

Safety Instructions

Gamma Modulator FHG65

ATEX: II 2 G Ex db IIC T5/T6 Gb
II 2 G Ex db eb IIC T5/T6 Gb
II 2 D Ex tb IIIC Txx°C Db

IECEX: Ex db IIC T5/T6 Gb
Ex db eb IIC T5/T6 Gb
Ex tb IIIC Txx°C Db



Gamma Modulator FHG65

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About this document



This document has been translated into several languages. Legally determined is solely the English source text.

The document translated into EU languages is available:

- In the download area of the Endress+Hauser website:
www.endress.com -> Downloads -> Manuals and Datasheets -> Type: Ex Safety Instruction (XA) -> Text Search: ...
- In the Device Viewer: www.endress.com -> Product tools -> Access device specific information -> Check device features



If not yet available, the document can be ordered.

Associated documentation

This document is an integral part of the following Operating Instructions:

BA00373F/00

Supplementary documentation

Explosion-protection brochure: CP00021Z/11

The Explosion-protection brochure is available:

- In the download area of the Endress+Hauser website:
www.endress.com -> Downloads -> Brochures and Catalogs -> Text Search: CP00021Z
- On the CD for devices with CD-based documentation

Manufacturer's certificates

EU Declaration of Conformity

Declaration Number:
EG08003

The EU Declaration of Conformity is available:

In the download area of the Endress+Hauser website:
www.endress.com -> Downloads -> Declaration -> Type: EU Declaration -> Product Code: ...

EU type-examination certificate

Certificate number:
KEMA 08 ATEX 0113 X

List of applied standards: See EU Declaration of Conformity.

IEC Declaration of Conformity

Certificate number:
IECEX KEM 08.0021X

Affixing the certificate number certifies conformity with the following standards (depending on the device version):

- IEC 60079-0 : 2017
- IEC 60079-1 : 2014
- IEC 60079-7 : 2015 / A1: 2017
- IEC 60079-31 : 2013

Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany
Address of the manufacturing plant: See nameplate.

Other standards

Among other things, the following standards shall be observed in their current version for proper installation:

- IEC/EN 60079-14: "Explosive atmospheres - Part 14: Electrical installations design, selection and erection"
- EN 1127-1: "Explosive atmospheres - Explosion prevention and protection - Part 1: Basic concepts and methodology"

Extended order code

The extended order code is indicated on the nameplate, which is affixed to the device in such a way that it is clearly visible. Additional information about the nameplate is provided in the associated Operating Instructions.

Structure of the extended order code

FHG65	–	*****	+	A*B*C*D*E*F*G*..
<i>(Device type)</i>		<i>(Basic specifications)</i>		<i>(Optional specifications)</i>

* = Placeholder

At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.

Basic specifications

The features that are absolutely essential for the device (mandatory features) are specified in the basic specifications. The number of positions depends on the number of features available. The selected option of a feature can consist of several positions.

Optional specifications

The optional specifications describe additional features for the device (optional features). The number of positions depends on the number of features available. The features have a 2-digit structure to aid identification (e.g. JA). The first digit (ID) stands for the feature group and consists of a number or a letter (e.g. J = Test, Certificate). The second digit constitutes the value that stands for the feature within the group (e.g. A = 3.1 material (wetted parts), inspection certificate).

More detailed information about the device is provided in the following tables. These tables describe the individual positions and IDs in the extended order code which are relevant to hazardous locations.

Extended order code: Gamma Modulator



The following specifications reproduce an extract from the product structure and are used to assign:

- This documentation to the device (using the extended order code on the nameplate).
- The device options cited in the document.

Device type

FHG65

Basic specifications

Position 1 (Approval)		
Selected option		Description
FHG65	1	ATEX II 2 G Ex db eb IIC T5/T6 Gb
	3	ATEX II 2 G Ex db eb IIC T5/T6 Gb
	5	ATEX II 2 D Ex tb IIIC Db
	7	IECEX Ex tb IIIC Db
	G	IECEX Ex db eb IIC T5/T6 Gb
	H	IECEX Ex db eb IIC T5/T6 Gb

Position 4 (Cable Entry Power Supply)		
Selected option		Description
FHG65	A	Gland M20
	B	Thread M20
	C	Thread G1/2
	D	Thread NPT1/2

Position 5 (Mounting Device)		
Selected option		Description
FHG65	1	Level, point level, density
	2	Level, point level, density + cooling tube

Optional specifications

No options specific to hazardous locations are available.

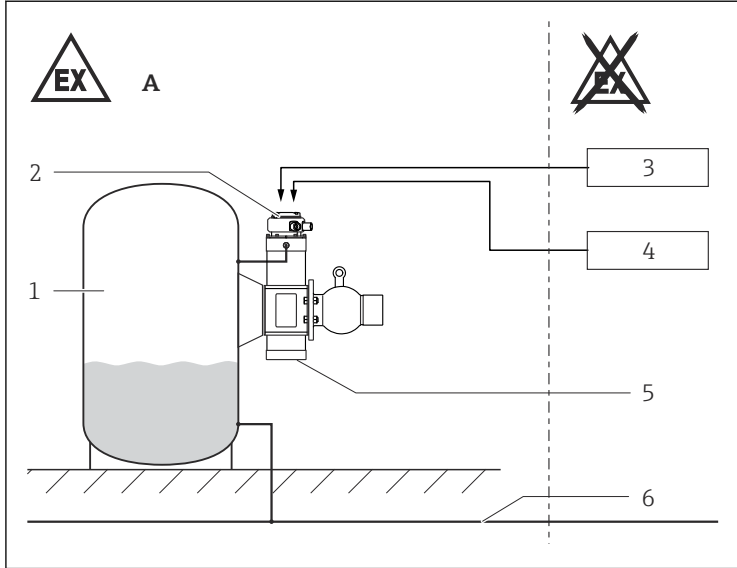
Safety instructions: General

- Comply with the installation and safety instructions in the Operating Instructions.
- Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:
 - Be suitably qualified for their role and the tasks they perform
 - Be trained in explosion protection
 - Be familiar with national regulations
- Install the device according to the manufacturer's instructions and national regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.
- Avoid electrostatic charging:
 - Of plastic surfaces (e.g. enclosure, sensor element, special varnishing, attached additional plates, ..)
 - Of isolated capacities (e.g. isolated metallic plates)
- Modifications to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.

Safety instructions: Special conditions

- To avoid electrostatic charging: Do not rub surfaces with a dry cloth.
- In the event of additional or alternative special varnishing on the enclosure or other metal parts or for adhesive plates:
 - Observe the danger of electrostatic charging and discharge.
 - Do not install in the vicinity of processes generating strong electrostatic charges.

Safety instructions: Installation



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- A Zone 1, Zone 2 or Zone 21, Zone 22
 1 Tank; Zone 0, Zone 1 or Zone 20, Zone 21
 2 Connection compartment
 3 Power supply
 4 Optional: Synchronizer FHG66
 5 Modulator FHG65
 6 Local potential equalization

- In potentially explosive atmospheres: Do not open the connection compartment cover when energized.
- Waiting time before opening the connection compartment after switching off the power supply: 60 minutes.
- At an ambient temperature higher than 70 °C: Cables and cable glands must be suitable for a temperature of at least 85 °C.
- To maintain the ingress protection of the enclosure IP65/67: Install the enclosure cover, cable glands and blind plugs correctly.
- Before operation:
 - Screw in the cover all the way.
 - Tighten the securing clamp on the cover.
- Tighten unused terminal screws.

Basic specification, Position 5 = 2

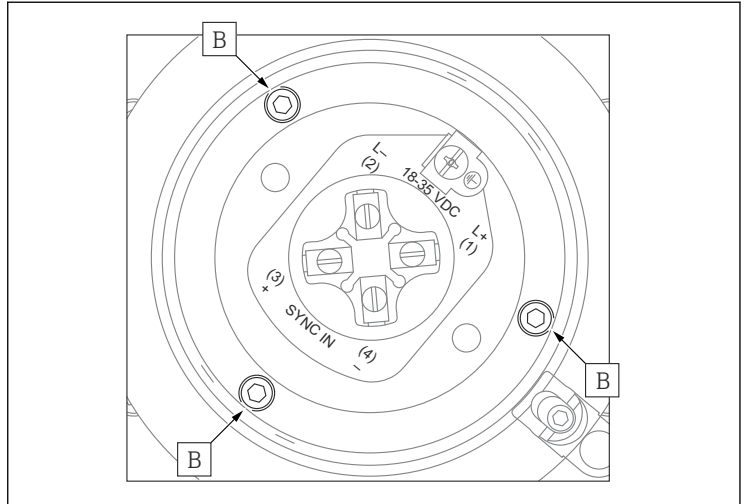
Use a connecting cable for continuous duty temperature $\geq T_a + 20$ K.

Potential equalization

Integrate the device into the local potential equalization.

Explosion protection "Increased safety Ex eb"

Basic specification, Position 1 = 1, G



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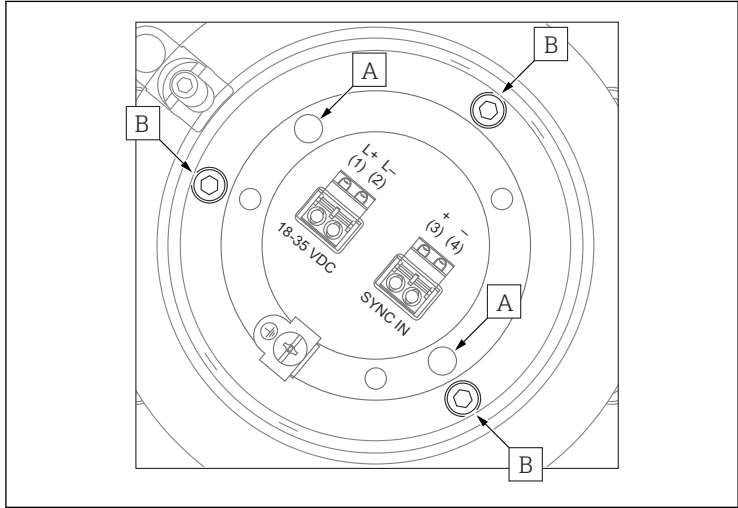
B Screws

- Only use Ex e approved cable glands providing the following minimum specifications:
 - Ingress protection: at least IP65/IP67
 - Temperature range: -40 to +100 °C
 - Type of protection: Ex eb IIC
 - Equipment protection level (EPL): Gb or Ga
- Replace cable glands and sealing plugs only with identical parts.
- Do not open screws [B].

Cross section connecting wire	Tightening torque of terminal screw	Stripped insulation
0.5 to 2.5 mm ²	≤ 0.8 Nm	6 to 8 mm

Explosion protection "Flameproof enclosure Ex db"

Basic specification, Position 1 = 3, H



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A Threaded holes
B Screws

Ex d volume < 1.9 l

- Connect the device:
 - Using suitable cable and wire entries of protection type "Flameproof Enclosure (Ex db)".
 - Using piping systems of protection type "Flameproof Enclosure (Ex db)".
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection. The plastic transport sealing plug does not meet this requirement and must therefore be replaced during installation.
- Only use certified cable entries or sealing plugs. The metal sealing plugs supplied meet this requirement.
- Only use genuine spare parts from Endress+Hauser which are specified for the device.
- Do not close threaded holes [A].
- Do not open screws [B].

Basic specification, Position 4 = C

Flameproof equipment with G threaded entry holes is not intended for new installations but only for replacement of equipment in existing

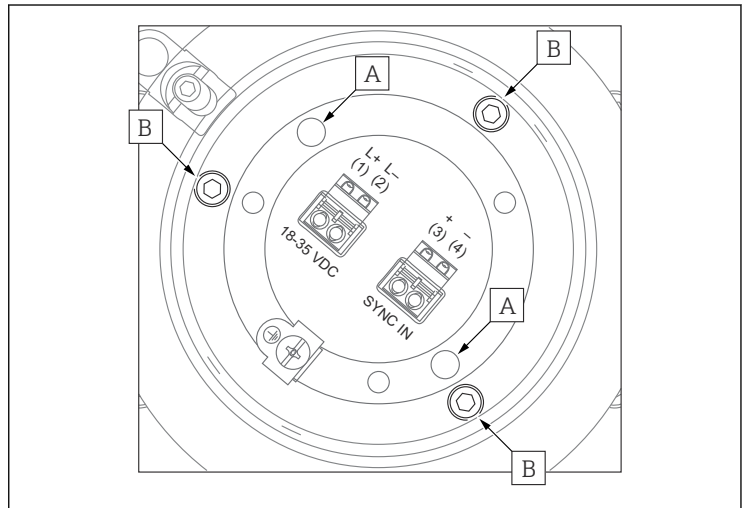
installations. Application of this equipment shall comply with the local installation requirements.

Safety instructions: Ex d joints

- If required or if in doubt: ask manufacturer for specifications.
- Flameproof joints are not intended to be repaired.

Explosion protection "Equipment dust ignition protection by enclosure Ex tb"

Basic specification, Position 1 = 5, 7



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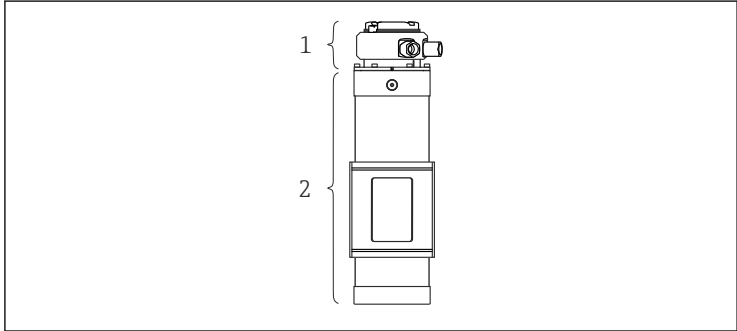
A Threaded holes

B Screws

- Only use Ex approved cable glands providing the following minimum specifications:
 - Ingress protection: at least IP65/IP67
 - Temperature range: -40 to +100 °C
 - Type of protection: Ex tb IIIC or Ex ta IIIC
 - Equipment protection level (EPL): Db or Da
- Do not open in a potentially explosive dust atmosphere.
- Seal unused entry glands with approved sealing plugs that correspond to the type of protection. The plastic transport sealing plug does not meet this requirement and must therefore be replaced during installation.
- Seal the cable entry or piping tight.

- Connect the device using suitable cable and wire entries of protection type "Equipment dust ignition protection by enclosure (Ex t)" (ingress protection of at least IP65). Lay connecting cable and secure.
- Replace cable glands and sealing plugs only with identical parts.
- Do not close threaded holes [A].
- Do not open screws [B].

Temperature tables



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- 1 Terminal head
- 2 Enclosure tube

Basic specification, Position 1 = 1, 3, G, H

Type of protection	
Device	Ex db or Ex db eb
Connection compartment	Ex db or Ex eb

Ambient temperature T_a (ambient)	
Without water cooling or water cooling out of operation.	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
With water cooling in operation.	
At the enclosure tube (within the water cooling):	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
At the terminal head:	$-40\text{ °C} \leq T_a \leq +75\text{ °C}$

Temperature class	
Without water cooling or water cooling out of operation.	T6: $-40\text{ °C} \leq T_a \leq +60\text{ °C}$
With water cooling in operation.	T5: $-40\text{ °C} \leq T_a \leq +75\text{ °C}$ T6: $-40\text{ °C} \leq T_a \leq +70\text{ °C}$

Basic specification, Position 1 = 5, 7

Type of protection	
Device and connection compartment	Ex tb

Ambient temperature T_a (ambient)	
Without water cooling or water cooling out of operation.	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
With water cooling in operation. At the enclosure tube (within the water cooling): At the terminal head:	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$ $-40\text{ °C} \leq T_a \leq +75\text{ °C}$

Maximum surface temperature	
Without water cooling or water cooling out of operation.	$+90\text{ °C}$ at $T_a = +60\text{ °C}$
With water cooling in operation. At the terminal head:	$+105\text{ °C}$ at $T_a = +75\text{ °C}$

Connection data


Power supply	
(1) L+	U = 18 to 35 V _{DC}
(2) L-	P = 3.2 W

Signal circuit SYNC IN (optional)	
(3) +	Only for connection to Synchronizer FHG66
(4) -	

Cable entry parameters**Ex eb IIC, Ex tb IIIC**Cable gland: *Basic specification, Position 4 = A*

Thread	Clamping range	Material	Sealing insert	O-ring
M20x1,5	$\varnothing 8$ to 10.5 mm ¹⁾ ($\varnothing 6.5$ to 13 mm) ²⁾	Ms, nickel-plated	Silicone	EPDM ($\varnothing 17 \times 2$)

- 1) Standard
- 2) Separate clamping inserts available

-  The tightening torque refers to cable glands installed by the manufacturer:
 - Recommended torque to connect the cable gland into the enclosure: 3.75 Nm
 - Recommended torque to tighten the cable into the cable gland: 3.5 Nm
 - Maximum torque to tighten the cable into the cable gland: 10 Nm
 - This value may be different depending on the type of cable. However, the maximum value must not be exceeded.
- Only suitable for fixed installation. The operator must pay attention to a suitable strain relief of the cable.
- To maintain the ingress protection of the enclosure: Install the enclosure cover, cable glands and blind plugs correctly.



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