

VETEC Pneumatic Rotary Actuator Type R

Application

For automatic actuation of rotary plug valves, ball valves and butterfly valves.

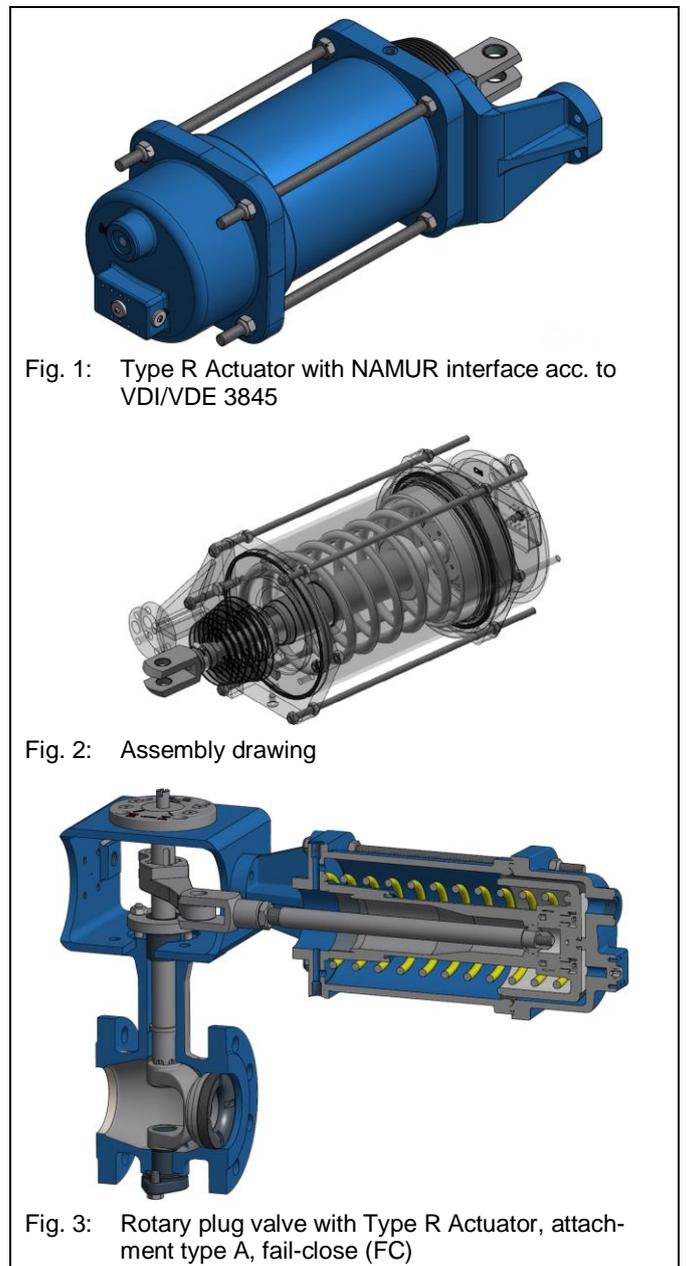
Usage	Throttling service and on/off service
Design	Rolling diaphragm and internal springs • single-acting
Actuator motion	Rotary
Standard sizes	R110, R150, R200, R250
Sizes with reinforced springs	R110v, R150v, R200v, R250v, R250vv

■ Special features

- Rugged, compact design
- Precise control
- Optional opening angle limitation (externally adjustable mechanical travel stops)
- Optimized spring ranges
- High torques (positioning forces)
- Temperatures from -40 to +80 °C
- NAMUR interface for solenoid valves according to VDI/VDE 3845
- Valve interface according to DIN EN ISO 5211
- Modular design (with manual gear, handwheel, accessories)
- Suitable for use in explosive atmospheres

■ Design

Its design allows the actuator to be used on valves with different opening angles up to 75°. As a result, it is perfectly tailored to VETEC rotary plug valves.



■ Mounting kits

A bracket or console connects actuator and valve. A handwheel as well as a positioner or other valve accessories can be mounted on the bracket or console.

- ▶ Mounting kit with connections acc. to DIN EN ISO 5211:

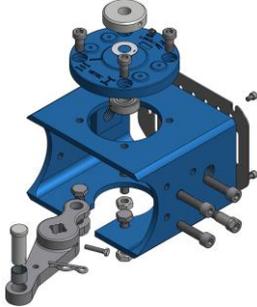


Fig. 4

- ▶ Mounting kit with connections acc. to VETEC standard:

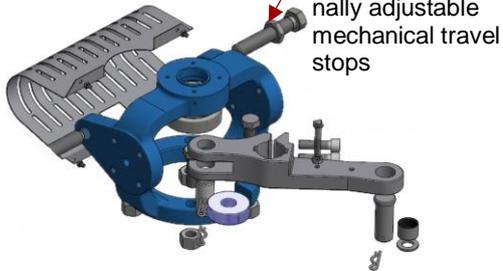


Fig. 5

■ Manual overrides and accessories

Type R Actuators can be mounted with additional manual override and accessories:

- Manual gear in size R200v and larger (Fig. 8)
- Handwheel up to size R200 (Fig. 9)

Accessories are attached according to VDI/VDE 3845 and NAMUR NA 19.

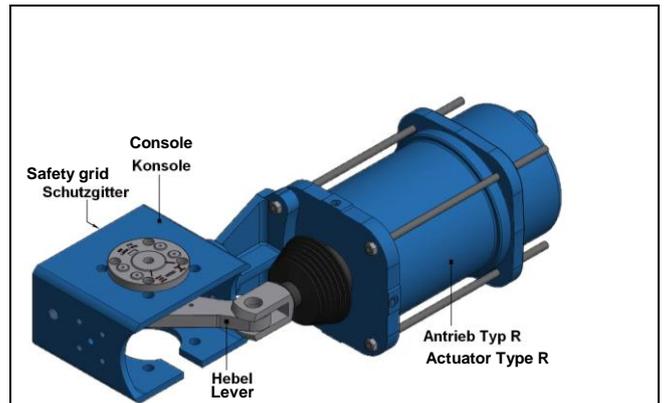


Fig. 6: Actuator with console

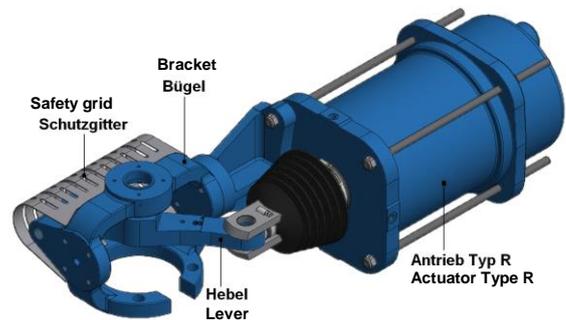


Fig. 7: Actuator with bracket

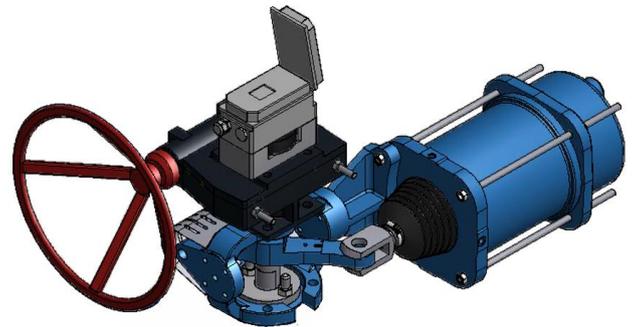


Fig. 8: Actuator with bracket and manual gear

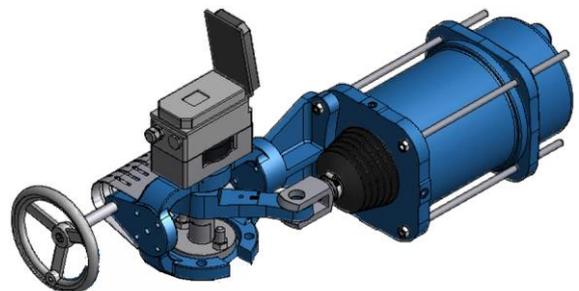


Fig. 9: Actuator with bracket and handwheel



Principle of operation

The actuator is equipped with a rolling diaphragm and one or two centrally arranged compression springs. The freely supported piston rod is directly connected to the lever for the valve shaft. Precise control is achieved by a long stroke and low-friction travel motion.

When the supply air fails, the control valve's fail-safe action is ensured by the spring return force:

Fail-close (FC): The valve closes when the supply air fails

Fail-open (FO): The valve opens when the supply air fails

Air torques (75° opening angle)

When compressed air is applied to the actuator, the compression springs are compressed and the shaft is caused to rotate (Fig. 10). The (air) torque is created by the air pressure.

Spring torques (75° opening angle)

When the actuator is vented, the spring return force causes the shaft to rotate (Fig. 11). The (spring) torque is created by the spring return force.

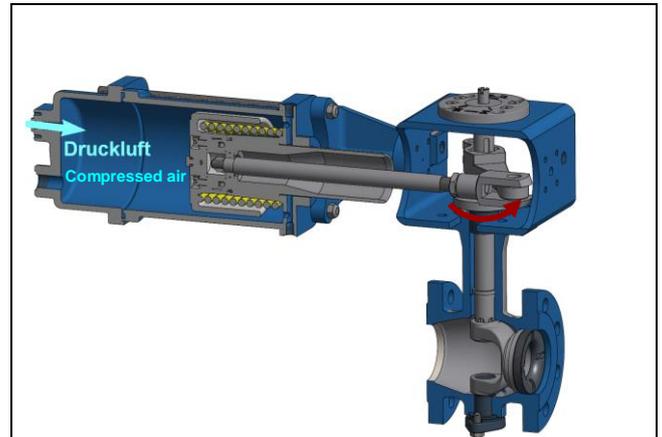


Fig. 10: Air torque causes the shaft to rotate



Fig. 11: Spring torque causes the shaft to rotate

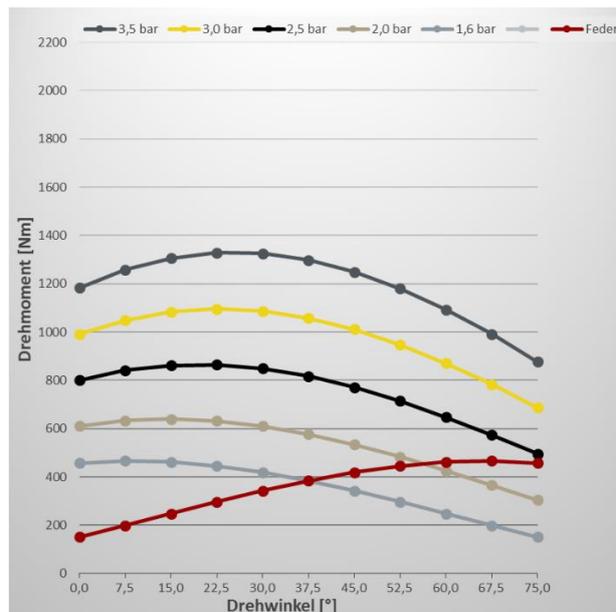


Fig. 12: Torques for size R200 actuators

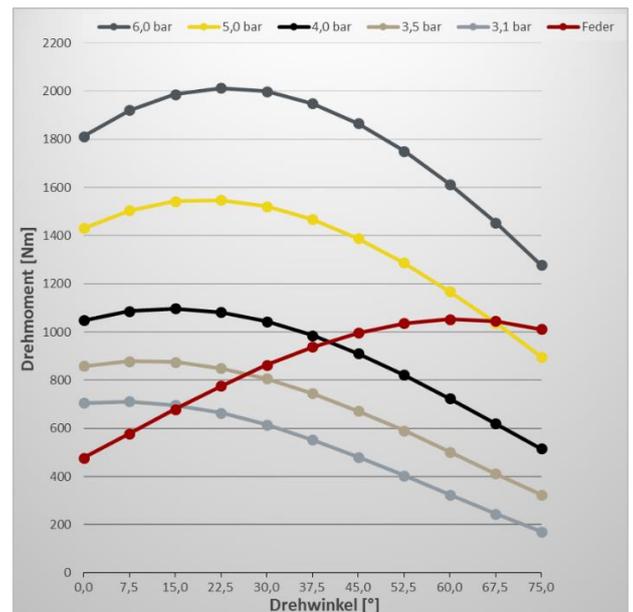


Fig. 13: Torques for size R200v actuators



■ Technical data

Table 1

Standard sizes		R110	R150	R200	R250	
Spring range for 75° opening angle [bar]		0.4 to 1.2	0.4 to 1.2	0.4 to 1.2	0.4 to 1.2	
No. of springs		1				
Spring torque at 0° [Nm]		28	77	152	241	
Rated travel [mm]		128	184	200	200	
Travel volume at rated travel [dm ³]		2.3	6.2	12.1	19.0	
Dead volume [dm ³]		0.16	0.28	0.48	0.66	
Diaphragm area [cm ²]		87	165	299	471	
Approx. transit times ⁽¹⁾ when venting [s]	Positioner $K_V = 0.15$	4.5	12	23	37	
	Solenoid valve $K_V = 0.32$	2.1	5.6	11	17	
	Booster $K_V = 0.74$			4.7	7.4	

(1) The transit times were determined under the following conditions: 75° opening angle, 4 bar air pressure. Different transit times apply under deviating operating conditions.

Table 2

Versions with reinforced springs		R110v	R150v	R200v	R250v	R250vv
Spring range for 75° opening angle [bar]		1.16 to 2.76	0.92 to 2.76	1.25 to 2.65	1.30 to 2.40	1.70 to 3.30
No. of springs		1				2
Spring torque at 0° [Nm]		82	178	477	783	1024
Rated travel [mm]		128	184	200	200	200
Travel volume at rated travel [dm ³]		2.3	6.2	12.1	19.0	19.0
Dead volume [dm ³]		0.16	0.28	0.48	0.66	0.66
Diaphragm area [cm ²]		87	165	299	471	471
Approx. transit times ⁽¹⁾ when venting [s]	Positioner $K_V = 0.15$	3.4	9.8	17	26	25
	Solenoid valve $K_V = 0.32$	1.6	4.6	8.1	12	11
	Booster $K_V = 0.74$			3.5	5.3	5.0

(1) The transit times were determined under the following conditions: 75° opening angle, 4 bar air pressure. Different transit times apply under deviating operating conditions.

Table 3

Opening angle	75°
Spring	Centrally arranged
Supply pressure [bar]	2 to 6 ► depending on actuator size and spring range
Temperature range [°C]	-40 to +80
Manual gear	Manual gear/handwheel
Differential pressures for actuator sizing	► TY005.069
Opening angle limitation (optional)	Externally adjustable mechanical travel stops
Shaft end	Feather key notch. Other connections on request.
Paint coating ⁽²⁾	Standard: wet paint coat, 120 µm film thickness

(2) Other coating systems possible on request ► EB005.060



■ Dimensions and weights

Table 4: Actuator with bracket, connections according to VETEC standard

Actuator Dimensions	R110 ⁽³⁾ DN 25	R110/R110v	R150/R150v	R200/R200v	R250	R250v/R250vv
K [mm]	484	508	624	701	741	827
L [mm]	83	83	119	126	126	126
N [mm]	75	100	100	130	130	130
P [mm]	149	149	187	253	300	300
HB [mm]	117	142	142	185	185	185
Weight [kg]	14	16/16.5	27/28	45/47	72	75/86
Valve connection acc. to VETEC standard	VF10	VF10/VF12	VF12/VF16	VF12/VF16/VF17		

(3) The values apply to the actuator for DN 25 valves

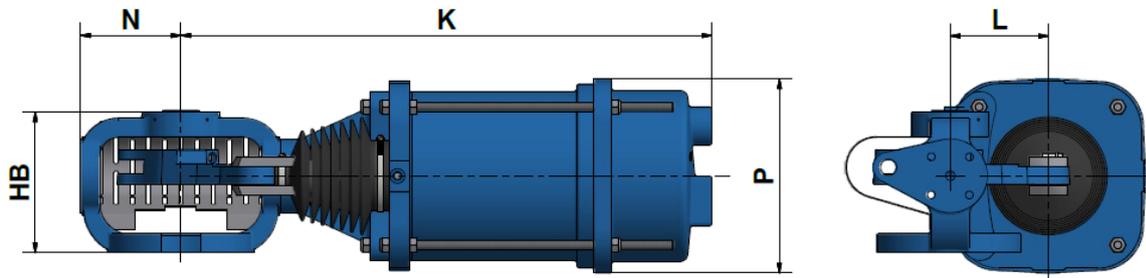


Fig. 14: Dimensional drawing for Type R Actuators with VETEC bracket

Table 5: Actuator with console, connections according to DIN EN ISO 5211

Dimensions	Type	R110/R110v	R150/R150v	R200/R200v	R250	R250v/R250vv
K [mm]		491	615	682/687*	732	816/821*
L [mm]		86	120	127	126	126
N [mm]		89	99	124/129*	124/129*	124/129*
P [mm]		149	187	246	300	300
HB [mm]		135	163	165/195*	165/195*	165/195*
Weight [kg]		17.5/18	29/30	52/54	79	82/93
Valve connection ⁽⁴⁾ acc. to DIN EN ISO 5211		F12/F14/F16	F12/F14/F16	F12/F14/F16/F17	F12/F14/F16/F17	F12/F14/F16/F17

* Depending on flange connection
 (4) Other valve connections on request

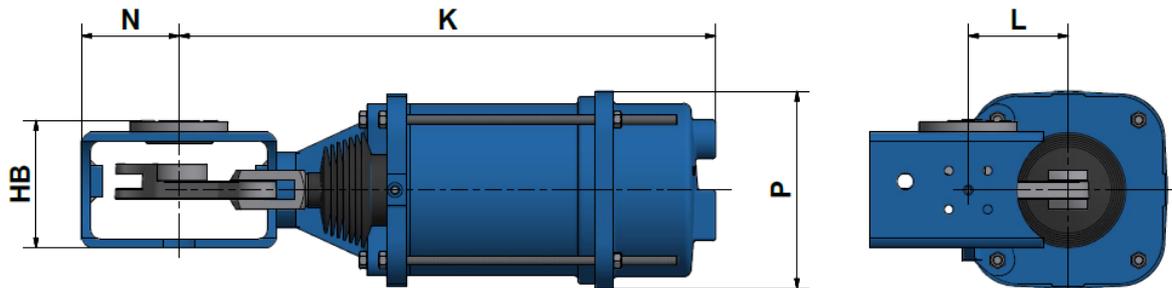


Fig. 15: Dimensional drawing for Type R Actuators with VETEC console



Table 6: Pneumatic connections

Type	R110/R110v	R150/R150v	R200/R200v	R250/R250v/R250vv
NAMUR connections	G ¼	G ¼	G ¼	G ¼
Pneumatic connections	G ¼	G ½	G ½	G ½
Vent connections	G ⅛	G ¼	G ¼/G ⅛	G ¼

Table 7: Materials

Component	Standard	Options	
Cylinder tube	Cast aluminum alloy	Steel	
Upper bonnet			
Lower flange			
Bellows seal	Soft PVC		
Connecting rod	Steel	Stainless steel	
Hex nut			
Forkhead			
Connecting piece	Spheroidal graphite iron		
Actuator stem	Stainless martensitic steel		
Compression spring	Spring steel		
Diaphragm	NBR: nitrile butadiene rubber		
Seals	Aramid fibers bonded with rubber mixture		
Spare parts drawings	R110/R110v ▶ ET019.003	R150/R150v ▶ ET019.004	R200/R200v ▶ ET019.005
	R250 ▶ ET019.006	R250v ▶ ET019.007	R250w ▶ ET019.008

Other materials on request

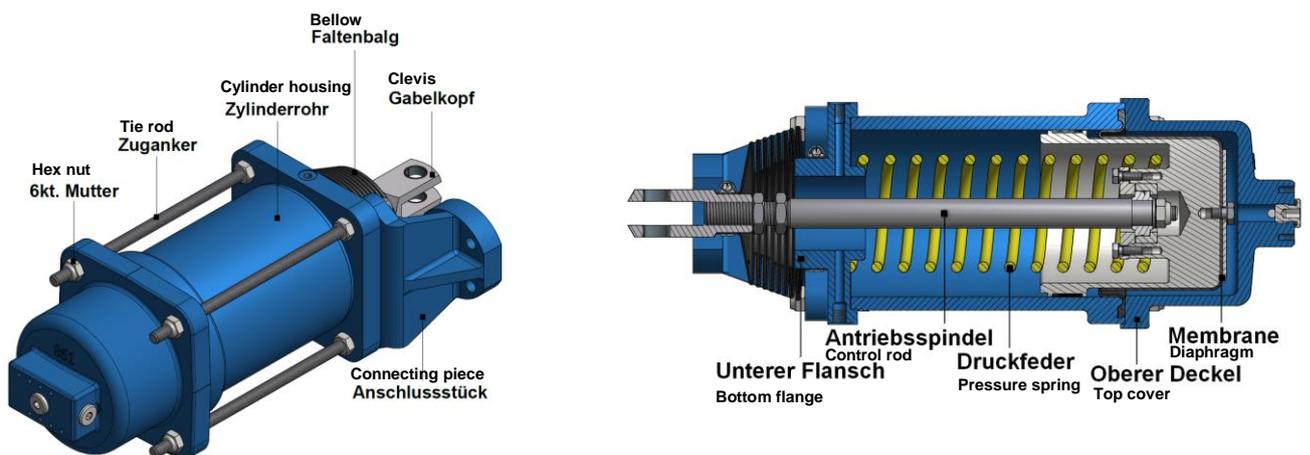


Fig. 16: Sectional and model drawing including components



■ **Actuator attachment**

Type R Actuators are suitable for valve attachment in compliance with type A, B, C or D (Fig. 17).

■ **Valve mounting position**

Type R Actuators can be operated in any desired mounting position.

⚠ **NOTICE!** Observe the mounting instructions for valve accessories.

For proper actuator sizing, specify if the mounting position deviates from the standard when ordering the control valve.

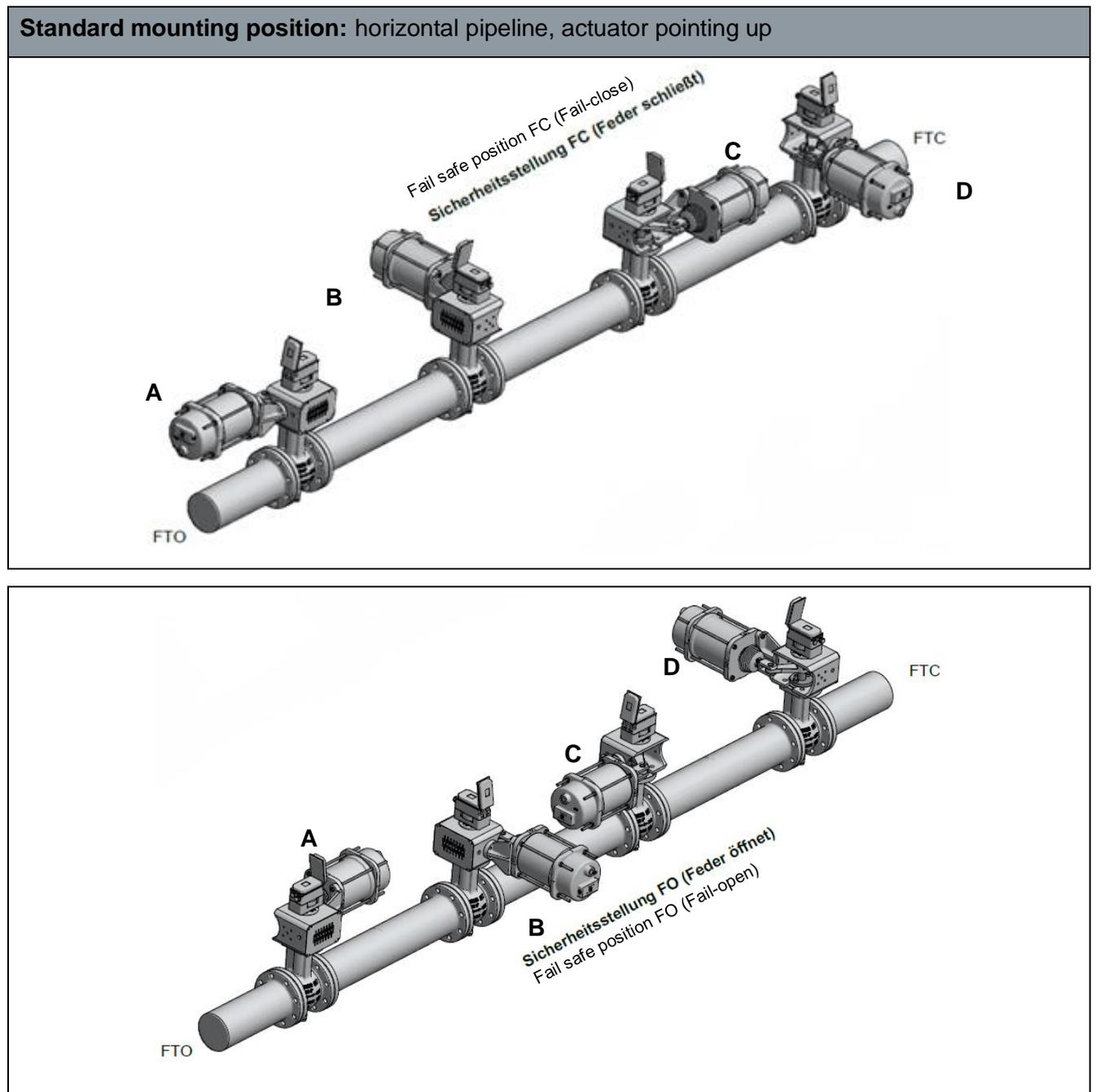


Fig. 17: Types of actuator attachment and valve mounting positions



Table 8: Certificates, manufacturer's declarations

Directive 2014/34/EU (ATEX)	Manufacturer's declaration FB002.014	Does not fall within scope of ignition risk assessment according to DIN EN 13463-1:2001, clause 5.2
PED 2014/68/EU	Manufacturer's declaration FB002.045	Does not fall within scope of Article 1, § 2, j)
Machinery Directive 2006/42/EC	Declaration of incorporation FB002.000	Partly completed machinery
IEC 61508/IEC 61511 (SIL)	Manufacturer's declaration FB002.012	Suitable for use up to SIL 2, with redundant circuitry up to SIL 3
TP TC 010/2011 (EAC)	Certificate FB002.135 (RU C-DE.AЯ04.B.00339)	Safety of machines and equipment (RU, BLR, KAZ)
TP TC 012/2011 (EAC/Ex)	Certificate FB002.152 (RU C-DE.ГБ08.B.02294)	Safety of equipment, for use in hazardous areas (RU, BLR, KAZ)

Table 9: Ordering data

Actuator sizes	According to Table 1 and Table 2
Type of actuator attachment	According to Fig. 17 or on request
Valve mounting position	According to Fig. 17 or on request
Fail-safe action	Fail-close (FC)/fail-open (FO)
Max. differential pressure	... bar (acc. to TY005.069)
Supply air	... bar
Transit times	... s
Other	Special version, coating, technical documentation etc.



VETEC Ventiltechnik GmbH Siemensstraße 12 · 67346 Speyer, Germany
Phone: +49 62 32 64 12-0 · Fax: +49 62 32 4 24 79 · E-mail: vetec@vetec.de · Internet: www.vetec.de

Specifications subject to change without notice