Rotary Plug Valve Series 72 · Type 72.3 and 72.3-02

Application
Control valve for process engineering and industrial applications.

Valve Size	DN 25 to 600	NPS 1 to 24	
Pressure Rating	PN 10 to 40	Class 150, 300	
Temperature Range	–100 to 500 °C	–148 to +932 °F	Various design versions

Features

Rotary plug valve operated with:

- pneumatic piston actuator Type AT / BR31a → control valve Type 72.3/AT and 72.3/BR31a (Fig. 1)
- pneumatic rolling diaphragm actuator Type R → control valve Type 72.3/R (Fig. 2)
- pneumatic diaphragm actuator Type MZ → control valve Type 72.3/MZ (only available for DN 100 to 350.) (Fig. 4)
- pneumatic diaphragm actuator Type MD → control valve Type 72.3/MD (only available for DN 100 to 350.) (Fig. 3)

The rotary plug valve can also be configured with an electric or hydraulic actuator.
The control valves, designed according to the modular assembly principle, can be equipped with various accessories: positioner, limit switches, solenoid valves, and other accessories acc. to VDI/VDE 3845-1 (EN 15714-3), resp. VDI/VDE 3847-2 for actuator Type AT.

Body material

- Cast steel
- Cast stainless steel
- Forged steel or forged stainless steel
- Special materials (Superduplex, Monel®, Hastelloy®, Titan etc.)

Valve seat

- Metal seal
- Soft seal
- Various seat factors (Standard: F1; F0,6; F0,4; F0,25)

Standard versions

- For temperatures from -40 to +350 °C

Further versions

- SAMSON VETEC low emission packing (VLE) optionally certified according to DIN EN ISO 15848-1*. (See fig. 18, 20)

Configuration samples

Fig. 1: *Type 72.3/AT*

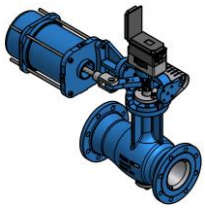


Fig. 2: *Type 72.3/R*

Fig. 3: *Type 72.3/MD*

Fig 4: *Type 72.3/MZ*

Fig 5: 72.3-IT 1

Fig. 6: *72.3-DSB*

Fig 7: *72.3- Cleaning connections*

Fig. 8: *72.3-Heating jacket*

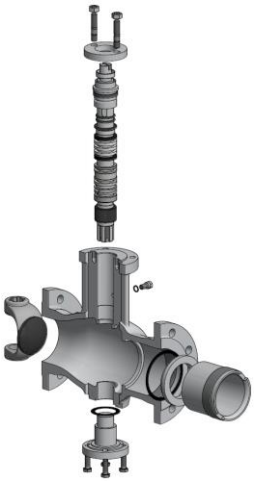


Fig 9: *Assembly drawing • Valve Type 72.3*

- Components for noise and cavitation reduction ► TY005.036
- **Bushing seals**
- **Insulating section IT1**** - High and low temperature extension: -40 to -100 °C und 350 to 500 °C (see fig. 5)
- **Double stuffing box DSB** - with or without test connection (see fig. 6)
- **Heating jacket HZM** from DN 150 (see fig. 8)
- **Flushing connections** for the plug, trunnion bearing, retainer ring and shaft (see fig. 11)

****The design may vary depending on the sealing elements installed (e.g., packing, O-rings) and operating parameters. The specified temperature values are only to be understood as guide values. The design of the valve is checked in each individual case.***

Principle of operation

The offset between the plug face and shaft centre and the offset between the shaft centre and valve centreline give the rotary plug valve its double eccentric (double offset) design (see fig.12/13). When opening and closing the valve, this double eccentric design allows the plug to lift smoothly off the seat without any friction, eliminating any breakaway torque. This smooth opening also
allows for stable control, even at small opening angles.

Fail-safe action

With single-acting rotary actuators, the control valve has two different fail-safe positions which become effective when the pressure on the diaphragm or the piston is
relieved or when the power supply fails:

- **FO** = spring opens (fail-open): the valve is open by the spring force of the actuator upon failure of power supply.
- **FC** = spring closes (fail-close): the valve is closed by the spring force of the actuator upon failure of power supply.

Flow Direction

The valve can be used in both flow directions, depending on the medium, operating conditions and flow requirements:

- FTC = Flow-to-close
- FTO = Flow-to-open

Installation:

An arrow on the valve will indicate the direction of flow the valve has been configured for.

Type 72.3 closes counter-clockwise and has an opening angle of 75°.

Fig. 10 *Plug movement with Double-Eccentric Arrangement*

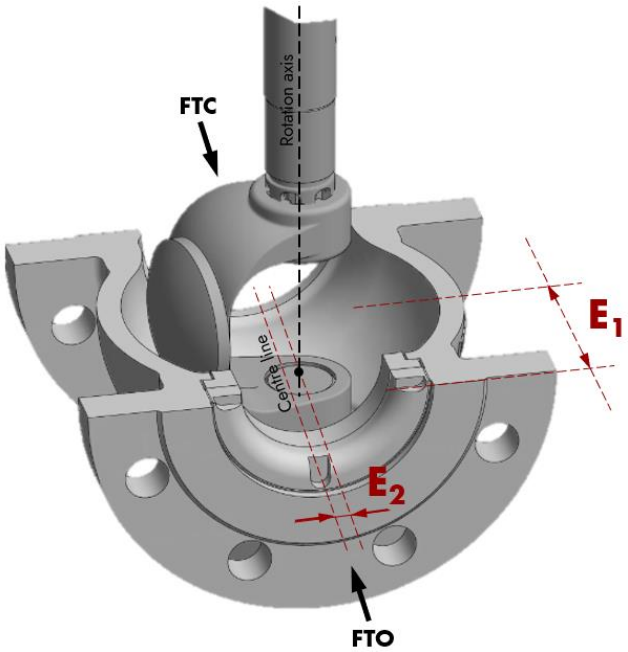


Fig. 11 *Double-Eccentric Principle (VDI/VDE 3844)*

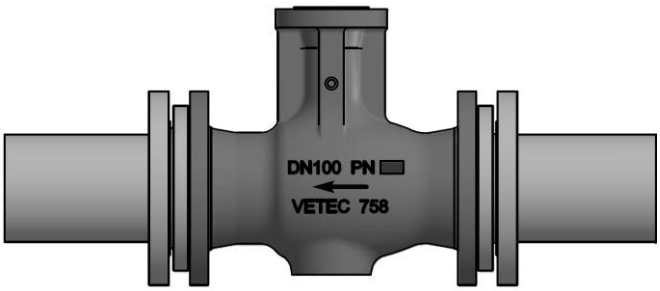


Fig 12. *Flow Direction*

Table 1. Technical Data

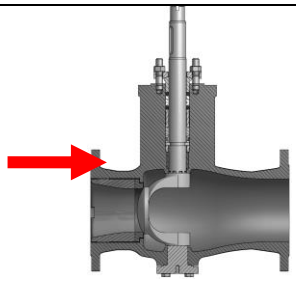
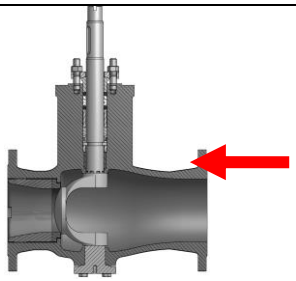
Type	**72.3**			
Valve size	DN 25 to 600		NPS 1 to 24	
Style	Flange		Flange	
Flange pressure rating	PN 10 / 16 / 25 / 40		CL 150 / CL 300	
Max. operating pressure	40 bar		50 bar	
Overall length	DN 25 to 250	DN 300 to 600	NPS 1 to 10	NPS 12 to 24
	EN 558, Series 1	EN 558, Series 15	EN 558, Series 37/38	558, Series 15
Flange bore/form	DIN EN 1092 B1		ASME B16.5	
Flow direction	 Direction of flow from the front: FTO		 Direction of flow from behind: FTC	
Characteristic	equal percentage / linear characteristic (by means of positioner) /on-off			
Rangeability	up to 200:1			
Temperature range of the process medium	-100 to + 500 °C (-148 to +932 °F)			
Opening angle	75°			
Plug movement	Closes counterclockwise			
Leakage class acc. to DIN EN 60534-4	Standard - metal seat		Optional - soft seat	
	IV		VI	
Actuator Type	Pneumatic, electric or hydraulic rotary actuators and manual override			
Conformity	CE TSG EAC			

Table 2.1: Standard materials DIN

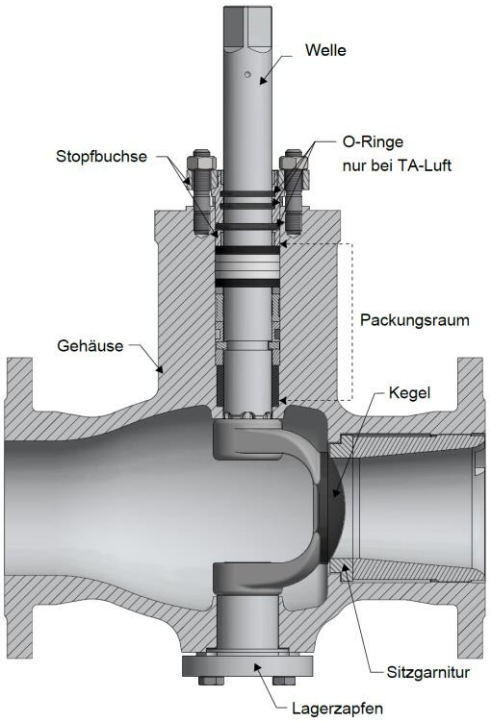
Item	Part	Material / max. permissible temperature in °C			Assembly drawing Type 72.3
100	Body	Cast steel 1.0619 -10…+400 °C		Cast stainless steel 1.4408 -100…+500 °C	
200	Plug	R30006 (Stellite® 6) -10…+400 °C		1.4408 (stellited/ hard-ened) -100…+500 °C	
300	Shaft	1.4542 (17-4PH®) -29…+315 °C	1.4404 -100…+400°C	1.4980 -100…+500 °C	
400	Trunnion bearing	1.4404 (stellited/ hard-ened)		1.4408 (stellited/ hard-ened)	
500	Seat ring	1.4404 (stellited/ hard-ened)		1.4408 (stellited/ hard-ened)	
501	Seat holder	1.4404		1.4408	
610	Packing bushing (Version 72.3-02)	1.4404			
620/ 621	Packing (*)	PTFE/Graphite -29…+280 °C		Graphite -100…+500 °C	
-/-	Gasket	VA/Graphite			
644/ 645	O-ring	FPM 80			

Fig. 13: Assembly drawing with items

(*) Depending on the application, different packaging ring materials and packaging ring combinations can be used. The number of packaging rings (5) remains constant.
Other materials available on request.

Table 2.1: Standard materials ANSI

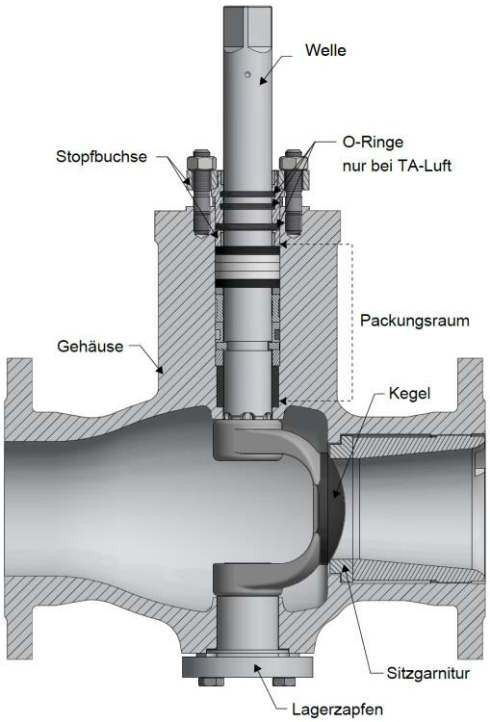
Item	Part	Material / max. permissible temperature in °F			Assembly drawing Type 72.3
100	Body	Cast steel A216 WCC 14… 752 °F		Cast stainless steel A351 CF8M -148… +932 °F	
200	Plug	R30006 (Stellite® 6) 14…752 °F		A351 CF8M (stellited/ hard-ened) -148…+932 °F	
300	Shaft	1.4542 (17-4PH®) -20…+599 °F	1.4404 -148…+752°F	1.4980 -148…+932 °F	
400	Trunnion bearing	316 L (stellited/ hardened)		A351 CF8M (stellited/ hard-ened)	
500	Seat ring	316 L (stellited/ hardened)		A351 CF8M (stellited/ hard-ened)	
501	Seat holder	316 L		A351 CF8M	
610	Packing bushing (Version 72.3-02)	316 L			
620/ 621	Packing (*)	PTFE/Graphite -20…+536 °F		Graphite -148…+932 °F	
-/-	Gasket	VA/Graphite			
644/ 645	O-ring	FPM 80			

Fig. 14: Assembly drawing with items

(*) Depending on the application, different packaging ring materials and packaging ring combinations can be used. The number of packaging rings (5) remains constant.
Other materials available on request.

Design change (New Generation)

Standard design 72.3

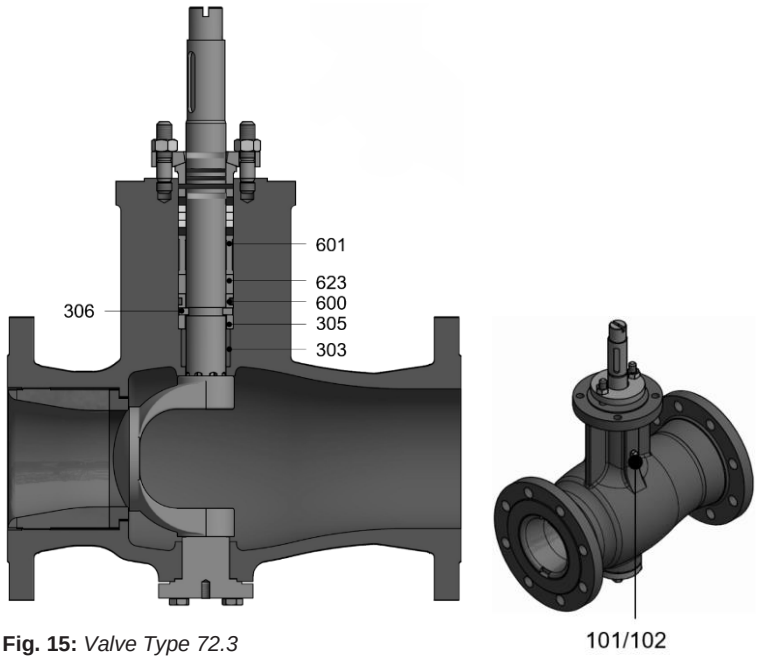


Fig. 15: *Valve Type 72.3*

→ Blow-out protection: screw (101, 102)
→ Internal parts (303, 305, 306, 600, 601, 623)

New Generation 72.3-02

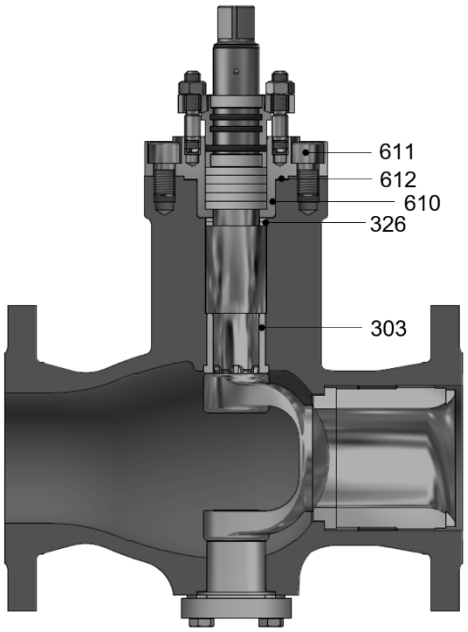


Fig. 16: *Valve Type 72.3-02*

→ Blow-out protection: packing bushing (610, 611, 612)
→ Internal parts (303, 326)

Designs versions

Standard stuffing box
Type 72.3 (without O-rings)

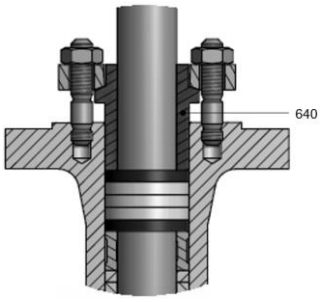


Fig. 17: stuffing box (640) adjustable

VLE stuffing box
Type 72.3 (with O-rings)

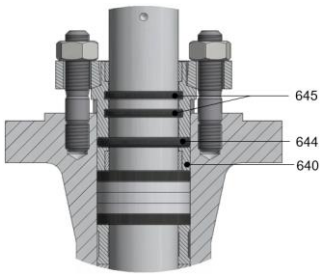


Fig. 18: two dynamic (645) and one static (644) O-ring;
NOT adjustable

Standard stuffing box
Type 72.3-02 (without O-rings)

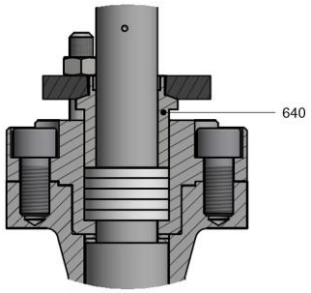


Bild 19: stuffing box (640) adjustable

VLE stuffing box
Type 72.3-02 (with O-rings)

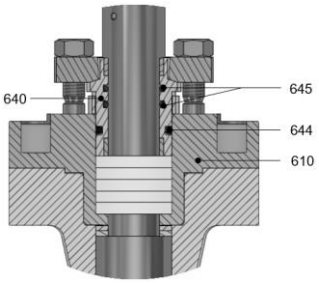


Bild 20: two dynamic (645) and one static (644) O-ring;
NOT adjustable

Shaft seal

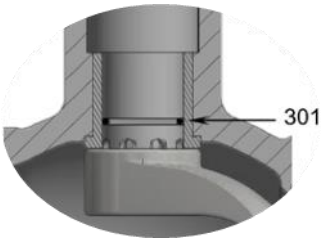


Fig. 21: Sealing of the shaft with O-ring

Trunnion bearing seal

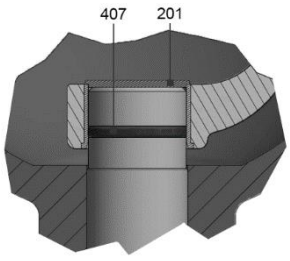


Fig. 22: Sealing of the trunnion bearing with O-ring and closed bearing bush

- **Flow Characteristics • Kvs/Cv-Coefficient**

The natural (inherent) design characteristic (fig. 23) of the rotary plug valve can be modified to achieve a linear or equal percentage (logarithmic) characteristic (fig. 24) using a positioner.
The flow coefficient (Kvs/Cv) depends on the opening angle of the valve.
➔ Kvs/Cv coefficients according to overview ► TY005.085

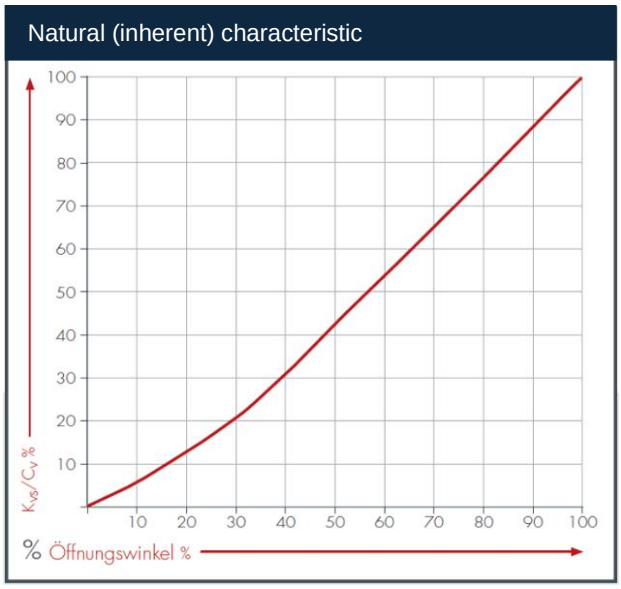


Fig. 23: Natural (inherent) characteristic

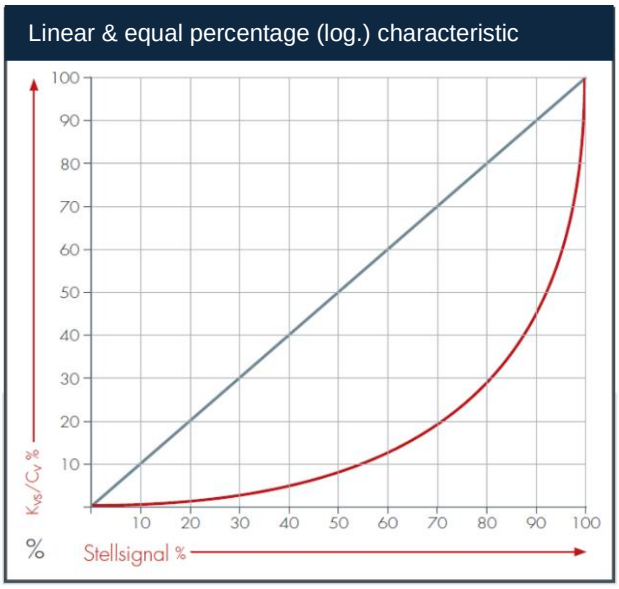


Fig. 24: Linear & equal percentage (log.) characteristic

Table 3. Kvs and Cvs Coefficients

3a. Seat with Metal Sealing - FTO

DN		**25**	**40**	**50**	**80**	**100**	**150**	**200**	**250**	**300**	**400**	**500**	**600**
NPS		**1**	**1 ½**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**16**	**20**	**24**
Flow rate													
100%	**Kvs**	16	36	70	220	360	720	1100	1950	2700	4700	6700	9700
	Cv	18	42	81	254	416	832	1272	2254	3121	5434	7746	11214
	Seat Ø mm	18	26	36	60	76	105	135	170	210	290	350	420
60%	**Kvs**	12	22	43	145	210	430	630	1230	1500	2700	3800	5800
	Cv	14	25	50	168	243	497	728	1422	1734	3121	4393	6705
	Seat Ø mm	16	21,5	29,5	50	60	86	106	146	163	225	271	330
40%	**Kvs**	10	16	31	105	150	275	390	850	900	1600	2300	3900
	Cv	12	18	36	121	173	318	451	983	1040	1850	2659	4509
	Seat Ø mm	14	18,5	25,5	44	53	73	88	126	133	184	221	275
25%	**Kvs**	4	12	19	70	100	185	245	500	640	1100	1250	2400
	Cv	4,6	14	22	81	116	214	283	578	740	1272	1445	2775
	Seat Ø mm	10	16	21	37	45	62	73	102	116	160	175	225

3b. Seat with Metal Sealing - FTC

DN		**25**	**40**	**50**	**80**	**100**	**150**	**200**	**250**	**300**	**400**	**500**	**600**
NPS		**1**	**1 ½**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**16**	**20**	**24**
Flow rate													
100%	**Kvs**	16	36	70	210	340	660	810	1300	2100	3400	4800	7680
	Cv	18	42	81	243	393	763	936	1503	2428	3931	5549	8879
	Seat Ø mm	18	26	36	60	76	105	135	170	210	290	350	420
60%	**Kvs**	12	22	43	135	200	320	410	820	900	1800	2700	4030
	Cv	14	25	50	156	231	370	474	948	1040	2081	3121	4659
	Seat Ø mm	16	21,5	29,5	50	60	86	106	146	163	225	271	330
40%	**Kvs**	10	16	31	95	120	185	250	540	570	1120	1600	2530
	Cv	12	18	36	110	139	214	289	624	659	1295	1850	2925
	Seat Ø mm	14	18,5	25,5	44	53	73	88	126	133	184	221	275
25%	**Kvs**	4	12	19	56	90	125	160	320	410	860	870	1410
	Cv	4,6	14	22	65	104	145	185	370	474	994	1006	1630
	Seat Ø mm	10	16	21	37	45	62	73	102	116	160	175	225

3c. Seat with Soft Sealing - FTC

DN		25	40	50	80	100	150	200	250	300	400	500	600
NPS		1	1 ½	2	3	4	6	8	10	12	16	20	24
							Flow rate						
100%	Kvs	12	36	68	180	290	535	730	1220	2000	2700	4800	7680
	Cv	14	42	79	208	335	618	844	1410	2312	3121	5549	8879
	Seat Ø mm	16	26	35	54	70	98	128	160	204	270	350	420
60%	Kvs	11	22	43	135	200	320	410	820	900	1800	2700	4030
	Cv	13	25	50	156	231	370	474	948	1040	2081	3121	4659
	Seat Ø mm	15	21,5	29,5	50	60	86	106	146	163	225	271	330
40%	Kvs	10	16	31	105	120	185	250	540	570	1120	1600	2530
	Cv	12	18	36	121	139	214	289	624	659	1295	1850	2925
	Seat Ø mm	14	18,5	25,5	46	53	73	88	126	133	184	221	275
25%	Kvs	4	12	19	56	90	125	160	320	410	860	870	1410
	Cv	4,6	14	22	65	104	145	185	370	474	994	1006	1630
	Seat Ø mm	10	16	21	37	45	62	73	102	116	160	175	225

Installation positions of the control valve and assembly position of the actuator

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HINWEIS

Risk of malfunction or damage to the control valve due to incorrect installation in the pipeline!

➔ Install the control valve in the pipeline so that the condensate can drain off.

➔ The plug must not swing downwards, as it can jam due to deposits of the medium.

➔ Observe the permissible installation position of the accessories (e.g. supply pressure regulator). See associated mounting and operating instructions.

➔ Actuators type MN must only be installed, transported, lifted or stored in a vertical position (with the piston rod vertical to the pipe).

- For the correct sizing of the actuator, the mounting position differing from the standard has to be specified when ordering the control valve.
- **Mounting Type A** is selected as the **standard** mounting position for **AT** and **R actuators** if no other specifications are provided.
- **Mounting Type B** is selected as the **standard** mounting position for **M actuators** if no other specifications are provided.

For the permissible **installation positions** of the **rotary plug valves** with **actuators Type AT, R** and **M** in the pipeline and **assembly positions** of the **actuators** on the valves, see ►data sheet **TY005.071**.

Table 4. Weight kg (without Actuator)

DN	**25**	**40**	**50**	**80**	**100**	**150**	**200**	**250**	**300**	**400**	**500**	**600**
NPS	**1**	**1½**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**16**	**20**	**24**
Weight kg	8	15	20	40	50	100	160	220	250	450	850	1500

Table 5. DIN Face-to-Face Dimensions

	DN	**25**	**40**	**50**	**80**	**100**	**150**	**200**	**250**	**300**	**400**	**500**	**600**
PN 10	**Length mm**	**160**	**200**	**230**	**310**	**350**	**480**	**600**	**730**	**500**	**600**	**700**	**800**
PN 16													
PN 25													
PN 40													

Table 6. ANSI Face-to-Face Dimensions, Series 37

	NPS	**1**	**1 ½**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**16**	**20**	**24**
CL 150	**Length mm**	**184**	**222**	**254**	**298**	**352**	**451**	**543**	**673**	**500**	**600**	**700**	**800**

Table 7. ANSI Face-to-Face Dimensions, Series 38

	NPS	**1**	**1 ½**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**16**	**20**	**24**
CL 300	**Length mm**	**197**	**235**	**267**	**317**	**368**	**473**	**568**	**708**	**500**	**600**	**700**	**800**

Ordering text

Rotary plug valves	Type …
Valve size	DN …
Pressure rating	PN …
Material	Acc. to table 2.1/2.2 or special materials
Type of end connection	Flange
Seat/plug seal	Metal sealing, soft sealing
Flow characteristic	Equal percentage or linear
Rotary actuator	Pneumatic, electric, hydraulic
Fail-safe position	Fail-close or fail-open
Process medium	Density and temperature
Max. flow rate	kg/h or m³/h
Operating pressure	p1 and p2 in bar (absolute pressure)
Accessories	Positioner/limit switch etc.
Others	Certificates, manufacturer's declaration etc.

Related documents

TY005.069	Max. permissible differential pressures Δp
TY005.085	Kvs / Cv coefficients
TY005.071	Mounting types of the actuators
TY005.xxx	Data sheet of the associated actuator

Revisions- und Genehmigungsliste (Regelung gemäß VA 002.002)
Freigabe und Genehmigung

Originaldokument

Erstellt: Abt., Name VA2, F. Thiede Datum: Sept. 2013

Genehmigt: Abt., Name Peter Konzack Datum: Sept. 2013

Änderungen

Rev.	Datum	Revisor	Beschreibung
16	16.09.2022	fth	
17	06.10.2025	fth	- Struktur angepasst. - Materialtabelle 2.2 eingefügt - Kennlinien neu gestaltet - „Einbaulagen“ eingefügt
03			
04			
05			
06			
07			
08			
09			