1) **Ex EQUIPMENT TYPE EXAMINATION REPORT**

2) TE Report Number: **KLPL/Ex/23-007 Issue no.00** **Dated: 17.01.2023**

3) **Ex Equipment:** **MTL5541/MTL5544 Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters**

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-23/002 **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 401501

Atul Marathe
Technical Manager

Karandikar Laboratories Pvt. Ltd.
Laboratory : Gat No. 142, Boisar Chilhar Road, Opp. Union Park, At Betegaon, Boisar (E) - 401501, Dist - Palghar Tel. : 02525-284 931/989
Head Office : B-101, Ansa Indl. Estate, Saki Vihar Road, Sakinaka, Andheri (E), Mumbai-400072. Tel. : 022-28471395 / 97 / 98 / 28470126
Email : sales@karandikarlab.com Website : www.karandikarlab.com

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

TE Report No.	Issue No.	Report No.	Date	Reason for Issue
KLPL/Ex/23-007	00	KLPL/Ex/MTL-23/002	17.01.2023	Original issue

13) **Description of equipment**

The MTL5544 Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is designed to provide a floating d.c. supply for energising two conventional 2 or 3-Wire 4/20mA transmitters or a 'smart' transmitter in the hazardous area and repeat these currents in the non-hazardous area, whilst restricting the transfer of energy from the unspecified non-hazardous area apparatus to the intrinsically safe circuits by the means of limitation of current and voltage. The apparatus also allows bi-directional signal communication between the hazardous and non-hazardous area by the connection of a hand-held communicator (HHC).

The MTL5544 Repeater Power Supply, 4/20 mA for 2 or 3-Wire Transmitters comprises four isolating transformers that provide galvanic isolation between the hazardous and non-hazardous area circuitry, zener diode chains and resistors providing voltage and current limitation. The above, together with other electronic components, are mounted on a single printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plug and sockets are provided for the hazardous and non-hazardous area connections. All models are fitted with a power indication LED.

The MTL5541 Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is a depopulated version of the MTL5544 and has only one channel populated. Both the MTL5541 and MTL5544 available in a number of model variants, denoted by the last digit in the model number. All models variants are built on a common PCB.

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
MTL5541	Single Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters	Refer Point 17 below
MTL5544	Two Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters	

KARANDIKAR LABORATORIES PVT. LTD.

Karandikar Laboratories Pvt. Ltd.
Email : sales@karandikarlab.com Website : www.karandikarlab.com

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 MTL4541/MTL4544/MTL5541 & MTL5544	CI4541-1 (I)	4	09.15	1 of 8
Circuit Diagram for MTL4541/41B/41P/44B/44B /MTL5541/5544	CI4541-1 (I)	6	10.12	2 of 8
Circuit Diagram FOR THE MTL4541/41B/41P/44B/44B /MTL5541/5544	CI4541-1 (I)	6	10.12	3 of 8
MTL4541/MTL4544/MTL5541 & MTL5544 Track Layout	CI4541-1 (I)	5	01.18	4 & 4A of 8
MTL4541/MTL5541 COMPONENT LAYOUT	CI4541-1 (I)	6	01.13	5 of 8
PCB Detail for TPL300	CI4541-1 (I)	2	01.07	6 of 8
PCB Detail for TPL301	CI4541-1 (I)	2	01.07	7 of 8
New 5500 outline	CI5500-100 (I)	3	01.13	1 of 1
MTL5541 SIDE LABEL	CI5541-701	1	01.23	1 of 1
MTL5544 SIDE LABEL	CI5544-701	1	01.23	1 of 1
PARTS LIST FOR MTL5541	CI4541-3 (I)	1	12.22	1 to 3
PARTS LIST FOR MTL5544	CI4544-3 (I)	1	12.22	1 to 3

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:

MTL5541/MTL5544 Channel Repeater Power Supply, 4/20mA for 2 or 3-Wire Transmitters is 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 7 to 14 (10 to 14 on MTL5541 model)

Um = 253V r.m.s.

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

KARANDIKAR LABORATORIES PVT. LTD.

Karandikar Laboratories Pvt. Ltd.

Email : sales@karandikarlab.com Website : www.karandikarlab.com

SCHEDULE

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

Hazardous Area Terminals 5 w.r.t. 4 (Channel 2 - MTL5544 model)

Uo = 28 V, Io = 93 mA, Po = 0.65 W, Ci = 0, Li = 0

Hazardous Area Terminals 3 w.r.t. 1 (Channel 1) OR

Hazardous Area Terminals 6 w.r.t. 4 (Channel 2 - MTL5544 model)

Uo = 1.1 V, Io = 53 mA, Po = 15 mW, Ui= 30 V, Ii= 121 mA Ci = 0, Li = 0

Hazardous Area Terminals 2 w.r.t. 3 (Channel 1) OR

Hazardous Area Terminals 5 w.r.t. 6 (Channel 2 — MTL5544 model)

Uo = 28 V, Io = 87 mA, Po = 0.61 mW, Ci = 0, Li = 0

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

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

TABLE 1

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	L/R RATIO (µH/ohm)
Hazardous Area Terminals 2 w.r.t. 1 or 5 w.r.t. 4			
IIC	0.083	4.2	56
IIB	0.65	12.6	210
IIA	2.15	33.6	444
I	3.76	53.7	668
Hazardous Area Terminals 3 w.r.t. 1 or 6 w.r.t 4			
IIC	100	12.8	2438
IIB**	1000	47.8	8932
IIA	1000	104.7	18140
I	1000	156.2	28229
Hazardous Area Terminals 2 w.r.t. 3 or 5 w.r.t 6			
IIC	0.083	4.9	59
IIB**	0.65	20.0	222
IIA	2.15	40.9	469
I	3.76	59.1	710

**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:

KARANDIKAR LABORATORIES PVT. LTD. BOISAR 401501

Karandikar Laboratories Pvt. Ltd.

Email : sales@karandikarlab.com Website : www.karandikarlab.com

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.
The values of Lo and Co determined by this method shall not be exceeded by the sum of all the Li plus cable inductances in the circuit and the sum of all of the Ci plus cable capacitances respectively.

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

Karandikar Laboratories Pvt. Ltd.
Email : sales@karandikarlab.com Website : www.karandikarlab.com