UK Type Examination Certificate CML 21UKEX2662X 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 **Digital Output modules (with position feedback) Type LB6116/17** and LB2116/17****

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 60079-0:2018 EN 60079-11:2012 EN 60079-15:2010

10 The equipment shall be marked with the following:

II 3 (1) G	II (1) D	I (M1)
Ex nA [ia Ga] IIC T4 Gc	[Ex ia Da] IIIC	[Ex ia Ma] I
Alternative: Ex nAc [ia Ga] IIC T4	[Ex ia] IIIC	[Ex ia] I

P. Shaw
Certification Officer

11 Description

The Digital Output modules type LB6116/17* and LB2116/17* (with Position Feedback) are associated apparatus which are also suitable for Installation in areas requiring category 3G equipment.
The modules provide one (LB2xnn) or two binary Outputs (LB6xnn), e.g. for driving valves (nn = number: [1 , 2 .... 17]) and two or none digital inputs according to Namur Standard (8.2 V supply for “dry contacts”/Namur switch). The inputs are for use with dry contacts (passive actors, like switch w./w.o. resistors) only.
The modules are only permitted to operate in connection with approved LB-Backplanes providing a power supply from a dedicated power supply module. A SELV/PELV power supply is required to supply the LB System.

Intrinsically safe circuits

Associated apparatus for Ex ia circuit (EPL Ga):

All Namur inputs:

LB2116/17*	Digital Input ch1: Pin 2(+) - 4/5/6(-) ch2: Pin 3(+) - 4/5/6(-)	
Maximum values:	Uo = 10 V Io = 13 mA Po = 33 mW (linear) Ci = 12 nF Li = negligible	
Ex ia IIC	Co = 2.97 µF Lo= 100 mH	Lo/Ro = 1.094 mH/Ω
Ex ia IIB	Co = 19.7 µF Lo = 100 mH	Lo/Ro = 4.376 mH/Ω
Ex ia IIA	Co = 99.7 µF Lo= 100 mH	Lo/Ro = 8.752 mH/Ω
Ex ia I	Co = 177 µF Lo = 100 mH	Lo/Ro= 14.358 mH/Ω

All outputs:

LB6116*	Digital Output ch1: Pin 1(+) - 4/5/6/8(-) ch2: Pin 7(+) - 4/5/6/8(-)	
Maximum values:	Uo = 24.2 V Io = 108 mA Po = 654 mW (linear) Ci = 12 nF Li = negligible	
Ex ia IIC	Co = 110 nF Lo = 3.04 mH	Lo/Ro = 0.054 mH/Ω
Ex ia IIB	Co= 898 nF Lo = 12.1 mH	Lo/Ro = 0.216 mH/Ω
Ex ia IIA	Co = 3.25 µF Lo = 24.3 mH	Lo/Ro = 0.432 mH/Ω
Ex ia I	Co = 5.15 µF Lo = 40.0 mH	Lo/Ro = 0.708 mH/Ω
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) *		
Maximum values:	Uo = 24.2 V Io = 216 mA Po = 1308 mW (linear) Ci = 24 nF Li = negligible	
Ex ia IIB	Co= 886 nF Lo = 3.04 mH	Lo/Ro = 0.027 mH/Ω
Ex ia IIA	Co = 3.24 µF Lo = 6.09 mH	Lo/Ro = 0.108 mH/Ω
Ex ia I	Co = 5.14 µF Lo = 10.0 mH	Lo/Ro = 0.216 mH/Ω

LB6117*	Digital Output ch1: Pin 1(+) - 4/5/6/8(-) ch2: Pin 7(+) - 4/5/6/8(-)	
Maximum values:	Uo = 17.8 V Io = 162 mA Po = 721 mW (linear) Ci = 12 nF Li = negligible	
Ex ia IIC	Co = 309 nF Lo = 1.35 mH	Lo/Ro = 0.049 mH/Ω
Ex ia IIB	Co = 1.82 µF Lo = 5.41 mH	Lo/Ro = 0.196 mH/Ω
Ex ia IIA	Co = 7.88 µF Lo = 10.83 mH	Lo/Ro = 0.392 mH/Ω
Ex ia I	Co= 10.4 µF Lo = 17.7 mH	Lo/Ro = 0.643 mH/Ω
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)*		
Maximum values:	Uo = 17.8 V Io = 324 mA Po = 1442 mW (linear) Ci = 24 nF Li = negligible	
Ex ia IIC	Co = 297 nF Lo = 0.338 mH	Lo/Ro = 0.024 mH/Ω
Ex ia IIB	Co = 1.81 µF Lo = 1.35 mH	Lo/Ro = 0.096 mH/Ω
Ex ia IIA	Co = 7.87 µF Lo = 2.70 mH	Lo/Ro = 0.192 mH/Ω
Ex ia I	Co = 10.3 µF Lo = 4.44 mH	Lo/Ro = 0.315 mH/Ω

LB2116*	Digital Output ch1: Pin 1(+) - 4/5/6 (-)	
Maximum values:	Uo =24.2 V Io =108 mA Po =654 mW (linear) Ci = 12 nF Li = negligible	
Ex ia IIC	Co = 110 nF Lo = 3.04 mH	Lo/Ro =0.054 mH/Ω
Ex ia IIB	Co = 898 nF Lo = 12.1 mH	Lo/Ro =0.216 mH/Ω
Ex ia IIA	Co = 3.25 µF Lo = 24.3 mH	Lo/Ro =0.432 mH/Ω
Ex ia I	Co = 5.15 µF Lo = 40.0 mH	Lo/Ro =0.708 mH/Ω

LB2117*	Digital Output ch1: Pin 1(+) - 4/5/6 (-)	
Maximum values:	Uo = 17.8 V Io = 162 mA Po = 721 mW (linear) Ci = 12 nF Li = negligible	
Ex ia IIC	Co = 309 nF Lo= 1.35mH	Lo/Ro = 0.049 mH/Ω
Ex ia IIB	Co = 1.82 µF Lo = 5.41 mH	Lo/Ro = 0.196 mH/Ω
Ex ia IIA	Co = 7.88 µF Lo = 10.83 mH	Lo/Ro = 0.392 mH/Ω
Ex ia I	Co 10.4 µF Lo 17.7 mH	Lo/Ro = 0.643 mH/Ω

The above parameters for capacitance and inductance apply when one of the two conditions below 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 above parameters for capacitance and inductance are reduced to 50% when both of the two conditions below are met:

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

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

12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	18 Nov 2021	R14112Y/00	Prime Certificate issued.

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

13 Conditions of Manufacture

The manufacturer shall carry out the following routine test:

Routine test for infallible transformer: Dielectric strength test between input and output windings of transformers T01 and T02 with a voltage of ≥1500 VAC for 60 s or ≥1800 VAC for at least 1 s.

14 Specific Conditions of Use

1. The devices must be installed and operated only in an environment that ensures a pollution degree 2 (or better) according to EN 60664-1.

   Installation in safe area:
   The device must be installed
   - in an enclosure with a degree of protection at least IP54 according to EN 60529 and EN 60079-0 or
   - in a controlled environment providing pollution degree 2, or better.

   Installation in areas requiring category 3G equipment:
   - The equipment shall be installed in an enclosure that provides a degree of protection not less than lP 54 in accordance with EN 60529 and EN 60079-15.

2. All circuits connected to the device must comply with overvoltage category 11 (or better) according to EN 60664-1 .
   • SELV/PELV power supply is required to supply the LB-system.

Certificate Annex

Certificate Number	**CML 21UKEX2662X**
Equipment	**Digital Output modules (with position feedback) Type LB6116/17** and LB2116/17****
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 EXA 16ATEX 0025X Issue 1. In addition to the drawings listed on EXA 16ATEX0025X Issue 1, 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	18 Nov 2021	Additional Marking Requirements for UKCA