UK Type Examination Certificate CML 23UKEX2147U 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; FB GW**

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:

For FB IO all models:

Ex II 2(1)G	Ex II (1)D	Ex I (M1)
Ex db eb q [ia Ga] IIC Gb	[Ex ia Da] IIIC	[Ex ia Ma] I

For FB GW models FB8205 - FB8209*:*

Ex II 2(1)G

Ex db eb q [ia Ga] IIC Gb

For FB GW models FB8211:*

Ex II 2(1)G

Ex db eb q [ib] IIC Gb

UKAS PRODUCT CERTIFICATION 8175

11 Description

The components FB IO, models FB1203*, FB1208*, FB5204*and FB5205* act as interface for signals between field devices and process control systems. All these modules are of type Input. The components FB GW communication unitsFB8205*-FB8209*and FB8211*act as communication interface for process control systems.

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

Additionally, the component FB IO provide intrinsically safe circuits, type of protection: [Ex ia] or [Ex ib] (model depending):

For FB IO: [Ex ia] up to areas requiring EPL Ga (Zone 0), EPL Da(Zone 20),EPL Ma.

For FB GW modelsFB8205*-FB8209*: [Ex ia] up to areas requiring EPL Ga (Zone 0).

For FB GW models FB8211*: [Ex ib] up to areas requiring EPL Gb (Zone 1).

The component FB IO is also called “FB-Module” type I/O, component FB GW is called “FB-Module” type Gateway and component FB BP is also called “FB-Backplane”.

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

Type designation

FB1203*, FB1208*, FB5204*, FB5205*; FB8205*-FB8209*, FB8211*

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. +12.48 V) has to be applied.

Non-intrinsically safe connections:

Power supply 12V:

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

Power supply 5.4V:

Value	Backplane Connector Pin 4 [+], Pin 5 [-]
Nominal voltage (U_n)	5.4VDC (-5/+5%), SELV/PELV
Rated voltage (U_r)	5.6VDC
Maximum common mode voltage (U_m)	60VDC

Bus signal / Communication signal:

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

Intrinsically safe connections:

The maximum values listed in the following tables apply to each channel if not specified otherwise.

FB1203* Digital Input

Module Type Terminal Assignment	**Type of Circuit**	**Maximum Values**						**Ex ia IIC**		**Ex ia IIB/Ex ia IIIC**		**Ex ia IIA**		**Ex ia I**	
		Charac-teristic	Uo [V]	Io [mA]	Po [mW]	Ci [nF]	Li [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]
FB1203* ch1: 1(+), 2(-) ch2: 4(+), 5(-) all (-) connected internally	2 Inputs	linear	10.5	23.34 (Sum Io, ch.1+2)	61.27 (Sum Po, ch.1+2)	3.3	0	2.4	65	16.8	100	75	100	95	100

Module Type Terminal Assignment	**Type of Circuit**	**Lo/Ro [mH/Ω]**			
		Ex ia IIC	**Ex ia IIB/Ex ia IIIC**	**Ex ia IIA**	**Ex ia I**
FB1203* ch1: 1(+), 2(-) ch2: 4(+), 5(-) all (-) connected internally	2 Inputs	0.581	2.325	4.651	7.630

FB1208* Digital Input

Module Type Terminal Assignment	Type of Circuit	Maximum Values (per channel)						Ex ia IIC		Ex ia IIB/Ex ia IIIC		Ex ia IIA		Ex ia I	
		Charac-teristic	Uo [V]	Io [mA]	Po [mW]	Ci [nF]	Li [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]
FB1208* ch1-8: 1/3/5/9/11/13/15(+) 2/4/8/10/12/14/16(-) All (-) connected internally	2 Inputs	linear	14.9	15.7	58.2	1.7	0	0.6	100	3.7	100	14.3	100	16.3	100

Module Type Terminal Assignment	Type of Circuit	Lo/Ro [mH/Ω]			
		Ex ia IIC	Ex ia IIB/Ex ia IIIC	Ex ia IIA	Ex ia I
FB1208* ch1-8: 1/3/5/9/11/13/15(+)2 /4/8/10/12/14/16(-) All (-) connected internally	8 Inputs	0.577	2.30	4.61	7.57

FB5204* Temperature Measuring Input (RTD), multi (quad) channel

Module Type Terminal Assignment	Type of Circuit	Maximum Values (per channel)						Ex ia IIC		Ex ia IIB/Ex ia IIIC		Ex ia IIA		Ex ia I	
		Charac-teristic	Uo [V]	Io [mA]	Po [mW]	Ci [nF]	Li [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]
FB5204* ch1: 1,2,3,4 ch2: 5,6,7,8	2 Inputs	linear	7.14	70 (sum Io, ch. 1+2)	123 (sum Io, ch. 1+2)	52	0	13	7	240	29	1000	58	1000	95
FB5204* ch3: 9,10,11,12 ch2: 13,14,15,16	2 Inputs	linear	7.14	70 (sum Io, ch. 3+4)	123 (sum Io, ch. 3+4)	52	0	13	7	240	29	1000	58	1000	95

Module Type Terminal Assignment	Type of Circuit	Lo/Ro [mH/Ω]			
		Ex ia IIC	Ex ia IIB/Ex ia IIIC	Ex ia IIA	Ex ia I
FB5204* ch3: 9,10,11,12 ch2: 13,14,15,16	2 Inputs	0.285	1.138	2.276	3.735
FB5204* ch3: 9,10,11,12 ch2: 13,14,15,16	2 Inputs	0.285	1.138	2.276	3.735

FB5205* Temperature Measuring Input (Thermocouple), multi (quad) channel

Module Type Terminal Assignment	Type of Circuit	Maximum Values						Ex ia IIC		Ex ia IIB/Ex ia IIIC		Ex ia IIA		Ex ia I	
		Charac-teristic	Uo [V]	Io [mA]	Po [mW]	Ci [nF]	Li [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]
FB5205* ch1: 1(+), 2(-) ch2: 5(+), 6(-) ch3: 9(+), 10(-) ch4: 13(+), 14(-)	4 Inputs	trapezoidal Ri=500 ohm	1.0	71 (sum Io, ch. 1+2+3+4)	62 (sum Io, ch. 1+2+3+4)	0	0	33	5	140	20	250	20	350	20

FB8205* - FB8209* Gateway

The front plug X103 is not intended for connecting intrinsically safe field devices. It is only permitted for connecting with another identical gateway module types for redundancy purposes. Therefore, no Lo/Ro values are given.

Module Type Terminal Assignment	Maximum Values (per channel)						Ex ia IIC Ga		Ex ia IIB Ga		Ex ia IIA Ga	
	Charac-teristic	Uo [V]	Io [mA]	Po [mW]	Ci [nF]	Li [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]
FB8205* **FB8206*** **FB8207*** **FB8208*** **FB8209*** X103 1,3,4,5,6(+) 2(-)	linear	6.5	44	71	0	0	25	15	570	60	1000	100

FB8211* Gateway

The front plug X103 is not intended for connecting intrinsically safe field devices. It is only permitted for connecting the SERV8001.

The front plug X104 is not intended for connecting intrinsically safe field devices. It is only permitted for connecting with another gateway module FB8211 for redundancy purposes. Therefore, no Lo/Ro values are given.

Module Type Terminal Assignment	**Maximum Values (per channel)**						**Ex ia IIC Gb**		**Ex ia IIB Gb**		**Ex ia IIA Gb**	
	Charac-teristic	Uo [V]	Io [mA]	Po [mW]	Ci [nF]	Li [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]	Co [uF]	Lo [mH]
FB8211* X103: ch1: 13(+) ch2: 14(+) to 9/10/11/12/15/16 (-) X104: ch1: 1(+) ch2: 2(+) ch3: 3(+) ch4: 4(+) to 5/6/7/8(-) All (-) connected internally X103 (-) internally connected to	linear	7.14	48.1	85.8	0	0	13.5	15	240	55	1000	100

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

i. the total Li of the external circuit (excluding the cable) is < 1% of the Lo value or
ii. 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:

i. the total Li of the external circuit (excluding the cable) is ≥ 1% of the Lo value and
ii. 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°C ≤ Tamb ≤ +60°C

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

Service temperature range of Ex components: -40 °C ≤ Ts ≤ +nn °C (max)

“nn” = for specific model refer to the following table, “Ts”.

	Function	Type (width)	Front-Side[1]			Rear-Side[2]	Ts[3]
			Con	LCD	LEDs	Connector	
FB1203*	Frequency input ch1: frequency ch2: revolution direction	Single	1 × 6	-	×	7 pins (1 row)	+91.5 °C
FB1208*	Binary input 8 channels, common ground	Double	2 × 8	-	×	7 pins (1 row)	+88.4 °C
FB5204*	RTD input (4 channel)	Double	2 × 8	-	×	7 pins (1 row)	+85.4 °C
FB5205*	Thermocouple input (4 channel)	Double	2 × 8	-	×	7 pins (1 row)	+87.9 °C
FB8205* - FB8209*	Gateway module	Double	1 × 6	-	×	14 pins (2 rows)	+81.9 °C
FB8211*	Gateway module	Double	2 × 8	-	×	14 pins (2 rows)	+86.5 °C

Notes:

1. “1 × 6” means 1 front connector with 6 contacts; “2 × 8” means 2 front connectors with 8 contacts.
2. At the rear side of the enclosure, there are connector pins to establish a connections type pf protection “Ex d” with their counterpart socket on FB-backplane. There are one or two rows of pins used.
3. Service temperature of components.

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	13 Apr 2023	R16366A/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 (for FB IO only): Dielectric strength test between input and output windings of transformers T01 and T02 with a voltage of ≥1500VAC for 60 s or ≥ 1800VAC 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 and GW shall be provided with protection that ensures a pollution degree 2 (or better).
ii. The components FB IO and FB GW Shall only be used together with approved backplanes FB BP, power supply FB PS and bus-termination FB BT.
iii. Supply the components FB IO and FB GW with a power supply FB PS that meets the requirements for safety extra-low voltage (SELV) or protected extra-low voltage (PELV) with a maximum voltage of Um=60V
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 23UKEX2147U**
Equipment	**FB IO; FB GW**
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 Presafe 19 ATEX 14058U. In addition to the drawings listed on Presafe 19 ATEX 14058U, 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