



## UK Type Examination Certificate CML 21UKEX21103 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 Type KFD2-HLC-Ex1.D. \*\* HART Loop Converter
- 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 60079-11:2012

10 The equipment shall be marked with the following:



[Ex ia Ga] IIC (-20°C≤Ta≤ +60°C)

έx∕ <sub>II (1) D</sub>

[Ex ia Da] IIC (20°C≤Ta ≤ +60°C)



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### 11 Description

The Type KFD2-HLC-Ex1.D.\*\* HART Loop Converter is designed to transfer up to three dynamic variables from a HART field device located in the hazardous area to unspecified apparatus located in the non-hazardous area using the HART protocol. The voltage and current passed to the hazardous area is limited to intrinsically safe levels. The hazardous area circuit is galvanically isolated from the non-hazardous area circuit using transformers.

The Type KFD2-HLC-Ex1.D.\*\* HART Loop Converter comprise a number of electronic components, including isolating transformers, fuses, zener diodes and resistors mounted on two inter-connected printed circuit boards and housed in a plastic enclosure with polarised plug-in terminals for hazardous and non-hazardous area connections. A Liquid Crystal Display (LCD) with push buttons is provided on the front of the enclosure to allow the user to monitor and configure the operation of the apparatus in addition to LED indication for Power-on and channel status. A jack socket is provided for updating the apparatus firmware using a data terminal.

There are three models of the Type KFD2-HLC-Ex1.D.\*\* HART Loop Converter, the Type KFD2-HLC-Ex1.D providing the basic functions and the Type KFD2-HLC-Ex1.D.2W HART Loop Converter with two output relays and the Type KFD2-HLC- ExI.D.2W HART Loop Converter with four output relays. The models fitted with relays provide either two or four relay outputs to the non-hazardous area for fault indication. All models in terms of intrinsic safety are identical.

#### Input/ Output Parameters

#### Non-Hazardous Area Terminals 7 to 24, Power Rail Connections PRI & PR2 & Jack Socket

U<sub>m</sub>= 253Vr.m.s.

The power supply circuit connected to non-hazardous area terminals 23 & 24 or Power Rail Connections PRI & PR2 are designed to operate from a d.c. supply of up to 30V.

Where fitted (Types KFD2-HLC-Ex1.D.2W & KFD2-HLC-Ex1.D.4S), non-hazardous area terminals 10 to 12 and 16 to 18 are connected to relay contacts which can switch up to 253V r.m.s and 1A.

Power Rail Connection PR4 (Fault Bus)

#### U<sub>m</sub> =253Vr.m.s.

The circuit connected to the power rail connection PR4 is designed to operate from a d.c. supply voltage of 30V.

Hazardous Area Terminals 1 / 4 w.r.t. 3

U <sub>o</sub> = 25.2 V	$C_i = 1.1 \ nF$
I <sub>o</sub> = 93mA	$L_{i}=0 \\$
$P_o = 586 mW$	

Hazardous Area Terminals 2 / 5 w.r.t. 3

$U_{o} = 1.1 V$	$U_i = 28 V$
l <sub>o</sub> = 11.9 mA	P <sub>i</sub> = 1.33 W
$P_o = 4 \text{ mW}$	
$C_i = 0$	
$L_i = 0$	





Hazardous Area Terminals 1 / 4 w.r.t. 3 (with external link between terminals 4 & 5)

$U_{o} = 25.2 V$	C <sub>i</sub> = 1.1 nF

l<sub>o</sub> = 104.9 mW

 $P_o = 661 \text{ mW}$ 

Hazardous Area Terminals 2 / 5 w.r.t. 3 (with external link between terminals 5 & 6)

 $L_i = 0$ 

$U_{o} = 1.1 V$	Ui = 28 V
l <sub>o</sub> = 11.9 mA	P <sub>i</sub> = 1.33 W
$P_o = 4 \text{ mW}$	
$C_i = 0$	
$L_i = 0$	

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals of the apparatus must not exceed the following values:

Group	Capacitance	INDUCTANCE O	R L/R RATIO	
	(μF)	(mH)	(μΗ/Ω)	
Hazardous Area Termin	als 1 / 4 w.r.t. 3			
IIC	0.105	4.1	60	
IIB / IIIC	0.81	16.4	240	
IIA	2.89	32.8	480	
Hazardous Area Terminals 2 / 5 w.r.t. 3 (with or without external link between terminals 5 & 6)				
IIC	100	251	10000	
IIB / IIIC	1000	000 1004 4300		
IIA	1000	2008	86000	
Hazardous Area Terminals 1 / 4 w.r.t. 3 (with external link between terminals 4 & 5)				
IIC	0.105 3.2		53	
IIB / IIIC	0.81	12.9	215	
IIA	2.89	25.8	430	

## NOTE:

The above parameters apply when one of the two conditions below is given:

- the total  $L_i$ , of the external circuit (excluding the cable) is < 1% of the  $L_0$  value or
- the total  $C_i$ , of the external circuit (excluding the cable) is < 1% of the  $C_o$  value.

The above parameters are reduced to 50% when both of the two conditions below are given:

- the total  $L_i$ , of the external circuit (excluding the cable) >1% of the  $L_o$  value and
- the total  $C_i$  of the external circuit (excluding the cable) >1% of the  $C_o$  value.

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1  $\mu$ F for Groups IIA & IIB/IIIC and 600nF for Group IIC.





## 12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	08 Feb 2023	R14112BM/00	Prime Certificate issued.

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

## 13 Conditions of Manufacture

None.

## 14 Specific Conditions of Use

None.

# **Certificate Annex**

Certificate Number	CML 21UKEX21103
Equipment	Type KFD2-HLC-ExI.D. ** HART Loop Converter
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 Baseefa 07ATEX0174. In addition to the drawings listed on Baseefa 07ATEX0174, 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	08 Feb 2023	Additional Marking Requirements for UKCA