

1 **EU - TYPE EXAMINATION CERTIFICATE**

2 **Safety Device, Controlling Device or Regulating Device intended for use outside a potentially explosive atmosphere but required for or contributing to the safe functioning of Equipment and Protective Systems with respect to the risks of explosion Directive 2014/34/EU**

3 EU - Type Examination Certificate Number: **BAS01ATEX7218 – Issue 7**

3.1 In accordance with Article 41 of Directive 2014/34/EU, EC-Type Examination Certificates referring to 94/9/EC that were in existence prior to the date of application of 2014/34/EU (20 April 2016) may be referenced as if they were issued in accordance with Directive 2014/34/EU. Supplementary Certificates to such EC-Type Examination Certificates, and new issues of such certificates, may continue to bear the original certificate number issued prior to 20 April 2016.

4 Product: **MTL Series Shunt Zener Diode Barriers (IIB)**

5 Manufacturer: **Eaton Electric Limited**

6 Address: **Great Marlings, Butterfield, Luton, Bedfordshire, LU2 8DL, United Kingdom**

7 This re-issued certificate extends EC Type Examination Certificate No. BAS01ATEX7218 to apply to product 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 SGS Fimko Oy, Notified Body number 0598, in accordance with Article 17 of Directive 2014/34/EU of the European Parliament and of the Council, dated 26 February 2014, certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of products intended for use in potentially explosive atmospheres given in Annex II to the Directive.

8.1 The original certificate was issued by The Electrical Equipment Certification Service (UK Notified Body 0600). It, and any supplements previously issued by SGS Baseefa Ltd (UK Notified Body 1180) have been transferred to the supervision of SGS Fimko Oy (EU Notified Body 0598). The original certificate number is retained.

The examination and test results are recorded in confidential Report No. **See Certificate History**

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

EN IEC 60079-0: 2018 EN 60079-11: 2012

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 product is subject to the Specific Conditions of Use specified in the schedule to this certificate.

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

12 The marking of the product shall include the following:

Ⓢ II (1) GD [Ex ia Ga] IIB [Ex ia Da] IIIC (-20°C ≤ T_a ≤ +60°C)

SGS Fimko Oy Customer Reference No. **0703**

Project File No. **23/0134**

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SGS Fimko Oy

Takomotie 8
FI-00380 Helsinki, Finland
Telephone +358 (0)9 696 361
e-mail sgs.fimko@sgs.com
web site www.sgs.fi

Business ID 0978538-5 Member of the SGS Group (SGA SA)



Mikko Välimäki
Authorised Signatory for SGS Fimko Oy

13 **Schedule**

14 **Certificate Number BAS01ATEX7218 - Issue 7**

15 **Description of Product**

The MTL7700 Series Shunt Zener Diode Barriers are 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 single and dual channel barriers covering positive polarised and diode return barriers. The barriers may have the non-hazardous supply provided by a power bus, where adjacent barriers are connected together via a power bus terminal (link).

The barriers consist of electronic components on a single printed circuit board encapsulated within a moulded plastic enclosure which incorporates one or two pairs of sockets at each end of the barrier. Circuits are connected to the socket via plugs which incorporate a screw terminal. When fitted with the screw terminals the enclosure meets the requirements of IP20. The barrier is connected to earth via a spring mounted foot on to a DIN rail or alternatively a single high integrity screw terminal. The barriers are asymmetrical and have a blue label defining the hazardous area terminals. Barriers may be fitted adjacent to each other on the DIN rail.

Input Parameters

Single Channel - Terminal 1 wrt 2 (including DIN Rail Foot)

Dual Channel - Terminal 1 & 2 wrt to DIN Rail Foot

$$U_m = 250V$$

Output Parameters

Single Channel 1 - Terminal 3 wrt 4 (including DIN Rail Foot)

Dual, Channel 1 - Terminal 3 wrt to DIN Rail Foot

$$U_o = \text{See a or a1 below} \quad C_i \text{ and } L_i = 0$$

$$I_o = \text{See a or a1 below}$$

$$P_o = \text{See a or a1 below}$$

Dual Channel 2 - Terminal 4 wrt to DIN Rail Foot

$$U_o = \text{See a2 below} \quad C_i \text{ and } L_i = 0$$

$$I_o = \text{See a2 below}$$

$$P_o = \text{See a2 below}$$

Type	Description	DC/AC		U _o (V)	R _{min} (Ω)	I _o (mA)	P _o (W)
MTL7707P	28V, 164R	+(PB)	a1	28	164	171	1.20
	Diode		a2	28	† (see note 3)		
			b	28	164	171	1.20
MTL7729P	28V, 164R	+(PB)	a	28	164	171	1.20

Reference to data in the standard shows that with the maximum supply current and voltage as defined in the above table, such a value has a factor of safety of at least 1.5 for Group IIB.

Notes:

1. + (PB) - Positive polarity shunt zener diode barrier which may have the non-hazardous supply provided by a power bus. Adjacent barriers are connected together via a bus power terminals
 Diode - diode return barrier
2. Circuit configuration for output parameters
 - a - Single channel
 - a1 - First channel of a dual channel barrier
 - a2 - Second channel of a dual channel barrier
 - b - Both channels of a dual channel barrier connected in parallel, with respect to earth.
3. The hazardous area terminals of each of the barrier outputs marked † must be considered at the voltage U_o . This is considered as the theoretical maximum to which a capacitive load across the hazardous area terminals could become charged by leakage through the series blocking diodes. This voltage does not contribute to the short circuit

Load Parameters

The capacitance or 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.

Type	ac/dc		IIB*			IIA		
			C (μ F)	L (mH)	L/R (μ H/ Ω)	C (μ F)	L (mH)	L/R (μ H/ Ω)
MTL7707P	+	a1	0.65	5.34	119	2.15	10.73	238
		a2	0.65	-	-	2.15	-	-
		b	0.65	5.34	119	2.15	10.73	238
MTL7729P	+	a	0.65	5.65	119	2.15	11.34	238

* Group IIB parameters also applicable for associated apparatus [Ex ia Da] IIIC

Notes:

- 1) 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.
- 2) 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 1μ F for Groups IIIC, IIB & IIA.

Variation 5.1

To permit the use of the following load parameters when connecting to an Ex ic system. These parameters give a factor of safety of at least 1 for Gas Group IIC.

The capacitance or 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.

Type	ac/dc		IIB*			IIA		
			C (μ F)	L (mH)	L/R (μ H/ Ω)	C (μ F)	L (mH)	L/R (μ H/ Ω)
MTL7707P	+	a1	1.65	10.21	267	6.60	21.88	535
		a2	1.65	-	-	6.60	-	-
		b	1.65	10.21	267	6.60	21.88	535
MTL7729P	+	a	1.65	10.21	267	6.60	21.88	535

* Group IIB parameters also applicable for associated apparatus [Ex ic Dc] IIIC

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 1μ F for Groups IIIC, IIB & IIA.

16 Report Number

See Certificate History

17 Specific Conditions of Use

None

18 Essential Health and Safety Requirements

In addition to the Essential Health and Safety Requirements (EHSRs) covered by the standards listed at item 9, the following are considered relevant to this product, and conformity is demonstrated in the report:

Clause	Subject	Compliance
1.2.7	Protection against other hazards (LVD type requirements, etc.)	Manufacturer responsibility
1.2.8	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
1.4.1	External effects	User/Installer responsibility
1.4.2	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

No new drawings were submitted for this issue of the certificate.

Current drawings which remain unaffected by this issue:

Number	Sheet	Issue	Date	Description
CI7707-2	4 of 4	6	7.16	MTL7707P+ Shunt Diode Safety Barrier Certification Label
CI7729-1	4 of 4	4	9.16	MTL7729P+, MTL7729P- Shunt Diode Safety Barrier Certification Label
CI7700-1* ¹	1 of 4	5	9.02	MTL 7700 Series – Shunt Zener Diode Safety Barriers General Arrangement :- External Details
CI7700-1* ¹	2 of 4	4	4.02	MTL 7700 Series – Shunt Zener Diode Safety Barriers General Arrangement :- Assembly Details
CI7700-1* ¹	3 of 4	3	9.02	MTL 7700 Series – Shunt Zener Diode Safety Barriers General Arrangement :- Component Details

Number	Sheet	Issue	Date	Description
CI7700-1* ¹	4 of 4	3	1.15	MTL7700 Series Barriers, Diode Pulse and Storage Temperature Test
CI7700-2* ¹	1 of 16	3	4.02	MTL7700 Series PCB947 Track Layout
CI7700-2* ¹	12 of 16	2	4.02	MTL7700 Series PCB965 Track Layout
CI7707-2* ²	1 of 4	2	4.02	MTL7707P+ Shunt Diode Safety Barrier Parts List
CI7707-2* ²	2 of 4	1	2.02	MTL7707P+ Shunt Diode Safety Barriers Circuit Diagram
CI7707-2* ²	3 of 4	2	5.02	MTL7707P+ Shunt Diode Safety Barriers Component Layout
CI7729-1* ²	1 of 4	6	1.15	MTL7729P+, MTL7729P- Shunt Diode Safety Barriers Parts List
CI7729-1* ²	2 of 4	4	6.02	MTL7729P+, MTL7729P- Shunt Diode Safety Barriers Circuit Diagram
CI7729-1* ²	3 of 4	3	6.02	MTL7729P+, MTL7729P- Shunt Diode Safety Barriers Component Layout
SCI-950	1 of 1	2	2.02	Correlation between MTL7700 Barrier and MTL7000 and MTL700 Barrier (IIB)

Drawings marked *¹ are also associated with IECEx Certificate No's IECEx BAS 04.0025, and ATEX Certificate No. BAS01ATEX7217.

Drawings marked *² are also associated with IECEx Certificate No. IECEx BAS 04.0025.

20 Certificate History

Certificate No.	Date	Comments
BAS01ATEX7218	8 August 2001	The release of the prime certificate. The associated test and assessment against the requirements of EN 50014: 1997 + Amds 1 & 2 and EN 50020: 1994 is documented in Certification Report No. 00(C)1001.
BAS01ATEX7218/1	4 December 2001	To permit: - i) Minor drawing changes associated with the MTL7729P. ii) Zener diodes D2, D3, D4, D8, D9 and D10 on the MTL7729P to be increased in value from 10.8V to 11.8V. The output voltage remains unchanged. The associated test and assessment is documented in Certification Report No. 00(C)1001/1.
BAS01ATEX7218/2	28 March 2002	To permit the addition of the MTL7707P+ Shunt Zener Diode Barrier to those listed in the original schedule. The associated test and assessment is documented in Certification Report No. 01(C)1169.
BAS01ATEX7218/3	9 July 2002	To permit: - i) The alternative fuse arrangements to be deleted from the MTL7729P. ii) Minor mechanical changes to the general arrangement. iii) The output characteristics of the MTL7707P to be altered from I _o = 164mA to I _o = 171mA. The associated test and assessment is documented in Certification Report No. 01(C)1169/1.

Certificate No.	Date	Comments
BAS01ATEX7218/4	29 October 2002	To permit: - i) The use of an alternative enclosure material. ii) Minor mechanical changes to the enclosure iii) Minor drawing changes not affecting the original assessment.
BAS01ATEX7218 Issue 5	5 February 2015	This issue of the certificate incorporates previously issued primary & supplementary certificates into one certificate and confirms the current design meets the requirements of EN 60079-0: 2012 & EN 60079-1: 2012 including the revision of the equipment marking in accordance with these standards. This issue of the certificate also permits the use of alternative parameters when connected to an Ex ic system. See Variation 5.1 in the certificate schedule for the parameters. The test and assessment of the above is documented in Certification Report No. GB/BAS/ExTR14.0350/00.
BAS01ATEX7218 Issue 6	12 October 2016	i) To permit the manufacturer's name to be changed on page 1 of the certificate and on the equipment marking. ii) To confirm the current designs of the MTL7700 Series Shunt Zener Diode Barriers (IIB) have been reviewed against EN 60079-0: 2012 + A11: 2013 in respect of the differences from EN 60079-0: 2012, and none of the differences affect the equipment. The associated assessment is documented in Certification Report No. GB/BAS/ExTR16.0248/00.
BAS01ATEX7218 Issue 7	20 March 2023	To confirm that the current designs for the MTL7700 Series Shunt Zener Diode Barriers (IIB) have been reviewed against EN IEC 60079-0: 2018 in respect of the differences from EN 60079-0: 2012 +A11:2013 and none of the differences affect the equipment. The associated assessment is documented in Report No. 23(C)0134. Project File No: 23/0134.

For drawings applicable to each issue, see original of that issue.