Applicant: SHANGHAI MATIS ELECTRIC CO.,LTD.

(full address): Room 320, No. 83, Huanhu West Third Road, Pudong, 201306 Shanghai P.R. China

Factory: Matismart Electric Suzhou Co.,Ltd.

(full address): Room201,Block 29,No.369,Lushan Road,High Tech District, Suzhou 215129 Jiangsu P.R. China

Type or Model Number: Enertrek E10, Enertrek V10

Kind of device: Multi-Circuit Multifunction Power Meter

Information/rated values for the switching element:

Model and/or type reference	Enertrek E10, Enertrek V10
Classification of PMD	☒PMD SD (Semi-direct insertion) ☐PMD DD (Direct insertion) ☐PMD SS (Indirect insertion) ☐PMD DS (Semi-direct insertion)
Classification of installation and use:	Performance measuring and monitoring
Supply Connection :	By terminals
Type of item tested :	Measurement
Description of equipment function :	Measure and monitor electric parameters
Serial number :	SN Code Format:TTYMSSSS TT+Y+M+SSSS TT: XX Enertrek V10:20; Enertrek E10-100 (CTO-100A):40; Enertrek E10-200 (CTO-200A):46; Enertrek E10-400 (CTO-400A):47; Enertrek E10-600 (CTO-600A):48 ; Y:0~9, Last digit of the year (e.g., 2025 → 5); M:1~12,Month (1~12) in hexadecimal format; SSSS:0001~9999,Serial number: Unique and incremental per model, per month
Rating(s) :	Auxiliary power supply: 80-265 VDC, 100-240 VAC, 50/60 Hz; Voltage input: 3 × 230 V L-N / 400 V L-L, 50/60 Hz; Current input: via external CTO current transformer, primary current 100/200/400/600 A.
Measurement (Installation) category:	III
Pollution degree :	2
Protection class :	Class 2
Environmental rating :	standard

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Date	Signature	Name	Company Stamp and Signature

Equipment mobility	:	fixed	
Connection to mains supply	:	Permanent	
Operating conditions	:	continuous	
Overall size of the equipment (W x D x H):		Overall size of the equipment (W x D x H): Approx. 35.8 mm x 88.9 mm x 68.3 mm for Enertrek V10; Approx. 18 mm x 88.9 mm x 68.3 mm for Enertrek E10;	
Mass of the equipment (kg)	:	Enertrek V10: approx. 0,140 kg max. Enertrek E10: approx. 0,048 kg max.	
Marked degree of protection to IEC 60529:		IP40 for front panel, IP20	
Rated operating conditions:		☐portable equipment	☒fixed installed equipment
		Rated operating range(with specified uncertainty): 0 °C to +40 °C Limit range of operation(no hardware failures): –10 °C to +55 °C Limit range for storage and shipping:–25 °C to +70 °C	K55 temperature class of PMD: Rated operating range(with specified uncertainty): –10 °C to +55 °C Limit range of operation(no hardware failures): –10 °C to +55 °C Limit range for storage and shipping: –25 °C to +70 °C

Accuracy Class for different models:

Measurement	Accuracy Class
Active Energy	Class 1 to IEC 61557-12
Reactive Energy	Class 1 to IEC 61557-12
Active Power	Class 1 to IEC 61557-12
Apparent power	Class 1 to IEC 61557-12
Reactive Power	Class 1 to IEC 61557-12
Voltage	Class 0,2 to IEC 61557-12
Current	Class 0,2 to IEC 61557-12

Critical Components
Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc
Components with winding: e.g. motor, transformer, magnetic coil etc.
Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

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Date Signature	Name Company Stamp and Signature

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Enclosure material	Protects internal components, ensures safety, and provides electrical insulation	KINGFA SCI & TECH CO LTD	PA66	Flammability :Thk-0.75mm, V-0 , 5VA (ALL) ; GWFI:Thk-0.75mm, 960°C	UL 94 V-0	UL:E171666
PCB connector	Provides secure, pluggable electrical connections for PCB-mounted devices.	PHOENIX CONTACT GmbH & Co. KG	BCH-508HS-2-GY; BCH-508HS-4-GY; BCH-381H-3 GY	Rated Voltage: 300 V Rated Current: 16 A UL 94 V-0	UL 1059	UL:E60425
All PCBs	Supporting part and protection against electric shock and fire	KingBoard Laminates Ltd. / KB	KB-616SF FR-4, 1.0 mm	FR-4 copper clad laminate, KB-616SF, thickness 1.0 mm, Tg 152.2°C, flammability UL94 V-0, CTI 175 V, RoHS compliant.	IPC-TM-650; UL 94 V-0: IEC 60112	UL:E123995
FPC connector J1 / J2	Internal connection	XUNPU	FPC-05F-8PH15	LCP Housing UL94 V-0 50 V 0.5 A	UL 94 V-0	Material UL Card (E6808)
RJ12 connector J6 / J7	Communication / internal connection	EVERCOM	5303-6P6C	FENG TONG Housing UL94 V-0 125 V 1.5 A	UL 94 V-0	Material UL Card (E352852)
RJ45 connector J8	Communication / internal connection	Ckmtw	R-RJ45R08P-A004	CHANG CHUN Housing UL94 V-0 125 V 1.5 A	UL 94 V-0	Material UL Card (E59481)
Common mode choke CH1	EMI suppression / filtering	Chilisin	BWDM0034162 0600X00	SMD common mode choke, 60 µH min. @100 kHz, RDC 1.7 Ω max., Irms 200 mA max., 50 VDC, -40°C to +105°C.	/	RoHS

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Inductor L1	Filtering and oscillation	DDY	WI0603LD470K ST-HF	Wire wound chip inductor, 0603, 47 µH, ±10%, Rdc 12 Ω max., Irms 100 mA typ., -40°C to +85°C.	REACH	CANEC250029 14408
Power inductor L2	Filtering and oscillation	ZE	ZECD43-101K	Power inductor, ZECD43-101K, 100 µH ±10%, DCR 1.190 Ω max., IDC 0.44 A max., -40°C to +125°C.	/	RoHS
Ferrite bead FB1 / FB2	EMI suppression / filtering	Murata	BLM15PD121S N1D	Chip ferrite bead, BLM15PD121S N1D, 120 Ω ±25% @100 MHz, rated current 1300 mA @85°C / 900 mA @125°C, DCR 0.09 Ω max., -55°C to +125°C.	/	RoHS
Ferrite bead FB3 / FB4	EMI suppression / filtering	FH	CBM100505U2 01T	Multilayer chip ferrite bead, 200 Ω ±25% @100 MHz, DCR 0.25 Ω max., rated current 700 mA max., -55°C to +125°C.	/	RoHS
TVS1 / TVS2 / TVS3	Transient voltage / ESD protection	BORN	PESD3V3S1BA -N	ESD protection diode, SOD-523, 3.3 V, 110 W peak pulse power, 10 A peak pulse current, -55°C to +150°C.	/	RoHS

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Diode array DA1	Signal protection	Nexperia	BAV99S	High-speed switching diode, SOT363 / SC-88, reverse voltage 100 V, forward current 200 mA, reverse recovery time 4 ns max., -65°C to +150°C.	/	RoHS
Button BT1	User operation / manual setting	XKB Connection	TS-1187A-C-J-B	Tact switch, 50 mA, 12 V DC, contact resistance 100 mΩ max., insulation resistance 100 MΩ min. @ 500 VDC, dielectric strength 250 VAC / 1 min., -30°C to +85°C.	/	RoHS
Instrument Transformers	Used for current, voltage, and harmonic analysis	JIANGYIN SPARK ELECTRONIC TECHNOLOGY CO LTD	CTO-5A, CTO-100A, CTO-200A, CTO-400A, CTO-600A	0–5A, 0–5V"): Maximum value 1000A; Output range: 0–5A, 0–5V	IEEE Std C57.13-2016/ CAN/CSA C61869-1	UL:File E341727, Vol 1/ROHS:A2240 704983101001E R1

NOTE → 1 List all different manufacturers of the above components

→ 2 May include electrical, mechanical values

→ 3 List licence no or method of acceptance

→ 4 asterisk indicates mark assuring agreed level of surveillance

TÜV Rheinland Group		License holder	
24.07.2026	Tonghai Wu		
Date	Signature	Name	Company Stamp and Signature

C E R T I F I C A T E

of Conformity
Low Voltage Directive (EU) 2014/35

Registration No.:	AN 50737988 0001
Report No.:	CN26L0FS 001
Holder:	SHANGHAI MATIS ELECTRIC CO.,LTD. Room 320, No. 83, Huanhu West Third Road, Pudong, 201306 Shanghai P.R. China
Product:	Power metering and monitoring devices *Multi-Circuit Multifunction Power Meter*

Type designation listed on the next page

This certificate of conformity is based on an evaluation of a sample of the above-mentioned product. Technical Report and documentation are at the License Holder's disposal. This is to certify that the tested sample is in conformity with Annex I of Council Directive (EU) 2014/35, referred to as the Low Voltage Directive. This certificate does not imply assessment of the series-production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex IV of the Directive.

Certification Body

Date: 2026-10-30

Wencai Zhang

TÜV Rheinland LGA Products GmbH
TÜVRheinland
Zertifizierungsstelle

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TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

The CE marking may be used if all relevant and effective EC Directives/Regulations are complied with.

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C E R T I F I C A T E

of Conformity
Low Voltage Directive (EU) 2014/35

Registration No.: AN 50737988 0001

Product: Power metering and monitoring devices
Multi-Circuit Multifunction Power Meter

Identification: Type Designation
Enertrek E10 Enertrek V10

Serial No.: Engineering sample

Remark: Issued in conjunction with TÜV Rheinland
license R 50737986 0001.

TÜV Rheinland LGA Products GmbH
TÜVRheinland
Zertifizierungsstelle

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Zertifikat *Certificate*

Zertifikatsnummer *Certificate No.:*
R 50737986 0001

Berichtsnummer *Report No.:*
CN26L0FS 001

Genehmigungsinhaber *License Holder:*
SHANGHAI MATIS ELECTRIC CO.,LTD.
Room 320, No. 83,
Huanhu West Third Road, Pudong,
201306 Shanghai
P.R. China

Fertigungsstätte *Manufacturing Site:*
Matismart Electric Suzhou Co.,Ltd
Room201,Block 29,No.369,Lushan Road,High Tech District, Suzhou
215129 Jiangsu
P.R. China

Prüfzeichen *Test Mark:*

TÜVRheinland CERTIFIED
Type Approved
Safety
Regular Production Surveillance
www.tuv.com
ID 1111320604

Geprüft nach *Tested according to:*
EN IEC 61557-12:2022+A1

Geräteidentifikation
Product Identification

Produkt: *Product:* Power metering and monitoring devices (Multi-Circuit Multifunction Power Meter)

Modell: *Type:* Modelle sind auf nächste(r) Seite(n) gelistet / *Type designation(s) are listed on the next page(s)*

Technische Daten: *Technical Data:* Technische Daten auf nächste(r) Seite(n) gelistet / Technical Data is listed on the next page(s)

Gültig ab: *Valid from:* 2026-10-30

Ausstellungsdatum: *Date of issue:* 2026-10-30

Zertifizierungsstelle: *Certification body:*

Wencai Zhang

TÜV Rheinland LGA Products GmbH
TÜVRheinland
Zertifizierungsstelle

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Dem Zertifikat liegt unsere Prüf- und Zertifizierungsordnung zugrunde und es bestätigt die Konformität des Produktes mit den oben genannten Standards und Prüfgrundlagen. Zusätzliche Anforderungen in Ländern, in denen das Produkt in Verkehr gebracht werden soll, müssen zusätzlich betrachtet werden. Die Herstellung des zertifizierten Produktes wird überwacht.
This certificate is based on our Testing and Certification Regulation and states the conformity of the product with the standards and testing requirements as indicated above. Any additional requirements in countries where the product is going to be marketed have to be considered additionally. The manufacturing of the certified product is subject to surveillance.

TÜV Rheinland LGA Products GmbH, Tillystraße 2, 90431 Nürnberg
http://www.tuv.com/safety E-mail: markcheck@tuv.com
Fax: +49 221 806-3935

Zertifikat *Certificate*

Zertifikatsnummer *Certificate No.:*
R 50737986 0001

Berichtsnummer *Report No.:*
CN26L0FS 001

Produkt *Product:* Power metering and monitoring devices
(Multi-Circuit Multifunction Power Meter)

Modell *Type:*

Bezeichnung *Designation:*

Type Designation	: Enertrek E10 Enertrek V10
Classification of PMD	: PMD SD
Classification of Installation and Use	: Performance measuring and monitoring
Ratings	: Auxiliary power supply: 80-265 VDC, 100-240 VAC, 50/60 Hz; Voltage input: 3 × 230 V L-N/400 V L-L, 50/60 Hz Current input: via external CT, Ipr: 100/200/400/600 A.
Pollution Degree	: 2
Protection Class	: 2
Rated Operating Conditions	: Fixed installed equipment: K55
Degree of Protection	: IP40 for front panel, IP20

ANLAGE (Appendix): 1

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C E R T I F I C A T E

of Conformity
Low Voltage Directive (EU) 2014/35

Registration No.:	AN 50740700 0001
Report No.:	CN26OIXU 001
Holder:	SHANGHAI MATIS ELECTRIC CO.,LTD. Room 320, No. 83, Huanhu West Third Road, Pudong, 201306 Shanghai P.R. China
Product:	Power metering and monitoring devices *Multi-Circuit Branch Circuit Meter*

Type designation listed on the next page

This certificate of conformity is based on an evaluation of a sample of the above-mentioned product. Technical Report and documentation are at the License Holder's disposal. This is to certify that the tested sample is in conformity with Annex I of Council Directive (EU) 2014/35, referred to as the Low Voltage Directive. This certificate does not imply assessment of the series-production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex IV of the Directive.

Certification Body

Date: 2026-10-30

Wencai Zhang

TÜV Rheinland LGA Products GmbH
TÜVRheinland
Zertifizierungsstelle

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C E R T I F I C A T E

of Conformity
Low Voltage Directive (EU) 2014/35

Registration No.: AN 50740700 0001

Product: Power metering and monitoring devices
Multi-Circuit Branch Circuit Meter

Identification: Type Designation
Enertrek M40 Enertrek M30 Enertrek M20 Enertrek M10
Enertrek V10

Serial No.: Engineering sample

Remark: Issued in conjunction with TÜV Rheinland
license R 50740699 0001.

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C E R T I F I C A T E

of Conformity
Low Voltage Directive (EU) 2014/35

Registration No.:	AN 50740700 0001
Report No.:	CN26OIXU 001
Holder:	SHANGHAI MATIS ELECTRIC CO.,LTD. Room 320, No. 83, Huanhu West Third Road, Pudong, 201306 Shanghai P.R. China
Product:	Power metering and monitoring devices *Multi-Circuit Branch Circuit Meter*

Type designation listed on the next page

This certificate of conformity is based on an evaluation of a sample of the above-mentioned product. Technical Report and documentation are at the License Holder's disposal. This is to certify that the tested sample is in conformity with Annex I of Council Directive (EU) 2014/35, referred to as the Low Voltage Directive. This certificate does not imply assessment of the series-production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex IV of the Directive.

Certification Body

Date: 2026-10-30

Wencai Zhang

TÜV Rheinland LGA Products GmbH
TÜVRheinland
Zertifizierungsstelle

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C E R T I F I C A T E

of Conformity
Low Voltage Directive (EU) 2014/35

Registration No.: AN 50740700 0001

Product: Power metering and monitoring devices
Multi-Circuit Branch Circuit Meter

Identification: Type Designation
Enertrek M40 Enertrek M30 Enertrek M20 Enertrek M10
Enertrek V10

Serial No.: Engineering sample

Remark: Issued in conjunction with TÜV Rheinland
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Certificate No. R50740699 0001 Our Reference 01-WTH- CN26OIXU 001 **Appendix No.** 1

Constructional Data Form (CDF) for PMD (EN61557-12)

Applicant: SHANGHAI MATIS ELECTRIC CO.,LTD.

(full address): Room 320, No. 83, Huanhu West Third Road, Pudong, 201306 Shanghai P.R. China

Factory: Matismart Electric Suzhou Co.,Ltd.

(full address): Room201,Block 29,No.369,Lushan Road,High Tech District, Suzhou 215129 Jiangsu P.R. China

Type or Model Number: Enertrek M10, Enertrek M20, Enertrek M30, Enertrek M40, Enertrek V10

Kind of device: Multi-Circuit Branch Circuit Meter

Information/rated values for the switching element:

Model and/or type reference	Enertrek M10, Enertrek M20, Enertrek M30, Enertrek M40, Enertrek V10
Classification of PMD	☒PMD SD (Semi-direct insertion) ☐PMD DD (Direct insertion) ☐PMD SS (Indirect insertion) ☐PMD DS (Semi-direct insertion)
Classification of installation and use:	Performance measuring and monitoring
Supply Connection :	By terminals
Type of item tested :	Measurement
Description of equipment function :	Measure and monitor electric parameters
Serial number :	SN Code Format:TTYMSSSS TT+Y+M+SSSS TT: XX Enertrek V10:20; Enertrek M10:30; Enertrek M20:31; Enertrek M30:32; Enertrek M40:33; Y:0~9, Last digit of the year (e.g., 2025 → 5); M:1~12,Month (1~12) in hexadecimal format; SSSS:0001~9999,Serial number: Unique and incremental per model, per month
Rating(s) :	Auxiliary power supply: 80-265 VDC, 100-240 VAC, 50/60 Hz; Voltage input: 3 × 230 V L-N / 400 V L-L, 50/60 Hz; Current input: Current input: via built-in current transformer, rated current up to 63 A.
Measurement (Installation) category:	III
Pollution degree :	2
Protection class :	Class 2
Environmental rating :	standard

TÜV Rheinland Group	License holder
24.07.2026 Tonghai Wu	
Date Signature	Name Company Stamp and Signature

Constructional Data Form (CDF) for PMD (EN61557-12)

Equipment mobility :	fixed	
Connection to mains supply :	Permanent	
Operating conditions :	continuous	
Overall size of the equipment (W x D x H):	Overall size of the equipment (W x D x H): Approx. 88.9 mm x 68.3 mm x 35.8 mm for Enertrek V10; Approx. 18 mm x 36 mm x 42.2 mm for Enertrek M10; Approx. 36 mm x 26.3 mm x 42.2 mm for Enertrek M20; Approx. 54 mm x 26.6 mm x 42.2 mm for Enertrek M30; Approx. 72 mm x 26.3 mm x 42.2 mm for Enertrek M40;	
Mass of the equipment (kg) :	Enertrek V10: approx. 0,140 kg max. Enertrek M10: approx. 0,024 kg max. Enertrek M20: approx. 0,030 kg max. Enertrek M30: approx. 0,055 kg max. Enertrek M40: approx. 0,063 kg max.	
Marked degree of protection to IEC 60529:	IP40 for front panel, IP20	
Rated operating conditions:	☐portable equipment	☒fixed installed equipment
	Rated operating range(with specified uncertainty): 0 °C to +40 °C Limit range of operation(no hardware failures): –10 °C to +55 °C Limit range for storage and shipping:–25 °C to +70 °C	K55 temperature class of PMD: Rated operating range(with specified uncertainty): –10 °C to +55 °C Limit range of operation(no hardware failures): –10 °C to +55 °C Limit range for storage and shipping: –25 °C to +70 °C

Accuracy Class for different models:

Measurement	Accuracy Class
Active Energy	Class 1 to IEC 61557-12
Reactive Energy	Class 1 to IEC 61557-12
Active Power	Class 0,5 to IEC 61557-12
Apparent power	Class 1 to IEC 61557-12
Reactive Power	Class 1 to IEC 61557-12
Voltage	Class 0,2 to IEC 61557-12
Current	Class 0,2 to IEC 61557-12

TÜV Rheinland Group	License holder
24.07.2026 Tonghai Wu	连建勇
Date Signature	Name Company Stamp and Signature

上海菱豆电气有限公司

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Enclosure material	Protects internal components, ensures safety, and provides electrical insulation	KINGFA SCI & TECH CO LTD	PA66	Flammability :Thk-0.75mm, V-0 , 5VA (ALL) ; GWFI:Thk-0.75mm, 960°C	UL 94 V-0	cURus: E171666
PCB connector	Provides secure, pluggable electrical connections for PCB-mounted devices.	PHOENIX CONTACT GmbH & Co. KG	BCH-508HS-2-GY; BCH-508HS-4-GY; BCH-381H-3 GY	Rated Voltage: 300 V Rated Current: 16 A UL 94 V-0	UL 1059	cURus: E60425
All PCBs	Supporting part and protection against electric shock and fire	KingBoard Laminates Ltd. / KB	KB-616SF FR-4, 1.0 mm	FR-4 copper clad laminate, KB-616SF, thickness 1.0 mm, Tg 152.2°C, flammability UL94 V-0, CTI 175 V, RoHS compliant.	IPC-TM-650; UL 94 V-0: IEC 60112	UL:E123995
RJ11 connector J8	Communication / external connection	EVERCOM	5504-6601121	FENG TONG Housing UL94 V-0 125 V 1.5 A	/	RoHS
Wire-to-board connector J1, J2, J3, J5, J6, J7	Internal connection	CJT	A1251WV-2P	1.25 mm pitch wire-to-board connector, 2-pin, 125 V AC/DC, 1 A, -40°C to +105°C, Nylon 66 insulator UL94V-0, phosphor bronze pin with tin over nickel.	UL 94V-0	UL:E326732

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
TVS1 / TVS2 / TVS3	Transient voltage / ESD protection	BORN	PESD3V3S1BA-N	ESD protection diode, SOD-523, 3.3 V, 110 W peak pulse power, 10 A peak pulse current, -55°C to +150°C.	/	RoHS
Common mode choke CH1	EMI suppression / filtering	Chilisin	BWDM00341620600X00	SMD common mode choke, 60 µH min. @100 kHz, RDC 1.7 Ω max., Irms 200 mA max., 50 VDC, -40°C to +105°C.	/	RoHS
Inductor L1	Filtering and oscillation	DDY	WI0603LD470KST-HF	Wire wound chip inductor, 0603, 47 µH, ±10%, Rdc 12 Ω max., Irms 100 mA typ., -40°C to +85°C.	/	RoHS
Ferrite bead FB1 / FB2	EMI suppression / filtering	Murata	BLM15PD121SN1D	Chip ferrite bead, BLM15PD121SN1D, 120 Ω ±25% @100 MHz, rated current 1300 mA @85°C / 900 mA @125°C, DCR 0.09 Ω max., -55°C to +125°C.	/	RoHS

Certificate No. R50740699 0001 Our Reference 01-WTH- CN26OIXU 001 **Appendix No.** 1

Constructional Data Form (CDF) for PMD (EN61557-12)

Applicant: SHANGHAI MATIS ELECTRIC CO.,LTD.

(full address): Room 320, No. 83, Huanhu West Third Road, Pudong, 201306 Shanghai P.R. China

Factory: Matismart Electric Suzhou Co.,Ltd.

(full address): Room201,Block 29,No.369,Lushan Road,High Tech District, Suzhou 215129 Jiangsu P.R. China

Type or Model Number: Enertrek M10, Enertrek M20, Enertrek M30, Enertrek M40, Enertrek V10

Kind of device: Multi-Circuit Branch Circuit Meter

Information/rated values for the switching element:

Model and/or type reference	Enertrek M10, Enertrek M20, Enertrek M30, Enertrek M40, Enertrek V10
Classification of PMD	☒PMD SD (Semi-direct insertion) ☐PMD DD (Direct insertion) ☐PMD SS (Indirect insertion) ☐PMD DS (Semi-direct insertion)
Classification of installation and use:	Performance measuring and monitoring
Supply Connection :	By terminals
Type of item tested :	Measurement
Description of equipment function :	Measure and monitor electric parameters
Serial number :	SN Code Format:TTYMSSSS TT+Y+M+SSSS TT: XX Enertrek V10:20; Enertrek M10:30; Enertrek M20:31; Enertrek M30:32; Enertrek M40:33; Y:0~9, Last digit of the year (e.g., 2025 → 5); M:1~12,Month (1~12) in hexadecimal format; SSSS:0001~9999,Serial number: Unique and incremental per model, per month
Rating(s) :	Auxiliary power supply: 80-265 VDC, 100-240 VAC, 50/60 Hz; Voltage input: 3 × 230 V L-N / 400 V L-L, 50/60 Hz; Current input: Current input: via built-in current transformer, rated current up to 63 A.
Measurement (Installation) category:	III
Pollution degree :	2
Protection class :	Class 2
Environmental rating :	standard

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24.07.2026 Tonghai Wu	
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Constructional Data Form (CDF) for PMD (EN61557-12)

Equipment mobility :	fixed	
Connection to mains supply :	Permanent	
Operating conditions :	continuous	
Overall size of the equipment (W x D x H):	Overall size of the equipment (W x D x H): Approx. 88.9 mm x 68.3 mm x 35.8 mm for Enertrek V10; Approx. 18 mm x 36 mm x 42.2 mm for Enertrek M10; Approx. 36 mm x 26.3 mm x 42.2 mm for Enertrek M20; Approx. 54 mm x 26.6 mm x 42.2 mm for Enertrek M30; Approx. 72 mm x 26.3 mm x 42.2 mm for Enertrek M40;	
Mass of the equipment (kg) :	Enertrek V10: approx. 0,140 kg max. Enertrek M10: approx. 0,024 kg max. Enertrek M20: approx. 0,030 kg max. Enertrek M30: approx. 0,055 kg max. Enertrek M40: approx. 0,063 kg max.	
Marked degree of protection to IEC 60529:	IP40 for front panel, IP20	
Rated operating conditions:	☐portable equipment	☒fixed installed equipment
	Rated operating range(with specified uncertainty): 0 °C to +40 °C Limit range of operation(no hardware failures): –10 °C to +55 °C Limit range for storage and shipping:–25 °C to +70 °C	K55 temperature class of PMD: Rated operating range(with specified uncertainty): –10 °C to +55 °C Limit range of operation(no hardware failures): –10 °C to +55 °C Limit range for storage and shipping: –25 °C to +70 °C

Accuracy Class for different models:

Measurement	Accuracy Class
Active Energy	Class 1 to IEC 61557-12
Reactive Energy	Class 1 to IEC 61557-12
Active Power	Class 0,5 to IEC 61557-12
Apparent power	Class 1 to IEC 61557-12
Reactive Power	Class 1 to IEC 61557-12
Voltage	Class 0,2 to IEC 61557-12
Current	Class 0,2 to IEC 61557-12

TÜV Rheinland Group	License holder
24.07.2026 Tonghai Wu	连建勇
Date Signature	Name Company Stamp and Signature

上海菱豆电气有限公司

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Enclosure material	Protects internal components, ensures safety, and provides electrical insulation	KINGFA SCI & TECH CO LTD	PA66	Flammability :Thk-0.75mm, V-0 , 5VA (ALL) ; GWFI:Thk-0.75mm, 960°C	UL 94 V-0	cURus: E171666
PCB connector	Provides secure, pluggable electrical connections for PCB-mounted devices.	PHOENIX CONTACT GmbH & Co. KG	BCH-508HS-2-GY; BCH-508HS-4-GY; BCH-381H-3 GY	Rated Voltage: 300 V Rated Current: 16 A UL 94 V-0	UL 1059	cURus: E60425
All PCBs	Supporting part and protection against electric shock and fire	KingBoard Laminates Ltd. / KB	KB-616SF FR-4, 1.0 mm	FR-4 copper clad laminate, KB-616SF, thickness 1.0 mm, Tg 152.2°C, flammability UL94 V-0, CTI 175 V, RoHS compliant.	IPC-TM-650; UL 94 V-0: IEC 60112	UL:E123995
RJ11 connector J8	Communication / external connection	EVERCOM	5504-6601121	FENG TONG Housing UL94 V-0 125 V 1.5 A	/	RoHS
Wire-to-board connector J1, J2, J3, J5, J6, J7	Internal connection	CJT	A1251WV-2P	1.25 mm pitch wire-to-board connector, 2-pin, 125 V AC/DC, 1 A, -40°C to +105°C, Nylon 66 insulator UL94V-0, phosphor bronze pin with tin over nickel.	UL 94V-0	UL:E326732

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
TVS1 / TVS2 / TVS3	Transient voltage / ESD protection	BORN	PESD3V3S1BA-N	ESD protection diode, SOD-523, 3.3 V, 110 W peak pulse power, 10 A peak pulse current, -55°C to +150°C.	/	RoHS
Common mode choke CH1	EMI suppression / filtering	Chilisin	BWDM00341620600X00	SMD common mode choke, 60 µH min. @100 kHz, RDC 1.7 Ω max., Irms 200 mA max., 50 VDC, -40°C to +105°C.	/	RoHS
Inductor L1	Filtering and oscillation	DDY	WI0603LD470KST-HF	Wire wound chip inductor, 0603, 47 µH, ±10%, Rdc 12 Ω max., Irms 100 mA typ., -40°C to +85°C.	/	RoHS
Ferrite bead FB1 / FB2	EMI suppression / filtering	Murata	BLM15PD121SN1D	Chip ferrite bead, BLM15PD121SN1D, 120 Ω ±25% @100 MHz, rated current 1300 mA @85°C / 900 mA @125°C, DCR 0.09 Ω max., -55°C to +125°C.	/	RoHS

Applicant: SHANGHAI MATIS ELECTRIC CO.,LTD.

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Factory: Matismart Electric Suzhou Co.,Ltd.

(full address): Room201,Block 29,No.369,Lushan Road,High Tech District, Suzhou 215129 Jiangsu P.R. China

Type or Model Number: Enertrek E21, Enertrek E31, Enertrek V10

Kind of device: Multi-Circuit Power Quality Meter

Information/rated values for the switching element:

Model and/or type reference	Enertrek E21, Enertrek E31, Enertrek V10
Classification of PMD	☒PMD SD (Semi-direct insertion) ☐PMD DD (Direct insertion) ☐PMD SS (Indirect insertion) ☐PMD DS (Semi-direct insertion)
Classification of installation and use:	Performance measuring and monitoring
Supply Connection :	By terminals
Type of item tested :	Measurement
Description of equipment function :	Measure and monitor electric parameters
Serial number :	SN Code Format:TTYMSSSS TT+Y+M+SSSS TT: XX Enertrek V10:20; Enertrek E21-100 (CTOV-100A):43; Enertrek E21-200 (CTOV-200A):49; Enertrek E21-400 (CTOV-400A):50; Enertrek E21-600 (CTOV-600A):51; Enertrek E31-800 (CTF-50):44; Enertrek E31-1000 (CTF-80):52; Enertrek E31-2000 (CTF-100)53; Enertrek E31-3000 (CTF-150):54; Enertrek E31-6300 (CTF-200):55; Enertrek E31-10000 (CTF-300):56; Y:0~9, Last digit of the year (e.g., 2025 → 5); M:1~12,Month (1~12) in hexadecimal format; SSSS:0001~9999,Serial number: Unique and incremental per model, per month

Rating(s) :	Auxiliary power supply: 80-265 VDC, 100-240 VAC, 50/60 Hz; Voltage input: 3 × 230 V L-N / 400 V L-L, 50/60 Hz; Enertrek E21: via external CTOV voltage-output current transformer, primary current 100/200/400/600 A; Enertrek E31: via external Rogowski coil, primary current 800/1000/2000/3000/6000/10000 A.	
Measurement (Installation) category:	III	
Pollution degree :	2	
Protection class :	Class 2	
Environmental rating :	standard	
Equipment mobility :	fixed	
Connection to mains supply :	Permanent	
Operating conditions :	continuous	
Overall size of the equipment (W x D x H):	Overall size of the equipment (W x D x H): Approx. 35.8 mm x 88.9 mm x 68.3 mm for Enertrek V10; Approx. 18 mm x 88.9 mm x 68.3 mm for Enertrek E21; Approx. 18 mm x 88.9 mm x 68.3 mm for Enertrek E31;	
Mass of the equipment (kg) :	Enertrek V10: approx. 0,150 kg max. Enertrek E21: approx. 0,054 kg max. Enertrek E31: approx. 0,056 kg max.	
Marked degree of protection to IEC 60529:	IP40 for front panel, IP20	
Rated operating conditions:	☐portable equipment	☒fixed installed equipment
	Rated operating range(with specified uncertainty): 0 °C to +40 °C Limit range of operation(no hardware failures): –10 °C to +55 °C Limit range for storage and shipping:–25 °C to +70 °C	K55 temperature class of PMD: Rated operating range(with specified uncertainty): –10 °C to +55 °C Limit range of operation(no hardware failures): –10 °C to +55 °C Limit range for storage and shipping: –25 °C to +70 °C

Accuracy Class for different models:

Measurement	Accuracy Class
Active Energy	Class 1 to IEC 61557-12
Reactive Energy	Class 1 to IEC 61557-12
Active Power	Class 1 to IEC 61557-12
Apparent power	Class 1 to IEC 61557-12
Reactive Power	Class 1 to IEC 61557-12
Voltage	Class 0.2 to IEC 61557-12

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Current	Class 0.2 to IEC 61557-12
Harmonics (Current, Voltage)	Class 2 to IEC 61557-12
THD (Current, Voltage)	Class 2 to IEC 61557-12

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Enclosure material	Protects internal components, ensures safety, and provides electrical insulation	KINGFA SCI & TECH CO LTD	PA66	Flammability :Thk-0.75mm, V-0 , 5VA (ALL) ; GWFI:Thk-0.75mm, 960°C	UL 94 V-0	UL:E171666
PCB connector	Provides secure, pluggable electrical connections for PCB-mounted devices.	PHOENIX CONTACT GmbH & Co. KG	BCH-508HS-2-GY; BCH-508HS-4-GY; BCH-381H-3 GY	Rated Voltage: 300 V Rated Current: 16 A UL 94 V-0	UL 1059	UL:E60425
All PCBs	Supporting part and protection against electric shock and fire	KingBoard Laminates Ltd. / KB	KB-616SF FR-4, 1.0 mm	FR-4 copper clad laminate, KB-616SF, thickness 1.0 mm, Tg 152.2°C, flammability UL94 V-0, CTI 175 V, RoHS compliant.	IPC-TM-650; UL 94 V-0: IEC 60112	UL:E123995
FPC connector J1 / J2	Internal connection	XUNPU	FPC-05F-8PH15	LCP Housing UL94 V-0 50 V 0.5 A	UL 94 V-0	Material UL Card (E6808)
RJ12 connector J6 / J7	Communication / internal connection	EVERCOM	5303-6P6C	FENG TONG Housing UL94 V-0 125 V 1.5 A	UL 94 V-0	Material UL Card (E352852)
RJ45 connector J8	Communication / internal connection	Ckmtw	R-RJ45R08P-A004	CHANG CHUN Housing UL94 V-0 125 V 1.5 A	UL 94 V-0	Material UL Card (E59481)

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Common mode choke CH1	EMI suppression / filtering	Chilisin	BWDM0034162 0600X00	SMD common mode choke, 60 µH min. @100 kHz, RDC 1.7 Ω max., Irms 200 mA max., 50 VDC, -40°C to +105°C.	/	RoHS
Inductor L1	Filtering and oscillation	DDY	WI0603LD470K ST-HF	Wire wound chip inductor, 0603, 47 µH, ±10%, Rdc 12 Ω max., Irms 100 mA typ., -40°C to +85°C.	REACH	CANEC250029 14408
Power inductor L2	Filtering and oscillation	ZE	ZECD43-101K	Power inductor, ZECD43-101K, 100 µH ±10%, DCR 1.190 Ω max., IDC 0.44 A max., -40°C to +125°C.	/	RoHS
Ferrite bead FB1 / FB2	EMI suppression / filtering	Murata	BLM15PD121S N1D	Chip ferrite bead, BLM15PD121S N1D, 120 Ω ±25% @100 MHz, rated current 1300 mA @85°C / 900 mA @125°C, DCR 0.09 Ω max., -55°C to +125°C.	/	RoHS
Ferrite bead FB3 / FB4	EMI suppression / filtering	FH	CBM100505U2 01T	Multilayer chip ferrite bead, 200 Ω ±25% @100 MHz, DCR 0.25 Ω max., rated current 700 mA max., -55°C to +125°C.	/	RoHS

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
TVS1 / TVS2 / TVS3	Transient voltage / ESD protection	BORN	PESD3V3S1BA-N	ESD protection diode, SOD-523, 3.3 V, 110 W peak pulse power, 10 A peak pulse current, -55°C to +150°C.	/	RoHS
Diode array DA1	Signal protection	Nexperia	BAV99S	High-speed switching diode, SOT363 / SC-88, reverse voltage 100 V, forward current 200 mA, reverse recovery time 4 ns max., -65°C to +150°C.	/	RoHS
Button BT1	User operation / manual setting	XKB Connection	TS-1187A-C-J-B	Tact switch, 50 mA, 12 V DC, contact resistance 100 mΩ max., insulation resistance 100 MΩ min. @ 500 VDC, dielectric strength 250 VAC / 1 min., -30°C to +85°C.	/	RoHS
Appliance Wiring Material (AWM) - Component	Provides safe, internal electrical power distribution for appliances	DONGGUAN CHENG XING ELECTRONIC CO LTD	CTOV-100A, CTOV-200A, CTOV-400A, CTOV-600A	300V / 105°C / 18AWG / VW-1	UL 758	UL:AVLV2.E249743
Insulating Tape - Component	Provides electrical insulation and secures wiring	JINGJIANG JINGYI ADHESIVE PRODUCT CO LTD	JY25-A	130°C / Flame Retardant	UL 510	UL:OANZ2.E246950

Constructional Data Form (CDF) for PMD (EN61557-12)

Critical Components

Material: e.g. external enclosure, PCB, closed-end connector, sleeves, cord anchorage etc

Components with winding: e.g. motor, transformer, magnetic coil etc.

Other components: e.g. switch, thermostat, heater, plug, internal wire, capacitor, relay, varistor etc.

Unique component reference or location	Application/function	Manufacturer / trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Standard	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)
Magnet Wire - Component	Forms inductive coils to conduct current and generate magnetic fields	NINGBO JINTIAN NEW MATERIAL CO LTD	xPIW/240 or QY-x/240	Temp Class: 240 / ANSI Type: MW 16C / Polyimide coating	UL 1446	UL:OBMW2. E227047

NOTE → 1 List all different manufacturers of the above components

→ 2 May include electrical, mechanical values

→ 3 List licence no or method of acceptance

→ 4 asterisk indicates mark assuring agreed level of surveillance

TÜV Rheinland Group		License holder	
24.07.2026	Tonghai Wu	李建勇	
Date	Signature	Name	Company Stamp and Signature

C E R T I F I C A T E

of Conformity
Low Voltage Directive (EU) 2014/35

Registration No.:	AN 50740703 0001
Report No.:	CN260H07 001
Holder:	SHANGHAI MATIS ELECTRIC CO.,LTD. Room 320, No. 83, Huanhu West Third Road, Pudong, 201306 Shanghai P.R. China
Product:	Power metering and monitoring devices *Multi-Circuit Power Quality Meter*

Type designation listed on the next page

This certificate of conformity is based on an evaluation of a sample of the above-mentioned product. Technical Report and documentation are at the License Holder's disposal. This is to certify that the tested sample is in conformity with Annex I of Council Directive (EU) 2014/35, referred to as the Low Voltage Directive. This certificate does not imply assessment of the series-production of the product and does not permit the use of a TÜV Rheinland mark of conformity. The holder of the certificate is authorized to use this certificate in connection with the EC declaration of conformity according to Annex IV of the Directive.

Certification Body

Date: 2026-10-30

Wencai Zhang

TÜV Rheinland LGA Products GmbH
TÜVRheinland
Zertifizierungsstelle

® TÜV, TUEV and TUV are registered trademarks. Utilisation and application requires prior approval.

TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

The CE marking may be used if all relevant and effective EC Directives/Regulations are complied with.

www.tuv.com

TÜVRheinland®
Precisely Right.

C E R T I F I C A T E

of Conformity
Low Voltage Directive (EU) 2014/35

Registration No.: AN 50740703 0001

Product: Power metering and monitoring devices
Multi-Circuit Power Quality Meter

Identification: Type Designation
Enertrek E21 Enertrek E31 Enertrek V10

Serial No.: Engineering sample

Remark: Issued in conjunction with TÜV Rheinland
license R 50740701 0001.

TÜV Rheinland LGA Products GmbH
TÜVRheinland
Zertifizierungsstelle

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TÜV Rheinland LGA Products GmbH - Tillystraße 2 - 90431 Nürnberg

The CE marking may be used if all relevant and effective EC Directives/Regulations are complied with.

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Zertifikat *Certificate*

Zertifikatsnummer *Certificate No.:*
R 50740701 0001

Berichtsnummer *Report No.:*
CN260H07 001

Genehmigungsinhaber *License Holder:*
SHANGHAI MATIS ELECTRIC CO.,LTD.
Room 320, No. 83,
Huanhu West Third Road, Pudong,
201306 Shanghai
P.R. China

Fertigungsstätte *Manufacturing Site:*
Matismart Electric Suzhou Co.,Ltd
Room201,Block 29,No.369,Lushan Road,High Tech District, Suzhou
215129 Jiangsu
P.R. China

Prüfzeichen *Test Mark:*

TÜVRheinland CERTIFIED
Type Approved
Safety
Regular Production Surveillance
www.tuv.com
ID 1111321413

Geprüft nach *Tested according to:*
EN IEC 61557-12:2022+A1

Geräteidentifikation
Product Identification

Produkt: *Product:*	Power metering and monitoring devices (Multi-Circuit Power Quality Meter)
Modell: *Type:*	Modelle sind auf nächste(r) Seite(n) gelistet *Type designation(s) are listed on the next page(s)*
Technische Daten: *Technical Data:*	Technische Daten auf nächste(r) Seite(n) gelistet Technical Data is listed on the next page(s)

Gültig ab: *Valid from:* 2026-10-30

Ausstellungsdatum: *Date of issue:* 2026-10-30

Zertifizierungsstelle: *Certification body:*

Wencai Zhang

TÜV Rheinland LGA Products GmbH TÜVRheinland Zertifizierungsstelle

Dem Zertifikat liegt unsere Prüf- und Zertifizierungsordnung zugrunde und es bestätigt die Konformität des Produktes mit den oben genannten Standards und Prüfgrundlagen. Zusätzliche Anforderungen in Ländern, in denen das Produkt in Verkehr gebracht werden soll, müssen zusätzlich betrachtet werden. Die Herstellung des zertifizierten Produktes wird überwacht.
This certificate is based on our Testing and Certification Regulation and states the conformity of the product with the standards and testing requirements as indicated above. Any additional requirements in countries where the product is going to be marketed have to be considered additionally. The manufacturing of the certified product is subject to surveillance.

TÜV Rheinland LGA Products GmbH, Tillystraße 2, 90431 Nürnberg
http://www.tuv.com/safety E-mail: markcheck@tuv.com
Fax: +49 221 806-3935

® TÜV, TUEV and TUV are registered trademarks. Utilisation and application requires prior approval.

Zertifikat *Certificate*

Zertifikatsnummer *Certificate No.:*
R 50740701 0001

Berichtsnummer *Report No.:*
CN260H07 001

Produkt *Product:* Power metering and monitoring devices
(Multi-Circuit Power Quality Meter)

Modell *Type:*

Bezeichnung *Designation:*

Type Designation	: Enertrek E21 Enertrek E31 Enertrek V10
Classification of PMD	: PMD SD
Classification of Installation and Use	: Performance measuring and monitoring
Ratings	: Auxiliary power supply: 80-265 VDC, 100-240 VAC, 50/60 Hz; Voltage input: 3 × 230 V L-N/400 V L-L, 50/60 Hz Current input: Enertrek E21: via external CTOVvoltage-output CT, Ipr:100/200/400/600A; Enertrek E31: via external Rogowski coil, Ipr:800/1000/2000/3000/6000/10000A.
Pollution Degree	: 2
Protection Class	: 2
Rated Operating Conditions	: Fixed installed equipment: K55
Degree of Protection	: IP40 for front panel, IP20

ANLAGE (Appendix): 1

TÜV Rheinland LGA Products GmbH
TÜVRheinland
Zertifizierungsstelle

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Attestation of Compliance

Reference No.	:	**LCSA09116035R**
Applicant	:	**Shanghai Matis Electric Co.Ltd**
Address	:	**Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306**
Sample Name(s)	:	**Multi Circuit Power Monitoring System**
Trade Mark	:	**Matis/Matismart**
Tested Model No.	:	**Enertrek V10/M10/M20/M30/M40/E10/E21/ E31**
Tested according to	:	**IEC 62321-3-1:2026, IEC 62321-5:2013, IEC 62321-4:2013+AMD1:2017 CSV, IEC 62321-6:2015, IEC 62321-7-1:2015, IEC 62321-7-2:2017, IEC 62321-8:2017**
Report No.	:	**LCSA09116035R**

The submitted products have been tested by us with the listed standards.

This attestation of compliance is issued according to the council directive 2011/65/EU and its amendment directives (EU) 2015/863. It confirms that the listed product complies with all essential requirements of the RoHS directive and applies only to the sample and its technical documentation submitted to Shenzhen LCS Compliance Testing Laboratory Ltd. for testing.

After preparation of the necessary technical documentation as well as the EC conformity declaration the required CE marking can be affixed on the product. Other relevant directives have to be observed.

RoHS

Date of issue: October 27, 2026

Manager

Shenzhen LCS Compliance Testing Laboratory Ltd.
Add: 901, No.40 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, Guangdong, China
Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

TEST REPORT

Applicant	:	**Shanghai Matis Electric Co.Ltd**
Applicant Address	:	**Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306**

Report on the submitted samples said to be:

Sample Name(s)	:	**Multi Circuit Power Monitoring System**
Trade Mark	:	**Matis/Matismart**
Tested Model No.	:	**Enertrek V10/M10/M20/M30/M40/E10/E21/ E31**
Sample Received Date	:	**September 11, 2026**
Testing Period	:	**September 11, 2026 ~ September 20, 2026**
Date of Report	:	**October 27, 2026**
Testing Location	:	**901, No.40 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, Guangdong, China**
Results	:	**Please refer to next page(s).**

TEST REQUEST	CONCLUSION
As specified by the client, the designated components of the submitted sample were tested. The detected contents of Lead (Pb), Cadmium (Cd), Mercury (Hg), Hexavalent Chromium (Cr(VI)), PBBs, PBDEs, Dibutyl Phthalate (DBP), Butylbenzyl Phthalate (BBP), Di-2-ethylhexyl Phthalate (DEHP) and Diisobutyl Phthalate (DIBP) are in compliance with the limit requirements specified in RoHS Directive 2011/65/EU as amended by (EU) 2015/863.	**PASS**

Signed for and on behalf of LCS

Yin Dong

Shenzhen LCS Compliance Testing Laboratory Ltd.
Add: 901, No.40 Building, Xialang Industrial Zone, Heshuikou Community, Matian Street, Guangming District, Shenzhen, Guangdong, China
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A. EU RoHS Directive 2011/65/EU and its amendment directives

Test method: Refer to IEC 62321-3-1:2026*, Screening by X-ray Fluorescence Spectroscopy (XRF).

Test result(s):

Sample No.	Sample Description	Screening Result(s)						Date of sample submission/ Resubmission
		Cd	Pb	Hg	Cr▼	Br▼		
						PBBs	PBDEs	
1	Silver metal	X	BL	BL	BL	/	/	2026-09-11
2	White hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
3	White hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
4	Transparent hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
5	Yellow hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
6	Green PCB Board	BL	BL	BL	BL	X	X	2026-09-11
7	Solder	BL	OL	BL	BL	/	/	2026-09-11
8	Grey hard plastic	BL	BL	BL	BL	X	X	2026-09-11
9	Metal contact pin	BL	BL	BL	BL	/	/	2026-09-11
10	Grey hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
11	Silver metal screw	OL	BL	BL	BL	/	/	2026-09-11
12	Silver metal	BL	BL	BL	BL	/	/	2026-09-11
13	Silver metal	BL	OL	BL	BL	/	/	2026-09-11
14	Metal contact pin	OL	BL	BL	BL	/	/	2026-09-11
15	Metal contact pin	BL	BL	BL	BL	/	/	2026-09-11
16	Black hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
17	Black hard plastic	BL	BL	BL	BL	X	X	2026-09-11
18	Glue	BL	BL	BL	BL	BL	BL	2026-09-11
19	Pink hard plastic	BL	BL	BL	BL	X	X	2026-09-11
20	Copper-colored metal wire core	BL	BL	BL	BL	/	/	2026-09-11
21	Yellow plastic tape	BL	BL	BL	BL	BL	BL	2026-09-11
22	IC body	BL	BL	BL	BL	BL	BL	2026-09-11
23	Inductor	BL	BL	BL	BL	BL	BL	2026-09-11
24	Surface-mount capacitor	BL	BL	BL	BL	BL	BL	2026-09-11
25	Inductor	BL	BL	BL	BL	BL	BL	2026-09-11
26	Surface-mount capacitor	BL	BL	BL	BL	BL	BL	2026-09-11
27	Blue capacitor	BL	BL	BL	BL	BL	BL	2026-09-11
28	Surface-mount resistor	BL	BL	BL	BL	BL	BL	2026-09-11
29	Flexible Printed	BL	BL	BL	BL	X	X	2026-09-11

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Sample No.	Sample Description	Screening Result(s)						Date of sample submission/ Resubmission
		Cd	Pb	Hg	Cr▼	Br▼		
						PBBs	PBDEs	
	Circuit Board							
30	White lamp bead	BL	BL	BL	BL	BL	BL	2026-09-11
31	Silver metal	BL	BL	BL	BL	/	/	2026-09-11
32	Black hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
33	White hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
34	Metal contact pin	BL	OL	BL	BL	/	/	2026-09-11
35	Black hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
36	Metal case of the capacitor	BL	BL	BL	BL	/	/	2026-09-11
37	Plastic sheath of capacitor	BL	BL	BL	BL	BL	BL	2026-09-11
38	Yellow plastic tape	BL	BL	BL	BL	BL	BL	2026-09-11
39	Metal pin	OL	BL	BL	BL	/	/	2026-09-11
40	Magnetic core	BL	BL	BL	BL	/	/	2026-09-11
41	Black hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
42	Copper-colored metal wire core	BL	BL	BL	BL	/	/	2026-09-11
43	White plastic tape	BL	BL	BL	BL	BL	BL	2026-09-11
44	Black hard plastic	BL	BL	BL	BL	X	X	2026-09-11
45	Metal pin	BL	BL	BL	BL	/	/	2026-09-11
46	Magnetic core	BL	BL	BL	BL	/	/	2026-09-11
47	Enameled wire	BL	BL	BL	BL	/	/	2026-09-11
48	IC body	BL	BL	BL	BL	BL	BL	2026-09-11
49	IC body	BL	BL	BL	BL	BL	BL	2026-09-11
50	Crystal	BL	BL	BL	BL	/	/	2026-09-11
51	Green capacitor	BL	BL	BL	X	BL	BL	2026-09-11
52	Inductor	BL	BL	BL	BL	BL	BL	2026-09-11
53	Yellow capacitor	BL	BL	BL	BL	BL	BL	2026-09-11
54	Inductor	BL	BL	BL	BL	BL	BL	2026-09-11
55	IC body	BL	BL	BL	BL	BL	BL	2026-09-11
56	Surface-mount resistor	BL	BL	BL	BL	BL	BL	2026-09-11
57	Silver metal screw	BL	BL	BL	BL	/	/	2026-09-11
58	Black hard plastic	BL	BL	BL	BL	X	X	2026-09-11
59	Silver metal	BL	BL	BL	BL	/	/	2026-09-11
60	Silver metal	BL	BL	BL	BL	/	/	2026-09-11
61	Metal spring	X	BL	BL	BL	/	/	2026-09-11

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Sample No.	Sample Description	Screening Result(s)						Date of sample submission/ Resubmission
		Cd	Pb	Hg	Cr▼	Br▼		
						PBBs	PBDEs	
62	Black plastic heat shrink tube	BL	BL	BL	BL	BL	BL	2026-09-11
63	Red plastic wire covering	BL	BL	BL	BL	BL	BL	2026-09-11
64	White hard plastic	BL	BL	BL	BL	BL	BL	2026-09-11
65	Black plastic wire covering	BL	BL	BL	BL	BL	BL	2026-09-11
66	Yellow plastic heat shrink tube	BL	BL	BL	BL	BL	BL	2026-09-11

Note:

1. Results were obtained by XRF for primary screening, and further chemical testing by ICP(for Cd, Pb, Hg), UV-Vis(for Cr(VI)) and GC-MS(for PBBs, PBDEs) are recommended to be performed, if the concentration exceeds the below warning value according to IEC 62321-3-1:2026(Unit: mg/kg).

Element	Polymers	Metals	Composite material
Cd	BL≤(70-3σ)<X<(130+3σ)≤OL	BL≤(70-3σ)<X<(130+3σ)≤OL	LOD<X<(150+3σ)≤OL
Pb	BL≤(700-3σ)<X<(1300+3σ)≤OL	BL≤(700-3σ)<X<(1300+3σ)≤OL	BL≤(500-3σ)<X<(1500+3σ)≤OL
Hg	BL≤(700-3σ)<X<(1300+3σ)≤OL	BL≤(700-3σ)<X<(1300+3σ)≤OL	BL≤(500-3σ)<X<(1500+3σ)≤OL
Cr	BL≤(700-3σ)<X	BL≤(700-3σ)<X	BL≤(500-3σ)<X
Br	BL≤(300-3σ)<X	N/A	BL≤(250-3σ)<X

Remark:

- BL= Below Limit
- OL= Over Limit
- X= The range of needing to do further testing
- 3σ= The reproducibility of analytical instruments
- N/A= Not applicable
- LOD= Detection limit

2. The XRF screening test for RoHS elements – The reading may be different to the actual content in the sample be of non-uniformity composition.
3. The maximum permissible limit is quoted from the document RoHS Directive 2011/65/EU with amendment (EU) 2015/863.
4. ▼=For restricted substances PBBs and PBDEs, the results show the total Br content, the restricted substance was Cr(VI), and the results showed the total Cr content.

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RoHS Restricted Substances	Maximum Concentration Value (mg/kg) (by weight in homogenous materials)
Cadmium(Cd)	100
Lead(Pb)	1000
Mercury(Hg)	1000
Hexavalent Chromium(Cr(VI))	1000
Polybrominated biphenyls(PBBs)	1000
Polybrominated diphenylethers(PBDEs)	1000
Dibutyl Phthalate(DBP)	1000
Butylbenzyl Phthalate(BBP)	1000
Di-(2-ethylhexyl) Phthalate(DEHP)	1000
Diisobutyl phthalate(DIBP)	1000

Disclaimers:

This XRF Screening report is for reference purposes only. The applicant shall make its/his/her own judgment as to whether the information provided in this XRF screening report is sufficient for its/his/her purposes. The result shown in this XRF screening report will differ based on various factors, including but not limited to, the sample size, thickness, area, surface flatness, equipment parameters and matrix effect (e.g. plastic, rubber, metal, glass, ceramic etc.). Further wet chemical pre-treatment with relevant chemical equipment analysis are required to obtain quantitative data.

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B. EU RoHS Directive 2011/65/EU with amendment (EU) 2015/863 on Lead(Pb), Cadmium(Cd), Hexavalent Chromium(Cr(VI)), PBBs, PBDEs, DBP, BBP, DEHP & DIBP content

Test method:

Lead(Pb) & Cadmium(Cd) Content:

Refer to IEC 62321-5:2013, by acid digestion and analysis was performed by inductively coupled plasma optical emission spectrometer (ICP-OES) or atomic absorption spectrometer (AAS).

Hexavalent Chromium(Cr(VI)) Content:

Refer to IEC 62321-7-1:2015 or IEC 62321-7-2:2017, analysis was performed by UV-visible spectrophotometer (UV-Vis).

PBBs & PBDEs Content:

Refer to IEC 62321-6:2015, by solvent extraction and analysis was performed by gas chromatography-mass spectrometer (GC-MS).

Phthalates(DBP, BBP, DEHP &DIBP) Content:

Refer to IEC 62321-8:2017, by solvent extraction and analysis was performed by gas chromatography-mass spectrometer (GC-MS).

Test result(s):

1) Lead(Pb) & Cadmium(Cd)

Tested Item	MDL (mg/kg)	Test Result(s) (mg/kg)			Limit (mg/kg)
		7	13	34	
Lead(Pb) Content	5	163	20714#	N.D.	1000

Tested Item	MDL (mg/kg)	Test Result(s) (mg/kg)					Limit (mg/kg)
		1	11	14	39	61	
Cadmium(Cd) Content	5	N.D.	N.D.	N.D.	N.D.	N.D.	100

2) Hexavalent Chromium(Cr(VI))

Tested Item	MDL (mg/kg)	Test Result(s) (mg/kg)	Limit (mg/kg)
		51	
Hexavalent Chromium(Cr(VI)) Content	8	N.D.	1000

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4) Phthalates(DBP, BBP, DEHP &DIBP)

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)				Limit (mg/kg)
		18	21	38	43	
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	N.D.	N.D.	1000
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	N.D.	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)			Limit (mg/kg)
		63	65	66	
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	N.D.	1000
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)		Limit (mg/kg)
		2+3+4	5+6+8	
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	1000
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)		Limit (mg/kg)
		10+16+17	19+22+23	
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	1000
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	1000

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Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)		Limit (mg/kg)
		24+25+26	27+28+29	
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	1000
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)		Limit (mg/kg)
		30+32+33	35+37+41	
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	1000
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)		Limit (mg/kg)
		44+48+49	51+52+53	
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	1000
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	1000

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)		Limit (mg/kg)
		54+55+56	58+62+64	
Diisobutyl phthalate(DIBP) Content	50	N.D.	N.D.	1000
Dibutyl Phthalate(DBP) Content	50	N.D.	N.D.	1000
Butylbenzyl Phthalate(BBP) Content	50	N.D.	N.D.	1000
Di-(2-ethylhexyl) Phthalate(DEHP) Content	50	N.D.	N.D.	1000

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5) Polybrominated Biphenyls(PBBs) & Polybrominated Diphenyl Ethers(PBDEs)

Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)				Limit (mg/kg)
		6	8	17	19	
Polybrominated Biphenyls(PBBs) Content						
Monobromobiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Dibromobiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Tribromobiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Tetrabromobiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Pentabromobiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Hexabromobiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Heptabromobiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Octabromobiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Nonabromodiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Decabromodiphenyl	100	N.D.	N.D.	N.D.	N.D.	/
Total content	/	N.D.	N.D.	N.D.	N.D.	1000
Polybrominated Diphenylethers(PBDEs) Content						
Monobromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Dibromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Tribromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Tetrabromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Pentabromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Hexabromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Heptabromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Octabromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Nonabromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Decabromodiphenyl ether	100	N.D.	N.D.	N.D.	N.D.	/
Total content	/	N.D.	N.D.	N.D.	N.D.	1000

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Tested Item(s)	MDL (mg/kg)	Test Result(s) (mg/kg)			Limit (mg/kg)
		29	44	58	
Polybrominated Biphenyls(PBBs) Content					
Monobromobiphenyl	100	N.D.	N.D.	N.D.	/
Dibromobiphenyl	100	N.D.	N.D.	N.D.	/
Tribromobiphenyl	100	N.D.	N.D.	N.D.	/
Tetrabromobiphenyl	100	N.D.	N.D.	N.D.	/
Pentabromobiphenyl	100	N.D.	N.D.	N.D.	/
Hexabromobiphenyl	100	N.D.	N.D.	N.D.	/
Heptabromobiphenyl	100	N.D.	N.D.	N.D.	/
Octabromobiphenyl	100	N.D.	N.D.	N.D.	/
Nonabromodiphenyl	100	N.D.	N.D.	N.D.	/
Decabromodiphenyl	100	N.D.	N.D.	N.D.	/
Total content	/	N.D.	N.D.	N.D.	1000
Polybrominated Diphenylethers(PBDEs) Content					
Monobromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Dibromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Tribromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Tetrabromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Pentabromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Hexabromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Heptabromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Octabromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Nonabromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Decabromodiphenyl ether	100	N.D.	N.D.	N.D.	/
Total content	/	N.D.	N.D.	N.D.	1000

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Note:

- MDL = Method Detection Limit
- N.D. = Not Detected (<MDL)
- mg/kg= milligram per kilogram=ppm
- Information on storage conditions and production date of the tested samples is unavailable and thus Cr(VI) results represent status of the sample at the time of testing.
- According to customer's requirement, only the appointed materials have been tested.

According to RoHS Directive 2011/65/EU and its amendments, Lead is exempted as an alloying element in Copper containing up to 4% (40000ppm) by weight.

- * =This testing method is not accredited by CNAS.

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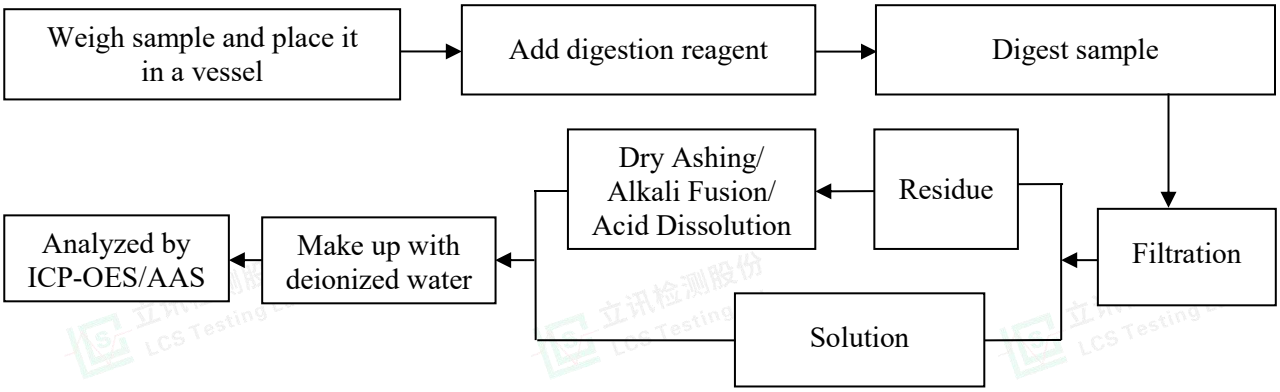
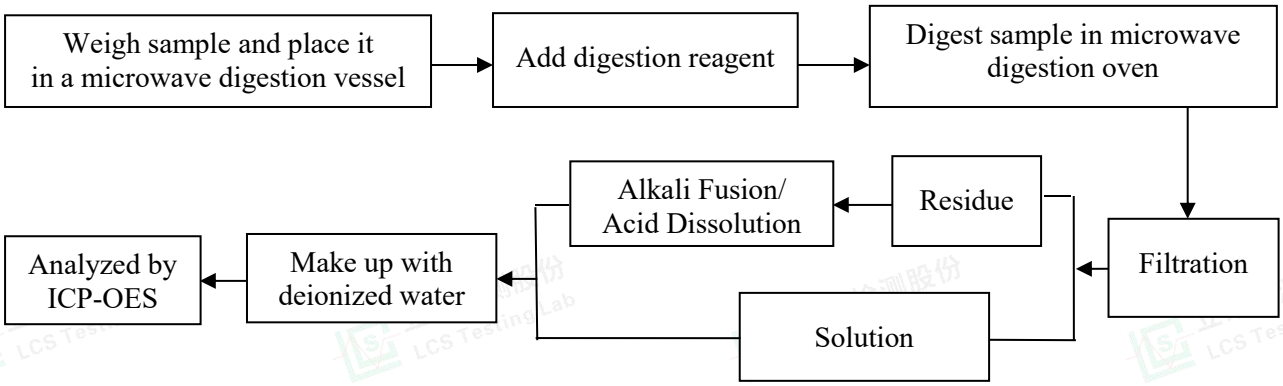
Test Process

1. Lead(Pb) & Cadmium(Cd): IEC 62321-5:2013

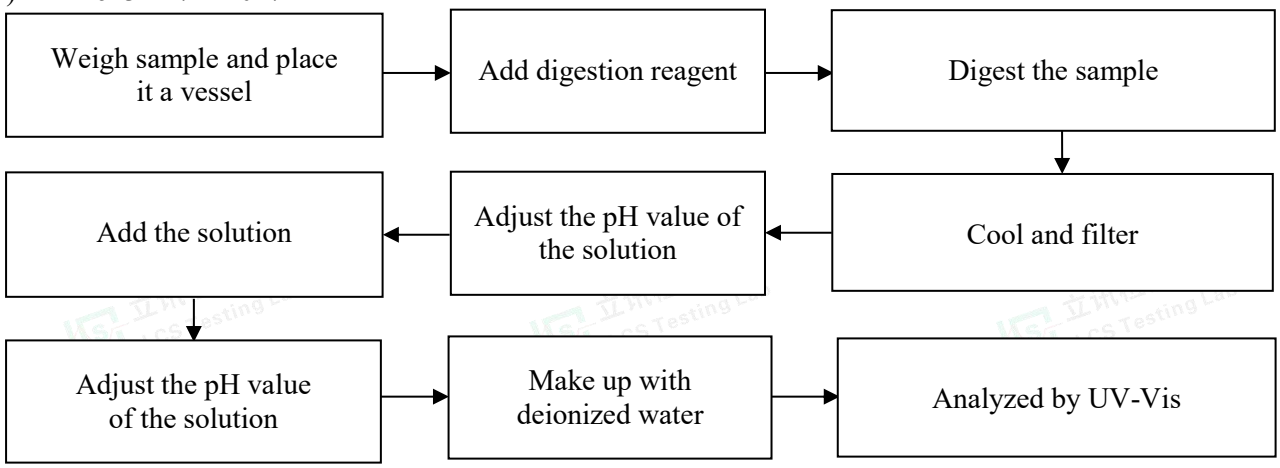


2. Mercury(Hg): IEC 62321-4:2013+AMD1:2017 CSV



3. Hexavalent Chromium(Cr(VI))

1) IEC 62321-7-2:2017



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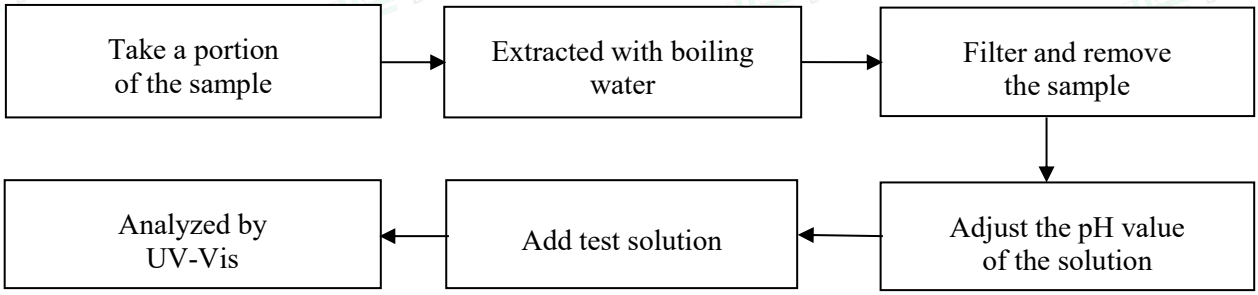
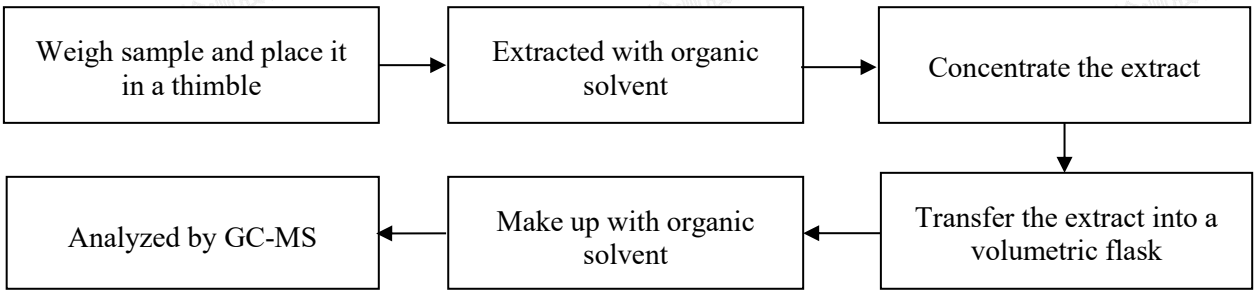
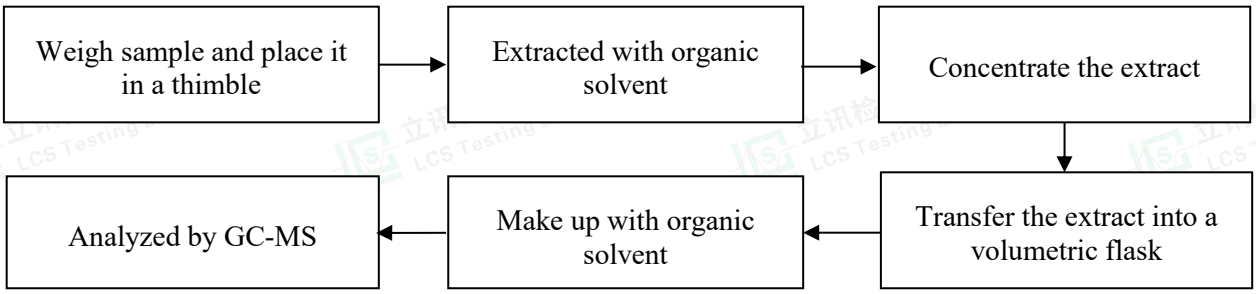
2) IEC 62321-7-1:2015



4. Polybrominated Biphenyls(PBBs) & Polybrominated Diphenyl Ethers(PBDEs) : IEC 62321-6:2015



5. Phthalates(DBP, BBP, DEHP & DIBP) : IEC 62321-8:2017



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Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com
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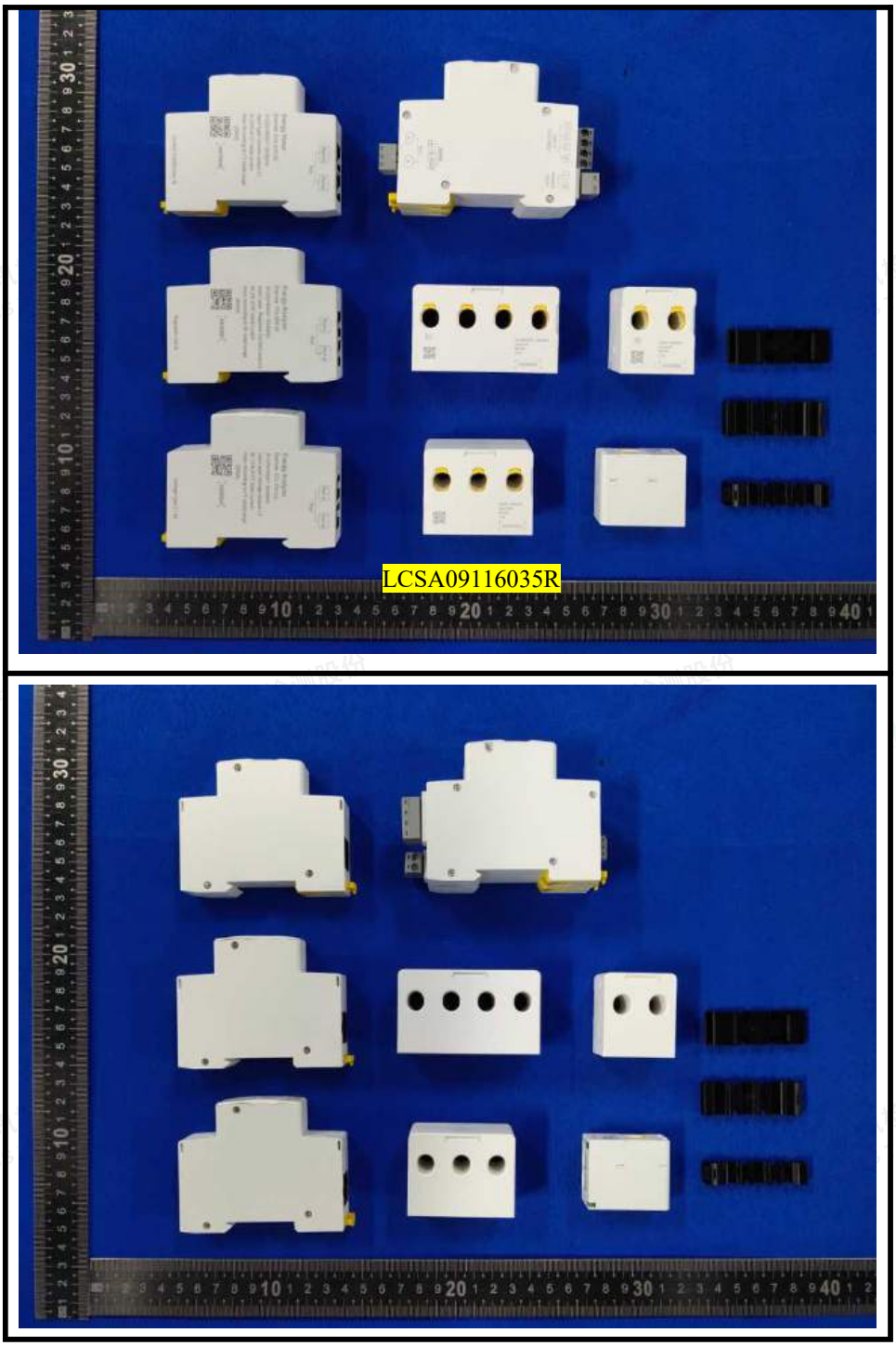
The photo(s) of the sample



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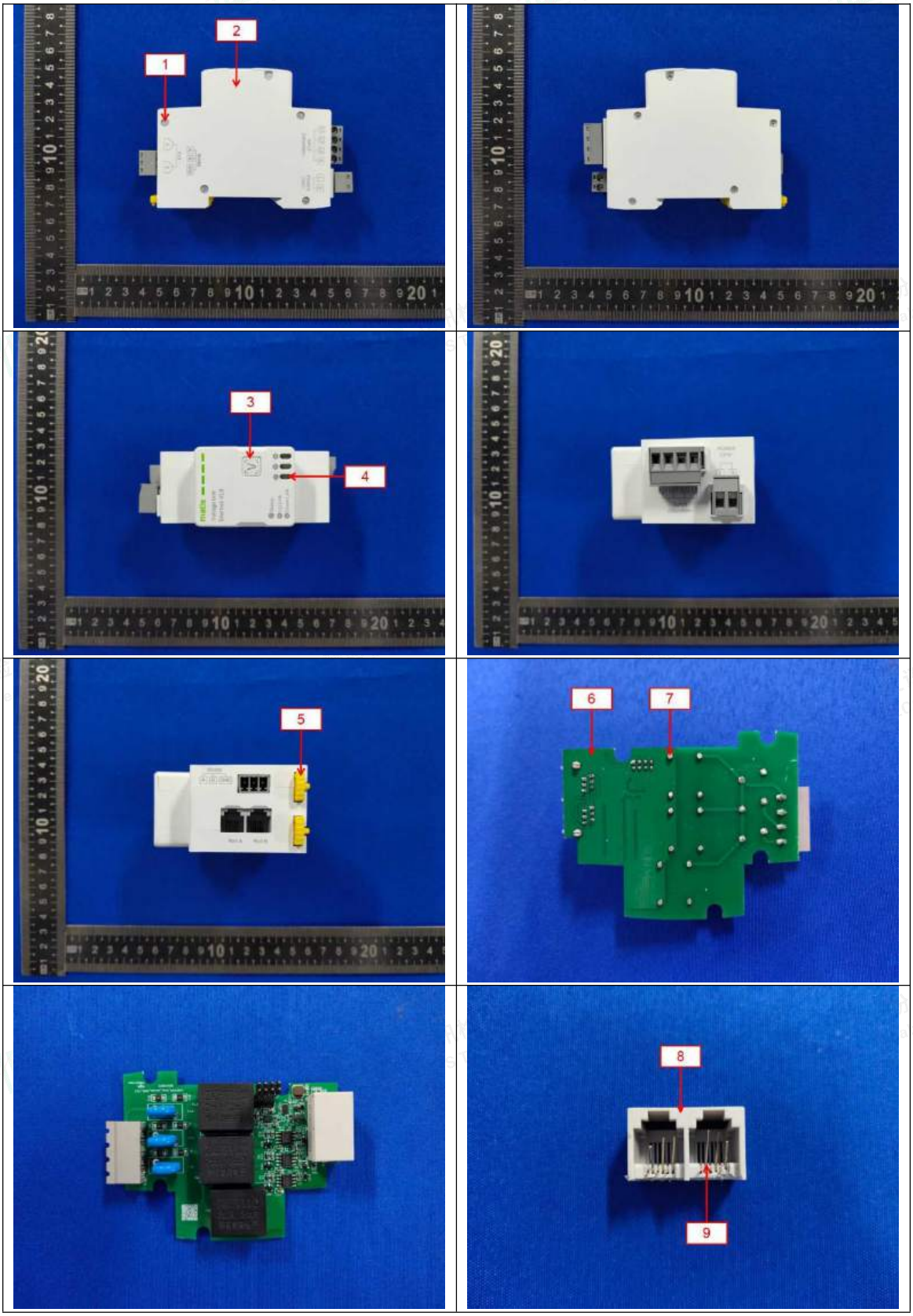

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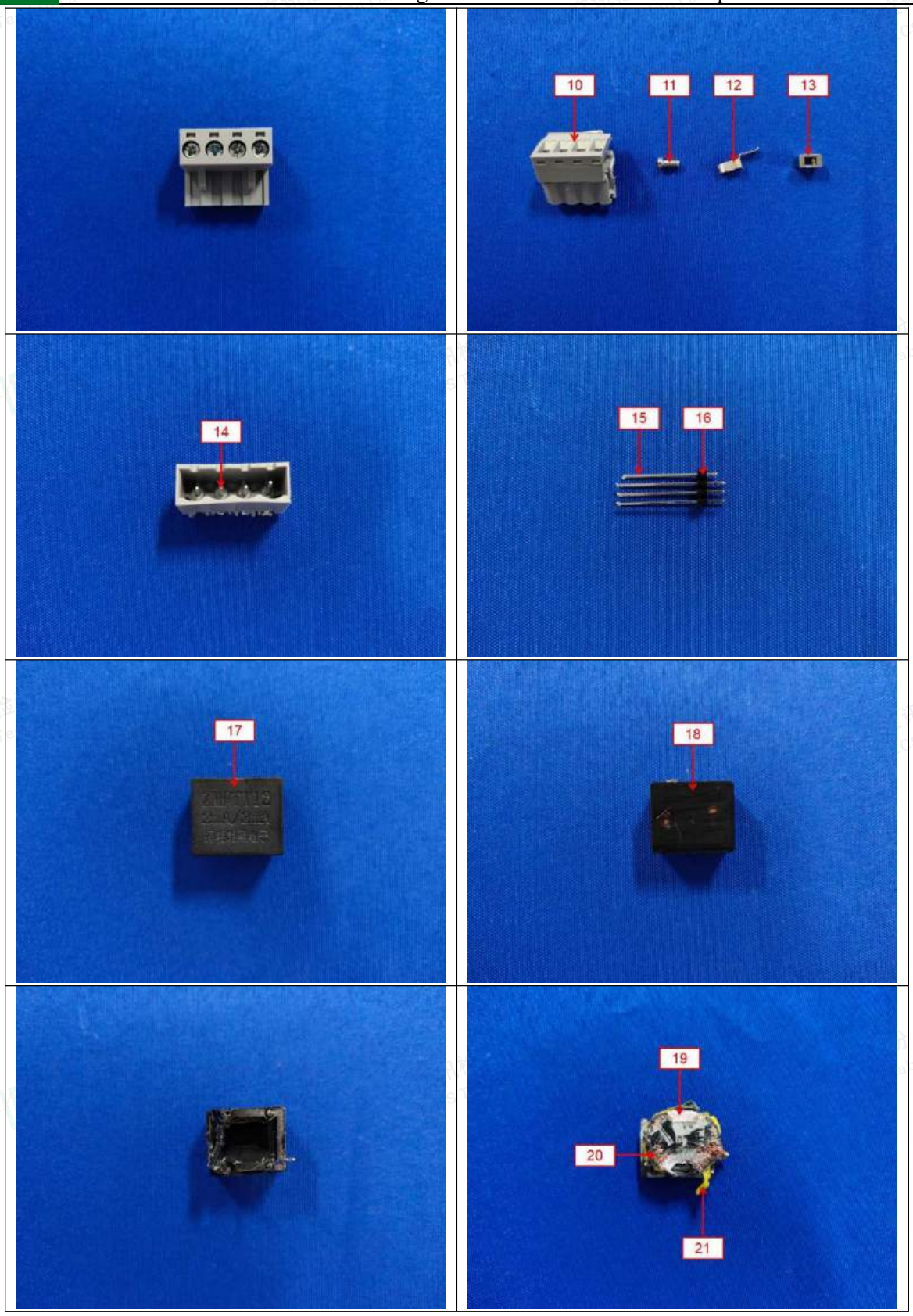

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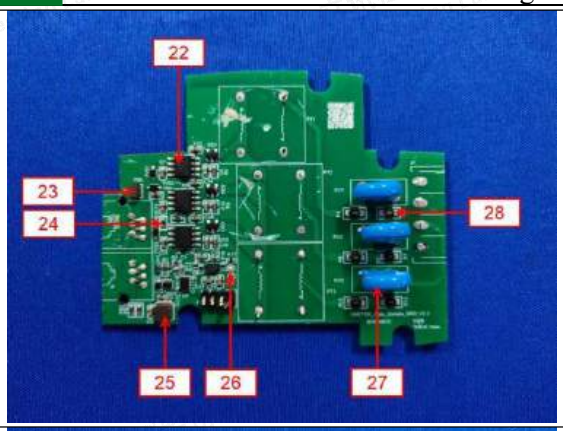

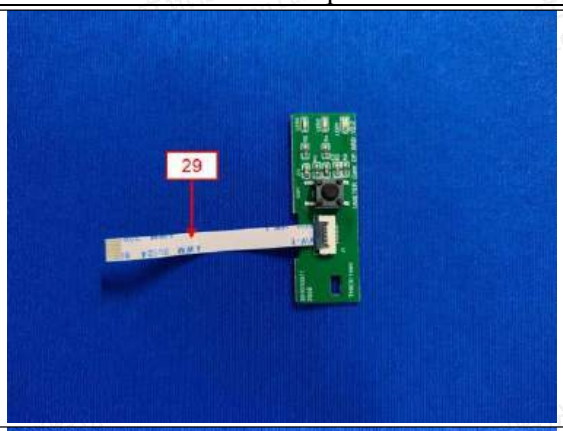

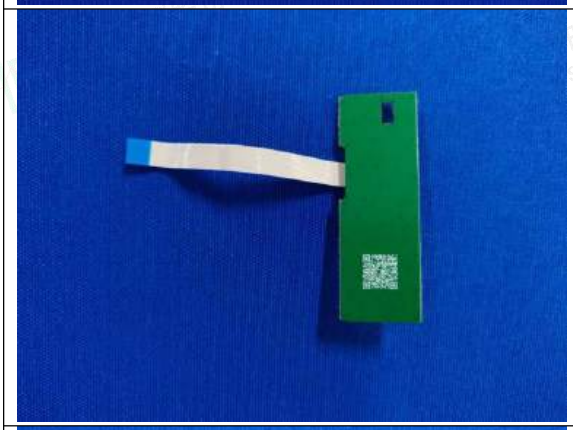

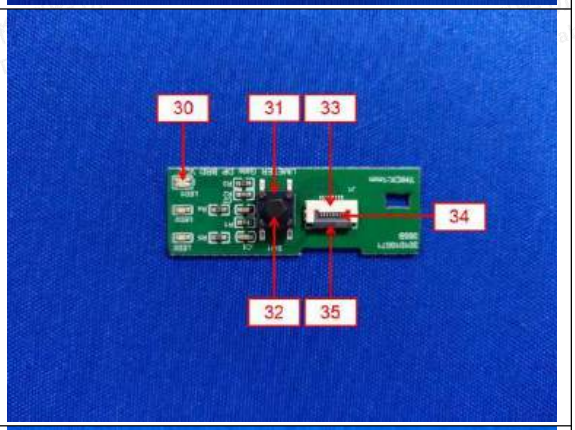

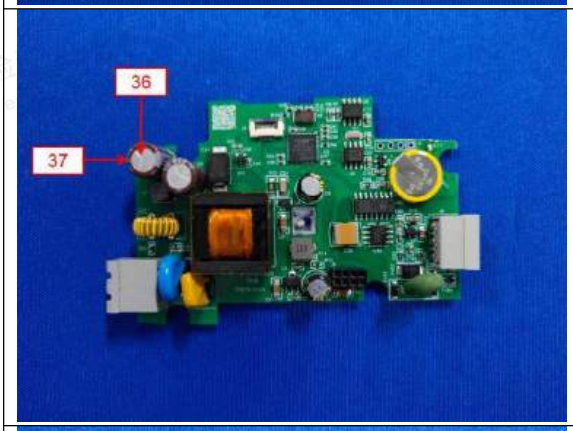

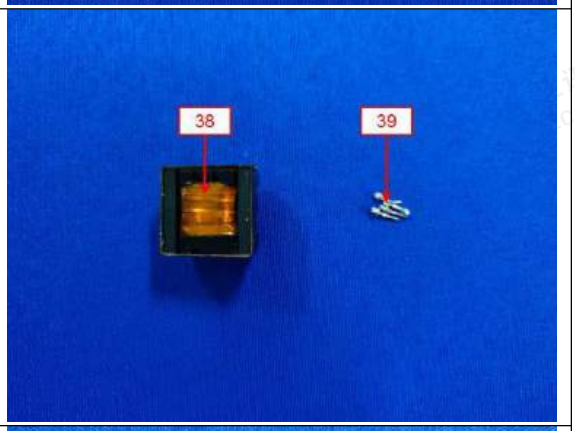

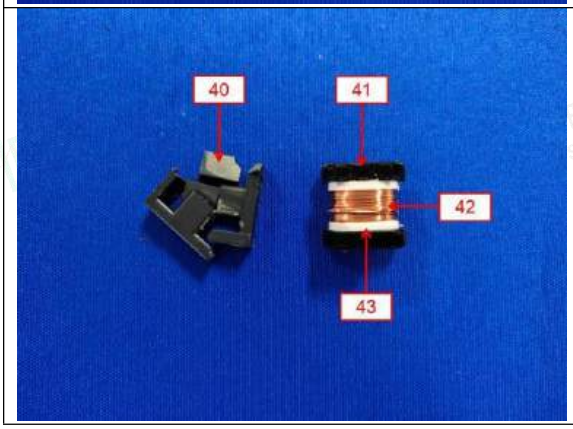



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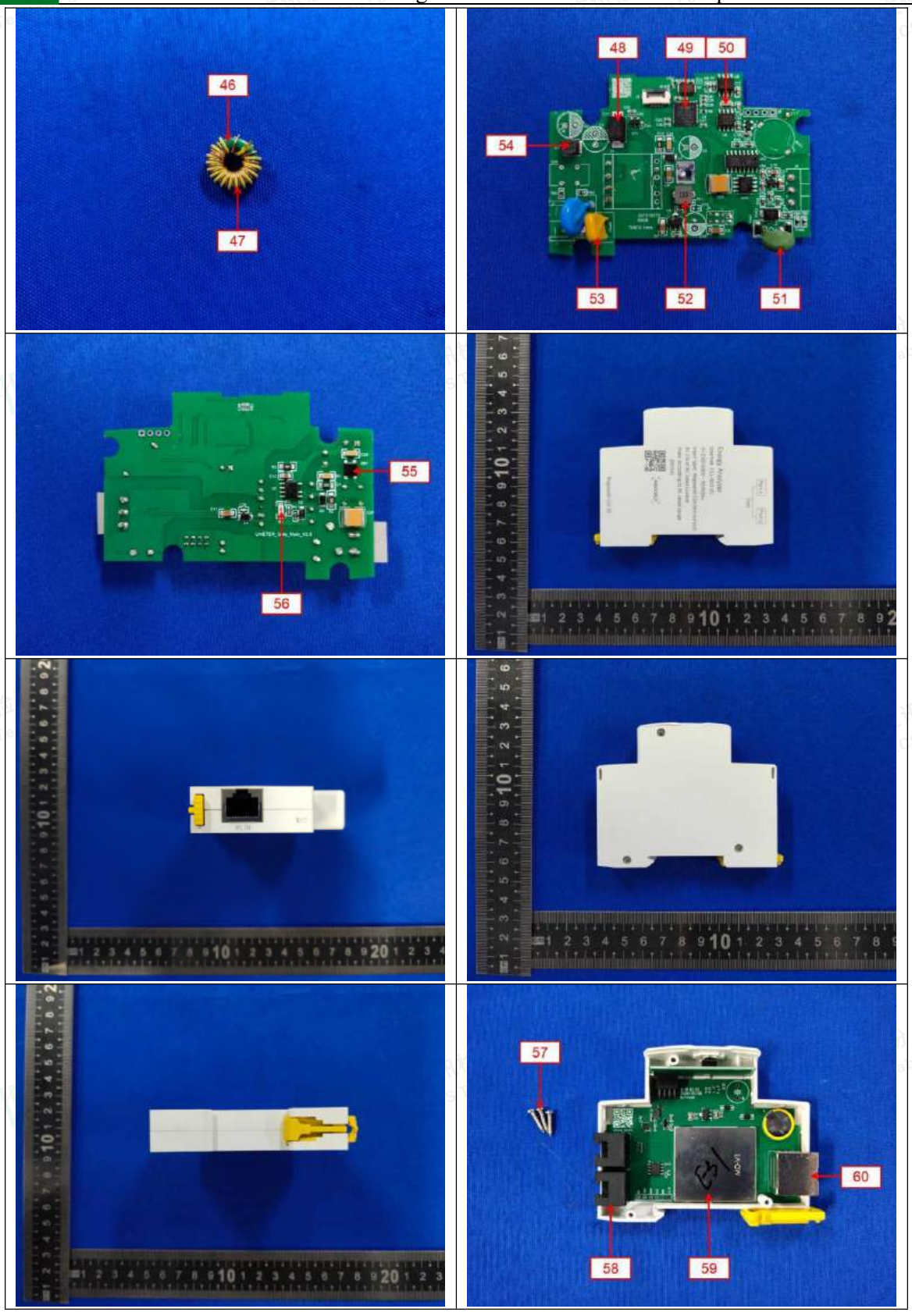

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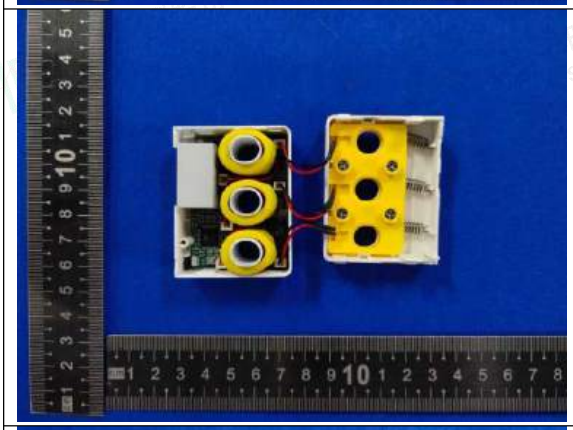	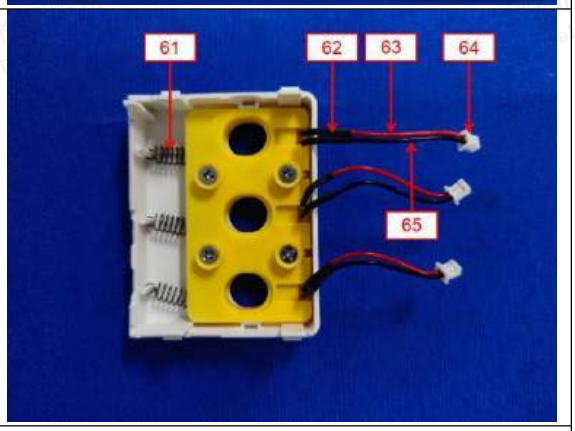
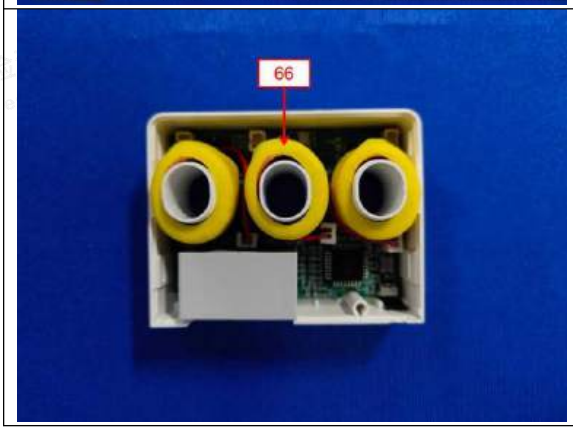	Blank

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Statement:

1. The test report is invalid without the signature of the approver and the special seal for the company's report;
2. The company name, address and sample information shown on the report were provided by the applicant who should be responsible for the authenticity which are not verified by LCS;
3. The test results in this report are only responsible for the tested samples;
4. Without written approval of LCS, this report can't be reproduced except in full;
5. In case of any discrepancy between the corresponding Chinese and English contents in the test report, the Chinese version shall prevail.

*** End of Report ***

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Shanghai Matis Electric Co.Ltd

CE TEST REPORT

Prepared For :	Shanghai Matis Electric Co.Ltd Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306
Product Name:	Multi Circuit Power Monitoring System
Trade Name:	Matis
Model :	Starline -V10Starline- M10/20/30/40+ Starline-E10/E11/E31+ CTO100/CTO/200/CTO400/CTO600
Additional model :	/
Prepared By :	BST Testing (Shenzhen) Co., Ltd. No.7, New Era Industrial Zone, Guantian, Bao'an District, Shenzhen, Guangdong, China
Test Date:	Jul.06,2025 To Jul.09,2025
Date of Report :	Jul.09,2025
Report No.:	XDAK223250958071411DR

BST TESTING (SHENZHEN) CO.,LTD. APPROVED

BAb7xc

9FYDks

EN 62053-21:2003, Electricity metering equipment (a.c.) –Particular requirements Part 21: Static meters for active energy (classes 1 and 2) Test Report Content
This test report consists of: *Main report
General information: The test results presented in this report relate only to the object tested and information given from applicant or manufacturer. Test case verdicts: P=Pass, F=Fail, N/A=Not applicable. Placed in the column marked "Verdict". This is a Computer generated Test Report. ×Information written in "Italic" or "Regular and bold" font style is a part of this "Test Report Form"
CONTENT FOR ADDITIONAL INFORMATION

EN 62053-21:2003		
Clause	**Requirements**	**Verdict**
1	**Scope**	
	This part of IEC 62053 applies only to newly manufactured static watt-hour meters of accuracy classes 1 and 2, for the measurement of alternating current electrical active energy in 50 Hz or 60 Hz networks and it applies to their type tests only. It applies only to static watt-hour meters for indoor and outdoor application consisting of a measuring element and register(s) enclosed together in a meter case. It also applies to operation indicator(s) and test output(s). If the meter has a measuring element for more than one type of energy (multi-energy meters), or when other functional elements, like maximum demand indicators, electronic tariff registers, time switches, ripple control receivers, data communication interfaces, etc. are enclosed in the meter case, then the relevant standards for these elements also apply. It does not apply to: – watt-hour meters where the voltage across the connection terminals exceeds 600 V (line-to-line voltage for meters for polyphase systems); – portable meters; – data interfaces to the register of the meter; – reference meters. Regarding acceptance tests, a basic guideline is given in IEC 61 358. The dependability aspect is covered by the standards of the IEC 62059 series.	**P**
2	**Normative references**	**P**
3	**Terms and definitions**	**P**
4	**Standard electrical values**	
	The values given in IEC 62052-1 1 apply.	**P**
5	**Mechanical requirements**	
	The requirements of IEC 62052-1 1 apply.	**P**
6	**Climatic conditions**	
	The conditions given in IEC 62052-1 1 apply.	**P**
7	**Electrical requirements**	
	In addition to the electrical requirements in IEC 62052-1 1 , meters shall fulfil the following requirements.	**P**
7.1	**Power consumption**	
	The power consumption in the voltage and current circuit shall be determined at reference conditions given in 8.5 by any suitable method. The overall maximum error of the measurement of the power consumption shall not exceed 5 %	**P**
7.1.1	**Voltage circuits**	
	The active and apparent power consumption in each voltage circuit of a meter at reference voltage, reference temperature and reference frequency shall not exceed the values shown in Table 1 .	**N**

EN 62053-21:2003		
Clause	**Requirements**	**Verdict**
7.1.2	**Current circuits**	
	The apparent power taken by each current circuit of a direct connected meter at basic current,reference frequency and reference temperature shall not exceed the values shown in Table 2.	P
	The apparent power taken by each current circuit of a meter connected through a current transformer shall not exceed the value shown in Table 2 at a current value that equals the rated secondary current of the corresponding transformer at reference temperature and reference frequency of the meter.	P
7.2	**Influence of short-time overcurrents**	
	Short-time overcurrents shall not damage the meter. The meter shall perform correctly when back to its initial working condition and the variation of error shall not exceed the values shown in Table 3.	P
	The test circuit shall be practically non-inductive and the test shall be performed for polyphase meters phase-by-phase.	N
	After the application of the short-time overcurrent with the voltage maintained at the terminals,the meter shall be allowed to return to the initial temperature with the voltage circuit(s) energized (about 1 h).	P
	a) Meter for direct connection The meter shall be able to carry a short-time overcurrent of 30 I max with a relative tolerance of+0 % to –1 0 % for one half-cycle at rated frequency.	P
	b) Meter for connection through current transformer The meter shall be able to carry for 0,5 s a current equal to 20 I max with a relative tolerance of+0 % to –1 0 %.	P
7.3	**Influence of self-heating**	
	The variation of error due to self-heating shall not exceed the values given in Table 4.	P
	The test shall be carried out as follows: after the voltage circuits have been energized at reference voltage for at least 2 h for class 1 and 1 h for class 2, without any current in the current circuits, the maximum current shall be applied to the current circuits. The meter error shall be measured at unity power factor immediately after the current is applied and then at intervals short enough to allow a correct drawing to be made of the curve of error variation as a function of time. The test shall be carried out for at least 1 h, and in any event until the variation of error during 20 min does not exceed 0,2 %.	P
	The same test shall then be carried out at 0,5 (inductive) power factor.	P
	The cable to be used for energizing the meter shall have a length of 1 m and a cross-section to ensure that the current density is between 3,2 A/mm 2 and 4 A/mm 2 .	P
7.4	**AC voltage test**	
	The test voltage shall be substantially sinusoidal, having a frequency between 45 Hz and 65 Hz, and applied for 1 min. The power source shall be capable of supplying at least 500 VA.	P

EN 62053-21:2003		
Clause	**Requirements**	**Verdict**
	During the tests relative to earth, the auxiliary circuits with reference voltage equal to or below 40 V shall be connected to earth.	**P**
	All these tests shall be carried out with the case closed and the cover and terminal covers in place.	**P**
	During this test, no flashover, disruptive discharge or puncture shall occur.	**P**
8	**Accuracy requirements**	
	Tests and test conditions given in IEC 62052-1 1 apply.	**P**
8.1	**Limits of error due to variation of the current**	
	If the meter is designed for the measurement of energy in both directions, the values in Table 6 and Table 7 shall apply for each direction.	**N**
	The difference between the percentage error when the meter is carrying a single-phase load and a balanced polyphase load at basic current I b and unity power factor for direct connected meters, respectively at rated current I n and unity power factor for transformer operated meters, shall not exceed 1 ,5 % and 2,5 % for meters of classes 1 and 2 respectively.	**P**
8.2	**Limits of error due to influence quantities**	
	The additional percentage error due to the change of influence quantities with respect to reference conditions, as given in 8.5, shall not exceed the limits for the relevant accuracy class given in Table 8.	**P**
8.2.1	**Accuracy test in the presence of harmonics**	
	Test conditions: – fundamental frequency current: I 1 = 0,5 I max – fundamental frequency voltage: U 1 = U n – fundamental frequency power factor: 1 – content of 5 th harmonic voltage: U 5 = 1 0 % ofU n – content of 5 th harmonic current: I 5 = 40 % of fundamental current – harmonic power factor: 1 – fundamental and harmonic voltages are in phase, at positive zero crossing.	**P**
	Resulting harmonic power due to the 5 th harmonic is P 5 = 0, 1 U 1 × 0,4 I 1 = 0,04 P 1 or total active power = 1 ,04 P 1 (fundamental + harmonics).	**P**
8.2.2	**Tests ofthe influence of odd harmonics and sub-harmonics**	
	The tests of the influence of odd harmonics and sub-harmonics shall be made with the circuit shown in Figure A.4 or with other equipment able to generate the required waveforms, and the current waveforms as shown Figure A.5 and Figure A.7 respectively	**P**
	The variation in percentage error when the meter is subjected to the test waveform given in Figure A.5 and Figure A.7 and when it is subjected to the reference waveform shall not exceed the limits of variation given	**P**
8.2.3	**Tests of the influence of d.c. and even harmonics**	
	The tests of the influence of direct current and even harmonics shall be made with the circuit shown in Figure A. 1 or with other equipment able to generate the required waveforms, and the current waveforms as shown in Figure A.2.	**P**

EN 62053-21:2003		
Clause	**Requirements**	**Verdict**
	The variation in percentage error when the meter is subjected to the test waveform given in Figure A.2 and when it is subjected to the reference waveform shall not exceed the limits of variation given in Table 8.	**P**
8.2.4	**Continuous magnetic induction of external origin**	
	The continuous magnetic induction may be obtained by using the electromagnet according to annex B, energized with a d.c. current. This magnetic field shall be applied to all accessible surfaces ofthe meter when it is mounted as for normal use. The value of the magneto-motive force applied shall be 1 000 At (ampere-turns).	**P**
8.3	**Test of starting and no-load condition**	
	For these tests, the conditions and the values of the influence quantities shall be as stated in 8.5 except for any changes specified below.	**P**
8.3.1	**Initial start-up of the meter**	
	The meter shall be functional within 5 s after the reference voltage is applied to the meter terminals.	**P**
8.3.2	**Test of no-load condition**	
	When the voltage is applied with no current flowing in the current circuit, the test output of the meter shall not produce more than one pulse.	**N**
	For this test, the current circuit shall be open-circuit and a voltage of 1 1 5 % of the reference voltage shall be applied to the voltage circuits.	**P**
	For transformer-operated meters with primary or half-primary registers, the constant k shall correspond to the secondary values (voltage and currents).	**P**
8.3.3	**Starting**	
	The meter shall start and continue to register at the starting current values (and in case of polyphase meters, with balanced load) shown in Table 9.	**P**
	If the meter is designed for the measurement of energy in both directions, then this test shall be applied with energy flowing in each direction.	**P**
8.4	**Meter constant**	
	The relation between the test output and the indication in the display shall comply with the marking on the name-plate.	**P**
8.5	**Accuracy test conditions**	
	To test the accuracy requirements, the following test conditions shall be maintained: a) the meter shall be tested in its case with the cover in position; all parts intended to be earthed shall be earthed; b) before any test is made, the circuits shall have been energized for a time sufficient to reach thermal stability; c) in addition, for polyphase meters: – the phase sequence shall be as marked on the diagram of connections; – the voltages and currents shall be substantially balanced (see Table 1 0).	**P**

EN 62053-21:2003		
Clause	**Requirements**	**Verdict**
	d) the reference conditions are given in Table 1 1 ; e) for requirements regarding test stations, see IEC 60736.	
8.6	**Interpretation of test results**	
	Certain test results may fall outside the limits indicated in Tables 6 and 7, owing to uncertainties of measurements and other parameters capable of influencing the measurements. However, if by one displacement of the zero line parallel to itself by no more than the limits indicated in Table 1 2, all the test results are brought within the limits indicated in Tables 6 and 7, the meter type shall be considered acceptable.	**P**

Product Photos

Fig. 1

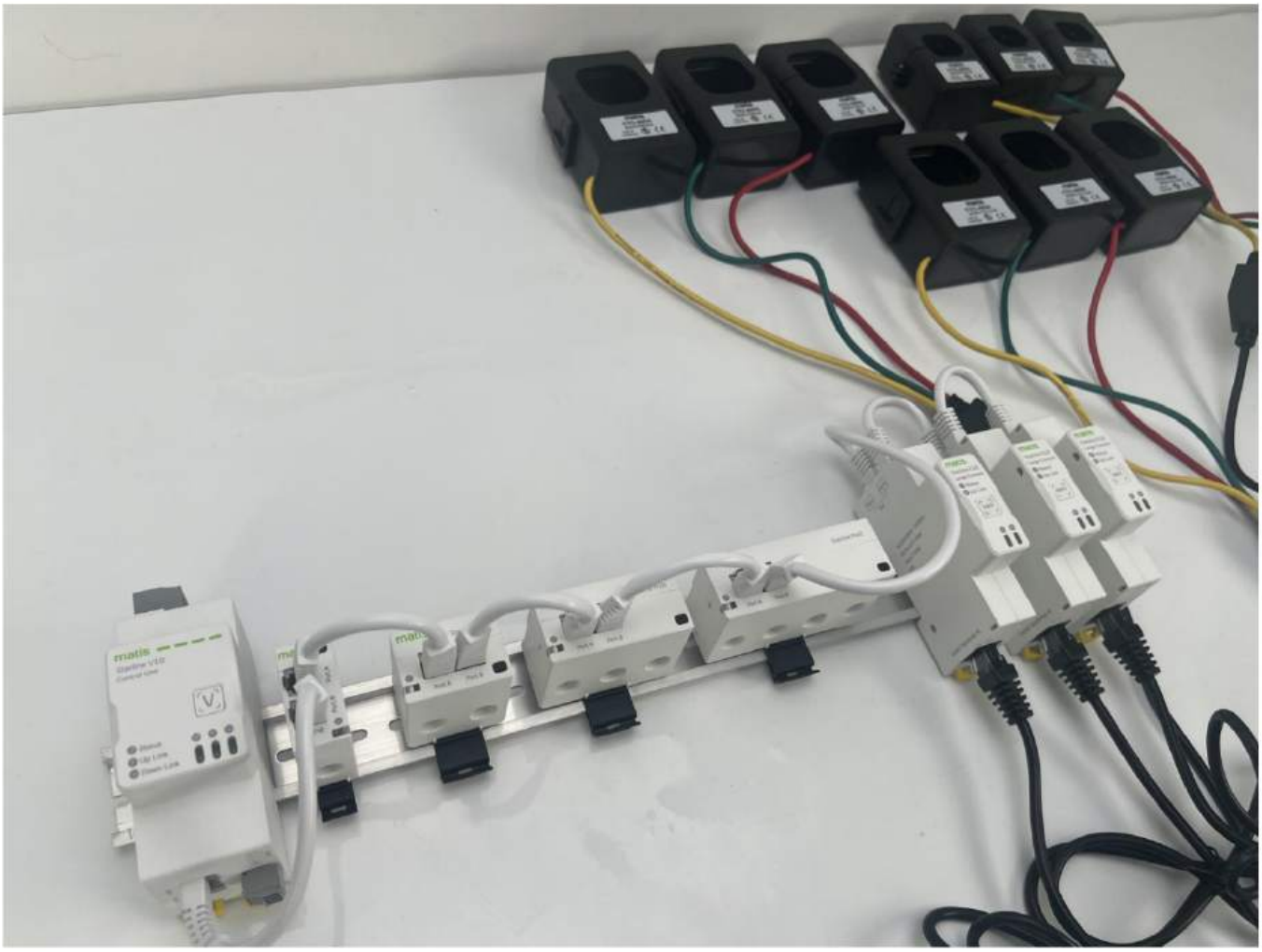
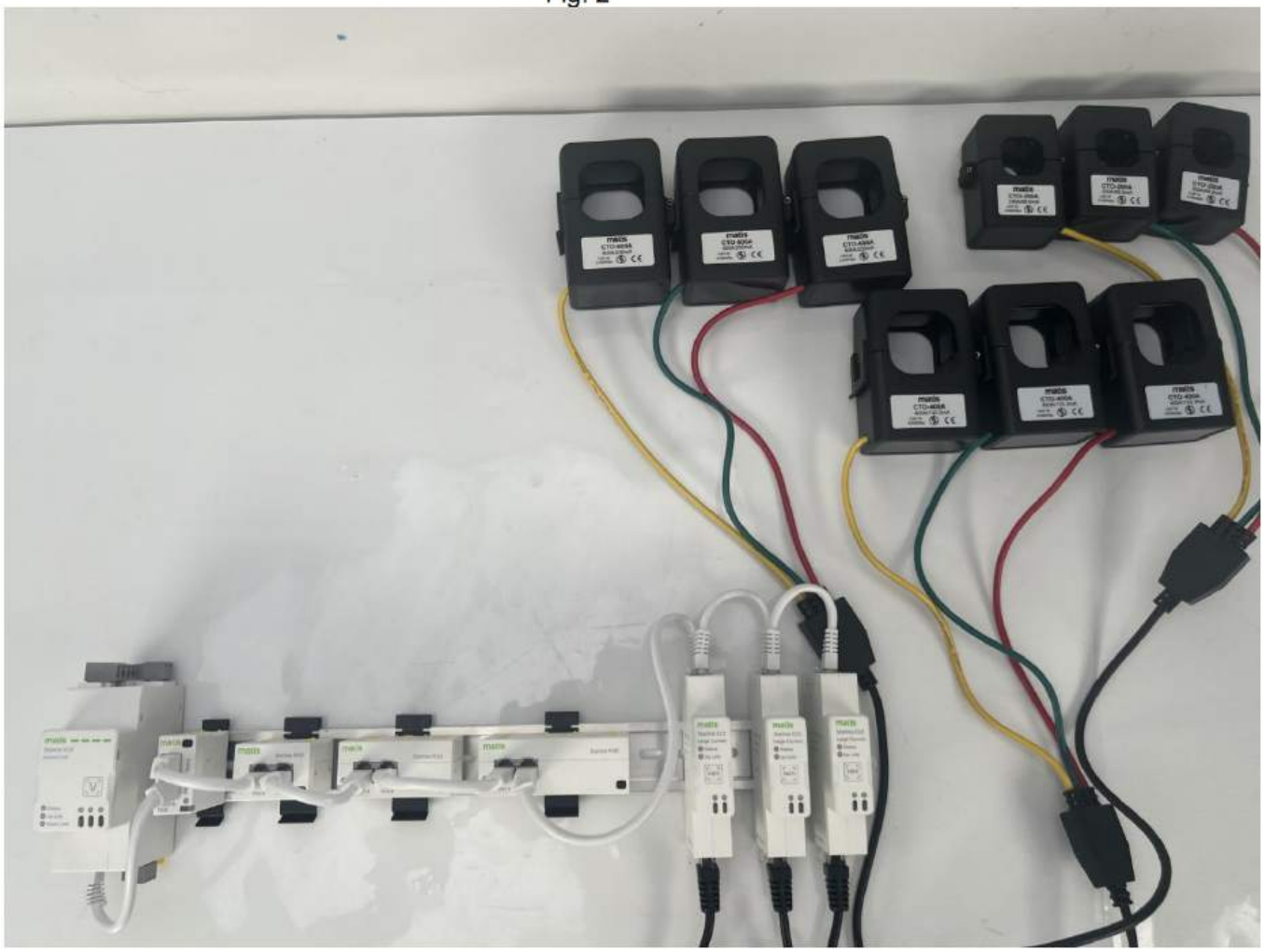


Fig. 2



---------- END OF REPORT ----------

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GLOBAL TESTING AND CERTIFICATION PRECISION SERVICE CLOUD FACTORY

Certificate of Compliance

Certificate No.	:	**XDAK223250958071411DC**
Applicant	:	**Shanghai Matis Electric Co.Ltd Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306**
Manufacturer	:	**Shanghai Matis Electric Co.Ltd Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306**
Product Name	:	**Multi Circuit Power Monitoring System**
Trade Name	:	**Matis**
Main Test Model	:	**Starline -V10Starline- M10/20/30/40+ Starline-E10/E11/E31+ CTO100/CTO/200/CTO400/CTO600**
Additional models	:	**/**
Test Standard	:	**EN 62053-21:2003**
As shown in the Test Report No.	:	**XDAK223250958071411DR**

The EUT described above has been tested by us with the listed standards and found in compliance with the council EMC directive 2014/30/EU. It is possible to use CE marking to demonstrate the compliance with this EMC Directive.
The certificate applies to the tested sample above mentioned only and shall not imply an assessment of the whole production.

BST TESTING (SHENZHEN) CO.,LTD. APPROVED
Manager
Jul.09,2025

BST Testing (Shenzhen)Co., Ltd.
Add: No.7,New Era Industrial Zone, Guantian, Bao'an District, Shenzhen, Guangdong, China
Certificate Search: http://www.bst-lab.com, Tel:4009626168, E-mail:christina@bst-lab.com

Strictly revise forbid

Shanghai Matis Electric Co.Ltd

CE LVD TEST REPORT

Prepared For :	Shanghai Matis Electric Co.Ltd Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306
Product Name:	Multi Circuit Power Monitoring System
Trade Name:	Matis
Main Test Model:	Starline -V10 + Starline- M10/20/30/40+ Starline-E10/E11/E31+ CTO100/CTO/200/CTO400/CTO600
Additional:	
Prepared By :	BST Testing (Shenzhen) Co.,Ltd. No.7,New E[illegible]l Zone, Guantian, Bao'an District, Shen[illegible], Guangdong, China
Test Date:	Jul.06,2025 To Jul.09,2025
Date of Report:	Jul.09,2025
Report No.:	XDAK223250958071412AR

BST TESTING (SHENZHEN) CO.,LTD. APPROVED

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TEST REPORT
EN 61010-1
Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements

Testing Laboratory	
Name..... :	BST Testing (Shenzhen) Co.,Ltd.
Address..... :	No.7,New Era Industrial Zone, Guantian, Bao'an District, Shenzhen, Guangdong, China
Testing location..... :	BST Testing (Shenzhen) Co.,Ltd.
Applicant	
name..... :	Shanghai Matis Electric Co.Ltd
Address..... :	Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306
Test specification:	
Standard..... :	EN 61010-1:2010+A1:2019
Test procedure..... :	Compliance with IEC 61010-1-2017COR.2:2013
Non-standard test method..... :	N/A
Test item	
Description..... :	See page 1
Model and/or type reference..... :	See page 1
Manufacturer ..... :	Shanghai Matis Electric Co.Ltd
Address ..... :	Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306
Test item particulars	
Classification of installation and use:	Class I
Supply Connection..... :	220V
Possible test case verdicts	
- test case does not apply to the test object :	N(.A)
- test object does meet the requirement :	P(Pass)
- test object does not meet the requirement :	F(Fail)

Summary of testing:

Testing location:

Tests performed (name of test and test clause):

- EN 61010-1: 2010 +A1: 2019

Copy of marking plate:

The artwork below may be only a draft. The use of certification marks on a product must be authorized by the respective NCBs that own these marks.

QPST

Multi Circuit Power Monitoring System
Model: Starline -V10
Input:AC230V 50HZ±10% ≤20mA

CE

Shanghai Matis Electric Co.Ltd
Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306

Remarks:

1. Height of CE mark is 5mm or more, height of WEEE symbol is 7mm or more, height of other marks is 5mm or more, height of letters and numerals is 2mm or more.

Prepared by : Adam Chen

Engineer

Reviewer : Jacky Zhang

Supervisor

Approved & Authorized Signer :

Manager

TEST ITEM PARTICULARS:	
Type of item	: Measurement / Control / Laboratory
Description of equipment funcion	: A method for quantitative analysis of specific DNA sequences
Connection to MAINS supply	: ~~Permanent / Detachable cord set / Non detachable cord set / None /~~ By adaptor
Overvoltage category	: II / ~~III~~ / ~~IV~~
POLLUTION DEGREE	: IIIb
Means of protection	: Class III
Environmental conditions	: Normal / ~~Extended (Specify):~~
For use in wet locations	: ~~Yes~~ / No
Equipment mobility	: Portable / ~~Hand-held~~ / ~~Floor standing~~ / ~~Fixed~~ / ~~Built-in~~
Operating conditions	: Continuous / ~~Short-time / Intermittent~~
Marked degree of protection to IEC 60529	: IPX0
Possible test case verdicts:	
- test case does not apply to the test object	: N/A (or N)
- test object does meet the requirement	: P (Pass)
- test object does not meet the requirement	: F (Fail)
Testing	:
Date of receipt of test item	: July 9, 2025
Date(s) of performance of tests	: July 05, 2025 to July 09, 2025
General remarks:	
The test results presented in this report relate only to the object tested. This report shall not be reproduced, except in full, without the written approval of the Issuing testing laboratory. "(see Enclosure #)" refers to additional information appended to the report. "(see appended table)" refers to a table appended to the report. **Throughout this report a ☐ comma / ☒ point is used as the decimal separator.**	
Manufacturer's Declaration per sub-clause 4.2.5 of IECEE 02:	
The application for obtaining a CB Test Certificate includes more than one factory location and a declaration from the Manufacturer stating that the sample(s) submitted for evaluation is (are) representative of the products from each factory has been provided	: ☐ Yes ☒ Not applicable
General product information 1, The product is has PCB boards. With adaptor.	

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Clause	Requirement + Test	Result - Remark	Verdict
1	**Scope and object**		**P**
1.3	Verification	Type tests	P
1.4	Environmental conditions	See below	P
1.4.1	Normal environmental conditions		P
a)	indoor use		P
b)	altitude up to 2 000 m		P
c)	temperature 5 ℃ to 40℃		P
d)	maximum relative humidity		--
e)	mains supply voltage fluctuations	±10 % of the nominal voltage	P
f)	transient overvoltages	For adaptor	N
g)	temporary overvoltages occurring on the mains supply	For adaptor	N
h)	Applicable pollution degree of the intended environment	Pollution degree 2	--
1.4.2	Extended environmental conditions		N
a)	outdoor use		N
b)	altitude above 2 000 m		N
c)	temperature below 5 ℃ or above 40℃		N
d)	maximum relative humidity		--
e)	mains supply voltage fluctuations	Exceeding ±10 % of the nominal voltage	N
f)	Wet Location		N
g)	transient overvoltages		N
4	**Tests**		--
4.1	General	Type tests	P
4.2	Sequence of tests	inspected after each test	P
4.3	Reference test conditions	15-20℃, 75-106kPa	P
4.4	**Testing in SINGLE FAULT CONDITION**	**(see Form A.1)**	**P**
4.4.1	General		P
4.4.2	Application of fault conditions		--
4.4.2.1	Fault conditions shall include those specified in 4.4.2.2 to 4.4.2.14	(see Form A.1)	--
	After each application of a fault condition, the equipment or part shall pass the applicable tests of 4.4.4.	See below	P

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Clause	Requirement + Test	Result - Remark	Verdict
4.4.2.2	Protective impedance		N
4.4.2.3	Protective conductor	(see Form A.1 & Form A.6)	P
4.4.2.4	Equipment or parts for short-term or intermittent operations	Continuous operation	N
4.4.2.5	Motors		P
	– stopped while fully energized	See appened table	P
	– prevented from starting	See appened table	P
	– one phase interrupted (multi-phase)		N
4.4.2.6	Capacitors		N
4.4.2.7	Mains transformers		P
4.4.2.7.1	Short circuit	(See Form A.1)	P
4.4.2.7.2	Overload	(See Form A.1)	P
4.4.2.8	Outputs	No hazards	P
4.4.2.9	Equipment for more than one supply		N
4.4.2.10	Cooling		P
a)	air-holes with filters shall be closed;	See appended table	P
b)	forced cooling by motor-driven fans shall be stopped		N
c)	cooling by circulation of water or other coolant shall be stopped		N
d)	loss of cooling liquid shall be simulated		N
4.4.2.11	Heating devices	No such heating devices	N
a)	Overridden timers for limit the heating period		N
b)	Overridden temperature controllers		N
4.4.2.12	Insulation between circuits and parts		P
4.4.2.13	Interlocks	No such interlocks	N
4.4.2.14	Voltage selectors		N
4.4.3	Duration of tests		--
4.4.3.1	The equipment shall be operated unit further change as a result of the applied fault is unlikely	Comply with requirement	P
4.4.3.2	A device interrupted or limited the current shall limit the temperature of parts easily touched		N
4.4.3.3	Fuse opened and not operate within approximately 1 s, and the current through the fuse shall be measured		N
4.4.4	Conformity after application of fault conditions		--

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Clause	Requirement + Test	Result - Remark	Verdict
4.4.4.1	Protection against electric shock is checked after the application of single fault as follows:		P
	a), no accessible conductive parts become hazardous live	Not become hazardous live parts	P
	b), performing a voltage test on double insulation or reinforced insulation	See clause 6.8	P
	c), measuring the temperature of transformer winding		P
4.4.4.2	Temperature of outer surface of enclosure and of parts that can be touched is checked	See appended table	P
4.4.4.3	Protection against the spread of fire is checked	See appended table	P
4.4.4.4	Protection against other hazard is checked	See clause 7 and 8 and 11 to 16	P

5	**MARKING AND DOCUMENTATION**		--
5.1	**Marking**		--
5.1.1	General	See below	P
	Required equipment markings are:		--
	visible:	See page 3	P
	From the exterior; or	See page 3	P
	After removing a cover; or	No removing cover	N
	Opening a door	No opening door	N
	After removal from a rack or panel		N
	Not put on parts which can be removed by an OPERATOR	No such parts	N
	Letter symbols (IEC 60027) used		P
	Graphic symbols (IEC 61010-1: Table 1) used		P
	Graphic symbols shall be explained in the documentation	See user manual or specification	P
5.1.2	Identification		--
	a) Manufacturer's or supplier's name or trademark	See label	P
	b) Model number, name or other means	See label	P
	Manufacturing location identified	Only one manufacturing location.	N
5.1.3	Mains supply		--
	Equipment is marked as follows:	See below	P
a)	Nature of supply:		--

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Clause	Requirement + Test	Result - Remark	Verdict
	1) a.c. RATED mains frequency or range of frequencies .....:		P
	2) d.c. with symbol 1		N
b)	RATED supply voltage(s) or range.....:	AC220V	P
c)	Max. RATED power (W or VA)or input current.....:	5W	P
	The measured value not more than 110 %	(see appended table)	P
	If more than one voltage range:		N
	Separate values marked; or		N
	Values differ by less than 20 %		P
d)	OPERATOR-set for different RATED supply voltages:		N
	Indicates the equipment set voltage		N
	PORTABLE EQUIPMENT indication is visible from the exterior		N
	Changing the setting changes the indication		N
e)	Accessory mains socket-outlets accepting standard mains plugs are marked:	No such accessory	N
	With the voltage if it is different from the mains supply voltage.....:		N
	For use only with specific equipment		N
	If not marked for specific equipment it is marked with:		N
	The maximum rated current or power; or		N
	Symbol 14 with full details in the documentation		N
5.1.4	Fuses		--
	OPERATOR replaceable fuse marking (see also 5.4.5).....:		N
5.1.5	Terminals, connections and operating devices	Comply with the standard	N
5.1.5.1	General		--
	Where necessary for safety, indication of purpose of terminals, connectors, controls and indicators marked	Comply with the standard	P
	If insufficient space, symbol 14 used		P
5.1.5.2	Terminals	See below	P
	Mains supply terminals identified		N
	Other terminal marking:	+ -	P
a)	functional earth terminals (symbol 5 used)		N
b)	protective conductor terminals:		--

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Clause	Requirement + Test	Result - Remark	Verdict
	Symbol 6 is placed close to or on the terminal; or		N
	Part of appliance inlet		N
c)	Terminals of control circuits which are permitted by 6.6.3 to be connected to accessible conductive parts, with symbol 7 of table 1 unless connection is self-evident;		N
d)	Hazardous live terminals supplied from the interior	Comply with the standard	N
	Symbol 14 used; or		N
	RATINGS marked		N
	Standard mains socket outlet; or		N
5.1.6	Switches and circuit breakers		N
	If disconnecting device, on or off position marked		N
	Symbols 9 and 10 of Table 1		N
	A lamp alone is not considered to be a satisfactory marking		N
	For a push-button switch		N
5.1.7	Equipment protected by double insulation or reinforced insulation		N
	Protected throughout (symbol 11 used)		N
	Only partially protected (symbol 11 not used)		N
5.1.8	Field-wiring terminal boxes		N
	If terminal or enclosure exceeds 60 °C:		N
	Cable temperature rating marked		N
	Marking visible or beside terminal		N
5.2	**Warning markings**		--
	Visible when ready for normal use		P
	Are near or on applicable parts		P
a)	Symbols shall be at least 2.75 mm high. Text shall be at least 1.5 mm high and contrast in colour with the background		P
b)	Symbols or text moulded, stamped or engraved in a material shall be at least 2.0 mm high. If not contrasting in colour, they shall have a depth or raised height of at least 0.5 mm		P
	If necessary marked with symbol 14		P
	Statement to isolate or disconnect		P
5.3	**Durability of markings**	See appended table	P

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Clause	Requirement + Test	Result - Remark	Verdict
	The required markings remain clear and legible in normal use		P
5.4	**Documentation**		--
5.4.1	General		P
	Equipment is accompanied by documentation which includes:		P
a)	Intended use	See user manual	P
b)	Technical specification	See user manual	P
c)	name and address of the manufacturer or supplier from whom technical assistance	See user manual	P
d)	Information specified in 5.4.2 to 5.4.5	See user manual	P
e)	information about how to mitigate RISKS	See user manual	P
f)	indicate that only accessories which meet the manufacturer's specifications shall be used	See user manual	P
g)	provide guidance on how to determine that the equipment is functioning correctly	See user manual	P
h)	instructions for lifting and carrying	See user manual	P
	Warning statements and a clear explanation of warning symbols	See user manual	P
	include a statement that it must be consulted in all cases where symbol 14 of Table 1 is marked	See user manual	P
	Documentation may be provided on printed or electronic media		P
5.4.2	Equipment ratings		--
	Documentation includes:		P
a)	Supply voltage or voltage range	See page 3	P
	Frequency or frequency range		N
	Power or current rating	Ditto	P
b)	Description of all input and output connections	See user manual	P
c)	Rating of insulation of external circuits		P
d)	Statement of the range of environmental conditions		P
e)	Degree of protection (IEC 60529)	IP20	N
5.4.3	Equipment installation	See user manual	P
	Documentation includes instructions for:		--
a)	Assembly, location and mounting	See user manual	P
b)	Protective earthing		N
c)	Connections to supply	See user manual	P

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Clause	Requirement + Test	Result - Remark	Verdict
d)	Permanently connected equipment:		P
	1) Supply wiring requirements		P
	2) If external switch or circuit-breaker, requirements and location recommendation		P
e)	Ventilation requirements	See user manual	P
f)	Special services (e. g. air, cooling liquid)		N
g)	Maximum sound power level		N
h)	Instructions about sound pressure		N
5.4.4	Equipment operation		--
	Instructions for use include:		P
a)	Identification of operating controls and modes		P
b)	Positioning for disconnection		P
c)	Interconnection		P
d)	Specification of intermittent operation limits		N
e)	Explanation of symbols used		P
f)	Replacement of consumable materials		N
g)	Cleaning and decontamination		P
h)	Listing of any poisonous or injurious gases and quantities		N
i)	Risk-reduction procedures relating to flammable liquids		N
j)	methods of reducing the RISKS of burns from surfaces permitted to exceed the temperature limits of 10.1		P
	A statement about protection impairment if used in a manner not specified by the manufacturer		P
5.4.5	Equipment maintenance and service		--
	Instructions include:		P
	Sufficient preventive maintenance and inspection information		P
	Replacement of supply cords		N
	Specific battery type		--
	Any manufacturer specified parts		P
	Rating and characteristics of fuses	See following table	P
	Provided for service personnel:		--
	a) product-specific risks that may affect the service personnel		P

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Clause	Requirement + Test	Result - Remark	Verdict
	b) protective measures for these risks		P
	c) verification of the safe state of the equipment after repair		P
5.4.6	Integration into systems or effects resulting from special conditions		--
	Aspects resulting from integration into systems or effects resulting from special ambient or application conditions shall be described in the documentation		P
6	**PROTECTION AGAINST ELECTRIC SHOCK**	**(see appended table)**	**--**
6.1	**General**		**P**
6.1.1	Requirements		P
	Accessible parts not hazadous live in normal condition and single fault condition	Class III	P
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.11	See below	P
6.1.2	Exceptions		--
	it is not feasible for operating reasons to prevent the following parts being both accessible and hazardous live		N
	a) parts of lamps and lamp sockets after lamp removal		N
	b) parts intended to be replaced by an OPERATOR		N
	hazardous live during the replacement or other operator action, but only if they are accessible only by means of a tool and have a warning marking		N
	Capacitance test	(see appended tables)	N
	Parts not hazardous live 10 s after interruption of supply		N
6.2	**Determination of accessible parts**		**P**
6.2.1	General	(see appended table A.6)	P
6.2.2	Examination	10N with test finger	P
6.2.2	Openings above parts that are hazardous live		P
6.2.3	Openings for pre-set controls	No such controls	N
6.3	**Limit values for accessible parts**		**--**
6.3.1	Levels in normal condition	(see appended table)	N
6.3.2	Levels in single fault condition	(see appended table)	N
6.4	**Primary means of protection**		**P**
6.4.1	General		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Accessible parts shall be prevented from becoming hazardous live by following:		P
6.4.2	Enclosures and protective barriers		P
	- meet the rigidity requirements of 8.1		P
	- for provide protection by basic insulation		N
	- provide protection by limiting access, clearances and creepage distances between accessible parts and hazardous live parts shall meet the requirements of 6.7		P
6.4.3	Basic insulation		P
	meet the requirements of 6.7		P
6.4.4	Impedance		N
	impedance used as a primary means of protection		--
	- a) limit the current or voltage to not more than the applicable level of 6.3.2		N
	- b) be rated for the maximum working voltage and for the amount of power that it will dissipate		N
	- c) meet the requirements of 6.7		N
6.5	**Additional means of protection in case of single fault conditions**		**P**
6.5.1	General		--
6.5.2	Protective bonding		N
6.5.2.1	General		--
	Accessible conductive parts:		--
	Bonded to the protective conductor terminal; or		N
	Separated by screen or barrier bonded to protective conductor terminal from parts which are hazardous live		N
6.5.2.2	Integrity of protective bonding		N
a)	Protective bonding consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		N
b)	Soldered connections:		N
	Independently secured		N
	Not used for other purposes		N
c)	Screw connections are secured		N
d)	Protective bonding not interrupted		N
e)	Any moveable connection specifically designed, and meets 6.5.2.4		N

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Clause	Requirement + Test	Result - Remark	Verdict
f)	No external metal braid of cables used		N
g)	If mains supply passes through:		--
	Means provided for passing protective conductor;		N
	Impedance meets 6.5.1.3.		N
h)	Protective conductors bare or insulated, if insulated, green/yellow		N
	Exceptions:		--
	1) earthing braids;		N
	2) internal protective conductors etc.;		N
	Green/yellow not used for other purposes		N
	terminal suitable, and meets 6.5.2.3		N
6.5.2.3	Protective conductor terminal		N
a)	Contact surfaces are metal		N
b)	Appliance inlet used		N
c)	For rewireable cords and permanently connected equipment, protective conductor terminal is close to mains supply terminals		N
d)	If no mains supply is required, any protective conductor terminal:		--
	Is near terminals of circuit for which protective earthing is necessary		N
	External if other terminals external		N
e)	Equivalent current-carrying capacity to mains supply terminals	(see appended table)	N
f)	If plug-in, makes first and breaks last		N
g)	If also used for other bonding purposes, protective conductor:		--
	Applied first;		N
	Secured independently;		N
	Unlikely to be removed by servicing; or		N
	Warning marking requires replacement of protective conductor		N
h)	Protective conductor of measuring circuit:		--
	1) Current rating;		N
	2) protective bonding:		N
	Not interrupted; or		N
	Indirect bonding used (see 6.5.1.5)		N

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Clause	Requirement + Test	Result - Remark	Verdict
i)	Functional earth terminals allow independent connection		N
j)	If a binding screw:		--
	Suitable size for bond wire		N
	Not smaller than M 4 (No. 6)		N
	At least 3 turns of screw engaged		N
k)	Contact pressure not capable of reduction by deformation of materials		N
	Passes tightening torque test	(see appended table)	N
6.5.2.4	Impedance of protective bonding of plug-connected equipment	(see appended table)	N
6.5.2.5	Impedance of protective bonding of permanently connected equipment	(see appended table)	N
6.5.2.6	Transformer protective bonding screen	(see appended table)	N
6.5.3	double insulation and reinforced insulation (see 6.7)	See 6.7	P
6.5.4	Protective impedance	(see appended table)	--
a)	single component used, that safety and reliability for protection against electric shock is assured		N
	- rated for twice the maximum working voltage		N
	- if a resistor, rated for twice the power dissipation for the maximum working voltage		N
b)	A combination of components used	No use such component	N
	Components, wires and connections are rated as required sw		N
6.5.5	Automatic disconnection of the supply		--
	If used, it meets :		P
a)	be rated to disconnect the load within the time specified in figure 2		P
b)	be rated for the maximum rated load conditions of the equipment		P
6.5.6	Current- or voltage-limiting device		--
	If used, it meets :		N
a)	be rated to limit the current or voltage to the levels not exceeding the values of 6.3.2		N
b)	shall be rated for the maximum working voltage and, if applicable, for the maximum operational current		N

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Clause	Requirement + Test	Result - Remark	Verdict
c)	clearance and creepage distance between the terminations of the current or voltage limiting device meet requirements of 6.7 for supplementary insulation		N
6.6	**Connections to external circuits**		--
6.6.1	General		--
	Connections do not cause accessible parts of the following to become hazardous live in normal condition or single fault condition:		N
	Separation of circuits provided; or		N
	Short circuit of separation does not cause a Hazard		N
	Instructions or markings include:		P
	a) rated conditions for terminal		N
	b) Required rating of external circuit insulation		N
6.6.2	terminals for external circuits		--
	terminals which receive a charge from an internal capacitor are not hazardous live	(see appended table)	N
6.6.3	Circuits with terminals which are hazardous live		--
	These circuits are:		--
	Not connected to accessible conductive parts; or		N
	Connected to accessible conductive parts, but are not mains circuits and have one terminal contact at earth potential		N
	No accessible conductive parts are hazardous live		N
6.6.4	Accessible terminals for stranded conductors		N
	No risk of accidental contact because:		--
	Located or shielded		N
	Self-evident or marked whether connected to accessible conductive parts		N
	Accessible terminals will not work loose		N
6.7	**Insulation requirements**		--
6.7.1	The nature of insulation		--
6.7.1.1	General		--
	requirements for insulation depend on:		--
	- the required level of insulation	Basic insulation	P
	- the maximum TRANSIENT OVERVOLTAGE		N
	- the maximum WORKING VOLTAGE	15VDC	P

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Clause	Requirement + Test	Result - Remark	Verdict
	- he POLLUTION DEGREE of the micro-environment	POLLUTION DEGREE 3	P
	- the maximum TEMPORARY OVERVOLTAGE		N
6.7.1.2	Clearances		--
	Multiplication factor	1 (rated operating altitude ≤ 2000m)	P
6.7.1.3	Creepage distances		--
	Material group IIIb	100 ⩽ CTI < 175	P
6.7.1.4	Solid insulation		--
6.7.1.5	Requirements for insulation according to type of circuit	see 6.7.2, 6.7.3, K1, K2, K3	--
6.7.2	Insulation for MAINS CIRCUITS of OVERVOLTAGE CATEGORY II with a nominal supply voltage up to 300 V		N
6.7.2.1	**CLEARANCES and CREEPAGE DISTANCES**	**(See appended table)**	**P**
6.7.2.2	**Solid Insulation**	**See below**	**P**
6.7.2.2.1	General		--
6.7.2.2.2	Moulded and potted parts	enclosure	P
6.7.2.2.3	Inner insulating layers of printed wiring boards		N
	For REINFORCED INSULATION (RI):		--
	a) the thickness of the insulation is at least 0,4 mm		N
	b) two separate layers, each of which is BASIC INSULATION (BI);		N
	c) two separate, and the combination of layers is REINFORCED INSULATION (RI)		N
6.7.2.2.4	Thin-film insulation		N
	a) the thickness of the insulation is at least 0,4 mm		N
	b) two separate layers, each of which is BASIC INSULATION (BI);		N
	c) two separate, and the combination of layers is REINFORCED INSULATION (RI)		N
6.7.3	Insulation for secondary circuits derived from MAINS CIRCUITS of OVERVOLTAGE CATEGORY II up to 300 V		--
6.7.3.1	General		--
6.7.3.2	Clearances		P
6.7.3.3	Creepage distances		P
6.7.3.4	**Solid insulation**		**P**
6.7.3.4.1	General		P

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Clause	Requirement + Test	Result - Remark	Verdict
6.7.3.4.2	Moulded and potted parts		P
6.7.3.4.3	Inner insulating layers of printed wiring boards		P
6.7.3.4.4	Thin-film insulation		N
6.8	**Procedure for voltage tests**	**(See appended table)**	**P**
6.8.1	General		--
6.8.2	Humidity preconditioning	40℃, 94%RH, 48h	--
6.8.3	Test procedures	(See appended table)	--
6.8.3.1	The a.c. voltage test		P
6.8.3.2	The 1 min d.c. voltage test		--
6.8.3.3	The impulse voltage withstand test		--
6.9	**Constructional requirements for protection against electric shock**		**--**
6.9.1	General		--
	If a failure could cause a hazard:		N
a)	Security of wiring connections		P
b)	Screws securing removable covers	No such covers	N
c)	Accidental loosening		P
6.9.2	Insulating materials		P
a)	Easily damaged materials not used		P
b)	Non-impregnated hydroscopic materials not used		P
6.9.3	Colour coding		P
	Green-and-yellow insulation shall not be used except for:		--
	a) protective earth conductors;		N
	b) PROTECTIVE BONDING conductors;		N
	c) potential equalization conductors for safety purposes;		N
	d) functional earth conductors.		N
6.10	Connection to mains supply source and connections between parts of equipment		--
6.10.1	Mains supply cords		--
	rated for maximum equipment current (see 5.1.3c)		N
	Cable complies with IEC 60227 or IEC 60245		N
	Heat-resistant if likely to contact hot parts		N
	Temperature rating (cord and inlet)		N
	Green/yellow used only for connection to protective conductor terminals		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Detachable cords with IEC 60320 mains connectors:		--
	Conform to IEC 60799; or		N
	Have the current rating of the mains connector		N
6.10.2	Fitting of non-detachable mains supply cords		N
6.10.2.1	Cord entry		N
	protected against abrasion and sharp bends at the point where the cord enters the equipment		--
a)	an inlet or bushing with a smoothly rounded opening		N
b)	a reliably fixed flexible cord guard made of insulating material protruding		N
	Non-detachable cord protection:		N
6.10.2.2	Cord anchorages:		N
a)	Cord is not clamped by direct pressure from a screw		N
b)	Knots are not used		N
c)	Cannot push the cord into the equipment to cause a hazard		N
d)	No failure of cord insulation in anchorage with metal parts		N
e)	not loosen the cord anchorage without the use of a TOOL		N
f)	be designed so that cord replacement does not cause a HAZARD, and it shall be clear how the relief from strain is provided		N
	compression bushing:		N
	1) Clamps all types and sizes of mains cords; and		N
	2) Is suitable:		N
	For connection to terminals provided; or		N
	It is designed for screened mains cord		N
6.10.3	Plugs and connectors		--
	Mains supply plugs, connectors etc., conform with relevant specifications		P
	If equipment supplied at voltages below 6.3.2.a) or from a sole source:		P
	Plugs of supply cords do not fit mains sockets above rated supply voltage		N
	Mains-type plugs used only for connection to mains supply		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Plug pins which receive a charge from an internal capacitor		N
	Accessory mains socket outlets:		N
	a) Marking if accepts a standard mains plug (see 5.1.3e)		N
	b) Input has a protective earth conductor if outlet has earth terminal contact		N
6.11	**Disconnection from supply source**		--
6.11.1	General	See below	P
	Disconnects all current carrying conductors		P
6.11.2	Exceptions		--
a)	Equipment supplied by low energy source; or		P
b)	Equipment connected to impedance protected supply; or		N
c)	Equipment constitutes an impedance protected load		N
6.11.3	Requirements according to type of equipment		--
6.11.3.1	Permanently connected equipment and multi-phase equipment		N
	Employs switch or circuit-breaker		N
	If switch or circuit-breaker is not part of the equipment, documentation specifies:		N
a)	Switch or circuit-breaker to be included in building installation		N
b)	Location		N
c)	Marking		N
6.11.3.2	Single-phase cord-connected equipment		N
	Equipment is provided with:		--
a)	Switch or circuit-breaker; or		N
b)	Appliance coupler (disconnectable without tool); or		N
c)	Separable plug (without locking device)		N
6.11.4	Disconnecting devices		--
6.11.4.1	General		--
	Electrically close to the supply		N
	Power-consuming components shall not be electrically located between the supply source and the disconnecting device		N
6.11.4.2	Switches and circuit-breakers		N

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Clause	Requirement + Test	Result - Remark	Verdict
	When used as disconnection device:		--
	Meets IEC 60947-1 and IEC 60947-3		N
	Marked to indicate function		N
	Not incorporated in mains cord		N
	Does not interrupt protective earth conductor		N
6.11.4.3	Appliance couplers and plugs		--
	Where an appliance coupler or separable plug is used as the disconnecting device		P
	Readily identifiable and easily reached by the operator		N
	Single-phase portable equipment cord length ≤ 3 m		N
	Protective earth conductor connected first and disconnected last		N
7	**PROTECTION AGAINST MECHANICAL HAZARDS**		--
7.1	General	See below	--
	Conformity is checked by 7.2 to 7.7		P
7.2	**Sharp edges**		**--**
	All easily-touched parts of the equipment shall be smooth and rounded		P
	easily-touched parts of the equipment shall not cause an injury in SINGLE FAULT CONDITION		P
7.3	**Moving parts**		**N**
7.3.1	General		--
7.3.2	Exceptions		--
a)	For obviously intended to operate on parts or materials external to the equipment, shall be designed to minimize inadvertent touching of these moving parts		N
b)	If operator access permitted:		--
	1) Access requires tool		N
	2) Statement about training		N
	3) Warning markings or symbol 14		N
7.3.3	RISK assessment for mechanical HAZARDS to body parts		--
	RISKS shall be reduced to a tolerable level by at least the applicable minimum protective measure of Table 12		N

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Clause	Requirement + Test	Result - Remark	Verdict
7.3.4	Limitation of force and pressure		N
	The maximum tolerable continuous contact pressure is 50 N/cm^2, with a maximum force of 150 N.		N
	The maximum tolerable temporary force for body contact areas of at least 3 cm^2 is 250 N for a maximum duration of 0,75 s		N
7.3.5	Gap limitations between moving parts		N
7.3.5.1	Gap limitations between moving parts – Access normally allowed		N
7.3.5.2	Gap limitations between moving parts – Access normally prevented		N
7.4	**Stability**		**P**
	For each castor and support foot:		--
	- RATED to support a load of at least 4 times its normal load		N
	- tested according to d) and e)		N
	Conformity tests:		--
a)	10° tilt test		P
b)	multi-directional force test		N
c)	downward force test		N
d)	castor or support foot that supports the greatest load (M) is loaded with 4 times that load (4M)		N
e)	The castor or support foot that supports the greatest load is removed from the equipment and the equipment is placed on a flat surface		N
7.5	**Provisions for lifting and carrying**		--
7.5.1	General		--
	Equipment or parts having a mass of 18 kg or more	No Handles or grips	N
7.5.2	Handles and grips		N
	Handles or grips withstand four times weight		N
7.5.3	Lifting devices and supporting parts		--
	four times the maximum load		N
7.6	**Wall mounting**		**N**
	Mounting brackets withstand four times weight		N
7.7	**Expelled parts**		--
	Equipment contains or limits the energy		P
	Protection not removable without the aid of a tool		P

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Clause	Requirement + Test	Result - Remark	Verdict
8	**Mechanical resistance to shock and impact**		--
8.1	General		--
	After the tests of 8.2 to 8.3		P
	hazardous live parts not accessible		P
	Voltage tests of 6.8	(see appended table)	P
i)	no leaks of corrosive or harmful substances		P
ii)	enclosure shows no cracks (hazard)		P
iii)	clearances not less than their permitted values	(see appended table)	P
iv)	insulation of internal wiring remains undamaged		P
v)	barriers not damaged or loosened		P
vi)	No moving parts exposed, except permitted by 7.3		P
vii)	No damage which could cause spread of fire		P
8.2	**Enclosure rigidity tests**		--
8.2.1	Static test		--
	a force of 30 N applied by the hemispherical end of a hard rod of 12 mm diameter.	See 8.1	P
8.2.2	Impact test		--
	impact by a smooth steel sphere with a mass 500 g ± 25 g and with a diameter of approximately 50 mm	See 8.1	P
8.3	**Drop test**		--
8.3.1	Equipment other than hand-held equipment and direct plug-in equipment		P
8.3.2	Hand-held equipment and direct plug-in equipment		P
9	**Protection against the spread of fire**		**P**
9.1	**General**		--
	Conformity for each source of hazard or area of the equipment is checked by one of the following:	(See appended table)	--
a)	Fault test of 4.4; or	(See appended table)	P
b)	Application of 9.2 (eliminating or reducing the sources of ignition); or		P
c)	Application of 9.3 (containment of fire within the equipment)		P
9.2	**Eliminating or reducing the sources of ignition within the equipment**	**See below**	--

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Clause	Requirement + Test	Result - Remark	Verdict
a)	1) Limited-energy circuit (see 9.4); or		P
	2) Insulation meets the requirements for basic insulation; or	(see appended table)	P
	Bridging the insulation does not cause ignition	(see appended table)	P
b)	Any ignition hazard related to flammable liquids (see 9.5)	No flammable liquid	N
c)	No ignition occurs when tested in single fault condition	(see appended table)	N
9.3	**Containment of the fire within the equipment, should it occur**		--
9.3.1	General		--
a)	Energizing of the equipment is controlled by an operator held switch		P
b)	Enclosure is conform with constructional requirements of 9.3.2; and		P
	Requirements of 9.5 are met		P
9.3.2	Constructional requirements		P
a)	Connectors and insulating material have flammability classification FV2 or better	(see appended table)	P
b)	Insulated wires and cables shall retard flame propagation. Meet: IEC 60332	(see appended table)	P
c)	The enclosure is constructed as follows :	The equipment has bottom openings	--
	1) Bottom and sides constructed with:		P
	i) No openings; or		P
	ii) be made of metal with perforations as specified in Table 16; or		P
	iii) Metal screen with a mesh		N
	iv) openings with baffles according to Figure 12		P
	2) Material of enclosure and any baffle or flame barrier is made of:		--
	Metal (except magnesium); or		P
	Non metallic materials have flammability classification FV1 or better		N
	3) enclosure and any baffle or flame barrier have adequate rigidity		P
9.4	**Limited-energy circuit**		--
a)	Potential not more than 30 r.m.s. and 42.4 V peak, or 60 V dc		N
b)	Current limited by one of following means:		N

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Clause	Requirement + Test	Result - Remark	Verdict
	1) Inherently or by impedance; or		N
	2) Overcurrent protective device; or		N
	3) A regulating network limits also in single fault condition		N
c)	Is separated by at least basic insulation		N
	If overcurrent protective device used:		N
	Fuse or a non adjustable electromechanical device		N
9.5	**Requirements for equipment containing or using flammable liquids**	**No such liquids.**	**N**
	Flammable liquids contained in or specified for use with equipment do not cause spread of fire		N
	Risk is reduced to a tolerable level :	(see appended table)	N
a)	The temperature of surface or parts in contact with flammable liquids is 25 °C below fire point		N
b)	The quantity of liquid is limited		N
c)	Flames are contained within the equipment		N
	Detailed instructions for risk-reduction provided		N
9.6	**Overcurrent protection**		--
9.6.1	General		--
	Devices not in the protective conductor		P
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase)		N
9.6.2	permanently connected equipment	Not such equipment	N
	Overcurrent device:		N
	Fitted within the equipment; or		N
	Specified in manufacturer's instructions		N
9.6.3	Other equipment		--
	Protection within the equipment		P

10	**Equipment temperature limits and resistance to heat**		**-**
10.1	**Surface temperature limits for protection against burns**		**P**
	Easily touched surfaces within the limits	(see appended table)	P
	Heated surfaces necessary for functional reasons exceeding specified values:		N
	Are recognizable as such by appearance or function; or		P

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Clause	Requirement + Test	Result - Remark	Verdict
	Are marked with symbol 13	No use this mark	N
	Guards are not removable without tool		P
10.2	**Temperatures of windings**	**(see appended table)**	**N**
	Limits not exceeded in:		N
	normal condition		N
	single fault condition		N
10.3	**Other temperature measurements**	**(see appended table)**	**P**
	Following measurements conducted if applicable:		--
a)	Value of 60 °C of field-wiring terminal box not exceeded		N
b)	Surface of flammable liquids and parts in contact with this liquids		N
c)	Surface of non-metallic enclosures		P
d)	Parts made of insulating material supporting parts connected to mains supply		P
e)	Terminals carrying a current more than 0.5 A		N
10.4	**Conduct of temperature test**	**(see appended table)**	**P**
10.4.1	General		--
10.4.2	Temperature measurement of heating equipment		N
10.4.3	Equipment intended for installation in a cabinet or a wall		N
10.5	**Resistance to heat**		**P**
10.5.1	Integrity of clearance and creepage distances	(See appended table)	P
10.5.2	Non-metallic enclosures	(See appended table)	P
	After treatment:		--
	No hazardous live parts accessible;		P
	Tests of 8.1 and 8.2	(See appended table)	P
	In case of doubt, tests of 6.8 (without humidity preconditioning)	(See appended table)	N
10.5.3	Insulating material		--
a)	Parts supporting parts connected to mains supply		P
b)	Terminals carrying a current more than 0.5 A		P
	Examination of material data; or		P
	in case of doubt:		N
	1) Ball pressure test; or	See appended table	P

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Clause	Requirement + Test	Result - Remark	Verdict
	2) Vicat softening test of ISO 306		N
11	**Protection against hazards from fluids**		**P**
11.1	General		P
11.2	Cleaning	(See appended table)	P
11.3	Spillage	(See appended table)	N
11.4	Overflow	(See appended table)	N
11.5	Battery electrolyte		--
	Battery electrolyte leakage presents no hazard		--
11.6	Specially protected equipment		N
11.7	**Fluid pressure and leakage**		**--**
11.7.1	Maximum pressure		N
	Maximum pressure of any part does not exceed Prated		N
11.7.2	Leakage and rupture at high pressure	(See appended table)	N
	Test to IEC 60335 (refrigeration only)		N
11.7.3	Leakage from low-pressure parts	(See appended table)	N
11.7.4	Overpressure safety device		--
	Does not operate in normal use		N
	Meets ISO 4126-1; and		N
	It is conform with:		N
a)	Connected as close as possible to parts intended to be protected		N
b)	Easy access for inspection, maintenance and repair		N
c)	Adjustment only with tool		N
d)	No discharge towards person		N
e)	No hazard from deposit of discharged material		N
f)	Adequate discharge capacity		N
	No shut-off valve between overpressure safety device and protected parts		N
12	**Protection against radiation, including laser sources, and against sonic and ultrasonic pressure**		--
12.1	General		N
	Equipment provides protection		N

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Clause	Requirement + Test	Result - Remark	Verdict
12.2	**Equipment producing ionizing radiation**		**N**
12.2.1	Ionizing radiation	No ionizing radiation	N
	a) Meet the requirements of 12.2.1.2. or be tested, classified, and marked according to IEC 60405	(See appended table)	N
	b) uses or generates radiation but only emits stray radiation, it shall meet the requirements of 12.2.1.3		N
12.2.1.2	Equipment intended to emit radiation		N
	Equipment which contains radioactive substances or that generates x-rays		N
	If the effective dose rate at any easily reached point 50 mm from the outer surface exceeds 5 µSv/h:		N
	a) with symbol 17 of Table 1;		N
	b) for equipment containing one or more radioactive substances, with the abbreviations of the radionuclides		N
	c) either with the maximum dose rate value at 1 m, or with a dose rate value between 1 µSv/h and 5 µSv/h at the appropriate distance in m		N
	Measuring maximum radiation		N
	Equipment containing X-ray sources is set to produce the maximum possible level of radiation		N
12.2.1.3	Equipment not intended to emit radiation		N
	The effective dose rate of unintended stray radiation at any easily reached point 100 mm shall not exceed 1 µSv/h		N
12.2.2	Accelerated electrons		N
	which electrons are accelerated by voltages exceeding 5 kV cannot be opened without the use of a tool		N
12.3	**Ultra-violet (UV) radiation**	**(Conformity test under consideration)**	**N**
	No unintentional and hazardous escape of UV radiation		N
12.4	**Micro-wave radiation**		**N**
	Power density does not exceed 10 W/m^2:		
12.5	**Sonic and ultrasonic pressure**		**N**
12.5.1	Sound level	(See appended table)	N
12.5.2	Ultrasonic pressure	(See appended table)	N

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Clause	Requirement + Test	Result - Remark	Verdict
12.6	**Laser sources (IEC 60825-1)**		**N**
13	**Protection against liberated gases, explosion and implosion**		**--**
13.1	**Poisonous and injurious gases**	**Not such gases**	**N**
	Attached data/test reports demonstrate conformity		N
13.2	**Explosion and implosion**		**N**
13.2.1	Components		N
	Components liable to explode:		N
	Pressure release device provided; or		N
	Apparatus incorporates operator protection (see also 7.6)		N
	Pressure release device:		N
	Discharge without danger		N
	Cannot be obstructed		N
13.2.2	Batteries and battery charging	No batteries used	N
	If explosion or fire hazard could occur:		N
	Protection incorporated in the equipment; or		N
	Instructions specify batteries with built-in protection		N
	In case of wrong type of battery used:		N
	No hazard; or		N
	Warning by marking and within instructions		N
	Equipment with means to charge rechargeable batteries:		N
	Warning against the charging of non-rechargeable batteries; and		N
	Type of rechargeable battery indicated; or		N
	Symbol 14 used		N
	Battery compartment design	(See appended table)	N
	Single component failure		N
	Polarity reversal test		N
13.2.3	Implosion of cathode ray tubes	No such tubes	N
	If maximum face dimensions > 160 mm:		N
	Intrinsically protected and correctly mounted; or		N
	enclosure provides protection:		N
	If non-intrinsically protected:		N

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Clause	Requirement + Test	Result - Remark	Verdict
	Screen not removable without tool		N
	If glass screen, not in contact with surface of tube		N

14	**Components and subassemblies**		**P**
14.1	General	See below	P
	Where safety is involved, components meet relevant requirements	(see appended table)	P
14.2	**Motors**		**N**
14.2.1	Motor temperatures		--
	Does not present a hazard when stopped or prevented form starting; or		N
	Protected by overtemperature or thermal protection device conform with 14.3		N
14.2.2	Series excitation motors		N
	Connected direct to device, if overspeeding causes a hazard		N
14.3	**Overtemperature protection devices**		**N**
	Devices operating in a single fault condition		--
a)	Reliable function is ensured		N
b)	Rated to interrupt maximum current and voltage		N
c)	Does not operate in normal use		N
	For self-resetting overtemperature protection device		--
	1) self-resetting overtemperature protection devices are caused to operate 200 times;		N
	2) non-self-resetting overtemperature protection devices, except thermal fuses, are reset after each operation and thus caused to operate 10 times;		N
	3) non-resetting overtemperature protection devices are caused to operate once.		N
14.4	**Fuse holders**		--
	No access to hazardous live parts		N
14.5	**Mains voltage selecting devices**		**N**
	constructed so that a change from one voltage or one type of supply to another cannot occur accidentally		N
	5.1.3 d) for marking requirements		N
14.6	**Mains transformers tested outside equipment**		**N**

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Clause	Requirement + Test	Result - Remark	Verdict
	short-circuit and overload tests in 4.4.2.7	(see Forms A.1)	P
14.7	**Printed circuit boards**	**See appended table**	**P**
	Data shows conformity with FV-1 of IEC 60707 or better; or	V-0	P
	Test shows conformity with FV-1 of IEC 60707 or better; or	See appended table	N
	Thin film flexible PCB with limited-energy circuit used		N
14.8	**Circuits or components used as transient overvoltage limiting devices**		**P**
	After test, no sign of overload or degradation		P
15	**Protection by interlocks**		**N**
15.1	General	Not interlocks	N
	Interlocks are designed to remove a hazard before operator exposed		N
15.2	Prevention of reactivation		N
15.3	Reliability		N
	Single fault unlikely to occur; or		N
	Cannot cause a hazard		N
16	**Hazards resulting from application**		**--**
16.1	**reasonably foreseeable misuse**		**P**
	No HAZARDS shall arise if adjustments, knobs, or other software-based or hardware-based controls are set in a way not intended, and not described in the instructions		P
	Other possible cases of REASONABLY FORESEEABLE MISUSE that are not addressed by specific requirements in this standard shall be addressed by RISK assessment (see Clause 17)		N
16.2	**Ergonomic aspects**		**--**
	For below which give rise to a HAZARD, a RISK assessment shall be documented:	No rise to hazard	--
	a) limitation of body dimensions;		N
	b) displays and indicators;		N
	c) accessibility and conventions of controls;		N
	d) Arrangements of TERMINALS.		N

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Clause	Requirement + Test	Result - Remark	Verdict
17	**RISK assessment**		**--**
	equipment shows that HAZARDS not fully addressed in Clauses 6 to 16		N
	a) risk analysis		N
	b) risk evaluation		N
	c) risk reduction		N
	risks remaining after a risk assessment shall be identified in the instructions for the responsible body.		N
	adequate information about how to mitigate these risks shall be given		N
	1) eliminate or reduce RISKS as far as possible		N
	2) take the necessary protective measures in relation to RISKS that cannot be eliminated		N
	3) inform users of the residual RISKS due to any shortcomings of the protective measures adopted		N

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Clause	Requirement + Test	Result - Remark	Verdict
ANNEX F	**ROUTINE TESTS**		--
	Manufacturer´s declaration		P
ANNEX H	**QUALIFICATION OF CONFORMAL COATINGS FOR PROTECTION AGAINST POLLUTION**		--
H.1	**General**		N
	Conformal coatings meet the requirements of Clause H.2 and H.3.		N
H.2	**Technical properties**		N
	Technical properties of conformal coatings are suitable for the intended application. In particular:		—
	a) Manufacturer indicate that it is a coating for PWBs;		N
	b) RATED operating temperature include the temperature range of the indicated application;		N
	c) CTI, insulation resistance and dielectric strength are suitable for the intended application;		N
	d) Coating have adequate UV resistance, if it is exposed to sunlight;		N
	e) Flammability RATING of the coating is at least the required flammability RATING of the applied PWB.		N
H.3	**Qualification of coatings**	(see Form A.42)	N
	Coating complies with the conformity requirements.		N
ANNEX K	**INSULATION REQUIREMENTS NOT COVERED BY CLAUSE 6.7**	(see Forms A.15 and A.18)	N

Appendix tables

4.4	TABLE: Testing in single FAULT CONDITION – Results		Form A.1	P
	Ambient temperature (°C)	22.5℃		--
	Ambient temperature (°C)	22.3℃		--
	Test voltage	15VDC		--

Test subclause	Fault No.	Fault	Test time	Comments	Verdict
4.4.2.6	Adaptor output	s-c	5min	Unit shut down, no damage, no hazards. No function	P
4.4.2.6.1	Q1 (pin G-D)	s-c	5mins	Unit shut down, no damage, no hazards. No function	P
	U2 (pin 1-6)	s-c	5mins	Unit shut down, no damage, no hazards. No function	P
	C1	s-c	5mins	Unit shut down, no damage, no hazards. No function	P
	D2	s-c	5mins	Unit shut down, no damage, no hazards. No function	P

NOTE:

1, Record dielectric strength test on Form A.14 and temperature tests on Form A.20.

2, Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

3, s-c=short circuit, o-c=open circuit, o-l=overload

5.1.3	TABLE: mainssupply				P
	Marked rating..... :		15VDC		--
	Phase..... :		/		--
	Frequency ..... :		/		--
	Power ..... :		6A		--
Test No.	U (V) / F (Hz)	I (A)	I rated (A)	Condition /status	
1	15VDC	4.69A	6A	Normally working	
Remark: the measured value not exceed the marked value by more than 10%					

Appendix tables

5.3	TABLE: Durability of markings				Form A.4	P
Marking method (see NOTE)				Agent		
1)				A Water		
2)				B Isopropyl alcohol/ Petroleum spirit		
3)				C (specify agent)		
4)				D (specify agent)		
5)				E (specify agent)		
NOTE – Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.						

Marking location	Marking method (see above)
Identification (5.1.2)	1), 2)
Mains supply (5.1.3)	1), 2)
Fuses (5.1.4)	1), 2)
Terminals and operating devices (5.1.5.1)	1), 2)
Measuring circuit terminals (5.1.5.2)	1), 2)
Switches and circuit breakers (5.1.6)	1), 2)
Double/reinforced equipment (5.1.7)	Not such equipment
Field wiring Terminal boxes (5.1.8)	Not such equipment
Warning marking (5.2)	1), 2)
Battery charging (13.2.2)	No battery

Method	Test agent	Remains legible Verdict	Label loose Verdict	Curled edges Verdict	Comments
1), 2)	A, B	Remains legible	No loose	No curled	All markings accordance with 5.1.2 to 5.2 test in this method, and pass the test

Appendix tables

6.2	TABLE: List of accessible parts		Form A.6	P
6.1.2	Exceptions	See below		--
6.2	Determination of accessible parts	See below		--

Item	Description	Determination method (NOTE 5)	Exception under 6.1.2 (NOTE 4)
1	Front Enclosure	Rigid test finger and Test pin 3 mm diameter	No hazard voltage

NOTE 1 – Test fingers and pins are to be applied without force unless a force is specified (see 6.2.1)
NOTE 2 – Special consideration should be given to inadequate insulation and high voltage parts (see 6.2)
NOTE 3 – Parts are considered to be ACCESSIBLE if they could be touched in the absence of any covering which is not considered to provide suitable insulation (see note to paragraph 1 of6.4).
NOTE 4 – Capacitor test may be required (see Form A.7).

NOTE 5 – The determination methods are: visual; rigid test finger; jointed test finger; pin 3 mm diameter; pin 4 mm diameter.

Supplementary information:

There are no any hazardous parts accessible after installation.

6.3.1	TABLE: Levels in NORMAL CONDITION					N
Open-circuit voltage measurement on secondary output terminal:						
Open-circuit voltage measured between:	Condition	max. Voltage			Comments	
		V peak	V d.c. / V a.c.			
--	--	--	--		--	
--		--	--		--	
Touch currentmeasured between:	Condition	Accessible current (mA)	Accessible current limit(mA)	Charged capacitance (µC/mJ)	Charged capacitance (µC/mJ)	
--	--	--	--	--	--	
--		--	--	--	--	

Note: the Accessible current was measured according to 6.3.1 b) with the test circuit of figure A.1 connected between the specified points.

Input: 110% of rated supply voltage

Appendix tables

6.3.2	TABLE: Levels in SINGLE FAULT CONDITION			Form A.6		N
Open-circuit voltage measurement on secondary output terminal (for model HT5156):						
Open-circuit voltage measured between:	Condition	max. Voltage			Comments	
		V peak	V d.c. / V a.c.			
--	Single fault condition	--	--		Limit: --.	
Touch current measured between:	Condition	Accessible current (mA)	Accessible current limit(mA)	Charged capacitance (µC/mJ)	Charged capacitance (µC/mJ)	
--	Single fault condition	--	--	--		
--		--	--	--		
Note: the Accessible current was measured according to 6.3.1 b) with the test circuit of figure A.1 connected between the specified points. Input: 110% of rated supply voltage						

6.5.2.1	TABLE: Cross-sectional area of bonding conductors	N
Conductor location	Cross-sectional area	Verdict
--	--	--

6.5.2.3	TABLE: Tighting torque test		N
Conductor location	Size of Screw	Tighting torque (Nm)	Verdict
--	--	--	--

6.5.2.4	TABLE: Impedance of of plug-connected equipment			N
ACCESSIBLE part under test	Test current A	Voltage attained after 1 min V	Calculated resistance (maximum allowed 0,1 Ω) Ω	Verdict
--	--	--	--	--
Supplementary information:				

6.5.2.5	TABLE: Impedance of protective bonding of permanently connected equipment		N
ACCESSIBLE part under test	Test current A	Voltage attained after 1 min (maximum 10 V) V	Verdict
Supplementary information: Not permanently connector equipment			

Appendix tables

6.5.2.6	TABLE: Transformer protective bonding screen		N
ACCESSIBLE part under test	Test current A	Voltage attained after 1 min (maximum 10 V) V	Verdict
Supplementary information: Not permanently connectorequipment			

6.5.3	TABLE: protective impedance		N
A high INTEGRITY single component			
Component	Location	Comments	
A combination of components			
Component	Location	Comments	
A combination of BASIC INSULATION and a current or voltage limiting device			
Component	Location	Comments	
Supplementary information:			

6.7.1	TABLE: protection against electric shock					N
clearance cl and creepage distance dcrat/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)

6.8	TABLE: Procedure for voltage tests (Dielectric strength tests)	P
4.4.4.1 b)	Conformity after application of fault conditions[1]	P
6.5.3	Supplementary insulation and reinforced insulation	P
6.6.1	Connections to external circuits	P
6.7.3.2	CLEARANCE	P
6.7.3.4	Solid insulation	P
6.10.2.2	Fitting of non-detachable MAINS SUPPLY cords[1]	N
8	Mechanical resistance to shock and impact	P
9.1 a) 2)	Eliminating or reducing the sources of ignition within the equipment	N
9.3 c)	Limited-energy circuit	N
11.2	Cleaning[1]	N
11.3	Spillage[1]	N

Appendix tables

11.4	Overflow[1]	N
11.6	Specially protected equipment[1]	N
[1] Record the fault, test or treatment applied before the dielectric strength test		
	Test site altitude.....:	< 2000m	--
	Test voltage correction factor (see Table 10)....:	1.0	--

Location or references from Forms A.2 and A.5	Clause or sub-clause	Humidity Yes/No	Working voltage V	Test voltage r.m.s./peak/d.c V	Comments	Verdict
+ - to enclosure	--	Yes	15V	500Vrms a.c.	No flashover or break down	P
Supplementary information:						

6.10.2.2	TABLE: Cord anchorage					N
Location	Mass kg	Pull N	Verdict	Torque Nm	Verdict	Comment
Supplementary information: Not fitting of non-detachable mains supply cords						

8	TABLE: mechanical resistance to shock and impact	P
Test part	Test condition	Test result
Enclosure	Static test: 30N, hard rod of Φ12mm,	No hazard
Enclosure	Impact test: 500g±25g, 50mm	No hazard

9.3	TABLE: flammability of materials (IEC 60695-11-10)		N
	Material tested .....:	Certificated materials	--
	Generic name .....:		--
	Material manufacturer .....:		--
	Type designation .....:		--
	Colour .....:		--
	Conditioning details .....:		--
	Thickness (mm) .....:	1 - 2 - 3 -	--
	Duration of flaming after first application (s) .....:	1 - 2 - 3 -	--
	Duration of flaming plus glowing after second application (s) .....:	1 - 2 - 3 -	--

Appendix tables

	Specimen burns to holding clamp (Yes/No) .....:	1 - 2 - 3 -	--
	Cotton ignited (Yes/No) .....:	1 - 2 - 3 -	--
Supplementary information: PCB and plastic enclosure have through UL authentication. And the flammability classification are V-0.			

9.4	TABLE: Limited-energy circuit					N
circuit / location	Open circuit voltage (V)	Maximum current (A)	Maximum available power (VA)	Overload protection (VA)	Limited current (Yes/No)	Comments
Supplementary information:						

10	TABLE: temperature tests					P
	Voltage (V) .....:	AC220V				--
	Frequency (Hz) .....:					--
	Duration (h, min) .....:	4 h				--
	Ambient temperature Ta (°C) .....:	See below				--
Part /location	Measured temperature Tm (°C)	Corrected maximum temperature(°C)	Maximum allowed temperature (°C)	Result	Comments	
connector	43	58.7	85	P	--	
Inside wire	38.1	53.8	105	P	--	
Enclosure	29.6	45.3	65	P	--	
Enclosure	29.3	45	65	P	--	
Ambient	24.3	40	--	--	--	
Supplementary information:						

10.5	TABLE: ball-pressure tests for thermoplastics		P
	Limited impression diameter (mm)	≤2 mm	--

Appendix tables

Part	Test temperature (°C)	Impression diameter (mm)
Enclosure	75°C	1.2
PCB	125°C	1.1

11	TABLE: protection against hazards from fluids							P
location	cleaning	spillage	overflow	equipment plus liquid	working voltage (V)	test voltage (V)	result	comments
	Enclosure	/	/		AC220V	500V	Pass	

11.7.2	TABLE: leakage and rupture at high pressure					N
Part	Maximum permissible working pressure (pa)	Factor	Test pressure (pa)	Leakage test	Burst test	Comments

11.7.3	TABLE: leakage from low-pressure parts		N
Part	Test pressure(Pa)	Result	Comments

12.2.1	TABLE: ionizing radiation		N
location	radiation (Sv/h)	result	comments

12.5.1	TABLE: sound level measurements	N
location	value (dBA)	calculated maximum sound pressure level

12.5.2	TABLE: ultrasonic pressure measurements		N
location	value (dB)	frequency (kHz)	result

13.2.2	TABLE: batteries tests		N
	Battery load and charging circuit diagram .....:	No battery used	--
	Battery type .....:		--

Appendix tables

	Battery manufacturer ..... :		--
	Battery model ..... :		--
	Battery catalogue No. ..... :		--
	Battery ratings ..... :		--
	Reverse polarity installment test		--

Component	Result, open circuit	Result, short circuit

14.1	TABLE: components	P

Object/part No.	Manufacturer/ trademark	Type/ model	Technical data	Standard	Mark(s) of conformity[1])
Enclosure	Various	Various	Thickness: Min. 1.2mm	--	--
Internal wire	Various	1015	26-18AWG, 105°C	UL758 UL61010-1	Tested with appliance & UL
connector	Various	DB9	ABS	UL61010-1	Tested with appliance

[1]) an asterisk indicates a mark which assures the agreed level of surveillance

14.2.1	TABLE: motor temperatures measurements		N
	Voltage (V) ..... :		--
	Frequency (Hz) ..... :		--
	Duration (h, min) ..... :		--
	Ambient temperature Ta (℃) ..... :		--

Motor No. and location	Insulation class	Measured temperature Tm (℃)	corrected maximum temperature Tm- Ta+ 40 (℃)	maximum allowed temperature (℃)	result

14.3	TABLE: overtemperature protection devices		N
component	type	result	comments

Appendix tables

Note: Type: self-resetting SR, non-self-resetting NSR, non-resetting NR			

14.6	TABLE: Short circuit (for Mains transformer)		Form A.39	N
	Mains transformers tested outside equipment	Approved Adaptor		--
4.4.2.7.2	Short circuit			--
	Type ..... :			--
	Manufacturer ..... :			--
	Test in equipment			N
	Test on bench			N
	Temperature protection class of the lowest RATED winding (class or maximum RATED temperature) .:			--
	Winding identification ..... :			--
	Type of protector for winding ..... :			--
	Elapsed time ..... :			--
	Winding temperature, primary (°C) ..... :			N
	Winding temperature, secondary (°C) ..... :			N
	Tissue paper / cheesecloth OK?			N
	Voltage test, primary to secondary (V) ..... :			N
	Voltage test, primary to core (V) ..... :			--

Appendix tables

14.6	TABLE: Overload tests (for Mains transformer)	Form A.40	N
	Mains transformers tested outside equipment	Approved Adaptor	
	Type ..... :		--
	Manufacturer ..... :		--
	Test in equipment		N
	Test on bench		N
	Temperature protection class of the lowest RATED winding (class or maximum RATED temperature) .:		--
	Winding identification ..... :		--
	Type of protector for winding ..... :		--
	Elapsed time ..... :		--
	Winding temperature, primary (°C) ..... :		N
	Winding temperature, secondary (°C) ..... :		N
	Tissue paper / cheesecloth OK ?		N
	Voltage test, primary to secondary (V) ..... :		N
	Voltage test, primary to core (V) ..... :		--

Product Photos

Fig. 1

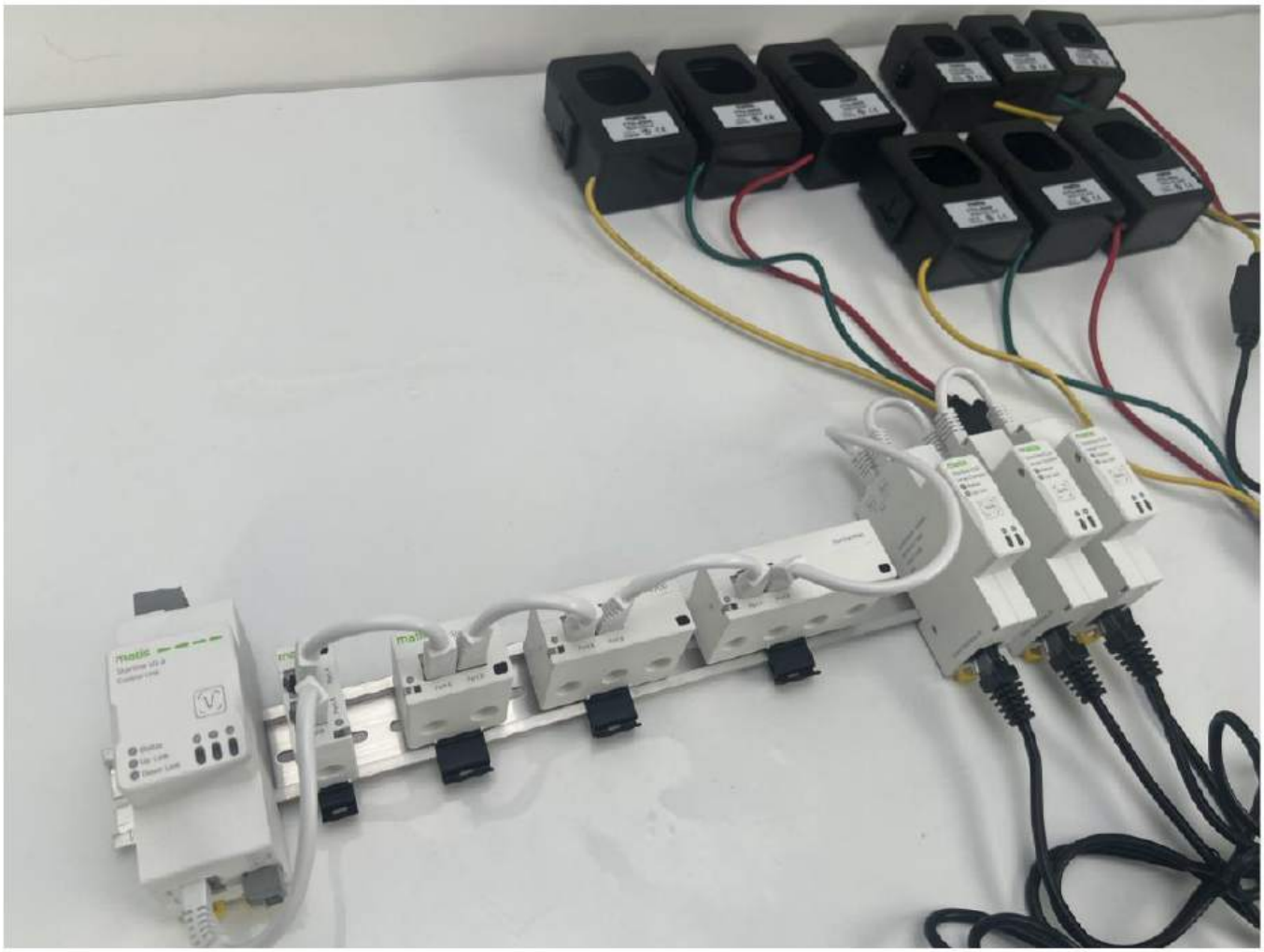
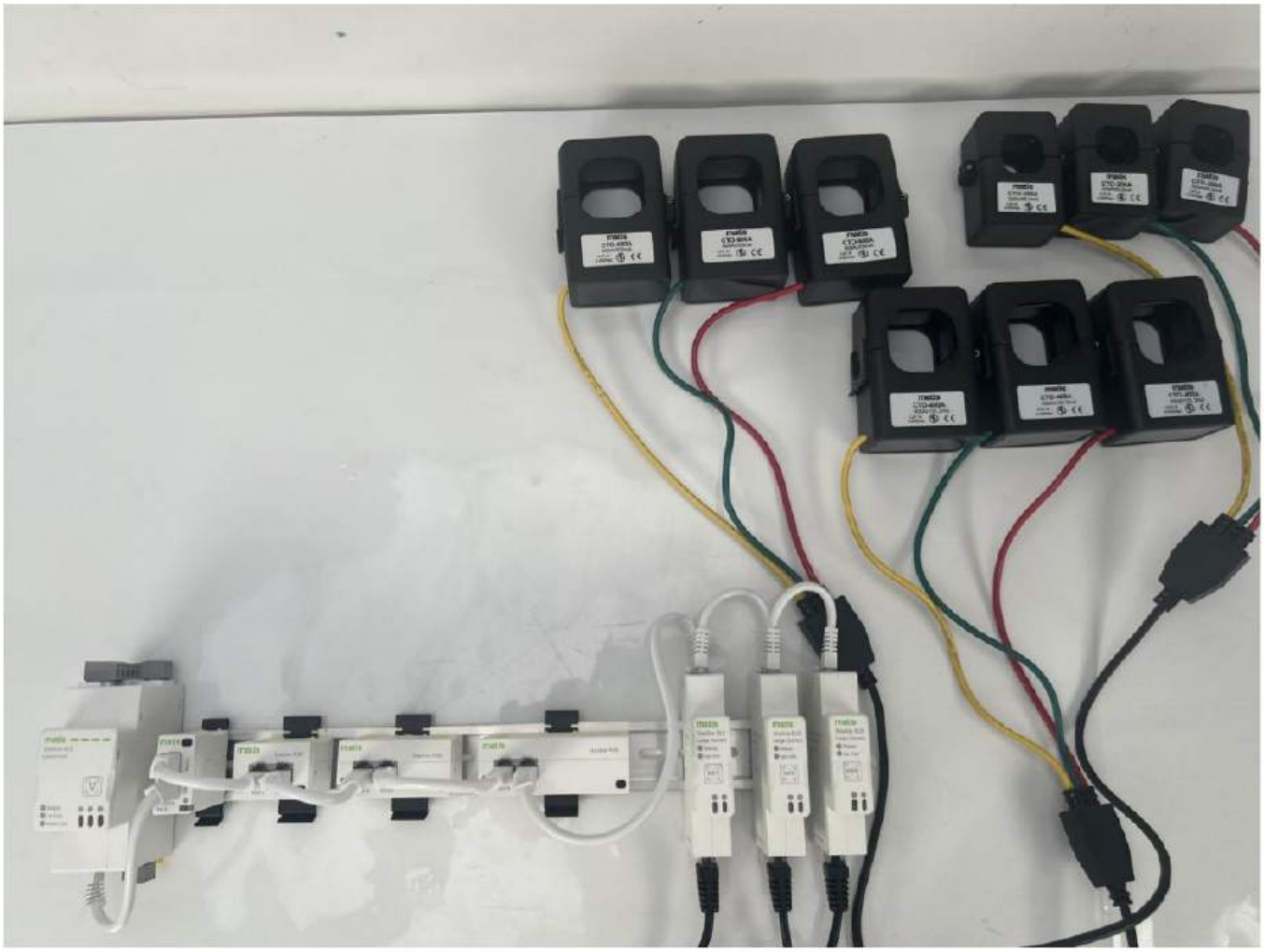


Fig. 2



---------- END OF REPORT ----------

BST A RELIABLE TESTING FOR TRUST
GLOBAL TESTING AND CERTIFICATION PRECISION SERVICE CLOUD FACTORY

Certificate of Compliance

Certificate No.	:	**XDAK223250958071412AC**
Applicant	:	**Shanghai Matis Electric Co.Ltd Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306**
Manufacturer	:	**Shanghai Matis Electric Co.Ltd Room318-320, No.83,West Huanghu Road, Pudong, Shanghai, China 201306**
Product Name	:	**Multi Circuit Power Monitoring System**
Trade Name	:	**Matis**
Main Test Model	:	**Starline -V10 + Starline- M10/20/30/40+ Starline-E10/E11/E31+ CTO100/CTO/200/CTO400/CTO600**
Additional Model	:	
Test Standard	:	**EN 61010-1:2010+A1:2019**
As shown in the Test Report No.	:	**XDAK223250958071412AR**

The EUT described above has been tested by us with the listed standards and found in compliance with the council LVD directive 2014/35/EU. It is possible to use CE marking to demonstrate the compliance with this LVD Directive.
The certificate applies to the tested sample above mentioned only and shall not imply an assessment of the whole production

CE

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