



1 **EC - TYPE EXAMINATION CERTIFICATE**

2 **Equipment or Protective System Intended for use in Potentially Explosive Atmospheres
Directive 94/9/EC**

3 EC - Type Examination Certificate Number: **BAS00ATEX7096 – Issue 7**

4 Equipment or Protective System: **A Range of Z-Series Shunt Zener Diode Safety Barriers**

5 Manufacturer: **Pepperl + Fuchs GmbH**

6 Address: **Lilienthalstrasse 200, 68307 Mannheim, Germany**

7 This re-issued certificate extends EC – Type Examination Certificate No. BAS00ATEX7096 to apply to equipment or protective systems designed and constructed in accordance with the specification set out in the Schedule of the said certificate but having any variations specified in the Schedule attached to this certificate and the documents therein referred to

8 The original certificate was issued by The Electrical Equipment Certification Service, Notified Body Number 0600, which retains responsibility for its original documentation. Baseefa, Notified Body Number 1180, is responsible only for the additional work relating to this re-issued certificate and any other supplementary certificate it has issued.

The examination and test results are recorded in confidential Report No's. – No additional Reports

9 Compliance with the Essential Health and Safety Requirements has been assured by compliance with:

EN 60079-0: 2006 EN 60079-11: 2007 EN 61241-11: 2006

except in respect of those requirements listed at item 18 of the Schedule.

10 If the sign “X” is placed after the certificate number, it indicates that the equipment or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

11 This EC - TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified equipment or protective system. Further requirements of the Directive apply to the manufacturing process and supply of this equipment or protective system. These are not covered by this certificate.

12 The marking of the equipment or protective system shall include the following :

**II (I) GD [Ex ia] IIC (-20°C ≤ T_a ≤ +60°C)
[Ex iaD]**

I (M1) [Ex ia] I (-20°C ≤ T_a ≤ 60°C)

This certificate may only be reproduced in its entirety, without any change, schedule included.

Baseefa Customer Reference No. **0808**

Project File No. **10/0355**

This certificate is granted subject to the general terms and conditions of Baseefa. It does not necessarily indicate that the equipment may be used in particular industries or circumstances.

R S SINCLAIR
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On behalf of
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Baseefa is a trading name of Baseefa Ltd
Registered in England No. 4305578. Registered address as above.

Re-issued 19 November 2010 to replace original

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Schedule

14

Certificate Number BAS00ATEX7096 – Issue 7

15 Description of Equipment or Protective System

The Range of Z-Series Shunt Zener Diode Safety Barriers is designed to restrict the transfer of energy, from unspecified safe area equipment to intrinsically safe circuits by limitation of voltage and current. The range consists of barriers covering polarised – positive and negative, non-polarised and non-polarised star connected barriers. The barriers incorporate user replaceable fuses.

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

The barriers are asymmetrical and have light blue hazardous area terminals. Whilst the barriers have user replaceable fuses they also incorporate encapsulated non replaceable fuses for the protection of safety components.

Input Parameters

Single Channel Barriers - Input Terminals 7 & 8

Dual Channel Barriers - Input Terminals 5, 6, 7 & 8

$$U_m = 250V$$

Output Parameters

Single Channel Barriers – Terminals 1 & 2

Dual Channel Barriers – Terminals 1, 2 & 3

$$U_o = \text{See Ch.1 below}$$

$$I_o = \text{See Ch.1 below}$$

$$P_o = \text{See Ch.1 below}$$

Dual Channel – Terminals 2, 3 & 4

$$U_o = \text{See Ch.2 below}$$

$$I_o = \text{See Ch.2 below}$$

$$P_o = \text{See Ch.2 below}$$

Barrier	Channels	Polarity	Ext. Fuse	Int. Fuse	U_o (V)	CLR (Ω)	I_o (A)	P_o (W)	FOS IIC
Z715.F	Ch.1	Pos.	63mA	100mA	14.7	98	0.150	0.55	9.8
Z815.F	Ch.1	Neg.	63mA	100mA	14.7	98	0.150	0.55	9.8
Z728.F	Ch.1	Pos.	50mA	80mA	28	300.86	0.093	0.65	1.93
Z828.F	Ch.1	Neg.	50mA	80mA	28	300.86	0.093	0.65	1.93
Z728.H.F	Ch.1	Pos.	50mA	80mA	28	235.2	0.120	0.83	1.50
Z828.H.F	Ch.1	Neg.	50mA	80mA	28	235.2	0.120	0.83	1.50
Z765.F	Ch.1	Pos.	63mA	100mA	14.7	98	0.150	0.55	9.8
	Ch.2	Pos.	63mA	100mA	14.7	98	0.150	0.55	9.8
	Combined				14.7	49	0.300	1.10	4.9
Z865.F	Ch.1	Neg.	63mA	100mA	14.7	98	0.150	0.55	9.8
	Ch.2	Neg.	63mA	100mA	14.7	98	0.150	0.55	9.8
	Combined				14.7	49	0.300	1.10	4.9



Barrier	Channels	Polarity	Ext. Fuse	Int. Fuse	U_0 (V)	CLR (Ω)	I_0 (A)	P_0 (W)	FOS IIC
Z779.F	Ch.1	Pos.	50mA	80mA	28	300.86	0.093	0.65	1.93
	Ch.2	Pos.	50mA	80mA	28	300.86	0.093	0.65	1.93
	Combined	Not Permitted for Group IIC			28	150.43	0.186	1.30	-
Z879.F	Ch.1	Neg.	50mA	80mA	28	300.86	0.093	0.65	1.93
	Ch.2	Neg.	50mA	80mA	28	300.86	0.093	0.65	1.93
	Combined	Not Permitted for Group IIC			28	150.43	0.186	1.30	-
Z779.H.F	Ch.1	Pos.	50mA	80mA	28	235.2	0.120	0.83	1.50
	Ch.2	Pos.	50mA	80mA	28	235.2	0.120	0.83	1.50
	Combined	Not Permitted for Group IIC			28	117.75	0.238	1.67	-
Z879.H.F	Ch.1	Neg.	50mA	80mA	28	235.2	0.120	0.83	1.50
	Ch.2	Neg.	50mA	80mA	28	235.2	0.120	0.83	1.50
	Combined	Not Permitted for Group IIC			28	117.75	0.238	1.67	-
Z787.F	Ch.1	Pos.	50mA	80mA	28	300.86	0.093	0.65	1.93
	Ch.2	Pos.	50mA	80mA	28	Diode Return - See Note below			
	Combined				28	300.86	0.093	0.65	1.93
Z887.F	Ch.1	Neg.	50mA	80mA	28	300.86	0.093	0.65	1.93
	Ch.2	Neg.	50mA	80mA	28	Diode Return - See Note below			
	Combined				28	300.86	0.093	0.65	1.93
Z787.H.F	Ch.1	Pos.	50mA	80mA	28	235.2	0.120	0.83	1.50
	Ch.2	Pos.	50mA	80mA	28	Diode Return - See Note below			
	Combined				28	235.2	0.120	0.83	1.50
Z887.H.F	Ch.1	Neg.	50mA	80mA	28	235.2	0.120	0.83	1.50
	Ch.2	Neg.	50mA	80mA	28	Diode Return - See Note below			
	Combined				28	235.2	0.120	0.83	1.50
Z960.F	Ch.1	AC Star	50mA	80mA	9.94	49	0.203	0.51	24.63
	Ch.2	AC Star	50mA	80mA	9.94	49	0.203	0.51	24.63
	Combined				9.94	24.5	0.406	1.02	12.31
Z961.F	Ch.1	AC	100mA	160mA	8.7	98	0.089	0.192	56.17
	Ch.2	AC	100mA	160mA	8.7	98	0.089	0.192	56.17
	Combined				17.4	49	0.178 @ 8.7V	0.384	4.15
Z966.F	Ch.1	AC	63mA	100mA	12	147	0.082	0.24	60.97
	Ch.2	AC	63mA	100mA	12	147	0.082	0.24	60.97
	Combined				24	73.5	0.164 @ 12V	0.49	1.59

Notes:

- Zener Barriers Types Z787.F, Z787.H.F, Z887.F & Z887.H.F have channels with diode returns. The hazardous area terminals for the channels with diode returns should be regarded as 28V voltage sources. The 28V must be considered as the theoretical maximum up to which a capacitive load can be applied to the terminals due to the leakage current of the diode return. This voltage is only used in calculating the load capacitance.

LOAD PARAMETERS

The capacitance and either the inductance or the inductance to resistance ratio (L/R) of the load connected to the output terminals must not exceed the following values:

Barrier(s)	Ch.	Group IIC			Group IIB			Group IIA			Group I		
		C (µF)	L (mH)	L/R (µH/Ω)	C (µF)	L (mH)	L/R (µH/Ω)	C (µF)	L (mH)	L/R (µH/Ω)	C (µF)	L (mH)	L/R (µH/Ω)
Z715.F & Z815.F	Ch.1	0.62	1.58	64	3.86	6.32	257	14.9	12.64	515	16.9	20.74	846
Z728.F & Z828.F	Ch.1	0.083	4.11	54	0.65	16.44	218	2.15	32.88	436	3.4	53.95	716
Z728.H.F & Z828.H.F	Ch.1	0.083	2.46	42	0.65	9.87	170	2.15	19.75	341	3.4	32.40	560
Z765.F & Z865.F	Ch.1	0.62	1.58	64	3.86	6.32	257	14.9	12.64	515	16.9	20.74	846
	Ch.2	0.62	1.58	64	3.86	6.32	257	14.9	12.64	515	16.9	20.74	846
	Combined	0.62	0.39	32	3.86	1.58	128	14.9	3.16	257	16.9	5.18	423
Z779.F & Z879.F	Ch.1	0.083	4.11	54	0.65	16.44	218	2.15	32.88	436	3.4	53.95	716
	Ch.2	0.083	4.11	54	0.65	16.44	218	2.15	32.88	436	3.4	53.95	716
	Combined	Not Permitted for Grp. IIC			0.65	4.11	109	2.15	8.22	218	3.4	13.48	358
Z779.H.F & Z879.H.F	Ch.1	0.083	2.46	42	0.65	9.87	170	2.15	19.75	341	3.4	32.40	560
	Ch.2	0.083	2.46	42	0.65	9.87	170	2.15	19.75	341	3.4	32.40	560
	Combined	Not Permitted for Grp. IIC			0.65	2.46	85	2.15	4.93	170	3.4	8.10	280
Z787.F & Z887.F	Ch.1	0.083	4.11	54	0.65	16.44	218	2.15	32.88	436	3.4	53.95	716
	Ch.2	0.083	1,000	852	0.65	1,000	1,703	2.15	1,000	2,409	3.4	1,000	3,086
	Combined	0.083	4.11	54	0.65	16.44	218	2.15	32.88	436	3.4	53.95	716
Z787.H.F & Z887.H.F	Ch.1	0.083	2.46	42	0.65	9.87	170	2.15	19.75	341	3.4	32.40	560
	Ch.2	0.083	1,000	852	0.65	1,000	1,703	2.15	1,000	2,409	3.4	1,000	3,086
	Combined	0.083	2.46	54	0.65	9.87	170	2.15	19.75	341	3.4	32.40	560
Z960.F	Ch.1	3.0	0.86	70	20.0	3.45	282	100.0	6.90	564	83.0	11.32	925
	Ch.2	3.0	0.86	70	20.0	3.45	282	100.0	6.90	564	83.0	11.32	925
	Combined	3.0	0.21	35	20.0	0.86	141	100.0	1.72	282	83.0	2.83	462
Z961.F	Ch.1	5.9	4.48	184	50.0	17.95	736	1,000	35.91	1,473	450	58.91	2,416
	Ch.2	5.9	4.48	184	50.0	17.95	736	1,000	35.91	1,473	450	58.91	2,416
	Combined	0.346	1.12	92	2.02	4.48	368	8.40	8.97	736	10.4	14.72	1,208
Z966.F	Ch.1	1.41	5.28	145	9.00	21.15	580	36.0	42.30	1,161	35.0	69.40	1,905
	Ch.2	1.41	5.28	145	9.00	21.15	580	36.0	42.30	1,161	35.0	69.40	1,905
	Combined	0.125	1.32	72	0.93	5.28	290	3.35	10.57	580	4.6	17.35	952

Notes:

- The above load parameters apply when one of the two conditions below is given:
 - the total L_i of the external circuit (excluding the cable) is $< 1\%$ of the L_o value or
 - the total C_i of the external circuit (excluding the cable) is $< 1\%$ of the C_o value.
- The above parameters are reduced to 50% when both of the two conditions below are given:
 - the total L_i of the external circuit (excluding the cable) is $\geq 1\%$ of the L_o value and
 - the total C_i of the external circuit (excluding the cable) is $\geq 1\%$ of the C_o value.



- The reduced capacitance of the external circuit (including cable) shall not be greater than 1 μ F for Group IIB and 600nF for Group IIC.

16 Report Number

None.

17 Special Conditions for Safe Use

None.

18 Essential Health and Safety Requirements

All relevant Essential Health and Safety Requirements are covered by the standards listed at item 9.

19 Drawings and Documents

No new drawings were submitted for this issue of certificate.

Current drawings associated with this certificate.

Number	Sheet	Issue	Date	Description
251-0363A	1 of 1	A	02/02/99	Circuit Diagram (Ref) for Z787.F, Z887.F, Z787.H.F and Z887.H.F
251-0366A	1 of 1	A	12/02/99	Circuit Diagram for Single Channel Positive and Negative Polarity Versions. (with replacement fuse)
251-0367A	1 of 1	A	12/02/99	Circuit Diagram for Dual Channel Positive and Negative Polarity Versions. (with replaceable fuse)
251-0368A	1 of 1	A	12/02/99	Circuit Diagram for 3 Diode, Single Channel, Positive and Negative Polarity Versions. (with replaceable fuse)
251-0369A	1 of 1	A	15/02/99	Circuit Diagram for 3 Diode Dual Channel, Positive and Negative Polarity Versions. (with replaceable fuse)
251-0370A	1 of 1	A	12/02/99	Circuit Diagram for Dual Channel A.C. Versions (with replaceable fuse)
251-0371A	1 of 1	A	05/03/99	Circuit Diagram for Dual Channel 9 Diode A.C. Versions (with replaceable fuses)
252-1267D	1 & 2	D	05/03/04	Parts List for Z787.F & Z887.F
252-1268C	1 & 2	C	05/03/04	Parts List for Z787.H.F & Z887.H.F
252-1269A	1 & 2	A	02/03/99	Parts List for Z728.F & Z828.F
252-1270A	1 & 2	A	02/03/99	Parts List for Z728.H.F & Z828.H.F
252-1271B	1 & 2	B	02/05/00	Parts List for Z779.F and Z879.F
252-1272B	1 & 2	B	02/05/00	Parts List for Z779.H.F and Z879.H.F
252-1273B	1 & 2	B	02/05/00	Parts List for Z961.F
252-1274B	1 & 2	B	02/05/00	Parts List for Z966.F
252-1275A	1 & 2	A	02/03/99	Parts List for Z715.F and Z815.F
252-1276B	1 & 2	B	02/05/00	Parts List for Z765.F and Z865.F
252-1277B	1 & 2	B	27/01/00	Parts List for Z960.F
253-0183D	1 of 1	D	07/06/04	Component Overlay (Ref.) for Z787.F, Z787.H.F (Positive) & Z887.F, Z887.H.F (Negative) Polarity Barriers



Number	Sheet	Issue	Date	Description
253-0184A	1 of 1	A	16/02/99	Component Overlay for Single Channel, Positive and Negative Polarity Versions (with replaceable fuse)
253-0185C	1 of 1	C	07/06/04	Component Overlay for Dual Channel, Positive and Negative Polarity Versions. (with replaceable fuse)
253-0186A	1 of 1	A	16/02/99	Component Overlay for 3 Diode, Single Channel, Positive and Negative Polarity Versions (with replaceable fuse)
253-0187C	1 of 1	C	07/06/04	Component Overlay for 3 Diode Dual Channel, Positive and Negative Polarity Versions (with replaceable fuse)
253-0188C	1 of 1	C	07/06/04	Component Overlay for Dual Channel A.C. Versions (with replaceable fuse)
253-0189E	1 of 1	E	07/06/04	Component Overlay for A.C. Star Connected 9 Diode Barrier (with replaceable fuse)
254-0296B	1 of 1	B	2004-May-02	Isolation Plate for Zener Barriers with Replaceable Fuses
255-1452E	1 to 4	E	07/06/04	P.C.B Master for the Zener Barrier with Replaceable Fuses
255-1454D	1 to 4	D	07/06/04	P.C.B Master for A.C. Star Connected Zener Barriers with Replaceable Fuses
257-0210B	1 & 2	B	07/06/04	P.C.B. Lacquering Details for Barrier with Replaceable Fuses
257-0211B	1 & 2	B	07/06/04	P.C.B. Lacquering Details for A.C. Star Connected Zener Barrier with Replaceable Fuses
257-5068	1 of 1	Original	2004-May-25	Modification Zener Barrier Z...F (PCB 255-1452D & 255-1454C)
266-028BS-04A	1 & 2	A	2009-Nov-09	General Assembly - Z7.., Z8.. & Z9.. Series Zener Barriers with Replaceable Fuses
266-028BS-10	1 to 3	Original	2009-Nov-09	Type Label (ATEX) Z-Series Shunt Zener Diode Safety Barriers with replaceable fuse
Nr 4-8117	1 of 1	B	20/05/98	PCB Mounted Replaceable Fuse Contact

20 Certificate History

Certificate No.	Date	Comments
BAS00ATEX7096	5 June 2000	The release of the prime certificate. The associated test and assessment against the requirements of EN 50014: 1997 + Amendments 1 & 2 and EN 50020: 1994 is documented in Test Report No. 99(C)0210.
BAS00ATEX7096/1	26 March 2001	To permit a minor change to printed circuit board 255-1452 not affecting the original assessment.
BAS00ATEX7096/2	18 December 2001	To permit minor changes to the layout of the certification label and the addition of an alternative place of manufacture.
BAS00ATEX7096/3	23 March 2004	To permit the replacement of one type of diode in the design with an equivalent device.



Certificate No.	Date	Comments
BAS00ATEX7096/4	16 June 2004	To permit the introduction of modifications to the dual channel barriers using existing PCB's 255-1452D and 255-1454C and existing isolation plate 254-0296A. Also to permit the introduction of a longer slot in PCB's 255-1452E and 255-1454D and the extended isolation plate 254-0296B used on dual channel barriers.
BAS00ATEX7096/5	21 July 2006	To permit alternative enclosure materials to be specified not affecting the original assessment. General Assembly Drawing No. 254-0280A replaced.
BAS00ATEX7096 Issue 6	16 December 2009	<p>The certificate incorporates previously issued primary & supplementary certificates into one certificate and confirms the current design meets the requirements of EN 60079-0: 2006, EN 60079-11: 2007 & EN 61241-11: 2006 including the revision of the equipment marking and load parameters in accordance with these standards.</p> <p>All models of the barriers were additionally assessed as Associated Electrical Apparatus to category [Ex ia] I in an ambient temperature range of -20°C to +60°C. The equipment markings were revised to include the group I markings and the load parameters listed in section 15 above revised to include group I parameters.</p> <p>The above assessment is documented in Certification Report No. 08(C)0829.</p> <p>The certificate's listed manufacturer was also changed to: Pepperl + Fuchs GmbH, Lilienthalstrasse 200, 68307 Mannheim, Germany.</p>
BAS00ATEX7096 Issue 7	14 May 2010	This issue of the certificate adds the Group IIB and IIA load parameter figures to the equipment description. This addition does not affect the original assessment.
For drawings applicable to each issue, see original of that issue.		