



TROX Ex-PD-2023 Explosion Proof Actuators Instruction Manual

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TROX[®] TECHNIK

Attachments






Explosion-proof actuators



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Ex-PD-2023 Explosion Proof Actuators

				
Limit switch	Solenoid valve	Pneumatic actuator	Electric actuator	Multileaf damper with explosion-proof actuator

For opening and closing multileaf dampers installed in potentially explosive atmospheres (ATEX)

Explosion-proof actuators for Type JZ, JZ-LL and JZ-HL multileaf dampers

- ATEX-compliant construction and parts
- Approved for gases, mists and vapours in zones 1 and 2, and for dusts in zones 21 and 22
- Supply voltage 24 V AC/DC or 230 V AC
- Pneumatic actuators with torque 8 – 70 Nm
- Electric actuator with torque 15 or 30 Nm
- Pneumatic: Double acting or single acting actuator for a positive lock connection with a multileaf damper
- Electric: Spring return actuator for a positive lock connection with a multileaf damper

Optional equipment and accessories

- Solenoid valve 24 V DC or 230 V AC
- Limit switch

Attachments General information

Type		Page
Explosion-proof actuators	General information	EX – 2
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	Variants	EX – 5
	Electric	EX – 6
	Double acting	EX – 8
	Single acting	EX – 10
	Limit switch	EX – 11
	Solenoid valves	EX – 12

Application

- Explosion-proof actuators for opening and closing
- Opening and closing of Type JZ, JZ-LL, JZ-HL multileaf dampers
- For use in potentially explosive atmospheres (ATEX)
- For steel or stainless steel multileaf dampers with brass or stainless steel bearings

Special characteristics

- ATEX mark and certification
- Approved for gases, mists and vapours in zones 1 and 2, and for dusts in zones 21 and 22

Classification

Multileaf damper

- Test certificate: EPS 23 ATEX 2 307 X
- II 2 GD c 80 °C (T6)

Subassembly: Multileaf damper with actuator

- Test certificate: EPS 23 ATEX 2 307 X
- II 2 GD or II 2/3 GD or II 3 GD

Description

Parts and characteristics

Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX)

Electric

- Actuators with overload protection
- Control input signal: 2-wire control (3-point, open/close)
- Spring return actuator for damper blade safety function
- Auxiliary switch for capturing the end positions

- Crank handle for manual operation

Pneumatic

- Pneumatic actuators, single acting or double acting
- Control input signal: 1-wire control of a solenoid valve
- Optional limit switch for capturing the end positions
- Safety function with double acting actuators (power off)
- Safety function with single acting actuators (pressure off)

Attachments Function

Functional description

The actuator moves the blades of a multileaf damper into OPEN or CLOSED position.

Electric spring return actuator

Control input signal with 2-wire control (3-point).

Double acting pneumatic actuators

The easiest way to generate the control input signal is electrically, using solenoid valves.

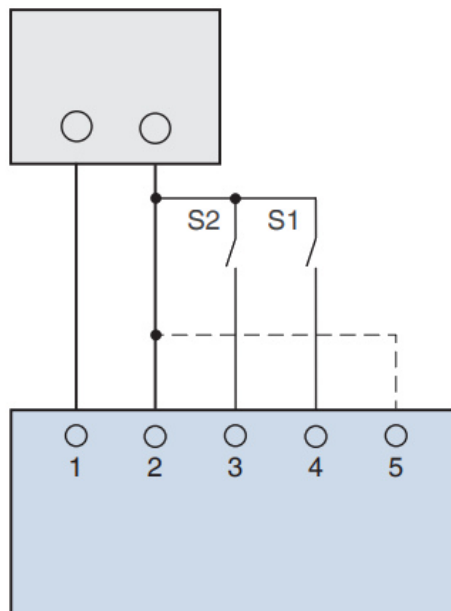
The multileaf damper is opened and closed with compressed air. For this purpose, the actuator has two tube connections. Compressed air is applied to one tube connection while the other connection remains open such that the air can escape from the corresponding chamber of the actuator. For the other direction of rotation, the process is reversed.

Single acting pneumatic actuators

The easiest way to generate the control input signal is electrically, using solenoid valves.

The multileaf damper is closed with compressed air and opened with spring force. The actuator has one tube connection. This tube connection is for compressed air. For the other direction of rotation the connection remains open.

Control input signal for open/close spring return actuator



Terminal 5 input only Z1EX

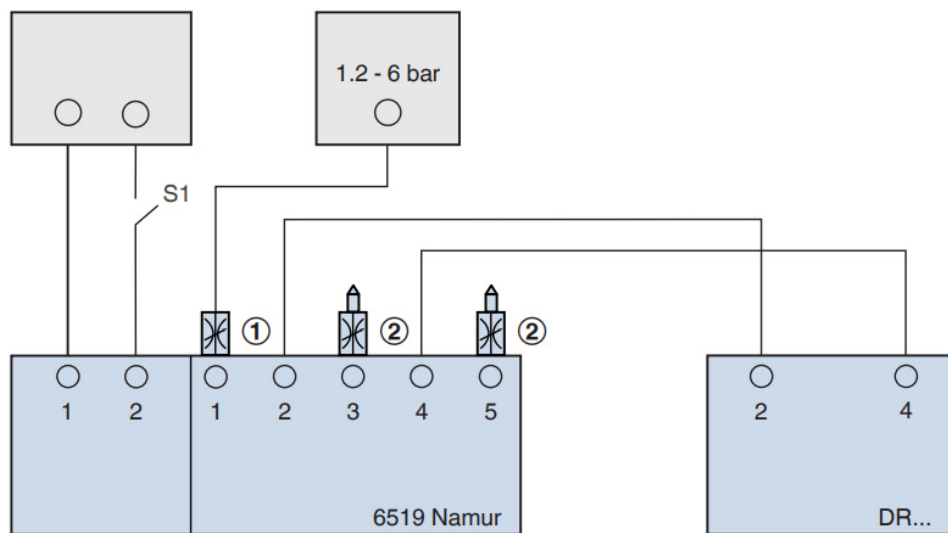
Switch functions

S1 closed: Direction of rotation 1

S1 closed: Direction of rotation 2

Safe damper blade position as an option

Control of a double acting pneumatic actuator using a solenoid valve



Switch functions

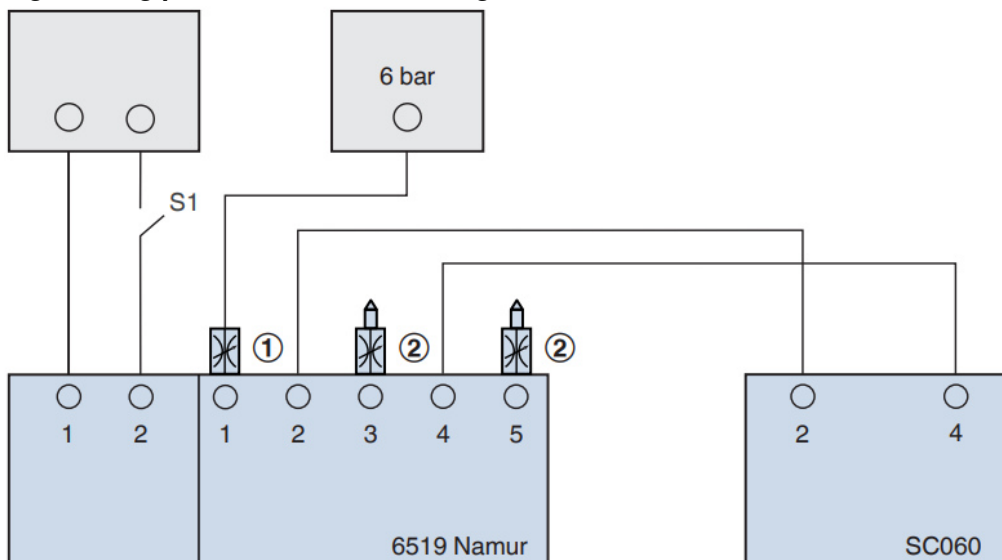
S1 closed: Direction of rotation 1

S1 open: Direction of rotation 2

① Throttle valve

② Flow reducer (noise reduction)

Control of a single acting pneumatic actuator using a solenoid valve



Switch functions

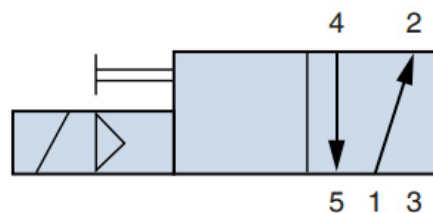
S1 closed: Direction of rotation 1

S1 open: Direction of rotation 2

① Throttle valve

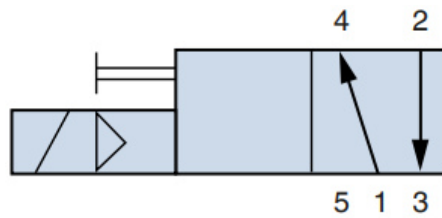
② Flow reducer (noise reduction)

Solenoid valve, power off



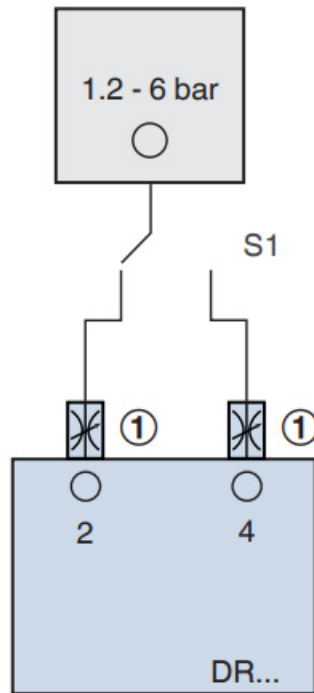
2: Direction of rotation 1

Solenoid valve, power on



4: Direction of rotation 2

Control of a double acting pneumatic actuator without a solenoid valve



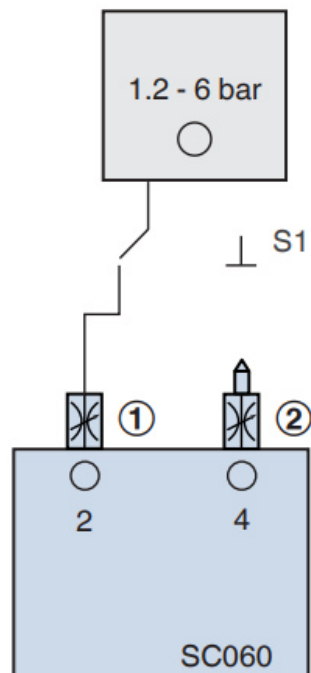
Switch functions

S1 closed: Direction of rotation 1

S1 open: Direction of rotation 2

① Throttle valve

Control of a single acting pneumatic actuator without a solenoid valve



Switch functions

S1 closed: Direction of rotation 1

S1 open: Direction of rotation 2

① Throttle valve

② Flow reducer (noise reduction)

Attachments Variants

Any attachments are to be defined with the order code of the multileaf damper.

Electric explosion-proof spring return actuators for multileaf dampers

Order code detail	Actuator			Torque	Supply voltage
	Part number	Type	Auxiliary switch		
Z1EX	M466EM1	ExMax15-SF	integrated	15 Nm	24 – 240 V
Z3EX	M466EM3	ExMax30-SF	integrated	30 Nm	24 – 240 V

Explosion-proof double acting pneumatic actuators for multileaf dampers

Order code detail	Actuator		Limit switch	Torque at 6 bar	Solenoid valve	Damper blade safety function
	Part number	Type	Part number			
Z60EX	M452DD0	DR030	–	35 Nm	–	
Z61EX	M452DD0	DR030	–	35 Nm	24 V	①
Z62EX	M452DD0	DR030	–	35 Nm	230 V	①
Z63EX	M452DD0	DR030	2 × M536AJ3	35 Nm	–	
Z64EX	M452DD0	DR030	2 × M536AJ3	35 Nm	24 V	①
Z65EX	M452DD0	DR030	2 × M536AJ3	35 Nm	230 V	①
Z66EX	M452DD1	DR060	–	70 Nm	–	
Z67EX	M452DD1	DR060	–	70 Nm	24 V	①
Z68EX	M452DD1	DR060	–	70 Nm	230 V	①
Z69EX	M452DD1	DR060	2 × M536AJ3	70 Nm	–	
Z70EX	M452DD1	DR060	2 × M536AJ3	70 Nm	24 V	①
Z71EX	M452DD1	DR060	2 × M536AJ3	70 Nm	230 V	①

① Power off to close/open

Operating pressure 1.2 – 6 bar

Explosion-proof single acting pneumatic actuators for multileaf dampers

Order code detail	Actuator	Limit switch	Torque at 6 bar	Solenoid valve	Damper blade safety function
	Type	Part number			
Z72EX	SC060/SO060	–	30 Nm	–	①
Z73EX	SC060/SO060	–	30 Nm	24 V	②
Z74EX	SC060/SO060	–	30 Nm	230 V	②
Z75EX	SC060/SO060	2 × M536AJ3	30 Nm	–	①
Z76EX	SC060/SO060	2 × M536AJ3	30 Nm	24 V	②
Z77EX	SC060/SO060	2 × M536AJ3	30 Nm	230 V	②

① Power off to close/open

② Power off and pressure off to close/open

Operating pressure 6 bar

Attachments Electric

Application

- Explosion-proof electric actuators for opening and closing
- Opening and closing of Type JZ, JZ-LL, JZ-HL multileaf dampers
- For use in potentially explosive atmospheres (ATEX)
- For steel or stainless steel multileaf dampers with brass or stainless steel bearings

Variants

- Z1EX: Explosion-proof actuator ExMax15-SF
- Z3EX: Explosion-proof actuator ExMax30-SF

Safety function

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

- Supply voltage 24 – 240 V AC/DC
- Automatic voltage detection
- Control input signal: 2-wire control (3-point)
- Integral controlled heating
- Two auxiliary switches with volt-free contacts for signalling or activating switch functions
- Auxiliary switches, factory set switching points at 5° and 85°
- Terminal box ExBox-Y/S

Explosion-proof actuator ExMax15-SF



Explosion-proof actuator
ExMax 15

Supply voltage (AC)	24 – 240 V AC ± 10 %, 50/60 Hz
Supply voltage (DC)	24 – 240 V DC ± 10 %,
Power rating (AC)	23 – 115 VA, depending on running time
Power rating (DC)	10 – 115 W, depending on running time
Torque	15 Nm
Motor running time for 90°	3, 15, 30, 60, 120 s, adjustable
Spring return time	3 – 10 s, adjustable
Control input signal	2-wire control (3-point)
Auxiliary switch: type of contact	2 changeover contacts ¹⁾
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	24 V DC
Max. switching current (DC)	0.25 A (resistive load); 0.1 A (inductive load)
IEC protection class	I (protective earth)
Protection level	IP 66
EC conformity	EMC to 2014/30/EU, low voltage to 2014/35/EU, ATEX to 2014/34/EU
Operating temperature	–40 to 40 °C
Weight	4.3 kg (including Ex Box)

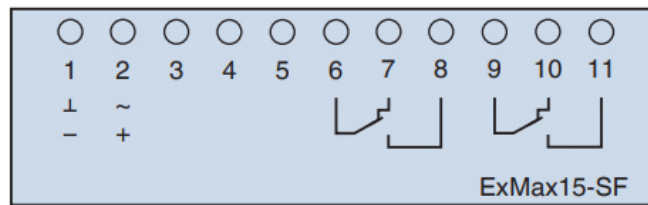
¹⁾ If both auxiliary switches are used the switching voltages must be the same



Explosion-proof actuator
ExMax 30

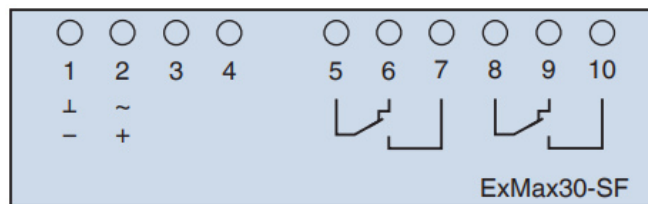
Supply voltage (AC)	24 – 240 V AC $\pm 10\%$, 50/60 Hz
Supply voltage (DC)	24 – 240 V DC $\pm 10\%$
Power rating (AC)	23 – 115 VA, depending on running time
Power rating (DC)	10 – 115 W, depending on running time
Torque	30 Nm
Motor running time for 90°	40, 60, 90, 120, 150 s, adjustable
Spring return time	20 s
Control input signal	2-wire control (3-point)
Auxiliary switch: type of contact	2 changeover contacts ¹⁾
Max. switching voltage (AC)	250 V AC
Max. switching current (AC)	3 A (resistive load); 0.5 A (inductive load)
Max. switching voltage (DC)	24 V DC
Max. switching current (DC)	0.25 A (resistive load); 0.1 A (inductive load)
IEC protection class	I (protective earth)
Protection level	IP 66
EC conformity	EMC to 2014/30/EU, low voltage to 2014/35/EU, ATEX to 2014/34/EU
Operating temperature	–40 to 40 °C
Weight	10 kg (including Ex Box)

¹⁾ If both auxiliary switches are used the switching voltages must be the same
ExMax15-SF, terminal connections in terminal box ExBox-Y/S



1. ⊥, -
2. ~, +
3. Control voltage for direction of rotation 1
4. Control voltage for direction of rotation 2
5. Input for 2 – 5 wire link, spring return ~3 s
6. Common contact
7. Mechanical stop 1 < 5°
8. Mechanical stop 1 > 5°
9. Common contact
10. Mechanical stop 2 < 85°
11. Mechanical stop 2 > 85°

ExMax30-SF, terminal connections in terminal box ExBox-Y/S



1. ⊥, -
2. ~, +
3. Control voltage for direction of rotation 1
4. Control voltage for direction of rotation 2
5. Common contact
6. Mechanical stop 1 < 5°
7. Mechanical stop 1 > 5°
8. Common contact
9. Mechanical stop 2 < 85°
10. Mechanical stop 2 > 85°

Attachments Double acting

Application

- Explosion-proof double acting pneumatic actuators for opening and closing
- Opening and closing of Type JZ, JZ-LL, JZ-HL multileaf dampers
- For use in potentially explosive atmospheres (ATEX)
- For steel or stainless steel multileaf dampers with brass or stainless steel bearings

Variants

- Z60EX, Z61EX, Z62EX, Z63EX, Z64EX, Z65EX: Actuator DR030
- Z66EX, Z67EX, Z68EX, Z69EX, Z70EX, Z71EX: Actuator DR060

Safety function

Z61EX, Z62EX, Z64EX, Z65EX, Z67EX, Z68EX, Z70EX, Z71EX

- NO: Power off to OPEN
- NC: Power off to CLOSE

Parts and characteristics

Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX)

- Double acting pneumatic actuators
- Control input signal: 1-wire control of a solenoid valve
- Optional limit switch for capturing the end positions
- Safety function (power off)

Pneumatic actuator DR030



Pneumatic actuator
DR030

Operating pressure	1.2 bar – 6.0 bar
Maximum pressure	8 bar
Torque at 6 bar	35 Nm
Running time for 90°	0.3 s
Air volume OPEN/CLOSE	0.16/0.26 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	–40 to 80 °C
Weight	1.6 kg

DR030, Torque depending on operating pressure

Operating pressure [bar]	1.2	2.5	3	4	5	6
Torque [Nm]	8	15	18	24	29	35

Pneumatic actuator DR060



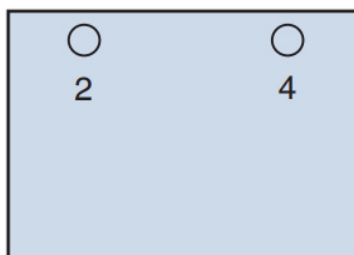
Pneumatic actuator
DR060

Operating pressure	1.2 bar – 6.0 bar
Maximum pressure	8 bar
Torque at 6 bar	70 Nm
Running time for 90°	0.5 s
Air volume OPEN/CLOSE	0.31/0.49 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	–40 to 80 °C
Weight	2.7 kg

DR060, Torque depending on operating pressure

Operating pressure [bar]	1.2	2.5	3	4	5	6
Torque [Nm]	14	30	36	47	58	70

Tube connections



2: Direction of rotation 1

4: Direction of rotation 2

For actuators without solenoid valve the tube connections 2 and 4 must be allocated by others (Z60(EX), Z63(EX)).

Attachments Single acting

Application

- Explosion-proof single acting pneumatic actuators for opening and closing
- Opening and closing of Type JZ, JZ-LL, JZ-HL multileaf dampers
- For use in potentially explosive atmospheres (ATEX)
- For steel or stainless steel multileaf dampers with brass or stainless steel bearings

Variants

- Z72EX, Z73EX, Z74EX, Z75EX, Z76EX, Z77EX: Actuator SC060, SO060

Safety function

Z72EX, Z75EX

- NO: Pressure off to OPEN
- NC: Pressure off to CLOSE

Z73EX, Z74EX, Z76EX, Z77EX

- NO: Power off and pressure off to OPEN
- NC: Power off and pressure off to CLOSED

Parts and characteristics

Construction and materials comply with the EU directive and guidelines for use in potentially explosive atmospheres (ATEX)

- Single acting pneumatic actuators
- Control input signal: 1-wire control of a solenoid valve
- Optional limit switch for capturing the end positions
- Safety function (pressure off)

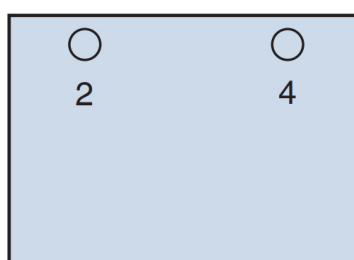
Pneumatic actuator SC060, SO060



Pneumatic actuator
SC060

Operating pressure	6.0 bar
Maximum pressure	6 bar
Torque at 6 bar	30 Nm
Running time for 90°	0.5 s
Air volume OPEN/CLOSE	0.31/0.49 l
Compressed air	Compressed air for instruments, free of oil, water and dust
Air connection	G 1/8"
Operating temperature	−40 to 80 °C
Weight	3.2 kg

Tube connections



2: Direction of rotation 1

4: Venting

For actuators without solenoid valve the tube connections 2 and 4 must be allocated by others (Z72(EX), Z75(EX)).

Attachments Limit switch

Application

- Limit switch: Bartec limit switch
- Volt-free contacts for signalling or activating switch functions

Variants

- Z63EX, Z64EX, Z65EX, Z69EX, Z70EX, Z71EX, Z75EX, Z76EX, Z77EX: Limit switch

Parts and characteristics

- Two limit switches, screwed onto a console of the multileaf damper
- Actuated with a lever on the external linkage

Explosion-proof limit switch (Bartec)

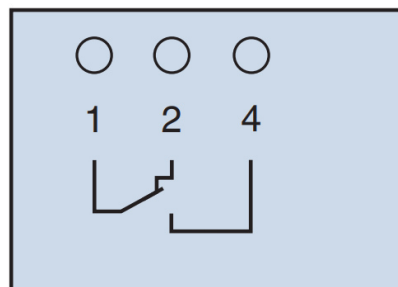


Limit switch

Type of contact	1 changeover contacts
Max. switching voltage (A C)	400 V AC
Max. switching current (A C)	3 A (resistive load); 3 A at 250 V AC (inductive load)
Max. switching voltage (D C)	250 V DC
Max. switching current (D C)	0.4 A (resistive load); 0.03 A (inductive load)
IEC protection class	II (protective insulation)
Protection level	IP 66
EC conformity	ATEX to 2014/34/EU, RoHS to 2011/65/EU
Weight	0.2 kg

Limit switch, connecting cable core identification

BK BU BN



- 1: Common contact
- 2: Normally closed contact
- 4: Normally open contact

Attachments Solenoid valves

Application

- Explosion-proof solenoid valves with connector

Variants

- Z61EX, Z64EX, Z67EX, Z70EX, Z73EX, Z76EX: Solenoid valve Type 6519 Namur 24 V Ex
- Z62EX, Z65EX, Z68EX, Z71EX, Z74EX, Z77EX: Solenoid valve Type 6519 Namur 230 V Ex

Safety function

Z61EX, Z62EX, Z64EX, Z65EX, Z67EX, Z68EX, Z70EX, Z71EX

- NO: Power off to OPEN
- NC: Power off to CLOSE

Z73EX, Z74EX, Z76EX, Z77EX

- NO: Power off and pressure off to OPEN
- NC: Power off and pressure off to CLOSED

Parts and characteristics

- Supply voltage 24 V DC or 230 V AC
- Control input signal: Supply voltage on/off
- Connector with connecting cable
- Namur interface for direct assembly on the pneumatic actuator

Explosion-proof solenoid valve 24 V EEx m



Explosion-proof solenoid valve 24 V DC

Supply voltage	24 V DC \pm 10 %
Power rating	3 W
Pressure range	1.2 – 8.0 bar
Flow rate Q Nn	900 l/min
Compressed air	Containing oil, oil-free, or nitrogen or instrument air
Air connection	G 1/8"
IEC protection class	III (protective extra-low voltage)
Protection level	With IP 65 connector
EC conformity	EMC to 2014/30/EU, ATEX to 2014/34/EU
Operating temperature	–25 to 55 °C
Weight	0.46 kg

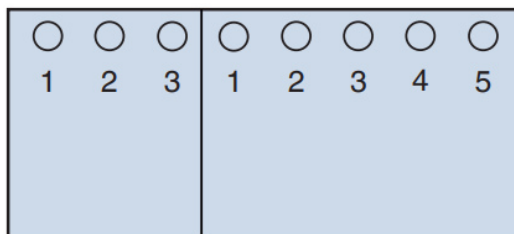
Explosion-proof solenoid valve 230 V EEx m



Explosion-proof solenoid valve 230 V AC

Supply voltage	230 V AC \pm 10 %
Power rating	3 W
Pressure range	1.2 – 8.0 bar
Flow rate Q Nn	900 l/min
Compressed air	Containing oil, oil-free, or nitrogen or instrument air
Air connection	G 1/8"
IEC protection class	II (protective insulation)
Protection level	With IP 65 connector
EC conformity	EMC to 2014/30/EU, low voltage to 2014/35/EU, ATEX to 2014/34/EU
Operating temperature	–25 to 55 °C
Weight	0.46 kg

Terminal connections and pneumatic connections



Electrical connections

1. Ground, neutral
2. Control voltage for direction of rotation 1
3. Earth

Pneumatic connections

1. Operating pressure, throttle valve
2. Direction of rotation 1
3. Flow reducer (noise reduction)
4. Direction of rotation 2
5. Flow reducer (noise reduction)



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Ex-PD-2023 Explosion Proof Actuators, Explosion Proof Actuators, Proof Actuators, Actuators

References

- [User Manual](#)

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