1) **Ex EQUIPMENT TYPE EXAMINATION REPORT**

2) TE Report Number: **KLPL/Ex/24-095 Issue no.00** **Dated: 02.12.2024**

3) **Ex Equipment:** **Single Channel Vibration Transducer Interfaces**
Models: MTL4531 & MTL5531

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: 2023

8) The Examination and Test results are recorded in KLPL's confidential
Report No.: KLPL/Ex/MTL-24/006 **Dated: 02.12.2024**

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

A. V. Karandikar

Ajit Karandikar
CEO

Karandikar Laboratories Pvt. Ltd.
Laboratory : Gat No. 142, Boisar Chilhar Road, Opp. Union Park, At Betegaon, Boisar (E) - 401501, Dist - Palghar **Mob.:**: +91 88550 22824
Head Office : B-101, Ansa Indl. Estate, Saki Vihar Road, Sakinaka, Andheri (E), Mumbai-400072. **Tel.** : 022-28471395 / 97 ,022-4971 6815
Branch UAE : KL Training Academy,Office No.06, Building No. 01,Plot No.05, Mussafah 35, Abu Dhabi. **Mob.:** +971 56198 1452
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/24-095	00	KLPL/Ex/MTL-24/006	02.12.2024	Original issue

13) Description of equipment

MTL4531 and MTL5531 Single Channel Vibration Transducer Interfaces

The MTL4531 and MTL5531 Single Channel Vibration Transducer Interface is designed to restrict the transfer of energy from unspecified apparatus in the non-hazardous area to intrinsically safe vibration transducers by limitation of voltage and current. Transformers and opto-isolators provide galvanic isolation between the hazardous and non-hazardous area circuitry. The apparatus comprises isolating transformer, opto-isolators and detection circuits with zener diode and resistor combinations to provide voltage and current limitation. The above, together with other electronic components are mounted on a printed circuit board and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections.

The electronic circuitry is housed in a plastic enclosure, which provides a degree of protection of not less than IP20 in accordance with IS/IEC 60529: 2001.

14) Model Designation:

Model No.	Product	Rating
MTL4531	Single Channel Vibration Transducer Interfaces	Refer Point 17 below
MTL5531	Single Channel Vibration Transducer Interfaces	

15) Drawings & Documents

Document Number	No. of Pages	Rev. No.	Date	Drawing Title
CI4533-1 (I)	1	2	10.09	PARTS LIST FOR MTL4531 & MTL4533
CI4533-1 (I)	1	2	10.09	MTL4533 CIRCUIT DIAGRAM HAZARDOUS AREA
CI4533-1 (I)	1	2	10.09	MTL4533 CIRCUIT DIAGRAM SAFE AREA
CI4533-1 (I)	1	1	06.09	PCB DETAIL FOR TPL301
CI4533-1 (I)	1	2	10.09	TRACK LAYOUT FOR MTL4531 AND MTL4533
CI4533-1 (I)	1	7	01.17	COMPONENT LAYOUT FOR MTL4531 AND MTL4533
CI4533-1 (I)	1	4	08.21	MTL4531 & MTL4533 Certification Label Details
CI4533-1 (I)	1	1	01.17	Thermal pad details
CI4533-1 (I)	1	4	08.21	MTL5533 & MTL5531 Certification Label Details and DIN rail fitting
CI4500-3 (I)	1	1	12.10	MTL4500 and MTL5500- Alternate Zener Diode (Panjit)

CI4500-6 (I)	1	1	12.10	MTL4500 and MTL5500 Conformal Coating
CI4500-5 (I)	1	1	11.10	MTL5500- Alternative DIN rail mechanism
CI5500-100 (I)	1	3	1.13	New 5500 outline
CI4500-100 (I)	1	2	01.13	New 4500 Case
CI4533-1(I)	1	1	11.14	PCB DETAIL FOR TPL308

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:

Single Channel Vibration Transducer Interfaces, Models: MTL4531 & MTL5531 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 11 to 14

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.

Hazardous Area Terminals 1 to 6 (forming part of the same intrinsically safe circuit)

Uo = 6.6 V, Io = 76 mA, Po = 0.13 W, Ci = 0, Li = 0

Hazardous Area Terminals 3 w.r.t. 1 (WITHOUT the Cold Junction Compensation (CJC) plug fitted)

Uo = 1.1 V, Io = 7 mA, Po = 2 mW, Ci = 0, Li = 0

Hazardous Area Terminals 3, 2 & 1 (with or without CJC plug fitted)

Uo = 6.6 V, Io = 10 mA, Po = 17 mW, Ci = 0, Li = 0

Programming / Configuration Port (Jack Socket)

Uo = 8 V, Io = 14.6 mA, Po = 26 mW, Ui=9.1 V, Ci = 0, Li = 0

Due to the fitting of current limiting resistors R1, R4, R5 (all 1 kΩ ± 1%), R2, R3 (both 160Ω ± 0.5%) and R6 (1.5 kΩ ± 1%), the capacitive components fitted on the hazardous area side of the circuit cannot be considered connected to the hazardous area terminals 1 to 6 even under two fault conditions. Similarly, due to the fitted of current limiting resistors R12, R13, R14 & R15 (all 1kΩ ± 1%), the capacitive components fitted on the hazardous area side of the circuit cannot be considered connected to the programming / configuration jack socket even under two fault conditions. Therefore, in both cases it is considered that Ci = 0.

Inductors L1, L2, L3, L10 & L11 (all < 5µH) are connected to hazardous area terminals 1 to 6. It is considered the inductance is very small in comparison to the permitted inductance at 76 mA, therefore it is considered that Li = 0 for these terminals. No inductive components are fitted on the terminals of the programming / configuration jack socket, therefore L = 0 is defined for this socket.

KARANDIKAR LABORATORIES PVT. LTD. BOISAR

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

SCHEDULE

The capacitance and either the inductance or inductance to resistance ratio (L/R) of the hazardous area load connected to hazardous area terminals 1 to 6 and the programming / configuration port must not exceed the following values:

TABLE 1

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	L/R RATIO (µH/ohm)
Hazardous Area Terminals 1 to 6			
IIC	22	6.42	288
IIB*	500	25.6	1057
IIA	1000	53.0	2228
I	1000	77.2	3402
Programming I Configuration Port (Jack Socket)			
IIC	0.367	153	349
IIB*	2.15	591	1355
IIA	8.8	1000	1453
I	12.32	1000	1453

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

Note:

1. The above load parameters apply when one of the two conditions below is given:
   - 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.
2. 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

KARANDIKAR LABORATORIES PVT. LTD. BOISAR 401501

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

19) **Routine test:**

- Routine test is to be carried out on each infallible switching transformer, it shall comply the dielectric test of Cl 10.3.1 IS/IEC 60079-11: 2023.
  - 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.
- Apply two coats of HumiSeal® 1B73EPA Acrylic Conformal Coating after cleaning the surface. Visual inspection after cure time shall be conducted for
  - Cracks
  - Non-homogenous covering

END OF DOCUMENT

KARANDIKAR LABORATORIES PVT. LTD. BOISAR 401501

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