


EU-TYPE EXAMINATION CERTIFICATE

- [2] COMPONENT INTENDED FOR USE ON/IN AN EQUIPMENT OR PROTECTIVE SYSTEM INTENDED FOR USE IN POTENTIALLY EXPLOSIVE ATMOSPHERES DIRECTIVE 2014/34/EU
- [3] EU-Type Examination Certificate Number: **Presafe 19 ATEX 14054 U Issue 0**
- [4] Product: **FB IO models: FB2216*, FB2217*, FB6216* and FB6217***
- [5] Manufacturer: **Pepperl+Fuchs GmbH**
- [6] Address: **Lilienthalstrasse 200
68307 Mannheim
Germany**
- [7] This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.
- [8] DNV GL Presafe AS, notified body number 2460, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

The examination and test results are recorded in confidential reports listed in section 16.
- [9] Compliance with the Essential Health and Safety Requirements has been assured by compliance with:
EN 60079-0:2012/A11:2013, EN 60079-1:2014, EN 60079-5:2015, EN 60079-7:2015 and EN 60079-11:2012
- [10] The sign "U" is placed after the certificate number. It indicates that this certificate must not be mistaken for a certificate intended for an equipment or protective system. This partial certification may be used as a basis for certification of an equipment or protective system
- [11] This EU - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Directive apply to the manufacturing process and supply of this product. These are not covered by this certificate.
- [12] The marking of the product shall include the following:

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



Date of issue:
2019-03-20



Bjørn Spongsveen
 For DNV GL Presafe AS
 The Certificate has been digitally signed.
 See www.dnvgl.com/digitalsignatures for info

[13] **Schedule**

[14] **EU-Type Examination Certificate No:** Presafe 19 ATEX 14054 U Issue 0

[15] **Description of Product**

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

Non-intrinsically safe connections:

Power supply:

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

Bus signal / Communication signal:

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

Shut-Down signal:

Value	Backplane Connector Pin 1 [+], Pin 5 [-]
Nominal voltage (U_n)	+12 V (-2/+4%) SELV/PELV derived from Power supply module FB PS (e.g. FB9206)
Rated voltage (U_r)	12.48 V _{DC}
Maximum common mode voltage (U_m)	60 V _{DC}

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 = 24.2 V I _o = 108 mA P _o = 654 mW (linear) C _i = 12 nF L _i = negligible		U _o = 17.8 V 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

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:	$U_o = 10\text{ V}$ $I_o = 13\text{ mA}$ $P_o = 33\text{ mW (linear)}$ $C_i = 12\text{ nF}$ $L_i = \text{negligible}$	
Ex ia IIC	$C_o = 2.97\text{ }\mu\text{F}$ $L_o = 100\text{ mH}$	$L_o/R_o = 1.094\text{ mH}/\Omega$
Ex ia IIB / IIIC	$C_o = 19.7\text{ }\mu\text{F}$ $L_o = 100\text{ mH}$	$L_o/R_o = 4.376\text{ mH}/\Omega$
Ex ia IIA	$C_o = 99.7\text{ }\mu\text{F}$ $L_o = 100\text{ mH}$	$L_o/R_o = 8.752\text{ mH}/\Omega$
Ex ia I	$C_o = 177\text{ }\mu\text{F}$ $L_o = 100\text{ mH}$	$L_o/R_o = 14.358\text{ mH}/\Omega$

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

- the total L_i of the external circuit (excluding the cable) is < 1% of the L_o value or
- the total C_i of the external circuit (excluding the cable) is < 1% of the C_o value.

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

- the total L_i of the external circuit (excluding the cable) is \geq 1% of the L_o value and
- the total C_i of the external circuit (excluding the cable) is \geq 1% of the C_o 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 30 mm perpendicular to the center of the front of the component FB IO.

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

Routine tests

The manufacturer shall carry out the following routine tests:

- The dielectric strength test for the filling material of each batch before filling process.
- 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.

[16] Report No.: D0003772_1

[17] **Schedule of Limitations**

- The components FB IO shall be provided with protection that ensures a pollution degree 2 (or better).
- 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.
- 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 $U_m = 60\text{ V}$
- All circuits connected to the device shall comply with the overvoltage category II (or better) according to EN 60664-1.
- Permitted supply short-circuit current for the components is 50 A

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

- The components FB IO 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.

[18] **Essential Health and Safety Requirements**

Essential Health and Safety Requirements (EHSRs) are covered by the standards listed at item 9

[19] **Drawings and documents**

Number	Title	Rev.	Date
16-1384EX-00	Description	-	2017-05-15
16-1384EX-01	Schematics	-	2017-07-05
16-1384EX-02	BOM / Part list safety components	-	2017-07-05
16-1384EX-03	Assembly plan (PCB)	-	2017-07-05
16-1384EX-04	Mechanical Drawing	-	2017-07-05
16-1384EX-05	Layouts	-	2017-07-05
16-1384EX-07	Assembly of FB-Module	-	2017-07-05
16-1384EX-09	Extract of instruction	-	2017-05-15
16-1384PR-10	Marking	-	2019-02-26
16-1000EX-00	FB-Module enclosure	-	2016-09-05
16-1000EX-04_2	Specification Filling Material (Glass beads) (1 page)	-	2017-05-18

[20] **Certificate History**

Issue	Description	Issue date	Report no.
0	Original issue	2019-03-20	D0003772_1

END OF CERTIFICATE