DATA SHEET TY005.002_en

Series 72 · Rotary Plug Valve Type 72.4 & 72.4-02

Double eccentric control valve for process engineering and industrial applications

Valve size	DN 25 to 300	NPS 1 to 12
Nominal pressure	PN 10 to 40	Class 150 and 300
Temperature	–100 to +500 °C	–148 to +932 °F

Valve body made of

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

Seat version

- Metal sealing, armored or unarmored
- Soft sealing

Version

Sandwich-style body no flanges

- DN 25 to DN 300, PN 10/PN 16/PN 25/PN 40, face-to-face dimensions acc. to EN 558, Series 36
- NPS 1 to NPS 12, Class 150/Class 300, face-to-face dimensions acc. to EN 558, Series 36

Further versions

- TA-Luft stuffing box / double stuffing box
- With high and low temperature extension (IT1)
- Double stuffing box (DSB)
- Flushing connections on the plug, trunnion bearing and shaft
- With protective sleeve made of hardened metal, tungsten carbide or ceramic
- Special materials for the body and trim
- Noise reduction (silencer)
- Higher and lower temperatures on request

The valves can be equipped with different accessories, such as positioners, solenoid valves and other accessories according to VDI/VDE 3845.

Configuration samples

Fig. 1: *Type 72.4/AT*

Fig. 2: *Type 72.4/R*

Fig. 3: *Type 72.4/MZ*

Fig. 4: *Type 72.4/MD*

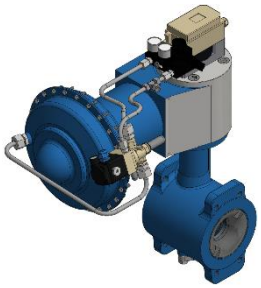


Fig. 5: *Type 72.4/MN*

Special designs

Fig. 6: 72.4-IT1

Fig. 7: 72.4-DSB

Fig. 8: 72.4-Cleaning connections

Fig. 9: 72.4-Protective sleeve

Principle of operation

The shaft/plug arrangement is eccentric Figs. 3 and 4. The double-eccentric design of the rotary plug valve is achieved in combination with the offset of the plug's pivot. When turning the plug shaft from closed position in opening direction, the double-eccentric design allows the plug to lift off the seat smoothly without initial breakaway torque. The valve is not opened suddenly and shows a stable control response even with small opening angles. The rotary plug valve can be used for both directions of flow.

For gases and vapors, the direction of flow is FTC medium closes.
The flow coefficient depends on the opening angle of the valve.
Using positioners or cam disks, the natural characteristic of the rotary plug valve can be modified to achieve a linear or equal-percentage characteristic Figs. 5 and 6.

Fail-safe action

In combination with the Type R/M/AT/S Rotary Actuators, the control valve has two fail-safe actions, which become effective when the piston is relieved of pressure or when the supply air fails.

Valve CLOSED without supply air: rotary plug valve is closed when the supply air fails.
Valve OPEN without supply air: rotary plug valve is opened when the supply air fails.

Installation

Observe the direction of flow indicated by the arrow on the valve body.

The 72.4 valve series closes counterclockwise and has an opening angle of 75°.

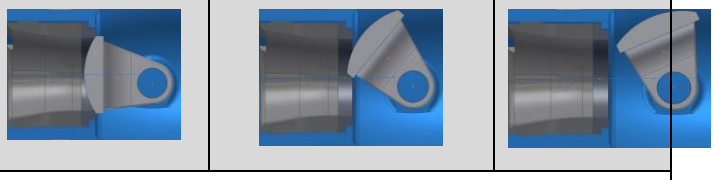


Fig. 10: Plug movement with double-eccentric arrangement

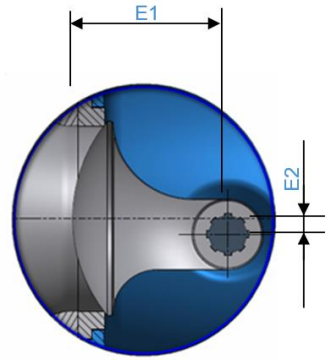


Fig. 11: Double-Eccentric Principle acc. to VDI/VDE 3844

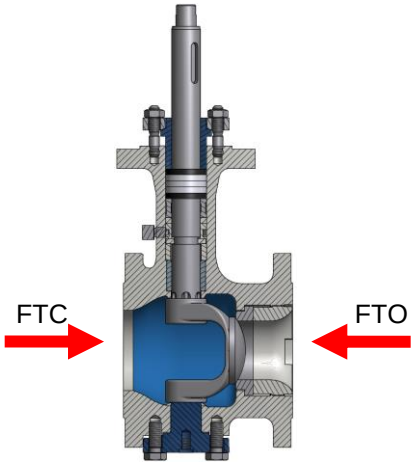
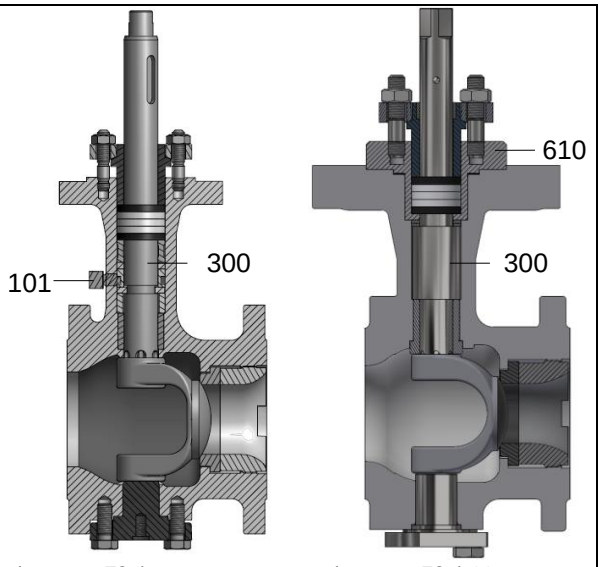


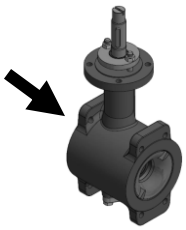
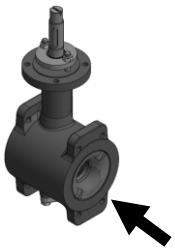
Fig 12. Flow Direction



Valve Type 72.4 Valve Type 72.4-02

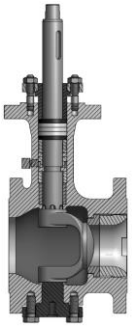
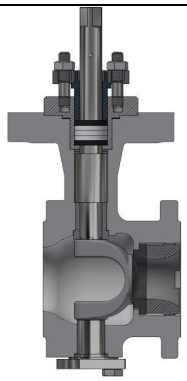
101 = Blow out protection shaft for Type 72.4
300 = Shaft
610 = Blow out protection shaft for Type 72.4-02

Table 1: Technical data

Design parameters		**DIN**	**ANSI**
Valve size		DN 25, 40, 50, 80, 100, 150, 200, 250, 300	NPS 1, 1½, 2, 3, 4, 6, 8, 10, 12
Pressure rating		PN 10 · 16 · 25 · 40	Class 150, 300
Max. operating pressure		40 bar(g)	50 bar(g)
Max. perm. differential pressure		see data sheet ►TY005.069	
Face-to-face dimensions		EN 558, series 36	
Connection	Flange	DIN EN 1092-1	ASME B16.5
Seat-plug seal		metal sealing or soft sealing	
Standard seat factors		F1 (100%) · F0,6 (60%) · F0,4 (40%) · F0,25 (25%)	
Characteristic		natural · equal percentage · linear · ON/OFF	
Rangeability		up to 200:1	
Opening angle		75°	
Plug movement (direction of rotation)		closing counterclockwise	
Flow direction		 Flow to close (FTC)	 Flow to open (FTO)
Temperature range [1]			
Body	Without insulating section	-40 to +350 °C	-40… +662 °F
	With insulating section IT1 (short)	-100 to-40 °C and 350 to 500 °C	-148…-40 and 662… 932 °F
Leckage‑Klasse nach DIN EN 60534-4			
Seat	Metal seal	IV	
	Soft seal	VI	
Actuator type		Pneumatic, electric or hydraulic rotary actuators and manual override	
Conformity		CE TSG	

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

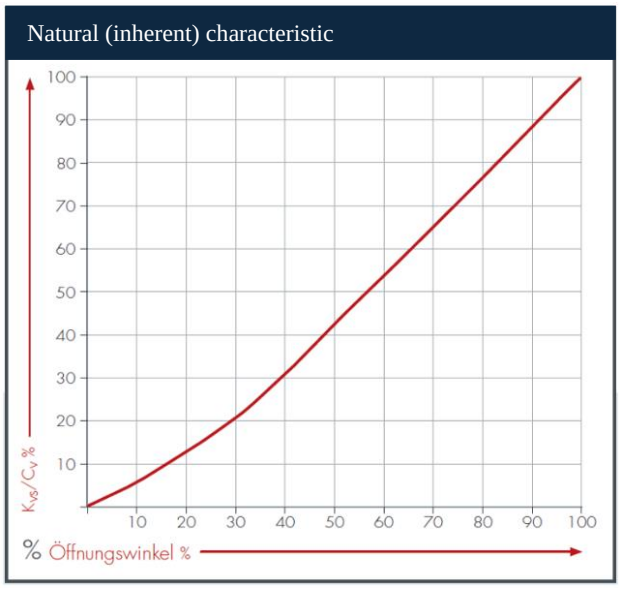
Table 2.1: Standard materials DIN

Item	Part	Material / max. permissible temperature in °C			Assembly drawing
100	Body	Cast steel 1.0619 -10…+400 °C		Cast stainless steel 1.4408 -100…+500 °C	 Type 72.4
200	Plug	R30006 (Stellite® 6) -10…+400 °C		1.4408 (stellited/ hardened) -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/ hardened)		1.4408 (stellited/ hardened)	
500	Seat ring	1.4404 (stellited/ hardened)		1.4408 (stellited/ hardened)	
501	Seat holder	1.4404		1.4408	 Type 72.4-02
610	Packing bushing	1.4404			
620/ 621	Packing (*)	PTFE/Graphite -29…+280 °C		Graphite, Aramid -100…+500 °C	
-/-	Gasket	VA/Graphite			
644/ 645	O-ring	FPM 80			

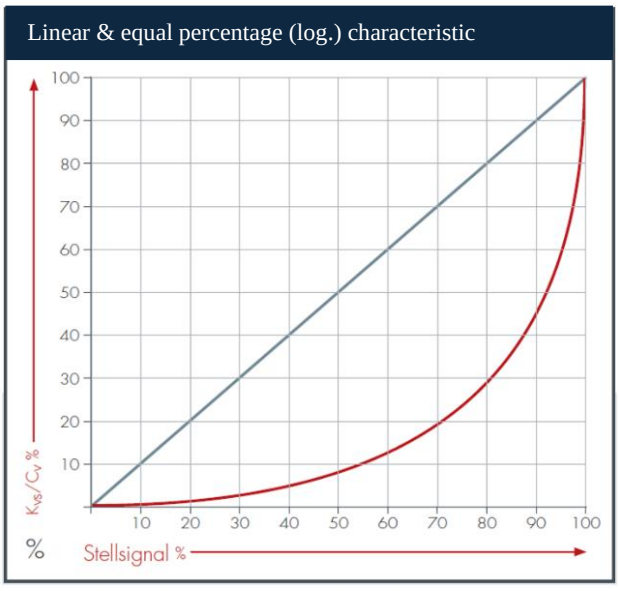
(*) Depending on the application, different packaging ring materials and packaging ring combinations can be used. The number of packaging rings (5) remains constant.
Other materials available on request.

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

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



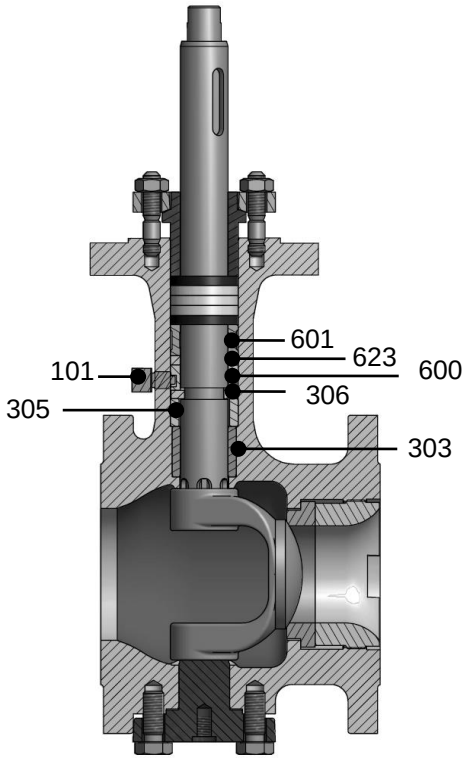
Natural (inherent) characteristic



Linear & equal percentage (log.) characteristic

- **Design change**

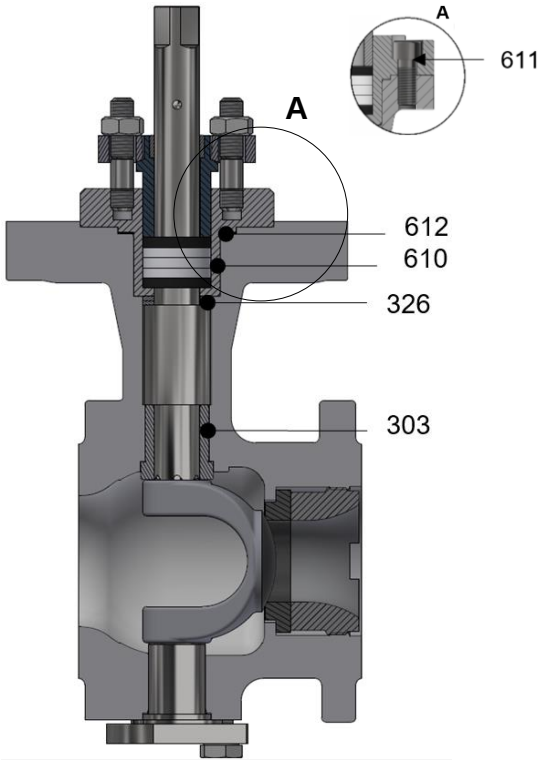
Type 72.4



→ Blow-out protection: retaining screw (101)

→ Packing (303, 305, 306, 600, 601, 623)

Type 72.4-02 (Design Generation 02)



→ Blow-out protection: packing bushing (610, 611, 612)

→ Packing (303, 326)

303	Guide bushing	1
305	Spacer	1
306	Split ring	1
600	Container ring	1
601	Lubricating bushing	1
623	Spacer	1

303	Guide bushing	1
326	Washer	2

Table 3. Kvs and Cv Coefficients

3a. Seat with metal sealing FTO

DN		25	40	50	80	100	150	200	250	300
NPS		1	1 1/2	2	3	4	6	8	10	12
Flow rate										
100%	Kvs	16	36	70	220	360	720	1100	1950	2700
	Cv	18	42	81	254	416	832	1272	2254	3121
	Seat Ø mm	18	26	36	60	76	105	135	170	210
60%	Kvs	12	22	43	145	210	430	630	1230	1500
	Cv	14	25	50	168	243	497	728	1422	1734
	Seat Ø mm	16	21,5	29,5	50	60	86	106	146	163
40%	Kvs	10	16	31	105	150	275	390	850	900
	Cv	12	18	36	121	173	318	451	983	1040
	Seat Ø mm	14	18,5	25,5	44	53	73	88	126	133
25%	Kvs	4	12	19	70	100	185	245	500	640
	Cv	4,6	14	22	81	116	214	283	578	740
	Seat Ø mm	10	16	21	37	45	62	73	102	116

3b. Seat with metal sealing FTC

DN		25	40	50	80	100	150	200	250	300
NPS		1	1 1/2	2	3	4	6	8	10	12
Flow rate										
100%	Kvs	16	36	70	210	340	660	810	1300	2100
	Cv	18	42	81	243	393	763	936	1503	2428
	Seat Ø mm	18	26	36	60	76	105	135	170	210
60%	Kvs	12	22	43	135	200	320	410	820	900
	Cv	14	25	50	156	231	370	474	948	1040
	Seat Ø mm	16	21,5	29,5	50	60	86	106	146	163
40%	Kvs	10	16	31	95	120	185	250	540	570
	Cv	12	18	36	110	139	214	289	624	659
	Seat Ø mm	14	18,5	25,5	44	53	73	88	126	133
25%	Kvs	4	12	19	56	90	125	160	320	410
	Cv	4,6	14	22	65	104	145	185	370	474
	Seat Ø mm	10	16	21	37	45	62	73	102	116

3c. Seat with soft sealing FTC

DN		25	40	50	80	100	150	200	250	300
NPS		1	1 1/2	2	3	4	6	8	10	12
Flow rate										
100%	**Kvs**	12	40	68	180	290	535	730	1220	2000
	Cv	14	42	79	208	335	618	844	1410	2312
	Seat Ø mm	16	26	35	54	70	98	128	160	204
60%	**Kvs**	11	22	43	135	200	320	410	820	900
	Cv	13	25	50	156	231	370	474	948	1040
	Seat Ø mm	15	21,5	29,5	50	60	86	106	146	163
40%	**Kvs**	10	16	31	105	120	185	250	540	570
	Cv	12	18	36	121	139	214	289	624	659
	Seat Ø mm	14	18,5	25,5	46	53	73	88	126	133
25%	**Kvs**	4	12	19	56	90	125	160	320	410
	Cv	4,6	14	22	65	104	145	185	370	474
	Seat Ø mm	10	16	21	37	45	62	73	102	116

Table 4: Weight in kg without actuator

DN	25	40	50	80	100	150	200	250	300
NPS	1	1½	2	3	4	6	8	10	12
Weight kg	6	10	12	22	33	65	90	136	168

Table 5: DIN face-to-face dimensions

	DN	25	40	50	80	100	150	200	250	300
PN 10	Length mm	102	114	124	165	194	229	243	297	338
PN 16										
PN 25										
PN 40										

Table 6: ANSI face-to-face dimensions

	NPS	1	1½	2	3	4	6	8	10	12
Class 150	Length mm	102	114	124	165	194	229	243	297	338
Class 300										

Order specifications:

Type	According to table
Valve size	DN ...
Nominal pressure	PN ...
Body material	According to table
Seat version	Metal or soft sealing
Characteristic	Equal percentage or linear
Kvs/Cv	According to table
Direction of flow	Standard: FTO medium opens Reverse: FTC medium closes
Actuator	Type
Type of mounting	Mounting location of actuator
Fail-safe action	when supply air fails Fail-close Fail-open
Max. differential pressure for	... bar
Supply air	... bar
Bench range	... bar
Accessories	e.g. positioners, limit switches, solenoid valve etc.
Others	e.g. special version, certificates, approvals etc.