Product group:	Limit switch box wave	**Product type:**	EV...-ED / EA...-ED	wave	EN
Certifications:	CE Ex IECEx EAC UKCA				

		
EVP-ED	EVE-ED	EAE-ED

Table of Contents

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:

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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 de t limit switch boxes are equipped with 1 to 3 mechanical Ex d switches depending on the model.

2. Intended use

The wave Ex de t limit switch box from the EUROTEC Antriebszubehör GmbH is intended for use in the explosive area of zones 1 and 2 with gases, mists or vapours and zone 21 and 22 with combustible dust. It's approved for use in the following ambient temperature ranges:

Vestamid: -20°C...+40°C
Aluminium: -55°C/-40°C/-20°C...+60°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 applies to limit switch boxes, which are made of components, that are at least suitable for this temperature.

Rated voltage:	U_N =	⩽ 90V oder 90V ⩽ Ue ⩽ 250V
Rated current:	I_N =	max. 4A
Max. power dissipation:	P_{max} =	2,5W

A further shaft feed-through in the cover may additionally be provided, which is constructed structurally the same. This makes it possible to create an additional interface according to VDI/VDE 3845, which enables the assembly of further components on top of the cover (-WD).

3. Marking

The labeling 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	IBExU 12 ATEX 1022 X IECEX IBE 13.0041X	II 2G Ex db eb IIC/IIB T6 Gb II 2D Ex tb IIIC T80°C Db
EAC Ex	RU C-DE.HA65.B.00838/20	1 Ex d e IIB T6 Gb 1 Ex d e IIC T6 Gb Ex t IIIC T80°C Db X
UKCA Ex	EPS 22 UKEX 1 146 X	II 2G Ex db eb IIC/IIB T6 Gb II 2D Ex tb IIIC T80°C Db

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. Special Conditions

The limit switch boxes type EV...ED and EV...K2D have been tested with reduced impact energy and must be protected against mechanical hazards. The special conditions specified in the corresponding operation instructions must be observed for the Ex components used. This applies in particular to cable glands and connectors.

5. 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 protection by flameproof enclosures (Ex d), increased safety (Ex e) and dust ignition protection by enclosure (Ex t) 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 IEC 60079-7:2018/A1:2018 (IEC 60079:2015+AMD1:2017, Ed.5.1)
EN 60079-31:2014 (IEC 60079-31, Ed. 2.0)
EN 60079-1:2014/AC:2018-09 (IEC 60079-1/ISH1:2020,Ed.7.0)

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 labelling, 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 the 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.

6. 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.

7. 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.

8. 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.

As an alternative to the cable gland, suitable and separately certified connecting elements may be used, such as M12 plugs or connectors. These connectors shall be electrically or mechanically interlocked or otherwise designed in such a way that they cannot be disconnected while live and that contacts cannot be energized when disconnected. Alternatively, the contacts can be held together with the aid of special fasteners in accordance with EN60079-0 section 9.2 if they are marked with an indication in accordance with EN 60079-0 section 29.12. Furthermore, separately certified thread adapters may be used (e. g. NPT1/2)

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	Manufacturer	Certificate	Conductor cross-section	Multi-conductor	Tightening torque	Strip length	Colour
09-9702...	Bartec	PTB 99 ATEX 3117U	0.5 - 2.5 mm²	2x 1.0 mm²	0.4 Nm	6-8 mm	light grey
1704342	Phoenix	KEMA 00 ATEX 2053U	0.5 - 2.5 mm²	2x 0.75 mm²	0.4 - 0.5 Nm	9 mm	green
1705547	Phoenix	KEMA 00 ATEX 2053U	0.5 - 2.5 mm²	2x 0.75 mm²	0.4 - 0.5 Nm	9 mm	green
2703208...	Phoenix	PTB 06 ATEX 1034U	0.5 - 4.0 mm²	2x1.50 mm²	0.6 - 0.8 Nm	8 mm	grey

If you have installed another Ex e terminal in the housing, then please find the connection data in the corresponding data sheet and the corresponding type examination certificate for the terminal. (Minimum cable cross-section: 0.75 mm² / max. power: 4A)

Standard cable glands:

Cable gland	Manufacturer	Certificate	Size	Cable diameter	Material	Colour
ESKE...	WISKA	PTB 13 ATEX 1015 X	M20x1,5 red.	4 - 13 mm	PA6	black
ESKE...	WISKA	PTB 13 ATEX 1015 X	M20x1,5	7 - 13 mm	PA6	black
GHG...	CEAG	PTB 99 ATEX 3128 X	M25x1.5	8.0 - 17 mm	PA6	black

If you have installed another Ex e cable gland in the housing, then please find the connection data in the corresponding data sheet and the corresponding type examination certificate for the cable gland.

9. 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.

10. Adjusting the swivel range

The actuators 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. Move the actuator to the required final position 1 and adjust the bottom actuator. To do so, press the actuator down on the outer ring and turn it to the position, in which the switch is activated. Let the actuator snap back up into the gearing again.
2. Move the actuator to the required final position 2 and adjust the top actuator. To do so, press the actuator down on the outer ring and turn it to the position, in which the switch is activated. Let the actuator snap back up into the gearing again.
3. Finally, check your default setting by switching the actuator several times.

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.

11. Connecting solenoid coils

Depending on the model, the wave Ex de t limit switch boxes from EUROTEC offer the option of connecting a maximum of one solenoid coil in one of the types of protection Ex m, Ex dm or Ex d. The boxes suitable for the connection of a magnetic coil have "-2KV" added in the item number. In this model, you can find a 9-pin terminal strip in the limit switch box and a second cable gland M20x1.5 on the housing. A minimum cable cross-section of 0.75mm² applies for the magnetic valve connection. The following rated values may not be exceeded: U_N = 24V / I_N = 4A

12. Outdoor use

If you would like to use the limit switch boxes outdoors (outdoor installation), the limit switch boxes should be equipped with an Ex e 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".

13. Maintenance

The limit switch boxes for ATEX areas may never be opened during operation or in an existing explosive atmosphere. Opening them can cause an explosion. Therefore, maintenance work is only possible outside of the Ex area.
With the long-term outdoor use of the switch boxes and with extremely high or low ambient temperatures, the sealings inside of the cover and on the shaft 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. 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!

14. Malfunctions

In the event of malfunctions, please check the lines, line connectors and the position of the cams. Furthermore, please check whether condensation water 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.

15. Item number

Please refer to the related order code of the switch box series wave EV/EA.

16. 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 execution:

EV... ED...	wave limit switch box. Housing Vestamid
EA... ED...	wave limit switch box. Housing Aluminum
EV...ED...-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 IEC 60079-0, Ed. 7.0	Explosive atmospheres - Part 0: Equipment - General requirements
EN IEC 60079-7:2018/A1:2018 IEC 60079-7:2015+AMD1:2017,, Ed. 5.1	Explosive atmospheres - Part 7: Equipment protection by increased safety "e"
EN 60079-1:2014/AC:2018-0 IEC 60079-1/ISH:2020, Ed. 7.0	Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures „d"
EN 60079-31:2014 IEC 60079-31, Ed. 2.0	Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"

Marking: **Ex II 2G Ex db eb IIC T6 Gb**

Ex II 2D Ex tb IIIC T80°C Db

EU-Type Examination Certificate: **IBExU 12 ATEX 1022 X**
IBExU Institut für Sicherheitstechnik GmbH
Fuchsmühlenweg 7, 09599 Freiberg,
Ident.-No.: 0637

UK-Type Examination Certificate: **EPS 22 UKEX 1 146 X**
Bureau Veritas Consumer Products Services Germany GmbH
Businesspark A96, DE-86842 Türkheim
Ident.-No.: 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

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