

## **GRS/06 VALVES**

### **FAMILY 01 - GROUP 89**

Master Handbook Description: Guide to Choice, Use and Maintenance of  
GRS/06 Nodular Cast Iron Valves (English  
version)

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## DECLARATION OF CONFORMITY

**Cod.: DPED02533****REV. 00****Date: 28/12/2006**

Family no. 1

**ON-OFF GLOBE VALVES - SERIES GRS/06  
NODURAL CAST IRON G EN-GJS-400-18-RT EN1563;****Group : 89**

We ITALVALVOLE S.A.S. of Spadon Oscar & C., via Amendola 125, 13836 Cossato (BI), declare that:

The gate globe valve, series GRS/06 with nodular cast iron body EN – GJS-400-18-RT in the following diameters and characteristics, ND 15 PS 25 – ND 20 PS 25 – ND 25 PS 25 – ND 32 PS 25 - ND 40 PS, complies with the directive 97/23/CE (directive PED) with classification under Art. 3.3.

## DECLARATION OF CONFORMITY

**Code: DPED029C1****REV. 00****Date: 28/12/2006**

Family no. 1

**ON-OFF GLOBE VALVES - SERIES GRS/06  
NODULAR CAST IRON G EN-GJS-400-18-RT EN1563;****Group : 89**

We ITALVALVOLE S.A.S. of Spadon Oscar & C., via Amendola 125, 13836 Cossato (BI), declare that:

The gate globe valve, series GRS/06 with nodular cast iron body EN – GJS-400-18-RT in the following diameters and characteristics, ND 50 PS 25 – ND 65 PS 25 - – ND 80 PS 25, complies with the directive 97/23/CE (directive PED) with classification under Art. 3.3.

The conformity evaluation procedure used as per Enclosure II consists of form A.

ITALVALVOLE S.A.S.

Legale rappresentante  
Legal representative

## Table of contents

<b>3.1</b>	<b>Pressure/temperature Graph.....</b>	<b>6</b>
<b>3.2</b>	<b>Table 1: Compatible Fluids .....</b>	<b>7</b>
<b>3.3</b>	<b>Table2: Δp of 2-way GRS/06 valves, without bellows.....</b>	<b>8</b>
<b>3.4</b>	<b>Table 3: Δp of 3-way GRS/06 valves, with bellows .....</b>	<b>9</b>
<b>3.5</b>	<b>Table 4: Δp of 2-way oversize GRS/06 valves, without bellows .....</b>	<b>10</b>
<b>3.6</b>	<b>Table 5: Δp of 5-way oversize GRS/06 valves, with bellows.....</b>	<b>11</b>
<b>3.7</b>	<b>Safety Notes.....</b>	<b>11</b>
<b>3.8</b>	<b>Overall Dimensions of GRS/06 Valves.....</b>	<b>12</b>
3.8.1	2-way spheroidal cast iron valve GRS/06 group: 89.....	12
3.8.2	3-way spheroidal cast iron valve GRS/06 group: 89.....	13
3.8.3	2-way spheroidal cast iron N.O. valve GRS/06 group: 89 .....	14
3.8.4	3-way spheroidal cast iron N.O. valve GRS/06 group: 89 .....	15
3.8.5	2-way spheroidal cast iron D.V. valve GRS/06 with bellows group: 89.....	16
3.8.6	3-way spheroidal cast iron D.V. valve GRS/06 with bellows group: 89.....	17
3.8.7	2-way spheroidal cast iron N.O. valve GRS/06 with bellows group: 89.....	18
3.8.8	3-way spheroidal cast iron N.O. valve GRS/06 with bellows group: 89.....	19
<b>5.1</b>	<b>Transport, Storage And Handling. ....</b>	<b>21</b>
<b>5.2</b>	<b>Assembly Instructions. ....</b>	<b>21</b>
5.2.1	General.....	21
5.2.2	Assembly of the valve.....	21
<b>5.3</b>	<b>Operation Test. ....</b>	<b>22</b>
<b>5.4</b>	<b>Troubleshooting.....</b>	<b>22</b>
5.4.1	N.C. VALVES .....	22
5.4.2	N.O. VALVES .....	22
<b>5.5</b>	<b>Scheduled Maintenance. ....</b>	<b>23</b>
<b>5.6</b>	<b>Instructions for Disassembly and Assembly of GRS/06 Servo control from the Valve Body .....</b>	<b>24</b>
5.6.1	Removal of NC servo control from the valve .....	24
5.6.2	Removal of NO servo control from the valve .....	24
5.6.3	Positioning of NC servo control on the valve .....	24
5.6.4	Positioning of NO servo control on the valve .....	24
<b>5.7</b>	<b>Instructions for Disassembly and Assembly of GRS/06 Servo control from the Valve Body with bellows. ....</b>	<b>26</b>
5.7.1	Removal of NC servo control from the valve with bellows .....	26
5.7.2	Removal of NO servo control from the valve with bellows.....	26
5.7.3	Positioning of NC servo control on the valve with bellows .....	26
5.7.4	Positioning of NO servo control on the valve with bellows.....	26
<b>5.8</b>	<b>Instructions for disassembly, gasket replacement and re-assembly of the D.V. N.C GRS/06 servo control .....</b>	<b>28</b>
5.8.1	Disassembly .....	28
5.8.2	Assembly .....	28
5.8.3	Section plan D.V. 2-Way Nodular Cast Iron N.C. Valve GRS/06.....	29
<b>5.9</b>	<b>Instructions for disassembly, gasket replacement and re-assembly of the D.V. N.O. GRS/06 servo control .....</b>	<b>30</b>
5.9.1	Disassembly .....	30
5.9.2	Assembly .....	30
5.9.3	Section plan 2-Way Nodular Cast Iron N.O. Valve GRS/06 .....	31
<b>5.10</b>	<b>Instructions for disassembly, gasket replacement and re-assembly of the 2-way D.V. GRS/06 body.....</b>	<b>32</b>
5.10.1	Disassembly .....	32

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5.10.2 Assembly.....	32
5.10.3 Section plan D.V. 2-Way Nodular Cast Iron N.C. Valve GRS/06.....	33
<b>5.11 Instructions for disassembly, gasket replacement and re-assembly of the 3-way D.V. GRS/06 body.....</b>	<b>34</b>
5.11.1 Disassembly.....	34
5.11.2 Assembly.....	34
5.11.3 Section plan D.V. 3-Way Nodular Cast Iron N.C. Valve GRS/06.....	35
<b>5.12 Instructions for disassembly, gasket replacement and re-assembly of the 2-way D.V. GRS/06 body with bellows.....</b>	<b>36</b>
5.12.1 Disassembly.....	36
5.12.2 Re-assembly.....	36
5.12.3 Section Plane – 2-way GRS/06 NC nodular Cast Iron D.V. with bellows.....	37
<b>5.13 Instructions for disassembly, gasket replacement and re-assembly of the 3-way D.V. GRS/06 body with bellows.....</b>	<b>38</b>
5.13.1 Disassembly.....	38
5.13.2 Re-assembly.....	38
5.13.3 Section Plane – 3-way GRS/06 NC Nodular Cast Iron D.V. with bellows.....	39
<b>5.14 Details and Spare Parts of GRS/06 D.V. N.C Servo control.....</b>	<b>41</b>
<b>5.15 Details and Spare Parts of GRS/06 N.O.Servo control.....</b>	<b>43</b>
<b>5.16 2-way GRS/06 valve body details and spare parts.....</b>	<b>45</b>
<b>5.17 3-way GRS/06 valve body details and spare parts.....</b>	<b>46</b>
<b>5.18 2-way GRS/06 valve body with bellows details and spare parts.....</b>	<b>49</b>
<b>5.19 3-way GRS/06 valve body with bellows details and spare parts.....</b>	<b>50</b>

## 1 Foreword

The valves series GRS/06 are used to control the flow of overheated water, liquids, gas and vapours inside pipes.

The valve shall be normally operated by a pilot automatic on-off valve using air as servo control fluid or by an hand-operated pneumatic remote control panel.

The opening and closing of the valves are possible thanks to the variation of the pneumatic signal arriving to the servomotor (pneumatic head of the valve).

The piston, the springs and valves shutters shall be sized in order to get the required fluid-dynamic characteristics and the perfect compliance with the operating conditions, as specified in the customer's order.

The on-off valves GRS/06 shall be supplied normally closed NC (air opens), or normally open NO (air closes).

In any case, being the servomotor reversible, a NC valve can be turned into a NO one, or vice-versa, just replacing the spring and a few detail components.


## 2 Legend

- **$\Delta p$  allowable** (allowable differential pressure): maximum allowable value, at a given temperature, of the static differential pressure of a valve when it is in the closed position (EN 7363 : 1997).
- **Allowable temperature**: operating temperature limit, prescribed for safety reasons.
- **Allowable pressure**: operating pressure limits, normally at the top of each chamber of the pressure equipment, prescribed for safety reasons (UNI EN 764: 1997).
- **ND**: is an alphanumeric designation of size for components of a pipework system, which is used for reference purposes.  
It includes the ND letters followed by a nondimensional whole number which is indirectly related to the physical dimension, expressed in millimeters, of the hole or the outer diameter of the final end of fittings (ISO 6708: 1995)
- **Kv**: flow rate, expressed in cubic meters/h, of water (from 10 to 25 °C with a volume equal to 1000 Kg/cubic meters), which goes through two ways of a valve, with a pressure drop  $\Delta p$  of 100 KPa (1 bar)

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

where : Q is the flow rate in cubic meters/h (UNI 9753 : 1990).

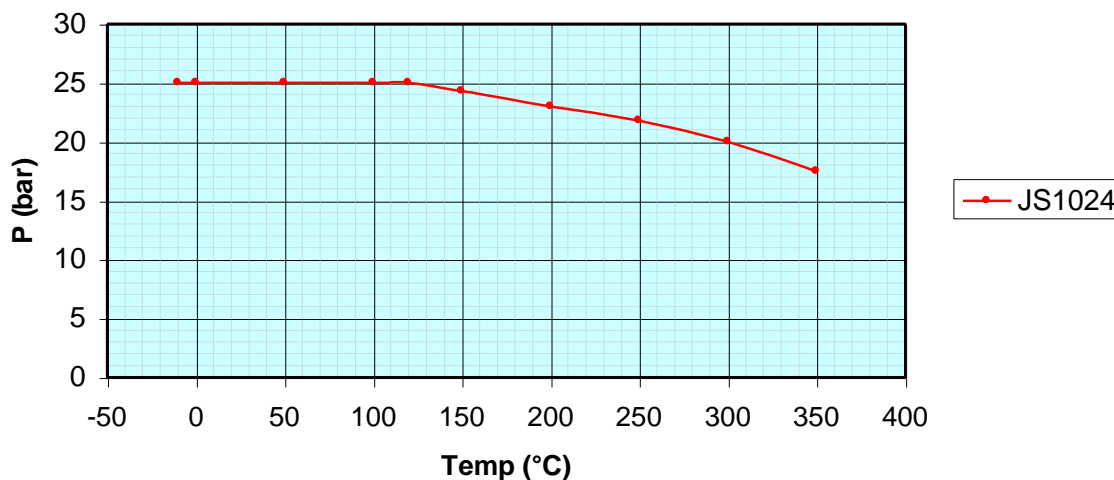
### 3 Technical Characteristics

<i>General notice:</i>	⇒ all the pressure values indicated hereinafter are gauge pressure values. ⇒ <b>Valve destined to fluids of group 2 (directive 97/23/EC).</b>	
<i>ND:</i>	⇒ 32 – 40 – 50	
<i>Connections:</i>	⇒ flanged in compliance with EN 1092-2: 1999 PN 25 EN 1092-2: 1999.	
<i>Pmax allowable:</i>	⇒ 25 bar	
<i>Pmin allowable:</i>	⇒ 0 bar.	
<i>Seal:</i>	⇒ PTFE-CARBO-GRAPHITE, metallic and "Stellited"	
<i>Shutter characteristic:</i>	⇒ equally percentage, linear	
<i>Tmax allowable:</i>	⇒ 170 °C PTFE-CARBO-GRAPHITE (standard), +350 °C with metallic and/or stellited seal (with safety bellows).	
<i>Tmin allowable:</i>	⇒ -10 °C (liquid phase).	
<i>Flow direction:</i>	⇒ 2-way globe valve, unidirectional. ⇒ Unidirectional 3-way globe valve, with angle pattern body.	
<i>Air connection:</i>	⇒ 1/8" GAS.	
<i>Supply fluid:</i>	⇒ instrument air	
<i>Supply pipes:</i>	⇒ pipe inner diameter = 4 mm, min. outer diameter = 6 mm, able to bear the supply Pmax under the environmental conditions of the plant where the valve has to be assembled.	
<i>P min. (supply):</i>	⇒ 6 bar.	
<i>Versions:</i>	⇒ normally closed, normally open, with or without bellows, with or without emergency handwheel	
<i>Working materials:</i>	⇒ see working drawings and relevant tables	
<i>Overall dimensions:</i>	⇒ See overall dimensions drawings and relevant tables.	



#### 3.1 Pressure/temperature Graph

**Pressure/Temperature Trend**



### 3.2 Table 1: Compatible Fluids

Type of fluid	Comp.	Type of fluid	Comp.
Linoleic acid	YES	Magnesium hydroxide	YES
Nitric acid HNO <sub>3</sub> anhydrous	YES	Animal oil	YES
Soft water H <sub>2</sub> O	YES	Lubricating oil	YES
Ammonia NH <sub>3</sub> water	YES	Sodium hydroxide NaOH 5%	YES
Ammonia NH <sub>3</sub> solution	YES	Sodium hydroxide NaOH 20% E <sup>(1)</sup>	YES
Air	YES	Sodium hydroxide NaOH 50% E <sup>(1)</sup>	YES
Nitrogen N liquid	YES	Sodium hydroxide NaOH 75% E <sup>(1)</sup>	YES
Magnesium disulphate	YES	Soda Na <sub>2</sub> CO <sub>3</sub> 5%	YES
Ethylene glycol	YES	Water steam 200° <sup>(2)</sup>	YES
Propylene glycol	YES		

<sup>(1)</sup> "E" means boiling

<sup>(2)</sup> In versions where the temperature can reach such a value

All data indicated under table 1, if not otherwise specified, is relevant to a temperature of 21°C.

All data has a general meaning and is not valid for all possible working conditions. These data may considerably vary depending upon various conditions, such as: temperature, concentration, fluid speed.

For a deeper and thorough information, please get in touch with our technical department.

Any use of the valve on explosive, easily inflammable, comburent and poison gases is strictly forbidden.

Any use of the valve on liquids based on: chlorine, fluorine, bromine, iodine and derivative elements is strictly forbidden.

Any deviation from such prohibitions may be issued for special applications, by our technical department, upon written request.

### 3.3 Table2: $\Delta p$ of 2-way GRS/06 valves, without bellows

Control Min pressure BAR						$\Delta p$						NO. FOR VALVE DEFINITION
						N. C. VALVES			N. O. VALVES			
						2	4	6	2	4	6	
ND	$\Phi$ seat [mm]	Kvs	CV	$\Phi$ i servo control [mm]	Letters for valve definition							
					A	B	C	M	N	O		
NOT AVAILABLE YET	15	3	0.1	0.117	70							1
		6	0.42	0.49								2
		15	2.8	3.2								3
	20	8	1.1	1.28	70							4
		15	2.5	2.9								5
		20	7.8	9.1								6
	25	15	2.4	2.8	70							7
		20	7	8.2								8
		24	13.5	15.7								9
	32	20	6.6	7.7	80							10
		24	12.2	14.2								11
		31	15.2	17.7								12
	40	24	11.5	13.4	80							13
		31	13.7	16								14
		38	25.8	30.1								15
50	31	12.9	15	80	7.5	15	21	8	19	25	16	
	38	23.2	27.1		5	10	14	5.5	14	21	17	
	48	33	38.6		3	6	9	3.5	9	14	18	
NOT AVAILABLE YET	65	38	21.9	25.6	125							19
		48	29.7	34.7								20
		63	62	72.5								21
	80	48	28	25.6	125							22
		63	55.8	65.2								23
		78	119	139								24



**3.4 Table 3:  $\Delta p$  of 3-way GRS/06 valves, with bellows**

Control Min pressure BAR						$\Delta p$						NO. FOR VALVE DEFINITION	
						N. C. VALVES			N. O. VALVES				
ND	$\Phi$ seat [mm]	Kvs	CV	$\Phi$ i servo control [mm]	2	4	6	2	4	6			
NOT AVAILABLE YET						Letters for valve definition						1	
						A	B	C	M	N	O		
NOT AVAILABLE YET	15	3	0.1	0.117	70							2	
		6	0.42	0.49									3
		15	2.8	3.2									4
	20	8	1.1	1.28	70								5
		15	2.5	2.9									6
		20	7.8	9.1									7
	25	15	2.4	2.8	70								8
		20	7	8.2									9
		24	13.5	15.7									10
	32	20	6.6	7.7	80								11
		24	12.2	14.2									12
		31	15.2	17.7									13
	40	24	11.5	13.4	80								14
		31	13.7	16									15
		38	25.8	30.1									16
50	31	12.9	15	80	6.9	12.1	19	3.6	13.3	22		17	
	38	23.2	27.1		5	10	14	3.2	12.9	19		18	
	48	33	38.6		3	6	9	2.5	9	14		19	
NOT AVAILABLE YET	65	38	21.9	25.6	125							20	
		48	29.7	34.7									21
		63	62	72.5									22
80	48	28	25.8	125								23	
	63	55.8	65.2									24	
	78	119	139										

### 3.5 Table 4: $\Delta p$ of 2-way oversize GRS/06 valves, without bellows

						$\Delta p$		NO. FOR VALVE DEFINITION
						N. C. VALVES	N. O. VALVES	
Control Min pressure BAR						6	6	
ND	$\Phi$ seat [mm]	Kvs	CV	$\Phi$ i servo control [mm]	Letters for valve definition			
						C	O	
NOT AVAILABLE YET	15	3	0.1	0.117	80			1
		6	0.42	0.49				2
		15	2.8	3.2				3
	20	8	1.1	1.28	80			4
		15	2.5	2.9				5
		20	7.8	9.1				6
	25	15	2.4	2.8	80			7
		20	7	8.2				8
		24	13.5	15.7				9
	32	20	6.6	7.7	125			10
		24	12.2	14.2				11
		31	15.2	17.7				12
	40	24	11.5	13.4	125			13
		31	13.7	16				14
		38	25.8	30.1				15
50	31	12.9	15	125	25	25	16	
	38	23.2	27.1		25	25	17	
	48	33	38.6		25	25	18	
NOT AVAILABLE YET	65	38	21.9	25.6	160			19
		48	29.7	34.7				20
		63	62	72.5				21
	80	48	28	25.6	160			22
		63	55.8	65.2				23
		78	119	139				24

### 3.6 Table 5: $\Delta p$ of 5-way oversize GRS/06 valves, with bellows

						$\Delta p$		NO. FOR VALVE DEFINITION
						N. C. VALVES	N. O. VALVES	
Control Min pressure BAR						6	6	
ND	$\Phi$ seat [mm]	Kvs	CV	$\Phi$ i servo control [mm]	Letters for valve definition			
					C	O		
NOT AVAILABLE YET	15	3	0.1	0.117	80			1
		6	0.42	0.49				2
		15	2.8	3.2				3
	20	8	1.1	1.28	80			4
		15	2.5	2.9				5
		20	7.8	9.1				6
	25	15	2.4	2.8	80			7
		20	7	8.2				8
		24	13.5	15.7				9
	32	20	6.6	7.7	125			10
		24	12.2	14.2				11
		31	15.2	17.7				12
	40	24	11.5	13.4	125			13
		31	13.7	16				14
		38	25.8	30.1				15
50	31	12.9	15	125	25	25	16	
	38	23.2	27.1		25	25	17	
	48	33	38.6		25	25	18	
NOT AVAILABLE YET	65	38	21.9	25.6	160			19
		48	29.7	34.7				20
		63	62	72.5				21
	80	48	28	25.6	160			22
		63	55.8	65.2				23
		78	119	139				24

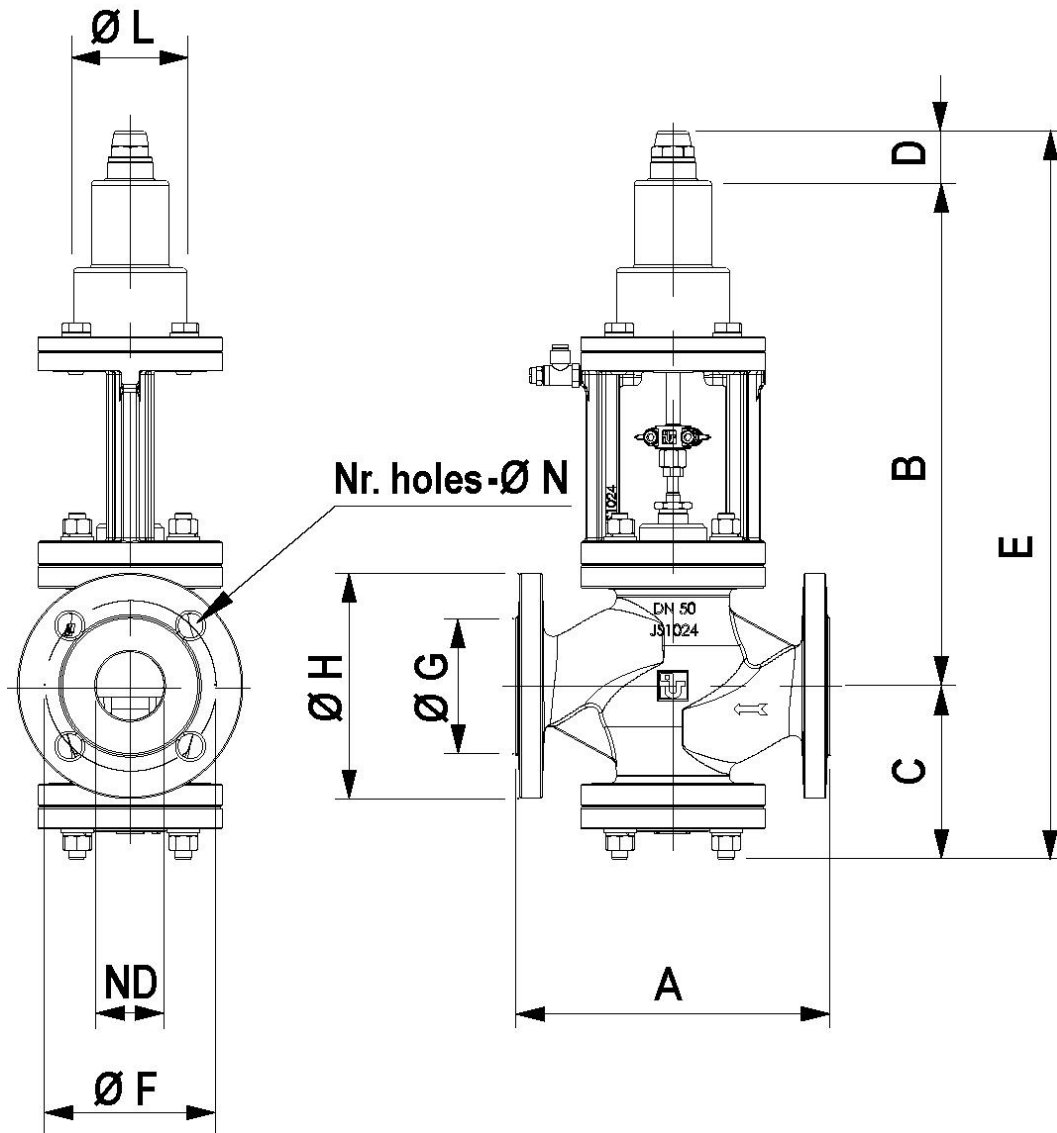
### 3.7 Safety Notes

- The valve body, under maximum operating temperature conditions, depending on the system, may reach a temperature T equal to 350° C. It is up to the engineer to provide the system with the necessary safety guards and/or warning signals aiming at removing/indicating the risk of possible burns by the user.
- No fluid shall be present inside pipes, nor inside the valve itself during any operation carried out on the valve.

### 3.8 Overall Dimensions of GRS/06 Valves

#### 3.8.1 2-way spheroidal cast iron valve GRS/06

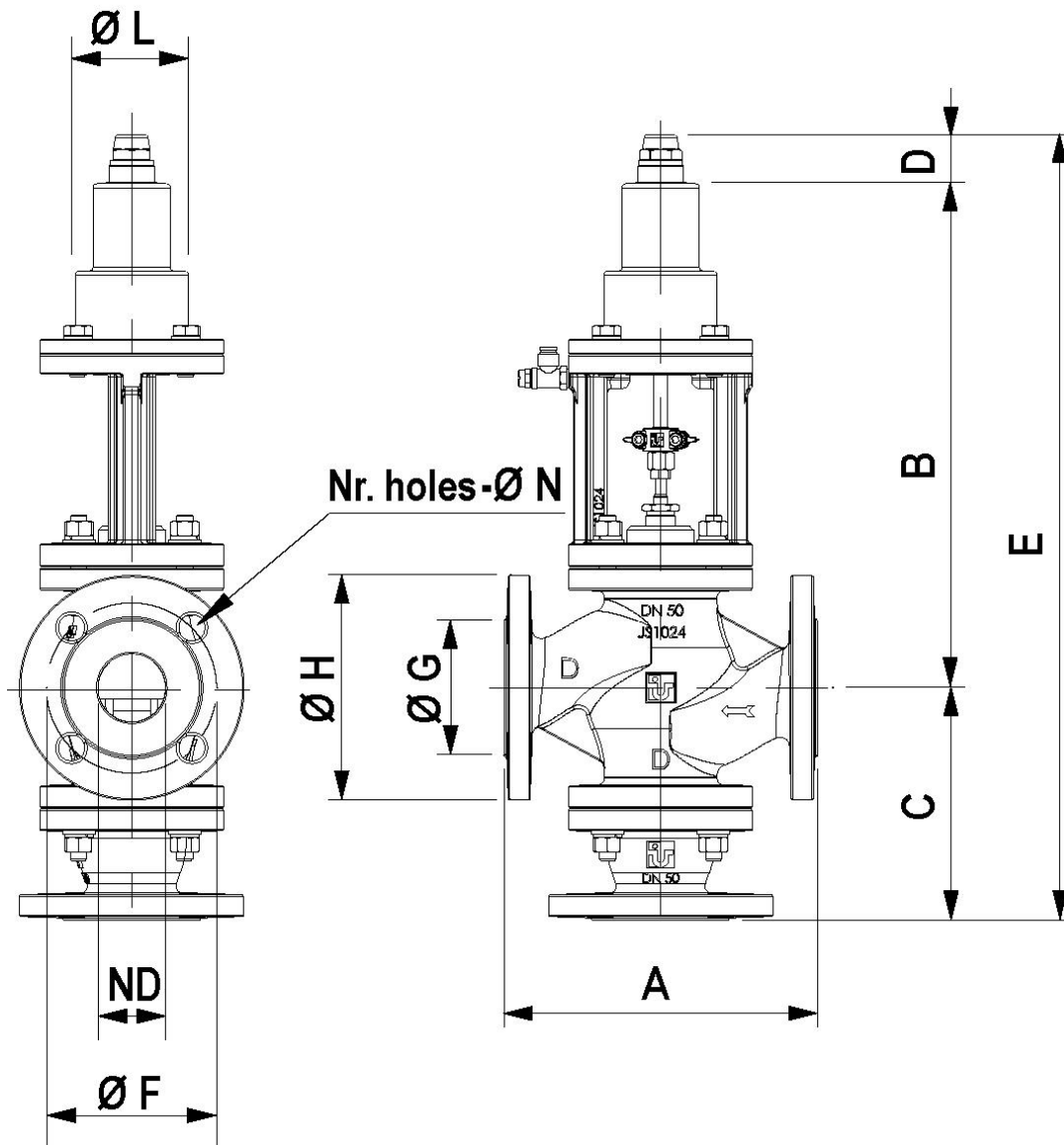
group: 89



Drawing No. 060227/1 Rev:00

ND	A	B	C	D	E	$\varnothing F$	$\varnothing G$	$\varnothing H$	$\varnothing L$	$\varnothing N$	holes no.
15											
20											
25											
32	180	370.5	127	36	533.5	100	76	140	80	19	4
40	200	370.5	127	36	533.5	110	84	150	80	19	4
50	230	370.5	127	36	533.5	125	99	165	80	19	4
65											
80											

Dimensions are in millimeters.

**3.8.2 3-way spheroidal cast iron valve GRS/06**
**group: 89**


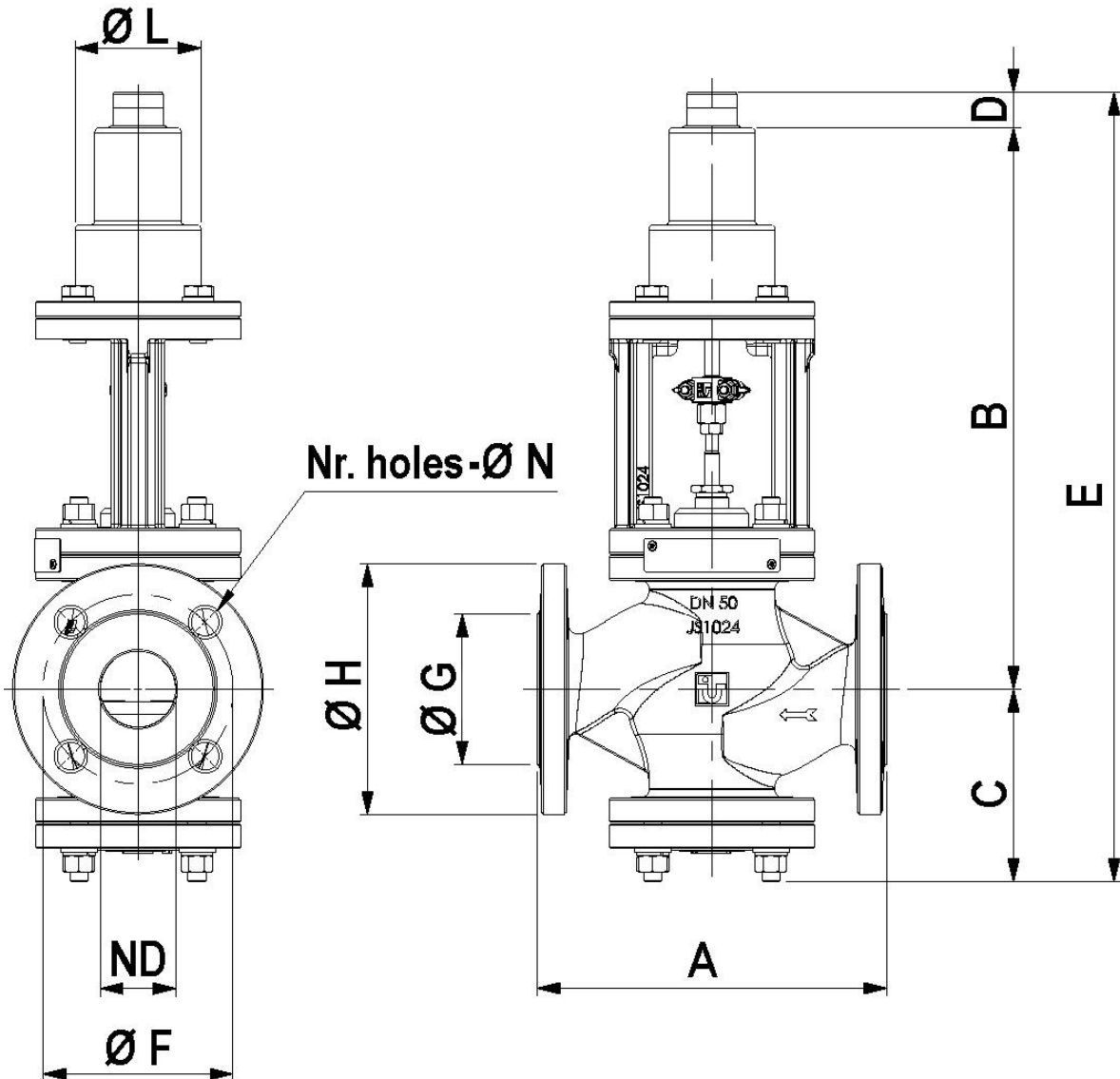
Drawing No. 060227/2 Rev:00

ND	A	B	C	D	E	Ø F	Ø G	Ø H	Ø L	Ø N	holes no.
15											
20											
25											
32	180	370.5	171	36	577.5	100	76	140	80	19	4
40	200	370.5	179	36	585.5	110	84	150	80	19	4
50	230	370.5	171	36	577.5	125	99	165	80	19	4
65											
80											

Dimensions are in millimeters.

**3.8.3 2-way spheroidal cast iron N.O. valve GRS/06**

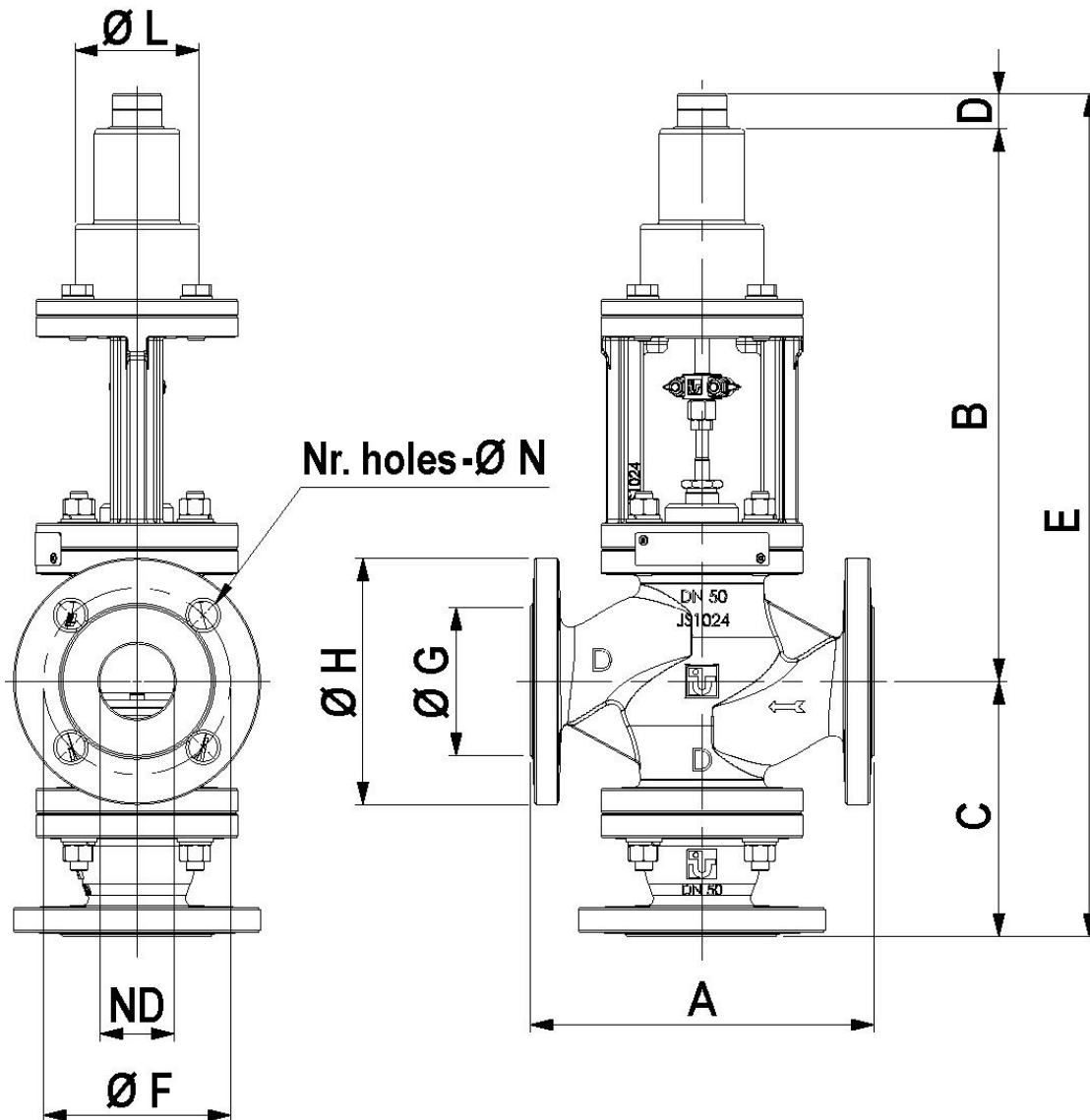
**group: 89**



Drawing No. 060337 Rev:00

ND	A	B	C	D	E	Ø F	Ø G	Ø H	Ø L	Ø N	holes no.
15											
20											
25											
32	180	370.5	127	23	520.5	100	76	140	80	19	4
40	200	370.5	127	23	520.5	110	84	150	80	19	4
50	230	370.5	127	23	520.5	125	99	165	80	19	4
65											
80											

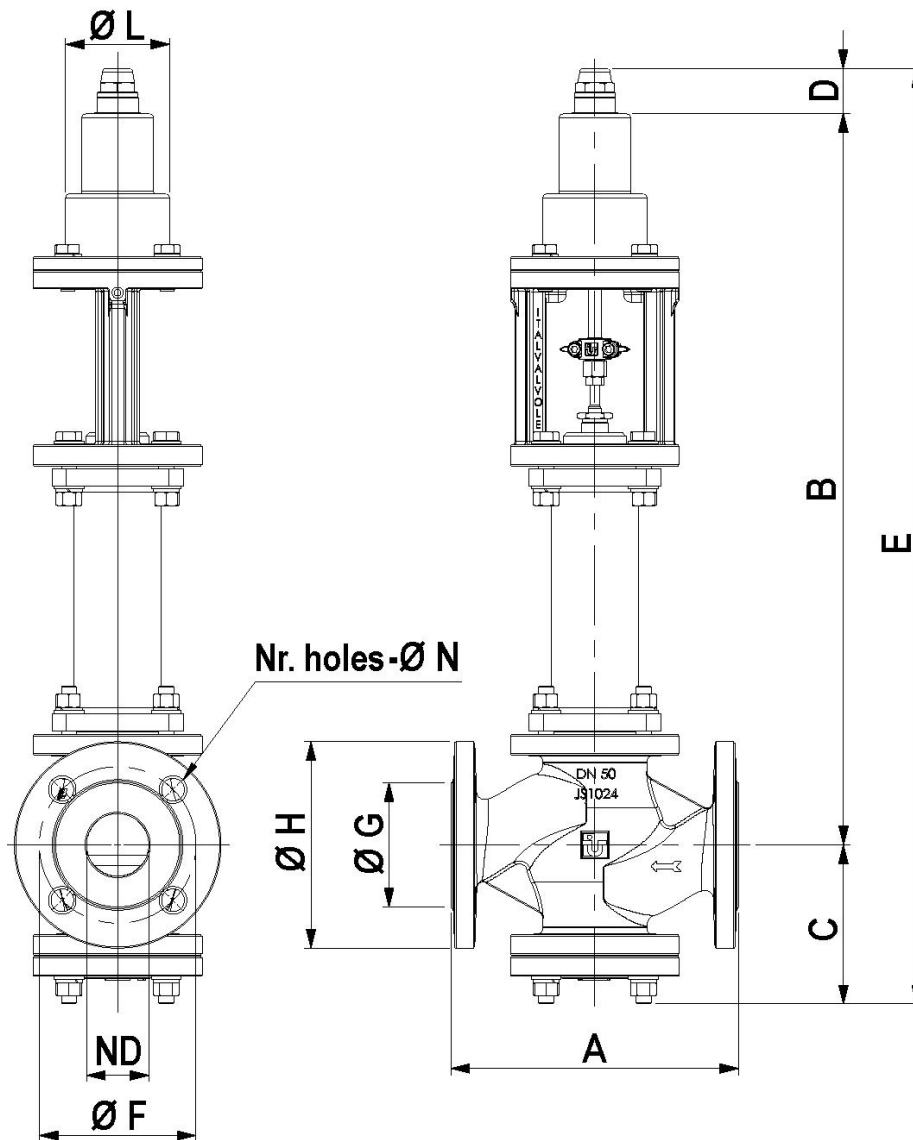
Dimensions are in millimeters.

**3.8.4 3-way spheroidal cast iron N.O. valve GRS/06**
**group: 89**


Drawing No. 060467 Rev:00

ND	A	B	C	D	E	Ø F	Ø G	Ø H	Ø L	Ø N	holes no.
15											
20											
25											
32	180	370.5	171	23	564.5	100	76	140	80	19	4
40	200	370.5	179	23	572.5	110	84	150	80	19	4
50	230	370.5	171	23	564.5	125	99	165	80	19	4
65											
80											

Dimensions are in millimeters.

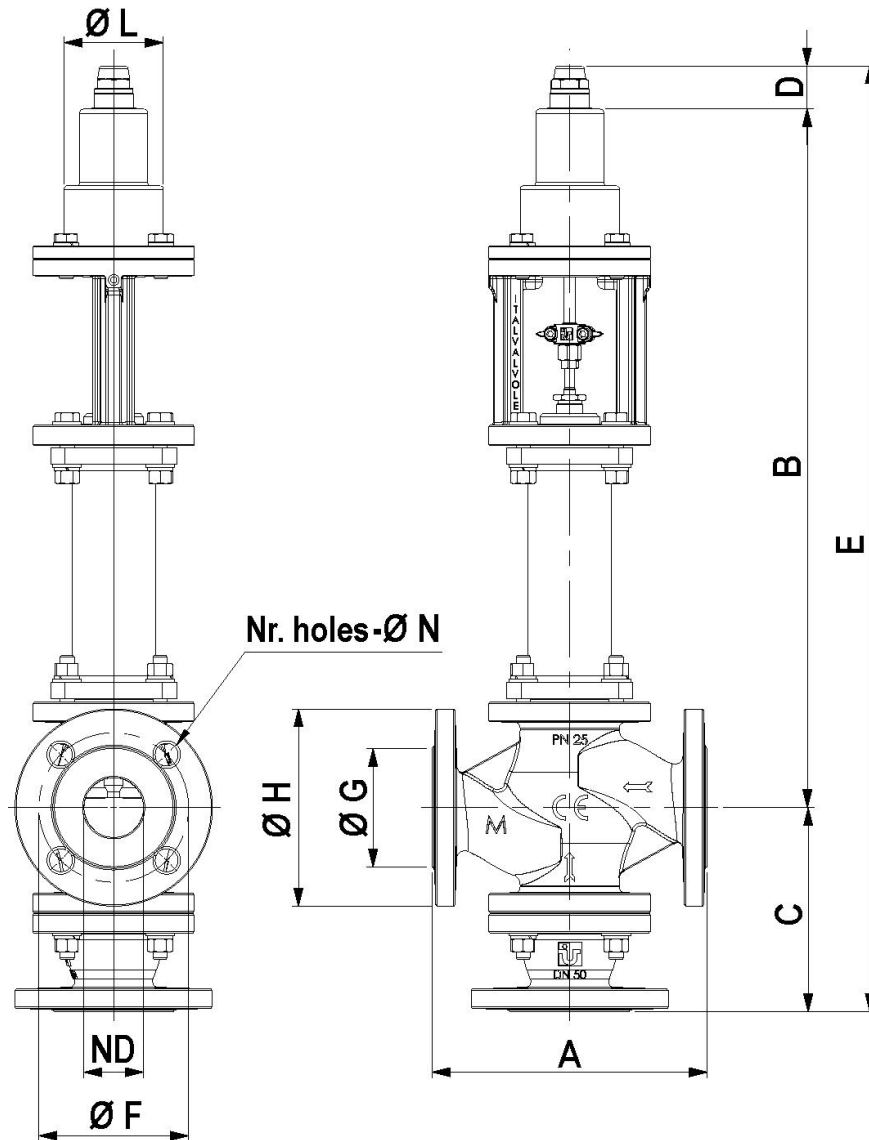
**3.8.5 2-way spheroidal cast iron D.V. valve GRS/06 with bellows group: 89**


Drawing No. 060505 Rev:00

ND	A	B	C	D	E	Ø F	Ø G	Ø H	Ø L	Ø N	holes no.
15											
20											
25											
32	180	584.5	127	36	747.5	100	76	140	80	19	4
40	200	584.5	127	36	747.5	110	84	150	80	19	4
50	230	584.5	127	36	747.5	125	99	165	80	19	4
65											
80											

Dimensions are in millimeters.

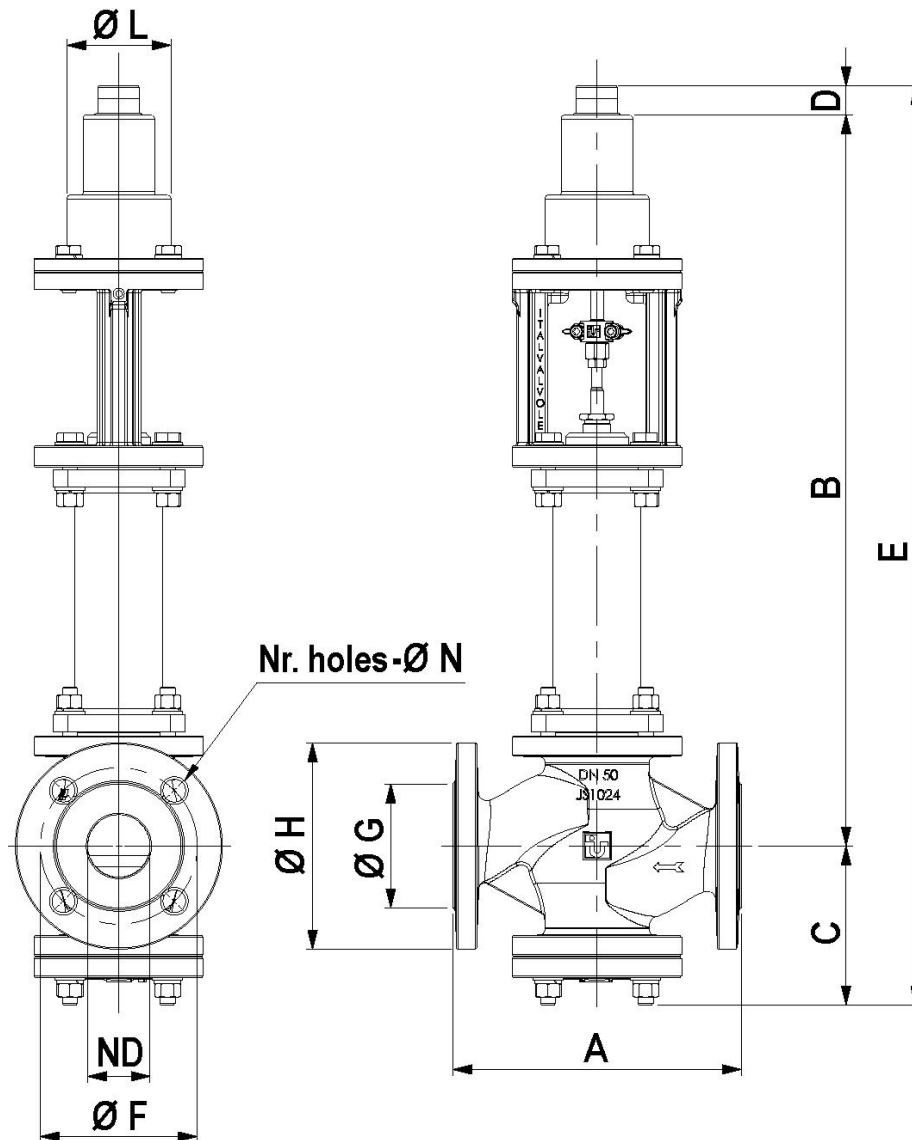


**3.8.6 3-way spheroidal cast iron D.V. valve GRS/06 with bellows group: 89**


Drawing No. 060506 Rev:00

ND	A	B	C	D	E	Ø F	Ø G	Ø H	Ø L	Ø N	holes no.
15											
20											
25											
32	180	584.5	171	36	791.5	100	76	140	80	19	4
40	200	584.5	179	36	799.5	110	84	150	80	19	4
50	230	584.5	171	36	791.5	125	99	165	80	19	4
65											
80											

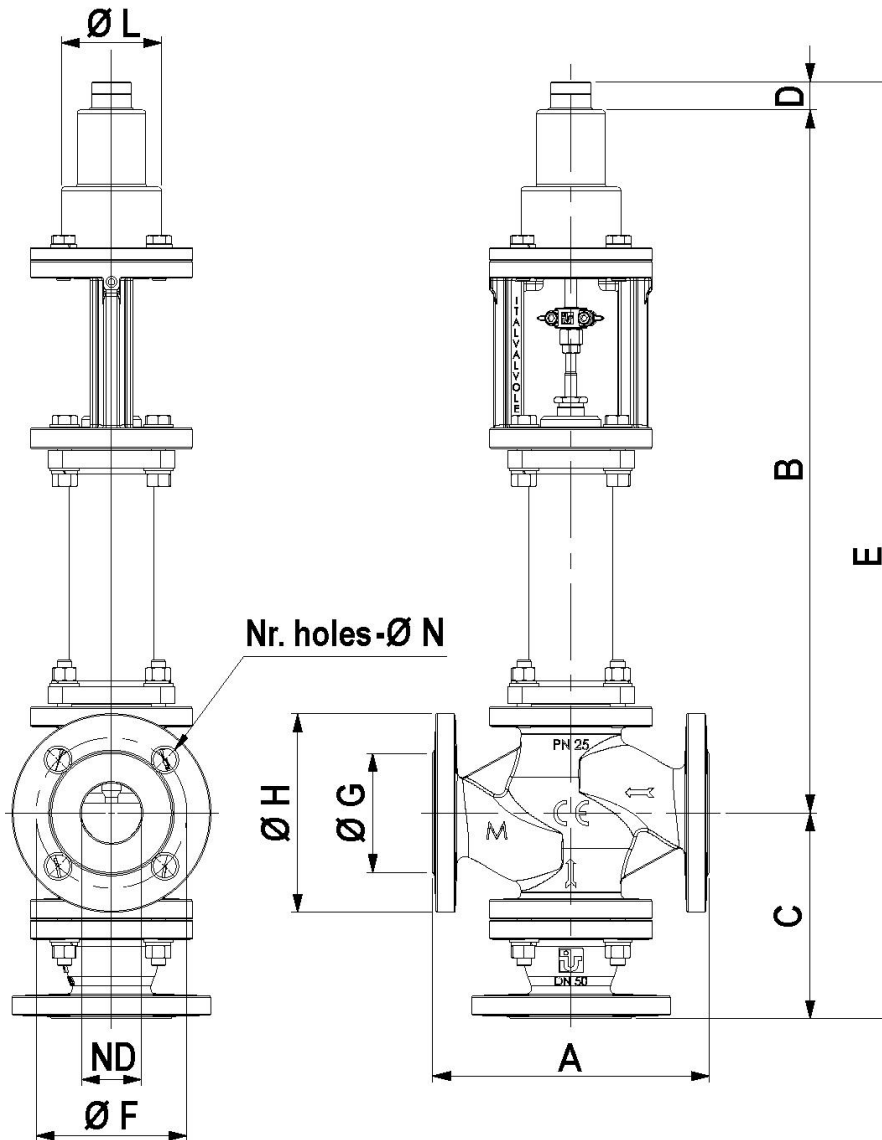
Dimensions are in millimeters.

**3.8.7 2-way spheroidal cast iron N.O. valve GRS/06 with bellows group: 89**


Drawing or. 060507 Rev:00

ND	A	B	C	D	E	Ø F	Ø G	Ø H	Ø L	Ø N	holes no.
15											
20											
25											
32	180	584.5	127	23	734.5	100	76	140	80	19	4
40	200	584.5	127	23	734.5	110	84	150	80	19	4
50	230	584.5	127	23	734.5	125	99	165	80	19	4
65											
80											

Dimensions are in millimeters.

**3.8.8 3-way spheroidal cast iron N.O. valve GRS/06 with bellows group: 89**


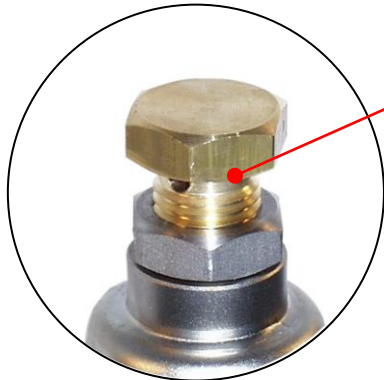
Drawing No. 060508 Rev:00

ND	A	B	C	D	E	Ø F	Ø G	Ø H	Ø L	Ø N	holes no.
15											
20											
25											
32	180	584.5	171	23	778.5	100	76	140	80	19	4
40	200	584.5	179	23	786.5	110	84	150	80	19	4
50	230	584.5	171	23	778.5	125	99	165	80	19	4
65											
80											

Dimensions are in millimeters.

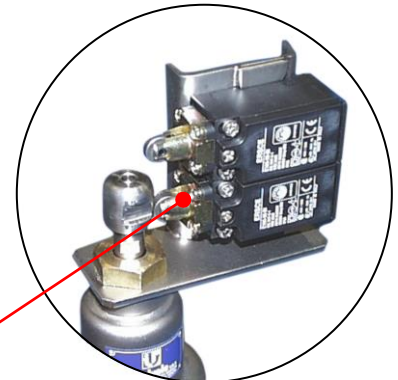
## 4 Fittings

GRS/06 valves may be fitted with various fittings, to meet the different customer's requirements.



### STROKE REGULATOR

The stroke regulator allows to limit the valve stroke to the desired value



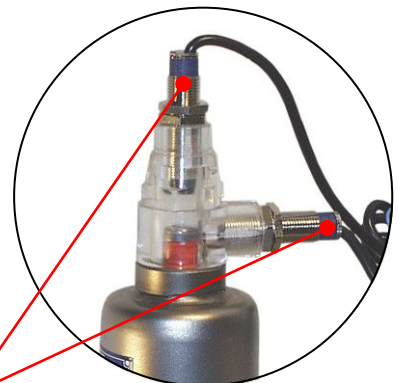
### ELECTRIC LIMIT SWITCH (G 809)

Actuated by the shutter stem movement, it detects the valve closing condition.



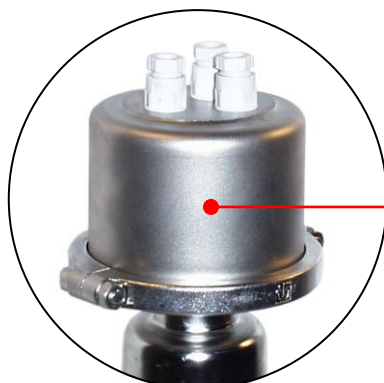
### MAGNETIC SENSOR (G 809)

This sensor allows to detect the valve opening: it is actuated by a magnet, which moves with the shutter.



### INDUCTIVE SENSOR (G 809)

This sensor allows to detect the valve opening/closing condition.



### SENSOR HOLDING BOX (G 809)

The sensor holding box is applied on the servo control top: electric and pneumatic limit switches can be housed here.



## 5 Storage, Assembly, Check And Maintenance.

### 5.1 Transport, Storage And Handling.

GRS/06 valves shall be handled with the maximum care throughout the whole transport and assembly phase. Any crashes and anomalous stresses are to be avoided (do not grasp the valve by the servo control).

Avoid crashes and tampering of and accessory, the valve may be equipped with (handwheel, solenoid valves, pneumatic electric 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 temperatures shall be included between 0°C and + 50°C.

Avoid any crush to the servo control, as they might cause misalignments and compromise the proper operation of the valve.

Observe label indications.

### 5.2 Assembly Instructions.

#### 5.2.1 General

The valve installation on the system shall be carried out by qualified personnel only, within the hydraulic and pneumatic fields, provided with all the equipment normally used in the industrial hydraulic and pneumatic plant engineering. The personnel shall always wear proper accident prevention garments, taking particular care to the protection of face, eyes and hands.

In any case the valve must not be disassembled or modified, under pain of revocation of each type of guarantee.

#### **N.B. Caution: Compression springs are located inside the valve.**

Before assembly, dust-proof protections shall be removed from the valve body.

In case of NC (normally closed) servo control, the supply shall be carried out in the side air connection. In case of NO (normally open) servo control, the supply shall be carried out in the air connection located on the servo control upper head. In case of NO valve, do not remove the air connection threaded cap, which is not in use, to prevent dust or foreign matters from entering the servo control.

The compressed air shall be instrument air, with a pressure ranging between 2 and 6 bar, depending upon the duty values of the servo control, in no way higher than 6 bar, with supply pipes made of nylon  $\varnothing_{int.} = 4$  mm The air connections on the valve shall be made of 1/8" threaded coupling.

#### 5.2.2 Assembly of the valve.

Observe the indications on the labels.

Before starting the assembly, make sure that dirt has not entered the valve body. When in doubt, strongly blow compressed air.

The assembly of a protection filter on the pipe upstream the valve is strongly recommended.

Generally, the valve shall be assembled vertically, with the servo control facing upwards. Whenever required by the overall dimensions, the valve can be assembled in a slanting position or horizontally.

If a continuous duty has to be guaranteed during the valve maintenance operations as well, it is advisable to provide for a proper bypass, with relevant on-off valves and manual control.

**NOTICES:** during the installation of a valve, a minimum space shall be provided for the disassembly of the pneumatic head and the inner bodies, which are required for the maintenance operations.

#### **N.B. Caution: Compression springs are located inside the valve.**

The maximum care shall be paid to the assembly of the valve on the piping. Make sure to assemble the valve making the arrows printed in the valve body follow the same direction of the pipe fluid. Then, torque tighten the flange bolts crossways and uniformly, in order to compress uniformly the gaskets and prevent dangerous stresses to the valve body.

After the assembly, with the pneumatic valve in the opening position, carefully clean the line with a proper blowing fluid in order to remove any foreign matters, lags and deposits, which might damage the seal surfaces of the valve.

Connect the pneumatic signal coming out of the pilot governor or the remote control to the proper threaded connection on the head.

### 5.3 Operation Test.

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

On valves with normally closed NC servo control:

- 1) Send the fluid inside the valve under shutter at the operating pressure, (check that it is always lower than the maximum allowable pressure indicated on the data plate).
- 2) Blow air into the servo control equal to the control signal as indicated on the data plate (the valve should start to open, this data can be read on the speed plate)
- 3) Blow air out of the servo control.
- 4) Repeat this operation 5 times.
- 5) Check, with air off, that there are no valve leakages.
- 6) Check, with air on, that there are no air leakages from the servo control.

On valves with normally open 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 indicated on the data plate).
- 2) Blow air into the servo control equal to the control signal as indicated on the data plate (the valve should start to close, this data can be read on the speed plate).
- 3) Repeat this operation 5 times.
- 4) Check, with air off, that there are no valve leakages.
- 5) Check, with air on, that there are no air leakages from the servo control.

### 5.4 Troubleshooting.

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

The valve serial number is printed on the metallic plate, which is fastened to the valve. Reference shall be made to the serial number when requiring spare parts and in mail.

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

#### 5.4.1 N.C. VALVES

In case of anomalous operation or valve leakages, the valve operation shall be immediately stopped and the following checks shall be carried out:

disconnect the air circuit; disconnect the air supplying pipe (with air off), to make sure that no air is present inside the piping.

**Caution:** during troubleshooting, the valve shall not be removed, nor placed elsewhere. No components of the valve shall be disassembled or unloosened.

Check with a pressure gauge that the fluid pressure at the valve inlet (upstream) is not higher than the maximum allowable pressure or, in case of  $\Delta p < P_S$ , the  $\Delta p$  is not exceeded.

Verify from the stroke connection clamp that the valve has carried out a complete stroke and that it is now in the off position. If the stroke is not complete, foreign matters might have entered the part between shutter and seat.

Should anomalies still be present after this check, verify the valve inner parts, disassembling the valve as indicated under the "Instructions for disassembly, gasket replacement and re-assembly of NC valves" included in this manual.

Should leakages still persist, contact our technical department.

#### 5.4.2 N.O. VALVES

In case of anomalous operation or a leakage through the valve, the operation shall be immediately interrupted and the following checks shall be carried out: blow air (at a pressure value equal to the one indicated 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 components of the valve shall be disassembled or unloosened.

Check with a pressure gauge that the fluid pressure at the valve inlet (upstream) is not higher than the maximum allowable pressure or, in case of  $\Delta p < P_S$ , the  $\Delta p$  is not exceeded.

Verify from the stroke connection clamp that the valve has carried out a complete stroke and that it is now in the off position. If the stroke is not complete, foreign matters might have entered the part 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.

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## 5.5 Scheduled Maintenance.

Periodic maintenance operations must be performed independently of those carried out as a result of possible damages, 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 a first operation period, it is advisable to check the packing gland, which requires particular care. During the first operating hours, check that no leakages are present. If so, remove them carefully operating on the fastening nut, rotating it by one fourth turn at maximum for each teflon-graphite packing gland.

It is strongly recommended not to tighten the nut too much, as frictions might derive on the stem, which might cause the valve to stop, or, in any case, give rise to an unsatisfying operation. Should leakage persist despite the tightening, the packing gland shall be completely replaced.

## 5.6 Instructions for Disassembly and Assembly of GRS/06 Servo control from the Valve Body

Refer to annexed Dwg. Nr. 060281 for the disassembly and assembly operations of the servo control for all the GRS/06 valves.

All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.

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

**NOTE: Read the procedures thoroughly before starting any operation.**

### 5.6.1 Removal of NC servo control from the valve

- 1) Unloosen screws (21), remove nuts (32) and remove the connection clamps (12).
- 2) Input air into the servo control (see value specified on the characteristic label)
- 3) Unloosen nuts (35), remove the spring washers (36) and flat washer (37) and withdraw the servo control from studs (34) of the valve body (14).
- 4) Blow air out of the servo control

### 5.6.2 Removal of NO servo control from the valve

- 1) Unloosen screws (21), remove nuts (32) and remove the connection clamps (12). Caution: When removing the connection clamps (12), the shutter (8) might move downwards and hit against the seat (25). It is then advisable to follow the shutter until it reaches the seat, to prevent any damage to the seal.
- 2) Unloosen nuts (35), remove the spring washers (36) and flat washer (37) and withdraw the servo control from studs (34) of the valve body (14).

### 5.6.3 Positioning of NC servo control on the valve

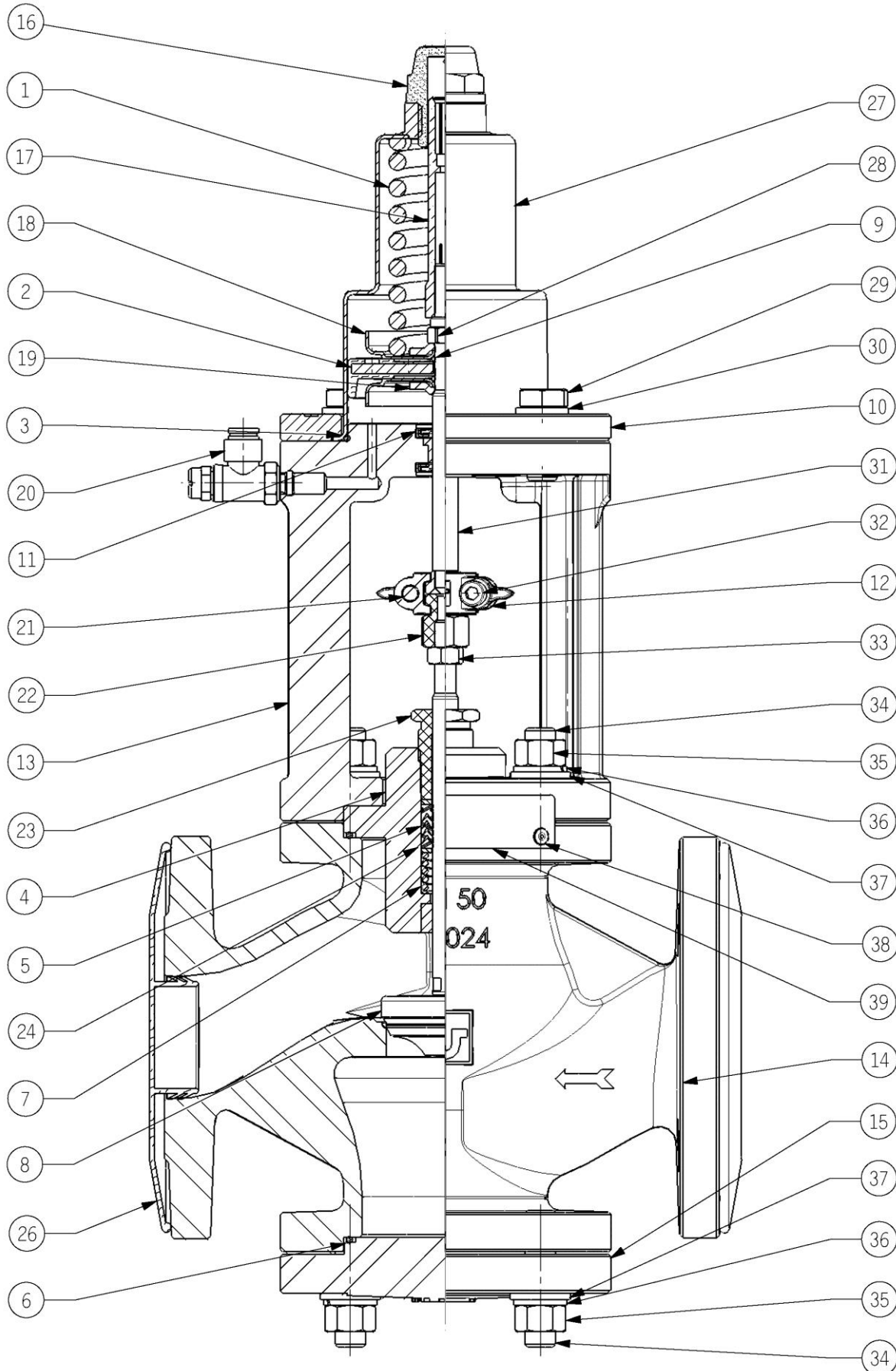
- 1) Blow air into the servo control. **Caution! The servo control shaft shall move from its stroke.**
- 2) Insert the servo control mounting onto studs (34) so that the air coupling is on the valve outlet side.
- 3) Insert the flat washers (37) and the spring washers (36) onto the studs (34).
- 4) Torque the nuts (35), according to indications in Table 6.
- 5) Remove air from the servo control. **Caution! The servo control shaft shall move from its stroke.**
- 6) Fasten the servo control shaft and the preload adjusting nut with the connection clamps (12).
- 7) Insert screws (21) into the connection clamps (12).
- 8) Torque the nuts (32), according to indications in Table 6.

### 5.6.4 Positioning of NO servo control on the valve

- 1) Insert the servo control mounting onto studs (34) so that the air coupling is on the valve outlet side.
- 2) Insert the flat washers (37) and the spring washers (36) onto the studs (34).
- 3) Torque the nuts (35), according to indications in Table 6.
- 4) Make the preload adjusting nut (22) contact the servo control shaft (31) and lift the shutter (8).
- 5) Fasten the servo control shaft and the preload adjusting nut with the connection clamps (12).
- 6) Insert screws (21) into the connection clamps (12).
- 7) Torque the nuts (32), according to indications in Table 6.



**Section plan D.V. 2-WAY NODULAR CAST IRON N.C. VALVE GRS/06**



Drawing No. 060281 Rev.: 01

## 5.7 Instructions for Disassembly and Assembly of GRS/06 Servo control from the Valve Body with bellows.

Refer to annexed Dwg. Nr. 060339 for the disassembly and assembly operations of the servo control for all the GRS/06 valves, with bellows.

All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.

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

**NOTE: Read the procedures thoroughly before starting any operation.**

### 5.7.1 Removal of NC servo control from the valve with bellows

- 8) Unloosen screws (21), remove nuts (32) and remove the connection clamps (12).
- 9) Input air into the servo control (see value specified on the characteristic label)
- 10) Unloosen nuts (52), remove the elastic washers (51) and the flat washers (50).
- 11) Remove screws (49), separate the servo control from the mounting extension (54).
- 12) Blow air out of the servo control

### 5.7.2 Removal of NO servo control from the valve with bellows

- 1) Unloosen screws (21), remove nuts (32) and remove the connection clamps (12). Caution: When removing the connection clamps (12), the shutter (8) might move downwards and hit against the seat (25). It is then advisable to follow the shutter until it reaches the seat, to prevent any damage to the seal.
- 2) Unloosen nuts (52), remove the elastic washers (51) and the flat washers (50).
- 3) Remove screws (49), separate the servo control from the mounting extension (54).

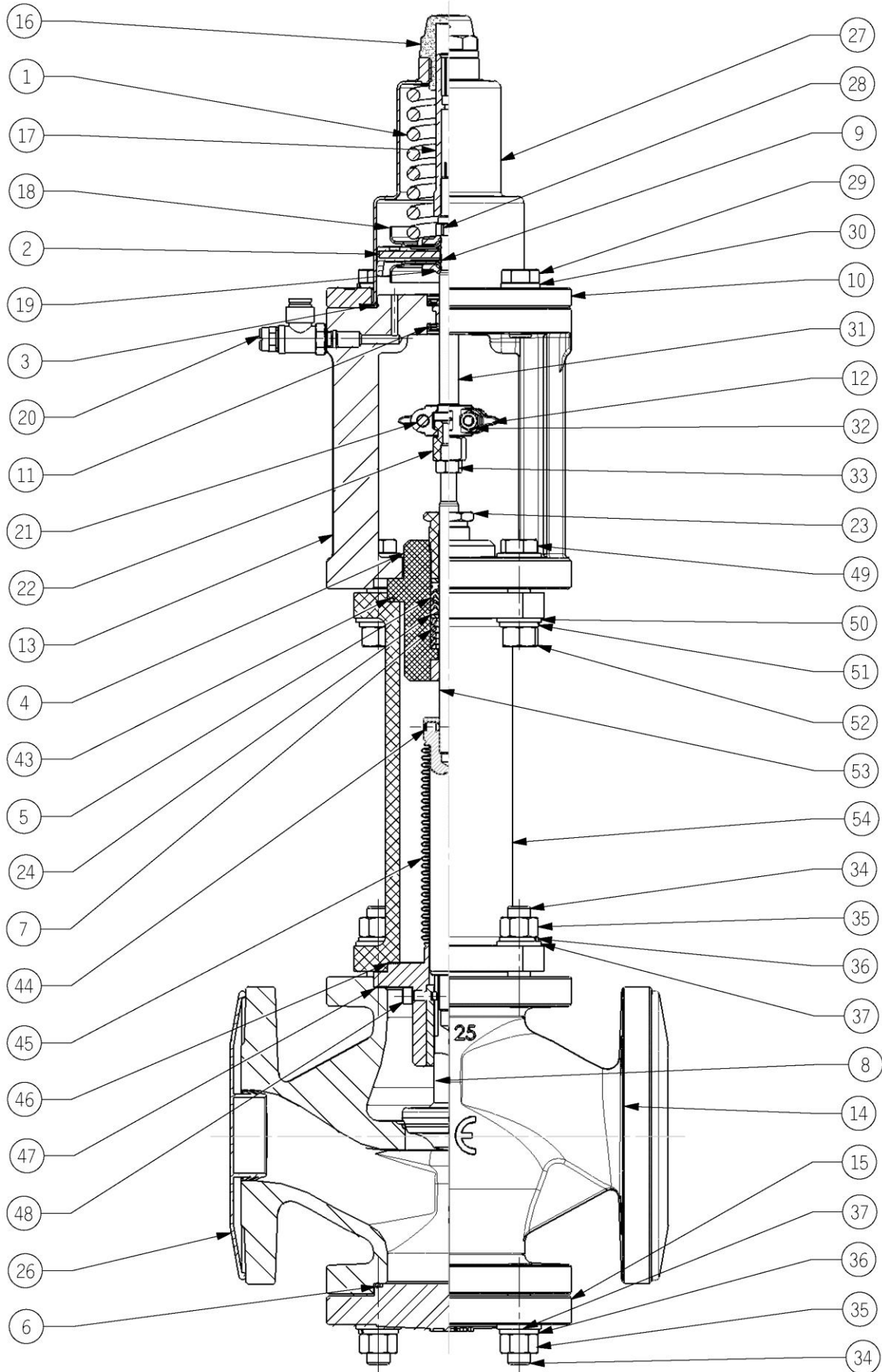
### 5.7.3 Positioning of NC servo control on the valve with bellows

- 1) Blow air into the servo control. **Caution! The servo control shaft shall move from its stroke.**
- 2) Insert the servo control mounting onto the intermediate body (4) so that the air coupling is on the valve outlet side.
- 3) Insert the screws (49) into the valve mounting (13) and into the mounting extension (54).
- 4) Insert the flat washers (49) and the spring washers (50) onto the screws (51).
- 5) Torque the nuts (52), according to indications in Table 6.
- 6) Remove air from the servo control. **Caution! The servo control shaft shall move from its stroke.**
- 7) Fasten the servo control shaft and the preload adjusting nut with the connection clamps (12).
- 8) Insert screws (21) into the connection clamps (12).
- 9) Torque the nuts (32), according to indications in Table 6.

### 5.7.4 Positioning of NO servo control on the valve with bellows

- 1) Insert the servo control mounting onto the intermediate body (4) so that the air coupling is on the valve outlet side.
- 2) Insert the screws (49) into the valve mounting (13) and into the mounting extension (54).
- 3) Insert the flat washers (49) and the spring washers (50) onto the screws (51).
- 4) Torque the nuts (52), according to indications in Table 6.
- 5) Make the preload adjusting nut (22) contact the servo control shaft (31) and lift the shutter (8).
- 6) Fasten the servo control shaft and the preload adjusting nut with the connection clamps (12).
- 7) Insert screws (21) into the connection clamps (12).
- 8) Torque the nuts (32), according to indications in Table 6.

**Section plan D.V. 2-WAY NODULAR CAST IRON N.C. VALVE GRS/06**



Drawing No. 060339 Rev.: 01

## 5.8 Instructions for disassembly, gasket replacement and re-assembly of the D.V. N.C GRS/06 servo control

Refer to the annexed Dwg. Nr. 060281 for the disassembly and assembly operations of the valves.

All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.

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

**NOTE: Read the procedures thoroughly before starting any operation.**

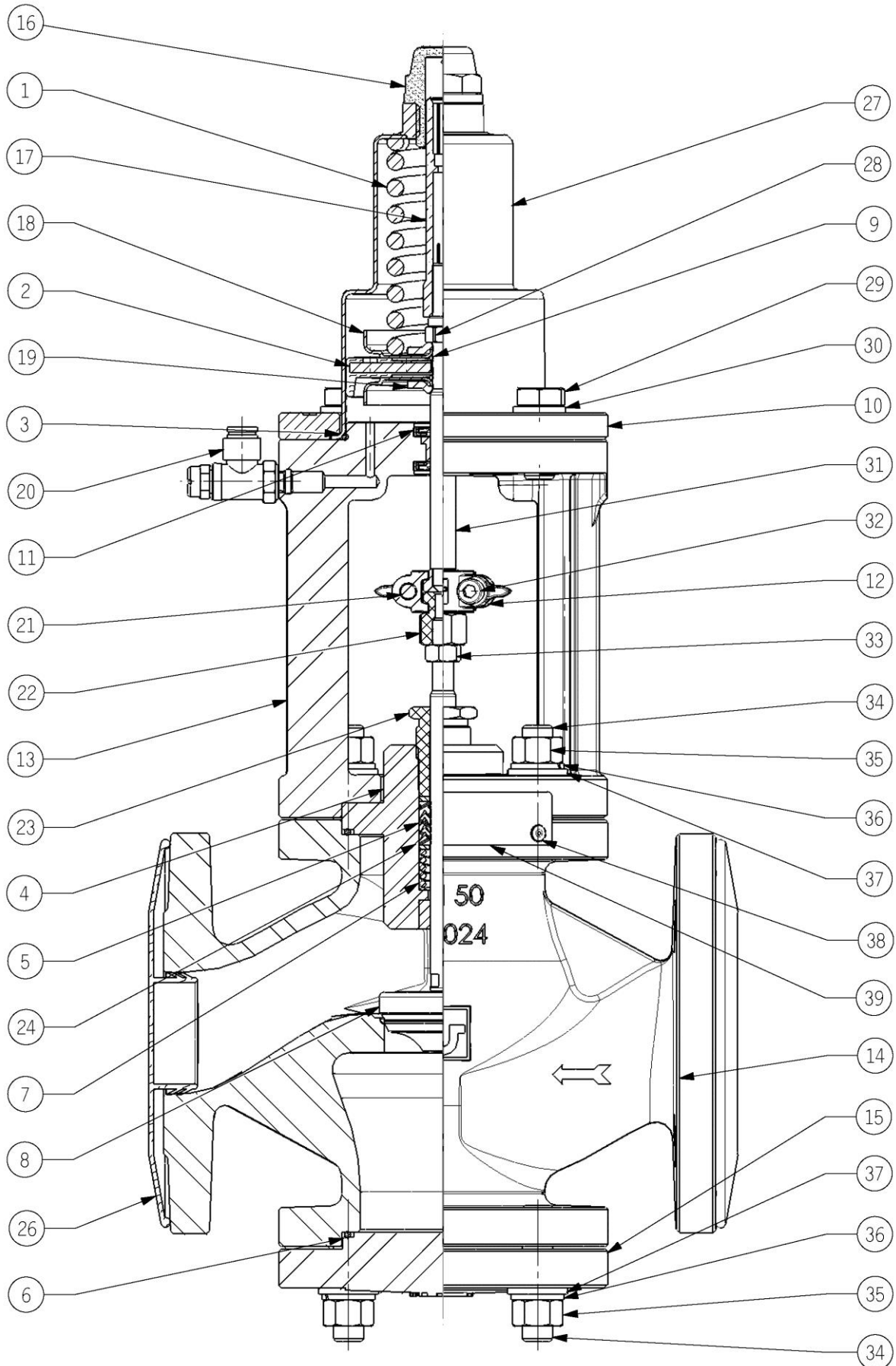
### 5.8.1 Disassembly.

- 1) Separate the servo control from the valve body as described in paragraph 5.6
- 2) Unloosen screws (29), remove washers (30). **Caution! A compressed spring is placed inside the cylinder.** Proper tools shall then be used to prevent the spring housing piston (27) from leaving the valve mounting (13), once all the screws (29) have been unloosen.
- 3) Remove the fastening plate (10).
- 4) Remove the spring housing piston (27).
- 5) Screw down the transparent cap (16).
- 6) Extract O-Ring (3).
- 7) Remove the spring (1).
- 8) Remove from the mounting the servo control stem (31) with details still assembled.
- 9) Block the stem of the servo control (31) between soft jaws. Screw out the stroke indicator (17) and the self-locking nut (28).
- 10) Withdraw the first piston bearing washer (19), withdraw the first piston support (18), placed on the upper part.
- 11) Remove the first OR (9), remove the piston with TDUOP gasket (2), remove the second OR (9).
- 12) Withdraw the second piston support (18), withdraw the second piston bearing washer (19).
- 13) Withdraw the servo control stem (31) from the valve mounting (13).
- 14) Remove BA gaskets (11) from the valve mounting (13).
- 15) At this point the servo control is completely disassembled. The required components can be then replaced.

### 5.8.2 Assembly.

- 1) Place the BA gaskets (13) into the valve mounting (11).
- 2) Lubricate the servo control stem (31) with silicone grease and insert it into the valve mounting (13).
- 3) Block the servo control stem (31) between the soft jaws.
- 4) Insert onto the servo control stem (31) the first piston supporting washer (19), the first piston holding support (18) and the first OR gasket (9).
- 5) Insert the piston with TDUOP gasket (2), positioning it with the edge downwards. Insert the second OR gasket (9), the piston holding second support (18) and the second piston supporting washer (19).
- 6) Tighten all components with the self-locking nut (28) closing the component package but without forcing closing to the correct torque.
- 7) Screw the stroke indicator (17) to the servo control stem (31).
- 8) Insert the spring (1) on the piston.
- 9) Insert the spring housing piston (27) on the valve mounting (13) paying attention at lubricating the lip of the TDUOP gasket (2) with silicone grease.
- 10) Insert the fastening plate (19) onto the spring housing piston (27).
- 11) Using proper tools, draw the spring housing piston (7) up to the valve mounting (13), place the washers (30) and torque tighten the screws (29), as indicated under Table 6. **Caution! A compressed spring is placed inside the cylinder.**
- 12) Screw down the transparent cap (16) and the flow rate control (20).
- 13) At this point, the servo control can be re-positioned on the valve body, as described in paragraph 5.6.

5.8.3 Section plan D.V. 2-Way Nodular Cast Iron N.C. Valve GRS/06



Drawing No. 060281 Rev.:01

## 5.9 Instructions for disassembly, gasket replacement and re-assembly of the D.V. N.O. GRS/06 servo control

Refer to the annexed Dwg. Nr. 060304 for the disassembly and assembly operations of the valves.

All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.

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

**NOTE: Read the procedures thoroughly before starting any operation.**

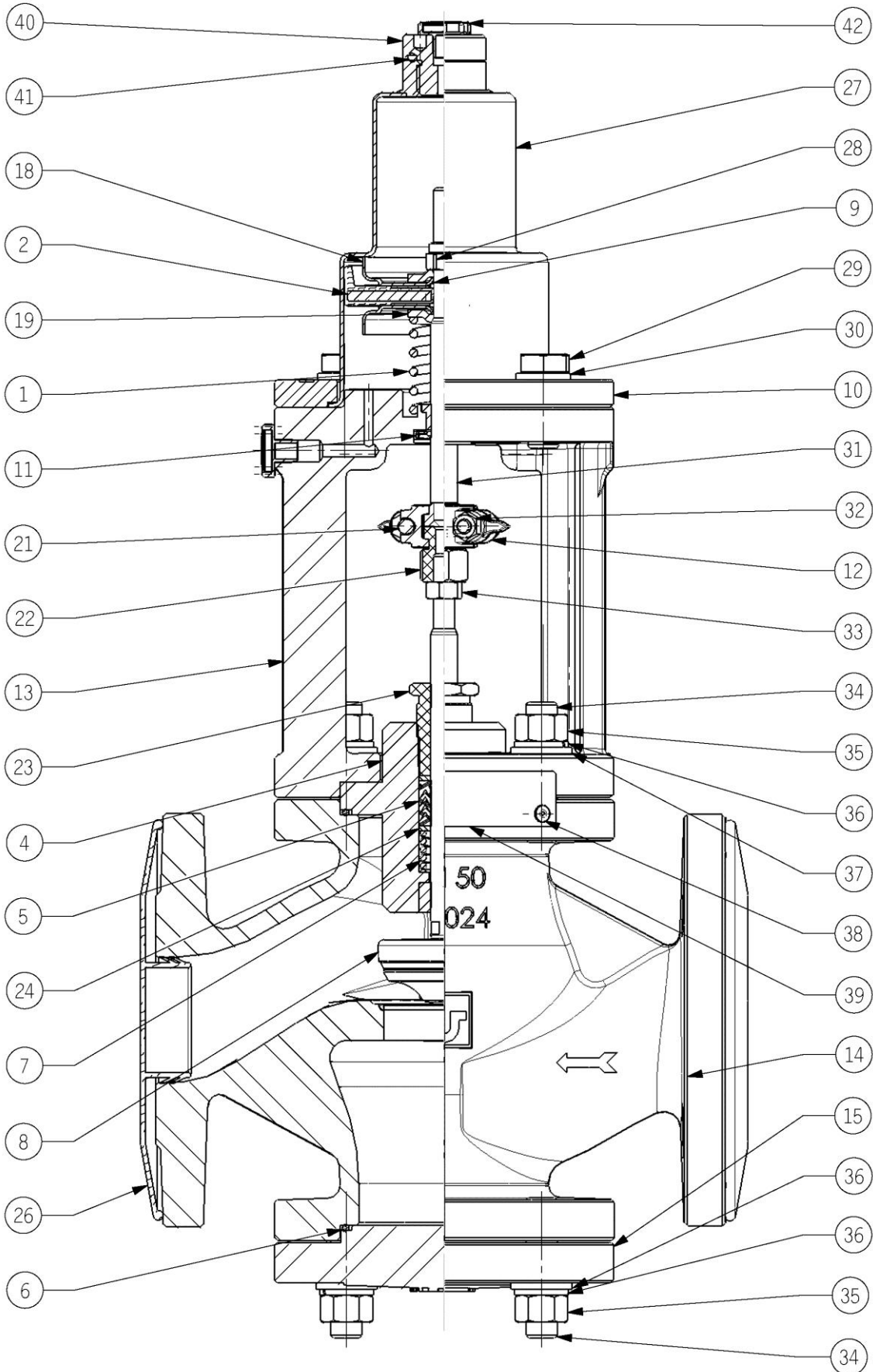
### 5.9.1 Disassembly.

- 1) Separate the servo control from the valve body as described in paragraph 5.6.
- 2) Unloosen the air inlet connection (40) and remove the OR gasket (41).
- 3) Unloosen screws (29), remove washers (30). **Caution! A compressed spring is placed inside the cylinder.** Proper tools shall then be used to prevent the spring housing piston (27) from leaving the valve mounting (13), once all the screws (29) have been unloosen.
- 4) Remove the fastening plate (10)
- 5) Remove the spring housing piston (27).
- 6) Block the stem of the servo control (31) between soft jaws. unloosen the self-locking nut (28).
- 7) Withdraw the first piston bearing washer (19), withdraw the first piston support (18), placed on the upper part.
- 8) Remove the first OR (9), remove the piston with TDUOP gasket (2), remove the second OR (9).
- 9) Withdraw the second piston support (18), withdraw the second piston bearing washer (19).
- 10) Remove the spring (1).
- 11) Withdraw the stem of the servo control (31) and the BA gasket (11) from the valve mounting (13).
- 12) At this point the servo control is completely disassembled. The required components can be then replaced.

### 5.9.2 Assembly.

- 1) Place the BA gasket (11) into the valve mounting (13).
- 2) Lubricate the servo control stem (31) with silicone grease and insert it into the valve mounting (13).
- 3) Block the servo control stem (31) between the soft jaws.
- 4) Insert the spring (1) on the stem of the servo control (31).
- 5) Insert onto the servo control stem (31) the first piston supporting washer (19), the first piston holding support (18) and the first OR gasket (9).
- 6) Insert the piston with TDUOP gasket (2), positioning it with the edge upwards. Insert the second OR gasket (9), the piston holding second support (18) and the second piston supporting washer (19).
- 7) Tighten all components with the self-blocking nut (28) closing the component package but without forcing closing to the correct torque.
- 8) Insert the spring housing piston (27) on the valve mounting (13) paying attention at lubricating the lip of the TDUOP gasket (2) with silicone grease.
- 9) Insert the fastening plate (19) onto the spring housing piston (27).
- 10) Using proper tools, draw the spring housing piston (7) up to the valve mounting (13), place the washers (30) and torque tighten the screws (29), as indicated under Table 6. **Caution! A compressed spring is placed inside the cylinder.**
- 11) Place the OR gasket (41) into the air inlet connection (40).
- 12) Torque tighten the air inlet connection (40) on the spring housing piston (27), as indicated under Table 6.
- 13) At this point, the servo control can be re-positioned on the valve body, as described in paragraph 5.6.

**5.9.3 Section plan 2-Way Nodular Cast Iron N.O. Valve GRS/06**



Drawing No. 060308 Rev.: 01

## 5.10 Instructions for disassembly, gasket replacement and re-assembly of the 2-way D.V. GRS/06 body

Refer to the annexed Dwg. Nr. 060281 for the disassembly and assembly operations of the valves.

All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.

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

**NOTE: Read the procedures thoroughly before starting any operation.**

**5.10.1 Disassembly.** Separate the valve body the servo control from as described in paragraph 5.6.

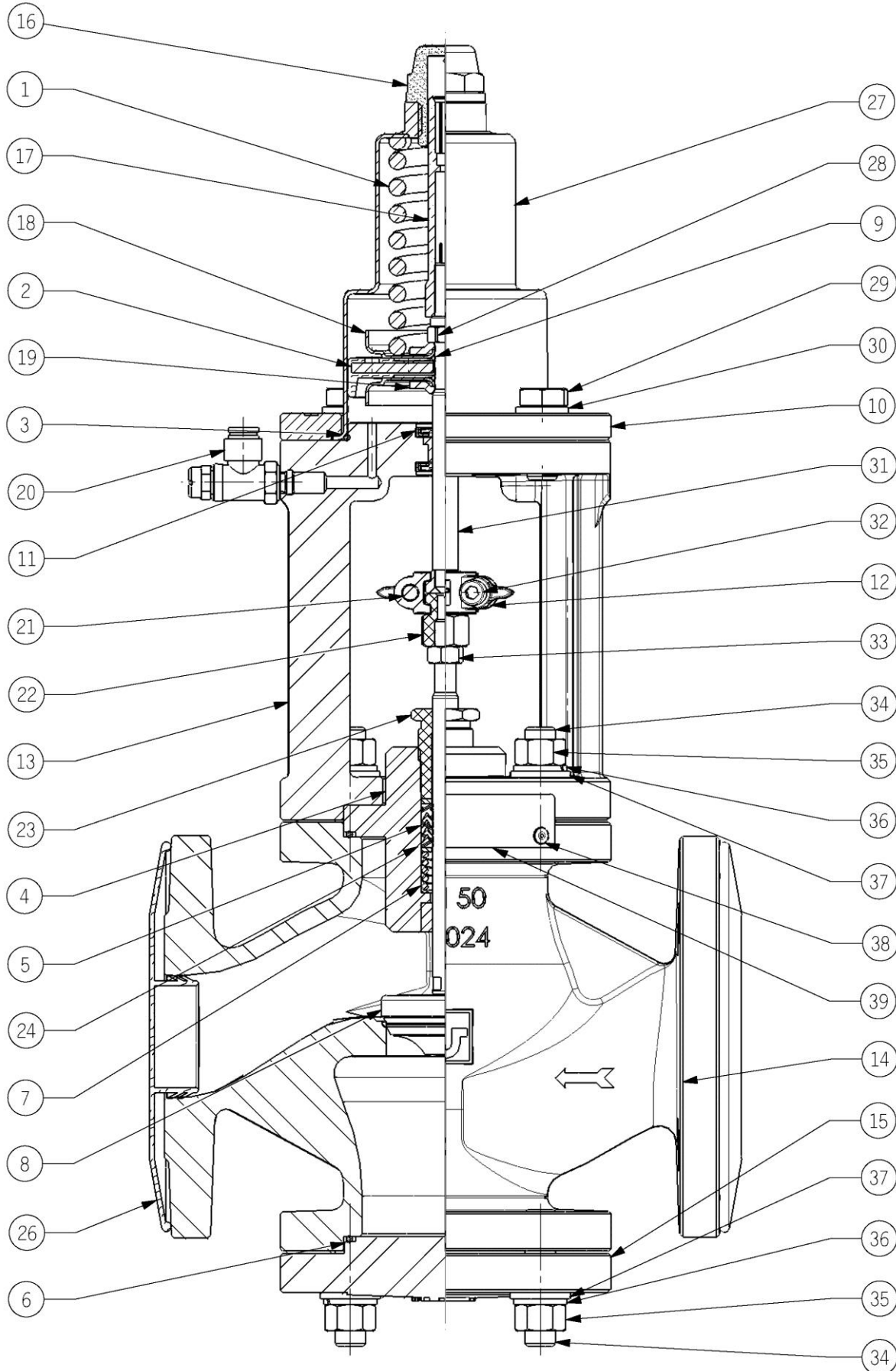
- 2) Mark the position of the adjusting nut (22) in order to reassemble the valve in the original calibration conditions.
- 3) Withdraw the adjusting nut (22) and the nut (33).
- 4) Withdraw the intermediate body (4) out of the valve body (14), together with the shutter (8) and the other seal components.
- 5) Withdraw the shutter (8) out of the intermediate body (4).
- 6) Unloosen the packing gland screw (23) and withdraw the first spacer ring washer (24) out of the intermediate body, the packing gland (5), the second spacer ring washer (24) and the packing gland spring (7). **Caution! The packing gland screw (23) keeps the packing gland spring (7) compressed. Pay attention that the inner components of the intermediate body do not come off once the packing gland screw (23) is no longer compressed.**
- 7) Remove the body gasket (14) from the valve body (6).
- 8) Unloosen the nuts (35), remove the spring washers (36) and the flat washers (37), remove the bottom.
- 9) Remove the body gasket (14) from the valve body (6).
- 10) At this point the valve body is completely disassembled. The required components can be then replaced

### 5.10.2 Assembly.

- 1) Position the lower OR gasket (6) on the bottom (15), then insert it into the valve body (14).
- 2) Insert the flat washers (37) and the spring washers (36) onto the lower studs (34).
- 3) Screw the lower nuts (35) in pairs, according to indications in Table 6.
- 4) Lubricate the inner part of the intermediate body (4) with silicone grease and insert inside it the packing gland spring (7), the second spacer ring washer (24), the packing gland (5), the second spacer ring washer (24).
- 5) Screw down the packing gland screw (23) until it protrudes ~ 10 mm from the upper side of the intermediate body. **Caution! The packing gland screw keeps the packing gland spring compressed. Pay attention that the components placed on the spring do not come off during the assembly.**
- 6) Lubricate the shutter stem (8) with silicone grease and insert it into the intermediate body (4) previously prepared.
- 7) Place the OR gasket (17) into the valve body seat (14). Then, place the intermediate body with the shutter inserted into the valve body.
- 8) Screw the nut (33), then screw the adjusting nut (22).
- 9) Bring again the preloaded adjusting nut (22) into the position previously marked.
- 10) Torque the nut (33), according to indications in Table 6, holding the preload adjusting screw (22).
- 11) At this point the valve body is completely assembled and can be reconnected to the servo control as described in paragraph 5.6.



**5.10.3 Section plan D.V. 2-Way Nodular Cast Iron N.C. Valve GRS/06**



Drawing No. 060281 Rev.: 01

## 5.11 Instructions for disassembly, gasket replacement and re-assembly of the 3-way D.V. GRS/06 body

Refer to the annexed Dwg. Nr. 060308 for the disassembly and assembly operations of the valves.

All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.

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

**NOTE: Read the procedures thoroughly before starting any operation.**

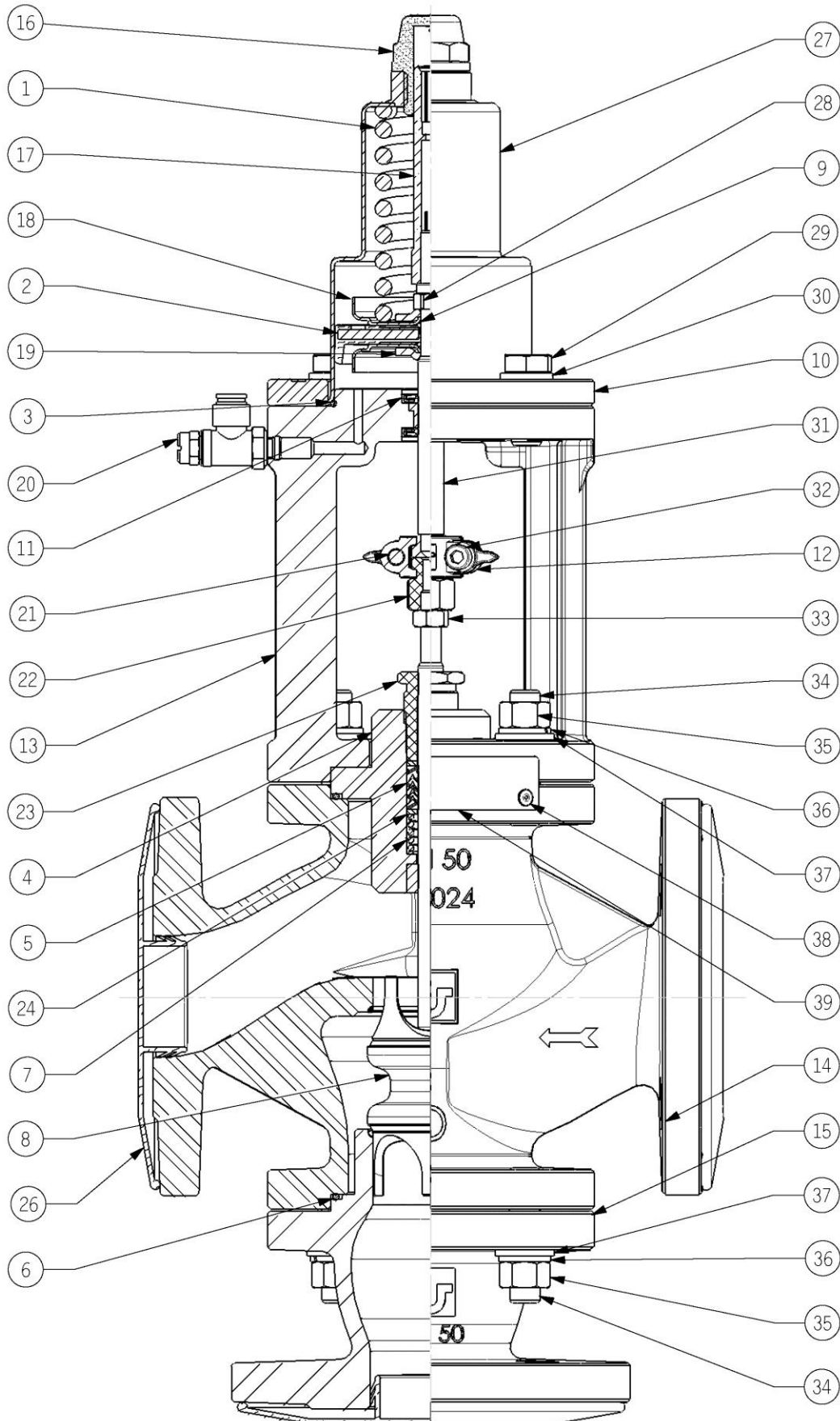
### 5.11.1 Disassembly.

- 1) Separate the valve body the servo control from as described in paragraph 5.6.
- 2) Mark the position of the adjusting nut (22) in order to reassemble the valve in the original calibration conditions.
- 3) Withdraw the adjusting nut (22) and the nut (33).
- 4) Unloosen the nuts (35), remove the spring washers (36) and the flat washers (37), remove the bottom.
- 5) Remove the body gasket (14) from the valve body (6).
- 6) Withdraw the shutter (8) from the valve body bottom (14).
- 7) Withdraw the intermediate body (4) out of the valve body (14), together with all sealing components already inserted in it.
- 8) Unloosen the packing gland screw (23) and withdraw the first spacer ring washer (24) out of the intermediate body, the packing gland (5), the second spacer ring washer (24) and the packing gland spring (7). **Caution! The packing gland screw (23) keeps the packing gland spring (7) compressed. Pay attention that the inner components of the intermediate body do not come off once the packing gland screw (23) is no longer compressed.**
- 9) Remove the body gasket (14) from the valve body (6).
- 10) At this point the valve body is completely disassembled. The required components can be then replaced

### 5.11.2 Assembly.

- 1) Lubricate the inner part of the intermediate body (4) with silicone grease and insert inside it the packing gland spring (7), the second spacer ring washer (24), the packing gland (5), the second spacer ring washer (24).
- 2) Screw down the packing gland screw (23) until it protrudes ~ 10 mm from the upper side of the intermediate body. **Caution! The packing gland screw keeps the packing gland spring compressed. Pay attention that the components placed on the spring do not come off during the assembly.**
- 3) Place the OR gasket (6) into the valve seat (14). Then place the intermediate body (4) previously assembled.
- 4) Lubricate the shutter stem (8) with silicone grease and insert it into the intermediate body (4) previously prepared.
- 5) Position the lower OR gasket (6) on the bottom (15), then insert it into the valve body (14).
- 6) Insert the flat washers (37) and the spring washers (36) onto the lower studs (34).
- 7) Screw the lower nuts (35) in pairs, according to indications in Table 6.
- 8) Screw the nut (33), then screw the adjusting nut (22).
- 9) Bring again the preloaded adjusting nut (22) into the position previously marked.
- 10) Torque the nut (33), according to indications in Table 6, holding the preload adjusting screw (22).
- 11) At this point the valve body is completely assembled and can be reconnected to the servo control as described in paragraph 5.6.

**5.11.3 Section plan D.V. 3-Way Nodular Cast Iron N.C. Valve GRS/06**



Drawing No. 060304 Rev.: 01

## 5.12 Instructions for disassembly, gasket replacement and re-assembly of the 2-way D.V. GRS/06 body with bellows.

Refer to annexed Dwg. Nr. 060339 for the disassembly and assembly operations of the 2-way GRS/06 valve body - with bellows.

All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.

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

**NOTE: Read the procedures thoroughly before starting any operation.**

### 5.12.1 Disassembly

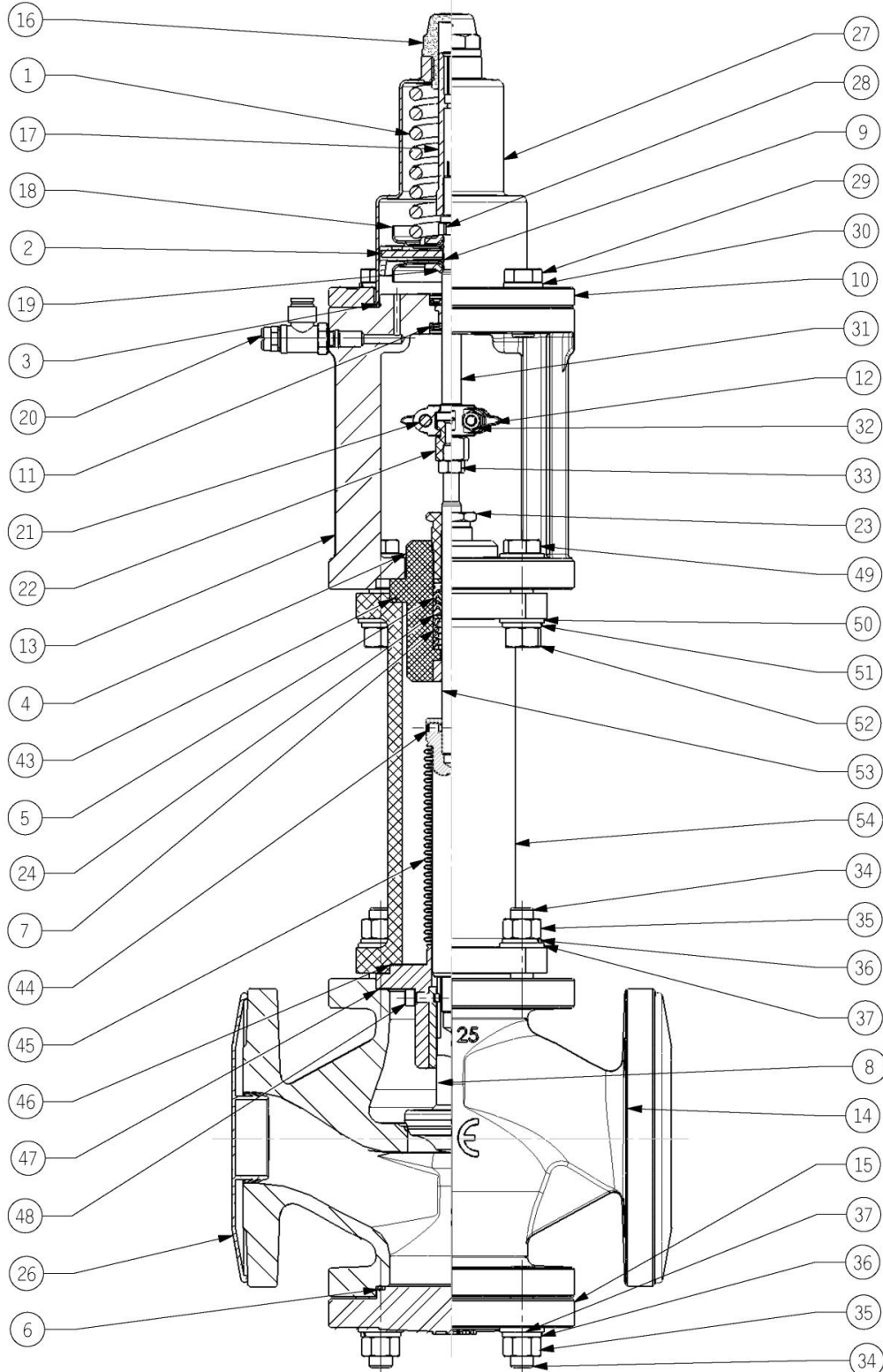
- 1) Separate the valve body the servo control from as described in paragraph 5.7.
- 2) Mark the position of the adjusting nut (22) in order to reassemble the valve in the original calibration conditions.
- 3) Withdraw the adjusting nut (22) from the shutter stem (53), unloosen the nut (33).
- 4) Withdraw the intermediate body (4) from the mounting extension (54), remove the OR gasket (43) from this latter.
- 5) Unloosen the packing gland screw (23). **Caution! The packing gland screw (23) keeps the packing gland spring (7) compressed. Pay attention that the inner components of the intermediate body do not come off once the packing gland screw (23) is no longer held by the threading.**
- 6) Withdraw the first packing gland washer (24), the packing gland (5), the second packing gland washer (24) and packing gland spring (7) from the intermediate body (9).
- 7) Unloosen the upper nuts (35), remove the elastic washers (36) and the flat washers (37).
- 8) Remove the mounting extension (54), then withdraw the FEP O seal gasket (46). It is then possible to withdraw the intermediate body with bellows (45). Pay attention, while handling the bellows, as it is a very delicate component, when disassembled and cannot be STRESSED.
- 9) Unloosen the grub screw (44), unloosen the shutter stem (53), preventing the bellows from being stressed.
- 10) Unloosen the socket head screw (48), it is then possible to screw out the shutter (8) from the intermediate body with bellows (45). NB: This action is very delicate and shall be carried out very carefully without stressing the bellows. It is not strictly necessary for the replacement of gaskets.
- 11) Remove the FEP O seals gasket (47) from the valve body (14).
- 12) Unloosen the nuts (35), remove the spring washers (36) and the flat washers (37).
- 13) Remove the bottom (14) and the FEP OR seals gasket (7) from the valve body (14).
- 14) At this point the valve body is completely disassembled. The required components can be then replaced.

### 5.12.2 Re-assembly

- 1) Position the FEP O seals gasket (6) on the bottom (15), then insert it into the valve body (14).
- 2) Insert the flat washers (37) and the spring washers (36) onto the lower studs (34).
- 3) Screw the lower nuts (35) in pairs, according to indications in Table 6.
- 4) Lubricate the intermediate body (4) with silicone grease.
- 5) Insert the packing gland spring (7), the packing gland washer (24), the packing gland (5), the second packing gland washer (24) into the intermediate body (4).
- 6) Screw down the packing gland screw (23) until it protrudes 10 mm from the upper side of the intermediate body. **Caution! The packing gland screw keeps the packing gland spring compressed. Pay attention that the components located on the spring do not come off during the assembly.**
- 7) Screw down the shutter (8) on the intermediate body stem with bellows (45). Then, screw down the HSH cap screw (48) into the intermediate body with bellows. This operation shall be carried out very carefully, as the point of the HSH cap screw (48) shall be perfectly centered. Moreover, it is necessary to make sure that the tip does not hinder the stem longitudinal sliding: in this case, adjust the screw length.
- 8) Screw down the shutter stem (53) into the intermediate body with bellows (45), then torque tighten the grub screw (44), as indicated under Table 6.
- 9) Insert the FEP O seals (47) into the valve body (14).
- 10) Then, insert the intermediate body with bellows previously assembled into the valve body.
- 11) Place the FEP O seals gasket (46) and insert the mounting extension (34) of the valve body onto the stud bolts (54).
- 12) Insert the flat washers (34), the elastic washers (37) onto tie rods of the studs (36) and screw nuts (35) in pairs, according to indications of Table 6.

- 13) Insert the OR gasket (43) into the mounting extension.
- 14) Insert the intermediate body (4) previously assembled into the mounting extension (54) and on the shutter stem (53).
- 15) Screw the nut (33), on the shutter stem (44), then screw the adjusting nut (22).
- 16) Bring again the preloaded adjusting nut (22) into the position previously marked.
- 17) Torque the nut (33), according to indications in Table 6, holding the preload adjusting screw (22).
- 18) At this point the valve body is completely assembled and can be reconnected to the servo control as described in paragraph 5.7.

### 5.12.3 Section Plane – 2-way GRS/06 NC nodular Cast Iron D.V. with bellows



Drawing No. 060339 Rev.: 01

## 5.13 Instructions for disassembly, gasket replacement and re-assembly of the 3-way D.V. GRS/06 body with bellows.

Refer to annexed Dwg. Nr. 060341 for the disassembly and assembly operations of the 3-way GRS/06 valve body - with bellows.

All the disassembly and assembly operations shall be carried out by qualified personnel, adequately equipped for the hydraulic and pneumatic and provided with the proper safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions.

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

**NOTE: Read the procedures thoroughly before starting any operation.**

### 5.13.1 Disassembly

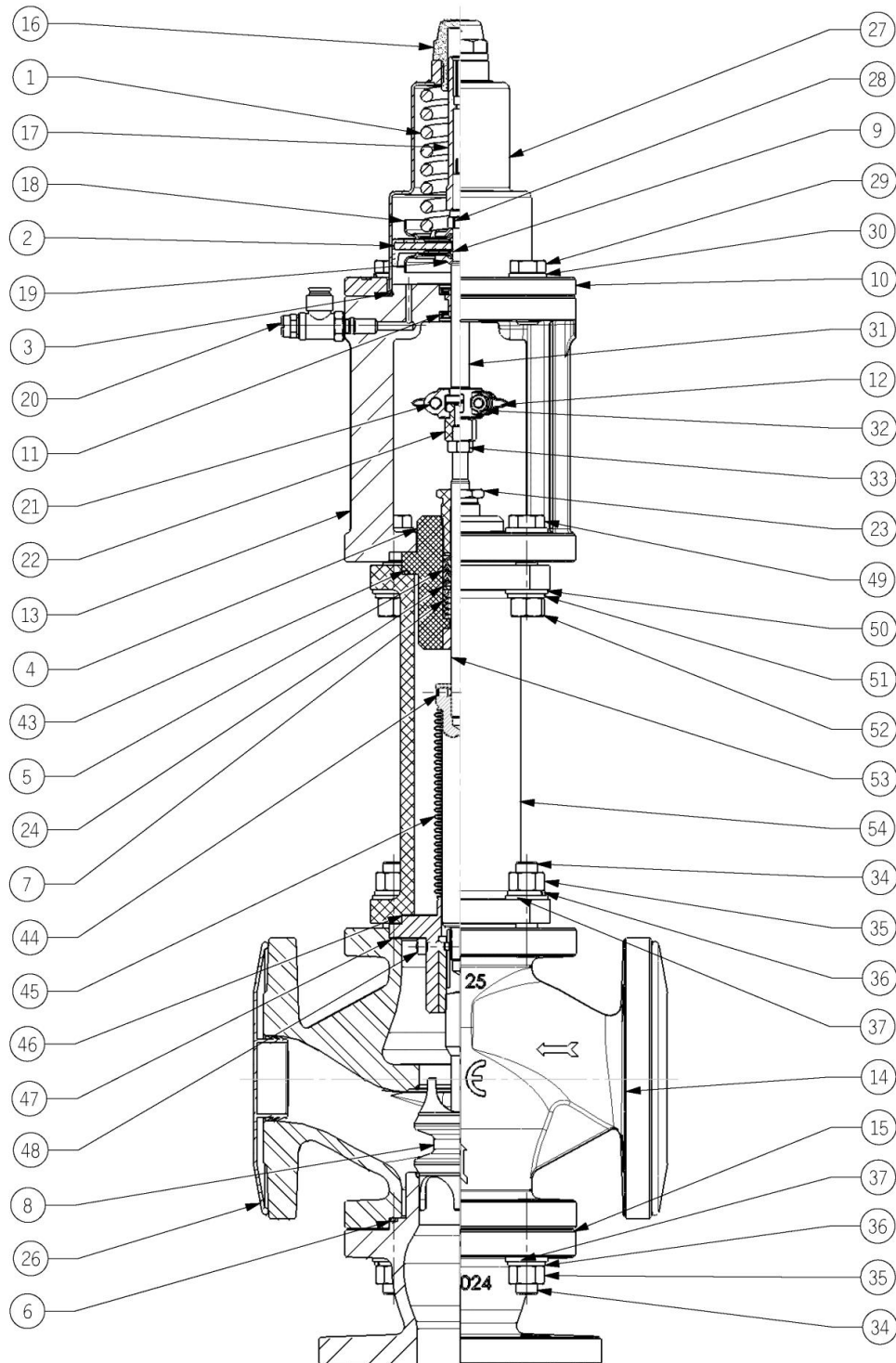
- 1) Separate the valve body the servo control from as described in paragraph 5.7.
- 2) Mark the position of the adjusting nut (22) in order to reassemble the valve in the original calibration conditions.
- 3) Withdraw the adjusting nut (22) from the shutter stem (53), unloosen the nut (33).
- 4) Withdraw the intermediate body (4) from the mounting extension (54), remove the OR gasket (43) from this latter.
- 5) Unloosen the packing gland screw (23). **Caution! The packing gland screw (23) keeps the packing gland spring (8) compressed. Pay attention that the inner components of the intermediate body do not come off once the packing gland screw (23) is no longer held by the threading.**
- 6) Withdraw the first packing gland washer (24), the packing gland (5), the second packing gland washer (24) and packing gland spring (7) from the intermediate body (4).
- 7) Unloosen the upper nuts (35), remove the elastic washers (36) and the flat washers (37).
- 8) Remove the mounting extension (54), then withdraw the FEP O seal gasket (46). Pay attention, while handling the bellows, as it is a very delicate component, when disassembled and cannot be STRESSED.
- 9) Unloosen the grub screw (44), unloosen the shutter stem (53), preventing the bellows from being stressed.
- 10) Blocking the valve body (14), take the intermediate body with bellows and pull until the HSH screw (48) comes out of the valve body; then, unloosen it. Caution! This operation is very delicate and requires a particular care. The bellows is has not to be stressed.
- 11) Unloosen the nuts (35), remove the spring washers (36) and the flat washers (37).
- 12) Remove the bottom (14) the 3-way bottom (15) and the FEP OR seals gasket (6) from it.
- 13) The shutter (8) can be then disassembled from the intermediate body with bellows (45) and withdraw the shutter from the valve bottom.
- 14) Withdraw the intermediate body with the bellows (45) from the valve body (14), then remove the FEP O seals gasket (47).
- 15) At this point the valve body is completely disassembled. The required components can be then replaced.

### 5.13.2 Re-assembly

- 1) Place the FEP O seals gasket (47) into the valve body (14), then place the intermediate body with bellows (45). Pay attention, while handling the bellows, as it is a very delicate component, when disassembled and has not to be stressed.
- 2) Inserting the shutter (8) from the valve body bottom, fasten it to the intermediate body with bellow.
- 3) Tightening the valve body, pull and remove from above the intermediate body with bellows until the hole for the HSH screw (48) is visible, then screw down the cap screw (49) into the intermediate body with bellows. This operation shall be carried out very carefully, as the point of the HSH cap screw (48) shall be perfectly centered in the shutter slot (8). Moreover, it is necessary to make sure that the tip does not hinder the stem longitudinal sliding: in this case, adjust the screw length.
- 4) Position the FEP O seals gasket (6) on the third-way bottom (15), then insert it into the valve body (14).
- 5) Insert the flat washers (37) and the spring washers (36) onto the lower studs (34).
- 6) Screw the lower nuts (35) in pairs, according to indications in Table 6.
- 7) Screw down the shutter stem (53) into the intermediate body with bellows (45), then torque tighten the grub screw (44), as indicated under Table 6.
- 8) Place the FEP O seals gasket (46) and insert the mounting extension (34) of the valve body onto the upper stud bolts (54).
- 9) Insert the flat washers (34), the elastic washers (37) onto tie rods of the studs (36) and screw nuts (35) in pairs, according to indications of Table 6.
- 10) Lubricate the intermediate body (4) with silicone grease.
- 11) Insert the packing gland spring (7), the packing gland washer (24), the packing gland (5), the second packing gland washer (24) into the intermediate body (4).

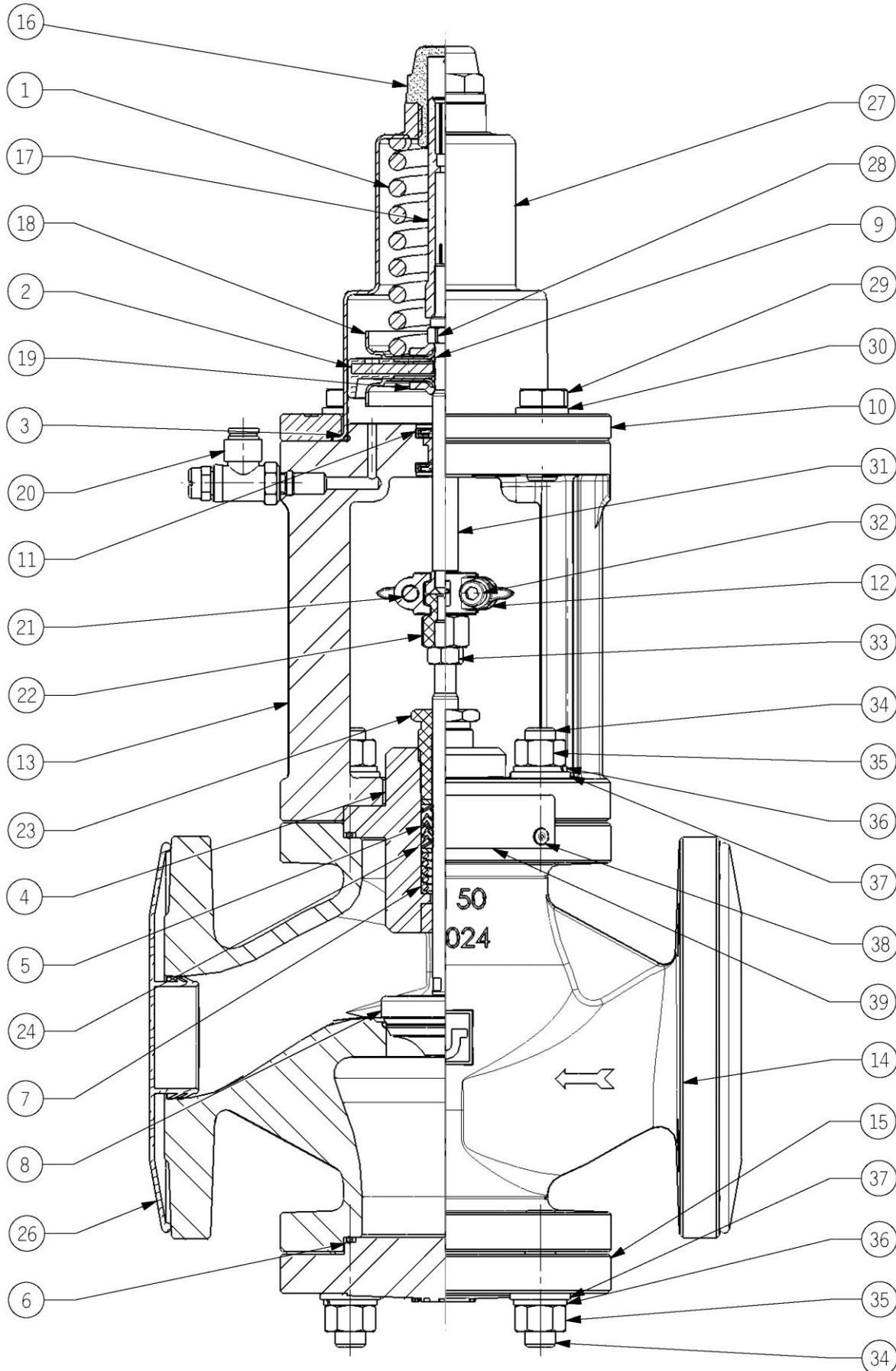
- 12) Screw down the packing gland screw (23) until it protrudes 10 mm from the upper side of the intermediate body.  
**Caution! The packing gland screw keeps the packing gland spring compressed. Pay attention that the components located on the spring do not come off during the assembly.**
- 13) Insert the gasket (43) into the mounting extension.
- 14) Insert the intermediate body (4) previously assembled into the mounting extension (54) and on the shutter stem (53).
- 15) Screw the nut (33) on the shutter stem (53), then screw the adjusting nut (22).
- 16) Bring again the preloaded adjusting nut (22) into the position previously marked.
- 17) Torque the nut (33), according to indications in Table 6, holding the preload adjusting screw (22).
- 18) At this point the valve body is completely assembled and can be reconnected to the servo control as described in paragraph 5.7.

### 5.13.3 Section Plane – 3-way GRS/06 NC Nodular Cast Iron D.V. with bellows



Drawing No. 060341 Rev.: 01

**Section plan D.V. 2-Way Nodular Cast Iron N.C. Valve GRS/06**



Drawing No. 060281 Rev.: 01



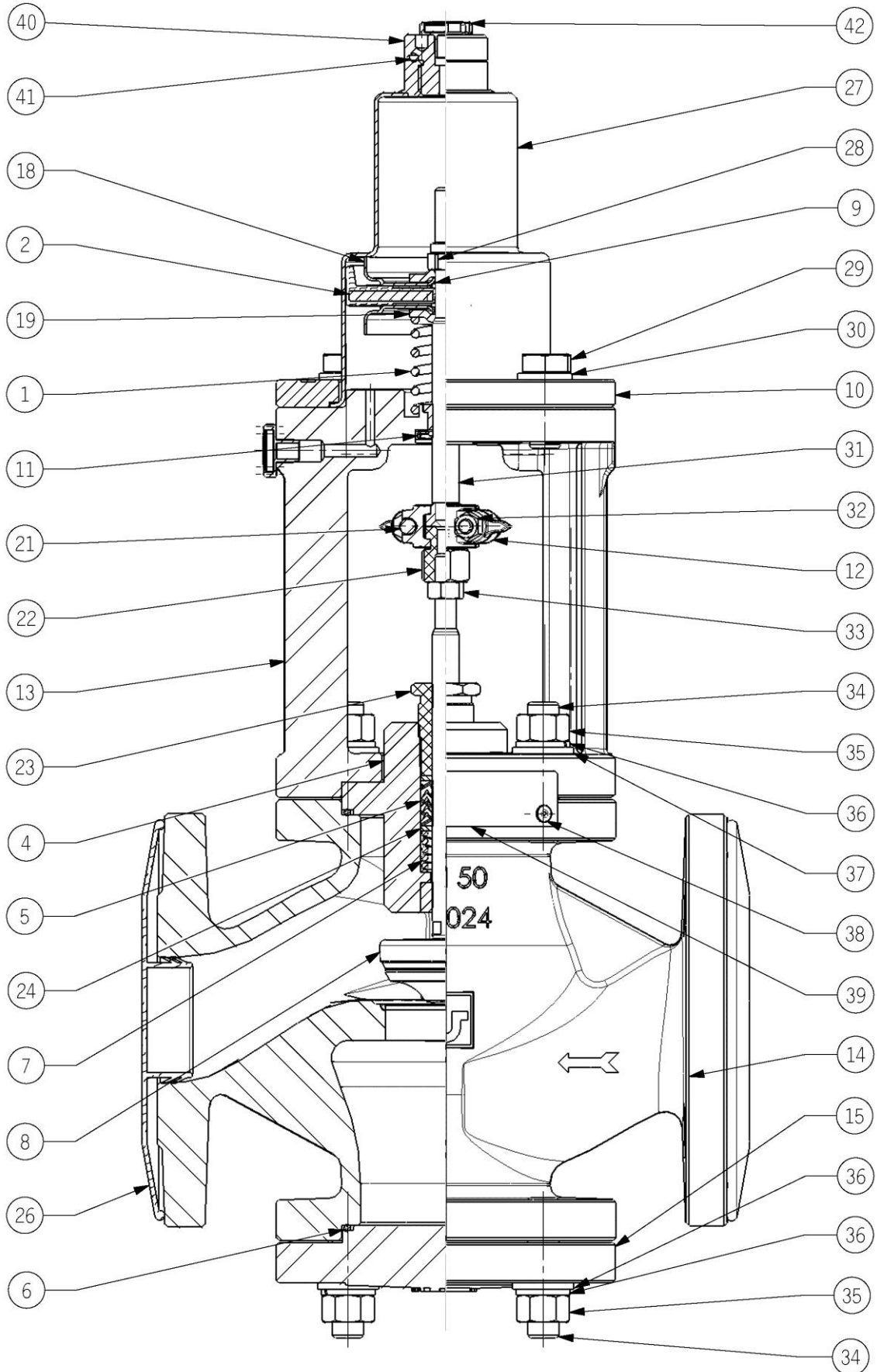
### 5.14 Details and Spare Parts of GRS/06 D.V. N.C Servo control

Part No.	Q.ty	DESCRIPTION	MATERIAL	GROUP	CODES	
					SERV. D.70	SERV. D.80
1	1	Spring	Spring steel	552	557	MTD087091
2	1	TDUOP gasket	NBR+Steel.	566	TDUOP7065	TDUOP8073
3	1	O-Ring gasket	Gaco	548	OR03256GA	OR03300GA
9	2	O-Ring gasket	Gaco	548	OR02025GA	OR02031GA
10	1	Fastening plate	Spher. Cast iron JS1024	653	-----	CLGR060203G
11	2	BA gasket	VITON	567	BA0V08224	BA0V10244
12	2	Connection clamp	CF8	585	M304050088	
13	1	Valve mounting	Spher. Cast iron JS1024	645	-----	CVSB060238
16	1	Transparent cap	Plastic	840	ICD091467	
17	1	Stroke indicator	PVC red	840	ICD091255	ICD091256
18	2	Piston support	Fe 360	545	AFD087239	AFD087240
19	2	Piston bearing washer	Fe 360	671	RAD087233	RAD087234
20	1	Flow rate control		613	3883	
21	2	Cheese head screw	AISI 304	551	TCCE06304	
27	1	Spring bearing washer	AISI 304	651	PAMC941010	PAMC950781
28	1	Self- locking nut	Fe 360	576	D06AUTOFE	D08AUTOFE
29	4	Hexagon head screw	AISI 304	500	VTE081604	VTE122004
30	4	Spring washer	AISI 304	503	RE0800304	RE1200304
31	1	Servo control stem	AISI 304	561	ASD092183	ASD092184
32	2	Hexagon nut	AISI 304	501	D06055884	

**GROUP 100**
**Air side spare parts**

Spare part code		2705	2708
Part. no.	Q.ty	SERVO CONTROL D.70	SERVO CONTROL D.80
2	1	TDUOP7065	TDUOP8073
3	1	OR03256GA	OR03300GA
9	2	OR02025GA	OR02031GA
11	2	BA0V08224	BA0V10244

**Section plan 2-Way Nodular Cast Iron N.O. Valve GRS/06**



Drawing No. 060308 Rev.: 01

## 5.15 Details and Spare Parts of GRS/06 N.O.Servo control

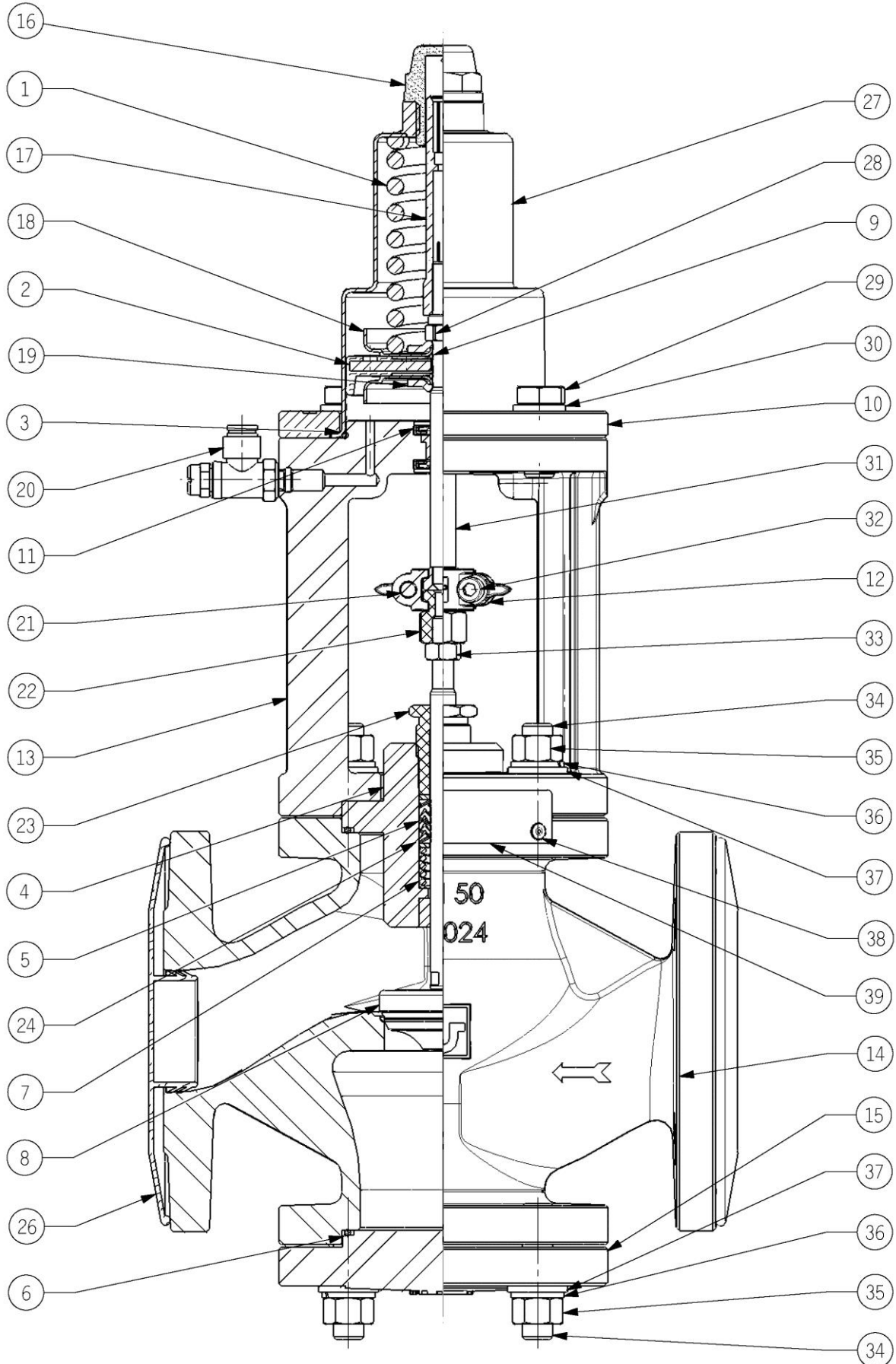
Part No.	Q.ty	DESCRIPTION	MATERIAL	GROUP	CODES	
					SERV. D.70	SERV. D.80
1	1	Spring	Spring steel	552	MTD092510	
2	1	TDUOP gasket	NBR+Steel.	566	TDUOP7065	TDUOP8073
9	2	O-Ring gasket	Gaco	548	OR02025GA	OR02031GA
10	1	Fastening plate	Spher. Cast iron JS1024	653	-----	CLGR060203G
11	1	BA gasket	VITON	567	BA0V08224	BA0V10244
12	2	Connection clamp	CF8	585	M304050088	
13	1	Valve mounting	Spher. Cast iron JS1024	645	-----	-----
18	2	Piston support	Fe 360	545	AFD087239	AFD087240
19	2	Piston bearing washer	Fe 360	671	RAD087233	RAD087234
21	2	Cheese head screw	AISI 304	551	TCCE06304	
27	1	Spring bearing washer	AISI 304	651	PAMC941010	PAMC950781
28	1	Self- locking nut	Fe 360	576	D06AUTOFE	D08AUTOFE
29	4	Hexagon head screw	AISI 304	500	VTE081604	VTE122004
30	4	Spring washer	AISI 304	503	RE0800304	RE1200304
31	1	Servo control stem	AISI 304	561	ASD092183	ASD092184
32	2	Hexagon nut	AISI 304	501	D06055884	
40	1	Air inlet fitting	AISI 304	811	RRDD93955	
41	1	O-Ring gasket	Gaco	548	533	
42	2	Threaded cap	Polyethylene	505	TEP400G018	

### GROUP 100

#### Air side spare parts

Spare part code		3953	3954
N° Part.	Q.ty	SERVO CONTROL D.70	SERVO CONTROL D.80
2	1	TDUOP7065	TDUOP8073
9	2	OR02025GA	OR02031GA
11	1	BA0V08224	BA0V10244
41	2	533	

**Section plan D.V. 2-Way Nodular Cast Iron N.C. Valve GRS/06**



Drawing No. 060281 Rev.: 01

### 5.16 2-way GRS/06 valve body details and spare parts

PART. NO.	Q.ty	DESCRIPTION	MATERIAL	GROUP	NOT AVAILABLE YET			ND 32	ND 40	ND 50	NOT AVAILABLE YET	
					ND 15	ND 20	ND 25				ND 65	ND 80
4	1	Intermediate body	Nodular Cast iron JS1024 + AISI 420	645				CVSB060240				
5	1	Packing gland	TEFLON+GRAPHITE	587				PT01020TT				
6	2	OR gasket	standard FPM	548				OR03281VI				
		FEP O seals gasket	High temp. FPM PFA covered					OR003281PF				
7	1	Packing gland spring	AISI 316	552				MTD086110				
8	1	Shutter	Plastic seal	AISI 304+TEF./CARB.	675			OVD088087	OVD088088	OVD088089		
			Metallic seal	AISI 304	595			OVD086056	OVD086057	OVD086058		
14	1	Valve body	Nodular Cast iron JS1024	645				CVSB060233	CVSB060235	CVSB040387		
15	1	Bottom	Nodular Cast iron JS1024	645				CVSB060239				
22	1	Load adjusting nut	Fe 360	558				DRD086048				
23	1	Packing gland screw	AISI 420	559				VVD086077				
24	2	Packing gland washer	AISI 316	703				RDD086274				
26	2	Flange cap	Polyethylene	505				TEP3050032	TEP3050040	TEP3050050		
33	1	Hexagon nut	Fe 360	608				D0805588F				
34	P	Stud bolts	Fe 360	558				PVFD86012				
35	P	Hexagon nut	Fe 360	608				D1205588F				
36	P	Flat washer	Fe 360	609				RP12000FE				
37	P	Spring washer	Fe 360	610				RE12000FE				
38	2	Tear rivets	Aluminum	589				RIV32510A				
39	1	Rating plate	Polyester	506				ERD086150				

P No. 8 from ND 15 to ND 50 No. 16 from ND 65 to ND 80

#### GROUP 100

Body side spare parts

Spare part code	Part. no.	Q.ty	ND 15	ND 20	ND 25	standard	High temperatures	ND 32 - ND 40 - ND 50	ND 65	ND 80
						8931	8949			
	5	1						PT01020TT		
	6	2						OR03281VI	OR003281PF	
	7	1						MTD086110		

### 5.17 3-way GRS/06 valve body details and spare parts

PART. NO.	Q.ty	DESCRIPTION	MATERIAL	GROUP	NOT AVAILABLE YET			ND 32	ND 40	ND 50	NOT AVAILABLE YET	
					ND 15	ND 20	ND 25				ND 65	ND 80
4	1	Intermediate body	Nodular Cast iron JS1024 + AISI 420	645				CVSB060240				
5	1	Packing gland	TEFLON+GRAPHITE	587				PT01020TT				
6	2	OR gasket	standard FPM	548				OR03281VI				
		FEP O seals gasket	High temp. FPM PFA covered					OR003281PF				
7	1	Packing gland spring	AISI 316	552				MTD086110				
8	1	Guided shutter	Plastic seal	AISI 304+TEF./CARB.	807			OV3D88179	OV3D88177	OV3D88180		
			Metallic seal	AISI 304	654			OV3D86223	OV3D86226	OV3D86220		
14	1	Valve body	Nodular Cast iron JS1024	645				CVSB060234	CVSB060236	CVSB040388		
15	1	Three-way bottom	Standard	Nodular Cast iron JS1024 + AISI 304	756			FOND060078	FOND060071	FOND050484		
			Stellited	Nodular. Cast iron JS1024 + Stellite						FOND060190		
22	1	Load adjusting nut	Fe 360	558				DRD086048				
23	1	Packing gland screw	AISI 420	559				VVD086077				
24	2	Packing gland washer	AISI 316	703				RDD086274				
26	3	Flange cap	Polyethylene	505				TEP3050032	TEP3050040	TEP3050050		
33	1	Hexagon nut	Fe 360	608				D0805588F				
34	P	Stud bolts	Fe 360	558				PVFD86012				
35	P	Hexagon nut	Fe 360	608				D1205588F				
36	P	Flat washer	Fe 360	609				RP12000FE				
37	P	Spring washer	Fe 360	610				RE12000FE				
38	2	Tear rivets	Aluminum	589				RIV32510A				
39	1	Rating plate	Polyester	506				ERD086150				

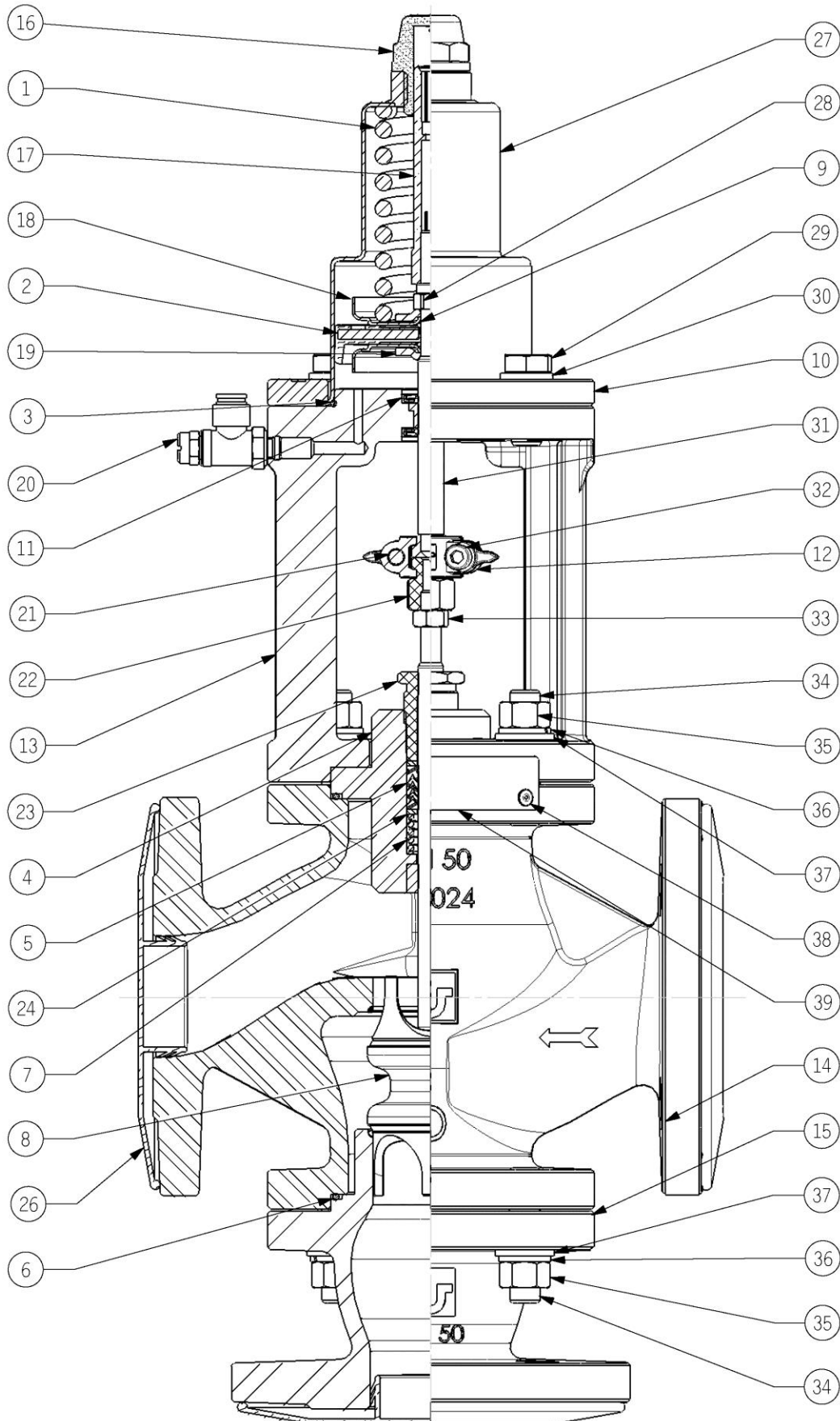
P No. 8 from ND 15 to ND 50 No. 16 from ND 65 to ND 80

#### GROUP 100

Body side spare parts

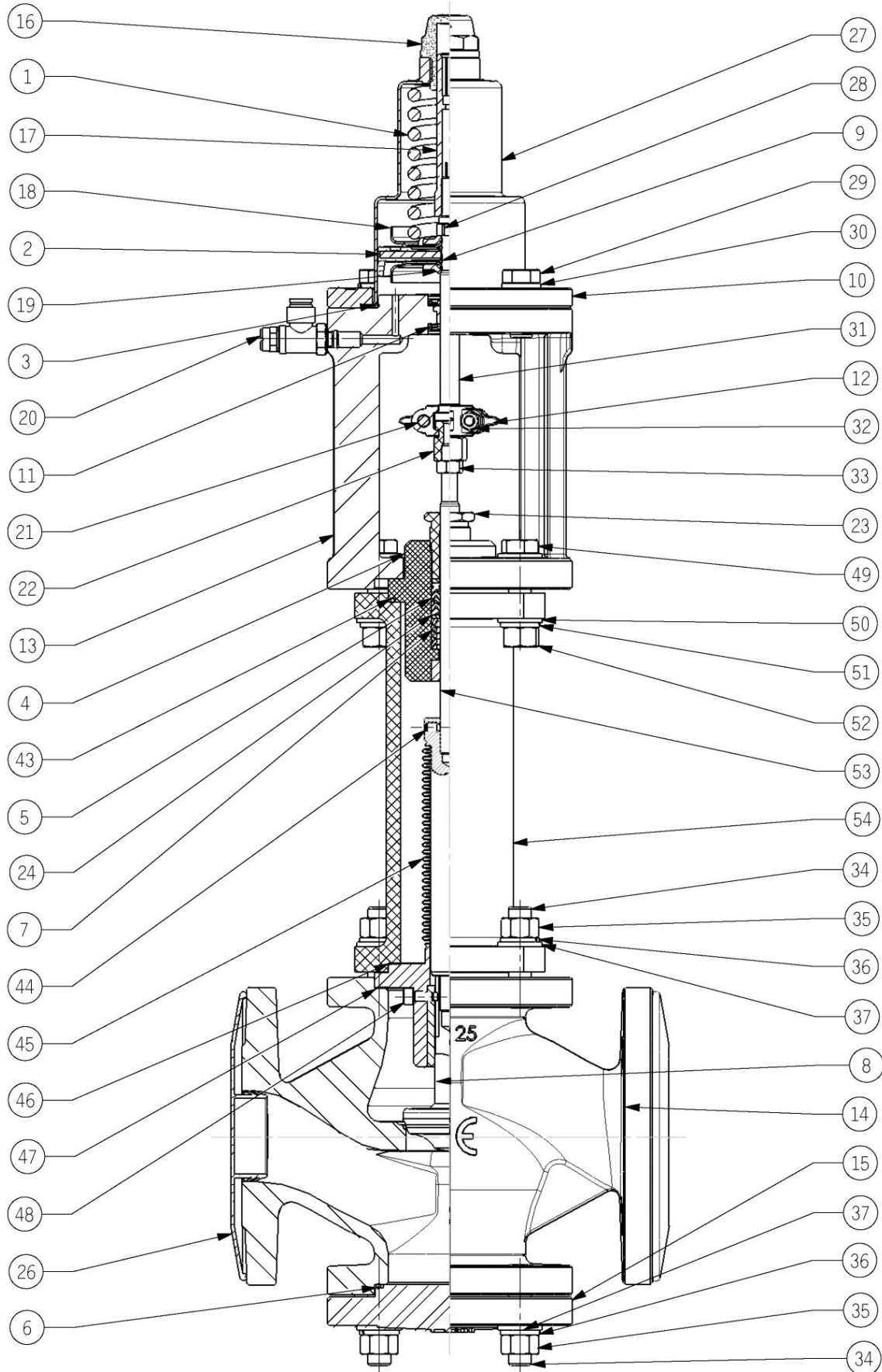
Spare part code				standard	High temperatures		
Part. no.	Q.ty	ND 15	ND 20	ND 25	ND 32 - ND 40 - ND 50	ND 65	ND 80
5	1				PT01020TT		
6	2				OR03281VI   OR003281PF		
7	1				MTD086110		

**Section plan D.V. 3-Way Nodular Cast Iron N.C. Valve GRS/06**



Drawing No. 060304 Rev.: 01

**Section Plane – 2-way GRS/06 NC Nodular Cast Iron D.V. with bellows**



Drawing No. 060339 Rev.: 01



### 5.18 2-way GRS/06 valve body with bellows details and spare parts

PART. NO.	Q.ty	DESCRIPTION	MATERIAL	GROUP	NOT AVAILABLE YET			ND 32	ND 40	ND 50	NOT AVAILABLE YET	
					ND 15	ND 20	ND 25				ND 65	ND 80
4	1	Intermediate body	Nodular. Cast iron JS1024 + AISI 420	645				CVSB060240				
5	1	Packing gland	TEFLON+GRAPHITE	587				PT01020TT				
6	1	FEP O seals gasket	FPM PFA covered	548				OR003281PF				
7	1	Packing gland spring	AISI 316	552				MTD086110				
8	1	Shutter Metallic seal	AISI 304	595				OTTR091348	OTTR091349	OTTR091350		
14	1	Valve body	Nodular Cast iron JS1024	645				CVSB060233	CVSB060235	CVSB040387		
15	1	Bottom	Nodular Cast iron JS1024	645				CVSB060239				
22	1	Load adjusting nut	Fe 360	558				DRD086048				
23	1	Packing gland screw	AISI 420	559				VVD086077				
24	2	Packing gland washer	AISI 316	703				RDD086274				
26	2	Flange cap	Polyethylene	505				TEP3050032	TEP3050040	TEP3050050		
33	1	Hexagon nut	Fe 360	608				D0805588F				
34	P	Stud bolts	Fe 360	558				PVFD86012				
35	P	Hexagon nut	Fe 360	608				D1205588F				
36	P	Flat washer	Fe 360	609				RP12000FE				
37	P	Spring washer	Fe 360	610				RE12000FE				
43	1	O-Ring gasket	FPM	548				OR003237VI				
44	1	Grub screw	AISI 304	542				VST050804				
45	1	Intermediate with bellows	AISI 316	855				INSF089004				
46	1	FEP O seals gasket	FPM PFA covered	548				-----				
47	1	FEP O seals gasket	FPM PFA covered	548				OR003281PF				
48	1	Machined socket head screw	AISI 316	855				ZSVD88127				
49	4	Hexagonal-head screw	Fe 360	607				VTE12050PF				
50	4	Flat washer	Fe 360	609				RP12000FE				
51	4	Spring washer	Fe 360	610				RE12000FE				
52	4	Hexagon nut	Fe 360	608				D1205588F				
53	1	Shutter stem	AISI 304	676				STOT091363				
54	1	Mounting extension	Fe 360	857				PRCA091366				

P No. 8 from ND 15 to ND 50 No. 16 from ND 65 to ND 80

#### GROUP 100

Body side spare parts

Spare part code		8932									
Part. no.	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50	ND 65	ND 80		
5	1					PT01020TT					
6	1					OR003281PF					
7	1					MTD086110					
43	1					OR003237V					
46	1					-----					
47	1					OR003281PF					

### 5.19 3-way GRS/06 valve body with bellows details and spare parts

PART. NO.	Q.ty	DESCRIPTION	MATERIAL	GROUP	NOT AVAILABLE YET			ND 32	ND 40	ND 50	NOT AVAILABLE YET	
					ND 15	ND 20	ND 25				ND 65	ND 80
4	1	Intermediate body	Nodular Cast iron JS1024 + AISI 420	645				CVSB060240				
5	1	Packing gland	TEFLON+GRAPHITE	587				PT01020TT				
6	1	FEP O seals gasket	FPM PFA covered	548				OR003281PF				
7	1	Packing gland spring	AISI 316	552				MTD086110				
8	1	Shutter   Metallic seal	AISI 304	595				OT3M980985	OT3M091357	OTTR091350		
14	1	Valve body	Nodular Cast iron JS1024	645				CVSB060234	CVSB060236	CVSB040388		
15	1	Three-way bottom	Standard	Nodular Cast iron JS1024 + AISI 304	756			FOND060078	FOND060061	FOND050484		
			Stellited	nodular Cast iron JS1024 + Stellite						FOND060190		
22	1	Load adjusting nut	Fe 360	558				DRD086048				
23	1	Packing gland screw	AISI 420	559				VVD086077				
24	2	Packing gland washer	AISI 316	703				RDD086274				
26	3	Flange cap	Polyethylene	505				TEP3050032	TEP3050040	TEP3050050		
33	1	Hexagon nut	Fe 360	608				D0805588F				
34	P	Stud bolts	Fe 360	558				PVFD86012				
35	P	Hexagon nut	Fe 360	608				D1205588F				
36	P	Flat washer	Fe 360	609				RP12000FE				
37	P	Spring washer	Fe 360	610				RE12000FE				
43	1	O-Ring gasket	FPM	548				OR003237VI				
44	1	Grub screw	AISI 304	542				VST050804				
45	1	Intermediate with bellows	AISI 316	855				INSF089004				
46	1	FEP O seals gasket	FPM PFA covered	548				-----				
47	1	FEP O seals gasket	FPM PFA covered	548				OR003281PF				
48	1	Machined socket head screw	AISI 316	855				ZSVD88127				
49	4	Hexagonal-head screw	Fe 360	607				VTE12050PF				
50	4	Flat washer	Fe 360	609				RP12000FE				
51	4	Spring washer	Fe 360	610				RE12000FE				
52	4	Hexagon nut	Fe 360	608				D1205588F				
53	1	Shutter stem	AISI 304	676				STOT091363				
54	1	Mounting extension	Fe 360	857				PRCA091366				

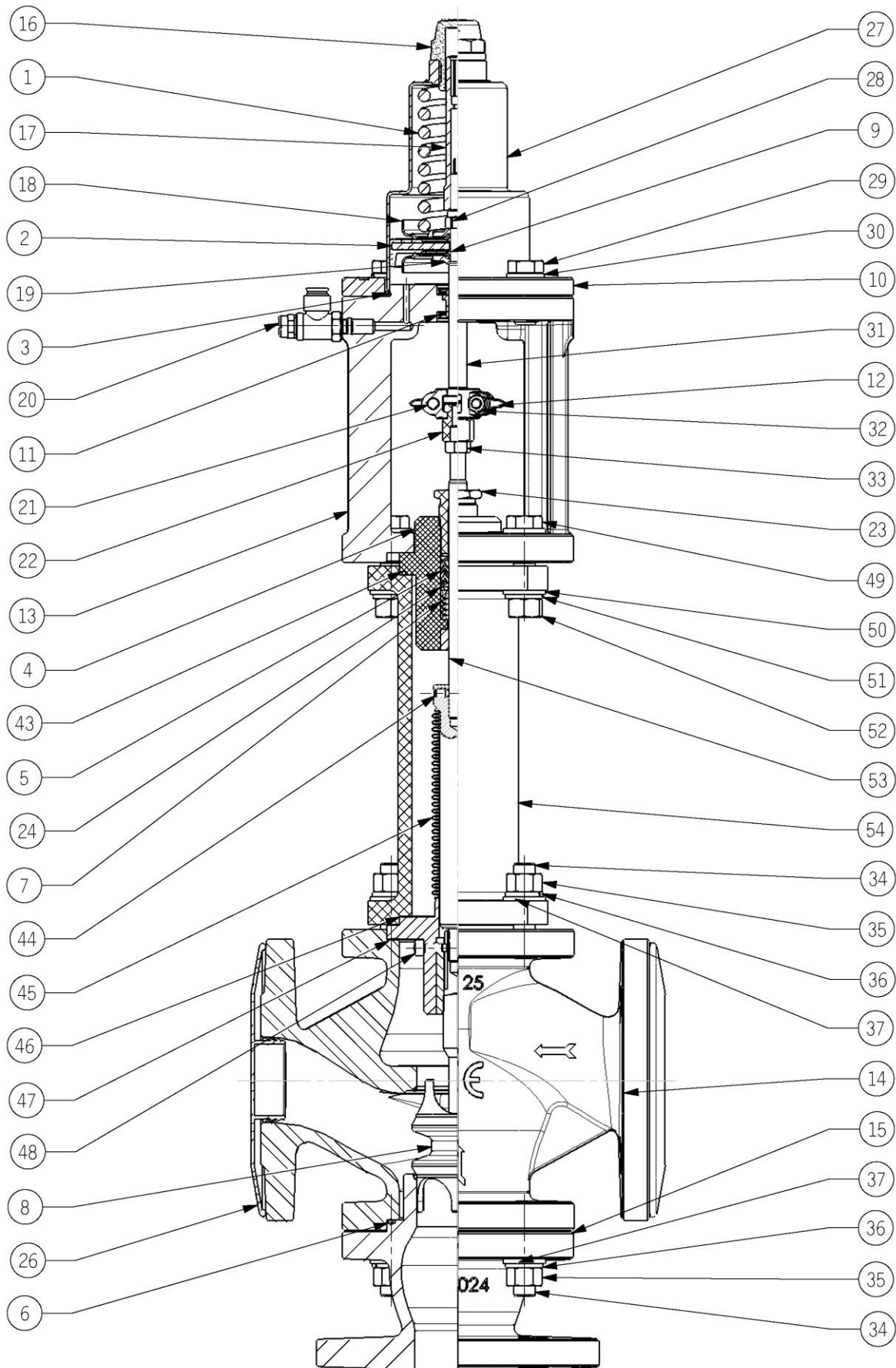
P No. 8 from ND 15 to ND 50 No. 16 from ND 65 to ND 80

#### GROUP 100

Body side spare parts

Spare part code		8932									
Part. no.	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50	ND 65	ND 80		
5	1					PT01020TT					
6	1					OR003281PF					
7	1					MTD086110					
43	1					OR003237V					
46	1					-----					
47	1					OR003281PF					

**Section Plane – 3-way GRS706 NC Nodular Cast Iron D.V. with bellows**



Drawing No. 060341 Rev.: 01

## 6 Table 6: Tightening Torques

Detail Combination	Tightening torque for threaded couplings in GRS valves [ Kg <sub>r</sub> ·m ]							
	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50	ND 65	ND 80
P.34-P.35	/	/	/	/	/	5.8	/	/
P.21-P.32	/	/	/	/	/	0.6	/	/
P.29	/	/	/	/	/	5.0	/	/
P.40-P.27	/	/	/	/	/	7.0	/	/
P.44-P.45	/	/	/	/	/	0.4	/	/
P.33-P.22	/	/	/	/	/	0.6	/	/
P.49-P.52	/	/	/	/	/	5.8	/	/

## 7 Valve Life

The GRS series valves has been designed and constructed to guarantee the proper operation under the conditions and limits provided by the technical characteristic.

All the fixed metallic parts, which do not have a seal function, have a life of 10 years. Seal parts and moving ones shall undergo a complete overhauling in the minor time interval between 500000 maneuvers and three years.

The overhauling operations must be performed by qualified personnel only.

Periodic maintenance operations must be performed independently of those carried out as a result of possible damages, which always require an immediate intervention.

## 8 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.

The disassembly operations must be performed by qualified personnel only, equipped with the necessary processing and safety equipment. **CAUTION! Compressed springs are present inside the servo control.**

For this reason, during the valve disassembly, for the disposal of components, proper safety equipment shall be used, which, once the fastening screws of the servo control upper head have been removed, prevent the upper head from suddenly come off the lower head.

### NOTES:

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