

**UK Type Examination Certificate CML 23UKEX2145X Issue 0****United Kingdom Conformity Assessment**

1 Product or Protective System Intended for use in Potentially Explosive Atmospheres UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

2 Equipment **Fieldbus Barrier type R4D0-FB-IA\***

3 Manufacturer **Pepperl+Fuchs SE**

4 Address **Lilienthalstrasse 200  
68307 Mannheim  
Germany**

5 The equipment is specified in the description of this certificate and the documents to which it refers.

6 Eurofins E&E CML Limited, Newport Business Park, New Port Road, Ellesmere Port, CH65 4LZ, United Kingdom, Approved Body Number 2503, in accordance with Regulation 43 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), certifies that this equipment has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment intended for use in potentially explosive atmospheres given in Schedule 1 of the Regulations.

The examination and test results are recorded in the confidential reports listed in Section 12.


7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to specific conditions of use (affecting correct installation or safe use). These are specified in Section 14.

8 This UK Type Examination certificate relates only to the design and construction of the specified equipment. Further requirements of the Regulations apply to the manufacturing process and supply of the product. These are not covered by this certificate.


9 Compliance with the Essential Health and Safety Requirements, with the exception of those listed in the confidential report, has been demonstrated through compliance with the following documents:

EN IEC 60079-0:2018      EN 60079-7:2015/A11:2018      EN 60079-11:2012  
EN 60079-18:2015+A1:2018


10 The equipment shall be marked with the following:

 II 2 (1) G

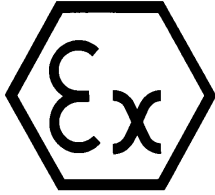
Ex eb ib mb [ia Ga] IIC T4 Gb

 II (1) D

[Ex ia Da] IIIC

 II (M1)

[Ex ia Ma] I



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## 11 Description

The Fieldbus Barrier is available in the following variants:

R4D0-FB-IA8 8-channel

R4D0-FB-IA10 10-channel

R4D0-FB-IA12 12-channel

Behind the number of channels, optionally further numbers or letters may be included in the type denomination to indicate different variations without influence on explosion protection

The 8-channel (R4D0-FB-IA8), 10-channel (R4D0-FB-IA10) and 12-channel (R4D0-FB-IA12) Fieldbus Barriers are galvanically isolated fieldbus couplers for the supply of intrinsically safe field devices and the bidirectional transmission of the fieldbus signals.

The up to 12 outputs are intrinsically safe, with level of protection, "Ex ia I", "Ex ia IIC" resp. "Ex ia IIIC", and can be led in areas requiring category M1, 1G resp. 1D. The intrinsically safe outputs are designed to be used in accordance with the Entity- and FISCO-concept.

On the trunk side the Fieldbus Barrier is supplied by a non-intrinsically safe circuit. The trunk connection for the supply is doubled to be able to loop through the supply voltage to the next unit. Maximum 3 Fieldbus Barriers may be connected to the trunk.

The non-intrinsically safe circuits are protected by type of protection increased safety "Ex eb" and encapsulation "Ex mb" and fulfil the requirements of category 2G.

The Fieldbus Barrier is intended to be mounted into an enclosure type of protection increased safety resp. into a suitable, separately certified enclosure.

1. Supply (terminals +,-) in type of protection increased safety Ex eb

- Nominal voltage DC 16...32 V
- Maximum safety voltage  $U_m$  AC 253 V
- Terminal S is intended for the connection of the cable shield.

The supply terminals are provided in a redundant way to loop through the supply voltage to another Fieldbus Barrier type R4D0-FB-IA\*. Maximum 3 Fieldbus Barriers type R4D0-FB-IA \* may be connected to the trunk.

2. Terminals 1T, 2T for the insertion of a terminal bridge.

With the terminal bridge 1T-2T an internal trunk terminator is switched on.

3. Terminals 1B, 2B for the insertion of a terminal bridge

Terminal 1B is connected to the PA-terminal.

Terminal 2B is connected to the shield connector (terminal S).

With the terminal bridge 1B-2B the shield connection is directly connected to the PA-terminal.

Without the terminal bridge the shield connection is connected to the PA-terminal via a capacitance of  $\leq 5.7$  nF.

4. PA-terminal

For the connection to the equalization bonding conductor.

5. Output circuits in type of protection Ex ia

Terminals 1(+,-) ... 12(+,-)

For each circuit:

|                                |       |                |
|--------------------------------|-------|----------------|
| Maximum output voltage         | $U_o$ | DC 17.10 V     |
| Maximum output current         | $I_o$ | 248.55 mA      |
| Maximum output power           | $P_o$ | 1063 mW        |
| Minimum internal resistance    | $R_i$ | 68.80 $\Omega$ |
| Effective internal capacitance | $C_i$ | negligible     |
| Effective internal inductance  | $L_i$ | negligible     |



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Linear output characteristics:

The intrinsically safe output circuits are safely galvanically isolated from the non-intrinsically safe circuits up to a voltage of 375 V. The intrinsically safe circuits are not galvanically isolate from each other.

Permissible external reactances :

For Group IIC:

|                              |    |      |    |
|------------------------------|----|------|----|
| Maximum external capacitance | Co | 367  | nF |
| Maximum external inductance  | Lo | 0.47 | mH |

For Group IIB resp. Group III:

|                              |    |      |    |
|------------------------------|----|------|----|
| Maximum external capacitance | Co | 2150 | nF |
| Maximum external inductance  | Lo | 2.0  | mH |

For Group I resp. Group IIA:

|                              |    |      |    |
|------------------------------|----|------|----|
| Maximum external capacitance | Co | 8800 | nF |
| Maximum external inductance  | Lo | 4.0  | nF |

These values are only applicable if the internal inductance  $L_i$  or the internal capacitance  $C_i$  of the connected equipment is  $\leq 1\%$  of the above specified values.

If  $L_i$  as well as  $C_i$  of the connected equipment are  $> 1\%$  of the specified values, the specified values of  $L_o$  and  $C_o$  shall be reduced to 50 %.

The reduced capacitance of the external circuit (capacitance of the cable + internal capacitance of the connected equipment) shall not exceed 1  $\mu$ F for Groups I, IIA, IIB and IIC and 600 nF for Group IIC.

For use of the Fieldbus Barrier in a fieldbus-svstem...

...in accordance with the FISCO-concept of IEC 60079-25:

Up to 32 F/SCO field devices can be connected to each output. All field devices shall be passive (non-supplying).

For each field device:

|                              |       |    |         |
|------------------------------|-------|----|---------|
| Maximum internal capacitance | $C_i$ | 5  | nF      |
| Maximum internal inductance  | $L_i$ | 10 | $\mu$ H |

The used fieldbus cable needs to be in the following range:

|                 |       |          |              |
|-----------------|-------|----------|--------------|
| Loop resistance | $R_c$ | 15...150 | $\Omega$ /km |
| Loop inductance | $L_c$ | 0.4...1  | mH/km        |
| Capacitance     | $C_c$ | 45.200   | nF/km        |

On each output circuit a maximum cable length of 1 km for Group IIC and 5 km for Groups I, IIA, IIB and IIC may be connected. If more than one device is connected, the spur cable to each device must be shorter than 60 m. The maximum cable length must include all spur cables.

...in accordance with the Entitv-concept of Foundation Fieldbus FF-816:

Up to 6 field devices of type 111, 112, 511 or 512 may be connected to each output. All field devices shall be passive (non-supplying).

For each field device:

|                              |       |    |         |
|------------------------------|-------|----|---------|
| Maximum internal capacitance | $C_i$ | 5  | nF      |
| Maximum internal inductance  | $L_i$ | 20 | $\mu$ H |

The used fieldbus cable needs to be in the following range:

|                 |       |          |              |
|-----------------|-------|----------|--------------|
| Loop resistance | $R_c$ | 15...150 | $\Omega$ /km |
| Loop inductance | $L_c$ | 0.4...1  | mH/km        |
| Capacitance     | $C_c$ | 45.200   | nF/km        |



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On each output circuit a maximum cable length of 1 km for Group IIC and 1.9 km for Groups I, IIA, IIB and IIIC may be connected. If more than one device is connected, the spur cable to each device must be shorter than 60 m. The maximum cable length must include all spur cables.

The terminals 1S...12S

are intended for connection of the cable shields. They are connected to the PA-terminal through a capacitance of < 4.4 nF for each terminal.

6. Ambient temperature range Ts: -40°C...+70°C

## 12 Certificate history and evaluation reports

| Issue | Date        | Associated report | Notes                     |
|-------|-------------|-------------------|---------------------------|
| 0     | 22 Mar 2023 | R14112DE/00       | Prime Certificate issued. |

Note: Drawings that describe the equipment are listed or referred to in the Annex.

## 13 Conditions of Manufacture

1. The manufacturer shall carry out the routine verifications and tests by EN IEC 60079-0:2018 necessary to ensure that the subject produced complies with the specification submitted to the testing station together with the prototype or sample. He shall also make any routine verifications and tests required by the respective European Standards.
2. These routine verifications and tests do not substitute for the procedure defined in annexes IV to VII inclusive of Directive 2014/34/EU as required, in addition to the module EU-Type Examination, for the conformity assessment procedure (article 13 of Directive 2014/34/EU).

## 14 Specific Conditions of Use

1. The Fieldbus Barrier has to be mounted into a suitable, separately certified enclosure. The temperature inside the enclosure shall not exceed the permissible ambient temperature of the Fieldbus Barrier.  
The external enclosure has to carry the warning "WARNING -- NON-INTRINSICALLY SAFE CIRCUITS PROTECTED BY INTERNAL IP30 COVER".
2. The terminals shall not be exposed to mechanical stress (no plugging/releasing or connection of wires) at ambient temperatures lower than -5°C.

## Certificate Annex

**Certificate Number** CML 23UKEX2145X  
**Equipment** Fieldbus Barrier type R4D0-FB-IA\*  
**Manufacturer** Pepperl+Fuchs SE



The following documents describe the equipment defined in this certificate:

### Issue 0

For drawings describing the equipment, refer to attached certificate BVS 13 ATEX E 121 X. In addition to the drawings listed on BVS 13 ATEX E 121 X, the following drawings include the additional marking required for this UK Type Examination certification:

| Drawing No   | Sheets | Rev | Approved date | Title                                    |
|--------------|--------|-----|---------------|--|
| 16-1555CM-10 | 1 to 2 | 0   | 22 Mar 2023   | Additional Marking Requirements for UKCA |