

# CERTIFICATE OF CONFORMITY



1. **HAZARDOUS (CLASSIFIED) LOCATION ELECTRICAL EQUIPMENT PER US REQUIREMENTS**
2. **Certificate No:** FM17US0370
3. **Equipment:** Z Series  
**(Type Reference and Name)** Zener Barriers
4. **Name of Listing Company:** Pepperl+Fuchs GmbH
5. **Address of Listing Company:** Lilienthalstrasse 200  
D-68307  
Mannheim 31,  
Germany
6. The examination and test results are recorded in confidential report number:  
  
2Y2A0.AX dated 15<sup>th</sup> June 1995
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 3610:2015, FM Class 3611:2004, FM Class 3810:2005
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:**  
  
Intrinsically safe connections to Class I, II, III, Groups A, B, C, D, E, F and G; Non-incendive for Class I, Division 2, Groups A, B, C and D; hazardous (classified) locations, with an ambient temperature rating of -20°C to +60°C.
11. The marking of the equipment shall include:

**Certificate issued by:**

  
\_\_\_\_\_  
J.E. Marquedant  
VP, Manager - Electrical Systems

30 October 2019  
\_\_\_\_\_  
Date

To verify the availability of the Approved product, please refer to [www.approvalguide.com](http://www.approvalguide.com)

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Class I, Division 2, Groups A, B, C, D; T5 Ta = 60°C  
Intrinsically safe connections to Class I Division 1, Groups A, B, C, D;  
Class II, Division 1, Groups E, F, G, Class III, Division 1  
or  
Class I, Division 2, Groups A, B, C, D; T5 Ta = 60°C  
Intrinsically safe connections to Class I Division 1, Groups C, D;  
Class II, Division 1, Groups E, F, G, Class III, Division 1

## 12. Description of Equipment:

**General** - The Z Series Shunt Zener Diode Safety Barriers are designed to restrict the transfer of energy, from unspecified safe area equipment to intrinsically safe circuits, through the limitation of voltage and current. The range consists of single, double, triple and quadruple channel barriers covering polarised – positive and negative, non-polarised, non-polarised-star connected barriers and diode return barriers.

**Construction** - The barriers consist of electronic components on a single printed circuit board encapsulated within a moulded plastic enclosure which incorporates two or four terminals with separate earth terminal at both the hazardous and non-hazardous area ends and an integral spring mounted foot, designed for a DIN rail.

**Ratings** - The barriers are rated for use in an ambient temperature range of -20°C to +60°C. See electrical ratings below:

Type	V <sub>oc</sub> (V)	I <sub>sc</sub> (mA)	V <sub>t</sub> (V)	I <sub>t</sub> (mA)	C <sub>a</sub> (μF)	L <sub>a</sub> (mH)
Z705	4.97	507	-	-	1000	0.10
Z710	9.77	200	-	-	3.51	0.48
Z710.CL	9.77	200	-	-	3.51	0.48
Z713	15.75	724	-	-	0.67	0.07
Z715	15.2	155	-	-	0.76	1.09
Z715.CL	15.2	155	-	-	0.76	1.09
Z715.F	15.2	155	-	-	0.76	1.09
Z715.1k	15.2	15.5	-	-	0.76	137
Z722	22.7	155	-	-	0.24	1.10
Z722.CL	22.7	155	-	-	0.24	1.10
Z728	28.0	93.0	-	-	0.13	3.91
Z728.CL	28.0	93.0	-	-	0.13	3.91
Z728.F	28.0	93.0	-	-	0.13	3.91
Z755						
Terminals 1-2	4.97	507	-	-	1000	0.10

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Terminals 3-4	4.97	507	-	-	1000	0.10
Terminals 1-4	-	-	5.97	1014	128	0.02
<b>Z757</b>						
Terminals 1-2	7.30	745	-	-	12.3	0.03
Terminals 3-4	7.30	745	-	-	12.3	0.03
Terminals 1-4	-	-	8.30	1489	6.89	0.01
<b>Z764</b>						
Terminals 1-2	11.9	12.1	-	-	1.69	220
Terminals 3-4	11.9	12.1	-	-	1.69	220
Terminals 1-4	-	-	12.9	24.3	1.28	57.0
<b>Z765</b>						
Terminals 1-2	15.2	155	-	-	0.76	1.09
Terminals 3-4	15.2	155	-	-	0.76	1.09
Terminals 1-4	-	-	16.2	309	0.62	0.20
<b>Z765.F</b>						
Terminals 1-2	15.2	155	-	-	0.76	1.09
Terminals 3-4	15.2	155	-	-	0.76	1.09
Terminals 1-4	-	-	16.2	309	0.62	0.20
<b>Z772</b>						
Terminals 1-2	22.7	155	-	-	0.24	1.10
Terminals 3-4	22.7	155	-	-	0.24	1.10
<b>Z778</b>						
Terminals 1-2	28.0	46.0	-	-	0.13	15.6
Terminals 3-4	28.0	46.0	-	-	0.13	15.6
Terminals 1-4	-	-	30.0	93.0	0.11	3.91
<b>Z779</b>						
Terminals 1-2	28.0	93.0	-	-	0.13	3.91
Terminals 1-2	28.0	93.0	-	-	0.13	3.91
<b>Z779.F</b>						
Terminals 1-2	28.0	93.0	-	-	0.13	3.91
Terminals 3-4	28.0	93.0	-	-	0.13	3.91
<b>Z786</b>						
Terminals 1-2	28.0	0.0	-	-	0.13	4.29
Terminals 3-4	28.0	0.0	-	-	0.13	4.29
Terminals 1-4	-	-	30.0	0.0	0.11	4.29
<b>Z787</b>						
Terminals 1-2	28.0	93.0	-	-	0.13	3.91

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Terminals 3-4	28.0	0.0	-	-	0.13	3.91
Terminals 1-4	-	-	30.0	93.0	0.11	3.91
<b>Z787.F</b>						
Terminals 1-2	28.0	93.0	-	-	0.13	3.91
Terminals 3-4	28.0	0.0	-	-	0.13	3.91
Terminals 1-4	-	-	30.0	93.0	0.11	3.91
<b>Z788</b>						
Terminals 1-2	28.0	93.0			0.13	3.91
Terminals 3-4	9.77	200			3.51	0.48
Terminals 1-4			29.9	296	0.12	0.21
<b>Z788.R</b>						
Terminals 1-2	28.0	93.0			0.13	3.91
Terminals 3-4	9.77	200			3.51	0.48
Terminals 1-4			29.9	296	0.12	0.21
<b>Z796</b>						
Terminals 1-2	27.5	87.7			0.15	4.71
Terminals 3-4	20.8	51.0			0.30	13.6
Terminals 1-4			29.5	139	0.12	1.60
<b>Z805</b>	-4.97	507	-	-	1000	0.10
<b>Z810</b>	-9.77	200	-	-	3.51	0.48
<b>Z810.CL</b>	-9.77	200	-	-	3.51	0.48
<b>Z813</b>	-15.75	724	-	-	0.67	0.07
<b>Z815</b>	-15.2	155	-	-	0.76	1.09
<b>Z815.CL</b>	-15.2	155	-	-	0.76	1.09
<b>Z815.F</b>	-15.2	155	-	-	0.76	1.09
<b>Z815.1k</b>	-15.2	15.5	-	-	0.76	137
<b>Z822</b>	-22.7	155	-	-	0.24	1.10
<b>Z822.CL</b>	-22.7	155	-	-	0.24	1.10
<b>Z828</b>	-28.0	93.0	-	-	0.13	3.91
<b>Z828.CL</b>	-28.0	93.0	-	-	0.13	3.91
<b>Z828.F</b>	-28.0	93.0	-	-	0.13	3.91
<b>Z855</b>						
Terminals 1-2	-4.97	507	-	-	1000	0.10
Terminals 3-4	-4.97	507	-	-	1000	0.10
Terminals 1-4	-	-	5.97	1014	128	0.02
<b>Z857</b>						

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Terminals 1-2	-7.30	745	-	-	12.3	0.03
Terminals 3-4	-7.30	745	-	-	12.3	0.03
Terminals 1-4	-	-	8.30	1489	6.89	0.01
<b>Z864</b>						
Terminals 1-2	-11.9	12.1	-	-	1.69	220
Terminals 3-4	-11.9	12.1	-	-	1.69	220
Terminals 1-4	-	-	12.9	24.3	1.28	57.0
<b>Z865</b>						
Terminals 1-2	-15.2	155	-	-	0.76	1.09
Terminals 3-4	-15.2	155	-	-	0.76	1.09
Terminals 1-4	-	-	16.2	309	0.62	0.20
<b>Z865.F</b>						
Terminals 1-2	-15.2	155	-	-	0.76	1.09
Terminals 3-4	-15.2	155	-	-	0.76	1.09
Terminals 1-4	-	-	16.2	309	0.62	0.20
<b>Z872</b>						
Terminals 1-2	-22.7	155	-	-	0.24	1.10
Terminals 3-4	-22.7	155	-	-	0.24	1.10
<b>Z878</b>						
Terminals 1-2	-28.0	46.0	-	-	0.13	15.6
Terminals 3-4	-28.0	46.0	-	-	0.13	15.6
Terminals 1-4	-	-	30.0	93.0	0.11	3.91
<b>Z879</b>						
Terminals 1-2	-28.0	93.0	-	-	0.13	3.91
Terminals 3-4	-28.0	93.0	-	-	0.13	3.91
<b>Z879.F</b>						
Terminals 1-2	-28.0	93.0	-	-	0.13	3.91
Terminals 3-4	-28.0	93.0	-	-	0.13	3.91
<b>Z886</b>						
Terminals 1-2	-28.0	0.0	-	-	0.13	4.29
Terminals 3-4	-28.0	0.0	-	-	0.13	4.29
Terminals 1-4	-	-	30.0	0.0	0.11	4.29
<b>Z887</b>						
Terminals 1-2	-28.0	93.0			0.13	3.91
Terminals 3-4	-28.0	0.0			0.13	4.29
Terminals 1-4			30.0	93.0	0.11	3.91
<b>Z887.F</b>						

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Terminals 1-2	-28.0	93.0	-	-	0.13	3.91
Terminals 3-4	-28.0	0.0	-	-	0.13	4.29
Terminals 1-4	-	-	30.0	93.0	0.11	3.91
<b>Z888</b>						
Terminals 1-2	-28.0	93.0			0.13	3.91
Terminals 3-4	-9.77	200			3.51	0.48
Terminals 1-4			29.0	293	0.12	0.21
<b>Z888.R</b>						
Terminals 1-2	-28.0	93.0			0.13	3.91
Terminals 3-4	-9.77	200			3.51	0.48
Terminals 1-4			29.0	293	0.12	0.21
<b>Z896</b>						
Terminals 1-2	-27.5	87.7			0.15	4.71
Terminals 3-4	-20.8	51.0			0.30	13.6
Terminals 1-4			29.5	139	0.12	1.60
<b>Z905</b>						
	5.10	520			1000	0.09
<b>Z910</b>						
	10.3	210			2.89	0.42
<b>Z915</b>						
	15.5	158			0.71	1.02
<b>Z915.1k</b>						
	15.5	15.8			0.71	132
<b>Z928</b>						
	28.0	93.0			0.13	3.91
<b>Z954</b>						
Terminals 1-2	5.10	433			1000	0.13
Terminals 3-2	5.10	433			1000	0.13
Terminals 4-2	5.10	433			1000	0.13
Terminals 1, 2, 3, 4			10.2	1300	2.97	0.01
<b>Z955</b>						
Terminals 1-2	5.10	520			1000	0.09
Terminals 3-4	5.10	520			1000	0.09
Terminals 1-4	-	-	10.2	1040	2.99	0.01
<b>Z960</b>						
Terminals 1-2	10.3	210	-	-	2.90	0.42
Terminals 3-4	10.3	210	-	-	2.90	0.42
Terminals 1-4			10.3	419	2.90	0.14
<b>Z960. F</b>						
Terminals 1-2	10.3	210	-	-	2.90	0.42
Terminals 3-4	10.3	210	-	-	2.90	0.42
Terminals 1-4	-	-	10.3	419	2.90	0.14

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<b>Z961</b>						
Terminals 1-2	8.7	91.8	-	-	5.9	4.30
Terminals 3-4	8.7	91.8	-	-	5.9	4.30
Terminals 1-4	-	-	17.4	184	0.346	0.62
<b>Z961.F</b>						
Terminals 1-2	9.0	91.8	-	-	5.01	4.30
Terminals 3-4	9.0	91.8	-	-	5.01	4.30
Terminals 1-4	-	-	18.0	184	0.43	0.62
<b>Z961.H</b>						
Terminals 1-2	9.63	26.3	-	-	4.41	49
Terminals 3-4	9.63	26.3	-	-	4.41	49
Terminals 1-4	-	-	18.5	52.5	0.4	12.88
<b>Z964</b>						
Terminals 1-2	12.4	12.6	-	-	1.45	204
Terminals 3-4	12.4	12.6	-	-	1.45	204
Terminals 1-4	-	-	24.7	25.2	0.18	53.1
<b>Z965</b>						
Terminals 1-2	15.5	158	-	-	0.68	1.02
Terminals 3-4	15.5	158	-	-	0.68	1.02
Terminals 1-4	-	-	15.5	316	0.68	0.19
<b>Z966</b>						
Terminals 1-2	12.4	84.0	-	-	1.45	5.14
Terminals 3-4	12.4	84.0	-	-	1.45	5.14
Terminals 1-4	-	-	24.7	168	0.18	0.83
<b>Z966.F</b>						
Terminals 1-2	12.4	84.0	-	-	1.45	5.14
Terminals 3-4	12.4	84.0	-	-	1.45	5.14
Terminals 1-4	-	-	24.7	168	0.18	0.83
<b>Z966.H</b>						
Terminals 1-2	12.31	167.6	-	-	1.46	0.84
Terminals 3-4	12.31	167.6	-	-	1.46	0.84
<b>Z967</b>						
Terminals 1-2	17.3	147	-	-	0.49	1.31
Terminals 3-4	17.3	147	-	-	0.49	1.31
Terminals 1-4	-	-	17.3	294	0.49	0.21
<b>Z972</b>						
Terminals 1-2	22.7	75.5	-	-	0.23	6.36

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Terminals 3-4	22.7	75.5	-	-	0.23	6.36
Terminals 1-4	-	-	22.7	151	0.23	1.19
<b>Z978</b>						
Terminals 1-2	28.0	46.0	-	-	0.13	15.6
Terminals 3-4	28.0	46.0	-	-	0.13	15.6
Terminals 1-4	-	-	30.0	93.0	0.11	3.91

Type	$V_{oc}$ (V)	$I_{sc}$ (mA)	$V_t$ (V)	$I_t$ (mA)	$C_a$ ( $\mu$ F)	$L_a$ (mH)
<b>Z726</b>	27.0	159.0	-	-	0.46	6.36
<b>Z728.H</b>	28.0	119.2	-	-	0.40	10.2
<b>Z728.H.F</b>	28.0	119.2	-	-	0.40	10.2
<b>Z772</b>						
Terminals 1-4	-	-	24.7	309	0.58	1.56
<b>Z779</b>						
Terminals 1-4	-	-	30.0	186	0.33	4.39
<b>Z779.F</b>						
Terminals 1-4	-	-	30.0	186	0.33	4.39
<b>Z779.H</b>						
Terminals 1-2	28.0	119.2	-	-	0.4	10.2
Terminals 3-4	28.0	119.2	-	-	0.4	10.2
Terminals 1-4	-	-	30.0	235.5	0.33	2.67
<b>Z779.H.F</b>						
Terminals 1-2, 3-4	28.0	119.2	-	-	0.40	10.2
Terminals 1-4	-	-	30.0	235.5	0.33	2.67
<b>Z787.H</b>						
Terminals 1-2	28.0	119.2	-	-	0.4	10.2
Terminals 3-4	28.0	0	-	-	0.4	78.9
Terminals 1-4	-	-	30.0	119.2	0.33	10.2
<b>Z787.H.F</b>						
Terminals 1-2	28.0	119.2	-	-	0.40	10.2
Terminals 3-4	28.0	0.0	-	-	0.40	78.9
Terminals 1-4	-	-	30.0	119.2	0.33	10.2
<b>Z788.H</b>						
Terminals 1-2	28.0	119.2	-	-	0.4	10.2

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Terminals 3-4	9.78	199.6	-	-	10.5	4.08
Terminals 1-4	-	-	30.0	321.8	0.33	1.40
<b>Z788.R.H</b>						
Terminals 1-2	28.0	119.2	-	-	0.4	10.2
Terminals 3-4	9.78	199.6	-	-	10.5	4.08
Terminals 1-4	-	-	30.0	321.8	0.33	1.4
<b>Z828.H</b>	-28.0	119.2	-	-	0.4	10.2
<b>Z828.H.F</b>	-28.0	119.2	-	-	0.40	10.2
<b>Z872</b>						
Terminals 1-4	-	-	24.7	309	0.58	1.56
<b>Z879</b>						
Terminals 1-4	-	-	30.0	186	0.33	4.39
<b>Z879.F</b>						
Terminals 1-4	-	-	30.0	186	0.33	4.39
<b>Z879.H</b>						
Terminals 1-2	-28.0	119.2	-	-	0.4	102
Terminals 3-4	-28.0	119.2	-	-	0.4	102
Terminals 1-4	-	-	30.0	235.5	0.33	2.67
<b>Z879.H.F</b>						
Terminals 1-2, 3-4	-28.0	119.2	-	-	0.40	10.2
Terminals 1-4	-	-	30.0	235.5	0.33	2.67
<b>Z887.H</b>						
Terminals 1-2	-28.0	119.2	-	-	0.4	10.2
Terminals 3-4	-28.0	0	-	-	0.4	78.9
Terminals 1-4	-	-	30.0	119.2	0.33	10.2
<b>Z887.H.F</b>						
Terminals 1-2	-28.0	119.2	-	-	0.40	10.2
Terminals 3-4	-28.0	0.0	-	-	0.40	78.9
Terminals 1-4	-	-	30.0	119.2	0.33	10.2
<b>Z888.H</b>						
Terminals 1-2	-28.0	119.2	-	-	0.4	10.2
Terminals 3-4	-9.78	199.6	-	-	10.5	4.08
Terminals 1-4	-	-	30.0	321.8	0.33	1.4
<b>Z888.R.H</b>						
Terminals 1-2	-28.0	119.2	-	-	0.4	10.2
Terminals 3-4	-9.78	199.6	-	-	10.51	4.08

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# SCHEDULE



US Certificate Of Conformity No: FM17US0370

Terminals 1-4	–	–	30.0	321.8	0.33	1.4
<b>Z966.H</b>						
Terminals 1-4	–	–	24.63	335.1	0.56	1.25

**13. Specific Conditions of Use:**

None

**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
15 <sup>th</sup> June 1995	Original Issue.
4 <sup>th</sup> January 2018	<u>Supplement 5:</u> Report Reference: – RR212188, dated 6 <sup>th</sup> December 2017. Description of the Change: Miscellaneous drawing updates, delisting of Types Z731 and Z922. Updated certificate to new format.
16 <sup>th</sup> January 2018	<u>Supplement 6:</u> Report Reference: – RR212504, dated 16 <sup>th</sup> January 2018. Description of the Change: The certificate Supplement 5 is missing some models that should have been included. Supplement 6 is to correct the certificate by adding the missing models.
9 <sup>th</sup> July 2019	<u>Supplement 7:</u> Report Reference: – RR219285, dated 9 <sup>th</sup> July 2019. Description of the Change: Change Uo values and Capacitance values on the Control Drawing for the zener barrier type Z961 to bring the Uo value in line with the IECEx approval. Updated FM Class 300 to 2018 edition.
30 <sup>th</sup> October 2019	<u>Supplement 8:</u> Report Reference: – RR220778, dated 30 <sup>th</sup> October 2019. Description of the Change: Added omitted changes from RR219285 to listing and certificate

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