



EU Type Examination Certificate CML 17ATEX2029X Issue 2

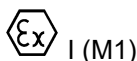
- 1 Equipment intended for use in Potentially Explosive Atmospheres Directive 2014/34/EU
- 2 Equipment **Smart Transmitter Isolator Type KFD2-STC(V)5-Ex1...**
- 3 Manufacturer **Pepperl+Fuchs GmbH**
- 4 Address **Lilienthalstrasse 200
68307 Mannheim
Germany**
- 5 The equipment is specified in the description of this certificate and the documents to which it refers.
- 6 CML B.V. , Chamber of Commerce No 6738671, Hoogoorddreef 15, Amsterdam, 1101 BA, The Netherlands, Notified Body Number 2776, 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 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 Annex II to the Directive.

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 conditions of safe use (affecting correct installation or safe use). These are specified in Section 14.
- 8 This EU Type Examination certificate relates only to the design and construction of the specified equipment or component. Further requirements of Directive 2014/34/EU Article 13 apply to the manufacture of the equipment or component and are separately certified.
- 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 60079-0:2012+A11:2013 EN 60079-11:2012

- 10 The equipment shall be marked with the following:



I (M1)

[Ex ia Ma] I

Ta = -20°C to +70°C



II (1) G

[Ex ia Ga] IIC



II (1) D

[Ex ia Da] IIIC

Note: An upper ambient temperature within the range +40°C to +70°C may be marked



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11 Description

The Smart Transmitter Isolator Type KFD2-STC(V)5-Ex1... are Intrinsically Safe Associated Apparatus Transmitter Power Supplies that transfer monitoring signals from a hazardous area to a safe area and communication signals in both directions. The Safe Area connections are the Power Supply and Output. The Hazardous Area Connections (Input Circuit) are for Sink Input, Source Input or Three Wire Input.

The intrinsically safe input circuit is galvanically isolated from the non-Ex output by transformers. The voltage and current limitation for the intrinsically safe input circuit is achieved with Zener diodes and current limiting resistors. The circuits are located on a single printed circuit board (PCB).

The polymeric enclosure is suitable for mounting on a DIN rail. It provides an environmental rating of IP 20 and is required to be installed in an enclosure or area with a control of pollution access. Field wiring connections to the device are by colour coded pluggable connectors or powered from pluggable DIN rail connection.

Nomenclature

Smart Transmitter Isolator Type KFD2-STC(V)5-Ex1...

KFD2-ST Smart Transmitter

Followed by one of the options:

C Current source/sink

V Voltage

Followed by:

5-Ex1 Single hazardous area input/Single non-hazardous area output.

Followed by one of the options:

-1 5 Volt – used with “V”

-2 10 Volt – used with “V”

.H Higher field voltage

.NCL No current limit

-Y1...n Customised version - does not affect intrinsic safety

-... Customised version - combination of numbers/letters does not affect intrinsic safety

Rating

SAFE Area Connections: KFD2-STC(V)5-Ex1:

Power Supply	
Connection(s):	Terminals 14, 15 and Power Rail 1,2
Operating Supply Voltage:	18 Vdc to 30 Vdc
Maximum Voltage (Um):	250 Vac

Output	
Connection(s):	Terminals 7, 8, 9
Maximum Voltage (Um):	250 Vac



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Sink transmitter input connection - KFD2-STC(V)5-Ex1:

Hazardous Area Connections, Input Circuits:

Sink transmitter input connection	
Connection(s):	Terminals 1, 3
U _o	26.2 V
U _q	27.25 V
I _o	93 mA
P _o	634 mW
C _i	5 nF
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 either channel must not exceed the following values:

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	L/R RATIO (μ H/ Ω)
IIC	0.092	4.11	56.22
IIB	0.745	16.44	224.8
IIA	2.535	32.88	449.7
I	4.415	53.95	737.9

The entity 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_o 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 and
- The total C_i of the external circuit (excluding the cable) > 1% of the C_o.

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for IIB and 600nF for IIC.



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Source transmitter input connection - KFD2-STC(V)5-Ex1:

Hazardous Area Connections, Input Circuits:

Source transmitter input connection	
Connection(s):	Terminals 3, 2
Uo	2.0 V
Io	8.5 mA
Po	4.3 mW
Ui	30 V
Ii	115 mA
Pi	1000 mW
Ci	0
Li	0
Connection(s):	3 +ve wrt 2
Uo	2.0 V
Io	8.5 mA
Po	4.3 mW
Connection(s):	2 +ve wrt 3
Uo	1.0 V
Io	4.3 mA
Po	1.1 mW

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

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	L/R RATIO (μ H/ Ω)
IIC	100	492	8366
IIB	1000	1968	33464
IIA	1000	3936	66928
I	1000	6459	109803

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

- 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 are reduced to 50% when both of the two conditions below are given:

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

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for IIB and 600nF for IIC.



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Three wire transmitter input connection - KFD2-STC(V)5-Ex1:

Hazardous Area Connections, Input Circuits:

Three wire transmitter input connection	
Connection(s):	Terminals 1, 2, 3
U _o	26.2 V
U _q	27.25 V
I _o	115mA
P _o	784mW
C _i	5nF
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 either channel must not exceed the following values:

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	L/R RATIO (μ H/ Ω)
IIC	0.092	2.68	45.38
IIB	0.745	10.75	181.5
IIA	2.535	21.50	363.1
I	4.415	35.27	595.6

The entity 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_o 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 and
- The total C_i of the external circuit (excluding the cable) > 1% of the C_o.

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for IIB and 600nF for IIC.



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Sink transmitter input connection - KFD2-STC(V)5-Ex1.H:

Hazardous Area Connections, Input Circuits:

Sink transmitter input connection	
Connection(s):	Terminals 1, 3
Uo	27.2 V
Io	93mA
Po	633mW
Ci	5nF
Li	0

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

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	L/R RATIO (μ H/ Ω)
IIC	0.084	4.11	56.22
IIB	0.685	16.44	224.8
IIA	2.295	32.88	449.7
I	4.045	53.95	737.9

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

- 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 are reduced to 50% when both of the two conditions below are given:

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

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for IIB and 600nF for IIC.



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Source transmitter input connection - KFD2-STC(V)5-Ex1.H:

Hazardous Area Connections, Input Circuits:

Source transmitter input connection	
Connection(s):	Terminals 3, 2
Uo	2.0 V
Io	8.5mA
Po	4.3mW
Ui	30V
Ii	115mA
Pi	1000mW
Ci	0
Li	0
Connection:	3 +ve wrt 2
Uo	2.0 V
Io	8.5mA
Po	4.3mW
Connection:	2 +ve wrt 3
Uo	1.0V
Io	4.3mA
Po	1.1mW

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

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	L/R RATIO (μ H/ Ω)
IIC	100	492	8366
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IIA	1000	3936	66928
I	1000	6459	109803

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

- 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 are reduced to 50% when both of the two conditions below are given:

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

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for IIB and 600nF for IIC.



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Three wire transmitter input connection - KFD2-STC(V)5-Ex1.H:

Hazardous Area Connections, Input Circuits:

Three wire transmitter input connection	
Connection(s):	Terminals 1, 2, 3
U _o	27.2 V
I _o	115mA
P _o	782mW
C _i	5nF
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 either channel must not exceed the following values:

GROUP	CAPACITANCE (μ F)	INDUCTANCE (mH)	L/R RATIO (μ H/ Ω)
IIC	0.084	2.68	45.46
IIB	0.685	10.75	181.8
IIA	2.295	21.50	363.7
I	4.045	35.27	596.7

The entity 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_o 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 and
- The total C_i of the external circuit (excluding the cable) > 1% of the C_o.

Note: the reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for IIB and 600nF for IIC.

Variation 1

This variation introduces the following modifications:

- Minor changes to PCB 16-1135CM-05



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12 Certificate history and evaluation reports

Issue	Date	Associated report	Notes
0	20 Apr 2017	R1616A/00	Issue of Prime Certificate
1	13 Apr 2018	R11656A/00	Introduction of Variation 1
2	07 Mar 2019	R12226A/00	Transfer of Certificate to CML BV

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

13 Conditions of Manufacture

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

- i. Where the product incorporates certified parts or safety critical components the manufacturer shall ensure that any changes to those parts or components do not affect the compliance of the certified product that is the subject of this certificate.
- ii. All transformers shall be subjected to EN 60079-11 CL 11.2 Routine Tests for Infallible Transformers with an applied voltage of 1,500 V applied between the input and output windings. The test voltage shall be applied for a period of at least 60 s. Alternatively, the test may be carried out at 1,2 times the test voltage, but with reduced duration of at least 1 s. The applied voltage shall remain constant during the test. The current flowing during the test shall not increase above that which is expected from the design of the circuit and shall not exceed 5 mA r.m.s. at any time. During these tests, there shall be no breakdown of the insulation between windings or between any winding and the core.

14 Specific Conditions of Use (Special Conditions)

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

- i. The equipment shall be installed in an enclosure that provides a degree of protection not less than IP54 in accordance requirements of EN 60079-0 unless the equipment is intended to be afforded an equivalent degree of protection by location. In addition, the pollution level shall be limited to pollution degree 2 or better as defined in IEC 60664-1 (Pollution degree 2 can be achieved when the installation is in a controlled environment with suitably controlled condensation or airborne pollution).
- ii. For some types of enclosure, additional certification will be required to permit the installation of the module within the enclosure. Reference should be made to the enclosure certificate. The installer shall ensure that the maximum ambient temperature of the module when installed is not exceeded.



Certificate Annex

Certificate Number CML 17ATEX2029X
Equipment Smart Transmitter Isolator Type KFD2-STC(V)5-Ex1...
Manufacturer Pepperl+Fuchs GmbH

The following documents describe the equipment or component defined in this certificate:

Issue 0

Drawing No	Sheets	Rev	Approved Date	Title
16-1135CM-01	1 to 4	2017-01-09	20 Apr 2017	Schematics KFD2-STC(V)5-Ex1...
16-1135CM-02	1 to 22	2017-02-27	20 Apr 2017	Safety Relevant Components KFD2-STC(V)5-Ex1...
16-1135CM-03	1 of 1	2017-01-20	20 Apr 2017	Component Layout KFD2-STC(V)5-Ex1...
16-1135CM-04	1 to 10	2016-09-06	20 Apr 2017	Mechanical Parts KF-Extended-Housing 15 term. Asymm
16-1135CM-05	1 to 4	2017-01-24	20 Apr 2017	PCB Layout KFD2-STC(V)5-Ex1...
16-1135CM-06	1 to 6	2016-10-19	20 Apr 2017	Transformers KFD2-STC(V)5-Ex1...
16-1135CM-09	1 to 3	2017-03-10	20 Apr 2017	Instructions KFD2-STC(V)5-Ex1...
16-1135CM-10	1 to 3	2017-03-10	20 Apr 2017	Type Label KFD2-STC(V)5-Ex1...

Issue 1

Drawing No	Sheets	Rev	Approved Date	Title
16-1135CM-05A	1 to 8	2017-12-06	11 Apr 2018	PCB Layout KFD2-STC(V)5-Ex1...

Issue 2

None.



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