1) **Ex EQUIPMENT TYPE EXAMINATION REPORT**

2) TE Report Number: **KLPL/Ex/24-091 Issue no.00** **Dated: 30.11.2024**

3) **Ex Equipment:** **Solenoid / Alarm Drivers**
Model: MTL 4521, MTL4524, MTL4523Y

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-24/002 **Dated: 30.11.2024**

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

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CEO

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12) Details of Type Examination Reports Issued: -

TE Report No.	Issue No.	Report No.	Date	Reason for Issue
KLPL/Ex/24-091	00	KLPL/Ex/MTL-24/002	30.11.2024	Original issue

13) Description of equipment

MTL4521 and MTL4524 Solenoid / Alarm Drivers

The MTL4521 and MTL4524 Solenoid / Alarm Drivers are designed to control and monitor a device located in the hazardous area and restrict the transfer of energy from unspecified apparatus in the non-hazardous area to an intrinsically safe circuit in the hazardous area by the limitation of voltage and current. Opto-isolators and a transformer provide galvanic isolation between the hazardous and non-hazardous area circuitry. The apparatus comprises an isolating transformer, opto-isolators, duplicated zener diode chains and current limiting resistors to provide voltage and current limitation. The above, together with other electronic components are mounted on a printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections. The MTL4521 and MTL4524 Solenoid / Alarm Drivers are built on a common PCB and are configured have certain features such as Line Fault Detection (LFD) and Phase Reversal facilities. There are also models in the range that are loop powered or have low current hazardous area outputs. All models have LED indication dependent on the model configuration.

MTL4523Y Solenoid / Alarm Driver with Line Fault Detection Alarm

The MTL4523Y Solenoid / Alarm Driver with Line Fault Detection Alarm is designed to control and monitor a device located in the hazardous area and restrict the transfer of energy from unspecified apparatus in the non-hazardous area to an intrinsically safe circuit in the hazardous area by the limitation of voltage and current. Opto-isolators and a transformer provide galvanic isolation between the hazardous and non-hazardous area circuitry. The apparatus comprises an isolating transformer, opto-isolators, duplicated zener diode chains and current limiting resistors to provide voltage and current limitation. The above, together with other electronic components are mounted on a printed circuit board (PCB) and housed in a moulded plastic enclosure. Polarised plugs and sockets are provided for hazardous and non-hazardous area connections. The MTL4523Y Solenoid / Alarm Drivers is built on a common PCB with different components fitted to give certain output parameters and features. The MTL4523Y is designed as the current limitation fitted on the hazardous area connections and bus powered and have additional Line Fault Detection (LFD) circuitry populated. All models have LED indication fitted dependent on the model indicating output status, Power on and LFD status where applicable.

The degree of ingress protection of IP 20 as per IS/IEC 60529:2001 is achieved by enclosure.

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SCHEDULE

14) Model Designation:

Model No.	Product	Rating
MTL4521	Solenoid / Alarm Drivers	Refer Point 17 below
MTL4524	Solenoid / Alarm Drivers	
MTL4523Y	Solenoid / Alarm Driver with Line Fault Detection Alarm	

15) Drawings & Documents

Document Number	No. of Pages	Rev. no.	Date	Drawing Title
CI4500-3 (I)	1	1	12.10	MTL4500 and MTL5500- Alternate Zener Diode (Panjit)
CI4500-100 (I)	1	2	01.13	MTL 4500 Case
CI4500-6 (I)	1	1	12.10	MTL4500 and MTL5500 Conformal Coating
CI4521-1(I)	1	3	02.10	MTL452X TRACK LAYOUT
CI4521-1(I)	1	5	07.10	CIRCUIT DIAGRAM FOR MTL452X
CI4521-1(I)	1	6	08.21	MTL4521 Certification Label Details
CI4521-1(I)	1	4	01.13	MTL452X COMPONENT LAYOUT
CI4521-1(I)	1	2	01.07	PCB DETAIL FOR TPL301
CI4521-1 (I)	1	1	08.06	PARTS LIST FOR MTL452X
CI4521Y-1 (I)	1	2	09.15	CIRCUIT DIAGRAM FOR MTL4521Y
CI4521Y-2 (I)	4	1	08.14	MTL4521Y PARTS LIST
CI4521Y-3 (I)	1	1	08.14	MTL4521Y TRACK LAYOUT
CI4521Y-4 (I)	1	2	09.15	MTL4521Y COMPONENT LAYOUT
CI4521Y-5 (I)	1	1	08.14	PCB DETAIL FOR TPL301
CI4521Y-6 (I)	1	1	08.14	MTL4521Y Certification Label Details

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:

Solenoid / Alarm Drivers Model: MTL 4521, MTL4524, MTL4523Y are an associated apparatus which will be placed in a non-Hazardous area and does not require a temperature class.

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17) **Electrical Rating:**

Input / Output Parameters

Non-Hazardous Area Terminals 7 to 14

Um = 253V r.m.s.

The equipment is designed to operate from a d.c. supply voltage of 20 V to 35 V.

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

Uo = 25 V, Io = 147 mA, Po = 0.92 W, Ci = 0, Li = 0

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:

TABLE 1

GROUP	CAPACITANCE (µF)	INDUCTANCE (mH)	L/R RATIO (µH/ohm)
IIC	0.11	1.4	40
IIB**	0.84	7.2	159
IIA	2.97	14.4	328
I	4.87	20.2	478

**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 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 1µF for Groups IIB, IIA & I and 600nF for Group IIC.

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

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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

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