



new product generation

EASY - SAFE - SMART

- ATEX / IECEx certified for gases and dusts
- Easy plug-in mounting
- Quick and safe installation
- Axis mount 12 x 12 mm
- Terminal box Ex e integrated
- Temperature range -40 ... +70 ° C
- Heating including thermostat integrated
- Protection class IP66
- Blocking resistant by electronic disconnection
- Low power consumption in holding mode
- High corrosion resistance by using high tech polymer and stainless steel
- Long life by using brushless motors
- Maintenance-free
- Optional Y-modulating version (analog inputs and outputs mA and V short-circuit-proof)
- Electrically isolated circuits for optimum interference immunity

EN

QT.Ex Manual

gen.2

BA.0003.06.EN

Assembly and installation instructions for safe use of explosion-proof actuator QT.Ex-M... with / without spring return Fail Safe function

**NOTA: Este manual foi reduzido
Para poder ser colocado no
website**

 made
in
Germany

pi 
safety components

SICHERHEITSHINWEISE SAFETY NOTES CONSIGNES DE SÉCURITÉ

Ex-Bereich
Hazardous area
Zone dangereuse
Zone 1,2,21,22

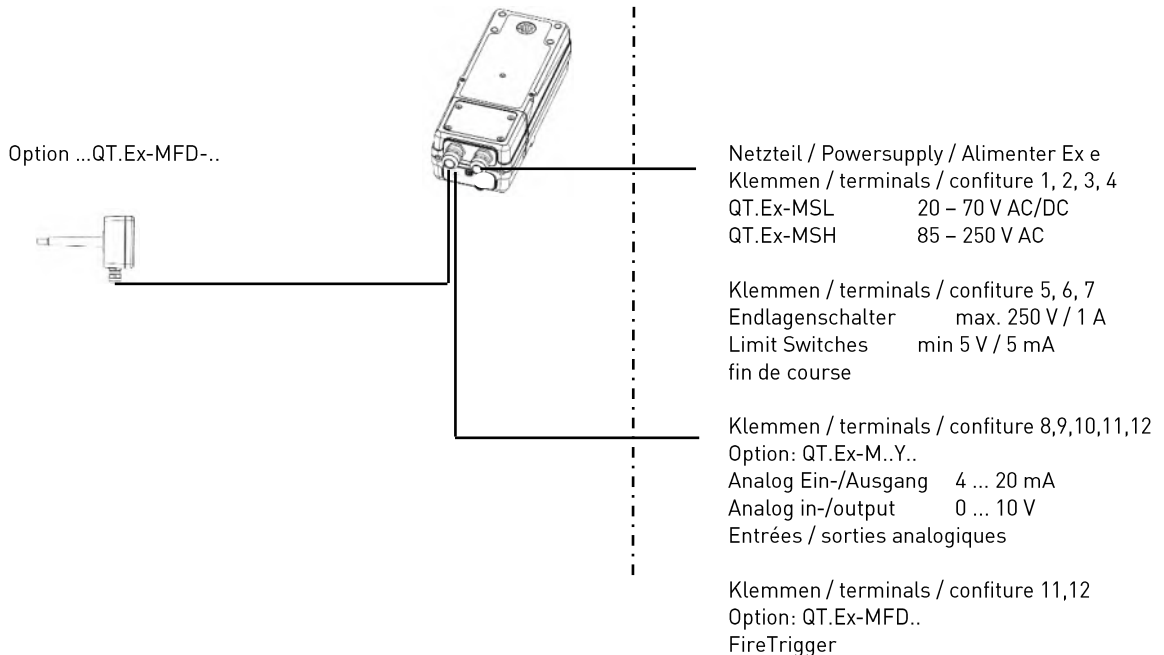


Sicherer Bereich
Safe area
Zone de sécurité



FT.Ex- ...
Ta (T6) -40 ...+75°C
Ta (T5) -40 ...+90°C
Ta (T4) -40 ...+125°C
Ta (T3-1) -40 ...+125°C

QT.Ex
Ta (T4) -40 ... +70°C



- Installieren Sie gemäß Herstellerangaben und für Sie gültigen Normen und Regeln.
 - Das Entriegeln des Gerätes oder öffnen des Klemmkastens ist nur im spannungslosen Zustand gestattet.
 - Beim Einbau des Gerätes ist darauf zu achten, dass die Gehäuseschutzart IP66 nach EN 60529 eingehalten wird.
 - Dieses Betriebsmittel kann nach Herstellerangaben in der Zone 1, 21 (II 2GD) bzw. Zone 2, 22 (II 3GD) eingesetzt werden.
 - Die Geräte dürfen nur in Messstoffen eingesetzt werden, gegen welche die prozessberührenden Materialien beständig sind.
 - Das Gerät ist an den Potenzialausgleich (PA) anzuschließen, dazu steht ein äußerer Anschluss zu Verfügung.
 - Das Gerät ist vor mechanischer Belastung zu schützen.
- Install in accordance with manufacturer's instructions and valid standards and rules.
 - Unlocking the device or open the terminal box is only permitted with the power off.
 - When installing the unit, make sure that the housing IP66 degree of protection is maintained in accordance with EN 60529.
 - This equipment can be used according to manufacturers' instructions in Zone 1, 21 (II 2GD) and 2, 22. (II 3GD).
 - The device may only be used in such conditions, against which the process-contacting materials are resistant.
 - The unit must be connected to the potential equalization (PA), an external terminal is available.
 - The unit must be protected against mechanical impact.
- Installer conformément aux instructions et aux normes et règles en vigueur du fabricant.
 - Libérer l'appareil ou ouvrir la boîte à bornes ne est autorisée qu'avec l'appareil hors tension.
 - Lors de l'installation, assurez-vous que le degré de protection IP66 boîtier est maintenu conformément à la norme EN 60529.
 - Cet équipement peut être utilisé selon les instructions du fabricant dans la zone 1, 21 (II 2 GD) et 2, 22 (II 3GD).
 - Le dispositif ne peut être utilisé dans de tels liquides, contre lequel les matériaux de traitement contact sont résistants.
 - L'appareil est connecté à la liaison équipotentielle (PA) pour rejoindre, ceci est une borne externe à votre disposition.
 - L'appareil doit être protégé contre les chocs mécaniques.

1. General

The manual is included in the delivery and serves to ensure proper handling and optimum functioning of the device. The manufacturer offers no guarantee for this publication and is not liable for any improper handling of the products described. For this reason, the manual has to be read before operation. In addition, all personnel who are involved in the transport, setup, operation, maintenance and repair are to be familiar with this manual. This manual may not, without the prior written consent of the manufacturer be used for competition purposes and will not be passed on to third parties. Copies for personal use are permitted. This documentation may contain technical inaccuracies or typographical errors. The information contained is regularly revised, inform yourself about updates via our contact address. The manufacturer reserves the right to modify or alter the product described at any given time.

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SYMBOLS



This sign shows Safety notes.
Safety notes must be followed.

Failure to observe may result in personal injury or property damage. The manufacturer assumes no liability.

SAFETY NOTES



Installation, electrical connection, maintenance and commissioning may only be performed by trained specialist.



Avoid excessive mechanical loads and improper use.



Switch off power when mounting and dismantling



The opening and closing times determined acc. to pi test cycle are approximate and may vary depending on the conditions of use. Always check your application fully to eliminate any risks.



The determination of the torque requirement requires information from the damper, valve manufacturers on the cross-section, type, location and technical conditions.



Depending on the external load and low temperatures, the spring return times may be extended.



The manual adjustment shaft must be used de-energized, only.



A protective roof is recommended for permanent rain and/or heavy water, dirt or direct sunlight, see accessories.



Attachments parts may affect the function. Check always your fully application to eliminate any risks.



The device may be accessed without the consent of the owner DE000010317181B4 and / or EP000001632013B1 no intrinsically safe (explosion-proof) control unit can be connected to parameterize the motor.



Every structural change leads to the expiry of the approval and means a considerable safety risk, further operation is prohibited.

2. Product description

The quarter turn actuator QT.Ex-M.. consists of a supply unit and a gear unit. Through the modular concept separation of electronics and transmission is a simple, safe assembly and commissioning. The integrated terminal box with type of protection Ex e ensures a direct electrical connection in the Ex zone.

FUNCTION

The QT.Ex-M.. can be installed in hazardous areas of categories 2, 3, G and D. The actuator performs a 90° (95°) rotation movement and opens / closes (fire protection) dampers and fittings. An optional spring moves the actuator into the safety position in the event of a power failure. A terminal box is integrated into the actuator.

APPLICATIONS

These actuators provide air dampers, VAV units, air handlers, ventilation flaps, louvers, reliable control for air damper applications and fire & smoke dampers.

QT.Ex-MF.. Fail Safe actuator

The actuator has the control On / Off / 3Pos. In case of power fail the actuator moves into the safety position by an internal spring.

QT.Ex-MFD... Fire damper actuator

The actuator and associated thermal release FT.Ex- ... sensor. If the sensor is trips, the actuator moves into the safety position.

QT.MF-MF02 / QT...-MFD02.. actuators

are only to be installed in 90° applications with the function normally closed. The flap must be closed during assembly and the actuator must be. Due to the extremely fast running times of the spring, there is a risk of gear breakage if incorrectly installed. Installation is not permitted if the application has an angle of rotation of less than 90°.

QT.Ex-MY.. Modulating actuator

Modulating actuator with control 0-10 V or 4-20 mA and feedback 0-10 V and 4-20 mA.

QT.Ex-MYQ .. VAV actuator

Modulation actuator with 0-10 V or 4-20 mA control and 0-10 V and 4-20 mA feedback. Fast runtime 5 s / 90° for digestories / laboratory fume cupboard applications.



These actuators are only intended for applications without a mechanical stop, e.g. seals, angle limitation. However, should a blockage occur within the actuator rotation angle, there is a risk of the gear breaking. Due to the extremely fast running times. Installation on systems with a mechanical stop is not permitted.

QT.Ex-MFY.. Modulating control with spring return

Modulating control 0-10 V or 4-20 mA and feedback signal 0-10 V and 4-20 mA. In case of power fail the actuator moves into the safety position by an internal spring.

INTENDED USE

The device is to be used as described in the HVAC sector for technical ventilation of buildings and processes. If the instructions are not observed, the operating permit expires. The limits and hazards are named in the document. The manufacturer has integrated a maximum of safety in order to prevent property damage and personal injury. Also note the engineers or professional practice for the legal requirements. The device is only approved for proper and intended use. This is understood to mean the use of devices, protective systems and devices in accordance with the device group and category and taking into account all manufacturer information that is necessary for the safe operation of the devices, protective systems and devices.

3. Technical data

QT.Ex-M SUPPLY-UNIT

TYPES		
QT.Ex-MSL	20 ... 70	V AC/DC
QT.Ex-MSH	85 ... 250	V AC

QT.Ex-M... GEAR-UNIT

SPRING RETURN (FAILSAFE) TYPES

QT.Ex-MF10	Motor 18 Nm 15 s	Spring 15 Nm 10 s	Nm/s/90°
QT.Ex-MF03	Motor 18 Nm 15 s	Spring 15 Nm 3 s	Nm/s/90°
QT.Ex-MF02	Motor 12 Nm 15 s	Spring 12 Nm 2 s	Nm/s/90°
QT.Ex-MF10Y	Motor 18 Nm 15 s	Spring 15 Nm 10 s	Nm/s/90°
QT.Ex-MFD10	Motor 18 Nm 15 s	Spring 15 Nm 10 s*	Nm/s/90°
QT.Ex-MFD03	Motor 18 Nm 15 s	Spring 15 Nm 3 s*	Nm/s/90°
QT.Ex-MFD02	Motor 12 Nm 15 s	Spring 12 Nm 2 s*	Nm/s/90°

*closing time by using thermal fire trigger

NON SPRING RETURN TYPES

QT.Ex-M	Motor 50 Nm 15 s	Nm/s/90°
QT.Ex-MY	Motor 40 Nm 15 s	Nm/s/90°
QT.Ex-MYQ	Motor 10 Nm 5 s	Nm/s/90°
QT.Ex-MYSQ	Motor 5 Nm 3 s	Nm/s/90°

SUPPLY

Voltage	See type list	
Frequency	50 – 60	Hz
Power consumption holding mode	5 / 7	W / VA
Power consumption motor mode	20 / 30	W / VA
Dimensioning @ 24 V supply	> 30 / 2	W / A
Protection class / over voltage category / pollution degree	II / 2 / III	insulated

ELECTRICAL CONNECTION

Terminal clamps	without sleeve 0,08 – 2,5	mm
ATEX/IECEX Ex e	with sleeve 0,25 – 1,5	mm
Cable glands M20x1,5 ATEX/IECEX/UKEX Ex e	6 - 13	Ø mm

AUXILLERY SWITCHES

Voltage	5 ... 250	V
Current	5 ... 100	mA
Limit switches	5 / 80	°

IN-/OUTPUTS MODULATION (OPTION Y)

Voltage / Current	0 – 10 / 4 – 20	V DC / mA
Position accuracy	0,2	°
Duty cycle	S1 - 80	%

HOUSING

High Tech Polymer	halogene-, silicone-	free
Housing protection	IP66	

GENERAL

Dimensions H x B x T	320 x 120 x 85	mm
Weight	4,0 / 4,1 (without / with spring)	kg

MATERIAL

Housing	High Tech Polymer	conductive
Front plate, screws	stainless steel	
Seals	EPDM	
Cable glands	Brass plated	
Gear wheels	Steel / Sinter steel heat treatment	
Output shaft double square	12 x 12, Steel surface treatment	mm

APPLICATION AREA

Ambient temperature and storage	-40 ... +70	°C
Ambient temperature and storage F02 actuators	-40 ... +50	°C
Humidity, without condensation	0 ... 90	%RH
Mounting position, altitude	any, < 2000 m	
Maintenance	maintenance free, time lubrication	
Corrosion resistance	On-/offshore	with high salt load

DELIVERY

QT.Ex-..	Fastening screws 4 x M6x100 incl. nut M6 galvanized, Allen key SW3, pointer 12 mm
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FT.Ex-72-... THERMAL TRIGGER UNIT Accessory for QT.Ex-MF.. actuators

TYPES AND TEMPERATUR RELEASE

FT.Ex-72	Thermal Fire Trigger	72	°C
FT.Ex-95	Thermal Fire Trigger	95	°C

SUPPLY VIA ACTUATOR MFD

Voltage	U	10	V
Current	I	10	mA

MATERIAL

High Tech Polymer	Halogene free
Cable	FRNC
Seal	EPDM
Potting	2K silicone
Sensor connection	Cable 2 pol, free leads

GENERAL

Dimensions H x B x T	90 x 70 x 50	mm
Weight	150	g

APPLICATION AREA

Ambient temperature*	-40 ... +125	°C
Storage temperature	-40 ... +60	°C
Humidity, without condensation	0 ... 90	%RH
Mounting position	any	
Thermal release	certified acc. to ISO 10294-4	

DELIVERY

FT.Ex-..	
Self-tapping screws 2x M3.9x50	
Duplex sealing insert 2 x 6 mm for feeding through FT and another cable for exchange in the M20 cable gland	

* The ambient temperature refers to the application area. The temperature fuses can already trigger at >60°C.

CERTIFICATES



QT.Ex-M....	ATEX IECEX	EPS 17 ATEX 1 020 X IECEX EPS 17.0009X	II 2G	Ex db eb mb	IIC T4	Gb
			II 2D	Ex tb	IIIC T130°C	Db
			II 2G	Ex h	IIC T4	Gb
			II 2D	Ex h	IIIC T130°C	Db
FT.Ex-..	ATEX IECEX	EPS 17 ATEX 1 020 X IECEX EPS 17.0009X	II 2G	Ex mb	IIC T6/T5/T4	Gb
			II 2D	Ex mb	IIIC T130°C	Db



QT.Ex-M	KTL	20-KA4B0-0343X
FT.Ex	KTL	20-KA4B0-0344X



QT.Ex-M....	UKEX	EPS 22 UKEX 1 225 X	II 2G	Ex db eb mb	IIC T4	Gb
			II 2D	Ex tb	IIIC T130°C	Db
			II 2G	Ex h	IIC T4	Gb
			II 2D	Ex h	IIIC T130°C	Db
FT.Ex-..	UKEX	EPS 22 UKEX 1 225 X	II 2G	Ex mb	IIC T6/T5/T4	Gb
			II 2D	Ex mb	IIIC T130°C	Db



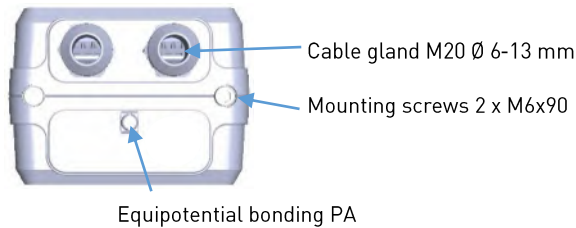
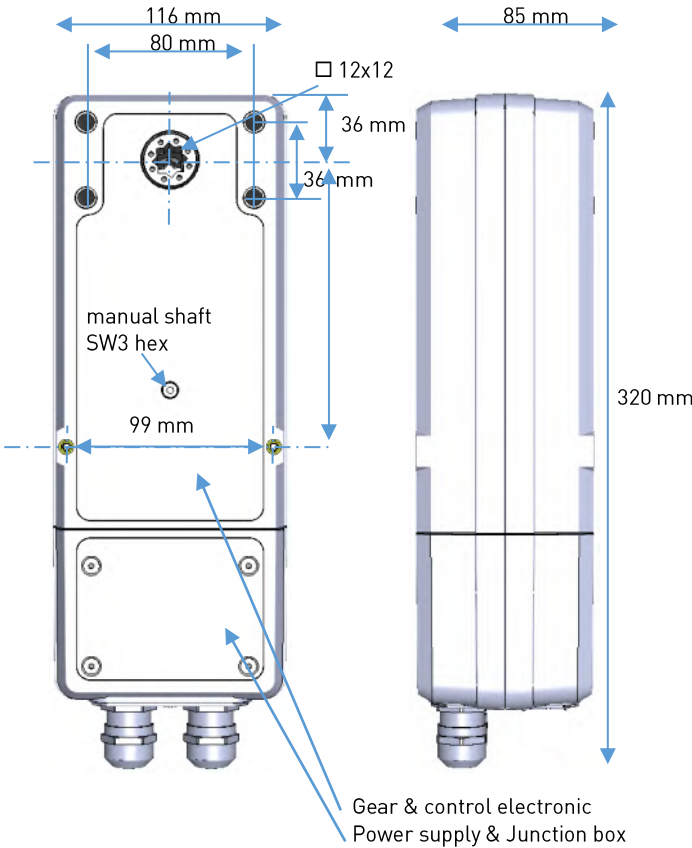
QT.Ex-M....	INMETRO	DNV 21.0270 X	Ex db eb mb	IIC T4	Gb
FT.Ex-..	INMETRO	DNV 21.0270	Ex tb	IIIC T130°C	Db
			Ex mb	IIC T6/T5/T4	Gb
			Ex mb	IIIC T130°C	Db



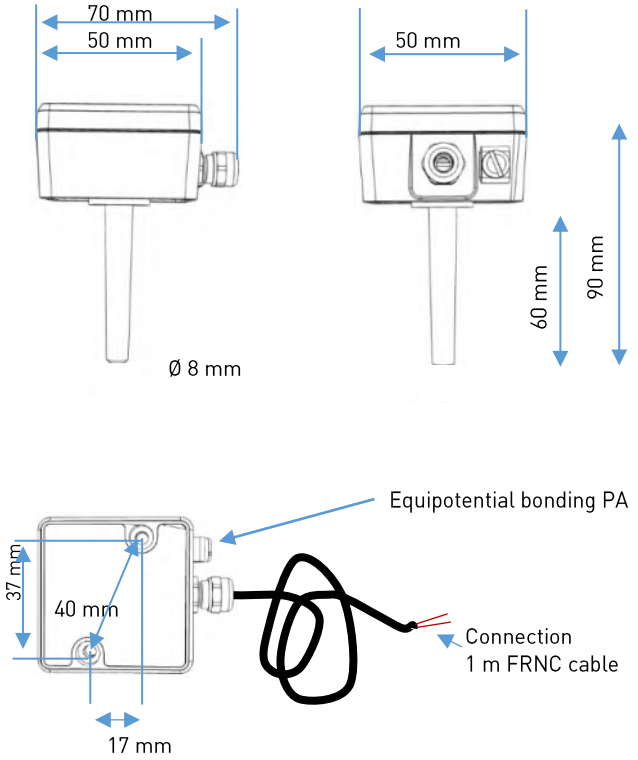
EAC on request

4. Dimensions

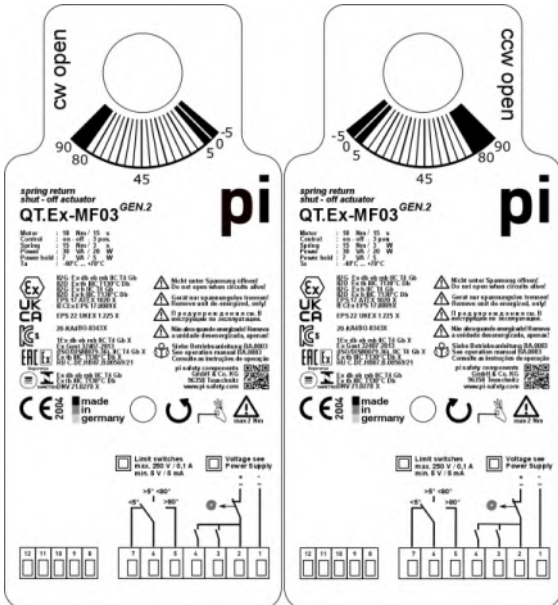
QT.Ex (ACTUATOR)



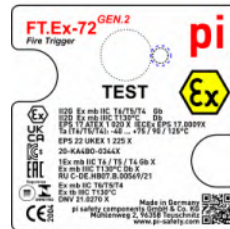
FT.Ex-.... (THERMAL FIRE TRIGGER)



Example of nameplate QT.Ex-MF03



Example of nameplate FT.Ex-72



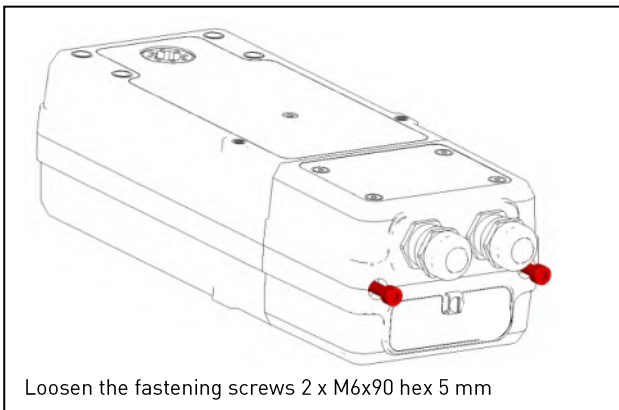
5. Mounting / Installation

In the delivery state, the power supply unit is installed (terminal box cover at the top), that the actuator runs clockwise UP and the counterclockwise CLOSE. By rotating the gear unit, the rotational direction / spring return direction of e.g. left (counterclockwise) to the right (clockwise). If this is necessary, proceed according to the next step, otherwise the installation follows.

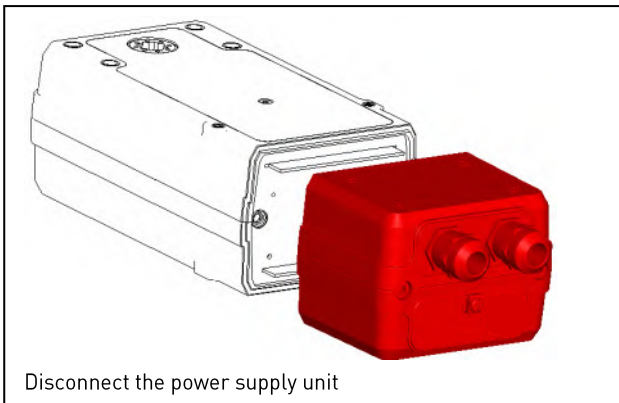
ELEKTRONIC UNLOC



Disconnect and check the voltage

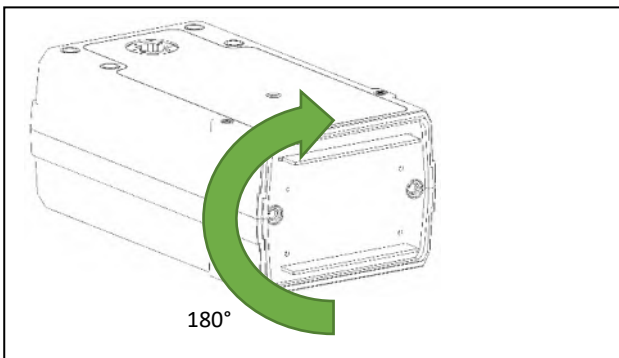


Loosen the fastening screws 2 x M6x90 hex 5 mm



Disconnect the power supply unit

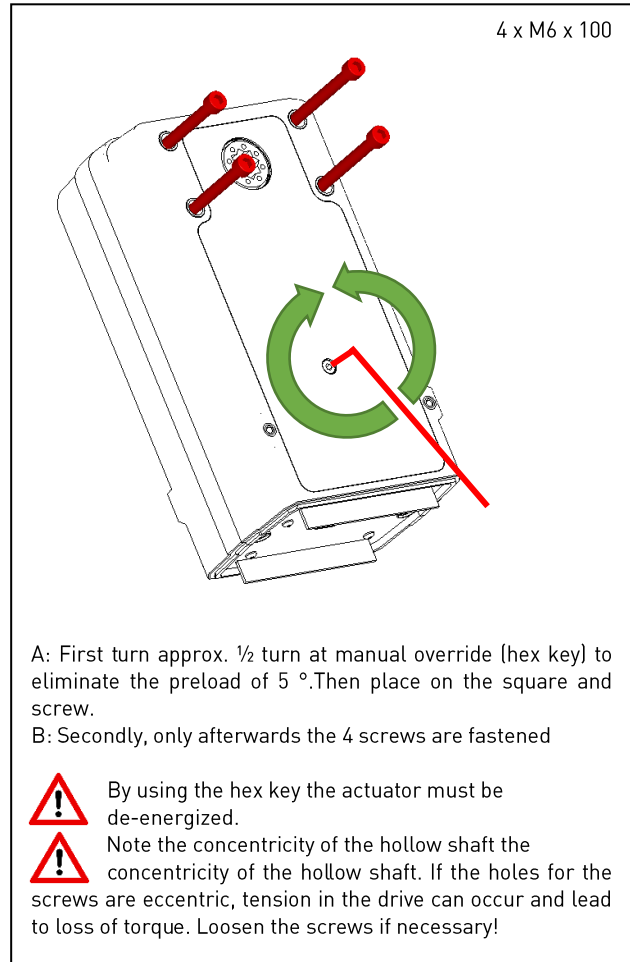
ROTATION OF ACTUATOR CW / CCW



180°

DIRECT MOUNTING

Regard the rotation of the actuator and the valve / valve during assembly.



4 x M6 x 100

A: First turn approx. 1/2 turn at manual override (hex key) to eliminate the preload of 5°. Then place on the square and screw.

B: Secondly, only afterwards the 4 screws are fastened

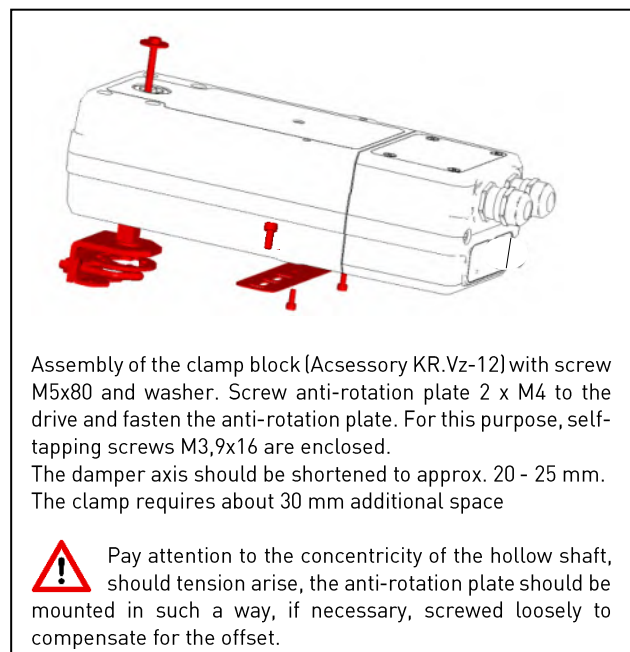


By using the hex key the actuator must be de-energized.



Note the concentricity of the hollow shaft the concentricity of the hollow shaft. If the holes for the screws are eccentric, tension in the drive can occur and lead to loss of torque. Loosen the screws if necessary!

CLAMP ASSEMBLY



Assembly of the clamp block (Accessory KR.Vz-12) with screw M5x80 and washer. Screw anti-rotation plate 2 x M4 to the drive and fasten the anti-rotation plate. For this purpose, self-tapping screws M3,9x16 are enclosed.

The damper axis should be shortened to approx. 20 - 25 mm. The clamp requires about 30 mm additional space



Pay attention to the concentricity of the hollow shaft, should tension arise, the anti-rotation plate should be mounted in such a way, if necessary, screwed loosely to compensate for the offset.

ELECTRICAL CONNECTION

The integrated electrical connection compartment in type of protection Ex e enables direct contacting of the supply, internal auxiliary switches and the analog signals. Acc. to IEC 61010-1, in the event of a fault before an impermissibly high current consumption, the device is e.g. secured with a fuse (> 2 A slow blow). Protect all lines against overload, short-circuit or fault currents in order to achieve maximum safety. The device must be connected to the equipotential bonding (PA), an external connection is available for this. The gear unit is connected to the (PA) by means of fastening screws.

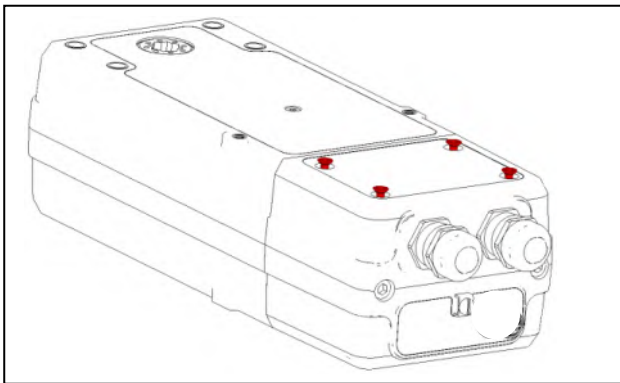
Regard the voltage drop in case of 24 VAC/DC supply

The line resistance of the supply and return lines must not exceed 3 Ohm. Example: 100 m cable length, cable cross-section 1.5 mm². Copper (0.01678 Ohm / mm² m),

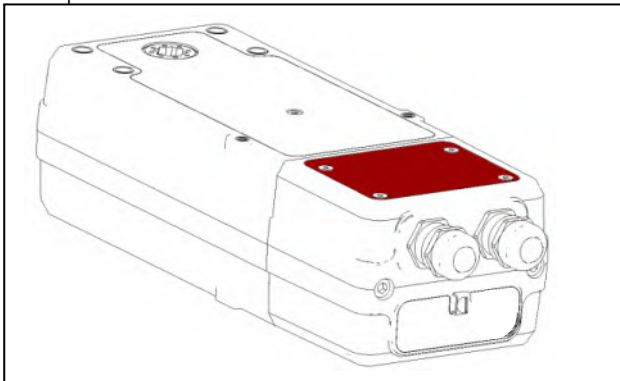
$$R = 2 \times \frac{L \times \rho}{A} = 2 \times \frac{100 \text{ m} \times 0,01678 \text{ Ohm/mm}^2}{1,5 \text{ mm}^2} = 2,24 \text{ Ohm} < 3 \text{ Ohm} \quad \text{OK}$$



- Disconnect and check the voltage
- Check the power supply voltage, which corresponds to the power supply label
- Loosen the screws M4 of the cover



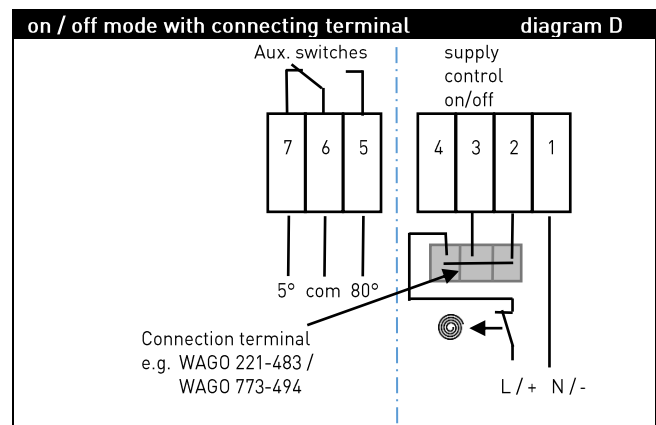
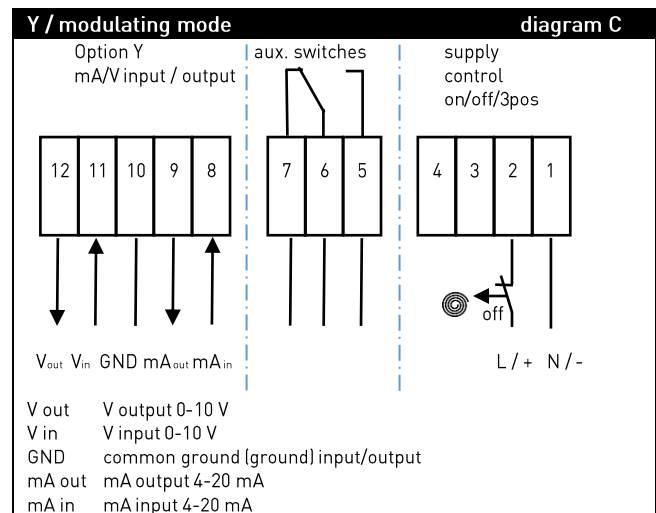
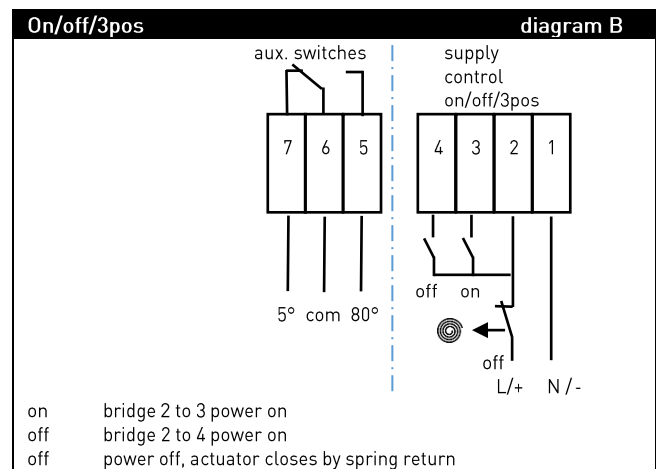
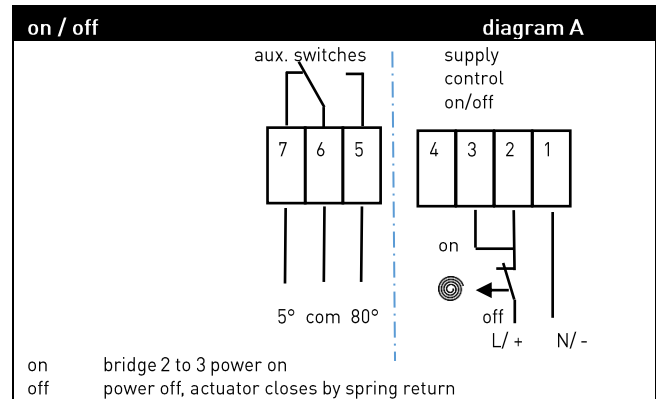
- Open cover



- Remove the cable gland protection
- Insert the cable
- Strip insulation (6 mm)
- Open the clamp by pressing with a screwdriver
- Insert the wire (s)
- Remove the screwdriver
- Close the cover
- An Tighten the cable glands
- Close unused opening with blind plugs

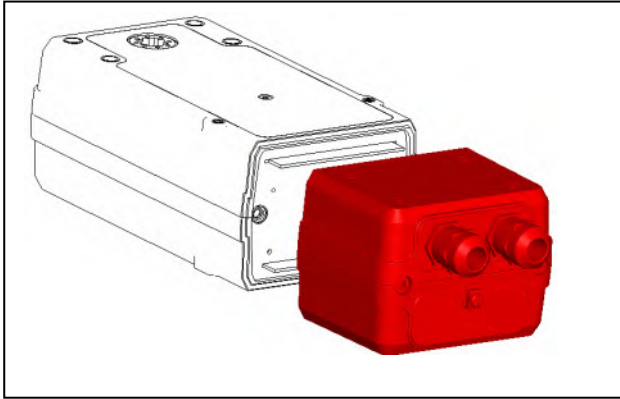
The supply, auxiliary switches and outputs are galvanically isolated, which offers a high degree of interference immunity. However, exchanging the connections can destroy the electronics.

WIRING DIAGRAMS

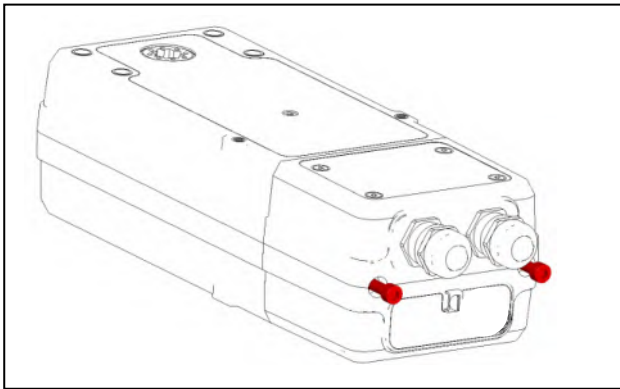


ELEKTRONIC LOOK

- attach the electronics carefully
- lock it together

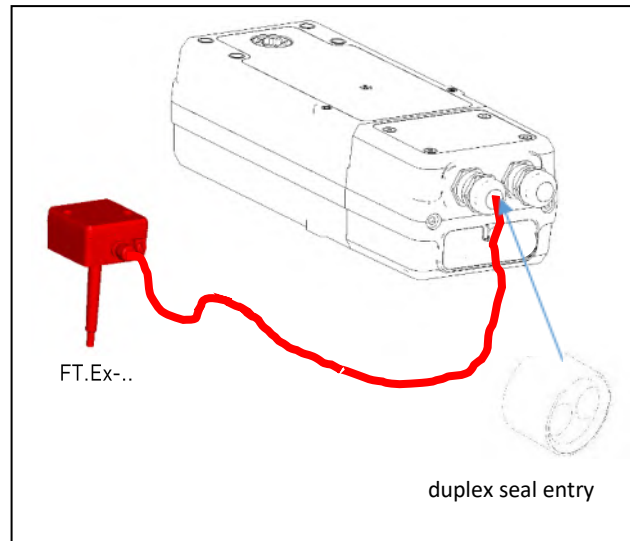


- Tighten the fastening screws. max. 3 Nm



- ⚠ Make sure that the gear unit and power supply unit are tightly closed when screwed together to prevent water or dust from entering.

MOUNTING THERMO TRIGGER FT.EX-...

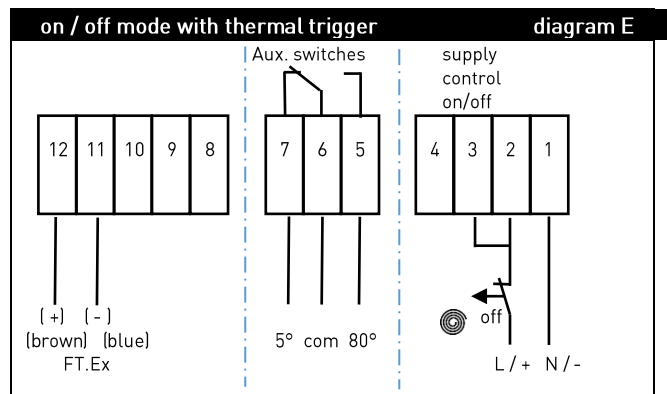


- ⚠ The function of the thermal release takes place via the voltage of the actuator

- ⚠ If the "Test" button is pressed for longer than 3 s, the actuator moves to the safety position. A voltage reset (power off) must then be carried out in order to acknowledge the locking.

- ⚠ Use the duplex seal in the FT.Ex accessory pack to feed the cable through. If required, this enables an additional cable, e.g. for the auxiliary switch connection. Unused openings must be sealed.

- ⚠ Only connect original parts from the manufacturer!



6. Maintenance

Ensure that the unit has been properly installed and connected in accordance with the chapters before, and that the voltage supply matches the specifications on the nameplate.

Switch on the power supply the device is ready for operation.

With variable speed drives, also note how often the drive moves. Controls that are too short and too fast can lead to premature wear.

7. Manual operation

The actuator can only be manually operated (3 mm hexagon) in the de-energized state and moved in any position. If the manual override is used when the supply voltage is applied, the motor will try to work against the force of the manual adjustment. Too large forces can be a mechanical destruction.



There is no automatic unlocking of the manual adjustment.



The hexagon key is to be removed in motor / spring operation, otherwise there is a risk of injury



Use manual hex key only, do not use any electrically operated devices such as a cordless screwdriver.

8. Internal auxiliary switch

The actuator has two fixed microswitches for end position feedback. The electrical contacts of these microswitches have a special alloy that is suitable for lower (mA range) currents. When using, make sure that the contacts can no longer be used in the lower (mA range) after a single use with larger currents.

9. Heating



When operating at low temperatures (-20° C ... -40° C), the actuator requires up to 30 minutes to heat up.

If the actuator is then under continuous voltage, the heating automatically regulates the power. An integrated thermostat switches off the heating.

Please note that the actuator must not be operated below -40°C without power supply.

When used in extreme low temperatures, we recommend an additional housing, which additionally isolates the actuator and encases it even more robustly by using stainless steel. See accessories



When using the thermal jacket (TJ.Va-M), make sure that it is an insulating housing and the heat by the self-heating convection no longer takes place. The permissible continuous operating temperature of the actuator is reduced to +40°C instead of +70°C. Duty cycle S6 10%.

10. Troubleshooting

No rotary movement of the output shaft

- Check power supply
- Check the power supply module with the gear module has been properly installed
- Check the direction of rotation of the valve / fitting and that of the actuator
- Check the wiring diagram. The actuator requires a contact for the run command.
Bridge from 2 to 3 OPEN
Bridge from 2 to 4 CLOSE

**EU / UK Konformitätserklärung
EU / UK Declaration of Conformity
Déclaration de Conformité UE / UK**

pi safety components GmbH & Co. KG ▪ Mühlenweg 2 ▪ 96358 Teuschnitz / Haßlach ▪ Germany

erklärt als Hersteller in alleiniger Verantwortung, dass das Produkt
declares as manufacturer under sole responsibility, that the product
déclare sous sa seule responsabilité en qualité de fabricant que le produit

QT.Ex-M...

FT.Ex-...

den Vorschriften folgender Europäischer Richtlinien durch Anwendung harmonisierter Normen entspricht:
conforms with the provisions of the following European Directives by applying the harmonised standards:
est conforme aux prescriptions des Directives Européennes suivantes par l'application des normes harmonisées :

Richtlinien/Directives/Directives	Normen/Standards/Normes	Ex-Normen/Ex-Standards/Normes Ex
2014/35/EU (LVVD)	EN 61010-1:2010+A1:2019	EN IEC 60079-0:2018 *GA22.03.01
2014/30/EU (EMC)	EN 60529:1991+A1:2000+A2:2013	EN 60079-1:2014
2014/34/EU (ATEX)	EN 61326-1:2013	EN IEC 60079-7:2015+A1:2018 *GA22.04.01
2012/19/EU (WEEE)	EN 61326-2-3 :2013	EN 60079-18:2015+A1 2017 *GA22.05.01
2011/65/EU (RoHS)	EN 55011:2016 Class A	EN 60079-31:2014
Regulation 2016 No. 1107 (Hazloc)	EN IEC 63000:2018	EN 80079-36:2016
Regulation 2016 No. 1091 (EMC)	ISO 10294-4:2001	EN 80079-37:2016
Regulation 2019 No. 696 (safety)		

EU / UK-Baumusterprüfbescheinigung Nr:
EC / UK-Type Examination Certificate No:
Numéro de l'attestation d'examen CE / UK de type:


**EPS 17 ATEX 1 020 X
EPS 22 UKEX 1 255 X**

Kennzeichnung Identification Marquage	QT.Ex-M...	II 2G Ex db eb mb IIC T6/T5/T4 (Gb)
		II 2D Ex tb IIIC 130°C (Db)
		II 2G Ex h IIC T4 (Gb)
		II 2D Ex h IIIC 130°C (Db)
	FT.Ex-...	II 2G Ex mb IIC T6/T5/T4 (Gb)
		II 2D Ex mb IIIC 130°C (Db)

Benannte Stelle Qualitätssicherung
Notified Body Quality assurance
Organisme Notifié Système d'assurance qualité

**Bureau Veritas / 2004 (ATEX)
Bureau Veritas / 8507 (UKEX)**

**pi safety components GmbH & Co. KG
Nürnberg, den 30.06.2022**



Rolf Petz
Geschäftsführer / Managing director / Le Directeur

* Lückeanalysen zu den aktuellen harmonisierten Normen wurden mit den auf der EU-Baumusterprüfbescheinigung (siehe oben) aufgeführten ersetzten Normen verglichen und es gelten keine Änderungen des «Standes der Technik» für die Geräte.
* gap analysis to the current harmonized standards have been compared to the superseded standards listed on the EU-Type-Examination Certificate (listed above) and no changes in the «state of the art» apply to the equipment.
* analyse des écarts aux normes harmonisées actuelles ont été comparées aux normes remplacées indiquées sur le certificat d'examen UE de type (énumérées ci-dessus) et aucun changement dans «l'état de la technique» ne s'applique à l'équipement.