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F 08 CE Rev. 02

1) **Ex EQUIPMENT TYPE EXAMINATION REPORT**

2) TE Report Number: **KLPL/Ex/23-010 Issue no.00** **Dated: 17.01.2023**

3) **Ex Equipment:** **MTL5541A Single Channel Current Repeater and MTL5544A Two Channel Current Repeater**

4) **Manufacturer:** **MTL Instruments Private Limited,**
#3, Old Mahabalipuram Road, Shollinganallur, Chennai – 600119, INDIA.

5) This equipment and any acceptable variation thereto are specified in the schedule to this report and the documents therein referred to

6) Karandikar Laboratories Pvt. Ltd. reports that this equipment has been found to comply with requirements of the following standards relating to the design and construction of equipment for explosive gas/dust atmospheres as applicable.

7) This TE Report was issued as verification that a sample, was assessed, tested and found to comply with the IS / IEC standards listed below.
IS/IEC 60079-0: 2017 & IS/IEC 60079-11: 2011

8) The Examination and Test results are recorded in KLPL's confidential
Report No.: KLPL/Ex/MTL-23/005 **Dated: 17.01.2023**

9) The sign X if placed after the TE report number; it indicates that the equipment is subject to specific conditions of use specified in the schedule to this TE Report.

10) This Report does not indicate compliance with electrical safety and performance requirements other than those expressly included in the above listed standards.

11) The marking of the Equipment shall include the following:
Ex Code:
[Ex ia Ma] I (-20°C ≤ Ta ≤ +60°C)
[Ex ia Ga] IIC (-20°C ≤ Ta ≤ +60°C)
[Ex ia Da] IIIC (-20°C ≤ Ta ≤ +60°C)

KARANDIKAR LABORATORIES PVT. LTD. BOISAR

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SCHEDULE

12) **Details of Type Examination Reports Issued: -**

TE Report No.	Issue No.	Report No.	Date	Reason for Issue
KLPL/Ex/23-010	00	KLPL/Ex/MTL-23/005	17.01.2023	Original issue

13) **Description of equipment**

The MTL5544A Two Channel Current Repeater is designed to repeat up to two 4-20mA current signals from separately powered 2-Wire 4/20mA transmitters located in the hazardous area to unspecified apparatus in the non-hazardous area, whilst restricting the transfer of energy from unspecified non-hazardous area apparatus to the intrinsically safe circuits by the limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by connection of a hand-held communicator (HHC).
The MTL5544A Two Channel Current Repeater comprises four isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, fuses, zener diodes and resistors providing voltage and current limitation on each channel. The above, together with other electronic components are mounted on a single printed circuit board and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections. LED indication is provided for power-on.
The MTL5541A Single Channel Current Repeater is a depopulated version of the MTL5544A and has only one channel populated.
The degree of ingress protection of IP 20 as per IS/IEC 60529: 2001 is achieved by enclosure.

14) **Model Designation:**

Model No.	Product	Rating
MTL5544A	Two Channel Current Repeater	Refer Point 17 below
MTL5541A	Single Channel Current Repeater	

15) **Drawings & Documents**

Drawing Title	Document Number	Rev. No.	Date MM.YY	No. of Pages
MTL4500 and MTL5500 Conformal Coating	CI4500-6 (I)	1	12.10	1 of 1
PARTS LIST FOR MTL4541A/MTL4544A/MTL5541A & MTL5544A	CI4541-2 (I)	1	10.08	1 of 8
CIRCUIT DIAGRAM FOR MTL4541A/MTL4544A/MTL5541A & MTL5544A	CI4541-2 (I)	1	11.08	2 of 8
CIRCUIT DIAGRAM FOR MTL4541A/MTL4544A/MTL5541A & MTL5544A	CI4541-2 (I)	1	11.08	3 of 8

MTL4541A/MTL4544A/MTL5541A & MTL5544A TRACK LAYOUT	CI4541-2 (I)	1	11.08	4 of 8
MTL4541A/MTL4544A/MTL5541A & MTL5544A COMPONENT LAYOUT	CI4541-2 (I)	2	1.13	5 of 8
PCB DETAIL FOR TPL300	CI4541-2 (I)	1	11.08	6 of 8
PCB DETAIL FOR TPL301	CI4541-2 (I)	1	11.08	7 of 8
New 5500 outline	CI5500-100 (I)	3	1.13	1 of 1
MTL5541A SIDE LABEL	CI5541A-701	1	1.23	1 of 1
MTL5544A SIDE LABEL	CI5544A-701	1	1.23	1 of 1
PARTS LIST FOR MTL5541A	CI4541-3 (I)	1	12.22	1 to 3
PARTS LIST FOR MTL5544A	CI4544-3 (I)	1	12.22	1 to 4

Drawings listed above are finally accepted as accurately representing the product for which *this evaluation report has been prepared. These drawings provide necessary information as required by the above referred standards.*

16) **Temperature Class:**

MTL5544A Two Channel Current Repeater and MTL5541A- Single Channel Current Repeater are an associated apparatus which will be placed in a non-Hazardous area and does not require a temperature class.

17) **Electrical Rating:**

Non-Hazardous Area Terminals 13 to 14

Um = 253 V r.m.s.

The apparatus is designed to operate on the above terminals from a d.c. Supply voltage of up to 35 Vdc.

Hazardous Area Terminals 2 w.r.t. 1 (Channel 1) or

Hazardous Area Terminals 5 w.r.t. 4 (Channel 2 - MTL5544A model)

Uo = 8.6 V, Io = 0, Po = 0 Ci = 0, Li = 0

This output voltage does not contribute to the short circuit spark risk, but must be considered for the calculation of load capacitance.

Each hazardous area channel is also considered suitable for the connection of an external intrinsically safe source with a Uo = 30 V and Io = 100 mA having a source resistance of Uo/Io to be connected to hazardous area terminals 2 w.r.t. 1 - Channel 1 and 5 w.r.t. 4 – Channel 2.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous

area cable must not exceed the values as detailed in the original schedule or the certificate relating to the external intrinsically safe source.

Each channel must be considered as a separate intrinsically safe circuit.

Hazardous Area Terminals 5 w.r.t. 1 (Channels 1 & 2 combined with terminals 2 & 4 connected together - MTL5544A model)

Uo = 17.2 V, Io = 0, Po = 0 Ci = 0, Li = 0

This output voltage does not contribute to the short circuit spark risk, but must be considered for the calculation of load capacitance.

The connection of channel 1 and 2 together is also considered suitable for the connection of an external intrinsically safe source with a Uo = 30 V and Io = 100 mA having a source resistance of Uo/Io to be connected to hazardous area terminals 5 w.r.t. 1.

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area cable must not exceed the values as detailed in the original schedule or the certificate relating to the external intrinsically safe source.

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

TABLE 1

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	L/R RATIO (µH/ohm)
Hazardous Area Terminals 2 w.r.t. 1 (Channel 1) or 5 w.r.t. 4 (Channel 2 – MTL5544Amodel only)			
IIC	6.2	5.01	1351
IIB**	55	20.06	5406
IIA	1000	40.12	10813
I	1000	65.82	17740
Hazardous Area Terminals 5 w.r.t. 1 (Channels 1 & 2 combined – MTL5544A models only)			
IIC	0.36	5.01	675
IIB**	2.11	20.06	2703
IIA	8.7	40.12	5406
I	12.16	65.82	8870

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

Note:

The above load parameters apply when one of the two conditions below is given:

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The total Li of the external circuit (excluding the cable) is < 1% of the Lo, value or

The total Ci of the external circuit (excluding the cable) is < 1% of the Co, value.

The above parameters are reduced to 50% when both of the two conditions below are given:

The total Li of the external circuit (excluding the cable) is ≥ 1 % of the Lo, value and

The total Ci of the external circuit (excluding the cable) is ≥ 1 % of the Co value.

The reduced capacitance of the external circuit (including cable) shall not be greater than 1 µF for Groups IIB, IIA & I and 600nF for Group IIC.

18) **Specific conditions of use:** Nil

19) **Routine test:**

Routine test is to be carried out on each infallible switching transformer, it shall comply the dielectric test of Cl 11.2 IS/IEC 60079-11: 2011

At 1500 Vac between the primary and secondary windings.

At 500 Vac between all the windings and the core or screen.

During these tests, there shall be no breakdown of the insulation between windings.

END OF DOCUMENT

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