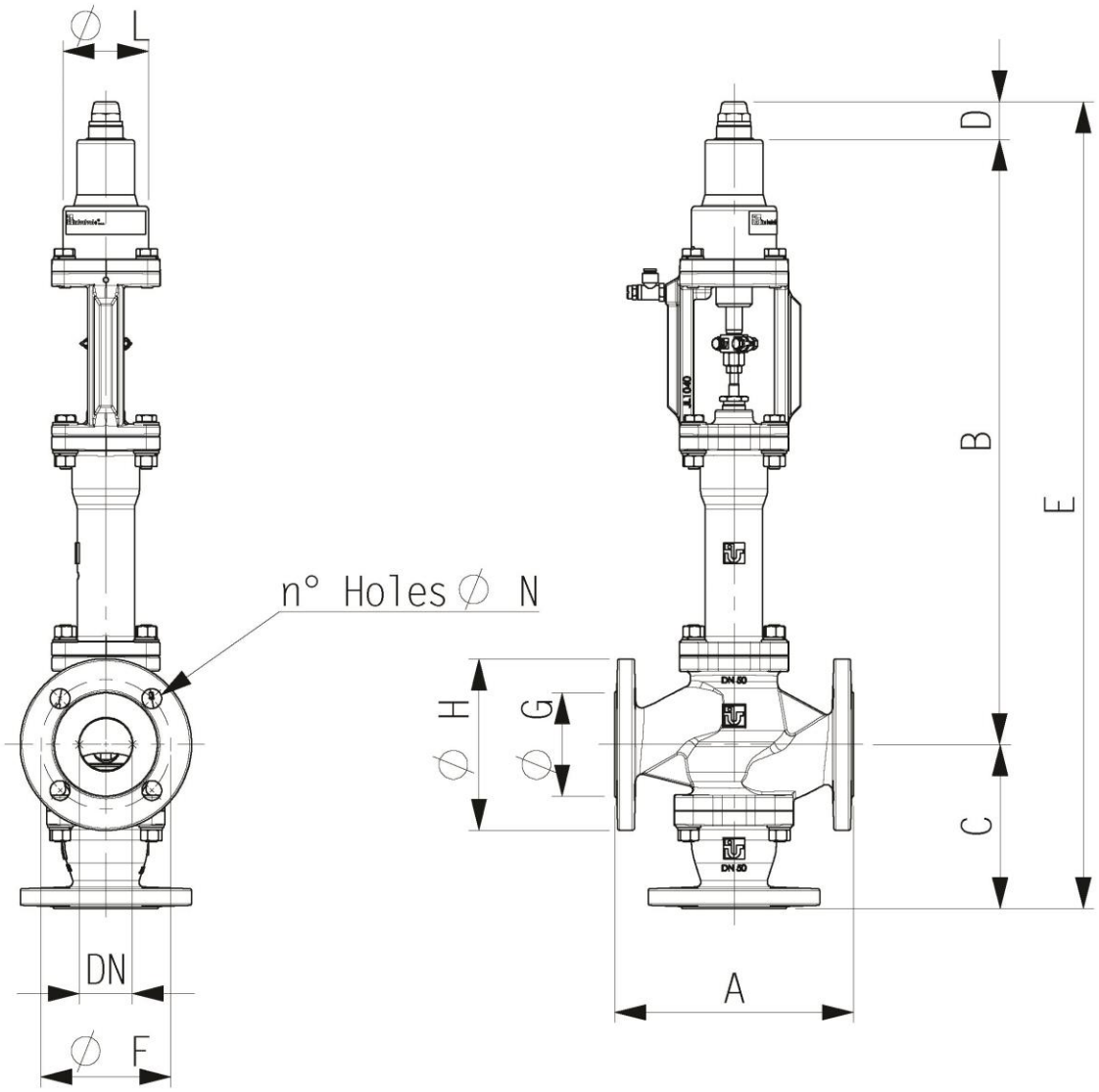


Drawing No. 090184 Rev.:00

DN	A	B				C	D				E				Ø F	Ø G	Ø H	Ø N	No. of holes
		L					L				L								
		70	80	125	160		70	80	125	160	70	80	125	160					
15	130	327	370	/	/	112	36	36	/	/	475	518	/	/	65	45	95	14	4
20	150	327	370	/	/	112	36	36	/	/	475	518	/	/	75	58	105	14	4
25	160	327	370	/	/	125	36	36	/	/	488	531	/	/	85	65	115	14	4
32	180	/	375	435	/	145	/	36	60,5	/	/	556	640,5	/	100	76	140	19	4
40	200	/	372	432	/	145	/	36	60,5	/	/	553	637,5	/	110	84	150	19	4
50	230	/	372	432	/	161	/	36	60,5	/	/	569	653,5	/	125	99	165	19	4
65	290	/	/	486	516	237	/	/	60,5	60,5	/	/	783,5	813,5	145	118	185	19	4
80	310	/	/	485	515	239	/	/	60,5	60,5	/	/	784,5	814,5	160	132	200	19	8

Dimensions are in millimetres

4.9.4 GRS/10 3 D D.V. with bellows

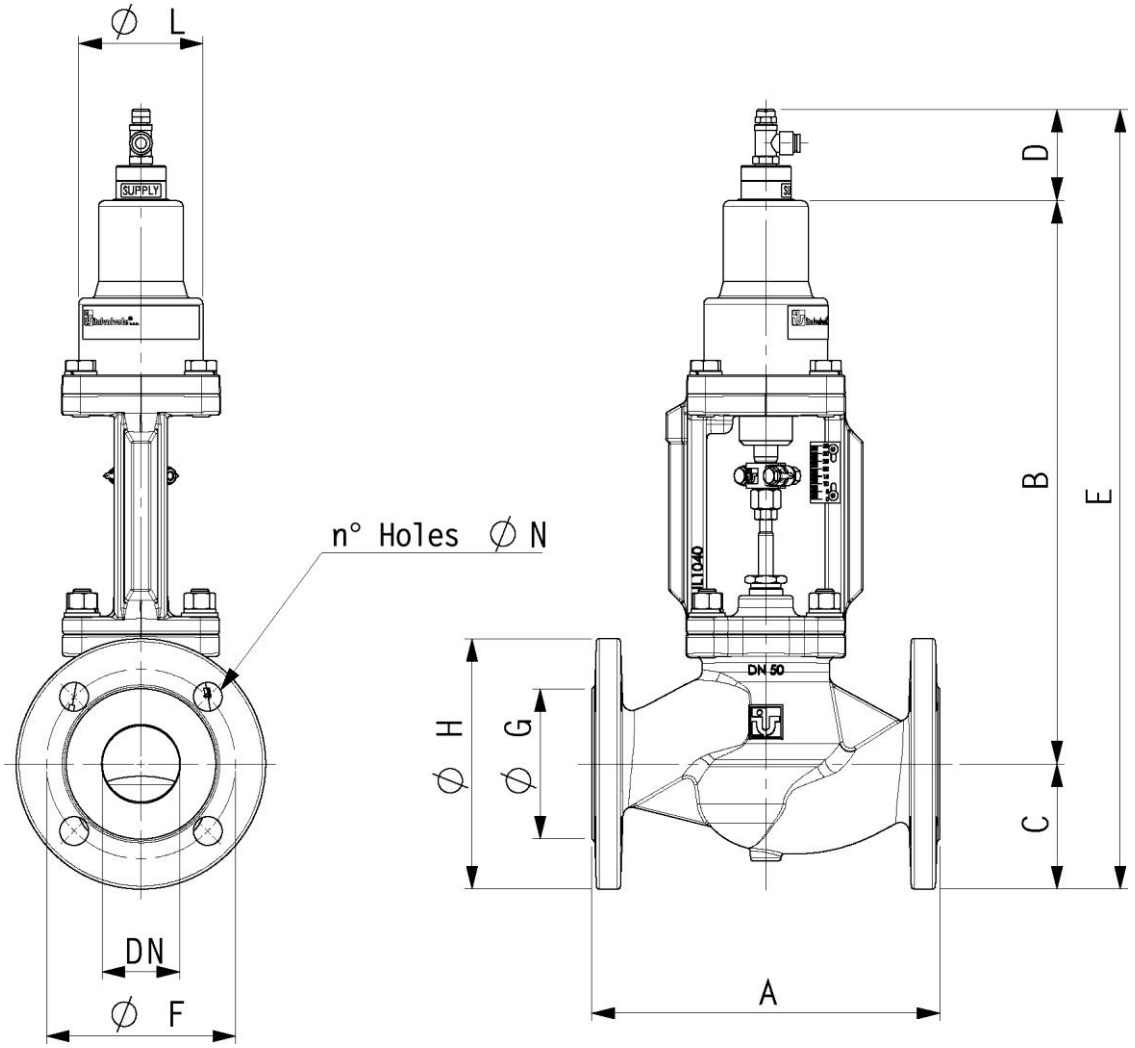


Drawing No.090943 Rev:00

DN	A	B				C	D				E				Ø F	Ø G	Ø H	Ø N	No. of holes
		L					L				L								
		70	80	125	160		70	80	125	160	70	80	125	160					
15	130	527	570			112	36	36			675	718			65	45	95	14	4
20	150	527	570			112	36	36			675	718			75	58	105	14	4
25	160	527	570			125	36	36			688	731			85	65	115	14	4
32	180		585,5	645,5		145		36	60,5			766,5	851		100	76	140	19	4
40	200		582,5	642,5		145		36	60,5			763,5	848		110	84	150	19	4
50	230		582,5	642,5		161		36	60,5			779,5	864		125	99	165	19	4
65	290			697	727	237			60,5	60,5			994,5	1024,5	145	118	185	19	4
80	310			696	726	239			60,5	60,5			995,5	1025,5	160	132	200	19	8

Dimensions are in millimetres

4.9.5 GRS/10 2 WAY N.O.

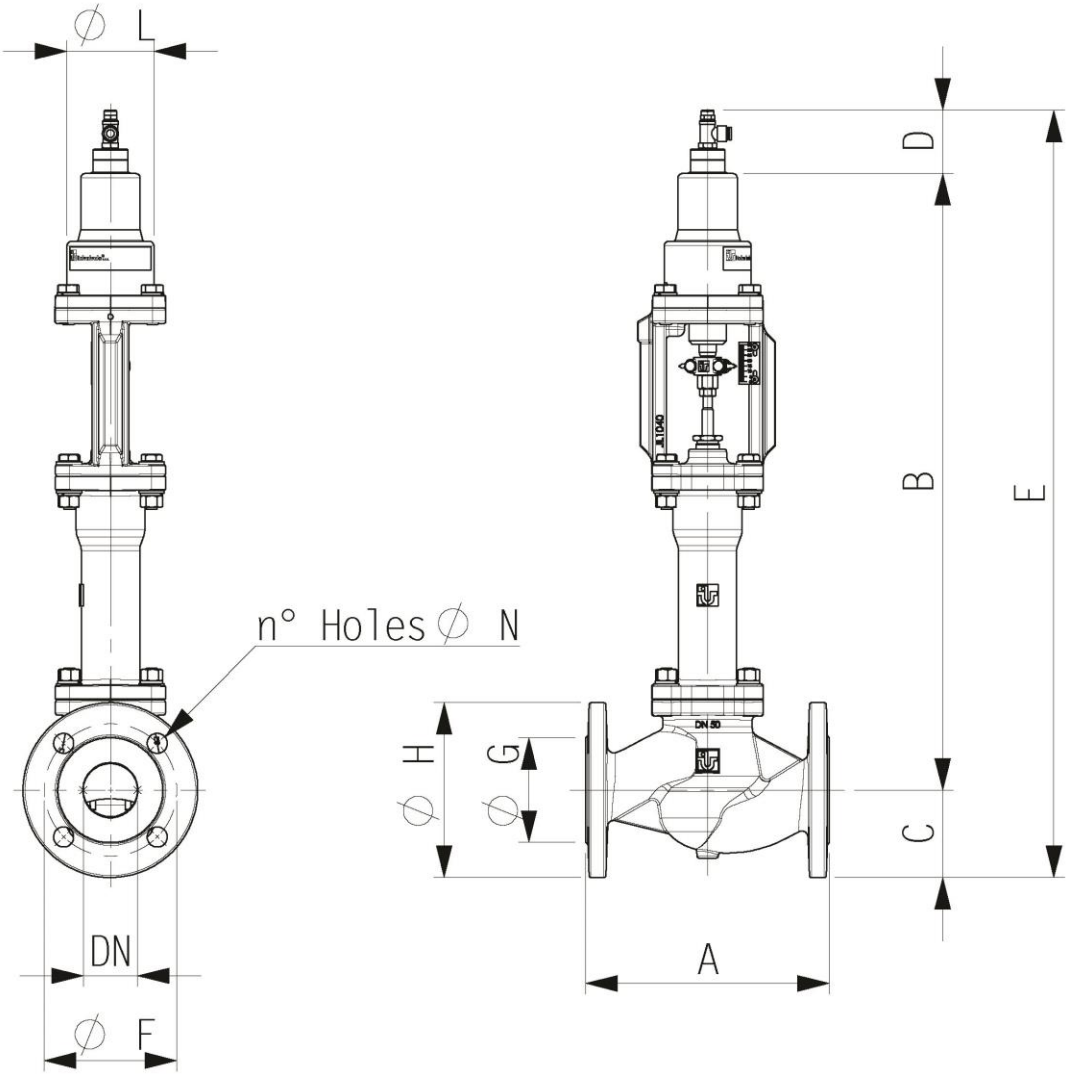


Drawing No. 090185 Rev:00

DN	A	B				C	D				E				Ø F	Ø G	Ø H	Ø N	No. of holes
		L					L				L								
		70	80	125	160		70	80	125	160	70	80	125	160					
15	130	327	370			47,5	54,5	54,5			429	472			65	45	95	14	4
20	150	327	370			52,5	54,5	54,5			434	477			75	58	105	14	4
25	160	327	370			57,5	54,5	54,5			439	482			85	65	115	14	4
32	180		375	435		70		54,5	59			499,5	564		100	76	140	19	4
40	200		372	432		75		54,5	59			501,5	566		110	84	150	19	4
50	230		372	432		82,5		54,5	59			509	573,5		125	99	165	19	4
65	290			486	516	92,5			59	59			637,5	667,5	145	118	185	19	4
80	310			485	515	100			59	59			644	674	160	132	200	19	8

Dimensions are in millimetres

4.9.6 GRS/10 2 WAY N.O. with bellows

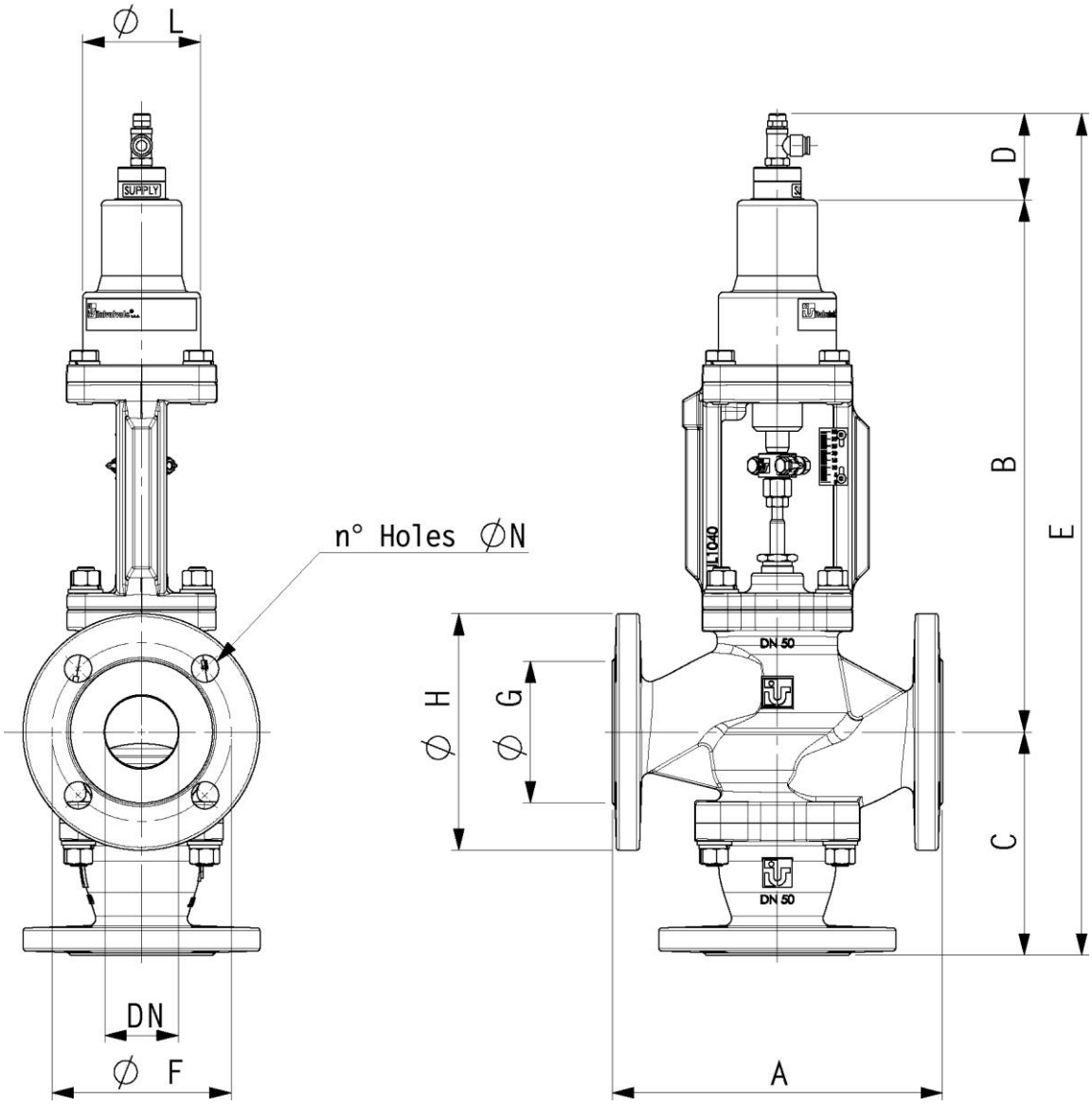


Drawing No. 090944 Rev:00

DN	A	B				C	D				E				Ø F	Ø G	Ø H	Ø N	No. of holes
		L					L				L								
		70	80	125	160		70	80	125	160	70	80	125	160					
15	130	527	570			47,5	54,5	54,5			629	672			65	45	95	14	4
20	150	527	570			52,5	54,5	54,5			634	677			75	58	105	14	4
25	160	527	570			57,5	54,5	54,5			639	682			85	65	115	14	4
32	180		585,5	645,5		70		54,5	59			710	774,5		100	76	140	19	4
40	200		582,5	642,5		75		54,5	59			712	776,5		110	84	150	19	4
50	230		582,5	642,5		82,5		54,5	59			719,5	784		125	99	165	19	4
65	290			697	727	92,5			59	59			848,5	878,5	145	118	185	19	4
80	310			696	726	100			59	59			855	885	160	132	200	19	8

Dimensions are in millimetres

4.9.7 GRS/10 3 D N.O.

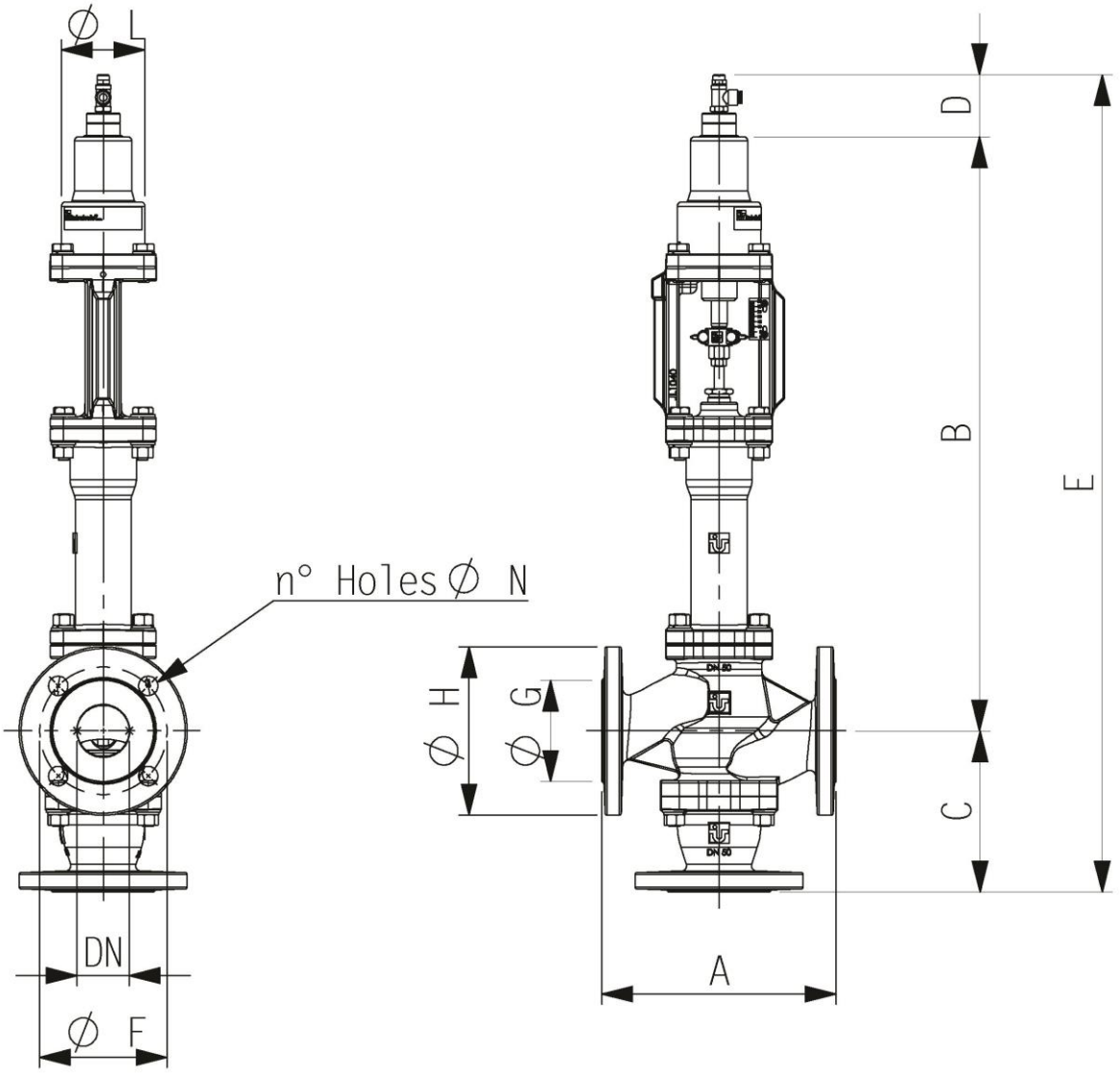


Drawing No. 090186 Rev:00

DN	A	B				C	D				E				Ø F	Ø G	Ø H	Ø N	No. of holes
		L					L				L								
		70	80	125	160		70	80	125	160	70	80	125	160					
15	130	327	370			112	54,5	54,5			493,5	536,5			65	45	95	14	4
20	150	327	370			112	54,5	54,5			493,5	536,5			75	58	105	14	4
25	160	327	370			125	54,5	54,5			506,5	549,5			85	65	115	14	4
32	180		375	435		145		54,5	59			574,5	639		100	76	140	19	4
40	200		372	432		145		54,5	59			571,5	636		110	84	150	19	4
50	230		372	432		161		54,5	59			587,5	652		125	99	165	19	4
65	290			486	516	237			59	59			782	812	145	118	185	19	4
80	310			485	515	239			59	59			783	813	160	132	200	19	8

Dimensions are in millimetres

4.9.8 GRS/10 3 D N.O. with bellows



Drawing No. 090945 Rev:00

DN	A	B				C	D				E				Ø F	Ø G	Ø H	Ø N	No. of holes
		L					L				L								
		70	80	125	160		70	80	125	160	70	80	125	160					
15	130	527	570			112	54,5	54,5			693,5	736,5			65	45	95	14	4
20	150	527	570			112	54,5	54,5			693,5	736,5			75	58	105	14	4
25	160	527	570			125	54,5	54,5			706,5	749,5			85	65	115	14	4
32	180		585,5	645,5		145		54,5	59			785	849,5		100	76	140	19	4
40	200		582,5	642,5		145		54,5	59			782	846,5		110	84	150	19	4
50	230		582,5	642,5		161		54,5	59			798	862,5		125	99	165	19	4
65	290			697	727	237			59	59			993	1023	145	118	185	19	4
80	310			696	726	239			59	59			994	1024	160	132	200	19	8

Dimensions are in millimetres

5 GRS/10 tags description

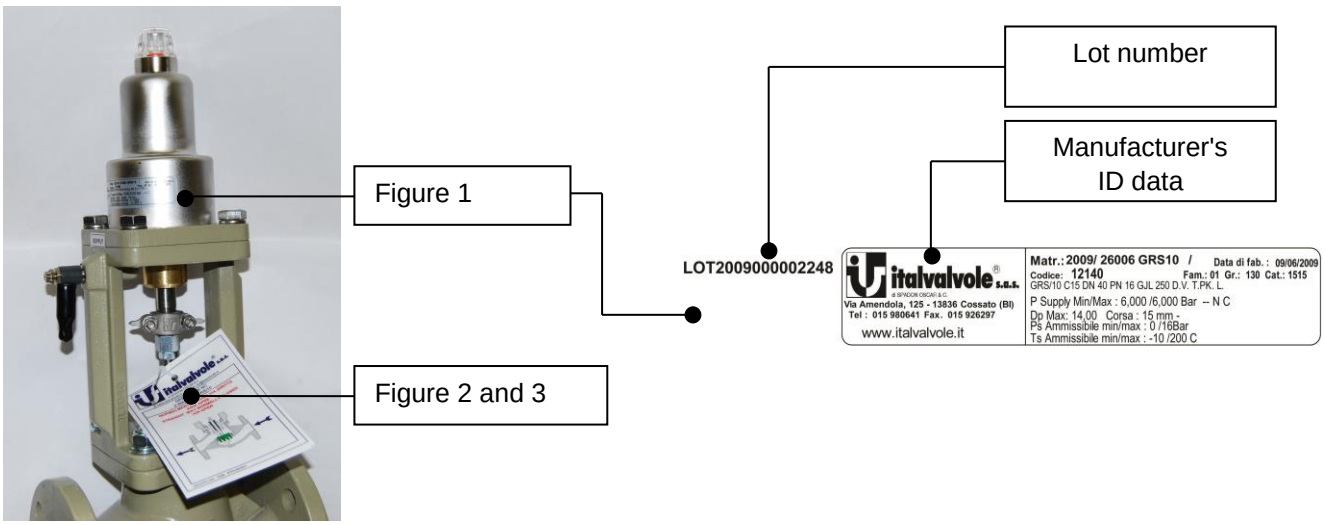


Fig.1 : Technical data of the valves

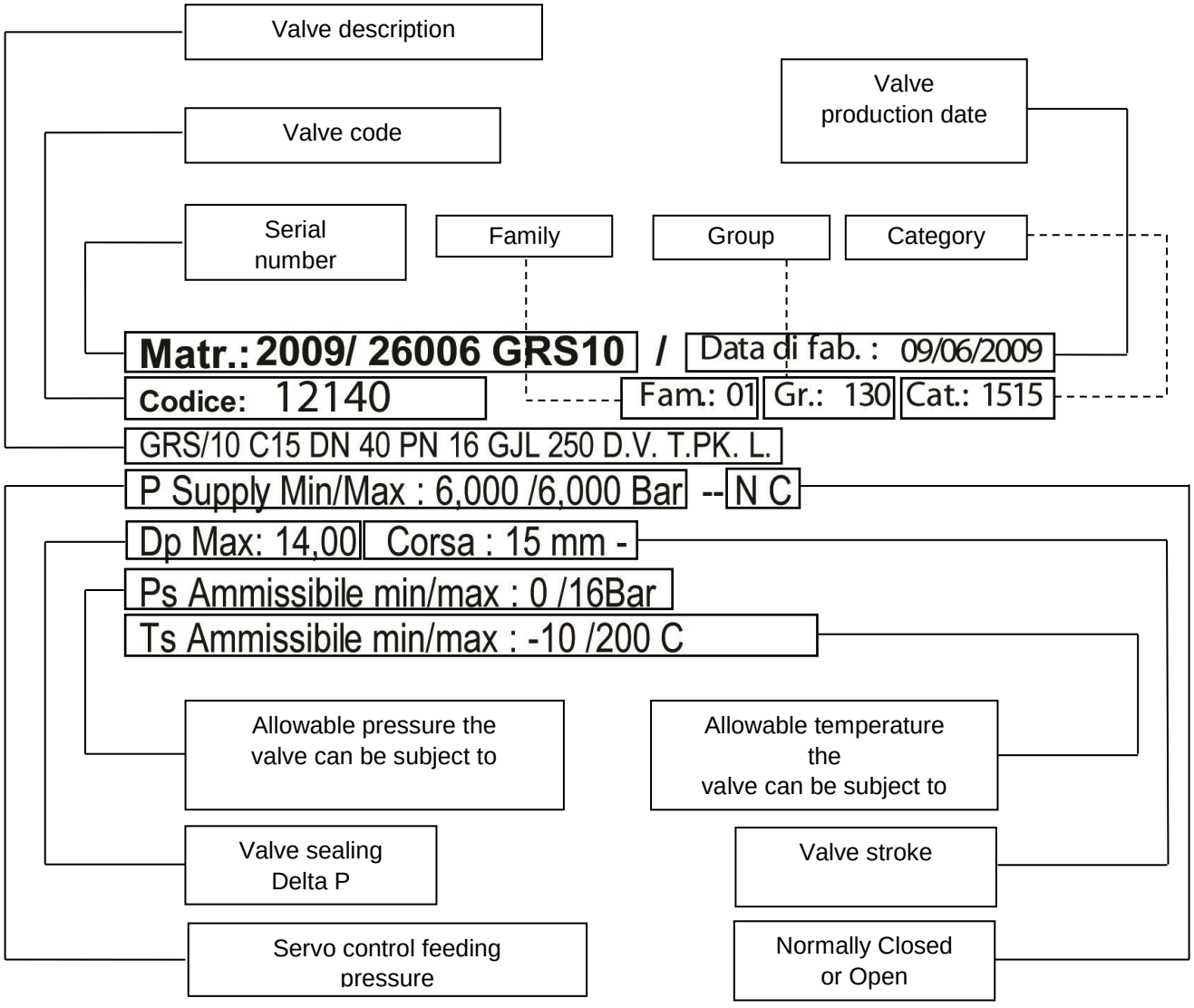
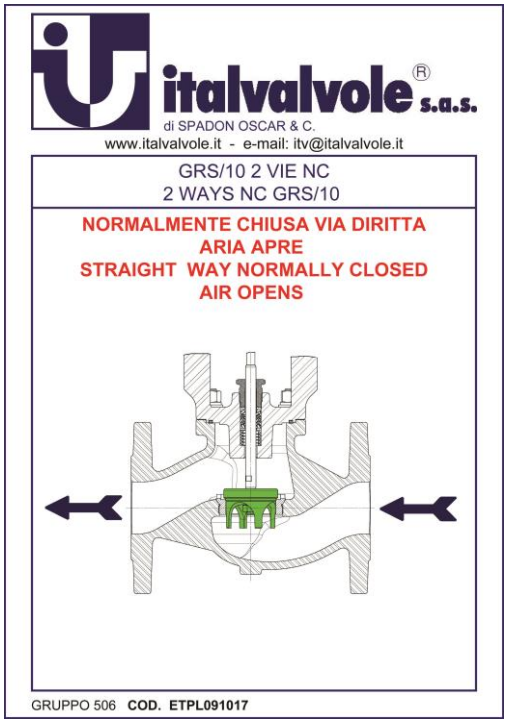


Fig. 2: Front - Proper installation procedure for optimum operation of the GRS/10 2 ways, 3D valves.



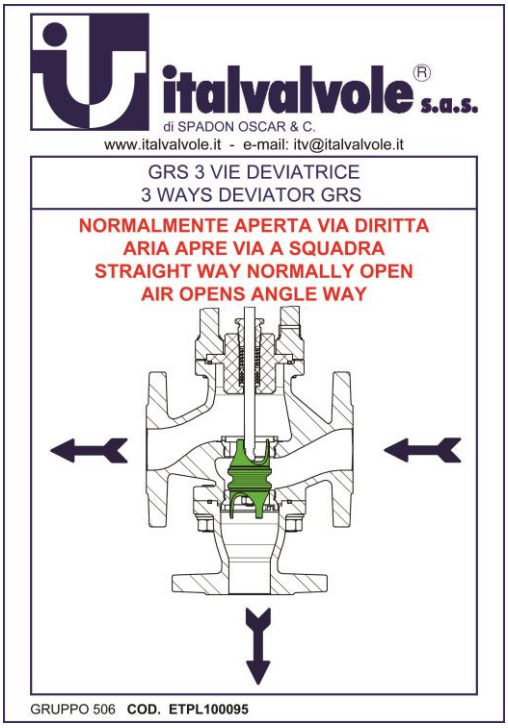
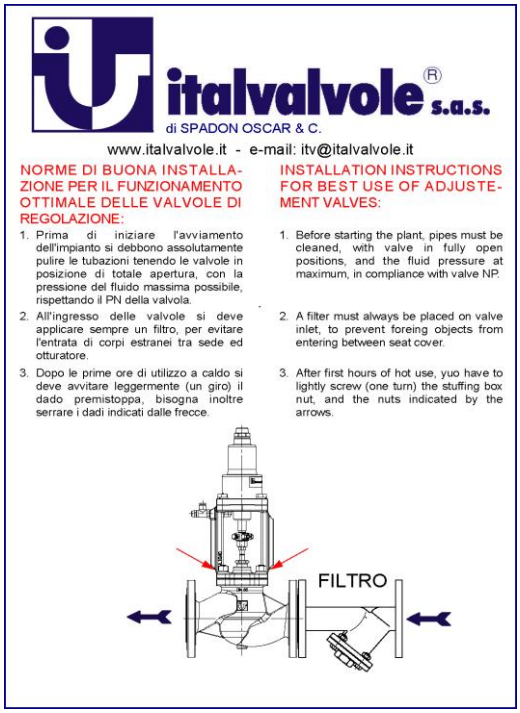
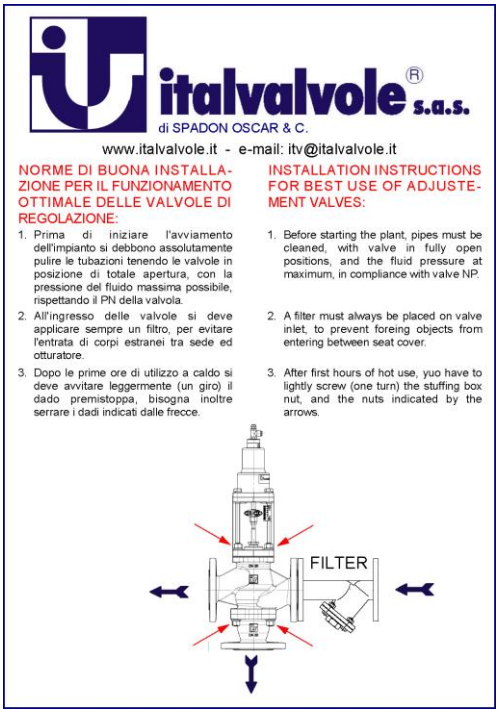


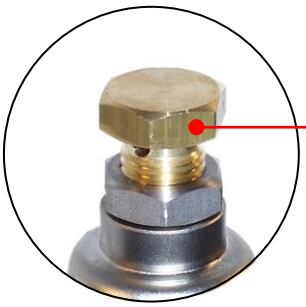
Fig. 3: Back - Proper installation procedure for optimum operation of the GRS/10 2 ways, 3D valves.



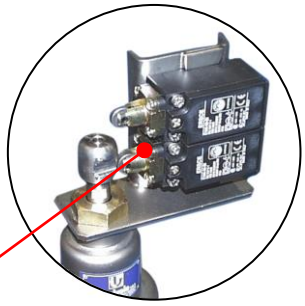


6 Fittings

GRS/10 valves can be supplied with several fittings to satisfy the different needs of the customer.



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

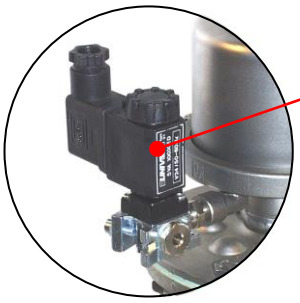


ELECTRIC LIMIT SWITCH
It is actuated from the movement of the shutter stem and detects the valve on/off condition.

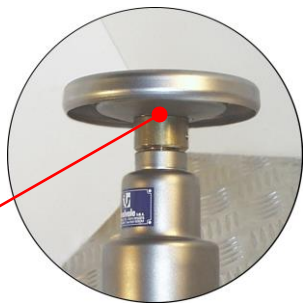
MAGNETIC SENSOR
This sensor enables to detect valve opening or closing: it is activated by a magnet moving with the shutter.

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

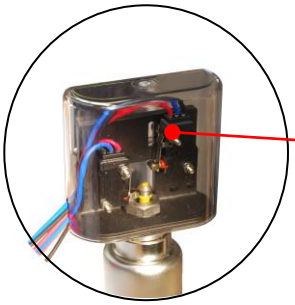
SENSOR BOX
The sensor box is fitted on the upper part of the servo control: electric or pneumatic limit switches can be fitted inside it.



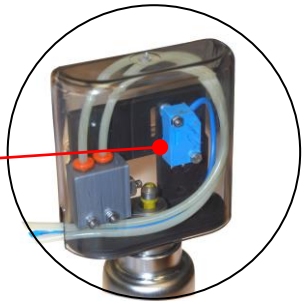
SOLENOID VALVE
The solenoid valve enables to control the opening and closing of the valve by means of an electric input.



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



PLASTIC SENSOR BOX
The sensor box is installed on top of the servo control: it can host electric/pneumatic limit switches, inductive sensors, magnetic sensors, that may detect the valve opening and/or closing position.



7 Storage, Assembly, Check And Maintenance.

7.1 Transport, Storage And Handling.

GRS/10 valves, during transport and assembly, must be handled very carefully. Shocks as well as anomalous stresses must be avoided (do not lift the valve by the servo control).
Avoid shocks and tampering to any accessories the valve may be equipped with (handwheels, solenoid valves, electric pneumatic limit switches or proximity sensors.).
Valves are delivered with dust-proof protections on all connections and these protections must not be removed until they are installed.
Valves shall be stored in areas which are not exposed to the sunshine, so as to prevent inner gaskets from getting dry and old before time.
Storage temperature shall be between 0°C and + 50°C.
Avoid any shock to servo control as they could provoke misalignments and affect valve proper operation.
Comply with specifications on labels.

7.2 Assembly Instructions

7.2.1 General information

Valve installation on the system shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the equipment normally used in the industrial hydraulic and pneumatic plant engineering. The personnel shall always wear proper accident prevention garments, taking particular care to protect face, eyes and hands.
The valve must never be disassembled or modified. Otherwise, warranty is voided.
Please note. Attention: compressed springs are included inside the servo control..
Before assembly, dust-proof protections shall be removed from the valve body.
In case of normally closed servo control, the supply shall be carried out from the lateral air connection; in case of normally open servo control, the supply shall be carried out from the air connection on the top of the servo control; in case of normally open valve, do not remove the protection cap of the unused air connection to avoid the entry of dirt and foreign matters into the servo control.
Compressed air shall be industrial air, with a pressure between 2 and 6 bars depending on the servo control useful values and anyway never exceeding 6 bars, with supply pipes made of nylon, inner ø = 4 mm.

7.2.2 Installation of valve on the plant.

Comply with specifications on labels.
Before assembly, ensure that no dirt has penetrate the valve body; in case of doubt, strongly blow with compressed air.
It is recommended to install a protection filter on pipe upstream the valve.
The commonest recommended installation provides for vertical assembly of the valve, with servo control on top. Tilted or horizontal assemblies are only accepted for dimensional reasons only, when assembly in oblique position is really mandatory.
To ensure a continuous operation of the plant also during valve maintenance, it is recommended to provide for a proper bypass with relevant on-off control valves.
WARNINGS: when installing a valve, provide for a minimum space necessary to disassemble the pneumatic head and internal organs during maintenance operations.
Please note. Attention: compressed springs are included inside the servo control..
Be very careful when assembling the pipe valve, ensure it is installed in compliance with specifications on body fusion, in the same direction as pipe flow. Perform a uniform and crossed tightening of flange bolts to evenly press seals and prevent any harmful tensions from arising on the valve body.
It is recommended to use joints between plant pipes and valve connections, suitable to discharge any tensions possibly damaging the valve itself.
After installation, with pneumatic valve in opening position, carefully clean the line with suitable fluid to remove any foreign bodies, welding slags and debris possibly damaging valve sealing surfaces.
Connect the pneumatic signal out of the pilot regulator or control panel to the relevant coupling on the head.

7.3 Installation diagrams

7.3.1 Installation of GRS/10 2-way valves

Nut tightening torque:
DN 15#25 [M10 nuts] 17 Nm
DN 32#80 [M12 nuts] 32 Nm

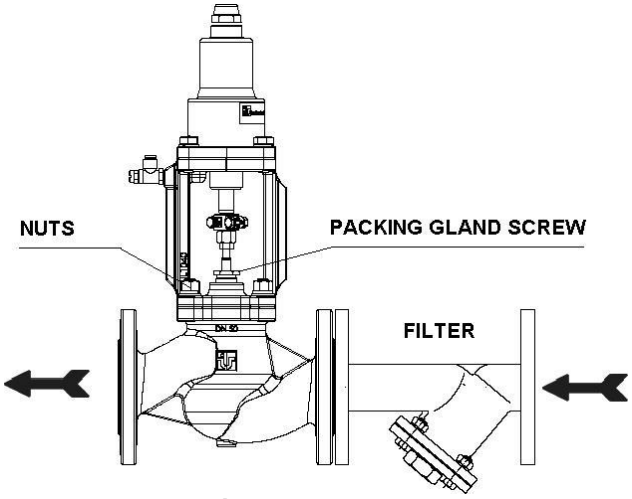


Figure 1

When installing GRS/10 2-way valves, a filter must be assembled on valve inlet to collect any impurity possibly damaging sealing. Assemble GRS/10 2-way valve as shown in figure 1, following the direction arrows on the valve. After the first hours of hot usage, slightly tighten the packing gland screw (1 revolution) and check tightening of nuts specified on diagram.

7.3.2 Installation of GRS/10 3 D valves

When installing GRS/10 3-way deviation valves, a filter must be assembled on valve inlet to collect any impurity possibly damaging sealing. Assemble GRS/10 3 D valve as shown in figure 2, following the direction arrows on the valve. After the first hours of hot usage, slightly tighten the packing gland screw (1 revolution) and check tightening of nuts specified on diagram.

Nut tightening torque:
DN 15#25 [M10 nuts] 17 Nm
DN 32#80 [M12 nuts] 32 Nm

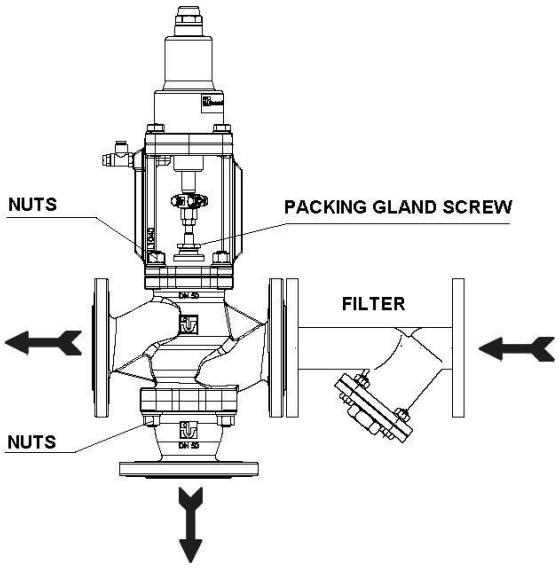


Figure 2

7.4 Operation Test

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

On valves with normally closed NC servo control:

1) Send the fluid inside the valve under shutter at the operating pressure (check that it is always lower than the maximum allowable pressure of the valve as shown on specifications plate).
2) Insert as much air into the servo control as the control signal shown on specifications plate (the valve should start opening, and this is detectable by the flow of the fluid).
3) Switch off air from the servo control.
4) Repeat this operation 5 times.
5) Check, with air off, that there is no leak from the valve.
6) Check, with air on, that there is no air leak from the servo control.

On valves with normally open NO servo control:

1) Send the fluid inside the valve under shutter at the operating pressure (check that it is always lower than the maximum allowable pressure of the valve).
2) Insert as much air into the servo control as the control signal shown on specifications plate (the valve should start closing, and this is detectable by the stop of the flow of the fluid).
3) Repeat this operation 5 times.
4) Check, with air on, that there is no leak from the valve.
5) Check, with air off, that there is no air leak from the servo control.

7.5 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.
Valve serial number is printed on the label located on servo control. Please refer to the serial number for spare part request and correspondence.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.

7.5.1 N. C. VALVES

In case of anomalous operation or valve leakages, the valve operation shall be immediately stopped and the following checks shall be carried out:
disconnect the air circuit; disconnect the air supply pipe (with air off), and make sure that no air is inside the line.
Caution: during troubleshooting, the valve shall not be removed, nor placed elsewhere. No component of the valve shall be disassembled or loosened.
Check, by means of a pressure gauge, that the pressure of the valve inlet fluid (upstream) is not higher than the maximum allowable pressure or, if $\Delta p < PS$, Δp. is not exceeded
Check from the outside (from the position of the stroke indicator clamp) that the valve has travelled its entire stroke and has reached its closing position. If the stroke is not complete, foreign matters may be located between shutter and seat.
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.

7.5.2 N. O. VALVES

In case of anomalous operation or valve leakage, the operation shall be immediately stopped and the following checks shall be carried out: blow air (at a pressure value equal to that specified for a proper operation) into the servo control so as to make the valve close.
Caution: during troubleshooting, the valve shall not be removed, nor placed elsewhere. No component of the valve shall be disassembled or loosened.
Check, by means of a pressure gauge, that the pressure of the valve inlet fluid (upstream) is not higher than the maximum allowable pressure or, if $\Delta p < PS$, Δp. is not exceeded.
Check from the outside (from the position of the stroke indicator clamp) that the valve has travelled its entire stroke and has reached its closing position. If the stroke is not complete, foreign matters may be located between shutter and seat.
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.

7.6 Scheduled Maintenance.

Scheduled maintenance operations shall be carried out independently of the ones due to possible failures, which always require an immediate intervention.

The time interval between one maintenance operation and the following shall be included in the lower time interval between the one corresponding to 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.

After first operating period, it is recommended to check the packing gland, as it requires special care. During the first operating hours, check no leaks have occurred, otherwise act very carefully on the relevant tightening nut to eliminate them: rotate by 1/4 of revolution (maximum 1 entire revolution) to compress the packing gland made of Teflon-graphite.

It is also recommended not to excessively tighten the nut, to prevent excessive increase of frictions on the stem which could block the valve or generate bad operation. Should further lacks persist in spite of tightening, fully replace the packing gland.

7.7 Instructions to disassemble and assemble the GRS/10 servo control from the valve body.

For the disassembly and assembly operations of the servo control for all GRS/10 valves, refer to annexed Drw. no. 090179 (090940 at page 47)

Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.

Whenever operations are to be carried out on valves, remove the fluid completely.

NOTE: Read the procedures thoroughly before starting any operation.

7.7.1 Removal of the normally closed servo control from the valve

1) Unscrew the screws (13), remove the nuts (31), remove the spring washers (32) and the junction clamps (33).
2) Blow air in the servo control (see the value indicated in the rating plate).
3) Untighten the preload adjustment nut (14) carefully marking its position, to obtain the same adjustment once the valve is refitted. Unscrew the hexagonal nut (15).
4) Unscrew the nuts (37/54), extract the spring washers (38/53), the plain washers (39/52) and remove the servocontrol from the stud bolts (36) of the valve body/frame extension (40/55).
5) Blow air out of the servo control

7.7.2 Removal of the normally open servo control from the valve

1) Unscrew the screws (13), remove the nuts (31), remove the spring washers (32) and the junction clamps (33). Take care when removing the junction clamps (33); the shutter (20) can move downward, colliding with the seat (21). We recommend to guide the shutter until it touches the seat, to avoid damages to the seal.
2) Untighten the preload adjustment nut (14) carefully marking its position, to obtain the same adjustment once the valve is refitted. Unscrew the hexagonal nut (15).
3) Unscrew the nuts (37), extract the spring washers (38), the plain washers (39) and remove the servocontrol from the stud bolts (36) of the valve body (40).

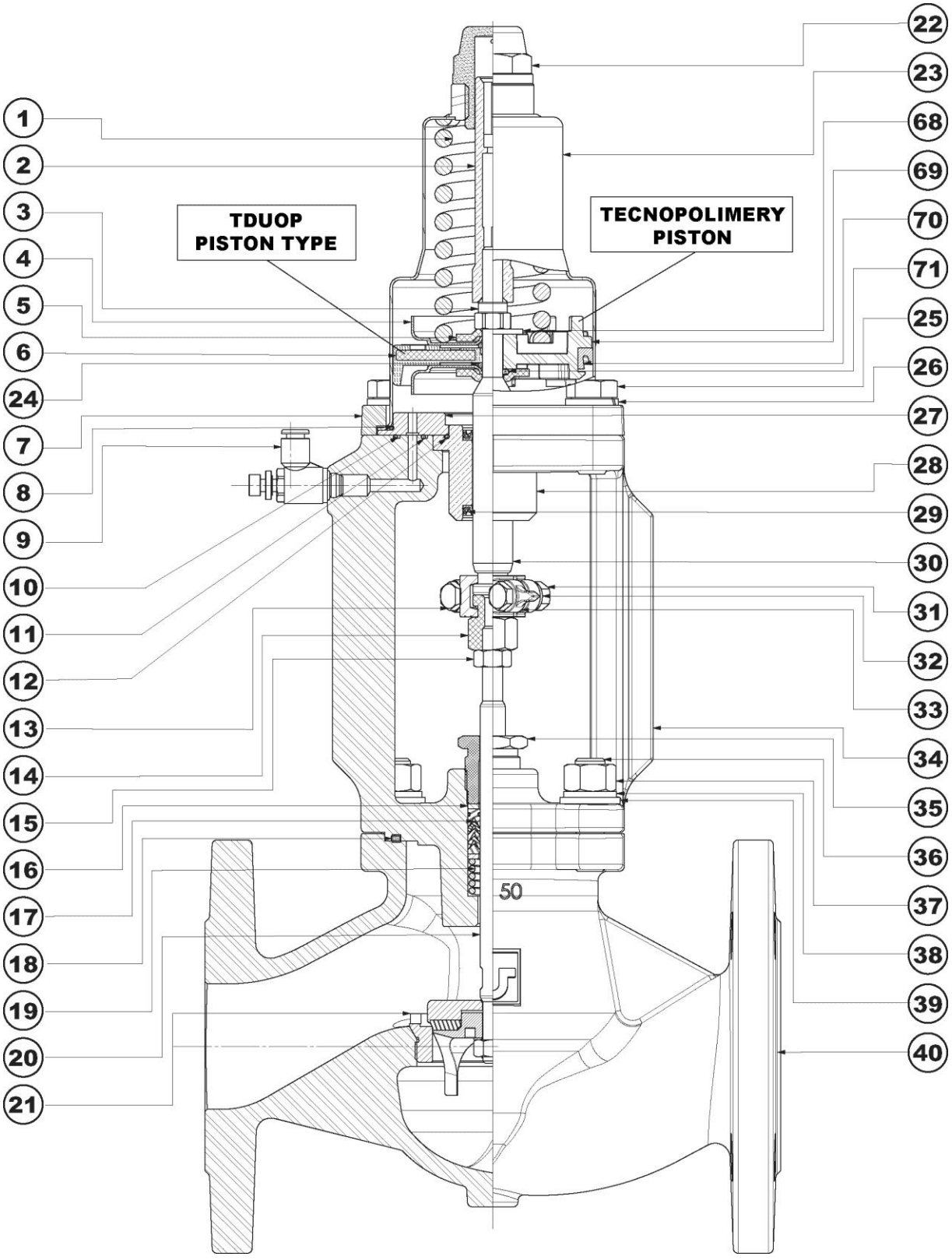
7.7.3 Positioning the normally closed servo control on the valve

1) Blow air into the servo control: **Attention! The servo control shaft will move by its stroke**.
2) Insert the servocontrol frame onto the stud-bolts (36/51), onto the shutter stem (20/47) so that the air attachment is on the valve output side.
3) Insert the plain washers (39/52) and the spring washers (38/53) onto the stud bolts (36/51).
4) Torque tighten the nuts (37/54) according to table 5.
5) Tighten packing gland screw (35) until it is projected by ≈ 13 mm from the intermediate body.
6) Tighten the hexagonal nut (15) and the preload adjustment nut (14), positioning it in the same position it had before disassembly, so as to obtain the same adjustment of the valve, then lock the adjustment nut (14) with the hexagonal nut (15).
7) Blow air out of the servo control. **Attention! The servo control shaft will move by its stroke**.
8) Lock the servo control shaft and the preload adjustment nut with the junction clamps (33).
9) Insert the screws (13) into the junction clamps (33).
10) Insert the spring washers (32) on the screws (13).
11) Torque tighten the nuts (31) according to table 5.

7.7.4 Positioning the normally open servo control on the valve

1) Insert the servocontrol frame onto the stud-bolts (36), onto the shutter stem (20) so that the air attachment is on the valve output side.
2) Insert the plain washers (39) and the spring washers (38) onto the stud bolts (36).
3) Torque tighten the nuts (37) according to table 5.
4) Tighten packing gland screw (35) until it is projected by ≈ 13 mm from the intermediate body.
5) Tighten the hexagonal nut (15) and the preload adjustment nut (14), positioning it in the same position it had before disassembly, so as to obtain the same adjustment of the valve, then lock the adjustment nut (14) with the hexagonal nut (15).
6) Insert air into the servo control (see value indicated on the rating plate): **Attention! The servo control stem will move downwards until in contact with the adjustment nut (14)**.
7) Lock the servo control shaft and the adjustment nut with the junction clamps (33).
8) Insert the screws (13) into the junction clamps (33).
9) Insert the spring washers (32) on the screws (13).
10) Torque tighten the nuts (31) according to table 5.
11) Blow air out of the servo control

Sectional View GRS/10 2 WAY D.V.



Drawing No. 090179 Rev.:01

7.8 Instructions for disassembly, gasket replacement, reassembly of servo control GRS/10 D.70#80 N.C. D.V.

For the disassembly and assembly operations of the valves, refer to annexed Dwg 090179 attached hereby.
Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

7.8.1 Disassembly

1) Separate the servo control from the valve body as described in paragraph 7.7.1
2) Extract the body gasket (18) from the valve frame (34).
3) Unscrew the screws (25), remove the washers (26). **Caution! A compression spring is inside the cylinder.** Adequate fixture shall then be used preventing the spring housing cylinder (23) from leaving the valve frame (34), once all screws (25) are removed.
4) Remove the fastening plate (7).
5) Remove the spring housing cylinder (23).
6) Unscrew the transparent cap (22) and the flow rate adjuster (9).
7) Extract the O-Ring (8).
8) Remove the spring (1).
9) Remove from the valve frame the servo control stem (30) with the parts still fitted.
10) Lock the servo control stem (30) between soft cheeks. Unscrew the stroke indicator (2) and the self-braking nut (3).

TDUOP gasket version

11) Extract the first piston bearing washer (5), remove the first piston bearing (4), located on the top.
12) Remove the first OR (24), remove the piston with TDUOP gasket (6), remove the second OR (24).
13) Remove the second piston bearing (4), extract the second piston bearing washer (5).

Tecnopolimery piston version

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

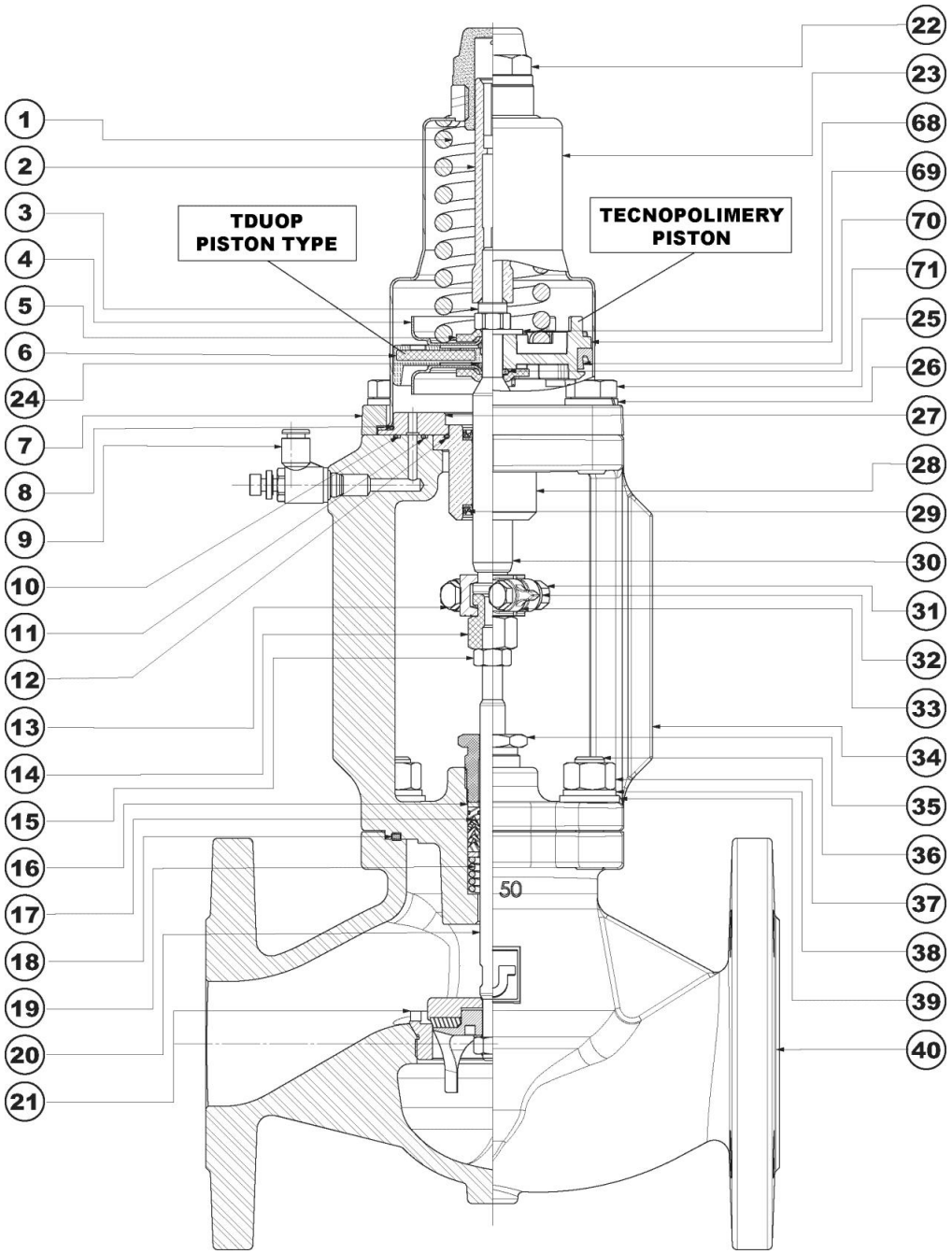
16) Remove the adapter for GRS (27).
17) Extract the O-Rings (10) and (11).
18) Remove from the valve frame (34) the jig bushing (28) and from the latter the BA seals (29) and the OR seal (12).
19) Unscrew the packing gland screw (35)**Caution! The packing gland screw (35) keeps the packing gland spring (19) compressed; maximum care shall then be taken to prevent the intermediate body components from coming out suddenly when the packing gland screw (35) is no longer in position.** Remove from the frame intermediate body the first washer (16), the packing gland (17), the second washer (16), and the packing gland spring (19).
20) Now the servo control has been completely disassembled, so that the required components can be replaced.

7.8.2 Assembly

1) Insert onto the frame intermediate body (34) the packing gland spring (19), the first washer (16), the packing gland (17), the second washer (16). Tighten the packing gland screw (35) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed; maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
2) Insert BA (29) and OR gasket (12) into jig bushing (28), then position the bushing in the valve frame (34).
3) Position the O-Rings (10) and (11).
4) Position the adapter for GRS (27) on the jig bushing.
5) Lock the servo control stem (30) between soft cheeks
6) Insert on it the piston bearing washer (5),
7) Insert on the Technopolimery piston (75) the DE gasket (76).
8) Insert on the shutter stem the piston, the plane washer (74). Tighten the assembly with the self-locking nut (5) closing the component package but without torque tightening.
9) Screw the stroke indicator (2) on the stem of the servo control (30).
10) Place the O-ring (8) into the adapter for GRS (27).
11) Grease with silicone grease the stem of the servo control (30) and insert it into the jig bushing (28).
12) Insert the spring (1).

13) Install the spring housing piston (23), taking care to grease with a layer of silicone grease the DE gasket lip (70).
14) Insert the fastening plate (8) on the spring housing cylinder (23).
15) Using proper instruments, approach the spring bearing piston (23) to the valve frame (34), position the washers (26) and screw the screws (25) according to the indications in Table 5. **Attention! Inside the cylinder there is a compressed spring**.
16) Screw the transparent cap (22) and the flow rate adjuster (9).
17) Insert the body gasket (18) in the valve frame (34).
18) Now the servo control can be repositioned on the valve body as described in paragraph 7.7.3

Sectional View GRS/10 ND 15#50 2 WAY D.V



Drawing No. 090179 Rev.:01

7.9 Instructions for disassembly, gasket replacement, reassembly of servo control GRS/10 D.125#160 N.C. D.V.

For the disassembly and assembly operations of the valves, refer to annexed Dwg 100685 attached hereby. Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.

NOTE: Read the procedures thoroughly before starting any operation.

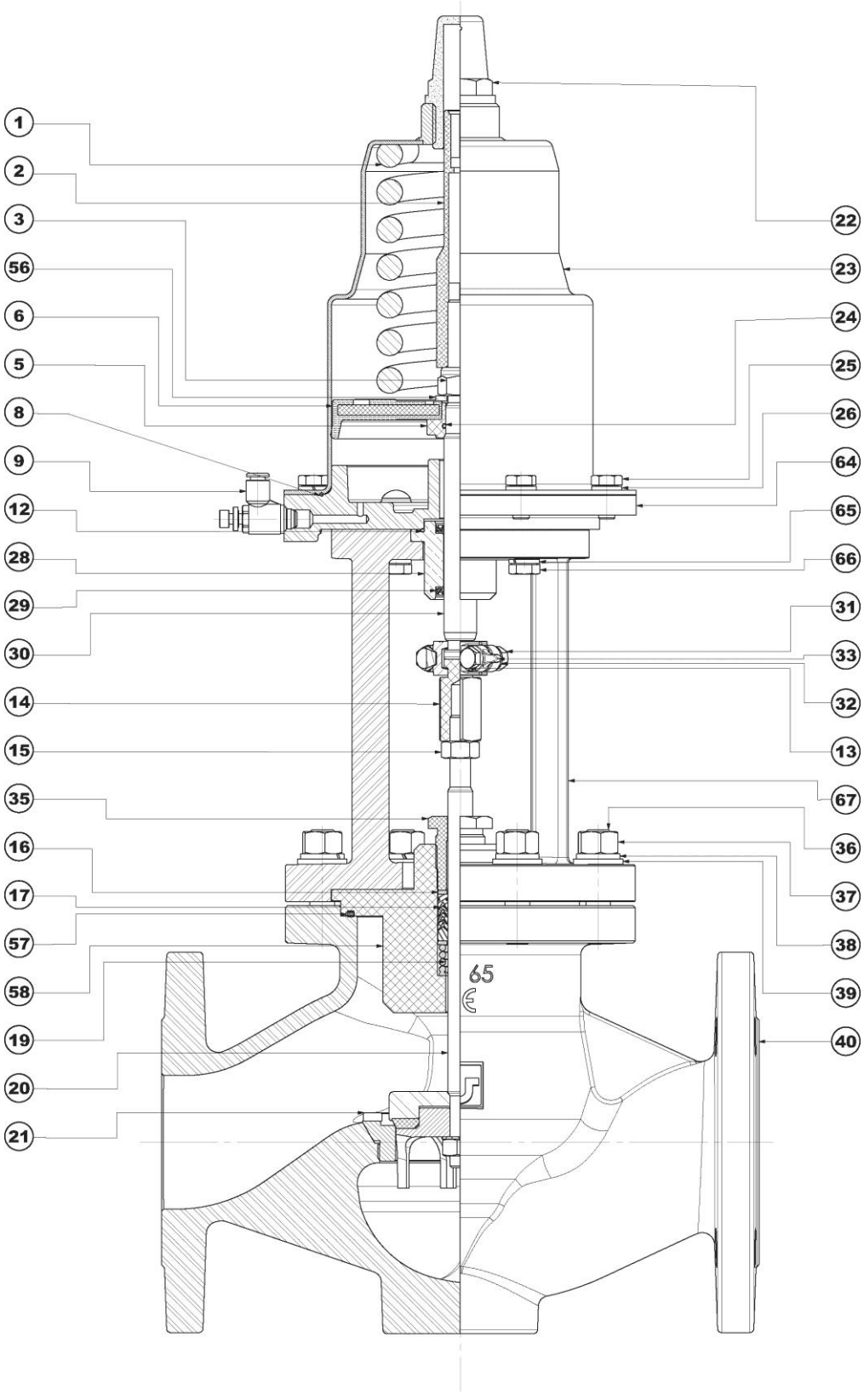
7.9.1 Disassembly.

1) Separate the servo control from the valve body as described in paragraph 7.7.1
2) Unscrew the screw (25), remove the washer (26). **Attention! Inside the cylinder there is a compressed spring** Adequate fixture shall then be used preventing the spring housing cylinder (23) from leaving the servocontrol plate (64), once all screws (25) are removed
3) Remove the spring housing cylinder (23).
4) Unscrew the transparent cap (22) and the flow rate adjuster (9). Remove the O-ring seal (8).
5) Remove the O-ring gasket (8).
6) Extract the spring (1).
7) Remove from the valve frame the servo control stem (30) with the parts still fitted.
8) Lock the servo control stem (30) between soft cheeks. Unscrew the stroke indicator (2) and the self-braking nut (3).
9) Remove the washer (56), extract the piston with TDUOP gasket (6), extract the piston bearing washer (5) and remove from it the O-ring gasket (24).
10) Unscrew the screw (66) and remove the elastic washer (65).
11) Separa the servocontrol plate (64) from the valve frame (67).
12) Remove from the valve frame (57) the jig bushing (28) and from the latter the BA seals (29) and the OR seal (12).
13) Now the servo control has been completely disassembled, so that the required components can be replaced.

7.9.2 Assembly.

1) Insert in the jig bushing (28) the latter the BA seals (29) and the O-ring seal (12), then position the bushing in the valve frame (57).
2) Position the servocontrol plate (64) on the jig bushing (28).
3) Insert the washers (65) on the screws (66) them screw the screws (25) according to the indications in Table 5.
4) Lock the servo control stem (30) between soft cheeks. And insert on it the piston bearing washer (5) insert on it the O-ring seal (24), Insert the piston with TDUOP gasket (6), taking care to position it with the lip facing down, insert the washer (56).
5) Tighten the assembly with the self-locking nut (5) closing the component package but without torque tightening.
6) Screw the stroke indicator (2) on the stem of the servo control (30).
7) Place the O-ring (8) on to the plate for GRS (64).
8) Grease with silicone grease the stem of the servo control (30) and insert it into the jig bushing (28).
9) Insert the spring (1).
10) Install the spring housing piston (23), taking care to grease with a layer of silicone grease the TDUOP (6).
11) Using proper instruments, approach the spring bearing piston (23) to the plate for GRS (64), position the washers (26) and screw the screws (25) according to the indications in Table 5. Attention! Inside the cylinder there is a compressed spring
12) Screw the transparent cap (22) and the flow rate adjuster (9).
13) Now the servo control can be repositioned on the valve body as described in paragraph 7.7.3

Sectional View GRS/10 ND 65#80 2 WAY D.V



Disegno n° 100685 Rev.:01

7.10 Instructions for disassembly, gasket replacement, reassembly of servo control GRS/10 D. 70#80 N.O

For the disassembly and assembly operations of the valves, refer to annexed Dwg 090181 attached hereby.
Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

7.10.1 Disassembly

1) Separate the servo control from the valve body as described in paragraph 7.7.2
2) Extract the body gasket (18) from the valve frame (34).
3) Unscrew the flow rate adjuster (9), unscrew the air inlet fitting (41) and extract the O-ring (42) from it.
4) Unscrew the screws (25), remove the washers (26). **Caution! A compression spring is inside the cylinder.**Adequate fixture shall then be used preventing the spring housing cylinder (23) from leaving the valve frame (34), once all screws (25) are removed.
5) Remove the fastening plate (7)
6) Remove the spring housing piston (23).
7) Extract from the jig bushing (28) the servo control stem (30) with the components still fitted.
8) Lock the servo control stem (30) between soft cheeks. Unscrew the self-braking nut (3).

TDUOP gasket version

9) Extract the first piston bearing washer (5), remove the first piston bearing (4), located on the top
10) Remove the first OR (24), remove the piston with TDUOP gasket (6), remove the second OR (24).
11) Remove the second piston bearing (4), extract the second piston bearing washer (5).

Tecnopolimery piston version

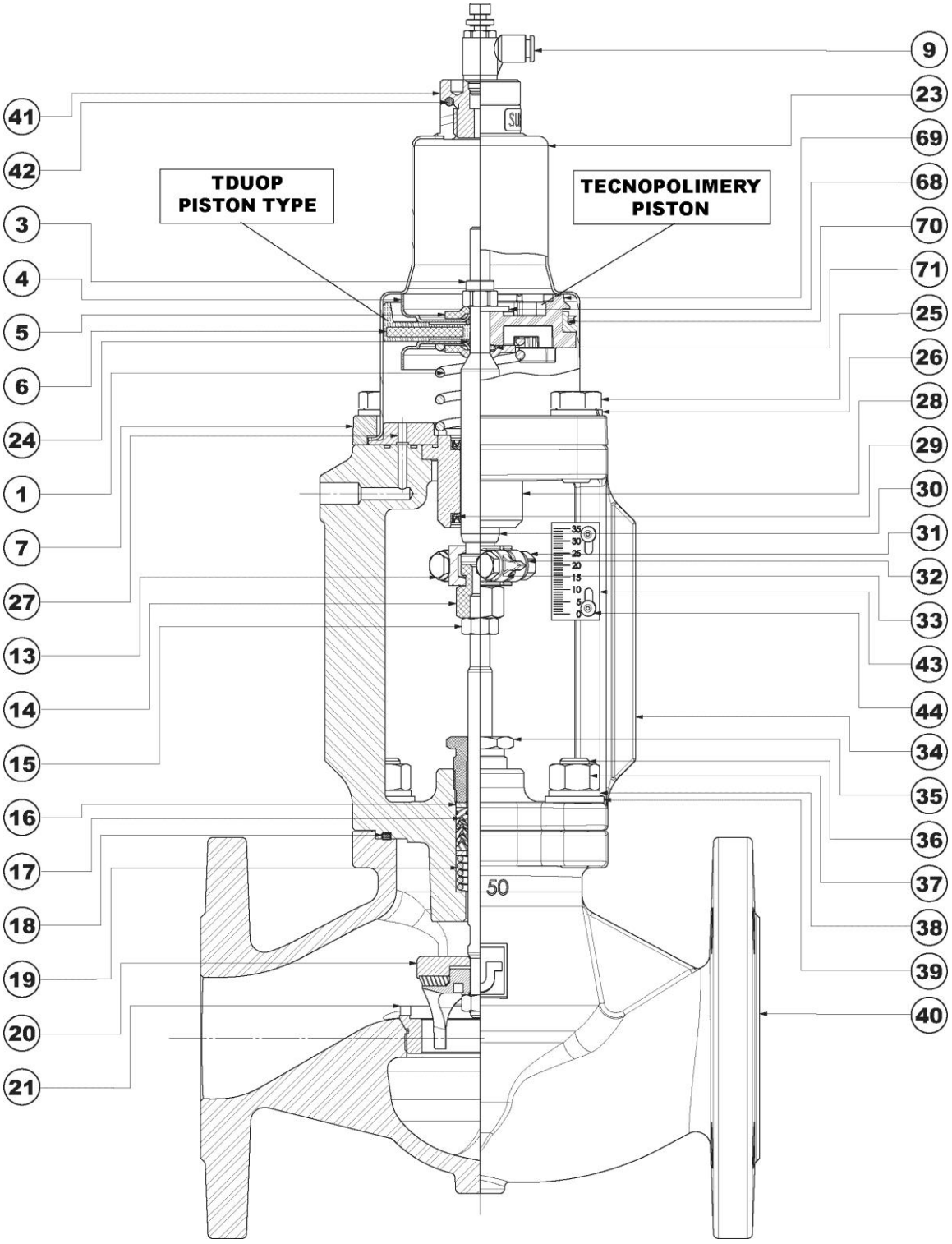
12) Remove the plane washer (74), remove the piston (75) with the DE gasket (76) insert, remove the DE gasket (76) from the piston (75).
13) Remove the O-ring (77) and the piston bearing washer (6).
14) Remove the spring (1) and the adapter for GRS valves (27).
15) Remove from the valve frame (34) the jig bushing (28) and remove from it the BA seals (29).
16) Untighten the packing gland screw (35). **Caution! The packing gland screw (35) keeps the packing gland spring (19) compressed; maximum care shall then be taken to prevent the intermediate body components from coming out suddenly when the packing gland screw (35) is no longer in position.** Remove from the frame intermediate body the first washer (16), the packing gland (17), the second washer (16), and the packing gland spring (19).
17) Now the servo control has been completely disassembled, so that the required components can be replaced.

7.10.2 Assembly

1) Insert onto the frame intermediate body (34) the packing gland spring (19), the first washer (16), the packing gland (17), the second washer (16). Tighten the packing gland screw (35) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed; maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
2) Insert BA (29) into jig bushing (28), then position the bushing in the valve frame (34).
3) Position on the jig bushing the adapter for GRS (27) and position on it the spring (1).
4) Lock the servo control stem (30) between soft cheeks
5) Insert on it the piston bearing washer (5),
6) Insert on the Technopolimery piston (75) the DE gasket (76).
7) Insert on the shutter stem the piston, the plane washer (74). Tighten the assembly with the self-locking nut (5) closing the component package but without torque tightening.
8) Grease with silicone grease the stem of the servo control (30) and insert it into the jig bushing (28).
9) Install the spring housing piston (23), taking care to grease with a layer of silicone grease the DE gasket lip (6).
10) Insert the fastening plate (7) on the spring housing cylinder (23).
11) Using proper instruments, approach the spring bearing piston (23) to the valve frame (34), position the washers (26) and screw the screws (25) according to the indications in Table 5. **Attention! Inside the cylinder there is a compressed spring**.
12) Position the O-ring gasket (42) into the air inlet fitting (41).
13) Screw down the air inlet coupling (41) on the spring bearing cylinder (23).
14) Screw the flow rate adjuster (9).

15) Insert the body gasket (18) in the valve frame (34).
16) Now the servo control can be repositioned on the valve body as described in paragraph 7.7.4

Sectional View GRS/10 2 WAY N.O.



Drawing No. 090181 Rev.:01

7.11 Instructions for disassembly, gasket replacement, reassembly of servo control GRS/10 D.125#160 N.O.

For the disassembly and assembly operations of the valves, refer to annexed Dwg 100686 attached hereby.
Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.

NOTE: Read the procedures thoroughly before starting any operation.

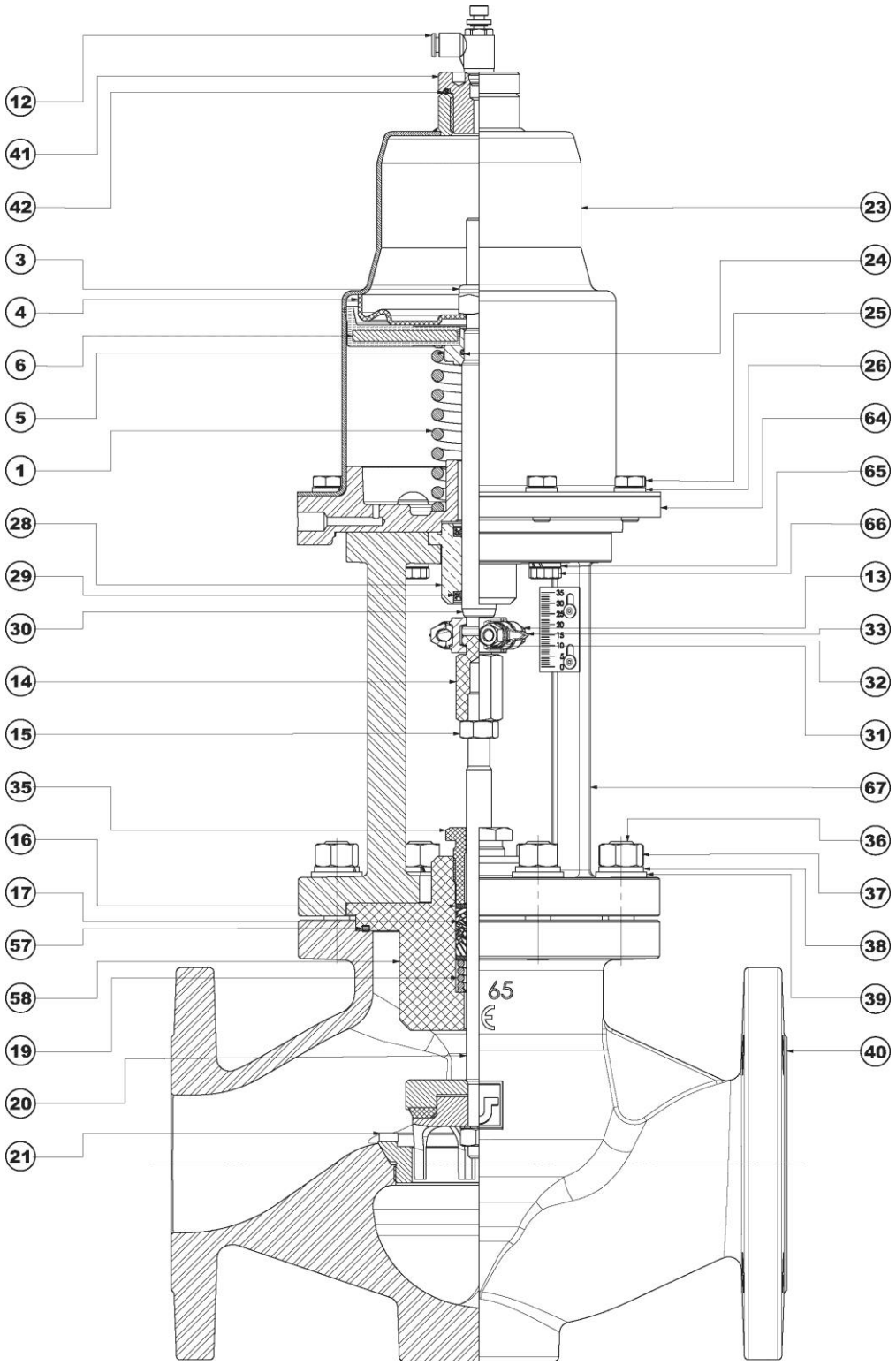
7.11.1 Disassembly.

1) Separate the servo control from the valve body as described in paragraph 7.7.2
2) Unscrew the flow rate adjuster (9), unscrew the air inlet fitting (41) and extract the O-ring (42) from it.
3) Unscrew the screw (25), remove the washer (26). **Attention! Inside the cylinder there is a compressed spring** Adequate fixture shall then be used preventing the spring housing cylinder (23) from leaving the servocontrol plate (64), once all screws (25) are removed
4) Remove the spring housing cylinder (23).
5) Remove from the valve frame the servo control stem (30) with the parts still fitted.
6) Lock the servo control stem (30) between soft cheeks. Unscrew the self-braking nut (3).
7) Remove the piston bearing (4) extract the piston with TDUOP gasket (6), extract the piston bearing washer (5) and remove from it the O-ring gasket (24).
8) Remove the spring (1).
9) Unscrew the screw (66) and remove the elastic washer (65).
10) Separate the servocontrol plate (64) from the valve frame (67).
11) Remove from the valve frame (57) the jig bushing (28) and from the latter the BA seals (29).
12) Now the servo control has been completely disassembled, so that the required components can be replaced.

7.11.2 Assembly.

1) Insert in the jig bushing (28) the latter the BA seals (29), then position the bushing in the valve frame (57).
2) Position the servocontrol plate (64) on the jig bushing (28).
3) Insert the washers (65) on the screws (66) them screw the screws (25) according to the indications in Table 5.
4) Lock the servo control stem (30) between soft cheeks. And insert on it the piston bearing washer (5) insert on it the O-ring seal (24), Insert the piston with TDUOP gasket (6), taking care to position it with the lip facing up, insert the piston bearing (4).
5) Tighten the assembly with the self-locking nut (5) closing the component package but without torque tightening.
6) Position on the servo control plate (64) the spring (1).
7) Grease with silicone grease the stem of the servo control (30) and insert it into the jig bushing (28).
8) Install the spring housing piston (23), taking care to grease with a layer of silicone grease the TDUOP (6).
9) Using proper instruments, approach the spring bearing piston (23) to the plate for GRS (64), position the washers (26) and screw the screws (25) according to the indications in Table 5. **Attention! Inside the cylinder there is a compressed spring**
10) Position the O-ring gasket (42) into the air inlet fitting (41).
11) Screw down the air inlet coupling (41) on the spring bearing cylinder (23).
12) Screw the flow rate adjuster (9).
13) Now the servo control can be repositioned on the valve body as described in paragraph 7.7.4

Sectional View GRS/10 ND 65#80 2 WAY N.O.



Disegno n° 100686 Rev.:01

7.12 Instructions for disassembly, gasket replacement, reassembly of GRS/10 ND 15#50 2-ways bodies

For the disassembly and assembly operations of the valves, refer to annexed Dwg 090189 and 090179 attached hereby.

Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.

Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.

NOTE: Read the procedures thoroughly before starting any operation.

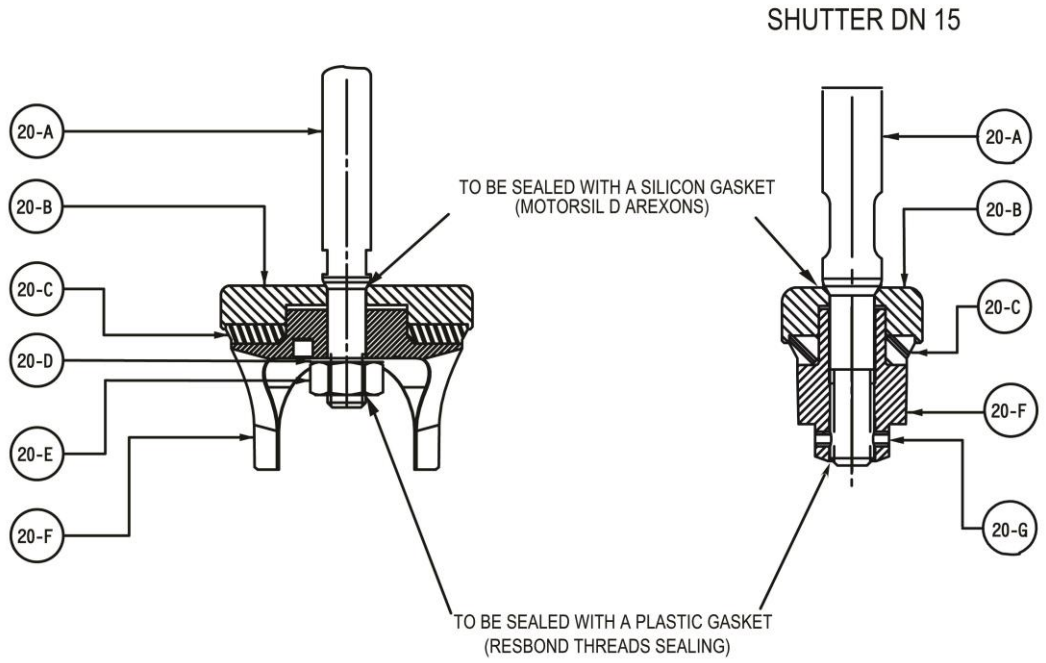
7.12.1 Disassembly

1) Separate the valve body from the servo control as described in paragraph 6.7
2) Extract the shutter (20) from the valve body (40).
3) Lock the shutter stem (20-A) to untighten the nut (20-E) or remove elastic plug (20-G).
4) Extract safety washer (20-D), jig (20-F), insert (20-C) and insert-holder (20-B). **Attention: items 3 and 4 must be carried out in case of replacement of the soft seal on the TP shutters.**
5) Now the valve body has been completely disassembled, so that the required components can be replaced.

7.12.2 Assembly

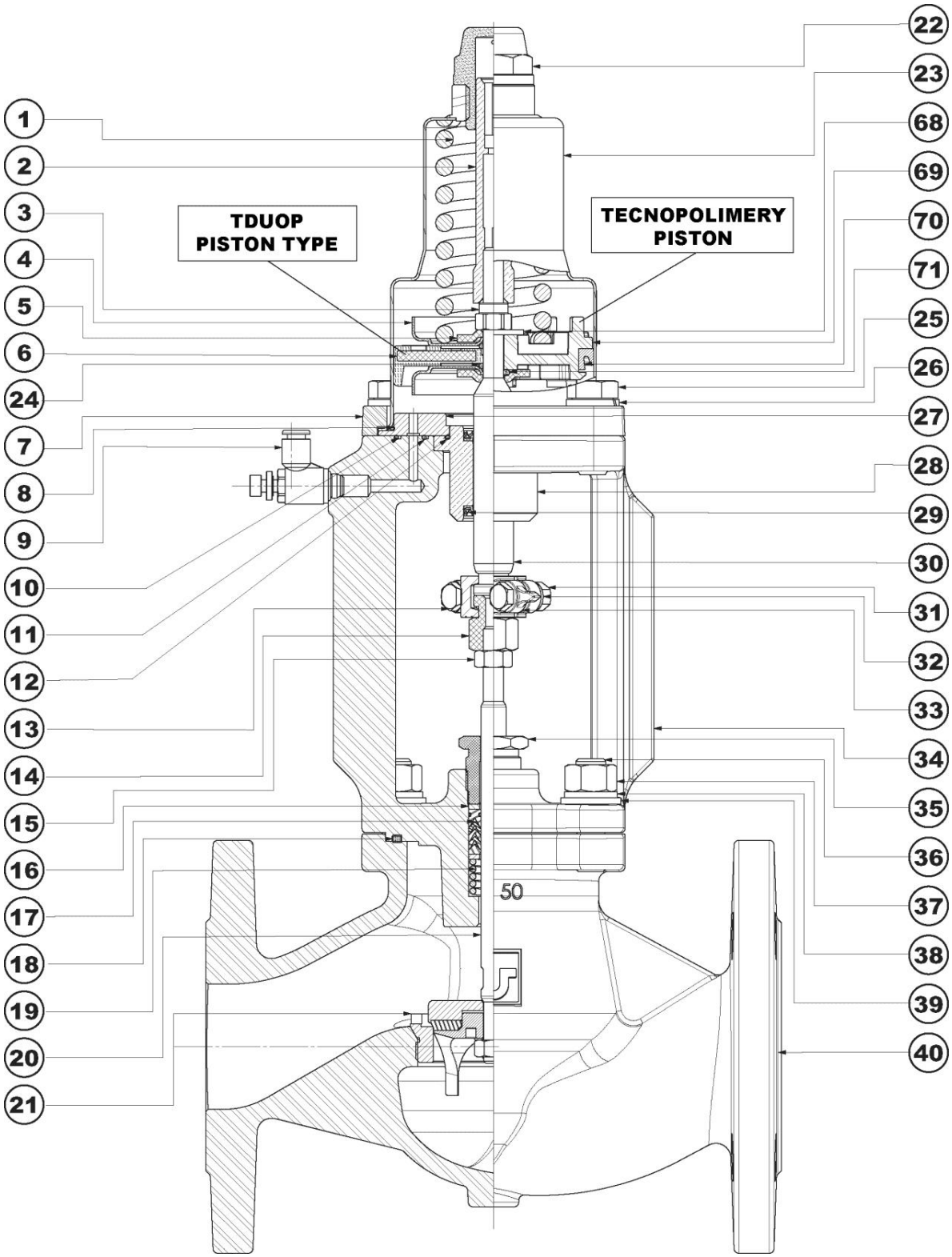
1) Spread MOTORSIL D (AREXONS) silicone gasket in insert holder (20-B) as shown in drawing.
2) Insert the shutter stem (20-A) into insert holder (20-B).
3) Place insert (20-C) and jig (20-F) into insert holder (20-B).
4) Insert the safety washer (20-D) into shutter stem (20-A).
5) Spread NT 907 TS (RESBOND) threading dope on shutter stem threading (20-A) and nut thread (20-E) as shown in drawing, then torque tighten the hexagonal nut (20-E) as specified in table 5 or insert elastic plug (20-G).
6) Punch nut as shown in drawing and let the shutter rest for at least 24 hours so that dopes can dry. **Attention: items 1, 2, 3, 4, 5 and 6 must be carried out in case of replacement of the soft seal on the TP shutters.**
7) Position the shutter (20) in the seat (21) of the valve body (40).
8) Now the valve body is fully assembled and can be reconnected to the servo control as described in paragraph 6.7

T.P. 2-way shutter diagram



Drawing No. 090189 Rev.:01

Sectional View GRS/10 ND 15#50 2 ways D.V.



Drawing No. 090179 Rev.:00

7.13 Instructions for disassembly, gasket replacement, reassembly of GRS/10 ND 65#80 2-ways bodies

For the disassembly and assembly operations of the valves, refer to annexed Dwg 100685 attached hereby. Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

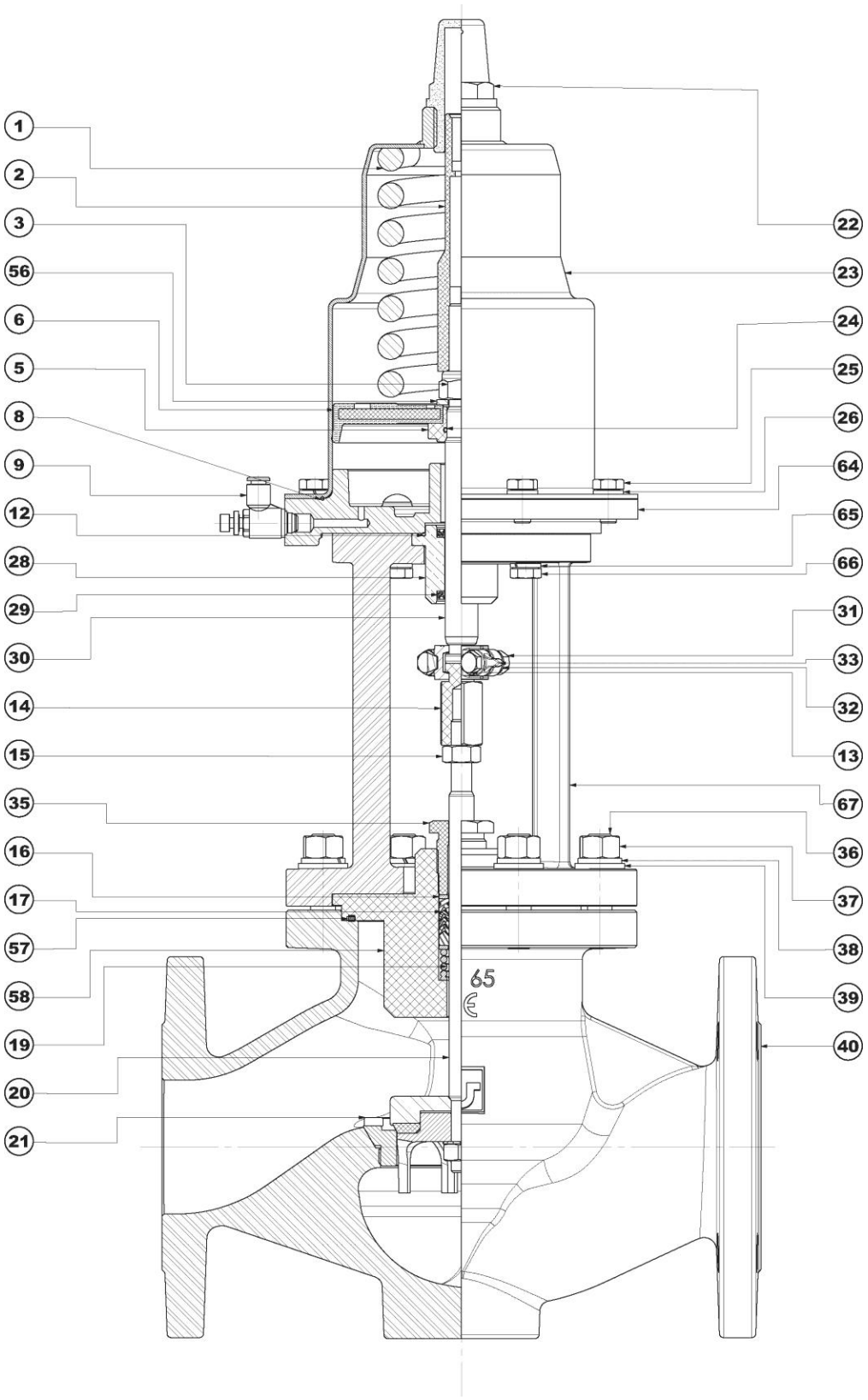
7.13.1 Disassembly.

1) Separate the valve body from the servo control as described in paragraph 7.7
2) Extract the intermediate body (58) from body valve (40), with the shutter (20) still insert.
3) Remove the shutter (20) from intermediate body (58), remove also the body gasket (57).
4) Untighten the packing gland screw (35). **Caution! The packing gland screw (35) keeps the packing gland spring (19) compressed; maximum care shall then be taken to prevent the intermediate body components from coming out suddenly when the packing gland screw (35) is no longer in position.** Remove from the intermediate body (58) the first washer (16), the packing gland (17), the second washer (16), and the packing gland spring (19).
5) Now the valve body has been completely disassembled, so that the required components can be replaced.

7.13.2 Assembly.

1) Insert in to the intermediate body (34) the packing gland spring (19), the first washer (16), the packing gland (17), the second washer (16). Tighten the packing gland screw (35) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed; maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
2) Position onto the intermediate body seals (58) the body gasket (57).
3) Insert the shutter (20) into the intermediate body (51), carefully greasing it with silicone grease.
4) Insert in the body valve (40) the intermediate body with the shutter.
5) Now the valve body is fully assembled and can be reconnected to the servo control as described in paragraph 7.7

Spaccato GRS/10 DN 65#80 2 VIE N.C. D.V.



Disegno n° 100685 Rev.:01

7.14 Instructions for disassembly, gasket replacement, reassembly of GRS/10 ND 15#50 3 D bodies

For the disassembly and assembly operations of the valves, refer to annexed Dwg 090190 and 090179 attached hereby.

Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.

Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.

NOTE: Read the procedures thoroughly before starting any operation.

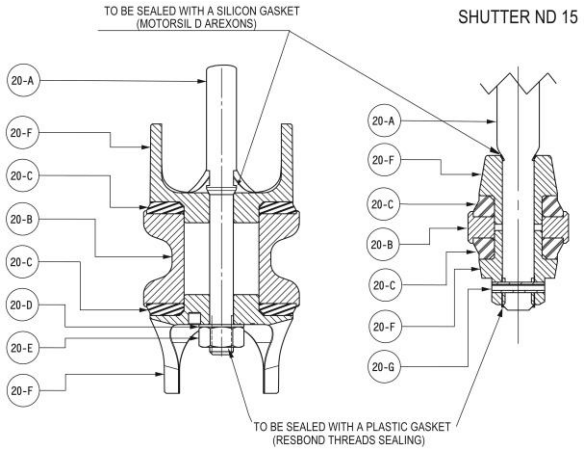
7.14.1 Disassembly

1) Separate the valve body from the servo control as described in paragraph 7.7
2) Unscrew the lower hexagonal nuts (37), extract the spring washers (38) and the plain washers (39).
3) Remove the third way bottom base (46) from the bottom stud bolts (36) and remove from it the gasket (45).
4) Unscrew the third way seat (21).
5) Extract the shutter (20) from the valve body (40).
6) Lock the shutter stem (20-A) to untighten the nut (20-E) or remove elastic plug (20-G).
7) Extract safety washer (20-D), first jig (20-F), first insert (20-C), insert-holder (20-B), second insert (20-C), second jig (20-F). **Attention: items 6 and 7 must be carried out in case of replacement of the soft seal on the TP shutters.**
8) Now the valve body has been completely disassembled, so that the required components can be replaced.

7.14.2 Assembly

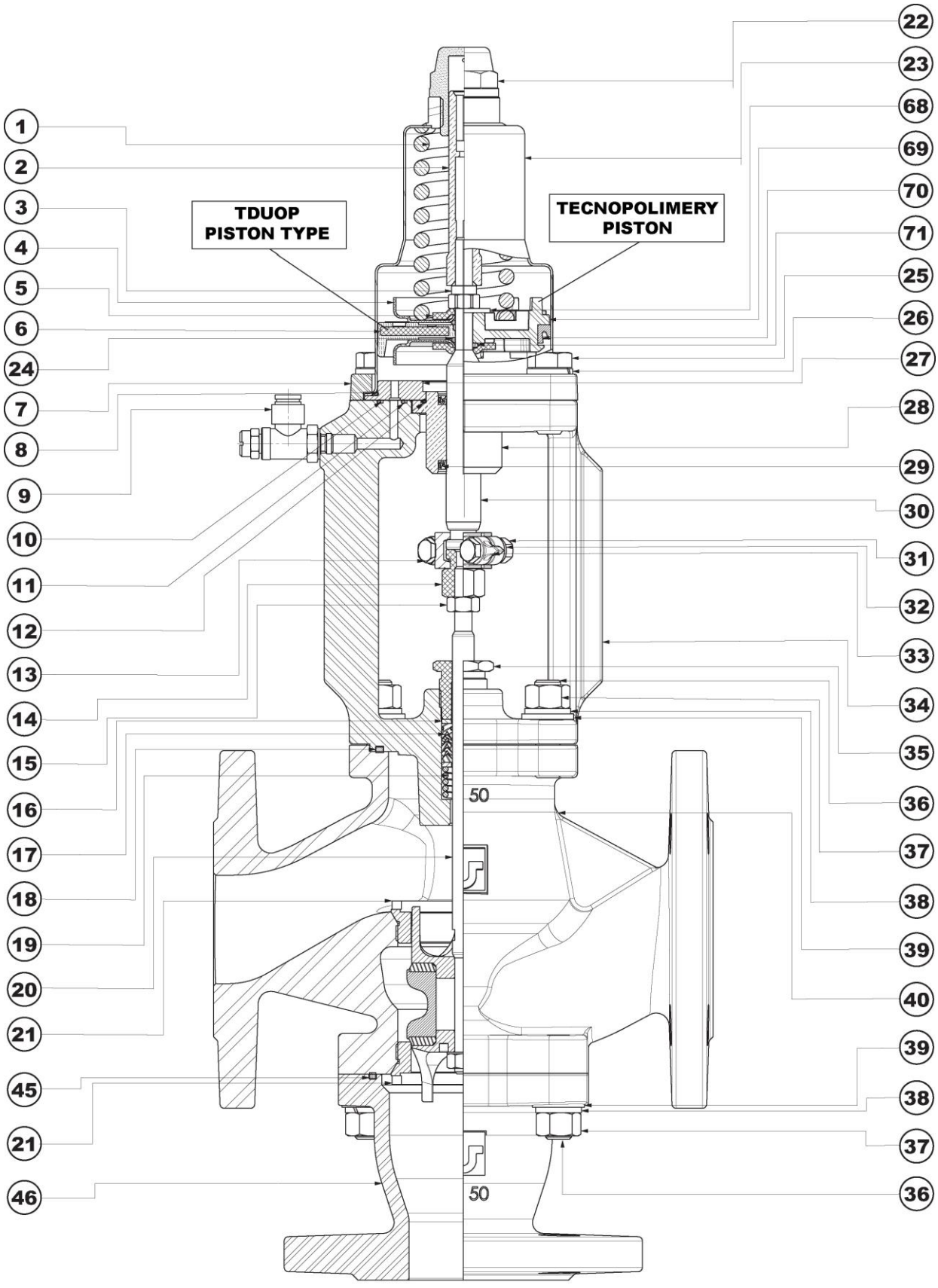
1) Spread MOTORSIL D (AREXONS) silicone gasket in upper jig (20-F) as shown in drawing.
2) Insert the shutter stem (20-A) into upper jig (20-F).
3) Insert first insert (20-C), insert-holder (20-B), second insert (20-C), second jig (20-F) on the jig (20-F).
4) Insert the safety washer (20-D) into shutter stem (20-A).
5) Spread NT 907 TS (RESBOND) threading dope on shutter stem threading (20-A) and nut thread (20-E) as shown in drawing, then torque tighten the hexagonal nut (21-E) as specified in table 5 or insert elastic plug (20-G).
6) Punch nut as shown in drawing and let the shutter rest for at least 24 hours so that dopes can dry. **Attention: items 1, 2, 3, 4, 5 and 6 must be carried out in case of replacement of the soft seal on the TP shutters.**
7) Insert the shutter (20) into the valve body (40) from the lower side of the body.
8) Spread MOTORSIL D (AREXONS) silicone gasket in the contact area between seat and valve body; then, tighten lower seat (21) according to the indications of table 5.
9) Insert the gasket (45) in the third way bottom base (46).
10) Insert the third way bottom base (46) on the bottom stud bolts (36).
11) Insert the plain washers (39) and the spring washers (38) on the bottom stud bolts (36) and torque tighten the nuts (37) according to the indications in table 5.
12) Now the valve body is fully assembled and can be reconnected to the servo control as described in paragraph 7.7

T.P. 3-way shutter diagram



Drawing No. 090190 Rev.:01

Sectional View GRS/10 ND 15#50 3 D N.C. D.V.



Drawing No. 090180 Rev.:00

7.15 Istructions for disassembly, gasket replacement, reassembly of GRS/10 ND 65#80 3 D bodies

For the disassembly and assembly operations of the valves, refer to annexed Dwg 100687 attached hereby.
Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

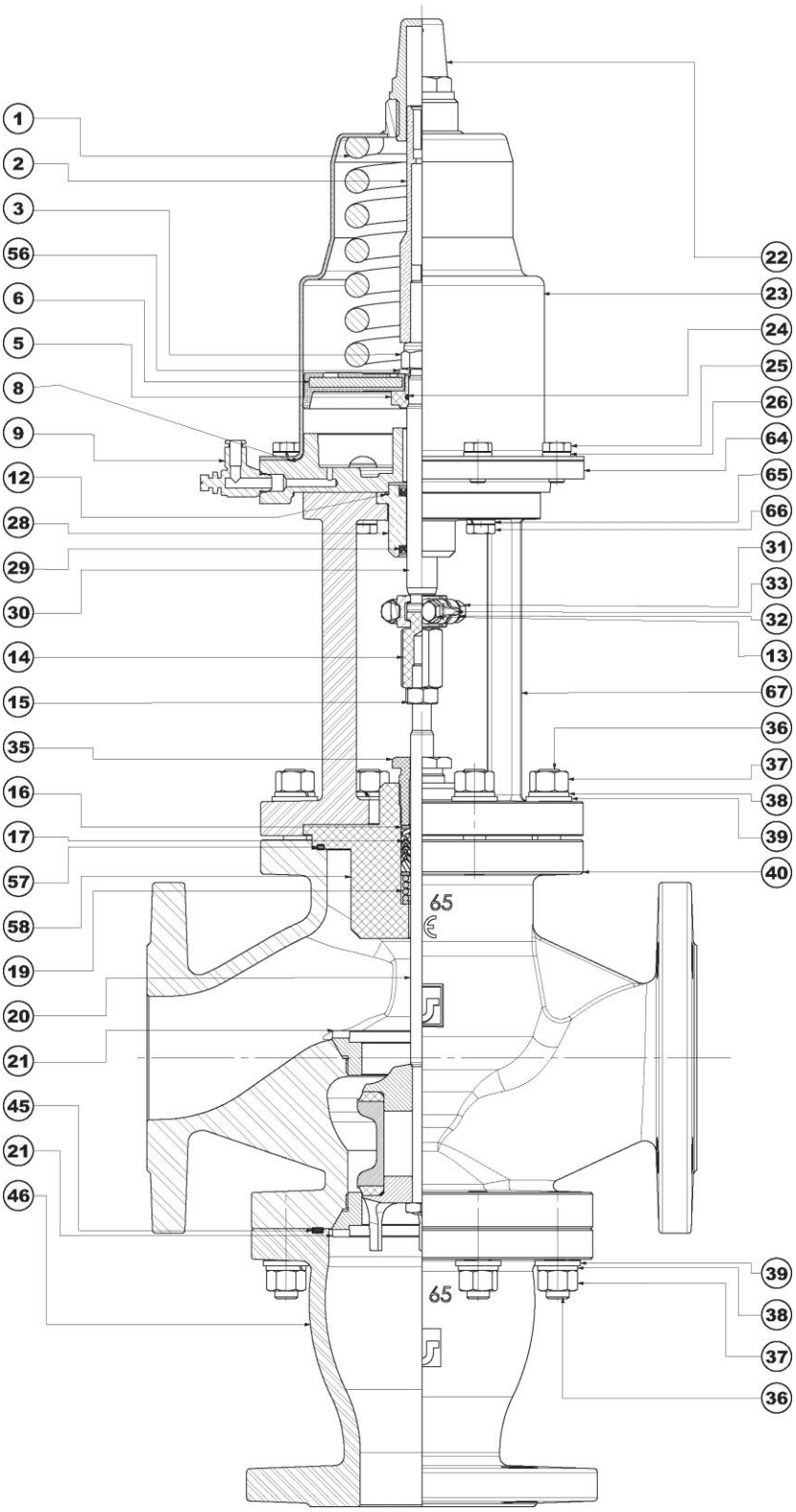
7.15.1 Disassembly.

1) Separate the valve body from the servo control as described in paragraph 7.7.
2) Extract the intermediate body (58) from body valve (40).
3) Remove the body gasket (57) from the intermediate body (58).
4) Untighten the packing gland screw (35). **Caution! The packing gland screw (35) keeps the packing gland spring (19) compressed; maximum care shall then be taken to prevent the intermediate body components from coming out suddenly when the packing gland screw (35) is no longer in position.** Remove from the intermediate body (58) the first washer (16), the packing gland (17), the second washer (16), and the packing gland spring (19).
5) Unscrew the low exagonal nut (37), remove the elastic washer (38) and the flat washer (39).
6) Remove the third way bottom base (46) from the bottom stud bolts (36) and remove from it the gasket (45).
7) Unscrew the third way seat (21).
8) Extract the shutter (20) from the valve body (40).
9) Now the valve body has been completely disassembled, so that the required components can be replaced.

7.15.2 Assembly.

1) Insert the shutter (20) into the valve body (40) from the lower side of the body.
2) Spread MOTORSIL D (AREXONS) silicone gasket in the contact area between seat and valve body; then, tighten lower seat (21) according to the indications of table 5.
3) Insert the gasket (45) in the third way bottom base (46).
4) Insert the third way bottom base (46) on the bottom stud bolts (36).
5) Insert the plain washers (39) and the spring washers (38) on the bottom stud bolts (36) and torque tighten the nuts (37) according to the indications in table 5.
6) Insert in to the intermediate body (34) the packing gland spring (19), the first washer (16), the packing gland (17), the second washer (16). Tighten the packing gland screw (35) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed; maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
7) Position onto the intermediate body seals (58) the body gasket (57).
8) Greasing the stem of the shutter (20) with silicone grease.
9) Insert in the body valve (40) and onto the stem of the shutter (20) the intermediate body.
10) Now the valve body is fully assembled and can be reconnected to the servo control as described in paragraph 7.7

Sectional View GRS/10 ND 65#80 3 D N.C. D.V.



Disegno n° 100687 Rev.:01

7.16 Disassembly and assembly instructions for GRS/10 ND 15#50 2 WAY with bellows

For the disassembly and assembly operations of the valves, refer to Dwg. No. 090940 attached hereby.
Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely.
NOTE: Read the procedures thoroughly before starting any operation.

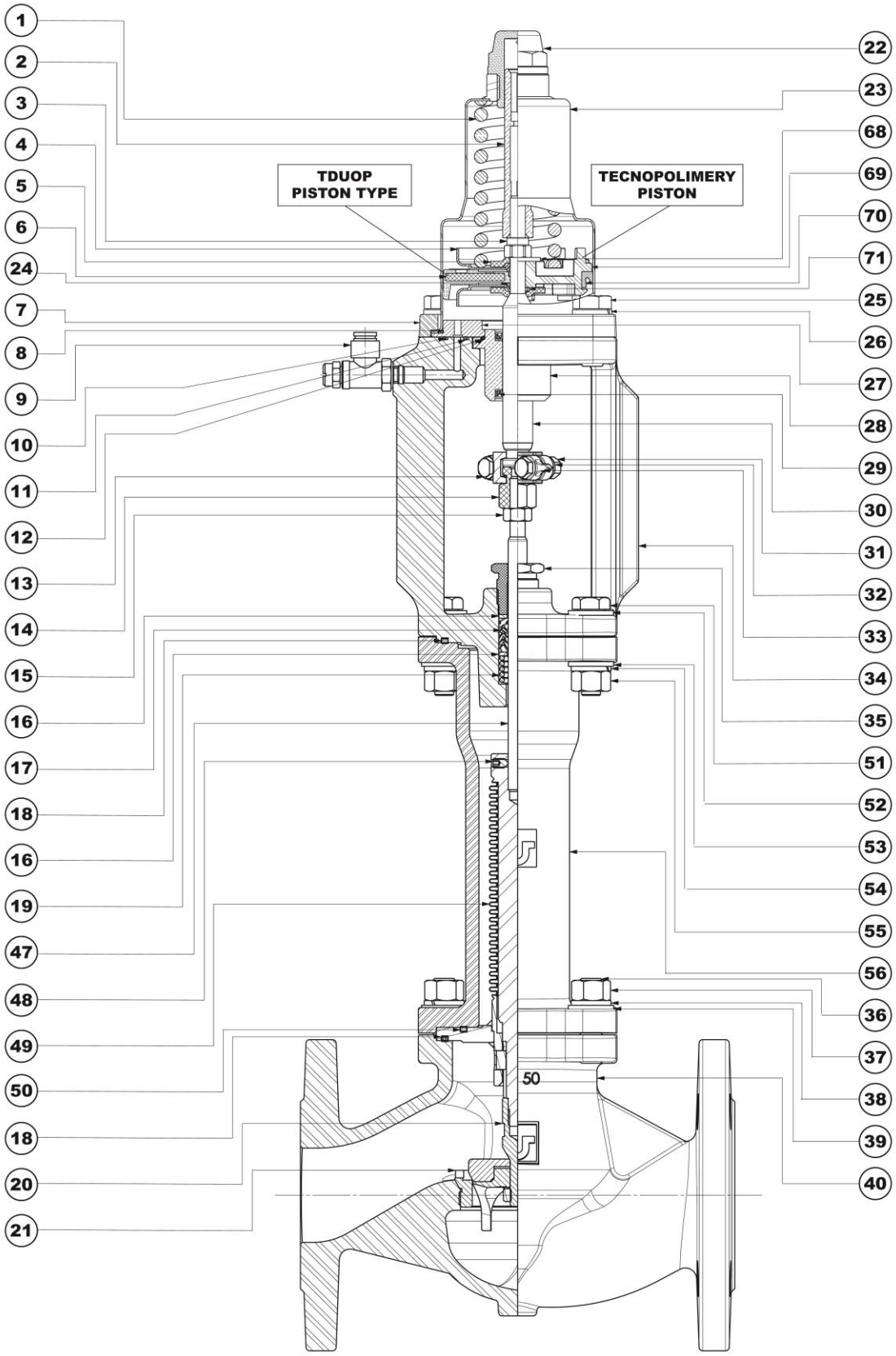
7.16.1 Disassembly

1) Separate the valve body from the servo control as described in paragraph 7.7
2) Unscrew the nuts (37), extract the spring washers (38), the plain washers (39) and the frame extension (55).
3) Extract the intermediate body with bellows (49) with bellows upper stem (47) and shutter (20) connected with it from the valve body (40).
4) Extract the headless screw (48), the bellows upper stem (47) and shutter (20) from the intermediate body with bellows (49).
5) Remove gaskets (50) and (18) from intermediate body with bellows.
6) Now the valve has been completely disassembled, so that the required components can be replaced.

7.16.2 Reassembly

1) Insert gaskets (18) and (50) into intermediate body with bellows.
2) Screw shutter (20) to intermediate body with bellows (49), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
3) Tighten the bellows upper stem (47) and fasten by headless screw (48).
4) Insert the intermediate body with bellows assembled inside the valve body (40).
5) Place the frame extension (55) inside the intermediate body with bellows in correspondence with stud-bolts (36).
6) Insert the plain washers (39) and the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 5.
7) Now the valve body is fully assembled and can be reconnected to the servo control as described in paragraph 7.7

Sectional View of valve GRS/10 ND 15#50 2 VIE N.C. D.V. with bellows



Drawing No. 090940 Rev.:00

7.17 Disassembly and assembly instructions for GRS/10 ND 65#80 2 WAY with bellows

For the disassembly and assembly operations of the valves, refer to Dwg. No. 100688 attached hereby.
Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely.
NOTE: Read the procedures thoroughly before starting any operation.

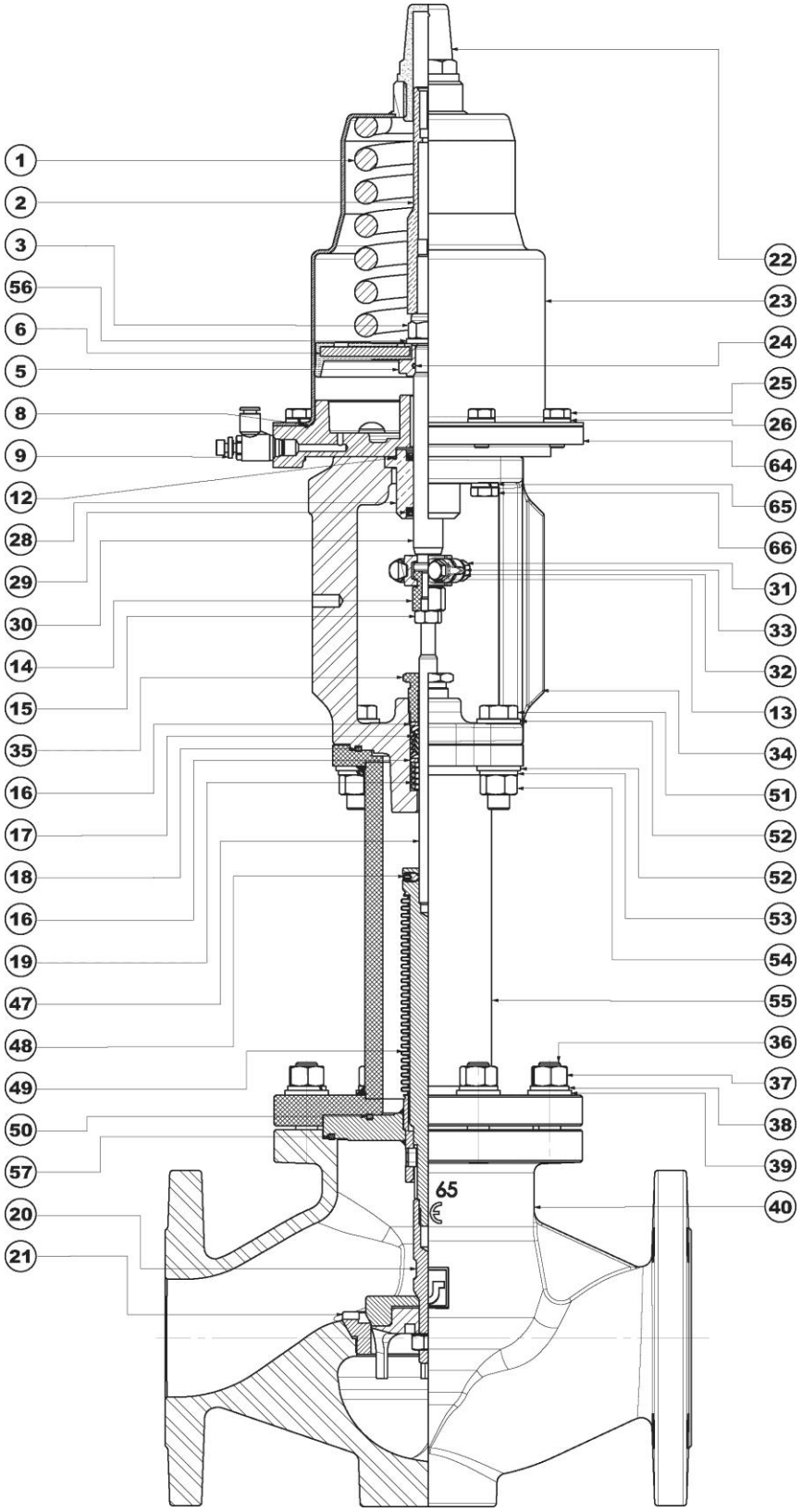
7.17.1 Disassembly

1) Separate the valve body from the servo control as described in paragraph 7.7
2) Unscrew the nuts (37), extract the spring washers (38), the plain washers (39) and the frame extension (55).
3) Extract the intermediate body with bellows (49) with bellows upper stem (47) and shutter (20) connected with it from the valve body (40).
4) Extract the headless screw (48), the bellows upper stem (47) and shutter (20) from the intermediate body with bellows (49).
5) Remove gaskets (50) and (57) from intermediate body with bellows.
6) Now the valve body has been completely disassembled, so that the required components can be replaced.

7.17.2 Assembly

1) Insert gaskets (57) and (50) into intermediate body with bellows.
2) Screw shutter (20) to intermediate body with bellows (49), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
3) Tighten the bellows upper stem (47) and fasten by headless screw (48).
4) Insert the intermediate body with bellows assembled inside the valve body (40).
5) Place the frame extension (55) inside the intermediate body with bellows in correspondence with stud-bolts (36).
6) Insert the plain washers (39) and the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 5.
7) Now the valve body is fully assembled and can be reconnected to the servo control as described in paragraph 7.7

Sectional View of valve GRS/10 ND 65#80 2 VIE N.C. D.V. with bellows



Drawing No. 100688 Rev.:01

7.18 Disassembly and assembly instructions for GRS/10 3 WAY with bellows

For the disassembly and assembly operations of the valves, refer to Dwg. No. 090941 attached hereby.
Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely.
NOTE: Read the procedures thoroughly before starting any operation.

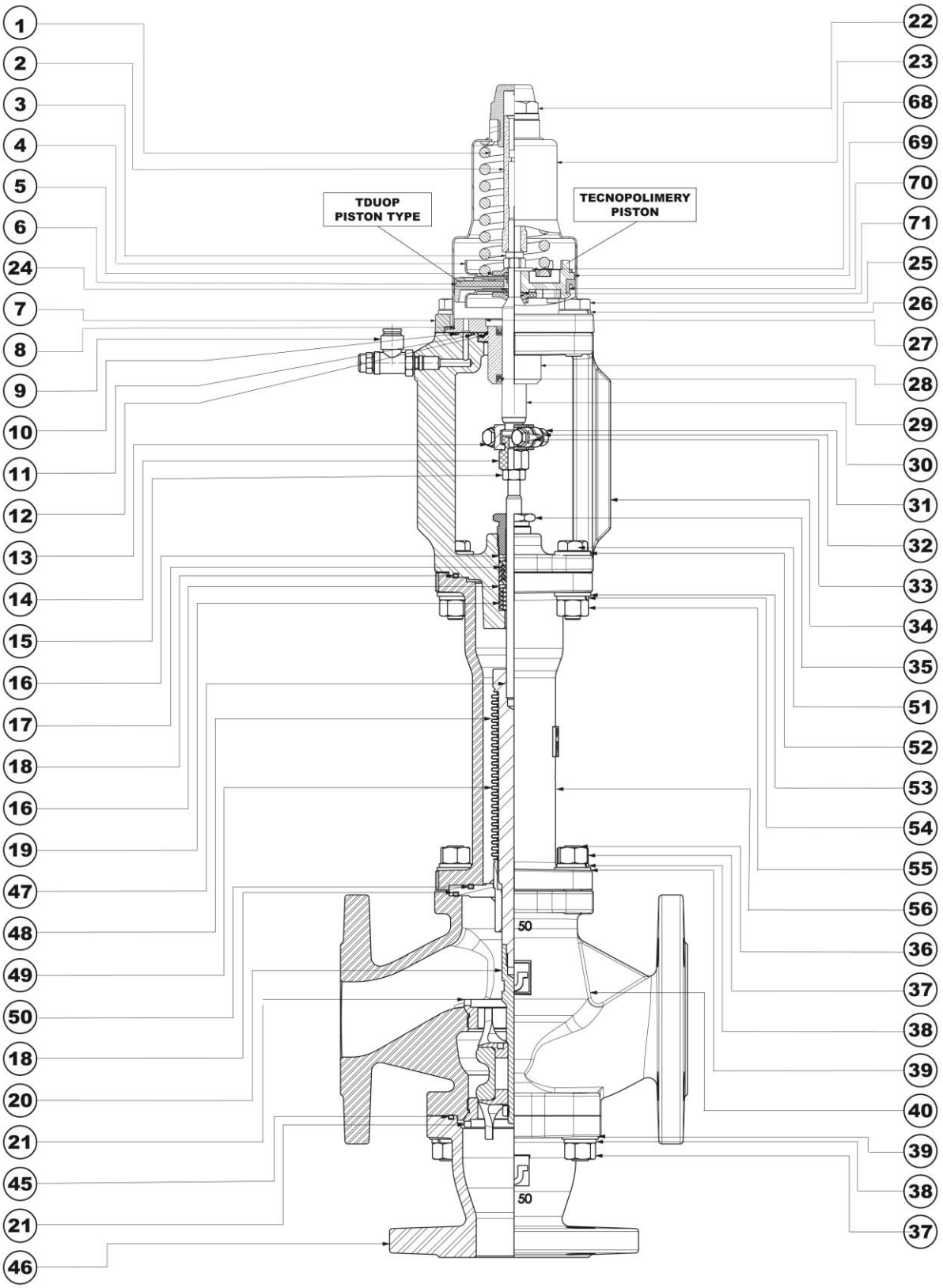
7.18.1 Disassembly

1) Separate the valve body from the servo control as described in paragraph 7.7
2) Unscrew the lower nuts (37), extract the spring washers (38) and the plain washers (39).
3) Separate the bottom base (46) from the valve body (40).
4) Extract the bottom base gasket (45).
5) Untighten the lower seat (21) and the shutter (20) from the intermediate body with bellows (49).
6) Unscrew the nuts (37), extract the spring washers (38), the plain washers (39) and the frame extension (55).
7) Extract the intermediate body with bellows (49) with bellows upper stem (47) connected with it from the valve body (40).
8) Extract the headless screw (48) and the bellows upper stem (47) from the intermediate body with bellows (49).
9) Remove gaskets (50) and (18) from intermediate body with bellows.
10) Now the valve has been completely disassembled, so that the required components can be replaced.

7.18.2 Reassembly

1) Insert gaskets (18) and (50) into intermediate body with bellows.
2) Tighten the bellows upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
3) Insert the intermediate body with bellows assembled inside the valve body (40).
4) Place the frame extension (55) inside the intermediate body with bellows in correspondence with stud-bolts (36).
5) Insert the plain washers (39) and the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 5.
6) Screw shutter (20) to intermediate body with bellows (49) (through valve body bottom), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
7) Spread MOTORSIL D (AREXONS) silicone gasket in the contact area between seat (21) and valve body (40); then, tighten lower seat (21).
8) Place the gasket (45) in the bottom base (46).
9) Insert the bottom base (46) on the stud-bolts, then insert plain washers (39) and spring washers (38) and torque tighten the lower nuts (37) according to table 5.
10) Now the valve body is fully assembled and can be reconnected to the servo control as described in paragraph 7.7

Sectional View of valve GRS/10 3 VIE N.C. D.V. R.P. with bellows



Drawing No. 090941 Rev.:00

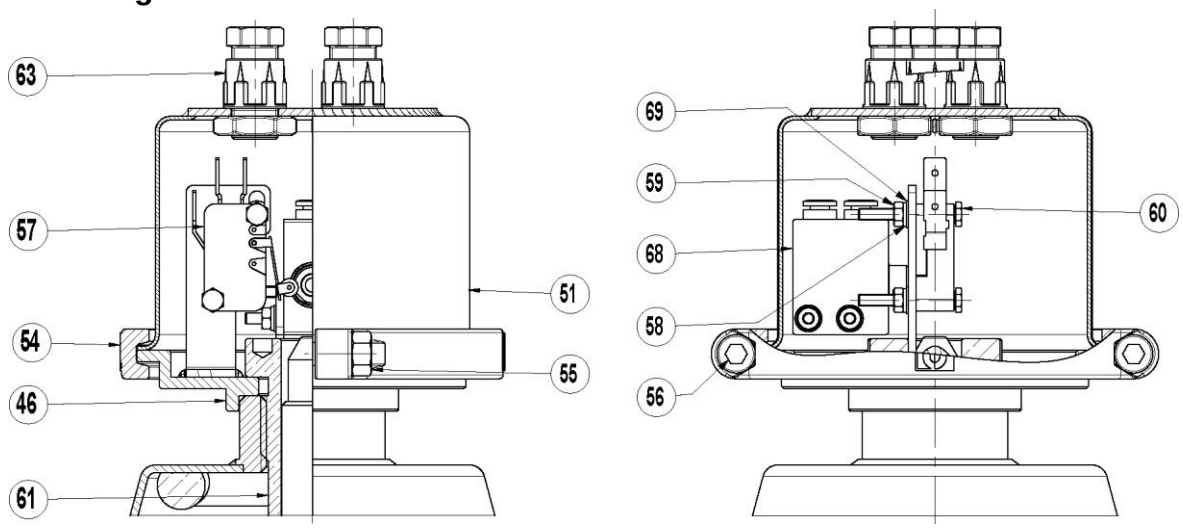
7.19 Micro holding box removal, wiring and refitting

For the disassembly and assembly operations of the valves, refer to Dwg. No. 090194 attached hereby.
Assembly and disassembly operations shall be carried out only by personnel qualified in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.
NOTE: Read the procedures thoroughly before starting any operation.

7.19.1 Micro holding box removal and refitting

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

Micro holding box Sectional view



Drawing no. 090194 Rev.:00

7.20 Instructions for the disassembly, the sensor and micro-switch replacement and the re-assembly of the plastic micro holding box.

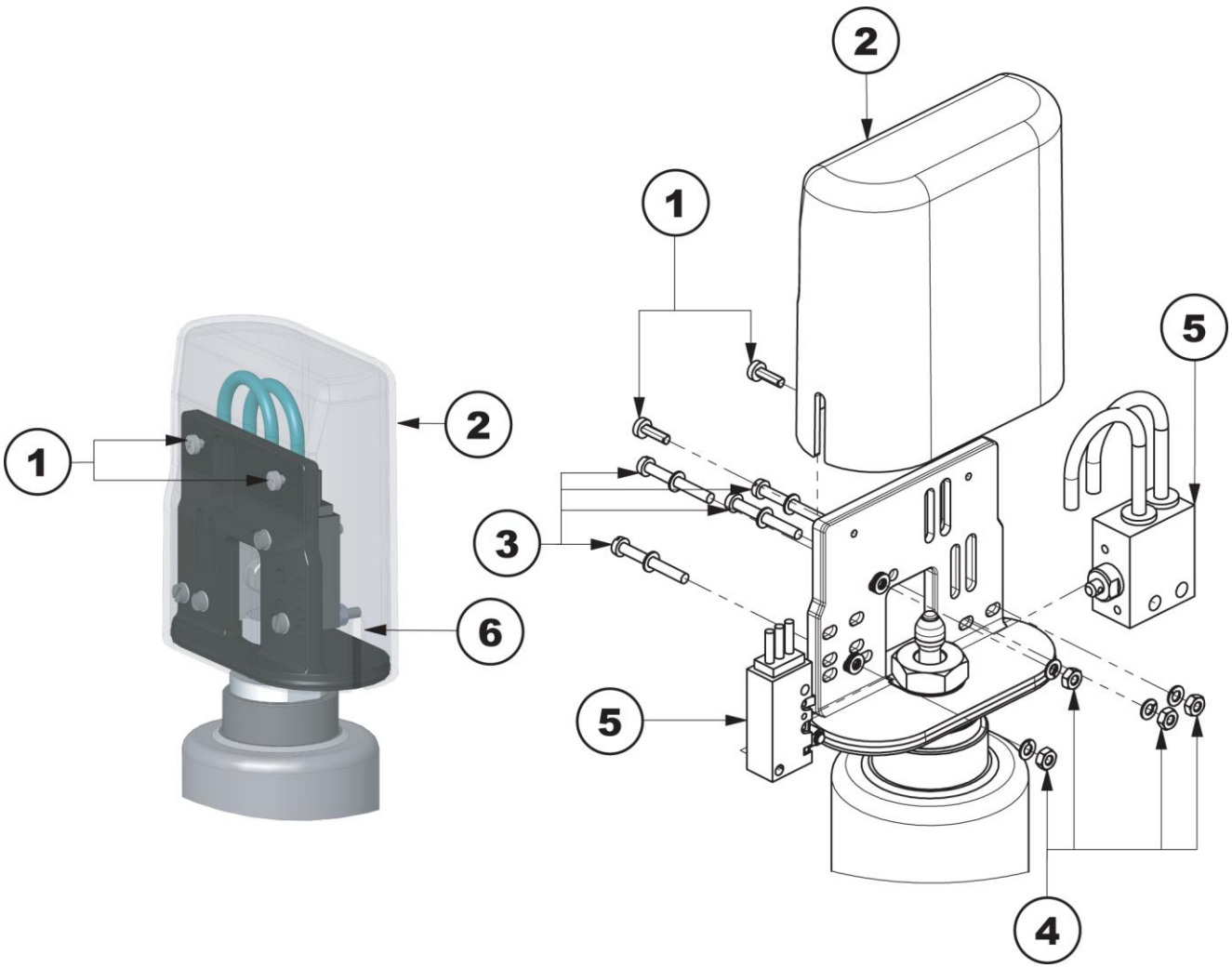
For the limit switch door unit disassembly and re-assembly operations, please refer to the figure below.
Assembly and disassembly operations shall be carried out only by personnel qualified in electrotechnics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.

NOTE: Thoroughly read the procedures before proceeding with operation.

7.20.1 Disassembly and re-assembly of the plastic micro holding box

1) Unscrew the cylinder head screws with cross tip (1).
2) Remove the limit switch unit guard (2).
3) Unscrew the nuts (4) locking the sensors or the micro switches. Remove the cylinder head screws (3), then remove the sensors or the micro switches (5).
4) Install the new sensors and/or micro switches on the limit switch holding plate using the cylinder head screws (3) and the nuts (4).
5) Pneumatically operate the valve, to adjust the position of the new sensors or of the micro switches.
6) Reinstall the guard (2) of the limit switch unit, taking care to route the electric cables and the pneumatic pipe through the slot (6), to prevent them from getting damaged if pinched between the guard and the plate.
7) Lock the limit switch unit holding guard (2) by tightening the cylinder head screws (1).

7.20.2 Plastic micro holding box



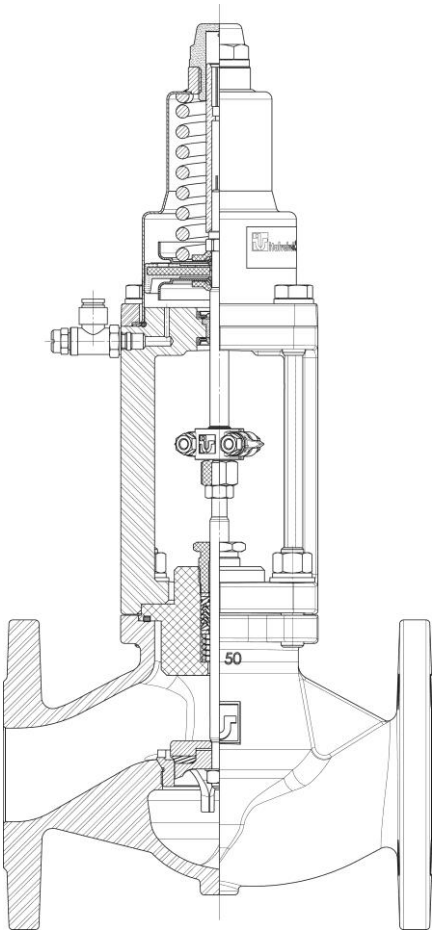
GRS/10 Valves – Constructive shapes

At first they have been produced in two a little different constructive shapes:

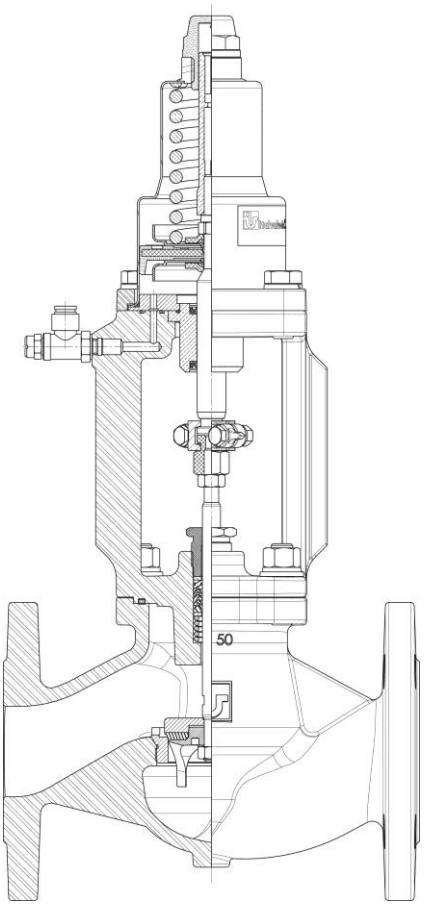
1. First constructive shape: it has been used a grey cast iron mounting and a galvanized ASTM A105 intermediate body;
2. Second constructive shape: it has been used a mounting complete with the intermediate CCCI body casting (one piece only). The second constructive shape is considered as standard constructive shape.

The two constructive shapes use the same spare part code for the body side, but two different codes for the air side. In the following vertical section drawings we have indicated the two codes of the spare parts air side. We have indicated with the letters CCCI the drawing relevant to the second constructive shape.

The user will easily understand to which constructive shapes its valve belongs (between the two). He will analyze whether the intermediate body and the mounting is one piece only: in this case it belongs to the second constructive shape.
In case the mounting and the intermediate body are two pieces it belongs to the first construction shape.



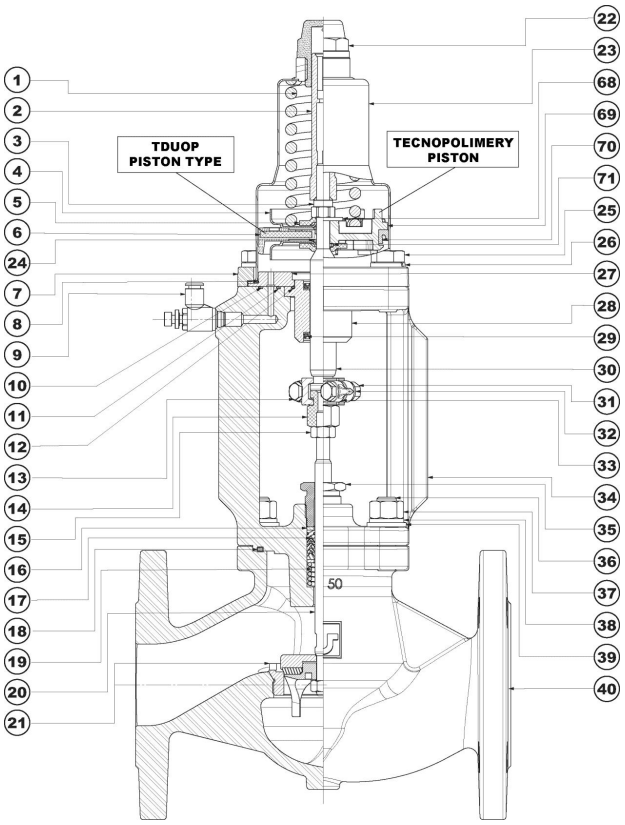
1. FIRST CONSTRUCTIVE SHAPE

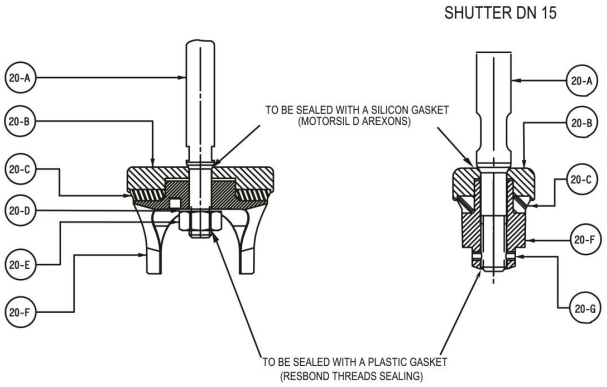


2. SECOND CONSTRUCTIVE SHAPE (CCCI)

7.21 Parts and spare parts GRS/10 ND 15#50 2-WAYS N.C. D.V.

No.	DESCRIPTION		MATERIAL	
			Version GJL-250	Version GJS-500-7
1	Spring		Steel for springs	
2	Stroke indicator		Red PVC	
3	Self- locking nut		Galvanized STEEL	
4	Piston bearing		Galvanized iron P04	
5	Piston bearing washer		Galvanized iron P04	
6	TDUOP gasket		NBR+Acc.	
7	Fastening plate		GJS-500-7	
8	O-Ring gasket		NBR	
9	Flow rate adjuster		BRASS+TECHNOPOLYMER	
10	O-Ring gasket		NBR	
11	O-Ring gasket		NBR	
12	O-Ring gasket		NBR	
13	Hexagon head screw		Galvanized CL.8.8 STEEL	
14	Adjustment nut		Galvanized Fe 430 B	
15	Hexagon nut		Galvanized CL.8 STEEL	
16	Distance ring washer		S31600/1.4301	
17	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
18	Body gasket		NOVATEC O KEVLAR+GRAFITE	
19	Packing gland spring		S31600	
20	Shutter	T.PK.	S30400+PEEK	
		T.M.	S30400	
21	Seat		S30400	
22	Transparent cap		PP FV30	
23	Spring housing cylinder		S30400	
24	O-Ring gasket		NBR	
25	Hexagon head screw		S30400	
26	Spring washer		S30400	
27	GRS valve adapter		Galvanized Fe 430 B	
28	Jig bushing		CuZn40Pb2	
29	BA gasket		NBR	
30	Servo control stem		S30400	
31	Hexagon nut		Galvanized CL.8 STEEL	
32	Spring washer		Galvanized STEEL	
33	Clamp		CF8	
34	Valve frame		GJL-250	
35	Packing gland screw		Galvanized CF9SMnPb36 STEEL	
36	Stud-bolts		Galvanized CL.8.8 STEEL	
37	Hexagon nut		Galvanized CL.8 STEEL	
38	Spring washer		Galvanized STEEL	
39	Flat washer		Galvanized STEEL	
40	Valve body		GJL-250	GJS-500-7
68	Flat washer		Fe 360	
69	Piston		PA 66 FV 30	
70	DE gasket		NBR	
71	O-Ring gasket		GACO	





Body side spare parts

ND	SPARE PART CODE (1) (Part. No. 17/18/19/20-C/20-D/20-E/20-G)	
	SHUTTER T.PK.	SHUTTER T.M.
15	15349	12558
20	13529	
25	13449	
32	13539	11749
40	12545	
50	12546	

(1) Parts 20-C/20-D/20-E are for valves with plastic seals ND20#50only. Parts 20-C/20-G are for valves with plastic seals ND15 only.

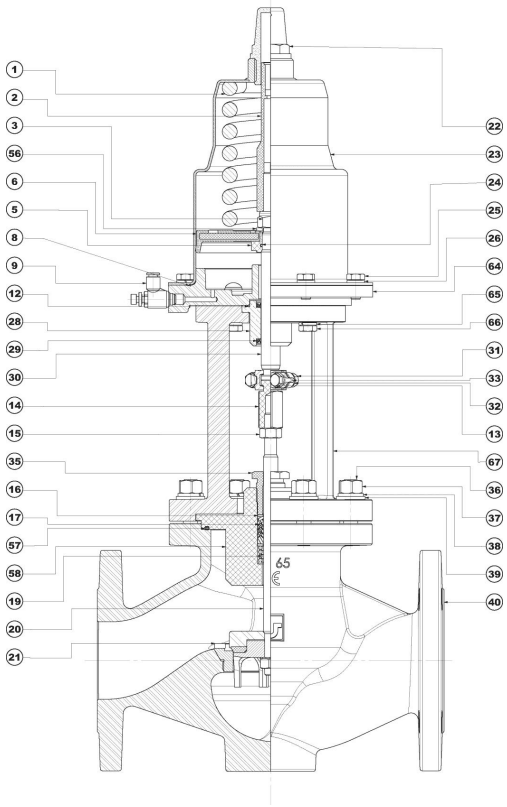
Air side spare parts

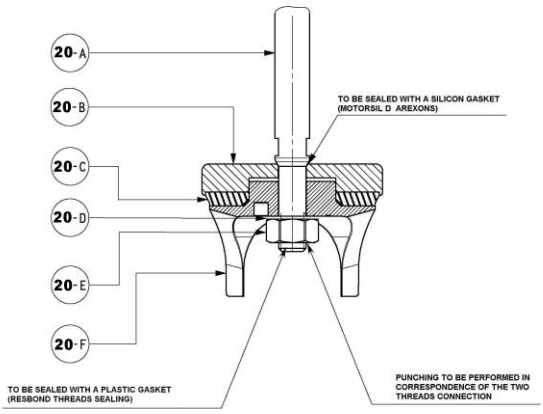
Ø servo control	SPARE PART CODE (Part No. 8/10/11/12/29/68/69/70/71)
Ø 70	2705
Ø 70 CCCI(2)	11668
Ø 80	2708
Ø 80 CCCI(2)	11669

(2) CCCI: intermediate body and mounting in one piece only version

7.22 ND 65#80 2 WAYS N.C. D.V.

No.	DESCRIPTION		MATERIAL	
			Version GJL-250	Version GJS-500-7
1	Spring		Steel for springs	
2	Stroke indicator		Red PVC	
3	Self- locking nut		Galvanized STEEL	
5	Piston bearing washer		Galvanized ASTM A105	
6	TDUOP gasket		NBR + Steel.	
8	O-Ring gasket		NBR	
9	Flow rate adjuster		BRASS+TECHNOPOLYMER	
12	O-Ring gasket		NBR	
13	Hexagon head screw		Galvanized CL.8.8 STEEL	
14	Adjustment nut		Galvanized Fe 430 B	
15	Hexagon nut		Galvanized CL.8 STEEL	
16	Distance ring washer		S31600/1.4301	
17	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
19	Packing gland spring		S31600	
20	Shutter	T.PK.	S30400+PEEK	
		T.M.	S30400	
21	Seat		S30400	
22	Transparent cap		PP FV30	
23	Spring housing cylinder		S30400	
24	O-Ring gasket		NBR	
25	Hexagon head screw		S30400	
26	Spring washer		S30400	
28	Jig bushing		CuZn40Pb2	
29	BA gasket		NBR	
30	Servo control stem		S30400	
31	Hexagon nut		Galvanized CL.8 STEEL	
32	Spring washer		Galvanized STEEL	
33	Clamp		CF8	
35	Packing gland screw		Galvanized CF9SMnPb36 STEEL	
36	Stud-bolts		Galvanized CL.8.8 STEEL	
37	Hexagon nut		Galvanized CL.8 STEEL	
38	Spring washer		Galvanized STEEL	
39	Flat washer		Galvanized STEEL	
40	Valve body		GJL-250	GJS-500-7
56	Flat washer		Galvanized STEEL	
57	Body gasket		NOVATEC O KEVLAR+GRAFITE	
58	Intermediate body		Galvanized Fe 430 B	
64	Servo control plate		GJS-400-18-RT	
65	Spring washer		Galvanized STEEL	
66	Hexagon head screw		Galvanized CL.8.8 STEEL	
67	Frame valve		GJS-400-18-RT	





Body side spare parts

ND	SPARE PART CODE [1](Part. N° 17/19/20-C/20-D/20-E/57)	
	SHUTTER T.PK.	SHUTTER T.M.
65	14951	15264
80	14952	

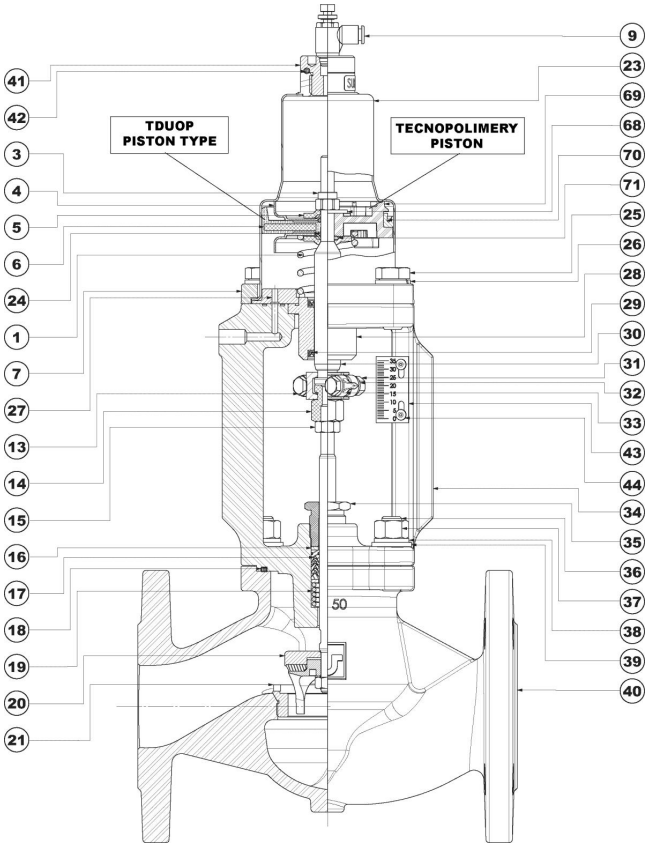
[1] Parts 20-C/20-D/20-E are for valves with plastic seals only

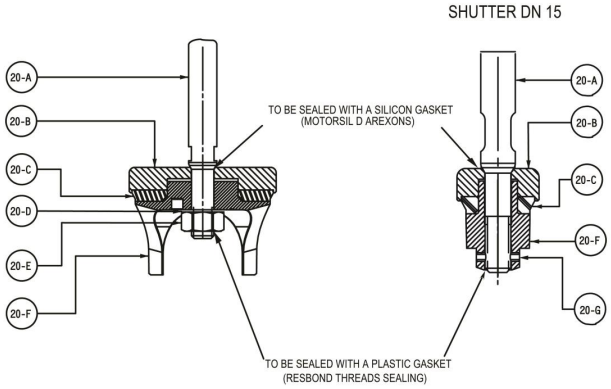
Air side spare parts

Ø servo control	SPARE PART CODE (Part. N° 6/8/12/24/29)
Ø 125	12420

7.23 Parts and spare parts GRS/10 ND 15#50 2-WAYS N.O.

No.	DESCRIPTION		MATERIAL	
			Version GJL-250	Version GJS-500-7
1	Spring		Acc. for springs	
3	Self- locking nut		Galvanized STEEL	
4	Piston bearing		Galvanized iron P04	
5	Piston bearing washer		Galvanized iron P04	
6	TDUOP gasket		NBR+Acc.	
7	Fastening plate		GJS-500-7	
9	Flow rate adjuster		BRASS+TECHNOPOLYMER	
13	Hexagon head screw		Galvanized white CL. 8.8 STEEL	
14	Adjustment nut		Galvanized Fe 430 B	
15	Hexagon nut		Galvanized white CL. 8 STEEL	
16	Distance ring washer		S31600	
17	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
18	Body gasket		NOVATEC O KEVLAR+GRAFITE	
19	Packing gland spring		S31600	
20	Shutter	T.PK.	S30400+PEEK	
		T.M.	S30400	
21	Seat		S30400	
23	Spring housing cylinder		S30400	
24	O-Ring gasket		NBR	
25	Hexagon head screw		S30400	
26	Spring washer		S30400	
27	GRS valve adapter		Galvanized Fe 430 B	
28	Jig bushing		CuZn40Pb2	
29	BA gasket		NBR	
30	Servo control stem		S30400	
31	Hexagon nut		Galvanized CL.8 STEEL	
32	Spring washer		Galvanized STEEL	
33	Clamp		CF8	
34	Valve frame		GJL-250	
35	Packing gland screw		Galvanized CF9SMnPb36 STEEL	
36	Stud-bolts		Galvanized CL.8.8 STEEL	
37	Hexagon nut		Galvanized CL.8 STEEL	
38	Spring washer		Galvanized STEEL	
39	Flat washer		Galvanized STEEL	
40	Valve body		GJL-250	GJS-500-7
41	Air inlet fitting		S30400	
42	O-Ring gasket		NBR	
43	Stroke indicator		Aluminium	
44	Tear away rivet		Aluminium	
68	Flat washer		Fe 360	
69	Piston		PA 66 FV 30	
70	DE gasket		NBR	
71	O-Ring gasket		GACO	





Body side spare parts

ND	SPARE PART CODE (1) (Part. No. 17/18/19/20-C/20-D/20-E/20-G)	
	SHUTTER T.PK.	SHUTTER T.M.
15	15349	12558
20	13529	
25	13449	
32	13539	11749
40	12545	
50	12546	

(1) Parts 20-C/20-D/20-E are for valves with plastic seals ND20#50only. Parts 20-C/20-G are for valves with plastic seals ND15 only.

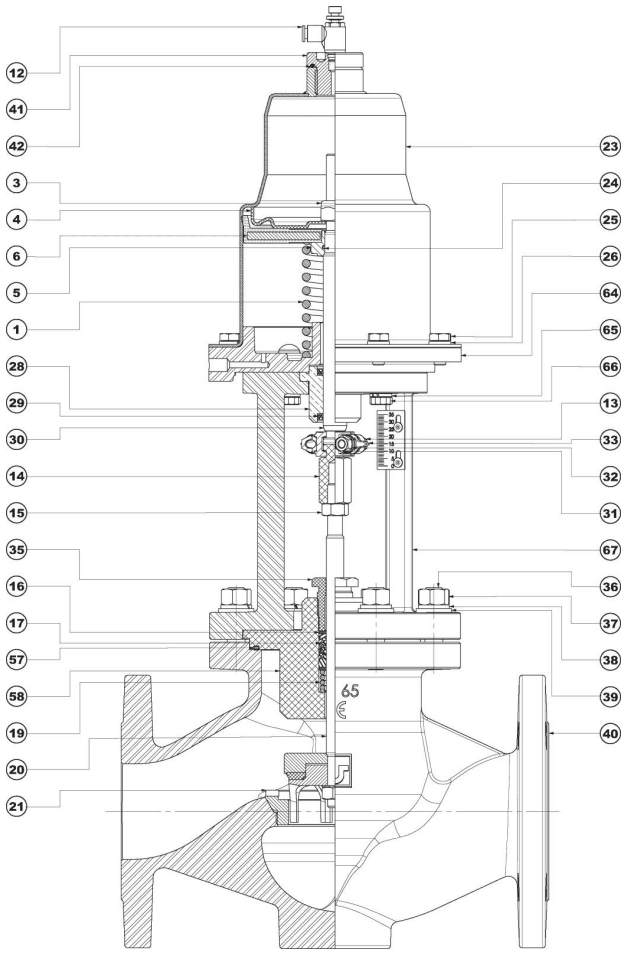
Air side spare parts

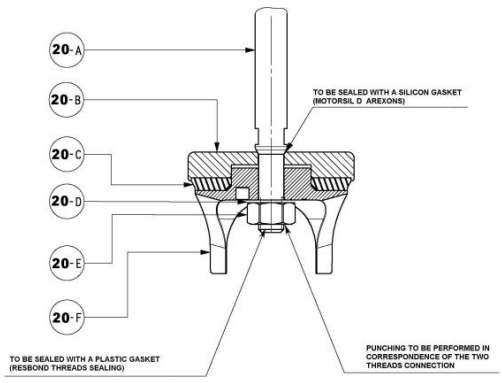
Ø servo control	SPARE PART CODE (Part No. 29/42/68/69/70/71)
Ø 70	3953
Ø 70 CCCI(2)	11670
Ø 80	3954
Ø 80 CCCI(2)	11671

(2) CCCI: intermediate body and mounting in one piece only version

7.24 Parts and spare parts GRS/10 ND 65#80 2 WAYS N.O.

No.	DESCRIPTION		MATERIAL	
			Version GJL-250	Version GJS-500-7
1	Spring		Steel for springs	
3	Self- locking nut		Galvanized STEEL	
4	Piston bearing		Galvanized iron P04	
5	Piston bearing washer		Galvanized ASTM A105	
6	TDUOP gasket		NBR + Steel.	
9	Flow rate adjuster		BRASS+TECHNOPOLYMER	
13	Hexagon head screw		Galvanized CL.8.8 STEEL	
14	Adjustment nut		Galvanized Fe 430 B	
15	Hexagon nut		Galvanized CL.8 STEEL	
16	Distance ring washer		S31600/1.4301	
17	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
19	Packing gland spring		S31600	
20	Shutter	T.PK.	S30400+PEEK	
		T.M.	S30400	
21	Seat		S30400	
23	Spring housing cylinder		S30400	
24	O-Ring gasket		NBR	
25	Hexagon head screw		S30400	
26	Spring washer		S30400	
28	Jig bushing		CuZn40Pb2	
29	BA gasket		NBR	
30	Servo control stem		S30400	
31	Hexagon nut		Galvanized CL.8 STEEL	
32	Spring washer		Galvanized STEEL	
33	Clamp		CF8	
35	Packing gland screw		Galvanized CF9SMnPb36 STEEL	
36	Stud-bolts		Galvanized CL.8.8 STEEL	
37	Hexagon nut		Galvanized CL.8 STEEL	
38	Spring washer		Galvanized STEEL	
39	Flat washer		Galvanized STEEL	
40	Valve body		GJL-250	GJS-500-7
41	Air inlet fitting		S30400	
42	O-Ring gasket		NBR	
57	Body gasket		NOVATEC O KEVLAR+GRAFITE	
58	Intermediate body		Galvanized Fe 430 B	
64	Servo control plate		GJS-400-18-RT	
65	Spring washer		Galvanized STEEL	
66	Hexagon head screw		Galvanized CL.8.8 STEEL	
67	Frame valve		GJS-400-18-RT	





Body side spare parts

ND	SPARE PART CODE (1)(Part. N° 17/19/20-C/20-D/20-E/57)	
	SHUTTER T.PK.	SHUTTER T.M.
65	14951	15264
80	14952	

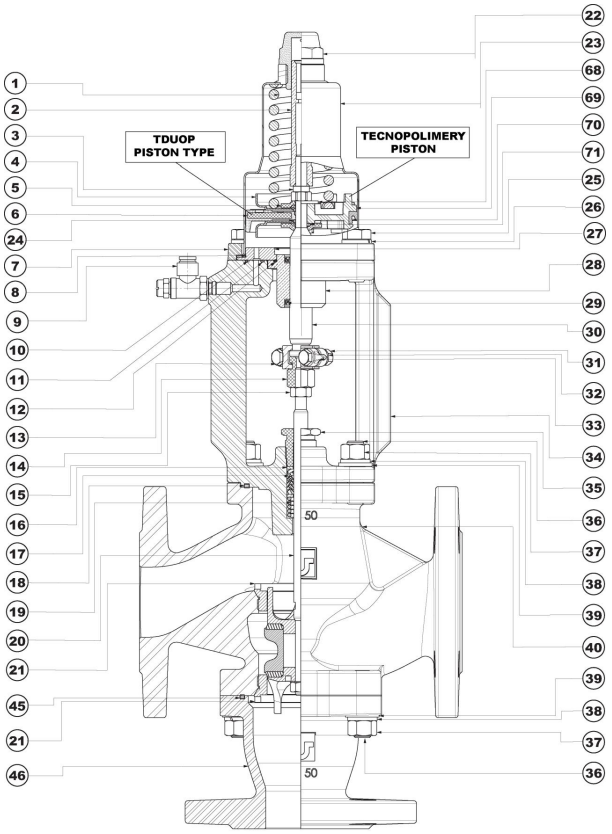
(1) Parts 20-C/20-D/20-E are for valves with plastic seals only

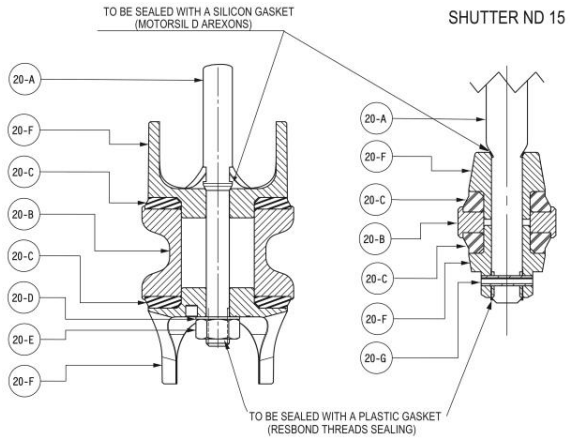
Air side spare parts

Ø servo control	SPARE PART CODE (Part. N° 6/24/29/42)
Ø 125	10316

7.25 Parts and spare parts GRS/10 ND 15#50 3 D N.C. D.V.

No.	DESCRIPTION		MATERIAL	
			Version GJL-250	Version GJS-500-7
1	Spring		Acc. for springs	
2	Stroke indicator		Red PVC	
3	Self- locking nut		Galvanized STEEL	
4	Piston bearing		Galvanized iron P04	
5	Piston bearing washer		Galvanized iron P04	
6	TDUOP gasket		NBR+Acc.	
7	Fastening plate		GJS-500-7	
8	O-Ring gasket		NBR	
9	Flow rate adjuster		BRASS+TECHNOPOLYMER	
10	O-Ring gasket		NBR	
11	O-Ring gasket		NBR	
12	O-Ring gasket		NBR	
13	Hexagon head screw		Galvanized white CL. 8.8 STEEL	
14	Adjustment nut		Galvanized Fe 430 B	
15	Hexagon nut		Galvanized white CL. 8 STEEL	
16	Distance ring washer		S31600	
17	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
18	Body gasket		NOVATEC O KEVLAR+GRAFITE	
19	Packing gland spring		S31600	
20	Shutter	T.PK.	S30400+PEEK	
		T.M.	S30400	
21	Seat		S30400	
22	Transparent cap		PP FV30	
23	Spring housing		S30400	
24	O-Ring gasket		NBR	
25	Hexagon head screw		S30400	
26	Spring washer		S30400	
27	GRS valve adapter		Fe 430 B galvanized	
28	Jig bushing		CuZn40Pb2	
29	BA gasket		NBR	
30	Servo control stem		S30400	
31	Hexagon nut		Galvanized CL.8 STEEL	
32	Spring washer		Galvanized STEEL	
33	Clamp		CF8	
34	Valve frame		GJL-250	
35	Packing gland screw		Galvanized CF9SMnPb36 STEEL	
36	Stud-bolts		Galvanized CL.8.8 STEEL	
37	Hexagon nut		Galvanized CL.8 STEEL	
38	Spring washer		Galvanized STEEL	
39	Flat washer		Galvanized STEEL	
40	Valve body		GJL-250	GJS-500-7
45	Bottom base gasket		NOVATEC O KEVLAR+GRAFITE	
46	Third way bottom base		GJL-250	GJS-500-7
68	Flat washer		Fe 360	
69	Piston		PA 66 FV 30	
70	DE gasket		NBR	
71	O-Ring gasket		GACO	





Body side spare parts

DN	SPARE PART CODE (1) (Part No. 17/18/19/20-C/20-D/20-E/20-G/45)	
	SHUTTER T.PK.	SHUTTER T.M.
15	14954	13533
20	13531	
25	13451	12555
32	13541	12556
40	12549	12557
50	13454	11961

(1) *Parts 20-C/20-D/20-E are for valves with plastic seals ND20#50only. Parts 20-C/20-G are for valves with plastic seals ND15 only.*

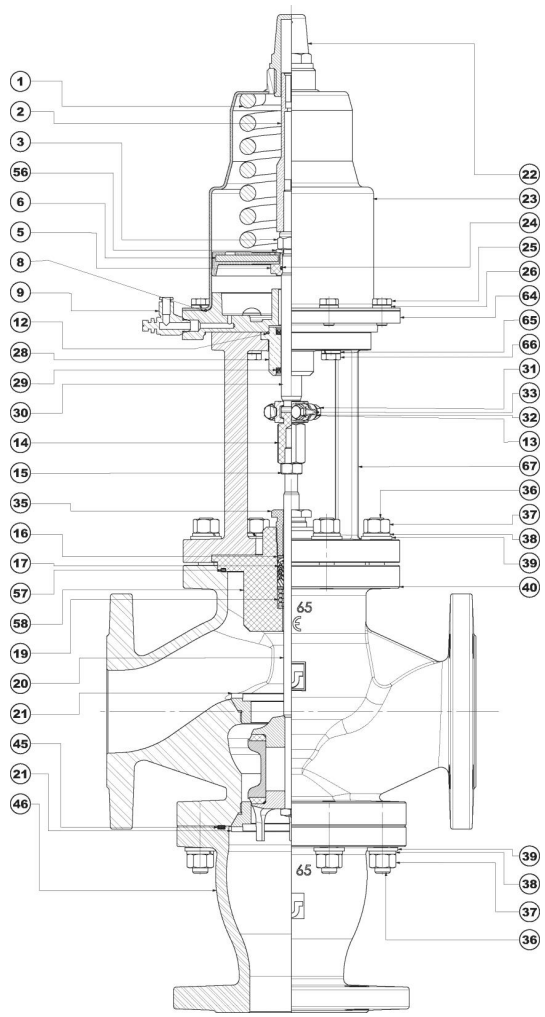
Air side spare parts

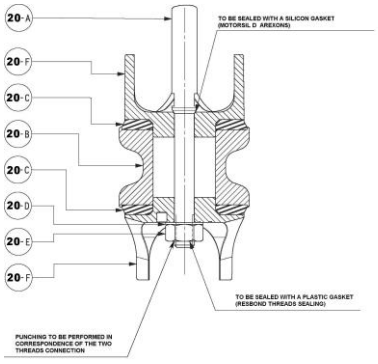
Ø servo control	SPARE PART CODE (Part No. 8/10/11/12/29/68/69/70/71)
Ø 70	2705
Ø 70 CCCI(2)	11668
Ø 80	2708
Ø 80 CCCI(2)	11669

(2) CCCI: intermediate body and mounting in one piece only version

7.26 Parts and spare parts GRS/10 ND 65#80 3 D N.C. D.V.

N°	DESCRIPTION		MATERIAL	
			Version GJL-250	Version GJS-500-7
1	Spring		Acc. for springs	
2	Stroke indicator		Red PVC	
3	Self- locking nut		Galvanized STEEL	
5	Piston bearing washer		Galvanized ASTM A105	
6	TDUOP gasket		NBR + Steel.	
8	O-Ring gasket		NBR	
9	Flow rate adjuster		BRASS+TECHNOPOLYMER	
12	O-Ring gasket		NBR	
13	Hexagon head screw		Galvanized CL.8.8 STEEL	
14	Adjustment nut		Galvanized Fe 430 B	
15	Hexagon nut		Galvanized CL.8 STEEL	
16	Distance ring washer		S31600/1.4301	
17	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
19	Packing gland spring		S31600	
20	Shutter	T.PK.	S30400+PEEK	
		T.M.	S30400	
21	Seat		S30400	
22	Transparent cap		PP FV30	
23	Spring housing cylinder		S30400	
24	O-Ring gasket		NBR	
25	Hexagon head screw		S30400	
26	Spring washer		S30400	
28	Jig bushing		CuZn40Pb2	
29	BA gasket		NBR	
30	Servo control stem		S30400	
31	Hexagon nut		Galvanized CL.8 STEEL	
32	Spring washer		Galvanized STEEL	
33	Clamp		CF8	
35	Packing gland screw		Galvanized CF9SMnPb36 STEEL	
36	Stud-bolts		Galvanized CL.8.8 STEEL	
37	Hexagon nut		Galvanized CL.8 STEEL	
38	Spring washer		Galvanized STEEL	
39	Flat washer		Galvanized STEEL	
40	Valve body		GJL-250	GJS-500-7
45	Bottom gasket		NOVATEC O KEVLAR+GRAFITE	
46	Third way bottom base		GJL-250	GJS-500-7
56	Flat washer		Galvanized STEEL	
57	Body gasket		NOVATEC O KEVLAR+GRAFITE	
58	Intermediate body		Galvanized Fe 430 B	
64	Servo control plate		GJS-400-18-RT	
65	Spring washer		Galvanized STEEL	
66	Hexagon head screw		Galvanized CL.8.8 STEEL	
67	Frame valve		GJS-400-18-RT	





Body side spare parts

ND	SPARE PART CODE (1) (Part. N° 17/19/20-C/20-E/45/57)	
	SHUTTER T.PK.	SHUTTER T.M.
65	13692	13693
80	14955	14956

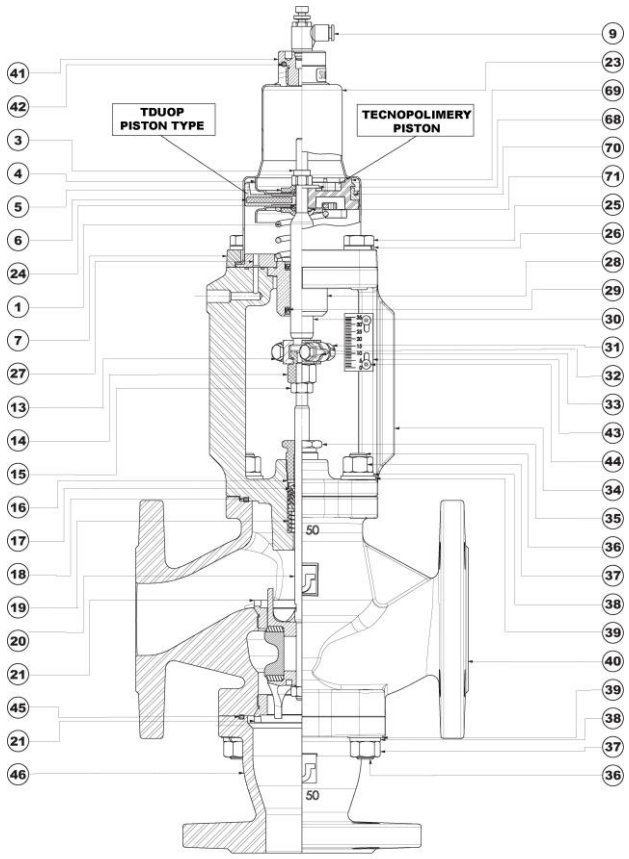
Air side spare parts

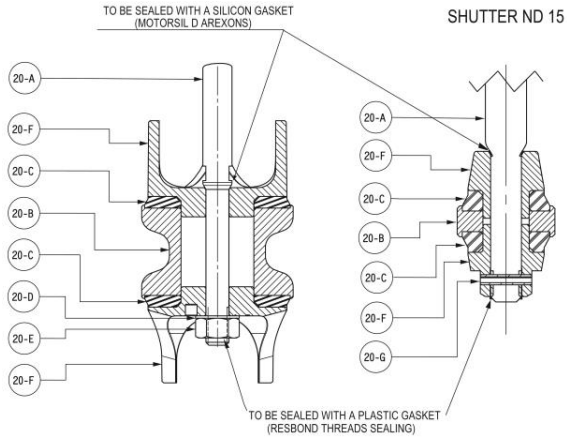
Ø servo control	SPARE PART CODE (Part. N° 6/8/12/24/29)
Ø 125	12420

(1) Parts 20-C/20-E are for valves with plastic seals only

7.27 Parts and spare parts GRS/10 ND 15#50 3 D N.O.

No.	DESCRIPTION		MATERIAL	
			Version GJL-250	Version GJS-500-7
1	Spring		Acc. for springs	
3	Self- locking nut		Galvanized STEEL	
4	Piston bearing		Galvanized iron P04	
5	Piston bearing washer		Galvanized iron P04	
6	TDUOP gasket		NBR+Acc.	
7	Fastening plate		GJS-500-7	
9	Flow rate adjuster		BRASS+TECHNOPOLYMER	
13	Hexagon head screw		Galvanized CL.8.8 STEEL	
14	Adjustment nut		Galvanized Fe 430 B	
15	Hexagon nut		Galvanized CL.8 STEEL	
16	Distance ring washer		S31600	
17	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
18	Body gasket		NOVATEC O KEVLAR+GRAFITE	
19	Packing gland spring		S31600	
20	Shutter	T.PK.	S30400+PEEK	
		T.M.	S30400	
21	Seat		S30400	
23	Spring housing		S30400	
24	O-Ring gasket		NBR	
25	Hexagon head screw		S30400	
26	Spring washer		S30400	
27	GRS valve adapter		Galvanized Fe 430	
28	Jig bushing		CuZn40Pb2	
29	BA gasket		NBR	
30	Servo control stem		S30400	
31	Hexagon nut		Galvanized CL.8 STEEL	
32	Spring washer		Galvanized STEEL	
33	Clamp		CF8	
34	Valve frame		GJL-250	
35	Packing gland screw		Galvanized CF9SMnPb36 STEEL	
36	Stud-bolts		Galvanized CL.8.8 STEEL	
37	Hexagon nut		Galvanized CL.8 STEEL	
38	Spring washer		Galvanized STEEL	
39	Flat washer		Galvanized STEEL	
40	Valve body		GJL-250	GJS-500-7
41	Air inlet fitting		S30400	
42	O-Ring gasket		NBR	
43	Stroke indicator		Aluminium	
44	Tear away rivet		Aluminium	
45	Bottom gasket		NOVATEC O KEVLAR+GRAFITE	
46	Third way bottom base		GJL-250	GJS-500-7
68	Flat washer		Fe 360	
69	Piston		PA 66 FV 30	
70	DE gasket		NBR	
71	O-Ring gasket		GACO	





Body side spare parts

DN	SPARE PART CODE (1) (Part No. 17/18/19/20-C/20-D/20-E/20-G/45)	
	SHUTTER T.P.	SHUTTER T.M.
15	14954	13533
20	13531	
25	13451	12555
32	13541	12556
40	12549	12557
50	13454	11961

(1) *Parts 20-C/20-D/20-E are for valves with plastic seals ND20#50only. Parts 20-C/20-G are for valves with plastic seals ND15 only.*

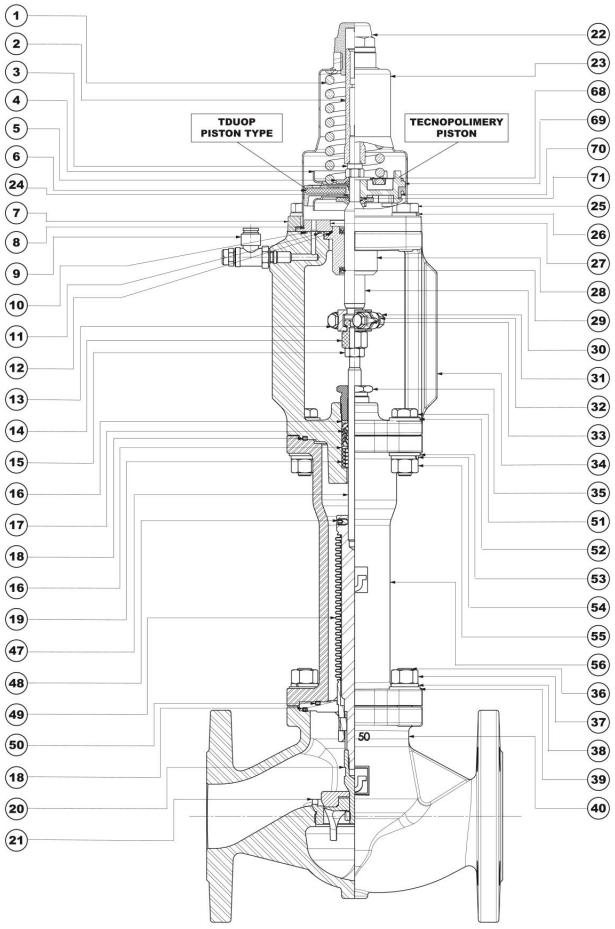
Air side spare parts

Ø servo control	SPARE PART CODE (Part No. 29/42/68/69/70/71)
Ø 70	3953
Ø 70 CCCI(2)	11670
Ø 80	3954
Ø 80 CCCI(2)	11671

(2) CCCI: intermediate body and mounting in one piece only version

7.28 Parts and spare parts GRS/10 2-WAY N.C. D.V. with bellows

No.	DESCRIPTION	MATERIAL
		Version GJS-500-7
1	Spring	Acc. for springs
2	Stroke indicator	Red PVC
3	Self- locking nut	Galvanized STEEL
4	Piston bearing	Galvanized iron P04
5	Piston bearing washer	Galvanized iron P04
6	TDUOP gasket	NBR+Acc.
7	Fastening plate	GJS-500-7
8	O-Ring gasket	NBR
9	Flow rate adjuster	BRASS+TECHNOPOLYMER
10	O-Ring gasket	NBR
11	O-Ring gasket	NBR
12	O-Ring gasket	NBR
13	Hexagon head screw	Galvanized CL.8.8 STEEL
14	Adjustment nut	Galvanized Fe 430 B
15	Hexagon nut	Galvanized CL.8 STEEL
16	Distance ring washer	S31600/1.4301
17	Packing gland	PTFE + PTFE/GRAPHITE + FPM
18	Body gasket	NOVATEC O KEVLAR+GRAFITE
19	Packing gland spring	S31600
20	Shutter T.M.	S30400
21	Seat	S30400
22	Transparent cap	PP FV30
23	Spring housing cylinder	S30400
24	O-Ring gasket	NBR
25	Hexagon head screw	S30400
26	Spring washer	S30400
27	GRS valve adapter	Galvanized Fe 430 B
28	Jig bushing	CuZn40Pb2
29	BA gasket	NBR
30	Servo control stem	S30400
31	Hexagon nut	Galvanized CL.8 STEEL
32	Spring washer	Galvanized STEEL
33	Clamp	CF8
34	Valve frame	GJL-250
35	Packing gland screw	Galvanized CF9SMnPb36 STEEL
36	Stud-bolts	Galvanized CL.8.8 STEEL
37	Hexagon nut	Galvanized CL.8 STEEL
38	Spring washer	Galvanized STEEL
39	Flat washer	Galvanized STEEL
40	Valve body	GJS-500-7
47	Bellows upper stem	S30400
48	Headless screw	S30400
49	Intermediate body with	S30400 + S31600 L
50	Gasket	NOVATEC O KEVLAR+GRAFITE
51	Hexagon head screw	Galvanized CL.8.8 STEEL
52	Flat washer	Galvanized STEEL
53	Spring washer	Galvanized STEEL
54	Hexagon nut	Galvanized CL.8 STEEL
55	Frame extension	Fe 430 B
68	Flat washer	Fe 360
69	Piston	PA 66 FV 30
70	DE gasket	NBR
71	O-Ring gasket	GACO



Body side spare parts

DN	SPARE PART CODE (Part No. 17/18/19/50)
	SHUTTER T.M.
15	13804
20	
25	12570
32	12571
40	
50	

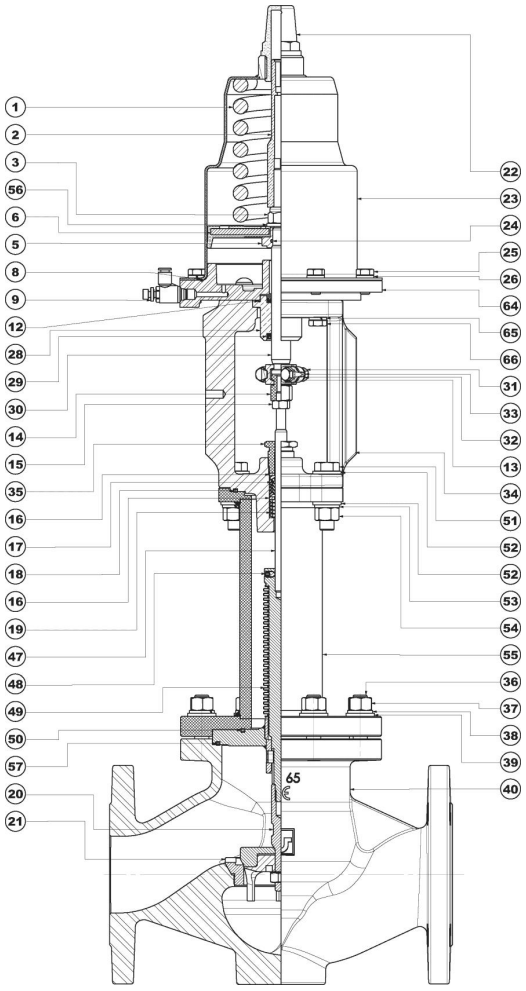
Air side spare parts

Ø servo control	SPARE PART CODE (Part No. 8/10/11/12/29/68/69/70/71)
Ø 70	2705
Ø 70 CCCI[(2)]	11668
Ø 80	2708
Ø 80 CCCI[(2)]	11669

[(2)] CCCI: intermediate body and mounting in one piece only version

7.29 Parts and spare parts GRS/10 ND 65#80 2 WAYS N.C. D.V. with bellows

N°	DESCRIPTION	MATERIAL
		Version GJS-500-7
1	Spring	Acc. for springs
2	Stroke indicator	Red PVC
3	Self- locking nut	Galvanized STEEL
5	Piston bearing washer	Galvanized ASTM A105
6	TDUOP gasket	NBR + Steel.
8	O-Ring gasket	NBR
9	Flow rate adjuster	BRASS+TECHNOPOLYMER
12	O-Ring gasket	NBR
13	Hexagon head screw	Galvanized CL.8.8 STEEL
14	Adjustment nut	Galvanized Fe 430 B
15	Hexagon nut	Galvanized CL.8 STEEL
16	Distance ring washer	S31600/1.4301
17	Packing gland	PTFE + PTFE/GRAPHITE + FPM
18	Body gasket	NOVATEC O KEVLAR+GRAFITE
19	Packing gland spring	S31600
20	Shutter T.M.	S30400
21	Seat	S30400
22	Transparent cap	PP FV30
23	Spring housing cylinder	S30400
24	O-Ring gasket	NBR
25	Hexagon head screw	S30400
26	Spring washer	S30400
28	Jig bushing	CuZn40Pb2
29	BA gasket	NBR
30	Servo control stem	S30400
31	Hexagon nut	Galvanized CL.8 STEEL
32	Spring washer	Galvanized STEEL
33	Clamp	CF8
34	Valve frame	GJL-250
35	Packing gland screw	Galvanized CF9SMnPb36 STEEL
36	Stud-bolts	Galvanized CL.8.8 STEEL
37	Hexagon nut	Galvanized CL.8 STEEL
38	Spring washer	Galvanized STEEL
39	Flat washer	Galvanized STEEL
40	Valve body	GJS-500-7
47	Bellows upper stem	S30400
48	Headless screw	S30400
49	Intermediate body with	S30400 + S31600 L
50	Gasket	NOVATEC O KEVLAR+GRAFITE
51	Hexagon head screw	Galvanized CL.8.8 STEEL
52	Flat washer	Galvanized STEEL
53	Spring washer	Galvanized STEEL
54	Hexagon nut	Galvanized CL.8 STEEL
55	Frame extension	Fe 430 B
56	Flat washer	Galvanized STEEL
57	Body gasket	NOVATEC O KEVLAR+GRAFITE
59	Bottom	Fe 430 B / S42000
60	Bottom gasket	NOVATEC O KEVLAR+GRAFITE
61	Flat washer	Galvanized STEEL
62	Spring washer	Galvanized STEEL
63	Hexagon head screw	S30400
64	Servo control plate	GJS-400-18-RT
65	Spring washer	Galvanized STEEL
66	Hexagon head screw	Galvanized CL.8.8 STEEL



Body side spare parts

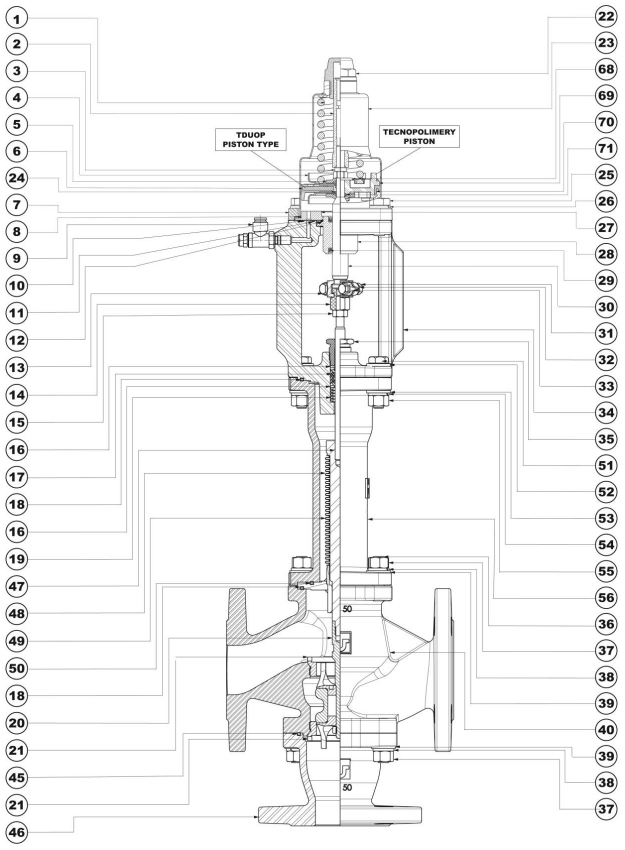
ND	SPARE PART CODE (Part. N° 17/18/19/50/57/60)
	OTTUR. T.M.
65	13696
80	

Air side spare parts

Ø servo control	SPARE PART CODE (Part. N° 6/8/12/24/29)
Ø 125	12420

7.30 Parts and spare parts GRS/10 3 D N.C. D.V. with bellows

No.	DESCRIPTION	MATERIAL Version GJS-500-7
1	Spring	Acc. for springs
2	Stroke indicator	Red PVC
3	Self- locking nut	Galvanized STEEL
4	Piston bearing	Galvanized iron P04
5	Piston bearing washer	Galvanized iron P04
6	TDUOP gasket	NBR+Acc.
7	Fastening plate	GJS-500-7
8	O-Ring gasket	NBR
9	Flow rate adjuster	BRASS+TECHNOPOLYMER
10	O-Ring gasket	NBR
11	O-Ring gasket	NBR
12	O-Ring gasket	NBR
13	Hexagon head screw	Galvanized CL.8.8 STEEL
14	Adjustment nut	Fe 430 B
15	Hexagon nut	Galvanized CL.8 STEEL
16	Distance ring washer	S31600/1.4301
17	Packing gland	PTFE + PTFE/GRAPHITE + FPM
18	Body gasket	NOVATEC O KEVLAR+GRAFITE
19	Packing gland spring	S31600
20	Shutter T.M.	S30400
21	Seat	S30400
22	Transparent cap	PP FV30
23	Spring housing cylinder	S30400
24	O-Ring gasket	NBR
25	Hexagon head screw	S30400
26	Spring washer	S30400
27	GRS valve adapter	Galvanized Fe 430 B
28	Jig bushing	CuZn40Pb2
29	BA gasket	NBR
30	Servo control stem	S30400
31	Hexagon nut	Galvanized CL.8 STEEL
32	Spring washer	Galvanized STEEL
33	Clamp	CF8
34	Valve frame	GJL-250
35	Packing gland screw	Galvanized CF9SMnPb36 STEEL
36	Stud-bolts	Galvanized CL.8.8 STEEL
37	Hexagon nut	Galvanized CL.8 STEEL
38	Spring washer	Galvanized STEEL
39	Flat washer	Galvanized STEEL
40	Valve body	GJS-500-7
45	Gasket	NOVATEC O KEVLAR+GRAFITE
46	Bottom base	GJS-500-7
47	Bellows upper stem	S30400
48	Headless screw	S30400
49	Intermediate body with	S30400 + S31600 L
50	Gasket	NOVATEC O KEVLAR+GRAFITE
51	Hexagon head screw	Galvanized CL.8.8 STEEL
52	Flat washer	Galvanized STEEL
53	Spring washer	Galvanized STEEL
54	Hexagon nut	Galvanized CL.8 STEEL
55	Frame extension	Fe 430 B
68	Flat washer	Fe 360
69	Piston	PA 66 FV 30
70	DE gasket	NBR
71	O-Ring gasket	GACO



Body side spare parts

DN	SPARE PART CODE (Part No. 17/18/19/45/50) SHUTTER T.M.
15	13689
20	
25	12572
32	12573
40	12574
50	12575
65	13697
80	14957

Air side spare parts

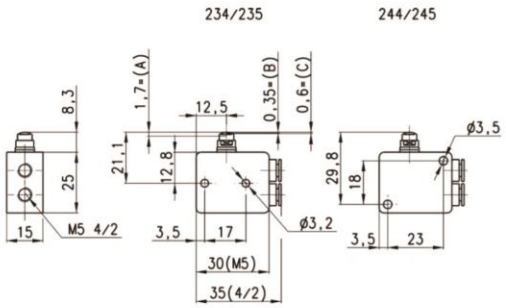
Ø servo control	SPARE PART CODE (Part No. 6/8/10/11/12/24/29)
Ø 70	2705
Ø 70 CCCI(2)	11668
Ø 80	2708
Ø 80 CCCI(2)	11669

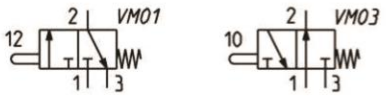
(2) CCCI: intermediate body and mounting in one piece only version

Annex 1 – Pneumatic limit switch type FINC000234

Minivalves

234-945





Code properties

Mod.	SYMBOL
234-945	VM01

Series general data

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

Annex 2 – Pneumatic limit switch type FINCVME201

METAL WORK PNEUMATIC

MINIVALVES, MECHANICALLY AND HAND OPERATED SERIES VME

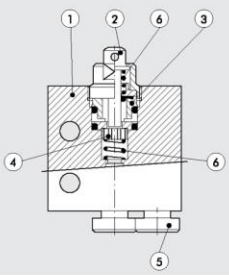
- Minivalves with 3/2 NO NC poppet,
- Installation in any position
- Push-in fittings for pipe Ø 4 mm and M5 on the valve body
- Low actuation force
- Rapid, accurate signal
- Mechanical actuation
- The 2 places adapter allows manual actuation of 1 or 2 VME valves with manual Ø 22 panel actuators. Thus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

TECHNICAL DATA

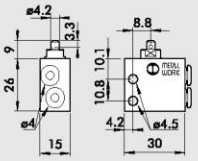
Valve fitting port		Push-in fitting for pipe diam. 4 and M5 (axial or side)
Fluid		Filtered air without lubrication; lubrication, if used, must be continuous
Type		With poppet
Versions		Mechanical and manual
Operators:		
• mechanical		With Plunger – Plunger for wall-mounting – Roller lever – Unidirectional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

COMPONENTS

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



Ø 4



Code	Description
W3501001101	VME2-01 NC Ø 4

Annex 3 – Electromechanic limit switch type FINC00E100

Position switches

Technical data

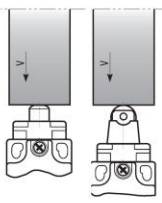
Insulation resistance			500 V DC	MΩ	100
Dielectric strength			50/60 Hz per 1' *	V AC	2500
Rated insulation voltage	Ui	IEC947-5-1		V AC	500
Rated thermal current	Ithe	IEC947-5-1		A	10
Rated operating current		IEC947-5-1/EN60947-5-1			
Category AC15	Ie		24 V	A	10
A300			125 V	A	6
			230 V	A	6
			400 V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

Condition of use

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

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

Operating features



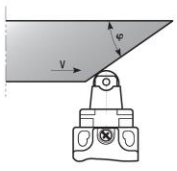
Plunger, Roller plunger, vertical travel
Actuators: A-B

Drive cam operating parameters

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

Drive forces

Minimum command force	9 N
Minimum forced opening force	28 N



Roller plunger, side travel
Actuator: B

Drive cam operating parameters

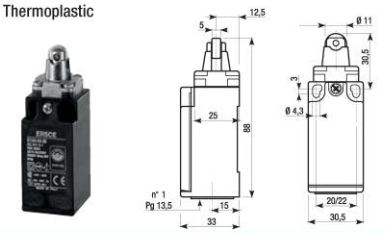
φ	V max (m/s)
30°	0,5
20°	1

Drive forces

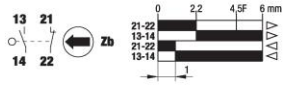
Minimum command force	9 N
Minimum forced opening force	28 N

Steel roller plunger

Thermoplastic



Part no.	Contact block	Circuit diagram	Contact travel
E10000BI	Snap action 1NO+1NC	00	



Annex 4 – Electromechanic limit switch type FINC00161E

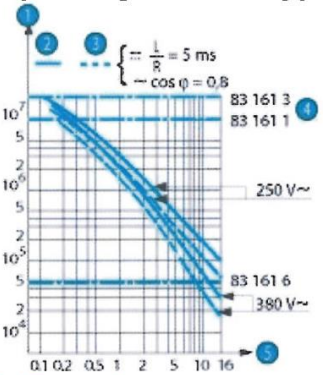
V3 - Standard83 161 3

The strengths of the family

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

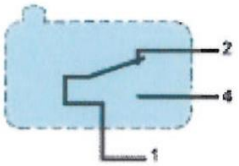
Reference characteristics	83 161 338
Function	I (changeover)
Connections	W3
Electrical characteristics	
Rating nominal / 250 VAC (A)	16
Rating thermal / 250 VAC (A)	20
Mechanical characteristics	
Maximum operating force (N)	0,8
Min. Release force (N)	0,2
Maximum total travel force (N)	2
Max. permitted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

Operating curve for types 831611 / 831613



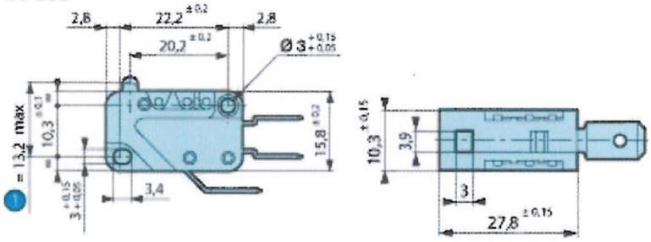
N°	Legend
1	Number of cycles
2	Resistive circuit
3	Inductive circuit
4	Mechanical life limit
5	Current in Amps

Single break changeover switch



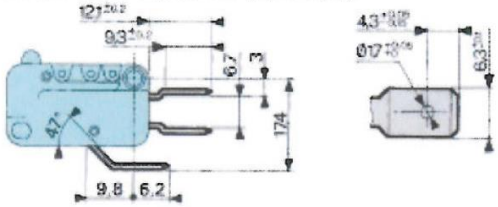
→ *Encombrements

83 161

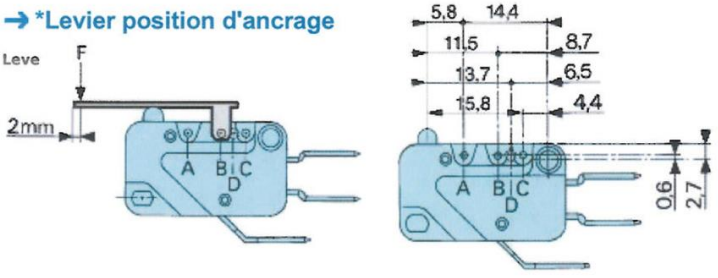


→ *Connexions

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

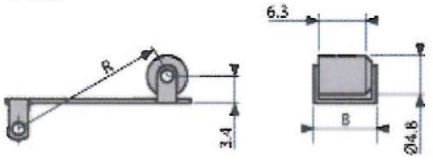


→ *Levier position d'ancrage



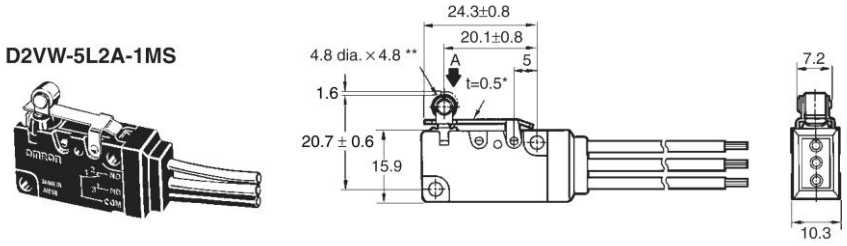
→ *Accessoires de manoeuvre

161 E

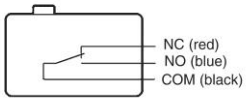


Annex 5 – Electro-mechanic micro switch type FINC100684

Electro-mechanic micro switch Omron type D2VW-5L2A-1MS with actuator lever equipped with a polyacetal resin wheel.



STRUTTURA SPDT



Operating frequency	Mechanical: 300 opt/min Electrical: 30 opt/min
Supply voltage	30 VDC (5 A) 125 VDC (0.4 A) 125 VAC (5 A) 250 VAC (5 A)
Insulation	100 MΩ min at 500 VDC
Contact resistance	50 mΩ max
Degree of protection	IEC IP67 (excluding the terminals)
Degree of protection against electric shock	Class I
Operating environment temperature	-40°C to +85°C
Operating environment humidity	95% max (5°C to 35°C)
Mechanical life	10,000,000 cycles
Contact material	Silver
Distance between contacts	0.5 mm.
Tripping force	1.18N
Release force	0.15N

Annex 6 – 2-wire inductive proximity switch A.C. N.O.

Proximity Sensors

XS6 Extended Range and Auto-Adaptable Inductive Sensor

Metal Tubular, DC and AC/DC

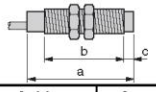
XS6 ••B1••L2

Features

Entire range of fully shielded metal body tubular inductive proximity sensors

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

Dimensions



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

in. (mm)

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

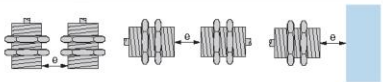
★ To order a normally closed (N.C.) version, change the A to B. Example: XS518B1PAL2 to XS518B1PBL2.
◆ Self-teach version only
▲ For a 5 m (16.4 ft) cable length, add suffix **L5**. For a 10 m (32.8 ft) cable length, add suffix **L10**.

Minimum Mounting Clearances, in. (mm)

Auto-Adaptable

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

Extended Range



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

Wiring

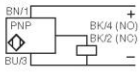
3-Wire Selectable

Connector M12

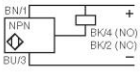
Cable

Blue	BU –
Brown	BN +
Black	BK Output

PNP



NPN

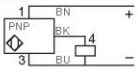


Connector M12

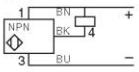
Cable

Blue	BU –
Brown	BN +
Black	BK Output

PNP



NPN



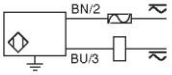
2-Wire AC/DC

Connector U20

Cable

Blue	BU –
Brown	BN +
Black	BK Output

2-Wire Non-Polarized



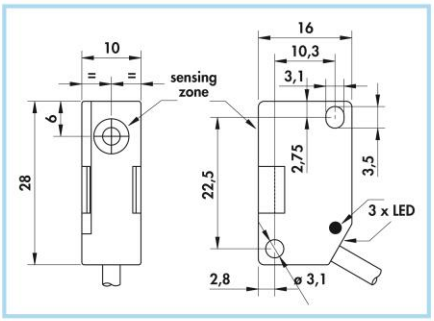
Specifications

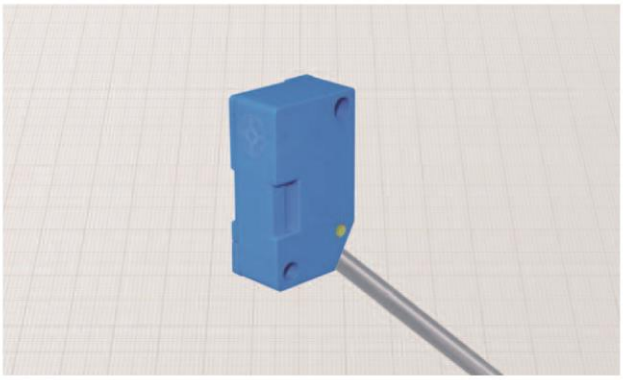
Mechanical		Extended Range	Auto-Adaptable Shielded	Auto-Adaptable Non-Shielded
Fine Detection Zone	12 mm	0–3.2 mm	1.7–3.4 mm	1.7–5 mm
Sn	12 mm	—	0–3.4 mm	0–5 mm
Temperature Rating	Storage	-40 to +185 °F (-40 to +85 °C)		
	Operation	-13 to +158 °F (-25 to +70 °C)		
Enclosure Rating	NEMA Type	3, 4X, 6P,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

Annex 7 - 2-wire D.C. inductive sensor type FINC100683

RECTANGULAR INDUCTIVE SENSORS

Type Z •
Amplified in d.c. 2 wires non polarized •
Cable output •





Materials:
- Cable: 2 m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
- Housing: plastic

General Features:
These sensors are not polarized and the load can be connected on both positive and negative lead (function PNP or NPN).
So they can replace traditional mechanical microswitches in many applications. They have shape and fixing holes as V3 standard microswitches. The particular cable position allows the mounting on every side of the housing. The output status is indicated by LED visible from 3 sides.

Technical data:

• Supply voltage (U_B):	10 ÷ 48 Vdc
• Max ripple:	10%
• Off-state current (I_r):	≤ 1 mA
• Minimum operational current (I_m):	5 mA
• Voltage drop (U_d) con I_e = 10 mA:	≤ 5 V
• Voltage drop (U_d) con I_e = 100 mA:	≤ 6 V
• Temperature range:	- 25° ÷ + 70°C
• Max thermal drift of sensing distance S_r:	± 10%
• Repeat accuracy (R):	2%
• Switching hysteresis (H):	10%
• Degree of protection:	IP67
• Switch status indicator:	yellow LED
• Cable conductor cross section:	0,35 mm²

- Protected against short-circuit and overload
- Suppression of initial false impulse
- Electromagnetic compatibility (EMC) according to EN60947-5-2 CE
- Shock and vibration resistance according to EN60068-2-27 EN60068-2-6

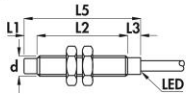
Flush mounting / Non flush mounting	Cable diameter	Sensing zone diameter	Rated operational current (I_e)	Max switching frequency (f)	Nominal sensing distance (S_n) ± 10%	ORDERING REFERENCES	
						NO	NC
	mm	mm	mA	KHz	mm		
•	4	9	100	2	2	DCMZ/4600KS	DCMZ/4610KS

Annex 8 – 3-wire inductive proximity switch D.C. N.O.

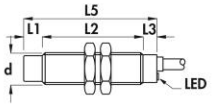
CYLINDRICAL INDUCTIVE SENSORS IN METAL HOUSING

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

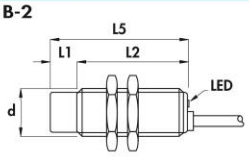
Housing B-6



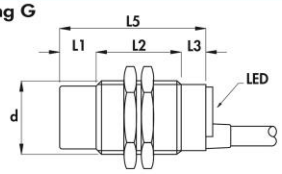
Housing B-3



Housing B-2

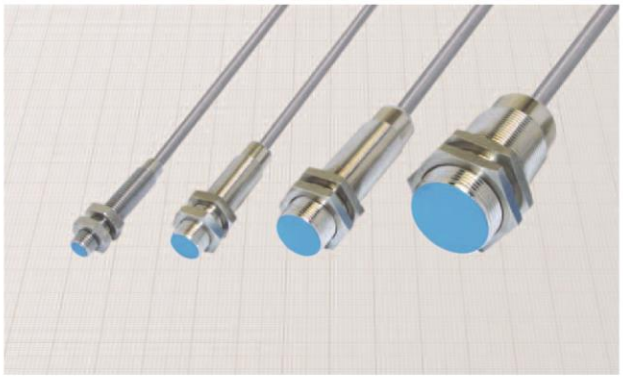


Housing G



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

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



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

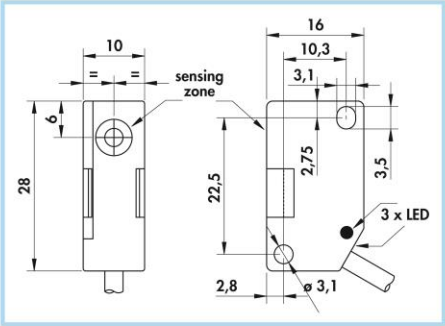
Technical data:
- Supply voltage (U_B): 20 ÷ 240 Vdc/Vac
- Electrical system frequency: 40 ÷ 60 Hz
- Off-state current (I_r) at 24 V: ≤ 1 mA
- Off-state current (I_r) at 220 V: ≤ 1,5 mA
- Minimum operational current (I_m): 5 mA
- Voltage drop (U_d): ≤ 5 V
- Temperature range: - 25° ÷ + 70°C
- Max thermal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

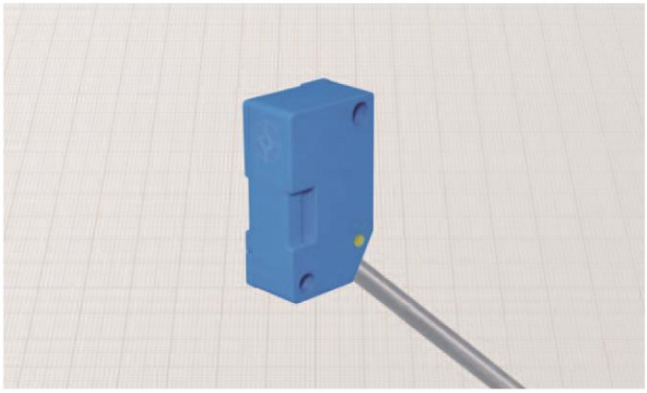
Housing	Flush mounting / Non flush mounting	L1	L2	L3	L4	L5	Cable diameter	Body diameter (d)	Max switching frequency (f) in d.c.	Max switching frequency (f) in a.c.	Rated operational current (I_e)	Nominal sensing distance (S_n) ± 10%	ORDERING REFERENCES NO	ORDERING REFERENCES NC
		mm	mm	mm	mm	mm	mm	mm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

Annex 9 - 3-wire D.C. inductive sensor type FINC100682

RECTANGULAR INDUCTIVE SENSORS

- **Type Z**
- **Amplified in d.c. 3 wires**
- Cable output





Materials:
- Cable: 2 m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
- Housing: plastic

General Features:
This sensor has the same shape and fixing holes as V3 standard microswitches. The particular cable position allows the mounting on every side of the housing. The output status is indicated by LED visible from 3 sides.

Technical data:
- Supply voltage (U_B): 7 ÷ 30 Vdc
- Max ripple: 10%
- No-load supply current (I_o): ≤ 10 mA
- Voltage drop (U_d): ≤ 1,5 V
- Temperature range: - 25° ÷ + 75°C
- Max thermal drift of sensing distance S_r: ± 10%
- Repeat accuracy (R): 2%
- Switching hysteresis (H): 10%
- Degree of protection: IP67
- Switch status indicator: yellow LED
- Cable conductor cross section: 0,15 mm²
- Protected against short-circuit and overload
- Protected against any wrong connection
- Suppression of initial false impulse
- Electromagnetic compatibility (EMC) according to EN60947-5-2 CE
- Shock and vibration resistance according to EN60068-2-27 EN60068-2-6

Flush mounting / Non flush mounting	Cable diameter	Sensing zone diameter	Rated operational current (I_e)	Max switching frequency (f)	Nominal sensing distance (S_n) ± 10%	ORDERING REFERENCES PNP (positive switching) NO	NC
	mm	mm	mA	KHz	mm		
•	3	9	200	2	2	DCAZ/4609KS	DCAZ/4619KS

Annex 10 – 2-wire magnetic sensor A.C. N.O.

Proximity Magnetic Sensors Cylindrical Body, FSM Series

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

Product Description

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

Ordering Key

FSM.S.2/S2/AT

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

Type Selection

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

General specification

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

Electrical specifications

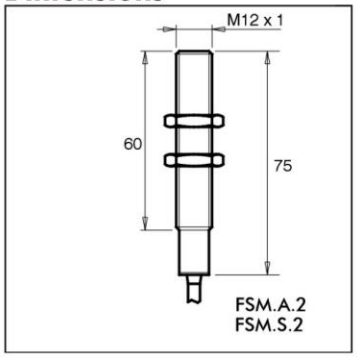
Contacts	2	7	S.2
Max switching voltage	250 Vac	-	220 Vac
Max switching current	3 A	50 mA	1 A
Max switching power	100 VA	-	60 VA

Operating distance

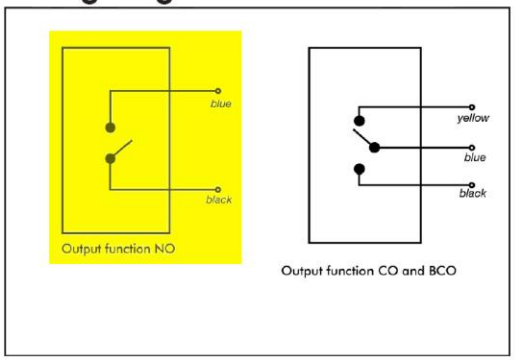
Magnetic Units	CL.10	CL.11	CL.18	CL.20/S1	CL.20/S3	CL.23	CL.31	CL.50
FSM.A.2	-	16	2	14	13	11	19	-
FSM.S.2	-	9	-	-	-	-	-	19
FSM.A.7*	-	-	-	-	-	-	-	-
FSM.S.2/S2/AT	-	-	-	-	8	-	-	-

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

Dimensions



Wiring Diagrams

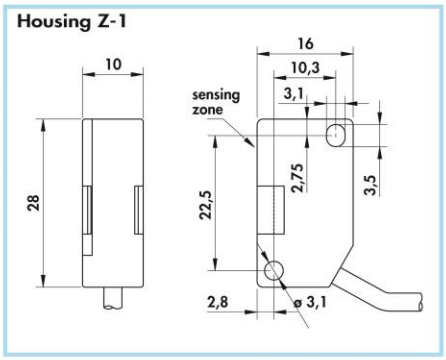


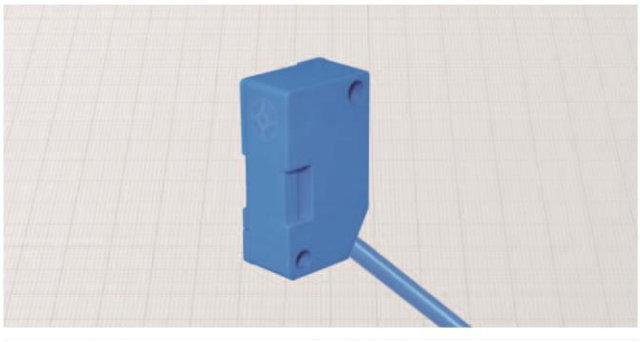
Annex 11 – Magnetic switch type FINC100681

RECTANGULAR MAGNETIC SENSORS

- **REED CONTACT 2 wires**
- **Type Z**
- Cable output

Housing Z-1





Materials:
- Cable: 2m PVC CEI 20 - 22 II; 90°C; 300 V; O.R.
- Housing: plastic

General Features:
These sensors give on the output a contact activated by an external magnetic field, not depending by the polarity of the field. The activation distance depends by the power of the magnet (see on page C-12), which must be ordered separately.
Reed contacts allows to drive directly dc loads (PNP/NPN) or ac loads.

Technical data:

• Working voltage	max 50 Vac/75 Vdc
• Output function	normally open
• Contact resistance max	0,1 Ω
• Operate time max	1 ms
• Release time max	0,4 ms
• Temperature range	- 25 ÷ + 85°C
• Degree of protection	IP67
• Cable conductor cross section	0,15 mm² Type Z

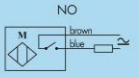
Housing	Cable diameter	Max switching frequency (f)	Rated operational current (I_e)	ORDERING REFERENCES
	mm	KHz	mA	NO 
Z - 1	3	0,5	500	**BMSZ/4600**

Table 5: Tightening Torques

Part match	Tightening torque for GRS valve threaded couplings [N·m]							
	DN 15	DN 20	DN 25	DN 32	DN 40	DN 50	DN 65	DN 80
Part 25	17			32			17	
Part 36/51 – Part 37/55	17			32				
Part 21 – Part 40	170	170	212	370	503	625		
Part 20-A – Part 20-E	9			19			32	
Part. 63 – Part. 40							17	

8 Valve life

GRS/10-series valve has been designed and manufactured to ensure proper operation under conditions and limits provided for by technical characteristics.
All fastened metal parts not involved in sealing have an expected life of 10 years. Sealing and moving parts must be subject to complete overhaul within a time interval shorter than 500000 manoeuvres and three years. This overhaul operation can be carried out by specialized personnel only.
Scheduled maintenance operations shall be carried out independently of the ones due to possible failures, which always require an immediate intervention.

9 Disposal

After use, for the valve disposal, it is necessary to disassemble the valve and separate the different materials the valve is composed of, according to the tables annexed to the valve working drawings, then dispose of the different materials in compliance with the laws in force.
Assembly and disassembly operations shall be carried out by qualified personnel only, equipped with all the work and safety tools. **ATTENTION! Compressed springs are included inside the servo control.**. Thus, during valve disassembly, components are disposed of by using all safety equipment necessary to prevent sudden separation of upper head from lower head when all servo control upper head fastening screws have been removed.

10 Warranty

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

WARNINGS:

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