



# IECEx Certificate of Conformity

## INTERNATIONAL ELECTROTECHNICAL COMMISSION IEC Certification System for Explosive Atmospheres

for rules and details of the IECEx Scheme visit [www.iecex.com](http://www.iecex.com)

Certificate No.: **IECEx DEK 13.0071X**

Page 1 of 4

Certificate history:

Status: **Current**

Issue No: 2

Issue 1 (2017-01-27)

Issue 0 (2014-05-02)

Date of Issue: 2021-04-02

Applicant: **Endress+Hauser SE+Co. KG**  
Hauptstraße 1  
79689 Maulburg  
Germany

Equipment: **Compact Transmitter Gammapiot M, Model FMG60-...**

Optional accessory:

Type of Protection: **Ex db eb ia tb**

Marking: Ex db eb [ia Ga] IIC T6, T5 Gb or Ex db [ia Ga] IIC T6, T5 Gb or  
Ex db eb [ia Ga] IIB T6, T5 Gb or Ex db [ia Ga] IIB T6, T5 Gb  
Ex tb [ia Da] IIIC T80 °C/T85 °C Db

Approved for issue on behalf of the IECEx  
Certification Body:

**R. Schuller**

Position:

**Certification Manager**

Signature:  
(for printed version)

Date:

1. This certificate and schedule may only be reproduced in full.
2. This certificate is not transferable and remains the property of the issuing body.
3. The Status and authenticity of this certificate may be verified by visiting [www.iecex.com](http://www.iecex.com) or use of this QR Code.



Certificate issued by:

**DEKRA Certification B.V.**  
Meander 1051  
6825 MJ Arnhem  
Netherlands





# IECEx Certificate of Conformity

Certificate No.: **IECEx DEK 13.0071X**

Page 2 of 4

Date of issue: 2021-04-02

Issue No: 2

Manufacturer: **Endress+Hauser SE+Co. KG**  
Hauptstraße 1  
79689 Maulburg  
Germany

Additional  
manufacturing  
locations:

This certificate is issued as verification that a sample(s), representative of production, was assessed and tested and found to comply with the IEC Standard list below and that the manufacturer's quality system, relating to the Ex products covered by this certificate, was assessed and found to comply with the IECEx Quality system requirements. This certificate is granted subject to the conditions as set out in IECEx Scheme Rules, IECEx 02 and Operational Documents as amended

## STANDARDS :

The equipment and any acceptable variations to it specified in the schedule of this certificate and the identified documents, was found to comply with the following standards

**IEC 60079-0:2017** Explosive atmospheres - Part 0: Equipment - General requirements  
Edition:7.0

**IEC 60079-1:2014-06** Explosive atmospheres - Part 1: Equipment protection by flameproof enclosures "d"  
Edition:7.0

**IEC 60079-11:2011** Explosive atmospheres - Part 11: Equipment protection by intrinsic safety "i"  
Edition:6.0

**IEC 60079-31:2013** Explosive atmospheres - Part 31: Equipment dust ignition protection by enclosure "t"  
Edition:2

**IEC 60079-7:2017** Explosive atmospheres - Part 7: Equipment protection by increased safety "e"  
Edition:5.1

This Certificate **does not** indicate compliance with safety and performance requirements other than those expressly included in the Standards listed above.

## TEST & ASSESSMENT REPORTS:

A sample(s) of the equipment listed has successfully met the examination and test requirements as recorded in:

Test Report:

[NL/DEK/ExTR13.0073/02](#)

Quality Assessment Report:

[DE/TUN/QAR06.0003/08](#)



# IECEx Certificate of Conformity

Certificate No.: **IECEx DEK 13.0071X**

Page 3 of 4

Date of issue: 2021-04-02

Issue No: 2

## **EQUIPMENT:**

Equipment and systems covered by this Certificate are as follows:

The Compact Transmitter Gammapilot M, Model FMG60-... is used for contactless measurement of level, level limit, density and concentration of liquids or solids. The radiation from an external gamma source, passing through a tank, generates light pulses in the sensor tube (scintillator) that are converted into an electrical signal. This measurement signal is converted into an output signal (4 - 20 mA with HART communication or Profibus PA or Foundation Fieldbus). The Gammapilot series provides types with rigid NaJ or PVT scintillator. Depending on the version, the output is intrinsically safe or not intrinsically safe.

The Compact Transmitter has intrinsically safe inputs and outputs for temperature measurement (Pt100), connection of an external indicator and series connection of several transmitters.

The Compact Transmitter can be provided with an aluminium or stainless steel terminal enclosure. For Transmitters marked with "eb" the terminal compartment for the supply is in type of protection increased safety "eb". For Transmitters marked with only "db" the terminal compartment for the supply is in type of flameproof enclosures "db".

For the type designation, thermal and electrical data see Annex 1 to NL/DEK/ExTR13.0073/02.

## **SPECIFIC CONDITIONS OF USE: YES as shown below:**

To minimize the risk of electrostatic charging of the labels and coating on metallic parts, see manufacturer instructions.

The manufacturer shall be contacted for information of the dimensions of the flameproof joints.



# IECEx Certificate of Conformity

Certificate No.: **IECEx DEK 13.0071X**

Page 4 of 4

Date of issue: 2021-04-02

Issue No: 2

## **DETAILS OF CERTIFICATE CHANGES (for issues 1 and above)**

- Change of manufacturers name
- Assessed per IEC 60079-0, ed. 7
- Assessed per IEC 60079-7, ed. 5.1
- Minor constructional changes

## **Annex:**

[225486500-Annex 1 to ExTR13 0073 02.pdf](#)

## Annex 1 to Report No. NL/DEK/ExTR13.0073/02

Note: in this document [.] is used as decimal separator.

### Type designation

**FMG 60**    -    **1**        **1**        **A**        **1**        **A**        **1**        **A**        **1**  
                  I                II                III                IV                V                VI                VII                VIII                IX

| Designation | Explanation                                                            | Value                                                    | Explanation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------|------------------------------------------------------------------------|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I           | Model                                                                  | FMG 60                                                   | Compact Scintillation Detector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| II          | Approval                                                               | 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>M<br>G<br>H<br>I | ATEX II 2(1) G Ex db eb [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1) G Ex db eb [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1) G Ex db [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1) G Ex db [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1) D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>ATEX II 2(1) G Ex db eb [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1) D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>ATEX II 2(1) G Ex db eb [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1) D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>ATEX II 2(1) G Ex db [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1) D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>ATEX II 2(1) G Ex db [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1) D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>IECEX Ex db eb [ia Ga] IIC T6/T5 Gb<br>IECEX Ex db [ia Ga] IIC T6/T5 Gb<br>IECEX Ex tb [ia Da] IIIC T80 °C/T85 °C Db |
| III         | Power supply                                                           | 1<br>2                                                   | 90 - 253 Vac<br>18 - 35 Vdc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| IV          | Connection power supply; Connection communication <sup>*4</sup> output | A<br>B<br>C<br>D<br>E<br>F<br>G<br>H<br>J<br>K<br>L      | Non Ex; Non Ex<br>Ex eb; Ex ia<br>Ex eb; Ex eb<br>Ex db; Ex db<br>Ex db; Ex ia<br>Ex tb; Ex tb<br>Ex eb, Ex tb; Ex eb, Ex tb<br>Ex db, Ex tb; Ex db, Ex tb<br>Ex eb, Ex tb; Ex ia, Ex tb<br>Ex db, Ex tb; Ex ia, Ex tb<br>Ex tb; Ex ia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| V           | Communication output                                                   | 1<br>2<br>3                                              | 4-20 mA, HART<br>Profibus PA<br>Foundation Fieldbus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

# Annex 1 to Report No. NL/DEK/ExTR13.0073/02

|                                                                                                                                                                                              |                                  |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VI                                                                                                                                                                                           | Scintillator measuring range     | A<br>B<br>C<br>D<br>G<br>H<br>J<br>K<br>L<br>M<br>N<br>P<br>Q<br>R<br>S<br>T | Nal-Crystal 50x50 mm<br>Nal-Crystal 50x50 mm + collimator axial<br>Nal-Crystal 50x50 mm + collimator radial<br>Nal-Crystal 50x50 mm + water cooling<br>PVT 200 mm<br>PVT 200 mm + water cooling<br>PVT 400 mm<br>PVT 400 mm + water cooling<br>PVT 800 mm<br>PVT 800 mm + water cooling<br>PVT 1200 mm<br>PVT 1200 mm + water cooling<br>PVT 1600 mm<br>PVT 1600 mm + water cooling<br>PVT 2000 mm<br>PVT 2000 mm + water cooling |
| VII                                                                                                                                                                                          | Housing; Operation               | 1<br>2<br>3<br>4                                                             | stainless steel, prepared for FHX40 remote display (accessory <sup>*2</sup> )<br>stainless steel; via communication <sup>*3</sup> )<br>aluminum, stainless steel ; prepared for FHX40 remote display (accessory <sup>*2</sup> )<br>aluminum, stainless steel ; via communication <sup>*3</sup> )                                                                                                                                  |
| VIII                                                                                                                                                                                         | Cable entry power supply         | A<br>B<br>C<br>D                                                             | Cable gland M20<br>Thread M20<br>Thread G ½ (only for Ex eb, Ex ia, Ex tb)<br>Thread NPT 1/2                                                                                                                                                                                                                                                                                                                                      |
| IX                                                                                                                                                                                           | Cable entry communication output | 1<br>2<br>3                                                                  | Gland/thread, as for power supply<br>Plug M12 <sup>*1</sup><br>Plug 7/8" <sup>*1</sup>                                                                                                                                                                                                                                                                                                                                            |
| All other options are not relevant for this certificate                                                                                                                                      |                                  |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Notes: <sup>*1</sup> only for intrinsically safe communication output<br><sup>*2</sup> not in scope of this certification<br><sup>*3</sup> via e.g. HART, PROFIBUS PA or FOUNDATION Fieldbus |                                  |                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## Annex 1 to Report No. NL/DEK/ExTR13.0073/02

### Thermal data

The relation between type of protection, ambient temperature, temperature class and maximum surface temperature is shown in the table below.

| Gammapilot with NaJ or PVT scintillator :                                                                 |                    |                     |                                                 |
|-----------------------------------------------------------------------------------------------------------|--------------------|---------------------|-------------------------------------------------|
| Type                                                                                                      | Type of protection | Ambient temperature | Temperature class / maximum surface temperature |
| Types without water cooling or water cooling out of operation                                             | Ex db or Ex db eb  | -40 °C to +60 °C    | T6                                              |
|                                                                                                           | Ex tb              | -40 °C to +60 °C    | T80 °C                                          |
| Types with water cooling in operation provided that the pipe housing is remained within -40 °C to +60 °C. | Ex db or Ex db eb  | -40 °C to +75 °C    | T6                                              |
|                                                                                                           |                    | -40 °C to +80 °C    | T5                                              |
|                                                                                                           | Ex tb              | -40 °C to +75 °C    | T80 °C                                          |
|                                                                                                           |                    | -40 °C to +80 °C    | T85 °C                                          |

The enclosure of the Compact Transmitter provides a degree of protection of at least IP64 in accordance with EN and IEC 60079-0.

### Electrical data

#### Gammapilot M Model FMG60-.1.....

Supply (terminals L1 and N): U = 90 ... 253 Vac, max 8.5 VA  
U<sub>m</sub> = 253 Vac

#### Gammapilot M Model FMG60-.2.....

Supply (terminals L+ and L-): U = 18 ... 35 Vdc, max 3.5 W  
U<sub>m</sub> = 253 Vac

#### Gammapilot M Model FMG60-..B1....., FMG60-..E1....., FMG60-..J1.....,FMG60-..K1....., FMG60-..L1.....

Output circuit (active) (terminals 3 and 4):

in type of protection intrinsic safety Ex ia IIC or Ex ia IIB or Ex ib IIC or Ex ib IIB or Ex ia IIIC, with following maximum values:

U<sub>o</sub> = 21.2 V; I<sub>o</sub> = 92 mA; P<sub>o</sub> = 479 mW;

C<sub>o</sub> and L<sub>o</sub>, depending on level of protection and apparatus group are listed in the following table:

|                          |                                                                                                               |
|--------------------------|---------------------------------------------------------------------------------------------------------------|
| Ex ia IIC                | C <sub>o</sub> = 156 nF and L <sub>o</sub> = 0.15 mH, or<br>C <sub>o</sub> = 116 nF and L <sub>o</sub> = 1 mH |
| Ex ia IIB,<br>Ex ia IIIC | C <sub>o</sub> = 886 nF and L <sub>o</sub> = 0.15 mH, or<br>C <sub>o</sub> = 686 nF and L <sub>o</sub> = 1 mH |
| Ex ib IIC                | C <sub>o</sub> = 169 nF and L <sub>o</sub> = 4 mH                                                             |
| Ex ib IIB                | C <sub>o</sub> = 1200 nF and L <sub>o</sub> = 15 mH                                                           |

When connected to an external intrinsically safe circuit, the following maximum values apply:

U<sub>i</sub> = 30 V; I<sub>i</sub> = 13 mA; P<sub>i</sub> = 390 mW; C<sub>i</sub> = 13.4 nF; L<sub>i</sub> = 0 mH.

If the active current output is connected via a passive dc single return barrier, as specified in drawing 960008339 - -, the maximum value I<sub>i</sub> = 500 mA applies.

## Annex 1 to Report No. NL/DEK/ExTR13.0073/02

Gammapilot M Model FMG60-..B2....., FMG60-..B3....., FMG60-..E2....., FMG60-..E3....., FMG60-..J2....., FMG60-..J3....., FMG60-..K2....., FMG60-..K3....., FMG60-..L2....., FMG60-..L3.....

Output circuit Profibus PA or Foundation Fieldbus (terminals 3 and 4 or external socket):  
in type of protection intrinsic safety Ex ia IIC, for connection to a certified intrinsically safe fieldbus according to FISCO, with following maximum values:

$U_i = 17.5 \text{ V}$ ;  $I_i = 500 \text{ mA}$ ;  $P_i = 5.5 \text{ W}$ ;  $C_i = 5 \text{ nF}$ ;  $L_i = 10 \text{ }\mu\text{H}$ ;

or in type of protection intrinsic safety Ex ia IIC, for connection to a certified intrinsically safe circuit, with following maximum values:

$U_i = 24 \text{ V}$ ;  $I_i = 250 \text{ mA}$ ;  $P_i = 1.2 \text{ W}$ ;  $C_i = 5 \text{ nF}$ ;  $L_i = 10 \text{ }\mu\text{H}$ .

Gammapilot M Model FMG60-.....

Sensor circuit (Pt100) (terminals 9, 10, 11 and 12; for all models):

in type of protection intrinsic safety Ex ia IIC or Ex ia IIB or Ex ib IIC or Ex ib IIB or Ex ia IIIC, with following maximum values:

$U_o = 8.4 \text{ V}$ ;  $I_o = 8.3 \text{ mA}$ ;  $P_o = 17.5 \text{ mW}$ ;

$C_o$  and  $L_o$ , depending on level of protection and apparatus group are listed in the following table:

|                          |                                                                                                                              |
|--------------------------|------------------------------------------------------------------------------------------------------------------------------|
| Ex ia IIC                | $C_o = 1.8 \text{ }\mu\text{F}$ and $L_o = 0.15 \text{ mH}$ , or<br>$C_o = 1.2 \text{ }\mu\text{F}$ and $L_o = 1 \text{ mH}$ |
| Ex ia IIB,<br>Ex ia IIIC | $C_o = 5.2 \text{ }\mu\text{F}$ and $L_o = 2 \text{ mH}$ , or<br>$C_o = 6 \text{ }\mu\text{F}$ and $L_o = 1 \text{ mH}$      |
| Ex ib IIC                | $C_o = 5.2 \text{ }\mu\text{F}$ and $L_o = 400 \text{ mH}$                                                                   |
| Ex ib IIB                | $C_o = 43 \text{ }\mu\text{F}$ and $L_o = 400 \text{ mH}$                                                                    |

Cascade output (terminals 7 and 8, for all models):

in type of protection intrinsic safety Ex ia IIC or Ex ia IIB or Ex ib IIC or Ex ib IIB or Ex ia IIIC, with following maximum values:

$U_o = 8.4 \text{ V}$ ;  $I_o = 19.2 \text{ mA}$ ;  $P_o = 40.3 \text{ mW}$ ;

$C_o$  and  $L_o$ , depending on level of protection and apparatus group are listed in the following table:

|                                        |                                                         |
|----------------------------------------|---------------------------------------------------------|
| Ex ia IIC,<br>Ex ib IIC                | $C_o = 5.1 \text{ }\mu\text{F}$ , $L_o = 69 \text{ mH}$ |
| Ex ia IIB,<br>Ex ib IIB,<br>Ex ia IIIC | $C_o = 42 \text{ }\mu\text{F}$ , $L_o = 199 \text{ mH}$ |

Cascade input (terminals 5 and 6, for all models):

in type of protection intrinsic safety Ex ia IIC, only for connection to the intrinsically safe cascade output circuit of a Compact Transmitter Gammapilot FMG 60, with following maximum values:

$U_i = 8.4 \text{ V}$ ;  $I_i = 19.2 \text{ mA}$ ;  $P_i = 40.3 \text{ mW}$ ;  $C_i = 0 \text{ nF}$ ;  $L_i = 67 \text{ }\mu\text{H}$ .

Display output circuit (connector):

in type of protection intrinsic safety Ex ia IIC or Ex ia IIIC, for connection of a certified external display, e.g. Type FXH40 with associated cable or Service Interface Commubox Type FXH193 with associated ToF cable, with following maximum values:

$U_o = 4.7 \text{ V}$ ;  $I_o = 37.7 \text{ mA}$ ;  $P_o = 44.3 \text{ mW}$ ;  $C_o = 150 \text{ }\mu\text{F}$ ;  $L_o = 25 \text{ mH}$ .

Gammapilot M Model FMG60-..C1....., FMG60-..D1....., FMG60-..F1....., FMG60-..G1....., FMG60-..H1.....

Signal output (terminals 3 and 4):    4 ... 20 mA (active)  
                                                       $U_m = 253 \text{ Vac}$



## Annex 1 to Report No. NL/DEK/ExTR13.0073/02

Gammapilot M Model FMG60-..C2....., FMG60-..D2....., FMG60-..F2....., FMG60-..G2....., FMG60-..H2....., FMG60-..C3....., FMG60-..D3....., FMG60-..F3....., FMG60-..G3....., FMG 60-..H3.....

Fieldbus connection (terminals 1 and 2):  $U \leq 32 \text{ V}$   
 $U_m = 253 \text{ Vac}$

### Instruction for safe use

The intrinsically safe circuits are infallibly galvanically isolated from the non-intrinsically safe circuits up to a peak value of the voltage of 375 V.

The intrinsically safe cascade input circuit and the intrinsically safe fieldbus circuit are infallibly galvanically isolated from each other and from the other intrinsically safe circuits up to a peak value of the voltage of 60 V.

The intrinsically safe sensor circuit (Pt100) of the Compact Transmitter may also extend in explosive atmospheres where the use of apparatus of equipment EPL Ga and /or EPL Da is required (category 1 G and/or 1 D for ATEX).

The intrinsically safe Fieldbus circuit is infallibly galvanically isolated from the other intrinsically safe circuits and from the non-intrinsically safe circuits up to a peak value of the voltage of 375 V.  
Intrinsically safe circuits in type of protection Ex ia IIC may also be connected to intrinsically safe circuits in type of protection Ex ia IIC or Ex ia IIB.

The non-intrinsically safe supply circuit and if applicable, the non-intrinsically safe output circuit of the Compact Transmitter shall be connected using suitable certified cable entry devices, in compliance with the type of protection of the terminal compartment.

Unused openings shall be closed with suitable certified blanking elements, in compliance with the type of protection of the terminal compartment.

When the Transmitter is installed in explosive atmospheres caused by dust/air mixtures, the cable entry devices and blanking elements shall additionally ensure a degree of protection of at least IP65. In this case, this requirement also applies to the cable entry devices of the terminal compartment of the intrinsically safe circuits.

Heat resistant cables and cable entry devices, suitable for a temperature of at least 20 K above the maximum ambient temperature shall be used for the supply connection and, if applicable, for the non-intrinsically safe signal connection respectively for the non-intrinsically safe fieldbus connection.

## Annex 1 to Report No. NL/DEK/ExTR13.0073/02

### Übersetzung, Originalsprache: Englisch

Hinweis: in diesem Dokument wird [.] als Dezimaltrennzeichen verwendet.

### Typ Identifikation

**FMG 60**    -    **1**        **1**        **A**        **1**        **A**        **1**        **A**        **1**  
                  I                II            III           IV           V           VI           VII           VIII          IX

| Bezeichnung | Erläuterung                                                              | Wert                                                     | Erläuterung                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-------------|--------------------------------------------------------------------------|----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| I           | Modell                                                                   | FMG 60                                                   | Compact Scintillation Detector                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| II          | Genehmigung                                                              | 1<br>2<br>3<br>4<br>5<br>6<br>7<br>8<br>M<br>G<br>H<br>I | ATEX II 2(1)G Ex db eb [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1)G Ex db eb [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1)G Ex db [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1)G Ex db [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1)D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>ATEX II 2(1)G Ex db eb [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1)D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>ATEX II 2(1)G Ex db eb [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1)D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>ATEX II 2(1)G Ex db [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1)D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>ATEX II 2(1)G Ex db [ia Ga] IIC T6/T5 Gb<br>ATEX II 2(1)D Ex tb [ia Da] IIIC T80 °C/T85 °C Db<br>IECEX Ex db eb [ia Ga] IIC T6/T5 Gb<br>IECEX Ex db [ia Ga] IIC T6/T5 Gb<br>IECEX Ex tb [ia Da] IIIC T80 °C/T85 °C Db |
| III         | Stromversorgung                                                          | 1<br>2                                                   | 90 - 253 Vac<br>18 - 35 Vdc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| IV          | Anschluss<br>Stromversorgung;<br>Anschluss<br>Kommunikations-<br>ausgang | A<br>B<br>C<br>D<br>E<br>F<br>G<br>H<br>J<br>K<br>L      | Non Ex; Non Ex<br>Ex eb; Ex ia<br>Ex eb; Ex eb<br>Ex db; Ex db<br>Ex db; Ex ia<br>Ex tb; Ex tb<br>Ex eb, Ex tb; Ex eb, Ex tb<br>Ex db, Ex tb; Ex db, Ex tb<br>Ex eb, Ex tb; Ex ia, Ex tb<br>Ex db, Ex tb; Ex ia, Ex tb<br>Ex tb; Ex ia                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| V           | Kommunikations-<br>ausgang                                               | 1<br>2<br>3                                              | 4-20 mA, HART<br>Profibus PA<br>Foundation Fieldbus                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

# Annex 1 to Report No. NL/DEK/ExTR13.0073/02

|                                                                  |                                       |   |                                                                      |
|------------------------------------------------------------------|---------------------------------------|---|----------------------------------------------------------------------|
| VI                                                               | Szintillator-Messbereich              | A | Nal-Crystal 50x50mm                                                  |
|                                                                  |                                       | B | Nal-Crystal 50x50mm + Kollimator axial                               |
|                                                                  |                                       | C | Nal-Crystal 50x50mm + Kollimator radial                              |
|                                                                  |                                       | D | Nal-Crystal 50x50mm + Wasserkühlung                                  |
|                                                                  |                                       | G | PVT 200mm                                                            |
|                                                                  |                                       | H | PVT 200mm + Wasserkühlung                                            |
|                                                                  |                                       | J | PVT 400mm                                                            |
|                                                                  |                                       | K | PVT 400mm + Wasserkühlung                                            |
|                                                                  |                                       | L | PVT 800mm                                                            |
|                                                                  |                                       | M | PVT 800mm + Wasserkühlung                                            |
|                                                                  |                                       | N | PVT 1200mm                                                           |
|                                                                  |                                       | P | PVT 1200mm + Wasserkühlung                                           |
|                                                                  |                                       | Q | PVT 1600mm                                                           |
|                                                                  |                                       | R | PVT 1600mm + Wasserkühlung                                           |
|                                                                  |                                       | S | PVT 2000mm                                                           |
|                                                                  |                                       | T | PVT 2000mm + Wasserkühlung                                           |
| VII                                                              | Gehäuse; Betrieb                      | 1 | Edelstahl, vorbereitet für FHX40 Fernanzeige (Zubehör *2)            |
|                                                                  |                                       | 2 | Edelstahl; via Kommunikation *3)                                     |
|                                                                  |                                       | 3 | Aluminium, Edelstahl; vorbereitet für FHX40 Fernanzeige (Zubehör *2) |
|                                                                  |                                       | 4 | Aluminium, Edelstahl; via Kommunikation *3)                          |
| VIII                                                             | Kabeleinführung Stromversorgung       | A | Kabelverschraubung M20                                               |
|                                                                  |                                       | B | Gewinde M20                                                          |
|                                                                  |                                       | C | Gewinde G ½ (Nur für Ex eb, Ex ia, Ex tb)                            |
|                                                                  |                                       | D | Gewinde NPT 1/2                                                      |
| IX                                                               | Kabeleinführung Kommunikationsausgang | 1 | Verschraubung/Gewinde, wie für Stromversorgung                       |
|                                                                  |                                       | 2 | Stecker M12 *1                                                       |
|                                                                  |                                       | 3 | Stecker 7/8" *1                                                      |
| Alle anderen Optionen sind für dieses Zertifikat nicht relevant  |                                       |   |                                                                      |
| Hinweise:      *1 nur für die eigensichere Kommunikationsausgang |                                       |   |                                                                      |
| *2 nicht im Bereich dieser Zertifizierung                        |                                       |   |                                                                      |
| *3 bspw. via HART, PROFIBUS PA oder FOUNDATION Fieldbus          |                                       |   |                                                                      |

## Annex 1 to Report No. NL/DEK/ExTR13.0073/02

### Thermische Daten

Die Beziehungen zwischen Schutzart, Umgebungstemperatur, Temperaturklasse und maximaler Oberflächentemperatur werden in der folgenden Tabelle dargestellt.

| Gammapilot mit NaJ oder PVT Szintillator :                                                                     |                      |                     |                                                          |
|----------------------------------------------------------------------------------------------------------------|----------------------|---------------------|----------------------------------------------------------|
| Typ                                                                                                            | Zündschutzart        | Umgebungstemperatur | Temperaturklasse/<br>maximale Ober-<br>flächentemperatur |
| Typen ohne Wasserkühlung<br>oder Wasserkühlung außer<br>Betrieb                                                | Ex db or<br>Ex db eb | -40 °C to +60 °C    | T6                                                       |
|                                                                                                                | Ex tb                | -40 °C to +60 °C    | T80 °C                                                   |
| Typen mit Wasserkühlung in<br>Betrieb, vorausgesetzt, das<br>Rohrgehäuse bleibt<br>zwischen -40 °C und +60 °C. | Ex db or<br>Ex db eb | -40 °C to +75 °C    | T6                                                       |
|                                                                                                                |                      | -40 °C to +80 °C    | T5                                                       |
|                                                                                                                | Ex tb                | -40 °C to +75 °C    | T80 °C                                                   |
|                                                                                                                |                      | -40 °C to +80 °C    | T85 °C                                                   |

Das Gehäuse des Kompakttransmitters gewährleistet einen Schutzgrad von mindestens IP64 in Übereinstimmung mit EN und IEC 60079-0.

### Elektrische Daten

#### Gammapilot M Typ FMG60-.1.....

Versorgung (Klemmen L1 und N): U = 90 ... 253 Vac, max 8.5 VA  
U<sub>m</sub> = 253 Vac

#### Gammapilot M Typ FMG60-.2.....

Versorgung (Klemmen L+ und L-): U = 18 ... 35 Vdc, max 3.5 W  
U<sub>m</sub> = 253 Vac

#### Gammapilot M Type FMG60-..B1....., FMG60-..E1....., FMG60-..J1.....,FMG60-..K1....., FMG60-..L1.....

Ausgangsstromkreis (aktiv) (Klemmen 3 und 4):

in Zündschutzart Eigensicherheit Ex ia IIC oder Ex ia IIB oder Ex ib IIC oder Ex ib IIB oder Ex ia IIIC, mit folgenden Höchstwerten

U<sub>o</sub> = 21.2 V; I<sub>o</sub> = 92 mA; P<sub>o</sub> = 479 mW;

C<sub>o</sub> und L<sub>o</sub>, entsprechend des Schutzniveaus und der Gerätegruppe sind folgender Tabelle zu entnehmen:

|                          |                                                                                                                 |
|--------------------------|-----------------------------------------------------------------------------------------------------------------|
| Ex ia IIC                | C <sub>o</sub> = 156 nF und L <sub>o</sub> = 0.15 mH, oder<br>C <sub>o</sub> = 116 nF und L <sub>o</sub> = 1 mH |
| Ex ia IIB,<br>Ex ia IIIC | C <sub>o</sub> = 886 nF und L <sub>o</sub> = 0.15 mH, oder<br>C <sub>o</sub> = 686 nF und L <sub>o</sub> = 1 mH |
| Ex ib IIC                | C <sub>o</sub> = 169 nF und L <sub>o</sub> = 4 mH                                                               |
| Ex ib IIB                | C <sub>o</sub> = 1200 nF und L <sub>o</sub> = 15 mH                                                             |

Bei Anschluss an einen externen eigensicheren Stromkreis gelten folgende Höchstwerte:

U<sub>i</sub> = 30 V; I<sub>i</sub> = 13 mA; P<sub>i</sub> = 390 mW; C<sub>i</sub> = 13.4 nF; L<sub>i</sub> = 0 mH.

Wenn die aktive Stromausgabe über eine einzelne passive Gleichstrom-Single Return Barrier, wie in Zeichnung 960008339 - - angegeben, angeschlossen ist, gilt der Höchstwert I<sub>i</sub> = 500 mA.

## Annex 1 to Report No. NL/DEK/ExTR13.0073/02

Gammapilot M Type FMG60-..B2....., FMG60-..B3....., FMG60-..E2....., FMG60-..E3....., FMG60-..J2....., FMG60-..J3....., FMG60-..K2....., FMG60-..K3....., FMG60-..L2....., FMG60-..L3.....

Ausgabekreis Profibus PA oder Foundation Fieldbus (Klemmen 3 und 4 oder externe Buchse):  
in Zündschutzart Eigensicherheit Ex ia IIC, für den Anschluss an einen zertifizierten eigensicheren Feldbus gemäß FISCO, mit folgenden Höchstwerten:

$U_i = 17.5 \text{ V}$ ;  $I_i = 500 \text{ mA}$ ;  $P_i = 5.5 \text{ W}$ ;  $C_i = 5 \text{ nF}$ ;  $L_i = 10 \text{ }\mu\text{H}$ ;

in Zündschutzart Eigensicherheit Ex ia IIC, für den Anschluss an einen zertifizierten eigensicheren Stromkreis, mit folgenden Höchstwerten:

$U_i = 24 \text{ V}$ ;  $I_i = 250 \text{ mA}$ ;  $P_i = 1.2 \text{ W}$ ;  $C_i = 5 \text{ nF}$ ;  $L_i = 10 \text{ }\mu\text{H}$ .

Gammapilot M Typ FMG60-.....

Sensorstromkreis (Pt100) (Klemmen 9, 10, 11 und 12; Für alle Typen):

in Zündschutzart Eigensicherheit Ex ia IIC oder Ex ia IIB oder Ex ib IIC oder Ex ib IIB oder Ex ia IIIC, mit folgenden Höchstwerten:

$U_o = 8.4 \text{ V}$ ;  $I_o = 8.3 \text{ mA}$ ;  $P_o = 17.5 \text{ mW}$ ;

$C_o$  und  $L_o$ , entsprechend des Schutzniveaus und der Gerätegruppe sind folgender Tabelle zu entnehmen

|                          |                                                                                                                                |
|--------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Ex ia IIC                | $C_o = 1.8 \text{ }\mu\text{F}$ and $L_o = 0.15 \text{ mH}$ , oder<br>$C_o = 1.2 \text{ }\mu\text{F}$ and $L_o = 1 \text{ mH}$ |
| Ex ia IIB,<br>Ex ia IIIC | $C_o = 5.2 \text{ }\mu\text{F}$ and $L_o = 2 \text{ mH}$ , oder<br>$C_o = 6 \text{ }\mu\text{F}$ and $L_o = 1 \text{ mH}$      |
| Ex ib IIC                | $C_o = 5.2 \text{ }\mu\text{F}$ and $L_o = 400 \text{ mH}$                                                                     |
| Ex ib IIB                | $C_o = 43 \text{ }\mu\text{F}$ and $L_o = 400 \text{ mH}$                                                                      |

Kaskadeausgang (Klemmen 7 und 8, Für alle Typen):

in Zündschutzart Eigensicherheit Ex ia IIC oder Ex ia IIB oder Ex ib IIC oder Ex ib IIB oder Ex ia IIIC, mit folgenden Höchstwerten:

$U_o = 8.4 \text{ V}$ ;  $I_o = 19.2 \text{ mA}$ ;  $P_o = 40.3 \text{ mW}$ ;

$C_o$  und  $L_o$ , entsprechend des Schutzniveaus und der Gerätegruppe sind folgender Tabelle zu entnehmen:

|                                       |                                                         |
|---------------------------------------|---------------------------------------------------------|
| Ex ia IIC,<br>Ex ib IIC               | $C_o = 5.1 \text{ }\mu\text{F}$ , $L_o = 69 \text{ mH}$ |
| Ex ia IIB,<br>Ex ib IIB<br>Ex ia IIIC | $C_o = 42 \text{ }\mu\text{F}$ , $L_o = 199 \text{ mH}$ |

Kaskadeeingang (Klemmen 5 und 6, Für alle Typen):

in Zündschutzart Eigensicherheit Ex ia IIC, nur zum Anschluss an den eigensicheren Kaskadeausgangstromkreis eines Kompakttransmitters Gammapilot FMG 60, mit folgenden Höchstwerten:

$U_i = 8.4 \text{ V}$ ;  $I_i = 19.2 \text{ mA}$ ;  $P_i = 40.3 \text{ mW}$ ;  $C_i = 0 \text{ nF}$ ;  $L_i = 67 \text{ }\mu\text{H}$ .

Anzeige Ausgangstromkreis (Steckverbinder):

in Zündschutzart Eigensicherheit Ex ia IIC oder Ex ia IIIC, zum Anschluss an ein bescheinigtes externes Anzeigegerät, z.B. Typ FHX 40 mit zugehörigen Kabel oder Serviceschnittstellen-Commubox Typ FXH193 mit folgenden Höchstwerten:

$U_o = 4.7 \text{ V}$ ;  $I_o = 37.7 \text{ mA}$ ;  $P_o = 44.3 \text{ mW}$ ;  $C_o = 150 \text{ }\mu\text{F}$ ;  $L_o = 25 \text{ mH}$ .

## Annex 1 to Report No. NL/DEK/ExTR13.0073/02

Gammapilot M Type FMG60-..C1....., FMG60-..D1....., FMG60-..F1....., FMG60-..G1....., FMG60-..H1.....

Ausgangsstromkreis (Klemmen 3 und 4): 4 ... 20 mA (activ)  
 $U_m = 253 \text{ Vac}$

Gammapilot M Type FMG60-..C2....., FMG60-..D2....., FMG60-..F2....., FMG60-..G2....., FMG60-..H2.....,  
FMG60-..C3....., FMG60-..D3....., FMG60-..F3....., FMG60-..G3....., FMG 60-..H3.....

Feldbus-Anschluss (Klemmen 1 und 2):  $U \leq 32 \text{ V}$   
 $U_m = 253 \text{ Vac}$

### Anweisungen zur sicheren Verwendung

Die eigensicheren Stromkreise sind vom Versorgungsstromkreis bis zu einem Scheitelwert der Spannung von 375 V sicher galvanisch getrennt.

Der eigensichere Kaskade-Eingangsstromkreis und der eigensichere Feldbus-Stromkreis sind von einander und von den anderen eigensicheren Stromkreisen bis zu einem Spannungsspitzenwert von 60 V ausfallsicher galvanisch isoliert.

Der eigensichere Sensorstromkreis (Pt100) des Kompakttransmitters darf auch auf explosive Umgebungen ausgedehnt werden, in denen die Verwendung von Geräten mit dem Geräteschutzniveau EPL Ga und/oder EPL Da erforderlich ist (Kategorie 1 G und/oder 1 D für ATEX).

Der eigensichere Feldbus-Stromkreis ist von den anderen eigensicheren Stromkreisen und den nicht eigensicheren Stromkreisen bis zu einem Spannungsspitzenwert von 375 V ausfallsicher galvanisch isoliert.

Eigensichere Stromkreise der Schutzart Ex ia IIC dürfen auch an eigensichere Stromkreise der Schutzart Ex ia IIC oder Ex ia IIB angeschlossen werden.

Der nicht eigensichere Versorgungsstromkreis und, falls zutreffend, der nicht eigensichere Ausgangsstromkreis des Kompakttransmitters müssen über geeignete zertifizierte Kabeleinführungseinrichtung unter Berücksichtigung der Schutzart des Anschlussraums angeschlossen werden.

Nicht verwendete Öffnungen sind mit geeigneten bescheinigten Verschlussstopfen in Übereinstimmung mit der Zündschutzart des Anschlussraums zu schließen.

Bei Errichtung des Detektors in durch Staub/Luft Gemische explosionsgefährdeten Bereichen ist durch die Kabel- und Leitungseinführungen sowie durch die Verschlussstopfen zusätzlich einen Schutz von mindestens IP 65 zu gewährleisten. Diese Anforderung gilt in diesem Fall auch für die Kabel- und Leitungseinführungen des Anschlussraums der eigensicheren Stromkreise.

Hitzebeständige Kabel und Kabeleinführungen, geeignet für eine Temperatur von mindestens 20 K über der maximalen Umgebungstemperatur müssen für den Versorgungsanschluss verwendet werden und, falls zutreffend, für die nicht eigensichere Signalverbindung bzw. für die nicht eigensichere Feldbus-Verbindung.