

CERTIFICATE OF CONFORMITY



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

2. **Certificate No:** FM19US0122X
3. **Equipment:** HiC Series
(Type Reference and Name) Transformer-Isolated Barriers

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

5. **Address of Listing Company:** Lilienthalstrasse 200
D-68307, Mannheim 31
Germany

6. The examination and test results are recorded in confidential report number:

3026498 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:

HiC2025 SMART Transmitter Power Supply, HiC2025A SMART Transmitter Power Supply and HiC2031 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 116-0470;

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

20 December 2019

Date

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

THIS CERTIFICATE MAY ONLY BE REPRODUCED IN ITS ENTIRETY AND WITHOUT CHANGE

FM Approvals LLC. 1151 Boston-Providence Turnpike, Norwood, MA 02062 USA
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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.

HiC2871 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 16-534FM-12; 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.

HiC2822 Isolated Switch Amplifier and HiC2821 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 16-534FM-12; 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:

HiC2025, HiC2025A and HiC2031:



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 FM19US0122X,
CL I ZN 2 Ex ec [ia Ga] IIC T4 Gc FM19CA0065X,
installed per 116-0470.

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

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HiC2871:



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 II(US), Ex nA II(Canada), IS circuits for CL I ZN 0 [AEx ia] IIC(US), [Ex ia] IIC(Canada) install per 16-534FM-12. FM19CA0065X, FM19US0122X.

Temperature Code T4

WARNING – Substitution of components may impair intrinsic safety.
WARNING - Explosion Hazard do not disconnect Equipment or actuate switches when a flammable or combustible atmosphere is present.

HiC2822 and HiC2821:



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 16-534FM-12. FM19CA0065X, FM19US0122X.

Temperature Code T4

WARNING – Substitution of components may impair intrinsic safety.
WARNING - Explosion Hazard do not disconnect Equipment or actuate switches when a flammable or combustible atmosphere is present.

12. Description of Equipment:

HiC2025 SMART Transmitter Power Supply – HiC2025 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. The device is rated 19...30Vdc, ≤45mA, ≤800mW. The device is a circuit board housed in a plastic enclosure which mounts on an HiC Termination Board.

Entity Parameters:

	5a, 5b	7a/1b, 5a
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

HiC2025A SMART Transmitter Power Supply – HiC2025A 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. The device is rated 19...30Vdc, ≤45mA, ≤800mW. The device is a circuit board housed in a plastic enclosure which mounts on an HiC Termination Board.

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Entity Parameters:

	5a, 5b	7a/1b, 5a
Voc, Uo (V)	25.2	1
Isc, Io (mA)	93	100
Po (mW)	586	25
Ca, Co Groups A, B, IIC	0.1	100
La, Lo Groups A, B, IIC	4.1	3.5
Lo/Ro, Groups A, B, IIC ($\mu\text{H}/\Omega$)	61	1400

HiC2031 SMART Repeater – HiC2031 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. An open field circuit presents a high input impedance to the control side to allow lead breakage monitoring by control system. The device is rated 19...30Vdc, $\leq 30\text{mA}$, $\leq 700\text{mW}$. The device is a circuit board housed in a plastic enclosure which mounts on an HiC Termination Board.

Entity Parameters:

	5a, 5b
Terminals	5a, 5b
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 ($\mu\text{H}/\Omega$)	55

HiC2871 Solenoid Driver – The HiC2871 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 mounts on an HiC Termination Board.

Entity Parameters:

	5a, 5b
Terminals	5a, 5b
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

HiC2821 Isolated Switch Amplifier – The HiC2821 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 mounts on an HiC Termination Board.

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Entity Parameters:

Terminals	5a, 5b
Voc, Uo (V)	10.5
Isc, Io (mA)	17.1
Po (mW)	45
Ca, Co Groups A, B, IIC (μ F)	2.41
La, Lo Groups A, B, IIC (mH)	121.5
Lo/Ro, Groups A, B, IIC (μ H/ Ω)	792

HiC2822 Isolated Switch Amplifier – The HiC2822 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 30mA, 600mW. The device is a circuit board housed in a plastic enclosure which mounted on an HiC Termination Board.

Entity Parameters:

Terminals	5a, 5b; 1a, 1b
Voc, Uo (V)	10.5
Isc, Io (mA)	17.1
Po (mW)	45
Ca, Co Groups A, B, IIC (μ F)	2.41
La, Lo Groups A, B, IIC (mH)	121.5
Lo/Ro, Groups A, B, IIC (μ H/ Ω)	792

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/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.

14. Test and Assessment Procedure and Conditions:

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

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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 rd October 2019	<u>Supplement 2:</u> Report Reference: – PR453189 dated 3 rd 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 HiC2025 and HiC2031 variants.• Add model variant HiC2025A.• Changes to circuitry and documents.
25 th October 2019	<u>Supplement 2- Reissue 1:</u> Report Reference: – PR453189 R1 dated 25 th October 2019. Description of the Change: Corrected typographical errors and formatting.
20 th December 2019	<u>Supplement 2- Reissue 2:</u> Report Reference: – PR453189 R2 dated 20 th December 2019. Description of the Change: Corrected typographical errors.

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