सत्यमेव जयते

TEST / CALIBRATION REPORT

Safety Test Report
for
MECO Universal Electrical Analyser

Testing as per EN 61010 -1 : 1993 + A2 : 1995

ELECTRONICS REGIONAL TEST LABORATORY (WEST)

MINISTRY OF COMMUNICATIONS & INFORMATION TECHNOLOGY, (STQC Dte.)

Government of India

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MEMORANDUM

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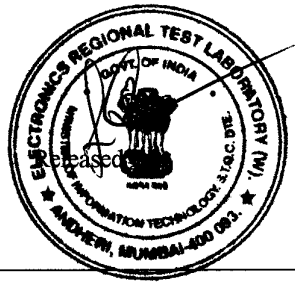
3. The result reported in this report are valid only at the time of and under the stated conditions of the measurements.

Electronics Regional Test Laboratory (West) Ministry of Communication and Information Technology (STQC Dte.)		Report No ERTL (W)/ 2002SAF46		
Subject: Safety Testing of Universal Electrical Analyser		Date 12 NOV 2002	Page 01	Of 26

1.0	SCOPE	
1.1	Service Request No	ERTL(W) / 200020993, 23rd May 2002
1.2	Service Request finalised on	23rd May 2002
1.3	Requested by (Name and Address of organisation)	MECO Instruments PVT. LTD. 301, Bharat Industrial Estate, T.J. Road, Seweri, Mumbai - 400 015, India
1.4	Item Description	Universal Electrical Analyser
1.5	Manufacturer/Make	Meco Instruments Private Limited
1.6	Model	SPVR-96
1.6	Test Specifications	EN 61010-1 : 1993 + A2 : 1995
1.7	Lab Ambient	Temperature: (25 ±2) °C Humidity: (55 ± 5) % RH



12 NOV 2002

CONFORMITY VERIFICATION REPORT
EN 61010
SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR MEASUREMENT, CONTROL AND LABORATORY USE.

Report reference No.	:	ERTL(W)/2002SAF046	
Compiled by (+ signature)	:	S.P. Pednekar / Jayant Kathe	Date : 24-Oct-2002
Reviewed by (+ signature)	:	G.R.Mahajan	Date 24-Oct-2002
Approved by (+ signature)	:	P H Bhave	Date : 25-Oct-2002
Testing organisation	:	Electronics Regional Test Laboratory (W)	
Address	:	STQC Directorate, Ministry of Communication and Information Technology Govt. of India, Seepz, Andheri (E), Mumbai - 93. India	
Testing Location	:	ERTL(W), Mumbai – 93. India	
Applicant	:	M/s. MECO Instruments Pvt. Ltd	
Address	:	301, Bharat Industrial Estate,T.J. Road, Seweri, Mumbai - 400 015, India	
Standard	:	EN 61010-1 : 1993 + A2 : 1995	
Type of test item	:	Universal Electrical Analyser	
Trademark	:	MECO	
Model / Type reference	:	SPVR-96	
Manufacturer	:	M/s. MECO Instruments Pvt. Ltd.	
Rating	:	Auxiliary Supply 230 V AC , 4VA, 50 Hz	

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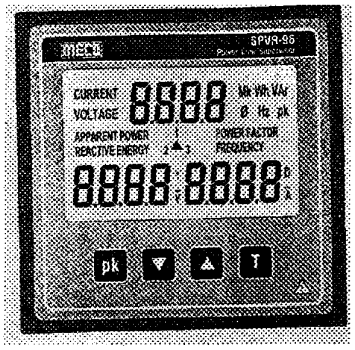

ELECTRONICS REGIONAL TEST LABORATORY (W.)
GOVT. OF INDIA
MINISTRY OF INFORMATION TECHNOLOGY STQC DIR.
ANDHERI, MUMBAI-400 093.

12 NOV 2002

Test item particulars : Universal Electrical Analyser
Type of eqpt. : Control Panel use

Description of equipment function : SVPR-96 Power Line Supervisor is a DIN96 16 bit DSP based multifunction 1 -phase & 3 - Phase electrical analyser indicating True rms values of electrical parameters. It measures 28 parameters on 26 display pages. It has a large back Lit LCD display with Annunciators.. It has built in multi drop RA485 interface that communicates scrolling through display pages and to set the programmable functions.

Installation/ Over voltage Category : II
Pollution degree : 2
Environmental rating : Standard
Equipment mobility : Panel mounted
Connection to mains supply : Screw connections are provided
Operating condition : Continuous
Overall size of the eqpt (W/D/H) : 150 mm X 115 mm X 70 mm
Mass of equipment (Kg.) : < 1 Kg
Marked degree protection to IEC60529 : IPX0

Accessories and detachable parts included in the evaluation : Nil

"(see appended table)" refers to a table appended to the report.
Throughout this report a point is used as decimal separator.
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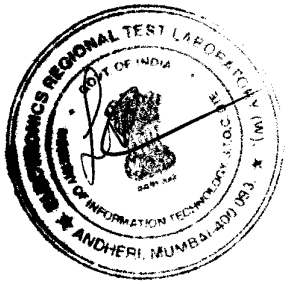
The test results presented in this report relate to the item tested.

Verdict cases used are :

Product meets the requirements of the standard : P (ass)
Product does not meet the requirements of the standard : **F** (ail)
Requirements are not applicable : **N**
No Pass- Fail verdict is provided : ' - -'

Documents attached to the report		
Document No.	Documents Description	No. of pages
Annex 1	Electrical Schematic	04
Annex 2	Block diagram & wiring diagram	01



TEST EQUIPMENT LIST 12 NOV 2002

Item	Type	Eqpt. No.	Cal Due ON
1.	Norma Power Analyser, Model No. D 5235	SAF/071	23/01/2003
2.	Hot winding ohm-meter Friborg	SAF/132	01/07/2003
3.	Earth Bond Tester Friborg	SAF/127	04/06/2003
4.	Hybrid Temperature Recorder, Yokogawa	SAF/004	04/07/2003
5.	AC High Voltage Tester, SEV	SAF/133	04/06/2003
6.	4 ½ digit True RMS Multimeter,	SAF/135	04/06/2003
7.	Environmental Simulator	ENV/026	09/04/2003

List of Safety Critical Components

SR. NO.	COMPONENT	MANUFACTURER	TECHNICAL DETAILS	APPROVAL STATUS
1	Non metallic enclosure	_ _	ABS 15 % glass filled	_ _
2	Connector	Howder	Thermoplastic 10A, 300 V AC	UL - 94 V0
3	Thermal Fuse	UMJ	Type X23, 250 VAC , 3 A, 50 Hz, 130 °C	VDE TUV, CSA, UL
4	PCB	Shogini	Glass epoxy, PTH	_ _
5	Optical isolator	QTC	IC 4N35. DIP 6 package > 2.5 KV isolation	_ _

_ _ : Information not available

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Clause	Requirement – Test	Result - Remark	Verdict

5	**Marking and Documentation**		
5.1.1	General Required equipment markings a) Visible - from the exterior or - after removing a cover or opening a door or - after removal from a rack or panel b) not but on parts which can be removed by an OPERATOR c) Letter symbols (IEC60027) used d) Graphic symbols (IEC61010-1:table 1) used	Marking label is fixed with glue on backside of the appliance. It is clearly visible. It is not on the operator removable parts.	P
5.1.2	**Identification**		
	Equipment is identified by: -manufacturer's name or registered trademark -model number, name or other means	SPVR-96 MECO	P
5.1.3	**Mains Supply**		
	Equipment is marked as follow :		P
	a) Nature of Supply : - a.c. RATED mains freq. or range of frequencies - d.c with symbol 1	Aux. supply : 230 V AC , 4 VA , 50 Hz	P
	b) RATED supply voltage(s) or range	Not used	
	c) maximum RATED power in watts or volt-amperes or maximum RATED input current The measured value not more than 110% (See form III)	Measured value is 4VA see form III	
	More than one voltage range: -Separate values marked or -values differ by less than 20% (See form III)	Single supply voltage	N
	d) Equipment which the OPERATOR can set for different RATED supply voltages: - Indicates the equipment set voltage - Portable Equipment indication is visible from the exterior - Changing the voltages setting changes the indication	Single supply voltage	N
	e) Accessory mains socket- outlets accepting standard mains plugs are marked : - with the voltages if it is different from the mains supply voltage - for use with specific equipment If not marked for specific equipment it is marked with: - the max. RATED current or power, and max. permitted leakage current - symbol 14 with full details the documentation	Screw type terminals are provided for mains supply connections. Socket out lets are not used	N

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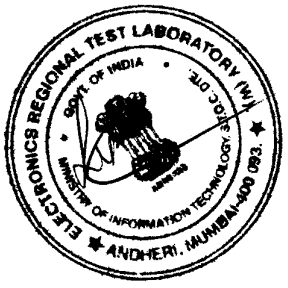
Clause	Requirement – Test	Result - Remark	Verdict

5.1.4	**Fuses**		
	OPERATOR replaceable fuse marking (see also 5.4.5)	Not used	N
5.1.5	**Measuring circuit TERMINALS**		
	RATED max. working voltage or current marked Clear indication that below limits or Max. RATED voltage to earth is marked Means for identifying TERMINALS are provided - marking is adjacent to TER MINALS or - The marking is on the rating plate or - The terminal is marked with symbol 14 or - Terminal is not accessible	Voltage measuring terminals are marked. Please see Annex 2 for marking	P
5.1.6	**TERMINALS & OPERATING DEVICES**		
	Where necessary for safety identification for terminals, connectors, controls and indicators		P
	Power supply switch ON/OFF position marked if used as disconnecting device	Earthing symbol is marked near earthing terminal. Wiring diagram is provided near terminals.	
	Mains supply terminals identified		
	Terminals marking		
	a) Function earth terminal		
	b) Protective conductive terminal (symbol 6 is placed close to or on the terminal		
	c) Terminals of measuring & control circuits		
	d) Terminals supplied from the interior		
	e) Accessible functional earth terminal		
5.1.7	**Eqpt. protected by Double Or Reinforced Insulation**		
	Protected throughout (Symbol 11) Only partially protected (symbol 11 not used)	Class I appliance with class II construction	P
5.18	**Battery charging**		
	Equipment with means to charge rechargeable batteries is marked : - to warn against the charging of non-rechargeable batteries - to indicate the type of re-chargeable batteries used	Rechargeable batteries are not used.	N
5.2	**Warning markings**		
	- visible when ready for NORMAL USE - if necessary marked with symbol 14 - are near or on applicable parts - warning to isolate or disconnect	Not necessary and hence not used.	N
	- TERMINAL voltage exceeds 1KV (symbol 12)	Not used	N
	easily touched high temperature. parts (symbol 13)	Not used	N
5.3	**Durability of markings**		
	The required markings remain clear and legible in NORMAL USE	Markings marked on the equipment is clear & durable see form IV	P



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Clause	Requirement – Test	Result - Remark	Verdict

5.4	**Documentation**		
5.4.1	General Equipment is accompanied by documentation which includes -technical specification -instruction for use -name and address of manufacturer or supplier -Definition of INSTALLATION CATEGORY -A clear explanation warning symbol is in the documentation or Information is durably and legibly marked on the equipment	Necessary information is given in the product catalogue. Also see 5.4.2 , 5.4.3, 5.4.4	P
5.4.2	**Equipment RATINGS**		
	Documentation includes : - Supply voltage or voltage range - The freq. or freq. range - the power or current RATING - a description of all input & output connections - The RATING of insulation of external circuits, when such circuits are nowhere ACCESSIBLE - Statements of the range of environmental conditions	In the product catalogue following information is provided : 1. Auxiliary supply 230 VAC, 50 Hz, 4 VA 2. Measuring voltage : 75V - 300 V AC, 0.3 VA/phase Accuracy ± 1 % of F.S. 3. Measuring current : 0 - 7.5 A AC max Accuracy ± 1 % of F.S.	P
5.4.3	**Equipment installation** Documentation includes instructions for : - assembly, location & mounting - protective earthing - connections to the supply - ventilation requirements - special services - instructions about sound pressure Additional information for PERMANENTLY CONNECTED EQPT.: - supply wiring - external switch or circuit- breaker and - external over- current protection - recommendation on switch or circuit breaker location	Detailed information for installation is given in the product catalogue.	P

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Clause	Requirement – Test	Result - Remark	Verdict

5.4.4	**Equipment Operation**		
	Instruction for use include: - Identification of operating controls - Equipment Positioning - Interconnection Requirements - Specification of Intermittent Operation Limits - Explanation of Required symbols - Explanation of Required symbols - Replacement of consumables - Replacement of consumables - Cleaning and decontamination A statement against use in a manner not specified by the manufacturer	Equipment operation is clearly described in the instruction maunal	P
5.4.5	**Equipment maintenance**		
	Instruction include : - sufficient preventative maintenance and inspection information - specific battery type - any manufacturer specified parts -RATING and characteristics of fuses	Necessary information is provided in the instruction manual	P

6	**Protection against electric shock**		
6.1	General Conformity is checked by the determination of 6.2 and 6.3 followed by the test of 6.4 to 6.12	See Form V	P
6.1.1	Exceptions Capacitance test	Exceptions are not applicable for this product	N
6.2	**Determination of ACCESSIBLE parts**	Appliance is panel mounted type. Live parts are not operator accessible during normal operation.	N
6.3	**Permissible limits for ACCESSIBLE parts**		
6.3.1	Values in NORMAL CONDITION	See 6.2	P
6.3.2	Values in SINGLE FAULT CONDITION		
6.4	**Protection in NORMAL CONDITION (see 6.8 and 8.1)** Basic insulation Enclosure or barrier Protective impedance	Class I appliance with class II construction. Reinforced insulation is provided between accessible parts & hazardous live parts.	P
6.5	**Protection in SINGLE FAULT CONDITION**		
	Additional protection is provided as specified in 6.5.1 to 6.5.4 or by automatic disconnection of the supply	See 6.5.1 to 6.5.4	P

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Clause	Requirement – Test	Result - Remark	Verdict
6.5.1	**Protective Earthing** ACCESSIBLE conductive parts are bonded to the PROTECTIVE CONDUCTOR TERMINAL or are separated from parts which are HAZARDOUS LIVE (For indirect bonding of measurement and test equipment see 6.5.1.4)	Class I appliance with class II construction	P
6.5.1.1	PROTECTIVE BONDING PROTECTIVE BONDING consists of directly connected structural parts or discrete conductors or both		
6.5.1.2	Bonding impedance of plug- connected equipment	Bonding impedance not used.	
6.5.1.3	Bonding impedance of PERMANENTLY CONNECTED EQUIPMENT		
6.5.1.4	Indirect bonding for measuring and test equipment		
6.5.2	**Double Insulation and Reinforced Insulation**	See 6.7, 6.8 & 6.9.2	P
6.5.3	**PROTECTIVE IMPEDANCE** A PROTECTIVE IMPEDANCE is used Components wires and connections are RATED as required	No such components used	N
6.5.4	**Built-in Panel meters** Where the requirements of 6.5.1 to 6.5.3 are not met, equipment : - has no Accessible conductive parts - has basic insulation of Accessible surfaces - has Double/Reinforced Insulation of accessible surface of parts intended to be grasped	Appliance is built in panel mounted type. Accessible conductive parts are not present. Accessible non metallic parts are separated from hazardous live parts by re - inforced insulation.	N
6.6	**External circuits**		
6.6.1	Separation of internal circuits If the other internal circuit exceed the values of 6.3.2 in Normal Condition the following are included in manufacturer's instructions - a statement that the TERMINAL is for use only with eqpt. which has no ACCESSIBLE live parts - the RATING of the insulation required for external circuits - the connection to be used at the remote end of external circuits - the type of equipment which may be connected to the TERMINAL Any of the above were waived	Class I appliance with Class II construction. Accessible non-metallic parts provides re-inforced insulation.	P
6.6.2	**TERMINALS for external circuits**		
	ACCESSIBLE TERMINALS are not HAZARDOUS LIVE except as permitted by. 6.1.1 The following TERMINALS are not HAZARDOUS LIVE : - PROTECTIVE CONDUCTOR TERMINALS -FUNCTIONAL EARTH TERMINALS - headphone TERMINALS TERMINALS which receive a charge from an internal capacitor High-voltage TERMINALS energised from the interior are : -not ACCESSIBLE -marked	Appliance is panel mounted type. Live terminals are not operator accessible during normal operation.	P
6.6.3	**Circuits with TERMINALS which are HAZARDOUS LIVE**		
	No mains circuits are connected to ACCESSIBLE contact at earth potential Circuits designed to be operated with one ACCESSIBLE TERMINALS contact floating	Hazardous live terminals are not accessible to operator	

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Clause	Requirement – Test	Result - Remark	Verdict
6.7	**CLEARANCES and CREEPAGE DISTANCES**		
	CLEARANCES and CREEPAGE DISTANCES between circuits and parts	See Form XI	P
6.8	**Dielectric strength tests**		
	Tests show that the requirements of 6.4 & 6.6 are met Protection against the spread of fire	See Form XI	P
6.9	**Constructional requirements for protection against electric shock**		
6.9.1	General In circuits exceeding the values of 6.3.2 : - security of wiring connections - screws securing removable covers - accidental loosening	No circuit is accessible	N
6.9.2	**ENCLOSURES of equipment with DOUBEL INSULATION or REINFORCED INSULATION**		
	ENCLOSURE surrounds all metal parts Small metal parts are separated ENCLOUSERS or parts made of insulating material Protection for metal ENCLOSURES or parts is provided by : - PROTECTIVE IMPEDANCE or - provision of an insulating coating or BARRIER on the inside or - CLEARANCES and CREEPAGE DISTANCES cannot be reduced by loosening of parts or wires	Class I appliance with Class II construction. Non metallic enclosure provides re-inforced insulation	P
6.9.3	**Equipment using PROTECTIVE BONDING**		
	a- Operator removable parts b- Movable conductive connections c- Exterior metal braids of cables d- Mains supply is passed through the equipment e- Protective earthing conductors are green/yellow Exceptions : - earthing braids - internal protective conductors - Equipment using PROTECTIVE BONDING	See 6.9.2	P
6.9.4	**Over-range indication**		
	Unambiguous	Not used	N

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Clause	Requirement – Test	Result - Remark	Verdict

6.10	**Connection to mains supply source and connections between Parts of equipment**		
6.10.1	**Mains supply cords**		
	Mains supply cords are RATED for maximum equipment current (see 5.1.3.c) The cable used complies with IEC 227or IEC 245 or is a certified Cord Cord is heat resistance Required temp. RATING Green/Yellow covered conductors are used only for connection to PROTECTIVE CONDUCTOR TERMINALS Detachable cords with IEC-320 mains connectors comply with : -IEC 799 or -the current RATING of the mains connector	Not provided with equipment	N
6.10.2	**Fitting of non-detachable mains supply cords**		
6.10.2.1	**Cord entry** Non-detachable cord protection : - Inlet smoothly rounded with radius at least 1.5D or insulated cord guard with specified projection at least 5 D	Mains cord is not used, electrical terminals are provided for auxiliary supply connections.	N
6.10.2.2	**Cord Anchorage :**		
	- relieves the conductors from strains and twisting - protects the conductor from abrasion - The protective earth conductor is the last to take the strain Cord anchorage (see form XIII) : - the cord is not clamped -cannot push the cord into the equipment, to the extent to cause a hazard -failure of the cord insulation in a cord anchorage which has metal parts Compression bushing : a) clamps all types and sizes of mains cords and b) is suitable for connection to TERMINAL provided or It is designed for screened mains cords Cord replacement : does not cause a hazard - the method of strain relief is clear	Mains cord is not provided with equipment	N
6.10.3	**Plugs and Connectors**		
	a) Plugs, connectors and appliance couplers comply with the relevant specifications b) In equipment designed to be supplied at voltages below 6.3.2.1 mains type plugs and sockets are not used incorrectly c) Plug pins of cord connected equipment which receive a charge from an internal capacitor d) Equipment with accessory mains socket outlets : - if it accepts a standard mains plug there is a marking according to 5.1.3.e - outlets with a PROTECTIVE EARTH TERMINAL contact	Appliance coupler is not used. The equipment is mains supply operated. Plug and socket not used	N

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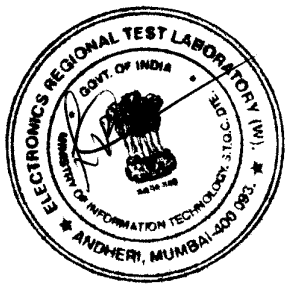
Clause	Requirement – Test	Result - Remark	Verdict

6.11	**TERMINALS**		
6.11.1	**ACCESSIBLE TERMINALS** a) No risk of accidental contact (also see 5.1.6c) b) are anchored	Appliance is panel mounted type. Hazardous live terminals are not operator accessible. Electrical terminals are provided for auxiliary supply connections and input signal.	P
6.11.2	**PROTECTIVE CONDUCTOR TERMINAL**		
	a) Appliance inlet used	Protective conductor terminals is provided near Aux. supply terminals and marked with symbol.	N
	b) For PERMANETLY CONNECTED EQPT. and for re-wirable cords, PROTECTIVE CONDUCTOR TERMINAL is close to the mains supply TERMINAL		
	c) i) If no mains supply is required, any PROTECTIVE COND UCTOR TERMINAL is near TERMINAL of circuit for which protective earthing is necessary ii) External TERMINALS		
	d) Equivalent current capacity		
	e) Soldered connections independently secured Such connections are not used for other purposes Screw connections are secured		
	f) Contact surfaces are metal		
	g) If plug in, makes first and breaks last		
	h) Protective conductor of measuring circuit : i) Current RATING ii) Protective bonding -not interrupted or -indirect bonding		
6.11.3	**- FUNCTIONAL EARTH TERMINALS**		
	Connection independent	Not used	N



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Clause	Requirement – Test	Result - Remark	Verdict
6.12	**Disconnection from supply source**		
6.12.1	**General**		
	Disconnection device provided	Switch is not provided for supply disconnection. Appliance is panel mounted type to be provided in end use.	P
6.12.1.1	Short circuit or overload cannot cause a hazard		
6.12.2	**Requirements according to type of equipment**		
6.12.2.1	PERMANENTLY CONNECTED EQUIPMENT		
	Switch or circuit breaker or Specified for building installation	Appliance is panel mounted (Built in type) disconnection device to be provided in end use application	N
6.12.2.2	**Single phase cord-connected equipment**		
	Switch or circuit breaker or Appliance coupler - no TOOL or Separable plug - no lock	Cord is not used	N
6.12.2.3	**Hazards arising from function**		
	An emergency switch is provided The emergency switch is located not more than 1m from the moving part	Not necessary & hence not provided	N
6.12.3	**Disconnecting devices**		
	Electrically close to the supply	Appliance is panel mounted (Built in type) disconnection device to be provided in end use application	N
6.12.3.1	**Switches and circuits-breakers** when used as disconnection devices : -meets IEC947-1 & IEC947-3 contact separation -contact position evident in off position -marked to indication function -not incorporated in mains cord -does not interrupt protection earth conductor -if has other contacts meets separation requirements of 6.6 and 6.7	See 6.12.3	N
6.12.3.2	**Appliance couplers and plug**		
	Where an appliance coupler or separable plug is used as the disconnecting device (see 6.12.2.2) : -it is readily identifiable and easily reached by the OPERATOR -single phase PORTABLE EQPT cord length is less than 3m The protective earth conductor connect before and disconnect after	Not used	N

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Clause	Requirement – Test	Result - Remark	Verdict
7.	**Protection against mechanical hazards**		
7.1	**General**		
	Conformity is checked by 7.2 to 7.5	See clause No. 7.2 to 7.5	
7.2	**Moving parts**		
	Moving parts not able to crush, etc (see also 6.12.2.3) If OPERATOR access permitted a)access requires TOOL b)instructions about training c)warning markings	Hazardous moving parts are not present.	N
7.3	**Stability**		
	Compliance tests : - 10 Degree tilt test - multidirectional force test - downward force test - marking of non-automatic means	Appliance is panel mounted type to be verified in end use application.	P
7.4	**Provisions for lifting and carrying**		
	Handles or grips withstand 4 times mass Equipment heavier than 18KG: -has means for lifting or carrying or -directions in documentation	Not necessary and hence not provided	N
7.5	**Expelled parts**		
	Equipment contains or limit the energy Protection not removable without the aid of a tool	Hazardous parts are not expelled after single fault conditioning	P
8.0	**Mechanical resistance to shock and impact**		
	-voltage tests -inspection, equipment meets the following requirements: i)HAZARDOUS LIVE parts not accessible ii) ENCLOSURE show no cracks (hazard) iii) CLEARANCES not less than their permitted values -BARRIERS not damaged or loosened -no moving parts exposed, expect as permitted by 7.2 -there is no damage which could cause spread no fire	Hazardous live parts are not accessible. Appliance is of panel mounted type , necessary protections to be provided in end use application See Form XI & XII. .	P
9.0	**Equipment temp. limits and protection against the spread of fire**		
9.1	**General**		
	Conformity is checked by : 9.2 and fault tests of 4.4 or Measurement of CREEPAGE DISTANCE and CLEARANCE And the voltage tests of annex - G or Method of annex F	Conformity is checked by clause no. 9.2 & fault tests of clause no. 4.4	P
9.2	**Temperature tests**		
	Temp. limits	See Form XVIII	

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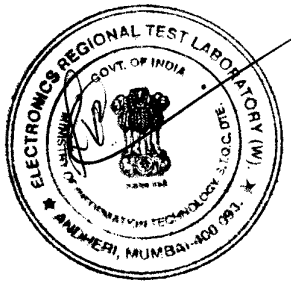
Clause	Requirement – Test	Result - Remark	Verdict
9.3	**Guards**		
	Surfaces liable to exceed 100 Degree C: -protected by guards -marked or - intended to be not (see 9.1) Guards not removable without TOOL	Not used	N
9.4	**Field-wiring TERMINAL boxes**		
	Marking of temp. RATING of the cable is Marking of temp. RATING of the cable is -adjacent to the field-wiring TERMINALS or -visible during and after installation	Not used	N
9.5	**Over temp. protection devices**		
	Over temp. protection device: -fitted and operates in SINGLE FAULT CONDITION -meets requirements of 14.3 -does not operate in NORMAL USE (see 3.5.6) -if self-resetting, can only be set to operate in single fault condition.	Not necessary and hence not provided	N
9.6	**Over current protection**		
	Mains operated equipment protected	See 9.6.1 and 9.6.2	N
9.6.1	**PERMANENTLY CONNECTED EQPT.**		
	Over current protection device -fitted within the equipment. or -specified in manufacturer's instruction	Appliance is of panel mounted type , necessary protections to be provided in end use application	N
9.6.2	**Other equipment**		
	Protection provided within the equipment Overcurrent protection devices not in the protective conductor Fuses or single pole circuit breaker not fitted in neutral (Multiphase)	See 9.6.1	N

10.	**Resistance to heat**		
10.1	**Integrity of CLEARANCE and CREEPAGE DISTANCES**	Complied	P
10.2	**Resistance to heat of non-metallic ENCLOSURE**	Complies the temperature Test at 70°C for 7 hr	P
10.3	**Resistance to heat of insulation material**		
	Supporting parts connected to : - mains supply - supporting TERMINALS	Insulating material used for screw type terminals meets the requirement of Vi-cut softening test at 130 ° C.	P



	EN 61010 -1	12 NOV 2002	
Clause	Requirement – Test	Result - Remark	Verdict

11	**Protection against hazards from fluids**		
11.1	**General**	Fluids are not used	N/A
11.2	**Cleaning**	See 11.1	N/A
11.3	**Spillage**	See 11.1	N/A
11.4	**Overflow**	See 11.1	N/A
11.5	**Battery electrolyte leakage presents no hazard**	Batteries are not used	N/A
11.6	**Specially Protected equipment** Test to IEC529	Appliance is not protected	N/A
11.7	**Fluid pressure and leakage**		
11.7.1	Max. pressure not exceeded Test to IEC 335 (refrigeration only)	Fluids are not used	N/A
11.7.2	Leakage and rupture at high pressure	See 11.7.1	N/A
11.7.3	Leakage from low-pressure parts	See 11.7.1	N/A
11.7.4	Overpressure safety device - no operation in NORMAL USE - position - access - adjustment - no discharge towards person - discharge capacity - no shut-off value	See 11.7.1	N/A

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Clause	Requirement – Test	Result - Remark	Verdict

12.	**Protection against radiation, including laser sources, and against sonic and ultrasonic pressure**		
12.1 12.2 12.2.1 12.2.2 12.3 12.4	General Equipment producing ionising radiation Ionising radiation Accelerated electrons Ultra-violet radiation Micro wave radiation	No such device is required and hence not provided	N
12.5 12.5.1 12.5.2	Sonic and ultrasonic pressure Sound level Ultrasonic pressure	No such components are used	N
12.6	Laser sources (IEC825)	No such components are used	N

13.0	**Protection against liberated gases, explosion & implosion**		
13.1	Poisonous and injurious gases (Attach any data/test report used to demonstrate conformity)	Gases are not liberated in normal / abnormal operations	P
13.2	Explosion and implosion		
13.2.1	Components	Capacitors are provided with pressure release means.	N
	Components liable to explode : - have pressure release device or - the apparatus incorporates OPERATER protection (see also 7.5)		
13.2.2	Batteries		
	Explosion/fire hazard :	Rechargeable batteries are not used	N
	- Protection is incorporated in the equipment or		
	- Instructions specify batteries to be used		
	Warning marking or symbol 14		
	Battery component design (Battery load and charging Circuit schematic		
13.3	Implosion of high-vacuum devices		
	High vacuum devices : Intrinsically protected or ENCLOSURE provides protection Non-intrinsically protected tube : Separate glass screen Cathode-ray tube or high vacuum device mounting	No such device is required and hence not provided	N

14.0	**Components**		
14.1	**General**		
	Safety components comply with applicable safety Requirements In relevant IEC standards	See list of safety critical components	- -
14.2	**Motors**		
14.2.1 14.2.2	Motor temp. Series excitation motors	Not used	N

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Clause	Requirement – Test	Result - Remark	Verdict
14.3	**Over temp protection devices**		
	Devices operating in a Single Fault Condition - are constructed and tested - are RATED for voltage and current interrupt - are RATED for the max. surface temperature. - parts in contact with flammable liquid - do not operate in NORMAL use (see 9.5) - no self-resetting unless protected part can not function	Thermal fuse is provided in the primary of mains transformer. Rating : 250 V , 3 A, 130 °C	P
14.4	**Fuse holders**	Not used	N
14.5	**Mains voltage selecting devices**	No such device is required and hence not provided	N
14.6	**HIGH INTEGRITY components used in applicable position**		
	Tested to IEC Publications Not a single electronic device	Not used	N
14.7	**Mains transformers**		
14.7.1	Short circuit tests Transformers meet 4.4.4.1 to 4.4.4.3	See Form XXVII	P
14.7.2	Overload tests Over temperature protection meets 14.3 OR Transformer meets 4.4.4.1 to 4.4.4.3	See Form XXVIII	P
14.8	**Overpressure safety devices** Meets ISO 4126	Not used	N

15	**Protection by interlocks**		
15.1	General Interlocks are designed to remove a hazard before OPERATER exposed Exceptions for 2 seconds - easily touched parts - moving parts - marking used - position of warning marking	Interlocks are not provided	N
15.2	Prevention of reactivation		
15.3	Reliability		

16	**Measuring circuits**		
16.1	Current measuring circuits	Current transformer and selector switches are not used .	N

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Summary of single fault conditions (4.4) 18 NOV 2002 **FORM I**

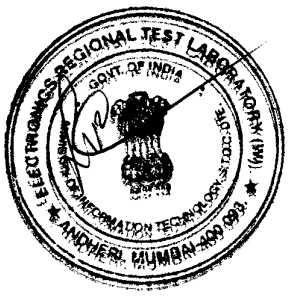
Cl. No	Requirement	Applicable	Carried out	Comments
4.4.2.1	PROTECTIVE IMPEDANCE	X	X	N/A
4.4.2.2	PROTECTIVE CONDUCTOR			N/A
4.4.2.3	Equipment or parts for short term or intermittent operation	X	X	N/A
4.4.2.4	Motors	X	X	N/A
4.4.2.5	Capacitors	X	X	N/A
4.4.2.6	Mains transformers Attach drawing of Mains TX showing all protective devices	_/	_/	P
4.4.2.7	Outputs	X	X	N/A
4.4.2.8	Equipment for more than one supply	X	X	N/A
4.4.2.9	Cooling - air holes closed - fans stopped - coolant stopped	X	X	N/A
4.4.2.10	Heating devices - timer overridden - temperature. controller - overridden - loss of cooling liquid	X	X	Not used
4.4.2.11	Insulation between circuits and parts	_/	_/	P
4.4.2.12	Interlocks	X	X	N/A
	Other SINGLE FAULT CONDITIONS list below all SFC not covered by 4.4.2.1 to 4.4.2.12	X	X	All other circuitry operates in SELV

Y : Yes N: No

High voltage test of Cl. No. 6.8 repeated after each fault condition. No breakdown or flashover observed.

TEST EQUIPMENT LIST ITEM 1. Hybrid Recorder 2. AC Breakdown Tester

T.d – Test duration



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Sub clause 5.1.3.c **Mains supply** 12 NOV 2002 **FORM III**

Marked RATING : 230 V AC, 50 Hz, single phase, VA.					
Test No.	**Voltage V**	**Frequency Hz**	**Current mA**	**Power in VA**	**Comments/Operating Conditions**
01	207 V	50 Hz	39	2.1	Test is conducted by operating the meter for continuous on full load.
02	230 V	50 Hz	41	2.7	
03	253 V	50Hz	40	3.4	
General Comments :					

Test Equipment List Item (section 1) : Power Analyser Norma

Sub clause 5.3 Durability of markings **FORM IV**

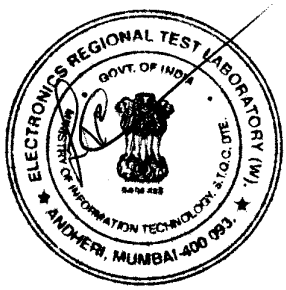
Table 1
Marking method (see Note)
1 Screen printed marking on non-metallic front window
2 Screen printing on thin metal plate fixed with rivets/screws
3 Marking label on metal surface fixed by adhesive (screen printing)
4 Marking label on non-metallic surface with screen printing and engraving

Table 2
Agent
A : Petroleum Spirit
B :
C : Water
D : Isopropyl alcohol

Note: Where applicable include print method, label material, ink or paint type, fixing method, adhesive and surface to which marking is fixed.

MARKING	
Marking Location	Marking method (table 1)
Identification (5.1.2)	1,4
Mains Supply (5.1.3)	4
Fuses (5.1.4)	- -
Measuring circuit terminals (5.1.5)	4
Terminals & operating devices(5.1.6)	- -
Double/reinforced eqpt. (5.1.7)	- -
Battery charging (5.1.8)	- -
Warning marking (5.2)	- -

Method (Table 1)	Test Agent (Table 2)	Remains legible (Pass/Fail)	Label Loose (Pass/Fail)	Curled edges (Pass/Fail)
Screen printing	C, D	P	P	P



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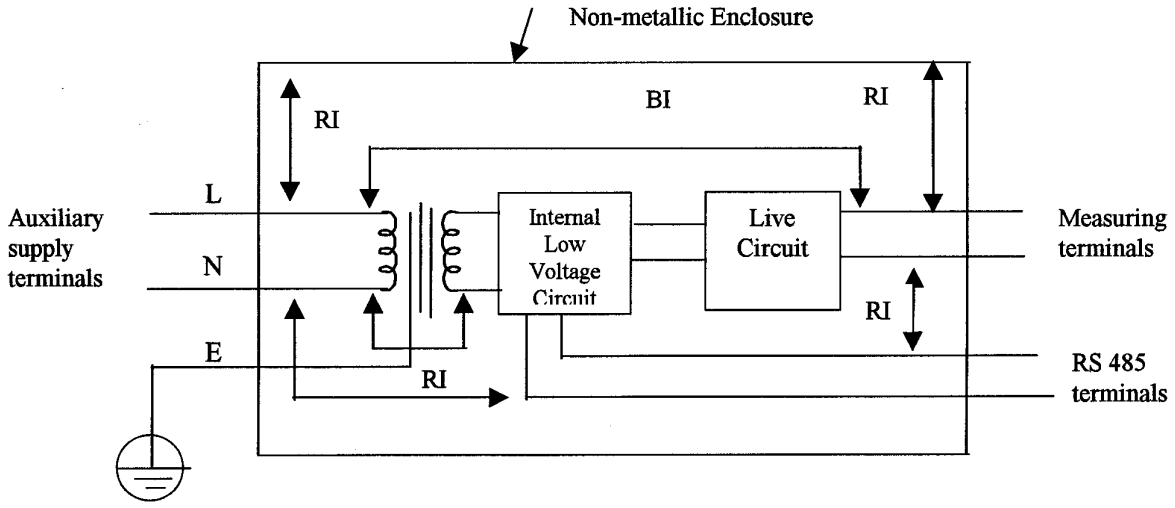
FORM V

Sub clause 6: Protection against electric shock - Block diagram of system



POLLUTION DEGREE : II OVERVOLTAGE/INSTALLATION CATEGORY : II

Location or Description	Insulation Type	Maximum Working	CREPAGE DISTANCE			CLEARANCE	Test Voltage V rms	Comments
			PWB mm	CTI	Other mm			
Primary to enclosure	RI	253	_ _	N/A	>10	6	2300	P
Primary to Secondary	RI	253	_ _	N/A	8	6	2300	P
Auxiliary supply terminals and measuring terminals	BI	253	_ _	N/A	>10	>10	1350	P
Measuring terminals and enclosure	RI	300	_ _	N/A	>10	>10	2300	P
Auxiliary supply terminals to RS485 terminals	RI	253	_ _	N/A	>10	> 10	2300	P
Measuring terminals to RS485 terminals	RI	300	_ _	N/A	>10	>10	2300	P

Notes : 1. -Type of insulation to be stated
BI: Basic Insulation
DI: Double Insulation
PI: Protective Impedance
RI: reinforced Insulation
SI: Supplementary Insulation

2. -Stated type of voltage
Pulse: Peak imp. test voltage
r.m.s.
d.c
peak

3. -Different OVERVOLTAGE/INSULATION CATEGORIES and POLLUTION DEGREES should be noted

12 NOV 2002 **FORM VI**

Subclause 6.1.1 Exceptions
Subclause 6.2 Determination of ACCESSIBLE parts
List of ACCESSIBLE parts

Item	Description	Determination method (see Note) V = Visible; J = Jointed test finger R = Rigid test finger; P3 = 3mm Pin; P4 =4mm Pin	Exception under 6.1.1 (Capacitor test may be required see form VII)
Enclosure	Non metallic enclosure having good mechanical strength, fixing screws are reliably connected to protective earth	Visible, J	No voltage exists
Electrical Terminals	Accessible as mounted on enclosure	Visible, J	No voltage exists
Display	Non metallic , having Good mechanical strength	Visible, J	No voltage exists

Test Equipment List Item (section 1) : 3 ½ digit Multimeter

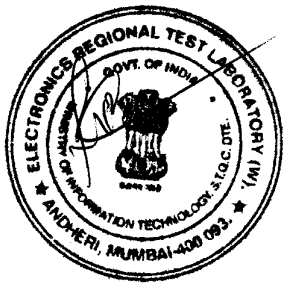
FORM XI

Subclause 6.7 CLEARANCES AND CREEPAGE DISTANCES
Subclause 8 Mechanical resistance to shock and impact
Subclause 10.1 Integrity of CLEARANCES and CREAPAGE DISTANCES

Location	Measured (Initial-6.7		Results	Mechanical Tests (see note)			Measured after test (if required)		Results
	Creepage mm	Clearance mm	Pass/ Fail	Applied Force 30N (6.7)	Rigidity (8.1)	Impact 0.5J Hammer (8.2)	Creepage mm	Clearance mm	Pass / Fail
1.	>10	>10	Pass	Pass	Pass	Pass	>10	>10	Pass
2.	8	6	Pass	Pass	Pass	Pass	8	6	Pass
3.	7	7	Pass	Pass	Pass	Pass	7	7	Pass
4.	>10	>10	Pass	Pass	Pass	Pass	>10	>10	Pass
5.	>10	>10	Pass	Pass	Pass	Pass	>10	>10	Pass
6.	>10	>10	Pass	Pass	Pass	Pass	>10	>10	Pass

Locations : 1. Phase to earth
2. Primary to secondary of Transformer
3. Primary to core of Transformer
4. Auxiliary supply terminals to measuring terminals.
5. Measuring terminals to RS 485 terminals
6. Auxiliary supply terminals to RS 485 terminals

Note -- refer to form XII for dielectric strength tests following the above tests.



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FORM XII

Subclause 6.8 Dielectric strength tests

Sl. No.	Location (see form V)	Working Voltage (V)	Test voltage r.m.s	Results Pass/ Fail	Comments
1.	Between Primary and Secondary of Transformer	230 VAC	2300 V	P	N.B.
2.	Between Primary and core of Transformer	230 VAC	1350 V	P	N.B.
3.	Between auxiliary supply terminals and measuring terminals	230 VAC	1350 V	P	N.B.
4.	Between auxiliary supply terminals and non metallic enclosure	230 VAC	2300 V	P	N.B.
5.	Between auxiliary supply terminals and RS 485 terminals	230 VAC	2300 V	P	N.B.
6.	Between measuring terminals and non metallic enclosure	300 VAC	2300 V	P	N.B.
7.	Between measuring terminals and RS 485 terminals	300 VAC	2300 V	P	N.B.

N.B. : No Breakdown or flashover observed

H.V. test repeated after fault conditioning no breakdown or flashover is observed.

TEST EQUIPMENT LIST ITEM 1. Hybrid Recorder 2. AC Breakdown Tester

FORM XVIII

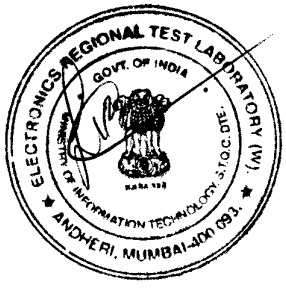
Subclause 9.2 Temp test
Operating Conditions : Normal
Freq. : 50 Hz, Duration : 4 Hr.
Voltage : 254 V Test room ambient : 27 °C

Part	tm °C	tc °C	ta °C	Results Pass/ Fail	Comments
Transformer winding	39	52	130	Pass	Test is conducted by operating the meter continuously for maximum input signal .
Transformer core	37	50	130	Pass	
Front window (Display)	29	42	80	Pass	
Back enclosure	30	43	80	Pass	
Terminals	35	48	80	Pass	
Room ambient temp.	27	40	--	--	

Note -- See also sub clause 14.1 with reference to component operating conditions.
Note -- tm : Measured temp.
tc : Corrected max. temp. (tm + 40 - test room ambient)
ta : Max. allowed temp.

Test was conducted at voltages : 207 V, 230 V, 254V rms 50 Hz ,
Maximum temperatures are noted at 254 V, 50 Hz

TEST EQUIPMENT LIST ITEM : 1. Hybrid Recorder.



Clause 4.4.2.6 Mains transformer
Clause 14.7.1 Short circuit tests (for mains transformer) TX 1

12 NOV 2002 FORM NO : XXVII

Type : Linear Transformer tested [-/] in Equipment or [ ] on Bench (both) Optional -- insulation class (IEC85) of the lowest rated winding :

Winding identification	0 - 9 V	0 - 9 V	0 - 9 V
Type of Protector for winding	Thermal fuse	Thermal fuse	Thermal fuse
Elapsed time	30 minutesr	30 minutes	30 minutes
Current, A Primary Secondary	Sec I short and other sec windings loaded with its normal load	Sec II short and other sec windings loaded with its normal load	Sec III short and other sec windings loaded with its normal load
Winding Temp., °C Primary (see note 2) Secondary	Thermal fuse operated after 30 minutes, temp. of transformer winding measured to be 128°C at an ambient temperature of 29 °C (TC method)	Thermal fuse operated after 30 minutes, temp. of transformer winding measured to be 126°C at an ambient temperature of 29 °C (TC method)	Thermal fuse operated after 30 minutes, temp. of transformer winding measured to be 124°C at an ambient temperature of 29 °C (TC method)
Tissue paper/cheesecloth OK? (Pass/ Fail)	P	P	P
Voltage tests (see note 3) Primary to sec 2300 Vrms Primary to Core 1350 V rms	 NB NB	 NB NB	 NB NB
Result (Pass/ Fail)	P	P	P

Note 1 : Primary fuse - Not used
Secondary fuse - Not used
Overtemp. protection - Not used
Impedance protection - Not used

Note 2 : Indicate method of measurement TC = with thermocouple / R = Resistance method
Note 3 : Record the voltage applied and the type of voltage (rms/d.c./peak) and for results use
NB : no breakdown or B : breakdown

Test was conducted at voltage 230 VAC, 50 Hz single phase

TEST EQUIPMENT LIST ITEM 1. Hybrid Recorder 2. AC Breakdown Tester

lause 4.4.2.6 Mains transformer FORM NO : XXVIII
Clause 14.7.2 Overload tests (for mains transformer) TX

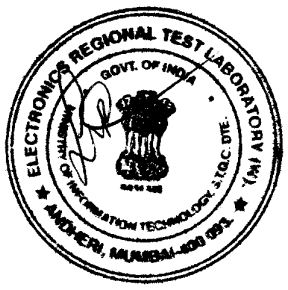
Type : Linear Transformer 12 NOV 2002 tested [-/] in Equipment or [ ] on Bench (both) Optional -- insulation class (IEC85) of the lowest rated winding :			
Winding identification	0 - 9 V	0 - 9 V	0 - 9 V
Type of Protector for winding	Thermal fuse	Thermal fuse	Thermal fuse
Elapsed time	2 hr	2 hr	2 hr
Current, A Primary Secondary	Overloaded for maximum obtainable VA other sec windings loaded with its normal load	Overloaded for maximum obtainable VA other sec windings loaded with its normal load	Overloaded for maximum obtainable VA other sec windings loaded with its normal load
Winding Temp., °C Primary (see note 2) Secondary	Thermal fuse operated after 2 hr, temp. of transformer winding measured to be 123°C at an ambient temperature of 29 °C (TC method)	Thermal fuse operated after 2 hr, temp. of transformer winding measured to be 128°C at an ambient temperature of 29 °C (TC method)	Thermal fuse operated after 2 hr, temp. of transformer winding measured to be 127°C at an ambient temperature of 29 °C (TC method)
Tissue paper/cheesecloth OK? (Pass/ Fail)	P	P	P
Voltage tests (see note 3) Primary to sec 2300 Vrms Primary to Core 1350 V rms	 NB NB	 NB NB	 NB NB
Result (Pass/ Fail)	P	P	P

Note 1 : Primary fuse - Not used
Secondary fuse - Not used
Overtemp. protection - 250V, 3 A, 130 °C Impedance protection

Note 2 : Indicate method of measurement TC = with thermocouple / R = Resistance method
Note 3 : Record the voltage applied and the type of voltage (rms/d.c./peak) and for results use
NB : no breakdown or B : breakdown

Test was conducted at voltage 230 VAC, 50 Hz, single phase

TEST EQUIPMENT LIST ITEM 1. Hybrid Recorder 2. AC Breakdown Tester



Electronics Regional Test Laboratory (West) Ministry of Communication and Information Technology (STQC Dte.)	Report No ERTL (W)/ 2002SAF046		
Subject: Safety Testing of Universal Electrical Analyser	Date 12 NOV 2002	Page 26	Of 26

3.0 GENERAL REMARKS: Nil

Report Approved By:

Head, Safety & EMC

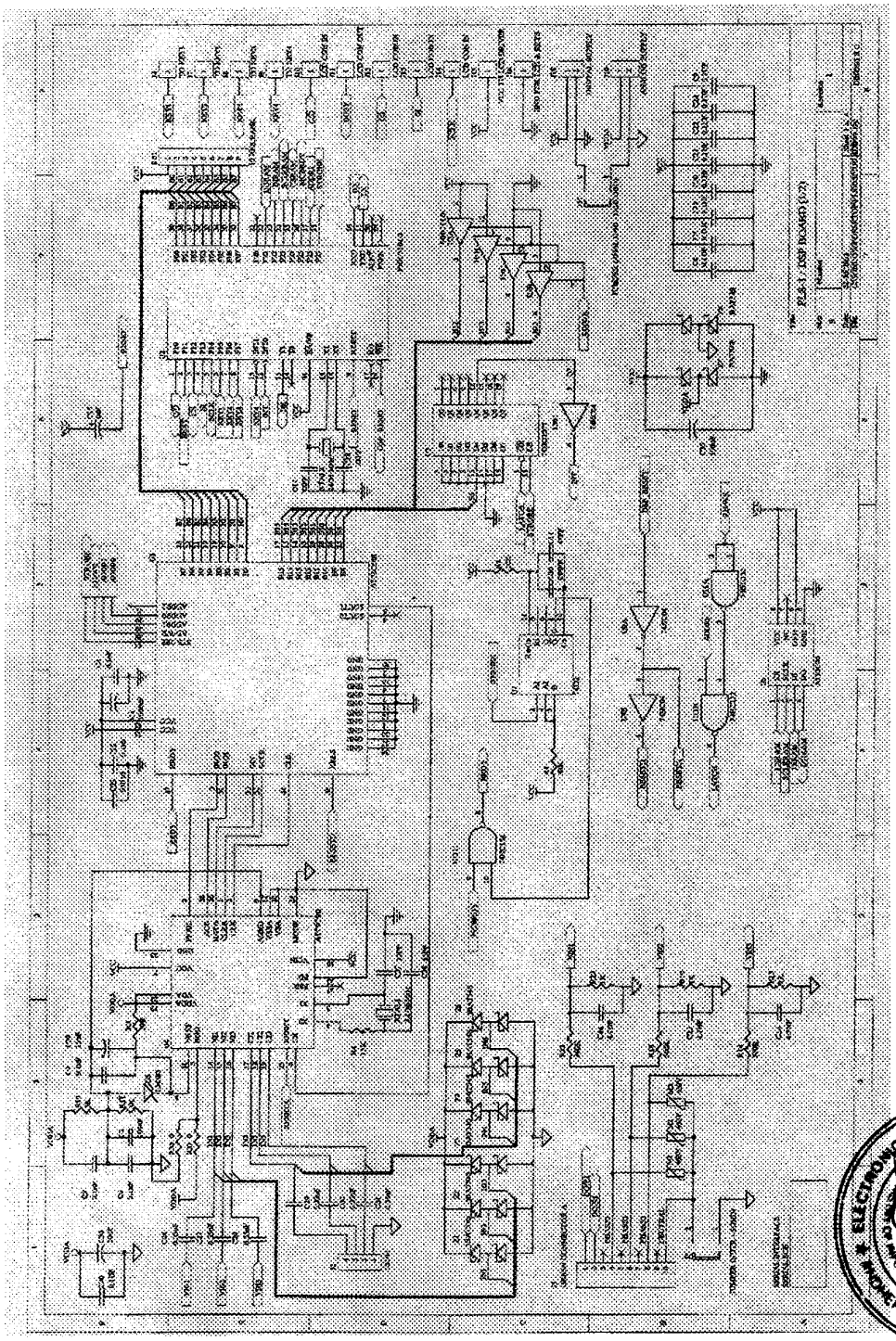
Report Released By:

OIC, Customer Service Cell

Annex 1

Electrical Schematics

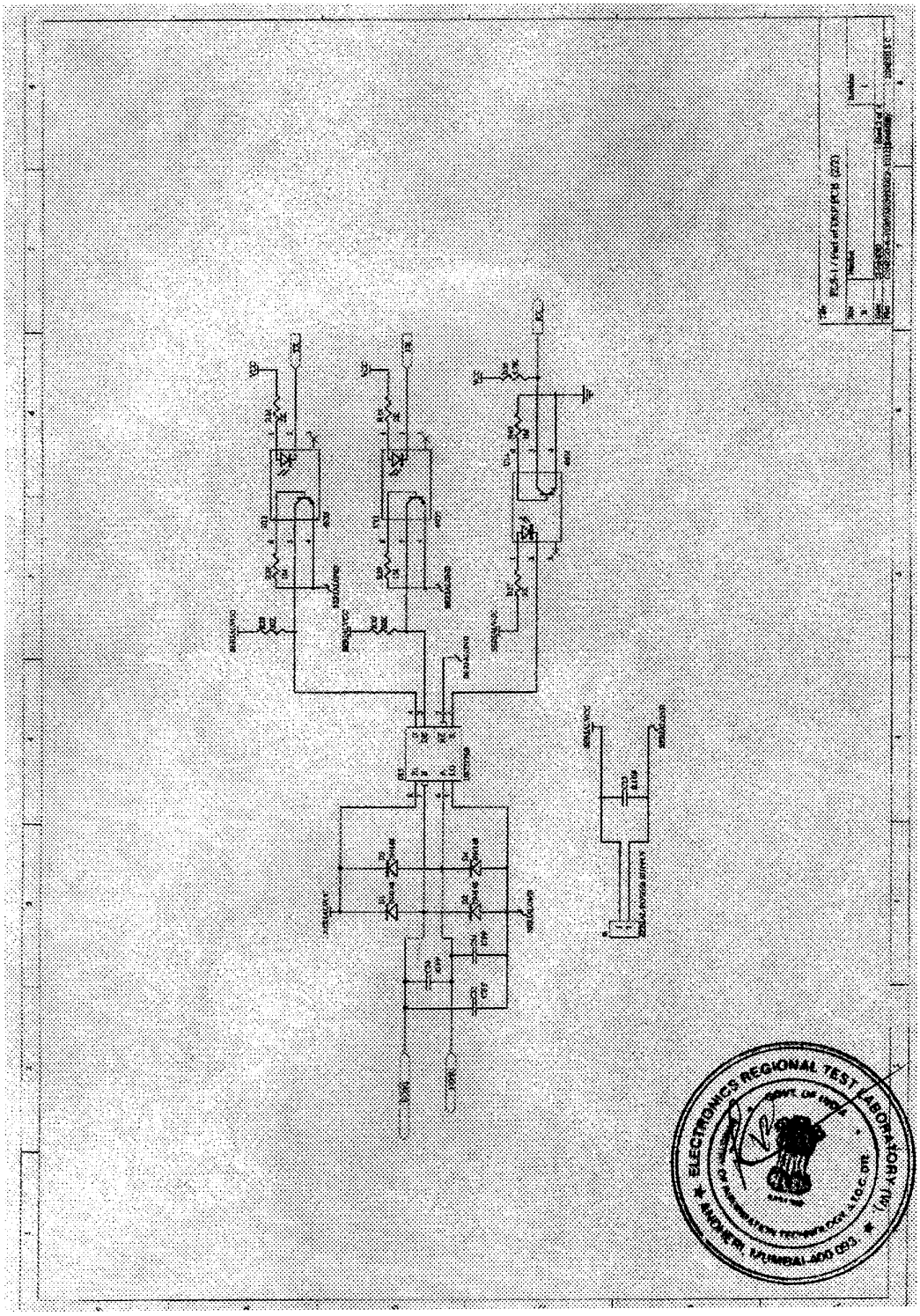
12 NOV 2002



Annex 1

Electrical Schematics

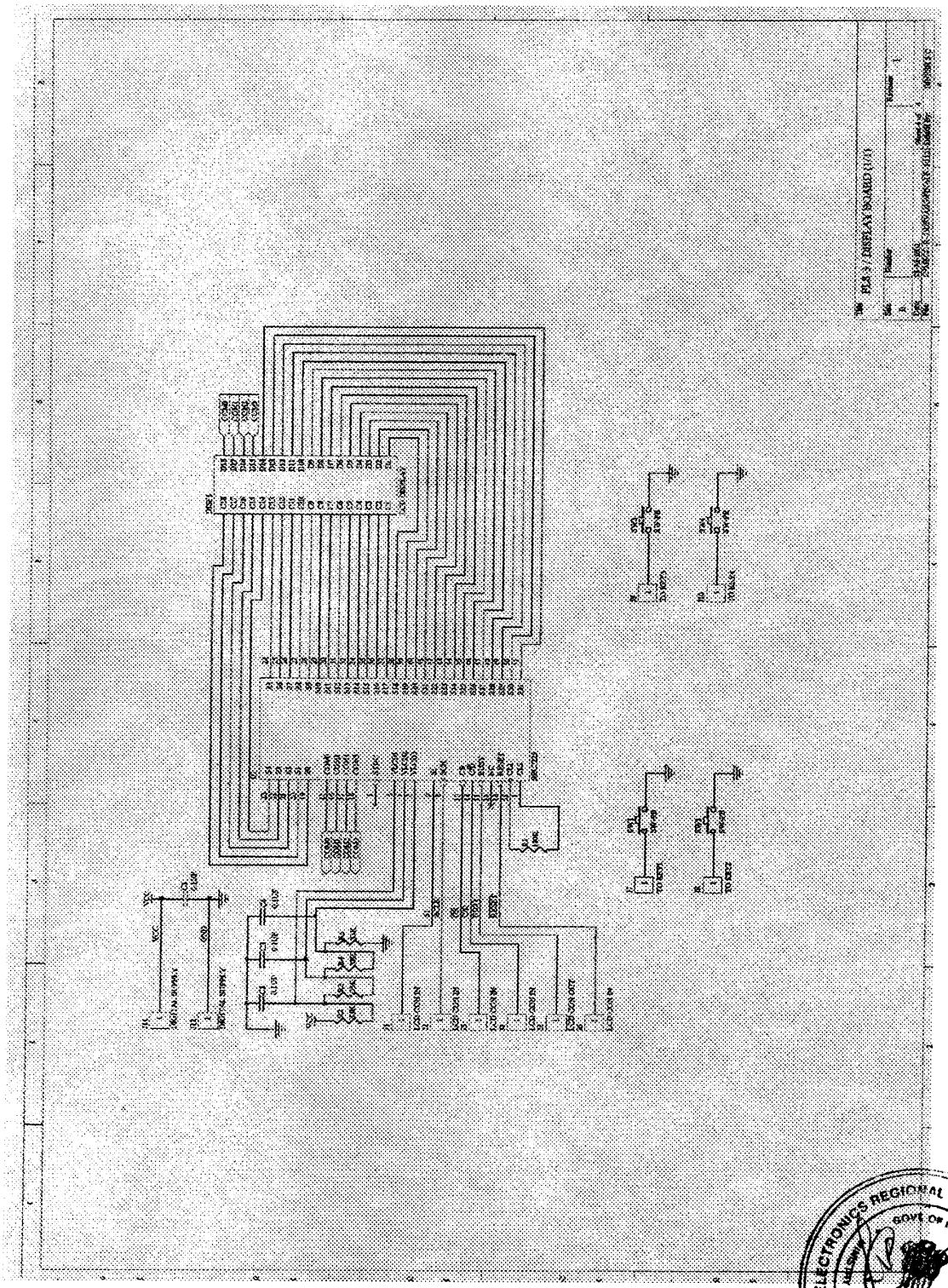
12 NOV 2002



Annex 1

Electrical Schematics

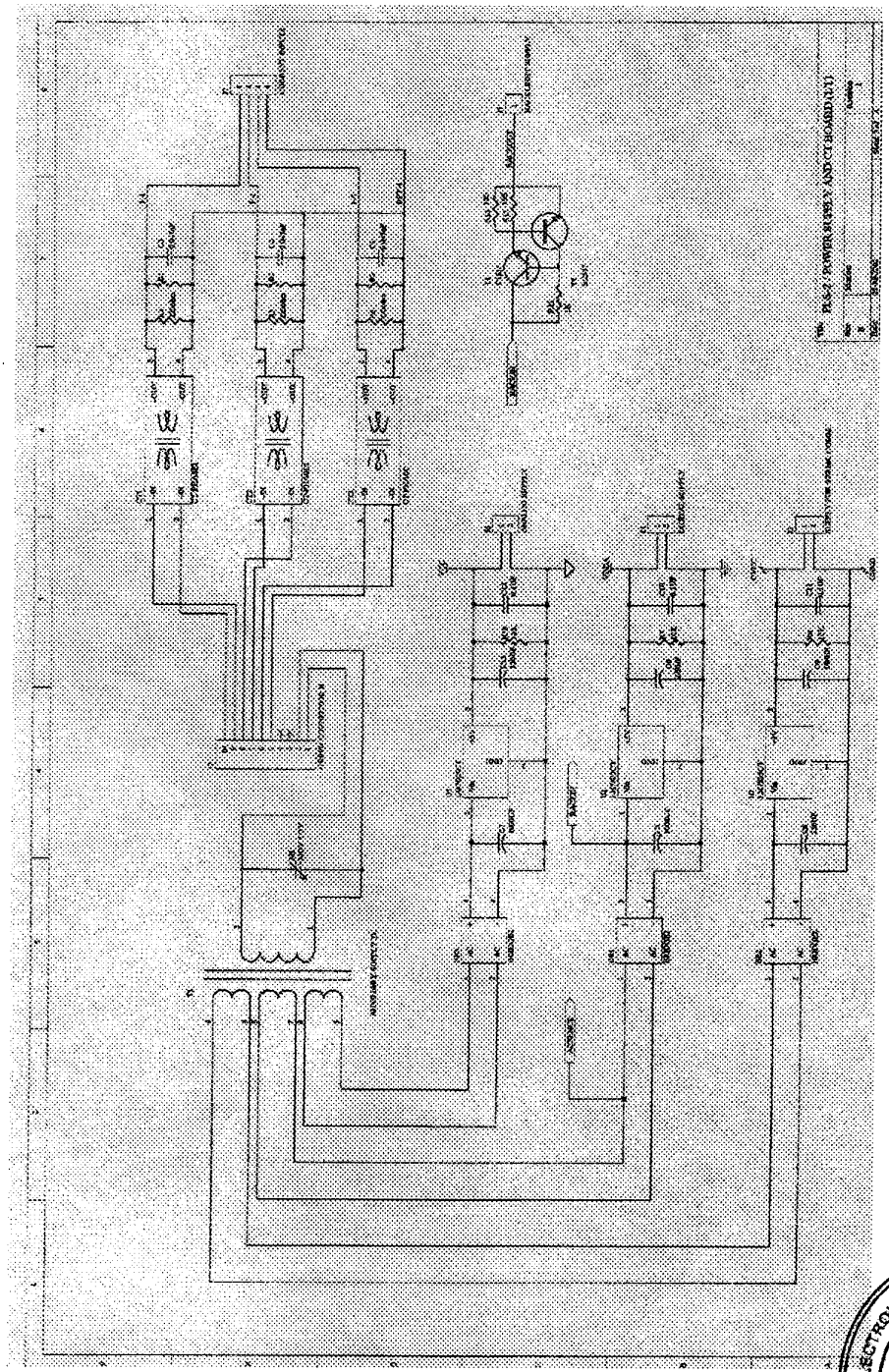
12 NOV 2002



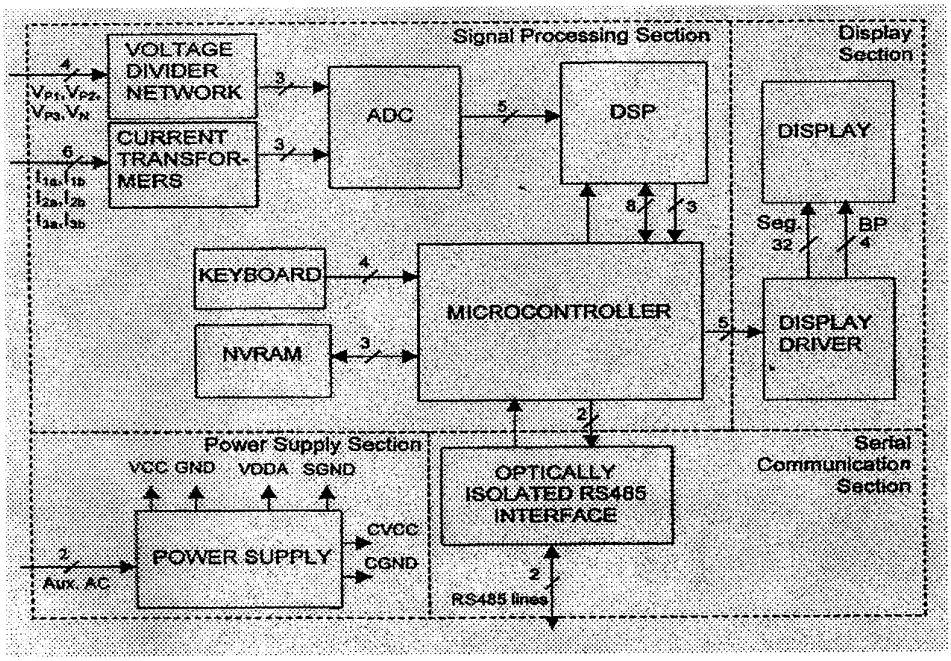
Annex 1

Electrical Schematics

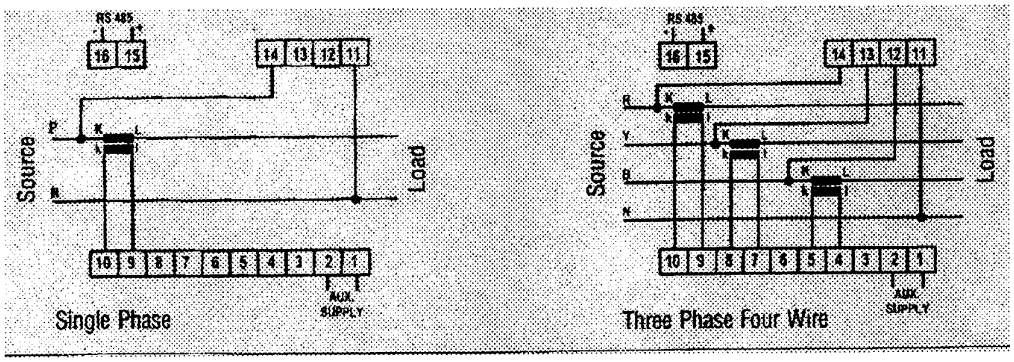
12 NOV 2002



Annex 2 12 NOV 2002



Block Diagram



Electrical Wiring Diagram

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ERTL (W) set up under the STQC Directorate, Ministry of Communications & Information Technology, Govt. of India has been accreditated under number of national / international systems as follows :

SYSTEM	AREA	STATUS
IECQ (International Electro-technical Commission on Quality Assessment System for Electronic Components)	**Component Testing** • Resistors (Fixed) • Capacitors (Fixed)	Accreditated as ITL (Independent Test Laboratory)
NABL (C), India National Accreditational Board for Test & Calibration laboratories (Calibration System)	**Calibration** • Electro-technical discipline • Thermal discipline • Mechanical discipline	Accreditated Calibration Laboratory
NABL(T), India National Accreditational Board for Test & Calibration laboratories (Testing System)	Electronic & Electrical Testing	Accreditated Test Laboratory
IECEE-CB Scheme	• Mains Operated Electronic Consumer Products	Approved as a CB test Laboratory
Other recognisation		Recognised by CSPO of State Govt., DOT, Naval Docyard, LCSO etc.