

CERTIFICATE OF CONFORMITY



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

2. **Certificate No:** FM19US0117X

3. **Equipment:** KCD Series Transformer-Isolated Barrier
(Type Reference and Name)

4. **Name of Listing Company:** Pepperl+Fuchs

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 Class 3600:2018, FM Class 3610:2018, FM Class 3611:2018, FM Class 3810:2018,
ANSI/ISA 12.12.01:2015, ANSI/ISA 61010-1:2015, ANSI/ISA 60079-0:2013, ANSI/UL 60079-7:2017,
ANSI/ISA 60079-11:2014, ANSI/ISA 60079-15:2013

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:

KCD2-STC-Ex1a SMART Transmitter Power Supply and KCD2-SCD-Ex1a SMART Repeater: Intrinsically safe (entity) connections to Class I, II and III, Division 1, applicable Groups A, B, C, D, E, F and G; intrinsically safe (entity) connections to Class I, [AEx ia] IIC per control drawing 116-0469; suitable for Class I, Division 2, Groups A, B, C and D, T4 at Tambient = -40°C to 70°C; Increased Safety, Class I, Ex ec IIC, Tambient = -40°C to +70°C, hazardous (classified) indoor locations.

Certificate issued by:

J. E. Marquedant
Vice President, Manager, Electrical Systems

3 October 2019

Date

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

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FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
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KCD0-SD-Ex1.1245a Solenoid Driver: Intrinsically safe (entity) connections to Class I, II and III, Division 1, applicable Groups A, B, C, D, E, F and G; intrinsically safe (entity) connections to Class I, [AEx ia] IIC per control drawing 116-0419; suitable for Class I, Division 2, Groups A, B, C and D, T4 at Tambient = -20°C to 60°C; sparking, Class I, AEx nA IIC, Tambient = -20°C to +60°C, hazardous (classified) indoor locations.

KCD2-SR-Ex1.LBa Isolated Switch Amplifier and KCD2-SR-Ex2a Isolated Switch Amplifier: Intrinsically safe (entity) connections to Class I, II and III, Division 1, applicable Groups A, B, C, D, E, F and G; intrinsically safe (entity) connections to Class I, [AEx ia] IIC per control drawing 116-0419; suitable for Class I, Division 2, Groups A, B, C and D, T4 at Tambient = -20°C to 60°C; sparking, Class I, AEx nC IIC, Tambient = -20°C to +60°C, hazardous (classified) indoor locations.

11. The marking of the equipment shall include:

KCD2-STC-Ex1a and KCD2-SCD-Ex1a



CL I, DIV 2, GP A-D T4, IS circuits for CL I, II, III, DIV 1, GP A-G;
CL I ZN 2 AEx ec [ia Ga] IIC T4 Gc FM19US0117X,
CL I ZN 2 Ex ec [ia Ga] IIC T4 Gc FM18CA0116X,
installed per 116-0469.

WARNING – Substitution of components may impair intrinsic safety.
AVERTISSEMENT – La substitution de composants peut compromettre la sécurité intrinsèque.

WARNING - Do not disconnect equipment or activate switches when energized and an explosive atmosphere is present.
AVERTISSEMENT – Ne débranchez pas l'appareil ou n'actionnez pas les commutateurs si sous tension et en présence d'une atmosphère explosive.

Um = 250V

-40°C ≤ Ta ≤ +70°C

Note:

Um & ambient temperature (see note above) may be printed on the opposite side of the housing.

KCD2-SR-Ex1.LBa, KCD2-SR-Ex2a and and KCD0-SD-Ex1.1245a

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CL I, DIV 2, GP A-D, IS circuits for CL I, II, III, DIV 1, GP A-G; CL I ZN 2 AEx nA IIC (US), Ex nA II(Canada), IS circuits for CL I ZN 0 [Aex ia] IIC (US), [Ex ia] IIC (Canada) install per 116-0419. FM18CA0116X, FM19US0117X.

Temperature Code T4

WARNING: Substitution of components may impair intrinsic safety and suitability for use in Class I, Division 2 / Zone 2

AVERTISSEMENT - La substitution de composants peut compromettre la sécurité intrinsèque et l'adéquation à une utilisation en Classe I, Div. 2/Zone 2.

Note: In the case of the KCD2-SR-Ex**** devices the marking shall be:

CL I, DIV 2, GP A-D, IS circuits for CL I, II, III, DIV 1, GP A-G; CL I ZN 2 AEx nC IIC(US), Ex nC IIC(Canada), IS circuits for CL I ZN 0 [Aex ia] IIC (US), [Ex ia] IIC (Canada) install per 116-0419. FM18CA0116X, FM19US0117X.

Temperature Code T4

WARNING: Substitution of components may impair intrinsic safety and suitability for use in Class I, Division 2 / Zone 2

AVERTISSEMENT - La substitution de composants peut compromettre la sécurité intrinsèque et l'adéquation à une utilisation en Classe I, Div. 2/Zone 2.

The equipment marking contains the supply voltage range as shown in the table below and the supply current (current on the marking is not less than the value in the table below):

Assembly	Supply voltage (Vdc)	Current Drawn under Load (mA)
KCD2-SR-Ex2 KCD2-SR-Ex2SP KCD2-SR-Ex1.LB KCD2-SR-Ex1.LB.SP	19 - 30	11.0
KCD0-SD-Ex1.1245 KCD0-SD-Ex1.1245.SP	19 - 30	49



12. Description of Equipment:

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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.

Entity Parameters:

	1+, 2-	3+, 4-
Voc, Uo (V)	25.2	7.2
Isc, Io (mA)	100	100
Po (mW)	630	25
Ca, Co Groups A, B, IIC	0.1	13.49
La, Lo Groups A, B, IIC	3.5	3.5
Lo/Ro, Groups A, B, IIC (μH/Ω)	55	27

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.

Entity Parameters:

Terminals	1+, 2-
Voc, Uo (V)	25.2
Isc, Io (mA)	100
Po (mW)	630
Ca, Co Groups A, B, IIC (μF)	0.1
La, Lo Groups A, B, IIC (mH)	3.5
Lo/Ro, Groups A, B, IIC (μH/Ω)	55

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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, $\leq 72\text{mA}$, $< 1\text{W}$. The device is a circuit board housed in a plastic enclosure which is DIN rail mounted.

Entity Parameters:

Terminals	1, 2
Voc, Uo (V)	25.2
Isc, Io (mA)	110
Po (mW)	693
Ca, Co Groups A, B, IIC (μF)	0.107
La, Lo Groups A, B, IIC (mH)	2.94
Lo/Ro, Groups A, B, IIC ($\mu\text{H}/\Omega$)	51

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, $\leq 30\text{mA}$, 500mW. The device is a circuit board housed in a plastic enclosure which is DIN rail mounted.

Entity Parameters:

Terminals	1, 2
Voc, Uo (V)	10.5
Isc, Io (mA)	17.1
Po (mW)	45
Ca, Co Groups A, B, IIC (μF)	2.41
La, Lo Groups A, B, IIC (mH)	121.5
Lo/Ro, Groups A, B, IIC ($\mu\text{H}/\Omega$)	792

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

Entity Parameters:

Terminals	1, 2, 3, 4
Voc, Uo (V)	10.5
Isc, Io (mA)	17.1
Po (mW)	45
Ca, Co Groups A, B, IIC (μF)	2.41
La, Lo Groups A, B, IIC (mH)	121.5

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US Certificate Of Conformity No: FM19US0117X

Lo/Ro, Groups A, B, IIC ($\mu\text{H}/\Omega$)	792
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13. 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/MFPA 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/MFPA 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. (Not applicable to KCD2-STC-Ex1a and KCD2-SCD-Ex1a).

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 th October 2006	Original Issue.
3 October 2019	Supplement 3: Report Reference: – PR453184 dated 3 October 2019 Description of the Change: <ul style="list-style-type: none">• Change to new format certificate• Update standard editions to latest editions.• Increase ambient temperature range for KCD2-STC and KCD2-SCD variants.• Changes to circuitry and documents.

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