1) **Ex EQUIPMENT TYPE EXAMINATION REPORT**

2) TE Report Number: **KLPL/Ex/23-013 Issue no.00** **Dated: 17.01.2023**

3) **Ex Equipment:** **MTL5511/MTL5514/MTL5516C Switch /Proximity Detector Interface**

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-23/008 **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)

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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/23-013	00	KLPL/Ex/MTL-23/008	17.01.2023	Original issue

13) **Description of equipment**

The MTL5511 / MTL5514 / MTL5516C Switch / Proximity Detector Interface are designed to restrict the transfer of energy from unspecified non-hazardous area apparatus to up to two intrinsically safe circuits by limitation of voltage and current. A transformer and relays provide galvanic isolation between the hazardous and non-hazardous area circuitry.

Each channel of the interface monitors either a detector or switch located in the hazardous area and controls non-hazardous area loads via relays. Some models of the interface are fitted with independent phase reverse controls and Line Fault Detection (LFD) circuitry allow an alarm condition to be signalled for either state, set by switches on the side of the interface.

The apparatus comprises an isolating transformer, relays, zener diodes and current limiting resistors to provide voltage and current limitation on each channel. These, together with other electronic components are mounted on a single printed circuit board and housed in a plastic enclosure. Polarised plugs and sockets are provided for connection to the hazardous and non-hazardous area. LED indication is provided to indicate Power-on, state of the outputs and LFD status.

The above listed models are all built on a common printed circuit board. The differences between the models relate to the configuration of relays 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
MTL5511	Single Channel Switch/ Proximity Detector Interface	Refer Point 17 below
MTL5514	Single Channel Switch / Proximity Detector Interface with Line Fault Detection Alarm	
MTL5516C	Two Channel Switch/ Proximity Detector Interface	

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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 MTL4516/MTL5516	CI4516-1 (I)	2	9.08	1 of 6
Circuit diagram for MTL4516/MTL5516	CI4516-1 (I)	5	10.11	2 of 6
MTL4516/MTL5516 Track layout	CI4516-1 (I)	3	12.07	3 of 6
MTL4516/MTL5516 COMPONENT LAYOUT	CI4516-1 (I)	6	10.12	4 of 6
PCB DETAIL FOR TPL308	CI4516-1 (I)	2	1.07	5 of 6
New 5500 outline	CI5500-100 (I)	3	1.13	1 of 1
MTL5511 SIDE LABEL	CI5511-701	1	1.23	1 of 1
MTL5516C SIDE LABEL	CI5516C-701	1	1.23	1 of 1
MTL5514 SIDE LABEL	CI5514-701	1	1.23	1 of 1
PARTS LIST FOR MTL5511	CI4511-3 (I)	1	12.22	1 to 3
PARTS LIST FOR MTL5514	CI4514-3 (I)	1	12.22	1 to 3
PARTS LIST FOR MTL5516C	CI4516C-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:**

MTL5511/MTL5514/MTL5516C Switch /Proximity Detector Interface are 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

Um = 253V r.m.s.

The circuit connected to non-hazardous area terminals 13 & 14 is designed to operate from a d.c. supply voltage of 20 V to 35 V.

Non-hazardous area terminals 7 to 12 are connected to relay contacts which can switch up to 253 Vr.m.s, 2 A r.m.s. and 100 VA.

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

Hazardous Area Terminals 4 w.r.t. 5/6 (Channel 2)*

Uo = 10.5 V, Io = 14 mA, Po = 37 mW, Ci = 0, Li = 0

*For MTL5516C Model only

The capacitance and either the inductance or the 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	2.41	175	983
IIB**	16.8	680	1333
IIA	75.0	1000	1333
I	95.0	1000	1333

**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:

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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