ELEKTROTECHNICKÝ ZKUŠEBNÍ ÚSTAV, s.p.
Pod Lisem 129

171 02 Praha 8 - Troja

Počet stran:1
Počet příloh/Počet stran příloh:1/62
Zn.:Še

Číslo protokolu: 202084-01/01

Datum vydání: 27. 11. 2012

PROTOKOL O ZKOUŠCE

Výrobek:	Kompaktní monitor fáze
Typ:	MEg70
Jmenovité hodnoty:	Napájení 12 V DC, 45 mA Měření: 230V, 50Hz, CAT IV, proudy 30 až 1000A, bezpečnostní třída II
Výrobní číslo:	00183
Výrobce:	MEgA - Měřící Energetické Aparáty, a. s., , 664 31 Česká 390, Česká republika
Výrobní místo:	MEgA - Měřící Energetické Aparáty, a. s.
Číselník výrobků EZÚ:	086006
Objednavatel:	MEgA - Měřící Energetické Aparáty, a. s., Česká 390, 664 31 Česká, Česká republika
Počet zkoušených vzorků:	1 + 1
Vzorky předloženy dne:	29.3.2012 a 14.11.2012
Místo provedení zkoušek:	Elektrotechnický zkušební ústav, s.p.
Zkoušky prováděny v době od	14.5.2012 **do** 27.11.2012
Jiné údaje:	---
Zkušební předpis:	ČSN EN 61010-1:2003

Výsledky zkoušek uvedené v protokolu se týkají pouze zkoušeného předmětu. Hodnoty v tomto protokolu jsou měřeny s přesností předepsanou ve zkušebním předpisu. Veškeré použité měřicí přístroje jsou řádně navázány.

Zpracoval: Stanislav Šeda

ZKUŠEBNÍ LABORATOŘ Elektrotechnický zkušební ústav, s.p. 10

Schválil: František Nekola
vedoucí zkušební laboratoře

Tel.: 266104111 Fax: 284680070 E-mail: testing@ezu.cz
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Test Report issued under the responsibility of:

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

Report Reference No. ..... :	202084-01/01
Date of issue ..... :	27.11. 2012
Total number of pages ..... :	62
CB Testing Laboratory ..... :	Electrotechnical Testing Institute
Address ..... :	Pod Lisem 129, 171 02 Praha 8 – Troja, Czech Republic
Applicant's name ..... :	MEgA –Měřicí Energetické Aparáty, a.s.
Address ..... :	664 31 Česká 390, Czech Republic
Test specification:	
Standard ..... :	ČSN EN 61010-1:2003
Test procedure ..... :	Local certification
Non-standard test method ..... :	N/A
Test Report Form No. ..... :	IEC61010_1E
TRF Originator ..... :	VDE Testing and Certification Institute
Master TRF ..... :	Dated 2008-06

This report is not valid as a CB Test Report unless signed by an approved CB Testing Laboratory and appended to a CB Test Certificate issued by an NCB in accordance with IECEE 02.

Test item description ..... :	Compact monitor
Trade Mark ..... :	MEgA
Manufacturer ..... :	MEgA –Měřicí Energetické Aparáty, a.s.
Model/Type reference ..... :	**Meg70**
Ratings ..... :	Supply: 12 V DC, 45 mA ; Measuring: 230V,50 Hz, CAT IV, Current 30, 100, 300 or 1000A according used current sensor, Safety class II

Testing procedure and testing location:	
☒ **CB Testing Laboratory**:	Electrotechnical Testing Institute
Testing location/ address ..... :	Pod Lisem 129, 171 02 Praha 8 – Troja, Czech republic
☒ **Associated CB Laboratory:**	Electrotechnical Testing Institute
Testing location/ address ..... :	Pod Lisem 129, 171 02 Praha 8 – Troja, Czech republic
Tested by (name + signature)..... :	Stanislav Šeda
Approved by (+ signature)..... :	František Nekola
☐ Testing procedure: TMP	
Tested by (name + signature)..... :	
Approved by (+ signature)..... :	
Testing location/ address ..... :	
☐ Testing procedure: WMT	
Tested by (name + signature)..... :	
Witnessed by (+ signature)..... :	
Approved by (+ signature)..... :	
Testing location/ address ..... :	
☐ Testing procedure: SMT	
Tested by (name + signature)..... :	
Approved by (+ signature)..... :	
Supervised by (+ signature)..... :	
Testing location/ address ..... :	
☐ Testing procedure: RMT	
Tested by (name + signature)..... :	
Approved by (+ signature)..... :	
Supervised by (+ signature)..... :	
Testing location/ address ..... :	

Summary of testing:	
Tests performed (name of test and test clause):	**Testing location:**
All relevant tests according Cl. 4 to Cl. 16 were carried out.	Electrotechnical Testing Institute Pod Lisem 129, 171 02 Praha 8 – Troja, Czech Republic

Summary of compliance with National Differences:

N/A

Copy of marking plate:

Test item particulars ..... :	
Type of item tested ..... :	Measurement
Description of equipment function..... :	For measuring voltage, current, powers and energies on one phase
Measurement (installation) category..... :	CAT IV
Pollution degree..... :	2
Protection class ..... :	II
Environmental rating..... :	extended (specify): - 25°C to + 60 °C
Equipment mobility ..... :	fixed
Connection to mains supply ..... :	DC supply
Operating conditions..... :	continuous
Overall size of the equipment (W x D x H) ..... :	97,5 x 44 x 50,5 mm
Mass of the equipment (kg) ..... :	0,130
Marked degree of protection to IEC 60529..... :	IP 20

Possible test case verdicts:

- test case does not apply to the test object ..... : 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 ..... : 23.4.2012

Date (s) of performance of tests ..... : 14.5.2012 – 27.11.2012

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.

General product information:

Is designed to measure voltage, current, powers and energy of one phase.

Compact monitor has this functions:

- on line measuring
- record time histories of measured values
- evaluation of extreme measured values
- evaluation of current daily diagrams
- measuring electricity in six registers

	TABLE: 1 - Test Report Index Page	
Document No.	Documents included / attached to this report (description)	Page Numbers
TABLE 1	This page	1
TABLE 2	List of test equipment used for measurements	1
TABLE 3	List of safety relevant components	1

TABLE: 2 - Test equipment list

Item	Type	Equipment No.	Calibration date		Comments
			Last[1]	Due	
	Dig. Multimeter FLUKE 87	91-5349	2/11	2/13	
	Dig. Multimeter FLUKE 87/III	20995	4/12	4/14	
	Dig. Multimeter FLUKE 87/III	20955	4/12	4/14	
	Thermometer GTH 1160	19646	5/12	5/14	
	Probe to GTH 1160	19654	5/12	5/14	
	Dattenlogger ALMEMO 3290	00-6248	4/12	4/14	
	High voltage tester WIP 61	80-4265	9/11	9/13	
	Stop watch PRISMA 200	551716	10/12	10/14	
	Test finger	22298	10/10	10/20	
	Digital slide caliper Mitutoyo CD-15CPX	551039	9/11	9/13	
	Dial gauge ČZ	1782	12/11	12/13	
	Humidity chamber VK	N 700461	9/11	9/13	
	Temperature chamber WSU 100	83-4540	10/11	10/13	
	Leakage current probe	N 700053	7/12	7/13	

1) or interval between calibrations.

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Clause	Requirement — Test		Result — Remark			Verdict
	TABLE: 3 - List of components and circuits relied on for safety					P
Unique component reference or location	Application/function	Manufacturer trademark (NOTE 1)	Type / model	Technical data (NOTE 2)	Mark(s) of conformity evidence of acceptance (NOTE 3 and 4)	
Resistors for protective impedance	Protective impedance	HITANO ENTERPRISE Corp.	MFR 100S	560 kΩ/500V/1 W	Tested with equipment	
Plastic material for cover	Protection against el. shock	E. Jordan Brookers	Noryl 30%GF	Flammability class V-0		
Material for PCB	Mounting of components	ISOLA GmbH	Duraver-E-Cu quality 104 ML	Flammability class V-0	UL E 416 25	
Terminals (SELV circuits)	Connecting supply and output RS 485	TME Czech Republic	TB-5.0-P-2P-SPR	300V/8A/up to 0,8 mm^2	Tested with equipment (SELV circuits only)	
Rigid socket	Connecting 230V	Multi-Contact	XEF-1RR	1000V/24A/CAT IV	UL	
Current sensor		MEgA	AMOS M	30 – 1000 A	EZU No.1100522	

Note → 1 List all different manufacturers of the above components 4 → asterisk indicates mark assuring agreed level of surveillance
→ 2 May include electrical, mechanical values
→ 3 List licence no, standard or method of acceptance

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Clause	Requirement — Test	Result — Remark	Verdict
4.4	**TESTING IN SINGLE FAULT CONDITIONS**		
4.4.1	Fault tests	(see Form A.1 and A.2)	P
4.4.2	SINGLE FAULT CONDITIONS not covered by 4.4.2.1 to 4.4.2.12	(see Form A.1 and A.2)	N
	Specific faults:		
4.4.2.1	PROTECTIVE IMPEDANCE		P
4.4.2.2	Protective conductor	(Class II)	N
4.4.2.3	Equipment or parts for short-term or intermittent operation		N
4.4.2.4	Motors		N
4.4.2.5	Capacitors		N
4.4.2.6	Mains transformers		N
4.4.2.7	Outputs		N
4.4.2.8	Equipment for more than one supply		N
4.4.2.9	Cooling		N
4.4.2.10	Heating devices		N
4.4.2.11	Insulation between circuits and parts		N
4.4.2.12	Interlocks		N

5	**MARKING AND DOCUMENTATION**		
5.1.1	General		P
	Required equipment markings are:		—
	visible:		
	From the exterior; or		P
	After removing a cover; or		N
	Opening a door		N
	After removal from a rack or panel		N
	Not put on parts which can be removed by an OPERATOR		P
	Letter symbols (IEC 60027) used		P
	Graphic symbols (IEC 61010-1: Table 1) used		P
5.1.2	Identification		
	Equipment is identified by:		—
	a) Manufacturer's or supplier's name or trademark	**MEgA**	P
	b) Model number, name or other means	**Meg70**	P
	Manufacturing location identified		N
5.1.3	Mains supply		
	Equipment is marked as follows:		—
	a) Nature of supply:	Is used symbol No.1	—

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Clause	Requirement — Test	Result — Remark	Verdict
	1) a.c. RATED mains frequency or range of frequencies ..... :	DC supply is used	N
	2) d.c. with symbol 1	Is used symbol: ⎓	P
	b) RATED supply voltage(s) or range ..... :	**12 V**	P
	c) Max. RATED power (W or VA)or input current .... :	**45 mA**	P
	The measured value not more than 110 %	(see Form A.3)	P
	If more than one voltage range:		—
	Separate values marked; or		N
	Values differ by less than 20 %	(see Form A.3)	N
	d) OPERATOR-set for different RATED supply voltages:		—
	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:		—
	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:		—
	The maximum RATED current or power; or		N
	Symbol 14 with full details in the documentation		N
5.1.4	Fuses	Are not used.	
	OPERATOR replaceable fuse marking (see also 5.4.5) ..... :		N
5.1.5	TERMINALS, connections and operating devices		P
	Where necessary for safety, indication of purpose of TERMINALS, connectors, controls and indicators marked		P
	If insufficient space, symbol 14 used		P
5.1.5.1	TERMINALS		
	Mains supply TERMINALS identified	Are not used.	N
	Other TERMINAL marking ..... :		P
	a) FUNCTIONAL EARTH TERMINALS (symbol 5 used)		N
	b) PROTECTIVE CONDUCTOR TERMINALS:		
	Symbol 6 is placed close to or on the TERMINAL; OR	(Class II)	N
	Part of appliance inlet		N

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Clause	Requirement — Test	Result — Remark	Verdict
	c) TERMINALS of measuring and control circuits (symbol 7 used)		N
	d) HAZARDOUS LIVE TERMINALS supplied from the interior		N
	Standard MAINS socket outlet; or		N
	RATINGS marked; or		N
	Symbol 14 used		N
	e) ACCESSIBLE FUNCTIONAL EARTH TERMINALS:		
	Self-evident; or		N
	Indication (symbol 8 acceptable)		N
5.1.5.2	Measuring circuit TERMINALS		
	Unless clear indication that below the limits of 50 V a.c. or 120 V d.c. to earth:		N
	Required markings are adjacent to TERMINALS; OR		N
	If insufficient space:		—
	On the RATING plate or scale plate; or		N
	TERMINAL is marked with symbol 14		N
	a) For CAT I measurement circuits:		—
	RATED voltage ..... :	---	N
	Current marked if applicable..... :	---	N
	Symbol 14 marked		N
	b) For CAT II, CAT III or CAT IV measurement circuits:		—
	RATED voltage ..... :	**U_n=230V~**	P
	Current marked if applicable..... :		N
	Appropriate measurement category marked (CAT II, CAT III or CAT IV); or..... :	**CAT IV/300V~**	P
	No marking required for:		
	TERMINALS other than those permanently connected and not ACCESSIBLE with appropriate information in installation manual (see 5.4.3)		N
	For specific connection to other equipment TERMINALS only, and means for identifying provided		N
5.1.6	Switches and circuit breakers		N
	If disconnecting device, on or off position marked		N
5.1.7	Equipment protected by DOUBLE INSULATION or REINFORCED INSULATION		
	Protected throughout (symbol 11 used)	Symbol is used.	P
	Only partially protected (symbol 11 not used)		N
5.1.8	Field-wiring TERMINAL boxes		
	If TERMINAL or ENCLOSURE exceeds 60 °C:	(See Form A.20A)	N

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Clause	Requirement — Test	Result — Remark	Verdict
	Cable temperature RATING marked ..... :	---	N
	Marking visible before and during connection or beside TERMINAL		N
5.2	Warning markings		
	Visible when ready for NORMAL USE		N
	Are near or on applicable parts		N
	Symbols and text correct dimensions and colour		N
	If necessary marked with symbol 14		P
	Statement to isolate or disconnect		N
5.3	Durability of markings		
	The required markings remain clear and legible in NORMAL USE	(see Form A.4)	P
5.4	Documentation		
5.4.1	General		P
	Equipment is accompanied by documentation which includes:		—
	a) Intended use		P
	b) Technical specification		P
	c) Instructions for use		P
	d) Name and address of manufacturer or supplier		P
	e) Information specified in 5.4.2 to 5.4.5		P
	f) If marking of TERMINALS required, definition of measurement category		P
	g) If CAT 1:		
	Warning not to be used in CAT II, CAT III or CAT IV measurement circuits		N
	RATINGS including RATED transient overvoltages ..... :	---	N
	Warning statements and a clear explanation of warning symbols:		—
	Provided in the documentation; or		N
	Information is marked on the equipment		N
5.4.2	Equipment RATINGS		
	Documentation includes:		—
	a) Supply voltage or voltage range ..... :	9V to 16 V (page 5)	P
	Frequency or frequency range ..... :	DC	N
	Power or current RATING ..... :	35-45 mA (page 5)	P
	b) Description of all input and output connections		P
	RATING of insulation of external circuits, when such circuits are nowhere ACCESSIBLE		N

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Clause	Requirement — Test	Result — Remark	Verdict
	c) Statement of the range of environmental conditions		P
	d) Degree of protection (IEC 60529)	IP 20(page 5)	P
5.4.3	Equipment installation	(page 9)	
	Documentation includes instructions for:		—
	a) Assembly, location and mounting requirements		P
	b) Protective earthing		N
	c) Connections to supply		P
	d) PERMANENTLY CONNECTED EQUIPMENT:		
	1) Supply wiring requirements		N
	2) If external switch or circuit-breaker, requirements and location recommendation		N
	e) Ventilation requirements		N
	f) Special services (e. g. air, cooling liquid)		N
	g) Maximum sound power level		N
	h) Instructions about sound pressure		N
	i) Permanently connected measuring TERMINALS:		
	Measurement category		P
	RATED maximum WORKING VOLTAGE or current		P
5.4.4	Equipment operation		
	Instructions for use include:		—
	a) Identification of operating controls	Without controls	N
	b) Positioning for disconnection		N
	c) Interconnection		P
	d) Specification of intermittent operation limits		N
	e) Explanation of symbols used		N
	f) Replacement of consumable materials		N
	g) Cleaning and decontamination (see 11.2)		N
	h) Listing of any poisonous or injurious gases and quantities		N
	i) Risk-reduction procedures relating to flammable liquids		N
	A statement about protection impairment if used in a manner not specified by the manufacturer	(page 11)	P
5.4.5	Equipment maintenance		
	Instructions for RESPONSIBLE BODY include:		—
	Sufficient preventive maintenance and inspection information		P
	Replacement of hoses or parts containing liquids, etc.		N

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Clause	Requirement — Test	Result — Remark	Verdict
	Specific battery type of user replaceable batteries	(page 5)	P
	Any manufacturer specified parts		N
	RATING and characteristics of fuses		N
6	**PROTECTION AGAINST ELECTRIC SHOCK**	(see Form A.5)	
6.1	General		P
6.1.1	Requirements		—
	ACCESSIBLE parts not HAZADOUS LIVE in NORMAL CONDITION and SINGLE FAULT CONDITION		P
	Conformity is checked by the determination of 6.2 and 6.3 followed by the tests of 6.4 to 6.11		P
6.1.2	Exceptions	For rigid socket Ø 4 mm.	P
	Capacitance test	(see Forms A.6 and A.7)	N
	Parts not HAZARDOUS LIVE 10 s after interruption of supply		N
6.2	Determination of ACCESSIBLE parts		
6.2.1	General examination	(see Form A.6)	P
6.2.2	Openings above parts that are HAZARDOUS LIVE	Without openings.	N
6.2.3	Openings for pre-set controls		N
6.3	Permissible limits for ACCESSIBLE parts		P
6.3.1	Values in NORMAL CONDITION	(see Form A.7)	P
6.3.2	Values in SINGLE FAULT CONDITION	(see Form A.8)	P
6.4	Protection in NORMAL CONDITION (see 6.2, 6.3.1, 6.7, 6.8 and 8.1)		
	a) BASIC INSULATION (see annex D)		N
	b) ENCLOSURES and BARRIERS		P
	c) Impedance	(Protective impedance)	P
6.5	Protection in SINGLE FAULT CONDITION		
	Additional protection is provided by:		—
	One or more of 6.5.1 to 6.5.3; or	(6.5.3)	P
	Automatic disconnection of the supply (6.5.4)		N
6.5.1	Protective BONDING	Not used – class II.	
	ACCESSIBLE conductive parts:		—
	Separated by DOUBLE INSULATION or REINFORCED INSULATION; or		N
	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
6.5.1.1	Integrity of PROTECTIVE BONDING		N

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Clause	Requirement — Test	Result — Remark	Verdict
	a) PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both; and withstands thermal and dynamic stresses		N
	b) Soldered connections:		
	Independently secured against loosening		N
	Not used for other purposes		N
	Screw connections are secured		N
	c) PROTECTIVE BONDING not interrupted		
	d) Any moveable connection specifically designed, and meets 6.5.1.3		N
	e) No external metal braid of cables used		N
	f) If MAINS supply passes through:		N
	Means provided for passing protective conductor;		N
	Impedance meets 6.5.1.3.		N
	g) 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
	h) TERMINAL suitable, and meets 6.5.1.2		N
6.5.1.2	PROTECTIVE CONDUCTOR TERMINAL	(Class II)	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:		N
	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 Form A.9)	N
	f) If plug-in, makes first and breaks last		N
	g) If also used for other bonding purposes, protective conductor:		N
	Applied first;		N
	Secured independently;		N
	Unlikely to be removed by servicing; or		N

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Clause	Requirement — Test	Result — Remark	Verdict
	Warning marking requires replacement of protective conductor		N
	h) PROTECTIVE CONDUCTOR of measuring circuit:		N
	1) Current RATING equivalent to measuring circuit TERMINAL;		N
	2) PROTECTIVE BONDING:		N
	Not interrupted; or		N
	Indirect bonding used (see 6.5.1.5)		N
	i) FUNCTIONAL EARTH TERMINALS allow independent connection		N
	j) If a binding screw used for PROTECTIVE CONDUCTOR TERMINAL:		N
	Suitable size for bond wire		N
	Not smaller than M 4 (No. 6)		N
	At least 3 turns of screw engaged		N
	Contact pressure not capable of reduction by deformation of materials		N
	Passes tightening torque test	(see Form A.9)	N
6.5.1.3	Impedance of PROTECTIVE BONDING of plug-connected equipment	(see Form A.10)	N
6.5.1.4	Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT	(see Form A.10)	N
6.5.1.5	Indirect bonding for measuring and test equipment	(see Form A.11)	N
6.5.2	DOUBLE INSULATION and REINFORCED INSULATION	(see 6.7, 6.8 and 6.9.2)	P
6.5.3	PROTECTIVE IMPEDANCE		P
	a) HIGH-INTEGRITY single component used (s. 14.6); or		N
	b) A combination of components used; or	Three resistors in serie.	P
	c) A combination of BASIC INSULATION and current- or voltage-limiting device used		N
	Components, wires and connections are RATED as required	(see Table 3 and Form A.12)	P
6.5.4	Automatic disconnection of the supply		
	If used, it meets :		—
	a) Supplied with the equipment; or		N
	Specified by installation instruction		N
	b) RATED disconnecting time within limit specified		N
	c) RATED for maximum RATED LOAD		N
6.6	Connections to external circuits		
6.6.1	General		P

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Clause	Requirement — Test	Result — Remark	Verdict
	Connections do not cause ACCESSIBLE parts of the following to become HAZARDOUS LIVE in NORMAL CONDITION or SINGLE FAULT CONDITION:		—
	a) The external circuits		P
	b) The equipment		P
	Separation of circuits provided; or		N
	Short circuit of separation does not cause a Hazard		N
	Instructions or markings include:		—
	1) RATED conditions for TERMINAL		N
	2) 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 Form A.7)	N
	High voltage TERMINALS energized from the interior are:		—
	Not ACCESSIBLE if connected; or		N
	When unmated HAZARDOUS LIVE TERMINALS not ACCESSIBLE ; or		N
	marked with symbol 12		N
6.6.3	Circuits with TERMINALS which are HAZARDOUS LIVE		
	These circuits are:		—
	Not connected to ACCESSIBLE conductive parts; or		P
	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		
	a) No risk of accidental contact because:		N
	Located or shielded		N
	Self-evident or marked whether or not connected to ACCESSIBLE conductive parts		N
	b) ACCESSIBLE TERMINALS will not work loose		N
6.7	CLEARANCES and CREEPAGE DISTANCES	(See Form A.5 and A.13)	P
6.7.1.2	CTI requirements	(See Form A.5)	P
	CTI tests performed		N
6.8	Procedure for dielectric strength tests	(See Form A.5 and A.14)	P
6.9	Constructional requirements for protection against electric shock		
6.9.1	General		
	If a failure could cause a HAZARD:		—

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict
	a) Security of wiring connections	Wires are not stressed.	N
	b) Screws securing removable covers		N
	c) Accidental loosening		P
	Material not to be used for safety relevant insulation:		—
	1) Easily damaged materials not used	This materials are not used.	P
	2) Non-impregnated hydroscopic materials not used		P
6.9.2	ENCLOSURES of equipment with DOUBLE INSULATION or REINFORCED INSULATION		
	ENCLOSURE surrounds all metal parts except for small metal parts which are separated		P
	ENCLOSURES or parts made of insulating material		N
	Protection for metal ENCLOSURES or parts by:		—
	a) An insulating coating or BARRIER on the inside; or		N
	b) CLEARANCES and CREEPAGE DISTANCES cannot be reduced by loosening of parts or wires		N
6.9.3	Over-range indication		
	Unambiguous		N
6.10	Connection to MAINS supply source and connections between parts of equipment		
6.10.1	MAINS supply cords	Supply cord is not used.	N
	a) RATED for maximum equipment current (see 5.1.3c)		N
	Cable complies with IEC 60227 or IEC 60245		N
	b) Heat-resistant if likely to contact hot parts		N
	c) Temperature RATING (cord and inlet)..... :	---	N
	d) Green/yellow used only for connection to PROTECTIVE CONDUCTOR TERMINALS		N
	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
	Non-detachable cord protection:		—
	a) Inlet or bushing smoothly rounded; or		N
	b) Insulated cord guard protruding >5D		N
	Protective earth conductor is the last to take the strain		N
	Cord anchorages:		N
	a) Cord is not clamped by direct pressure from a screw		N

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Clause	Requirement — Test	Result — Remark	Verdict
	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) Compression bushing:		
	1) Clamps all types and sizes of MAINS cords; and		N
	2) Is suitable:		—
	For connection to TERMINALS provided; or		N
	It is designed for screened MAINS cord		N
	f) Cord replacement does not cause a HAZARD and method of strain relief is clear		N
	Push-pull test	(see Form A.15)	N
6.10.3	Plugs and connectors		
	a) MAINS supply plugs, connectors etc., conform with relevant specifications		N
	b) If equipment supplied at voltages below 6.3.2.a) or from a sole source:		N
	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
	c) Plug pins which receive a charge from an internal capacitor	(See Form A.7)	N
	d) Accessory MAINS socket outlets:		N
	1) Marking if accepts a standard MAINS plug (see 5.1.3e)		N
	2) Input has a protective earth conductor if outlet has earth TERMINAL contact		N
6.11	Disconnection from supply source	Note: ↓	
	Equipment is for monitoring in power distribution systems and can not have the disconnection device.		
6.11.1	General		N
	Disconnects all current carrying conductors		N
6.11.1.1	Exceptions		N
	a) Equipment supplied by low energy source; or		N
	b) Equipment connected to impedance protected supply; or		N
	c) Equipment constitutes an impedance protected load		N
6.11.2	Requirements according to type of equipment		N

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Clause	Requirement — Test	Result — Remark	Verdict
6.11.2.1	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:		—
	a) Switch or circuit-breaker to be included in building installation		N
	b) Location		N
	c) Marking		N
6.11.2.2	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
6.11.2.3	HAZARDS arising from function		N
	Emergency switch		N
	Emergency switch ≤ 1 m from the moving part		N
6.11.3	Disconnecting devices		N
	Electrically close to the supply		N
6.11.3.1	Switches and circuit-breakers		N
	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
	If has other contacts meets separation requirements of 6.6 and 6.7		N
6.11.3.2	Appliance couplers and plugs		N
	Where an appliance coupler or separable plug is used as the disconnecting device (see 6.11.2.2):		—
	Readily identifiable and easily reached by the OPERATOR		N
	Single-phase PORTABLE EQUIPMENT cord length not more than 3 m		N
	Protective earth conductor connected first and disconnected last		N

7	**PROTECTION AGAINST MECHANICAL HAZARDS**		
7.1	General	No mechanical hazards.	N
	Conformity is checked by 7.2 to 7.6		N

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Clause	Requirement — Test	Result — Remark	Verdict
7.2	Moving parts		N
	Moving parts not able to crush, etc. (see also 6.11.2.3)		N
	If OPERATOR access permitted:		—
	a) Access requires TOOL		N
	b) Statement about training		N
	c) Warning markings or symbol 14		N
7.3	Stability		N
	Marking of non-automatic means		N
	Conformity tests:	Not tested, equipment for fix mounting.	—
	a) 10° tilt test		N
	b) multi-directional force test		N
	c) downward force test		N
7.4	Provisions for lifting and carrying		
	Handles or grips withstand four times weight		N
	Equipment more than 18 kg :	< 18 kg	—
	Has means for lifting or carrying; or		N
	Directions in documentation		N
7.5	Wall mounting		N
	Mounting brackets withstand four times weight		N
7.6	Expelled parts		N
	Equipment contains or limits the energy		N
	Protection not removable without the aid of a TOOL		N

8	**MECHANICAL RESISTANCE TO SHOCK AND IMPACT**		
8.1	ENCLOSURE rigidity test		P
8.2	Drop test		P
	After the tests of 8.1 to 8.2:		—
	Voltage tests	(see Form A.14)	P
	Inspections:		—
	a) HAZARDOUS LIVE parts not accessible		P
	b) ENCLOSURE shows no cracks (hazard)		P
	c) CLEARANCES not less than their permitted values	(see Form A.13)	P
	d) BARRIERS not damaged or loosened		P
	e) No moving parts exposed, except permitted by 7.2		N
	f) No damage which could cause spread of fire		P

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Clause	Requirement — Test	Result — Remark	Verdict
9	**PROTECTION AGAINST THE SPREAD OF FIRE**		
	Conformity for each source of HAZARD or area of the equipment is checked by one of the following:	(See Form A.16)	—
	a) Fault test of 4.4; or	(See Forms A.1 and A.2)	P
	b) Application of 9.1 (eliminating or reducing the sources of ignition); or		P
	c) Application of 9.2 (containment of fire within the equipment)		N
9.1	Eliminating or reducing the sources of ignition within the equipment		
	a) 1) Limited-energy circuit (see 9.3); or		N
	2) BASIC INSULATION provided for parts of different potential; OR	(see Form A.5 and A.14)	N
	Bridging the insulation does not cause ignition	(see Form A.2)	N
	b) Surface temperature of liquids and parts (see 9.4.a)		N
	c) No ignition in circuits designed to produce heat	(see Form A.2)	N
9.2	Containment of the fire within the equipment, should it occur		
	a) Energizing of the equipment is controlled by an OPERATOR held switch		N
	b) Enclosure is conform with constructional requirements of 9.2.1; and		P
	Requirements of 9.4b) or c) are met		N
9.2.1	Constructional requirements		
	a) Insulated wires have flammability classification FV1 or better	(see Table: 3 or Form A.17)	P
	Connectors and insulating material have flammability classification FV2 or better	(see Table: 3 or Form A.17)	P
	b) The enclosure is constructed as follows :		
	1) Bottom constructed with:		—
	No openings; or	No openings.	P
	Extent as specified in figure 7; or		N
	Baffles as specified in figure 6; or		N
	Perforated as specified in Table 12; or		N
	Metal screen with a mesh		N
	2) Sides have no openings as specified in figure 7	No openings.	P
	3) Material of ENCLOSURE and any baffle or flame barrier is made of:		—
	Metal (except magnesium); or		N
	Non metallic materials have flammability classification FV1 or better	(see Table: 3 or Form A.17) flammability class V-0	P

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Clause	Requirement — Test	Result — Remark	Verdict
	4) ENCLOSURE and any baffle or flame barrier have adequate rigidity		P
9.3	Limited-energy circuit		
	a) Potential not more than 30 r.m.s. and 42.4 V peak, or 60 V dc	(see Form A.18)	N
	b) Current limited by one of following means:		
	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:		—
	Fuse or a non adjustable electromechanical device		N
9.4	Requirements for equipment containing or using flammable liquids		
	Flammable liquids contained in or specified for use with equipment do not cause spread of fire	Flammable liquids are not used.	N
	Risk is reduced to a tolerable level :	(see Form A.19)	—
	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
9.5	Overcurrent protection		
	Devices not in the protective conductor		N
	Fuses or single-pole circuit-breakers not fitted in neutral (multi-phase)		N
9.5.1	PERMANENTLY CONNECTED EQUIPMENT		
	Overcurrent device:		—
	Fitted within the equipment; or		N
	Specified in manufacturer's instructions		N
9.5.2	Other equipment		N
	Protection within the equipment		N

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 Form A.20A)	P
	Heated surfaces necessary for functional reasons exceeding specified values:		—
	Are recognizable as such by appearance or function; or		N

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Clause	Requirement — Test	Result — Remark	Verdict
	Are marked with symbol 13		N
	Guards are not removable without TOOL		N
10.2	Temperatures of windings		N
	Limits not exceeded in:	(see Form A.20B)	—
	NORMAL CONDITION		N
	SINGLE FAULT CONDITION		N
10.3	Other temperature measurements		P
	Following measurements conducted if applicable:	(see Form A.20A)	—
	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 Form A20)	P
10.5	Resistance to heat		P
10.5.1	Integrity of CLEARANCE and CREEPAGE DISTANCES	(See Form A.13)	P
10.5.2	Non-metallic ENCLOSURES	(See Forms A.21)	P
	After treatment:		—
	No HAZARDOUS LIVE parts ACCESSIBLE;		P
	Tests of 8.1 and 8.2	(See Form A.13)	P
	In case of doubt, tests of 6.8 (without humidity preconditioning)	(See Form A.14)	P
10.5.3	Insulating material		
	a) Parts supporting parts connected to MAINS supply		P
	b) TERMINALS carrying a current more than 0.5 A	< 0,5 A	N
	Examination of material data; or		N
	in case of doubt:		—
	1) Ball pressure test; or		N
	2) Vicat softening test of ISO 306		N

11	**PROTECTION AGAINST HAZARDS FROM FLUIDS**		
11.1	General		N
11.2	Cleaning	(See Form A.23)	N
11.3	Spillage	(See Form A.23)	N
11.4	Overflow	(See Form A.23)	N

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Clause	Requirement — Test	Result — Remark	Verdict
11.5	Battery electrolyte		N
	Battery electrolyte leakage presents no hazard		N
11.6	Specially protected equipment	(See Form A.23)	N
11.7	Fluid pressure and leakage		N
11.7.1	Maximum pressure ..... :	(See Form A.24)	N
	Maximum pressure of any part does not exceed P_{RATED}		N
11.7.2	Leakage and rupture at high pressure	(See Form A.24)	N
	Test to IEC 60335 (refrigeration only)		N
11.7.3	Leakage from low-pressure parts	(See Form A.24)	N
11.7.4	Overpressure safety device		N
	Does not operate in NORMAL USE		N
	Meets ISO 4126-1; and		N
	It is conform with:		—
	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
	g) 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
12.2	Equipment producing ionizing radiation		N
12.2.1	Ionizing radiation	(See Form A.25)	N
12.2.2	Accelerated electrons		N
12.3	Ultra-violet (UV) radiation (Conformity test under consideration)		
	No unintentional and HAZARDOUS escape of UV radiation		N
12.4	Micro-wave radiation		N
	Power density does not exceed 10 W/m^2 ..... :	---	N
12.5	Sonic and ultrasonic pressure		N
12.5.1	Sound level	(See Form A.26)	N
12.5.2	Ultrasonic pressure	(See Form A.26)	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		N
	Attached data/test reports demonstrate conformity		N
13.2	Explosion and implosion		N
13.2.1	Components		N
	Components liable to explode:		—
	Pressure release device provided; or		N
	Apparatus incorporates OPERATOR protection (see also 7.6)		N
	Pressure release device:		—
	Discharge without danger		N
	Cannot be obstructed		N
13.2.2	Batteries and battery charging		P
	If explosion or fire hazard could occur:		—
	Protection incorporated in the equipment; or		P
	Instructions specify batteries with built-in protection		N
	In case of wrong type of battery used:		—
	No HAZARD; or		N
	Warning by marking and within instructions		N
	Equipment with means to charge rechargeable batteries:		—
	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 Form A.27)	N
	Single component failure		N
	Polarity reversal test		N
13.2.3	Implosion of cathode ray tubes		N
	If maximum face dimensions > 160 mm..... :	---	—
	Intrinsically protected and correctly mounted; or		N
	ENCLOSURE provides protection:		N
	If non-intrinsically protected:		—
	Screen not removable without TOOL		N
	If glass screen, not in contact with surface of tube		N
13.2.4	Equipment RATED for high pressure (See 11.7)		N

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Clause	Requirement — Test	Result — Remark	Verdict
14	**COMPONENTS**		
14.1	General		P
	Where safety is involved, components meet relevant requirements	(see Table: 3)	P
14.2	Motors	Are not used.	
14.2.1	Motor temperatures		N
	Does not present a HAZARD when stopped or prevented form starting; or	(See Form A.20)	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	Are not used.	
	Devices operating in a SINGLE FAULT CONDITION	(See Form A.28)	N
	a) Reliable function is ensured		N
	b) RATED to interrupt maximum current and voltage		N
	c) Does not operate in NORMAL USE		N
14.4	Fuse holders		N
	No access to HAZARDOUS LIVE parts		N
14.5	Mains voltage selecting devices		N
	Accidental change not possible		N
14.6	HIGH INTEGRITY components		N
	Used in applicable positions (see Table 3)		N
	Conforms with IEC publications		N
	Single electronic device not used		N
14.7	Mains transformers tested outside equipment	(see Forms A.29 and A.30)	N
14.8	Printed circuit boards		P
	Data shows conformity with FV-1 of IEC 60707 or better; or		P
	Test shows conformity with FV-1 of IEC 60707 or better; or	See Form A.17	N
	Thin film flexible PCB with limited-energy circuit used		N
14.9	Circuits or components used as transient overvoltage limiting devices		N
	After test, no sign of overload or degradation		N
15	**PROTECTION BY INTERLOCKS**		
15.1	General		N

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Clause	Requirement — Test	Result — Remark	Verdict
	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	**TEST AND MEASUREMENT EQUIPMENT**		
16.1	Current measuring circuits	(see Form A.31)	N
16.2	Multifunction meters and similar equipment	(see Form A.32)	N
	No HAZARD from:		—
	RATED input voltage combinations		N
	Settings of functions		N
	Settings of range controls		N
ANNEX F	**ROUTINE TESTS**		
	Manufacturer's declaration		P

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Clause	Requirement — Test	Result — Remark	Verdict

4.4.2	**TABLE: Summary of SINGLE FAULT CONDITIONS**			**Form A.1**	P
Subclause	Title	Does not apply	Carried out	Comments	
4.4.2.1	PROTECTIVE IMPEDANCE		X		
4.4.2.2	Protective conductor	X		see Form A.8	
4.4.2.3	Equipment or parts for short-term or intermittent operation	X			
4.4.2.4	Motors	X			
4.4.2.5	Capacitors	X			
4.4.2.6	Mains transformers Attach drawing of MAINS Txs showing all protective devices (see Forms A.29 and A.30)	X			
4.4.2.7	Outputs	X			
4.4.2.8	Equipment for more than one supply	X			
4.4.2.9	Cooling – air holes closed – fans stopped – coolant stopped	 X X X			
4.4.2.10	Heating devices – timer overridden – temperature controller overridden – loss of cooling liquid – overfilled or empty or both	 X X X X			
4.4.2.11	Insulation between circuits and parts	X			
4.4.2.12	Interlocks	X			
List below all SINGLE FAULT CONDITIONS not covered by 4.4.2.1 to 4.4.2.12:					
Supplementary information: (see Form A.2 for details of tests)					

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

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Clause	Requirement — Test	Result — Remark	Verdict

4.4	TABLE: Testing in single FAULT CONDITION – Results			Form A.2	P
Test subclause	Fault No.	Fault description	Td 4.4.3 (NOTE)	How was test terminated Comments	Meets 4.4.4
4.4.2.1	1	Short circuit one resistor 560 kΩ in protective impedance.	10 min.	See page 35 form A.8	P

NOTE Td = Test duration in h:min:s
Record dielectric strength test on Form A.14 and temperature tests on Form A.20.
Record in the comments column for each test whether carried out during or after SINGLE FAULT CONDITION.

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM See table 2 – test equipment list

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Clause	Requirement — Test	Result — Remark	Verdict

5.1.3c)	**TABLE: Mains supply**		**Form A.3**	P
	Marked rating.....:	12	V	—
	Phase.....:		DC	—
	Frequency .....:	---	Hz	—
	Current .....:	45	mA	—
	Power .....:		W	—
	Power .....:		VA	—

Test	Voltage	Frequency	Current	Power in	Power in	Comments
No.	V	Hz	mA	W	VA	
1	9	DC	40,1	0,36	---	
2	10	DC	38,7	0,38	---	
3	12	DC	38,8	0,46	---	
4	14	DC	35,3	0,49	---	
5	16	DC	38,8	0,62	---	

Note: Measurements are only required for marked ratings.

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

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Clause	Requirement — Test	Result — Remark	Verdict

5.3	**TABLE: Durability of markings**	**Form A.4**	P

Marking method (see NOTE)	Agent
1) Self adhesive label	A Water
2)	B Isopropyl alcohol
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
Mains supply (5.1.3)	1
Fuses (5.1.4)	---
TERMINALS and operating devices (5.1.5.1)	---
Measuring circuit TERMINALS (5.1.5.2)	---
Switches and circuit breakers (5.1.6)	---
DOUBLE/REINFORCED equipment (5.1.7)	1
Field wiring TERMINAL boxes (5.1.8)	---
Warning marking (5.2)	1
Battery charging (13.2.2)	---

Method	Test agent	Remains legible	Label loose	Curled edges	Comments
		Verdict	Verdict	Verdict	
Friction 30 sec.	A	yes	no	no	
Friction 30 sec.	B	yes	no	no	

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

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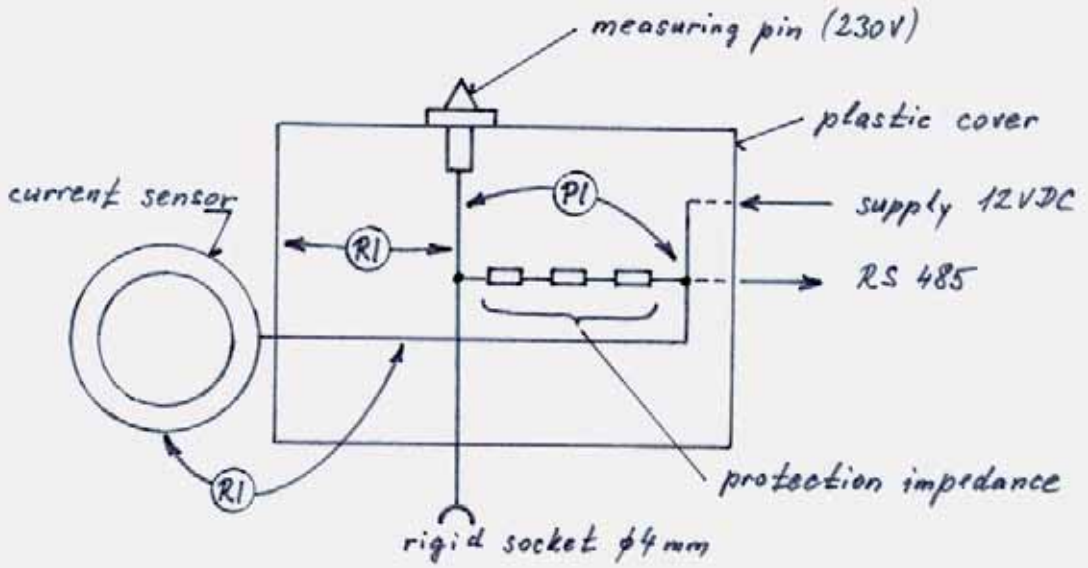
Clause	Requirement — Test	Result — Remark	Verdict
6	**TABLE: Protection against electric shock - Block diagram of system Form A.5**		P



Pollution degree.....: 2 | Measurement category (overvoltage category) ..: IV

Location or description	Insulation type (NOTE 1)	Maximum working voltage (NOTE 2)	CREEPAGE DISTANCE (NOTE 3) PWB mm	CTI	Other mm	CTI	CLEARANCE (NOTE 3) mm	Test voltage (NOTE 2) V	Comments
requirement	RI/PI	230	2,0	2,5	3,6	5,0	10,5	5312 rms	
Resistors in protective impedance	PI	230	---	---	---	14,1	14,1	----	Is not possible to tested
Live parts x cover	RI	230	---	---	---	>10,5	>10,5	5312 rms	Pass
Accessible rigid socket		Exception according 6.1.2 c)							

NOTE 1 – Type of insulation:
BI = BASIC INSULATION
DI = DOUBLE INSULATION
PI = PROTECTIVE IMPEDANCE
RI = Reinforced INSULATION
SI = Supplementary INSULATION

NOTE 2 - Types of voltage
Peak impulse test voltage (pulse)
r.m.s.
d.c.
peak

NOTE 3 - INSTALLATION CATEGORIES (OVERVOLTAGE CATEGORIES) or POLLUTION DEGREES which differ from these should be shown under "Comments".

Supplementary Information: For connection is used rigid socket Ø 4 mm, for use is not required tool. It is acceptable according Cl.6.1.2 c).

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

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Clause	Requirement — Test	Result — Remark	Verdict

6.2	**TABLE: List of ACCESSIBLE parts**	**Form A.6**	P
6.1.2	Exceptions		—
6.2	Determination of accessible parts		—

Item	Description	Determination method (NOTE 5)	Exception under 6.1.2 (NOTE 4)
6.1.2	Exception – rigid socket Ø 4,0 mm		6.1.2 c)
6.2	Plastic cover	Test finger	

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 of 6.4).
NOTE 4 – Capacitor test may be required (see Form A.7).
NOTE 5 – The determination methods are:
V = visual; R = rigid test finger; J = jointed test finger; P3 = pin 3 mm diameter; P4 = pin 4 mm diameter.

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6	**TABLE: Values in NORMAL CONDITION**	**Form A.7**	P
6.1.1	Exceptions	11.2 Cleaning and decontamination	—
6.3.1	Values in NORMAL CONDITION (see NOTE 1)	11.3 Spillage	—
6.6.2	Terminals for external circuit	11.4 Overflow	—
6.10.3	Plugs and connections		—

Item	Voltage			Current				Capacitance		10 s / 5 s test (NOTE)			Comments
(see Form A.6)	V r.m.s.	V peak	V d.c.	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.	µC	mJ	V	µC	mJ	
cover	≪ 33,0	≪ 46,7	---	A2	≪ 0,5	≪0,7	---						
Supply terminals	24mV	33,9mV	---	A2	12,3µA	17,4 µA	---						
RS 485	6,01	8,5	---	A2	0,79 µA	1,12 µA	---						
Disconnected N wire from terminal ⊥ (connected only phase on test pin):													
cover	≪ 33,0	≪ 46,7	---	A2	≪ 0,5	≪0,7	---						
Supply terminals	216	305,5	---	A2	170µA	240,4 µA	---						
RS 485	36,2	51,2	---	A2	4,6 µA	6,5 µA	---						
Allowed:	33,0	46,7	70		0,5	0,7	2,0						

NOTE – A 10 s test is specified in 6.1.2 a) b). A 5 s test is specified in 6.10.3 c).

Supplementary information: On measuring circuit U= 253 V.

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.3.2	TABLE: Values in SINGLE FAULT CONDITION											Form A.8	P
Item	Subclause and	Voltage			Transient (see NOTE)		Current				Capacitance		
(See Form A.6)	fault No. (see FormA.2)	V r.m.s.	V peak	V d.c.	V	s	Test circuit A1/A2/A3	mA r.m.s.	mA peak	mA d.c.	µF (NOTE)	Comments	
Cover	Short circuit one	≪55	≪78	---	---	---	A2	≪3,5	≪5,0	---			
Supply terminals	resistor in protective	26,4mV	37,3mV	---	---	---	A2	13µA	18,4 µA	---			
RS 485	impedance	1,4	1,98	---	---	---	A2	0,32 µA	0,45 µA	---			
Disconnected N wire from terminal ⊥ (connected only phase on test pin):													
Cover	Short circuit one	≪55	≪78	---	---	---	A2	≪3,5	≪5,0	---			
Supply terminals	resistor in protective	227	321	---	---	---	A2	254µA	359 µA	---			
RS 485	impedance	37,3	52,7	---	---	---	A2	4,8 µA	6,8 µA	---			
Allowed:		55	78	140				3,5	5,0	15,0			
NOTE – Transient voltages must be below the limits given from Figure 1 and the capacitance below the limits from figure 2 of IEC 61010-1.													
Supplementary information: On measuring circuit U= 253 V.													

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.5.1.1	**TABLE: Cross-sectional area of bonding conductors**	**Form A.9**	N

Conductor location	Cross-sectional area mm^2	Verdict
Class II		

6.5.1.2	TABLE: Tighting torque test	N

Conductor location	Size of Screw	Tighting torque Nm	Verdict

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.5.1.3	**TABLE: Bonding impedance of plug connected equipment** **Form A.10**			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:

6.5.1.4	TABLE: Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT		N
ACCESSIBLE part under test	Test current A	Voltage attained after 1 min (maximum 10 V) V	Verdict

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.5.1.5	**TABLE: Indirect bonding for measuring and test equipment** **Form A.11**		N
ACCESSIBLE part under test	Voltage attained V	Time for voltage to drop to allowable levels s	Verdict
a) Voltage limiting device	—	—	—

Supplementary Information:

ACCESSIBLE part under test	Voltage applied V	Time for device to trip s	Verdict
b) Voltage-sensitive tripping device			

Supplementary Information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.5.3	**TABLE: PROTECTIVE IMPEDANCE**	**Form A.12**	P

A high INTEGRITY single component

Component	Location	Comments
	N	

A combination of components

Component	Location	Comments
Voltage input 230 V –protective impedance.	Three resistors in serie.	

A combination of BASIC INSULATION and a current or voltage limiting device

Component	Location	Comments
	N	

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.7	**TABLE: CLEARANCES and CREEPAGE DISTANCES** **Form A.13**	P
8	Mechanical resistance to shock and impact	P
10.5.1	Integrity of CLEARANCES and CREEPAGE DISTANCES	P

Location	Measured (initial – 6.7)		Verdict	Mechanical tests (note)					Test at max.	Measured after test (if required)		Verdict	
(see Form A.5)	CREEPAGE DISTANCE	CLEARANCE		Applied force	Rigidity (8.1)		Drop (8.2)		RATED ambient	CREEPAGE DISTANCE	CLEARANCE		Comments
	mm	mm		(6.7) N	Static	Dynamic	Normal	Hand-held/ Plug-in	(10.5.1)	mm	mm		
← see on page 32 →			P	---	30N	5J	---	---	60	Without changes		P	

NOTE – Refer to Form A.14 for dielectric strength tests following the above tests.

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

6.8	**TABLE: Dielectric strength tests** **Form A.14**	P
4.4.4.1 b)	Conformity after application of fault conditions[1]	N
6.4	Protection in NORMAL CONDITION	N
6.5.2	DOUBLE INSULATION and REINFORCED INSULATION	P
6.6.1	Connections to external circuits	N
6.7.3.1 c)	CLEARANCE values – General: reduced CLEARANCES for homogeneous construction	N
6.10.2.5	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
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.....:	cca 200m	—
	Test voltage correction factor (see Table 10).....:	N	—

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
Cover x measuring circuits	6.5.2, 6.8	Yes	230	5312 r.m.s.		P
Current sensor	6.5.2, 6.8	yes	230	5312 r.m.s.		P

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

6.10.2	TABLE: Cord anchorage				Form A.15	N
Location	Mass kg	Pull N	Verdict	Torque Nm	Verdict	Comment
Power cord is not used.						
Supplementary information:						

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

9	**TABLE: Protection against the spread of fire**			**Form A.16**	P
Item	Source of HAZARD or area of the equipment considered (circuit, component, liquid etc.)	Protection Method (9a, 9b or 9c)	Protection details		Verdict
		9 a)			
Supplementary information:					

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

9.2.1	**TABLE: Constructional requirements**	**Form A.17**	P
14.8	Printed circuit boards		P

Material tested ..... :	Not tested see supplementary information	—
Generic name ..... :	Duraver E Cu-104ML	—
Material manufacturer ..... :	ISOLA GmbH	—
Type ..... :		—
Colour ..... :		—
Conditioning details ..... :		—

		Sample 1	Sample 2	Sample 3
Thickness of specimen	mm			
Duration of flaming after first Application	s			
Duration of flaming plus glowing After second application	s			
Specimen burns to holding clamp	Yes/No			
Cotton ignited	Yes/No			
Sample result	Pass/Fail			

Supplementary information:
14.8. Used material for printed circuit boards is Duraver- E- Cu quality 104ML, manufacturer ISOLA GmbH, flammability class V-0. File UL E 41625.

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

9.3	TABLE: Limited-energy circuit					Form A.18	N
Item	9.3 a)	9.3 b) Current and power limitation			9.3 c)	Decision	
or Location (see Form A.16)	Maximum potential in circuit voltage r.m.s./d.c. V	Maximum available current A	Maximum available power VA	Overload protection after 120 s A	Circuit separation	Yes/No	Comments
Are not used.							
Supplementary information:							

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: —

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

9.4	TABLE: Requirements for equipment containing or using flammable liquids	Form A.19	N
Type of liquid	9.4 Flammable liquids		Verdict
	b) quantity	c) Containment	
Flammable liquids are not used.			
Supplementary information:			

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.	**TABLE : Temperature Measurements** **Form A.20A**	P
10.1	Surface temperature limits - NORMAL CONDITION and / or SIGNLE FAULT CONDITION	P
10.2	Temperature of windings- NORMAL CONDITION and / or SIGNLE FAULT CONDITION	N
10.3	Other temperature measurements	P

Operating conditions:	1. Supply voltage 16 V DC, on measuring circuit voltage 253 V.			
Frequency.....:	50 Hz	Test room ambient temperature (t_a) ..:	26,8 °C	
Voltage .....:	253 V	Test duration.....:	5 h --- min	

Part / Location	t_m °C	t_c °C	t_{max} °C	Verdict	Comments
Input part with protection impedance.	31,2	64,4		P	
Processor	42,6	75,8		P	
Printed circuit board	42,9	76,1		P	
Bottom cover	29,1	62,3	80	P	
Upper cover	27,1	60,3	80	P	
Terminals	36,4	69,6		P	

NOTE 1 - t_m = measured temperature
t_c = t_m corrected (t_m–t_a+ **40 °C** or max. RATED ambient)
t_{max} = maximum permitted temperature
NOTE 2 - See also 14.1 with reference to component operating conditions
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary
NOTE 4 - See Form A.20B for details of winding temperature measurements

Supplementary information: Temperatures t_c are calculated for + 60°C.

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.2	**TABLE: Temperature of windings** **Resistance method Temperature Measurements** **Form A.20B**	N
4.4.2.6	MAINS Transformers	N
14.2.1	Motor temperatures	N

Operating conditions:			
Frequency.....:	Hz	Test room ambient temperature (t_{a1}/t_{a2})...:	/ °C (initial / final)
Voltage .....:	V	Test duration .....:	h min

Part / Designation	R_{cold} Ω	R_{warm} Ω	Current A	t_r K	t_c °C	t_{max} °C	Verdict	Comments
Transformer is not used.								

NOTE 1- R_{cold} = initial resistance R_{warm} = final resistance
t_r = temperature rise $t_c = t_r$ corrected ($t_c = t_r - \{ t_{a2} - t_{a1} \} + [40\ °C$ or max RATED ambient])
t_{max} = maximum permitted temperature
NOTE 2 - Indicate insulation class (IEC 85) under comments (optional)
NOTE 3 - Record values for NORMAL CONDITION and / or SINGLE FAULT CONDITION in this Form use additional form if necessary

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ----

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.5.2	**TABLE: Resistance to heat of non-metallic enclosures** **Form A.21**		P
	Test method used:		—
	Non operative treatment .....:	[X]	P
	Empty ENCLOSURE .....:	[ ]	N
	Operative treatment .....:	[ ]	N
	Temperature during tests .....:	72,3	—
	ENCLOSURE samples tested were .....:		—

Description	Material	Comments	Verdict

	Dielectric strength test (6.8).....:	5312	V	r.m.s	P

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

10.5.3	**TABLE: Insulating Materials**	**Form A.22**	P
10.5.3a)	Ballpressure test		P
	Max. allowed impression diameter .....:	2 mm	—

Part	Test temperature °C	Impression Diameter (mm)	Verdict
Plastic material for pin	+ 125 °C	1,1	P
Rigid socket	+ 125 °C	1,2	P

Supplementary information:
Material bearing live pin: NORYL 30% GF.
Rigid socket (Ø 4 mm) certified component Multi- Contact XEF-1RR.

10.5.3b)	Vicat softening test (ISO 306)	N

Part	Vicat softening temperature °C	Thickness of sample (mm)	Verdict

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

8	**TABLE: Mechanical resistance to shock and impact**	**Form A.23**	P
11	**Protection against hazards from fluids**		N

Voltage tests can be carried out once after performing the tests of clause **8** and clause **11**. However, if voltage tests are carried out separately after each set of tests, two forms can be used.

	Clause 8 tests				Clause 11 tests							
Location (see form A.5)	Static	Dynamic	Normal	Handheld Plug-in	Cleaning (11.2)	Spillage (11.3)	Overflow (11.4)	IEC 60529 (11.6)	Working voltage V	Test voltage V	Verdict	Comments
cover	30N	5J	fall	---	---	---	---	---	230 V	5312	P	

NOTE – Use r.m.s., d.c. or peak to indicate the used test voltage.

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

11.7.2	**TABLE: Leakage and rupture at high pressure**	**Form A.24**	N

Part	Maximum permissible working pressure MPa	Test pressure MPa	Leakage YES / NO	Burst YES / NO	Comments

Supplementary information:

11.7.3	Leakage from low-pressure parts	N

Part	Test pressure MPa	Leakage YES / NO	Comments

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

12.2.1	**TABLE: Ionizing radiation**	**Form A 25**	N

Locations tested	Measured values µSv/h	Verdict	Comments

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: —

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

12.5.1	**TABLE: Sound level**	**Form A.26**	N

Locations tested	Measured values dBA	Calculated maximum sound pressure level
At operator's normal position and at bystanders' positions		
a)		
b)		
c)		
d)		
e)		
f)		

Supplementary information:

12.5.2	Ultrasonic pressure	N

Locations tested	Measured values		Comments
	dB	kHz	
At OPERATOR'S normal position			
At 1 m from the ENCLOSURE			
a)			
b)			
c)			
d)			
e)			

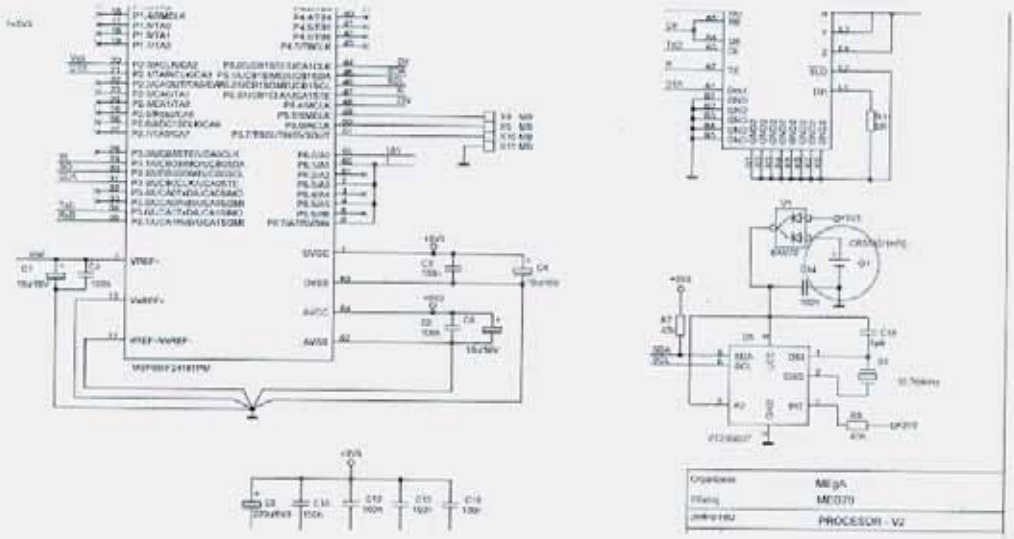
NOTE – No limit is specified at present, but a limit of 110 dB above the reference pressure value of 20 μPa is under consideration for applicable frequencies between 20 kHz and 100 kHz.

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

13.2.2	**TABLE: Batteries**	**Form A.27**	P
	Battery load and charging circuit diagram:		



	Battery type ..... :	CR 2032	—
	Battery manufacturer/model/catalogue No. ..... :	Panasonic	—
	Battery ratings ..... :	3 V	—
	Reverse polarity instalment test		P

Single component failures	Verdict	
Component	Open circuit	Short circuit
1. Short circuit of diode V1(diode connected to + pole of battery) without supply 12 V: current 2,92 µA → 3,59 µA. Without hazard.		
2. Short circuit of second diode V1 (connected to +3V3) without supply 12V: current 2,92 µA → 7,33 mA. Without hazard. With supply – without changes.		

Supplementary information: Without supply voltage 12 V DC is current from battery 2,92 µA, with supply voltage 0,0 µA.

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: See table 2 – test equipment list

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

14.3	TABLE: Overtemperature protection devices	Form A.28	N

Reliability test

Component	Type (note)	Verdict	Comments
Are not used.			

NOTE:
NSR = non-self-resetting (10 times)
NR = non-resetting(1 time)
SR = self-resetting (200 times)

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ----

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

4.4.2.6	**TABLE: Mains transformer**	**Form A.29**	N
4.4.2.6.1	Short circuit		N
14.7.1	MAINS transformers tested outside equipment		N
Type.....:			—
Manufacturer .....:			—
Test in equipment			
Test on bench			
Test repeated inside equipment (see 14.7)			
Optional – Insulation class (IEC 60085) of the lowest RATED winding .....:			—

Winding identification				
Type of Protector for winding (Note 1)				
Elapsed time				
Current, A primary				
secondary				
Winding temperature, °C primary				
(see Note 2) secondary				
Tissue paper / cheesecloth OK ? (Pass / Fail)				
Voltage tests (see Note 3)				
primary to secondary _____ V ____				
primary to core _____ V ____				
secondary to secondary _____ V ____				
secondary to core _____ V ____				
Verdict				

Note 1: Primary fuse - PF / ( ) A
Secondary fuse - SF / ( ) A
Overtemperature protection - OP / ( ) °C
Impedance protection - Z

Note 2: Indicate method of measurement TC = with thermocouple
R = resistance method
If resistance method is used, record resistance in cold and warm condition in FormA.20B!

Note 3: Record the voltage applied and the type of voltage (r.m.s. / d.c. / peak) and for results use NB = no breakdown or B = breakdown

Supplementary information:

Mains transformer is not used.

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: —

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

4.4.2.6	**TABLE: Mains transformer**	**Form A.30**	N
14.7.2	Overload tests (for mains transformers)		N
Type.....:			—
Manufacturer .....:			—
Test in equipment			
Test on bench			
Test repeated inside equipment (see 14.7)			
Optional – Insulation class (IEC 60085) of the lowest RATED winding .....:			—

Winding identification				
Type of Protector for winding (Note 1)				
Elapsed time				
Current, A primary				
secondary				
Winding temperature, °C primary				
(see Note 2) secondary				
Tissue paper / cheesecloth OK ? (Pass / Fail)				
Voltage tests (see Note 3)				
primary to secondary ____ V ____				
primary to core ____ V ____				
secondary to secondary ____ V ____				
secondary to core ____ V ____				
Verdict				

Note 1: Primary fuse - PF / ( ) A
Secondary fuse - SF / ( ) A
Overtemperature protection - OP / ( ) °C
Impedance protection - Z

Note 2: Indicate method of measurement TC = with thermocouple
R = resistance method
If resistance method is used, record resistance in cold and warm condition in FormA.20B!

Note 3: Record the voltage applied and the type of voltage (r.m.s. / d.c. / peak) and for results use NB = no breakdown or B = breakdown

Supplementary information:

Mains transformer is not used.

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: —

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

16.1	**TABLE: Current measuring circuits**	**Form A.31**	N

These tests are performed with all types and models of current transformers without internal protection, and which are specified by the manufacturer for use with the equipment

a) Current transformers

Type/Model	RATED current A	Test current A	Interrupt Yes / No	Verdict	Comments

Supplementary information:
Clasic current transformer is not used. For measuring current is used flexible sensor – see photos on the end of the test report.

b) Range changing switches

Type / Model	Maximum rated current of switch A	Cycling test Verdict	Comments

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: ---

ČSN EN 61010-1			
Clause	Requirement — Test	Result — Remark	Verdict

16.2	**TABLE: Multifunctional meters and similar equipment** **Form A. 32**		N
	Operating conditions ..... :		—
	Maximum RATED voltage applied (V) ..... :		—
	Measurement category ..... :		—
	Test source limit (KVA) ..... :		—

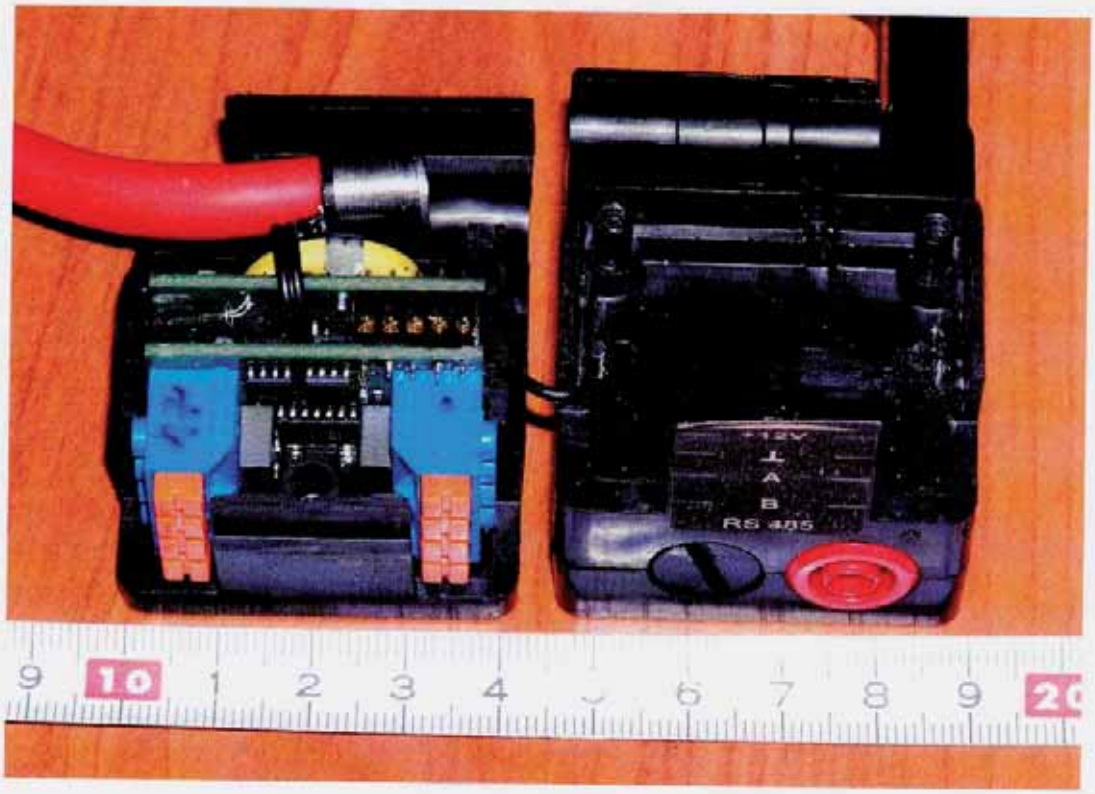
Function	Range	Verdict

Supplementary information:

TESTED BY: Šeda DATE: TEST EQUIPMENT LIST ITEM: —

Photodocumentation:


MEg70
COMPACT MONITOR
+12V
⊥
A
B
RS 485


+12V
⊥
A
B
RS 485