WCB - CF8M SBS/10 VALVES

FAMILY 04 GROUPS 124#129

Master handbook description: Guide to selection, use and maintenance of WCB – CF8M SBS/10 valves (English)

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Approved by: OS

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DICHIARAZIONE DI CONFORMITA' UE

Mod: 701
Rev: 02
Data: 18/07/2017

DECLARATION OF UE CONFORMITY

VALVOLE A GLOBO DI REGOLAZIONE SERIE SBS
MODULATING GLOBE VALVES SERIES SBS

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

La presente dichiarazione di conformità è rilasciata sotto la responsabilità esclusiva del fabbricante.
This declaration of conformity is issued under the sole responsibility of the manufacturer.

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

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

2014/68/UE

CLASSIFICAZIONE DELLE VALVOLE / *CLASSIFICATION OF THE VALVES*

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

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

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

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

ALTRE DIRETTIVE EUROPEE APPLICATE:
OTHER EUROPEAN STANDARDS APPLIED:

2014/34/UE

Marcatura dell'apparecchiatura:
Marking of equipment:

CE Ex II 2 GD Ex h IIC Tx Gb
CE Ex II 2 GD Ex h IIC Tx Db

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

EN ISO 80079-36:2016 / EN ISO 80079-37: 2016

Attestato di archiviazione del fascicolo:
Certificate of the technical file storage:

0425 ATEX 1318-01

ENTE NOTIFICATO – *NOTIFIED BODY*

ICIM S.p.a

Via Don Enrico Mapelli, 75 – 20099 Sesto San Giovanni (MI)
Numero Identificativo dell'Organismo Notificato
Notified Body Identification Number:

0425

LUOGO e DATA - *Place and Date*
Cossato, 18/07/2017

Legale rappresentante
Legal representative

Firmato digitalmente da

OSCAR SPADON

SerialNumber = IT:SPDSCR44M19L436J
C = IT

Table of contents

1 Foreword

SBS/10 valves have been created to further improve a product already consolidated in versions /86 and /06.
With the support of analysis programs such as FLOWorks and COSMOSWorks, our technical staff has been committed in improving fluid-dynamic properties of new valves, re-designing their bodies and shutters to improve their final Kv and provide for better performance to customers.
Valves with diaphragm servomotor have been conceived to check the flow of overheated water, liquids, gas and steam in pipes.
SBS/10-series control valve are the basic element of flow rate control (as a consequence, of temperature and pressure control) for a fluid, within the process in an automatic plant.
Even though the valve operating principle and its main features are the same (manufacturing structure, dimensions,power and control forces in servo control have remained unchanged) (∆P), ITALVALVOLE® has focused on the quality of materials.

- **2-way version of this series is delivered with guided shutter in both upper (intermediate body) and lower (seat) part. This measure ensures a longer life of sealing components, also in heavy-duty conditions.**
- **The special feature of the new version is the integration of intermediate body into the frame, to reduce possible misalignment between seat and shutter.**
- **Shutters have been fully renewed and calculated by FloWorks program. This study has allowed improving performance of typical flow rate curve according to different (linear and equipercentage) profiles as shown in the following diagrams**
- **Stroke indicator, an AISI 304 investment casting, replaces the pressed washer and indication arrow provides clearer and immediate reading of valve stroke.**
- **Valves in version INOX CF8M can be supplied with servocontrol head in INOX. To be used in aggressive atmosphere environments**

Opening, closing and modulating action of valve are generated by the variation of pneumatic signal reaching the servomotor (valve pneumatic head).
Diaphragm/spring combinations delivered inside valve pneumatic head cover the following inlet signal ranges on diaphragm: 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® SBS/10 series control valves supplied are normally closed (N.C.) (air opening) or normally open (N.O.) (air closing).
Anyway, since servomotor is reversible, it can transform a N.C. valve into N.O. valve or viceversa by simply replacing a few details.

2 Legend

- $\Delta p_{allowable}$ (allowable differential pressure): maximum allowable value, at a given temperature, of the static differential pressure of a valve in closed position (EN 764-1 : 2005).
- **Allowable max/min temperature:** maximum/minimum operating temperature, prescribed for safety reasons (EN 764-1 : 2005)
- **Allowable max pressure:** maximum operating pressure, normally at the top of each compartment of the pressure equipment, prescribed for safety reasons (UNI EN 764-1 : 2005).
- **DN:** is an alphanumeric designation of size for components of a pipework system, which is used for reference purposes.
  It comprises the letters DN followed by a dimensionless whole number which is indirectly related to the physical dimension, expressed in millimetres, of the hole or of the outer diameter of the ends of connection pipes (ISO 6708: 1997).
- **Kv**: flow rate, expressed in cubic m^3/h, of water (10 to 25 °C with a volume equal to 1000 Kg/m^3), which goes through two ways of a valve, with a pressure drop ∆p of 100 KPa (1 bar)

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

  where: Q is the flow rate in m^3/h (UNI 9753: 1990).

3 Inquiries

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

DATA REQUIRED:

DN_____ PN 40
Two-way☐ Three-way deviator☐ Three-way mixer☐
Control signal_____
Shutter ☐ linear
☐ equal percentage
☐ with silencer
Body material ☐ WCB steel ☐ CF8M inox
Valve action ☐ normally closed
☐ normally open
Operating fluid_____ Specific weight_____Kg/m^3
Maximum flow rate_____ Kg/h _____m^3/h
Pressure upstream the valve _____bars
Pressure downstream the valve _____bars
Fluid temperature in °C _____
Intermediate body ☐ Standard
☐ with bellows
With handwheel☐ With pneumatic positioning device☐

4 Technical features

General notice: ⇒ all the pressure values indicated hereinafter are relative pressure values
⇒ **valve designed for fluids of group 2 (directive 2014/34/UE).Please contact our technical department for fluids of group 1 (directive 2014/34/UE).**

DN: ⇒ 15 # 80

Connections: ⇒ flanged according to PN 40 under EN 1092-1

Pmax all.: ⇒ 40 bar (20 bar with safety bellows)

Pmin all.: ⇒ 0 bar

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

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

Shutter features: ⇒ equal percentage, linear

Body material: ⇒ ASTM A216 WCB (EN 10213-2 1.0619) and ASTM A351 CF8M (EN 10213-4 1.4408).

Tmax all.: ⇒ +200°C all seal, standard version
+250°C with PEEK seal and safety bellows.
+300°C with metal or stellited seal and safety bellows

Tmin all.: ⇒ -10 °C (in liquid phase) standard version.
-28 °C (in liquid phase) WCB body and safety bellows
-40 °C (in liquid phase) CF8M body and safety bellows

Flow direction: ⇒ unidirectional 2-way globe valve.
⇒ 3-way globe valve, with angle body, in DEVIATOR and MIXER versions.

Air connection: ⇒ 1/8” GAS (head Ø 200), 1/4" GAS (head Ø 275, Ø 360, Ø 430)

Supply fluid: ⇒ industrial air

Supply pipes: ⇒ pipe inner diameter = 4 mm, min. outdoor diameter = 6 mm

Supply P: ⇒ 3÷15 PSI, 6÷18 PSI, 6÷30 PSI, 9÷32 PSI, 3÷9 PSI, 9÷15 PSI

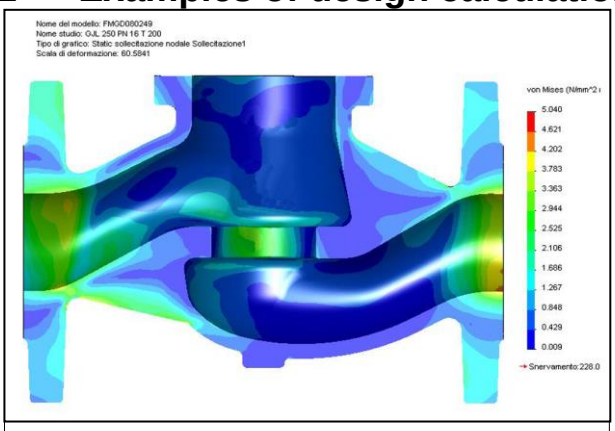
Versions: ⇒ normally closed, normally open (for three-way, it is considered as normally open when square way is open), with or without bellows, with or without emergency handwheels, with cage on shutter to reduce fluid noise level, positioned, elettropositioner, trasductor, FRM group (fylter, reducer, manometer).

Stroke: ⇒ - 2 ways DN 15,20,25 stroke 15mm.
- 2 ways DN 32,40,50,65,80 stroke 20mm
- 3 ways deviator stroke 20mm
- 3 ways mixing stroke 15mm
- 2/3 ways with bellows stroke 15mm
N.B. For different stroke requirement, please contact our technical department

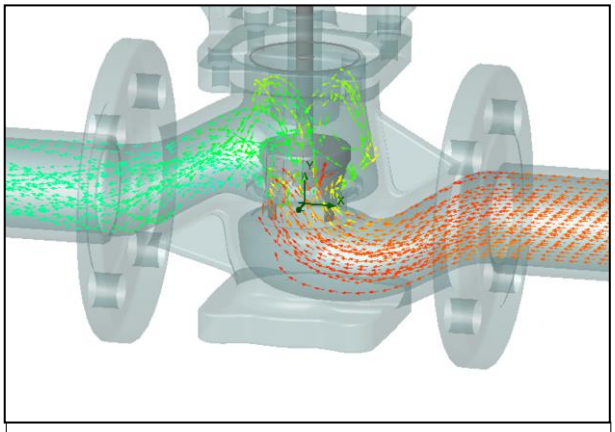
Manufacturing materials: ⇒ see drawings and relevant tables

Overall dimensions: ⇒ see overall dimensions drawings and relevant tables

4.1 Examples of design calculations

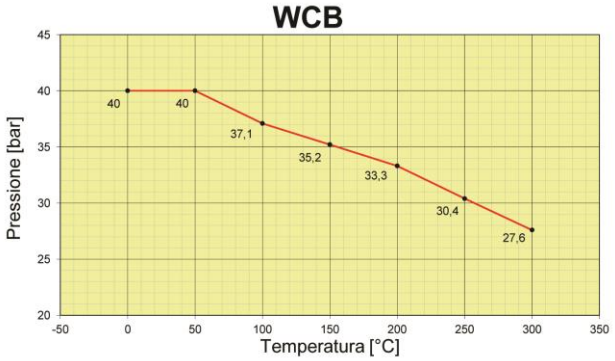


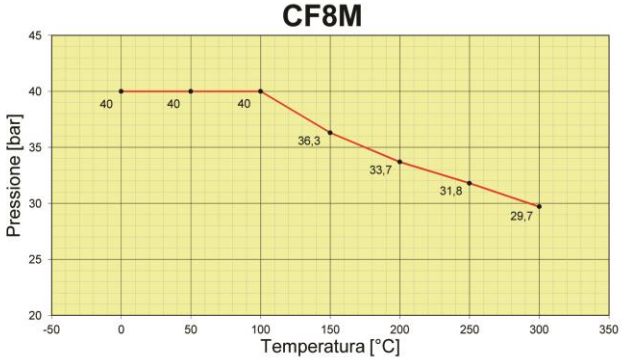
Structural calculations performed by COSMOSWorks



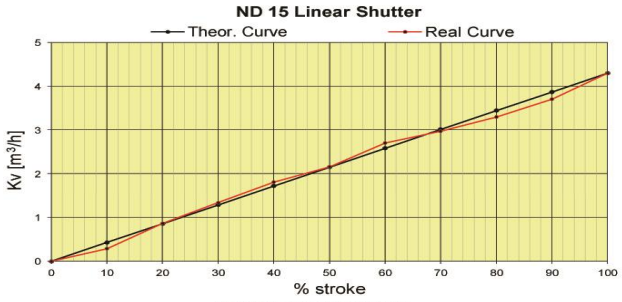
Fluid dynamic calculation performer by FLOWorks

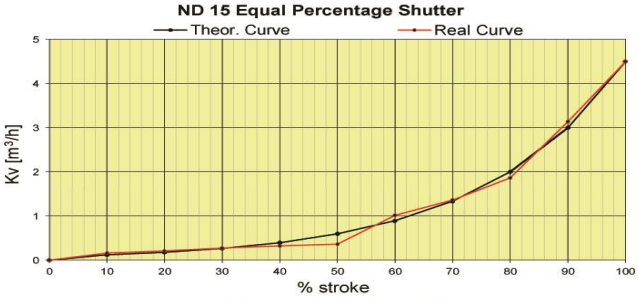
4.2 Pressures/Temperatures

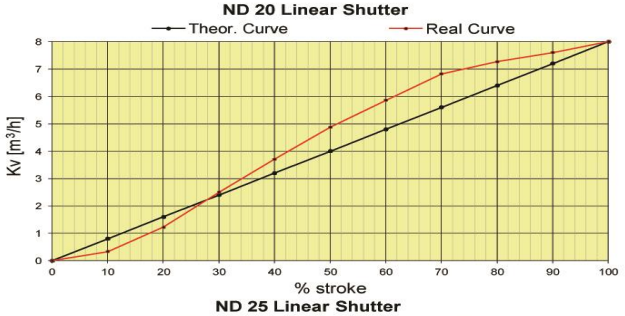


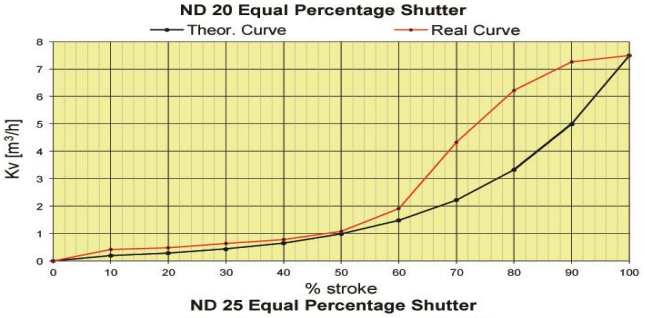


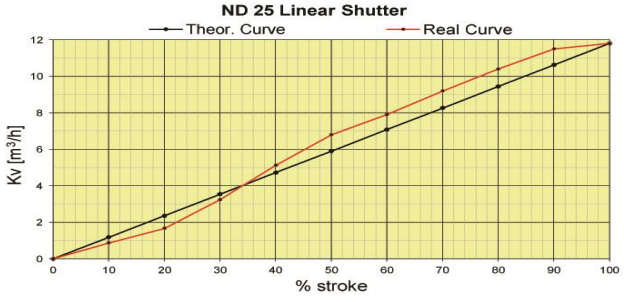
4.3 DiagramExample of linear and equal percentage shutters features of SBS/10 valves stroke 15

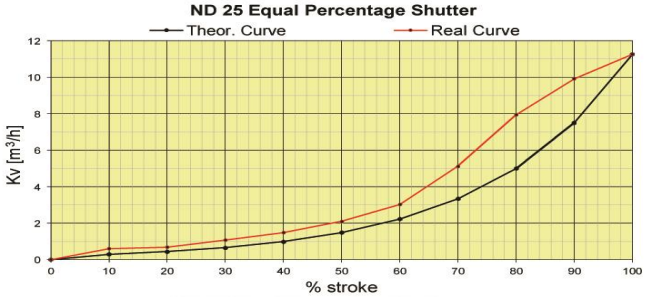


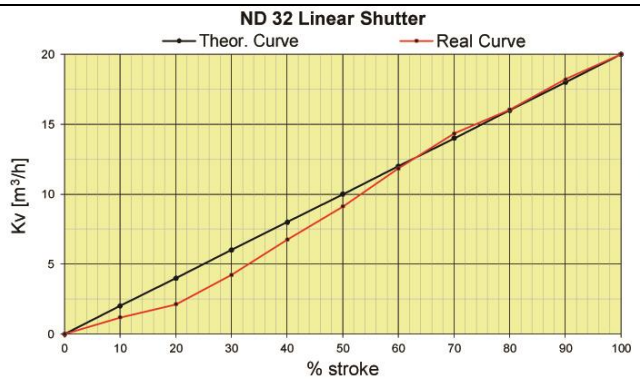


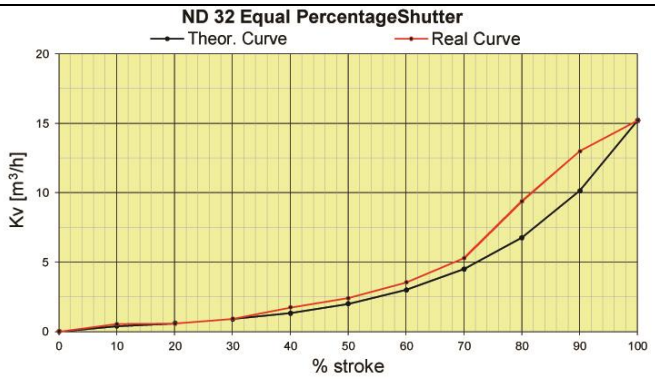


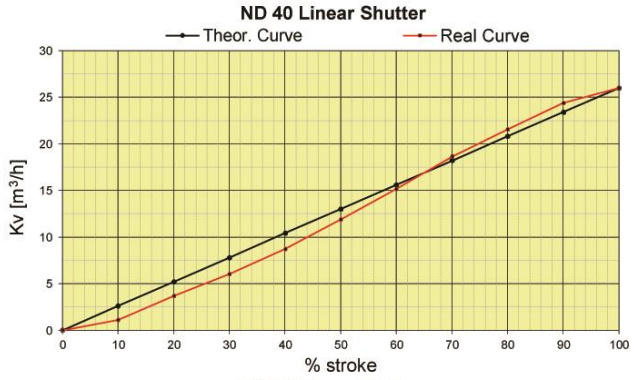


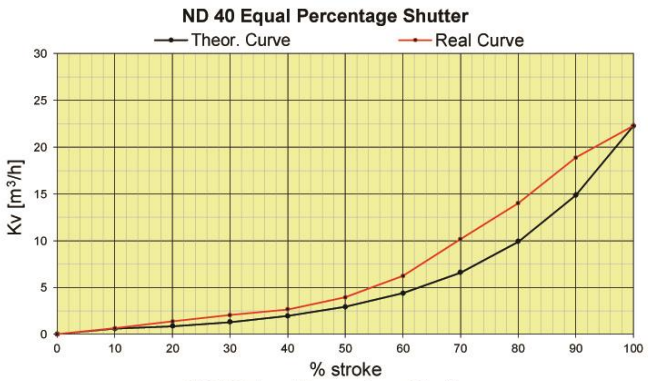


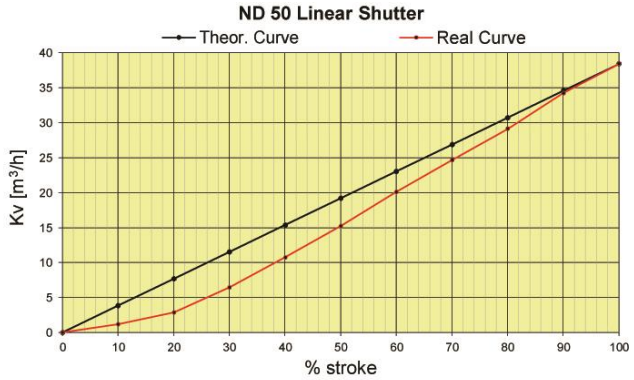


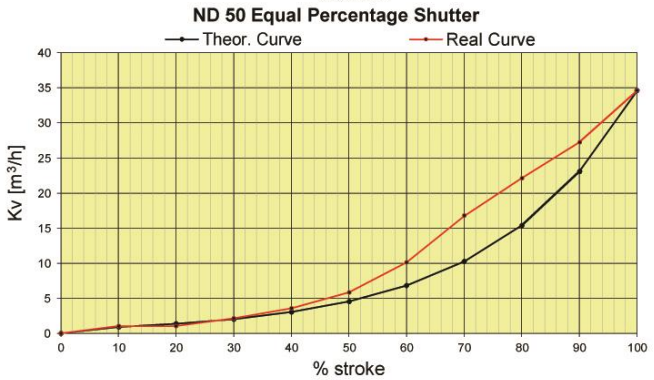

ND 32 Linear Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke

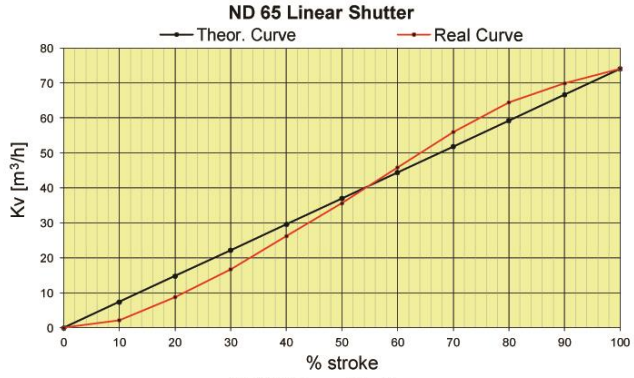

ND 32 Equal PercentageShutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke

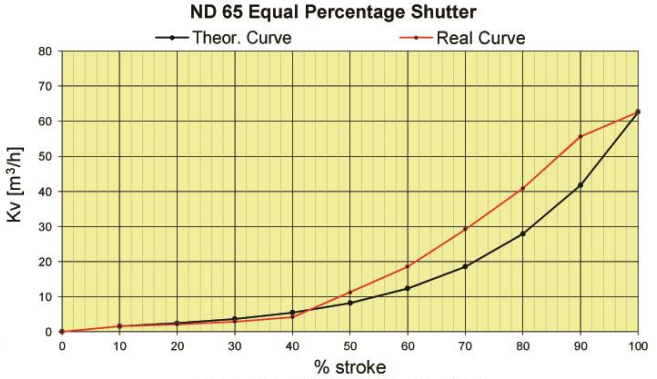

ND 40 Linear Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke

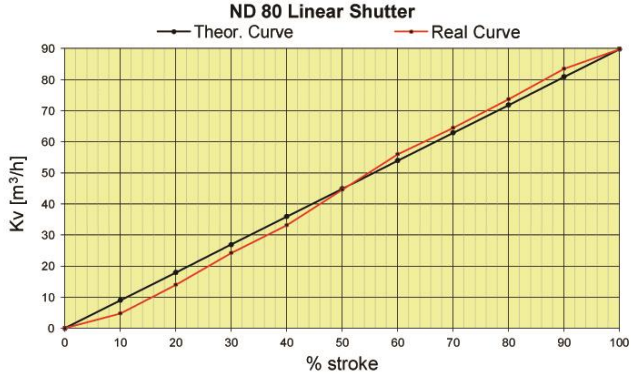

ND 40 Equal Percentage Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke


ND 50 Linear Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke


ND 50 Equal Percentage Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke


ND 65 Linear Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke


ND 65 Equal Percentage Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke


ND 80 Linear Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke

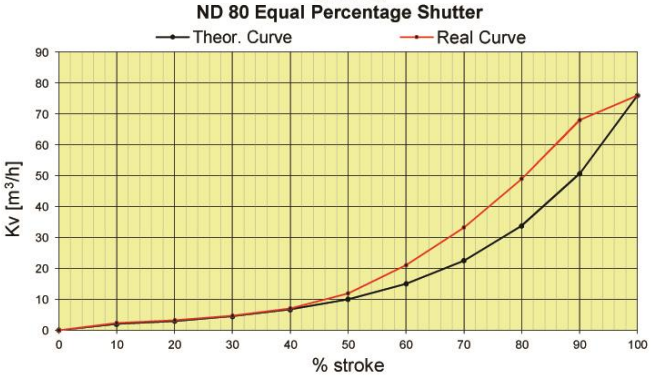

ND 80 Equal Percentage Shutter
Theor. Curve
Real Curve
Kv [m³/h]
% stroke

Table 1: Compatible Fluids

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

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

(2) In versions where temperature cannot reach such value

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

4.4 Table 2: Δp SBS/10 2-way Valves without bellows

TAB: *SBS Δp PN40 Rev. 02 del 15/02/2018*			Δp Valve						Valve definition N°
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	
Max control pressure BAR			1	1,26	2,21	2,4	0,8	1,2	
ND	Øseat [mm]	$Ø_e$SERV. [mm]	Valve definition letters						
			A	**B**	**C**	**D**	**R**	**S**	
15	3	200	*40*	*40*	*40*	*40*	*40*	*40*	**1**
	6	200	*40*	*40*	*40*	*40*	*40*	*40*	**3**
		275	*40*	*40*	*40*	*40*	*40*	*40*	**4**
	15	200	*15*	*30*	*30*	*39*	*13*	*39*	**5**
		275	*35*	*40*	*40*	*40*	*32*	*40*	**6**
	20	200	*8*	*16*	*16*	*21*	*7*	*21*	**101**
		275	*20*	*40*	*40*	*40*	*18*	*40*	**102**
		360	*37*	*40*	*40*	*40*	*36*	*40*	**103**
20	8	200	*40*	*40*	*40*	*40*	*40*	*40*	**7**
		275	*40*	*40*	*40*	*40*	*40*	*40*	**8**
	15	200	*15*	*30*	*30*	*39*	*13*	*39*	**9**
		275	*35*	*40*	*40*	*40*	*32*	*40*	**10**
	20	200	*8*	*16*	*16*	*21*	*7*	*21*	**13**
		275	*20*	*40*	*40*	*40*	*18*	*40*	**14**
		360	*37*	*40*	*40*	*40*	*36*	*40*	**15**
25	15	200	*15*	*30*	*30*	*39*	*13*	*39*	**17**
		275	*35*	*40*	*40*	*40*	*32*	*40*	**18**
	20	200	*8*	*16*	*16*	*21*	*7*	*21*	**21**
		275	*20*	*40*	*40*	*40*	*18*	*40*	**22**
		360	*37*	*40*	*40*	*40*	*36*	*40*	**23**
	26	200	*5*	*10*	*10*	*15*	*5*	*15*	**25**
		275	*13*	*26*	*26*	*34*	*12*	*34*	**26**
		360	*25*	*40*	*40*	*40*	*24*	*40*	**27**
		430	*28*	*40*	*40*	*40*	*28*		**28**
32	20	200	*8*	*16*	*16*	*21*	*7*	*21*	**29**
		275	*20*	*40*	*40*	*40*	*18*	*40*	**30**
		360	*37*	*40*	*40*	*40*	*36*	*40*	**31**
	26	200	*5*	*10*	*10*	*15*	*5*	*15*	**33**
		275	*13*	*26*	*26*	*34*	*12*	*34*	**34**
		360	*25*	*40*	*40*	*40*	*24*	*40*	**35**
		430	*28*	*40*	*40*	*40*	*28*		**36**
	31	200	*4*	*8*	*8*	*12*	*4*	*12*	**37**
		275	*10*	*20*	*20*	*30*	*10*	*30*	**38**
		360	*21*	*40*	*40*	*40*	*20*	*40*	**39**
		430	*23*	*40*	*40*	*40*	*23*		**40**
40	26	200	*5*	*10*	*10*	*15*	*5*	*15*	**41**
		275	*13*	*26*	*26*	*34*	*12*	*34*	**42**
		360	*25*	*40*	*40*	*40*	*24*	*40*	**43**
		430	*28*	*40*	*40*	*40*	*28*		**44**
	31	200	*4*	*8*	*8*	*12*	*4*	*12*	**45**
		275	*10*	*20*	*20*	*30*	*10*	*30*	**46**
		360	*21*	*40*	*40*	*40*	*20*	*40*	**47**
		430	*23*	*40*	*40*	*40*	*23*		**48**
	38	200	*2,8*	*5,5*	*5,5*	*8*	*2,8*	*8*	**49**
		275	*7*	*14*	*14*	*20*	*7*	*20*	**50**
		360	*14*	*28*	*28*	*40*	*14*	*40*	**51**
		430	*15*	*30*	*30*	*40*	*15*		**52**

TAB: *SBS Δp PN40 Rev. 02 del 15/02/2018*			Δp Valve						Valve definition N°
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	
Max control pressure BAR			1	1,26	2,21	2,4	0,8	1,2	
ND	Øseat [mm]	$Ø_e$SERV [mm]	Valve definition letters						
			A	**B**	**C**	**D**	**R**	**S**	
50	31	200	*4*	*8*	*8*	*12*	*4*	*12*	**53**
		275	*10*	*20*	*20*	*30*	*10*	*30*	**54**
		360	*21*	*40*	*40*	*40*	*20*	*40*	**55**
		430	*23*	*40*	*40*	*40*	*23*		**56**
	38	200	*2,8*	*5,5*	*5,5*	*8*	*2,8*	*8*	**57**
		275	*7*	*14*	*14*	*20*	*7*	*20*	**58**
		360	*14*	*28*	*28*	*40*	*14*	*40*	**59**
		430	*15*	*30*	*30*	*40*	*15*		**60**
	48	200	*1,6*	*3,2*	*3,2*	*4,5*	*1,6*	*4,5*	**61**
		275	*4*	*8*	*8*	*10,5*	*4*	*10,5*	**62**
		360	*8*	*16*	*16*	*21*	*8*	*21*	**63**
		430	*9,3*	*16,8*	*16,8*	*24*	*9,3*		**64**
65	38	200	*2,8*	*5,5*	*5,5*	*8*	*2,8*	*8*	**65**
		275	*7*	*14*	*14*	*20*	*7*	*20*	**66**
		360	*14*	*28*	*28*	*40*	*14*	*40*	**67**
		430	*15*	*30*	*30*	*40*	*15*		**68**
	48	200	*1,6*	*3,2*	*3,2*	*4,5*	*1,6*	*4,5*	**70**
		275	*4*	*8*	*8*	*10,5*	*4*	*10,5*	**71**
		360	*8*	*16*	*16*	*21*	*8*	*21*	**72**
		430	*9,3*	*16,8*	*16,8*	*24*	*9,3*		**73**
	63	200	*1*	*2*	*2*	*2,5*	*1*	*2,5*	**75**
		275	*2,5*	*5*	*5*	*6,5*	*2,5*	*6,5*	**76**
		360	*5*	*10*	*10*	*13*	*5*	*13*	**77**
		430	*5,5*	*11*	*11*	*16*	*5,5*		**78**
80	48	200	*1,6*	*3,2*	*3,2*	*4,5*	*1,6*	*4,5*	**80**
		275	*4*	*8*	*8*	*10,5*	*4*	*10,5*	**81**
		360	*8*	*16*	*16*	*21*	*8*	*21*	**82**
		430	*9,3*	*16,8*	*16,8*	*24*	*9,3*		**83**
	63	200	*1*	*2*	*2*	*2,5*	*1*	*2,5*	**85**
		275	*2,5*	*5*	*5*	*6,5*	*2,5*	*6,5*	**86**
		360	*5*	*10*	*10*	*13*	*5*	*13*	**87**
		430	*5,5*	*11*	*11*	*16*	*5,5*		**88**
	78	275	*1,5*	*3*	*3*	*4*	*1,5*	*4*	**91**
		360	*3*	*6*	*6*	*8,5*	*3*	*8,5*	**92**
		430	*3,5*	*7*	*7*	*10,5*	*3,5*		**93**

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

(1) In NO valves, to obtain the same Δp as NC valves, maximum control signal must consist of the addition of two signals; for example, in a NO valve with 3÷15 PSI signal, the maximum control signal must be taken to 18 PSI (3+15) to obtain Δp of similar NC valve.
In 3-way valves, Δp refers to the way closing when air lacks; to obtain the same Δp on the other way follow the same procedure as applied to obtain Δp in NO valve.

4.5 Table 2: Δp SBS/10 2-way Valves with bellows

TAB: *SBS Δp PN40 Rev. 01 del 22/07/2015*			Δp Valve						Valve definition N°
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	
Max control pressure BAR			1	1,26	2,21	2,4	0,8	1,2	
ND	Øseat [mm]	$Ø_e$SERV. [mm]	Valve definition letters						
			A	**B**	**C**	**D**	**R**	**S**	
15	3	200	*4,5*	*8,5*	*8,5*	*11*	*4,5*	*11*	**1**
		275	*10,5*	*20*	*20*	*20*	*10,5*	*20*	**2**
	6	200	*4,5*	*8,5*	*8,5*	*11*	*4,5*	*11*	**3**
		275	*10,5*	*20*	*20*	*20*	*10,5*	*20*	**4**
	15	200	*4,5*	*8,5*	*8,5*	*11*	*4,5*	*11*	**5**
		275	*10,5*	*20*	*20*	*20*	*10,5*	*20*	**6**
	20	200	*4*	*8,5*	*8,5*	*11*	*4*	*11*	**101**
		275	*10*	*20*	*20*	*20*	*10*	*20*	**102**
		360	*20*	*20*	*20*	*20*	*20*	*20*	**103**
20	8	200	*4,5*	*8,5*	*8,5*	*11*	*4,5*	*11*	**7**
		275	*10,5*	*20*	*20*	*20*	*10,5*	*20*	**8**
	15	200	*4,5*	*8,5*	*8,5*	*11*	*4,5*	*11*	**9**
		275	*10,5*	*20*	*20*	*20*	*10,5*	*20*	**10**
		360	*20*	*20*	*20*	*20*	*20*	*20*	**11**
	20	200	*4*	*8,5*	*8,5*	*11*	*4*	*11*	**13**
		275	*10*	*20*	*20*	*20*	*10*	*20*	**14**
		360	*20*	*20*	*20*	*20*	*20*	*20*	**15**
25	15	200	*4,5*	*8,5*	*8,5*	*11*	*4,5*	*11*	**17**
		275	*10,5*	*20*	*20*	*20*	*10,5*	*20*	**18**
		360	*20*	*20*	*20*	*20*	*20*	*20*	**19**
	20	200	*4*	*8,5*	*8,5*	*11*	*4*	*11*	**21**
		275	*10*	*20*	*20*	*20*	*10*	*20*	**22**
		360	*20*	*20*	*20*	*20*	*20*	*20*	**23**
	26	200	*4*	*8*	*8*	*11*	*4*	*11*	**25**
		275	*10*	*20*	*20*	*20*	*10*	*20*	**26**
		360	*16*	*20*	*20*	*20*	*16*	*20*	**27**
		430	*20*	*20*	*20*	*20*	*20*		**28**
32	20	200	*4*	*8,5*	*8,5*	*11*	*4*	*11*	**29**
		275	*10*	*20*	*20*	*20*	*10*	*20*	**30**
		360	*20*	*20*	*20*	*20*	*20*	*20*	**31**
	26	200	*4*	*8*	*8*	*11*	*4*	*11*	**33**
		275	*10*	*20*	*20*	*20*	*10*	*20*	**34**
		360	*16*	*20*	*20*	*20*	*16*	*20*	**35**
		430	*20*	*20*	*20*	*20*	*20*		**36**
	31	200	*3,5*	*7,5*	*7,5*	*10,5*	*3,5*	*10,5*	**37**
		275	*9,5*	*18*	*18*	*20*	*9,5*	*20*	**38**
		360	*18*	*20*	*20*	*20*	*18*	*20*	**39**
		430	*20*	*20*	*20*	*20*	*20*		**40**
40	26	200	*4*	*8*	*8*	*11*	*4*	*11*	**41**
		275	*10*	*20*	*20*	*20*	*10*	*20*	**42**
		360	*16*	*20*	*20*	*20*	*16*	*20*	**43**
		430	*20*	*20*	*20*	*20*	*20*		**44**
	31	200	*3,5*	*7,5*	*7,5*	*10,5*	*3,5*	*10,5*	**45**
		275	*9,5*	*18*	*18*	*20*	*9,5*	*20*	**46**
		360	*18*	*20*	*20*	*20*	*18*	*20*	**47**
		430	*20*	*20*	*20*	*20*	*20*		**48**
	38	200	*2,8*	*5,5*	*5,5*	*8*	*2,8*	*8*	**49**
		275	*7*	*14*	*14*	*20*	*7*	*20*	**50**
		360	*14*	*20*	*20*	*20*	*14*	*20*	**51**
		430	*15*	*20*	*20*	*20*	*15*		**52**

TAB: *SBS Δp PN40 Rev. 01 del 22/07/2015*			Δp Valve						Valve definition N°
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	
Max control pressure BAR			1	1,26	2,21	2,4	0,8	1,2	
ND	Øseat [mm]	$Ø_e$SERV [mm]	Valve definition letters						
			A	**B**	**C**	**D**	**R**	**S**	
50	31	200	*3,5*	*7,5*	*7,5*	*10,5*	*3,5*	*10,5*	**53**
		275	*9,5*	*18*	*18*	*20*	*9,5*	*20*	**54**
		360	*18*	*20*	*20*	*20*	*18*	*20*	**55**
		430	*20*	*20*	*20*	*20*	*20*		**56**
	38	200	*2,8*	*5,5*	*5,5*	*8*	*2,8*	*8*	**57**
		275	*7*	*14*	*14*	*20*	*7*	*20*	**58**
		360	*14*	*20*	*20*	*20*	*14*	*20*	**59**
		430	*15*	*20*	*20*	*20*	*15*		**60**
	48	200	*1,6*	*3,2*	*3,2*	*4,5*	*1,6*	*4,5*	**61**
		275	*4*	*8*	*8*	*10,5*	*4*	*10,5*	**62**
		360	*8*	*16*	*16*	*20*	*8*	*20*	**63**
		430	*9,3*	*18*	*18*	*20*	*9,3*		**64**
65	38	200	*2,8*	*5,5*	*5,5*	*8*	*2,8*	*8*	**65**
		275	*7*	*14*	*14*	*20*	*7*	*20*	**66**
		360	*14*	*20*	*20*	*20*	*14*	*20*	**67**
		430	*15*	*20*	*20*	*20*	*15*		**68**
	48	200	*1,6*	*3,2*	*3,2*	*4,5*	*1,6*	*4,5*	**70**
		275	*4*	*8*	*8*	*10,5*	*4*	*10,5*	**71**
		360	*8*	*16*	*16*	*20*	*8*	*20*	**72**
		430	*9,3*	*18*	*18*	*20*	*9,3*		**73**
	63	200	*1*	*2*	*2*	*2,5*	*1*	*2,5*	**75**
		275	*2,5*	*5*	*5*	*6,5*	*2,5*	*6,5*	**76**
		360	*5*	*10*	*10*	*13*	*5*	*13*	**77**
		430	*5,5*	*10,5*	*10,5*	*16*	*5,5*		**78**
80	48	200	*1,6*	*3,2*	*3,2*	*4,5*	*1,6*	*4,5*	**80**
		275	*4*	*8*	*8*	*10,5*	*4*	*10,5*	**81**
		360	*8*	*16*	*16*	*20*	*8*	*20*	**82**
		430	*9,3*	*18*	*18*	*20*	*9,3*		**83**
	63	200	*1*	*2*	*2*	*2,5*	*1*	*2,5*	**85**
		275	*2,5*	*5*	*5*	*6,5*	*2,5*	*6,5*	**86**
		360	*5*	*10*	*10*	*13*	*5*	*13*	**87**
		430	*5,5*	*10,5*	*10,5*	*16*	*5,5*		**88**
	78	275	*1,5*	*3*	*3*	*4*	*1,5*	*4*	**91**
		360	*3*	*6*	*6*	*8,5*	*3*	*8,5*	**92**
		430	*3,5*	*7*	*7*	*10,5*	*3,5*		**93**

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

(1) In NO valves, to obtain the same Δp as NC valves, maximum control signal must consist of the addition of two signals; for example, in a NO valve with 3÷15 PSI signal, the maximum control signal must be taken to 18 PSI (3+15) to obtain Δp of similar NC valve.
In 3-way valves, Δp refers to the way closing when air lacks; to obtain the same Δp on the other way follow the same procedure as applied to obtain Δp in NO valve.

4.6 Table 4: of SBS/10 2-way valves

ND	Ø seat [mm]	Stroke [mm]	Kvs (1)		CV	
			Linear shutter	Equipercentage shutter	Linear shutter	Equipercentage shutter
15	3	15	UT	UT	UT	UT
	6	15	UT	UT	UT	UT
	15	15	4,3	4,5	5	5,2
	20	15	5	5	5,8	5,8
20	8	15	UT	UT	UT	UT
	15	15	6	4,8	7	5,6
	20	15	8	7,5	9,3	8,7
25	15	15	5,4	5,3	6,3	6,2
	20	15	9,3	9,1	10,8	10,6
	26	15	11,8	11,3	13,7	13,1
32	20	15	9,6	9,5	11,2	11
		20	10,2	10,5	11,8	12,2
	26	15	14,5	13,5	16,9	15,7
		20	14,9	15,4	17,3	17,9
	31	15	20	15,2	23,3	17,7
		20	18,9	18,9	22	22
40	26	15	16,5	15,6	19,2	18,4
		20	18,1	18,5	21,1	21,4
	31	15	21,9	19	25,5	22,1
		20	24,5	24,7	28,5	28,7
	38	15	26	22,3	30,2	25,9
		20	29,3	28,3	34,1	32,9
50	31	15	22,1	19,1	25,7	22,2
		20	25,1	25,1	29,1	29,1
	38	15	27,6	23	32,1	26,7
		20	33,8	32	39,3	37,2
	48	15	38,4	34,6	44,7	40,2
		20	42,4	44,7	49,3	52
65	38	15	27,9	24	32,4	27,9
		20	34,1	33	39,7	38,4
	48	15	45,5	42	53,5	49,4
		20	56,9	55	66,9	64,7
	63	15	61	36,3	71,0	42,3
		20	74,8	63,1	87,1	73,5
80	48	15	43,2	41,6	50,3	48,4
		20	55,5	53,5	64,6	62,3
	63	15	62,2	37	72,4	43,1
		20	76,6	62,2	89,2	72,4
	78	15	61,9	43,16	72,1	50,3
		20	85,8	77,9	99,9	90,7

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

For valves with bellows consider only stroke 15

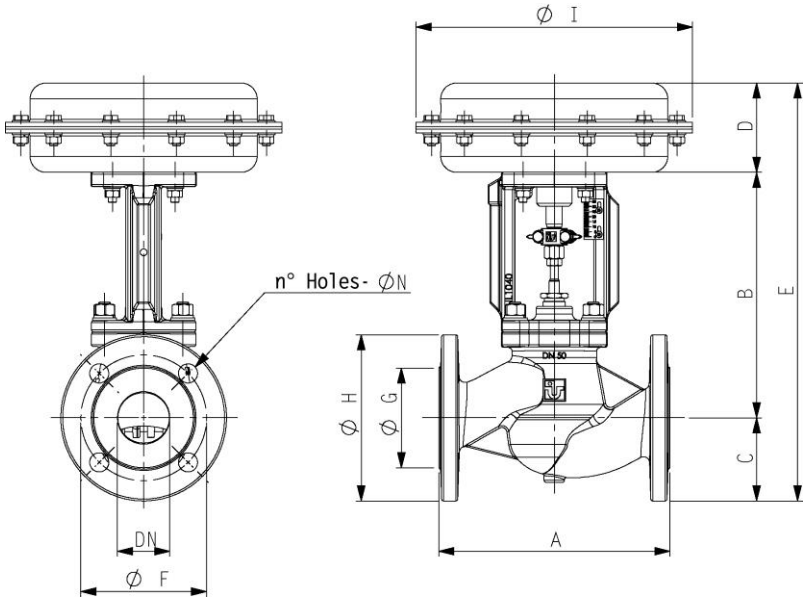
UT: contact our technical deparment.

4.7 Safety Notes

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

4.8 Overall dimensions of SBS/10 valves

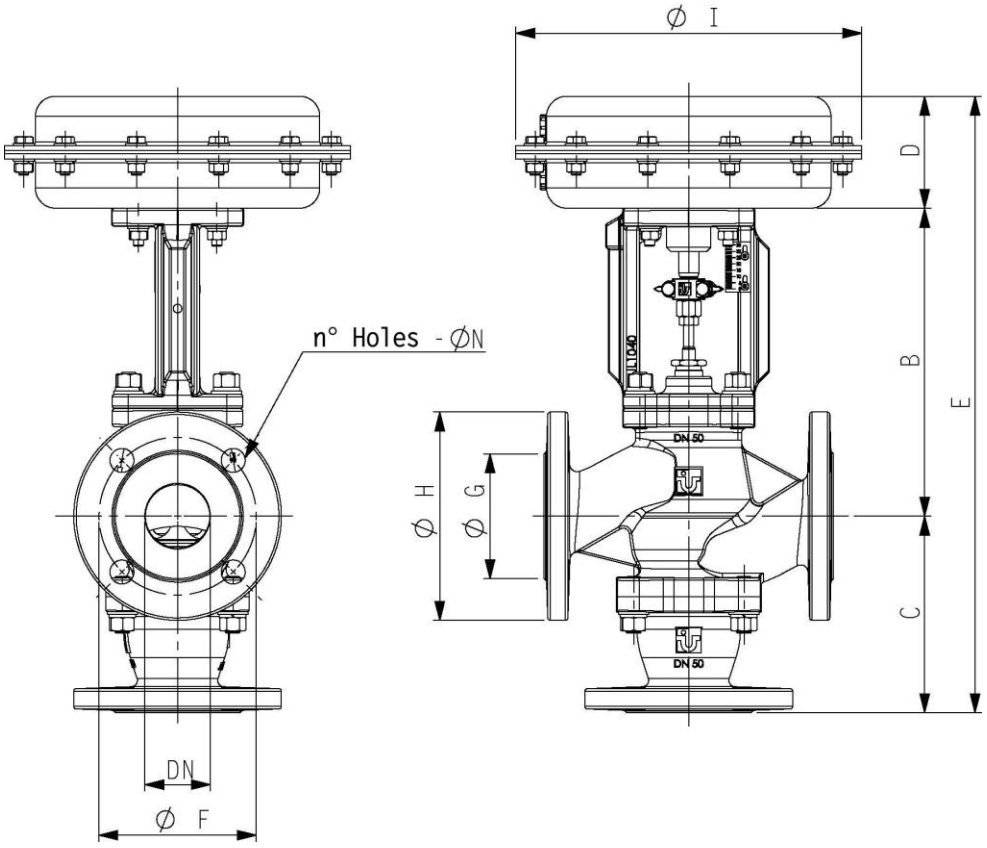
4.8.1 WCB e CF8M SBS/10 2-way



ND	A	B	C	D			E			Ø F	Ø G	Ø H	Ø I	Ø N	n° holes
				Ø servo control			Ø servo control								
				200	275 360	430	200	275 360	430						
15	130	227	47.5	77	88,5	123	351,5	363	397,5	65	45	95	According to sealing Δp required (200-275-360-430)	14	4
20	150	227	52.5	77	88,5	123	356,5	368	402,5	75	58	105		14	4
25	160	227	57,5	77	88,5	123	361,5	373	407,5	85	65	115		14	4
32	180	245	70	77	88,5	123	392	403,5	438	100	76	140		18	4
40	200	245	75	77	88,5	123	397	408,5	443	110	84	150		18	4
50	230	243,5	82,5	77	88,5	123	403	414,5	449	125	99	165		18	4
65	290	299	92,5	77	88,5	123	468,5	480	514,5	145	118	185		18	8
80	310	298	100	77	88,5	123	475	486,5	521	160	132	200		18	8

Dimensions are in millimeters

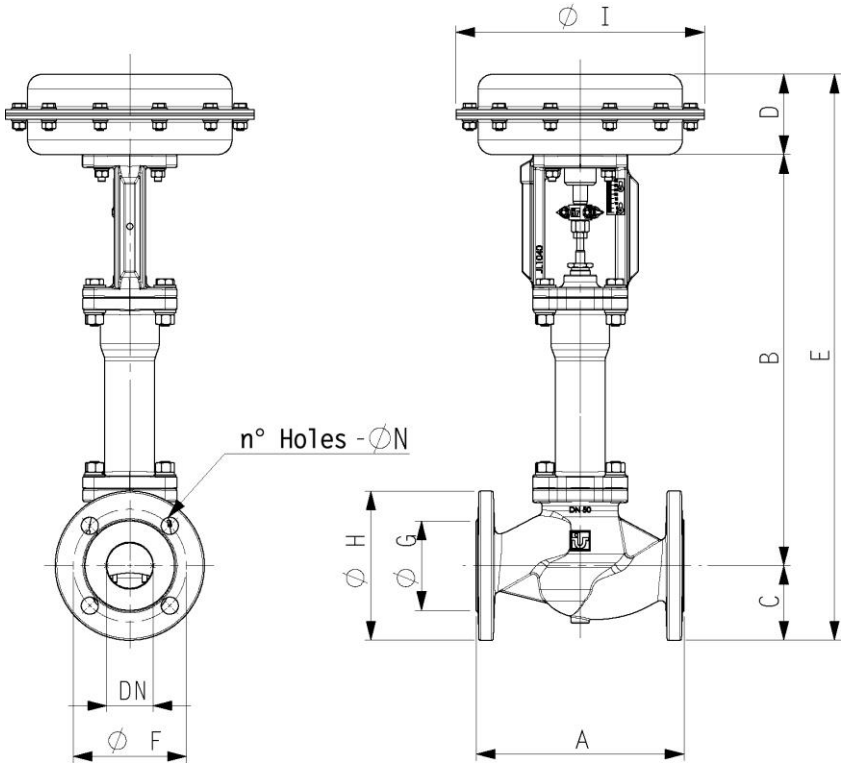
4.8.2 WCB e CF8M SBS/10 3-way



ND	A	B	C	D			E			Ø F	Ø G	Ø H	Ø I	Ø N	n° holes
				Ø servo control			Ø servo control								
				200	275 360	430	200	275 360	430						
15	130	227	112	77	88,5	123	416	427,5	462	65	45	95	According to sealing Δp required (200-275-360-430)	14	4
20	150	227	112	77	88,5	123	416	427,5	462	75	58	105		14	4
25	160	227	124,5	77	88,5	123	428,5	440	474,5	85	65	115		14	4
32	180	245	145	77	88,5	123	467	478,5	513	100	76	140		18	4
40	200	245	144	77	88,5	123	466	477,5	512	110	84	150		18	4
50	230	243,5	161	77	88,5	123	481,5	493	527,5	125	99	165		18	4
65	290	299	236,5	77	88,5	123	612,5	624	658,5	145	118	185		18	8
80	310	298	238,5	77	88,5	123	613,5	625	659,5	160	132	200		18	8

Dimensions are in millimeters

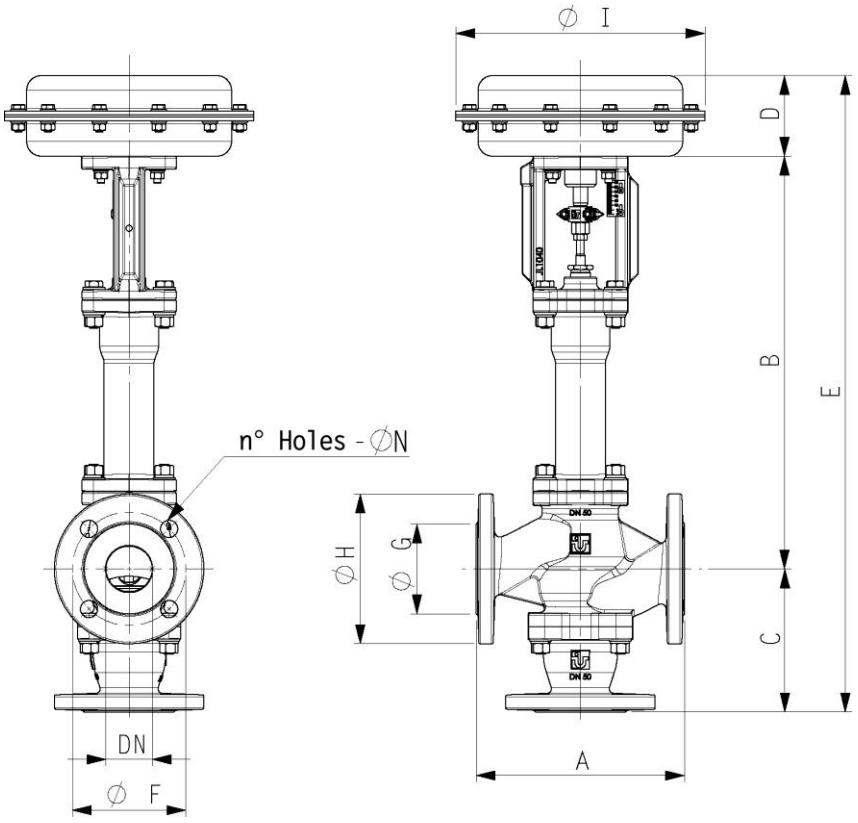
4.8.3 WCB e CF8M SBS/10 2-way with safety bellows



ND	A	B	C	D			E			Ø F	Ø G	Ø H	Ø I	Ø N	n° holes
				Ø servo control			Ø servo control								
				200	275 360	430	200	275 360	430						
15	130	429	47,5	77	88,5	123	553,5	565	599,5	65	45	95	According to sealing Δp required (200-275-360-430)	14	4
20	150	429	52,5	77	88,5	123	558,5	570	604,5	75	58	105		14	4
25	160	429	57,5	77	88,5	123	563,5	575	609,5	85	65	115		14	4
32	180	456	70	77	88,5	123	603	614,5	649	100	76	140		18	4
40	200	456	75	77	88,5	123	608	619,5	654	110	84	150		18	4
50	230	454,5	82,5	77	88,5	123	614	625,5	660	125	99	165		18	4
65	290	510	92,5	77	88,5	123	679,5	691	725,5	145	118	185		18	8
80	310	509	100	77	88,5	123	686	697,5	732	160	132	200		18	8

Dimensions are in millimeters

4.8.4 WCB e CF8M 3 way with safety bellows



ND	A	B	C	D			E			Ø F	Ø G	Ø H	Ø I	Ø N	n° holes
				Ø servo control			Ø servo control								
				200	275 360	430	200	275 360	430						
15	130	429	112	77	88,5	123	618	629,5	664	65	45	95	According to sealing Δp required (200-275-360-430)	14	4
20	150	429	112	77	88,5	123	618	629,5	664	75	58	105		14	4
25	160	429	124,5	77	88,5	123	630,5	642	676,5	85	65	115		14	4
32	180	456	145	77	88,5	123	678	689,5	724	100	76	140		18	4
40	200	456	144	77	88,5	123	677	688,5	723	110	84	150		18	4
50	230	454,5	161	77	88,5	123	692,5	704	738,5	125	99	165		18	4
65	290	510	236,5	77	88,5	123	825,5	837	871,5	145	118	185		18	8
80	310	509	238,5	77	88,5	123	824,5	836	870,5	160	132	200		18	8

Dimensions are in millimeters

5 SBS/10 tags description

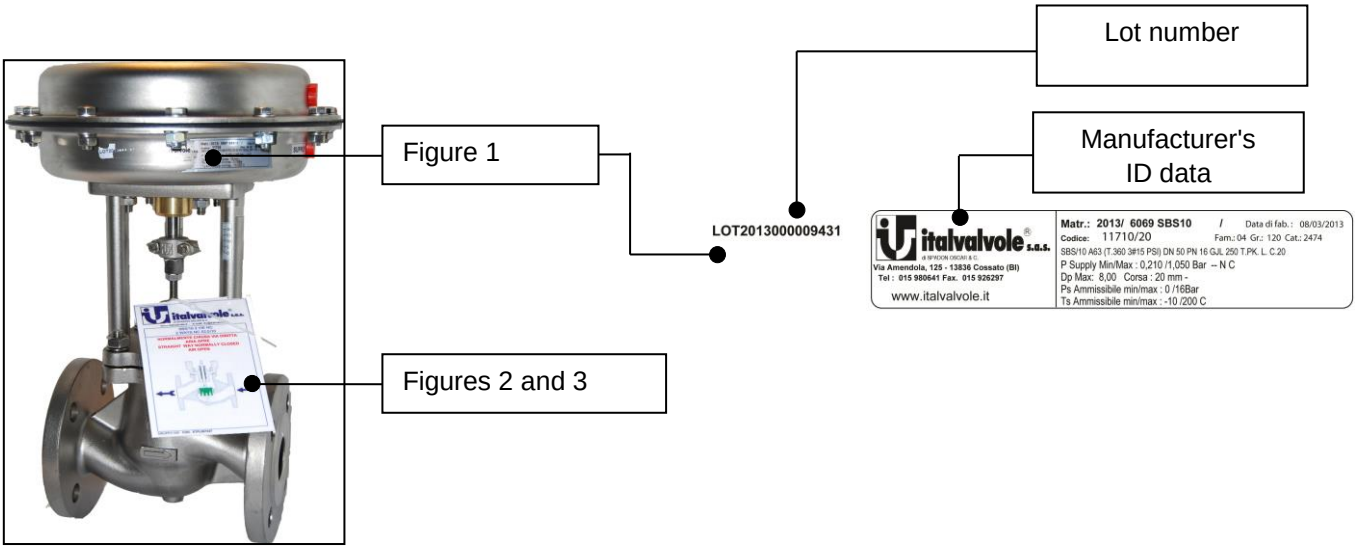


Fig.1 : Technical data of the valves

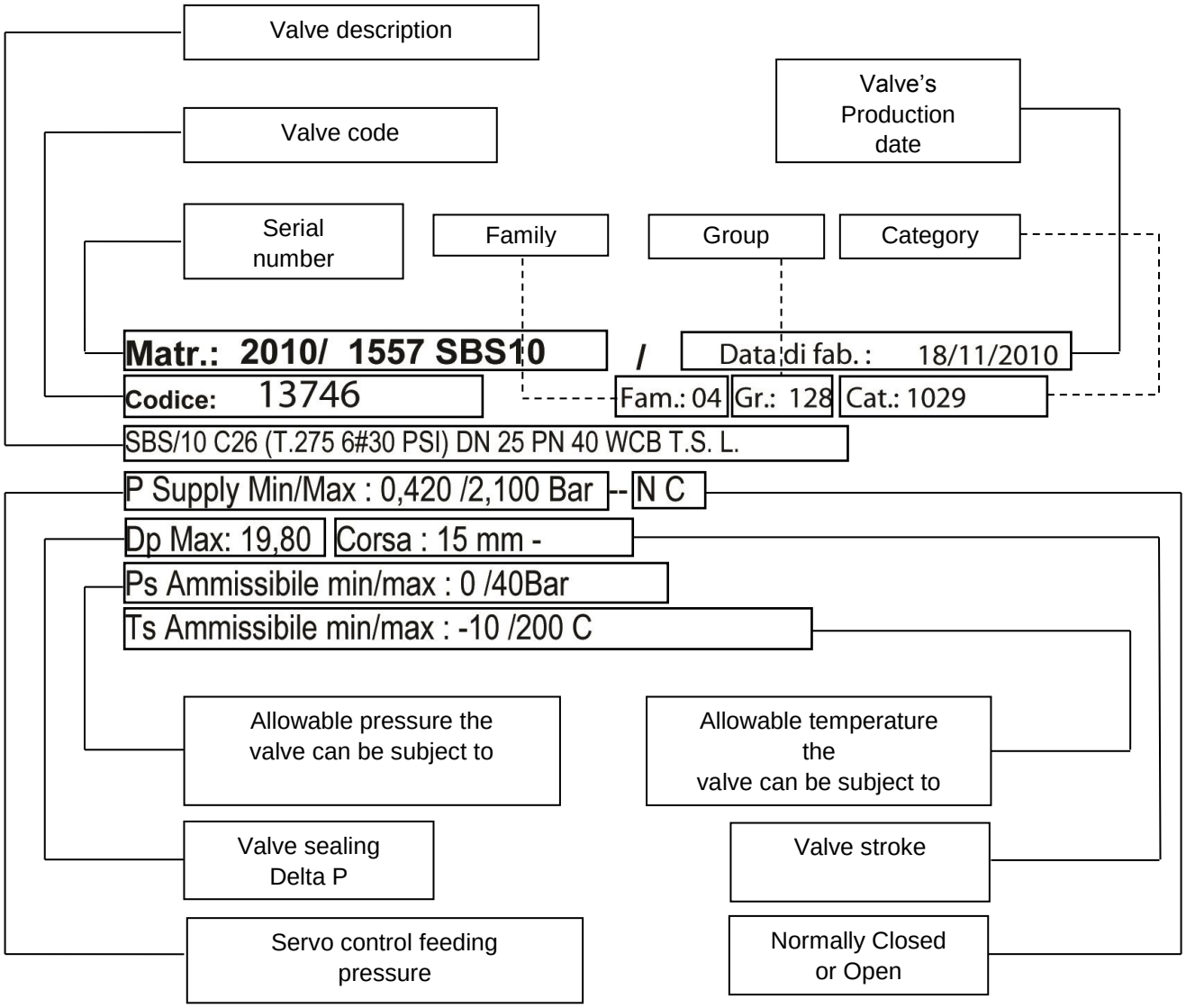
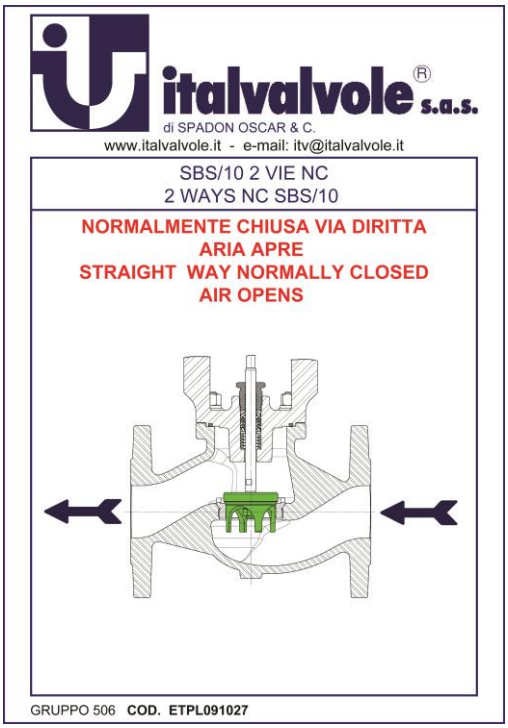


Fig. 2: Front - Proper installation procedure for optimum operation of the SBS/10 2-way, 3M valves.



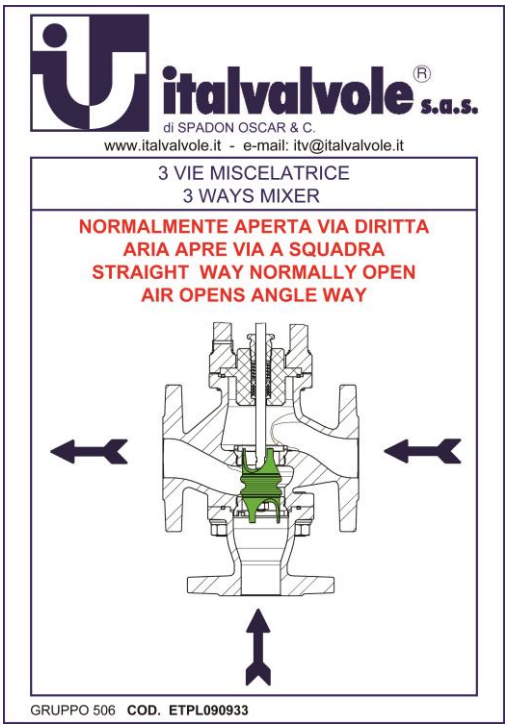
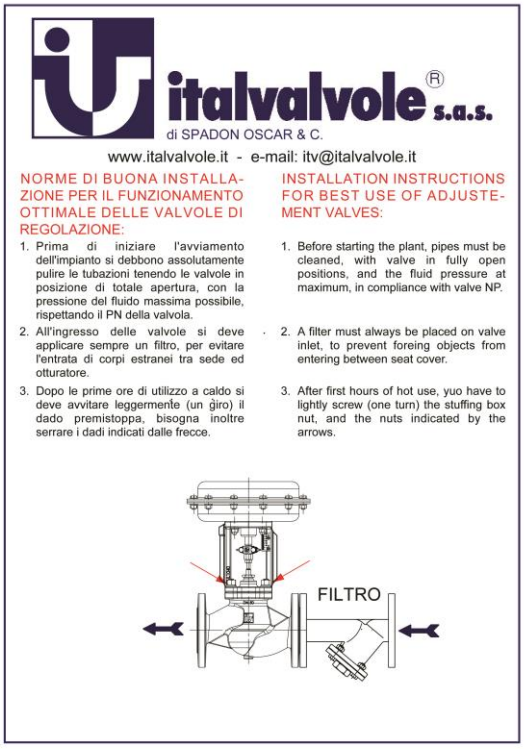
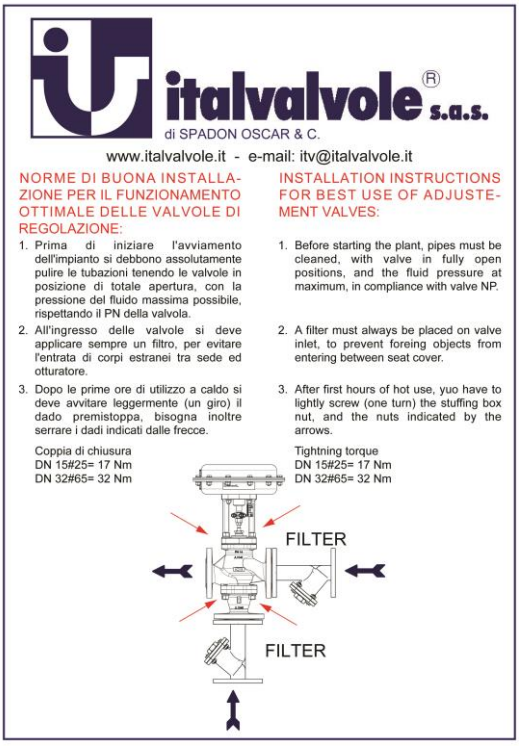


Fig. 3: Back - Proper installation procedure for optimum operation of the SBS/10 2-way, 3M valves.





6 Storage, Assembly, Check And Maintenance

6.1 Transport, Storage and Handling

SBS/10 valves, during transport and assembly, must be handled very carefully. Shocks as well as anomalous stresses must be avoided (do not lift the valve by servo control).
Avoid shocks and tampering to any accessories the valve may be equipped with (positioning devices, transducers, FRLM units, etc.).
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 and membrane from getting dry and old before time.
Storage temperature shall be between 0°C and + 50°C.
Avoid any shock to servo control as they could provoke misalignments and affect valve proper operation.
Comply with specifications on labels.

6.2 Assembly Instructions

6.2.1 General information

Valve installation on the system shall be carried out only by personnel qualified in in hydraulics and pneumatics, provided with all the equipment normally used in the industrial hydraulic and pneumatic plant engineering. The personnel shall always wear proper accident prevention garments, taking particular care to protect face, eyes and hands.
The valve must never be disassembled or modified. Otherwise, warranty is voided.
Please note. Attention: compressed springs are included inside the servo control..
Before assembly, dust-proof protections shall be removed from the valve body.
The threaded cap on unused air connection must not be removed to prevent dust or foreign matters from entering the servo control.
Compressed air shall be industrial air, with a pressure between servo control useful values and anyway never exceeding 2.5 bars, with supply pipes made of nylon or copper and $_{\text{inner diameter}}$ = 4 mm. Air connections on valve must be 1/8” GAS (head Ø 200) or 1/4" (head Ø 275, Ø 360, Ø 430) male threaded couplings.

6.2.2 Installation of valve on the plant

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

6.3 Installation diagrams

6.3.1 Installation SBS/10 2-way Valves

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

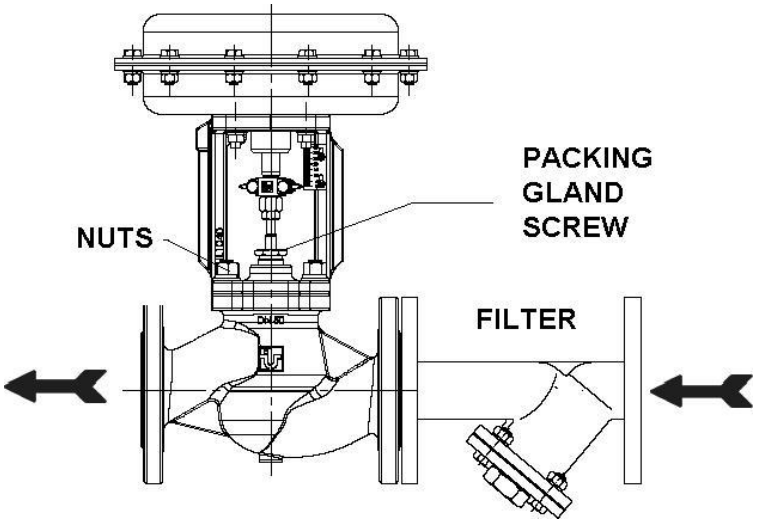


Figure 1

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

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6.3.2 Installation of SBS/10 3-way deviator valves

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

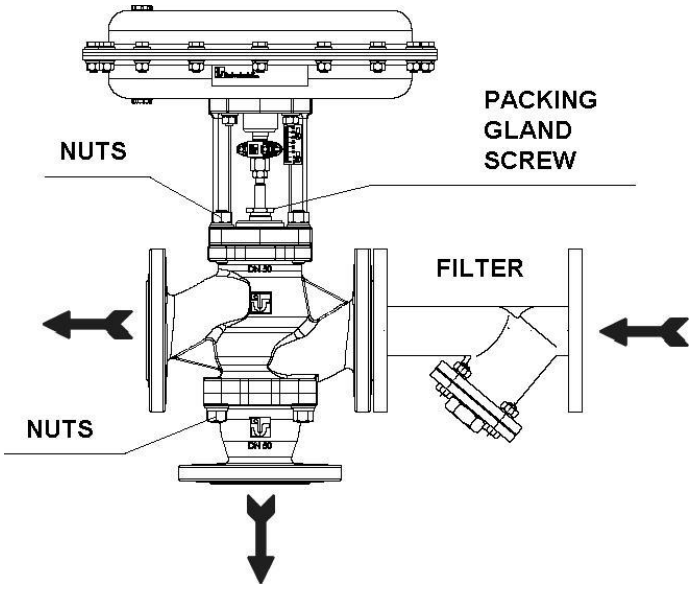


Figure 2

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

6.3.3 Installation of SBS/10 3-way mixer valves

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

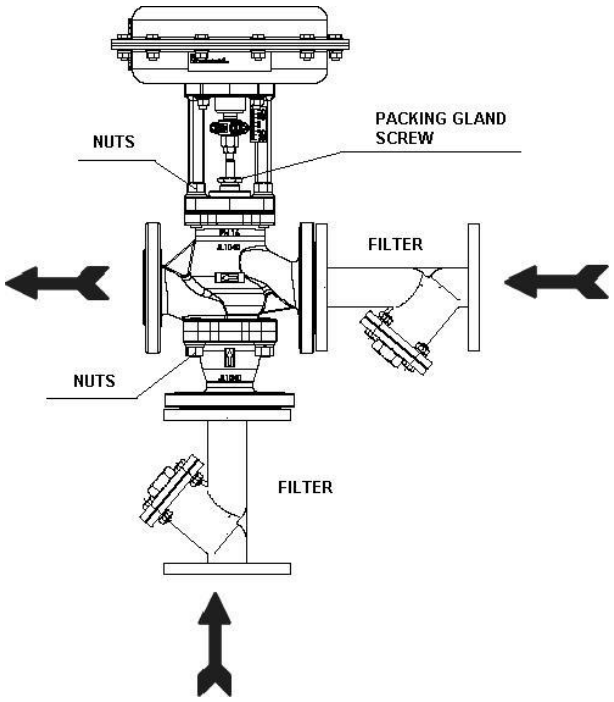


Figure 3

When installing SBS/10 3-way mixer valves, filters must be assembled on two valve inlets to collect any impurity possibly damaging sealing. Assemble SBS/10 3-way mixer valve as shown in figure 3, following the direction arrows on the valve. After the first hours of hot usage, slightly tighten the packing gland screw (1 revolution) and check tightening of nuts specified.

6.4 Operation test

Before starting up the system and after any repair or overhaul, the following operation test shall be carried out:
On valves with normally closed NC servo control:

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

On valves with normally open NO servo control:

1) Send the fluid inside the valve under shutter at the operating pressure (check that it is always lower than the maximum allowable pressure of the valve).
2) Insert into servo control the minimum value of control signal shown on specifications plate (the valve should start closing, datum available on stroke plate).
3) Insert into servo control the maximum value of control signal shown on specifications plate (the valve should close, datum available on stroke plate).
4) Repeat this operation 5 times.
5) Check, with air on, that there is no leak from the valve (with pressure value equal to the addition of two signals 3/15 =18 PSI).
6) Check, with air on, that there is no air leak from the servo control.

6.5 Troubleshooting

Troubleshooting operations shall be always carried out by qualified personnel only, adequately equipped for the hydraulic and pneumatic operations and provided with the proper safety clothing, paying particular attention to the protection of face, eyes and hands.
Please note: to properly operate the valve, the stem must freely move with no friction when air pressure on diaphragm changes.
Valve serial number is printed on the label located on servo control. Please refer to the serial number for spare part request and correspondence.
Whenever operations are to be carried out on valves, remove the fluid completely. The valve body shall be completely empty.

6.5.1 Fluid passage with valve closed

If the valve is in closed position, ensure that no foreign body exists between shutter and seat and the surface contact is not damaged.
For effective damages affecting the seat, the shutter seat must be replaced (for valve disassembly see instructions below).

6.5.2 Diaphragm (membrane)

If the rubber membrane inside the servo control breaks, the valve cannot perform a complete stroke.
Replace the membrane when it is broken or has lost elasticity (see proper procedure below).
In all cases of irregular operation during adjustment, immediately ensure that pneumatic connections between pilot regulator and valve and the relevant fittings show no signs of air leaks.
Also ensure that regulator is properly calibrated (activity direction, proportionate band, automatic restoration).

6.6 Scheduled Maintenance

Scheduled maintenance operations shall be carried out independently of the ones due to possible failures, which always require an immediate intervention.
The time interval between one maintenance operation and the following shall be included in the lower time interval between the one corresponding to 500,000 cycles and three years. It consists of a complete disassembly of the valve, replacement of all the gaskets and a complete cleaning of all other components. For disassembly and re-assembly operations, make reference to the relevant paragraphs of this manual.
After first operating period, it is recommended to check the packing gland, as it requires special care. During the first operating hours, check no leaks have occurred, otherwise act very carefully on the relevant tightening nut to eliminate them, by rotating once of 1/4 revolution maximum on each packing gland make of teflon-graphite.
It is also recommended not to excessively tighten the nut, to prevent excessive increase of frictions on the stem which could block the valve or generate bad operation. Should further lacks persist in spite of tightening, fully replace the packing gland.

6.7 Disassembly and assembly instructions for SBS/10 ND 15#50 2-way NC valve

For disassembly and assembly instructions for SBS/10 ND 15#50 2-way NC valve refer to Drw. No. 100791 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

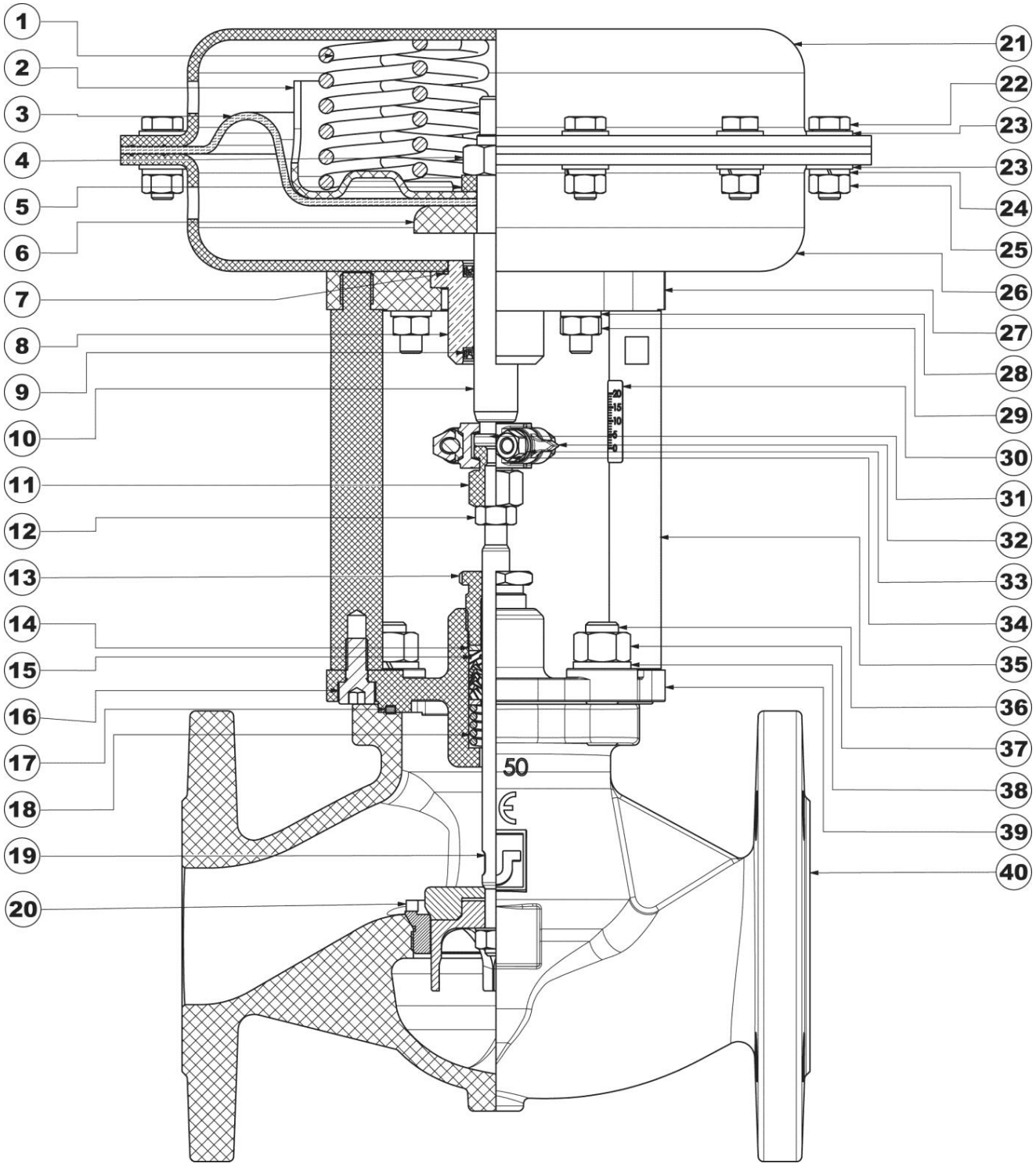
6.7.1 Disassembly

1) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards**
2) Unscrew the nuts (37), extract the spring washers (38).
3) Separate the servo control, the frame with intermediate body and the shutter from the valve body.
4) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
5) Untighten adjustment nut (11) and nut (12) carefully making their position.
6) Remove the shutter (19) from the frame with intermediate body (27,35,39,16).
7) Remove air from servo control, unscrew the nuts (29), extract the spring washers (28).
8) Separate the frame with intermediate body from servo control.
9) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
10) Extract from frame with the intermediate body, the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
11) Remove the body seal (17) from the frame with intermediate body.
12) Disassemble the servo control following the procedure described in paragraph 6.23.1.
13) Disassemble the shutter following the procedure described in paragraph 6.25.1.
14) Now the valve has been completely disassembled, so that the required components can be replaced.

6.7.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.23.2.
2) Reassemble the shutter following the procedure described in paragraph 6.25.2.
3) Insert in the frame with the intermediate body (27,35,39,16) the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
4) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed; maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
5) Insert the shutter (19) into the frame with intermediate body, carefully greasing it with silicone grease.
6) Insert the body gasket (17) into the frame seat (27,35,39,16).
7) Insert the previously-assembled frame on to stud-bolts and into the valve body seat (40).
8) Insert the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
9) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
10) Fully tighten on the shutter stem (19) the nut (12) and the adjustment nut (11).
11) Place the previously-assembled servo control on the frame with intermediate body.
12) Insert the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
13) Enter air into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control stem shall move upwards in its stroke.**
14) Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
15) Push shutter in contact with seat, then extract air from servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
16) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional view of SBS/10 ND 15#50 2-way NC valve



Drawing N° 100791 Rev.:00

6.8 Disassembly and assembly instructions for SBS/10 ND 65#80 2-way NC valve

For disassembly and assembly instructions for SBS/10 ND 65#80 2-way NC valve refer to Drw. No. 100792 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

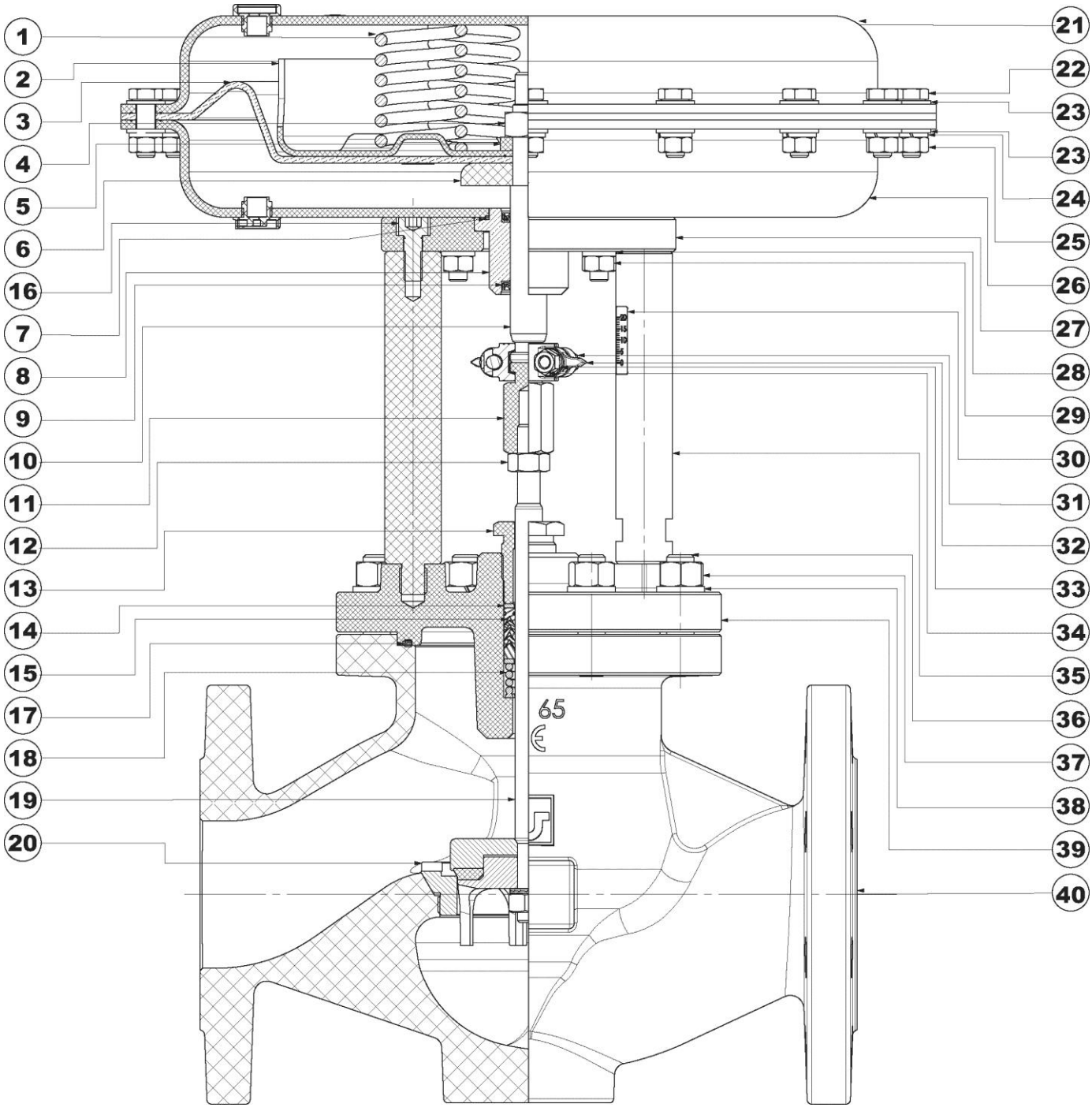
6.8.1 Disassembly

1) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards**.
2) Unscrew the nuts (37), extract the spring washers (38).
3) Separate the servo control, the mounting valve from the valve body.
4) UnScrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
5) Untighten adjustment nut (11) and nut (12) carefully making their position.
6) Remove the shutter (19) from the frame with intermediate body (27,35,39,16).
7) Remove air from servo control, unscrew the nuts (29), extract the spring washers (28).
8) Separate the frame with intermediate body from servo control.
9) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
10) Extract from frame with the intermediate body, the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
11) Remove the body seal (17) from the frame with intermediate body.
12) Disassemble the servo control following the procedure described in paragraph 6.23.1.
13) Now the valve has been completely disassembled, so that the required components can be replaced.

6.8.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.23.2.
2) Insert in the intermediate body the packing gland spring (17), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
3) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed; maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
4) Insert the shutter (19) into the intermediate body, carefully greasing it with silicone grease.
5) Insert the body gasket (17) into the intermediate body seat (27,35,39,16).
6) Insert the previously-assembled intermediate body on to the valve body seat (40).
7) Insert the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
9) Fully tighten on the shutter stem (19) the nut (12) and the adjustment nut (11).
10) Place the servo control with mounting on the valve body.
11) Insert the spring washers (28) on the stud-bolts and torque tighten the nuts (27) according to table 6 on page 74.
12) Enter air into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control stem shall move upwards in its stroke**
13) Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
14) Push shutter in contact with seat, then extract air from servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
15) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional SBS/10 ND 65#80 2-way NC valve



Drawing N° 100792 Rev.:00

6.9 Disassembly and assembly instructions for SBS/10 ND 15#50 2-way NO valve

For disassembly and assembly instructions for SBS/10 ND 15#50 2-way NO valve refer to Drw. No. 110588 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

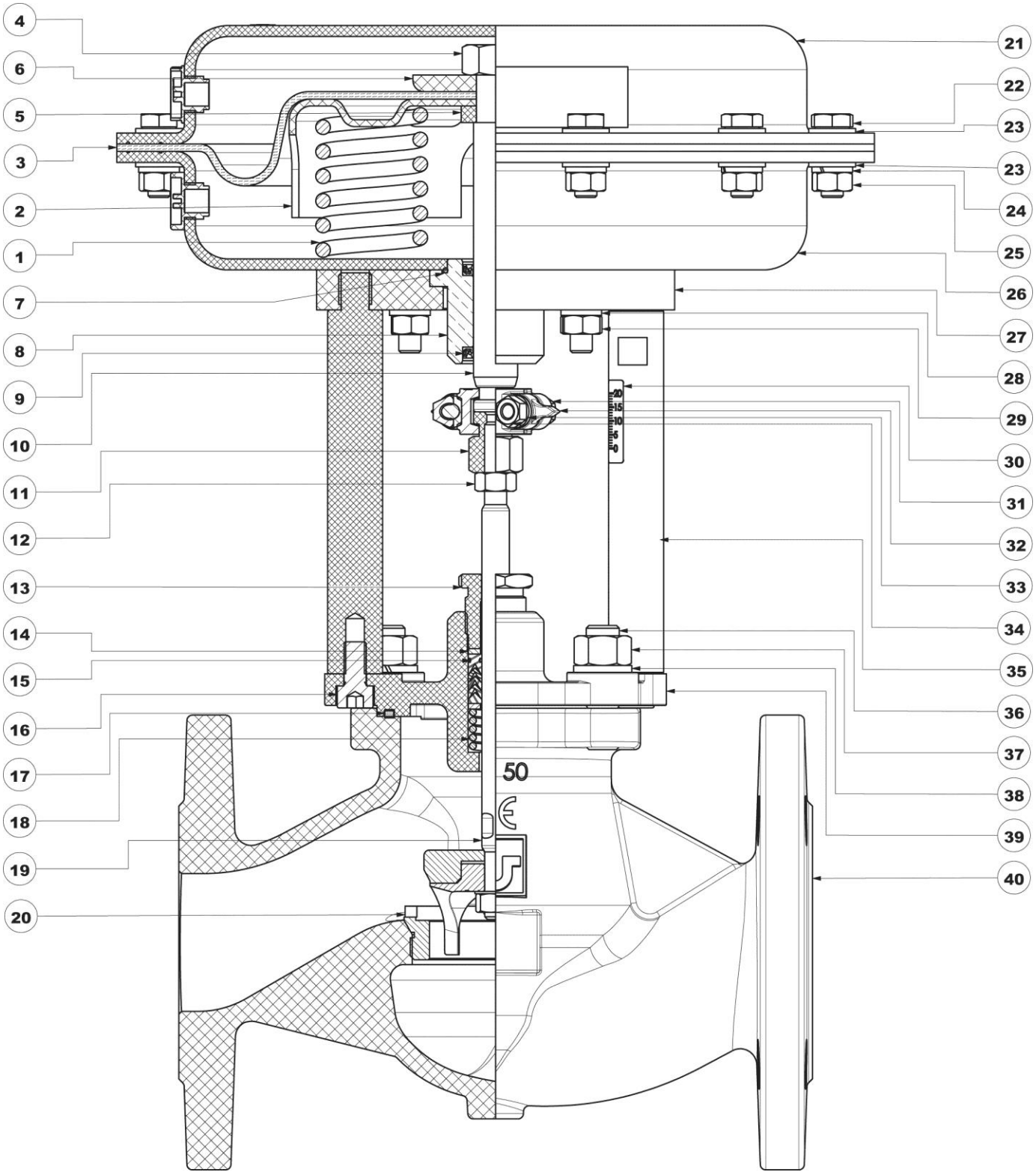
6.9.1 Disassembly

1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) **Caution! When the junction clamp will be removed, the shutter may move downwards and hit the seat. Accompany him in contact with the seat to prevent damage.**
3) Unscrew the nuts (29), extract the spring washers (28).
4) Separate the servo control, the mounting valve from the valve body.
5) Unscrew adjustment nut (11) and nut (12) carefully making their position.
6) Unscrew the nuts (37), extract the spring washers (36).
7) Separate the intermediate body (27,35,39,16) with the shutter (19) in the valve body.
8) Remove the shutter (19) from the frame with intermediate body (27,35,39,16).
9) Remove the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
10) Separate the body seal (17) from the frame with intermediate body (27,35,39,16).
11) Extract from frame with the intermediate body, the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
12) Disassemble the servo control following the procedure described in paragraph 6.24.1.
13) Disassemble the shutter following the procedure described in paragraph 6.25.1
14) Now the valve has been completely disassembled, so that the required components can be replaced.

6.9.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Reassemble the shutter following the procedure described in paragraph 6.25.2.
3) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
4) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed; maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
5) Insert the shutter (19) into the frame with intermediate body (27,35,39,16), carefully greasing it with silicone grease.
6) Insert the body gasket (17) into the frame seat (27,35,39,16).
7) Insert the previously-assembled frame on to stud-bolts and into the valve body seat (40).
8) Insert the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
9) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
10) Tighten nut (12) and adjustment nut (11) on the shutter stem (19) and place adjustment nut in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12) .
11) Place the previously-assembled servo control on the frame with intermediate body (27,35,39,16).
12) Insert the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
13) Push shutter in contact with seat, then insert as much air into servo control as equivalent to the maximum value provided for by the signal: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
14) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional SBS/10 ND 15#50 2-way NO valve



Drawing N° 110588 Rev.:00

6.10 Disassembly and assembly instructions for SBS/10 ND 65#80 2-way NO valve

For disassembly and assembly instructions for SBS/10 ND 65#80 2-way NO valve refer to Drw. No. 110589 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

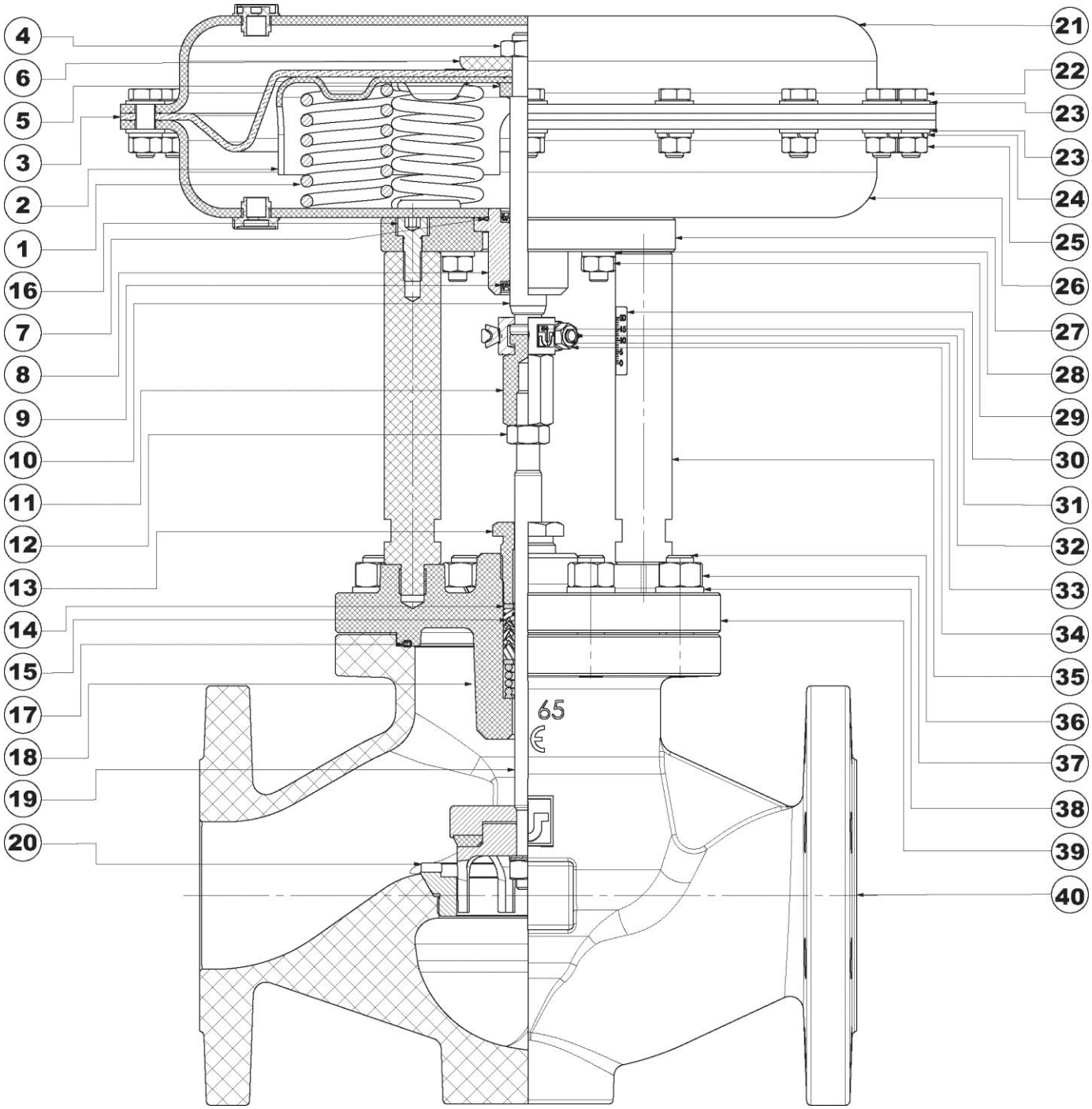
6.10.1 Disassembly

1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) **Caution! When the junction clamp will be removed, the shutter may move downwards and hit the seat. Accompany him in contact with the seat to prevent damage.**
3) Unscrew the nuts (29), extract the spring washers (28).
4) Separate the servo control, the mounting valve from the valve body.
5) Unscrew adjustment nut (11) and nut (12) carefully making their position.
6) Unscrew the nuts (37), extract the spring washers (36).
7) Separate the intermediate body (27,35,39,16) with the shutter (19) in the valve body.
8) Separate the body seal (17) from the frame with intermediate body (27,35,39,16).
9) Remove the shutter (19) from the frame with intermediate body (27,35,39,16).
10) Remove the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
11) Extract from frame with the intermediate body, the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
12) Disassemble the servo control following the procedure described in paragraph 6.24.1.
13) Disassemble the shutter following the procedure described in paragraph 6.25.1
14) Now the valve has been completely disassembled, so that the required components can be replaced.

6.10.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Reassemble the shutter following the procedure described in paragraph 6.25.2.
3) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
4) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed; maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
5) Insert the shutter (19) into the frame with intermediate body (27,35,39,16), carefully greasing it with silicone grease.
6) Insert the body gasket (17) into the frame seat (27,35,39,16).
7) Insert the previously-assembled frame on to stud-bolts and into the valve body seat (40).
8) Insert the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
9) Tighten nut (12) and adjustment nut (11) on the shutter stem (19) and place adjustment nut in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12) .
10) Place the previously-assembled servo control on the frame with intermediate body (27,35,39,16).
11) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
12) Insert the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
13) Push shutter in contact with seat, then insert as much air into servo control as equivalent to the maximum value provided for by the signal: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
14) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional SBS/10 ND 65#80 2-way NO valve



Drawing N° 110589 Rev.:00

6.11 Disassembly and assembly instructions for SBS/10 3-way NC mixer valve

For disassembly and assembly instructions for SBS/10 3-way NC mixer valve refer to Drw. No. 100794 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.11.1 Disassembly

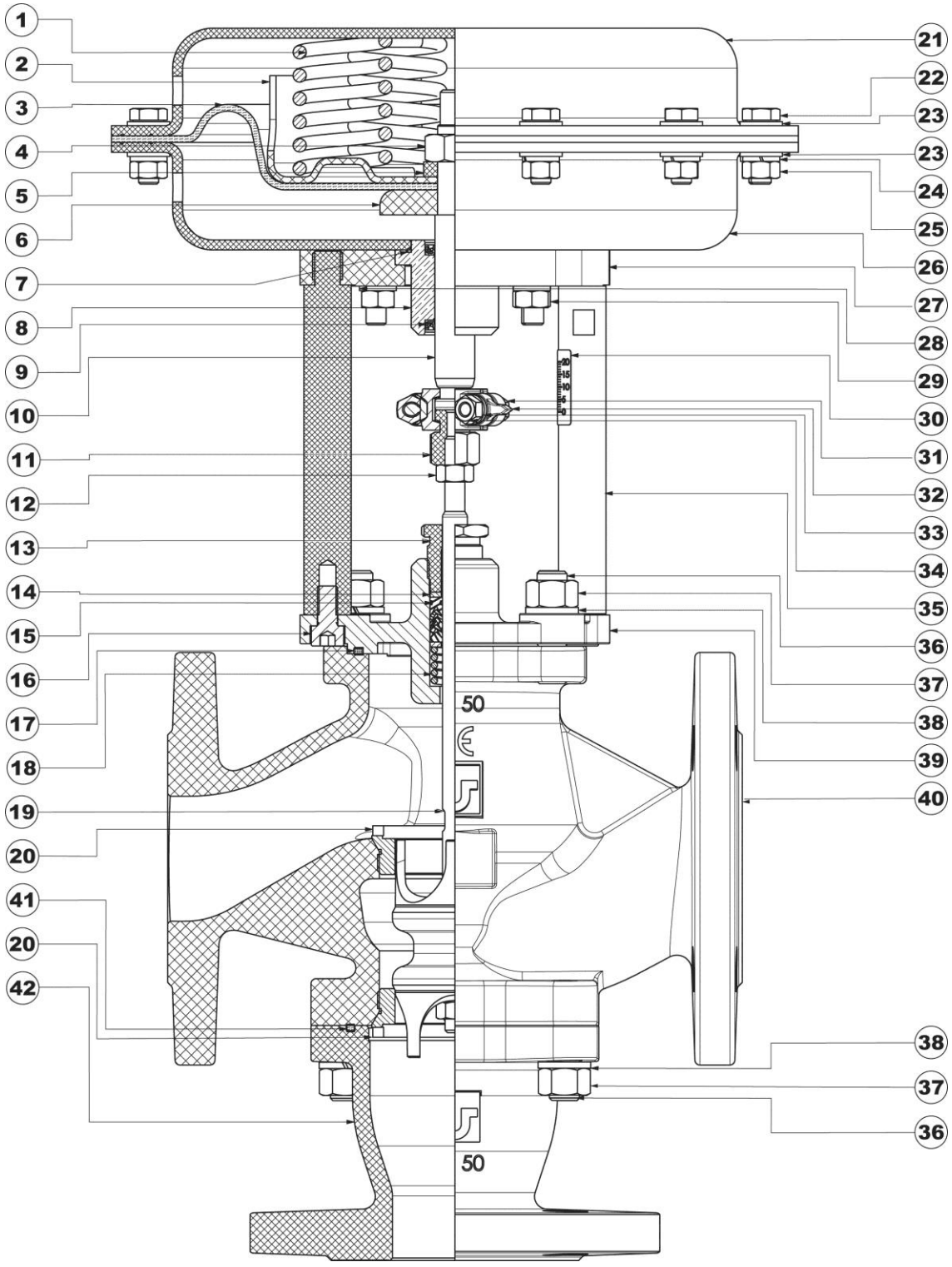
1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards**
3) Unscrew the upper nuts (37), extract the spring washers (38).
4) Untighten adjustment nut (11) and nut (12) carefully making their position.
5) Separate the servo control and the frame with intermediate body: the shutter remains in the valve body.
6) Remove air from servo control, unscrew the nuts (29), extract the spring washers (28).
7) Separate the frame with intermediate body(27,35,39,16) from servo control.
8) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
9) Extract from frame with the intermediate body (27,35,39,16), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
10) Remove the body seal (17) from the frame with intermediate body (27,35,39,16).
11) Unscrew the lower nuts (37), extract the spring washers (38).
12) Separate the bottom base (42) from the valve body (40).
13) Extract the bottom base gasket (41).
14) Unscrew the lower seat (20) and extract the shutter (19) from valve body.
15) Disassemble the servo control following the procedure described in paragraph 6.23.1.
16) Disassemble the shutter following the procedure described in paragraph 6.26.1.
17) Now the valve has been completely disassembled, so that the required components can be replaced.

6.11.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.23.2.
2) Reassemble the shutter following the procedure described in paragraph 6.26.2.
3) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
4) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
5) Insert the body gasket (17) into the frame seat (27,35,39,16).
6) Insert the shutter (19) into valve body (40); spread MOTORSIL D (AREXONS) silicone gasket in the contact area between seat and valve body; then, tighten lower seat (20).
7) Insert the previously-assembled frame onto stud-bolts, into the valve body seat and onto shutter stem; please remember lubricating the last component with silicone grease.
8) Insert the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
9) Place the gasket (41) in the bottom base (42).
10) Insert the bottom base (42) on the stud-bolts, then insert elastic washers (38) and torque tighten the lower nuts (37) according to table 6 on page 74.
11) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
12) Fully tighten on the shutter stem (19) the nut (12) and the adjustment nut (11).
13) Place the previously-assembled servo control on the frame with intermediate body (27,35,39,16).
14) Insert the the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
15) Enter air into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control stem shall move upwards in its stroke.**
16) Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).

17) Push shutter in contact with seat, then extract air from servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
18) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional SBS/10 3-way NC mixer valve



Drawing N° 100794 Rev.:00

6.12 Disassembly and assembly instructions for SBS/10 3-way NO mixer valve

For disassembly and assembly instructions for SBS/10 3-way NO mixer valve refer to Drw. No. 110590 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

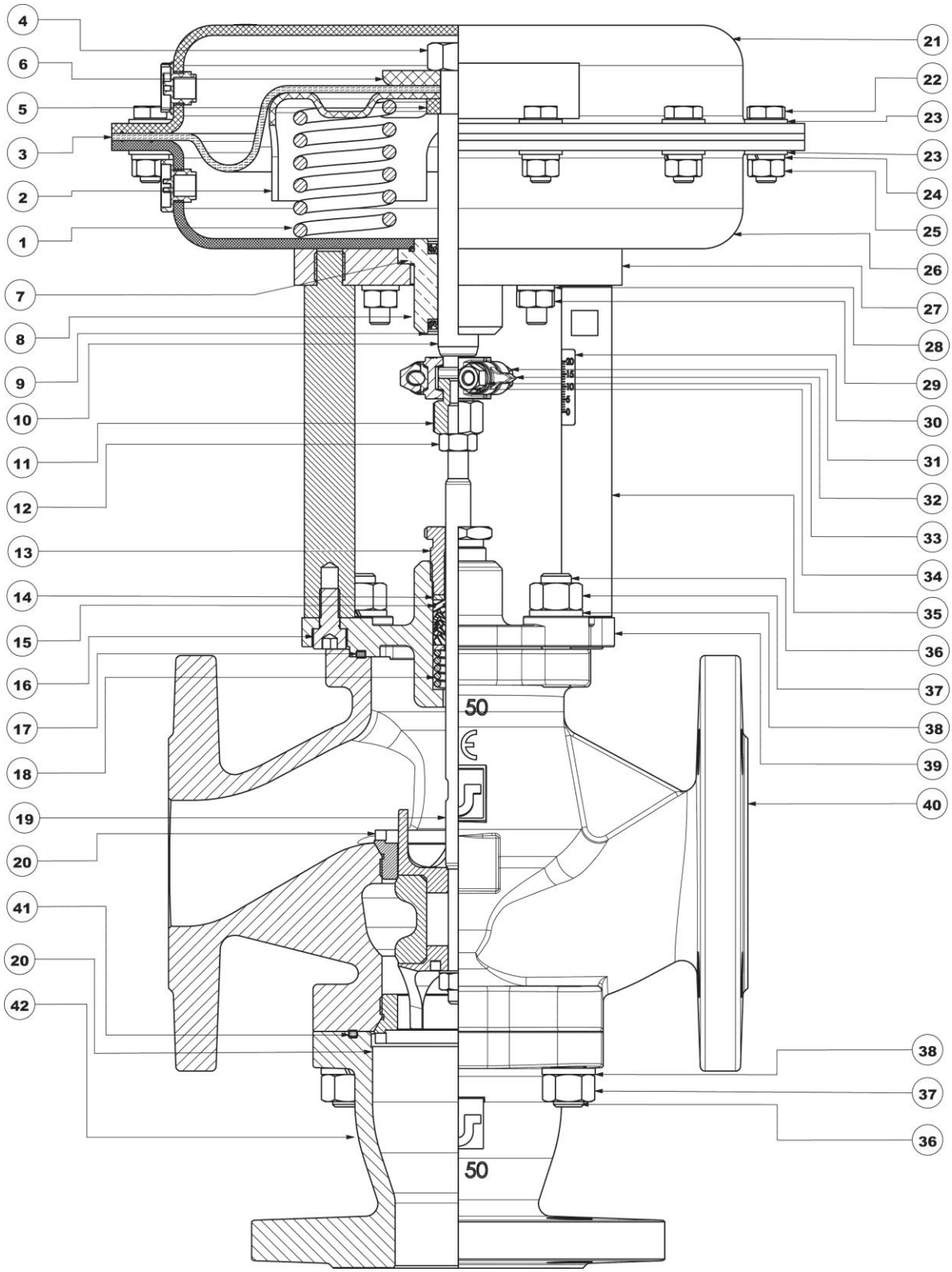
6.12.1 Disassembly

1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) **Caution! When the junction clamp will be removed, the shutter may move downwards and hit the seat. Accompany him in contact with the seat to prevent damage.**
3) Unscrew the upper nuts (29), extract the spring washers (28).
4) Separate the servo control from the mounting valve.
5) Untighten adjustment nut (11) and nut (12) carefully making their position.
6) Unscrew the nuts (37), extract the spring washers (36).
7) Separate the mounting from (27,35,39,16) from the body valve.
8) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (17) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
9) Extract from the intermediate body (27,35,39,16), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
10) Extract the body gasket (17) from the intermediate body (27,35,39,16).
11) Unscrew the lower nuts (37), extract the spring washers (38).
12) Separate the bottom base (42) from the valve body (40).
13) Extract the bottom base gasket (41).
14) Unscrew the lower seat (20) and extract the shutter (19) from valve body.
15) Disassemble the servo control following the procedure described in paragraph 6.24.1.
16) Disassemble the shutter following the procedure described in paragraph 6.26.1.
17) Now the valve has been completely disassembled, so that the required components can be replaced.

6.12.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Reassemble the shutter following the procedure described in paragraph 6.26.2.
3) Insert in the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
4) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
5) Insert the body gasket (17) into the intermediate body seat (27,35,39,16).
6) Insert the shutter (19) into valve body (40); spread MOTORSIL D (AREXONS) silicone gasket in the contact area between seat and valve body; then, tighten lower seat (20).
7) Insert the previously-assembled intermediate body, into the valve body seat and onto shutter stem; please remember lubricating the last component with silicone grease.
8) Insert the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
9) Place the gasket (41) in the bottom base (42).
10) Insert the bottom base (42) on the stud-bolts, then insert elastic washers (38) and torque tighten the lower nuts (37) according to table 6 on page 74.
11) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body
12) Place on the shutter (19) precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
13) Place the previously-assembled servo control on the mounting (27,35,39,16).
14) Insert the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
15) Push shutter in contact with seat, then insert air from servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
16) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional view of SBS/10 3-way NO mixer valve



Drawing N° 110590 Rev.:00

6.13 Disassembly and assembly instructions for SBS/10 3-way NC deviator valve

For disassembly and assembly instructions for SBS/10 ND 3-way NC deviator valve refer to Drw. No. 110591 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

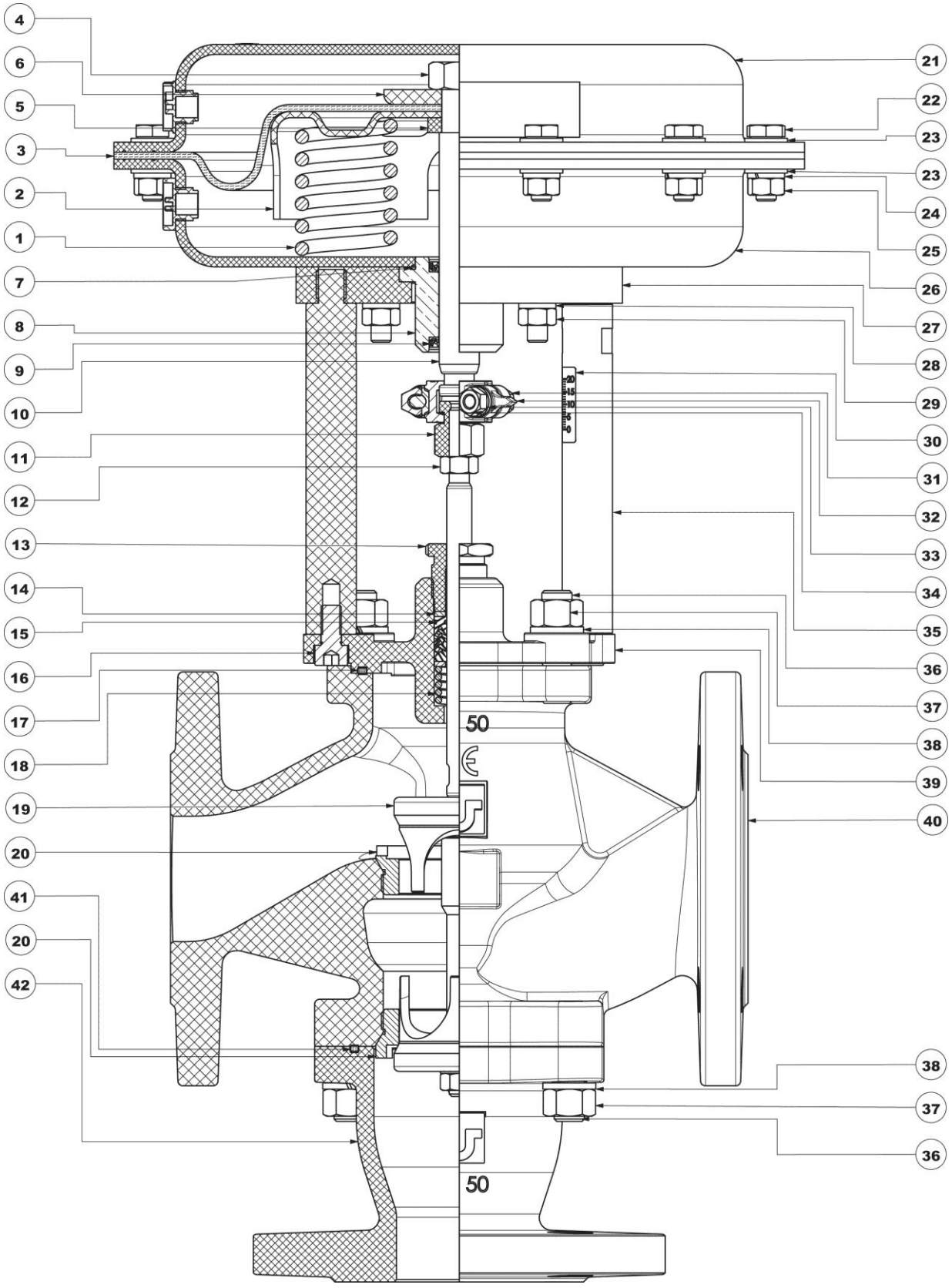
6.13.1 Disassembly

1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) **Caution! When the junction clamp will be removed, the shutter may move downwards and hit the seat. Accompany him in contact with the seat to prevent damage.**
3) Unscrew the upper nuts (29), extract the spring washers (28).
4) Separate the servo control from the mounting valve.
5) Untighten adjustment nut (11) and nut (12) carefully making their position.
6) Unscrew the nuts (37), extract the spring washers (36).
7) Separate the mounting from (27,35,39,16) from the body valve.
8) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (17) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
9) Extract from the intermediate body (27,35,39,16), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
10) Extract the body gasket (17) from the intermediate body (27,35,39,16).
11) Unscrew the lower nuts (37), extract the spring washers (38).
12) Separate the bottom base (42) from the valve body (40).
13) Extract the bottom base gasket (41).
14) Disassemble the servo control following the procedure described in paragraph 6.27.1.
15) Disassemble the shutter following the procedure described in paragraph 6.24.1.
16) Now the valve has been completely disassembled, so that the required components can be replaced.

6.13.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Reassemble the shutter (19) and insert into the valve body (40) following the procedure described in paragraph 6.27.2.
3) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
4) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
5) Insert the body gasket (17) into the frame seat (27,35,39,16).
6) Insert the previously-assembled frame onto stud-bolts, into the valve body seat (40) and on to shutter stem (19); please remember lubricating the last component with silicone grease.
7) Insert the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Place the gasket (41) in the bottom base (42).
9) Insert the bottom base (42) on the stud-bolts, then insert and elastic washers (38) and torque tighten the lower nuts (37) according to table 6 on page 74.
10) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
11) Tighten nut (12) and adjustment nut (11) on the shutter stem (19); place adjustment nut in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12) .
12) Place the previously-assembled servo control on the frame with intermediate body .
13) Insert the elastic washers (28) on the lower head stud-bolts; torque tighten the nuts (29) according to table 6 on page 74.
14) Push shutter downward in contact with seat, then insert as much air into servo control as equivalent to the maximum value provided for by the signal: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
15) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32); insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional view of SBS/10 3-way NC deviator valve



Drawing N° 110591 Rev.:00

6.14 Disassembly and assembly instructions for SBS/10 ND 3-way NO deviator valve

For disassembly and assembly instructions for SBS/10 3-way NO deviator valve refer to Drw. No. 100793 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

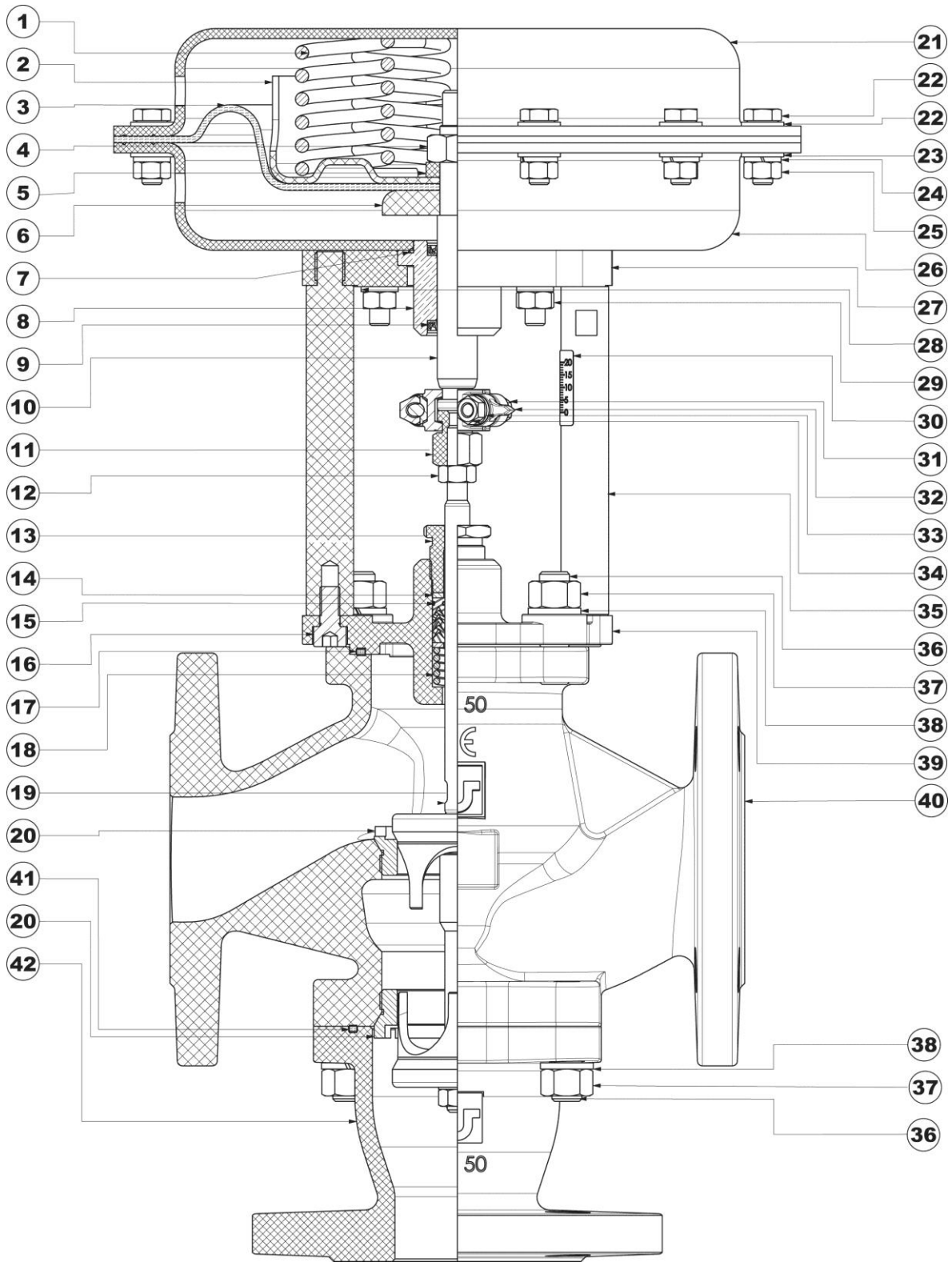
6.14.1 Disassembly

1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards**
3) Untighten adjustment nut (11) and nut (12) carefully making their position.
4) Unscrew the upper nuts (37), extract the spring washers (38).
5) Separate the servo control and the frame with intermediate body: the shutter remains in the valve body.
6) Remove air from servo control, unscrew the nuts (29), extract the spring washers (28).
7) Separate the frame with intermediate body (27,35,39,16) from servo control.
8) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
9) Extract from frame with the intermediate body (27,35,39,16), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
10) Remove the body seal (17) from the frame with intermediate body (27,35,39,16).
11) Unscrew the lower nuts (37), extract the spring washers (38).
12) Separate the bottom base (42) from the valve body (40).
13) Extract the bottom base gasket (41).
14) Disassemble the servo control following the procedure described in paragraph 6.27.1.
15) Disassemble the shutter following the procedure described in paragraph 6.24.1.
16) Now the valve has been completely disassembled, so that the required components can be replaced.

6.14.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Reassemble the shutter (19) following the procedure described in paragraph 6.27.2.
3) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
4) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
5) Insert the body gasket (17) into the frame seat (27,35,39,16).
6) Insert the shutter (19) into valve body (40); spread MOTORSIL D (AREXONS) silicone gasket in the contact area between seat and valve body.
7) Insert the spring washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Place the gasket (41) in the bottom base (42).
9) Insert the bottom base (42) on the stud-bolts, then insert elastic washers (38) and torque tighten the lower nuts (37) according to table 6 on page 74.
10) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
11) Fully tighten on the shutter stem (19) the nut (12) and the adjustment nut (11).
12) Place the previously-assembled servo control on the frame with intermediate body (27,35,39,16).
13) Insert the the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
14) Enter air into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control stem shall move upwards in its stroke.**
15) Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
16) Push shutter in contact with seat, then extract air from servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
17) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional view of SBS/10 3-way NO deviator valve



Drawing N° 100793 Rev.:00

6.15 Disassembly and assembly instructions for SBS/10 ND 15#50 2-way NC valve with bellows

For disassembly and assembly instructions for SBS/10 ND 15#50 2-way NC valve with bellows refer to Drw. No. 110571 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.15.1 Disassembly

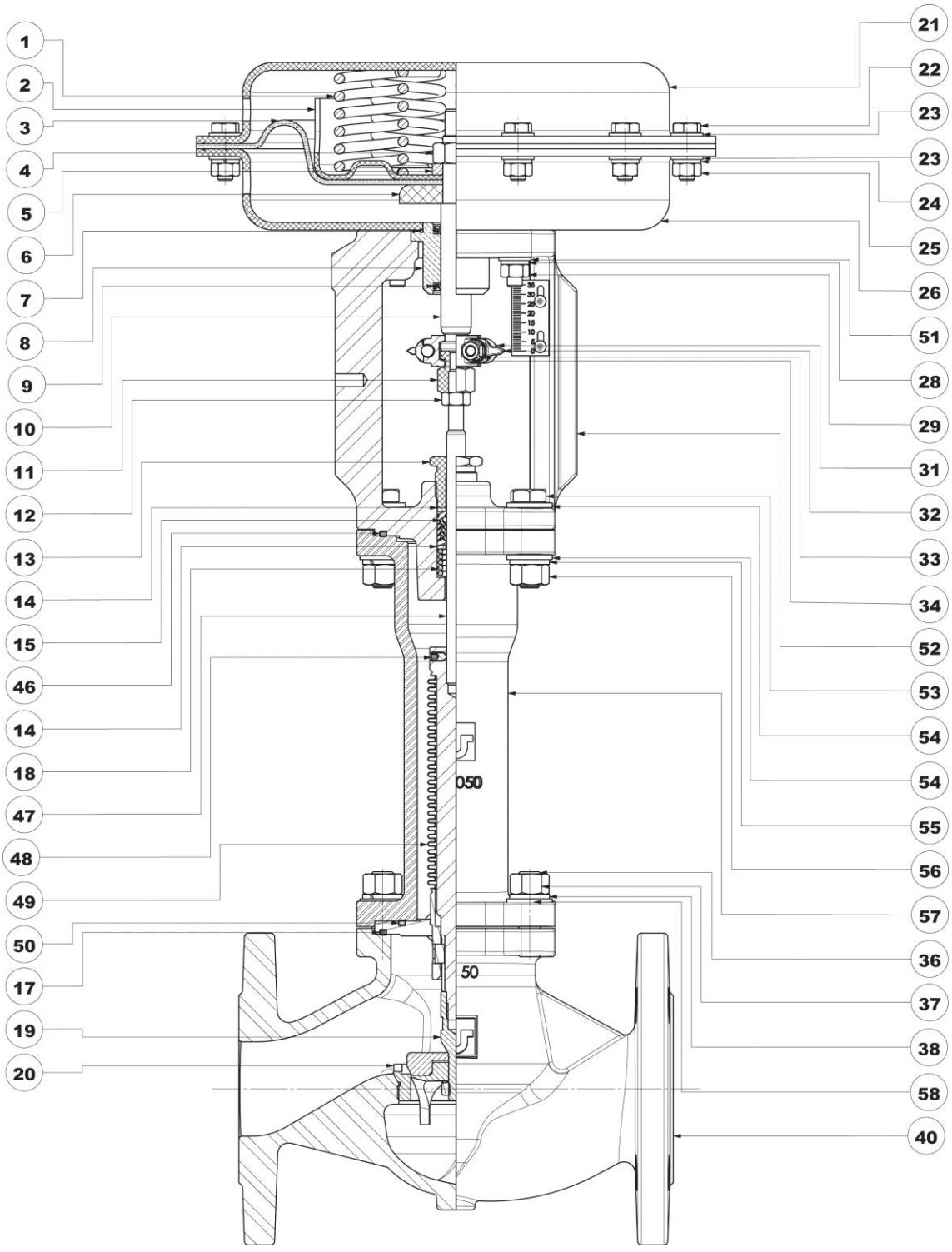
1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards**
3) Untighten adjustment nut (11) and nut (12) carefully making their position.
4) Unscrew the nuts (56), extract the spring washers (55), the flat washers (54) and the screws (53).
5) Separate the servo control and the frame with intermediate body frame extension (57).
6) Remove air from servo control, unscrew the nuts (29), extract the spring washers (28) and the flat washers (51).
7) Separate the frame with intermediate body from servo control.
8) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
9) Extract from frame with the intermediate body (52), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
10) Remove the gasket (46) from the frame with intermediate body (52).
11) Unscrew the nuts (37), extract the spring washers (38), the flat washers (58) and the frame extension (57).
12) Extract the intermediate body with bellows (49) with upper stem (47) and shutter (19) connected with it from the valve body (48).
13) Extract the headless screw (48), the with upper stem (47) and shutter (19) from the intermediate body with bellows (49).
14) Remove gaskets (50) and (17) from intermediate body with bellows.
15) Disassemble the servo control following the procedure described in paragraph 6.23.1.
16) Now the valve has been completely disassembled, so that the required components can be replaced.

6.15.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.23.2.
2) Insert gaskets (17) and (50) into intermediate body with bellows.
3) Screw shutter (19) to intermediate body with bellows (49), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
4) Tighten the upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
5) Insert the intermediate body with bellows assembled inside the valve body (40).
6) Place the frame extension (57) inside the intermediate body with bellows in correspondence with stud-bolts (36).
7) Insert the flat washers (58) and the elastic washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
9) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
10) Place the gasket (46) into the frame seat (57).
11) Insert the previously-assembled frame into the frame extension (57) and onto the upper stem (47).
12) Insert washers (54) into screws (53) and the screws into the frame (52).
13) Insert the flat washers (54) and the elastic washers (55) on the screws (53) and torque tighten the nuts (56) according to table 6 on page 74.
14) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
15) Fully tighten on the upper stem (48) the nut (12) and the adjustment nut (11).
16) Place the previously-assembled servo control on the frame with intermediate body (57).
17) Insert the flat washers (51) and the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
18) Enter air into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control stem shall move upwards in its stroke.**

19) Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
20) Extract air from servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
21) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32); insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional view of SBS/10 ND 15#50 2-way NC valve with bellows



Drawing N° 110571 Rev.:00

6.16 Disassembly and assembly instructions for SBS/10 ND 65#80 2-way NC valve with bellows

For disassembly and assembly instructions for SBS/10 ND 65#80 2-way NC valve with bellows refer to Drw. No. 100573 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.16.1 Disassembly

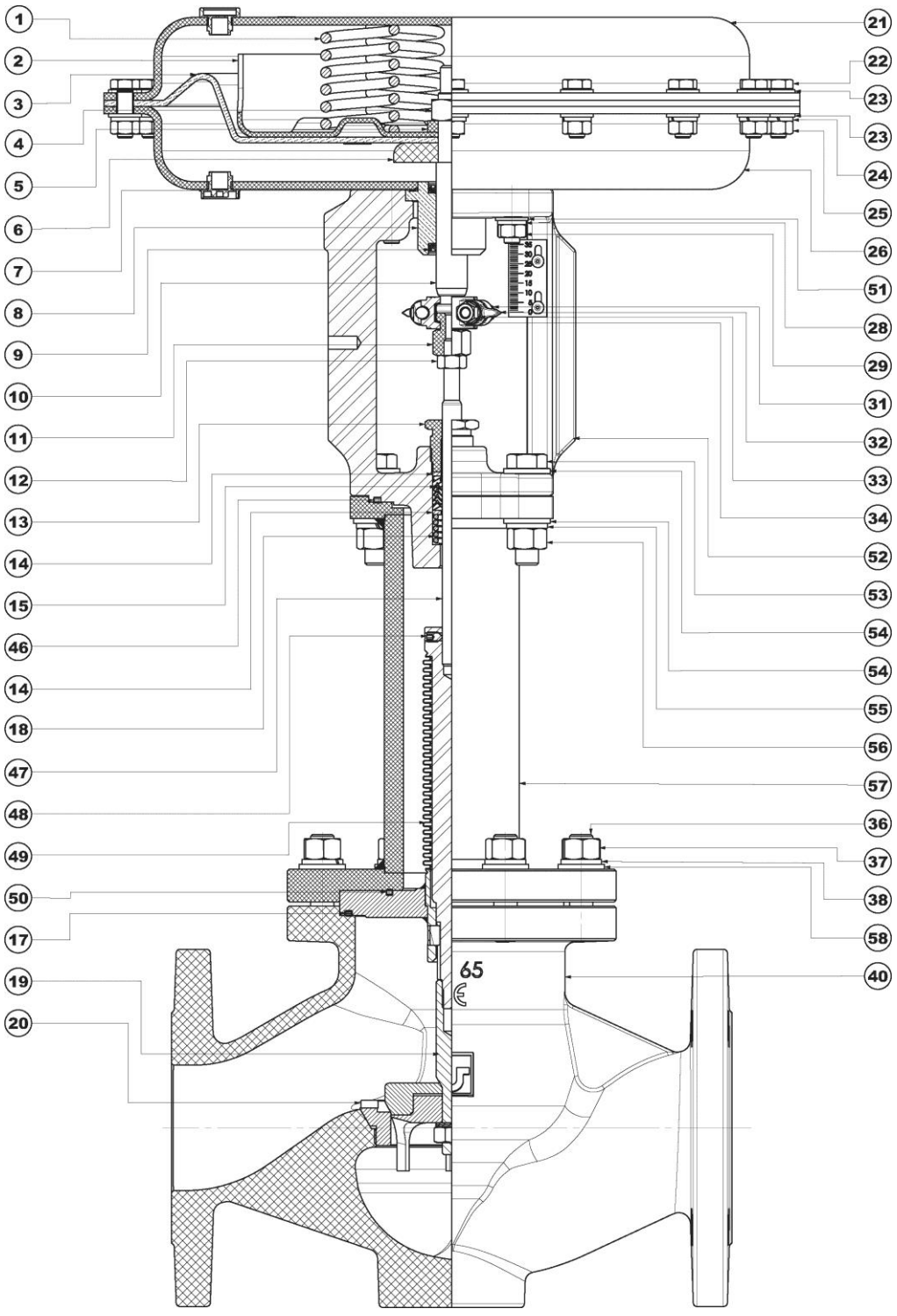
1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards**
3) Untighten adjustment nut (11) and nut (12) carefully making their position.
4) Unscrew the nuts (56), extract the spring washers (55), the flat washers (54) and the screws (53).
5) Separate the servo control and the frame with intermediate body frame extension (57).
6) Remove air from servo control, unscrew the nuts (29), extract the spring washers (28) and the flat washers (51).
7) Separate the frame with intermediate body from servo control.
8) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
9) Extract from frame with the intermediate body (52), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
10) Remove the body gasket (46) from the frame with intermediate body (52).
11) Unscrew the nuts (37), extract the spring washers (38), the flat washers (58) and the frame extension (57).
12) Extract the intermediate body with bellows (49) with upper stem (47) and shutter (19) connected with it from the valve body (40).
13) Extract the headless screw (48), the with upper stem (47) and shutter (19) from the intermediate body with bellows (49).
14) Remove gaskets (50) and (17) from intermediate body with bellows.
15) Disassemble the servo control following the procedure described in paragraph 6.23.1.
16) Now the valve has been completely disassembled, so that the required components can be replaced.

6.16.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.23.2.
2) Insert gaskets (50) and (17) into intermediate body with bellows.
3) Screw shutter (19) to intermediate body with bellows (49), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
4) Tighten the upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
5) Insert the intermediate body with bellows assembled inside the valve body (48).
6) Place the frame extension (57) inside the intermediate body with bellows in correspondence with stud-bolts (36).
7) Insert the flat washers (58) and the elastic washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
9) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
10) Place the gasket (46) into the frame seat (52).
11) Insert the previously-assembled frame into the frame extension (57) and onto the upper stem (47).
12) Insert washers (54) into screws (53) and the screws into the frame (52).
13) Insert the flat washers (54) and the elastic washers (55) on the screws (53) and torque tighten the nuts (56) according to table 6 on page 74.
14) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
15) Fully tighten on the upper stem (47) the nut (12) and the adjustment nut (11).
16) Place the previously-assembled servo control on the frame with intermediate body (52).
17) Insert the flat washers (51) and the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
18) Enter air into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control stem shall move upwards in its stroke.**

19) Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
20) Extract air from servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
21) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32); insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional view of SBS/10 ND 65#80 2-way NC valve with bellows



Drawing N° 110573 Rev.:00

6.17 Disassembly and assembly instructions for SBS/10 ND 15#50 2-way NO valve with bellows

For disassembly and assembly instructions for SBS/10 ND 15#50 2-way NO valve with bellows refer to Drw. No. 110574 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.17.1 Disassembly

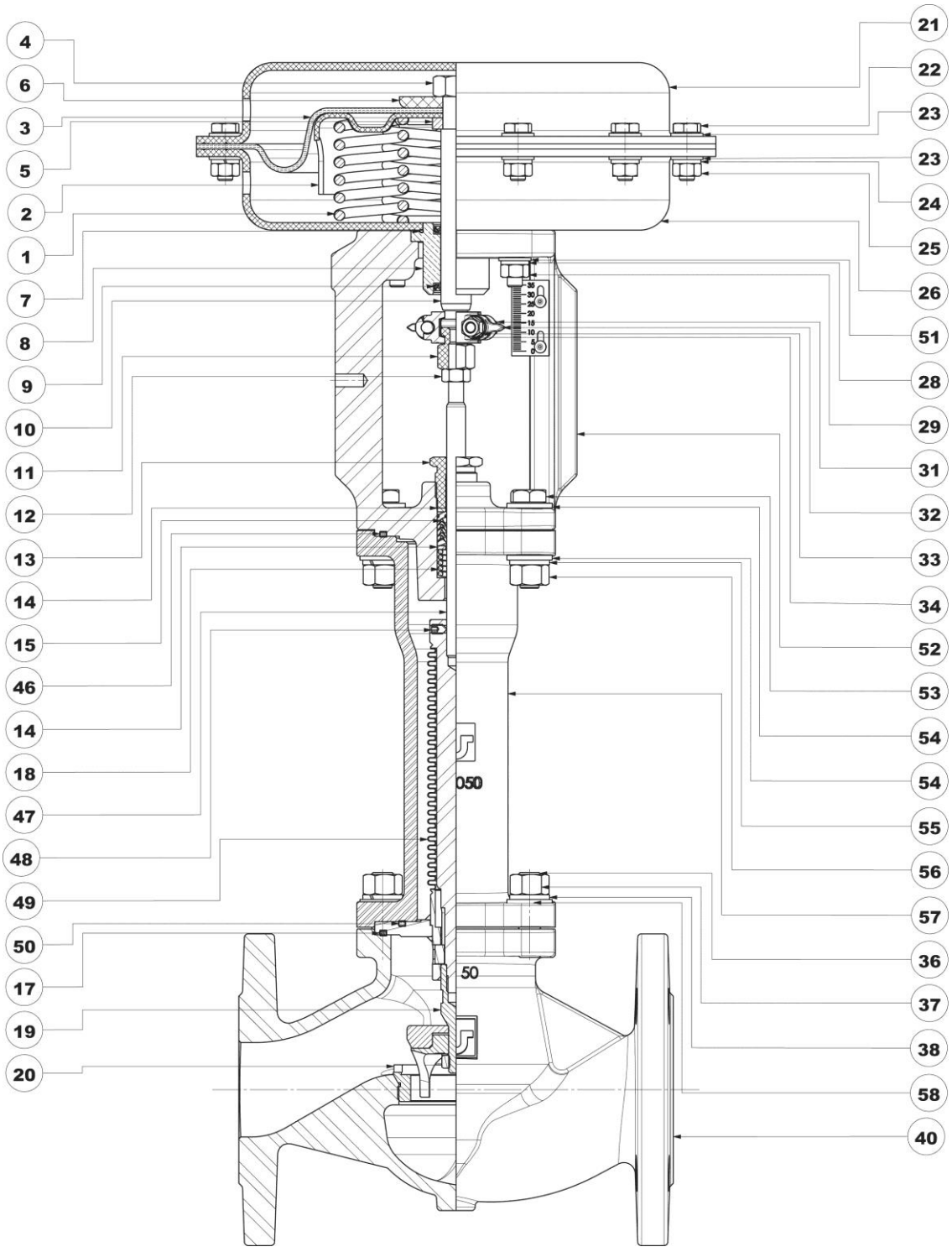
1) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move downwards.**
2) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
3) Extract air from the servo control: **Attention! Servo control shaft shall move upwards.**
4) Unscrew the nuts (29), extract the spring washers (28) and the flat washers (51).
5) Separate the servo control from frame with intermediate body.
6) Untighten adjustment nut (11) and nut (12) carefully making their position.
7) Unscrew the nuts (56), extract the spring washers (55), the flat washers (54) and the screws (53).
8) Separate the frame with intermediate body from frame extension (57).
9) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
10) Extract from frame with the intermediate body (52), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
11) Remove the gasket (46) from the frame with intermediate body (52).
12) Unscrew the nuts (37), extract the spring washers (38), the flat washers (58) and the frame extension (57).
13) Extract the intermediate body with bellows (49) with upper stem (47) and shutter (19) connected with it from the valve body (40).
14) Extract the headless screw (48), the with upper stem (47) and shutter (19) from the intermediate body with bellows (49).
15) Remove gaskets (50) and (17) from intermediate body with bellows.
16) Disassemble the servo control following the procedure described in paragraph 6.24.1.
17) Now the valve has been completely disassembled, so that the required components can be replaced.

6.17.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Insert gaskets (17) and (50) into intermediate body with bellows.
3) Screw shutter (19) to intermediate body with bellows (49), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
4) Tighten the upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
5) Insert the intermediate body with bellows assembled inside the valve body (40).
6) Place the frame extension (57) inside the intermediate body with bellows in correspondence with stud-bolts (36).
7) Insert the flat washers (58) and the elastic washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
9) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
10) Place the gasket (46) into the frame seat (52).
11) Insert the previously-assembled frame into the frame extension (57) and onto the upper stem (47).
12) Insert washers (54) into screws (53) and the screws into the frame (52).
13) Insert the flat washers (54) and the elastic washers (55) on the screws (53) and torque tighten the nuts (56) according to table 6 on page 74.
14) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
15) Tighten nut (12) and adjustment nut (11) on the upper stem (47): place adjustment nut in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
16) Place the previously-assembled servo control on the frame with intermediate body (52).

17) Insert the flat washers (51) and the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
18) Insert as much air into servo control as equivalent to maximum value provided for by the signal: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
19) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).
20) Extract air from the servo control: **Attention! Servo control shaft shall move upwards in its stroke.**

Sectional view of SBS/10 ND 15#50 2-way NO valve with bellows



Drawing N° 110574 Rev.:00

6.18 Disassembly and assembly instructions for SBS/10 ND 65#80 2-way NO valve with bellows

For disassembly and assembly instructions for SBS/10 ND 65#80 2-way NO valve with bellows refer to Drw. No. 110575 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.18.1 Disassembly

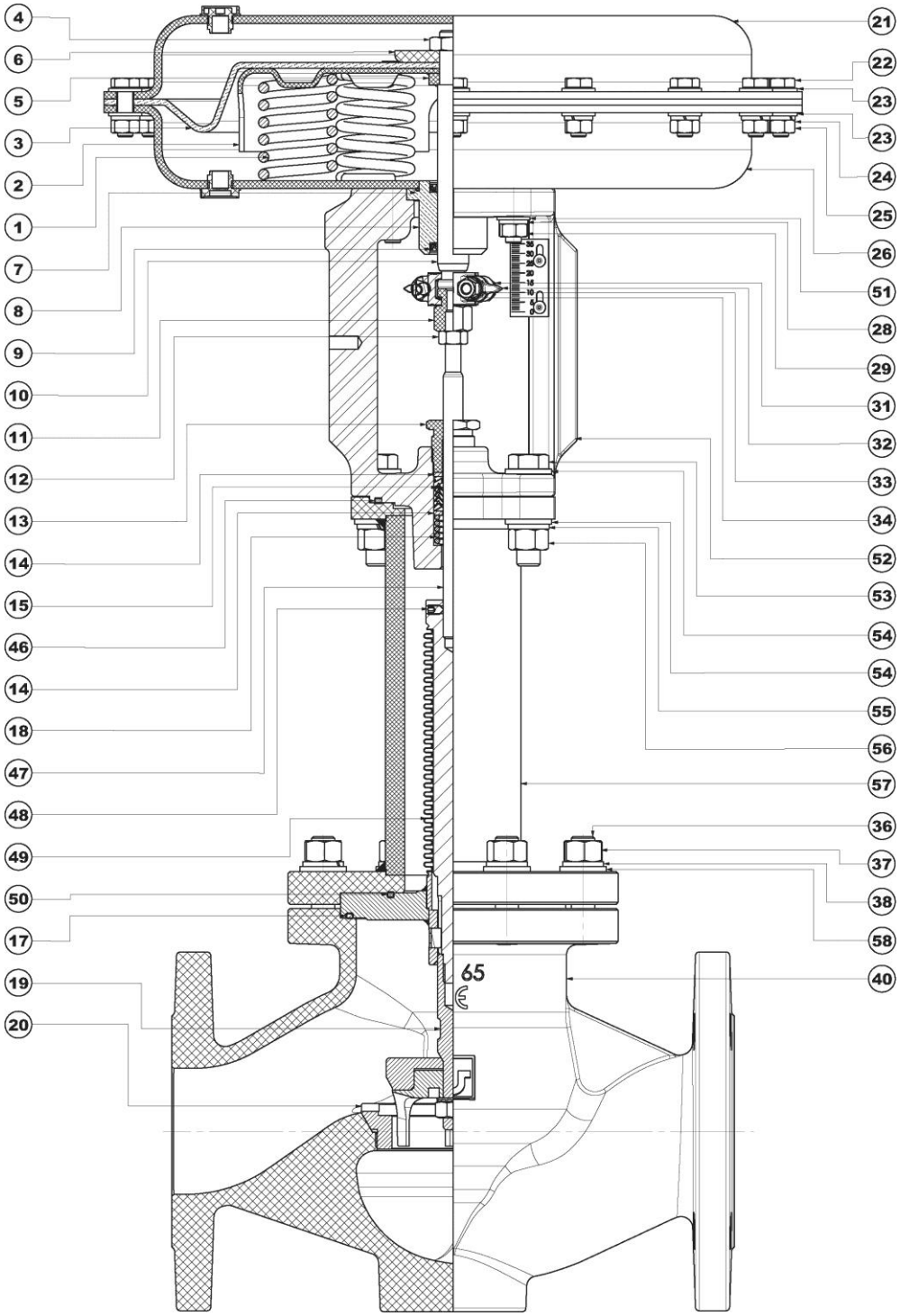
1) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move downwards.**
2) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
3) Extract air from the servo control: **Attention! Servo control shaft shall move upwards.**
4) Unscrew the nuts (29), extract the spring washers (28) and the flat washers (51).
5) Separate the servo control from frame with intermediate body.
6) Untighten adjustment nut (11) and nut (12) carefully making their position.
7) Unscrew the nuts (56), extract the spring washers (55), the flat washers (54) and the screws (53).
8) Separate the frame with intermediate body from frame extension (57).
9) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
10) Extract from frame with the intermediate body (52), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
11) Remove the gasket (46) from the frame with intermediate body (52).
12) Unscrew the nuts (37), extract the spring washers (38), the flat washers (58) and the frame extension (57).
13) Extract the intermediate body with bellows (49) with upper stem (47) and shutter (19) connected with it from the valve body (40).
14) Extract the headless screw (48), the with upper stem (47) and shutter (19) from the intermediate body with bellows (49).
15) Remove gaskets (50) and (17) from intermediate body with bellows.
16) Disassemble the servo control following the procedure described in paragraph 6.24.1.
17) Now the valve has been completely disassembled, so that the required components can be replaced.

6.18.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Insert gaskets (17) and (50) into intermediate body with bellows.
3) Screw shutter (19) to intermediate body with bellows (49), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
4) Tighten the upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
5) Insert the intermediate body with bellows assembled inside the valve body (40).
6) Place the frame extension (57) inside the intermediate body with bellows in correspondence with stud-bolts (36).
7) Insert the flat washers (58) and the elastic washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
9) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
10) Place the gasket (46) into the frame seat (52).
11) Insert the previously-assembled frame into the frame extension (57) and onto the upper stem (47).
12) Insert washers (54) into screws (53) and the screws into the frame (52).
13) Insert the flat washers (54) and the elastic washers (55) on the screws (53) and torque tighten the nuts (56) according to table 6 on page 74.
14) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
15) Tighten nut (12) and adjustment nut (11) on the upper stem (47): place adjustment nut in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
16) Place the previously-assembled servo control on the frame with intermediate body (52).
17) Insert the flat washers (51) and the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.

18) Insert as much air into servo control as equivalent to maximum value provided for by the signal: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
19) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32), insert screws (31) and insert washers (33) on them, then tighten the nuts (34).
20) Extract air from the servo control: **Attention! Servo control shaft shall move upwards in its stroke.**

Sectional view of SBS/10 ND 65#80 2-way NO valve with bellows



Drawing N° 110575 Rev.:00

6.19 Disassembly and assembly instructions for SBS/10 3-way NC mixer valve with bellows

For disassembly and assembly instructions for SBS/10 3-way NC mixer valve with bellows refer to Drw. No. 110576 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.19.1 Disassembly

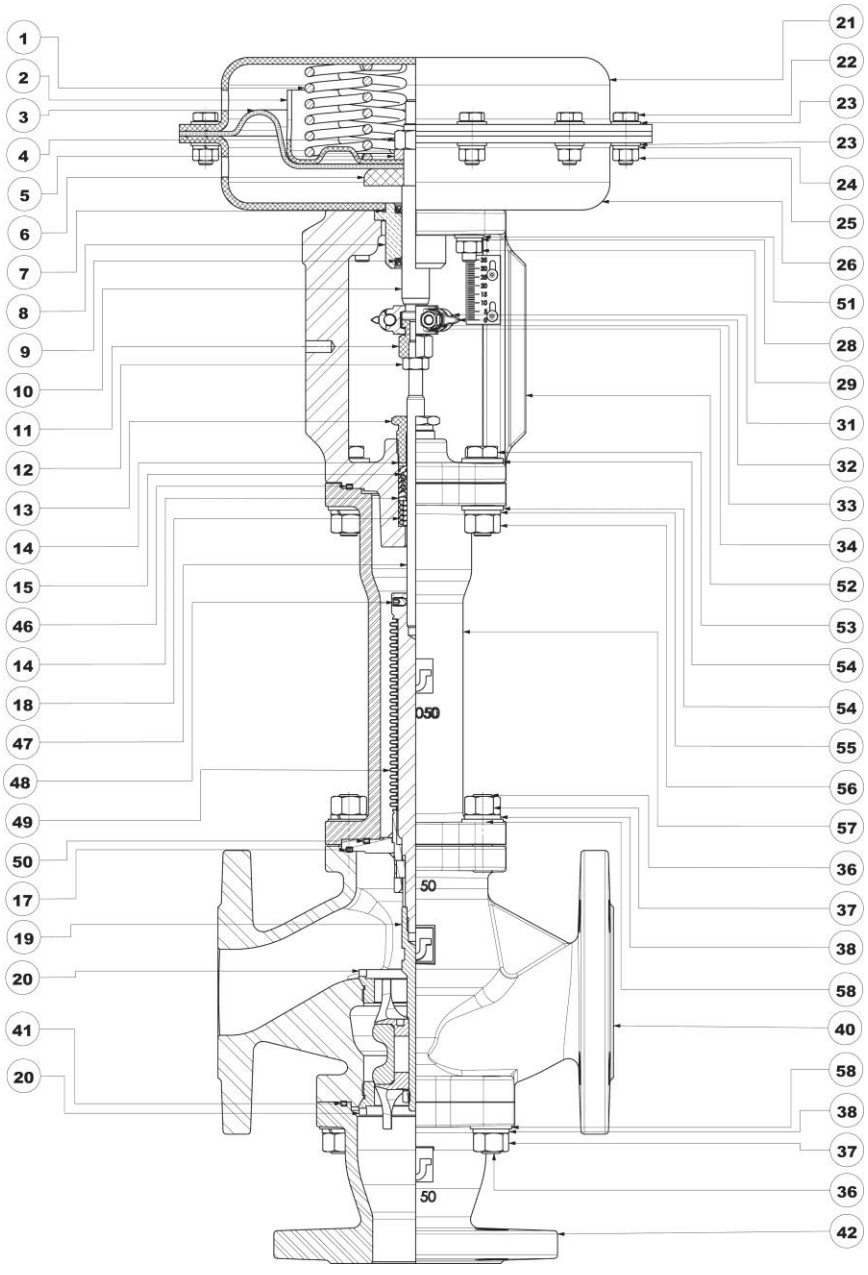
1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards**
3) Untighten adjustment nut (11) and nut (12) carefully making their position.
4) Unscrew the nuts (56), extract the spring washers (55), the flat washers (54) and the screws (53).
5) Separate the servo control and the frame with intermediate body frame extension (57).
6) Remove air from servo control, unscrew the nuts (29), extract the spring washers (28) and the flat washers (51).
7) Separate the frame with intermediate body from servo control.
8) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
9) Extract from frame with the intermediate body (52), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
10) Remove the gasket (46) from the frame with intermediate body (52).
11) Unscrew the lower nuts (37), extract the spring washers (38) and the flat washers (58).
12) Separate the bottom base (42) from the valve body (40).
13) Extract the bottom base gasket (41).
14) Untighten the lower seat (20) and the shutter (19) from the intermediate body with bellows (49).
15) Unscrew the nuts (37), extract the spring washers (38), the flat washers (58) and the frame extension (57).
16) Extract the intermediate body with bellows (49) with upper stem (47) connected with it from the valve body (40).
17) Extract the headless screw (48) and the upper stem (47) from the intermediate body with bellows (43).
18) Remove gaskets (50) and (17) from intermediate body with bellows.
19) Disassemble the servo control following the procedure described in paragraph 6.23.1.
20) Now the valve has been completely disassembled, so that the required components can be replaced.

6.19.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.23.2.
2) Insert gaskets (17) and (50) into intermediate body with bellows.
3) Tighten the upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
4) Insert the intermediate body with bellows assembled inside the valve body (40).
5) Place the frame extension (57) inside the intermediate body with bellows in correspondence with stud-bolts (36).
6) Insert the flat washers (58) and the elastic washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
7) Screw shutter (19) to intermediate body with bellows (49) (through valve body bottom), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
8) Spread MOTORSIL D (AREXONS) silicone gasket in the contact area between seat and valve body; then, tighten lower seat (20).
9) Place the gasket (41) in the bottom base (42).
10) Insert the bottom base (42) on the stud-bolts, then insert flat washers (58) and elastic washers (38) and torque tighten the lower nuts (37) according to table 6 on page 74.
11) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
12) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
13) Place the gasket (46) into the frame seat (52).
14) Insert the previously-assembled frame into the frame extension (57) and onto the upper stem (47).
15) Insert washers (54) into screws (53) and the screws into the frame (52).
16) Insert the flat washers (54) and the elastic washers (55) on the screws (53) and torque tighten the nuts (56) according to table 6 on page 74.

17) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
18) Fully tighten on the upper stem (47) the nut (12) and the adjustment nut (11).
19) Place the previously-assembled servo control on the frame with intermediate body (52).
20) Insert the flat washers (51) and the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
21) Enter air into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control stem shall move upwards in its stroke.**
22) Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
23) Extract air from servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
24) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32); insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional view of SBS/10 3-way NC mixer valve with bellows



Drawing N° 110576 Rev.:00

6.20 Disassembly and assembly instructions for SBS/10 3-way NO mixer valve with bellows

For disassembly and assembly instructions for SBS/10 3-way NO mixer valve with bellows refer to Drw. No. 110577 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.20.1 Disassembly

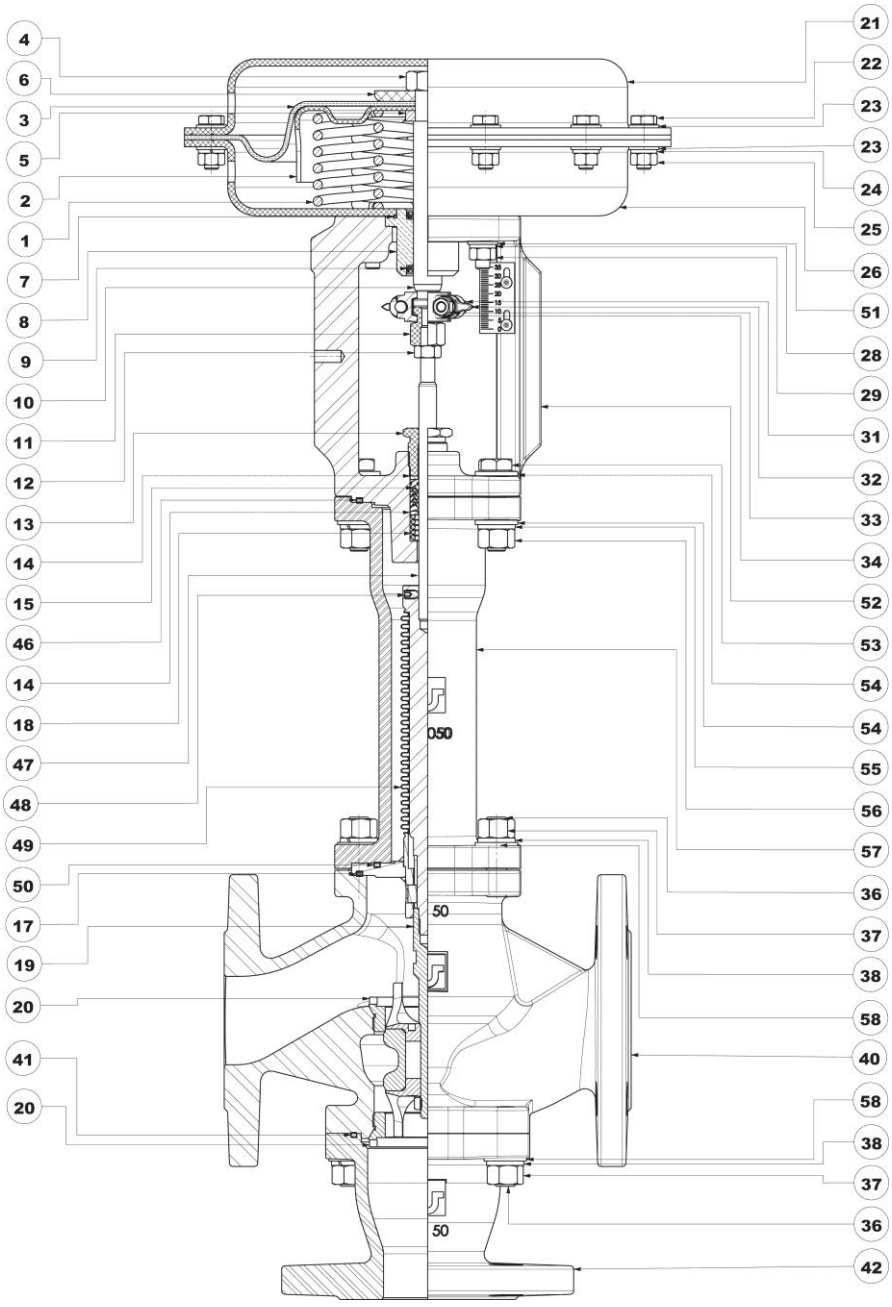
1) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move downwards.**
2) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
3) Extract air from the servo control: **Attention! Servo control shaft shall move upwards.**
4) Unscrew the nuts (29), extract the spring washers (28) and the flat washers (51).
5) Separate the servo control from frame with intermediate body.
6) Untighten adjustment nut (11) and nut (12) carefully making their position.
7) Unscrew the nuts (56), extract the spring washers (55), the flat washers (54) and the screws (53).
8) Separate the frame with intermediate body (52) from frame extension (57).
9) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
10) Extract from frame with the intermediate body (52), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
11) Remove the gasket (46) from the frame with intermediate body (52).
12) Unscrew the lower nuts (37), extract the spring washers (38) and the flat washers (58).
13) Separate the bottom base (42) from the valve body (40).
14) Extract the bottom base gasket (41).
15) Untighten the lower seat (20) and the shutter (19) from the intermediate body with bellows (49).
16) Unscrew the nuts (37), extract the spring washers (38), the flat washers (58) and the frame extension (57).
17) Extract the intermediate body with bellows (49) with upper stem (47) connected with it from the valve body (40).
18) Extract the headless screw (48) and the upper stem (47) from the intermediate body with bellows (49).
19) Remove gaskets (50) and (17) from intermediate body with bellows.
20) Disassemble the servo control following the procedure described in paragraph 6.24.1.
21) Now the valve has been completely disassembled, so that the required components can be replaced.

6.20.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Insert gaskets (17) and (50) into intermediate body with bellows.
3) Tighten the upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
4) Insert the intermediate body with bellows assembled inside the valve body (40).
5) Place the frame extension (57) inside the intermediate body with bellows in correspondence with stud-bolts (36).
6) Insert the flat washers (58) and the elastic washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
7) Screw shutter (19) to intermediate body with bellows (49) (through valve body bottom), by using NT 907 TS (RESBOND) threading dope as shown in drawing.
8) Spread MOTORSIL D (AREXONS) silicone gasket in the contact area between seat and valve body; then, tighten lower seat (20).
9) Place the gasket (41) in the bottom base (42).
10) Insert the bottom base (42) on the stud-bolts, then insert flat washers (58) and elastic washers (38) and torque tighten the lower nuts (37) according to table 6 on page 74.
11) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
12) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
13) Place the gasket (46) into the frame seat (52).
14) Insert the previously-assembled frame into the frame extension (57) and onto the upper stem (47).
15) Insert washers (54) into screws (53) and the screws into the frame (52).

16) Insert the flat washers (54) and the elastic washers (55) on the screws (53) and torque tighten the nuts (56) according to table 6 on page 74.
17) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
18) Fully tighten on the upper stem (47) the nut (12) and the adjustment nut (11). Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
19) Place the previously-assembled servo control on the frame with intermediate body (52).
20) Insert the flat washers (51) and the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
21) Insert as much air into servo control as equivalent to maximum value provided for by the signal: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
22) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32); insert screws (31) and insert washers (33) on them, then tighten the nuts (34).
23) Extract air from the servo control: **Attention! Servo control stem shall move upwards.**

Sectional view of SBS/10 3-way NO mixer valve with bellows



Drawing N° 110577 Rev.:00

6.21 Disassembly and assembly instructions for SBS/10 3-way NC deviator valve with bellows

For disassembly and assembly instructions for SBS/10 3-way NC deviator valve with bellows refer to Drw. No. 110578 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.21.1 Disassembly

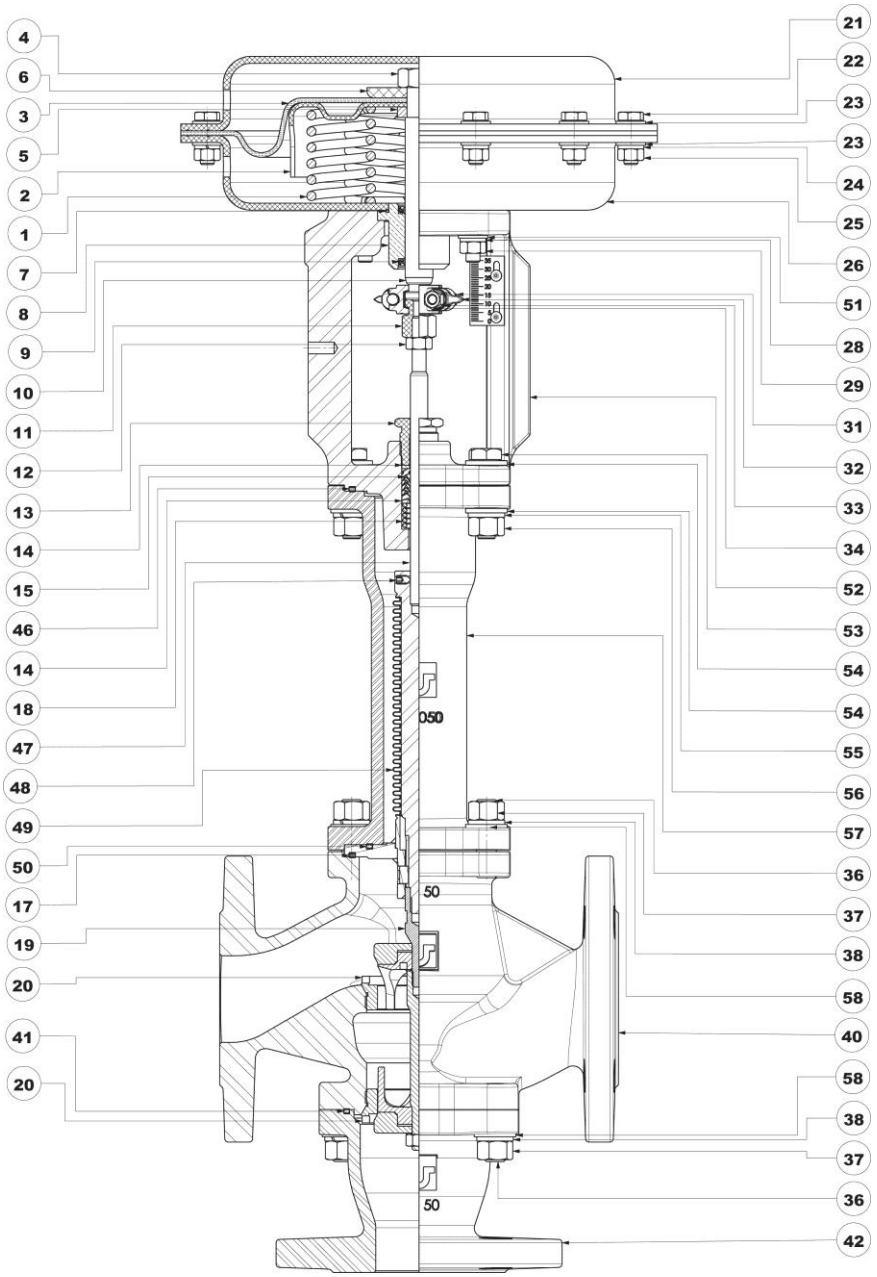
1) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move downwards.**
2) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
3) Extract air from the servo control: **Attention! Servo control shaft shall move upwards.**
4) Unscrew the nuts (29), extract the spring washers (28) and the flat washers (51).
5) Separate the servo control from frame with intermediate body.
6) Untighten adjustment nut (11) and nut (12) carefully making their position.
7) Unscrew the nuts (56), extract the spring washers (55), the flat washers (54) and the screws (53).
8) Separate the frame with intermediate body (52) from frame extension (57).
9) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
10) Extract from frame with the intermediate body (52), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
11) Remove the gasket (46) from the frame with intermediate body (52).
12) Unscrew the lower nuts (37), extract the spring washers (38) and the flat washers (58).
13) Separate the bottom base (42) from the valve body (40).
14) Extract the bottom base gasket (41).
15) Disassemble the shutter following the procedure described in paragraph 6.28.1
16) Unscrew the nuts (37), extract the spring washers (38), the flat washers (58) and the frame extension (57).
17) Extract the intermediate body with bellows (49) with upper stem (47) connected with it from the valve body (40).
18) Extract the headless screw (48) and the upper stem (47) from the intermediate body with bellows (49).
19) Complete disassemble the shutter following the procedure described in paragraph 6.28.2
20) Remove gaskets (50) and (17) from intermediate body with bellows.
21) Disassemble the servo control following the procedure described in paragraph 6.23.1.
22) Now the valve has been completely disassembled, so that the required components can be replaced.

6.21.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.23.2.
2) Reassemble the shutter following the procedure described in paragraph 6.28.3
3) Insert gaskets (17) and (50) into intermediate body with bellows.
4) Tighten the upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
5) Insert the intermediate body with bellows assembled inside the valve body (40).
6) Place the frame extension (57) inside the intermediate body with bellows in correspondence with stud-bolts (36).
7) Insert the flat washers (58) and the elastic washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Complete reassemble the shutter following the procedure described in paragraph 6.28.4
9) Place the gasket (41) in the bottom base (42).
10) Insert the bottom base (42) on the stud-bolts, then insert flat washers (58) and elastic washers (38) and torque tighten the lower nuts (37) according to table 6 on page 74.
11) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
12) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
13) Place the gasket (46) into the frame seat (52).
14) Insert the previously-assembled frame into the frame extension (57) and onto the upper stem (47).
15) Insert washers (54) into screws (53) and the screws into the frame (52).
16) Insert the flat washers (54) and the elastic washers (55) on the screws (53) and torque tighten the nuts (56) according to table 6 on page 74.

17) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
18) Fully tighten on the upper stem (47) the nut (12) and the adjustment nut (11). Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
19) Place the previously-assembled servo control on the frame with intermediate body (52).
20) Insert the flat washers (51) and the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
21) Insert as much air into servo control as equivalent to maximum value provided for by the signal: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
22) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32); insert screws (31) and insert washers (33) on them, then tighten the nuts (34).
23) Extract air from the servo control: **Attention! Servo control stem shall move upwards.**

Sectional view of SBS/10 3-way NC deviator valve with bellows



Disegno N° 110578 Rev.:00

6.22 Disassembly and assembly instructions for SBS/10 3-way NO deviator valve with bellows

For disassembly and assembly instructions for SBS/10 3-way NO deviator valve with bellows refer to Drw. No. 110579 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

6.22.1 Disassembly

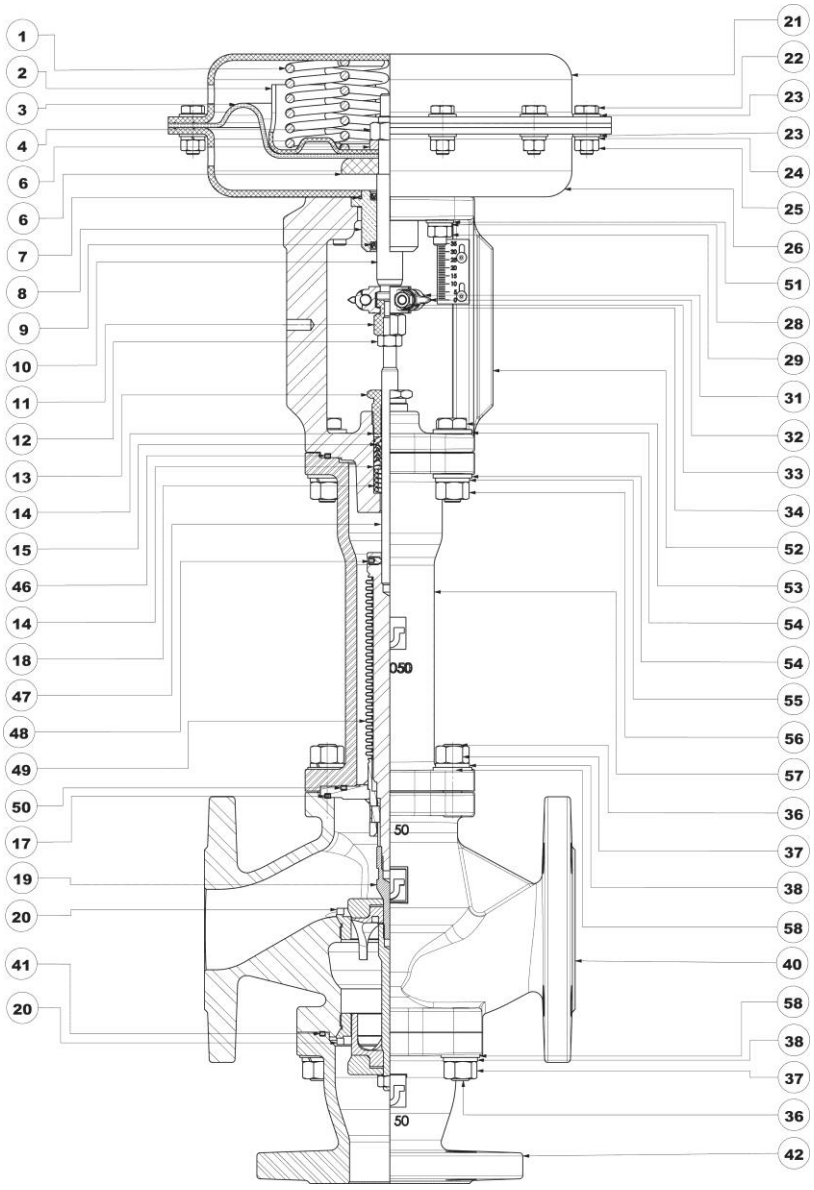
1) Unscrew the nuts (34), extract the washers (33) and the screws (31), separate the junction clamps (32).
2) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards.**
3) Unscrew the nuts (56), extract the spring washers (55), the flat washers (54) and the screws (53).
4) Untighten adjustment nut (11) and nut (12) carefully making their position.
5) Separate the frame with intermediate body (52) from frame extension (57).
6) Extract air from the servo control: **Attention! Servo control shaft shall move downwards.**
7) Unscrew the nuts (29), extract the spring washers (28) and the flat washers (51).
8) Separate the servo control from frame with intermediate body.
9) Untighten the packing gland screw (13). **Caution! The packing gland screw (13) keeps the packing gland spring (18) compressed; maximum care shall then be taken to prevent the inner components of frame with intermediate body from coming out suddenly when the packing gland screw (13) is no more kept by the thread.**
10) Extract from frame with the intermediate body (52), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14) and the packing gland spring (18).
11) Remove the gasket (46) from the frame with intermediate body (52).
12) Unscrew the lower nuts (37), extract the spring washers (38) and the flat washers (58).
13) Separate the bottom base (42) from the valve body (40).
14) Extract the bottom base gasket (41).
15) Disassemble the shutter following the procedure described in paragraph 6.28.1
16) Unscrew the nuts (37), extract the spring washers (38), the flat washers (58) and the frame extension (57).
17) Extract the intermediate body with bellows (49) with upper stem (47) and shutter part connected with it from the valve body (40).
18) Extract the headless screw (48) and the upper stem (47) from the intermediate body with bellows (49).
19) Unscrew the shutter stem (19) from the body with intermediate body.
20) Complete disassemble the shutter following the procedure described in paragraph 6.28.2
21) Remove gaskets (50) and (17) from intermediate body with bellows.
22) Disassemble the servo control following the procedure described in paragraph 6.24.1.
23) Now the valve has been completely disassembled, so that the required components can be replaced.

6.22.2 Reassembly

1) Reassemble the servo control following the procedure described in paragraph 6.24.2.
2) Reassemble the shutter following the procedure described in paragraph 6.28.3
3) Insert gaskets (17) and (50) into intermediate body with bellows.
4) Tighten the upper stem (47) inside the intermediate body with bellows (49) and fasten by headless screw (48).
5) Insert the intermediate body with bellows assembled inside the valve body (40).
6) Place the frame extension (57) inside the intermediate body with bellows in correspondence with stud-bolts (36).
7) Insert the flat washers (58) and the elastic washers (38) on the stud-bolts and torque tighten the nuts (37) according to table 6 on page 74.
8) Complete reassemble the shutter following the procedure described in paragraph 6.28.4
9) Place the gasket (41) in the bottom base (42).
10) Insert the bottom base (42) on the stud-bolts, then insert flat washers (58) and elastic washers (38) and torque tighten the lower nuts (37) according to table 6 on page 74.
11) Insert in the frame with the intermediate body the packing gland spring (18), the first packing gland washer (14), the packing gland (15), the second packing gland washer (14).
12) Tighten the packing gland screw (13) by two revolutions. **Caution! The packing gland screw keeps the packing gland spring compressed: maximum care shall then be taken to prevent the parts located on the spring from coming out suddenly during the assembly operations.**
13) Place the gasket (46) into the frame seat (52).
14) Insert the previously-assembled frame into the frame extension (57) and onto the upper stem (47).
15) Insert washers (54) into screws (53) and the screws into the frame (52).

16) Insert the flat washers (54) and the elastic washers (55) on the screws (53) and torque tighten the nuts (56) according to table 6 on page 74.
17) Tighten packing gland screw (13) until it is projected by ≈ 13 mm from the upper level of intermediate body.
18) Fully tighten on the upper stem (47) the nut (12) and the adjustment nut (11).
19) Place the previously-assembled servo control on the frame with intermediate body (52).
20) Insert the flat washers (51) and the elastic washers (28) on the lower head stud-bolts and torque tighten the nuts (29) according to table 6 on page 74.
21) Enter an air signal into the servo control equal to the maximum value provided for by this signal: **Attention! Servo control shaft shall move upwards.**
22) Place precharge adjustment nut (11) in the position kept before valve disassembly to obtain the same calibration, then fasten by nut (12).
23) Insert as much air into servo control as equivalent to maximum value provided for by the signal: **Attention! Servo control stem shall move downwards.**
24) Extract air from the servo control: **Attention! Servo control stem shall move downwards until in contact with adjustment nut (11).**
25) Join precharge adjustment nut (11) and servo control shaft (10) with junction clamps (32); insert screws (31) and insert washers (33) on them, then tighten the nuts (34).

Sectional view of SBS/10 3-way NO deviator valve with bellows



Disegno N° 110579 Rev.:00

6.23 Disassembly and assembly instructions for SBS/10 NC servo control

For disassembly and assembly instructions for N.C. servo control for SBS/10 to Drw. No. 100791 attached hereby.

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

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

NOTE: Read the procedures thoroughly before starting any operation.

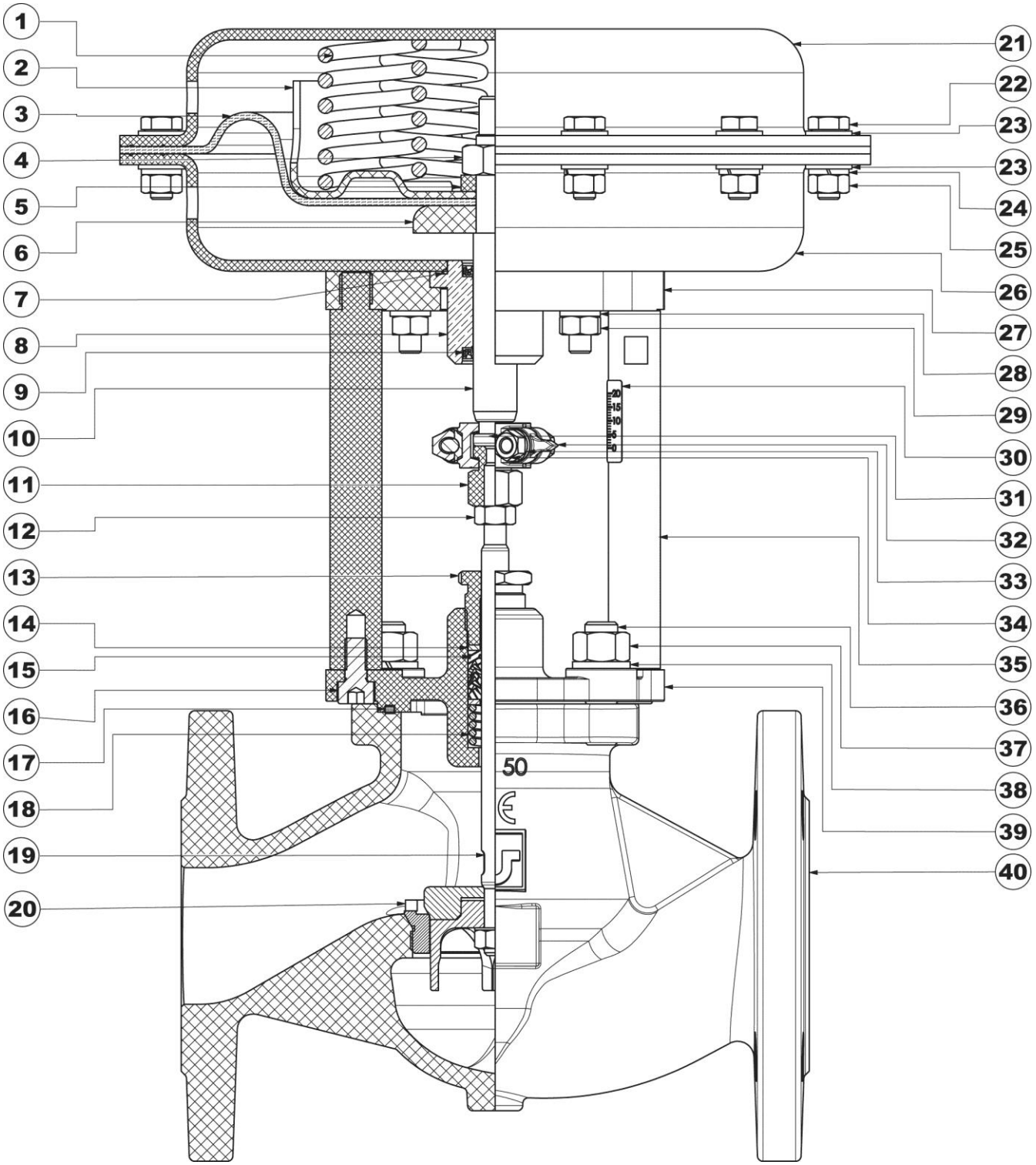
6.23.1 Disassembly

1) Extract jig bushing (8). Remove BA (9) and OR gasket (7) from it.
2) Untighten screws (22) and separate from nuts (25), from flat washers (23) and from elastic washers (24).
3) **Attention! Compressed springs are included inside the servo control**: use a suitable equipment to prevent sudden separation of two servo control heads when all screws are untightened (22).
4) Remove the upper head (21).
5) Extract servo control springs (1).
6) Extract the lower head (26) from servo control shaft (10).
7) Lock the servo control shaft between soft jaws (10), then unscrew the nut (4).
8) Extract the servo control shaft (10) from spacer ring washer (5), spring-holding plate (2), membrane (3) and diaphragm counter-disc (6).
9) Now the servo control has been completely disassembled, so that the required components can be replaced.

6.23.2 Reassembly

1) Fasten the servo control shaft (10) between soft jaws, insert on it diaphragm counter-disc (6), membrane (3), spring-holding plate (2) and spacer ring washer (5).
2) Tighten and punch hexagonal nut (4).
3) Insert the lower head (26) into servo control shaft assembled.
4) Place membrane (2) so that its screw holes correspond with lower head screw holes.
5) Insert springs (1) into spring-holding plate (3), by placing them on centring bosses located on spring-holding plate.
6) Place upper head (21) so that air holes of both heads are on the same vertical line and screw holes correspond with membrane and lower head screw holes.
7) Using proper instruments, press the springs go get the two heads closer. **Attention! Ensure that two heads cannot suddenly separate before being fastened with proper screws.**
8) Insert the flat washers (23) in the screws (22), insert screws (22) into upper head holes (21), insert flat washers (23) and elastic washers (24) into screws (22) and torque tighten the hexagonal nuts (25) according to table 6 on page 74.
9) Insert BA (9) and OR gasket (7) into jig bushing (8).
10) Insert jig bushing assembled (8) on servo control shaft (10) and lower head (26).
11) Now, servo control is completely assembled and can be re-located on valve frame.

Sectional view of SBS/10 2-way NC valve



Drawing N° 100791 Rev.:00

6.24 Disassembly and assembly instructions for SBS/10 NO servo control

For disassembly and assembly instructions for N.O. servo control for SBS/10 to Drw. No. 110558 attached hereby. Assembly and disassembly operations shall be carried out only personnel qualified in in hydraulics and pneumatics, provided with all the necessary work and safety equipment. Before carrying out any operation on systems and valves, get acquainted with operating temperatures and pressures and any other particular conditions, and take the relevant safety measures.
Whenever operations are to be carried out on valves, remove the fluid completely.
NOTE: Read the procedures thoroughly before starting any operation.

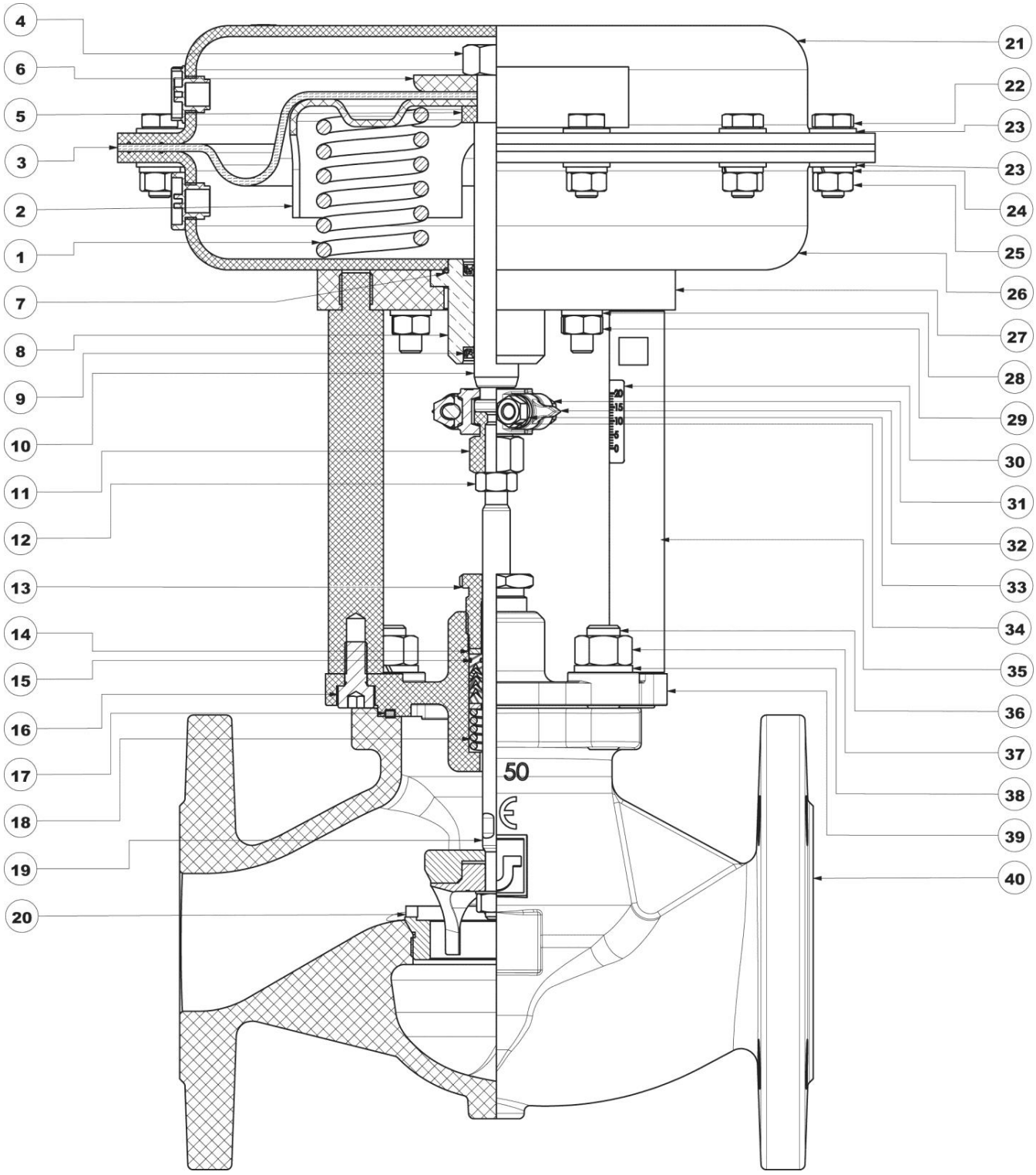
6.24.1 Disassembly

1) Extract jig bushing (8). Remove BA (9) and OR gasket (7) from it.
2) Untighten screws (21) and separate from nuts (24), from flat washers (23) and from elastic washers (22).
3) **Attention! Compressed springs are included inside the servo control**: use a suitable equipment to prevent sudden separation of two servo control heads when all screws are untightened (21).
4) Remove the upper head (20).
5) Extract the lower head (25) from servo control shaft (10).
6) Extract the springs (1) from lower head (25).
7) Lock the servo control shaft between soft jaws and unscrew the nut (4), extract diaphragm counterdisc (6). Note: 200 diameter servo control has no nut (4), but the same diaphragm counterdisc works like a closing nut.
8) Extract membrane (3), spring-holding plate (2) and spacer (5) from servo control shaft (10).
9) Now the servo control has been completely disassembled, so that the required components can be replaced.

6.24.2 Reassembly

1) Fasten the servo control shaft (10) between soft jaws, insert on it spacer (5), spring-holding plate (2), membrane (3) and diaphragm counter-disc (6).
2) Tighten and punch hexagonal nut (4). 200 diameter servo control has no nut (4), but the same diaphragm counterdisc (6) works like a closing nut.
3) Place servo control shaft assembled on the upper head (20).
4) Place membrane so that its screw holes correspond with upper head screw holes.
5) Insert springs (1) into spring-holding plate (2), by placing them on centring bosses located on plate.
6) Place lower head (25) so that air holes of both heads are on the same vertical line and screw holes correspond with membrane and upper head screw holes.
7) Using proper instruments, press the springs go get the two heads closer. **Attention! Ensure that two heads cannot suddenly separate before being fastened with screws (21).**
8) Insert the flat washers (22) in the screws (21), insert screws (21) into upper head holes (20), insert flat washers (22) and elastic washers 23) into screws (21) and torque tighten the hexagonal nuts (24) according to table 6 on page 74.
9) Insert BA (9) and OR gasket (7) into jig bushing (8).
10) Insert jig bushing assembled (8) on servo control shaft (10) and lower head (25).
11) Now, servo control is completely assembled and can be re-located on valve frame.

Spaccato valvola SBS/10 2 vie NA



Drawing N° 110588 Rev.:00

6.25 Instructions for disassembly, gasket replacement, reassembly of SBS/10 2-way T.PK. shutters

For the disassembly and assembly operations of the valves, refer to annexed Dwg No. 090189 attached hereby.
Assembly and disassembly operations shall be carried out by qualified personnel only, equipped with all the work and safety tools.
NOTE: Read the procedures thoroughly before starting any operation.

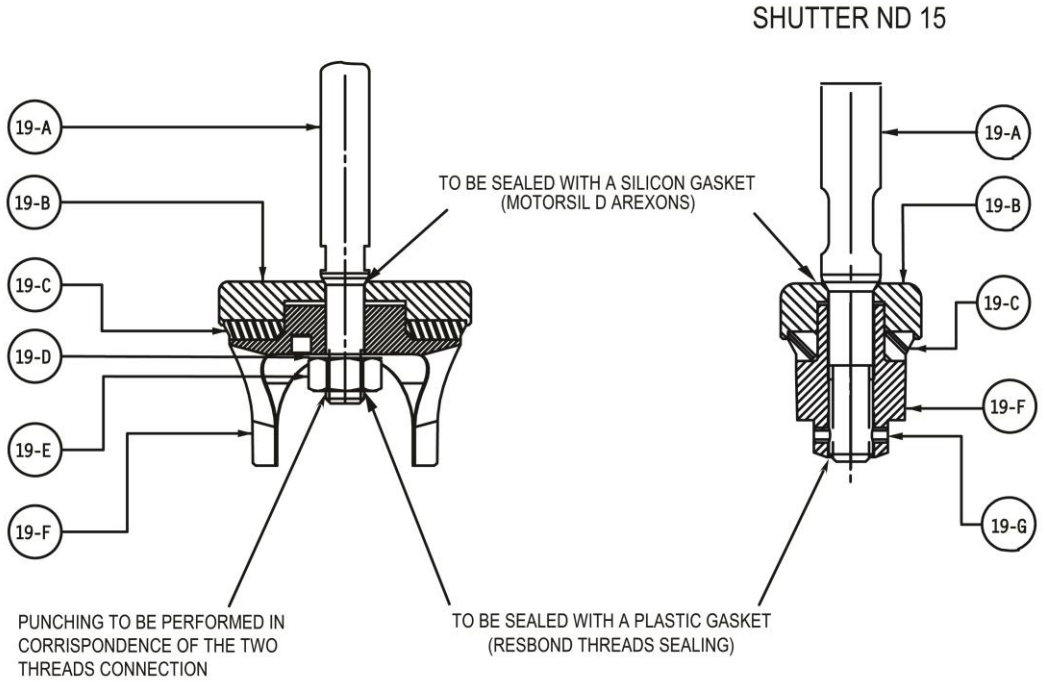
6.25.1 Disassembly

1) Lock the shutter stem (19-A) to untighten the nut (19-E) or for ND 15 remove elastic plug (19-G).
2) Extract safety washer (19-D), jig (19-F), insert (19-C) and insert-holder (19-B).

6.25.2 Assembly

1) Spread MOTORSIL D (AREXONS) silicone gasket in insert holder (19-B) as shown in drawing.
2) Insert the shutter stem (19-A) into insert holder (19-B).
3) Place insert (19-C) and jig (19-F) into insert holder (19-B).
4) Insert the safety washer (19-D) into shutter stem (19-A).
5) Spread NT 907 TS (RESBOND) threading dope on shutter stem threading (19-A) as shown in drawing, then torque tighten the hexagonal nut (19-E) as specified in table 6 page 74. For ND 15 insert elastic plug (19-G).
6) Punch nut as shown in drawing and let the shutter rest for at least 24 hours so that dopes can dry.

6.25.3 T.PK. 2-way shutter diagram



Drawing n° 090189 Rev.:01

6.26 Instructions for disassembly, gasket replacement, reassembly of SBS/10 3-way T.PK. mixer

For the disassembly and assembly operations of the valves, refer to Dwg No. 090190 attached hereby.
Assembly and disassembly operations shall be carried out by qualified personnel only, equipped with all the work and safety tools.

NOTE: Read the procedures thoroughly before starting any operation.

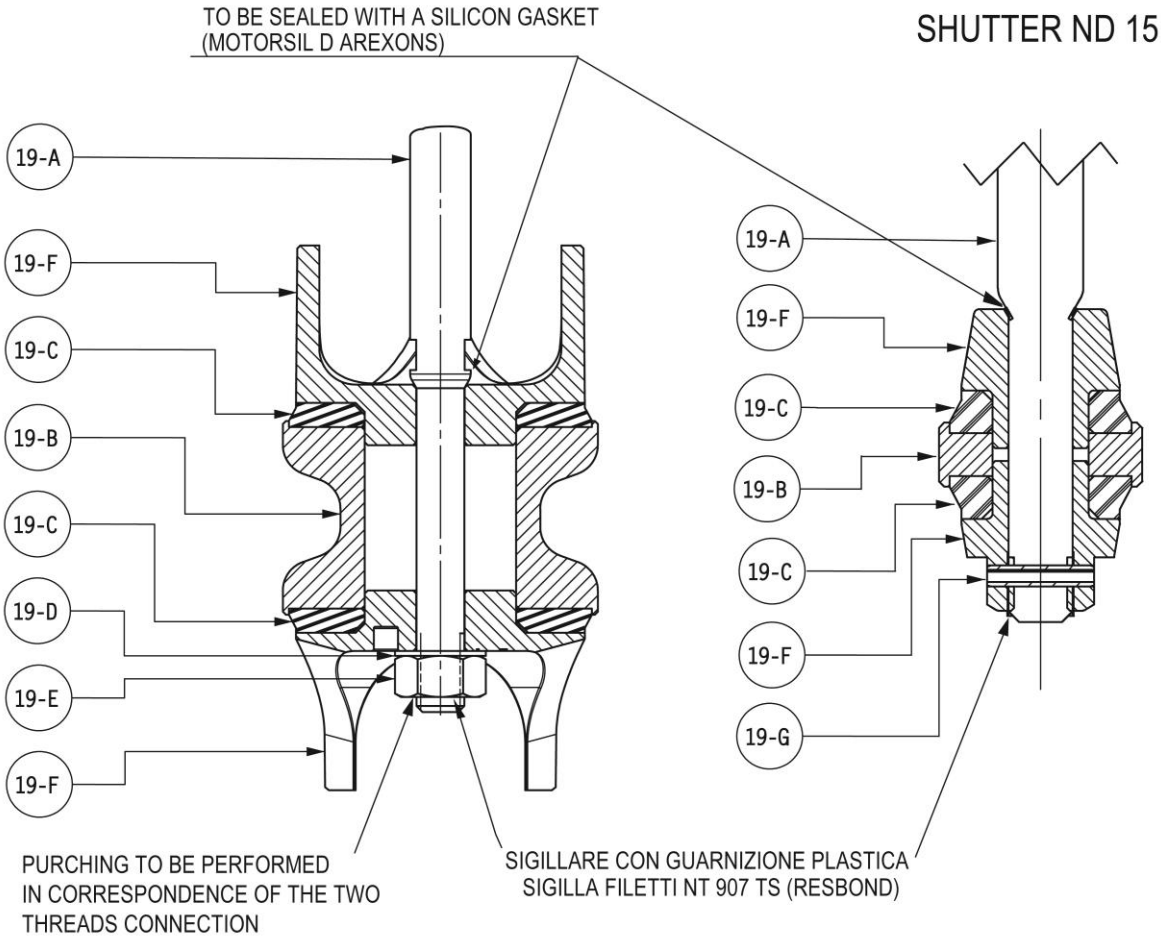
6.26.1 Disassembly

1) Lock the shutter stem (19-A) to untighten the nut (19-E) or for ND 15 remove elastic plug (19-G)..
2) Extract safety washer (19-D), first jig (19-F), first insert (19-C), insert-holder (19-B), second insert (19-C), second jig (19-F).

6.26.2 Assembly

1) Spread MOTORSIL D (AREXONS) silicone gasket in upper jig (19-F) as shown in drawing.
2) Insert the shutter stem (19-A) into upper jig (19-F).
3) Insert first insert (19-C), insert-holder (19-B), second insert (19-C), second jig (19-F) on the jig (19-F).
4) Insert the safety washer (19-D) into shutter stem (19-A).
5) Spread NT 907 TS (RESBOND) threading dope on shutter stem threading (19-A) as shown in drawing, then torque tighten the hexagonal nut (19-E) as specified in table 6 page 74 or for ND 15 insert elastic plug (19-G).
6) Punch nut as shown in drawing and let the shutter rest for at least 24 hours so that dopes can dry.

6.26.3 T.PK. 3-way mixer shutter diagram.



Drawing n° 090190 Rev.:01

6.27 Instructions for disassembly, gasket replacement, reassembly of shutters for SBS/10 3-way T.PK. deviator

For the disassembly and assembly operations of the valves, refer to annexed Dwg No. 090915 attached hereby.

Assembly and disassembly operations shall be carried out by qualified personnel only, equipped with all the work and safety tools.

NOTE: Read the procedures thoroughly before starting any operation.

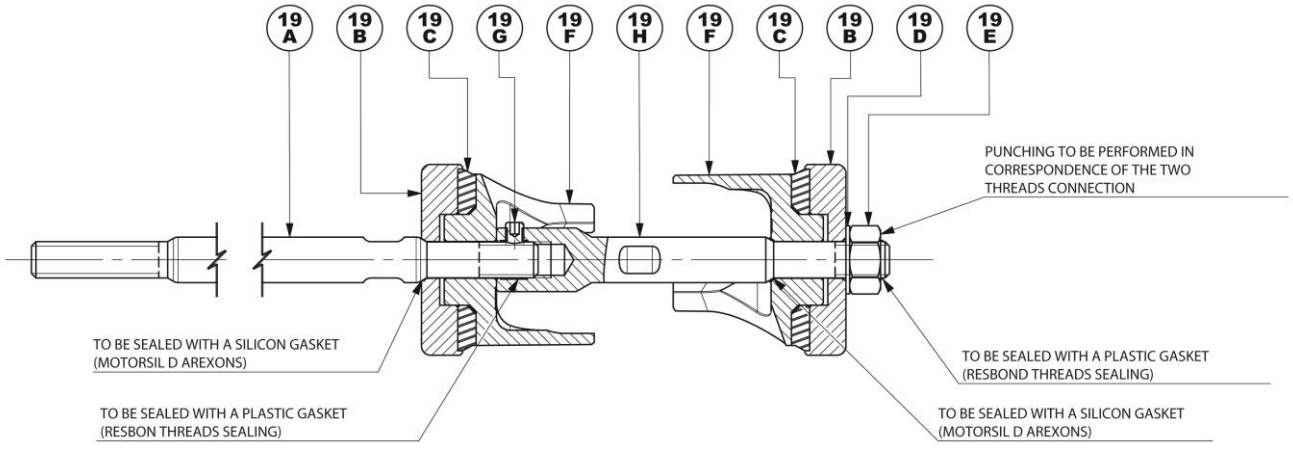
6.27.1 Disassembly

1) Lock the shutter stem (19-A) to untighten the nut (19-E).
2) Extract the first safety washer (19-D), the first insert holder (19-B), the first insert (19-C) and the first jig (19-F).
3) Extract the shutter from the valve body.
4) Lock the shutter stem (19-A), unscrew the setscrews (19-G), unscrew the stem (19-H).
5) Extract the second jig (19-F), the second insert (19-C) and the second insert-holder (19-B).

6.27.2 Assembly

1) Spread MOTORSIL D (AREXONS) silicone gasket in the first insert holder (19-B) as shown in drawing.
2) Insert the shutter stem (19-A) into the first insert holder (19-B).
3) Place the first insert (19-C) and the first jig (19-F) into the first insert holder (19-B).
4) Spread NT 907 TS (RESBOND) threading dope on shutter stem threading (19-A) as shown in drawing, then torque tighten the stem (19-H) as specified in table 6 page 74, tighten the setscrew (19-G) .
5) Insert the shutter assembled from the valve body.
6) Spread MOTORSIL D (AREXONS) silicone gasket in the second jig (19-F) as shown in drawing.
7) Insert the second jig (19-F) onto shutter stem (19-H).
8) Place the second insert (19-C) and the insert holder (19-B) into the second jig (19-F).
9) Insert the safety washer (19-D) into shutter stem (19-H).
10) Spread NT 907 TS (RESBOND) threading dope on shutter stem threading (19-G) as shown in drawing, then torque tighten the hexagonal nut (19-E) as specified in table 6 page 74.
11) Punch nut as shown in drawing and let the shutter rest for at least 24 hours so that dopes can dry.

6.27.3 T. PK. 3-way deviator shutter diagram



Drawing n° 090915 Rev.:01

6.28 Instructions for disassembly, gasket replacement, reassembly of shutters for SBS/10 3-way deviator

For the disassembly and assembly operations of the valves, refer to annexed Dwg No. 090939 attached hereby.

Assembly and disassembly operations shall be carried out by qualified personnel only, equipped with all the work and safety tools.

NOTE: Read the procedures thoroughly before starting any operation.

6.28.1 Disassembly: 1st part

1) Unscrew the nut (19-E).
2) Extract the safety washer (19-D), the first metal insert (19-B), the first jig (19-F).

6.28.2 Disassembly: 2nd part

1) Extract the intermediate body with bellows from valve body (40), untighten shutter stem (19-A) from intermediate body with bellows (49).
2) Lock the shutter stem (19-A) unscrew the setscrews (19-G), unscrew the stem (19-H).
3) Extract the second jig (19-F), the second metal insert (19-B).

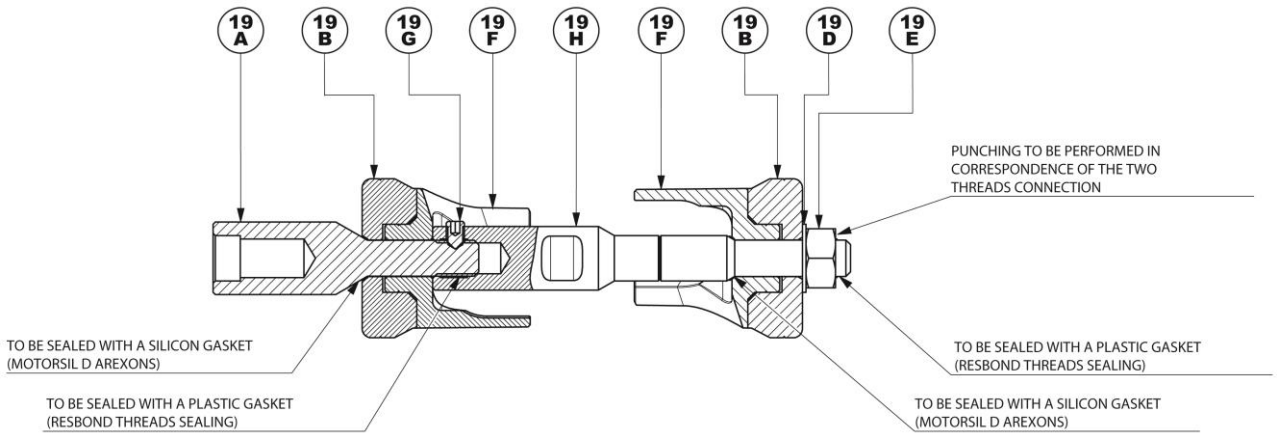
6.28.3 Assembly: 1st part

1) Spread MOTORSIL D (AREXONS) silicone gasket in the first metal insert (19-B) as shown in drawing.
2) Insert the shutter stem (19-A) into the first metal insert (19-B).
3) Place the first jig (19-F) into the first metal insert (19-B).
4) Spread NT 907 TS (RESBOND) threading dope on shutter stem threading (19-A) as shown in drawing, then torque tighten the stem (19-H) as specified in table 6 page 74.
5) Tighten the setscrew (19-G).
6) Spread NT 907 TS (RESBOND) threading dope on intermediate body stem threading (49) and tighten shutter stem (19-A).

6.28.4 Assembly: 2nd part

1) After inserting the intermediate body with bellows (49) into valve body, spread MOTORSIL D (AREXONS) silicone gasket in the second jig (19-F) as shown in drawing.
2) Insert the second jig (19-F) onto shutter stem (19-H).
3) Place the second metal insert (19-B) into the second jig (19-F).
4) Insert the safety washer (19-D) into shutter stem (19-H).
5) Spread NT 907 TS (RESBOND) threading dope on shutter stem threading (19-H) as shown in drawing, then torque tighten the hexagonal nut (19-E) as specified in table 6 page 74.
6) Punch nut as shown in drawing and let the shutter rest for at least 24 hours so that dopes can dry.

6.28.5 3-way deviator bellow shutter diagram

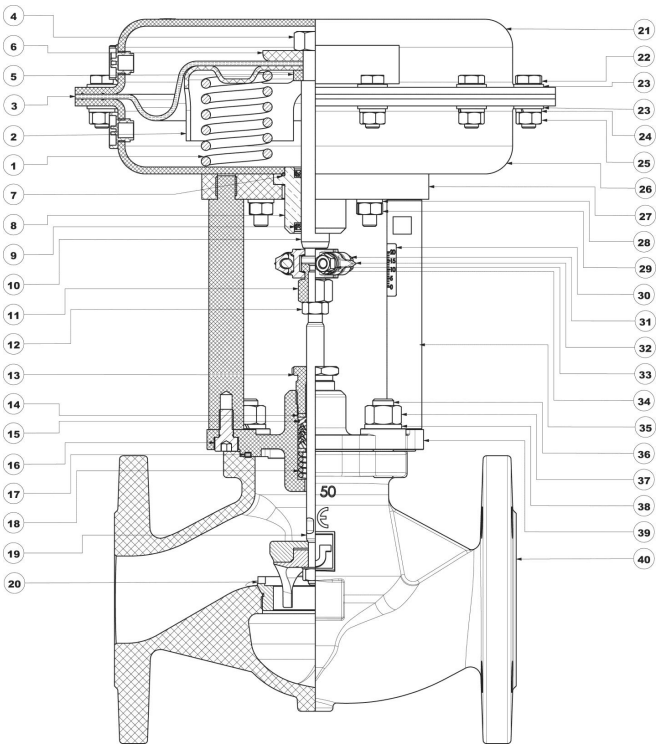


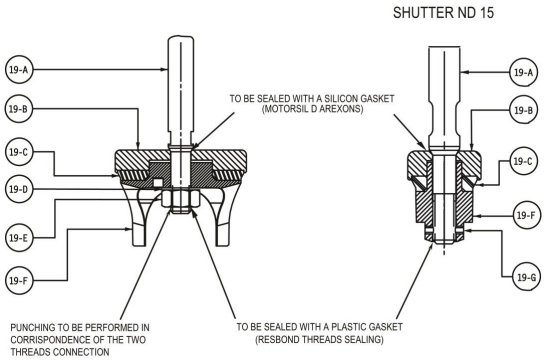
Disegno n° 090939 Rev.:00

6.29 Part and spare part SBS/10 ND 15#50 2-WAY N.C./N.O.

N°	DESCRIPTION		MATERIAL		
			WCB	CF8M	
				Fe Serv.	INOX Serv.
1	Servo control spring		SPRING STEEL		
2	Spring-holding plate		Fe – P04		
3	Membrane		NBR rubber fabric		
4	Hexagon nut		Galvanized CL.8 STEEL		
5	Distance ring washer		Galvanized ASTM A105		
6	Diaphragm counterdisc		Galvanized ASTM A105		
7	O-Ring gasket		NBR		
8	Jig bushing		BRASS		Galv. BRASS
9	BA gasket		NBR		
10	Servo control shaft		S30400		
11	Adjustment nut		Galv.Fe 430 B	S42000	
12	Hexagon nut		Galv. steel	S30400	
13	Packing gland screw		Galv. steel	S42000	
14	Distance ring washer		S30400		
15	Packing gland		PTFE + PTFE/GRAPHITE + FPM		
16	TCE screw		Galv. steel	S30400	
17	Body gasket		NOVATEC O KEVLAR+GRAPHITE		
18	Packing gland spring		S31600		
19	Shutter	T.P.	S30400+PEEK	S31600+PEEK	
		T.M.	S30400	S31600	
20	Seat (1)		S30400	S31600	
21	Upper head		Fe – P04		S30400
22	T.E. screw		Galvanized CL.8.8 STEEL		S30400
23	Flat washer		Galvanized STEEL		S30400
24	Spring washer		Galvanized STEEL		S30400
25	Hexagon nut		Galvanized CL.8 STEEL		S30400
26	Lower head		Fe – P04 + copper STEEL		S30400
27	Upper flange		Galv. Fe 430 B	S30400	
28	Spring washer		Galvanized STEEL		S30400
29	Hexagon nut		Galvanized CL.8 STEEL		S30400
30	Label graduated		POLYETHYLENE		
31	T.E. screw		S30400		
32	Clamp with indicator		CF8		
33	Spring washer		S30400		
34	Hexagon nut		S30400		
35	Columns spacer		Galv. Fe 430 B	S30400	
36	Stud-bolt		Galv. STEEL	S30400	
37	Hexagon nut		Galv. STEEL	S30400	
38	Spring washer		Galv. STEEL	S30400	
39	Intermediate body		WCB	CF8M	
40	Valve body		WCB	CF8M	

(1) In valves CF8M with full passage, seat is obtained from body's casting directly.





Body side spare parts

ND	SPARE PART CODE (2) (Part. N° 15/17/18/19-C/19-D/19-E/19-G)		
	SHUTTER T.PK.		SHUTTER T.M.
	WCB	CF8M	
15	15349	14977	12558
20	13529	14978	
25	13449	14979	
32	13539	13800	11749
40	12545	13801	
50	12546	15684	

(2) Parts 19-C/19-D/19-E are for valves with plastic seals ND20#50only. Parts 19-C/19-G are for valves with plastic seals ND15 only

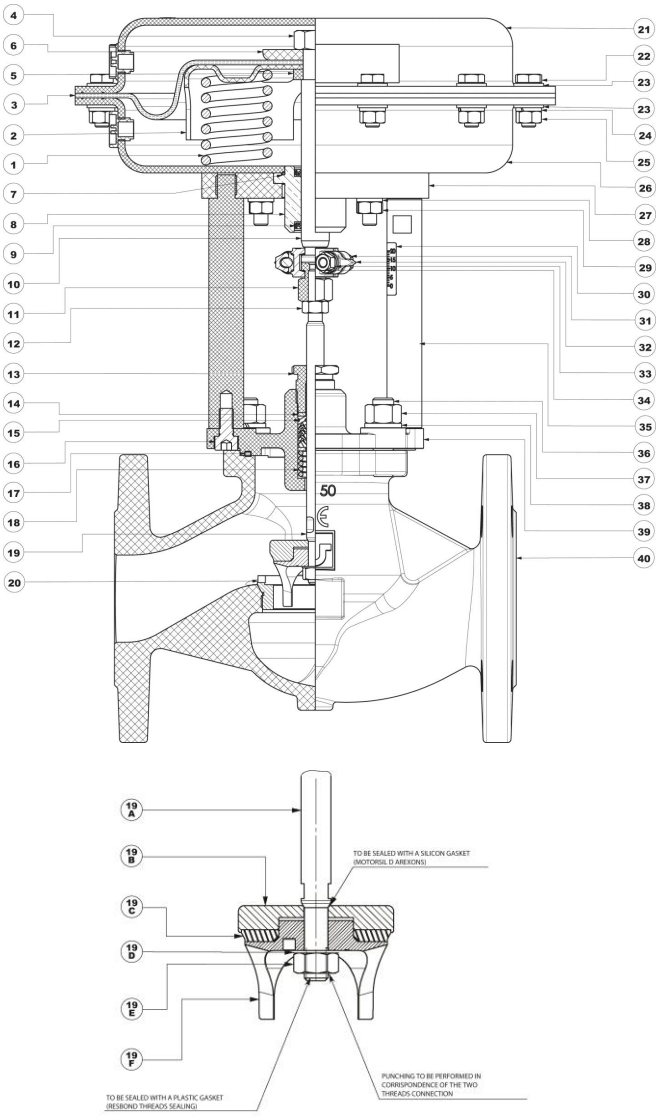
Air side spare parts

Ø Servo control	SPARE PART CODE (Part. N° 3/7/9)
Ø 200	2655
Ø 275	5401
Ø 360	5402
Ø 430	5403

6.30 Parts and spare parts SBS/10 ND 65#80 2-WAY N.C./N.O.

N°	DESCRIPTION		MATERIAL		
			WCB	CF8M	
				Fe Serv.	INOX Serv.
1	Servo control spring		SPRING STEEL		
2	Spring-holding plate		Fe – P04		
3	Membrane		NBR rubber fabric		
4	Hexagon nut		Galvanized CL.8 STEEL		
5	Distance ring washer		Galvanized ASTM A105		
6	Diaphragm counterdisc		Galvanized ASTM A105		
7	O-Ring gasket		NBR		
8	Jig bushing		BRASS		Galv. BRASS
9	BA gasket		NBR		
10	Servo control shaft		S30400		
11	Adjustment nut		Galv.Fe 430 B	S42000	
12	Hexagon nut		Galv. steel	S30400	
13	Packing gland screw		Galv. steel	S42000	
14	Distance ring washer		S30400		
15	Packing gland		PTFE + PTFE/GRAPHITE + FPM		
16	TCE screw		Galv. steel	S30400	
17	Body gasket		NOVATEC O KEVLAR+GRAPHITE		
18	Packing gland spring		S31600		
19	Shutter	T.P.	S30400+PEEK	S31600+PEEK	
		T.M.	S30400	S31600	
20	Seat (1)		S30400	S31600	
21	Upper head		Fe – P04		S30400
22	T.E. screw		Galvanized CL.8.8 STEEL		S30400
23	Flat washer		Galvanized STEEL		S30400
24	Spring washer		Galvanized STEEL		S30400
25	Hexagon nut		Galvanized CL.8 STEEL		S30400
26	Lower head		Fe – P04 + copper STEEL		S30400
27	Upper flange		Galv. Fe 430 B	S30400	
28	Spring washer		Galvanized STEEL		S30400
29	Hexagon nut		Galvanized CL.8 STEEL		S30400
30	Label graduated		POLYETHYLENE		
31	T.E. screw		S30400		
32	Clamp with indicator		CF8		
33	Spring washer		S30400		
34	Hexagon nut		S30400		
35	Columns spacer		Galv. Fe 430 B	S30400	
36	Stud-bolt		Galv. STEEL	S30400	
37	Hexagon nut		Galv. STEEL	S30400	
38	Spring washer		Galv. STEEL	S30400	
39	Intermediate body		WCB	CF8M	
40	Valve body		WCB	CF8M	

(1) In valves CF8M with full passage, seat is obtained from body's casting directly



Body side spare parts

ND	SPARE PART CODE (2) (Part. N° 15/17/18/19-C/19-D/19-E)		
	SHUTTER T.PK.		SHUTTER T.M.
	WCB	CF8M	
65	14951	14983	15264
80	14952	14984	

(2) Parts 19-C/19-D/19-E are for valves with plastic seals only

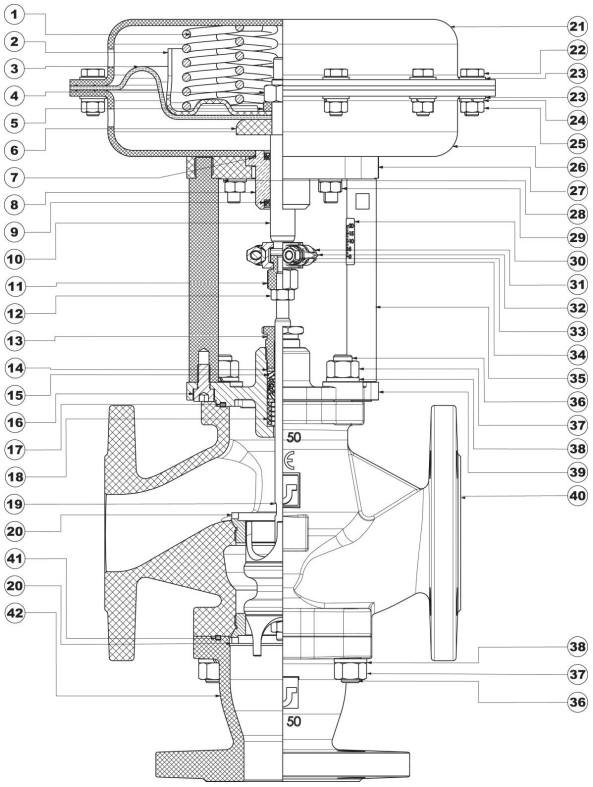
Air side spare parts

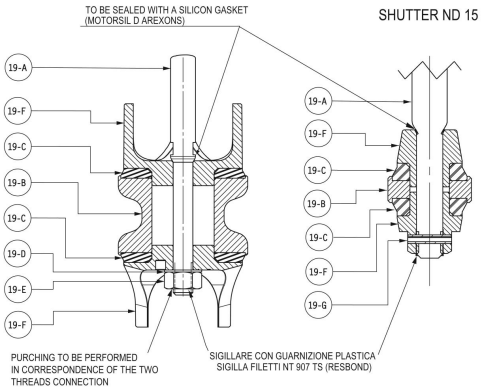
Ø servocontrol	SPARE PART CODE (Part. N° 3/7/9)
Ø 200	2655
Ø 275	5401
Ø 360	5402
Ø 430	5403

6.31 Parts and spare parts SBS/10 3-way N.C./N.O. Mixer

N°	DESCRIPTION		MATERIAL		
			WCB	CF8M	
				Fe Serv.	INOX Serv.
1	Servo control spring		SPRING STEEL		
2	Spring-holding plate		Fe – P04		
3	Membrane		NBR rubber fabric		
4	Hexagon nut		Galvanized CL.8 STEEL		
5	Distance ring washer		Galvanized ASTM A105		
6	Diaphragm counterdisc		Galvanized ASTM A105		
7	O-Ring gasket		NBR		
8	Jig bushing		BRASS		Galv. BRASS
9	BA gasket		NBR		
10	Servo control shaft		S30400		
11	Adjustment nut		Galv.Fe 430 B	S42000	
12	Hexagon nut		Galv. steel	S30400	
13	Packing gland screw		Galv. steel	S42000	
14	Distance ring washer		S30400		
15	Packing gland		PTFE + PTFE/GRAPHITE + FPM		
16	TCE screw		Galv. steel	S30400	
17	Body gasket		NOVATEC O KEVLAR+GRAPHITE		
18	Packing gland spring		S31600		
19	Shutter	T.P.	S30400+PEEK	S31600+PEEK	
		T.M.	S30400	S31600	
20	Seat (1)		S30400	S31600	
21	Upper head		Fe – P04		S30400
22	T.E. screw		Galvanized CL.8.8 STEEL		S30400
23	Flat washer		Galvanized STEEL		S30400
24	Spring washer		Galvanized STEEL		S30400
25	Hexagon nut		Galvanized CL.8 STEEL		S30400
26	Lower head		Fe – P04 + copper STEEL		S30400
27	Upper flange		Galv. Fe 430 B	S30400	
28	Spring washer		Galvanized STEEL		S30400
29	Hexagon nut		Galvanized CL.8 STEEL		S30400
30	Label graduated		POLYETHYLENE		
31	T.E. screw		S30400		
32	Clamp with indicator		CF8		
33	Spring washer		S30400		
34	Hexagon nut		S30400		
35	Columns spacer		Galv. Fe 430 B	S30400	
36	Stud-bolt		Galv. STEEL	S30400	
37	Hexagon nut		Galv. STEEL	S30400	
38	Spring washer		Galv. STEEL	S30400	
39	Intermediate body		WCB	CF8M	
40	Valve body		WCB	CF8M	
41	Bottom base gasket		NOVATEC O KEVLAR+GRAPHITE		
42	Bottom base		WCB	CF8M	

(1) In valves CF8M with full passage, seat is obtained from body's casting directly





Body side spare parts

ND	SPARE PART CODE (2) (Part. N° 15/17/18/19-C/19-D/19-E/19-G/41)		
	SHUTTER T.PK.		SHUTTER T.M.
	WCB	CF8M	
15	14954	14985	13533
20	13531	14986	
25	13451	14987	12555
32	13541	14988	12556
40	12549	14989	12557
50	13454	14990	11961
65	13692	14991	13693
80	14955	14992	14956

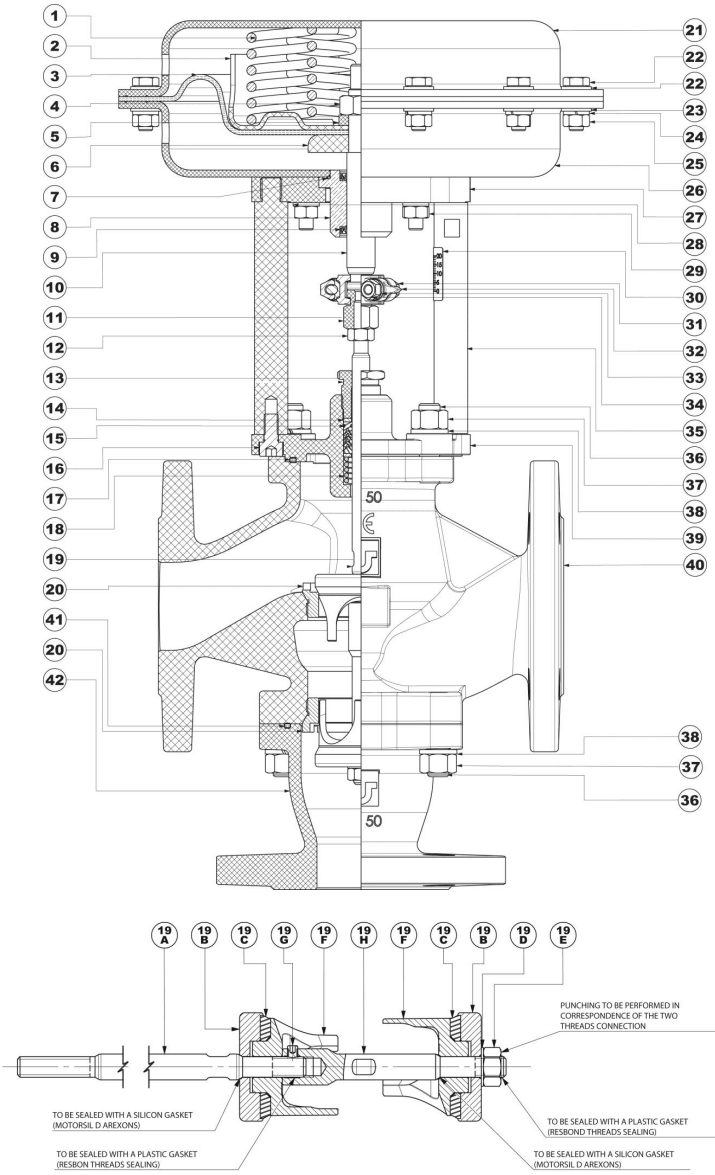
(2) Parts 19-C/19-D/19-E are for valves with plastic seals ND20#50only. Parts 19-C/19-G are for valves with plastic seals ND15 only

Air side spare parts

Ø servocontrol	SPARE PART CODE (Part. N° 3/7/9)
Ø 200	2655
Ø 275	5401
Ø 360	5402
Ø 430	5403

6.32 Parts and spare parts SBS/10 3-WAY N.C./N.A. Deviator

N°	DESCRIPTION	MATERIAL		
		WCB	CF8M	
			Fe Serv.	INOX Serv.
1	Servo control spring	SPRING STEEL		
2	Spring-holding plate	Fe – P04		
3	Membrane	NBR rubber fabric		
4	Hexagon nut	Galvanized CL.8 STEEL		
5	Distance ring washer	Galvanized ASTM A105		
6	Diaphragm counterdisc	Galvanized ASTM A105		
7	O-Ring gasket	NBR		
8	Jig bushing	BRASS		Galv. BRASS
9	BA gasket	NBR		
10	Servo control shaft	S30400		
11	Adjustment nut	Galv.Fe 430 B	S42000	
12	Hexagon nut	Galv. steel	S30400	
13	Packing gland screw	Galv. steel	S42000	
14	Distance ring washer	S30400		
15	Packing gland	PTFE + PTFE/GRAPHITE + FPM		
16	TCE screw	Galv. steel	S30400	
17	Body gasket	NOVATEC O KEVLAR+GRAPHITE		
18	Packing gland spring	S31600		
19	Shutter T.P.	S30400+PEEK	S31600+PEEK	
	Shutter T.M.	S30400	S31600	
20	Seat (1)	S30400	S31600	
21	Upper head	Fe – P04		S30400
22	T.E. screw	Galvanized CL.8.8 STEEL		S30400
23	Flat washer	Galvanized STEEL		S30400
24	Spring washer	Galvanized STEEL		S30400
25	Hexagon nut	Galvanized CL.8 STEEL		S30400
26	Lower head	Fe – P04 + copper STEEL		S30400
27	Upper flange	Galv. Fe 430 B	S30400	
28	Spring washer	Galvanized STEEL		S30400
29	Hexagon nut	Galvanized CL.8 STEEL		S30400
30	Label graduated	POLYETHYLENE		
31	T.E. screw	S30400		
32	Clamp with indicator	CF8		
33	Spring washer	S30400		
34	Hexagon nut	S30400		
35	Columns spacer	Galv. Fe 430 B	S30400	
36	Stud-bolt	Galv. STEEL	S30400	
37	Hexagon nut	Galv. STEEL	S30400	
38	Spring washer	Galv. STEEL	S30400	
39	Intermediate body	WCB	CF8M	
40	Valve body	WCB	CF8M	
41	Bottom base gasket	NOVATEC O KEVLAR+GRAPHITE		
42	Bottom base	WCB	CF8M	



(1) In valves CF8M with full passage, seat is obtained from body's casting directly

Body side spare parts

ND	SPARE PART CODE (2) (Part. N° 15/17/18/19-C/19-D/19-E/41)		
	SHUTTER T.PK.		SHUTTER T.M.
	WCB	CF8M	
15	14962	14985	13532
20	13530	14986	
25	13450	14987	12559
32	13540	14988	12560
40	12553	14989	12561
50	13453	14990	13139
65	13694	14991	13695
80	15450	14992	14964

(2) Part 19-C are for valves with plastic seals only

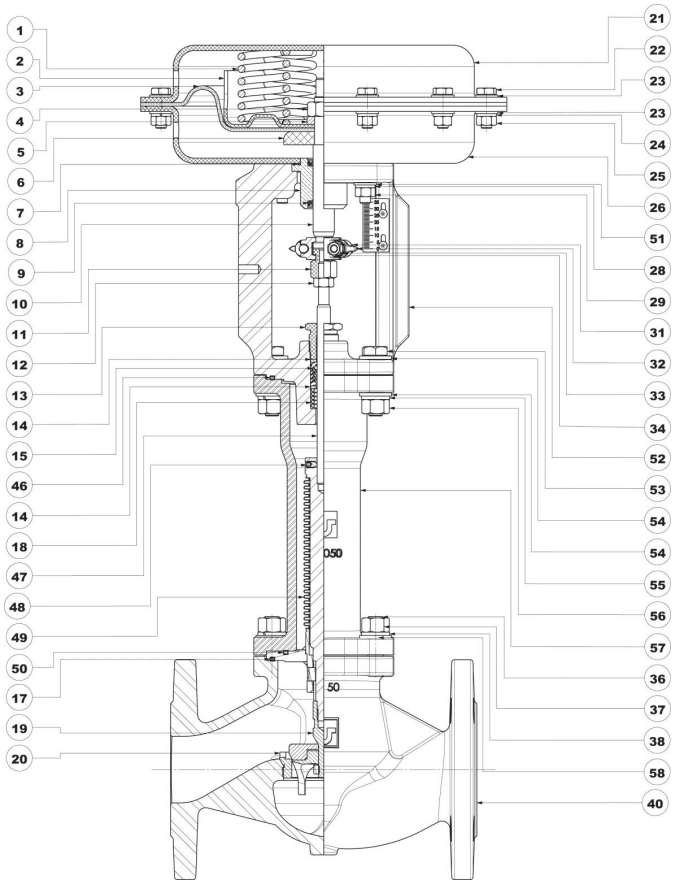
Air side spare parts

Ø servocontrol	SPARE PART CODE (Part. N° 3/7/9)
Ø 200	2655
Ø 275	5401
Ø 360	5402
Ø 430	5403

6.33 Parts and spare parts SBS/10 ND 15#50 2-WAY with bellows N.C./N.O.

N°	DESCRIPTION		MATERIAL	
			WCB	CF8M
1	Servo control spring		SPRING STEEL	
2	Spring-holding plate		Fe – P04	
3	Membrane		NBR rubber fabric	
4	Hexagon nut		Galvanized CL.8 STEEL	
5	Distance ring washer		Galvanized ASTM A105	
6	Diaphragm counterdisc		Galvanized ASTM A105	
7	O-Ring gasket		NBR	
8	Jig bushing		BRASS	
9	BA gasket		NBR	
10	Servo control shaft		S30400	
11	Adjustment nut		Galv.Fe 430 B	
12	Hexagon nut		Galv. steel	
13	Packing gland screw		Galv. steel	
14	Distance ring washer		S30400	
15	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
17	Body gasket		NOVATEC O KEVLAR+GRAPHITE	
18	Packing gland spring		S31600	
19	Shutter	T.P.	S30400+PEEK	S31600+PEEK
		T.M.	S30400	S31600
20	Seat (1)		S30400	S31600
21	Upper head		Fe – P04	
22	T.E. screw		Galvanized CL.8.8 STEEL	
23	Flat washer		Galvanized STEEL	
24	Spring washer		Galvanized STEEL	
25	Hexagon nut		Galvanized CL.8 STEEL	
26	Lower head		Fe – P04 + copper STEEL	
28	Spring washer		Galvanized STEEL	
29	Hexagon nut		Galvanized CL.8 STEEL	
30	Label graduated		POLYETHYLENE	
31	T.E. screw		S30400	
32	Clamp with indicator		CF8	
33	Spring washer		S30400	
34	Hexagon nut		S30400	
35	Columns spacer		Galv. Fe 430 B	S30400
36	Stud-bolt		Galv. STEEL	S30400
37	Hexagon nut		Galv. STEEL	S30400
38	Spring washer		Galv. STEEL	S30400
39	Intermediate body		WCB	CF8M
40	Valve body		WCB	CF8M
46	Gasket		NOVATEC O KEVLAR+GRAPHITE	
47	Upper stem		S30400	
48	Headless screw		S30400	
49	Int. body with bellows		S30400+S31600	S31600
50	Gasket		NOVATEC O KEVLAR+GRAPHITE	
51	Flat washer		Galv. STEEL	
52	Int. body with frame		GJL 250	
53	T.E. screw		Galv. STEEL	
54	Flat washer		Galv. STEEL	
55	Spring valve		Galv. STEEL	
56	Hexagon nut		Galv. STEEL	
57	Frame extension		Fe 360	
58	Flat washer		Galv. STEEL	S30400

(1) In valves CF8M with full passage, seat is obtained from body's casting directly



Body side spare part

ND	SPARE PART CODE (Part. N° 15/17/18/46/50)
	SHUTTER T.M.
15	13804
20	
25	12570
32	12571
40	
50	

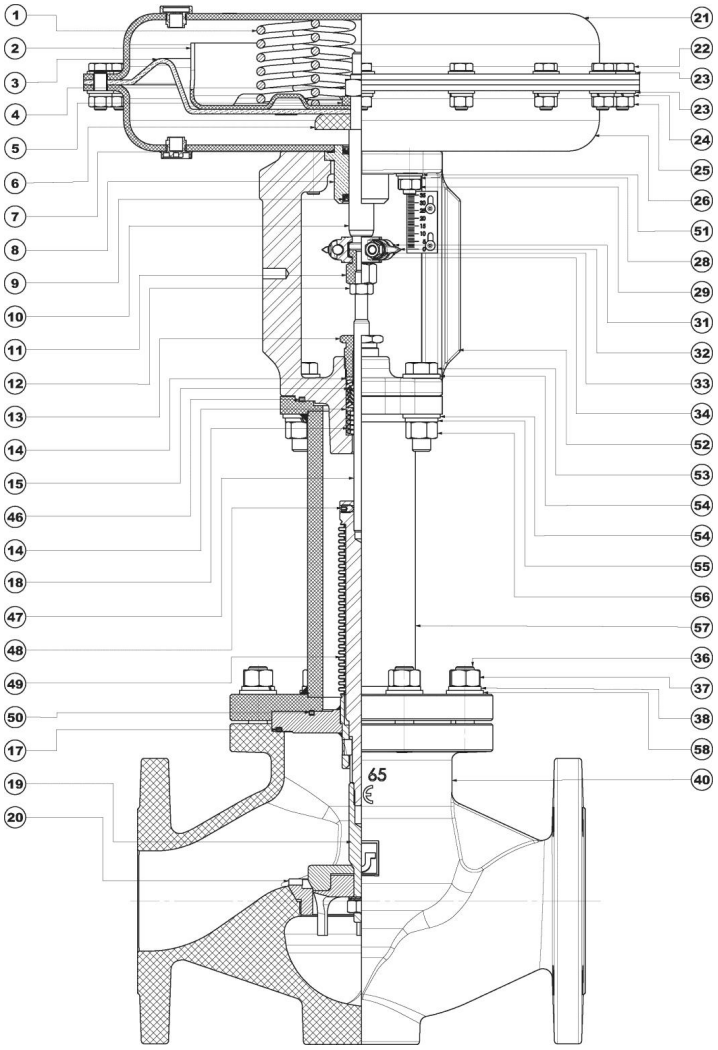
Air side spare part

Ø servocontrol	SPARE PART (Part. N° 3/7/9)
Ø 200	2655
Ø 275	5401
Ø 360	5402
Ø 430	5403

6.34 Parts and spare parts SBS/10 ND 65#80 2-WAY with bellows N.C./N.O.

N°	DESCRIPTION		MATERIAL	
			WCB	CF8M
1	Servo control spring		SPRING STEEL	
2	Spring-holding plate		Fe – P04	
3	Membrane		NBR rubber fabric	
4	Hexagon nut		Galvanized CL.8 STEEL	
5	Distance ring washer		Galvanized ASTM A105	
6	Diaphragm counterdisc		Galvanized ASTM A105	
7	O-Ring gasket		NBR	
8	Jig bushing		BRASS	
9	BA gasket		NBR	
10	Servo control shaft		S30400	
11	Adjustment nut		Galv.Fe 430 B	
12	Hexagon nut		Galv. steel	
13	Packing gland screw		Galv. steel	
14	Distance ring washer		S30400	
15	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
17	Body gasket		NOVATEC O KEVLAR+GRAPHITE	
18	Packing gland spring		S31600	
19	Shutter	T.P.	S30400+PEEK	S31600+PEEK
		T.M.	S30400	S31600
20	Seat [1]		S30400	S31600
21	Upper head		Fe – P04	
22	T.E. screw		Galvanized CL.8.8 STEEL	
23	Flat washer		Galvanized STEEL	
24	Spring washer		Galvanized STEEL	
25	Hexagon nut		Galvanized CL.8 STEEL	
26	Lower head		Fe – P04 + copper STEEL	
28	Spring washer		Galvanized STEEL	
29	Hexagon nut		Galvanized CL.8 STEEL	
30	Label graduated		POLYETHYLENE	
31	T.E. screw		S30400	
32	Clamp with indicator		CF8	
33	Spring washer		S30400	
34	Hexagon nut		S30400	
35	Columns spacer		Galv. Fe 430 B	S30400
36	Stud-bolt		Galv. STEEL	S30400
37	Hexagon nut		Galv. STEEL	S30400
38	Spring washer		Galv. STEEL	S30400
39	Intermediate body		WCB	CF8M
40	Valve body		WCB	CF8M
46	Gasket		NOVATEC O KEVLAR+GRAPHITE	
47	Upper stem		S30400	
48	Headless screw		S30400	
49	Int. body with bellows		S30400+S31600	S31600
50	Gasket		NOVATEC O KEVLAR+GRAPHITE	
51	Flat washer		Galv. STEEL	
52	Int. body with frame		GJL 250	
53	T.E. screw		Galv. STEEL	
54	Flat washer		Galv. STEEL	
55	Spring valve		Galv. STEEL	
56	Hexagon nut		Galv. STEEL	
57	Frame extension		Fe 360	
58	Flat washer		Galv. STEEL	S30400

[1] In valves CF8M with full passage, seat is obtained from body's casting directly



Body side spare parts

ND	SPARE PART CODE (Part. N° 15/17/18/46/50)
	SHUTTER T.M.
65	13696
80	

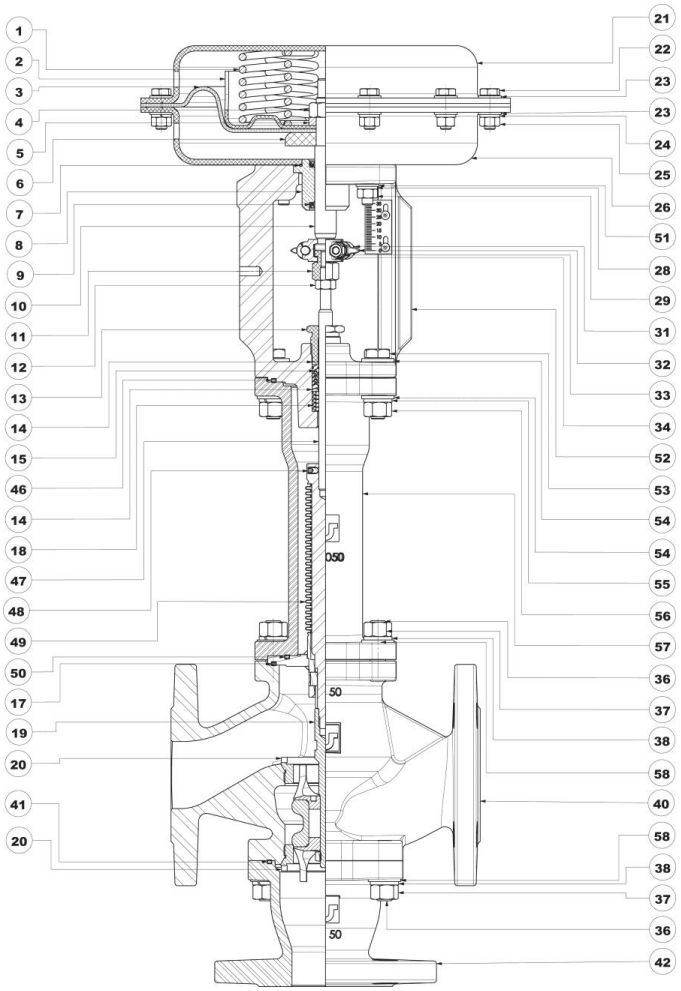
Air side spare parts

Ø servocontrol	SPARE PART CODE (Part. N° 3/7/9)
Ø 200	2655
Ø 275	5401
Ø 360	5402
Ø 430	5403

6.35 Parts and spare parts SBS/10 3-WAY with bellows N.C./N.O. Mixer

N°	DESCRIPTION		MATERIAL	
			WCB	CF8M
1	Servo control spring		SPRING STEEL	
2	Spring-holding plate		Fe – P04	
3	Membrane		NBR rubber fabric	
4	Hexagon nut		Galvanized CL.8 STEEL	
5	Distance ring washer		Galvanized ASTM A105	
6	Diaphragm counterdisc		Galvanized ASTM A105	
7	O-Ring gasket		NBR	
8	Jig bushing		BRASS	
9	BA gasket		NBR	
10	Servo control shaft		S30400	
11	Adjustment nut		Galv.Fe 430 B	
12	Hexagon nut		Galv. steel	
13	Packing gland screw		Galv. steel	
14	Distance ring washer		S30400	
15	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
17	Body gasket		NOVATEC O KEVLAR+GRAPHITE	
18	Packing gland spring		S31600	
19	Shutter	T.P.	S30400+PEEK	S31600+PEEK
		T.M.	S30400	S31600
20	Seat (1)		S30400	S31600
21	Upper head		Fe – P04	
22	T.E. screw		Galvanized CL.8.8 STEEL	
23	Flat washer		Galvanized STEEL	
24	Spring washer		Galvanized STEEL	
25	Hexagon nut		Galvanized CL.8 STEEL	
26	Lower head		Fe – P04 + copper STEEL	
28	Spring washer		Galvanized STEEL	
29	Hexagon nut		Galvanized CL.8 STEEL	
30	Label graduated		POLYETHYLENE	
31	T.E. screw		S30400	
32	Clamp with indicator		CF8	
33	Spring washer		S30400	
34	Hexagon nut		S30400	
35	Columns spacer		Galv. Fe 430 B	S30400
36	Stud-bolt		Galv. STEEL	S30400
37	Hexagon nut		Galv. STEEL	S30400
38	Spring washer		Galv. STEEL	S30400
39	Intermediate body		WCB	CF8M
40	Valve body		WCB	CF8M
41	Bottom base gasket		NOVATEC O KEVLAR+GRAPHITE	
42	Bottom base		WCB	CF8M
46	Gasket		NOVATEC O KEVLAR+GRAPHITE	
47	Upper stem		S30400	
48	Headless screw		S30400	
49	Int. body with bellows		S30400+S31600	S31600
50	Gasket		NOVATEC O KEVLAR+GRAPHITE	
51	Flat washer		Galv. STEEL	
52	Int. body with frame		GJL 250	
53	T.E. screw		Galv. STEEL	
54	Flat washer		Galv. STEEL	
55	Spring valve		Galv. STEEL	
56	Hexagon nut		Galv. STEEL	
57	Frame extension		Fe 360	
58	Flat washer		Galv. STEEL	S30400

(1) In valves CF8M with full passage, seat is obtained from body's casting directly.



Body side spare parts

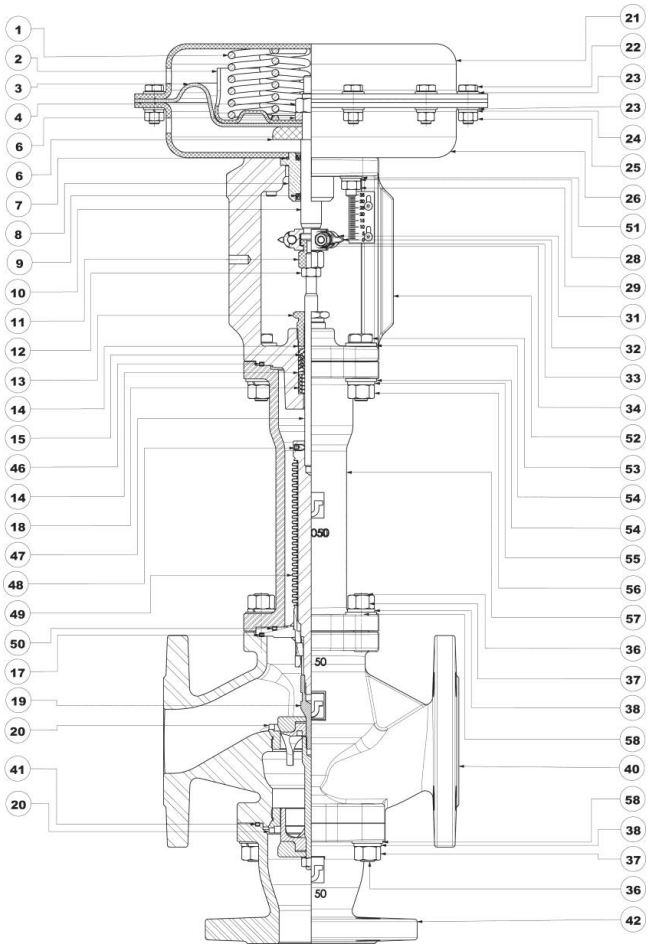
ND	SPARE PART CODE (Part. N° 15/17/18/41/46/50)
	SHUTTER T.M.
15	13689
20	
25	12572
32	12573
40	12574
50	12575
65	13697
80	14957

Air side spare parts

Ø servocontrol	SPARE PART CODE (Part. N° 3/7/9)
Ø 200	2655
Ø 275	5401
Ø 360	5402
Ø 430	5403

6.36 Parts and spare parts SBS/10 3-WAY with bellows N.C./N.O. Deviator

N°	DESCRIPTION		MATERIAL	
			WCB	CF8M
1	Servo control spring		SPRING STEEL	
2	Spring-holding plate		Fe – P04	
3	Membrane		NBR rubber fabric	
4	Hexagon nut		Galvanized CL.8 STEEL	
5	Distance ring washer		Galvanized ASTM A105	
6	Diaphragm counterdisc		Galvanized ASTM A105	
7	O-Ring gasket		NBR	
8	Jig bushing		BRASS	
9	BA gasket		NBR	
10	Servo control shaft		S30400	
11	Adjustment nut		Galv.Fe 430 B	
12	Hexagon nut		Galv. steel	
13	Packing gland screw		Galv. steel	
14	Distance ring washer		S30400	
15	Packing gland		PTFE + PTFE/GRAPHITE + FPM	
17	Body gasket		NOVATEC O KEVLAR+GRAPHITE	
18	Packing gland spring		S31600	
19	Shutter	T.P.	S30400+PEEK	S31600+PEEK
		T.M.	S30400	S31600
20	Seat (1)		S30400	S31600
21	Upper head		Fe – P04	
22	T.E. screw		Galvanized CL.8.8 STEEL	
23	Flat washer		Galvanized STEEL	
24	Spring washer		Galvanized STEEL	
25	Hexagon nut		Galvanized CL.8 STEEL	
26	Lower head		Fe – P04 + copper STEEL	
28	Spring washer		Galvanized STEEL	
29	Hexagon nut		Galvanized CL.8 STEEL	
30	Label graduated		POLYETHYLENE	
31	T.E. screw		S30400	
32	Clamp with indicator		CF8	
33	Spring washer		S30400	
34	Hexagon nut		S30400	
35	Columns spacer		Galv. Fe 430 B	S30400
36	Stud-bolt		Galv. STEEL	S30400
37	Hexagon nut		Galv. STEEL	S30400
38	Spring washer		Galv. STEEL	S30400
39	Intermediate body		WCB	CF8M
40	Valve body		WCB	CF8M
41	Bottom base gasket		NOVATEC O KEVLAR+GRAPHITE	
42	Bottom base		WCB	CF8M
46	Gasket		NOVATEC O KEVLAR+GRAPHITE	
47	Upper stem		S30400	
48	Headless screw		S30400	
49	Int. body with bellows		S30400+S31600	S31600
50	Gasket		NOVATEC O KEVLAR+GRAPHITE	
51	Flat washer		Galv. STEEL	
52	Int. body with frame		GJL 250	
53	T.E. screw		Galv. STEEL	
54	Flat washer		Galv. STEEL	
55	Spring valve		Galv. STEEL	
56	Hexagon nut		Galv. STEEL	
57	Frame extension		Fe 360	
58	Flat washer		Galv. STEEL	S30400



(1) In valves CF8M with full passage, seat is obtained from body's casting directly

Body side spare parts

ND	SPARE PART CODE (Part. N° 15/17/18/19-D/19-E/41/46/50)
	SHUTTER T.M.
15	13690
20	
25	12576
32	12577
40	12578
50	12579
65	13698
80	14965

Air side spare parts

Ø servocontrol	SPARE PART CODE (Part. N° 3/7/9)
Ø 200	2655
Ø 275	5401
Ø 360	5402
Ø 430	5403

7 Table 5: Servo control springs

Øe SERV	STROKE (mm)	SIGNAL											
		3 ÷ 15		6 ÷ 18		6 ÷ 30		9 ÷ 32		3 ÷ 9		9 ÷ 15	
		N°	CODICE	N°	CODICE	N°	CODICE	N°	CODICE	N°	CODICE	N°	CODICE
200	15	3	MTD086100	3	MTD086101	6	MTD086100	6	MTD086102	3	MOLL092037	3	MOLL940412
	20		MOLL110523		MOLL100804		MOLL110523						
275	15	3	MTD086106	6	MTD086107	6	MTD086106	6	MTD086108	3	MTD086107	3	MOLL092038
	20		MOLL100528		MOLL100529		MOLL100528		MOLL100530				
360	15	6	MTD086106	12	MTD086107	12	MTD086106	12	MTD086108	6	MTD086107	6	MOLL092038
	20		MOLL100528		MOLL100529		MOLL100528		MOLL100530				
430	15	4	MTD086103	8	MTD086104	8	MTD086103	8	MTD086105	4	MTD086104		
	20		MOLL100532		MOLL100533		MOLL100532		MOLL100534				
	30		MOLL950278	8	MOLL950279	8	MOLL950278	8	MOLL950280				

8 Table 6: Tightening Torques

Part couplings	Tightening torque for SBS/10 valve threaded couplings [N·m]												
	Servo Control Couplings Øe Serv.				Body couplings DN								
	200	275	360	430	15	20	25	32	40	50	65	80
Part. 22 – Part. 25	12	17										
Part. 29 – Part. 26	17											
Part. 36 – Part. 37					17			32				-
Part. 53 – Part. 56					17			32				-
Part. 20 – Part. 40					170	170	212	370	503	625	-	-
Part. 19-A – Part. 19-E					9			19			32	
Part. 19-G – Part. 19-E					9			19			32	
Part. 40 – Part. 45											17	

9 Valve life

SBS-series valve has been designed and manufactured to ensure proper operation under conditions and limits provided for by technical characteristics.

All fastened metal parts not involved in sealing have an expected life of 10 years. Sealing and moving parts must be subject to complete overhaul within a time interval shorter than 500000 manoeuvres and three years. This overhaul operation can be carried out by specialized personnel only.

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

10 Disposal

After use, for the valve disposal, it is necessary to disassemble the valve and separate the different materials the valve is composed of, according to the tables annexed to the valve working drawings, then dispose of the different materials in compliance with the laws in force.

Assembly and disassembly operations shall be carried out by qualified personnel only, equipped with all the work and safety tools. **ATTENTION! Compressed springs are included inside the servo control.** Thus, during valve disassembly, components are disposed of by using all safety equipment necessary to prevent sudden separation of upper head from lower head when all servo control head fastening screws have been removed.

11 Warranty

Every valve is checked before leaving the factory. On request of customer a certificate of control can be issued. The customer himself can inspect and check the material at our factory before shipment. Such inspection is considered definitive.

All expenses relative to special checks or requirements by the customer are at the customers expense.

Our responsibility is limited to the replacement or repair of parts which develop material or manufacturing defects within 12 months from shipment and which have been used in normal working conditions. This use exclude every and any other obligation. All transport and additional costs are at the customer expense.

Our responsability (for damage to person or/and properties during installation and/or maintenance) lapses when the valve is removed from its original packaging.

ITALVALVOLE® reserved the right to stop, change or modify the characteristics of any of its products without being obliged to replace or mount the modified parts on products already supplied

WARNINGS:

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