# Operating Manual

## End position feedback ATEX type

Art. No. 117198 and 117259

RIEGLER & Co. KG, Sales Engineering
Schützenstraße 27 | 72574 Bad Urach
Phone +49 7125 9497-642
technik@riegler.de

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BA_X001
Operating instructions

| | | | | | |
|---|---|---|---|---|---|
| **Product group:** | Limit switch box wave | **Product type:** | EV...-IA / EA...-IA | wave | EN |
| **Certifications:** | | | | | |

| | | |
|---|---|---|
|  |  |  |
| EVP-IA | EVE-IA | EAE-IA |

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# BA_X001
# Operating instructions

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 | 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 wave Ex ia limit switch boxes of the types EV and EA are, depending on the model, equipped with 1 potentiometer, 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, 1 dual sensor.

## 2. Intended use

The wave 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.

| ATEX / IECEx | EAC Ex (TR-CU-012) |
|---|---|
| Ex II 2G Ex ia IIC/IIB T4/T6 Gb | 1 Ex ia IIB T6/T4 Gb X<br>1 Ex ia IIC T6/T4 Gb X |
| Ex II 2D Ex ia IIIC T80°C/T110°C Db | Ex ia IIC T80°C/T110°C Db X |
| IBExU 11 ATEX 1154 / IECEx IBE 13.0042 | |

The following ambient temperature is approved:

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|---|---|
| Vestamid: | -25°C...+70°C |
| Aluminium: | T6: -55°C/-40°C/-25°C...+70°C |
| | T4: -55°C/-40°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. A lower temperature range down to -55°C or -40°C and a higher temperature range up to 100°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.

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| For mechanical gold contact switches, the following rates have to be respected: | Ui: 30V, Ii: 52mA, Pi: 120mW |
| For potentiometers, the following rates have to be respected: | Ui: 13,8V, Ii: 35mA(T4)/10mA(T6), Pi: 121mW |

## 3. Labeling

The labeling on the housing is shown in Fig. 1 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.


Fig. 1: Labeling

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|  | **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 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 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:

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|  | **Failure to observe the safety instructions in these operating instructions and using or handling the device improperly, releases us from any liability.**<br>**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, Ii, 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 / Turck, IM36-11EX-U/24VDC (for potentiometer)

### 5. Assembly on actuators

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

1. Adjust your actuator to the final position, in which the groove of the drive shaft is parallel to the drive 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. 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. Mounting on manual valves

The limit switch boxes with F05 interface at the bottom side of the housing can also be mounted on manual valves by using our mounting kit "MSH". Thereto your manual valve needs a top flange according to ISO 5211 (F03 - F16) and a threaded bore hole in the valve shaft. For detailed assembly instructions please consider the operation manual of the "MSH".

### 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 devises 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.

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|  | **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 | Thightening torque | Stripping length | Colour |
|---|---|---|---|---|---|
| AK100... | PTR | single-wire fixed: 0,2 - 4,0 mm²<br>fine-wire flexible: 0,2 - 2,5 mm²<br>With end ferrule: 0,2 - 2,5 mm² | 0,45 - 0,50 Nm | 7 mm | light 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. 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.

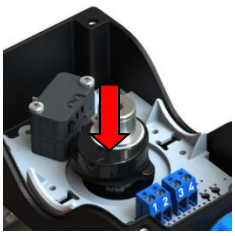

Fig. 2: Setting of cams

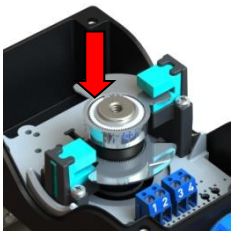

Fig. 3: Slot type cams

*2. Cylindrical limit switches*

a. Loosen the M6 nut screw and remove the upper cam. (Fig. 4)
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. 5)
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. 6)
d. Finally verify your presetting through repeated switching of the actuator.

Fig. 4: Loosen nut screw

Fig. 5: Fixation of cam 1

Fig. 6: Fixation of cam 2

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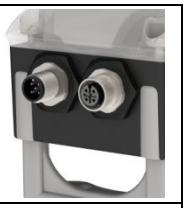
|  | **Danger of injury! During the switching process of the actuator you might squeeze body parts between switch and cam. Stay far enough away from the source of danger when switching the actuator!**<br>**Attention, the switch can be damaged by the cams in the event of a wrong presetting. Take care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

### 10. Connecting magnetic coils

Depending on the model, the wave Ex ia limit switch boxes of EUROTEC provide the possibility to connect one or two intrinsically safe solenoid coils (Ex i) inside the housing. The suitable switch boxes for one coil are marked with an additional '-MA' in their part number. This version has a cable with a length of 500mm that is connected to the terminal block inside the housing and lead outside the housing through a cable gland. The leads of this cable have to be wired to the plug connector of the solenoid coil. Please consider the coil manufacturer's operation manual and the circuit diagram on or inside the limit switch box cover or on the according technical data sheet. The same applies to the connection of two solenoid coils. This version is marked with an additional '-2MA' in its part number and provides two cables with a length of 500mm each. With the models "-2KV" and "-2NPT1/2" the solenoid valve connection (Ex i) is optional on poles 7-9.

The following values must not be exceeded: IIC: Ui = 28V, Ii = 200mA / IIB: Ui = 30V, Ii = 450mA

| | | | | |
|---|---|---|---|---|
|  |  |  |  |  |
| Fig. 10: -MA | Fig. 11: -2MA | Fig. 12: -2KV | Fig. 13: -2NPT1/2 | Fig. 14: -2M12-MA12 |

### 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 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, but no later than after 5 years. The necessary sealings can be ordered from EUROTEC. 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 wave EV/EA.

## 15. EU Declaration of Conformity

### EU-Declaration of Conformity
**according to the Directive 2014/34/EU (ATEX-Directive)**

We herewith confirm that the following named equipment for the use in hazardous areas does fulfill the requirements of the Directive 2014/34/EU in the delivered execution:

| | |
|---|---|
| EV...IA... | wave limit switch box. Housing Vestamid |
| EA...IA... | wave limit switch box. Housing Aluminum |
| EV...IA...-3D... | wave limit switch box. Housing Vestamid with Polycarbonate cover (IIB) |

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

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

Marking: **II 2G Ex ia IIC/IIB T4/T6 Gb**

**II 2D Ex ia IIIC T80°C/T110°C Db**

EU-Type Examination Certificate: **IBExU 11 ATEX 1154**
IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7, 09599 Freiberg,
Kennnummer: 0637

EU-Certificate Quality Assurance: **EPS 19 ATEX Q 057**
Bureau Veritas Consumer Products Services Germany GmbH
Businesspark A96, DE-86842 Türkheim
Ident.-No.: 2004

2021-03-05
Date

General Manager: Melissa Berge