

SBS/06 VALVES

FAMILY 04 - GROUP 88

Master Handbook Description: Guide to choice, use and maintenance of
SBS/06 Nodular Cast Iron Valves (English
version)

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DECLARATION OF CONFORMITY

Code: DPED02833

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Date: July 25th, 2006

Family no. 4

**CONTROL GLOBE VALVES - SERIES SBS/06
NODULAR CAST IRON EN-GJS-400-18-RT EN1563**

Group : 88

We ITALVALVES s.a.s. of Spadon Oscar & C., via Amendola 125, 13836 Cossato (BI), declare that:
The control globe valve, series SBS/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: DPED028C1

REV. 00

Date: July 25th, 2006

Family no. 4

**CONTROL GLOBE VALVES - SERIES SBS/06
NODULAR CAST IRON EN-GJS-400-18-RT EN1563**

Group : 88

We ITALVALVES s.a.s. of Spadon Oscar & C., via Amendola 125, 13836 Cossato (BI), declare that:
The control globe valve, series SBS/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

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1 Foreword

Diaphragm valves with servomotor have been designed to control the flow of overheated water, liquids, gases and vapor inside the pipes.

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

The opening, closing and modulating action of the valve is possible thanks to the variation of the pneumatic signal arriving to the servomotor (pneumatic head of the valve).

Diaphragm, springs and shutters of valves 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 diaphragm/spring combinations on the valve pneumatic head are normally provided for a control signal on the diaphragm of: 3/15 psi (0.2/1.0 bar), 6/18 psi (0.42/1.26 bar), 6/30 psi (0.42/2.1 bar), 9/32 psi (0.6/2.24 bar), 3/9 psi (0.2/0.6 bar), 9/15 psi (0.6/1.0 bar).

ITALVALVOLE® diaphragm valves are supplied normally closed N.C. (air opens), or normally open NO (air closes).

However, being the servo motor reversible, a NC valve can be turned into a NO, or vice-versa just replacing a few detail components.

2 Legend

- **$\Delta p_{\text{allowable}}$** (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 non-dimensional whole number which is indirectly related to the physical dimension, expressed in millimeters, of the hole or the outer diameter of the final end of fittings (ISO 6708: 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 Δp 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 Requests

In case of special requirements or doubts, the proper type of valve to be used shall be communicated to you, after contacting our technical department and filling up the following form.

DATA TO KNOW: ND _____ NP 25

Two-Ways Three-Ways

Control signal _____ Type of flanging _____

Shutter linear
 equally percentage

Body material nodular cast iron

Valve operation normally closed
 normally open

Operating fluid _____ Specific weight _____ Kg/cubic meter

Maximum capacity _____ Kg/h _____ cubic meters/h

Valve upstream pressure _____ bar

Valve downstream pressure _____ bar

Fluid temperature in °C _____

Intermediate body standard
 with bellows

With handwheel With pneumatic setting device

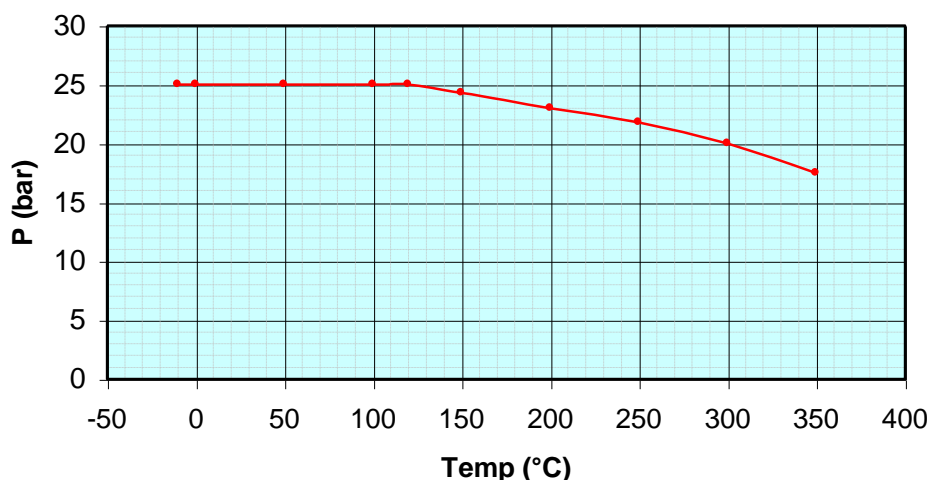
4 Technical Characteristics

- General notice:** ⇒ all the pressure values indicated hereinafter are gauge pressure values.
 ⇒ **valve destined to fluids of group 2 (directive 97/23/EC).**
- ND:** ⇒ 32 – 40 – 50
- Connections:** ⇒ flanged in compliance with EN 1092-2: 1999 PN 25
- P_{max} allowable:** ⇒ 25 bar
- P_{min} allowable:** ⇒ 0 bar.
- Seal:** ⇒ PTFE-CARBO-GRAPHITE, metallic and "Stellited"
- Shutter characteristic:** ⇒ equally percentage, linear
- T_{max} allowable.:** ⇒ +170 °C PTFE-CARBO-GRAPHITE (standard), +350 °C with metallic and/or stellited seal (with safety bellows).
- T_{min} allowable:** ⇒ -10 °C (liquid phase).
- Flow direction:** ⇒ 2-way globe valve, unidirectional.
 ⇒ unidirectional 3-way globe valve, with angle pattern body.
- Air connection:** ⇒ 1/8" GAS (head 200 dia), 1/4" GAS (head 275 dia, 360 dia, 430 dia, 530 dia).
- Supply fluid:** ⇒ instrument air
- Supply pipes:** ⇒ pipe inner diameter = 4 mm, min. outer diameter = 6 mm, able to bear the supply P_{max} under the environmental conditions of the plant where the valve has to be assembled.
- P min. (supply):** ⇒ 3 to 15 PSI, 6 to 18 PSI, 6 to 30 PSI, 9 to 32 PSI, 3 to 9 PSI, 9 to 15 PSI
- Versions:** ⇒ normally closed, normally open, with or without bellows, with or without emergency handwheel
- Working materials:** ⇒ See working drawings and relevant tables.
- Overall dimensions:** ⇒ See overall dimensions drawings and relevant tables.



4.1 Pressure/temperature Graph

Andamento Pressioni/Temperature



4.2 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
Soft water H ₂ O	YES	Lubricating oil	YES
Ammonia NH ₃ water	YES	Sodium hydroxide NaOH 5%	YES
Ammonia NH ₃ solution	YES	Sodium hydroxide NaOH 20% E ⁽¹⁾	YES
Air	YES	Sodium hydroxide NaOH 50% E ⁽¹⁾	YES
Nitrogen N liquid	YES	Sodium hydroxide NaOH 75% E ⁽¹⁾	YES
Magnesium disulphate	YES	Soda Na ₂ CO ₃ 5%	YES
Ethylene glycol	YES	Water steam 200° ⁽²⁾	YES
Propylene glycol	YES		

(1) "E" means boiling

(2) 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 are not valid for all possible working conditions. These data may considerably varies depending upon various conditions, such as: temperature, concentration, fluid speed.

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

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

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

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

4.3 Table 2: Δp of 2-way SBS/06 valves, without bellows

Note: if 3-way or 2-way valves with guided shutter SBS/06 are considered, as regards Kvs values mentioned in the table, an about 20% reduction has to be considered.

						Δp						N. FOR VALVE DEFINITION	
						3/15	6/18	6/30	9/32	3/9	9/15		
Control signal in PSI ⁽¹⁾													
Control signal in BAR						0.2/1	0.42/1.26	0.4/2.1	0.6/2.24	0.2/0.6	0.6/1.0		
Control Max pressure BAR						1.2	1.4	2.2	2.4	0.8	1.2		
ND	Φ seat [mm]	Kvs	CV	Φ_e servo control [mm]	Letters for valve definition								
					A	B	C	D	R	S			
Not available	15	3	0.1	0.117	200							1	
					275							2	
		6	0.42	0.49	200							3	
					275							4	
		15	2.8	3.2	200							5	
					275							6	
Not available	20	8	1.1	1.28	200							7	
					275							8	
		15	2.5	2.9	200								9
					275							10	
					360							11	
					430							12	
	20	7.8	9.1	200								13	
				275							14		
				360							15		
				430							16		
	Not available	25	15	2.4	2.8	200							17
						275							18
360												19	
430												20	
20			7	8.2	200								21
					275							22	
		360									23		
		430									24		
24		13.5	15.7	200								25	
				275							26		
				360							27		
				430							28		
Not available	32	20	6.6	7.7	200							29	
					275							30	
					360							31	
					430							32	
		24	12.2	14.2	200								33
					275							34	
	360										35		
	430										36		
	31	15.2	17.7	200								37	
				275							38		
				360							39		
				430							40		

Note: the Δp Max is reached without air in the head.

(1) In NO valves, to reach the same Δp of NC valves, the maximum control signal shall be increased by 20%. Then, for instance, in a NO valve with 3/15 PSI signal, the maximum control signal shall be increased up to 18 PSI to get the Δp of a similar NC valve.

						Δp						N. FOR VALVE DEFINITION		
Control signal in PSI ⁽¹⁾						3/15	6/18	6/30	9/32	3/9	9/15			
Control signal in BAR						0.2/1	0.42/1.26	0.4/2.1	0.6/2.24	0.2/0.6	0.6/1.0			
Control Max pressure BAR						1.2	1.4	2.2	2.4	0.8	1.2			
ND	Φ seat [mm]	Kvs	CV	Φ e servo control [mm]	Letters for valve definition									
					A	B	C	D	R	S				
Not available	40	24	11.5	13.4	200							41		
					275							42		
					360							43		
					430							44		
		31	13.7	16	200								45	
					275							46		
	360										47			
	430										48			
	38	25.8	30.1	200								49		
				275							50			
				360							51			
				430							52			
50				31	12.9	15	200							53
							275							54
	360										55			
	430										56			
38	23.2	27.1	200								57			
			275							58				
			360	14	25	25	25	14	25	59				
			430							60				
			48	33	38.6	200	1.6	3.2	3.2	4.5	1.6	4.5		61
						275	4	8	8	12	4	12		62
360	8	16				16	24	8	24		63			
430	9.3	18.6				18.6	25	9.3	25		64			
Not available	65	38	21.9	25.6	200							65		
					275								66	
					360								67	
					430								68	
		48	29.7	34.7	200								70	
					275								71	
	360											72		
	430											73		
	63	62	72.5	200								75		
				275								76		
				360								77		
				430								78		
Not available	80	48	28	32.7	200							80		
					275								81	
					360								82	
					430								83	
		63	55.8	65.2	200								85	
					275								86	
	360											87		
	430											88		
	78	76	88.7	200								90		
				275								91		
				360								92		
				430								93		

Note: the Δp Max is reached without air in the head.

(1) In NO valves, to reach the same Δp of NC valves, the maximum control signal shall be increased by 20%. Then, for instance, in a NO valve with 3/15 PSI signal, the maximum control signal shall be increased up to 18 PSI to get the Δp of a similar NC valve.

4.4 Table 2: Δp of 2-way SBS/06 valves, with bellows

Note: if 3-way or 2-way valves with guided shutter SBS/06 are considered, as regards Kvs values mentioned in the table, an about 20% reduction has to be considered.

						Δp						N. FOR VALVE DEFINITION	
						Control signal in PSI ⁽¹⁾	3/15	6/18	6/30	9/32	3/9		9/15
Control signal in BAR						0.2/1	0.42/1.26	0.4/2.1	0.6/2.24	0.2/0.6	0.6/1.0		
Control Max pressure BAR						1.2	1.4	2.2	2.4	0.8	1.2		
ND	Φ seat [mm]	Kvs	CV	Φ e servo control [mm]	Letters for valve definition								
					A	B	C	D	R	S			
Not available	15	3	0.1	0.117	200							1	
					275							2	
		6	0.42	0.49	200								3
					275							4	
		15	2.8	3.2	200								5
					275							6	
Not available	20	8	1.1	1.28	200							7	
					275							8	
		15	2.5	2.9	200								9
					275							10	
					360							11	
					430							12	
	20	7.8	9.1	200								13	
				275							14		
				360							15		
				430							16		
	Not available	25	15	2.4	2.8	200							17
						275							18
360												19	
430												20	
20			7	8.2	200								21
					275							22	
		360									23		
		430									24		
24		13.5	15.7	200								25	
				275							26		
				360							27		
				430							28		
Not available	32	20	6.6	7.7	200							29	
					275							30	
					360							31	
					430							32	
		24	12.2	14.2	200								33
					275							34	
	360										35		
	430										36		
	31	15.2	17.7	200								37	
				275							38		
				360							39		
				430							40		

Note: the Δp Max is reached without air in the head.

(1) In NO valves, to reach the same Δp of NC valves, the maximum control signal shall be increased by 20%. Then, for instance, in a NO valve with 3/15 PSI signal, the maximum control signal shall be increased up to 18 PSI to get the Δp of a similar NC valve.

					Δp						N. FOR VALVE DEFINITION			
Control signal in PSI ⁽¹⁾					3/15	6/18	6/30	9/32	3/9	9/15				
Control signal in BAR					0.2/1	0.42/1.26	0.4/2.1	0.6/2.24	0.2/0.6	0.6/1.0				
Control Max pressure BAR					1.2	1.4	2.2	2.4	0.8	1.2				
ND	Φ seat [mm]	Kvs	CV	Φ e servo control [mm]	Letters for valve definition									
					A	B	C	D	R	S				
Not available	40	24	11.5	13.4	200							41		
					275								42	
					360									43
					430									44
	31	13.7	16	200									45	
				275									46	
				360									47	
				430									48	
	38	25.8	30.1	200									49	
				275									50	
				360									51	
				430									52	
50	31	12.9	15	200								53		
				275									54	
				360									55	
				430									56	
	38	23.2	27.1	200									57	
				275									58	
				360	14	25	25	25	14	25		59		
				430									60	
	48	33	38.6	200	1.6	3.2	3.2	4.5	1.6	4.5			61	
				275	4	8	8	12	4	12			62	
				360	8	16	16	24	8	24			63	
				430	9.3	18.6	18.6	25	9.3	25			64	
Not available	65	38	21.9	25.6	200							65		
					275									66
					360									67
					430									68
	48	29.7	34.7	200									70	
				275									71	
				360									72	
				430									73	
	63	62	72.5	200									75	
				275									76	
				360									77	
				430									78	
Not available	80	48	28	32.7	200							80		
					275									81
					360									82
					430									83
	63	55.8	65.2	200									85	
				275									86	
				360									87	
				430									88	
	78	76	88.7	200									90	
				275									91	
				360									92	
				430									93	

Note: the Δp Max is reached without air in the head.

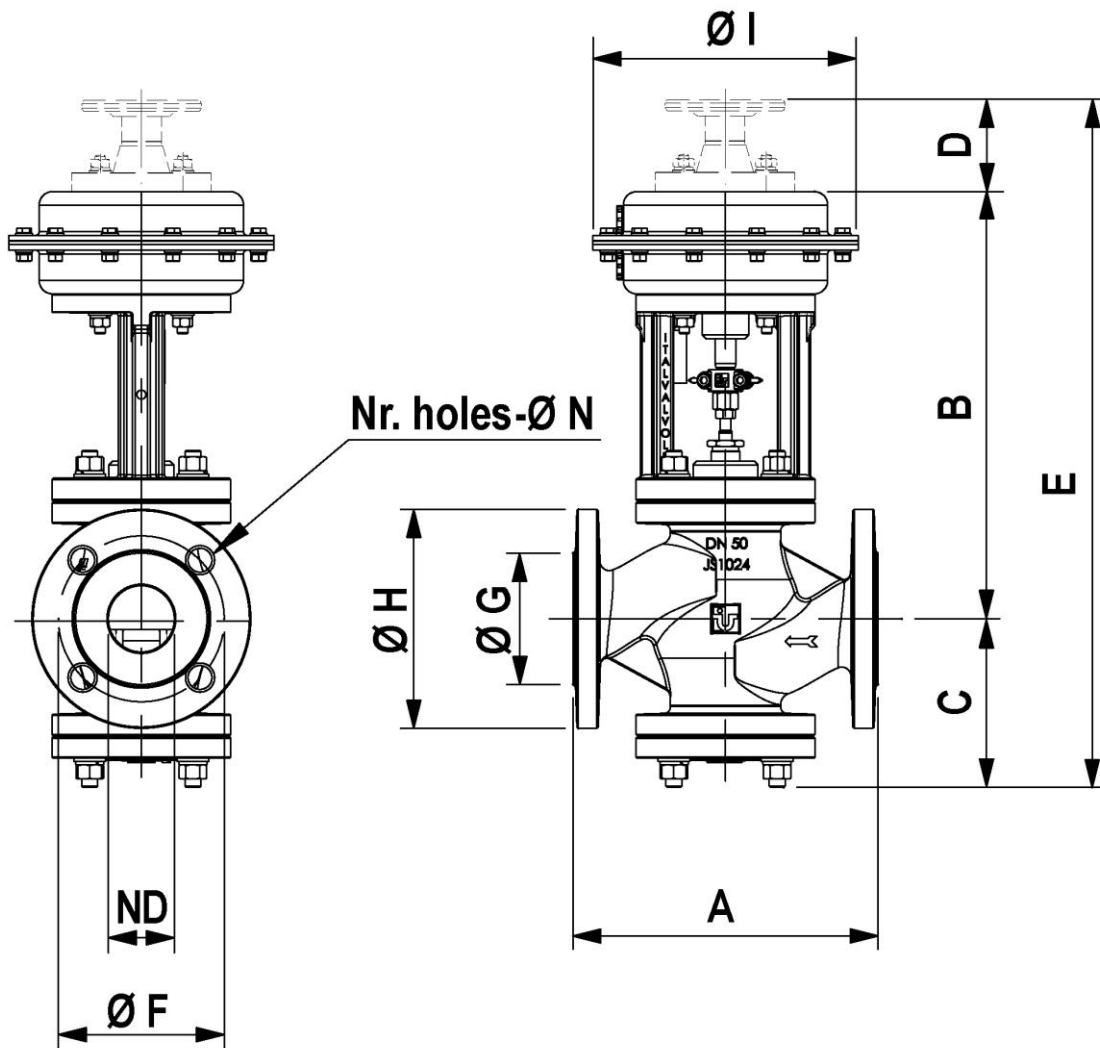
(1) In NO valves, to reach the same Δp of NC valves, the maximum control signal shall be increased by 20%. Then, for instance, in a NO valve with 3/15 PSI signal, the maximum control signal shall be increased up to 18 PSI to get the Δp of a similar NC valve.

4.5 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.

4.6 Overall Dimensions of SBS/06 Valves

4.6.1 2-ways Nodular Cast Iron Valve SBS/06 group: 88



Drawing No. 060223/2 Rev:00

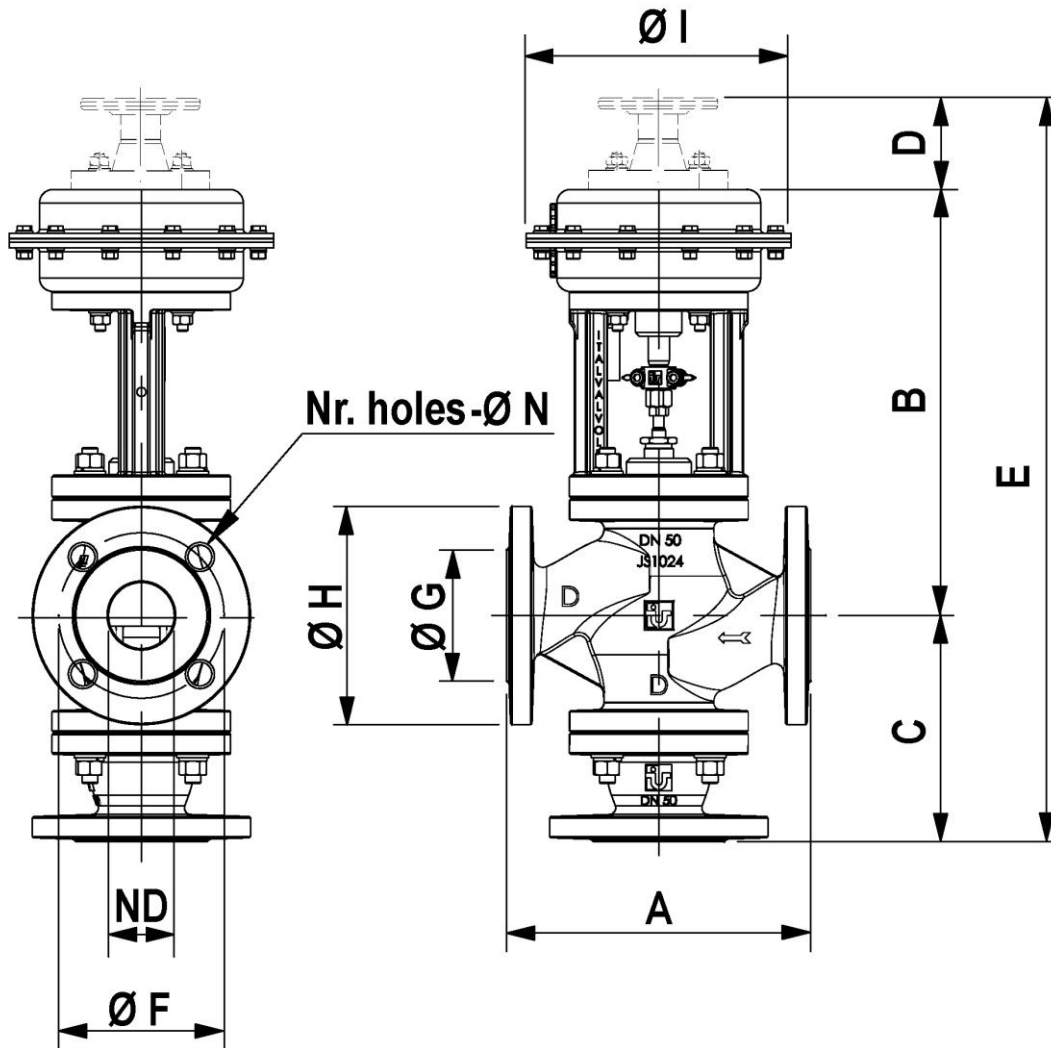
ND	A	B			C	D			E			\varnothing F	\varnothing G	\varnothing H	\varnothing I	\varnothing N	holes No.
		\varnothing servo control				\varnothing servo control			\varnothing servo control								
		200	275 360	430		200	275 360	430	200	275 360	430						
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
32	180	322	333,5	368	127	70	74	79	519	534,5	574	100	76	140	-	19	4
40	200	322	333,5	368	127	70	74	79	519	534,5	574	110	84	150	-	19	4
50	230	322	333,5	368	127	70	74	79	519	534,5	574	125	99	165	-	19	4
65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Depending upon the required seal Δp (200-275-360-430)

Dimensions are in millimeters

4.6.2 3-ways Nodular Cast Iron Valve SBS/06

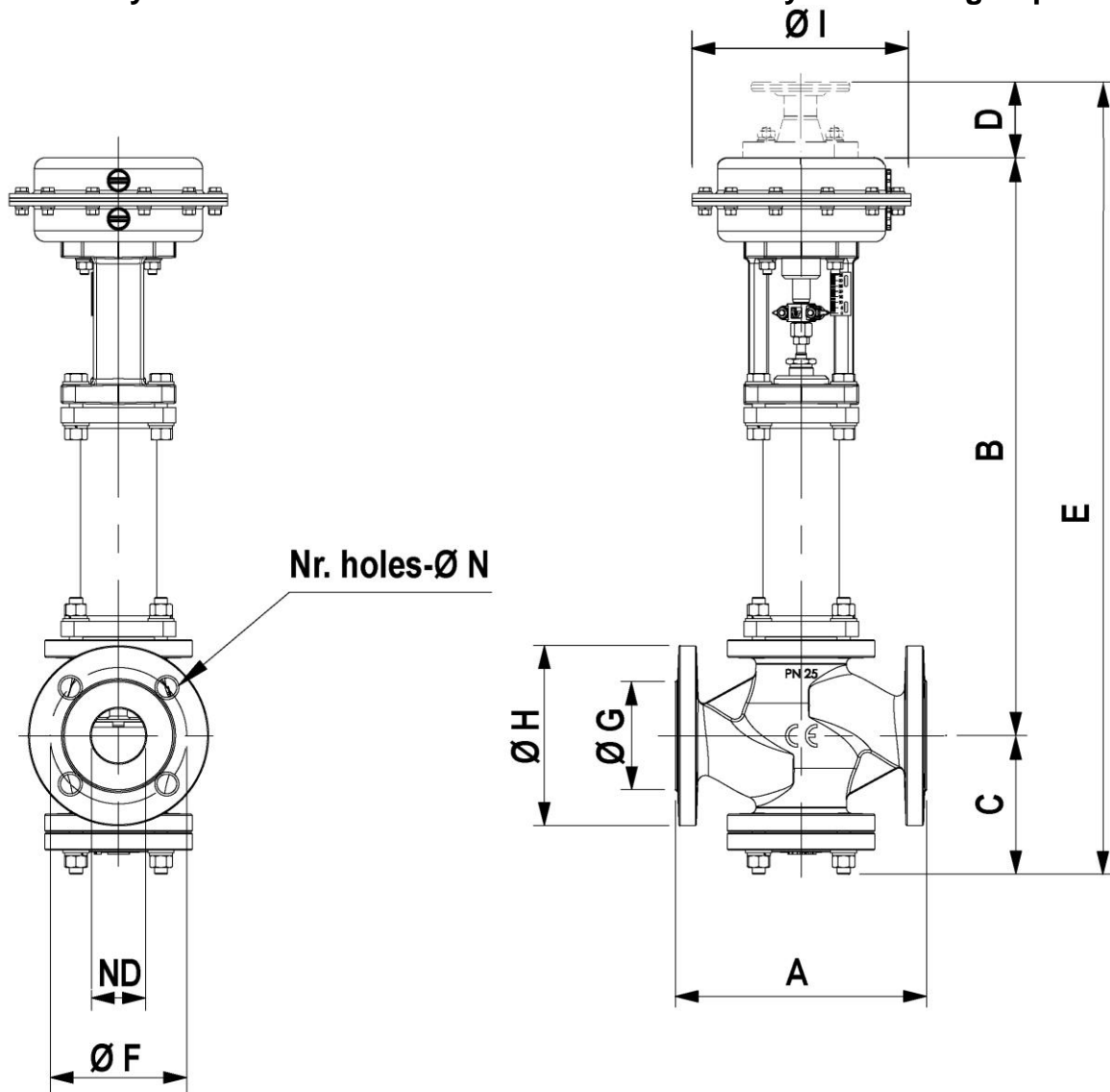
group: 88



Drawing No. 060223/3 Rev: 00

ND	A	B			C	D			E			Ø F	Ø G	Ø H	Ø I	Ø N	holes No.	
		Ø servo control				Ø servo control			Ø servo control									
		200	275 360	430		200	275 360	430	200	275 360	430							
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
32	180	322	333,5	368	171	70	74	79	563	578,5	618	100	76	140	19	4	Depending upon the required seal Δp (200-275-360-430)	
40	200	322	333,5	368	179	70	74	79	571	586,5	626	110	84	150	19	4		
50	230	322	333,5	368	171	70	74	79	563	578,5	618	125	99	165	19	4		
65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-

Dimensions are in millimeters

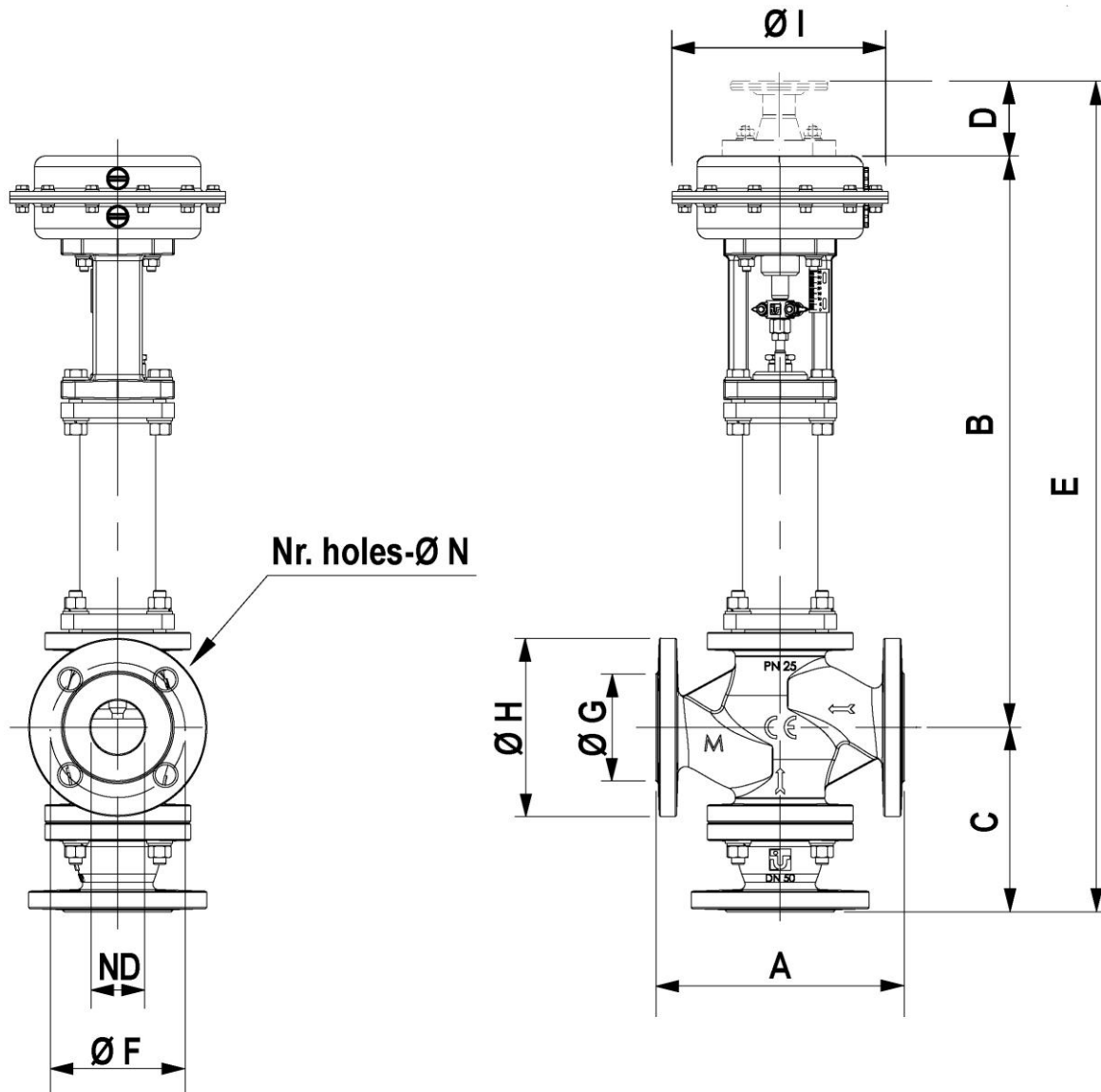
4.6.3 2-ways Nodular Cast Iron Valve SBS/06 with safety bellows group: 88


Drawing No. 060254/1 Rev:00

ND	A	B			C	D			E			Ø F	Ø G	Ø H	Ø I	Ø N	holes No.
		Ø servo control				Ø servo control			Ø servo control								
		200	275 360	430		200	275 360	430	200	275 360	430						
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
32	180	534,5	546	574	127	70	74	79	731,5	747	786,5	100	76	140	-	-	
40	200	534,5	546	574	127	70	74	79	731,5	747	786,5	110	84	150	19	4	
50	230	534,5	546	574	127	70	74	79	731,5	747	786,5	125	99	165	19	4	
65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

 Depending upon the
 required seal Δp
 (200-275-360-430)

Dimensions are in millimeters

4.6.4 3-ways Nodular Cast Iron Valve SBS/06 with safety bellows group: 88


Drawing No. 060254/2 Rev: 00

ND	A	B			C	D			E			Ø F	Ø G	Ø H	Ø I	Ø N	holes No.
		Ø servo control				Ø servo control			Ø servo control								
		200	275 360	430		200	275 360	430	200	275 360	430						
15	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
32	180	534,5	546	574	171	70	74	79	775,5	791	830,5	100	76	140	-	-	
40	200	534,5	546	574	179	70	74	79	783,5	799	838,5	110	84	150	19	4	
50	230	534,5	546	574	171	70	74	79	775,5	791	830,5	125	99	165	19	4	
65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

 Depending upon the
 required seal Δp
 (200-275-360-430)

Dimensions are in millimeters

5 Storage, Assembly, Check And Maintenance

5.1 Transport, Storage And Handling

SBS/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 lift the valve grasping it by the servo control).

Avoid crashes and tampering of any possible fitting, which the valve might be equipped with (handwheels, solenoid valves, 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.

These valves shall be stored in areas which are not exposed to the sunshine, so as to prevent diaphragm and 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 servo control lower head.

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

The compressed air shall be instrument air, with a pressure included within the duty values of the servo control, in no way higher than 2.5 bar, with supply pipes made of nylon or copper $\varnothing_{inner} = 4$ mm. The air connections on the valve shall be made of 1/8" (head 200 dia) and 1/4" GAS (head 275 dia, 360 dia, 430 dia) threaded coupling.

5.2.2 Assembly of the valve

Follow instruction indicated on labels and casting of the valve body.

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. Only overall dimensions justify the valve assembly 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 servo control and the inner bodies during 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 following instructions provided on the body casting, in 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 maximum opening position, carefully clean the line with a proper pressurized 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 servo control.

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) Insert the minimum value of the control signal, as indicated on the data plate, into the servo control (the valve shall start to open, this data can be read on the speed plate)
- 3) Insert the maximum value of the control signal, as indicated on the data plate, into the servo control (the valve shall be completely open, this data can be read on the speed plate)
- 4) Blow air out of the servo control.
- 5) Repeat this operation 5 times.
- 6) Check, with air off, that there are no valve leakages.
- 7) 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) Insert the minimum value of the control signal, as indicated on the data plate, into the servo control (the valve shall start to close, this data can be read on the speed plate).
- 3) Insert the maximum value of the control signal, as indicated on the data plate, into the servo control (the valve shall be completely close, this data can be read on the speed plate).
- 4) Repeat this operation 5 times.
- 5) Check, with air on (with a pressure value increased by 20% compared to the control maximum signal) that there are no air leakages from the valve.
- 6) Check, with air on, that there are no air leakages from the servo control.

5.4 Troubleshooting

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

Note: For a proper operation of the valve, the stem shall be able to move freely, without any friction, should the air pressure on the diaphragm change.

The valve serial number is printed on the label, which is fastened to the mounting/body. 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 Passage of fluid with closed valve

If the valve is in the close position, check that no foreign matters are present between the shutter and the seat and that the contact surface is not damaged.

In case of real damages, owing to which the seat is damaged, the shutter seat has to be replaced (for the disassembly of the valve, see following items)

5.4.2 Diaphragm

In case the rubber diaphragm located inside the servo control breaks up, the valve cannot carry out a complete stroke.

When the diaphragm is broken or has lost its elasticity, it shall be removed (see following items for the proper procedure to be followed).

In all case of improper operation, check immediately that there are no air leakages from the pneumatic connections between the pilot governor and the valve and relevant fittings.

Verify, moreover, the proper calibration of the governor (operation direction, proportional band, automatic realignment, and so on) and its regular operation.

5.5 Scheduled Maintenance

Scheduled maintenance operations shall be carried out apart from the ones due to possible failures, which always need an immediate intervention.

The time interval between one maintenance operation and the following shall be included in the lower time interval between the one corresponding to 500,000 cycles and three years. It consists of a complete disassembly of the valve, replacement of all the gaskets and a complete cleaning of all other components. For disassembly and re-assembly operations, make reference to the relevant paragraphs of this manual.

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, in order not to increase frictions on the stem, which might cause the valve to stop, or, in any case, give rise to an unsatisfying operation. In case leakages persist despite the tightening, the packing gland shall be completely replaced.

5.6 Instructions for Disassembly and Assembly of 15 mm Stroke SBS/06 Servo control from the Valve Body

Refer to annexed Dwg. No. 060242 for the disassembly and assembly operations of the servo control for all the SBS/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 (19), remove nuts (38) and remove the connection clamps (5).
- 2) Input an air signal into the servo control equivalent to the maximum provided value: the valve sets to the maximum opening condition
- 3) Unloosen upper nuts (41), remove the spring washers (40), the flat washers (39) and remove the mounting with the servo control still fastened.

5.6.2 Removal of NA servo control from the valve

- 1) Unloosen screws (14), remove nuts (43), withdraw washers (38) and remove the connection clamps (19). When removing the connection clamps (19), the shutter (10) might move downwards and hit against the seat (13). It is then advisable to follow the shutter until it reaches the seat, to prevent any damage to the seal.
- 2) Unloosen upper nuts (41), remove the spring washers (40), the flat washers (39) and remove the mounting with the servo control still fastened.

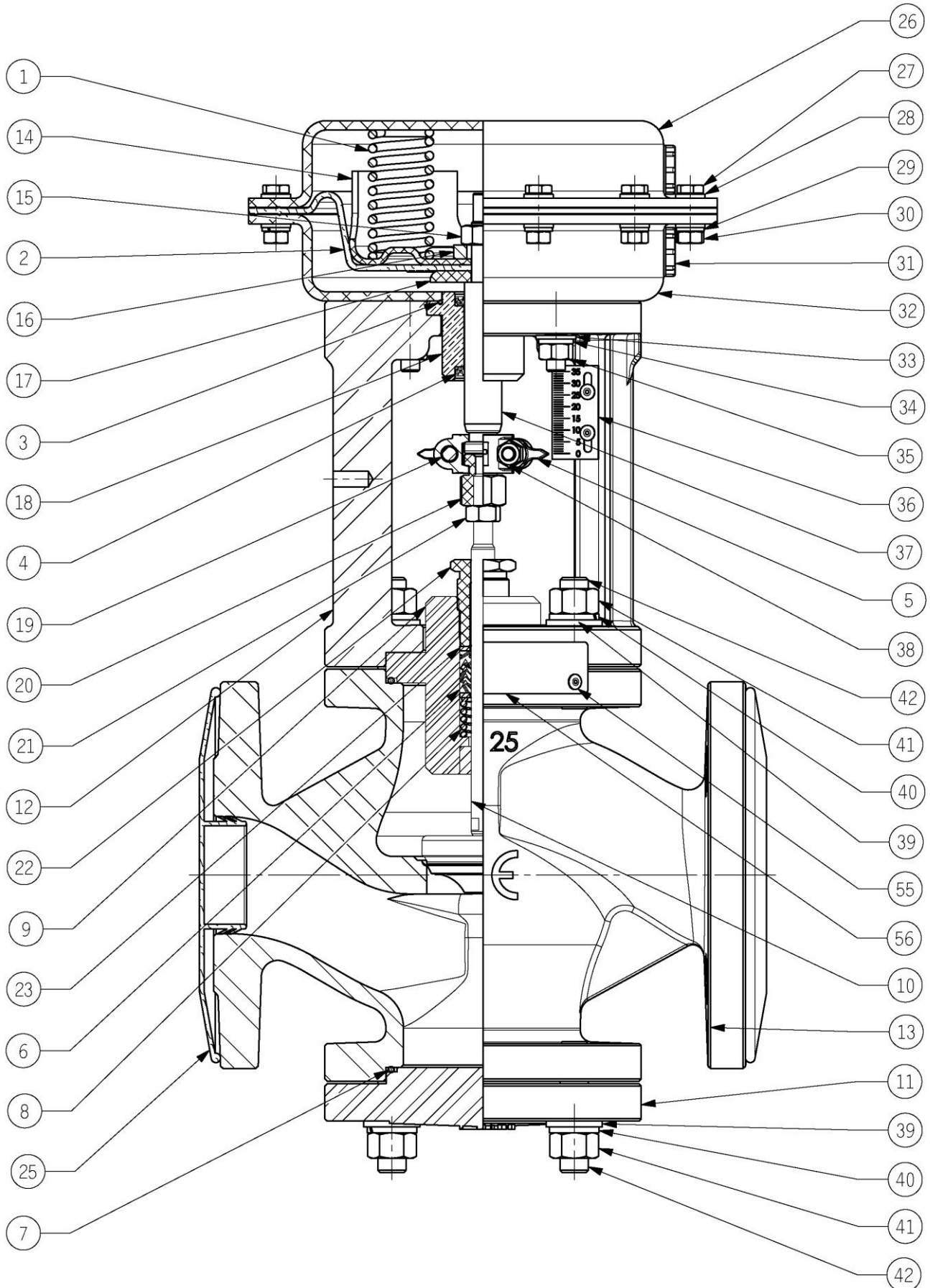
5.6.3 Positioning of NO servo control on the valve

- 1) Blow air into the servo control. **Caution! The servo control shaft shall move from its stroke.**
- 2) Position the mounting complete with servo control to the valve body, so that air couplings are on the valve outlet side.
- 3) Insert the flat washers (39) and the spring washers (40) onto the upper stud bolts (42).
- 4) Torque the upper nuts (41), according to indications in Table 5.
- 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 (5).
- 7) Insert screws (19) into the connection clamps (5).
- 8) Torque the nuts (38), according to indications in Table 5.

5.6.4 Positioning of NO servo control on the valve

- 4) Position the mounting complete with servo control to the valve body, so that air couplings are on the valve outlet side.
- 5) Insert the flat washers (39) and the spring washers (40) onto the upper stud bolts (42).
- 6) Torque the upper nuts (41), according to indications in Table 5.
- 7) Make the preload adjusting nut (20) contact the servo control shaft (37) and lift the shutter (10).
- 8) Fasten the servo control shaft and the preload adjusting nut with the connection clamps (5).
- 9) Insert screws (19) into the connection clamps (5).
- 10) Torque the nuts (38), according to indications in Table 5.

Section Plane – 2-way NC SBS Valve



Drawing No. 060242 Rev.:01

5.7 Instructions for Disassembly and Assembly of 15 mm Stroke SBS/06 Servo control from the Valve Body with bellows

Refer to annexed Dwg. No. 060242 for the disassembly and assembly operations of the servo control for all the SBS/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.

5.7.1 Removal of NC servo control from the valve with bellows

- 1) Unloosen screws (19), remove nuts (38) and remove the connection clamps (5).
- 2) Input an air signal into the servo control equivalent to the maximum provided value: the valve sets to the maximum opening condition
- 3) Unloosen nuts (53), remove the spring washers (52) and the flat washers (51).
- 4) Unloosen the screws (50), separate the mounting with the still fastened servo control from the mounting extension (54).

5.7.2 Removal of NO servo control from the valve with bellows

- 1) Unloosen screws (14), remove nuts (43), withdraw washers (38) and remove the connection clamps (19). When removing the connection clamps (19), the shutter (10) might move downwards and hit against the seat (13). It is then advisable to follow the shutter until it reaches the seat, to prevent any damage to the seal.
- 2) Unloosen nuts (53), remove the spring washers (52) and the flat washers (51).
- 3) Unloosen the screws (50), separate the mounting with the still fastened servo control from the mounting extension (54).

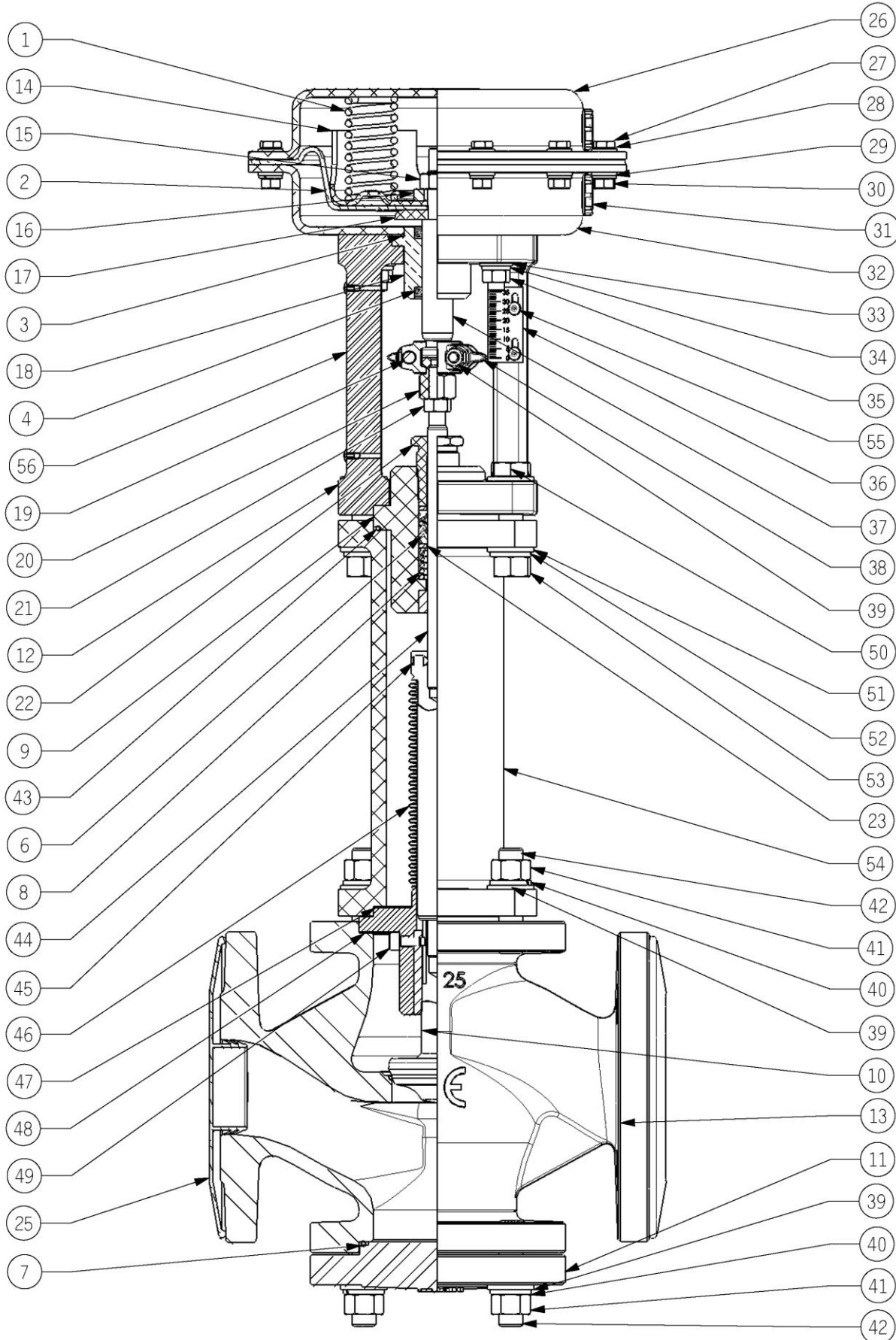
5.7.3 Positioning of NO servo control on the valve with bellows

- 1) Blow air into the servo control. **Caution! The servo control shaft shall move from its stroke.**
- 2) Insert the mounting complete with servo control onto the intermediate valve body (9), so that air couplings are on the valve outlet side.
- 3) Insert the screws (50) into the valve mounting (12) and into the mounting extension (54).
- 4) Insert the flat washers (51) and the spring washers (52) onto the screws (50).
- 5) Torque the nuts (53), according to indications in Table 5.
- 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 (19).
- 8) Insert screws (19) into the connection clamps (5).
- 9) Torque the nuts (38), according to indications in Table 5.

5.7.4 Positioning of NO servo control on the valve with bellows

- 1) Insert the mounting complete with servo control onto the intermediate valve body (9), so that air couplings are on the valve outlet side.
- 2) Insert the screws (50) into the valve mounting (12) and into the mounting extension (54).
- 3) Insert the flat washers (51) and the spring washers (52) onto the screws (50).
- 4) Torque the nuts (53), according to indications in Table 5.
- 5) Make the preload adjusting nut (20) contact the servo control shaft (37) and lift the shutter (19).
- 6) Fasten the servo control shaft and the preload adjusting nut with the connection clamps (5).
- 7) Insert screws (19) into the connection clamps (5).
- 8) Torque the nuts (38), according to indications in Table 5.

Section Plane – 2-way NC SBS/06 Valve with bellows



Drawing No. 060245 Rev.: 01

5.8 Instructions for Disassembly, Replacement of Gaskets and re-assembly of NC Servo controls for SBS/06

Refer to annexed Dwg. No. 060242 for the disassembly and assembly operations of the NC servo control for SBS/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.

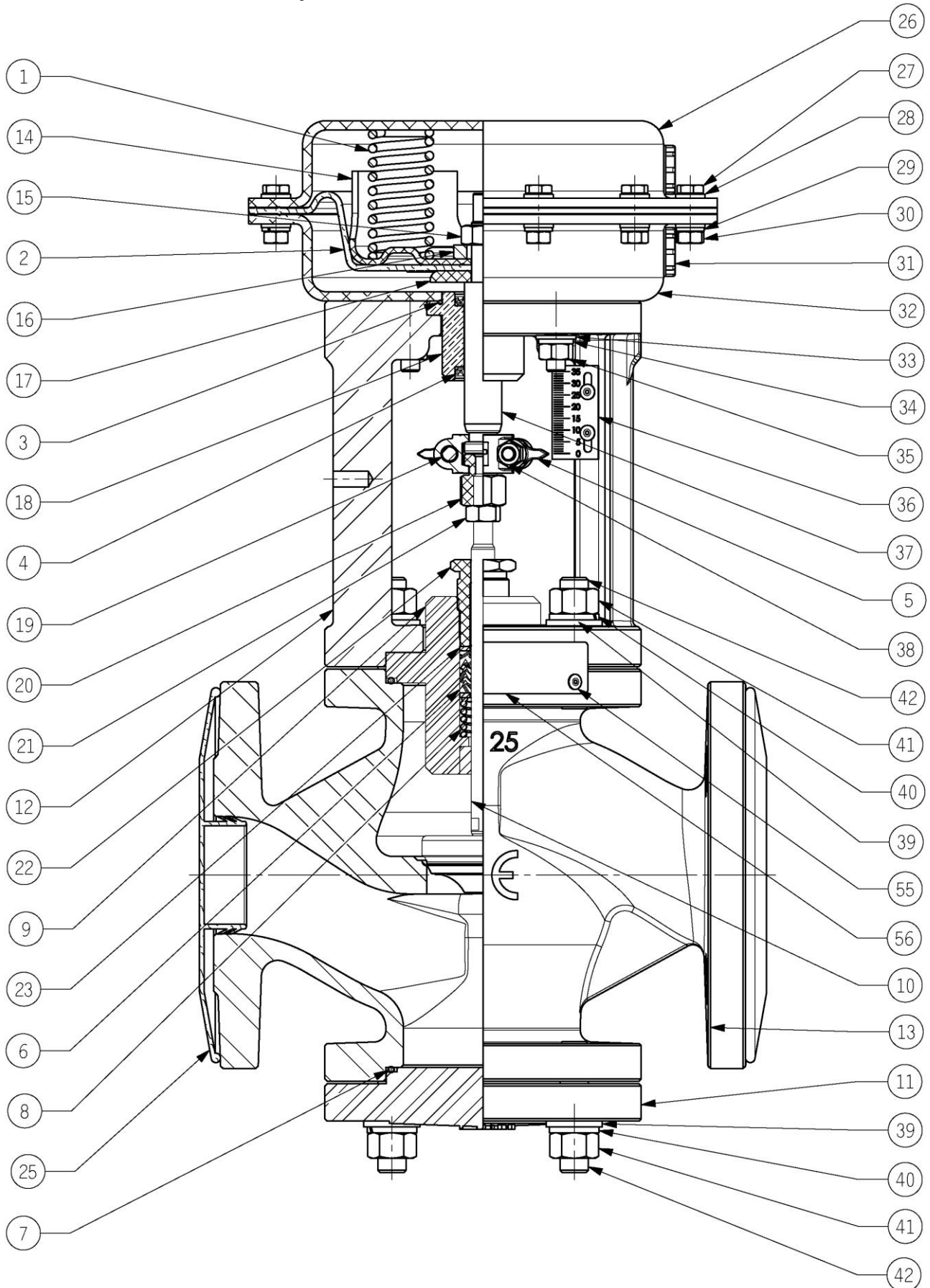
5.8.1 NC servo control disassembly

- 1) Separate the servo control from the valve body as described in paragraph 5.6
- 2) Unloosen the nuts (35), remove the spring washers (34) and the flat washers (33).
- 3) Remove the mounting (12) from tie-rods of the lower head (32).
- 4) Withdraw the guide bush (18). Remove BA gaskets (4) and OR gasket (3).
- 5) Withdraw the screws (27) and separate them from nuts (30) from flat washers (28) and spring washers (37).
- 6) **Caution! The servo control shaft shall move from its stroke:** it is necessary to use proper tools to prevent the two heads from suddenly move away from the servo control when all the screws (27) are unloosen.
- 7) Remove the upper head (26).
- 8) Withdraw the springs of the servo control (1).
- 9) Withdraw the lower head (32) from the servo control shaft (37).
- 10) Fasten the servo control shaft (37) between soft jaws, then unloosen the nut (15).
- 11) Withdraw the distance ring washer (16), the spring plate (14), the diaphragm (2) and the diaphragm counterdisk (17) from the servo control shaft (37).
- 12) At this point the servo control is completely disassembled. The required components can be then replaced.

5.8.2 NC servo control re-assembly

- 1) Fasten the servo control shaft (37) between soft jaws, insert on it the diaphragm counterdisk (17), the diaphragm (2), the spring plate (14) and the distance ring washer (16).
- 2) Screw down and punch the hexagon nut (15).
- 3) Insert the servo control shaft into the lower head (32).
- 4) Insert the springs (1) into the spring plate (14) positioning them on the centering bosses present in the spring plate.
- 5) Place the diaphragm (2) so that the holes for its screws correspond to the holes for the screws of the lower head.
- 6) Place the upper head (26) so that the holes for the air inlet of the two heads are aligned and the holes for the screws correspond to the holes of the diaphragm and lower head screws.
- 7) Compress the springs with proper tools in order to make the two heads come closer. **Caution! Make sure that the two heads do not come suddenly off before they are fastened with the screws.**
- 8) Insert washers (28) into the screws (27), insert the screws (27) into the holes of the upper head (26), insert spring washers (29) and flat washers (28) onto the screws (27), torque tighten the hexagonal nuts (30), as indicated in Table 5.
- 9) Insert the BA gaskets (4) and OR gasket (3) into the guide bush (18).
- 10) Insert the guide bush (18) in the servo control shaft (37) and in the lower head (32).
- 11) Insert the mounting (12) onto tie rods of the lower head (32).
- 12) Insert the flat washers (33), the spring washers (34) onto tie rods of the lower head (32) and torque nuts (35), according to indications of Table 5.
- 13) Now the servo control is completely assembled and can be re-positioned on the valve mounting, as described in paragraph 5.6.

5.8.3 Section Plane – 2-way NC SBS/06 Valve



Drawing No. 060242 Rev.: 01

5.9 Instructions for Disassembly, Replacement of Gaskets and re-assembly of NO Servo controls for SBS/06

Refer to annexed Dwg. No. 060243 for the disassembly and assembly operations of the NO servo control for SBS/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.

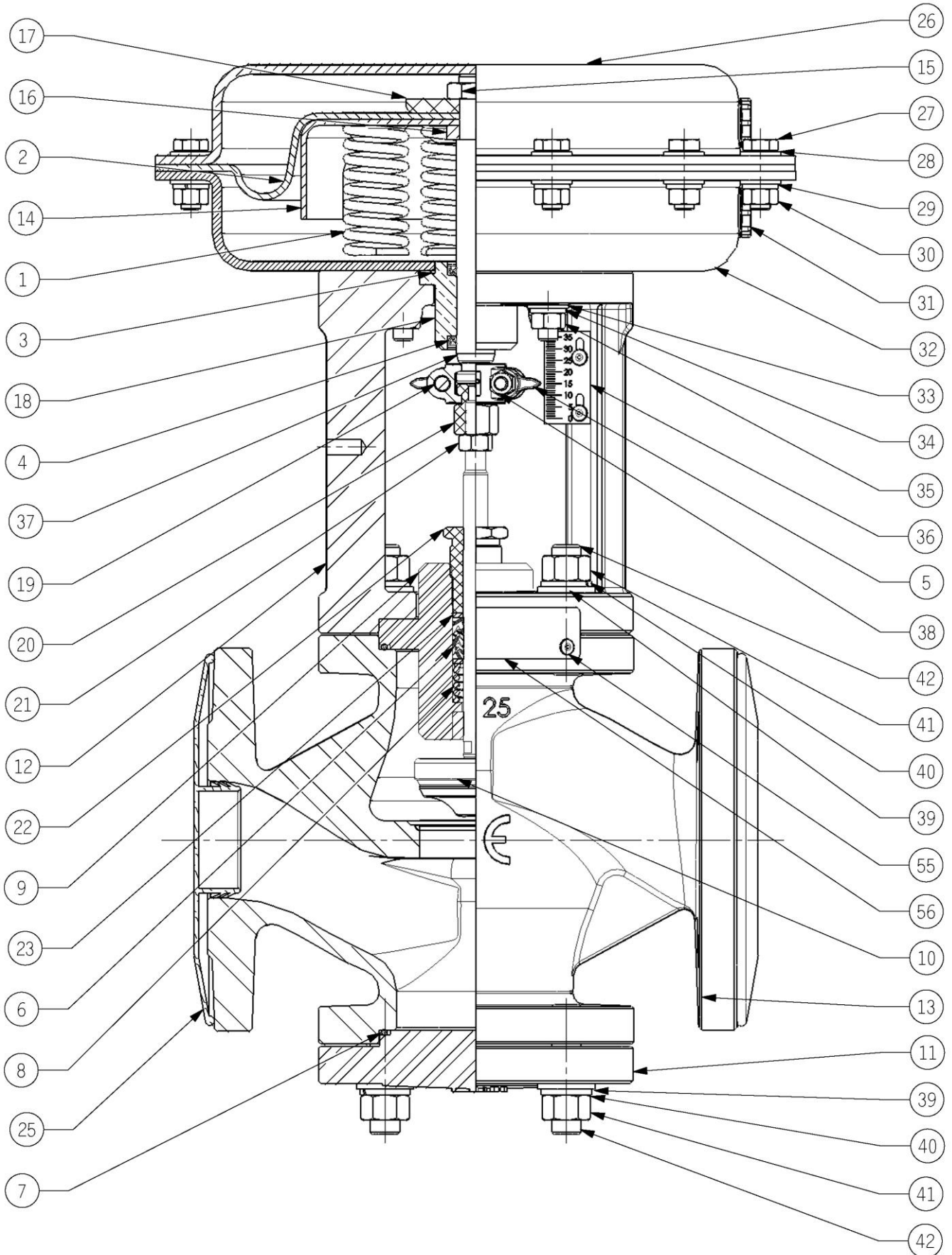
5.9.1 NC servo control disassembly

- 4) Separate the servo control from the valve body as described in paragraph 5.6.
- 5) Unloosen the nuts (35), remove the spring washers (34) and the flat washers (33).
- 6) Remove the mounting (12) from tie-rods of the lower head (32).
- 7) Withdraw the guide bush (18). Remove BA gaskets (4) and OR gasket (3).
- 8) Withdraw the screws (27) and separate them from nuts (30) from spring washers (29) and flat washers (28).
- 9) **Caution! The servo control shaft shall move from its stroke:** it is necessary to use proper tools to prevent the two heads from suddenly move away from the servo control when all the screws (27) are unloosen.
- 10) Remove the upper head (26).
- 11) Withdraw the lower head (32) from the servo control shaft (37).
- 12) Withdraw the springs (1) from the upper head (16).
- 13) Fasten the servo control shaft (18) between soft jaws, then unloosen the nut (15), withdraw the diaphragm counterdisk (17). Note: the nut (15) is not available for the 200 dia servo control, as it is the same diaphragm counterdisk to act as fastening nut.
- 14) Withdraw the diaphragm (2), the spring plate (14) and the distance ring washer (16) from the servo control (37) shaft.
- 15) At this point the servo control is completely disassembled. The required components can be then replaced.

5.9.2 NO servo control re-assembly

- 1) Fasten the servo control shaft (37) between soft jaws, insert on it the distance ring washer (16), the spring plate (14), the diaphragm (2) and the diaphragm counterdisk (17).
- 2) Screw down and punch the hexagon nut (15). Note: the nut (15) is not available for the 200 dia servo control, as it is the same diaphragm counterdisk (17) to act as fastening nut.
- 3) Lay the servo control shaft onto the upper head (26).
- 4) Insert the springs (1) into the spring plate (14) positioning them on the centering bosses present in the plate.
- 5) Place the diaphragm so that the holes for its screws correspond to the holes for the screws of the lower head.
- 6) Position the upper head (32) so that the holes for the air inlet of the two heads are aligned and the holes for the screws correspond to the holes of the diaphragm and lower head screws.
- 7) Compress the springs with proper tools in order to make the two heads come closer. **Caution! Make sure that the two heads do not come suddenly off before they are fastened with the screws (27).**
- 8) Insert washers (28) into the screws (27), insert the screws (27) into the holes of the upper head (26), insert spring washers (29) and flat washers (28) onto the screws (27), torque tighten the hexagonal nuts (30), as indicated in Table 5.
- 9) Insert the BA gaskets (4) and OR gasket (3) into the guide bush (18).
- 10) Insert the guide bush (18) in the servo control shaft (37) and in the lower head (32).
- 11) Insert the mounting (12) onto tie rods of the lower head (32).
- 12) Insert the flat washers (33), the spring washers (34) onto tie rods of the lower head (32) and torque nuts (35), according to indications of Table 5.
- 13) Now the servo control is completely assembled and can be re-positioned on the valve mounting, as described in paragraph 5.6.

5.9.3 Section Plane – 2-way NO SBS Valve



Drawing No. 060243 Rev.: 01

5.10 Instructions for Disassembly, Replacement of Gaskets and Re-assembly of 2-way SBS/06 Valve Bodies

Refer to annexed Dwg. No. 060242 for the disassembly and assembly operations of the 2-way SBS valve body.

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.

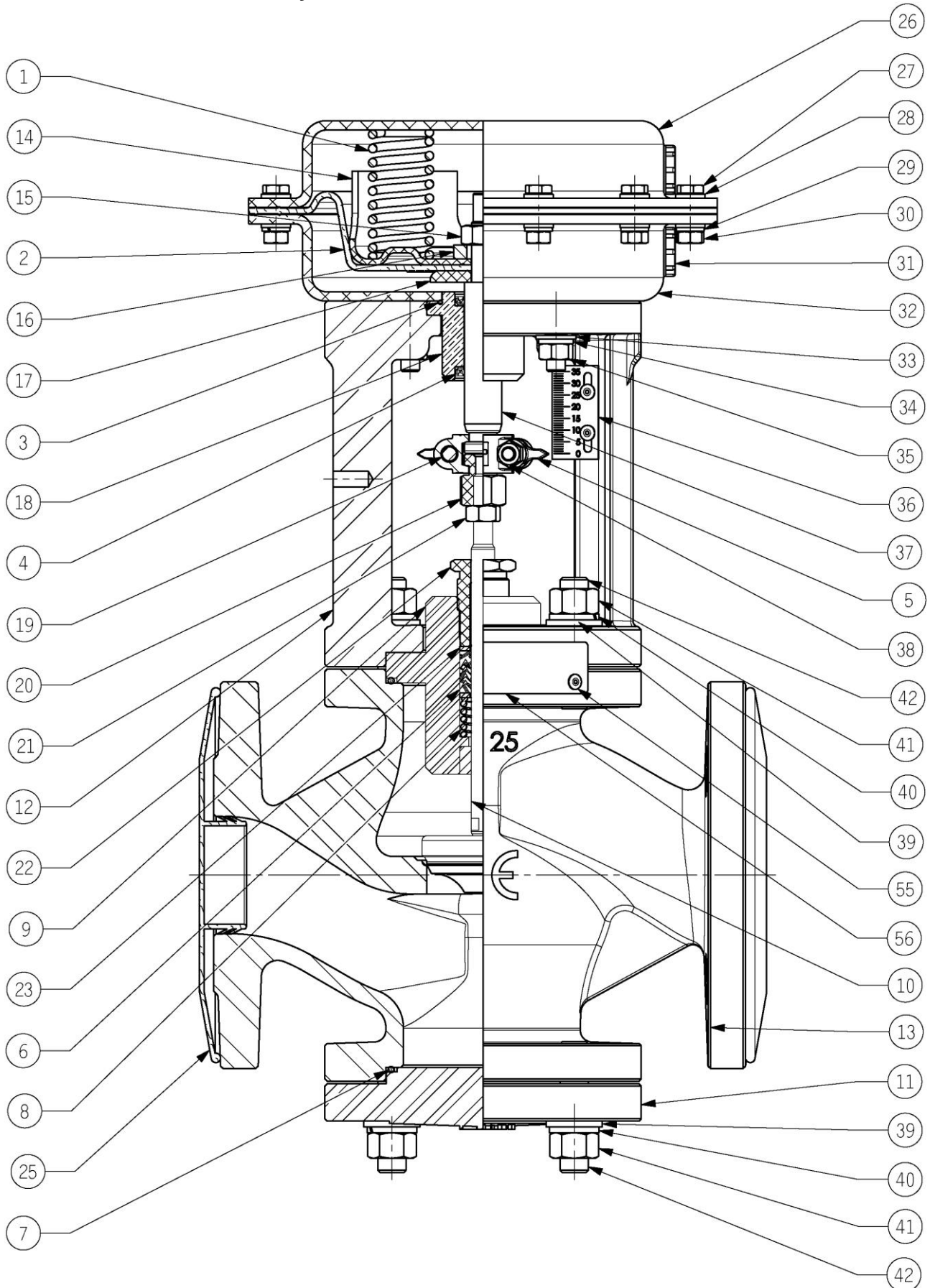
5.10.1 Disassembly of 2-way valve body.

- 1) Separate the servo control from the valve body as described in paragraph 5.6.
- 2) Mark the position of the adjusting nut (20) in order to reassemble the valve in the original calibration conditions.
- 3) Withdraw the adjusting nut (20) from the shutter stem (10).
- 4) Unloosen the nut (21).
- 5) Withdraw the intermediate body (9) with the shutter (10).
- 6) Extract the shutter (10) from the intermediate body (9).
- 7) Unloosen the packing gland screw (22). **Caution! The packing gland screw (22) 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 (22) is no longer held by the threading.**
- 8) Withdraw the first packing gland washer (23), the packing gland (6), the second packing gland washer (23) and packing gland spring (8) from the intermediate body (9).
- 9) Withdraw the body gasket (7) from the valve body (13).
- 10) Unloosen the nuts (41), remove the spring washers (40) and the flat washers (39).
- 11) Remove the bottom (11) and the lower OR gasket (7) from the valve body (13).
- 12) At this point the valve body is completely disassembled. The required components can be then replaced.

5.10.2 Re-assembly of 2-way valve body.

- 1) Position the lower OR gasket (7) on the bottom (11), then insert it into the valve body (13).
- 2) Insert the flat washers (39) and the spring washers (40) onto the lower stud bolts (42).
- 3) Torque the lower nuts (41), according to indications in Table 5.
- 4) Lubricate the intermediate body (9) with silicone grease.
- 5) Insert the packing gland spring (8), the packing gland washer (23), the packing gland (6), the second packing gland washer (23) into the intermediate body (9).
- 6) Screw down the packing gland screw (22) 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) Lubricate with silicone grease the shutter stem (10) and insert it into the previously prepared intermediate body (9). Lay the upper OR gasket (7) onto the intermediate lower body (9).
- 8) Then, place the intermediate body (9) with the shutter (10) into the valve body (13).
- 9) Screw the nut (21), then screw the adjusting nut (20).
- 10) Bring again the preloaded adjusting nut (20) into the position previously marked.
- 11) Torque the nut (21), according to indications in Table 5, holding the preload adjusting screw (20).
- 12) 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 Plane – 2-way NC SBS/06 Valve



Drawing No. 060242 Rev.: 01

5.11 Instructions for Disassembly, Replacement of Gaskets and Re-assembly of 3-way SBS/06 Valve Bodies

Refer to annexed Dwg. No. 060244 for the disassembly and assembly operations of the 3-way SBS/60 valve body.

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.

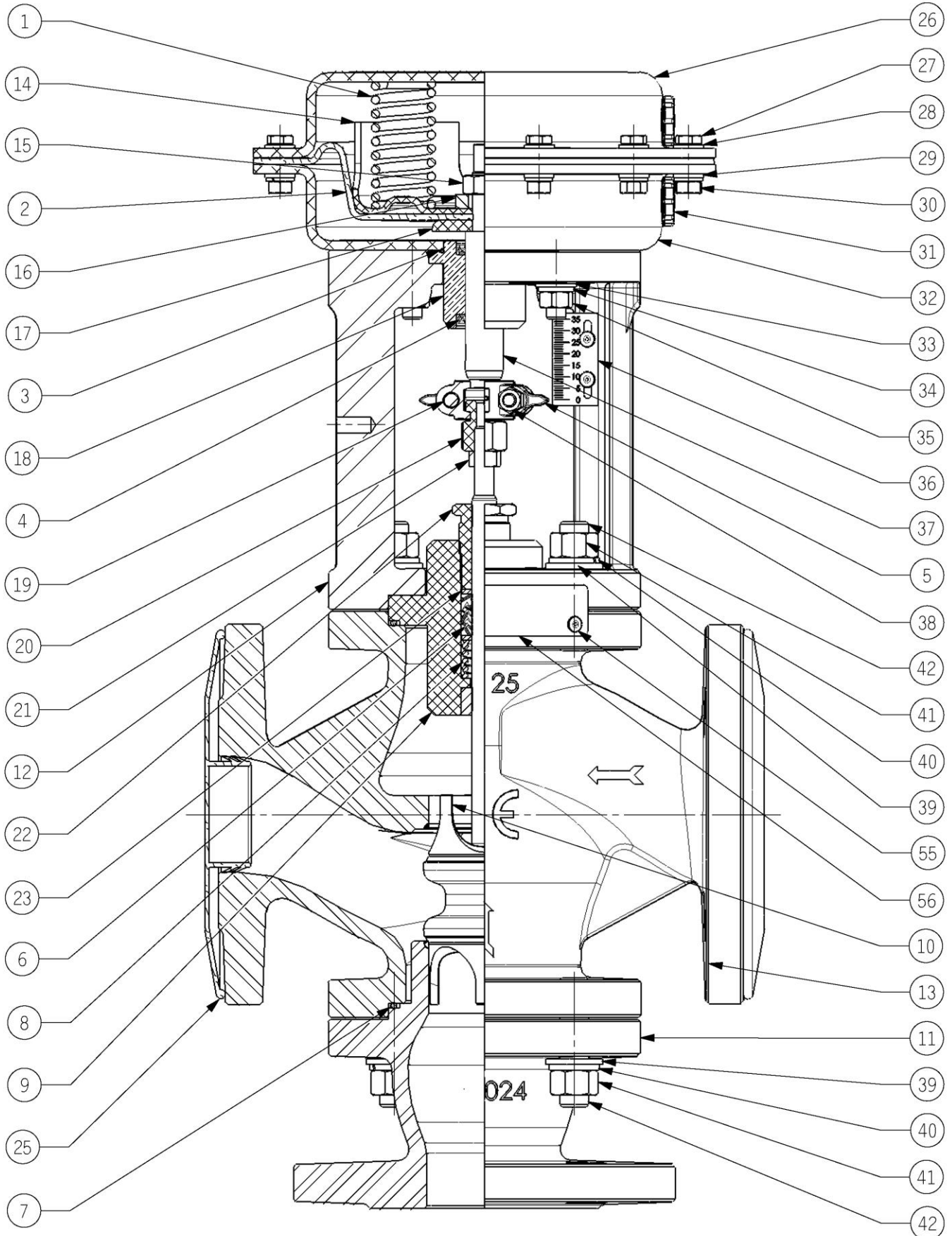
5.11.1 Disassembly of 3-way valve body

- 1) Separate the servo control from the valve body as described in paragraph 5.6.
- 2) Mark the position of the adjusting nut (20) in order to reassemble the valve in the original calibration conditions.
- 3) Withdraw the adjusting nut (20) from the shutter stem (10).
- 4) Unloosen the nut (21).
- 5) Withdraw the intermediate body (9) with the shutter (10).
- 6) Extract the shutter (10) from the intermediate body (9).
- 7) Unloosen the packing gland screw (22). **Caution! The packing gland screw (22) 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 (22) is no longer held by the threading.**
- 8) Withdraw the first packing gland washer (23), the packing gland (5), the second packing gland washer (23) and packing gland spring (8) from the intermediate body (9).
- 9) Withdraw the body gasket (7) from the valve body (13).
- 10) Unloosen the nuts (41), remove the spring washers (40) and the flat washers (39).
- 11) Remove the bottom (11) the third-way bottom (11) and the lower OR gasket (7) from the valve body (13).
- 12) At this point the valve body is completely disassembled. The required components can be then replaced

5.11.2 Re-assembly of 3-way valve body

- 1) Position the lower OR gasket (7) on the third way bottom (11), then insert it into the valve body (13).
- 2) Insert the flat washers (39) and the spring washers (40) onto the lower stud bolts (42).
- 3) Torque the lower nuts (41), according to indications in Table 5.
- 4) Lubricate the intermediate body (9) with silicone grease.
- 5) Insert the packing gland spring (8), the packing gland washer (23), the packing gland (6), the second packing gland washer (23) into the intermediate body (9).
- 6) Screw down the packing gland screw (22) 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) Lubricate the shutter stem (10) with silicone grease and insert it into the intermediate body (9) previously prepared.
- 8) Insert the upper OR gasket (7) into the intermediate body (9).
- 9) Then, place the intermediate body (9) with the shutter (10) into the valve body (13).
- 10) Screw the nut (21), then screw the adjusting nut (20).
- 11) Bring again the preloaded adjusting nut (20) into the position previously marked.
- 12) Torque the nut (21), according to indications in Table 5, holding the preload adjusting screw (20).
- 13) 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 Plane – 3-way NC SBS Valve



Drawing No. 060244 Rev.: 01

5.12 Instructions for Disassembly, Replacement of Gaskets and Re-assembly of 2-way SBS/06 Valve Bodies with bellows

Refer to annexed Dwg. No. 060245 for the disassembly and assembly operations of the 2-way SBS/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 of 2-way valve body with bellows.

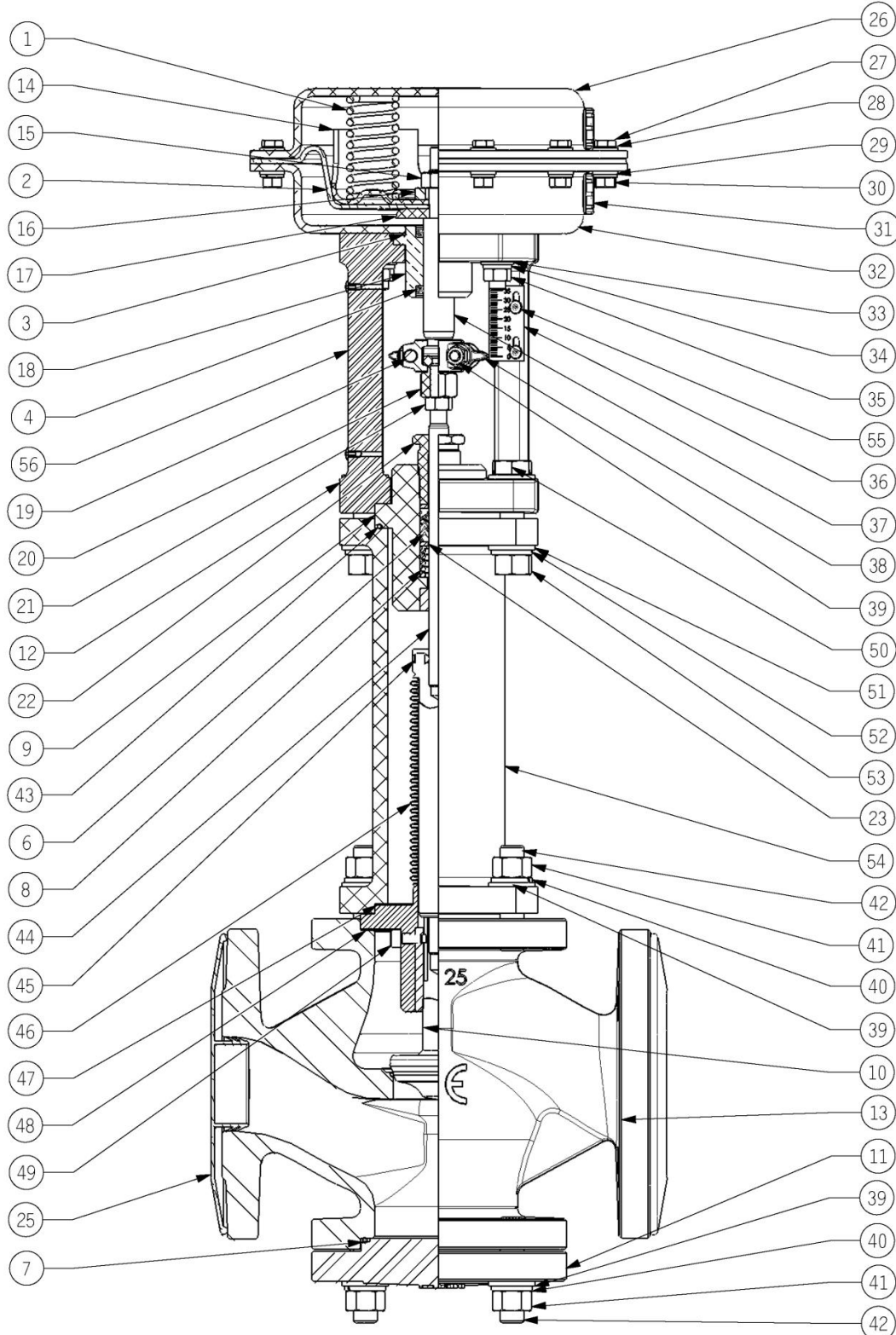
- 1) Separate the servo control from the valve body as described in paragraph 5.7.
- 2) Mark the position of the adjusting nut (20) in order to reassemble the valve in the original calibration conditions.
- 3) Withdraw the adjusting nut (20) from the shutter stem (10), unloosen the nut (21).
- 4) Withdraw the intermediate body (9) from the mounting extension (54), remove the OR gasket (43) from this latter.
- 5) Unloosen the packing gland screw (22). **Caution! The packing gland screw (22) 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 (22) is no longer held by the threading.**
- 6) Withdraw the first packing gland washer (23), the packing gland (6), the second packing gland washer (23) and packing gland spring (8) from the intermediate body (9).
- 7) Unloosen the upper nuts (41), remove the spring washers (40) and the flat washers (39).
- 8) Remove the mounting extension (54), then withdraw the FEP O seal gasket (47). It is then possible to withdraw the intermediate body with bellows (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 (45), unloosen the shutter stem (44), preventing the bellows from being stressed.
- 10) Unloosen the socket head screw (49), it is then possible to screw out the shutter (10) from the intermediate body with bellows (46). 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 (48) from the valve body (13).
- 12) Unloosen the nuts (41), remove the spring washers (40) and the flat washers (39).
- 13) Remove the bottom (11) and the FEP OR seals gasket (7) from the valve body (13).
- 14) At this point the valve body is completely disassembled. The required components can be then replaced.

5.12.2 Re-assembly of 2-way valve body with bellows.

- 1) Position the lower FEP O seals gasket (7) on the bottom (11), then insert it into the valve body (13).
- 2) Insert the flat washers (39) and the spring washers (40) onto the lower stud bolts (42).
- 3) Torque the lower nuts (41), according to indications in Table 5.
- 4) Lubricate the intermediate body (9) with silicone grease.
- 5) Insert the packing gland spring (8), the packing gland washer (23), the packing gland (6), the second packing gland washer (23) into the intermediate body (9).
- 6) Screw down the packing gland screw (22) 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 (10) on the intermediate body stem with bellows (46). Then, screw down the HSH 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 (49) 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 (44) into the intermediate body with bellows (46), then torque tighten the grub screw (45), as indicated under Table 6.
- 9) Insert the FEP O seals (48) into the valve body (13).
- 10) Then, insert the intermediate body with bellows previously assembled into the valve body.
- 11) Place the FEP O seals gasket (47) and insert the mounting extension (54) of the valve body onto the stud bolts (54).
- 12) Insert the flat washers (39), the spring washers (40) onto tie rods of the stud bolts (42) and torque nuts (41), according to indications of Table 5.

- 13) Insert the OR gasket (43) into the mounting extension.
- 14) Insert the intermediate body (9) assembled into the mounting extension (54) and on the shutter stem (44).
- 15) Screw the nut (21), on the shutter stem (44), then screw the adjusting nut (20).
- 16) Bring again the preloaded adjusting nut (20) into the position previously marked.
- 17) Torque the nut (21), according to indications in Table 5, holding the preload adjusting screw (20).
- 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 NC SBS/06 Valve with bellows



Drawing No. 060245 Rev.: 01

5.13 Instructions for Disassembly, Replacement of Gaskets and Re-assembly of 3-way SBS/06 Valve Bodies with bellows

Refer to annexed Dwg. No. 060246 for the disassembly and assembly operations of the 3-way SBS/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 of 3-way valve body with bellows.

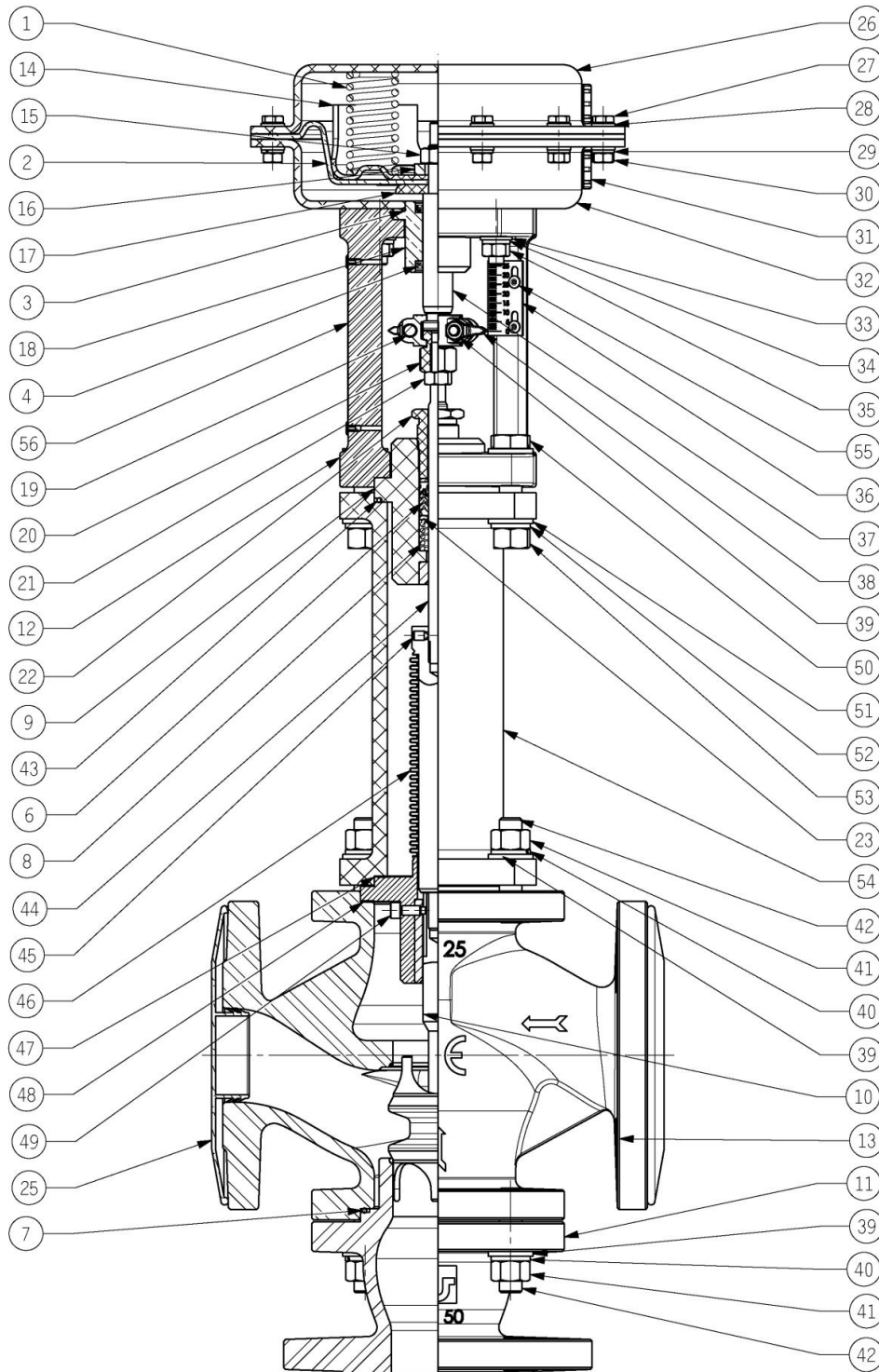
- 1) Separate the servo control from the valve body as described in paragraph 5.7.
- 2) Mark the position of the adjusting nut (20) in order to reassemble the valve in the original calibration conditions.
- 3) Withdraw the adjusting nut (20) from the shutter stem (10), loosen the nut (21).
- 4) Withdraw the intermediate body (9) from the mounting extension (54), remove the OR gasket (43) from this latter.
- 5) Unloosen the packing gland screw (22). **Caution! The packing gland screw (22) 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 (22) is no longer held by the threading.**
- 6) Withdraw the first packing gland washer (23), the packing gland (6), the second packing gland washer (23) and packing gland spring (8) from the intermediate body (9).
- 7) Unloosen the upper nuts (41), remove the spring washers (40) and the flat washers (39).
- 8) Remove the mounting extension (54), then withdraw the FEP O seal gasket (47). Pay attention, while handling the bellows, as it is a very delicate component, when disassembled and cannot be STRESSED.
- 9) Unloosen the grub screw (45), loosen the shutter stem (44), preventing the bellows from being stressed.
- 10) Blocking the valve body (13), take the intermediate body with bellows and pull until the HSH screw (49) comes out of the valve body; then, loosen it. Caution! This operation is very delicate and requires a particular care. The bellows is has not to be stressed.
- 11) Unloosen the nuts (41), remove the spring washers (40) and the flat washers (39).
- 12) Remove the third-way bottom (11) and the FEP OR seals gasket (7) from the valve body (13).
- 13) The shutter (10) can be then disassembled from the intermediate body with bellows (46) and withdraw the shutter from the valve bottom.
- 14) Withdraw the intermediate body with the bellows (46) from the valve body (13), then remove the FEP O seals gasket (24).
- 15) At this point the valve body is completely disassembled. The required components can be then replaced.

5.13.2 Re-assembly of 3-way valve body with bellows

- 1) Place the FEP O seals gasket (48) into the valve body (13), then place the intermediate body with bellows (46). 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 (10) 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 (49) 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 (49) 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.
- 4) Position the FEP O seals gasket (7) on the third-way bottom (11), then insert it into the valve body (13).
- 5) Insert the flat washers (39) and the spring washers (40) onto the lower stud bolts (42).
- 6) Torque the lower nuts (41), according to indications in Table 5.
- 7) Screw down the shutter stem (44) into the intermediate body with bellows (46), then torque tighten the grub screw (45), as indicated under Table 6.
- 8) Place the FEP O seals gasket (47) and insert the mounting extension (54) of the valve body onto the upper stud bolts (54).
- 9) Insert the washers (39) and (40) on the stud bolts, then torque tighten the nuts (41) as indicated under Table 5.
- 10) Lubricate the intermediate body (9) with silicone grease.
- 11) Insert the packing gland spring (8), the packing gland washer (23), the packing gland (6), the second packing gland washer (23) into the intermediate body (9).

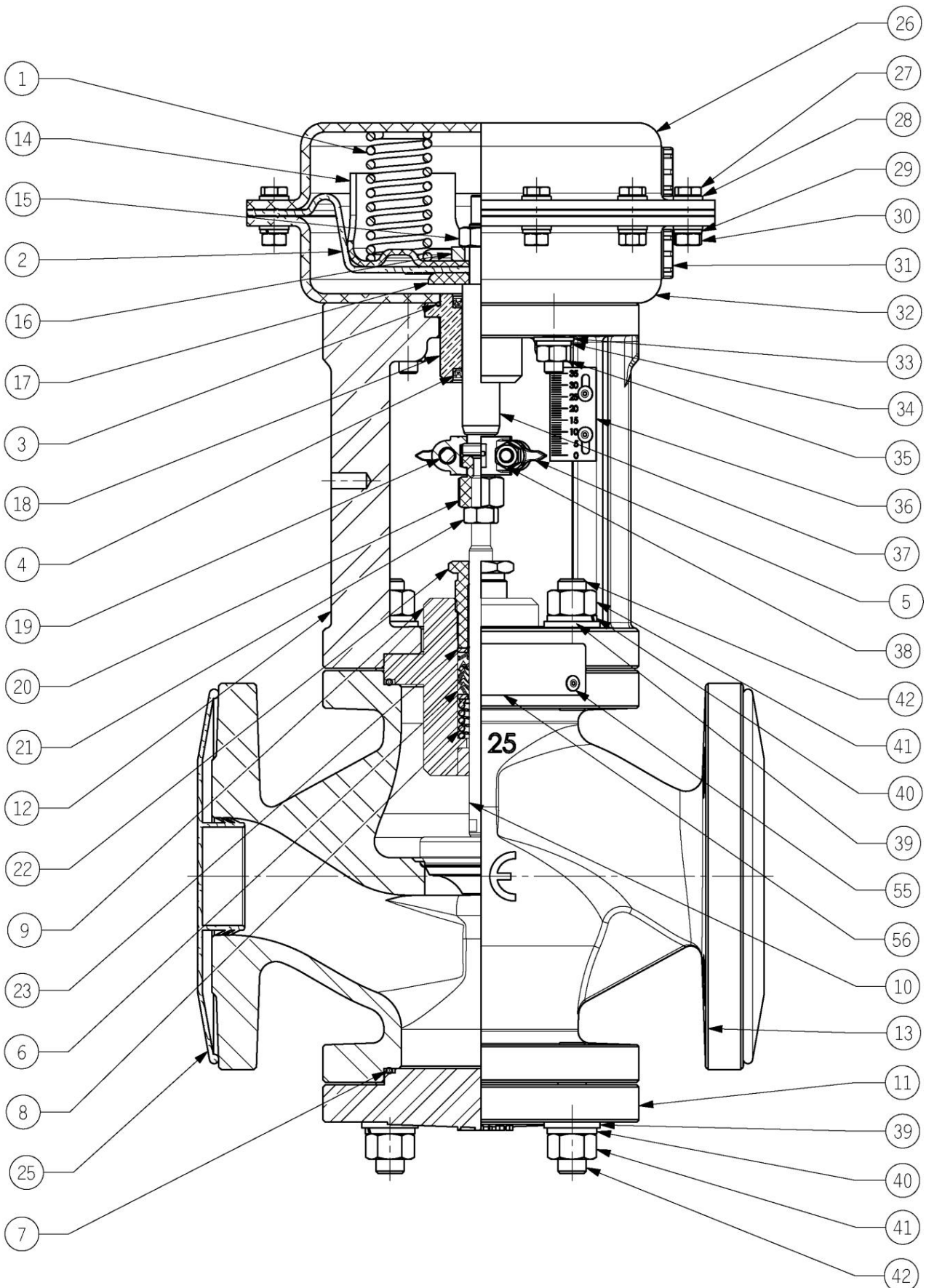
- 12) Screw down the packing gland screw (22) until it protrudes 10 mm from the upper side of the intermediate body.
Caution! The packing gland screw keeps the packing gland spring compressed. Pay attention that the components located on the spring do not come off during the assembly.
- 13) Insert the gasket (43) into the mounting extension.
- 14) Insert the intermediate body (9) assembled into the mounting extension (54) and on the shutter stem (44).
- 15) Screw the nut (21) on the shutter stem (44), then screw the adjusting nut (20).
- 16) Bring again the preloaded adjusting nut (20) into the position previously marked.
- 17) Torque the nut (21), according to indications in Table 5, holding the preload adjusting screw (20).
- 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 NC SBS/06 Valve with bellows



Drawing No. 060246 Rev.: 01

Section Plane – 2-way NC SBS Valve



Drawing No. 060242 Rev.:01

5.14 Details and Spare Parts of SBS/06 NC Servo controls

Part No.	Q.ty	DESCRIPTION	MATERIAL	GROUP	CODES			
					SERV Ø 200	SERV Ø 275	SERV Ø 360	SERV Ø 430
1	P	Servo control spring	Phosphate steel	552	SEE TABLE 4 PAGE 44			
2	1	Diaphragm	NBR	584	1425	1426	1714	1715
3	1	O-Ring gasket	GACO	548	OR02137GA			
4	2	BA gasket	GACO	567	BA0016244			
5	2	Connection clamp	CF8	841	M304050088			
14	1	Spring plate	Fe 360	591	PPMD86250	PPMD86248	PPMD86249	PPMD86247
15	1	Hexagon nut	Fe 360	608	D1005588F	D1405588F		
16	1	Distance ring washer	AISI 304	703	RNDS011229			
17	1	Diaphragm counterdisk	Fe 360	557	CDD086117	CDD086118	CDD086119	
18	1	Guide bush	Brass	581	BGD086114			
19	2	Hexagon head screw	AISI 304	551	TCCE05204			
26	1	Upper head	Fe 360	592	TSD086200	TSD086207	TSD086203	TSD086210
27	PP	Hexagon head screw	Fe 360	607	VTE06025FZ	VTE0825FE		
28	PPP	Flat washer	Fe 360	609	RP06000FE	RP08000FE		
29	PP	Spring washer	Fe 360	610	RE06000FE	RE08000FE		
30	PP	Hexagon nut	Fe 360	608	D0605588F	D0805588F		
31	2	EP/400 threaded caps	Polyethylene	505	TEP400G018	TEP400G014		
32	1	Lower head	Fe 360	592	TSD086201	TSD086208	TSD086204	TSD086211
33	4	Flat washer	Fe 360	609	RP08000FE			
34	4	Spring washer	Fe 360	610	RE08000FE			
35	4	Hexagon nut	Fe 360	608	D0805588F			
37	1	Servo control shaft	AISI 304	561	ASD086120	ASD086121	ASD086122	
38	2	Hexagon nut	AISI 304	501	D06055884			

GROUP 100

Servo control spare parts (without spring)

SPARE PART CODE		2655	5401	5402	5403
Part No.	Q.ty	SERV Ø	SERV Ø	SERV Ø	SERV Ø
2	1	1425	1426	1714	1715
3	1	OR02137GA			
4	2	BA0016244			

P The number depends upon the control signal

PP No. 12 for the 200 and 275 servo controls, No. 16 for the 360 servo controls, No. 20 for the 430 servo controls

PPP No. 24 for the 200 and 275 servo controls, No. 32 for the 360 servo controls, No. 40 for the 430 servo controls

5.15 Details and Spare Parts of SBS/06 NO Servo controls

Part No.	Q.ty	DESCRIPTION	MATERIAL	GROUP	CODES			
					SERV Ø 200	SERV Ø 275	SERV Ø 360	SERV Ø 430
1	P	Servo control spring	Phosphate steel	552	SEE TABLE 4 PAGE 44			
2	1	Diaphragm	NBR	584	1425	1426	1714	1715
3	1	O-Ring gasket	GACO	548	OR02137GA			
4	2	BA gasket	GACO	567	BA0016244			
5	2	Connection clamp	CF8	841	M304050088			
14	1	Spring plate	Fe 360	591	PPMD86250	PPMD86248	PPMD86249	PPMD86247
15	1	Hexagon nut	Fe 360	608	D1405588F			
16	1	Distance ring washer	AISI 304	703	RNDS011229			
17	1	Diaphragm counterdisk	Fe 360	557	CDD086198	CDD0861199		
18	1	Guide bush	Brass	581	BGD086114			
19	2	Hexagonal head screw	AISI 304	551	TCCE05204			
26	1	Upper head	Fe 360	592	TSD086200	TSD086207	TSD086203	TSD086210
27	PP	Hexagon head screw	Fe 360	607	VTE06025FZ	VTE0825FE		
28	PPP	Flat washer	Fe 360	609	RP06000FE	RP08000FE		
29	PP	Spring washer	Fe 360	610	RE06000FE	RE08000FE		
30	PP	Hexagon nut	Fe 360	608	D0605588F	D0805588F		
31	2	EP/400 threaded caps	Polyethylene	505	TEP400G018	TEP400G014		
32	1	Lower head	Fe 360	592	TSD086201	TSD086208	TSD086204	TSD086211
33	4	Flat washer	Fe 360	609	RP08000FE			
34	4	Spring washer	Fe 360	610	RE08000FE			
35	4	Hexagon nut	Fe 360	608	D0805588F			
37	1	Servo control shaft	AISI 304	561	ASD086148	ASD086149	ALSC960353	
38	2	Hexagon nut	AISI 304	501	D06055884			

P The number depends upon the control signal

PP No. 12 for the 200 and 275 servo controls, No. 16 for the 360 servo controls, No. 20 for the 430 servo controls

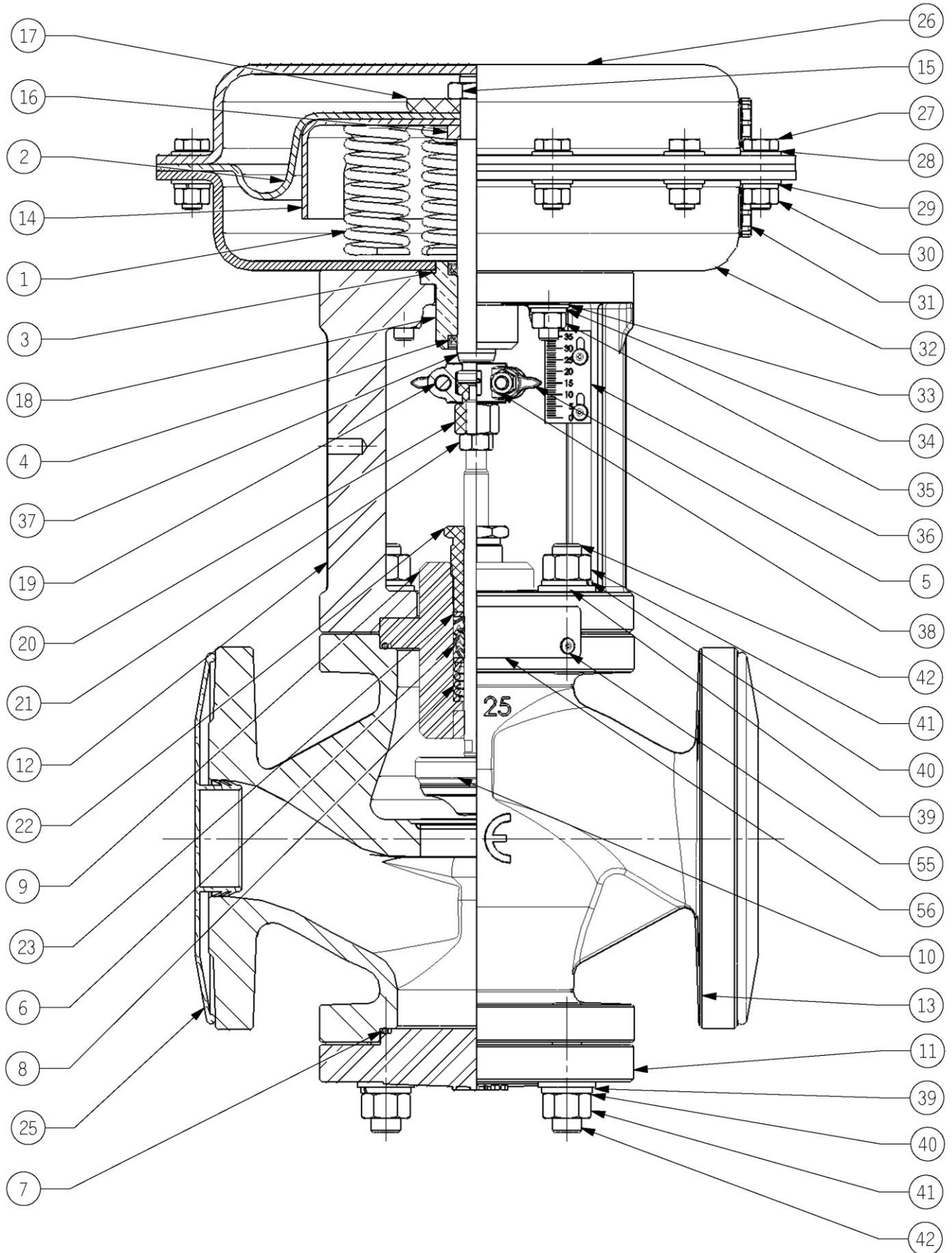
PPP No. 24 for the 200 and 275 servo controls, No. 32 for the 360 servo controls, No. 40 for the 430 servo controls

GROUP 100

Servo control spare parts (without spring)

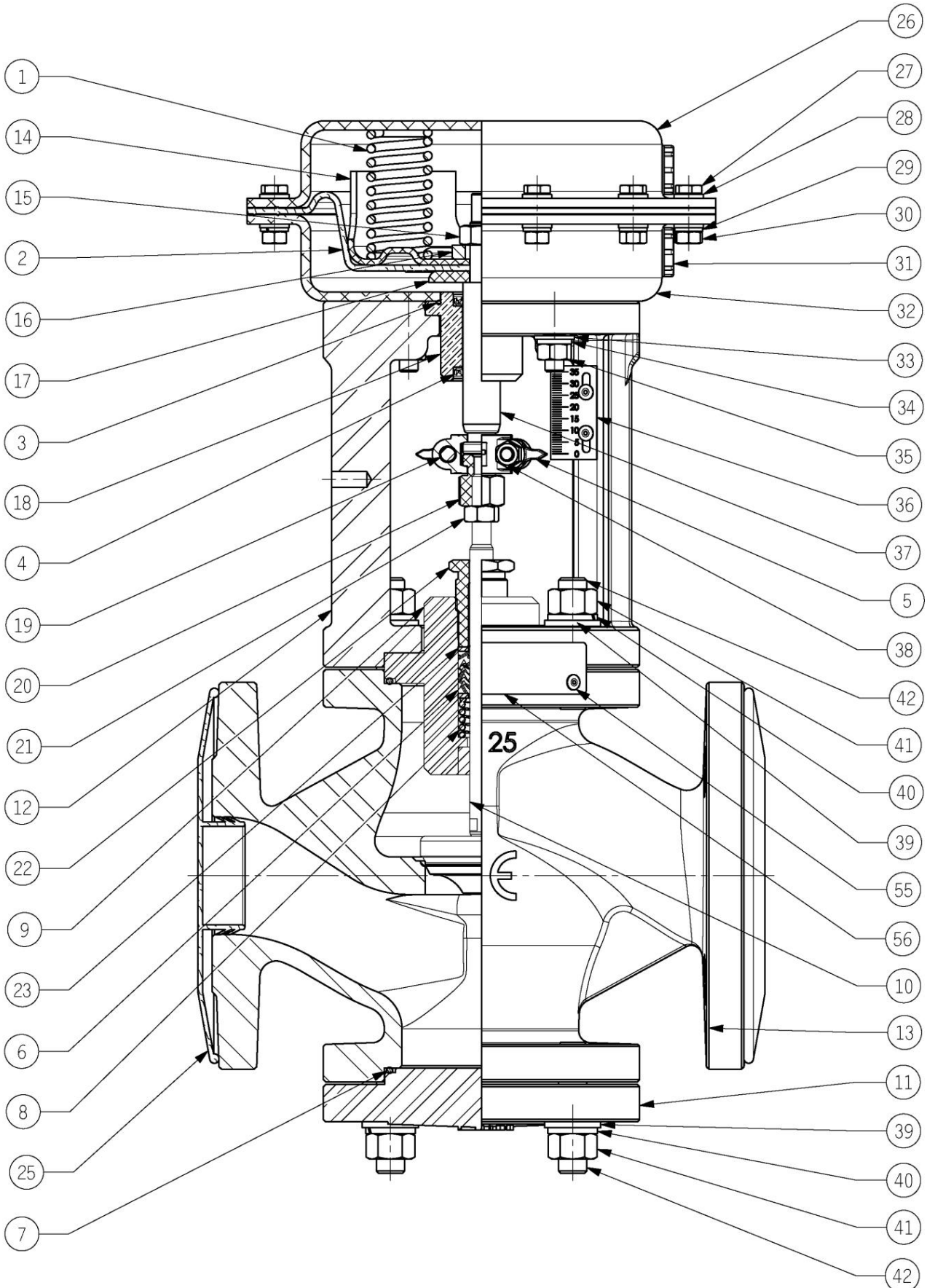
SPARE PART CODE		2655	5401	5402	5403
Part No.	Q.ty	SERV Ø	SERV Ø	SERV Ø	SERV Ø
2	1	1425	1426	1714	1715
3	1	OR02137GA			
4	2	BA0016244			

Section Plane – 2-way NO SBS Valve



Drawing No. 060243 Rev.: 01

Section Plane – 2-way NC SBS Valve



Drawing No. 060242 Rev.: 01

5.16 2-way SBS/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	
6	1	Packing gland	TEFLON+GRAPHITE	587				PT01020TT					
7	2	OR gasket	standard	FPM	548				OR03281VI				
		FEP O seals gasket	High temp.	FPM PFA covered					OR003281PF				
8	1	Packing gland spring	AISI 316	552				MTD086110					
9	1	Intermediate body	Spher. Cast iron JS1024 + AISI 420	645				CVSB060240					
10	1	Shutter	Plastic seal	AISI 304+TEF./CARB.	675			OVD088087	OVD088088	OVD088089			
			Metallic seal	AISI 304	595			OVD086056	OVD086057	OVD086058			
11	1	Bottom	Spher. Cast iron JS1024	645				CVSB060239					
12	1	Valve mounting	Spher. Cast iron JS1024	645				CVSB060237					
13	1	Valve body	Spher. Cast iron JS1024	645			CVSB060233	CVSB060235	CVSB040387				
20	1	Load adjusting nut	Fe 360	558				DRD086048					
21	1	Hexagon nut	Fe 360	608				D0805588F					
22	1	Packing gland screw	AISI 420	559				VVD086077					
23	2	Packing gland washer	AISI 316	703				RDD086274					
25	2	Flange cap	Polyethylene	505			TEP3050032	TEP3050040	TEP3050050				
36	1	Stroke plate	Aluminum	590				ERD086151					
41	P	Hexagon nut	Fe 360	608				D1205588F					
39	P	Flat washer	Fe 360	609				RP12000FE					
40	P	Spring washer	Fe 360	610				RE12000FE					
46	P	Stud bolts	Fe 360	558				PVFD86012					
55	4	Tear rivets	Aluminum	589				RIV32510A					
56	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			
	6	1						PT01020TT		
	7	2						OR03281VI OR003281PF		
	8	1						MTD086110		

5.17 3-way SBS/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
6	1	Packing gland	TEFLON+GRAPHITE	587						PT01020TT		
7	2	OR gasket	standard	FPM						OR03281VI		
		FEP O seals gasket	High temp.	FPM PFA covered	548						OR003281PF	
8	1	Packing gland spring	AISI 316	552						MTD086110		
9	1	Intermediate body	Spher. Cast iron JS1024 + AISI 420	645					CVSB060240			
10	1	Guided shutter	Plastic seal	AISI 304+TEF./CARB.	807				OV3D88179	OV3D88177	OV3D88180	
			Metallic seal	AISI 304	654				OV3D86223	OV3D86226	OV3D86220	
11	1	Three-way bottom	Standard	Spher. Cast iron JS1024 + AISI 304	756				FOND060078	FOND060071	FOND050484	
			Stellited	Spher. Cast iron JS1024 + Stellite							FOND060190	
12	1	Valve mounting	Spher. Cast iron JS1024	645					CVSB060237			
13	1	Valve body	Spher. Cast iron JS1024	645				CVSB060234	CVSB060236	CVSB040388		
20	1	Load adjusting nut	Fe 360	558					DRD086048			
21	1	Hexagon nut	Fe 360	608					D0805588F			
22	1	Packing gland screw	AISI 420	559					VVD086077			
23	2	Packing gland washer	AISI 316	703					RDD086274			
25	2	Flange cap	Polyethylene	505				TEP3050032	TEP3050040	TEP3050040		
36	1	Stroke plate	Aluminum	590					ERD086151			
41	P	Hexagon nut	Fe 360	608					D1205588F			
39	P	Flat washer	Fe 360	609					RP12000FE			
40	P	Spring washer	Fe 360	610					RE12000FE			
46	P	Stud bolts	Fe 360	558					PVFD86012			
55	4	Tear rivets	Aluminum	589					RIV32510A			
56	1	Rating plate	Polyester	506					ERD086150			

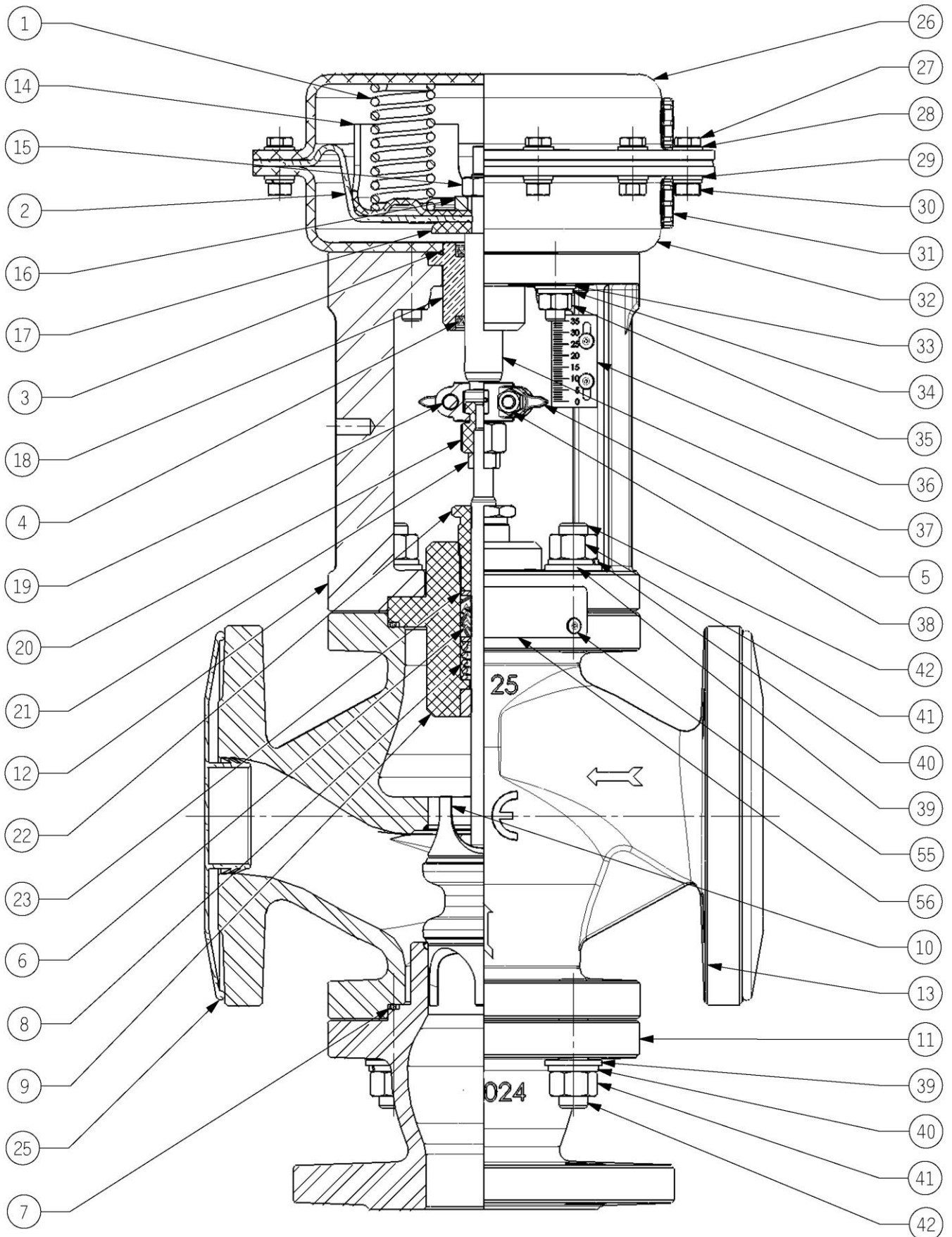
P No. 8 from ND 15 to ND 50 No. 16 from ND 65 to ND 80

GROUP 100

Body side spare parts

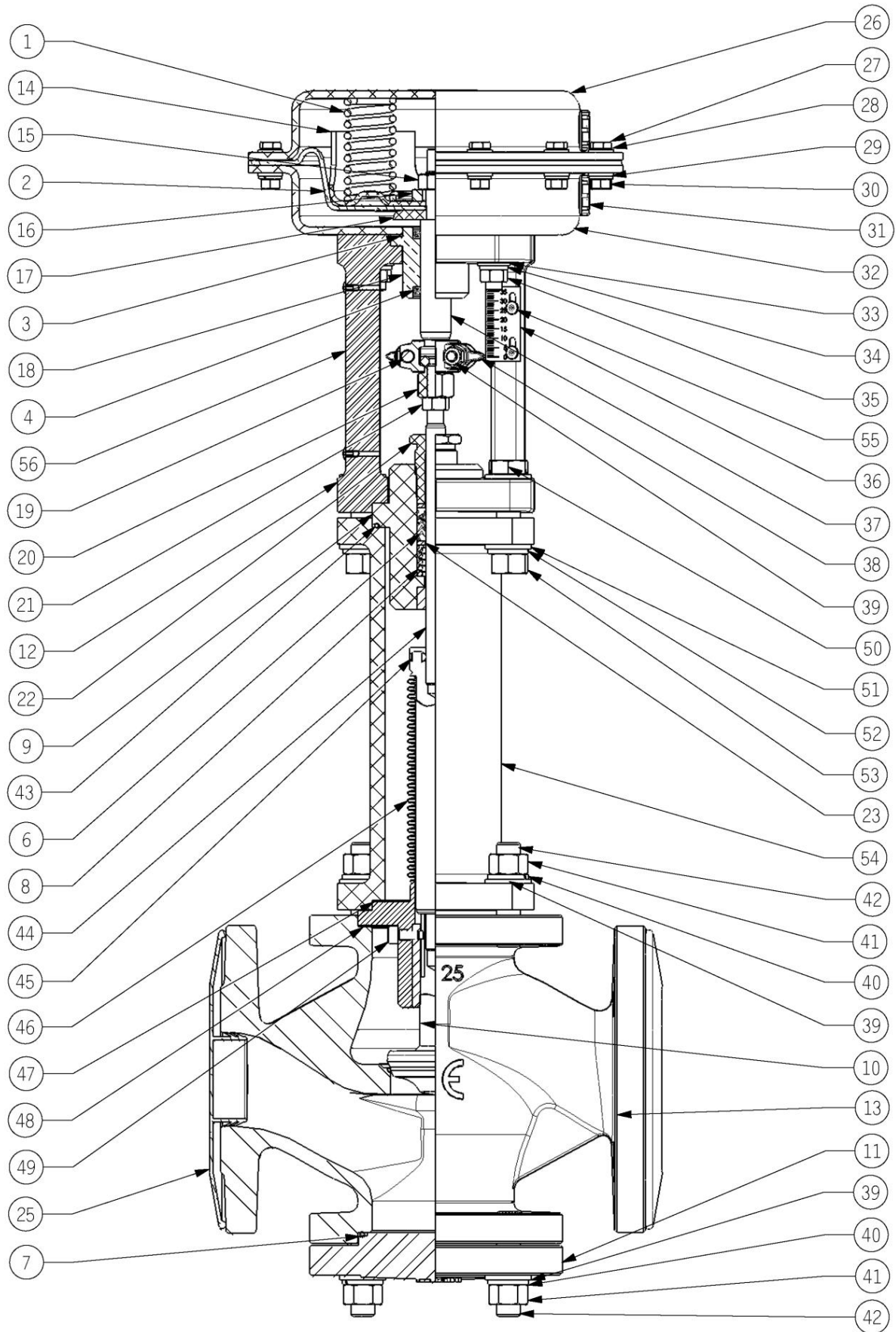
Spare part code		standard	High temperatures						
Part. No.	Q.ty	8931	8949	ND 15	ND 20	ND 25	ND 32 - ND 40 - ND 50	ND 65	ND 80
6	1						PT01020TT		
7	2						OR03281VI	OR003281PF	
8	1						MTD086110		

Section Plane – 3-way NC SBS Valve



Drawing No. 060244 Rev.: 01

Section Plane – 2-way NC SBS/06 Valve with bellows



Drawing No. 060244 Rev.:01

5.18 2-way SBS/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
6	1	Packing gland	TEFLON+GRAPHITE	587								
7	1	FEP O seals gasket	FPM PFA covered	548								
8	1	Packing gland spring	AISI 316	552								
9	1	Intermediate body	Spher. Cast iron JS1024 + AISI 420	645								
10	1	Shutter Metallic seal	AISI 304	595								
11	1	Bottom	Spher. Cast iron JS1024	645								
12	1	Valve mounting	Cast iron G25	570								
13	1	Valve body	Spher. Cast iron JS1024	645								
20	1	Load adjusting nut	Fe 360	558								
21	1	Hexagon nut	Fe 360	608								
22	1	Packing gland screw	AISI 420	559								
23	2	Packing gland washer	AISI 316	703								
25	2	Flange cap	Polyethylene	505								
36	1	Stroke plate	Aluminum	590								
39	P	Flat washer	Fe 360	609								
40	P	Spring washer	Fe 360	610								
41	P	Hexagon nut	Fe 360	608								
42	P	Stud bolts	Fe 360	558								
43	1	O-Ring gasket	FPM	548								
44	1	Shutter stem	AISI 304	676								
45	1	Grub screw	AISI 304	542								
46	1	Intermediate with bellows	AISI 316	855								
47	1	FEP O seals gasket	FPM PFA covered	548								
48	1	FEP O seals gasket	FPM PFA covered	548								
49	1	Machined socket head screw	AISI 316	855								
50	4	Hexagonal-head screw	Fe 360	607								
51	4	Flat washer	Fe 360	609								
52	4	Spring washer	Fe 360	610								
53	4	Hexagon nut	Fe 360	608								
54	1	Mounting extension	Fe 360	857								
55	4	Tear rivets	Aluminum	589								
56	1	Rating plate	Polyester	506								

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			8932		8932		8932	
Part. No.	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50	ND 65	ND 80	
6	1									
7	1									
8	1									
43	1									
47	1									
48	1									

5.19 3-way SBS/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
6	1	Packing gland	TEFLON+GRAPHITE	587						PT01020TT		
7	1	FEP O seals gasket	FPM PFA covered	548						OR003281PF		
8	1	Packing gland spring	AISI 316	552						MTD086110		
9	1	Intermediate body	Spher. Cast iron JS1024 + AISI 420	645						CVSB060240		
10	1	shutter	Metallic seal	AISI 304	595				OT3M980985	OT3M091357	OTTR091350	
11	1	Three-way bottom	Standard	Spher. Cast iron JS1024 + AISI 304	756				FOND060078	FOND060061	FOND050484	
			Stellited	Spher. Cast iron JS1024 + Stellite						FOND060190		
12	1	Valve mounting	Cast iron G25	570						CSD086115		
13	1	Valve body	Spher. Cast iron JS1024	645				CVSB060234	CVSB060236	CVSB040387		
20	1	Load adjusting nut	Fe 360	558						DRD086048		
21	1	Hexagon nut	Fe 360	608						D0805588F		
22	1	Packing gland screw	AISI 420	559						VVD086077		
23	2	Packing gland washer	AISI 316	703						RDD086274		
25	2	Flange cap	Polyethylene	505				TEP3050032	TEP3050040	TEP3050050		
36	1	Stroke plate	Aluminum	590						ERD086151		
39	P	Flat washer	Fe 360	609						RP12000FE		
40	P	Spring washer	Fe 360	610						RE12000FE		
41	P	Hexagon nut	Fe 360	608						D1205588F		
42	P	Stud bolts	Fe 360	558						PVFD86012		
43	1	O-Ring gasket	FPM	548						OR003237VI		
44	1	Shutter stem	AISI 304	676						STOT091363		
45	1	Grub screw	AISI 304	542						VST050804		
46	1	Intermediate with bellows	AISI 316	855						INSF089004		
47	1	FEP O seals gasket	FPM PFA covered	548						-----		
48	1	FEP O seals gasket	FPM PFA covered	548						OR003281PF		
49	1	Machined socket head screw	AISI 316	855						ZSVD88127		
50	4	Hexagonal-head screw	Fe 360	607						VTE12050PF		
51	4	Flat washer	Fe 360	609						RP12000FE		
52	4	Spring washer	Fe 360	610						RE12000FE		
53	4	Hexagon nut	Fe 360	608						D1205588F		
54	1	Mounting extension	Fe 360	857						PRCA091366		
55	4	Tear rivets	Aluminum	589						RIV32510A		
56	1	Rating plate	Polyester	506						ERD086150		

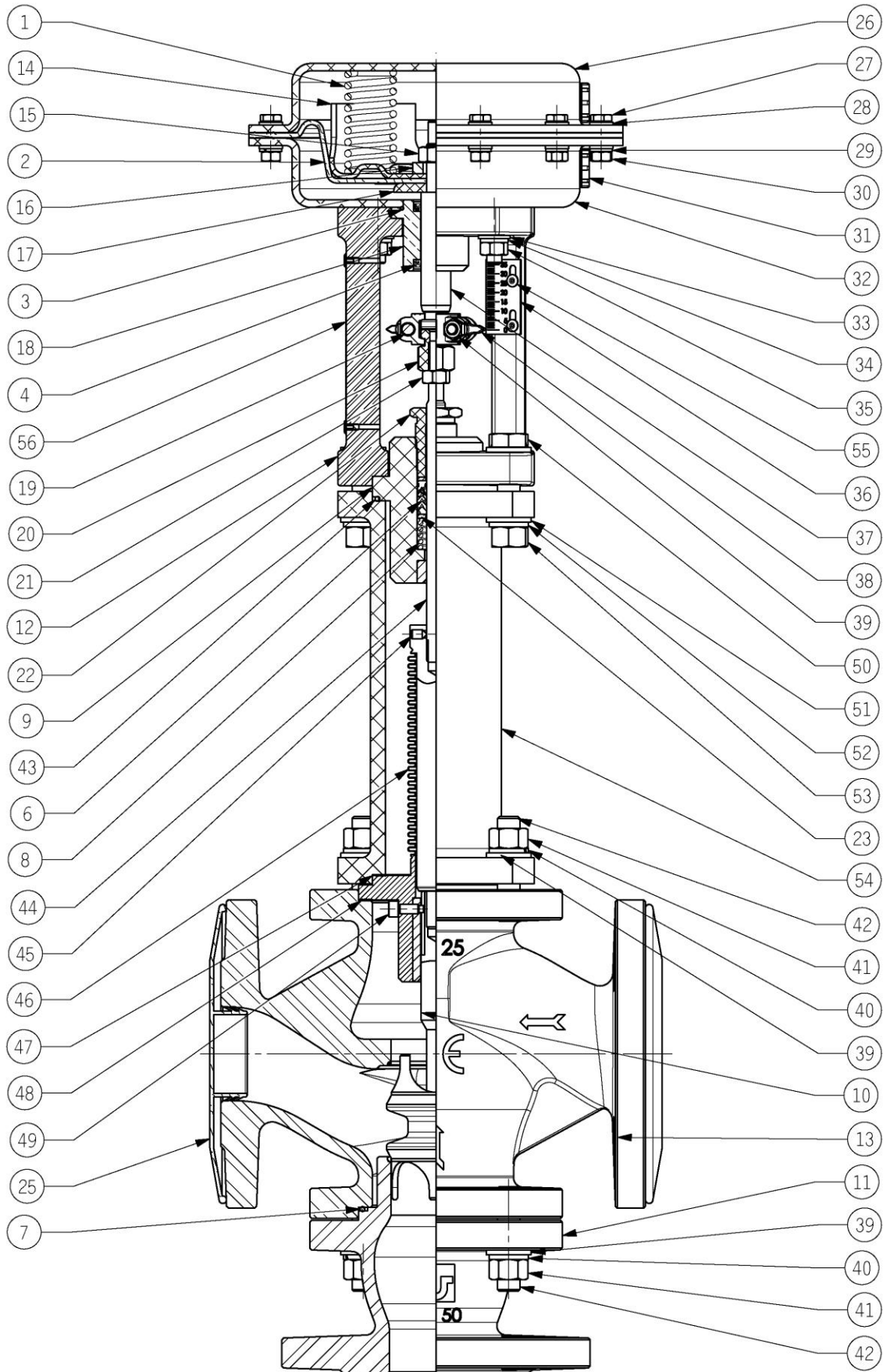
P No. 8 from ND 15 to ND 50 No. 16 from ND 65 to ND 80

GROUP 100

Body side spare parts

Spare part code		8932									
Part. No.	Q.ty	ND 15	ND 20	ND 25	ND 32	ND 40	ND 50	ND 65	ND 80		
6	1										PT01020TT
7	1										OR003281PF
8	1										MTD086110
43	1										OR003237V
47	1										-----
48	1										OR003281PF

Section Plane – 3-way NC SBS/06 Valve with bellows



Drawing No. 020386 Rev.: 01

6 Table 4: Servo control Springs

Ø _e Serv.	STROKE (mm)	SIGNAL											
		3 to 15		6 to 18		6 to 30		9 to 32		3 to 9		9 to 15	
		No.	CODE	No.	CODE	No.	CODE	No.	CODE	No.	CODE	No.	CODE
200	15	3	MTD086100	3	MTD086101	6	MTD086100	6	MTD086102	3	MOLL092037	3	MOLL940412
275	15	3	MTD086106	6	MTD086107	6	MTD086106	6	MTD086108	3	MTD086107	3	MOLL092038
360	15	6	MTD086106	12	MTD086107	12	MTD086106	12	MTD086108	6	MTD086107		
430	15	4	MTD086103	8	MTD086104	8	MTD086103	8	MTD086105	4	MTD086104		
	30	4	MOLL950278	8	MOLL950279	8	MOLL950278						

7 Table 5: Tightening Torques

Combination Details	Tightening torque for threaded couplings in SBS valves [Kg _r ·m]															
	Servo control Couplings Ø _e Serv.					Body couplings ND										
	200	275	360	430		15	20	25	32	40	50	65	80	100	125	150
				C.15	C.30											
P. 42	1.6															
P.14 - P.43	0.6															
P.36 - P.40	0.6	1.6														
P.73 - P.18					9.3											
P.69 - P.70															5.8	
P.46 - P.34						3.3			5.8				14.7	28.8		
P.47 - P.6						1.6					3.3		5.8	14.7		
P.51 - P.22											60	60				
P.53 - P.22						40	60	60	60	60	60	60				
P.56 - P.57						0.4										
P.61 - P.63						3.3			5.8							
P.64 - P.75														60		

8 Valve Life

The SBS series valve 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.

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.

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 servo control head fastening screw 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.
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