

CERTIFICATE OF CONFORMITY



Member of the FM Global Group

1. HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS

2. Certificate No: **FM19US0117X**
3. Equipment:
(Type Reference and Name) **KCD Series Transformer-Isolated Barrier**
4. Name of Listing Company: **Pepperl+Fuchs SE**
5. Address of Listing Company: **Lilienthalstrasse 200, D-68307 Mannheim 31,
Germany**
6. The examination and test results are recorded in confidential report number:

3026449 dated 17th October 2006

7. FM Approvals LLC, certifies that the equipment described has been found to comply with the following Approval standards and other documents:

FM 3600:2022, FM 3610:2021, FM 3611:2021, FM 3810:2021, ANSI/UL 60079-0:2020, ANSI/UL 60079-7:2021, ANSI/UL 60079-11:2018, ANSI/UL 60079-15:2017, ANSI/UL 61010-1:2018, ANSI/UL 121201:2021

8. If the sign 'X' is placed after the certificate number, it indicates that the equipment is subject to specific conditions of use specified in the schedule to this certificate.
9. This certificate relates to the design, examination and testing of the products specified herein. The FM Approvals surveillance audit program has further determined that the manufacturing processes and quality control procedures in place are satisfactory to manufacture the product as examined, tested and Approved.

10. Equipment Ratings:

See Annex

11. The marking of the equipment shall include:

See Annex

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

24 July 2023

Date

To verify the availability of the Approved product, please refer to www.approvalguide.com

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12. Description of Equipment:

KCD2-STC-Ex1a SMART Transmitter Power Supply – The KCD2-STC-Ex1a SMART Transmitter Power Supply is a 1-channel isolation barrier. The device supplies 2-wire transmission in the hazardous area and can also be used with 2-wire SMART current sources. It transfers the analog input signal to the safe area as an isolated current value. Digital signals may be superimposed on the input signal in the hazardous or safe area and are transferred bi-directionally. Selectable output of current sources, sink mode or voltage output is available via DIP switches. If the HART communication resistance in the loop is too low, the internal resistance of 250Ω between terminals 6 and 8 can be used. Test sockets for the connection of HART communication are integrated into the terminal of the device. The device is rated 19...30Vdc, ≤45mA, ≤800mW. The device is a circuit board housed in a plastic enclosure which is DIN rail mounted.

KCD2-SCD-Ex1a SMART Repeater – The KCD2-SCD-Ex1a SMART Repeater is a 1-channel isolation barrier. It drives SMART I/P converters, electrical valves and positioners in hazardous areas. Digital signals are superimposed on the analog values at the field or control side and are transferred bi-directionally. Current transfers across the DC/DC converter is repeated at terminals 1 and 2. An open field circuit presents a high input impedance to the control side to allow lead breakage monitoring by control system. If the loop resistance for the digital communication is too low, an internal resistance of 250Ω between terminals 6 and 9 is available, which may be used as HART communication resistance. Socket for connection of a HART communicator are integrated into the terminals of the device. The device is rated 19...30Vdc, ≤30mA, ≤700mW. The device is a circuit board housed in a plastic enclosure which is DIN rail mounted.

KCD0-SD-Ex1.1245a Solenoid Driver – The KCD0-SD-Ex1.1245a is a 1-channel isolation barrier. It supplies power to solenoids, LED's and audible alarms located in a hazardous area. It is loop powered, so the available energy at the output is received from the input signal. The output signal has a resistive characteristic. As a result the output voltage and current are dependent on the load and the input voltage. At full load 12V at 45mA is available for the hazardous area. The device is rated 19...30Vdc, ≤72mA, <1W. The device is a circuit board housed in a plastic enclosure which is DIN rail mounted.

KCD2-SR-Ex1.LBa Isolated Switch Amplifier – The KCD2-SR-Ex1.LBa Isolated Switch Amplifier is a 1-channel isolation barrier. It transfers digital signals (NAMUR sensor/mechanical contacts) from a hazardous area to a safe area. The proximity sensor or switch controls a form A normally open relay contact for the safe area load. The normal output state can be reversed using switch S1. Switch S2 allows output II to be switched between a signal output and an error message output. Switch S3 enables or disables line fault detection of the field circuit. During an error condition, relays revert to their de-energized state and LEDs indicate the fault according to NAMUR NE44. The device is rated 19...30Vdc, ≤30mA, 500mW. The device is a circuit board housed in a plastic enclosure which is DIN rail mounted.

KCD2-SR-Ex2a Isolated Switch Amplifier – The KCD2-SR-Ex2a Isolated Switch Amplifier is 2-channel isolation barrier. It transfers digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. The proximity sensor or switch controls a form A normally open relay contact for the safe area load. The normal output state can be reversed using switches S1 and S2. Switch S3 is used to enable or disable line fault detection of the field circuit. During an error condition, relays revert to their de-energized state and LEDs

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indicate the fault according to NAMUR NE44. The device is rated 19...30Vdc, ≤30mA, 600mW. The device is a circuit board housed in a plastic enclosure which is DIN rail mounted.

See Annex for model code options and intrinsic safety output parameters.

13. Specific Conditions of Use:

See Annex

14. Test and Assessment Procedure and Conditions:

This Certificate has been issued in accordance with FM Approvals US Certification Requirements.

15. Schedule Drawings

A copy of the technical documentation has been kept by FM Approvals.

16. Certificate History

Details of the supplements to this certificate are described below:

Date	Description
17 October 2006	Original Issue.
3 October 2019	<u>Supplement 3:</u> Report Reference: – PR453184 dated 3 October 2019 Description of the Change: <ol style="list-style-type: none">1. Change to new format certificate2. Update standard editions to latest editions.3. Increase ambient temperature range for KCD2-STC and KCD2-SCD variants.4. Changes to circuitry and documents.
24 July 2023	<u>Supplement 4:</u> Report Reference: PR465721 dated 24 July 2023. Description of the Change(s): <ol style="list-style-type: none">1. Updates to KCD2-STC-Ex1 SMART Transmitter Power Supply and KCD2-SCD-Ex1 SMART Repeater2. FM3600 updated to latest edition (2022)3. FM3610, FM3611 and FM3810 updated to latest edition (2021)4. ANSI/ISA 121201:2015 updated to ANSI/UL 121201:20215. ANSI/ISA 61010-1:2015 updated to ANSI/UL 61010-1:20186. ANSI/ISA 60079-0:2013 updated to ANSI/UL 60079-0:20207. ANSI/UL 60079-7:2017 updated to ANSI/UL 60079-7:20218. ANSI/ISA 60079-11:2014 updated to ANSI/UL 60079-11:20189. ANSI/ISA 60079-15:2013 updated to ANSI/UL 60079-15:2017

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ANNEX

KCD0-SD-Ex1.1245a Solenoid Driver

Equipment Ratings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG in accordance with 116-0419
Nonincendive for Class I, Division 2, Groups ABCD
Increased Safety protection for Class I, Zone 2 with Intrinsically Safe connections to Class I, Zone 0, AEx ec [ia Ga] IIC in accordance with 116-0419

Markings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG
Class I, Division 2, Groups ABCD T4
Class I, Zone 2, AEx ec [ia Ga] IIC T4 Gc
T4, Ta = -20°C to +60°C

Description of Equipment:

KCD0-SD-Ex1.1245a. Solenoid Driver.

a = Terminal Type: Blank (Screw Terminals), .SP (Spring Terminals)

Entity Parameters:

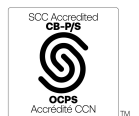
Terminals	1, 2
$V_{OC}, U_o(V)$	25.2
$I_{SC}, I_o(mA)$	110
$P_o(mW)$	693
$C_a, C_o, \text{Groups, A, B, IIC (}\mu\text{F)}$	0.107
$L_a, L_o, \text{Groups, A, B, IIC (mH)}$	2.94
$L_o/R_o, \text{Groups A, B, IIC (}\mu\text{H}/\Omega)$	51

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Specific Conditions of Use:

1. In Class I, Division 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70).
2. In Class I, Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Zone 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70). Where installed in outdoor or potentially wet locations, the enclosure shall, at a minimum, meet the requirements of IP54. Where installed in dry, clean, indoor locations, the enclosure shall, at a minimum, meet the requirements of IP4X.
3. In Class I, Zone 2 installations, the installer shall ensure protection of supply terminals against transient voltages exceeding 140% of the rated supply voltage.

KCD2-SCD-Ex1a SMART Repeater

Equipment Ratings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG in accordance with 116-0469A

Nonincendive for Class I, Division 2, Groups ABCD

Increased Safety protection for Class I, Zone 2 with Intrinsically Safe connections to Class I, Zone 0 AEx ec [ja Ga] IIC in accordance with 116-0469A

Markings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG

Class I, Division 2, Groups ABCD T4

Class I, Zone 2, AEx ec [ja Ga] IIC T4 Gc

T4, Ta = -40°C to +70°C

Description of Equipment:

KCD2-SCD-Ex1a. SMART Repeater.

a = Terminal Type: Blank (Screw Terminals), .SP (Spring Terminals)

Entity Parameters:

Terminals	1+, 2-
Voc, Uo (V)	25.2
Isc, Io (mA)	100
Po (mW)	630

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Ca, Co Groups A, B, IIC	0.1
La, Lo Groups A, B, IIC	3.5
Lo/Ro Groups A, B, IIC ($\mu\text{H} / \Omega$)	55

Specific Conditions of Use:

1. In Class I, Division 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70).
2. In Class I, Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Zone 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70). Where installed in outdoor or potentially wet locations, the enclosure shall, at a minimum, meet the requirements of IP54. Where installed in dry, clean, indoor locations, the enclosure shall, at a minimum, meet the requirements of IP4X.

KCD2-STC-Ex1a SMART Transmitter Power Supply

Equipment Ratings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG in accordance with 116-0469A
Nonincendive for Class I, Division 2, Groups ABCD
Increased Safety protection for Class I, Zone 2 with Intrinsically Safe connections to Class I, Zone 0 AEx ec [ja Ga] IIC in accordance with 116-0469A

Markings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG
Class I, Division 2, Groups ABCD T4
Class I, Zone 2, AEx ec [ja Ga] IIC T4 Gc
T4, Ta = -40°C to +70°C

Description of Equipment:

KCD2-STC-Ex1a. SMART Transmitter Power Supply.

a = Terminal Type: Blank (Screw Terminals), .SP (Spring Terminals)

Entity Parameters:

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Terminals	Uo (V)	Io (mA)	Po (mW)	Co (uF)	Lo (mH)	Lo/Ro [uH / Ω]
				A,B IIC	A,B IIC	A,B IIC
1+, 2-	25.2	100	630	0.10	3.5	55
3+, 4-	7.2	100	25	13.49	3.5	27
	Ui = 30V	Ii = 128mA	Pi = 1W			
	Ci = 5.7nF					

Specific Conditions of Use:

- In Class I, Division 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70).
- In Class I, Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Zone 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70). Where installed in outdoor or potentially wet locations, the enclosure shall, at a minimum, meet the requirements of IP54. Where installed in dry, clean, indoor locations, the enclosure shall, at a minimum, meet the requirements of IP4X.

KCD2-SR-Ex1.LBa Isolated Switch Amplifier

Equipment Ratings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG in accordance with 116-0419
 Nonincendive for Class I, Division 2, Groups ABCD
 Spark Protection for Class I, Zone 2 with Intrinsically Safe connections to Class I, Zone 0, AEx nC [ia Ga] IIC in accordance with 116-0419

Markings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG
 Class I, Division 2, Groups ABCD T4
 Class I, Zone 2, AEx nC [ia Ga] IIC T4 Gc
 T4, Ta = -20°C to +60°C

Description of Equipment:

KCD2-SR-Ex1.LBa. Isolated Switch Amplifier.

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a = Terminal Type: Blank (Screw Terminals), .SP (Spring Terminals)

Entity Parameters:

Terminals	1, 2
$V_{oc}, U_o(V)$	10.5
$I_{sc}, I_o(mA)$	17.1
$P_o(mW)$	45
$C_a, C_o, \text{Groups, A, B, IIC (}\mu\text{F)}$	2.41
$L_a, L_o, \text{Groups, A, B, IIC (mH)}$	121.5
$L_o/R_o, \text{Groups A, B, IIC (}\mu\text{H}/\Omega)$	792

Specific Conditions of Use:

1. In Class I, Division 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70).
2. In Class I, Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Zone 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70). Where installed in outdoor or potentially wet locations, the enclosure shall, at a minimum, meet the requirements of IP54. Where installed in dry, clean, indoor locations, the enclosure shall, at a minimum, meet the requirements of IP4X.
3. In Class I, Zone 2 installations, the installer shall ensure protection of supply terminals against transient voltages exceeding 140% of the rated supply voltage.

KCD2-SR-Ex2a Isolated Switch Amplifier

Equipment Ratings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG in accordance with 116-0419
Nonincendive for Class I, Division 2, Groups ABCD
Spark Protection for Class I, Zone 2 with Intrinsically Safe connections to Class I, Zone 0, AEx nC [ia Ga] IIC in accordance with 116-0419

Markings:

Associated Apparatus providing Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG
Class I, Division 2, Groups ABCD T4

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Class I, Zone 2, AEx nC [ia Ga] IIC T4 Gc
T4, Ta = -20°C to +60°C

Description of Equipment:

KCD2-SR-Ex2a. Isolated Switch Amplifier.

a = Terminal Type: Blank (Screw Terminals), .SP (Spring Terminals)

Entity Parameters:

Terminals	1, 2, 3, 4
V _{oc} , U _o (V)	10.5
I _{sc} , I _o (mA)	17.1
P _o (mW)	45
C _a , C _o , Groups, A, B, IIC (uF)	2.41
L _a , L _o , Groups, A, B, IIC (mH)	121.5
L _o /R _o , Groups A, B, IIC (uH/Ω)	792

Specific Conditions of Use:

1. In Class I, Division 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Division 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70).
2. In Class I, Zone 2 installations, the subject equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the Class I, Zone 2 wiring methods specified in the National Electrical Code (ANSI/NFPA 70). Where installed in outdoor or potentially wet locations, the enclosure shall, at a minimum, meet the requirements of IP54. Where installed in dry, clean, indoor locations, the enclosure shall, at a minimum, meet the requirements of IP4X.
3. In Class I, Zone 2 installations, the installer shall ensure protection of supply terminals against transient voltages exceeding 140% of the rated supply voltage.

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