

UK Type Examination Certificate CML 23UKEX2150U 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 **FB IO model: FB2216*, FB2217*, FB6216 and FB6217***
- 3 Manufacturer **Pepperl+Fuchs SE**
- 4 Address **Lilienthalstrasse 200
68307 Mannheim
Germany**

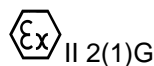
- 5 The equipment is specified in the description of this certificate and the documents to which it refers.
- 6 Eurofins E&E CML Limited, Newport Business Park, New Port Road, Ellesmere Port, CH65 4LZ, United Kingdom, Approved Body Number 2503, in accordance with Regulation 43 of the Equipment and Protective 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.

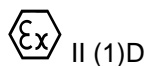
- 7 If an 'X' suffix appears after the certificate number, it indicates that the equipment is subject to specific conditions of use (affecting correct installation or safe use). These are specified in Section 14.
- 8 This UK Type Examination certificate relates only to the design and construction of 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 60079-1:2014 EN 60079-5:2015
EN IEC 60079-7:2015+A1:2018 EN 60079-11:2012

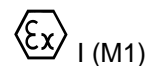
- 10 The equipment shall be marked with the following:



Ex db eb q [ia Ga] IIC Gb



[Ex ia Da] IIIC



[Ex ia Ma] I



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11 Description

The components FB IO, consisting of models FB2216*, FB2217*, FB6216*, FB6217*, act as interface for signals between field devices and process control systems.

The components FB IO are intended to be mounted in areas requiring EPL Gb (Zone 1) on approved backplanes FB BP.

The component FB IO provides galvanically separated intrinsically safe digital output(s) as associated apparatus [Ex ia], up to areas requiring EPL Ga (Zone 0), EPL Da (Zone 20) and Mining (M1). FB221** is equipped with additional intrinsically safe inputs for position feedback.

The components FB IO, listed in this document, meet the relevant parameters of FB concept.

Type designation

FB2216*, FB2217*, FB6216*, FB6217*

Electrical Data

All Non-IS signals listed below are Extra-low voltage supply system signals, type: SELV or PELV, derived from Power supply module FB PS, placed at a dedicated slot on the backplane FB BP. All NON-IS signals must meet Over voltage category II (or better).

Voltage Um (e.g. 60V) shall apply as a common mode failure voltage (in respect to PA / PE) only. As differential mode failure voltage the rated voltage Ur (e.g. +12.48V) has to be applied.

Non-intrinsically safe connections:

Power supply:

Value	Backplane Connector Pin 6 [+], Pin 5 [-]
Nominal voltage (Un)	12VDC (-2/+4%), SELV/PELV
Rated voltage (Ur)	12.48VDC
Maximum common mode voltage (Um)	60VDC

Bus signal / Communication signal:

Value	Backplane Connector Pin 2, Pin 3
Nominal operating voltage (Un)	±2.5V signal with reference level 2.5VDC (Manchester-Signal)
Rated voltage (Ur)	12.48VDC (SELV/PELV, same GND reference as power supply)
Maximum common mode voltage (Um)	60VDC



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Shut-Down signal:

Value	Backplane Connector Pin 1 [+], Pin 5 [-]
Nominal voltage (Un)	+12 V (-2/+4%) SELV/PELV derived from Power supply module FB PS (e.g. FB9206)
Rated voltage (Ur)	12.48VDC
Maximum common mode voltage (Um)	60VDC

Intrinsically safe connections:

Digital Output:

Ex Parameters	Digital output FB2216*: ch1: Pin 1(+)-4/5/6(-) FB6216*: ch1: Pin 1(+)-4/5/6/8(-) ch2: Pin 7(+)-4/5/6/8(-)		Digital output FB2217*: ch1: Pin 1(+)-4/5/6(-) FB6217*: ch1: Pin 1(+)-4/5/6/8(-) ch2: Pin 7(+)-4/5/6/8(-)	
Maximum values:	U _o = 24.2V I _o = 108 mA P _o = 654 mW (linear) C _i = 12 nF L _i = negligible		U _o = 17.8V I _o = 162 mA P _o = 721 mW (linear) C _i = 12 nF L _i = negligible	
Ex ia IIC	C _o = 110 nF L _o = 3.04 mH	L _o /R _o = 0.054 mH/Ω	C _o = 309 nF L _o = 1.35 mH	L _o /R _o = 0.049 mH/Ω
Ex ia IIB / IIIC	C _o = 898 nF L _o = 12.1 mH	L _o /R _o = 0.216 mH/Ω	C _o = 1.82 μF L _o = 5.41 mH	L _o /R _o = 0.196 mH/Ω
Ex ia IIA	C _o = 3.25 μF L _o = 24.3 mH	L _o /R _o = 0.432 mH/Ω	C _o = 7.88 μF L _o = 10.83 mH	L _o /R _o = 0.392 mH/Ω
Ex ia I	C _o = 5.15 μF L _o = 40.0 mH	L _o /R _o = 0.708 mH/Ω	C _o = 10.4 μF L _o = 17.7 mH	L _o /R _o = 0.643 mH/Ω
For FB621** only: Parameters for the use of both outputs in parallel (SW option to assert outputs simultaneously; connector Pin 1 must be directly connected externally to Pin 7 at the connector).				
Ex Parameters	Digital output FB6216*: ch1+2 (parallel): Pin 1/7(+)-4/5/6/8(-)		Digital output FB6217*: ch1+2 (parallel): Pin 1/7(+)-4/5/6/8(-)	
Maximum values:	U _o = 24.2 V I _o = 216 mA P _o = 1308 mW (linear) C _i = 24 nF L _i = negligible		U _o = 17.8 V I _o = 324 mA P _o = 1442 mW (linear) C _i = 24 nF L _i = negligible	
Ex ia IIC	n.a.		C _o = 297 nF L _o = 0.338 mH	L _o /R _o = 0.024 mH/Ω
Ex ia IIB / IIIC	C _o = 886 nF L _o = 3.04 mH	L _o /R _o = 0.027 mH/Ω	C _o = 1.81 μF L _o = 1.35 mH	L _o /R _o = 0.096 mH/Ω
Ex ia IIA	C _o = 3.24 μF L _o = 6.09 mH	L _o /R _o = 0.108 mH/Ω	C _o = 7.87 μF L _o = 2.70 mH	L _o /R _o = 0.192 mH/Ω
Ex ia I	C _o = 5.14 μF L _o = 10.0 mH	L _o /R _o = 0.216 mH/Ω	C _o = 10.3 μF L _o = 4.44 mH	L _o /R _o = 0.315 mH/Ω



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Digital input (Namur), for passive sensors only:

Ex Parameters	Digital Input FB221 **: ch1: Pin 2(+) -4/5/6(-), ch2: Pin 3(+) -4/5/6(-)	
Maximum values:	U _o = 10V I _o = 13 mA P _o = 33 mW (linear) C _i = 12 nF L _i = negligible	
Ex ia IIC	C _o = 2.97 μF L _o = 100 mH	Lo/Ro = 1.094 mH/Ω
Ex ia IIB / IIIC	C _o = 19.7 μF L _o = 100 mH	Lo/Ro = 4.376 mH/Ω
Ex ia IIA	C _o = 99.7 μF L _o = 100 mH	Lo/Ro = 8.752 mH/Ω
Ex ia I	C _o = 177 μF L _o = 100 mH	Lo/Ro = 14.358 mH/Ω

The values of Lo and Co listed in the tables above are allowed if one of the following conditions is met:

- the total Li of the external circuit (excluding the cable) is < 1% of the Lo value or
- the total Ci of the external circuit (excluding the cable) is < 1% of the Co value.

The values of Lo and Co listed in the tables above shall be reduced to 50% when both of the following conditions are met:

- the total Li of the external circuit (excluding the cable) is ≥ 1% of the Lo value and
- the total Ci of the external circuit (excluding the cable) is ≥ 1% of the Co value.

Note: The reduced capacitance of the external circuit (including cable) shall not be greater than 1 μF for groups I, IIA, IIB and 600 nF for IIC.

Degrees of protection (IP Code)

IP20 (if mounted on backplane).

Temperature range:

$$-40^{\circ}\text{C} \leq T_{\text{amb}} \leq +60^{\circ}\text{C}$$

Ambient temperature range is referenced to measurement point in a distance of 30mm perpendicular to the centre of the front of the component FB IO.

Service temperature range of Ex component: $-40^{\circ}\text{C} \leq T_s \leq +99^{\circ}\text{C}$



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12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	13 Apr 2023	R16366D/00	Issue of Prime Certificate

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

13 Conditions of Manufacture

The following conditions are required of the manufacturing process for compliance with the certification.

- i. A dielectric strength test in accordance with EN 60079-5:2015 is required for each batch of the filling material before the filling process is carried out.
- ii. Routine test for infallible transformer: Dielectric strength test between input and output windings of transformers T01 and T02 with a voltage of $\geq 1500\text{VAC}$ for 60 s or $\geq 1800\text{VAC}$ for at least 1 s.

14 Schedule of Limitations

The following conditions relate to safe installation and/or use of the component.

- i. The components FB IO shall be provided with protection that ensures a pollution degree 2 (or better).
- ii. The components FB IO shall only be used together with approved backplanes FB BP, power supply FB PS, gateway FB GW and bus-termination FB BT.
- iii. Supply the device with a power supply that meets the requirements for safety extra-low voltage (SELV) or protected extra-low voltage (PELV) with a maximum voltage of $U_m=60\text{V}$
- iv. All circuits connected to the device shall comply with the overvoltage category II (or better) according to EN 60664-1.
- v. Permitted supply short-circuit current for the components is 50A.

Installation in areas requiring category 2G/EPL Gb equipment:

- i. The components FB IO and FB GW shall be installed and operated only in surrounding enclosures that comply with the safety requirements for EPL Gb enclosures according to EN 60079-0 and are rated with the degree of protection IP54 according to EN 60529.

Certificate Annex

Certificate Number CML 23UKEX2150U
Equipment FB IO model: FB2216*, FB2217*, FB6216 and FB6217*
Manufacturer Pepperl+Fuchs SE



The following documents describe the equipment defined in this certificate:

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For drawings describing the equipment, refer to attached certificate Presafe 19 ATEX 14054U. In addition to the drawings listed on Presafe 19 ATEX 14054U, 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	13 Apr 2023	Additional Marking Requirements for UKCA