

Product Catalogue

Nuclear Valves



Engineering, Equipment and Consulting

2016



The company **ENEQ CONSULT Ltd.** has the necessary resources in the field of deliveries to all sectors of the power, petrol and gas equipment industry.

The policy and strategy of our company are directed at the complex solutions for implementation of the projects, starting from deliveries of the equipment, its installation, operation and servicing.

Our suppliers and partners – the worldwide manufacturers from the Czech Republic, Croatia, Italy, Russia.

The general principles of our company are, as follows:

- Individual approach towards every single partner in relation to the products that we offer, in view of highly-technological quality of the equipment, which is in conformity with the world standards, as well as competitive prices to the satisfaction of our partners-employers;

Type “K” – fixtures for conventional power engineering with application in thermal power engineering, the oil and gas, chemical, food, water, marine and other industries.

The general design of the fixtures is in conformity with EN, whereas our company can also offer designs in accordance with GOST, API and BSI. These fixtures are manufactured using materials and fitting dimensions under EN, ASME, ASTM and GOST standards. There is also an option for special execution of dimensions and materials as per the individual requirements of the customer.

The company is capable of delivering any other type of specialized fixtures, beyond those proposed in this catalogue, by request of the customer.

We offer warranty for all products from delivery to post-warranty servicing.

We hope for a fruitful collaboration and express our gratitude for your trust!



**Type A00 / A01
DN 65 - 600
Pp to 25 MPa**



**Gate Valve for
Nuclear Power**

Butt-Welded, Flanged



DATA SHEET A00 / A01

Application

- Shut-off valve used to fully open or close the flow, can be operated at full pressure drop on the valve with the reversible direction of the fluid flow
- **Fluids**
According to NP-068-05, VTP- 87/91
- **Industry**
Nuclear power plants (especially with VVER and RBMK reactors); chemical industry
- **Environments**
Normal, seismic

Technical description

- Gate valves are made of carbon and austenitic steel
- Forged body
- Seats are inserted into the body with the overlap, welded with the seal weld
- Split wedge, its function is ensured by the guidance placed in the groove
- Body is sealed by the bonnet joint
- Sealing of the spindle is ensured by a single or two-part sucked gland with the organized drain of leakage
- Bonnet joint of the gate valves to 9,2 MPa and the spindle gland are sealed with the sealing rings made of the expanded graphite
- Rising non-rotating spindle
- Spindle nut is located on two bearings
- Resversible flow of the operating fluid

Connection

- Welding ends
- Other connection on request

Installation

- Gate valves can be mounted to the pipelines in all positions
- For assembly with the electric actuator - see manufacturer's instructions
- For installation, operation and maintenance is valid AL 990923 - Technical description and maintenance and repair manual for the gate valves type A00, A01

Operating conditions

- NP-068-05 a VTP-87 - General technical requirements for NP special valves
- PNAE G-7-008-89 - The rules for the construction and safe operation of the NP equipment and pipelines
- PNAE G-1-011-97 (OPB-88/97) - General requirements for NP safe operation
- PNAE G-7-002/86 - Standards of calculation of the strength of the NP equipment and piping
- PNAE G-7-009-89 - NP equipment and piping. Welded joints and weldings
- PNAE G-7-010-89 - NP equipment and piping. Control rules
- PNAE G-5-006-87, OP PNAE G-7-009-89 - Standards of designing seismically resistant NPP



By-pass

- Standard delivery without by-pass; by-passes on request
- Central cavity equalization
- Carried out where necessary or on the customer's request by drilling the wedge plate
- Fluid flow direction is indicated by the arrow «→»

Testing

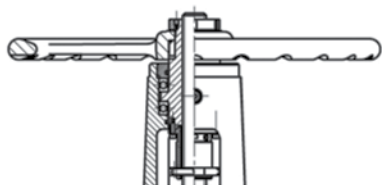
- Test of the operational capacity and tightness by the pressure Pp
- Vacuum tightness test towards the external environment - just for the gate valves working at

Pp (MPa)	Testing fluid test (Mp)
2,5	4,5
4	7
6	10
8,6	14
9,2	15
11	18
12	20
14	22
18	29
20	32
25	40

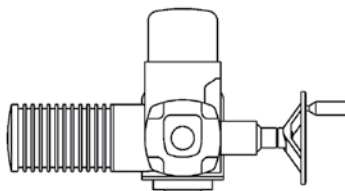


DATA SHEET A00 / A01

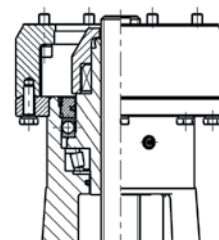
Operation



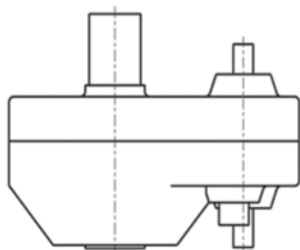
Hand wheel



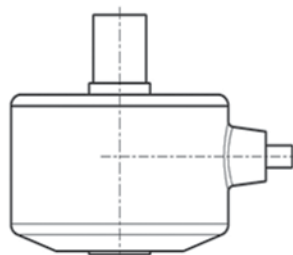
Electric actuator



Connection for the electric actuator and reducer



Spur gear



Bevel gear



Direct remote control

- Manual operation (hand wheel with stop), with locking device
- Electric actuator – with location outside or inside the hermetic zone
- Spur gear
- Bevel gear
- Direct remote control
- Connection of the electric actuator or gear to the valve according to ISO 5210

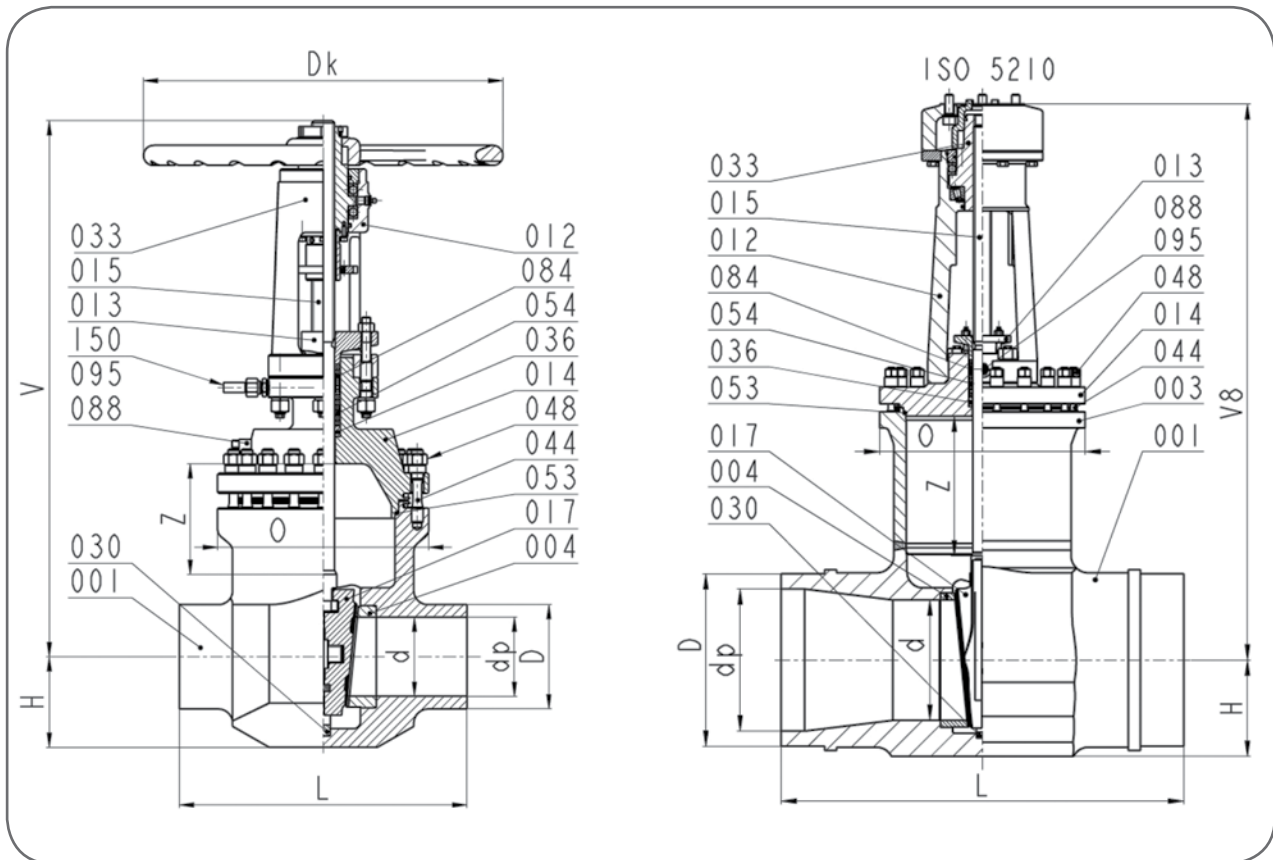
DATA SHEET A00 / A01

Table of designed and maximum operating parameters

Max. pressure MPa	Gate valve		Connection ends	
	Max. temperature °C	Max. pressure MPa	Max. temperature °C	Max. pressure MPa
Gate valves DN 200-400, Pp to 4 MPa, carbon and stainless steel				
4	250	2,5	250	
		4	250	
Gate valves DN 200-300, Pp over 4 to 9,2 MPa, carbon and stainless steel				
9,2	300	6	275	
		8,6	300	
		9,2	300	
Gate valves DN 65-150, Pp to 9,2 MPa, carbon and stainless steel				
9,2	300	2,5	250	
		4	250	
		6	275	
		8,6	300	
		9,2	300	
Gate valves DN 200-350, Pp over 9,2 to 12 MPa, carbon steel				
12	300	11	300	
		12	250	
Gate valves DN 200-350, Pp over 9,2 to 14 MPa, stainless steel				
14	335	11	300	
		14	335	
Gate valves DN 65-150, Pp to 12 MPa, carbon steel				
12	300	2,5	250	
		4	250	
		6	275	
		8,6	300	
		9,2	300	
		12	250	
Gate valves DN 65-150, Pp to 14 MPa, stainless steel				
14	335	2,5; 4	250	
		9,2; 11	300	
		12	250	
		12	300	
		14	335	
Gate valves DN 80/75, Pp over 14 to 25 MPa, stainless steel				
18	350	18	350	
20	300	20	300	
25	250	25	250	
Gate valves DN 250-300/350, Pp over 14 to 20 MPa, stainless steel				
18	350	18	350	
20	300	20	300	
Gate valves DN 400 - 600, Pp to 12 MPa, carbon steel (classification marking 3C)				
4,4	256	4,4	256	
6,8	220	6,8	220	
7,2	220	7,2	220	
8,6	300	8,6	300	
12	300	12	300	

DATA SHEET A00 / A01

Materials of main parts



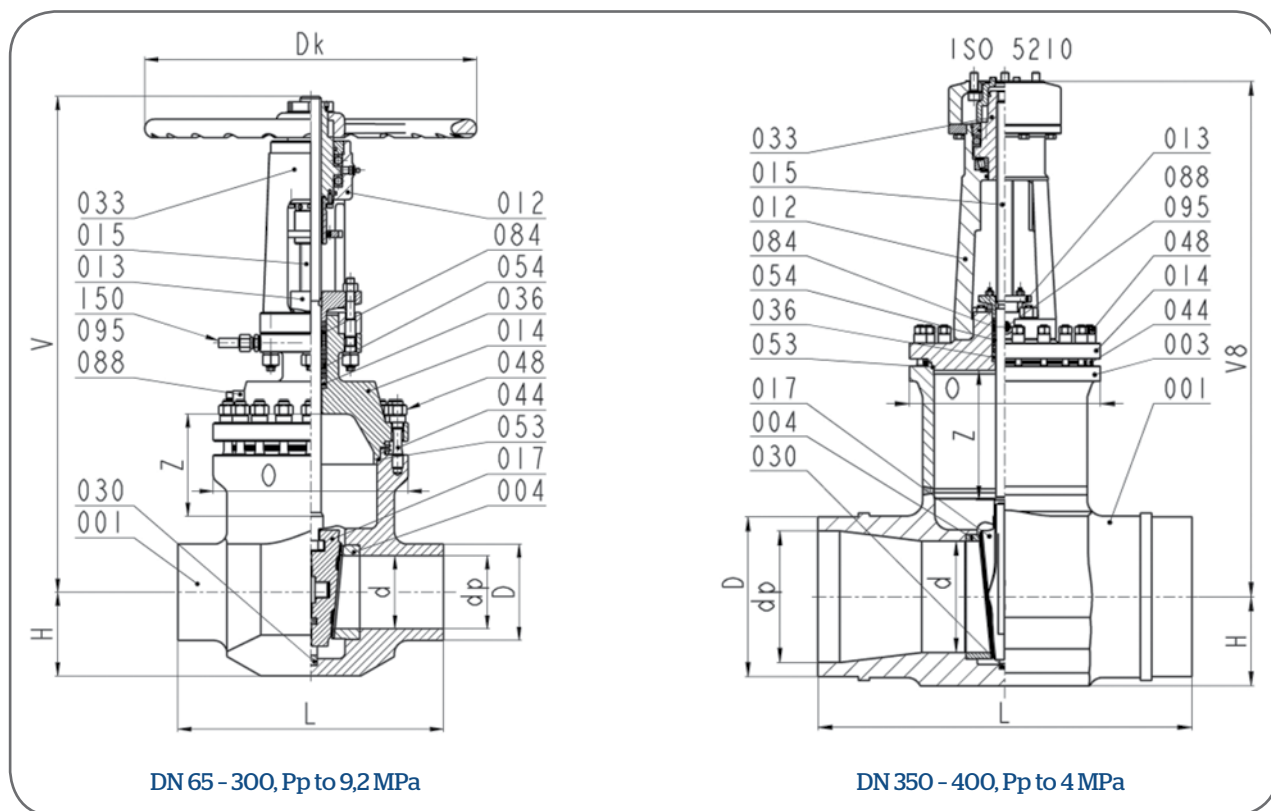
	Name	Material		
001	Body			
004	Seat			
003	Flange	11416	22K	08X18H10T
014	Bonnet			
017	Wedge			
088	Stopper	12020		08X18H10T
015	Spindle	14X17H2, 17134 - hard-coated with Cr		
030	Wedge guidance	11523		17027.4
012	Yoke	422743, 11416		
013	Gland lid	422743, 11416		
033	Spindle nut	423046/11416		
044	Bolt	15320		
048	Nut	15236		
036	Bushing	08X18H10T		
084	Ring	08X18H10T		
053	Sealing rings	Expanded graphite		
054				
095				

- Sealing surfaces of the seat and plug are hardfaced with cobalt-free alloy ANTINIT DUR 500 FD (type C1111)
- Recommended spare parts on order: sealing rings (053, 054, 095), spindle (015), spindle nut (033), wedge (017)



DATA SHEET A00 / A01

Dimensions



Gate valves with the hand wheel for the electric actuator and the reducer

DN	Pp MPa	D	dp	d	Dk	H	L	O	V	Z	m kg	V8	m8 kg
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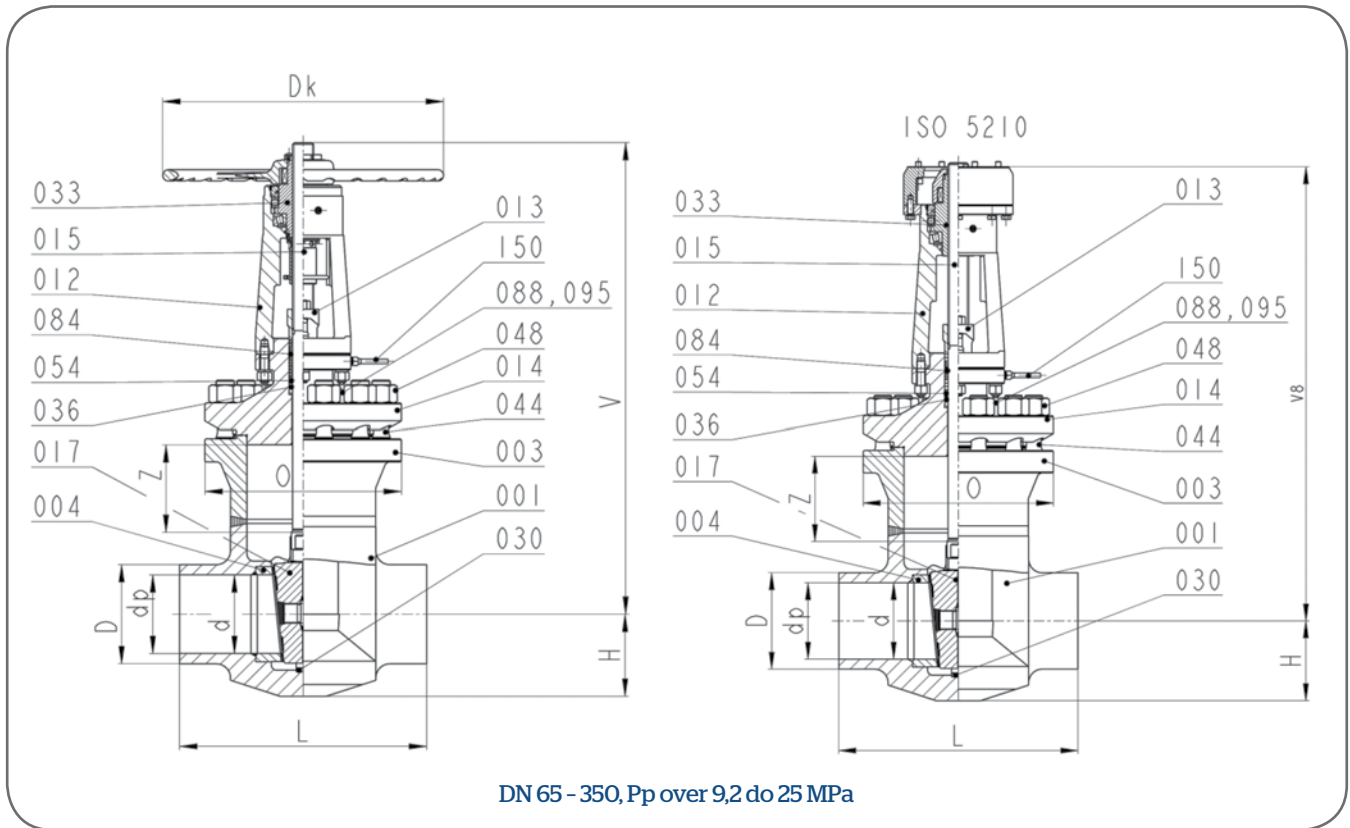
Quick-acting gate valves with the electric actuator

DN	Pp MPa	D	dp	d	Connection with EA	H	L	O	V8	Z	m8 kg
200/170	2,5	Connection dimensions according to TP 422-24-43		170	ISO 5210 *)	155	550	300	854	180	219
200/170	4			170		155	550	300	854	180	219
250/225	4			225		235	650	435	1160	242	576

*) Other types of connection on request



DATA SHEET A00 / A01



Gate valves with the hand wheel for the electric actuator and the gear
(connection with the electric actuator ISO 5210^{*)})

DN	Pp MPa	D	dp	d	Dk	H	L	O	V	Z	m kg	V8	m8 kg
65/55	to 14	Connection dimensions according to TP 422-2443		55	320	70	360	210	585	60	69	607	82
80/75				75	400	90	450	270	635	90	108	650	120
100/75				75	400	90	450	270	635	90	124	650	135
125/110				110	500	130	500	350	830	130	271	835	275
150/110				110	500	130	550	350	830	130	284	835	285
200/140	over 9,2 to 14			140	630	155	650	390	930	171	393	945	398
225/200				200	800	235	750	560	1345	250	1072	1335	1080
250/225				225	800	235	800	560	1348	251	1090	1336	1103
300/225				225	800	235	900	560	1348	251	1214	1336	1220
125-150/110	over 14 to 20			110	500	128	450	335	883	130	366	885	283
250/225		225		235	800	560		255		1340	1177		
300/225		225	ISO	235	900	560		255		1340	1352		
300-350 /225		225	5210	235	900	560		255		1340	1352		
300-350 /225		225		235	900	560		255		1340	1445		
80/75	over 14 to 25			75	500	130	450	350	870	90	230	875	237



DATA SHEET A00 / A01

Quick-acting gate valves with the electric actuator

DN	Pp MPa	D	dp	d	Connection with EA	H	L	O	V8	Z	m8 kg
150/110	to 14	Connection dimensions according to TP 422-24- 43		110	ISO 5210 ¹⁾	130	500	350	890	130	220
200/140				140		155	650	390	945	170	398
250/200				200		235	800	560	1335	250	1090
300/225	11/7 ²⁾			225		235	900	560	1360	250	1230
300/225	18/6			225		235	900	560	1360	251	1352
125-150 /110	18/18 ²⁾			110		130	560	335	885	130	294
125/110	14/14 ³⁾			110		130	560	335	780	130	294
300-350 /265	18/6,5 ³⁾			265		263	990	632	1764	296	1726

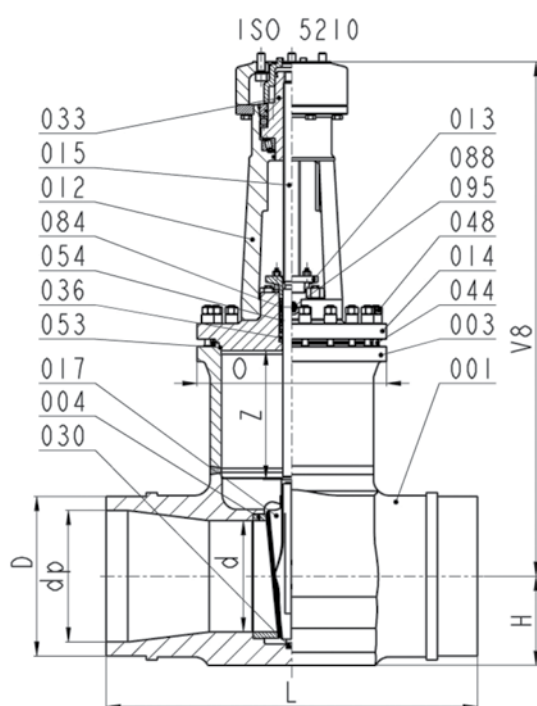
1) Other types of connection on request

2) CAOP

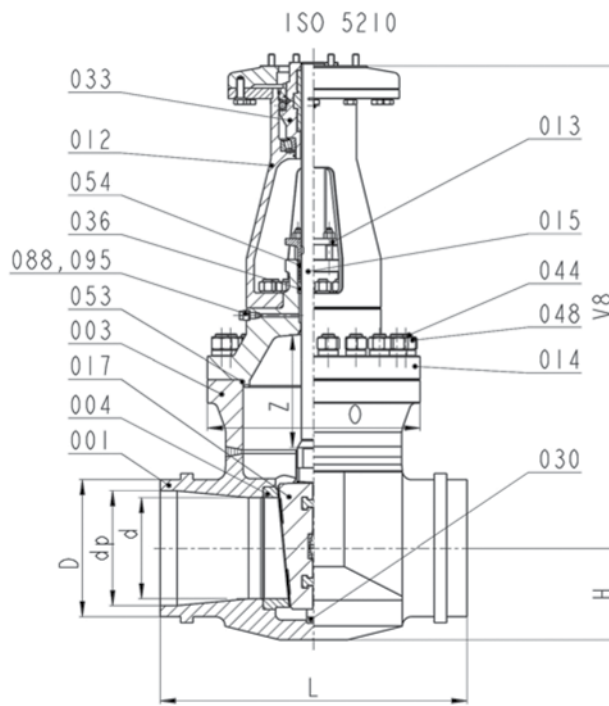
3) CA03



DATA SHEET A00 / A01



DN 400- 600, Pp to 12 MPa



DN 400/330, Pp to 12 MPa

- Gate valves with by-passes on request
- Maximum pressure difference of the gate valve DN 500/450 and 600/500 - 3.0 + 3.5 MPa - when using electric actuator

Gate valves with the electric actuator

DN	Pp MPa	D	dp	d	Connection with EA	H	L	O	V8	Z	m8 kg
400/400	4,4	Connection dimensions according to TP 422-24-43		400	ISO 5210 1)	325	1000	660	1678	445	1940
400/400	6,8			1884							
450/400	4,4			1990							
450/400	6,8			1995							
500/450	4,4			2665							
500/450	6,8			2702							
400/330	12			330		300	1000	695	1581	362	2258
500/450	8,6/3,5			450		360	1200	950	2510	550	4025
500/450	12/3,5			450		360	1200	950	2510	550	4025
500/500	8,6/3,5			500		425	1400	1100	2860	650	4425
600/500	12/3,5			500		425	1400	1100	2860	650	4425

Quick-acting gate valves with the electric actuator

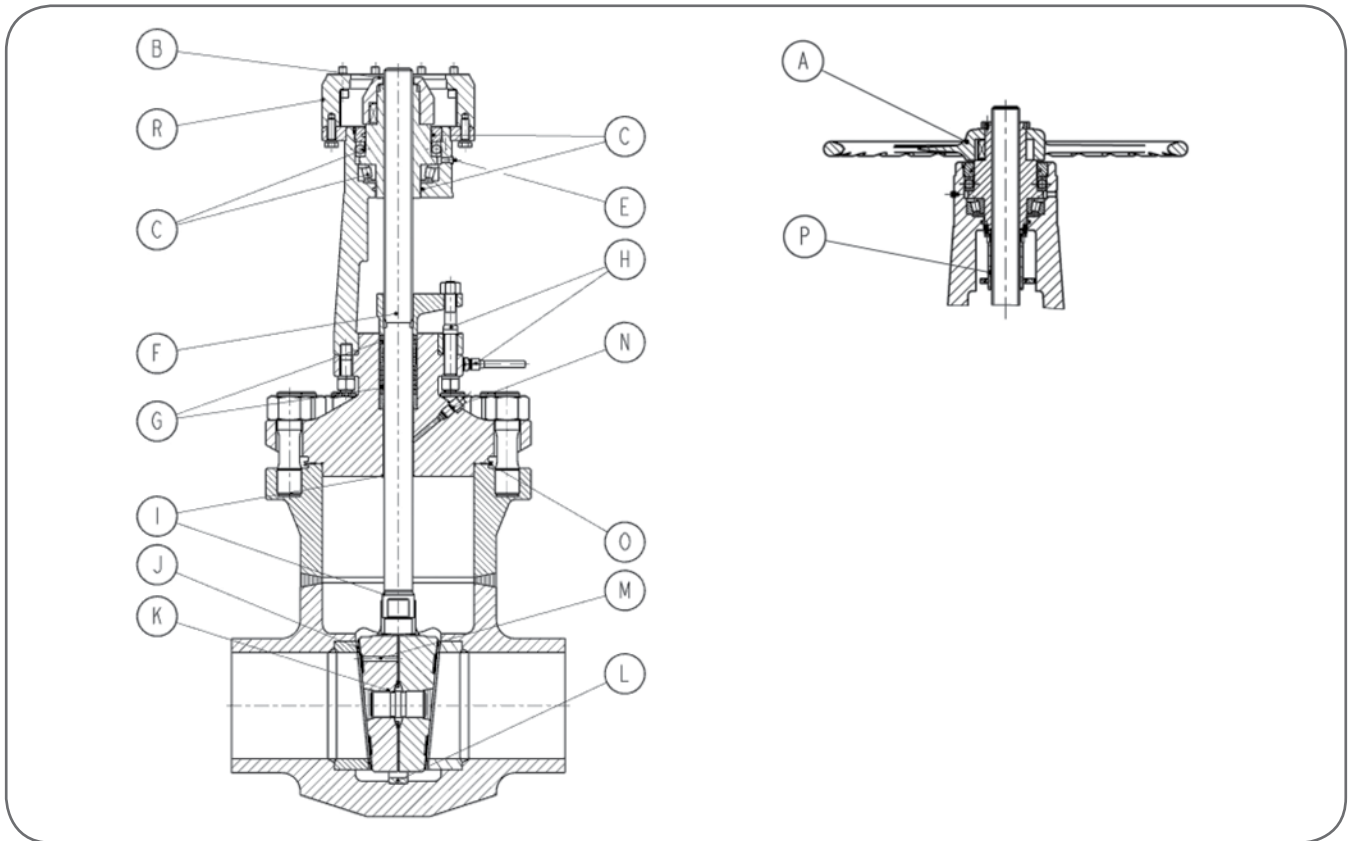
DN	Pp MPa	D	dp	d	Connection with EA	H	L	O	V8	Z	m8 kg
450/400	7,2/7,2	Connection dimensions according to TP 422-24-43		400	ISO 5210 1)	325	1000	660	1680	445	1995
400/330	12/12			330		300	1000	695	1585	365	2260

1) Other types of connection on request



DATA SHEET A00 / A01

Advantages of construction



A	Non-rising hand wheel with the stop: Suitable for lack of space and to achieve the required control effect
B	Single connection of the actuators and gears according to ISO 5210: Possibility of using control elements from different manufacturers
C	Spindle nut located on two roller bearings: Simplifies control
D	Dust rings: Protect the bearings from dirt
E	Pressure lubrication: Simplifies control, extends bearings lifetime
F	Rising non-rotating spindle More reliable sealing of the spindle in the gland
G	Spindle stem - expanded graphite with side wiper rings: Reliable tightness, ecological material
H	Spindle gland with suction: Emergency protection against the release of radioactive substances into the air
E	Check valve of the spindle: Additional sealing by the spindle to replace the gland
J	Sealing surfaces are hard-alloyed with the cobalt-free alloy: Long-term durability, wear resistance
K	Wedge with inclined plates: Reliable fit and sealing

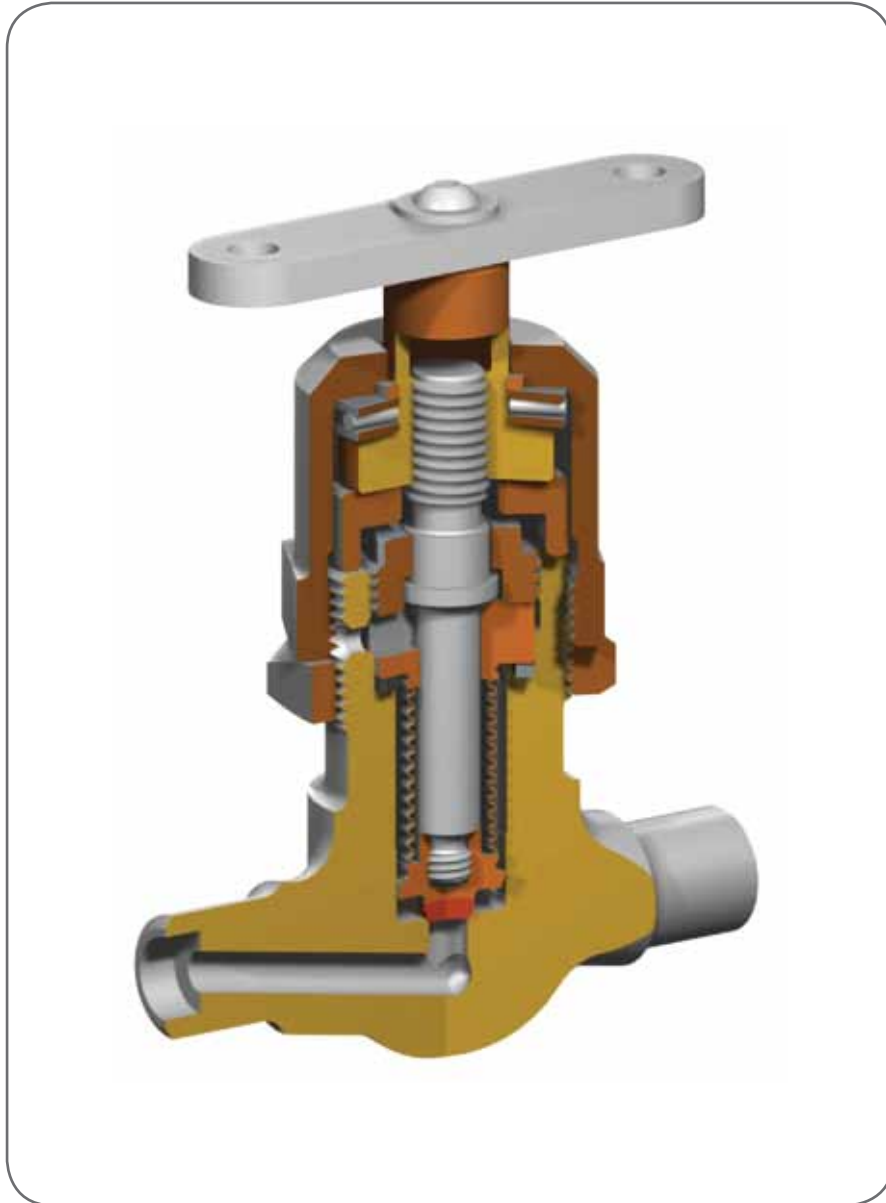
DATA SHEET A00 / A01

L	Demountable guidance of the wedge: Simple replacement and removal when replacing the seats
M	Central cavity equalization against overpressure: Protects the body from the excessive rise of the pressure
N	Opening with the stopper: Allows to replace the gland and install the gauge for testing and release of air
O	Bonnet with tabs: Allows triple additional sealing by welding the tabs
P	Local valve position indicator: For service orientation of the gate valves without control of the electric servo motor. Ability to install the remote control of the position

A	Non-rising hand wheel with the stop: Suitable for lack of space and to achieve the required control effect
B	Single connection of the actuators and gears according to ISO 5210: Possibility of using control elements from different manufacturers
C	Spindle nut located on two roller bearings: Simplifies control
D	Dust rings: Protect the bearings from dirt
E	Pressure lubrication: Simplifies control, extends bearings lifetime
F	Rising non-rotating spindle More reliable sealing of the spindle in the gland
G	Spindle stem - expanded graphite with side wiper rings: Reliable tightness, ecological material
H	Spindle gland with suction: Emergency protection against the release of radioactive substances into the air Check
I	Check valve of the spindle: Additional sealing by the spindle to replace the gland
J	Sealing surfaces are hard-alloyed with the cobalt-free alloy: Long-term durability, wear resistance
K	Wedge with inclined plates: Reliable fit and sealing



Type A10.0
DN 10 - 15
Pp to 20 MPa



Shut-off Bellows Valve KIP for Nuclear Power

Butt-Welded



DATA SHEET A10.0 KIP

Application

- Shut-off valve used to fully open or close the flow, can be operated at full pressure drop, with the direction of the fluid flow under the plug
- Fluids
- According to NP-068-05, VTP-87/91
- Industry
- Nuclear power plants (especially with VVER and RBMK reactors) - can be installed in the NPP safety systems with location inside and outside the hermetic zone; chemical industry
- Environments
- Normal, seismic

Technical description

- Valves are made of austenitic steel
- Forged body
- Connection ends - butt-welded, threaded
- Plug is welded to the bellows
- The non-rotating rising spindle is screwed into the plug
- The spindle is sealed with the multilayer bellows and the sealing ring
- Spindle nut is stored on one needle bearings
- Manual control lever with locking device
- The direction of the operating fluid flow is under the plug
- Sealing surface of the plug is welded with hard cobalt-free alloy, body without body without welding
- Sealing ring for sealing the body with bellows and emergency packing sealing rings are made of expanded graphite

Operation

- Manual lever (on request with locking device)

Installation

- Valves can be mounted to the pipelines in all positions
- For installation, operation and maintenance is valid AL 9906.21 - Technical description and maintenance and repair manual for the bellows valves

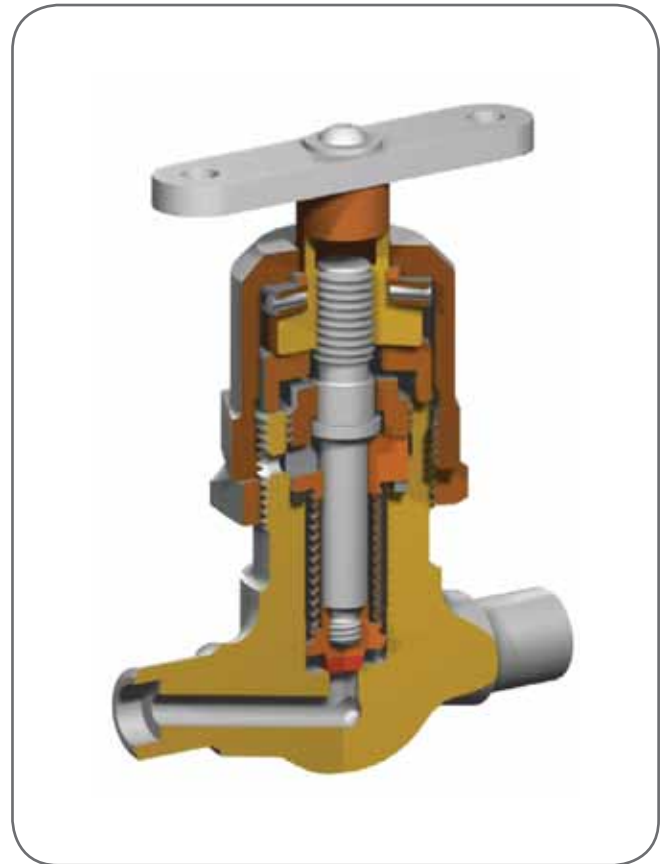
Testing

- Test of the operational capacity and tightness by the pressure Pp
- Vacuum tightness test towards the external environment
- Strength test

Pp MPa	Testing fluid pressure MPa
18	28
20	28

Table of designed and maximum operating parameters

Bellows valve		Connection ends	
Max. pressure MPa	Max. temperature °C	Max. pressure MPa	Max. temperature °C
18	350	18	350
20	300	20	300



Connection

- Welding ends or threaded; other connection on request

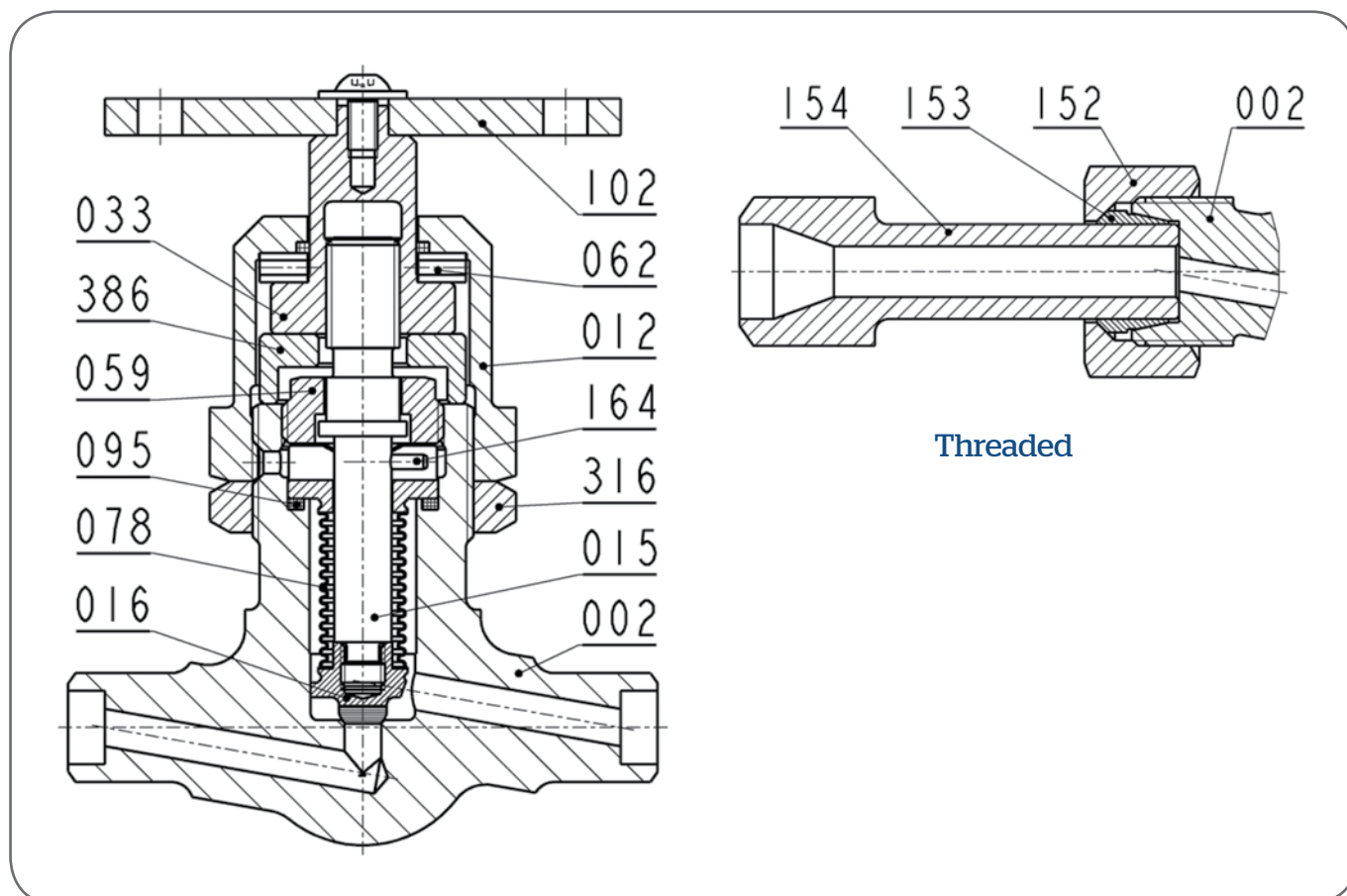
Operating conditions

- **NP-068-05** and **VTP-87** - General technical requirements for NP special valves
- **PNAE G-7-008-89** - The rules for the construction and safe operation of the NP equipment and pipelines
- **PNAE G-1-011-97 (OBP-88/97)** - General requirements for NP safe operation
- **PNAE G-7-002/86** - Standards of calculation of the strength of the NP equipment and piping
- **PNAE G-7-009-89** - NP equipment and piping. Welded joints and weldings
- **PNAE G-7-010-89** - NP equipment and piping. Control rules
- **PNAE G-5-006-87** - Standards of seismically resistant NPP designing



DATA SHEET A10.0 KIP

Materials of main parts



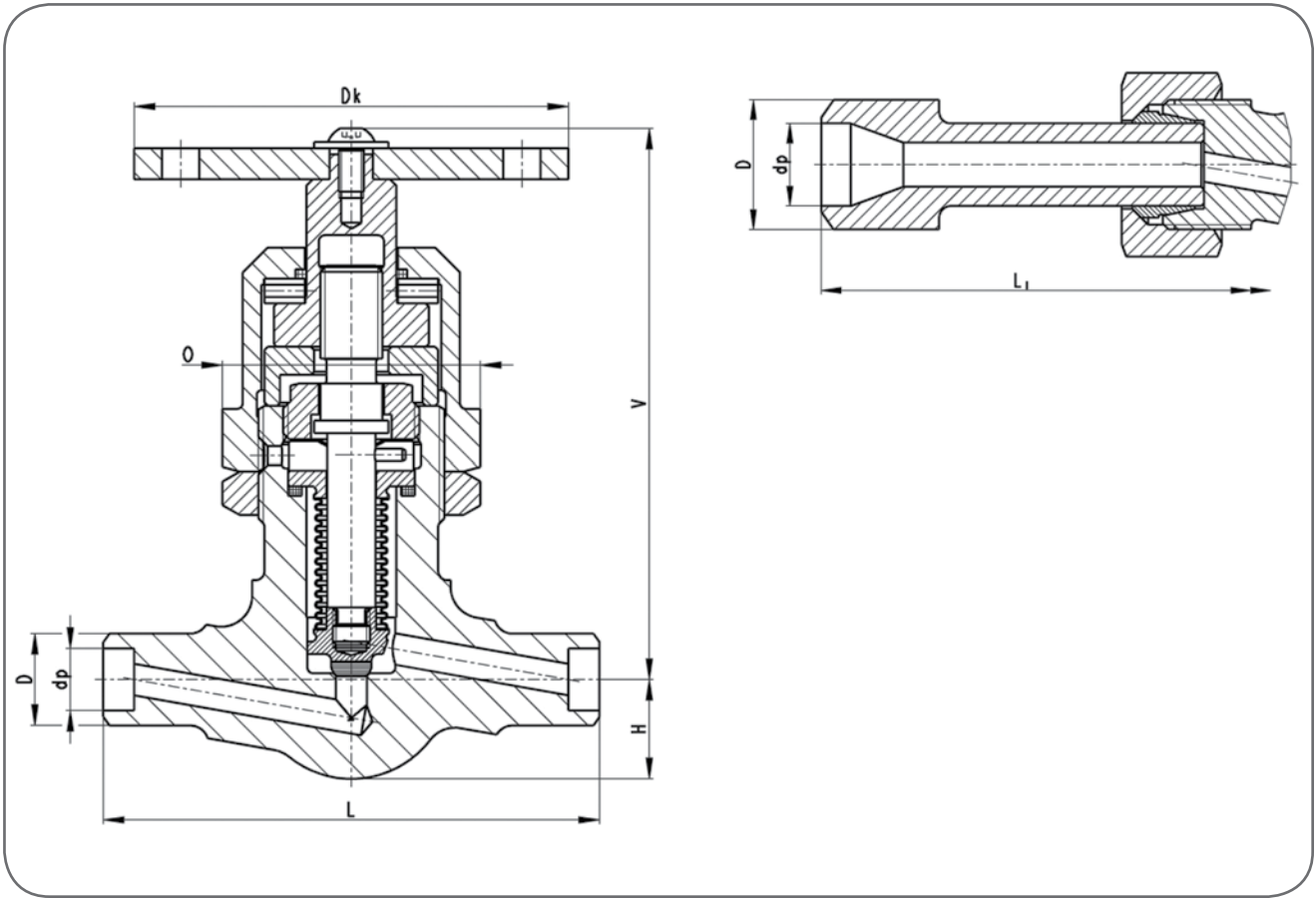
Name	Material
002 Body	08X18H10T
078 Bellows set	08X18H10T
016 Plug	08X18H10T
015 Spindle	14X17H2, 17134
012 Yoke	17027
033 Spindle nut	423046, 423047
316 Safety nut	17027
059 Threaded connection	17027
386 Washer	08X18H10T
062 Needle bearing	1xAXK 1528, 2x AS 1528
095 Sealing ring	Expanded graphite
164 Pin	CSN EN ISO 2338
102 Lever	17240
152 Nut	1.4571
153 Sealing ring	1.4571
154 Pipe	08X18H10T

- Sealing surface of the plug is welded with hard cobalt-free alloy - ANTINIT DUR 500 FD (typ C1111)
- Recommended spare parts on order: sealing ring (095), bellows set (078)



DATA SHEET A10.0 KIP

Dimensions



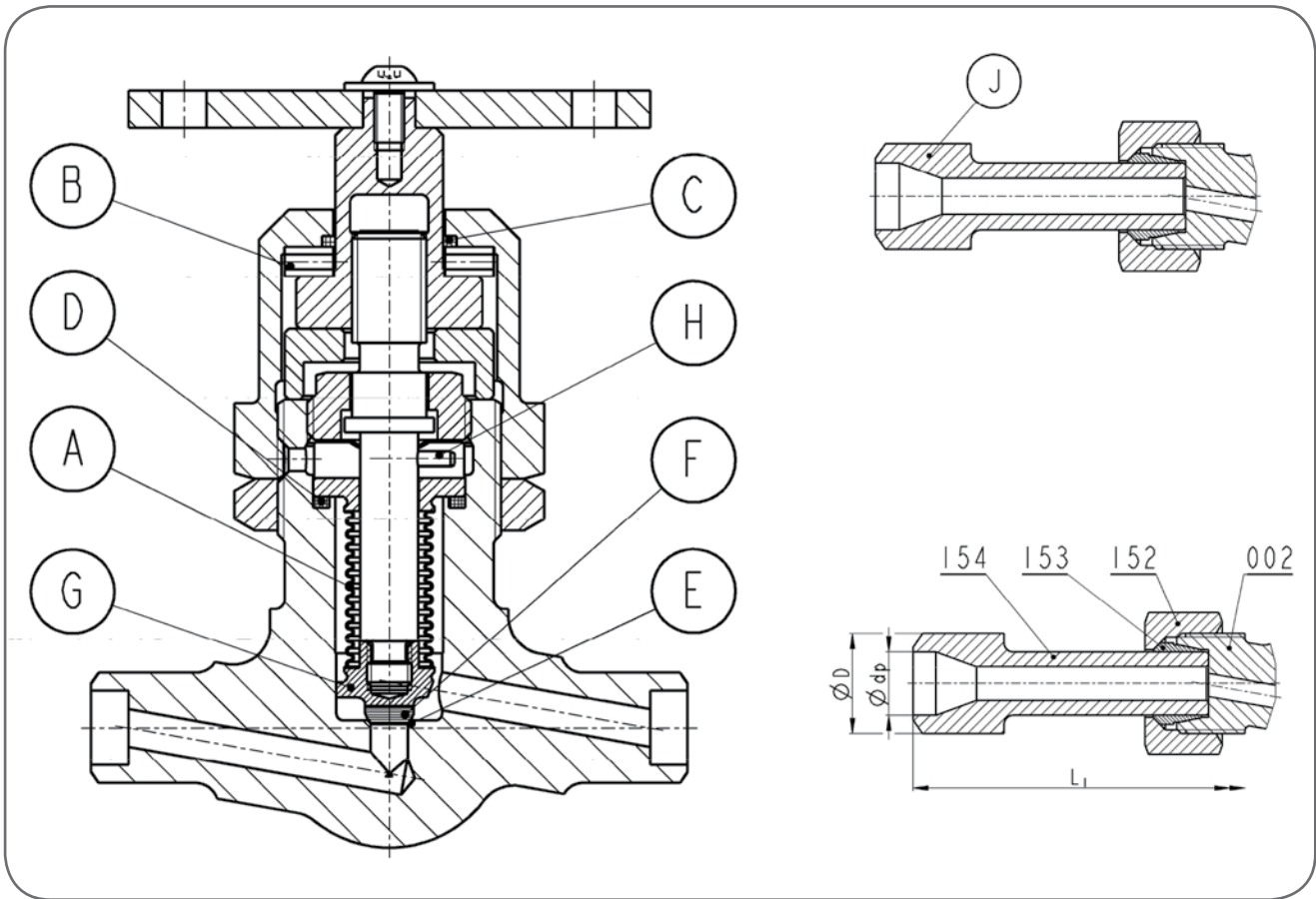
A
B
C
D
E
F
G
H
J

DN	Pp MPa	D	dp	Dk	H	L	O	V	m kg	L1	m1 kg
10	to 20	Connection dimensions according to TP 422-24-41		70	16	80	42	90	0,76	210	0,9
15/10											
15											



DATA SHEET A10.0 KIP

Advantages of construction



A	Spindle sealing with the multilayer bellows: Ensures reliable tightness towards external environment
B	Spindle nut is stored on the bearing: Simplifies control
C	Dust rings: Protects the bearings from dirt
D	Spindle packing is made of expanded graphite: Reliable tightness, ecology
E	Body seat - austenitic steel, without welding: Ensures reliable tightness
F	Plug is welded with hard cobalt-free alloy: Long-term durability, wear resistance
G	Plug with flattening surface: Provides pressure equalization and drainage of the area behind the plug
H	Pin between the body and the spindle: Protects spindles with bellows against rotation
J	Possibility to connect to the pipe with threading connection: Simplifies installation and dismantling of the valve

Type A10 / A11 / A13
DN 10 - 150
Pp up to 20 MPa



Shut -off Bellow
Valve for Nuclear Power

Butt-Welded



DATA SHEET A10/A11/A13

Application

- Shut-off bellow valve A10 or shut-off bellow valve for rough regulation with linear characteristics or fastacting valve A13; possible to operate also in full pressure drop at the valve
- Fluids
- According to NP-068-05, VTP- 87/91
- Industry
- Nuclear power plants (especially with VVER and RBMK reactors); chemici industry
- **Environments** Normal, seismic

Technical description

- Valves made of carbon steel and austenitic steel
- Forged body
- The seat in the body and the plug disc sealing are surfaced using hard cobalt-free alloy.
- The body and stem are sealed with bellows and sealing ring (expanded graphite).
- Emergency seal of the stem
- Valves DN 50-150 with cap flange
- The stem non-rotating
- Stem nut seated in two antifriction bearings

Connection

- Butt-welded
- Other connection on request

Installation

- The valves can be installed in any position.
- installation, handling, and maintenance shall be carried out in accordance with the "AL 9906.21 - Technical Description and the Bellows Valve Operator's Manual and Repair Instructions"

Operating conditions

- **NP-068-05 and VTP-87/91** - General Technical Requirements for purpose-made valves for NPP
- **PNAE G-7-008-89** - Rules for Construction and Safe Operation of NPP equipment and piping
- **PNAE G-1-011-97 (OPB-88/97)** - General Requirements for NPP Safety Assurance
- **PNAE G-7-002/86** - Strength Calculation Norms for NPP Equipment and Piping
- **PNAE G-7-009-89** - NPP Equipment and Piping. Weld Joints and Overlays
- **PNAE G-7-010-89** - NPP Equipment and Piping. Inspection Rules
- **PNAE G-5-006-87, OP PNAE G-7-009-89** - Design Norms for Seismic-Resistant Nuclear Power Plants



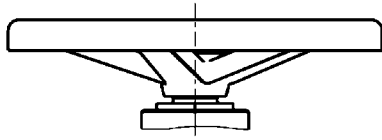
Testing

- Test of operation capability and tightness using the Pp pressure
- Leak test against ambient conditions
- Strength test:

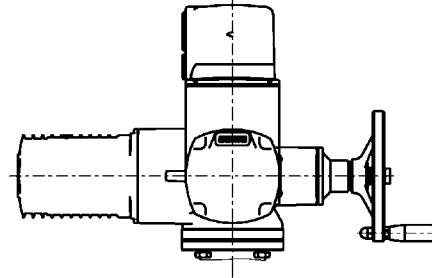
Pp MPa	Testing fluid test MPa
2,5	4,5
4	7
6	10
8,6	14
9,2	15
11	18
12	20
14	22
18	29
20	32

DATA SHEET A10/A11/A13

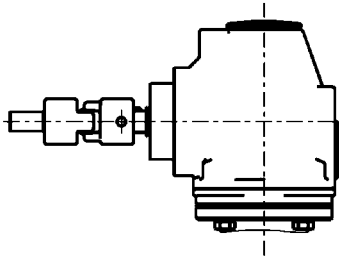
Operation



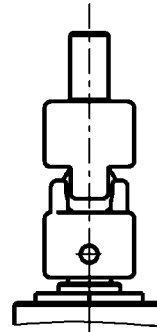
Hand wheel
(with loping device)



Electric actuator
(placed outside or inside the hermetic zone)



Bevel gear



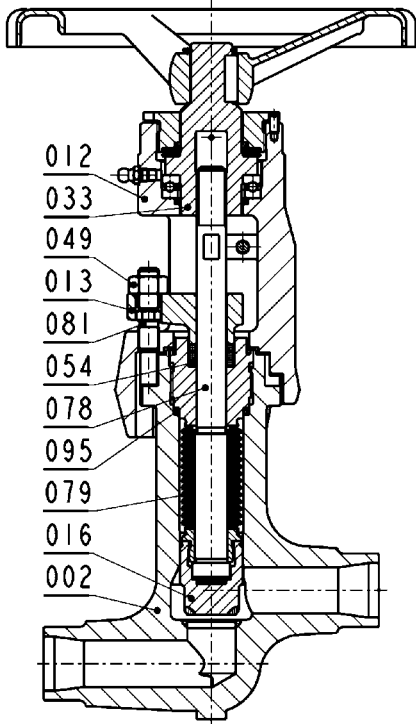
Direct remote control

Table of designed and maximum operating parameters

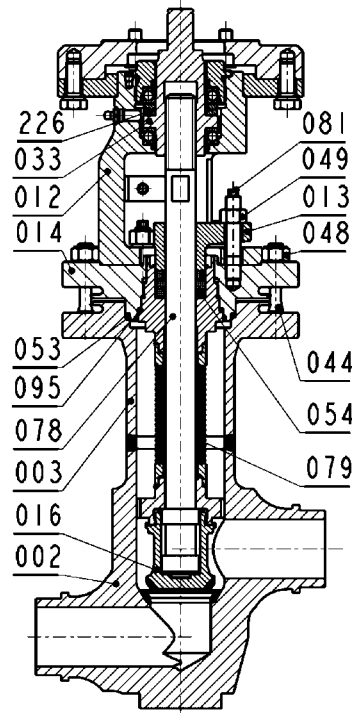
Max. pressure MPa	Valve Max. temperature	Connection ends	
		Max. pressure MPa	Max. temperature °C
Valves DN 10-150, Pp up to 4 MPa, carbon and stainless steel			
4	250	2,5	250
		4	250
Valves DN 10-150, Pp 4 - 12 MPa, carbon steel			
12	300	6	275
		8,6	300
		9,2	300
		11	300
		12	250
Valves DN 10-150, Pp 4 - 14 MPa, stainless steel			
14	335	6	275
		8,6	300
		9,2	300
		11	300
		12	250
		14	335
Valves DN 10-150, Pp 14 - 20 MPa, stainless steel			
18	350	18	350
20	300	20	300

DATA SHEET A10/A11/A13

Materials of main parts



Bellows valves DN 10 - 32 (40)



Bellows valves DN 50 - 150

Name

Material

Name	Material
002 Body	11416
003 Flange	22K
014 Cover	08X18H10T
078 Stem (with bellows)	14X17H2
079 Bellows	W Nr. 1.4541
044 Bolt	15320
048 Nut	15236
016 Plug	08X18H10T
012 Yoke	422828,422743,11416, 08X18H10T
013 Seal cover	422828,422743,11416
033 Stem nut	423046/ 11416
081 Screw	14X17H2, 17134
049 Nut	CSN EN ISO 4032
226 Spring	19721, 14260
053	
054 Sealingring	Expanded graphite
095	

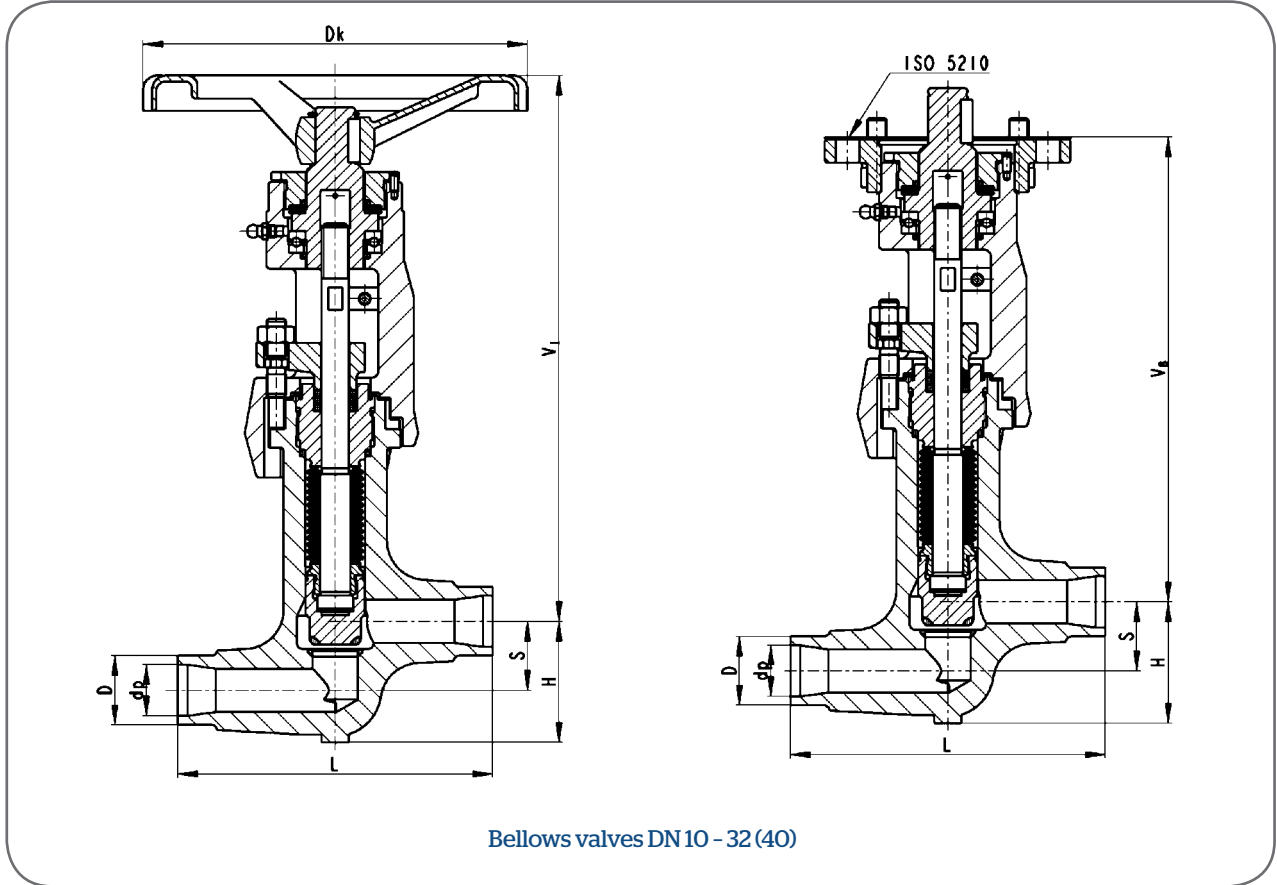
- The plug disc sealing are surfaced using hard cobalt-free alloy ANTINIT DUR 500 FD (type C1111)
- Recommended spare parts to order: sealing rings (054, 095), stem with bellows (078), stem nut (033)
- Valves DN 50 - 150 for Pp up to 4 MPa - with yoke (012) and cap (014)



DATA SHEET A10/A11/A13

Dimensions

Bellows valves DN 10 - 32 (40)



Bellows valves DN 10 - 32 (40)

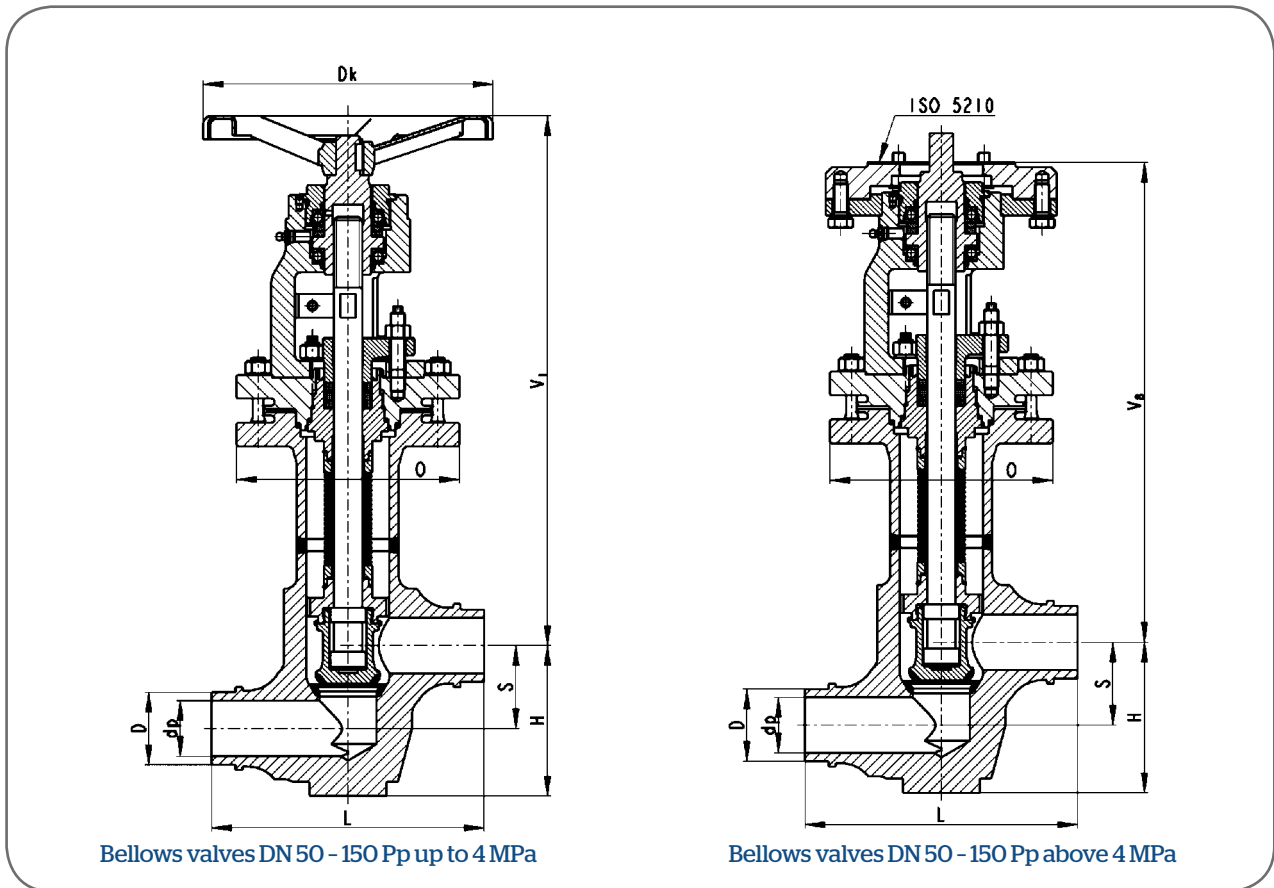
Valves with hand-held wheel intended for electric drive and gear

DN	Pp MPa	D	dp	Dk	H	L	O	S	V1	m1 kg	V8	m8 kg1
10, 15	up to 4	Connection dimensions according to TP 422-24-21		200	43	130	80	24	237	4,1	196	4,4
20,25				200	62	160	92	35	277	7,2	236	7,5
32 (40)				250	76	180	108	45	361	10,2	270	10
10, 15	above 4 up to 14			200	43	130	92	24	281	6,1	240	6,3
20,25				250	62	160	108	35	330	9,7	284	9,5
32 (40)				250	76	180	128	45	464	16,4	376	17,8
10, 15	above 14 up to 20			200	43	130	92	24	300	6,4	259	6,7
20,25				250	62	160	108	35	351	10,3	295	10,1
32 (40)				250	76	180	128	45	433	17,3	390	18,6

- Construction dimensions and weights apply to quick-acting valves

DATA SHEET A10/A11/A13

Bellows valves DN 50 - 150



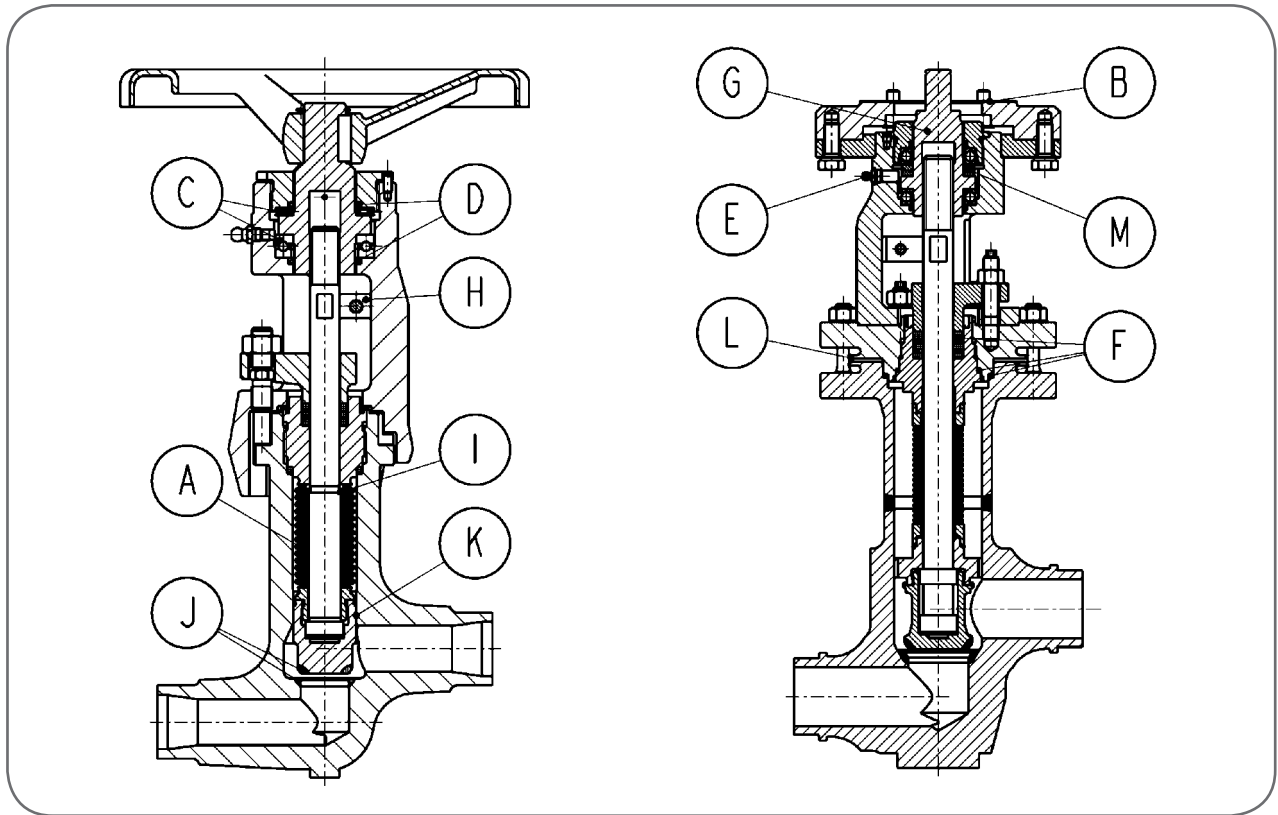
Valves with hand-held wheel intended for electric drive and gear

DN	Pp MPa	D	dp	Dk	H	L	O	S	V1	m1 kg	V8	m8 kg
50	up to 4			250	127	230	188	70	450	33	408	40,4
65				250	172	340	200	110	551	50	508	57
80				500	216	380	265	140	599	104	543	111
100				500	246	430	265	160	599	120	543	127
125				800	322	550	352	210	857	235	864	285
150				800	322	550	352	210	857	240	864	290
50	above 4 up to 14	Connection dimensions according to TP 422-24-21		500	127	230	210	70	618	70	567	85
65				500	165	340	265	110	700	103		
80				710	216	380	270	140	922	195	840	195
100				710	246	430	270	160	922	209	840	199
125						550		210				
150						550		210				
50	above 14 up to 20			500	127	230	210	70	700	70	667	85
65				500	165	340	265	110	880	147		
80				800	216	380	270	140	960	208	891	195
100				800	246	430	270	160	960	221	891	210
125						550		210				
150						550		210				



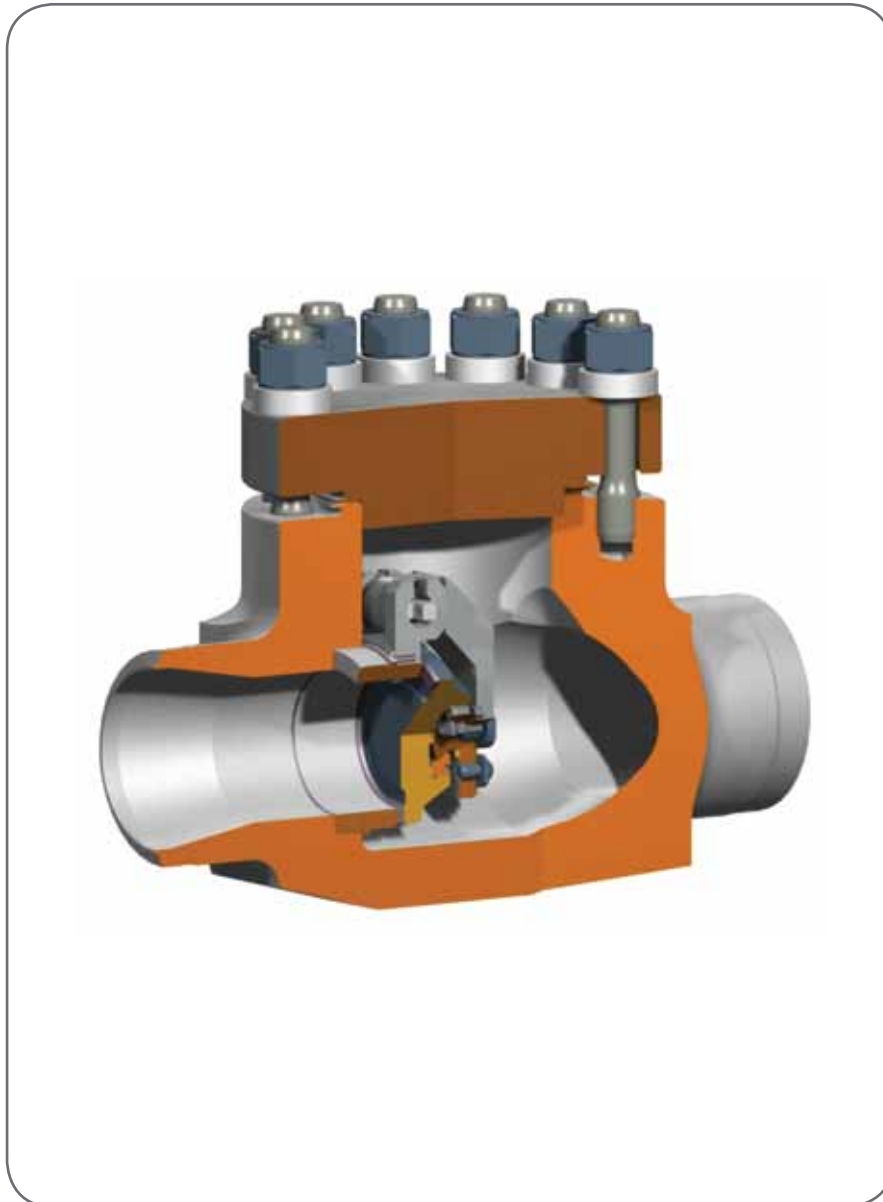
DATA SHEET A10/A11/A13

Advantages of construction



- A** **The stem sealed with multi-casing bellows:**
Perfect stem sealing
- B** **Uniform connection for drives as well as for gear as per ISO 5210:**
Possible to use control elements made by different manufacturers
- C** **The stem nut seated in two antifriction bearings:**
User-friendly, prolonged service life
- D** **Dust rings:**
Protects the bearing space against impurities
- E** **Pressure lubrication:**
User-friendly, prolonged service life of bearings
- F** **Emergency seal of the stem, bellows and cap flange sealing - expanded graphite:**
Protection against a release of medium to the surrounding area in case of failure of the bellows; reliable tightness, environment-friendly
- G** **The stem nut uniform for all modes of control:**
There is no need to dismantle the valve in order to change the mode of control.
- H** **The valve position indicator:**
Local for the purpose of orientation of the operator where the valve not controlled by electric drive. Possible to install a remote indication of DSP position.
- J** **Reverse closure of the stem:**
Ensures the defined travel of the bellows
- K** **The sealing is surfaced using hard cobalt-free alloy:**
Long term lifespans, resistance against wear and tear, and radiation
- The plug guided through the body hole - plugs with aligning listels:**
Ensure pressure equalization and removal of service medium from the space above the plug.
- Tongue-and-groove sealing joint:**
Allow to additionally, during the operation, weld the body-bellows joint or body-cap
- Disc springs:**
Makes it possible to alleviate inertial effects upon the turning down the electric drive, and compensate the heat expansion

Type A43
DN 50 - 400
Pp to 24,5 MPa



Check Valve
for Nuclear Power

Butt-Welded



DATA SHEET A43

Application

- Pipe valves automatically prevent backflow of the fluid in the pipe; can be operated at full pressure drop on the cap
- Fluids
- According to NP-068-05, VTP-87/91
- Industry
- Nuclear power plants (especially with VVER and RBMK reactors) - can be installed in the NPP safety systems with location inside and outside the hermetic zone; chemical industry
- Environments
- Normal, seismic

Technical description

- Check valves are made of carbon and austenitic steel
- Forged body
- Seat is inserted into the body with the overlap, welded with the seal weld
- Disc is freely mounted on the arm pivoting on a pin placed at the hinge at the top of the seat
- The body is sealed by the flange joint
- Seat sealing surface and discs are welded with the hard cobalt-free alloy
- Sealing ring for sealing of the joints body - bonnet (up to 4 MPa) is made of the expanded graphite, the other without sealing, metal - metal
- The direction of the operating fluid flow is under the disc

Operation

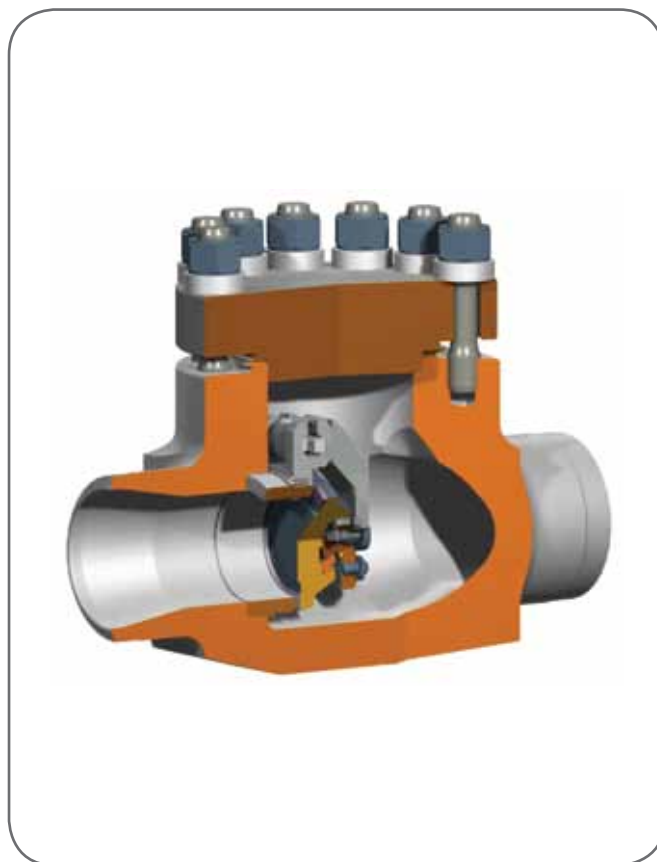
- Automatic

Installation

- Valves should be installed in horizontal piping with the bonnet on top, the direction of flow is under the plate
- For installation, operation and maintenance is valid AL 9906.27 - Technical description and maintenance and repair manual for the check valves

Operating conditions

- **NP-068-05** and **VTP-87** - General technical requirements for NP special valves
- **PNAE G-7-008-89** - The rules for the construction and safe operation of the NP equipment and pipelines
- **PNAE G-1-011-97 (OPB-88/97)** - General requirements for NP safe operation
- **PNAE G-7-002/86** - Standards of calculation of the strength of the NP equipment and piping
- **PNAE G-7-009-89** - NP equipment and piping. Welded joints and weldings
- **PNAE G-7-010-89** - NP equipment and piping. Control rules
- **PNAE G-5-006-87** - Standards of seismically resistant NPP designing



Connection

- Welding ends
- Other connection on request

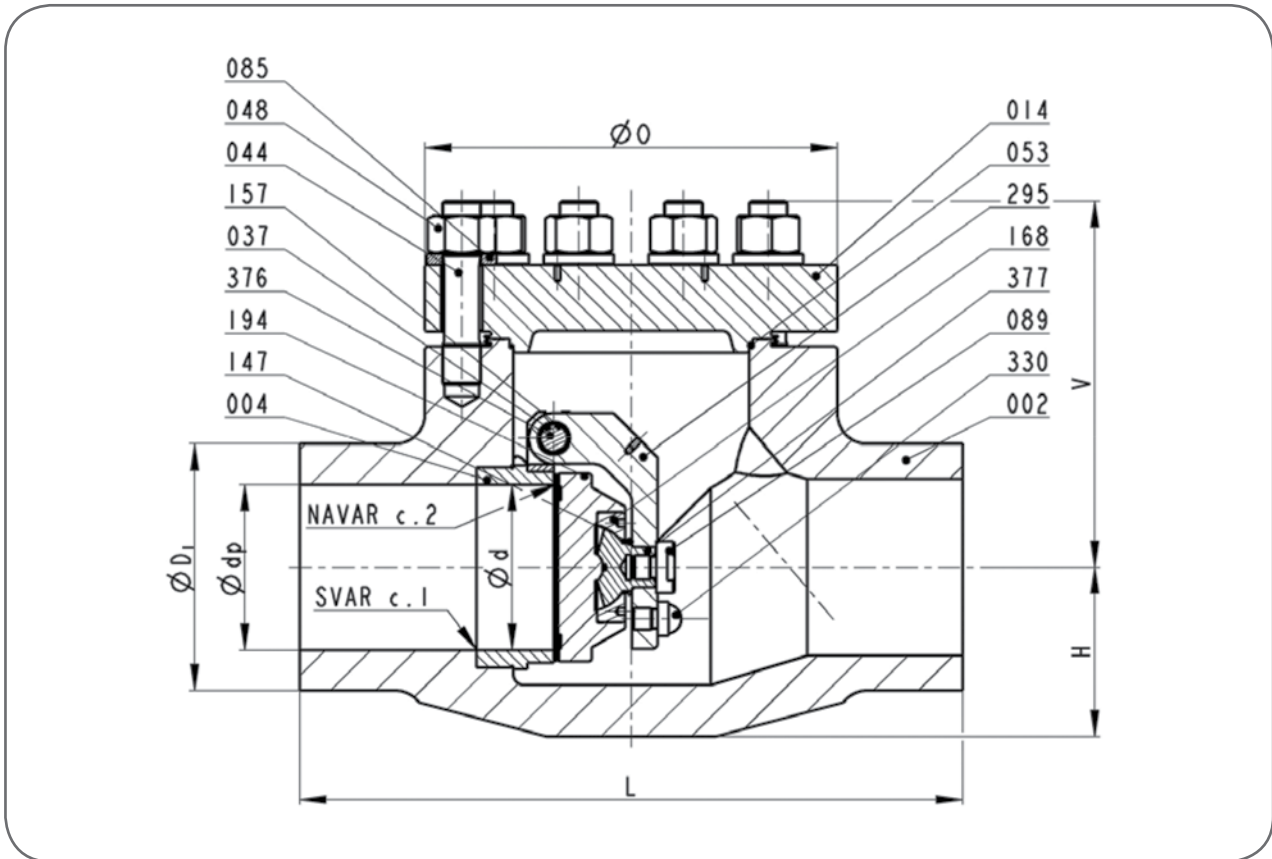
Testing

- Operational capability test - mechanical, without pressure
- Tightness test by the operating pressure P_p
- Vacuum tightness test towards the outside environment just for the valves operating under underpressure
- Strength test:

P_p Pa	Testing fluid pressure MPa
2,5	4,5
4	7
6	10
8,6	14
9,2	15
11	18
12	20
14	22
18	29
20	32
24,5	40

DATA SHEET A43

Materials of main parts



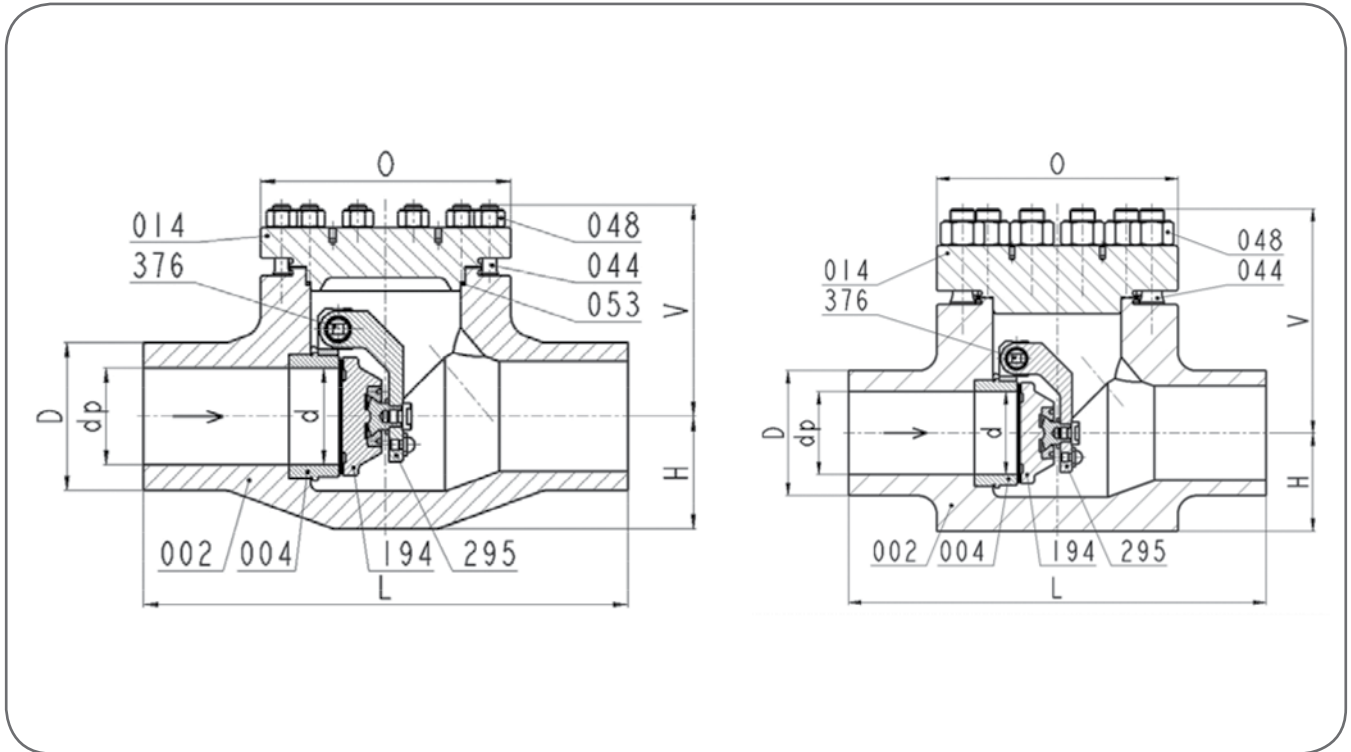
	Name	Material
002	Body	11416, 08X18H10T
004	Seat	11416, 12020, 08X18H10T
014	Bonnet	11416, 08X18H10T
044	Bolt	15320
048	Nut	15236
085	Washer	17134 -14X17H2
194	Disc	11416, 08X18H10T
295	Disc arm	11416, 08X18H10T
376	Pin	17134 - 14X17H2
037	Bushing	17029.4
157	Safety lock	14041.2
377	Pin	17027.6
168	Threaded connection	15320, 14X17H2 - 17134
089	Bolt	15320, 08X18H10T
147	Safety washer	15320, 17027.6
330	Stop	15320, 17134 - 14X17H2

- The sealing surfaces of the seat and the plug are welded with cobalt-free alloy ANTINIT DUR 500 FD (type C1111)
- Recommended spare parts on order: sealing ring (053), disc (194)



DATA SHEET A43

Dimensions



DN/d	Pp MPa	D	dp	d	H	L	O	V	m kg
50/55	over 4	Connection di- mensions according to TP 422-24-47		55	70	360	164	141	29
65/55				55	70	360	164	141	30
80/75				75	90	450	208	186	57
100/75				75	90	450	208	186	58
125/110				110	130	500	284	242	121
150/110				110	130	550	284	242	141
200/150				150	155	650	330	277	263
250/225				225	210	800	425	348	425
300/225				225	210	900	425	348	535



DATA SHEET A43

DN/d	Pp MPa	D	dp	H	L	O	V	m kg
50/55	over 4 to 14	Connection dimensions according to TP 422-24-47		70	360	210	161	43
65/55				70	360	210	161	44
80/75				90	450	265	224	89
100/75				90	450	265	224	93
125/110				130	500	320	298	197
150/110				130	550	320	298	204
200/150				155	650	390	325	374
250/225				230	800	560	498	999
300/225				230	900	560	498	1074
50/55				over 14 to 20			70	360
65/55	70	360						
80/75	90	450	280				233	115
100/75	90	450	280				233	
125/110	130	500						
150/110	130	550						
200/150	155	650						
250/225	230	800	560				658	
300/225	230	900	560				658	1075
350/225	230	900	560				658	
80/75	over 14 to 24,5			90	450	280	233	

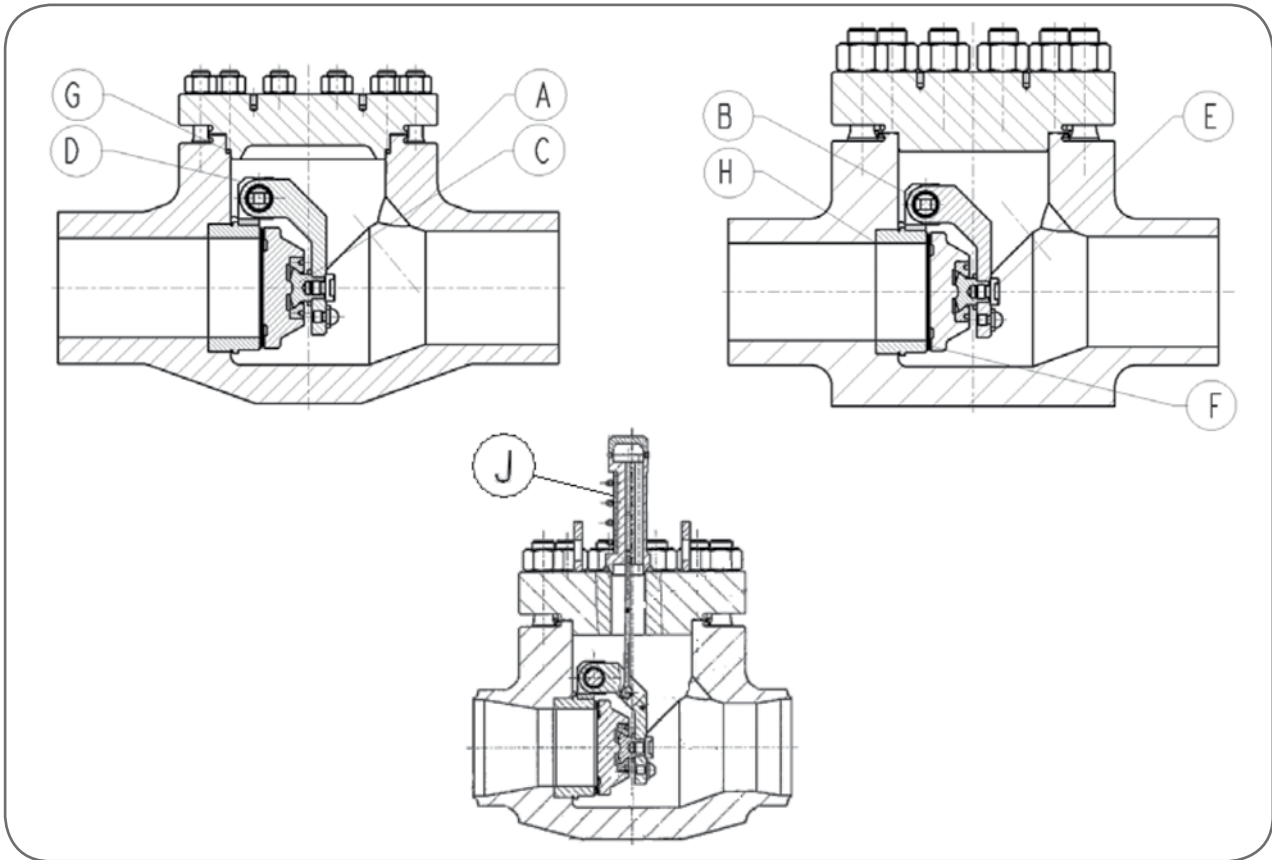
Max. pressure MPa	Valve		Connection ends	
	Max. temperature		Max. pressure	Max. temperature
Check valve DN 50-300, Pp to 4 MPa, carbon and stainless steel				
4	250		2,5	250
			4	250
Check valves DN 50-300, Pp over 4 to 12 MPa, carbon steel				
12	300		6	275
			8,6	300
			9,2	300
			11	300
			12	250
Check valves DN 50-300, Pp over 4 to 14 MPa, stainless steel				
14	335		9,2	300
			11	300
			14	335
Check valves DN 50-300, Pp over 14 to 20 MPa, stainless steel				
18	350		18	350
20	300		20	300
Check valves DN 80, Pp to 24.5 MPa, stainless steel				
24,5	150		24,5	150

Note: Other parameters acc. to NP-068-05 or on request



DATA SHEET A43

Advantages of construction



- A** **Reduced forged body without weld joint:**
It reduces weight, eliminates weld crack detection
- B** **Pin of the disc arm inside the body:**
Does not pass through the body, does not affect the outer tightness
- C** **Arm - disc joint:**
Allows tilting. Tight contact of the sealing surfaces of the closure
- D** **Arm hinge:**
Welded to the seat, does not affect the outer tightness of the valve
- E** **Disc arm - pin joint:**
Simple, reliable, easy assembly and disassembly
- F** **Sealing surfaces are welded with the cobalt-free alloy:**
Long-term durability, wear resistance
- G** **Sealing ring is made of expanded graphite**
Reliable tightness, ecology
- H** **Placement of the seat in the body:**
Inserted into the body with the overlap, welded with the seal weld
- J** **DUP signalling:**
Allows remote signaling of the end positions of the closure