1) **Ex EQUIPMENT TYPE EXAMINATION REPORT**

2) TE Report Number: **KLPL/Ex/23 -102X Issue no.00** **Dated: 24-01-2024**

3) Ex Equipment: **COMPACT FIELDBUS BARRIER**

4) Manufacturer: **MTL Instruments Private Limited**

No.3: Old Mahabalipuram Road, Shollinganallur, Chennai - 600119, Tamil Nadu, 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 60079-7: 2017, IS/IEC 60079-31:2022

8) The Examination and Test results are recorded in KLPL's confidential
Report No.: KLPL/Ex/MTL-23/009 **Dated: 24-01-2024**

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 db eb ib mb [ia Ga] IIC T4 Gb
Ex tb IIIC T80°C Db

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Ravi Paranjpe
Director(Operations)

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/23-102X	00	KLPL/Ex/MTL-23/009	24.01.2024	Original Issue

13) Description of equipment

The '937X-FB3-XXXX-XXXS Fieldbus Barrier' is a field-mounted wiring hub providing up to12, intrinsically safe spur connections from a single non-intrinsically safe trunk, for connection to Foundation™ fieldbus H1 fieldbus instruments. The field-mounted Ex-Cell (IECEx BAS 15.0071U) enclosure contains a fieldbus barrier (IECEx BAS 19.0017U) supplied via a non-intrinsically safe trunk and converts this to several galvanically isolated, intrinsically safe, spur connections. The trunk in terminal block (IECEx ULD 14.0005U or IECEx KEM 06.0027U) is the entry point for the wiring. The wires from the terminal block are routed to the Trunk IN Isolating switch (IECEx BVS 13.0108U) from which the wires are routed to the trunk surge protector FS32-XE (IECEx BAS 20.0079U). The Isolating switch is used to turn OFF the power to the fieldbus barrier module, in case the barrier module needs to be replaced during service. DIN-rail terminals and the Isolating switch are protected by covers that meets an IP30 ingress protection rating, since these are all bare live parts not protected by the Type of Protection "i".The trunk terminals are implemented as increased safety (Ex e) and the spur terminals as intrinsically safe (Ex ia) for connection to IS fieldbus instruments in IIC, Zone 0 hazardous areas. The spur connections are compatible with both FISCO and Entity-certified field instruments. The 9377-FB3-** Compact Fieldbus Barrier (IECEx BAS 19.0017U) with built-in selectable fieldbus terminator is designed to be supplied from a 16V to 32Vdc.IEC 61158 compliant fieldbus trunk supply and produce 12 intrinsically safe spur outputs that are each compliant with the FISCO power supply requirements. The spur outputs are isolated from the trunk input but are not isolated from each other. The electrical connections are made by either spring clamp or screw clamp terminals. A Trunk Out connection is available where the fieldbus trunk is to be connected to more than one fieldbus barrier in either the same or separate enclosures. The spur outputs may optionally be fitted with up to 12 FS32 Spur Surge Protectors (IECEx BAS 09.0083X). Each Spur Output –Connections is suitable for Zone 0 Areas. The 12 spur channels share a common 0V output connection but are galvanically isolated from the connections to the safe area. The FS32 Fieldbus Surge Protection Devices are designed as a FISCO Field Device, to provide protection for sensitive electronic Fieldbus compatible equipment, and are intended to be mounted either in a Safe Area immediately following a certified FISCO Power Supply having an intrinsically safe output or within a Hazardous Area connected in an intrinsically safe circuit.

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SCHEDULE

Model designation:

Compact Fieldbus Barrier

937X-FB3-XXXX-XXXS

X Spur
X Connection type
X Enclosure
X Tag Label Options
X Terminals
-
X Trunk Surge Protection options
X Spur Surge Protection options
X Cable entry plugs & breather options
I Trunk Isolation Switch as defined in the Certification drawing - CI9373-FB3-6

The "X"s represent character positions that can be Alpha-numeric (0-9 or A -Z) and the resulting 18 character part number will result in a design specific code where all features are covered and permitted within drawing – CI9373-FB3-7, and also covered by this certificate

List of pre-certified devices

Sr No.	Item	Manufacture	Type/Model	Ex Code	Ambient temperature range	Certificate No	Standard
1	Switch base	Cooper Crouse-Hinds GmbH	GHG 238 ** ** R ****	Ex db eb I Mb Ex db eb IIB/IIC Gb Ex db ia/ib IIB/IIC Gb	-55°C up to +80°C	IECEx BVS 13.0108U Issue No. 2	IEC 60079-0:2011 Ed. 6.0 IEC 60079-1:2014 Ed. 7.0 IEC 60079-7:2015 Ed. 5.0 IEC 60079-11:2011 Ed. 6.0
2	Fieldbus Surge Protection Device	Eaton Electric Limited	FS32	Ex ia IIB T3 Ga or Ex ia IIC T4 Ga	-40≤ Ta ≤+50 or +75	IECEx BAS 09.0083X Issue No. 03	IEC 60079-0:2011 Ed. 6.0 IEC 60079-11:2011 Ed. 6.0
3	Ex Cell Range of Enclosures	Cooper Crouse - Hinds GmbH	Ex -Cell EAGLE	Ex eb IIC Gb Ex tb IIIC Db	-60°C to +135°C	IECEx BAS 15.0071U Issue No. 03	IEC 60079-0:2017 Ed. 7.0 IEC 60079-31:2013 Ed. 2 IEC 60079-7:2017 Ed. 5.1
4	Stainless Steel Enclosure	Trimurti Stainlink Equipment PVT. Ltd.	Series C with Silicon Gasket	Ex eb IIC Gb Ex tb IIIC Db	-20°C to +80°C	IECEx CML 17.0160U	IEC 60079-0:2011 Ed.6.0 IEC 60079-31:2013 Ed. 2 IEC 60079-7:2015 Ed. 5.0
5	Feed through and protective conductor terminals with accessories	Weidmuller Interface GmbH & Co. KG	WDU 2,5	Ex eb IIC Gb	-40°C to +110°C	IECEx ULD 14.0005U Issue No. 7	IEC 600479-0:2017 Ed. 7.0 IEC 60079-7:2017 Ed. 5.1

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6	Terminal Blocks	Phoenix Contact GmbH & Co. KG	UT 2,5	Ex eb IIC Gb	-60°C to +110°C	IECEx KEM 06.0027U Issue No. 9	IEC 60079-0:2017 Ed. 7.0 IEC 60079-7:2017 Ed. 5.1
7	Surge Protection Device	Eaton Electric Limited	FS32-XE	Ex eb mb IIC Gb	-40°C ≤ Ta ≤ +80°C	IECEx BAS 20.0079U Issue No. 1	IEC 60079-0:2017 Ed. 7.0 IEC 60079-18:2017 Ed. 4.1 IEC 60079-7:2017 Ed. 5.1
8	Compact Fieldbus Barrier	Eaton Electric Limited	9377-FB3	Ex eb ib mb [ia Ga] IIC Gb	-20°C ≤ Ta ≤ +65°C	IECEx BAS 19.0017U Issue No. 0	IEC 60079-0:2017 Ed. 7.0 IEC 60079-11:2011 Ed. 6.1 IEC 60079-18:2014 Ed. 4.0 IEC 60079-7:2015 Ed. 5.0
9	PCB Connector Series	Phoenix Contact GmbH & Co. KG	GMVSTB (R) (W) 2,5	Ex eb IIC Gb	-60C to +110C	IECEx KEM 10.0093U	IEC 60079-0:2017 Ed. 7.0 IEC 60079-7:2017 Ed.5.1

"Conditions of Manufacturer":

1. For pre-certified device, Ex-Cell Range of Enclosure certified vide IECEx BAS 15.0071U
   - When the gland plates or enclosure panels are painted, the required entry holes provided Cooper Crouse Hinds shall not have paint on the entry hole seal faces.
   - For Dust Application: When the Ex-Cell enclosure has a non-metallic coating a warning shall be added to the equipment label i.e., "Warning: For Dust Applications, potential electrostatic charging hazard, see instructions"
2. For pre-certified device, Terminal Blocks WDU 2.5 certified vide IECEx ULD 14.0005U
   - When using the types WDU and WPE with other terminal blocks series or sizes or accessories, the requirements for clearance and creepage distances according to table 2 of IS/IEC 60079-7 must be observed. Regarding the use of covers, cross-connectors and end brackets the instructions of the manufacturer must be followed.
   - For terminal jumper accessories current ratings and the resistances across the terminals please refer to the table under "types & electrical rating" above. Details on creepage and clearance values and the required torque values are in the respective "Notice to installers".The terminal can be used with either one or two wires into either side of the terminal. When two wires are used they must be of the same type, and of equal sizes. No other wire sizes or types than the ones specified in instructions must be used. The terminal blocks must either be mounted next to another block of the same type and size or with an end plate.
   - If smaller conductor cross sections than the rated conductor cross sections are used, then the corresponding lower current shall be stated in the Certificate of the complete apparatus.

SCHEDULE

- Unused terminals shall be tightened.

3. For pre-certified device, Terminal Blocks UT 2.5 certified vide IECEx KEM 06.0027U
   - When assembling with other certified series and sizes and using the associated accessories, the required creepage distances and clearances have to be observed.
   - The installation instruction of the manufacturer shall be followed e.g. for the use of cover, jumpers, end brackets.
4. For pre-certified device, FS32 Fieldbus Surge Protection Device certified vide IECEx BAS 09.0083X
   - The FS32 Fieldbus Surge Protection Devices may not be capable of withstanding the 500V voltage withstand test for one minute without breakdown to earth. This must be taken into consideration in any installation.
   - FS32 Fieldbus Surge Protection Device must always fitted with Plug Connector for ensuring IP 20.
5. For pre-certified device, 93ZX-FB3 Compact Fieldbus Barrier, certified vide IECEx BAS 19.0017U
   - When one or more FS32 Spur Surge Modules are fitted, the spur output will not withstand a 500V a.c. isolation test to earth. This must be taken into account during installation
6. For pre-certified device, FS32-XE Surge Protection Device, certified vide IECEx BAS 20.0079U
   - The equipment in which the FS32-XE is installed will not be capable of withstanding a 500Vac isolation test voltage between all inputs to earth. This must be taken into account during installation.
7. For pre-certified device, PCB connectors, certified vide IECEx KEM 10.0093U
   - To avoid mechanical stress to the soldered joints, the headers have to be mechanically supported by e.g. screwing or, bending the solder pins.

The equipment/component carries degree of protection IP66 and found to be comply with IS/IEC 60529:2001.

14) Model Designation:

Model No.	Product	Rating
937X-FB3-XXXX-XXXS	COMPACT FIELDBUS BARRIER	16 - 32 Vdc

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15) Drawings & Documents

Drawing Number	No. of sheets	Issue & Rev.	Date	Title
CI9373-FB3-6	2	1	20.12.23	COMPACT FIELDBUS BARRIER WITH ISOLATION SWITCH & SPARE TERMS - KARANDIKAR CERTIFICATION
CI9373-FB3-7	2	1	19.12.23	937X-FB3 ENCL + ISO SWITCH. CERTIFICATION LABEL for KARANDIKAR Certification body

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:

Considering the maximum ambient of +60 °C, the requested temperature class of "T4" is acceptable.

17) Electrical Rating:

Electrical parameters Trunk In terminal (+, S, -)
Parameters according to the certificate IECEx BAS 19.0017U:

Maximum input voltage	Um	253V
Rated voltage	UN	16 to 32 V d.c.
Rated current	IN	410 mA

Intrinsically safe output spur terminals without Surge module, optional 1 to 12 spurs ("+", "S" or "-"):

12 spur outputs that are each compliant with the FISCO power supply requirements according to thecertificate IECEx BAS 19.0017U.

Parameters according to the certificate IECEx BAS 19.0017U:

For each spur

Maximum output voltage	Uo	16.4	V
Maximum output peak current	Io	247.9	mA
Maximum output continuous current	Io	107.1	mA
Maximum output power	Po	1.02	W
Maximum internal capacitance	Ci	negligible	
Maximum internal inductance	Li	negligible	
Maximum external capacitance	Co	0.424	µF
Maximum external inductance	Lo	0.57	mH
Maximum external inductance to resistance ratio	Lo/Ro	34.9	µH/Ω

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The 12 spur channels share a common 0V output connection but are galvanically isolated from the connections to the safe area

Intrinsically safe output spur terminals with Surge module FS32, optional 1 to 12 spurs ("+", "S" or "-"):

For each spur

Maximum output voltage	Uo	16.4 V
Maximum output peak current	Io	247.9 mA
Maximum output continuous current	Io	107.1 mA
Maximum output power	Po	1.02 W
Maximum internal capacitance	Ci	negligible
Maximum internal inductance	L	negligible
Maximum external capacitance	Co	0.424µF
Maximum external inductance	Lo	0.57 mH
Maximum external inductance to resistance ratio	Lo/Ro	34.9 µH/Ω

The 12 spur channels share a common 0V output connection but are galvanically isolated from the connections to the safe area.

The FS32 Fieldbus Surge protection Devices is designed as a FISCO Field Device and the intrinsically safe output spur terminals with the Surge module (FS32) will have the same output parameters as without Surge module, since the surge module has output parameters as input (Uo=Ui, Io=Ii, Po=Pi) according to the certificate IECEx BAS 09.0083X

Thermal parameters

For type of protection "db", "eb", "ib", "mb"

Temperature class T4 -20 °C ≤ Tamb ≤ +60 °C

For type of protection "tb"

Maximum surface temperature T80 °C -20 °C ≤ Tamb ≤ +60 °C

18) Specific conditions of use:

1. Intrinsically safe circuits can be connected to earth. Potential equalization along the intrinsically safe circuits must be ensured.
2. The installation requirements in hazardous areas are to be complied with in accordance with IEC 60079-14.
3. Equipment is not intended for use with Dust layer. It shall be ensured that enclosure is routinely cleaned to avoid buildup of dust layer on the enclosure.
4. For pre-certified device, FS32 Fieldbus Surge Protection Device certified vide IECEx BAS 09.0083X
   - The FS32 Fieldbus Surge Protection Devices may not be capable of withstanding the 500V voltage withstand test for one minute without breakdown to earth. This must be taken into consideration in any installation.

- FS32 Fieldbus Surge Protection Device must always fitted with Plug Connector for ensuring IP 20.

5. For pre-certified device, Ex-Cell Range of Enclosure certified vide IECEx BAS 15.0071U
   - Due to narrow gauge of the Ex-Cell enclosure:
     - When a hinge lid is fitted, the enclosure shall only be mounted in a vertical orientation on a flat surface, and care is required in the installation process and when opening the hinged lid to ensure the enclosure do not distort.
     - When fully bolted lid is fitted the enclosure may be mounted in any orientation but it shall be on a flat surface, and care is required in the installation process to ensure the enclosure do not distort.Distortion will affect the sealing faces.
   - Cable entry holes in the gland plate, side panels or back panel shall be fitted with suitable cable gland having an equipment certificate. The operating temperature range and ingress protection rating of the enclosure is limited to that of the cable gland fitted. The plain hole shall be no larger than 0.7mm above the major diameter of the cable gland thread.cable gland entries are not permitted in the enclosure lid.
   - Unused entry holes shall be fitted with suitable stopping plugs having an equipment certificate, or having a component certificate subjected to the confirmation by the end user/installer of the ingress protection rating and the permitted service temperature of the component. The operating temperature range and ingress protection rating of the enclosure is limited to that of the stopping plug fitted.
   - Only equipment certified breather/drain device may be used with these enclosures and they shall be suitable for the wall thickness of the enclosure to ensure draining can occur, subject to the confirmation by the end user/installer of the ingress protection rating IP 66 and the permitted service temperature range of -20°C to +65°C. The breather/drain devices must be installed in their correct orientation in the bottom face.
   - Only adapter/reducer devices having an equipment certificate may be used with these enclosures subject to the confirmation by the end user/installer of the ingress protection rating IP66 and the permitted service temperature range of -20°C to +65°C. The operating temperature range and the ingress protection rating of the enclosure is limited to that of the adaptor/reducer device fitted.
   - For Dust Application: When the Ex-Cell enclosure has a non-metallic coating a warning shall be added to the equipment label i.e., "Warning: For Dust Applications, potential electrostatic charging hazard, see instructions"
6. For pre-certified device, 93ZX-FB3 Compact Fieldbus Barrier certified vide IECEx BAS 19.0017U
   - When one or more FS32 Spur Surge Modules are fitted, the spur output will not withstand a 500V a.c. isolation test to earth. This must be taken into account during installation.
7. For pre-certified device, FS32-XE Surge Protection Device certified vide IECEx BAS 20.0079U

- The equipment in which the FS32-XE is installed will not be capable of withstanding a 500Vac isolation test voltage between all inputs to earth. This must be taken into account during installation.

8. For pre-certified device, Switch Base, certified vide IECEx BVS 13.0108U
   - In case of the parts forming the joint shall be replaced or repaired, the dimensions information of the flameproof joints must be obtained from the manufacturer, because the gap length of the flameproof joint of this apparatus are in parts longer and the gap width are in parts smaller than required by Table 3 of IS/IEC 60079-1:2014.
9. For pre-certified device, Terminal Blocks WDU 2.5 certified vide IECEx ULD 14.0005U
   - When using the types WDU and WPE with other terminal blocks series or sizes or accessories, the requirements for clearance and creepage distances according to table 2 of IS/IEC 60079-7 must be observed. Regarding the use of covers, cross-connectors and end brackets the instructions of the manufacturer must be followed.
   - For terminal jumper accessories current ratings and the resistances across the terminals please refer to the table under "types & electrical rating" above. Details on creepage and clearance values and the required torque values are in the respective "Notice to installers".The terminal can be used with either one or two wires into either side of the terminal. When two wires are used they must be of the same type, and of equal sizes. No other wire sizes or types than the ones specified in instructions must be used. The terminal blocks must either be mounted next to another block of the same type and size or with an end plate.
   - Unused terminals shall be tightened.
10. For pre-certified device, Terminal Blocks certified vide IECEx KEM 10.0093U
    - The installation instruction of the manufacturer shall be followed. The data regarding current and associated temperature rise shall be used as guideline for the given conductor cross sections. The cross section has influence on the temperature rise which shall be assessed in the end application.

19) Routine test:

Dielectric test to be conducted at 500V for 60 seconds. No electrical breakdown shall occur.

END OF DOCUMENT

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