

1 **UK-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 Product and Protective Systems with respect to the risks of explosion**
UKSI 2016:1107 (as amended) – Schedule 3A, Part 1

3 UK-Type Examination **BAS21UKEX0441**
Certificate Number:

4 Product: **MTL7700 Series Shunt Zener Diode Barriers (IIB)**

5 Manufacturer: **Eaton Electric Limited**

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

7 This product and any acceptable variation thereto is specified in the schedule to this certificate and the documents therein referred to.

8 SGS Baseefa, Approved Body number 1180, in accordance with Regulation 43 of the Equipment and Protective Systems Intended for Use in Potentially Explosive Atmospheres Regulations 2016, UKSI 2016:1107 (as amended), 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 Schedule 1 of the Regulations.

The examination and test results are recorded in confidential Report No. **21(C)0386/02**

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 UK-TYPE EXAMINATION CERTIFICATE relates only to the design and construction of the specified product. Further requirements of the Regulations 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 (-20°C ≤ T_a ≤ +60°C)
[Ex ia Da] IIIC (-20°C ≤ T_a ≤ +60°C)

SGS Baseefa Customer Reference No. **0703**

Project File No. **21/0386**

This document is issued by the Company subject to its General Conditions for Certification Services accessible at <http://www.sgs.com/en/Terms-and-Conditions.aspx> and the Supplementary Terms and Conditions accessible at <http://www.sgs.com/SGSBaseefa/Terms-and-Conditions.aspx>. Attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any holder of this document is advised that information contained herein reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. It does not necessarily indicate that the equipment may be used in particular industries or circumstances. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents. This document cannot be reproduced except in full, schedule included, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law.

SGS Baseefa Limited

Rockhead Business Park, Staden Lane,
Buxton, Derbyshire SK17 9RZ

Telephone +44 (0) 1298 766600 Fax +44 (0) 1298 766601

e-mail baseefa@sgs.com web site www.sgs.co.uk/sgsbaseefa

Registered in England No. 4305578.

Registered address: Rossmore Business Park, Ellesmere Port, Cheshire, CH65
3EN



R S Sinclair

R S SINCLAIR
TECHNICAL MANAGER
On behalf of SGS Baseefa Limited

13

Schedule

14

Certificate Number BAS21UKEX0441

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:

- + (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 (Ex ia & Ex ib)

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 1 μ F for Groups IIB, IIA & I and 600nF for Group IIC.

The values of L_o and C_o determined by this method shall not be exceeded by the sum of all the L_i plus cable inductances in the circuit and the sum of all of the C_i plus cable capacitances respectively.

Load Parameters (Ex ic)

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:

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 $1\mu\text{F}$ for Groups IIIC, IIB & IIA.

16 Report Number

21(C)0386/02

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
13	Protection against other hazards (LVD type requirements, etc.)	Manufacturer responsibility
14	Overloading of equipment (protection relays, etc.)	User/Installer responsibility
22(1)	External effects	User/Installer responsibility
22(2)	Aggressive substances, etc.	User/Installer responsibility

19 Drawings and Documents

Number	Sheet	Issue	Date	Description
CI7729-1	4 of 4	5	8.21	MTL7729P+, MTL7729P- Shunt Diode Safety Barrier Certification Label
CI7707-2	4 of 4	7	8.21	MTL7707P+ Shunt Diode Safety Barrier Certification Label

For all other drawings see BAS01ATEX7218 Issue 5