



Product group:	Limit switch box flex	Product type:	EFX...-IA		EN
Certifications:					



EFX-IA

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Thank you for choosing a EUROTEC product. In doing so, you have chosen a quality product. To ensure functionality and your own safety, please read these operating instructions carefully before beginning with the installation. Nevertheless, should you have any further questions, please contact:

EUROTEC Antriebszubehör GmbH | Tel. +49 (0) 7543 93463 - 0 | Fax. - 10 | [sales@eurotec.global](mailto:sales@eurotec.global) | [www.eurotec.global](http://www.eurotec.global)

### 1. Device description

Limit switch boxes serve to provide feedback and control the position of industrial valves, which are activated using pneumatic actuators. The shaft of the limit switch box has a positive connection with the shaft of the actuator and is rotated with the rotational movement of the actuator. The actuating cams attached to the shaft, activate the installed sensors, which support the electronic signal transmission. The flex Ex ia limit switch boxes are, depending on the model, equipped with 1 to 4 mechanical limit switches or intrinsically safe proximity switches. Which contain 1-4 V3 proximity switches, 1-3 slot type sensors, 1-2 cylindrical sensors or 1 dual sensor.

### 2. Intended use

The flex Ex ia limit switch boxes from EUROTEC Antriebszubehör GmbH are, in combination with intrinsically safe circuits according to DIN EN 60079-25:2010, suitable for use in hazardous areas of zone 1 and 2 with gas, mist, or steam and for use in zone 21 and 22 with combustible dust. It's approved for use in the following ambient temperature ranges:

T6/T80°C: -55°C/-25°C...+70°C  
T5/T95°C: -55°C/-25°C...+80°C  
T4/T135°C: -55°C/-25°C...+100°C

The approved ambient temperature varies, depending on the sealing compound and the installed switch type. You can find the ambient temperature in the corresponding data sheet and on the product label. For the use to a minimum ambient temperature of -25°C the limit switch boxes type EFX can also be fitted with a viewing glass in the cover housing. A lower temperature range down to -55°C applies to limit switch boxes, which are made of components, that are at least suitable for this temperature.

The electrical input ratings are determined by the separately certified intrinsically safe inductive sensors that are used. You will find the values for Ui, Ii, Pi, Ci and Li on the product label of your limit switch box as well as in the instruction manual of the sensor.

For mechanical gold contact switches, the following rates have to be respected:

Ui: 30V, Ii: 15mA, Pi: 35mW

### 3. Marking

The marking on the housing is shown in the following table and varies depending on the installed switch type. You can find the number of the indicated responsible office for the QM system and the serial number below the CE mark. It consists of the year of manufacture and the respective order number.

Approval	Certificate	Marking
ATEX/IECEx	EPS 16 ATEX 1012 X IECEx EPS 16.0006 X	II 2G Ex ia IIC/IIB T4-T6 Gb II 2D Ex ia IIIC T80°C-T135°C Db
EAC Ex	RU C-DE.HA65.B.00838/20	1 Ex ia IIB <<T6...T4>> Gb X 1 Ex ia IIC <<T6...T4>> Gb X Ex ia IIIC T80°C/T95°C/T130°C Db X
UKCA Ex	EPS 22 UKEX 1 143 X	II 2G Ex ia IIC/IIB T4-T6 Gb II 2D Ex ia IIIC T80°C-T135°C Db
CCC Ex	2021322304003950	Ex ia IIC/IIB T4-T6 Gb Ex iaD 21 T80-T135



**The housings are not intended to be used as stepladders, to climb into the system. This can lead to damaging them and having a negative effect on their function. If the housing is damaged, water as well as dirt and combustible material can accumulate inside the housing. This can lead to a short circuit. Furthermore, the device can heat up severely due to the accumulation and can cause an explosion.**

### 4. Safe activation

To avoid mistakes, only specialists are permitted to set up, connect and put the devices into operation. The specialists must have expertise in the intrinsic safety Ex ia/ib types of protection as well as in all relevant regulations and provisions for operating materials in explosive areas. The limit switch boxes are developed in compliance with the following harmonised/designated standards:

EN IEC 60079-0:2018 (IEC 60079-0, Ed. 7.0)

EN 60079-11:2012 (IEC 60079-11, Ed. 6)

It is imperative to observe the following safety instructions prior to initial operation:



**Failure to observe the safety instructions in these operating instructions and using or handling the device improperly, releases us from any liability. Furthermore, the warranty for the devices and accessory components will expire.**

- ☞ Check on the labeling, whether or not the existing device is suitable for your case of application.
- ☞ Observe national regulations and provisions as well as the corresponding installation specifications.
- ☞ Take suitable measures, to prevent unintentional activation or improper interferences with the device.
- ☞ Remove any existing sealing plugs just before inserting the wires to avoid Dirt in the housing.
- ☞ Make sure the strain is sufficiently relieved on the connecting cables or lay them securely.
- ☞ Check the approved conductor cross-sections as well as the approved tightening torques in the documentation for cable connections
- ☞ Effectively protect the devices and cables against damages.
- ☞ Avoid static charge on plastic parts and cables.
- ☞ Housing components made of metal must be included in the potential equalisation by means of appropriate assembly.
- ☞ This device may only be operated in a fully assembled condition.
- ☞ Never disconnect the connector cables while they have power.
- ☞ Connect the switch box to intrinsically safe circuits, that are certified with a type examination certificate and which do not exceed the maximum values of the proximity switches Ui, li, Pi, Ci and Li.
- ☞ Each sensor inside the switch box housing has its own separated intrinsically safe circuit. For two sensors inside the switch box we recommend as associated electrical equipment one of the following 2-channel barriers:  
IFM, N0533A/ P+F, KFD2-SR2-Ex2.W / Turck, IM1-22EX-R

### 5. Assembly on actuators

Using the enclosed mounting material, the modules can be quickly and easily assembled to the provided actuator according to VDI (Association of German Engineers)/VDE (German Electrical Engineering Association) 3845.

1. Adjust your actuator to the final position, in which the groove of the actuator shaft is parallel to the actuator housing.
2. Now, place the box with the appropriate mounting bracket on the actuator.
3. The mounting bracket can now be screwed tightly onto the actuator using the provided lock screws (4 pcs.).
4. Unscrew the four cover screws and open the housing. Make sure you do not unscrew the screws too far; they should remain in the cover.
5. Insert the system cable into the housing through the cable gland and connect the individual wires to the terminal block. When doing so, please refer to the terminal diagram on the respective data sheet or on the cover of the housing and connect the housing to the equipotential bonding.
6. Close the housing using the cover. When attaching the cover, please make sure that the seal is correctly positioned and tighten the cover screws.

### 6. Assembly on manual valves

The boxes with an F05-connection on the bottom of the housing, can also be assembled on manually operated valves using our assembly kit "MSH". It is important that your manual valve has a head flange according to ISO 5211 and a threaded hole in the shaft. Please use the "MSH" instruction manual for detailed assembly instructions. For the assembly onto the bigger sizes starting with F10, additional assembly parts are needed. Please contact our sales team for assistance.

### 7. Electrical connection

You can find the approved cable diameter in the corresponding data sheet for the limit switch box. You can find the terminal diagram for the wiring either on or in the cover of the housing as well as on the corresponding data sheet for the limit switch box. Each sensor inside the switch box housing has its own separated intrinsically safe circuit. As an alternative to the cable gland, also other suitable connecting devices may be used, such as M12 plugs or connectors. These must comply with the separation distances according to table 5 of EN 60079-11. Unused plugs must be sealed with a dust-proof cap.



**When tightening the cable gland, please make sure that the base body of the cable gland, which is screwed in place in the housing, does not rotate as well. This could make the sealing washer shift and it would then no longer provide proper sealing. It is best to use 2 open-ended spanners for this purpose. One to secure the base body of the cable gland and one to tighten the screw nut.**

Standard terminals:

Terminal	Producer	Wire cross-section	Tightening torque	Stripping length	Colour
MSB 2,5-RZ...	Phoenix	single-wire fixed: 0,08 - 4,0 mm <sup>2</sup> fine-wire flexible: 0,08 - 2,5 mm <sup>2</sup> With end ferrule: 0,14 - 2,5 mm <sup>2</sup>	spring cage	8 mm	blue

## 8. Disassembly

During dismantling you must observe the instructions in Chapter 4.

1. Disconnect the device from the power supply.
2. Open the cover of the housing by unscrewing the 4 cover screws. Make sure that you do not unscrew the screws too far; they should remain in the cover and not be able to fall out.
3. Disconnect the cables in the system from the terminal strip in the limit switch box.
4. Now, unscrew the 4 screws with which the bracket of the box is attached to the actuator and remove the limit switch box from the actuator.

## 9. Adjusting the swivel range

The cams are always preset to a swivel range of 0-90° by the EUROTEC Antriebszubehör GmbH. Should you require a different swivel range for your application, please carry out the following steps:

### 1. Rectangular V3 limit switches and slot type sensors

- a. Bring the actuator in the desired end position 1. Adjust the lower cam first. Press the cam down and turn it into the position in which it actuates the switch. Now let the cam engage again with the gearing. (Fig. 1+2)
- b. Bring the actuator in the desired end position 2. Press the upper cam down and turn it into the position in which it actuates the switch. Now let the cam engage again with the gearing.
- c. Finally verify your presetting through repeated switching of the actuator.

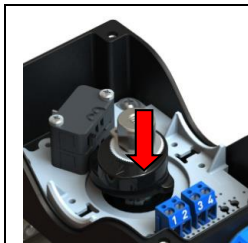


Fig. 1: Setting of cams

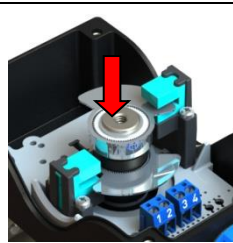


Fig. 2: Slot type cams

### 2. Cylindrical limit switches

- a. Loosen the M6 nut screw and remove the upper cam. (Fig. 3)
- b. Unfasten the threaded rod, bring the actuator in the desired end position 1, and adjust the lower cam. Then tighten the threaded rod again firmly. (Fig. 4)
- c. Bring the actuator in the desired end position 2, adjust the upper cam and tighten it again by means of the nut screw. (Fig. 5)
- d. Finally verify your presetting through repeated switching of the actuator.



Fig. 3: Loosen nut screw



Fig. 4: Fixation of cam 1



Fig. 5: Fixation of cam 2



**Danger of injury! During the switching process of the actuator you might squeeze body parts between switch and cam. Stay far enough away from the source of danger when switching the actuator! Attention, the switch can be damaged by the cams in the event of a wrong presetting. Take care that the cam does not hit the switch when switching the actuator.**

## 10. Connecting magnetic coils

Depending on the model, the flex Ex ia limit switch boxes of EUROTEC provide the possibility to connect one or two intrinsically safe solenoid coils (Ex i) inside the housing. For the connection of a magnetic coil replace one protection plug by a blue cable gland M20x1,5 together with a suitable seal insert for your cable diameter. Ensure that the IP protection class as well as the ambient temperature of your cable gland match at least the characteristics of the flex box housing. Verify that with the data sheet of your cable gland. Matching cable glands can be purchased from EUROTEC:

Cable diameter: 6 - 13mm  
Cable diameter: 4 - 13mm

Part number: SE-KVM20x1,5BL-W  
Part number: SE-KVM20x1,5BL-RK-W



The cable for the magnetic coil connection needs to match the terminal block as well as the cable gland and shall be in light blue colour.

The wires of your cable need to be connected to the terminal block and possibly as well with the magnetic coil. Consider the referring operation instructions of the coil manufacturer and the wiring diagram inside the switch box cover or on the technical data sheet of the limit switch box.

The following values must not be exceeded: IIC:  $U_i = 28V$ ,  $I_i = 200mA$  / IIB:  $U_i = 30V$ ,  $I_i = 450mA$

#### 11. Outdoor use

If you would like to use the limit switch boxes outdoors (outdoor installation), the limit switch boxes should be equipped with a pressure compensating element. The pressure compensating element prevents water condensation in the housing in the event of outdoor temperature fluctuations. Please check whether or not there is a pressure compensating element. If not, you have to order respective limit switch boxes. In this case, the addition to the item number is "-DAE".

#### 12. Maintenance

The flex Ex ia limit switch boxes for ATEX areas may be opened during operation or in an existing explosive atmosphere. Maintenance work is possible inside of the Ex area due to intrinsically safe circuits. With the long-term outdoor use of the switch boxes and with extremely high or low ambient temperatures, the cover and shaft sealings can become porous. A safe use can only be guaranteed with a leak-proof housing. Sealings need to be replaced as soon as they are worn out. In addition to that the cover screws can loosen in the event of strong vibrations or temperature fluctuations. Retighten the screws every two years. Any other modifications to the device are prohibited!

#### 13. Malfunctions

In the event of malfunctions, please check the lines, line connectors and the position of the cams. Furthermore, please check whether condensation has accumulated in the housing and whether the valve and the actuator are functioning properly. Rectify any possible errors. If this does not rectify the malfunction, disconnect the housing from the power supply voltage and contact one of the manufacturer's authorised and trained specialists.

#### 14. Item number

Please refer to the related order code of the switch box series flex EFX.



## 15. EU/UK Declaration of Conformity

### EU/UK-Declaration of Conformity according to the Directive 2014/34/EU and SI 2016 No. 1107



We herewith confirm that the following named equipment for the use in hazardous areas does fulfill the requirements of the Directive 2014/34/EU and SI 2016 No. 1107 in the delivered version:

EFX...IA... flex limit switch box. Housing aluminum

The equipment has been developed and designed in consideration of the following harmonised/designated standards:

EN IEC 60079-0:2018 IEC 60079-0 Ed. 7.0	Explosive atmospheres - Part 0: Equipment - General requirements
EN 60079-11:2012 IEC 60079-11 Ed. 6.0	Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"

Marking:

 II 2G Ex ia IIC T4-T6 Gb  
 II 2D Ex ia IIC T80°C-T135°C Db

EU/UK-Type Examination Certificate:

**EPS 16 ATEX 1 012 X / EPS 22 UKEX 1 143 X**  
Bureau Veritas Consumer Products Services Germany GmbH  
Businesspark A96, DE-86842 Türkheim  
Ident.-No.: 2004 / 8507

EU/UK-Certificate Quality Assurance:

**EPS 22 ATEX Q 098 / EPS 22 UKEX Q 098**  
Bureau Veritas Consumer Products Services Germany GmbH  
Businesspark A96, DE-86842 Türkheim  
Ident.-No.: 2004 / 8507

2022/07/06

Date

  
General Manager: Melissa Berge