CERTIFICATE OF CONFORMITY

FM Approvals
Member of the FM Global Group

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

2. **Certificate No:** **FM19US0122X**

3. **Equipment:**
   (Type Reference and Name) **HiC Series**
   Transformer-Isolated Barriers

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:

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

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 for Equipment Ratings

11. The marking of the equipment shall include:

    See Annex for Equipment Markings

Certificate issued by:

J.E. Marquedant
VP, Manager - Electrical Systems

10 July 2023
Date

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

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SCC Accredited CB-P/S OCPS Accredité CCN

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.

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.

HiC2031 SMART Repeater – HiC2031 SMART Repeater is a 1-channel isolation barrier. It drives SMART I/P converters, electrical values 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, ≤30mA, ≤700mW. The device is a circuit board housed in a plastic enclosure which mounts on an HiC Termination Board.

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 are 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 mounts on an HiC Termination Board.

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, ≤30mA, 600mW.The device is a circuit board housed in a plastic enclosure which mounted on an HiC Termination Board.

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, ≤72mA, <1W. The device is a circuit board housed in a plastic enclosure which mounts on an HiC Termination Board.

See Annex

13. **Specific Conditions of Use:**

    1. The equipment shall be mounted within a tool-secured enclosure which is capable of accepting one or more of the wiring methods specified in the National Electrical Code (ANSI/NFPA 70).
    2. The equipment shall only be used in an area of at least pollution degree 2, as defined in IEC 60664-1
    3. The equipment shall be installed in an enclosure that provides a minimum ingress protection of IP54 in accordance with ANSI/UL 60079-0
    4. In Class I, Zone 2 installations, transient protection shall be provided that is set at a level not exceeding 140% of the peak rated voltage value at the supply terminals of the equipment

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	Supplement 2: Report Reference: – PR453189 dated 3rd October 2019. Description of the Change: 1. Change to new format certificate 2. Update standard editions to latest editions. 3. Increase ambient temperature range for HiC2025 and HiC2031 variants. 4. Add model variant HiC2025A. 5. Changes to circuitry and documents.
25 October 2019	Supplement 2- Reissue 1: Report Reference: – PR453189 R1 dated 25th October 2019. Description of the Change: Corrected typographical errors and formatting.

Date	Description
20 December 2019	Supplement 2- Reissue 2: Report Reference: – PR453189 R2 dated 20th December 2019. Description of the Change: Corrected typographical errors.
10 July 2023	Supplement 3: Report Reference: PR465164 dated 10 July 2023. Description of the Change(s): 1. Modifications to HiC2025, HiC2025A and HiC2031 Isolation Barriers 2. FM3600 updated to the latest edition (2022) 3. FM3610, FM3611 and FM3810 updated to the latest edition (2021) 4. ANSI/ISA 60079-0:2013 updated to ANSI/UL 60079-0:2020 5. ANSI/ISA 60079-7:2017 updated to ANSI/UL 60079-7:2021 6. ANSI/ISA 60079-11:2014 updated to ANSI/UL 60079-11:2018 7. ANSI/ISA 60079-15:2013 updated to ANSI/ISA 60079-15:2017 8. ANSI/ISA 121201:2015 updated to ANSI/UL 121201:2021 9. ANSI/ISA 61010-1:2015 updated to ANSI/UL 61010-1:2018

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ANNEX

HiC2025, HiC2025A, HiC2031

Equipment Ratings

Intrinsically safe connections to Class I, II and III, Division 1, applicable Groups A, B, C, D, E, F and G per control drawing 116-0470A
Increased Safety protection for Class I, Zone 2 with Intrinsically safe connections to Class I, Zone 0, AEx ec [ia Ga] IIC per control drawing 116-0470A
Nonincendive for Class I, Division 2, Groups A, B, C and D,
T4, Ta = -40°C to 70°C

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

Description of Equipment

HiC2025. SMART Transmitter Power Supply.
HiC2025A. SMART Transmitter Power Supply.
HiC2031. SMART Repeater.

Model Number	Terminals	U_o (V)	I_o (mA)	P_o (mW)	C_o (µF)			L_o (mH)			L_o / R_o [µH / Ω]		
					A, B IIC	C, E, F, G IIB, IIC	D IIA	A, B IIC	C, E, F, G IIB	D IIA	A, B IIC	C, E, F, G IIB	D IIA
HiC2025	5a, 5b	25.2	100	630	0.10	0.81	2.8	3.5	14	28	55	222	444
		C_i = 5.7 nF											
	5a, 7a/1b	7.2	100	25	13.49	239	1000	3.5	14	28	27	108	216
		U_i = 30V	I_i = 128mA	P_i = 1W									

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HiC2025A	5a, 5b	25.2	93	586	0.10	0.81	2.8	4.1	16.4	32.8	61	244	488
		C_i = 5.7 nF											
	5a, 7a/1b	1	100	25	100	1000	1000	3.5	14	28	1400	5600	11200
		U_i = 30V	I_i = 128mA	P_i = 1W									
HiC2031	5a, 5b	25.2	100	630	0.10	0.81	2.8	3.5	14	28	55	222	444
		C_i = 5.7 nF											

HiC2821, HiC2822

Equipment Ratings

Intrinsically safe connections to Class I, II, III Division 1, Groups ABCDEFG per drawing 16-534FM-12
Nonincendive for Class I, Division 2, Groups ABCD
Protected Sparking for Class I, Zone 2 with Intrinsically Safe connections to Class I, Zone 0, AEx nC [ia Ga] IIC per drawing 16-534FM-12
T4, Ta = -20°C to +60°C

Markings

Associated Apparatus providing Intrinsically Safe connections to Class I, III, III, Division 1, Groups ABCDEFG
Class I, Division 2, Groups ABCD, T4
Class I, Zone 2, AEx nC [ia Ga] IIC T4 Gc

Description of Equipment

HiC2821. Isolated Switch Amplifier.
Entity Parameters:

Terminals	5a, 5b
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 (µF)	2.41
L_a, L_o, Groups A, B, IIC (mH)	121.5

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L_o / R_o, Groups A, B, IIC (µH / Ω)	792

HiC2822. Isolated Switch Amplifier.
Entity Parameters:

Terminals	5a, 5b; 1a, 1b
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 (µF)	2.41
L_a, L_o, Groups A, B, IIC (mH)	121.5
L_o / R_o, Groups A, B, IIC (µH / Ω)	792

HiC2871

Equipment Ratings

Intrinsically Safe connections to Class I, II, III, Division 1, Groups ABCDEFG per drawing 16-534FM-12
Nonincendive for Class I, Division 2, Groups ABCD
Increased Safety protection for Class I, Zone 2 with Intrinsically Safe connection to Class I, Zone 0, AEx ec [ia Ga] IIC per drawing 16-534FM-12
T4, Ta = -20°C to +60°C

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

Description of Equipment

HiC2871. Solenoid Driver.
Entity parameters:

Terminals	5a, 5b
V_{oc}, U_o (V)	25.2

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I_{sc}, I_o (mA)	110
P_o (mW)	693
C_a, C_o Groups A, B, IIC (µF)	0.107
L_a, L_o, Groups A, B, IIC (mH)	2.94
L_o / R_o, Groups A, B, IIC (µH / Ω)	51

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