



TEST REPORT

IEC-EN 60950

SAFETY OF INFORMATION TECHNOLOGY EQUIPMENT

Report

Report reference No.....: 1924400-3335-0030 (18176)

Tested by.....: Jürgen Bärwinkel

Name in block letters and title

Approved by.....: Frank Richter

Name in block letters and title

Signature

Signature

Date of issue: 16.07.2002

This report is based on a blank test report that was prepared by FIMKO using information obtained from the TRF originator (see below)

Testing laboratory

Name: VDE Testing and Certification Institute

Address: Merianstraße 28, D-63069 Offenbach

Testing location: American Power Conversion Corp.

85 Rangeway Road Bldg. #2, N. Billerica, MA USA

TMP (TDAP File no. 1924400-9501-0001)

Applicant/Client

Name: American Power Conversion (APC)

Address: 85 Rangeway Road Bldg #2, N. Billerica, MA, 01862

Manufacturer

Name: American Power Conversion (APC)

Address: 85 Rangeway Road Bldg #2, N. Billerica, MA, 01862

Factory

See page 2

Test specification

Standard.....: EN 60950:2000 3rd Edition; IEC 60950:1999 + corr. 2000 modified;
DIN EN 60950 (VDE 0805):2001-12

Test procedure: CB, VDE

Procedure deviation: --

Non-standard test method: --

Test Report Form

Test Report Form No.....: 60950__E/00-08

TRF originator: FIMKO

Master TRF: dated 00-08

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Factory	
Name.....:	American Power Conversion
Address	Blk. 3, Lot 14, Phase 3, PEZA, Cavite Economic Zone, Rosario, Philippines
Factory	
Name.....:	
Address	
Factory	
Name.....:	
Address	
Factory	
Name.....:	
Address	
Factory	
Name.....:	
Address	

This test report includes the following appendices:			
Appendix 1	Markings	3	pages
Appendix 2	Critical Components List	3	pages
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Test item

Description : Uninterruptible Power Supply (UPS)
Trademark..... : APC
Manufacturer..... : American Power Conversion (APC)
Model and/or type reference : SU750RMI1U
Rating(s)..... : Input: AC 220-240V, 50-60HZ, 10A
..... : Output: AC 220-240V, 50-60HZ, 10A, 480W, 750VA

Model and/or type reference : SU1000RMI1U
Rating(s)..... : Input: AC 220-240V, 50-60HZ, 10A
..... : Output: AC 220-240V, 50-60HZ, 10A, 670W, 1000VA

Ambient: 40 °C

Particulars: test item vs. test requirements

Equipment mobility : movable / hand-held / stationary / fixed / permanent
connection / direct plug-in / for building-in
Operating condition : continuous / short-time / intermittent
Mains supply tolerance (%)..... : ---
Tested for IT power systems : Yes / No
IT testing, phase-phase voltage (V) : ---
Class of equipment : Class I / Class II / Class III
Mass of equipment (kg)..... : >18
Protection against ingress of water : ---

Test case verdicts

Test case does not apply to the test object : N(/A)
Test item does meet the requirement : P(ass)
Test item does not meet the requirement .. : F(ail)

Testing

Date of receipt of test item : March 03, 2002
Date(s) of performance of test : March 07, 2002 to May 23, 2002

General remarks

This report shall not be reproduced except in full without the written approval of the testing laboratory.
The test results presented in this report relate only to the item(s) tested.
"(see remark #)" refers to a remark appended to the report.
"(see Annex #)" refers to an annex appended to the report.
Throughout this report a comma is used as the decimal separator.
"C" refers to an CENELEC deviation



Copy of marking plate

See Appendix 1

(Information/Comment)

Complete details of construction and testing as well as supporting documentation such as photographs and schematics are included in the attachment

Operating Condition: Input : AC 220-240V, 50-60HZ, 10A
 Output : AC 220-240V, 50-60HZ, 480W, 750VA (SU750RMI1U)
 Output : AC 220-240V, 50-60HZ, 670W, 1000VA (SU1000RMI1U)

Product description:
This UPS is designed and approved for use in Installation Category II.



1	GENERAL		—
1.5	Components		—
1.5.1	Comply with IEC 950 or relevant component standard	(see appended table 1.5.1)	P
1.5.2	Evaluation and testing of components	Certified components are used in accordance with their ratings and certifications, and they comply with applicable parts of this standard. Components not certified are used in accordance with their ratings and they comply with applicable parts of IEC 950 and the relevant component standard. Components, for which no relevant IEC-Standard exists, have been tested under the conditions occurring in the equipment, using applicable parts of IEC 950.	P
	Dimensions (mm) of mains plug for direct plug-in :	Not direct plug-in equipment	N
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N) :		N
1.5.3	Thermal controls		N
1.5.4	Transformers	See annex C for details	P
1.5.5	Interconnecting cables		P
1.5.6	Capacitors in primary circuits :		P
1.5.7	Double or reinforced insulation bridged by components	Double or reinforced insulation bridged by transformers only	N
1.5.7.1	Bridging capacitors		N
1.5.7.2	Bridging resistors		N
1.5.7.3	Accessible parts		N
1.5.8	Components in equipment for IT power systems	Not for use on IT-system	N



1.6	Power interface		—
1.6.1	AC power distribution systems	TN- System	P
1.6.2	Input current	(see appended table 1.6.2)	P
1.6.3	Voltage limit of hand-held equipment	Equipment is not hand-held	N
1.6.4	Neutral conductor		P

1.7	Marking and instructions		—
1.7.1	Power rating	Refer to copy of rating label	P
	Rated voltage(s) or voltage range(s) (V)	AC 220-240V	P
	Symbol for nature of supply for d.c.	AC Unit	N
	Rated frequency or frequency range (Hz)	50 – 60 Hz	P
	Rated current (A)	10 A	P
	Manufacturer's name/Trademark	APC	P
	Type/model	SU750RMI1U, SU1000RMI1U	P
	Symbol of Class II	Class I equipment	N
	Other symbols		N
	Certification marks	VDE	N
1.7.2	Safety instructions	In English and German	P
1.7.3	Short duty cycles	See IEC 146-4 test report for run times (Appendix 5)	N
1.7.4	Supply voltage adjustment		N
1.7.5	Power outlets on the equipment	See Appendix 1	P
1.7.6	Fuse identification	Main Circuit Breaker is marked with ratings	P
1.7.7	Wiring terminals		P
1.7.7.1	Protective earthing and bonding terminals	Ground symbol (60417-2-IEC-5019)	P
1.7.7.2	Terminal for a.c. mains supply conductors	Appliance Inlet	P
1.7.8	Controls and indicators		P
1.7.8.1	Identification, location and marking		P
1.7.8.2	Colours		P



1.7.8.3	Symbols according to IEC 60417	Complies with IEC 417	P
1.7.8.4	Markings using figures		P
1.7.9	Isolation of multiple power sources		N
1.7.10	IT power system	Equipment not evaluated for use on IT power systems	N
1.7.11	Thermostats and other regulating devices	No adjustable thermal devices employed	N
1.7.12	Language	German / English	—
1.7.13	Durability		P
1.7.14	Removable parts	No marking on removable parts	P
1.7.15	Replaceable batteries	Replaceable Lead Acid Battery. See Appendix 3	P
	Language	German and English	—
1.7.16	Operator access with a tool	No hazards accessible	P
1.7.17	Equipment for restricted access locations	Unit is not evaluated for use in a restricted access area	N

2	PROTECTION FROM HAZARDS		—
2.1	Protection from electric shock and energy hazards		—
2.1.1	Protection in OPERATOR access areas	Access to SELV only	P
2.1.1.1	Access to energized parts		P
	Test by inspection		P
	Test with test finger		P
	Test with test pin		P
	Test with test probe		P
2.1.1.2	Battery compartments	No TNV circuits	N
2.1.1.3	Access to ELV wiring	No ELV circuits	N
	Working voltage (V); distance (mm) through insulation	(see appended table 2.10.5)	—
2.1.1.4	Access to hazardous voltage circuit wiring		P
2.1.1.5	Energy hazards	Battery terminals are protected	P
2.1.1.6	Manual controls		P



2.1.1.7	Discharge of capacitors in the primary circuit		P
	Time-constant (s); measured voltage (V):	See data below	—
2.1.2	Protection in service access areas		P
2.1.3	Protection in restricted access locations		N

Location	Switch Position	V _{in} (V _{rms})	V _{in} (V _{peak})	37% V _{in} (Volts)	V _t (Volts)	T.C. (mS)
Phase to Neutral	On	254	360	133,2	0	2
Phase to Neutral	Off	254	360	133,2	0	2
Phase to ground	On	254	360	133,2	0	1
Phase to Ground	Off	254	360	133,2	0	1,7
Neutral to ground	On	254	360	133,2	0	1
Neutral to Ground	Off	254	360	133,2	0	1

2.2	SELV circuits		—
2.2.1	General requirements		P
2.2.2	Voltages under normal conditions (V).....:	Less than or equal to 42.4 Vpk or 60 Vdc	P
2.2.3	Voltages under fault conditions (V).....:	Less than or equal to 42.4 Vpk or 60 Vdc	P
2.2.3.1	Separation by double or reinforced insulation (method 1)		P
2.2.3.2	Separation by earthed screen (method 2)	Not used	N
2.2.3.3	Protection by earthing of the SELV circuit (method 3)	Not used	N
2.2.4	Connection of SELV circuits to other circuits.....:	SELV circuits are not connected to other circuits	N



2.3	TNV circuits		—
2.3.1	Limits	No TNV circuits	N
	Type of TNV circuits		—
2.3.2	Separation from other circuits and from accessible parts		N
	Insulation employed.....		—
2.3.3	Separation from hazardous voltages		N
	Insulation employed.....		—
2.3.4	Connection of TNV circuits to other circuits		N
	Insulation employed.....		—
2.3.5	Test for operating voltages generated externally		N

2.4	Limited current circuits		—
2.4.1	General requirements	No limited current circuits	N
2.4.2	Limit values		N
	Frequency (Hz)		—
	Measured current (mA).....		—
	Measured voltage (V)		—
	Measured capacitance (μ F).....		—
2.4.3	Connection of limited current circuits to other circuits		N

2.5	Limited power sources	Display board is protected by a limited power source.	P
	Inherently limited output		P
	Impedance limited output		N
	Overcurrent protective device limited output		N
	Regulating network limited output under normal operating and single fault condition		N
	Regulating network limited output under normal operating conditions and overcurrent protective device limited output under single fault condition		N
	Output voltage (V), output current (A), apparent power (VA)	5V, 113 mA, 0.56 VA	—
	Current rating of overcurrent protective device (A)		—



2.6	Provisions for earthing and bonding				—
2.6.1	Protective earthing			Accessible metal parts are reliably earthed	P
2.6.2	Functional earthing				N
2.6.3	Protective earthing and protective bonding conductors				P
2.6.3.1	Size of protective earthing conductors				P
	Rated current (A), cross-sectional area (mm2), AWG:				—
2.6.3.2	Size of protective bonding conductors				P
	Rated current (A), cross-sectional area (mm2), AWG:				—
2.6.3.3	Rated current (A), type and nominal thread diameter (mm) :				P
	Resistance (Ω) of earthing conductors and their terminations, test current (A) :			25A for 1 minute. See results below	P
2.6.3.4	Colour of insulation..... :			Green/Yellow used only for protection earthing	N
2.6.4	Terminals			Appliance Inlet	—
2.6.4.1	Protective earthing and bonding terminals			Appliance Inlet	P
	Rated current (A), type and nominal thread diameter (mm) :			Appliance Inlet	—
2.6.4.2	Separation of the protective earthing conductor from protective bonding conductors				P
2.6.5	Integrity of protective earthing				P
2.6.5.1	Interconnection of equipment				P
2.6.5.2	Components in protective earthing conductors and protective bonding conductors			There are no switches or fuses in the earthing conductor	P
2.6.5.3	Disconnection of protective earth				P
2.6.5.4	Parts that can be removed by an operator				N
2.6.5.5	Parts removed during servicing				P
2.6.5.6	Corrosion resistance				P
2.6.5.7	Screws for protective bonding				P
2.6.5.8	Reliance on telecommunication network			No TNV circuits	N
Test Point (from)		Test Point (to)	Current (A)	Time (minutes)	Resistance (Ohms)
Gnd. Terminal		Battery Door	25	1	0,075
Gnd. Terminal		Enclosure, front	25	1	0,075
Gnd. Terminal		Enclosure, side	25	1	0,073
Pri. Gnd Trace		Chassis (J9)	25	1	



2.7	Overcurrent and earth fault protection in primary circuits		—
2.7.1	Basic requirements	VDE approved circuit breaker is used for overcurrent and earth fault protection. See Appendix 2	P
	Instructions when protection relies on building installation		N
2.7.2	Faults not covered in 5.3	Adequate fault protection N/A for "C"	P
2.7.3	Short-circuit backup protection	Protective devices have adequate breaking (rupturing) capacity to interrupt the max. fault current (including short circuit), see 2.7.1	P
2.7.4	Number and location of protective devices		P
2.7.5	Protection by several devices		N
2.7.6	Warning to service personnel		N

2.8	Safety interlocks		—
2.8.1	General principles	No safety interlock	N
2.8.2	Protection requirements		N
2.8.3	Inadvertent reactivation		N
2.8.4	Fail-safe operation		N
2.8.5	Interlocks with moving parts		N
2.8.6	Overriding an interlock		N
2.8.7	Switches and relays in interlock systems		N
2.8.7.1	Contact gaps (mm)		N
2.8.7.2	Overload test		N
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test (V)	(see appended table 5.2)	N
2.8.8	Mechanical actuators		N



2.9	Electrical insulation		—
2.9.1	Properties of insulating materials	No hygroscopic, rubber or asbestos materials used.	P
2.9.2	Humidity conditioning	95 / 25°C	P
2.9.3	Requirements for insulation	See clause 2.10 and 5.2	P
2.9.4	Insulation parameters		P
2.9.5	Categories of insulation	Operational, Basic, Supplementary, Reinforced or Double Insulation is used.	P

2.10	Clearances, creepage distances and distances through insulation		—
2.10.1	General	Installation Category II is used for this unit.	P
2.10.2	Determination of working voltage	Max. 250 Vrms	P
2.10.3	Clearances	See General	P
2.10.3.1	General	See General	P
2.10.3.2	Clearances in primary circuit	See General	P
2.10.3.3	Clearances in secondary circuits	See General	P
2.10.3.4	Measurement of transient levels		N
2.10.4	Creepage distances	See General	P
	CTI tests		—
2.10.5	Solid insulation	See General	P
2.10.5.1	Minimum distance through insulation	See General	P
2.10.5.2	Thin sheet material	Used in transformers	P
	Number of layers (pcs)	3 minimum. See Annex C	—
	Electric strength test	(see appended table 5.2)	—
2.10.5.3	Printed boards		N
	Distance through insulation		N
	Electric strength test for thin sheet insulating material	(see appended table 5.2)	—
	Number of layers (pcs)		N
2.10.5.4	Wound components	Triple insulated wire is used for Transformers CT1 and CT2	P
	Number of layers (pcs)	3 Layers	P
	Two wires in contact inside component; angle between 45° and 90°		P
2.10.6	Coated printed boards		N



2.10.6.1	General		N
2.10.6.2	Sample preparation and preliminary inspection		N
2.10.6.3	Thermal cycling		N
2.10.6.4	Thermal ageing (°C)		N
2.10.6.5	Electric strength test	(see appended table 5.2)	—
2.10.6.6	Abrasion resistance test		N
	Electric strength test	(see appended table 5.2)	—
2.10.7	Enclosed and sealed parts		N
	Temperature $T_1=T_2 = T_{mra} - T_{amb} + 10K$ (°C).....		N
2.10.8	Spacings filled by insulating compound		N
	Electric strength test	(see appended table 5.2)	—
2.10.9	Component external terminations		P
2.10.10	Insulation with varying dimensions		N

3	WIRING, CONNECTIONS AND SUPPLY		—
3.1	General		—
3.1.1	Current rating and overcurrent protection	All internal wiring used in the distribution of primary power protected against overcurrent and short circuit by suitably rated protective devices	P
3.1.2	Protection against mechanical damage	3.1.2, 3.1.3: The wires are well routed away from sharp edges, etc. The wires are also adequately fixed to prevent excessive strain on wire and terminals, and avoid damage to the insulation	P
3.1.3	Securing of internal wiring	Wires are positioned in such a manner that prevents excessive strain, loosening of terminal connections and damage of conductor insulation	P
3.1.4	Insulation of conductors	Insulation on internal conductors are considered to be of adequate quality, and suitable for the application and working voltage	P
3.1.5	Beads and ceramic insulators	Beads or ceramic insulators are not use	N
3.1.6	Screws for electrical contact pressure		P



3.1.7	Non-metallic materials in electrical connections	The equipment does not have any electrical connections that rely on insulation material for adequate contact pressure	N
3.1.8	Self-tapping and spaced thread screws	Thread cutting or space thread screws are not used for ele. Connections.	N
3.1.9	Termination of conductors		P
	10 N pull test		P
3.1.10	Sleeving on wiring		P

3.2	Connection to a.c. mains supplies		—
3.2.1	Means of connection	Appliance Inlet	P
3.2.2	Multiple supply connections		N
3.2.3	Permanently connected equipment		N
	Number of conductors, diameter (mm) of cable and conduits	Appliance Inlet	—
3.2.4	Appliance inlets		N
3.2.5	Power supply cords	Mains Input power cord was not part of this investigation "C"	P
	Type.....		—
	Rated current (A), cross-sectional area (mm ²), AWG		—
3.2.6	Cord anchorages and strain relief		N
	Mass of equipment (kg), pull (N)		—
	Longitudinal displacement (mm)		—
3.2.7	Protection against mechanical damage		N
3.2.8	Cord guards		N
	D (mm); test mass (g)		—
	Radius of curvature of cord (mm).....		—
3.2.9	Supply wiring space		P



3.3	Wiring terminals for connection of external conductors		—
3.3.1	Wiring terminals		N
3.3.2	Connection of non-detachable power supply cords		N
3.3.3	Screw terminals		N
3.3.4	Rated current (A), cord/cable type, cross-sectional area (mm ²)		N
3.3.5	Rated current (A), type and nominal thread diameter (mm)		N
3.3.6	Wiring terminals design		N
3.3.7	Grouping of wiring terminals		N
3.3.8	Stranded wire		N

3.4	Disconnection from the a.c. mains supply		—
3.4.1	General requirement		P
3.4.2	Disconnect devices	Appliance Coupler	P
3.4.3	Permanently connected equipment		N
3.4.4	Parts which remain energized		N
3.4.5	Switches in flexible cords		N
3.4.6	Single-phase equipment		P
3.4.7	Three-phase equipment		N
3.4.8	Switches as disconnect devices		N
3.4.9	Plugs as disconnect devices		N
3.4.10	Interconnected equipment		N
3.4.11	Multiple power sources		N

3.5	Interconnection of equipment		—
3.5.1	General requirements	There are no TNV circuits in the equipment	P
3.5.2	Types of interconnection circuits	No ELV interconnection circuits	P
3.5.3	ELV circuits as interconnection circuits	No ELV interconnection circuits	N



4	PHYSICAL REQUIREMENTS		—
4.1	Stability	Component for building-in	—
	Angle of 10°	10°	N
	Test: force (N)..... :		N

4.2	Mechanical strength		—
4.2.1	General	Component for building-in	P
4.2.2	Steady force test, 10 N	10 N	P
4.2.3	Steady force test, 30 N	30 N	P
4.2.4	Steady force test, 250 N	250 N	P
4.2.5	Impact test	The entire enclosure is made of metal	P
4.2.6	Drop test		N
4.2.7	Stress relief		N
4.2.8	Cathode ray tubes	No CRT provided	N
	Picture tube separately certified :	(See separate test report or attached certificate)	N
4.2.9	High pressure lamps	No high pressure lamps in the unit	N
4.2.10	Wall or ceiling mounted equipment; force (N) :		N

4.3	Design and construction		—
4.3.1	Edges and corners	All edges and corners were judged to be sufficiently well rounded as to not constitute a hazard	P
4.3.2	Handles and manual controls; force (N) :	15 / 20 N	P
4.3.3	Adjustable controls		P
4.3.4	Securing of parts	No loosening of parts impairing creepage distances or clearances is likely to occur	P
4.3.5	Connection of plugs and sockets	All outlets are IEC approved	P
4.3.6	Direct plug-in equipment		N
	Torque (Nm) :		—
4.3.7	Heating elements in earthed equipment	No heating element in the unit	N
4.3.8	Batteries	See IEC 146 report (Annex 5)	P
4.3.9	Oil and grease	Insulation is not exposed to oil, grease, etc.	N



4.3.10	Dust, powders, liquids and gases	Equipment does not produce dust	N
4.3.11	Containers for liquids or gases		N
4.3.12	Flammable liquids..... :		N
	Quantity of liquid (l)..... :		N
	Flash point (°C)..... :		N
4.3.13	Radiation; type of radiation :	"C"	N
	Equipment using lasers	LED with diffuse light emission under normal and abnormal condition remains in Laser class 1 LEDs see appendix 11	P

4.4	Protection against hazardous moving parts		—
4.4.1	General		P
4.4.2	Protection in operator access areas		P
4.4.3	Protection in restricted access locations		N
4.4.4	Protection in service access areas		P

4.5	Thermal requirements		—
4.5.1	Temperature rises	(see appended table 4.5)	P
	Normal load condition per Annex L :		N
4.5.2	Resistance to abnormal heat	Based on the physical characteristic of the thermoplastic materials employed in the power supply, this test was not considered necessary	N

4.6	Openings in enclosures		—
4.6.1	Top and side openings	Side openings only	P
	Dimensions (mm) :	71 hexagonal openings, each opening is 7 mm at the wide maximum. 70 openings, each opening is 3.7 mm diameter.	—
4.6.2	Bottoms of fire enclosures	No openings in the bottom of the unit	P
	Construction of the bottom :	Metal enclosure	—
4.6.3	Doors or covers in fire enclosures	Battery door is hinged and can't be easily detached from the unit	P



4.6.4	Openings in transportable equipment		N
4.6.5	Adhesives for constructional purposes		N
	Conditioning temperature/time :		—

4.7	Resistance to fire		—
4.7.1	Reducing the risk of ignition and spread of flame	All components are used within their temperature ratings, no fire hazard.	P
4.7.2	Conditions for a fire enclosure	Enclosure is entirely made of metal	P
4.7.2.1	Parts requiring a fire enclosure	See 4.7.2	P
4.7.2.2	Parts not requiring a fire enclosure	Front bezel	P
4.7.3	Materials		P
4.7.3.1	General		P
4.7.3.2	Materials for fire enclosures	Enclosure is entirely made of metal	P
4.7.3.3	Materials for components and other parts outside fire enclosures	Front Bezel rated HB (decorative only)	P
4.7.3.4	Materials for components and other parts inside fire enclosures	All internal materials are rated V-2 or better, or are mounted on printed wiring boards rated V-1 or better.	P
4.7.3.5	Materials for air filter assemblies	No air filters provided in the unit	N
4.7.3.6	Materials used in high-voltage components	No high-voltage components	N

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5	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		—
5.1	Touch current and protective conductor current		P
5.1.1	General		P
5.1.2	Equipment under test (EUT)		P
5.1.3	Test circuit	Fig. 5A	P
5.1.4	Application of measuring instrument	D1	P
5.1.5	Test procedure		P
5.1.6	Test measurements	U2/500	P
	Test voltage (V)	254	—
	Measured current (mA)	1,6	—
	Max. allowed current (mA)	3,5	—
5.1.7	Equipment with touch current exceeding 3.5 mA.....		N
5.1.8	Touch currents to and from telecommunication networks	No Active TNV components	N
5.1.8.1	Limitation of the touch current to a telecommunication network		N
	Test voltage (V)		
	Measured current (mA)		
	Max. allowed current (mA)		
5.1.8.2	Summation of touch currents from telecommunication networks		N

5.2	Electric strength		—
5.2.1	General	(see appended table 5.2)	P
5.2.2	Test procedure	(see appended table 5.2)	P

5.3	Abnormal operating and fault conditions		—
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors	(see appended Annex B)	P
5.3.3	Transformers	(see appended Annex C)	P
5.3.4	Functional insulation.....	Functional insulation complies with the requirement (a), (b) or (c)	P
5.3.5	Electromechanical components	No electromechanical components	N
5.3.6	Simulation of faults	(see appended table 5.3)	P
5.3.7	Unattended equipment		N



5.3.8	Compliance criteria for abnormal operating and fault conditions	(see appended table 5.3)	P
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6	CONNECTION TO TELECOMMUNICATION NETWORKS		—
6.1	Protection of telecommunication network service personnel, and users of other equipment connected to the network, from hazards in the equipment	No TNV circuits	N
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements		N
	Test voltage (V)		—
	Current in the test circuit (mA)		—
6.1.2.2	Exclusions.....		N
6.2	Protection of equipment users from overvoltages on telecommunication networks		—
6.2.1	Separation requirements		N
6.2.2	Electric strength test procedure		N
6.2.2.1	Impulse test	(see appended table 5.2)	N
6.2.2.2	Steady-state test	(see appended table 5.2)	N
6.2.2.3	Compliance criteria		N
6.3	Protection of telecommunication wiring system from overheating		—
	Max. output current (A)		—
	Current limiting method		—

A	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		—
A.1	Flammability test for fire enclosures of movable equipment having a total mass exceeding 18 kg, and of stationary equipment (see 4.7.3.2)		—
A.1.1	Samples, material.....		—
	Wall thickness (mm)		—
A.1.2	Conditioning of samples; temperature (°C)		N
A.1.3	Mounting of samples		N
A.1.4	Test flame		N
A.1.5	Test procedure		N
A.1.6	Compliance criteria		N
	Sample 1 burning time (s)		—



	Sample 2 burning time (s)		—
	Sample 3 burning time (s)		—

A.2	Flammability test for fire enclosures of movable equipment having a total mass not exceeding 18 kg, and for material and components located inside fire enclosures (see 4.7.3.2 and 4.7.3.4)		—
A.2.1	Samples, material		—
	Wall thickness (mm)		—
A.2.6	Compliance criteria		N
	Sample 1 burning time (s)		—
	Sample 2 burning time (s)		—
	Sample 3 burning time (s)		—
A.2.7	Alternative test acc. to IEC 60695-2-2, cl. 4, 8		N
	Sample 1 burning time (s)		—
	Sample 2 burning time (s)		—
	Sample 3 burning time (s)		—
A.3	High current arcing ignition test (see 4.7.3.2)		—
A.3.1	Samples, material		—
	Wall thickness (mm)		—
A.3.5	Compliance criteria		N
	Sample 1 number of arcs to ignition (pcs)		—
	Sample 2 number of arcs to ignition (pcs)		—
	Sample 3 number of arcs to ignition (pcs)		—
	Sample 4 number of arcs to ignition (pcs)		—
	Sample 5 number of arcs to ignition (pcs)		—

A.4	Hot wire ignition test (see 4.7.3.2)		—
A.4.1	Samples, material		—
	Wall thickness (mm)		—
A.4.5	Compliance criteria		N
	Sample 1 ignition time (s)		—
	Sample 2 ignition time (s)		—
	Sample 3 ignition time (s)		—
	Sample 4 ignition time (s)		—
	Sample 5 ignition time (s)		—



A.5	Hot flaming oil test (see 4.6.2)		N
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A.6	Flammability tests for classifying materials V-0, V-1 or V-2		—
A.6.1	Samples, material		—
	Wall thickness (mm)		—
A.6.5	Compliance criteria	(see appended table A.6.5) Note: This clause is not applicable if A.6.6 conducted	N
A.6.6	Permitted retest	(see appended table A.6.6)	N

A.7	Flammability test for classifying foamed materials HF-1, HF-2 or HFB		—
A.7.1	Sample, material		—
	Wall thickness (mm)		—
A.7.4	Compliance criteria	(see appended table A.7.4 - A.7.7)	N
A.7.5	Compliance criteria, HF-2	(see appended table A.7.4 - A.7.7) Note: This clause is not applicable if A.7.8 conducted	N
A.7.6	Compliance criteria, HF-1	(see appended table A.7.4 - A.7.7) Note: This clause is not applicable if A.7.8 conducted	N
A.7.7	Compliance criteria, HBF	(see appended table A.7.4 - A.7.7) Note: This clause is not applicable if A.7.9 conducted	N
A.7.8	Permitted retest, HF-1 or HF-2	(see appended table A.7.8)	N
A.7.9	Permitted retest, HBF	(see appended table A.7.9)	N

A.8	Flammability test for classifying materials HB		—
A.8.1	Samples, material		—
	Sample thickness (mm)		—
A.8.2	Conditioning of samples; temperature (°C)		N
A.8.4	Test procedure		N
A.8.5	Compliance criteria	(see appended table A.8.5) Note: This clause is not applicable if A.8.6 conducted	N
A.8.6	Permitted retest	(see appended table A.8.6)	N



A.9	Flammability test for classifying materials 5V		—
A.9.1	Samples, material..... :		—
	Sample thickness (mm)..... :		—
A.9.4	Test procedure, test bars		N
A.9.5	Test procedure, test plaques		N
A.9.6	Compliance criteria	Note: This clause is not applicable if A.9.7 conducted	N
A.9.7	Permitted retest	(see appended table A.9.7)	N

A.10	Stress relief conditioning (see 4.2.7)		N
	Temperature (°C)..... :		—

B	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (SEE 4.7.2.2 AND 5.3.2)		—
B.1	General requirements		—
	Position :	DC Fan	—
	Manufacturer :	See Components List	—
	Type :	See Components List	—
	Rated values :	24VDC	—
B.2	Test conditions		N
B.3	Maximum temperatures	(see appended table 5.3)	N
B.4	Running overload test	(see appended table 5.3)	N
B.5	Locked-rotor overload test		—
	Test duration (days) :		—
	Electric strength test: test voltage (V) :		—
B.6	Running overload test for DC motors in secondary circuits		N
B.7	Locked-rotor overload test for DC motors in secondary circuits	max 54.4 °C / 7 h	P
B.7.1	Test procedure	(see appended table 5.3)	N
B.7.2	Alternative test procedure; test time (h) :		N
B.7.3	Electric strength test	(see appended table 5.2)	N
B.8	Test for motors with capacitors	(see appended table 5.3)	N
B.9	Test for three-phase motors	(see appended table 5.3)	N
B.10	Test for series motors		N
	Operating voltage (V) :		—



C	ANNEX C, TRANSFORMERS (SEE 1.5.4 AND 5.3.3)		—
	Position	Main Transformer	—
	Manufacturer	Leader	—
	Type	430-1222	—
	Rated values	See Appendix 6 for details	—
	Method of protection	(see appended table 5.3)	—
C.1	Overload test	(see appended table 5.3)	P
C.2	Insulation	(see appended table 5.2)	P
	Protection from displacement of windings		P

NOTE:

See attached drawings (appendix 6) for details.

C	ANNEX C, TRANSFORMERS (SEE 1.5.4 AND 5.3.3)		—
	Position	Sense Transformer T1, T2	—
	Manufacturer	Leader/Eastar/Shanghai SK Transformer Co., LTD.	—
	Type	430-0030	—
	Rated values	See Appendix 6 for details	—
	Method of protection	(see appended table 5.3)	—
C.1	Overload test	(see appended table 5.3)	N
C.2	Insulation	(see appended table 5.2),	P
	Protection from displacement of windings		P

NOTE:

See attached drawings (appendix 6) for details.



C	ANNEX C, TRANSFORMERS (SEE 1.5.4 AND 5.3.3)		—
	Position	Sense Transformer CT1	—
	Manufacturer	Falco	—
	Type	460-0006	—
	Rated values	See Appendix 6 for details	—
	Method of protection	(see appended table 5.3)	—
C.1	Overload test	(see appended table 5.3)	N
C.2	Insulation	(see appended table 5.2)	P
	Protection from displacement of windings		P
NOTE: Primary winding is triple insulated wire. See attached drawings (appendix 6) for details.			

C	ANNEX C, TRANSFORMERS (SEE 1.5.4 AND 5.3.3)		—
	Position	Sense Transformer CT2	—
	Manufacturer	Falco	—
	Type	460-1501A	—
	Rated values	See Appendix 6 for details	—
	Method of protection	(see appended table 5.3)	—
C.1	Overload test	(see appended table 5.3)	N
C.2	Insulation	(see appended table 5.2),	P
	Protection from displacement of windings		P
NOTE: Primary winding is triple insulated wire. See attached drawings (appendix 6) for details.			



J	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (SEE 2.6.5.6)		—
	Metal used		N

K	ANNEX K, THERMAL CONTROLS (SEE 1.5.3 AND 5.3.7)		—
K.1	Making and breaking capacity		N
K.2	Thermostat reliability; operating voltage (V)..... :		N
K.3	Thermostat endurance test; operating voltage (V) .. :		N
K.4	Temperature limiter endurance; operating voltage (V)		N
K.5	Thermal cut-out reliability		N
K.6	Stability of operation	(see appended table 5.3)	N

M	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (SEE 2.3.1)		—
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringling signal		N
M.3.1.1	Frequency (f)		—
M.3.1.2	Voltage (V)		—
M.3.1.3	Cadence; time (s), voltage (V)		—
M.3.1.4	Single fault current (mA)..... :		—
M.3.2	Tripping device and monitoring voltage..... :		N
M.3.2.1	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2	Tripping device		N
M.3.2.3	Monitoring voltage (V)		N



U	ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (SEE 2.10.5.4)		—
U.1	Wire construction	Triple insulated wire used in CT1 and CT2 is VDE certified to annex U, see annex C for details. Totoku TIW-2 Furukawa TEX-E Rubadue T14A01FXX-3	P
	Number of spirally wrapped layers of polyimide tape		—
U.2	Conformance tests		P
	Temperature (°C); humidity (%)		—
U.2.1	Electric strength		P
	Test voltage (V)		—
U.2.2	Adherence and flexibility		P
	Electric strength test: test voltage (V); temperature (°C)		—
U.2.3	Heat shock		P
	Electric strength test: test voltage (V)		—
U.2.4	Retention of electric strength after bending		—
	Electric strength test: test voltage (V)		—
U.2.5	Resistance to abrasion		P
U.3	Production line test		P
	Routine testing for electric strength: test voltage (V)		—



1.5.1	TABLE: list of critical components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾	
see Appendix 2						
¹⁾ an asterisk indicates a mark which assures the agreed level of surveillance						

1.6.2	TABLE: electrical data (in normal conditions)						P
fuse #	I rated (A)	U (V)	P (W)	I (A)	I fuse (A)	condition/status	
SU750MI1U							
Input	10	220	500	3.7	---	Normal	
Output	10	217	470	3.4	---	Normal	
Input	10	230	490	3.6	---	Normal	
Output	10	228	480	3.4	---	Normal	
Input	10	240	486	3.5	---	Normal	
Output	10	238	460	3.2	---	Normal	
Input	10	220	560	3.8	---	Recharge	
Output	10	216	480	3.6	---	Recharge	
Input	10	230	580	3.0	---	Recharge	
Output	10	226	490	3.1	---	Recharge	
Input	10	240	630	3.5	---	Recharge	
Output	10	236	480	3.2	---	Recharge	
Note:							



1.6.2		TABLE: electrical data (in normal conditions)					P
fuse #	Irated (A)	U (V)	P (W)	I (A)	Ifuse (A)	condition/status	
SU1000RMI1U							
Input	10	220	690	4.8	---	Normal	
Output	10	219	667	4.7	---	Normal	
Input	10	230	690	4.7	---	Normal	
Output	10	230	670	4.5	---	Normal	
Input	10	240	690	4.4	---	Normal	
Output	10	240	670	4.2	---	Normal	
Input	10	220	780	5.2	---	Recharge	
Output	10	220	670	5.0	---	Recharge	
Input	10	230	780	4.9	---	Recharge	
Output	10	226	670	4.9	---	Recharge	
Input	10	240	780	4.7	---	Recharge	
Output	10	240	670	4.7	---	Recharge	
Note:							



2.10.3 and 2.10.4	TABLE: clearance and creepage distance measurements					P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
PWB: Primary to Ground	360	254	2,0	2,0	2,5	2,5
PWB: Primary to SELV	360	254	4,0	5,0	5,0	5,0
T1: Primary to Ground	360	254	2,0	2,0	2,5	2,5
T1 Primary to SELV	360	254	4,0	4,0	5,0	5,0
Main Transformer: Pri to Gnd	360	254	2,0	2,0	2,5	2,5
Main Transformer: Pri to SELV	360	254	4,0	5,0	5,0	5,0
T2: Primary to Ground	360	254	2,0	2,0	2,5	2,5
T2 Primary to SELV	360	254	4,0	4,0	5,0	5,0
Relays: Pri to SELV	360	254	4,0	5,0	5,0	5,0
CT1: Primary to SELV	360	254	4,0	5,0	5,0	5,0
CT2: Primary to SELV	360	254	4,0	5,0	5,0	5,0
Note:	The folloing components are not used on the PWB: IC20, R179, R177, D41, R176, R175, Q38, R211, R199, CT400, J401, J400, J405, J406					

2.10.5	TABLE: distance through insulation measurements			P
distance through insulation di at/of:	U r.m.s. (V)	test voltage (V)	required di (mm)	di (mm)
Main Transformer: Pri to SELV	250	3000	3 layers tape	3 layers tape used. 2 layers tested with 3000VAC
Sleeving on Primary wires	250	3000	0,4	>0,4



4.5	TABLE: temperature rise measurements				P
	UPS Normal Mode				
	test voltage (V)	240V			
	t1 (°C)	25			
	t2 (°C)	25			
nrise dT of part/at:		dT (K)	allowed dT (K)		
Transformer Primary		28,2	130		
Transformer Primary		27,2	130		
Transformer Secondary		47,6	130		
Transformer Secondary		46,4	130		
Inductor L4A		14,8	75		
Inductor L4B		13,7	75		
Inductor L3		14,5	75		
Relay RY3		0,8	75		
MOV MV2		8,7	75		
FET 1		40,7	75		
FET 2		40,8	75		
FET 3		41,1	75		
Battery 1		8,8	30		
Battery 2		8,2	30		



4.5	TABLE: temperature rise measurements				P
	UPS Normal Mode				
	test voltage (V)	204V			
	t1 (°C)	27			
	t2 (°C)	27			
rise dT of part/at:		dT (K)	allowed dT (K)		
Transformer Primary		47,1	130		
Transformer Primary		46,1	130		
Transformer Secondary		65,8	130		
Transformer Secondary		58,7	130		
Inductor L4A		18,9	75		
Inductor L4B		17,4	75		
Inductor L3		17	75		
MOV MV2		10,6	75		
FET 1		43,4	75		
FET 2		44,2	75		
FET 3		45	75		
Battery 1		8,2	30		
Battery 2		7,1	30		



4.5	TABLE: temperature rise measurements				P
	UPS Normal Mode				
	test voltage (V)	172V			
	t1 (°C)	28			
	t2 (°C)	28			
rise dT of part/at:		dT (K)	allowed dT (K)		
Transformer Primary		81,5	130		
Transformer Primary		80,4	130		
Transformer Secondary		95,3	130		
Transformer Secondary		96,6	130		
Inductor L4A		33,5	75		
Inductor L4B		31,6	75		
Inductor L3		25,6	75		
MOV MV2		16,4	75		
FET 1		50,0	75		
FET 2		50,7	75		
FET 3		53,7	75		
Battery 1		10,5	30		
Battery 2		9,6	30		



4.5	TABLE: temperature rise measurements				P
	UPS Normal Mode				
	test voltage (V)	254V			
	t1 (°C)	27			
	t2 (°C)	27			
rise dT of part/at:		dT (K)	allowed dT (K)		
Transformer Primary		53,7	130		
Transformer Primary		53,3	130		
Transformer Secondary		61,6	130		
Transformer Secondary		66,2	130		
Inductor L4A		22,0	75		
Inductor L4B		20,0	75		
Inductor L3		16,7	75		
MOV MV2		12,8	75		
FET 1		46,9	75		
FET 2		47,8	75		
FET 3		48,6	75		
Battery 1		13,8	30		
Battery 2		12,3	30		



4.5.2	TABLE: ball pressure test of thermoplastic parts		N
	allowed impression diameter (mm): ≤ 2 mm		—
part	test temperature (°C)	impression diameter (mm)	

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5.2	TABLE: electric strength tests and impulse tests		P
test voltage applied between:		test voltage (V)	breakdown Yes / No
Primary to ground		1500VAC	No
Primary to SELV		4243VDC	No
Transformer 430-1222 by Leader Pri-SELV		3000VAC	No
Transformer 430-1222 by Leader Pri-Core		1500VAC	No
Transformer 430-1222 by Leader Sec-Core		1500VAC	No
Transformer T1, T2 Pri-Sec		3000VAC	No
Transformer T1, T2 Pri-Core		1500VAC	No
Transformer T1, T2 Sec-Core		1500VAC	No
supplementary information			
Test voltage a.c. / d.c.			

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5.3	TABLE: fault condition and SELV reliability tests						P
	ambient temperature (°C)	25					—
	model/type of power supply						—
	manufacturer of power supply	APC					—
	rated markings of power supply						—
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result	
Output	Short Circuit	240	2 seconds	N/A		Unit shut down, current limiting mode	
Output	Short Circuit	0 (inverter)	2 seconds	N/A		Unit shut down, current limiting mode	
Output	Overload	240		N/A		VDE Certified circuit breaker tripped	
Output	Overload	0 (inverter)	2 minutes	N/A		Unit shut down due to low battery	
Fan (490-0036)	Locked Rotor	24Vdc	7 Hours	N/A		Temperatures stabilized. Temperature Rise: 30.4°C UL Listed	
T1A	Short Circuit	240Vac	7 Hours	N/A		Temperatures stabilized.	
Q6	Short Circuit	240Vac	1 Hours	N/A		Temperatures stabilized.	
Q36	Short Circuit	240Vac	7 Hours	N/A		Unit shut down, current limiting mode	
IC3	Short Circuit	240Vac	7 Hours	N/A		Temperatures stabilized.	
Enclosure	Locked Rotor	240Vac	7 Hours	N/A		Temperatures stabilized.	
Enclosure	Locked Rotor	0 (inverter)	2 Minutes	N/A		Unit shut down due to low battery	
supplementary information							



A.6.5	TABLE: flammability test for classifying materials V-0, V-1 or V-2	N
A.6.6	TABLE: flammability re-test for classifying materials V-0, V-1 or V-2	N
A.7.4, A.7.5, A.7.6 and A.7.7	TABLE: flammability test for classifying foam materials HF-1, HF-2 or HBF	N
A.7.8	TABLE: flammability re-test for classifying foam materials HF-1 or HF-2	N
A.7.9	TABLE: flammability re-test for classifying foam materials HBF	N
A.8.5	TABLE: flammability test for classifying materials HB	N
A.8.6	TABLE: flammability re-test for classifying materials HB	N
A.9.6	TABLE: flammability test for classifying materials 5V	N
A.9.7	TABLE: flammability re-test for classifying materials 5V	N



Clause	Requirement – Test	Result	Verdict
	SPECIAL NATIONAL CONDITIONS AND NATIONAL DEVIATIONS A = National Deviation (A-deviation) C = CENELEC Common Modification F = other information S = Special National Condition		P
	C: delete all the "country" notes that appear on the following pages of the reference document (IEC 60950:1999): 85, 91, 99, 103, 117, 119, 123, 125, 149, 171, 213, 215, 219, 251, 283, 325, 327, 331, 333 and 407		P
1.2.4.1	S (DK): certain types of Class I appliances (see subclause 3.2.1) may be provided with a plug not establishing earthing continuity when inserted into Danish socket-outlets		N
1.5.1	A (CH, SE): add the following: NOTE: Switches containing mercury such as thermostats, relays and level controllers are not allowed		P
1.5.8	S (NO): due to the IT power system used (see annex V, figure V.7), capacitors are required to be rated for the applicable phase-to phase voltage (230 V)		N
1.7.2	S (NO): class I pluggable equipment type A intended for connection to other equipment or a communication network shall, if safety relies on connection to protective earth, require a marking stating that the equipment must be connected to an earthed mains socket outlet	Label will be provided by the manufacturer	P
	S (SE): if the separation between the mains and SELV terminal relies upon connection to the safety earth, the apparatus shall have a marking stating that it must be connected to an earthed mains socket-outlet. The marking text shall be in Swedish and as follows: "Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk."	Label will be provided by the manufacturer	P
	A (DK): supply cords of Class I equipment, which are delivered without a plug must be provided with a visible tag with the following text: "Vigtigt! Lederen med grøn/gul isolation må kun tilsluttes en klemme mærket  eller  (IEC 417, No. 5019 eller IEC 417, No. 5017)." If essential for the safety of the equipment, the tag must in addition be provided with a diagram, which shows the connection of the other conductors, or be provided with the following text: "For tilslutning af de øvrige ledere, se medfølgende installationsvejledning."		N



Clause	Requirement – Test	Result	Verdict
1.7.5	S (DK): socket-outlets for providing power to other equipment shall be in accordance with the Heavy Current Regulations, Section 107-2-D1, Standard Sheet DK 1-3a, DK 1-5a or DK 1-7a, when used on Class I equipment		N
	A (DK): Class II equipment shall not be fitted with socket-outlets for providing power to other equipment		N
1.7.12	<p>A (DE): (Gesetz über technische Arbeitsmittel (Gerätesicherheitsgesetz) [Law on technical labour equipment {Equipment safety law}], of 23rd October 1992, Article 3, 3rd paragraph, 2nd sentence, together with the "Allgemeine Verwaltungsvorschrift zur Durchführung des Zweiten Abschnitts des Gerätesicherheitsgesetzes" [General administrative regulation on the execution of the Second Section of the Equipment safety law], of 10th January 1996, article 2, 4th paragraph item 2)</p> <p>Directions for use with rules to prevent certain hazards for (among others) maintenance of the technical labour equipment, also for imported technical labour equipment shall be written in the German language.</p> <p>NOTE: Of this requirement, rules for use even only by service personnel are not exempted</p>		P
1.7.15	A (CH): (Ordinance on environmentally hazardous substances SR 814.013) Annex 4.10 of SR 814.013 applies for batteries		N
	F (ALL): warning texts for lithium batteries		N
	Languages		—
2.2.4	S (NO): requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply		P
2.3.2	S (NO): requirements according to this annex, sub-clause 6.1.2.1 apply		P
2.3.3	S (NO): requirements according to this annex, sub-clause 6.1.2.1 apply		P
2.3.4	S (NO): requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply		P



Clause	Requirement – Test	Result	Verdict
2.7.1	<p>C: replace the subclause as follows:</p> <p>Basic requirements To protect against excessive current, short circuits and earth faults in primary circuits, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b), and c):</p> <p>a) Except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as integral parts of the equipment.</p> <p>b) For components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short circuit and earth fault protection may be provided by protective devices in the building installation.</p> <p>c) It is permitted for pluggable equipment type B or permanently connected equipment, to rely on dedicated overcurrent and short circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers, is fully specified in the installation instruction.</p> <p>If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for pluggable equipment type A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet</p>		P
2.7.2	C: This subclause has been declared 'void'		P
2.10.3.1	S (NO): due to the IT power distribution system used (see annex V, figure V.7), the a.c. mains supply voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault		N



Clause	Requirement – Test	Result	Verdict
3.2.1	<p>S (CH): supply cords of equipment having a rated current not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 884-1 and one of the following dimensions sheets:</p> <ul style="list-style-type: none">- SEV 6532-2:1991: plug type 15, 3P+N+PE 250/400 V, 10 A- SEV 6533-2:1991: plug type 11, L+N 250 V, 10 A- SEV 6534-2:1991: plug type 12, L+N+PE 250 V, 10 A <p>In general, EN 60 309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and socket-outlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998:</p> <ul style="list-style-type: none">- SEV 5932-2:1998: plug type 25, 3L+N+PE 230/400 V, 16 A- SEV 5933-2:1998: plug type 21, L+N 250 V, 16 A- SEV 5934-2:1998: plug type 23, L+N+PE 250 V, 16 A		N
	<p>S (DK): supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to the Heavy Current Regulations Section 107-2-D1.</p> <p>Class I equipment provided with socket-outlets with earth contacts or which are intended to be used in locations where protection against indirect contact is required according to the wiring rules shall be provided with a plug in accordance with Standard Sheet DK 2-1a or DK 2-5a.</p> <p>If poly-phase equipment and single-phase equipment having a rated current exceeding 10 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations Section 107-D1 or EN 60309-2</p>		N



Clause	Requirement – Test	Result	Verdict
	<p>S (ES): supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to UNE 20315:1994</p> <p>Supply cords of single-phase equipment having a rated current not exceeding 2,5 A shall be provided with a plug according to UNE-EN 50075:1993</p> <p>Class I equipment provided with socket-outlets with earth contacts, or which are intended to be used locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994</p> <p>If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2</p>		N
	<p>S (GB): apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to BS 1363 by means of that flexible cable or cord and plug, shall be fitted with a "standard plug" in accordance with Statutory Instrument 1768:1994 – The Plugs and Sockets etc. (Safety) Regulations 1994, unless exempted by those regulations.</p> <p>NOTE: "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug</p>		N
	<p>S (IE): apparatus which is fitted with a flexible cable or cord and is designed to be connected to a mains socket conforming to I.S. 411 by means of that flexible cable or cord and plug shall be fitted with a 13 A plug in accordance with Statutory Instrument 525: 1997 – National Standards Authority of Ireland (section 28) (13 A Plugs and Conversion Adaptors for Domestic Use) Regulations 1997</p>		N
3.2.3	<p>C: delete note 1, and in table 3A delete the conduit sizes in parentheses</p>		P



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Clause	Requirement – Test	Result	Verdict
4.3.13	<p>C: replace the second compliance paragraph by: For equipment using LEDs or lasers, compliance is checked according to EN 60825-1</p> <p>NOTE 1 – If equipment falling within the scope of EN 60950 is inherently a class 1 laser product, i.e. it contains no embedded laser or LED of a higher class number, then a laser warning label or other laser warning statement is not required (see 1.1 of EN 60825-1)</p> <p>Renumber the NOTE below the third compliance paragraph as NOTE 2</p>		P
6.1.2.1	<p>S (NO, SE): add the following text between the first and second paragraph:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none">- two layers of thin sheet material, each of which shall pass the electric strength test below, or- one layer having a distance through insulation of at least 0,4 mm, which shall pass the electric strength test below. <p>If this insulation forms part of a semiconductor component e.g. an optocoupler, there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that clearances and creepage distances do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition:</p> <ul style="list-style-type: none">- passes the tests and inspection criteria of 2.10.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.7 shall be performed using 1,5 kV); and- is subjected to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV. <p>It is permitted to bridge this insulation with a capacitor complying with EN 132400:1994, subclass Y2</p>		P
6.1.2.2	<p>S (FI, NO, SE): the exclusions are applicable for permanently connected equipment and pluggable equipment type B only</p>		P
G.2	<p>S (NO): due to the IT power distribution system used (see annex V, figure V.7), the a.c. mains supply voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault</p>		N



Clause	Requirement – Test	Result	Verdict
ANNEX H	C: replace the last paragraph of this annex by: At any point 10 cm from the surface of the operator access area, the dose rate shall not exceed 1 μ Sv/h (0,1 mR/h) (see note). Account is taken of the background level		P
	C: replace the NOTE as follows: NOTE – These values appear in Directive 96/29/Euratom		P
	<p>A (DE):</p> <p>(Regulation on protection against hazards by X-ray, of 8th January 1987, Article 5 [Operation of X-ray emission source], clauses 1 to 4)</p> <p>a) A licence is required by those who operate an X-ray emission source.</p> <p>b) A licence in accordance with Cl. 1 is not required by those who operate an X-ray emission source on which the electron acceleration voltage does not exceed 20 kV if</p> <p>1) the local dose rate at a distance of 0,1 m from the surface does not exceed 1 μSv/h and</p> <p>2) it is adequately indicated on the X-ray emission source that</p> <p>i) X-rays are generated and</p> <p>ii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer.</p> <p>c) A licence in accordance with Cl. 1 is also not required by persons who operate an X-ray emission source on which the electron acceleration voltage exceeds 20 kV if</p> <p>1) the X-ray emission source has been granted a type approval and</p> <p>2) it is adequately indicated on the X-ray emission source that</p> <p>i) X-rays are generated</p> <p>ii) the device stipulated by the manufacturer or importer guarantees that the maximum permissible local dose rate in accordance with the type approval is not exceeded and</p> <p>iii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer.</p> <p>d) Furthermore, a licence in accordance with Cl. 1 is also not required by persons who operate X-ray emission sources on which the electron acceleration voltage does not exceed 30 kV if</p>		N



Clause	Requirement – Test	Result	Verdict
	1) the X-rays are generated only by intrinsically safe CRTs complying with Enclosure III, No. 6, 2) the values stipulated in accordance with Enclosure III, No. 6.2 are limited by technical measures and specified in the device and 3) it is adequately indicated on the X-ray emission source that the X-rays generated are adequately screened by the intrinsically safe CRT		
ANNEX P	C: replace the text of this annex by: See Annex ZA		P
ANNEX Q	C: Add the following notes for the standards indicated: IEC 60127 series NOTE: Harmonized as EN 60127 series (not modified) IEC 60269-2-1 NOTE: Harmonized as HD 630.2.1 S2:1997 (modified) IEC 60529 NOTE: Harmonized as EN 60529:1991 (not modified) IEC 61032 NOTE: Harmonized as EN 61032:1998 (not modified)		P
ANNEX ZA	C: This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies. NOTE: When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.		P
	— IEC 60050-151:1978 — IEC 60050-195:1998 EN 600651):1993 + corr. Nov. 1993 IEC 60065 (mod):1985 EN 60073:1996 IEC 60073:1996 HD 566 S1:1990 IEC 60085:1984 HD 214 S2:1980 IEC 60112:1979 HD 212) Series IEC 60227 (mod) Series HD 223) Series IEC 60245 (mod) Series EN 60309 Series IEC 60309 Series EN 60320 Series IEC 60320 (mod) Series HD 384.3 S2:1995 IEC 60364-3 (mod):1993 HD 384.4.41 S2:1996 IEC 60364-4-41 (mod):1992 — IEC 60384-14:1993 EN 60417-1:1999 IEC 60417-1:1998		



Clause	Requirement – Test	Result	Verdict
	EN 60417-2:1999 HD 625.1 S1:1996 + corr. Nov. 1996 EN 60695-2-2/1:1996 EN 60695-2-2:1994 — EN 60730-1:1995 EN 60825-1:1994 + corr. Feb. 1995 + A11:1996 EN 60851-3:1996 EN 60851-5:1996 EN 60851-6:1996 — EN 60990:1999 — —	IEC 60417-2:1998 IEC 60664-1 (mod):1992 IEC 60695-2-1/1:1994 + corr. May 1995 IEC 60695-2-2:1991 IEC 60695-10-2:1995 IEC 60730-1 (mod):1993 IEC 60825-1:1993 IEC 60851-3:1995 IEC 60851-5:1996 IEC 60851-6:1996 IEC 60885-1:1987 IEC 60990:1999 IEC 61058-1:1996 ISO 261:1973	
	— — — — ITU-T Recommendation K.17:1988, Tests on power-fed repeaters using solid-state devices in order to check the arrangements for protection from external interference ITU-T Recommendation K.21:1996, Resistibility of subscribers' terminals to overvoltages and overcurrents 1) EN 60065:1993 is superseded by EN 60065:1998 + corrigendum June 1999, which is based on IEC 60065:1998, mod. 2) The HD 21 series is related to, but not directly equivalent with the IEC 60227 series. 3) The HD 22 series is related to, but not directly equivalent with the IEC 60245 series.	ISO 262:1973 ISO 3864:1984 ISO 4046:1978 ISO 7000:1989	



Clause	Requirement – Test	Result	Verdict
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IEC 60950, 3rd edition (1999)

Information technology equipment including electrical business equipment

Issuance and recognition: Adherence by the country does not automatically imply that its NCB(s) are entitled to issue CB Test Certificates for this standard. At the date of the issue, CB Test Certificates for equipment in accordance with the standard concerned are issued and recognized by the National Certification Bodies (NCBs) of the following countries. The letter "R" adjacent to the name of the country indicates that the National Certification Body is only a Recognizing NCB for the standard in question.

Country	Remark	Group differ.	National differ.	National standard
AT Austria		Yes		
CA Canada	R		Yes	CAN/CSA C22.2 No. 60950 / UL 60950 3 rd Edition pr EN 60950
CH Switzerland		Yes		
CZ Czech Republic		Yes		
DE Germany	R (#)			
DK Denmark				
FI Finland		Yes	Yes	EN 60950
FR France				
GB United Kingdom				
HU Hungary		Yes		MSZ EN 60950
NL The Netherlands				
NO Norway		Yes	Yes	NEK EN 60950
PL Poland	R			
RU Russian Federation	R			
SE Sweden		Yes	Yes	SS EN 60950, 6 th Edition
SI Slovenia		Yes		
SG Singapore				
US United States of America	R		Yes	UL 60950
ZA South Africa				SABS IEC 60950

(#) Remark: According to information from VDE this indication is not correct !

NATIONAL DIFFERENCES

Canada (CA)

GENERAL

Canada and the United States of America have adopted a single, bi-national standard, CAN/CSA C22.2 No. 60950/UL60950, Third Edition, based on IEC 60950, Third Edition. This standard may be used for product certification immediately, however, the previous version of the standard may also be used until April 1, 2003.

Note: The previous version is CAN/CSA C22.2 No. 950-95/UL 1950-1997, Third Edition, based on IEC 60950, 2nd Edition including Amendments 1, 2, 3 and 4. Refer to the „IEC 60950, 2nd Edition + Amds 1, 2, 3 & 4, CA” section of the CB Bulletin for the national differences in this version of the standard



Clause	Requirement – Test	Result	Verdict
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The following is a summary of the key national differences from IEC 60950, 3rd Edition. The standard (CAN/CSA C22.2 No. 60950/UL 60950, Third Edition) should be consulted for further details on the national differences summarized below.

SPECIAL NATIONAL CONDITIONS

Those requirements are identified as Special National Conditions since they are directly related to the Canadian Electrical code (CEC), Part 1 and the Canadian Building Code, which are referenced in legislation and which form the basis for the rules and practices followed in electrical and other building installations in Canada.

Notes:

- * "CEC" denotes Canadian Electrical Code.
- * "NEC" denotes US National Electrical Code.
- * Due to common Canadian and US national differences, products that are in compliance with the Canadian national differences are also considered in compliance with the US national differences.

1.1.1	All equipment design and installations are required to be in accordance with the Canadian Electrical Code (CEC), Part 1, CAN/CSA C22.1, and with National Electrical Code (NEC), ANSI/NFPA 70, and, unless marked or otherwise identified, the Standard for the Protection of Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75.		P
1.5.5	For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g. DP, CL2) specified in the CEC/NEC. For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies which are not types specified in the CEC/NEC are required to have special construction features and identification markings.		N
1.7.1	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. A voltage rating that exceeds an attachment plug cap rating is only permitted if it does not exceed the extreme operating conditions in Table 2 of CAN/CSA C22.2 No. 235, and if it is part of a range that extends into the Table 2 „Normal Operating Conditions“. Likewise, a voltage rating shall not be lower than the specified „Normal Operating Conditions“, unless it is part of a range that extends into the „Normal Operating Conditions“.		N
2.5	Where a fuse is used to provide Class 2, Limited Power Source, or TNV current limiting, it shall not be operator-accessible unless it is not interchangeable.		N



Clause	Requirement – Test	Result	Verdict
2.7.1	Suitable CEC/NEC branch circuit protection is required for all standard supply outlets, receptacles and medium-base or smaller lampholders if the supply branch circuit protection is not suitable. Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require transformer overcurrent protection.		N
3.2	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains shall be in accordance with the CEC/NEC.		N
3.2.1	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.		N
3.2.3	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.		N
3.2.5	Power supply cords are required to be no longer than 4.5 m in length. Flexible power supply cords are required to be compatible with Tables 11 & 12 of the CEC, and Article 400 of the NEC.		N
3.2.9	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.		P
3.3	Wiring terminals and associated spacings for field wiring connections shall comply with CAN/CSA C22.2 No. 0.		P
3.3.3	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm ²).		N
3.3.4	Terminals for permanent wiring, including protective earthing terminals are required to be suitable for Canadian/U.S. wire gauge sizes, rated 125 percent of the equipment rating, and specially marked when specified (1.7.7).		P
3.4.2	Motor control devices are required for cord-connected equipment with a motor if the equipment is rated more than 12 A, or if the motor has a nominal voltage rating greater than 120 V or is rated more than 1/3 hp (locked rotor current over 43 A).		N
3.4.8	Vertically-mounted disconnect switches and circuit breakers are required to have the "on" position indicated by the handle in the up position.		P
3.4.10	For computer room applications, equipment with battery systems capable of supplying 750 VA for five minutes are required to have a battery disconnect means that may be connected to the computer room remote power-off circuit.		N
4.3.12	The maximum quantity of flammable liquid stored in equipment is required to comply with NFPA 30.		N
4.3.13	Equipment with lasers is required to meet Code of Federal Regulations 21CFR 1040 and/or Canadian Radiation Emitting Devices Act, REDR C1370, as applicable.		N
4.7.1	For computer room applications, automated information storage systems with com-bustible media greater than 27 cubic feet are required to have a provision for con-nection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		N



Clause	Requirement – Test	Result	Verdict
4.7.3.1	For computer room applications, enclosures with combustible material measuring greater than 0.9 m ² or a single dimension greater than 1.8 m, are required to have a flame spread rating of 50 or less. For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less.		N
Annex H	Equipment that produces ionizing radiation is required to comply with Code of Federal Regulations, 21 CFR 1020 and/or Canadian Radiation Emitting Devices Act, REDR C1370, as applicable.		N

OTHER DIFFERENCES

The following key national differences are based on requirements other than national regulatory requirements. The bi-national standard (CAN/CSA C22.2 No. 60950/UL 60950, Third Edition) referenced above should be consulted for further details on the national differences summarized below.

1.5.2	<p>Components of equipment must be suitable for the application, and must comply with the requirements of the equipment standard and the applicable national (Canadian and/or U.S.) component or material standards, as far as they may apply.</p> <p>The acceptance will be based on the following:</p> <p>E) A component Certified by a Canadian or U.S. National Certification Body (NCB) to a Canadian or U.S. component standard will be checked for correct application and use in accordance with its specified rating. Where necessary, it will also be subject to the applicable tests of the equipment standard.</p> <p>F) A component, which has a CB Test Certificate for compliance with a relevant IEC component standard, will be checked for correct application and use in accordance with its specified ratings. Where necessary, it will also be subject to the applicable tests of the equipment standard, and to the applicable tests of the Canadian and/or U.S. component or material standard, under the conditions occurring in the equipment.</p> <p>G) A component, which has no approval as in A) or B) above or which is used not in accordance with its specified ratings, will be subject to the applicable tests of the equipment standard, and to the applicable tests of the Canadian and/or U.S. component or material standard, under the conditions occurring in the equipment.</p> <p>H) Some components may require annual re-testing, which may be carried out by the manufacturer, CSA International or another laboratory.</p>		P
2.3.1	For TNV-2 and TNV-3 circuits with other than ringing signals and with voltages exceeding 42.4 Vp or 60 Vd.c., the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 ma d.c. under normal operating conditions.		N
2.6.3.3	When subject to impedance testing, protective earthing and bonding are required to be tested to the additional test conditions that originate in CAN/CSA C22.2 No. 0.4.		P



Clause	Requirement – Test	Result	Verdict
4.2.8.1	Enclosures around CRTs having a diagonal dimension of 160 mm or more are re-quired to reduce the risk of injury due to the implosion of the CRT.		N
4.3.2	Equipment with handles is required to comply with special loading tests.		N
5.1.8.1.1	Equipment intended to receive telecommunication ringing signals is required to comply with a special touch current measurement test.		N
6.2.1	Enamel coating on winding wire is not considered electrical separation unless subject to special investigation.		N
6.4	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses in accordance with 6.4 and Annex NAC.		N
6.5	Equipment connected to a telecommunications network and supplied with an earphone intended to be held against or in the ear is required to comply with special acoustic pressure tests.		N
Annex M.2	Continuous ringing signals up to 16 mA only are permitted if the equipment is subject to special installation and performance restrictions.		N
Annex NAB	Equipment connected to centralized d.c. power systems is required to comply with special earthing, wiring, marking and insulation requirements in accordance with Annex NAB and 3.6.1.		N

Finland (FI)

6.1.2.2	In Finland, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B only.		N
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Norway (NO)

1.5.8	In Norway, due to the IT power system used (see annex V, figure V.7), capacitors are required to be rated for the applicable phase-to-phase voltage (230 V).		N
1.7.2	In Norway, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a communication network shall, if safety relies on connection to protective earth, require a marking stating that the equipment must be connected to an earthed mains socket-outlet.	Label will be provided by the manufacturer	P
2.2.4	In Norway, requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply.		N
2.3.2	In Norway, requirements according to this annex, sub-clause 6.1.2.1 apply.		N
2.3.3	In Norway, requirements according to this annex, sub-clause 6.1.2.1 apply.		N
2.3.4	In Norway, requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply.		N



Clause	Requirement – Test	Result	Verdict
2.10.3.1	In Norway, due to the IT power distribution system used (see annex V, figure V.7), the A.C. MAINS SUPPLY voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault.		N
6.1.2.1	<p>In Norway, add the following text between the first and second paragraph:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either</p> <ul style="list-style-type: none">- two layers of thin sheet material, each of which shall pass the electric strength test below, or- one layer having a distance through insulation of at least 0.4 mm, which shall pass the electric strength test below. <p>If this insulation forms part of a semiconductor component e.g. an optocoupler, there is no distance through insulation requirement for the insulation consists of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist if the component passes the electric strength test in accordance with the compliance clause below and in addition:</p> <ul style="list-style-type: none">- passes the tests and inspection criteria of 2.10.8 with an electric strength test of 1.5 kV multiplied by 1.6 (the electric strength test of 2.10.7 shall be performed using 1.5 kV), and- is subjected to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1.5 kV. <p>It is permitted to bridge this insulation with a capacitor complying with EN 132400: 1994, subclass Y2.</p>		P
6.1.2.2	In Norway, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B only.		N
Annex G.2	In Norway, due to the IT power distribution system used (see annex V, figure V.7), the A.C. MAINS SUPPLY voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault.		N

Sweden (SE)

1.5.1	<p>Add the following:</p> <p>NOTE: In Sweden, switches containing mercury such as thermostats, relays and level controllers are not allowed.</p>		N
1.7.2	<p>In Sweden, if the separation between the mains and SELV terminal relies upon connection to the safety earth, the apparatus shall have a marking stating that it must be connected to an earthed mains socket-outlet.</p> <p>The marking shall be in Swedish and as follows:</p> <p>„Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk.“</p>	Label will be provided by the manufacturer	P



Clause	Requirement – Test	Result	Verdict
6.1.2.1	<p>In Sweden, add the following text between the first and the second paragraph:</p> <p>If this insulation is solid, including insulation forming part of a component, it shall at least consist of either:</p> <ul style="list-style-type: none">- two layers of thin sheet material, each of which shall pass the electric strength test below, or- one layer having a distance through insulation of at least 0.4 mm, which shall pass the electric strength test below. <p>If this insulation forms part of a semiconductor component e.g. an optocoupler, there is no distance through insulation requirement for the insulation consisting of an insulating compound completely filling the casing, so that CLEARANCES and CREEPAGE DISTANCES do not exist, if the component passes the electric strength test in accordance with the compliance clause below and in addition:</p> <ul style="list-style-type: none">- passes the tests and inspection criteria of 2.10.8 with an electric strength test of 1.5 kV multiplied by 1.6 (the electric strength test of 2.10.7 shall be performed using 1.5 kV), and- is subjected to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1.5 kV. <p>It is permitted to bridge this insulation with a capacitor complying with EN 132400: 1994, subclass Y2.</p>		P
6.1.2.2	<p>In Sweden, the exclusions are applicable to PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B only.</p>		N

GROUP DIFFERENCES

2.7.1	<p>Replace the subclause as follows:</p> <p>Basic requirements</p> <p>To protect against excessive current, short circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b), and c)</p> <p>a) Except as detailed in b) and c), protective devices necessary to comply with the requirements of subclause 6.3 shall be included as parts of the equipment.</p> <p>b) For components in series with the mains input to the equipment such as the supply cord, appliance coupler, r.f.i. filter and switch, short circuit and earth fault protection may be provided by protective devices in the building installation.</p> <p>c) It is permitted for PLUGGABLE EQUIPMENT TYPE B or PERMANENTLY CONNECTED EQUIPMENT, to rely on dedicated overcurrent and short circuit protection in the building installation, provided that the means of protection, e.g. fuses or circuit breakers,</p>		P
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Clause	Requirement – Test	Result	Verdict
	is fully specified in the installation instruction. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.		
2.7.2	This subclause has been declared ,void'.		P
3.2.3	Delete NOTE 1, and in table 3A delete the conduit sizes in parentheses.		P
3.2.5	Replace „60245 IEC 53” by „HO5RR-F” „60227 IEC 52” by „HO3VV-F or H03VVH2-F” „60227 IEC 53” by „HO5VV-F or H05VVH2-F2” In table 3B, replace the first four lines by the following: I Up to and including 6 I 0.75 1) I I Over 6 up to and including 10 I (0.75) 2) 1.0 I I Over 10 up to and including 16 I (1.0)3) 1.5 I In the conditions applicable to table 3B delete the words „in some countries” in condition 1) In NOTE 1, delete the second sentence.		P
3.3.4	In table 3D, delete the fourth line - conductor sizes for 10 to 13 A, and replace with the following: I Over 10 up to and including 16 I 1.5 to 2.5 I 1.5 to 4 I Delete the fifth line - conductor sizes for 13 to 16 A.		P
4.3.13	Replace the second compliance paragraph by: For equipment using LEDs or lasers, compliance is checked according to EN 60825-1. NOTE 1 - if equipment falling within the scope of EN 60950 is inherently a class 1 laser product, i.e. it contains no embedded laser or LED of a higher class number, then a laser warning label or other laser warning statement is not required (see 1.1 of EN 60825-1). Renummer the NOTE below the third compliance paragraph as NOTE 2.		P
Annex H	Replace the last paragraph of this annex by: At any point 10 cm from the surface of the OPERATOR ACCESS AREA the dose rate shall not exceed 1µSv/h (0.1 mR/h) (see note). Account is taken of the background level. Replace the NOTE as follows: NOTE - These values appear in directive 96/29/Euratom.		P



VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement – Test	Result	Verdict
Annex P	Replace the text of this annex by: See annex ZA.		P
Annex Q	Add the following notes for the standards indicated: IEC 60127 (series) NOTE: Harmonized as series EN 60127 (not modified) IEC 60269-2-1 NOTE: Harmonized as HD 630.2.1 S2:1997 (modified) IEC 60529 NOTE: Harmonized as EN 60629:1991 (not modified) IEC 61032 NOTE: Harmonized as EN 61032:1998 (not modified)		P

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Applicable Drawing

Part no. 885-1316

Rev 1

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R.06
TYP.

4.00"	UNINTERRUPTIBLE POWER SUPPLY	
	 Pb	CONTAINS SEALED NON SPILLABLE LEAD-ACID BATTERIES. MUST BE RECYCLED
		
	CAUTION: This equipment contains potentially hazardous voltages. The output may be energized from the battery when the unit is not connected to AC. Do not attempt to disassemble the unit. Except for batteries, there are no user serviceable parts inside. Refer servicing to qualified personnel.	
	For use in a controlled environment. Refer to manual for environmental conditions.	
OUTPUT: 220-240V~50/60Hz 1000 MODEL: 1000VA / 670W 750 MODEL: 750VA / 480W		
<div></div>		
MOD: [PLACE SERIAL LABEL HERE] S/N: []		
885-1316-1		

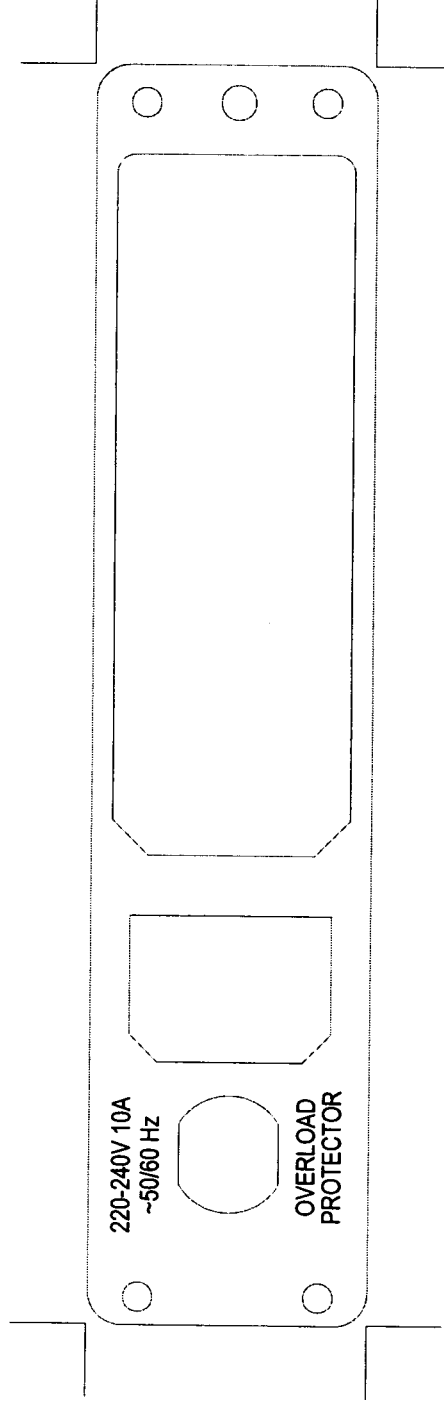
5.00"

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885-1316_REV1.CDR



0B1003 CONSISTS OF SILKSCREENED 870-1317 PDU PANEL

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0B1003_1.CDR

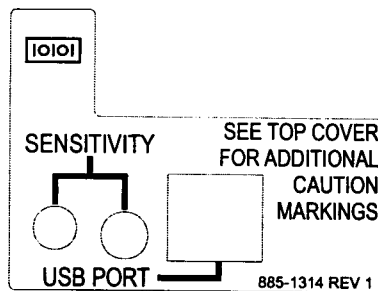
Applicable Drawing

Part # 885-1314

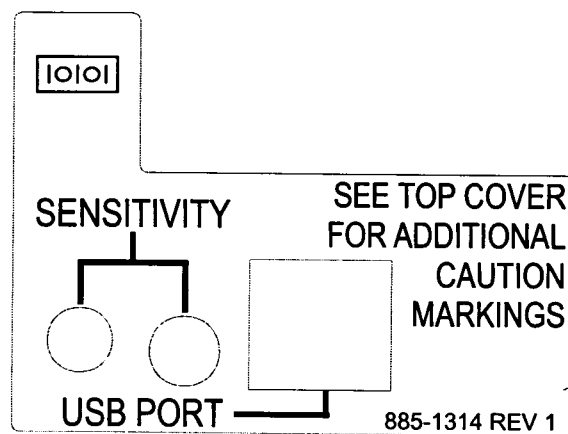
Rev. 1

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Scale = 100%



Scale = 150%



Vendor ID

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885-1314_REV01.CDR

List of Critical Components – Model SU750RMI1U, SU1000RMI1U					
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾
Transformer (APC 430-1222)	Leader Electronics Inc.	LS-A6899-PT2	Rated 230Vac, 50 Hz		UL
Transformer (T1) (APC 430-0030B)	Eastar Leader Electronics Inc. Shanghai SK Transformer Co., LTD	430-0030 LS-A472-PT 430-0030A	Rated 230Vac, Type 2		UL UL UL
Current Transformer (CT1) (APC 460-0006)	Eastar Falco	460-0006 460-0006	Rated 230Vac		
Current Transformer (CT2) (APC 460-1501-A)	Eastar Falco	460-1501-A U10004	Rated 240Vac		VDE VDE
Metal Oxide Varistor (APC 380-0010) (MV2)	Panasonic Ceramic Products	ERZV14D471	Rated 300 Volt, 125J		VDE
Metal Oxide Varistor (APC 380-0010) (MV1A)	Panasonic Ceramic Products Infineon Technologies	ERZV14D681 SIOV-S14K420	Rated 420 Volt, 90J		VDE VDE
Relay (APC 450-0012A) (RY1, RY2, RY3)	Song Chuan Precision Ltd. American Zettler	793-P-1C-S-24(Y) AZ-755-1C-24B	Rated 16A/250V	IEC 384-14	VDE
Relay (APC 450-2151) (RY5, RY7)	Gruner Tyco Electronics Corp.	R200A-G0013E 9-1393235-2	208A- Rated 8A/250V	IEC 384-14	VDE
Circuit Breaker (APC 530-0034)	Mechanical Products Snap Action Inc. Rototech Electrical Con., Inc. Tecknic 93 Electronics	1600-254-100 MB1-10-S B110S TR-11WY63	Rated 10A, 250V		VDE

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List of Critical Components – Model SU750RMI1U, SU1000RMI1U					
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾
Capacitor X2 (APC 232-0105) (C101I)	Vishay/Roederstein	F1772-510-2000 or F1778-510M2KCT0	Rated 1.0μF, 250Vac	IEC384-14	VDE
	Panasonic Industrial	ECQU2A105MV			VDE
	Tecate Industries	MPX-275/105M27			VDE
	Evov-Rifa, Inc.	PHE830MF7100M			
	Nissei Arcotronics	R40105M275BS or R46105M275BRS			
	Iskra Electronics	KNB1530			
	Okaya Electric America Inc. Camel Electronics Industrial Corp.	PA105 or RE105L MPX105K275VAC or MPX105K5KUP0P			
Capacitor X2 (APC 232-0334) (C113I)	Vishay/Roederstein	F1772-433-2000	Rated 0.33μF, 250Vac	IEC 384-14	
	Tecate Industries	MPX-275/334M22			
	Evov-Rifa, Inc.	PHE830MD6330M			
	Nissei Arcotronics	R47334M250B or R40334M275B or R40334M275B			
	Iskra Electronics	KNB1530			
	Okaya Electric America Inc.	XA334, PA334 or RE334			
	Camel Electronics Industrial Corp.	MPX334K275VAC or MPEX334M250V			
Capacitor X2 (APC 232-0225) (C53I)	BC Components	222-336-20334			
	Okaya Electric America Inc.	PA225	Rated 2.2μF, 250Vac	IEC 384-14	
	Vishay/Roederstein	F1772-522-2000			
	Aerovox Inc.	RBEX00223V2KB7BKZZ			
	Iskra Electronics, Inc.	KNB1530			
	Riva Evov UL LTD	PHE830MR7220M			
	Evov-Rifa, Inc.	PHE830MR7220MR-30			
	Camel Electronics Industrial Corp.	MPX225K275VAC			

List of Critical Components – Model SU750RMI1U, SU1000RMI1U					
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾
Battery (APC 910-6005)	Panasonic Industrial Co.	UP-RW0645P1	6V, 9Ah		UL
	B & B Battery Co.	HR9-6			UL
	Yuasa Battery	NPW45-6			UL
Output Receptacle (APC 770-0006)	Qualtek Well Shin I-Sheng Richbay	PPC742W-20/22 WS-045A 44R02-4121-200 IS-11, R-302G4	10 A, 250 V~	EC320	VDE
AC Connect CEE-22 (APC 770-0012)	Panel Components	8301311	Rated 10A, 250Vac	EC320	VDE
	Bulgin	PX0575/15/28			
	Power Dynamics, Inc.	42R03-3122-150, 42R03- 3152-150			
	Qualtek Electronics	701W-15/21			
	Singapore Resource Management	SRM-045-1			
	Schurter, Inc.	6100.4115			
Fan (APC 490-0036)	Sunon	9726/GM2404PKBX-A(2)	20MM, 24Vdc		UL
Connector (J2, J7) (APC 724-0026)	AMP Inc.	P.C. mount, 2 position Mate-N-Lock 350428-1			VDE
Connector (J5) (APC 724-0002)	AMP Inc.	P.C. mount, 4 position Mate-N-Lock 641967-1			VDE



User's Manual

English

APC Smart-UPS®

1000VA/750VA 230VAC/120VAC

1U Rack Mount

Uninterruptible Power Supply

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Introduction

American Power Conversion Corporation (APC) is the leading national and international manufacturer of state-of-the-art uninterruptible power supplies, redundant switches, power management software, and related equipment. APC products protect hardware, software, and data from power disturbances in business and government offices throughout the world.

The APC Uninterruptible Power Supply (UPS) is designed to prevent blackouts, brownouts, sags, and surges from reaching your computer and other valuable electronic equipment. The UPS filters small utility line fluctuations and isolates your equipment from large disturbances by internally disconnecting from the utility line. The UPS provides continuous power from its internal battery until the utility line returns to safe levels or the battery is discharged.

1: INSTALLATION



Read the Safety Instruction sheet before installing the UPS.

Unpacking

Inspect the UPS upon receipt. APC designed robust packaging for your product. However, accidents and damage may occur during shipment. Notify the carrier and dealer if there is damage.

The packaging is recyclable; save it for reuse or dispose of it properly.

Check the package contents. The package contains the UPS, the front bezel, a literature kit containing one CD, one serial cable, one USB cable, product documentation and Safety Information. The package also includes rails, brackets, and a hardware packet, (necessary for rack mounting the UPS).

230V models Two IEC jumper cables are included and a utility connector plug is included for use on servers with permanently attached power cords.



The UPS is shipped with the battery disconnected.

Positioning the UPS

Place the UPS where it will be used. **The UPS is heavy. Select a location sturdy enough to handle the weight.**

Do not operate the UPS where there is excessive dust or the temperature and humidity are outside the specified limits.

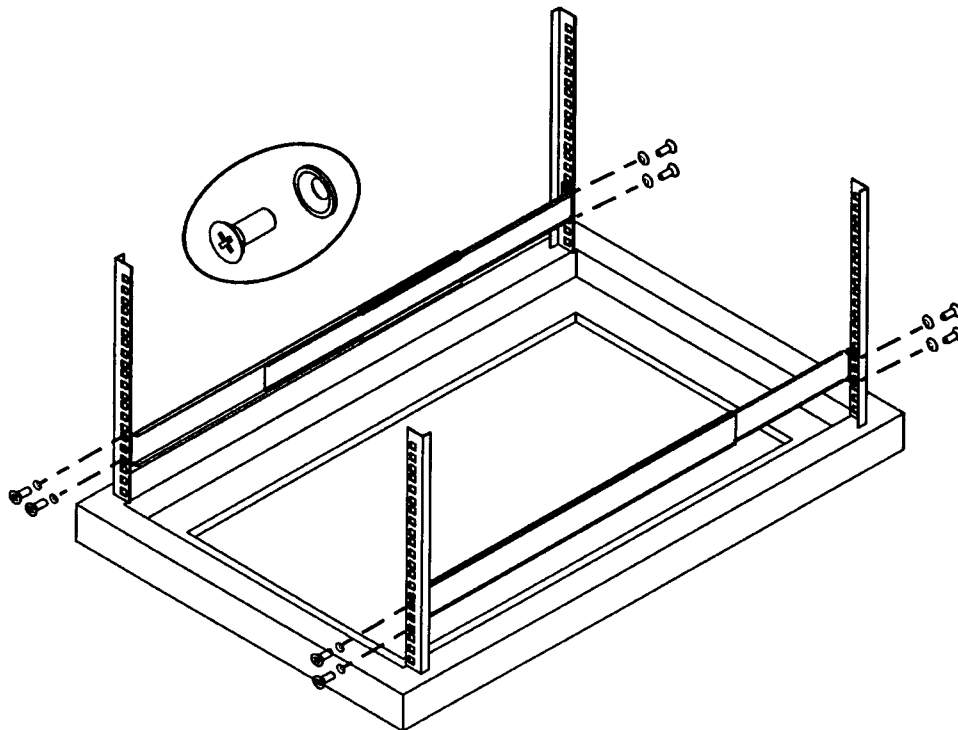
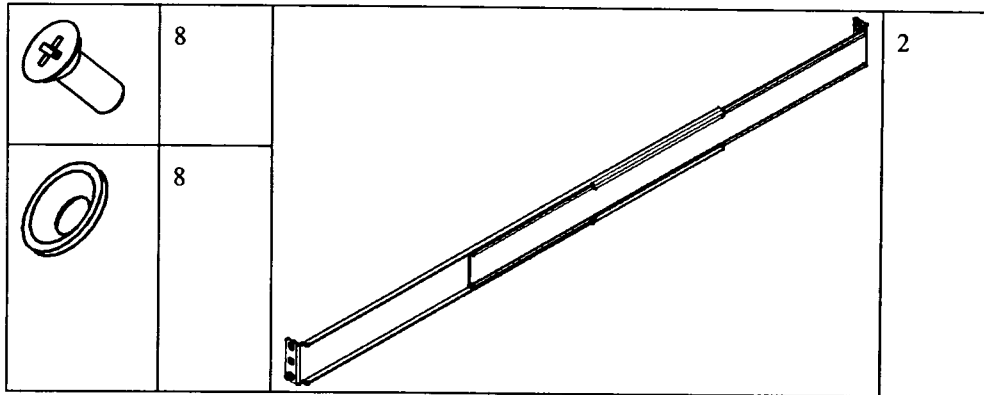
PLACEMENT

0°- 40°C (32°-104°F)
0-95% Relative Humidity



Installing the Rails in the Rack

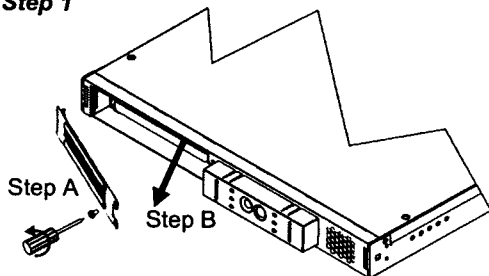
The UPS fits in a standard 46.5-cm (19-inch) rack. Mounting brackets and rails are packaged separately within the main box. Cleats for rack mounting are preinstalled on the UPS.



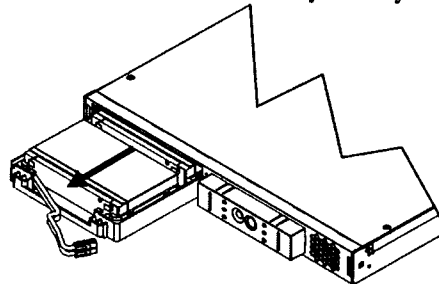
Mounting the UPS in a Rack

The UPS is heavy. To lighten it, you may remove the battery before mounting the unit in the rack (Steps 1 and 2).

Step 1

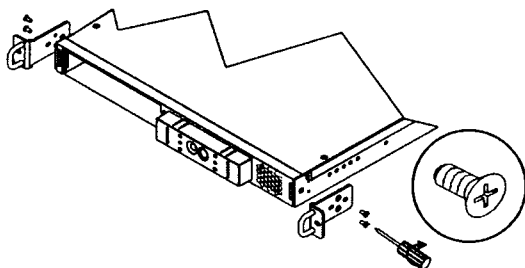


Step 2 Be careful-the battery is heavy.

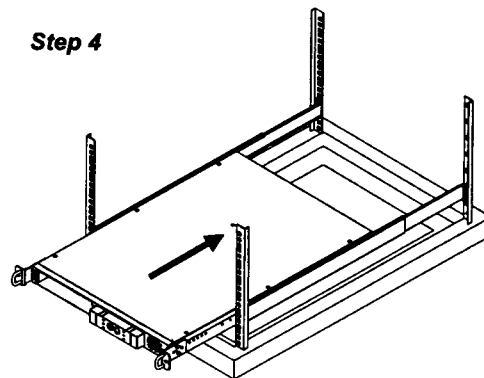


Install the UPS at or near the bottom of the rack.

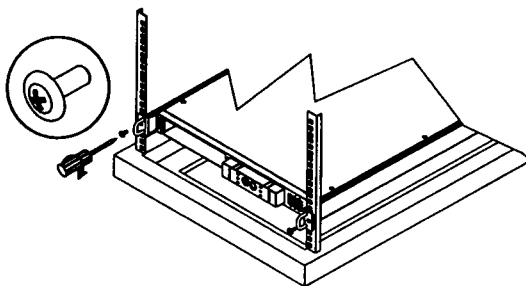
Step 3



Step 4



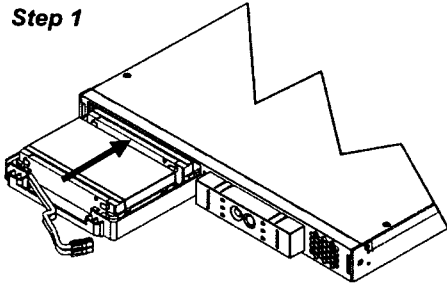
Step 5



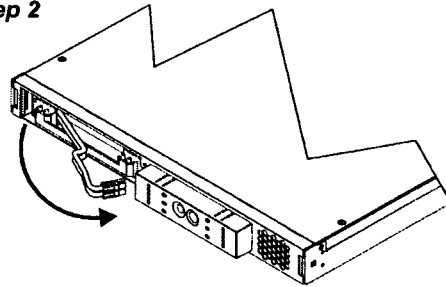
Check to make sure the rack will not tip after installing the UPS into the rack.

Installing and Connecting the Battery and Attaching the Front Bezel

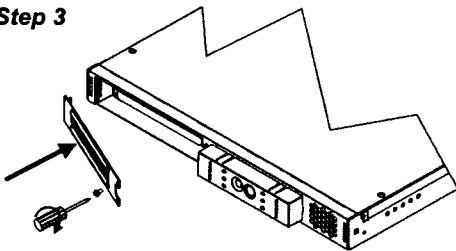
Step 1



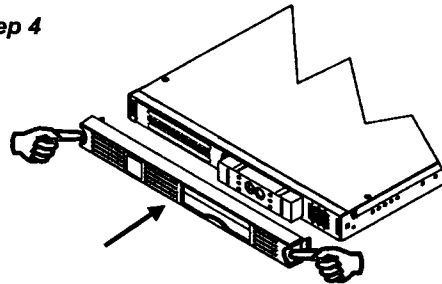
Step 2



Step 3



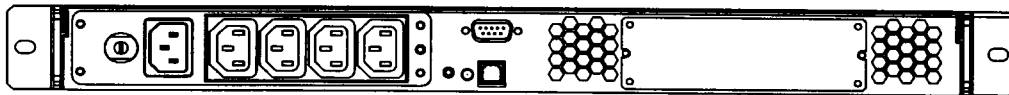
Step 4



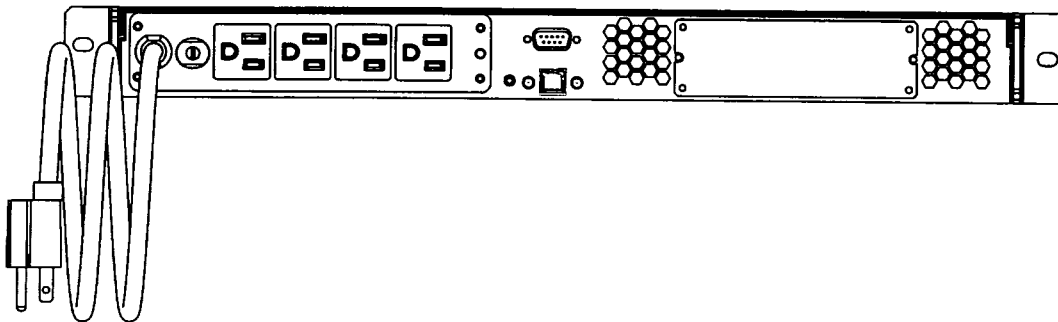
Connecting Equipment and Power to the UPS


SMART-UPS REAR PANEL

230V Models



120V Models



1. Connect equipment to the UPS. **Note: Do not connect a laser printer to the UPS. A laser printer draws significantly more power than other types of equipment and may overload the UPS.**
2. Add any optional accessories to the Smart-Slot.
3. Using a power cord, plug the UPS into a two-pole, three-wire, grounded receptacle only.
Avoid using extension cords.
 - *120V models:* The power cord is permanently attached to the rear panel of the UPS.
4. Turn on all connected equipment. To use the UPS as a master ON/OFF switch, be sure all connected equipment is switched ON. The equipment will not be powered until the UPS is turned on.
5. To power up the UPS press the  button on the front panel.
 - The UPS charges its battery when it is connected to utility power. The battery charges to 90% capacity during the first three hours of normal operation. **Do not** expect full battery run capability during this initial charge period.
 - *120V Models:* Check the site wiring fault LED located on the rear panel. It lights up if the UPS is plugged into an improperly wired utility power outlet. Refer to *Troubleshooting* in this manual.
6. For additional computer system security, install PowerChutePlus® Smart-UPS monitoring software.

BASIC CONNECTORS

Serial Port



USB Port



Power management software and interface kits can be used with the UPS. Use only interface kits supplied or approved by APC.



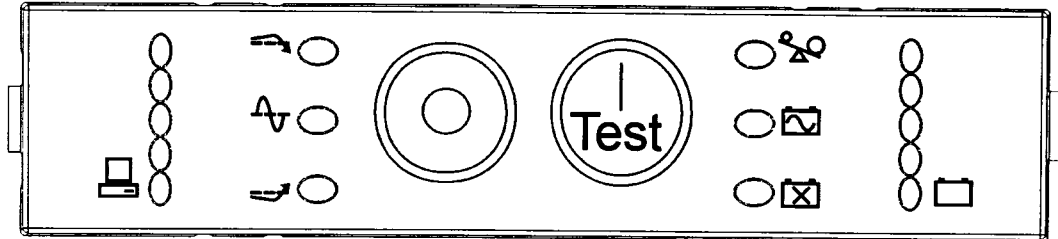
Use an APC supplied cable to connect to the Serial Port. **DO NOT** use a standard serial interface cable since it is incompatible with the UPS connector.

Both Serial and USB Ports are provided. They cannot be used simultaneously.

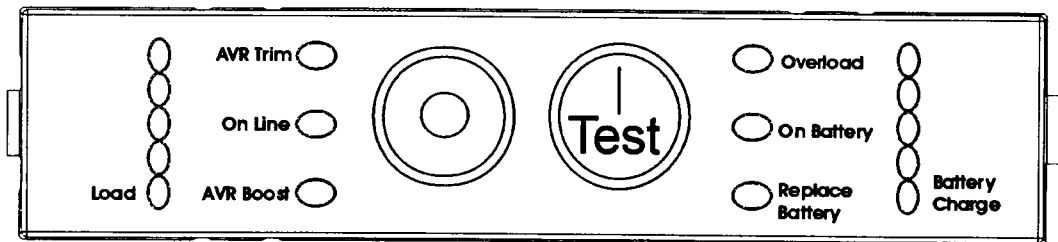
2: OPERATION

SMART-UPS FRONT PANEL

230V Models



120V Models



Power On



Power Off



120V	230V
085%	085%
067%	067%
050%	050%
033%	033%
017%	017%
Load	

120V	230V
096%	096%
072%	072%
048%	048%
024%	024%
00%	00%
Battery Charge	

Online



The online LED illuminates when the UPS is supplying utility power to the connected equipment. If the LED is not lit, the UPS is either not turned ON, or is supplying battery power.

AVR Trim



This LED illuminates to indicate the UPS is compensating for a high utility voltage.

AVR Boost



This LED illuminates to indicate the UPS is compensating for a low utility voltage.

On Battery



When the *on battery power* LED is lit the UPS is supplying battery power to the connected equipment. When on battery, the UPS sounds an alarm—four beeps every 30 seconds.

Overload



The LED illuminates and the UPS emits a sustained alarm tone when an overload condition occurs.

Replace Battery



Failure of a battery self-test causes the UPS to emit short beeps for one minute and the *replace battery* LED illuminates. Refer to *Troubleshooting* in this manual.

Battery Disconnected




The *replace battery* LED flashes and short beep is emitted every two seconds to indicate the battery is disconnected.


Automatic Self-Test

The UPS performs a self-test automatically when turned on, and every two weeks thereafter (by default).

During the self-test, the UPS briefly operates the connected equipment on battery.


If the UPS fails the self-test, the *replace battery* LED  lights and immediately returns to online operation. The connected equipment is not affected by a failed test. Recharge the battery for 24 hours and perform another self-test. If it fails, the battery must be replaced.

Manual Self-Test

Press and hold the  button for a few seconds to initiate the self-test.

On Battery Operation

The Smart-UPS switches to battery operation automatically if the utility power fails. While running on battery, an alarm beeps four times every 30 seconds.

Press the  button (front panel) to silence the UPS alarm (for the current alarm only). If the utility power does not return, the UPS continues to supply power to the connected equipment until the battery is exhausted.

If PowerChute is not being used you must manually save your files and power down before the UPS turns off.

DETERMINING ON BATTERY RUN TIME

UPS battery life differs based on usage and environment. It is recommended that the battery/batteries be changed once every three years. See the APC web site, www.apc.com, for on battery run times.






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3: USER CONFIGURABLE ITEMS






NOTE: SETTINGS ARE MADE THROUGH SUPPLIED POWERCHUTE SOFTWARE OR OPTIONAL SMART SLOT ACCESSORY CARDS.

FUNCTION	FACTORY DEFAULT	USER SELECTABLE CHOICES	DESCRIPTION
Automatic Self-Test	Every 14 days (336 hours)	Every 7 days (168 hours), On Startup Only, No Self-Test	This function sets the interval at which the UPS will execute a self-test. Refer to your software manual for details.
UPS ID	UPS_IDEN	Up to eight characters to define the UPS	Use this field to uniquely identify the UPS, (ie. server name or location) for network management purposes.
Date of Last Battery Replacement	Manufacture Date	Date of Battery Replacement mm/dd/yy	Reset this date when you replace the battery module.
Minimum Capacity Before Return from Shutdown	0 percent	15, 30, 45, 50, 60, 75, 90 percent	The UPS will charge its batteries to the specified percentage before return from a shutdown.
Voltage Sensitivity The UPS detects and reacts to line voltage distortions by transferring to battery operation to protect the connected equipment. Where power quality is poor, the UPS may frequently transfer to battery operation. If the connected equipment can operate normally under such conditions, reduce the sensitivity setting to conserve battery capacity and service life.	 high	<i>Brightly lit:</i> UPS is set to high sensitivity. <i>Dimly lit:</i> UPS is set to medium sensitivity. <i>Off:</i> UPS is set to low sensitivity.  high  medium  low	To change the UPS sensitivity, press the <i>voltage sensitivity</i> button  (rear panel). Use a pointed object (such as a pen) to do so. You can change the sensitivity level through PowerChute software.
Alarm Control	Enable	Mute, Disable	User can mute a present ongoing alarm or disable all existing alarms permanently.
Shutdown Delay	90 seconds	0, 180, 270, 360, 450, 540, 630 seconds	Sets the interval between the time when the UPS receives a shutdown command and actual shutdown.

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NOTE: SETTINGS ARE MADE THROUGH SUPPLIED POWERCHUTE SOFTWARE OR OPTIONAL SMART SLOT ACCESSORY CARDS.			
FUNCTION	FACTORY DEFAULT	USER SELECTABLE CHOICES	DESCRIPTION
Low Battery Warning. PowerChute interface software provides automatic, unattended shutdown when approximately two minutes (by default) of battery operated run time remains.	 2 min.	<p><i>Brightly lit:</i> Low battery warning interval is about two minutes.</p> <p><i>Dimly lit:</i> Low battery warning interval is about five minutes.</p> <p><i>Off:</i> Low battery warning interval is about eight minutes.</p> <p> 2 min.</p> <p> 5 min.</p> <p> 8 min.</p> <p>Possible interval settings: 2, 5, 8, 11, 14, 17, 20, 23 minutes.</p>	<p>The low battery warning beeps are continuous when two minutes of run time remain.</p> <p>To change the warning interval default setting, press the <i>voltage sensitivity</i> button (use a pointed object such as a pen to do so), while pressing and holding the  button (front panel).</p>
Synchronized Turn-on Delay	0 seconds	60, 120, 180, 240, 300, 360, 420 seconds	The UPS will wait the specified time after the return of utility power before turn-on (to avoid branch circuit overload).
High Transfer Point	<p><i>230V models:</i> 253VAC</p> <p><i>120V models:</i> 127VAC</p>	<p><i>230V models:</i> 257, 261, 265VAC</p> <p><i>120V models:</i> 130, 133, 136VAC</p>	To avoid unnecessary battery usage, set the high transfer point higher if the utility voltage is chronically high and the connected equipment is known to work under this condition.
Low Transfer Point	<p><i>230V models:</i> 208VAC</p> <p><i>120V models:</i> 106VAC</p>	<p><i>230V models:</i> 196, 200, 204VAC</p> <p><i>120V models:</i> 97, 100, 103VAC</p>	Set the low transfer point lower if the utility voltage is chronically low and the connected equipment can tolerate this condition.
Output Voltage	<i>230V models:</i> 230VAC	<i>230V models:</i> 220, 225, 240VAC	<i>230V models ONLY:</i> allows the user to select the on battery output voltage.

5: STORAGE, MAINTENANCE, AND TRANSPORTING

Storage

Store the UPS covered and positioned as for proper functioning, in a cool, dry location, with the batteries fully charged.

At -15 to +30 °C (+5 to +86 °F), charge the UPS battery every six months.

At +30 to +45 °C (+86 to +113 °F), charge the UPS battery every three months.

Replacing the Battery Module

This UPS has an easy to replace, hot-swappable battery module. Replacement is a safe procedure, isolated from electrical hazards. You may leave the UPS and connected equipment on for the following procedure. See your dealer or contact APC at the web site, www.apc.com for information on replacement battery modules.



Once the battery is disconnected, the connected equipment is not protected from power outages.

Be careful during the following steps-the battery module is heavy.

Refer to *Installing and Connecting the Battery and Attaching the Front Bezel*, in this manual.

Reverse the instructions for battery removal.



Be sure to deliver the spent battery to a recycling facility or ship it to APC in the replacement battery packing material.

Disconnecting the Battery for Transport



Always DISCONNECT THE BATTERY before shipping in compliance with U.S. Department of Transportation (DOT) regulations.





The battery may remain in the UPS; it does not have to be removed.



1. Shut down and disconnect any equipment attached to the UPS.
2. Shut down and disconnect the UPS from the power supply.
3. Unplug the battery connector. Refer to *Mounting the UPS in a Rack*, Steps 1 and 2 in this manual.





For shipping instructions and to obtain appropriate packing materials contact APC at the web site, www.apc.com/support/contact.

5: TROUBLESHOOTING

Use the chart below to solve minor Smart-UPS installation and operation problems. Refer to the APC web site, www.apc.com, for assistance with complex UPS problems.

PROBLEM AND POSSIBLE CAUSE	SOLUTION
UPS WILL NOT TURN ON	
Battery not connected properly.	Check that the battery connector is fully engaged.
 button not pushed. UPS not connected to utility power supply. Very low or no utility voltage.	Press the  button once to power the UPS and the connected equipment. Check that the power cable from the UPS to the utility power supply is securely connected at both ends. Check the utility power supply to the UPS by plugging in a table lamp. If the light is very dim, have the utility voltage checked.
UPS WILL NOT TURN OFF	
 button not pushed. Internal UPS fault.	Press the  button once to turn the UPS off. Do not attempt to use the UPS. Unplug the UPS and have it serviced immediately.
UPS BEEPS OCCASIONALLY	
Normal UPS operation when running on battery.	None. The UPS is protecting the connected equipment.
UPS DOES NOT PROVIDE EXPECTED BACKUP TIME	
The UPS battery is weak due to a recent outage or is near the end of its service life.	Charge the battery. Batteries require recharging after extended outages. They wear faster when put into service often or when operated at elevated temperatures. If the battery is near the end of its service life, consider replacing the battery even if the <i>replace battery</i> LED is not yet lit.
ALL LEDs ARE LIT AND THE UPS EMITS A CONSTANT BEEPING	
Internal UPS fault.	Do not attempt to use the UPS. Turn the UPS off and have it serviced immediately.
FRONT PANEL LEDs FLASH SEQUENTIALLY	
The UPS has been shut down remotely through software or an optional accessory card.	None. The UPS will restart automatically when utility power returns.
ALL LEDs ARE OFF AND THE UPS IS PLUGGED INTO A WALL OUTLET	
The UPS is shut down and the battery is discharged from an extended outage.	None. The UPS will return to normal operation when the power is restored and the battery has a sufficient charge.

PROBLEM AND POSSIBLE CAUSE	SOLUTION
THE OVERLOAD LED IS LIT AND THE UPS EMITS A SUSTAINED ALARM TONE	
The UPS is overloaded.	<p>The connected equipment exceeds the specified "maximum load" as defined in <i>Specifications</i> at the APC web site, www.apc.com.</p> <p>The alarm remains on until the overload is removed. Disconnect nonessential equipment from the UPS to eliminate the overload.</p> <p>The UPS continues to supply power as long as it is online and the circuit breaker does not trip; the UPS will not provide power from batteries in the event of a utility voltage interruption.</p> <p>If a continuous overload occurs while the UPS is on battery, the unit turns off output in order to protect the UPS from possible damage.</p>
THE REPLACE BATTERY LED IS LIT	
<p>Replace Battery LED flashes and short beep is emitted every two seconds to indicate the battery is disconnected.</p> <p>Weak battery.</p> <p>Failure of a battery self-test.</p>	<p>Check that the battery connectors are fully engaged.</p> <p>Allow the battery to recharge for 24 hours. Then, perform a self-test. If the problem persists after recharging, replace the battery.</p> <p>The UPS emits short beeps for one minute and the <i>replace battery</i> LED illuminates. The UPS repeats the alarm every five hours. Perform the self-test procedure after the battery has charged for 24 hours to confirm the <i>replace battery</i> condition. The alarm stops and the LED clears if the battery passes the self-test.</p>
THE SITE WIRING FAULT LED IS LIT	
<p>120V models only. Site wiring LED on rear panel .</p> <p>The UPS is plugged into an improperly wired utility power outlet.</p>	<p>Wiring faults detected include missing ground, hot-neutral polarity reversal, and overloaded neutral circuit.</p> <p>Contact a qualified electrician to correct the building wiring.</p>
THE INPUT CIRCUIT BREAKER TRIPS	
<p>The plunger on the circuit breaker (located to the right of the input cable connection) pops out. .</p>	<p>Reduce the load on the UPS by unplugging equipment and press the plunger in.</p>
AVR BOOST OR AVR TRIM LEDs LIGHT	
Your system is experiencing excessive periods of low or high voltage.	<p>Have qualified service personnel check your facility for electrical problems. If the problem continues, contact the utility company for further assistance.</p>

PROBLEM AND POSSIBLE CAUSE	SOLUTION												
UPS OPERATES ON BATTERY ALTHOUGH NORMAL LINE VOLTAGE EXISTS													
UPS input circuit breaker tripped. Very high, low, or distorted line voltage. Inexpensive fuel powered generators can distort the voltage.	Reduce the load on the UPS by unplugging equipment and resetting the circuit breaker (on the back of UPS) by pressing the plunger in. Move the UPS to a different outlet on a different circuit. Test the input voltage with the utility voltage display (see below). If acceptable to the connected equipment, reduce the UPS sensitivity.												
BATTERY CHARGE AND BATTERY LOAD LEDs FLASH SIMULTANEOUSLY													
The internal temperature of the UPS has exceeded the allowable threshold for safe operation.	Check that the room temperature is within the specified limits for operation. Check that the UPS is properly installed allowing for adequate ventilation. Allow the UPS to cool down. Restart the UPS. If the problem continues contact APC at, www.apc.com/support .												
DIAGNOSTIC UTILITY VOLTAGE FEATURE													
Utility Voltage <table> <tr> <td>230V</td><td>120V</td></tr> <tr> <td>0266</td><td>0133</td></tr> <tr> <td>0248</td><td>0124</td></tr> <tr> <td>0229</td><td>0114</td></tr> <tr> <td>0213</td><td>0105</td></tr> <tr> <td>0196</td><td>0096</td></tr> </table>  Battery Charge	230V	120V	0266	0133	0248	0124	0229	0114	0213	0105	0196	0096	<p>The UPS has a diagnostic feature that displays the utility voltage. Plug the UPS into the normal utility power.</p> <p>Press and hold the  button to view the utility voltage bar graph display. After a few seconds the five-LED, Battery Charge, , display on the right of the front panel shows the utility input voltage.</p> <p>Refer to the figure at left for the voltage reading (values are not listed on the UPS).</p> <p>The display indicates the voltage is between the displayed value on the list and the next higher value.</p> <p>Three LEDs light, indicating utility voltage within the normal range.</p> <p>If no LEDs are lit and the UPS is plugged into a working utility power outlet, the line voltage is extremely low.</p> <p>If all five LEDs are lit, the line voltage is extremely high and should be checked by an electrician.</p>
230V	120V												
0266	0133												
0248	0124												
0229	0114												
0213	0105												
0196	0096												
	The UPS starts a self-test as part of this procedure. The self-test does not affect the voltage display.												

Service

If the UPS requires service do not return it to the dealer. Instead, follow these steps:

1. Review the problems discussed in the *Troubleshooting* section of this manual to eliminate common problems.
2. If the problem persists, contact APC Customer Service through the APC web site, www.apc.com/support.
 - Note the model number of the UPS, the serial number, and the date purchased. If you call APC Customer Service, a technician will ask you to describe the problem and try to solve it over the phone, if possible. If this is not possible, the technician will issue a Returned Material Authorization Number (RMA#).
 - If the UPS is under warranty, repairs are free. If not, there is a repair charge.
3. Pack the UPS in its original packaging. If the original packing is not available, refer to the APC web site, www.apc.com/support, for information about obtaining a new set.
 - Pack the UPS properly to avoid damage in transit. Never use Styrofoam beads for packaging. Damage sustained in transit is not covered under warranty.



Always DISCONNECT THE BATTERY before shipping in compliance with U.S. Department of Transportation (DOT) regulations.

The battery may remain in the UPS; it does not have to be removed.

4. Mark the RMA# on the outside of the package.
5. Return the UPS by insured, prepaid carrier to the address given to you by Customer Service.

Contacting APC

Refer to the information provided at the APC Internet site,

<http://www.apc.com/support>.

8: REGULATORY AND WARRANTY INFORMATION

Regulatory Agency Approvals and Radio Frequency Warnings

230V MODELS



This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take corrective actions.

120V MODELS



LISTED 42C2
E95463



LR 63938



This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Shielded signal cables must be used with this product to ensure compliance with the Class A FCC limits.

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

Declaration of Conformity

CE 2001

EC Declaration of Conformity

We, the undersigned, declare under our sole responsibility that the equipment specified below, conforms to the following standards and directives:	
Standards to Which Conformity Declared:	EN50091-1, EN60950, EN50091-1-1, IEC60950 EN55022, EN50091-2, EN61000-3-2, EN61000-3-3 73/23/EEC, 93/68/EEC
Application of Council Directives:	89/336/EEC, 92/31/EEC, 93/137/EEC
Type of Equipment:	Uninterruptible Power Supply
Model Numbers:	SUA750RM41U, SUA1900RM41U
Manufacturer's Name and Address:	American Power Conversion 132 Fargomede Road West Kingston, Rhode Island, 02892, USA -or- American Power Conversion (A.P.C.) s. Ballyhenry Business Park Galway, Ireland -or- American Power Conversion Main Avenue, Pozo Rosario, Cebu, Philippines -or- American Power Conversion Jail Street, Pozo, Cebu Economic Zone Rosario, Cebu, Philippines -or- American Power Conversion Lot 32 Phase I Camarero, Industrial Park Caulahang, Cebu, Luzon Philippines -or- APC (Suzhou) UPS Co., Ltd. No. 189 Susheng Road, China-Singapore Suzhou Industrial Park Suzhou 215021, Jiangsu, P.R.C. American Power Conversion (A.P.C.) s. Ballyhenry Business Park Galway, Ireland
Importer's Name and Address:	
Place:	N. Balencia, MAU S 5 Jan 01
Place:	Galway, Ireland 5 Jan 01
<p>Richard J. Everett, Sr. Regulatory Compliance Engineer</p> <p>Ray S. Ballard, Managing Director, Europe Phone: 353 917 0200 Fax: 353 9175 6909</p>	

Limited Warranty

American Power Conversion (APC) warrants its products to be free from defects in materials and workmanship for a period of two years from the date of purchase. Its obligation under this warranty is limited to repairing or replacing, at its own sole option, any such defective products. To obtain service under warranty you must obtain a Returned Material Authorization (RMA) number from customer support. Products must be returned with transportation charges prepaid and must be accompanied by a brief description of the problem encountered and proof of date and place of purchase. This warranty does not apply to equipment that has been damaged by accident, negligence, or misapplication or has been altered or modified in any way. This warranty applies only to the original purchaser who must have properly registered the product within 10 days of purchase.

EXCEPT AS PROVIDED HEREIN, AMERICAN POWER CONVERSION MAKES NO WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Some states do not permit limitation or exclusion of implied warranties; therefore, the aforesaid limitation(s) or exclusion(s) may not apply to the purchaser.

EXCEPT AS PROVIDED ABOVE, IN NO EVENT WILL APC BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OF THIS PRODUCT, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE. Specifically, APC is not liable for any costs, such as lost profits or revenue, loss of equipment, loss of use of equipment, loss of software, loss of data, costs of substitutes, claims by third parties, or otherwise.

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Installationshandbuch

Deutsch

APC Smart-UPS®

1000VA/750VA 230VAC/120VAC

1U Rackmount, 19 Zoll-Einbau

Unterbrechungsfreie Stromversorgung (USV)

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990-1086, 11/01

Einleitung

American Power Conversion Corporation (APC) ist der führende nationale und internationale Hersteller von hochentwickelten unterbrechungsfreien Stromversorgungen, redundanten Schaltern, Energieüberwachungssoftware und ähnlichen Produkten. APC Produkte schützen die Hardware, Software und Daten von Firmen und Regierungen in der ganzen Welt vor möglichen Stromstörungen.

Die APC unterbrechungsfreie Stromversorgung (USV) verhindert, dass Stromausfälle, Spannungsabfälle, Stromunterspannungen und Überspannungen Ihren Computer und andere elektronische Geräte erreichen. Die USV filtert geringe Stromschwankungen heraus und isoliert Ihre Geräte von großen Störungen, indem es die Verbindung mit dem Stromeingangskabel intern abbricht und ununterbrochene Stromversorgung anhand einer internen Batterie gewährleistet, bis die externe Stromversorgung wieder sicher ist.

1: INSTALLATION



Bitte lesen Sie die beiliegenden Sicherheitsanweisungen, bevor Sie die USV installieren.

Auspacken

Überprüfen Sie die USV bei Erhalt. APC benutzt robuste Verpackungsmaterialien für Ihr Produkt. Trotzdem kann es vorkommen, dass ein Produkt beim Versand beschädigt wurde. Informieren Sie im Schadensfall Ihren Händler und die Speditionsfirma.

Verpackungsmaterialien können wiederverwendet oder recycled werden.

Prüfen Sie den Packungsinhalt. Das Paket enthält die USV, die Frontblende, ein Informationspaket mit einer CD, einem seriellen Kabel, einem USB-Kabel, Produktinformationen und Sicherheitsinformationen. Außerdem sind Schienen, Klammern und ein Hardwarepaket für das Montieren der USV im 19 Zoll-Schrank enthalten.

230V Modelle: Für Server mit festverdrahteten Stromversorgungskabeln liegen zwei IEC Überbrückungskabel und ein Verbindungsstecker bei.



Die USV wird mit nicht-angeschlossener Batterie geliefert.

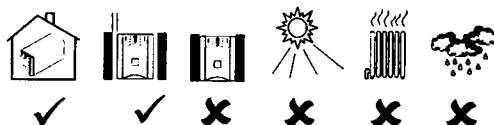
Die USV platzieren

Plazieren Sie die USV dort, wo sie montiert werden soll. **Die USV ist schwer; wählen Sie einen Installationsort, der das Gewicht aushält.**

Nehmen Sie die USV nicht in Betrieb, wenn Temperatur und Luftfeuchtigkeit außerhalb der spezifizierten Grenzen liegen.

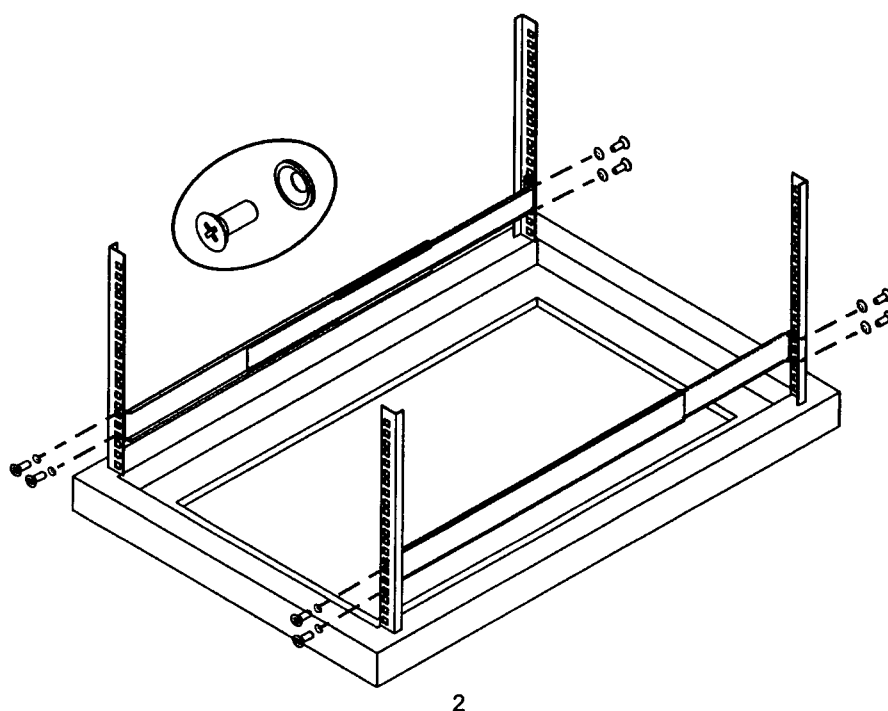
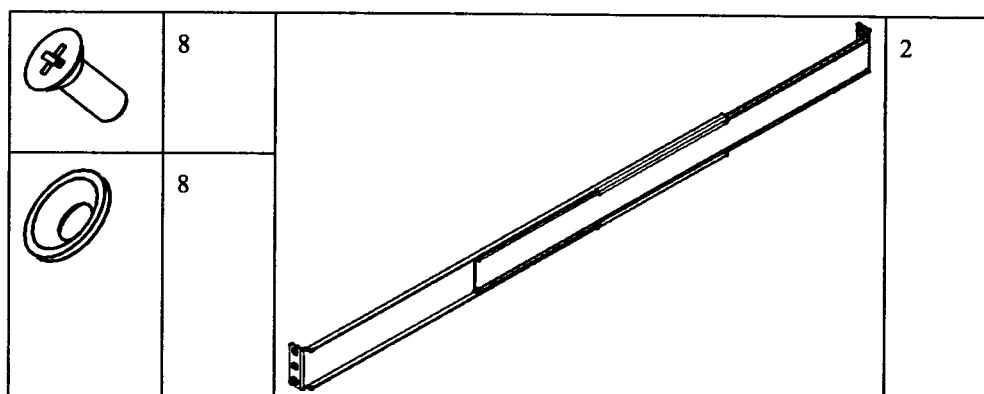
PLAZIERUNG

0° - 40°C
0-95% relative
Luftfeuchtigkeit



Die Schienen im 19 Zoll-Schrank installieren

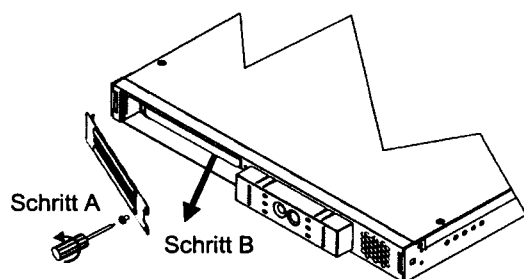
Die USV passt in einen standardmäßigen 19 Zoll-Schrank (46.5 cm). Montierklammern und -schienen sind im Paket separat verpackt. Die Leisten für die Installation in einen 19 Zoll-Schrank sind schon an der USV montiert.



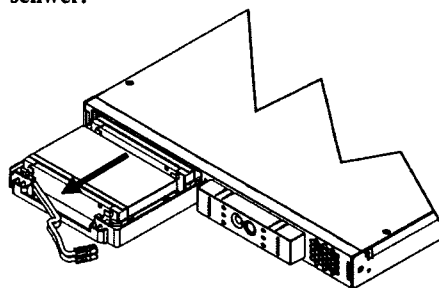
Die USV in einen 19 Zoll-Schrank montieren

Die USV ist sehr schwer. Um sie leichter zu machen, können Sie die Batterie entfernen, bevor Sie die USV installieren (Schritte 1 und 2).

Schritt 1

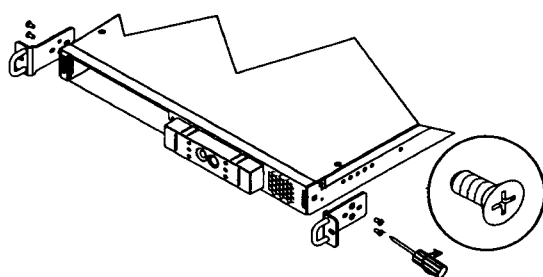


Schritt 2: Seien Sie vorsichtig - die Batterie ist schwer.

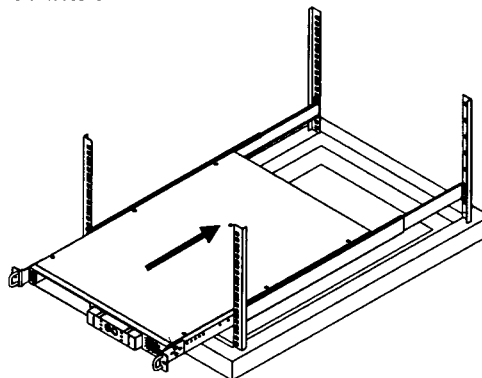


Installieren Sie die USV am unteren Ende des 19 Zoll-Schranks.

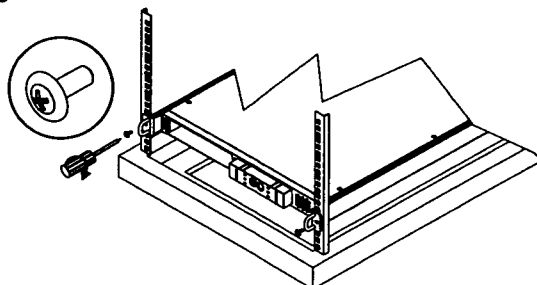
Schritt 3



Schritt 4



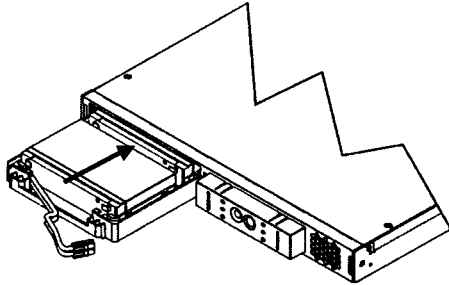
Schritt 5



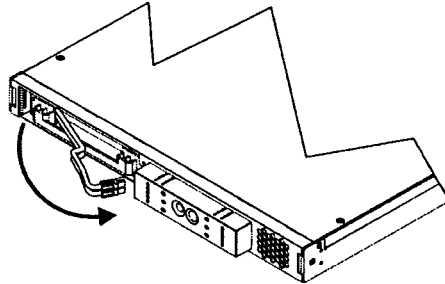
Vergewissern Sie sich, dass der Schrank nach der Installation der USV nicht überkippt.

Die Batterie installieren und anschließen, und die Frontblende anbringen

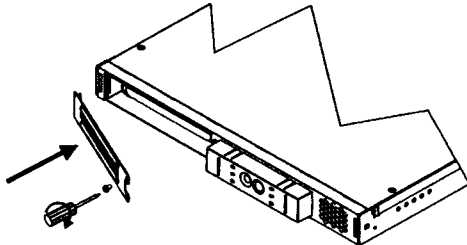
Schritt 1



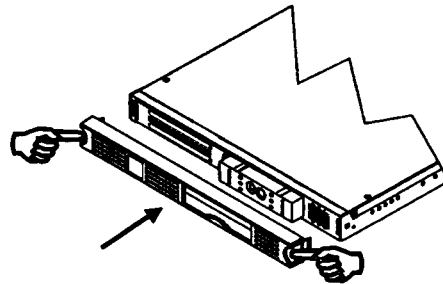
Schritt 2



Schritt 3



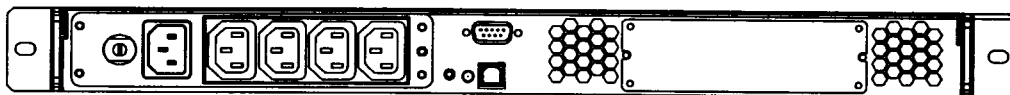
Schritt 4



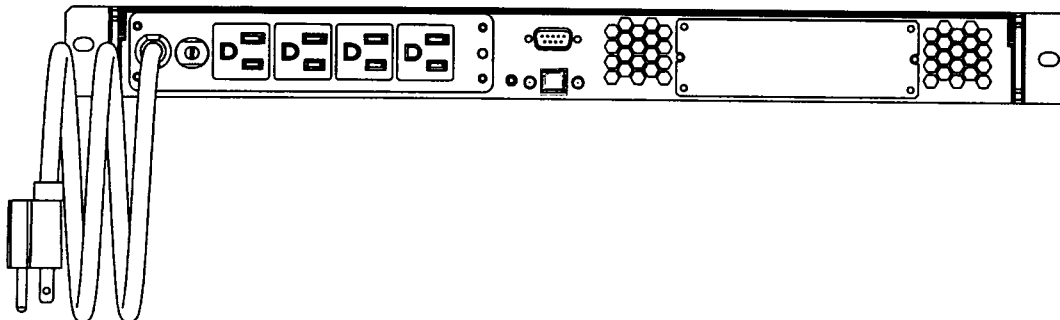
Strom- und Geräteanschluss an die USV


SMART-UPS RÜCKANSICHT

230V Modelle



120V Modelle



1. Schließen Sie die gewünschten Geräte an der USV an. **Hinweis: Schließen Sie keinen Laserdrucker an die USV an, da dieser wesentlich mehr Strom benötigt als andere Geräte und die USV überlasten könnte.**
2. Installieren Sie gewünschtes Smartslotzubehör.
3. Schließen Sie die USV mit einem Stromkabel an eine zwei-polige, drei-drahtige, geerdete Steckerbuchse an.
Vermeiden Sie das Benutzen von Verlängerungskabeln.
 - **120V Modelle:** Das Stromkabel ist an der Rückseite der USV festverdrahtet.
4. Schalten Sie alle angeschlossenen Geräte ein. Um die USV als EIN/AUS-Hauptschalter zu benutzen, vergewissern Sie sich, dass alle angeschlossenen Geräte eingeschaltet sind. Die Geräte werden nicht mit Strom versorgt, bis die USV eingeschaltet ist.
5. Drücken Sie danach den -Schalter an der Vorderseite, um die USV zu starten.
 - Die USV lädt ihre Batterie auf, wenn sie am Stromnetz angeschlossen ist. Die Batterie erreicht beim Aufladen während der ersten drei Betriebsstunden eine Kapazität von 90%. Während des ersten Ladezeitraums können Sie **keine** volle Laufzeit erwarten.
 - **120V Modelle:** Überprüfen Sie die Verdrahtungsfehler-LED an der Rückseite der USV. Sie leuchtet auf, wenn die USV an ein fehlerhaft verdrahtetes Stromnetz angeschlossen ist. Hinweise hierzu finden Sie im Abschnitt *Fehlersuche (Troubleshooting)* in diesem Handbuch.
6. Zur weiterreichenden Computersystemsicherheit können Sie die PowerChutePlus® Smart-UPS Überwachungssoftware installieren.

ANSCHLÜSSE

Serieller Port



USB Port



Power Managementsoftware und Schnittstellenkits können mit der USV benutzt werden. **Benutzen Sie nur Schnittstellenkits, die von APC geliefert oder empfohlen werden.**



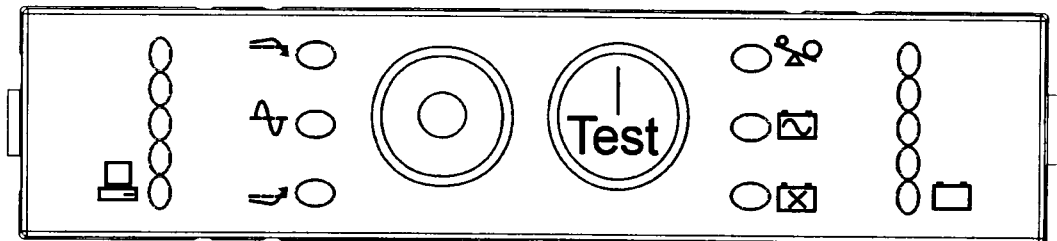
Benutzen Sie das mit der USV mitgelieferte Kabel, um die USV an den seriellen Port anzuschließen. Benutzen Sie KEIN standardmäßiges, serielles Schnittstellenkabel, da es mit dem USV-Anschluss nicht kompatibel ist.

Serieller und USB Ports sind vorhanden, können jedoch nicht gleichzeitig benutzt werden.

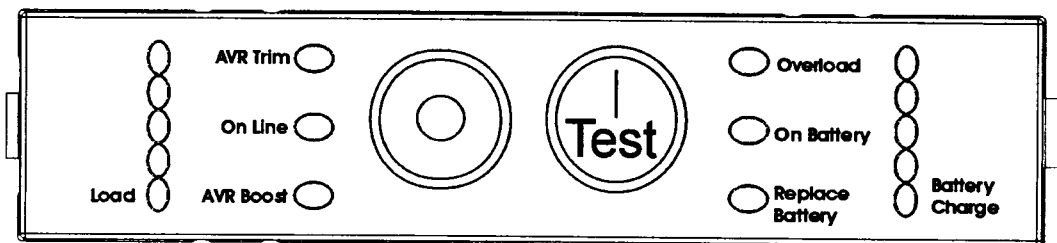
2: BETRIEB

SMART-UPS VORDERSEITE

230V Modelle



120V Modelle



Strom ein



Strom aus



120V	230V
085%	085%
067%	067%
050%	050%
033%	033%
017%	017%
Load	

120V	230V
096%	096%
072%	072%
048%	048%
024%	024%
00%	00%
Battery Charge	

Online



Die On-line-Anzeige leuchtet auf, wenn die USV Strom an die angeschlossenen Geräte weitergibt. Leuchtet diese Anzeige nicht auf, ist die USV entweder nicht eingeschaltet, oder läuft auf Batteriestrom.

Minderung der Spannung










Diese LED zeigt an, dass die USV eine hohe Stromspannung ausgleichen muss.

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Erhöhung der Spannung 	Diese LED zeigt an, dass die USV eine niedrige Stromspannung ausgleichen muss.
Batteriestrom 	Leuchtet die Batteriestrom-Anzeige auf, versorgt die USV die an ihr angeschlossenen Geräte mit Batteriestrom. In diesem Fall ertönt ein Alarm (alle 30 Sekunden vier Pieptöne).
Überlastet 	Die USV gibt einen durchgehenden Ton von sich und die LED leuchtet auf, wenn ein Überlasten vorliegt.
Batterie ersetzen 	Wird ein Batterie-Selbsttest nicht bestanden, gibt die USV für eine Minute kurze Pieptöne von sich und die LED Batterie ersetzen leuchtet auf. Weitere Informationen dazu finden Sie im Abschnitt <i>Fehlersuche</i> in diesem Handbuch.
Batterie nicht angeschlossen 	Diese LED blinkt auf und alle zwei Sekunden ertönt ein kurzer Piepton, wenn die Batterie nicht angeschlossen ist.
Automatischer Selbsttest	<p>Die USV führt zuerst automatisch einen Selbsttest durch, wenn sie eingeschaltet wird, und danach alle weiteren zwei Wochen (Standard).</p> <p>Während des Selbsttests laufen angeschlossene Geräte für kurze Zeit auf Batterie.</p> <p>Besteht die USV den Selbsttest nicht, leuchtet die LED  Batterie austauschen auf und der On-line-Betrieb wird wiederhergestellt. Die angeschlossenen Geräte werden von einem nicht bestandenen Test nicht beeinflusst. Laden Sie die Batterie für 24 Stunden auf, und führen Sie dann einen neuen Selbsttest durch. Wird der Test wieder nicht bestanden, muss die Batterie ersetzt werden.</p>
Manueller Selbsttest	Halten Sie den  -Schalter für ein paar Sekunden gedrückt, um den Selbsttest zu initiieren.

Batteriestrom

Wird die Eingangsspannung gestoppt, kann die USV mit Hilfe ihrer internen Batterie die angeschlossenen Geräte für eine bestimmte Zeit mit Strom versorgen. In diesem Fall ertönt ein Alarm (alle 30 Sekunden vier Pieptöne).

Drücken Sie den -Schalter an der Vorderseite, um den USV-Alarm auszuschalten (gilt nur für den gegenwärtigen Alarm). Wird die Stromversorgung nicht wieder hergestellt, versorgt die USV die angeschlossenen Geräte mit Batteriestrom, bis die Batterie leer ist.

Wird PowerChute nicht benutzt, müssen Sie Ihre Dateien manuell speichern und Ihren Computer herunterfahren, bevor die USV ausgeschaltet wird.

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




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DIE BATTERIELAUFZEIT BESTIMMEN

Die USV-Batterielebenszeit hängt vom Gebrauch und der Umgebung ab. Wir empfehlen, dass Sie Batterien alle drei Jahre ersetzen. Weitere Informationen zu diesem Them finden Sie auf der APC Web-Seite, www.apc.com.

3: BENUTZERKONFIGURATION

HINWEIS: ZUM EINSTELLEN DIESER OPTIONEN BENÖTIGEN SIE DIE POWERCHUTE SOFTWARE ODER DAS ENTSPRECHENDE SMART SLOT-ZUBEHÖR .			
FUNKTION	STANDARD-EINSTELLUNG	BENUTZER-OPTIONEN	BESCHREIBUNG
Automatischer Selbsttest	Alle 14 Tage (336 Stunden)	Alle 7 Tage (168 Stunden), nur beim Starten, kein Selbsttest	Diese Funktion bestimmt den Interval, in dem die USV einen Selbsttest durchführt. Details hierzu finden Sie in Ihrer Software-Dokumentation.
UPS ID	UPS_IDEN	Bis zu acht Zeichen, um die USV zu kennzeichnen	Benutzen Sie dieses Feld, um die USV für Netzwerkverwaltungszwecke zu kennzeichnen.
Datum des letzten Batterieaustauschs	Herstellungsdatum	Datum für den Batterieaustausch MM/TT/JJ	Tragen Sie dieses Datum neu ein, wenn Sie das Batteriemodul ersetzen.
Minimale Kapazität vor Wiedereinschalten	0 Prozent	15, 30, 45, 50, 60, 75, 90 Prozent	Die USV lädt ihre Batterien bis zum angegebenen Prozentsatz auf, bevor sie sich nach dem Ausschalten wieder einschaltet.
Spannungssensitivität Bestimmen Sie eine niedrigere Sensitivität, um in Situationen, in denen angeschlossene Geräte kleinere Stromstörungen tolerieren können, die Batteriekapazität zu vergrößern und die Funktionsdauer zu verlängern.	 high	<p><i>Helles Leuchten:</i> Die USV ist auf <i>hohe</i> Sensitivität eingestellt (Standard).</p> <p><i>Schwaches Leuchten:</i> Die USV ist auf <i>mittlere</i> Sensitivität eingestellt.</p> <p><i>Aus:</i> Die USV ist auf <i>niedrige</i> Sensitivität eingestellt.</p> <p> high  medium  low</p>	<p>Ändern Sie die USV-Sensitivität, indem Sie den -Schalter an der Rückseite drücken. Benutzen Sie dazu ein spitzes Objekt, z.B. einen Kugelschreiber.</p> <p>Weiterhin können Sie die Sensitivität mit Hilfe der PowerChute Software einstellen.</p>
Alarmsteuerung	Aktivieren	Abschalten, Deaktivieren	Sie können einen aktiven Alarm abschalten, oder alle Alarme permanent deaktivieren.

HINWEIS: ZUM EINSTELLEN DIESER OPTIONEN BENÖTIGEN SIE DIE POWERCHUTE SOFTWARE ODER DAS ENTSPRECHENDE SMART SLOT-ZUBEHÖR.			
FUNKTION	STANDARD-EINSTELLUNG	BENUTZER-OPTIONEN	BESCHREIBUNG
Abschaltverzögerung	90 Sekunden	0, 180, 270, 360, 450, 540, 630 Sekunden	Diese Funktion bestimmt, wann das eigentliche Herunterfahren durchgeführt wird, nachdem die USV den Befehl zum Herunterfahren erhalten hat.
<p>Dauer der Batteriewarnung.</p> <p>Diese Funktion bestimmt die Zeit vor dem Abschalten, während die USV eine Batteriewarnung ausgibt. Geben Sie eine größere Zeitspanne als in der Standardeinstellung vor, wenn Ihr Betriebssystem zum Herunterfahren mehr Zeit benötigt.</p>	 2 min.	<p><i>Helles Leuchten:</i> Batteriewarningsintervall ist etwa 2 Minuten.</p> <p><i>Schwaches Leuchten:</i> Batteriewarningsintervall ist etwa 5 Minuten.</p> <p><i>Aus:</i> Batteriewarningsintervall ist etwa 8 Minuten.</p> <p> 2 min.  5 min.  8 min.</p> <p>Mögliche Alarmintervalle: 2, 5, 8, 11, 14, 17, 20, 23 Minuten.</p>	<p>Der Batteriewarningsalarm ertönt durchgehend, wenn noch etwa 2 Minuten Laufzeit verbleiben.</p> <p>Ändern Sie den Batteriewarningsintervall, indem Sie den -Schalter an der Rückseite drücken (Benutzen Sie dazu ein Spitzen Objekt, z.B. einen Kugelschreiber.), und gleichzeitig den -Schalter an der Vorderseite gedrückt halten.</p>
Synchronisierte Einschaltverzögerung	0 Sekunden	60, 120, 180, 240, 300, 360, 420 Sekunden	Hier wartet die USV die spezifizierte Zeit, bevor sie sich wieder einschaltet, nachdem die Eingangsspannung nach einem Stromausfall wiederhergestellt ist (z.B. um ein Überlasten der Verzweigungsleitung zu verhindern).
Hoher Transferpunkt	<p>230V Modelle: 253VAC</p> <p>120V Modelle: 127VAC</p>	<p>230V Modelle: 257, 261, 265VAC</p> <p>120V Modelle: 130, 133, 136VAC</p>	Um unnötigen Batteriegebrauch zu minimieren, stellen Sie den hohen Transferpunkt höher ein, wenn die Stromspannung üblicherweise sehr hoch ist, und die angeschlossenen Geräte dies tolerieren.

HINWEIS: ZUM EINSTELLEN DIESER OPTIONEN BENÖTIGEN SIE DIE POWERCHUTE SOFTWARE ODER DAS ENTSPRECHENDE SMART SLOT-ZUBEHÖR .			
<i>FUNKTION</i>	<i>STANDARD- EINSTELLUNG</i>	<i>BENUTZER- OPTIONEN</i>	<i>BESCHREIBUNG</i>
Niedriger Transferpunkt	230V Modelle: 208VAC 120V Modelle: 106VAC	230V Modelle: 196, 200, 204VAC 120V Modelle: 97, 100, 103VAC	Stellen Sie den niedrigen Transferpunkt niedriger ein, wenn die Stromspannung üblicherweise sehr niedrig ist, und die angeschlossenen Geräte dies tolerieren.
Ausgangsspannung	230V Modelle: 230VAC	230V Modelle: 220, 225, 240VAC	NUR 230V Modelle: Ausgangsspannung für den Batteriebetrieb kann vom Benutzer ausgewählt werden.

4: LAGERUNG, WARTUNG UND TRANSPORT

Lagerung

Lagern Sie die USV abgedeckt und flach an einem kühlen, trockenen Ort, mit voll aufgeladenen Batterien.

Bei -15 bis +30 °C; Batterien alle sechs Monate neu aufladen.

Bei +30 bis +45 °C; Batterien alle drei Monate neu aufladen.

Das Batteriemodul austauschen

Die USV hat ein einfach zu ersetzendes, schnell austauschbares Batteriemodul. Das Austauschen des Batteriemoduls ist ein sicheres Verfahren, ohne elektrische Gefahren. Sie können für den Austausch die USV angeschlossen lassen (mit den angeschlossenen Geräten eingeschaltet). Informationen über den Ersatz von Batteriemodulen erhalten Sie bei Ihrem Händler oder auf der APC Web-Seite, www.apc.com/support.



Nachdem die Batterie von der USV getrennt wurde, sind angeschlossene Geräte nicht mehr vor Stromausfällen geschützt.

Seien Sie während der folgenden Schritte vorsichtig, da das Batteriemodul sehr schwer ist.

Weitere Informationen finden Sie im Abschnitt *Die Batterie installieren und anschließen, und die Frontblende anbringen* in diesem Handbuch.

Führen Sie die Anweisungen zum Entfernen der Batterie in umgekehrter Reihenfolge aus.



Senden Sie das Batteriemodul in der Verpackung der neuen Batterie an APC zurück, oder geben Sie es zum Recycling an eine entsprechende Stelle weiter.

Die USV transportieren



Vergewissern Sie sich, dass die Batterie NICHT an die USV angeschlossen ist, bevor Sie die USV transportieren. Versandrichtlinien *erfordern* möglicherweise, dass Batterien während des Transports nicht angeschlossen sind.





Die Batterie kann ruhig in der USV verbleiben, sie muss nicht entfernt werden.


1. Schalten Sie alle Geräte aus, die an die USV angeschlossen sind.
2. Schalten Sie die USV aus, und trennen Sie sie von der Stromversorgung.
3. Ziehen Sie den Batterieverbindungsstecker heraus. Weitere Anweisungen finden Sie im Abschnitt *Die USV in einen 19 Zoll-Schrank montieren*, Schritte 1 und 2 in diesem Handbuch.




Informationen über den Versand und angemessene Verpackungsmaterialien finden Sie auf der APC Web-Seite, www.apc.com/support/contact.


5: FEHLERSUCHE (TROUBLESHOOTING)

Benutzen Sie die nachfolgende Tabelle, um kleinere Installationsprobleme zu lösen. Sollten Sie komplexere Installationsprobleme haben, wenden Sie sich bitte an die APC Web-Seite, www.apc.com.

PROBLEM UND MÖGLICHE URSACHE	LÖSUNG
DIE USV LÄSST SICH NICHT EINSCHALTEN	
Batterie ist nicht richtig angeschlossen. Der  -Schalter wurde nicht gedrückt. Die USV ist nicht an das Stromnetz angeschlossen. Sehr niedrige oder keine Stromspannung.	Überprüfen Sie, dass der Anschlussstecker richtig angeschlossen ist. Drücken Sie einmal den  -Schalter, um die USV und die Geräte zu starten. Vergewissern Sie sich, dass das Stromeingangskabel von der USV zum Stromnetz richtig angeschlossen ist. Prüfen Sie den Stromfluss zur USV, indem Sie eine Tischlampe o.ä. anschießen. Ist das Licht sehr gedämpft, lassen Sie die Stromspannung überprüfen.
DIE USV LÄSST SICH NICHT AUSSCHALTEN	
 -Schalter wurde nicht gedrückt. Interner USV-Fehler.	Drücken Sie den  -Schalter einmal, um die USV auszuschalten. Benutzen Sie die USV nicht. Trennen Sie sie von der Stromversorgung und wenden Sie sich an den Kundenservice.
DIE USV PIEPT HIN UND WIEDER	
Normaler USV-Zustand, wenn auf Batteriebetrieb.	Keine. Die USV schützt die angeschlossenen Geräte.
DIE USV LIEFERT NICHT DIE ERWARTETE LAUFZEIT IM BATTERIEBETRIEB	
Die USV-Batterie ist aufgrund eines Stromausfalls schwach, oder nähert sich dem Ende ihrer Nutzungsdauer.	Laden Sie die Batterie neu auf. Batterien müssen nach längeren Stromausfällen neu aufgeladen werden. Sie entladen sich bei häufiger Nutzung oder erhöhten Temperaturen schneller. Ist die Nutzungsdauer der Batterie fast abgelaufen, sollten Sie sie ersetzen, auch wenn die Batterie ersetzen LED noch nicht aufleuchtet.
ALLE LEDs LEUCHTEN AUF UND DIE USV PIEPT UNUNTERBROCHEN	
Interner USV-Fehler.	Benutzen Sie die USV nicht. Schalten Sie sie aus und wenden Sie sich an den Kundenservice.
DIE LEDs AN DER VORDERSEITE BLINKEN SEQUENTIELL	
Die USV wurde nicht manuell, sondern durch eine Software oder eine optionale Zubehörkarte ausgeschaltet.	Keine. Die USV startet automatisch, wenn die Eingangsspannung wiederhergestellt ist.

PROBLEM UND MÖGLICHE URSACHE	LÖSUNG
ALLE LEDs SIND AUS UND DIE USV IST AN EIN STROMNETZ ANGESCHLOSSEN	
Die USV ist heruntergefahren und die Batterie wurde aufgrund eines längeren Stromausfalls entleert.	Keine. Die USV startet automatisch, wenn die Eingangsspannung wiederhergestellt ist und die Batterie sich ausreichend aufgeladen hat.
DIE LED ÜBERLASTET LEUCHTET AUF UND DIE USV GIBT EINEN DURCHGEHENDEN PIEPTON VON SICH	
Die USV ist überlastet.	<p>Die angeschlossenen Geräte überschreiten die maximale Last. Siehe <i>Specifications</i> auf der APC Web-Seite, www.apc.com.</p> <p>Der Alarm ertönt, bis genügend angeschlossene Geräte entfernt wurden. Trennen Sie entsprechende Geräte von der USV.</p> <p>Die USV versorgt die angeschlossenen Geräte mit Strom, solange sie eingeschaltet ist und die Eingabe-Schaltkreissicherung nicht herauspringt. Die USV gibt keinen Batteriestrom weiter, wenn eine Stromspannungsunterbrechung auftritt.</p> <p>Besteht ein durchgehendes Überlasten während die USV auf Batteriebetrieb läuft, schaltet sich die Einheit zum Schutz vor möglichen Schäden aus.</p>
DIE LED BATTERIE AUSTAUSCHEN LEUCHTET AUF	
<p>Die LED Batterie austauschen blinkt und alle zwei Sekunden ertönt ein kurzes Piepen, das anzeigt, dass die Batterie nicht angeschlossen ist.</p> <p>Schwache Batterie.</p> <p>Selbsttest nicht bestanden.</p>	<p>Vergewissern Sie sich, dass der Batterieanschluss voll belegt ist.</p> <p>Warten Sie mindestens 24 Stunden, damit die Batterie sich aufladen kann. Führen Sie dann einen Selbsttest durch. Besteht das Problem nach Neuaufladen der Batterie weiterhin, tauschen Sie die Batterie aus.</p> <p>Die USV gibt für eine Minute kurze Pieptöne von sich und die LED Batterie austauschen leuchtet auf. Die USV wiederholt den Alarm alle fünf Stunden. Führen Sie den Selbsttest durch, nachdem sich die Batterie für 24 Stunden aufgeladen hat. Besteht die Batterie den Selbsttest, hört der Alarm auf und die LED leuchtet nicht mehr auf.</p>
DIE VERDRAHTUNGSFEHLER LED LEUCHTET AUF	
<p>Nur 120V Modelle: Verdrahtungsfehler-LED befindet sich an der Rückseite</p>  <p>Die USV ist an ein fehlerhaft verdrahtetes Stromnetz angeschlossen.</p>	<p>Verdrahtungsfehler, die erkannt werden, sind fehlende Erdung, Spannung-Nullleiter Umpolung und überlasteter Nullstrom.</p> <p>Wenn die USV einen Verdrahtungsfehler anzeigt, sollte ein qualifizierter Elektriker die Gebäudeverdrahtung reparieren.</p>

PROBLEM UND MÖGLICHE URSACHE	LÖSUNG
DIE EINGABE-SCHALTKREISSICHERUNG IST HERAUSGESPRUNGEN	
Die USV-Eingabe-Schaltkreissicherung (rechts neben dem Eingangskabelanschluss) springt heraus  .	Reduzieren Sie die Last der USV, indem Sie angeschlossene Geräte entfernen und die Schaltkreissicherung wieder neu setzen (den Austrittsarm wieder hereindrücken).
EINE ODER BEIDE LEDs ZUR ERHÖHUNG ODER MINDERUNG DER SPANNUNG LEUCHTEN AUF	
Es bestehen längere Zeiträume mit zu hoher oder zu niedriger Spannung.	Lassen Sie die Spannung von einem qualifizierten Elektriker überprüfen. Besteht das Problem weiterhin, wenden Sie sich an Ihren Stromversorger.
DIE USV BEFINDET SICH IM BATTERIEBETRIEB OBWOHL STROMVERSORGUNG ANLIEGT	
Die USV-Eingabe-Schaltkreissicherung ist herausgesprungen. Sehr hohe, niedrige oder verzerrte Stromspannung. Preiswerte, kraftstoffbetriebene Generatoren können die Spannung verzerren.	Reduzieren Sie die Geräte der USV, indem Sie Geräteanschlüsse entfernen und die Schaltkreissicherung (hinten an der USV) wieder neu setzen (den Austrittsarm wieder hereindrücken). Schließen Sie die USV an ein anderes Stromnetz oder an einen anderen Stromkreis an. Testen Sie die Eingabespannung mit der Stromspannungsanzeige. Wenn es für die angeschlossenen Geräte akzeptabel ist, vermindern Sie die USV-Sensitivität.
DIE LEDs BATTERIEKAPAZITÄT UND BATTERIELADUNG BLINKEN GLEICHZEITIG AUF	
Die interne Temperatur der USV hat die für den sicheren Betrieb zulässige Temperatur überstiegen.	Überprüfen Sie, dass die Zimmertemperatur innerhalb der Spezifizierungen liegt. Überprüfen Sie, dass die USV ausreichender Belüftung ausgesetzt ist. Lassen Sie die USV abkühlen. Starten Sie die USV neu. Kontaktieren Sie APC unter http://www.apc.com/support , wenn das Problem weiterhin besteht.
DIAGNOSEFUNKTION FÜR STROMSPANNUNG	
Stromspannung <div> <div>230V</div> <div>0266</div> <div>0248</div> <div>0229</div> <div>0213</div> <div>0196</div> <div></div> </div> <div> <div>120V</div> <div>0133</div> <div>0124</div> <div>0114</div> <div>0105</div> <div>0096</div> <div>Battery Charge</div> </div>	<p>Die USV verfügt über eine Diagnosefunktion, die die Stromspannung anzeigt. Schließen Sie die USV an das normale Stromnetz an.</p> <p>Halten Sie den -Schalter gedrückt, um die Anzeige für die Stromspannung zu sehen. Nach ein paar Sekunden zeigen die fünf LEDs vorne rechts die Eingangsspannung an. Zum Ablesen des Spannungswerts, siehe Abbildung links (Werte sind auf der eigentlichen USV nicht angegeben).</p> <p>Die Anzeige indiziert, dass sich die Spannung zwischen dem angezeigten Wert und dem nächst höheren Wert befindet.</p> <p>Wenn z.B. drei LEDs aufleuchten, liegt die Eingangsspannung im normalen Bereich.</p> <p>Leuchten keine LEDs auf, obwohl die USV an den Stromkreis angeschlossen ist, ist die Leitungsspannung extrem niedrig.</p> <p>Leuchten alle 5 LEDs auf, ist die Leitungsspannung extrem hoch und sollte von einem Elektriker überprüft werden.</p>

PROBLEM UND MÖGLICHE URSACHE	LÖSUNG
	Die USV startet für dieses Verfahren einen Selbsttest, der die Spannungsanzeige jedoch nicht beeinflusst.

Service

Wenn Sie Probleme mit Ihrer USV haben, bringen Sie sie nicht zurück zum Händler, sondern folgen Sie diesen Schritten:

1. Überprüfen Sie die im Abschnitt *Fehlersuche (Troubleshooting)* behandelten Punkte, um allgemeinere Probleme auszuschließen.
2. Wenn das Problem weiterhin besteht, kontaktieren Sie den APC Kundendienst über die APC Web-Seite, www.apc.com/support.
 - Notieren Sie sich die Modellnummer der USV, die Seriennummer und das Kaufdatum. Wenn Sie den APC Kundendienst anrufen, wird ein Mitarbeiter Sie bitten das Problem zu beschreiben, und versuchen, es am Telefon für Sie zu lösen. Ist dies nicht möglich, erhalten Sie eine Warenrücknahmenummer (RMA-Nr.).
 - Ist noch Garantie auf der USV, erfolgen Reparaturen kostenlos. Ist die Garantie abgelaufen, werden Ihnen Reparaturkosten in Rechnung gestellt.
3. Verpacken Sie die Einheit in der Originalverpackung. Falls diese nicht mehr vorhanden ist, erhalten Sie auf der APC Web-Seite, www.apc.com/support, Informationen über den Erhalt neuer Verpackungsmaterialien.
 - Verpacken Sie alle Produkte vorsichtig. Benutzen Sie keine Styroporchips zum Verpacken. Transportschäden fallen nicht unter die Garantie.



Vergewissern Sie sich, dass die Batterie NICHT an die USV angeschlossen ist, bevor Sie die USV transportieren. Versandrichtlinien *erfordern* möglicherweise, dass Batterien während des Transports nicht angeschlossen sind.

Die Batterie kann ruhig in der USV verbleiben, sie muss nicht entfernt werden.

4. Vermerken Sie die RMA-Nr. außen auf der Verpackung.
5. Senden Sie die USV versichert, mit bezahlten Versandkosten an die Adresse, die Sie vom Kundendienst erhalten haben.

APC kontaktieren

Informationen hierzu finden Sie auf der APC Web-Seite:

<http://www.apc.com/support>

6: REGULATIONS- UND GARANTIEINFORMATIONEN

Prüfungsstellengenehmigungen und Radiofrequenzwarnungen

230V MODELLE



Hierbei handelt es sich um ein Class A-Produkt. In einer privaten Umgebung kann dieses Produkt Radiointerferenz verursachen. Der Benutzer muss diesem u. U. Abhilfe schaffen.

120V MODELLE



LISTED 42C2
E95463



LR 63938



Dieses Gerät wurde getestet und entspricht den Grenzwerten digitaler Class A-Geräte, gemäß Abschnitt 15 der FCC Regulationen. Diese Grenzwerte bieten angemessenen Schutz gegen schädliche Interferenz, wenn das Gerät in einer kommerziellen Umgebung betrieben wird. Dieses Gerät generiert, benutzt und kann Radiofrequenzenergie ausstrahlen, und verursacht, wenn es nicht gemäß den Bedienungsanweisungen installiert und benutzt wird, schädliche Radiokommunikationsinterferenz. Der Betrieb dieses Geräts in Wohngebieten verursacht wahrscheinlich schädliche Interferenz, der der Benutzer auf eigene Kosten Abhilfe schaffen muss.

Abgeschirmte Signalkabel müssen mit diesem Produkt benutzt werden, um den Betrieb gemäß Class A FCC zu gewährleisten.

警告使用者:

這是甲類的資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當的對策。

100V MODELLE



LISTED 42C2
E95463

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Übereinstimmungserklärung

CE 2001
EC Declaration of Conformity

We, the undersigned, declare under our sole responsibility that the equipment specified below conforms to the following standards and directives:

Standards to Which Conformity Declared:	EN50091-1, EN50090, EN50091-1-1, IEC60950 EN55022, EN50091-2, EN61000-3-2, EN61000-3-3 73/23/EEC, 93/MA/EEC
Application of Council Directives:	1903/MA/EEC, 92/31/EEC, 91/157/EEC
Type of Equipment:	Uninterruptible Power Supply
Model Number:	SCA750RM11U, SLA1000RM11U
Manufacturer's Name and Address:	American Power Conversion 172 Pangbourne Road West Kingston, Rhode Island, 02892, USA -or- American Power Conversion (A.P.C.) Ltd. Ballyhenry Business Park Galway, Ireland -or- American Power Conversion Main Avenue, Pinar Rozzano, Cavite, Philippines -or- American Power Conversion 2nd Street, Pinar, Cavite Economic Zone Rozzano, Cavite, Philippines -or- American Power Conversion Lot 32 Phase 1 Carmelway Industrial Park Cebu, Cebu, Cebu, Philippines -or- APC (Suzhou) UPS Co., Ltd. No. 189 Salsong Road, China-Singapore Industrial Park Suzhou 215021, Jiangsu, P.R.C. American Power Conversion (A.P.C.) Ltd. Ballyhenry Business Park Galway, Ireland
Importer's Name and Address:	
Place:	N. Bellenen, MA U.S. 5 Jan 01 Richard J. Everett, Sr. Regulatory Compliance Engineer
Place:	Galway, Ireland 5 Jan 01 Rev. S. Bolland, Managing Director, Europe Phone: 353 917 02000 Fax: 353 9175 6000

Beschränkte Garantie

American Power Conversion (APC) gewährleistet, dass dieses Produkt für die Dauer von zwei Jahren ab Kaufdatum frei von Material- und Fertigungsfehlern ist, außer in Indien, wo die Dauer ein Jahr für Batteriemodule beträgt. Die Verpflichtung von APC gemäß dieser Garantie ist auf die Reparatur oder den Ersatz (Entscheidung trifft APC) jeglicher defekter Produkte begrenzt. Bevor unter die Garantie fallende Wartungsleistungen in Anspruch genommen werden können, muss beim Kundendienst eine Warenrücknahmenummer (Returned Material Authorization---RMA) angefordert werden (Weitere Informationen finden Sie im Abschnitt Service im Bedienungshandbuch). Produkte müssen als vom Absender bezahlte Sendung zurückgeschickt werden, und eine kurze Beschreibung des aufgetretenen Problems sowie einen Nachweis von Ort und Datum des Kaufs enthalten. Diese Garantie gilt nicht für Geräte, die durch Unfall, Fahrlässigkeit oder Missbrauch beschädigt, oder in irgendeiner Weise verändert oder modifiziert wurden. Diese Garantie gilt nur für den ursprünglichen Käufer, der das Produkt vorschriftsmäßig innerhalb von zehn Tagen nach dem Kauf registriert haben muss.

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TEST REPORT

EN 50091-1-1 :1996

Uninterruptible power systems (UPS)

Part 1: General and safety requirements for UPS used in operator access areas

Report

Report reference No.: 1924400-3335-0030 (18176)

Tested by (+ signature).....: Jürgen Bärwinkel

Approved by (+ signature): Frank Richter i.v.

Date of issue: 16.07.2002

This report is based on a blank test report that was prepared by FIMKO using information obtained from the TRF originator (see below)

Testing laboratory

Name: VDE Testing and Certification Institute

Address: Merianstrasse 28, D-63069 Offenbach, Germany

Testing location: American Power Conversion Corp.
85 Rangeway Road Bldg. #2 , N. Billerica, MA USA
TMP (TDAP File no. 19244-9501-0001)

Client

Name: American Power Conversion (APC)

Address: 85 Rangeway Road Bldg. #2 , N. Billerica, MA USA

Test specification

Standard: EN 50091-1-1:96

Test procedure: CB / VDE

Procedure deviation: ---

Non-standard test method: ---

Test Report Form

Test Report Form No.....: 5009111B/99-11

TRF originator: FIMKO

Master TRF: dated 97-11

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Test item	
Description	Uninterruptible Power Supply (UPS)
Trademark	APC
Model and/or type reference	SU750RMI1U, SU1000RMI1U
Manufacturer.....	See IEC/EN60950 Test report
Rating(s)	See IEC/EN60950 Test report
Particulars: test item vs. test requirements	
Equipment mobility.....	For build in (rackmount)
Tested for IT power systems	No
IT testing, phase-phase voltage (V) :	---
Class of equipment	Class I
Mass of equipment (kg)	> 18
Protection against ingress of water :	---
Test case verdicts	
Test case does not apply to the test object :	N(.A.)
Test item does meet the requirement	P(ass)
Test item does not meet the requirement ...:	F(ail)
Testing	
Date of receipt of test item	March 03, 2002
Date(s) of performance of test	March 07, 2002 to May 23, 2002
General remarks	
"(see remark #)" refers to a remark appended to the report.	
"(see Annex #)" refers to an annex appended to the report.	
This report shall not be reproduced except in full without the written approval of the testing laboratory.	
The test results presented in this report relate only to the item tested.	
Throughout this report a comma is used as the decimal separator.	
Standard EN 50091-1-1:1996 is to be used in conjunction IEC 60950:1991 + A1:1992 + A2:1993 + A3:1995 + A4:1996 / EN 60 950:1992 + A1:1993 + A2:1993 + A3:1995 + A4:1997 + A11:1997/ DIN EN 60950 (VDE 0805):1997-11+A11:1998-08, which is referred to in this TRF by 'RD'".	
Copy of marking plate	
See IEC/EN60950 Test report	



Cl.	Requirement – Test	Result	Verdict
1	GENERAL		
1.5	Components	1.5.1 – 1.5.4/RD See IEC/EN60950 Test report for details	
1.5.1/RD	Comply with IEC 950 or relevant component standard		P
1.5.2/RD	Evaluation and testing of components		P
1.5.3/RD	Transformers		P
1.5.4/RD	High voltage components (component; manufacturer; flammability)		N
1.7	Power interfaces		
1.7.1	Neutral conductors		P
1.6.4/RD	Components in equipment intended for IT power system	1.6.4 – 1.6.5/RD See IEC/EN60950 Test report for details	N
1.6.5/RD	Mains supply tolerance (V)		P
1.8	Marking and instructions		
1.8.1	Rated voltage (V)	220 - 240	P
	Symbol of nature of supply for d.c.		N
	Rated frequency (Hz)	50 – 60	P
	Rated current (A)	6	P
	Number of phases (1Ø - 3Ø)	Single Phase	P
	Output rated active power (W/kW)	480 W (SU750RMI1U)	P
	Output rated apparent power (VA/kVA)	750 VA (SU750RMI1U)	P
	Output rated active power (W/kW)	680 W (SU1000RMI1U)	P
	Output rated apparent power (VA/kVA)	1000 VA (SU1000RMI1U)	P
	Maximum ambient operating temperature range (°C) [optional]	40	P
	Stored energy time (min/h) [optional]	---	N
	Manufacturer	American Power Conversion	P
	Trademark	APC	P
	Type/model	SU750RMI1U, SU1000RMI1U	P
	Symbol of Class II		N
	Supply ratings given in installation instructions for units with additional separate automatic pybass/maintenance bypass, additional input a.c. supply for external batteries		N
	Text referring to installation instructions on/near point of connection		N



Cl.	Requirement – Test	Result	Verdict
	Certification marks		N
1.8.2	Safety instructions	Provided with each unit	P
1.8.3 1.7.4/RD	Marking for voltage setting/frequency setting		N
1.8.4 1.7.5/RD	Marking at power outlets	See IEC/EN60950 Test report for details	P
1.8.5	Marking at fuseholders	all fuses and circuit breakers are marked with ratings or F4, F5, See schematics	P
1.8.6	Protective earthing terminals	Located on Printed Circuit Board	P
1.8.7	Battery terminals	Marked '+' and '-' on Battery connector	P
1.8.8 1.7.8/RD	Identification and location of switches and controls	See IEC/EN60950 Test report for details	P
	Colours of controls and indicators		P
	Symbols according to IEC 417		P
	Figures used for marking		P
	Location of markings and indications for switches and controls		P
1.8.9 1.7.9/RD	Isolation of multiple power sources		N
1.8.10 1.7.10/RD	Instructions for installation to IT power system		N
1.8.11	Instructions when protection relies on building installation		N
1.8.12 1.7.12/RD	High leakage current	See IEC/EN60950 Test report for details	P
	Marking when leakage current exceeds 3,5 mA		N
1.8.12.1	Installation manual defining connection method		N
1.8.12.2	Warning label and installation manual defining connection method		N
1.8.13 1.7.13/RD	Indication at thermostats and regulating devices		N
1.8.14 1.7.14/RD	Language of safety markings/instructions		P
	Language	German / English	
1.8.15 1.7.15/RD	Durability and legibility	See IEC/EN60950 Test report for details	P
1.8.16 1.7.16/RD	Removable parts	See IEC/EN60950 Test report for details	P



Cl.	Requirement – Test	Result	Verdict
1.8.17 1.7.17/RD	Warning text for replaceable lithium batteries	No batteries	N
	Language		
1.8.18 1.7.18/RD	Operator access with a tool	See IEC/EN60950 Test report for details	N
1.8.19	a) Battery type and number of blocks or cells	Lead-Acid	P
	b) Nominal voltage of total battery (V)	DC 12 V	P
	c) Nominal capacity of total battery [optional]		N
	d) Warning label denoting energy/electrical shock and chemical hazard, reference to maintenance handling and disposal requirements		N
	Instructions for internally mounted battery	See Manual for details	P
	Instructions for externally mounted battery		N
	External battery cabinets		N
1.8.20	Signalling circuits		N
1.8.21	Internal circuit configuration		N

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Cl.	Requirement – Test	Result	Verdict
2	FUNDAMENTAL DESIGN REQUIREMENTS		
2.1	Protection against electric shock and energy hazards		
2.1.1 2.1.5/RD	Access to energized parts	See IEC/EN60950 Test report for details	P
2.1.2 2.1.2/RD	Protection in operator access areas		P
	Test by inspection		P
	Test with test finger		P
	Test with test pin		P
	Insulation of internal wiring in an ELV circuit accessible to operator		N
	Working voltage (V); distance (mm) through insulation		N
	Operator accessible insulation of internal wiring at hazardous voltage	See IEC/EN60950 Test report for details	P
2.1.3	Risk of electric shock from stored charge on capacitors connected to external circuit	See IEC/EN60950 Test report for details	P
	Time-constant (s); measured voltage (V)		
2.1.4	Backfeed protection in UPS with flexible cord and plug		
2.1.4/RD	Protection in service access areas	See IEC/EN60950 Test report for details	P
2.1.5	All-pole type switching device		
	Protection time(s)		
2.1.5/RD	Energy hazard in operator access area		
2.1.6	Emergency switching device		N
2.1.6/RD	Clearances behind conductive enclosures	See IEC/EN60950 Test report for details	P
2.1.7/RD	Shafts of manual controls		P
2.1.8/RD	Isolation of manual controls		P
2.1.9/RD	Conductive casings of capacitors		P

2.1.4

Backfeed protection is realized by two relays double pole with a gap between the contacts of 1.5 mm for each pole (2 x 1.5 mm = 3.0 mm).



Cl.	Requirement – Test	Result	Verdict
2.2	Insulation		
2.2.1 2.2.1/RD	Methods of insulation	2.2.1 – 2.2.6/RD See IEC/EN60950 Test report for details	P
2.2.2/RD	Properties of insulating materials		P
2.2.3/RD	Humidity treatment		P
	Humidity (%)		
	Temperature (°C)		
2.2.4/RD	Requirements for insulation		P
2.2.5/RD	Insulation parameters		P
2.2.6/RD	Categories of insulation		P

2.3	Safety extra-low voltage (SELV) circuits		
2.3.1	Multiway plugs and sockets, location of uninsulated parts at hazardous voltage, SELV connectors not compatible with IEC 320	2.3.1 – 2.3.10/RD See IEC/EN60950 Test report for details	P
2.3.1/RD	Voltage (V) of SELV circuits under normal operating conditions and after a single fault		
2.3.2/RD	Voltage (V) between any two conductors of SELV circuit(s) and for Class I equipment between any conductor of SELV circuit and equipment protective earthing terminal under normal operating conditions		P
2.3.3/RD	Voltage (V) of SELV in the event of a single failure of basic or supplementary insulation or of a component		
	Method used for separation	Method 1	P
2.3.4/RD	Additional constructional requirements		P
2.3.5/RD	Connection of SELV circuits to other circuits		P



Cl.	Requirement – Test	Result	Verdict
2.4	Limited current circuits		
2.4.1/RD 2.4.2/RD	Frequency (Hz)		
	Measured current (mA)		N
2.4.3/RD	Measured voltage (V)		
	Measured capacitance (µF)		N
2.4.4/RD	Measured voltage (V)		
	Measured charge (µC)		N
2.4.5/RD	Measured voltage (V)		
	Measured energy (mJ)		N

2.5	Provisions for protective earthing		
2.5.1	Class I equipment		P
	Warning label for service personnel		N
2.5.2	Sufficient terminals , earthed socket-outlets or other means for equipotential bonding to the UPS from other Class I equipment including UPS battery cabinets		P
2.5.2/RD	Protective earthing in Class II equipment	2.5.2 – 2.5.11/RD See IEC/EN60950 Test report for details	P
2.5.3/RD	Switches/fuses in earthing conductors		P
2.5.4/RD	Assured earthing connection for Class I equipment in systems comprising Class I and Class II equipment		P
2.5.5/RD	Green/yellow insulation		P
2.5.6/RD	Continuity of earth connections		P
2.5.7/RD	Making and breaking of protective earthing connections		P
2.5.8/RD	Disconnection protective earthing connections		P
2.5.9/RD	Protective earthing terminals for fixed supply conductors or for non-detachable power supply cords		N
2.5.10/RD	Corrosion resistance		P
2.5.11/RD	Resistance (Ω) of protective earthing conductors ≤ 0,1 Ω		P
	Test current (A)		



Cl.	Requirement – Test	Result	Verdict
2.6	A.C. and D.C. power isolation		
2.6.1	Disconnection devices	See IEC/EN60950 Test report for details	P
2.6.2	For three-phase equipment simultaneous disconnection of all phase conductors of supply For IT equipment simultaneous disconnection of neutral conductor		N
2.6.2/RD	Type of disconnect device:	See IEC/EN60950 Test report for details	P
2.6.3	Marking of on/off positions	See IEC/EN60950 Test report for details	N
2.6.3/RD	Disconnect device in permanently connected equipment		N
2.6.4	Permanently connected unit receiving power from more than one external source		N
2.6.4/RD	Parts of disconnect device which remain energized	See IEC/EN60950 Test report for details	P
2.6.5	Opening of all ungrounded conductors of battery(s)	Connector for Battery disconnection	P
2.6.5/RD	Switches in flexible cords		N
2.6.6/RD	Disconnection of both poles simultaneously in single-phase equipment	See IEC/EN60950 Test report for details	P
2.6.9/RD	Installation instructions if plug on power supply cord acts as disconnect device	See IEC/EN60950 Test report for details	P
	Language:		
2.6.10/RD	Disconnection of protective earthing connection		P
2.6.11/RD	Interconnected equipment		P
2.6.12	Multiple power sources		N
2.6.13/RD	Compliance with requirements of 2.6		P



Cl.	Requirement – Test	Result	Verdict
2.7	Overcurrent and earth fault protection		
2.7.1 a)	Protective devices as integral parts of equipment		P
2.7.1 b)	Protective devices in building installation for components in series with mains input		P
2.7.1 c)	Reliance based on protection in building installation. Installation instructions		N
2.7.1 d)	Available fault current under most unfavourable conditions		N
	Specified by manufacturer (mA)		N
	Limiting of inverter output current (A) and period of operation(s)		N
2.7.2	Overcurrent protection of battery supply circuit	Plastic enclosure, F1/F2 provided, no shorts to ground possible.	P
2.7.3 2.7.3/RD	Short-circuit backup protection	See IEC/EN60950 Test report for details	P
2.7.4 2.7.4/RD	Location of overcurrent protective device where batteries are installed outside UPS		N
	Number and location of protective devices		N
2.7.5 2.7.5/RD	Protection by several devices	See IEC/EN60950 Test report for details	P
	Rating of overcurrent protective device located internally	See IEC/EN60950 Test report for details	P
	Rating of protective device in instruction manual for separate battery supply		
2.7.6/RD	Warning to service personnel		N



Cl.	Requirement – Test	Result	Verdict
2.8	Protection of personnel - safety interlocks		
2.8.1	Requirements applying to service personnel		N
2.8.2	Arranging parts at hazardous voltage or energy		N
2.8.3	Reducing likelihood of unintentional contact by service personnel		N
2.8.4	Parts at hazardous voltage/energy level located on rear side of door		N
2.8.5/RD	Overriding an interlock		N
2.8.5	Location of energized component		N
2.8.6	Adjustment with screwdriver Contact gap (mm)		N
2.8.7	Moving parts causing injury		N
2.8.8	Discharging of capacitor banks Discharge time(s), time to reduce hazard to safe level (min)		N
2.8.9	Arranging of internal batteries Interconnection method:		N

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Cl.	Requirement – Test	Result	Verdict
2.9	Clearances, creepage distances and distances through insulation		
	Nominal voltage (V):	2.9.1 – 2.9.8 See IEC/EN60950 Test report for details	
2.9.1/RD	General requirements		P
2.9.2/RD	Clearances		P
2.9.2	Clearances in primary circuits		P
2.9.2	Clearances in secondary circuits		P
2.9.3/RD	Creepage distances		P
	CTI tests:		
2.9.4/RD	Minimum distances through insulation		P
	Thin sheet material		N
2.9.5/RD	Distances on coated printed boards		N
	Routine testing for electric strength		N
2.9.6/RD	Enclosed and sealed parts		P
2.9.7/RD	Spacings filled by insulating compound		N
2.9.8/RD	Component external terminations		P
2.10	External signalling circuits		
	General requirements	See IEC/EN60950 Test report for details	P
	Type of interconnection circuits:	See IEC/EN60950 Test report for details	P
	ELV circuits as interconnection circuits		N
2.11	Limited power source	See IEC/EN60950 Test report for details	P
2.11/RD	Use of limited power source:		
2.12	Protection of applied load Valve of static output voltage variations not exceeding values of static input voltage tolerances:		P



Cl.	Requirement – Test		Result	Verdict
3	WIRING, CONNECTIONS AND SUPPLY			
3.1/RD	General			
3.1.1/RD	Cross-sectional area of internal wiring/ interconnecting cables	3.1 – 3.1.11 See IEC/EN60950 Test report for details		P
	Protection of internal wiring and interconnecting cables			P
3.1.2/RD	Wireways			P
3.1.3/RD	Fixing of internal wiring			P
3.1.4/RD	Fixing of uninsulated conductors			P
3.1.5/RD	Insulation of internal wiring			P
3.1.6/RD	Wires coloured green/yellow only for protective earth connection			P
3.1.7/RD	Fixing of beads and similar ceramic insulators			P
3.1.8/RD	Required electrical contact pressure			P
3.1.9/RD	Reliable electrical connections			P
3.1.10/RD	End of stranded conductor			P
3.1.11/RD	Use of spaced thread screws/thread-cutting screws			N

3.2	Connection to power		
3.2.1	Type of connection	See IEC/EN60950 Test report for details	P
	Design of product with more than one supply connection		N
3.2.2/RD	Provision for permanent connection	3.2.2 – 3.2.8 See IEC/EN60950 Test report for details	N
	Size (mm) of cables and conduits		N
3.2.3/RD	Appliance inlet		P
3.2.4/RD	Type and cross-sectional area (mm ²) of power supply cord		P
3.2.5/RD	Cord anchorage		
	Test: 25 times; 1 s; pull (N)		
	Longitudinal displacement ≤ 2 mm		N
3.2.6/RD	Protection of power supply cord		N
3.2.7/RD	Cord guard		N
	D (mm)		
	Test: mass (g)		
	Radius of curvature of the cord ≤ 1,5 D		
3.2.8/RD	Supply wiring space		N



Cl.	Requirement – Test	Result	Verdict
3.3	Wiring terminals for external power supply conductors		
3.3.1/RD	Terminals		N
3.3.2/RD	Special non-detachable cord		N
	Type of connection		
	Pull test at 5 N		N
3.3.3/RD	Screws and nuts		N
3.3.4/RD	Fixing of conductors		N
3.3.5/RD	Connection of connectors		N
3.3.6/RD	Size of terminals		N
	Nominal thread diameter (mm)		N
3.3.7/RD	Protection against damage of conductors		N
3.3.8/RD	Terminal location		N
3.3.9/RD	Test with 8 mm stranded wire		N

4	PHYSICAL REQUIREMENTS		
	Frame of chassis and use of enclosure		P
4.1	Stability and mechanical hazards		P
4.1.1	Stability tests		P
	Angle of 10°		P
	Test: force (N)		N
4.1.2/RD	Protection against personal injury		N
4.1.3/RD	Warning and means provided for stopping the moving part		N
4.1.4/RD	Edges and corners		P
4.1.5/RD	Enclosure of a high pressure lamp		N

4.2	Mechanical strength and stress relief		
4.2.1/RD	General	4.2.1 – 4.2.7 See IEC/EN60950 Test report for details	P
4.2.2/RD	Internal enclosures 30 N ± 3 N; 5 s		P
4.2.3/RD	External enclosures 250 N ± 10 N; 5 s		P
4.2.4/RD	Steel ball tests		P
	Fall test		P
	Swing test		P
4.2.6/RD	Heat test for enclosures of moulded or formed thermoplastic materials: 7 h; T (°C)		P
4.2.7/RD	Compliance criteria		P



Cl.	Requirement – Test	Result	Verdict
4.3	Construction details		
4.3.1	Openings vertically above bare parts at hazardous voltages in top of enclosure.....:	See IEC/EN60950 Test report for details	P
4.3.1/RD	Changing of setting for different power supply voltages	See IEC/EN60950 Test report for details	N
4.3.2	Openings in the side of fire enclosure or electrical enclosure	See IEC/EN60950 Test report for details	P
4.3.2/RD	Adjustment of accessible control devices	See IEC/EN60950 Test report for details	N
4.3.3	Safeguards against risk of dangerous gas concentration and dangerous external spillage in case of using batteries	Sealed Battery	P
4.3.3/RD	Prevention of penetration or spilt liquid	See IEC/EN60950 Test report for details	N
4.3.4	Equipment provided with castors Brakes on wheels		N
4.3.5/RD	Fixing of knobs, grips, handles, levers		N
	Test: force (N)		N
4.3.6/RD	Driving belts/couplings shall not ensure electrical insulation	4.3.6 – 4.3.21 See IEC/EN60950 Test report for details	N
4.3.7/RD	Retaining of sleeves		P
4.3.8/RD	Gaps in supplementary or basic insulation		P
4.3.9/RD	Protection of loosening parts		P
4.3.10/RD	Protection of supplementary and reinforced insulation		P
4.3.11/RD	Resistance to oil and grease		N
4.3.13/RD	Securing of screwed connections		P
4.3.17/RD	Interchangeable plugs and sockets		P
4.3.21/RD	Protection of lithium batteries		N
	Construction of protection circuit		N



Cl.	Requirement – Test	Result	Verdict
4.4	Resistance to fire		
4.4.1/RD	Methods of achieving resistance to fire	4.4.1 – 4.4.8 See IEC/EN60950 Test report for details	P
4.4.2/RD	Minimizing the risk of ignition		P
	Printed board: manufacturer; type; flammability ..		P
4.4.3	Flammability of batteries	Battery is min V2	P
4.4.3/RD	Flammability of materials and components		
4.4.3.2/RD	Material and component: manufacturer; type; flammability		P
4.4.3.3/RD	Exemptions		P
4.4.3.4/RD	Wiring harnesses: manufacturer; flammability		P
4.4.3.5/RD	Cord anchorage bushings: manufacturer; flammability		P
4.4.3.6/RD	Air filter assemblies: manufacturer; flammability .		N
4.4.4/RD	Enclosures and decorative parts: manufacturer; type; flammability		P
4.4.5/RD	Conditions for fire enclosures		P
4.4.5.1/RD	Components requiring fire enclosure: manufacturer; flammability		P
4.4.5.2/RD	Components not requiring fire enclosure		N
4.4.6/RD	Fire enclosure construction		P
4.4.7/RD	Doors or covers in fire enclosures		P
4.4.8/RD	Flammable liquids		N

4.5	Battery location		
4.5.1	General requirements for installation		P
	Accessibility and maintainability		P
	Ingress of dust, solid objects and moisture		P
	Temperature range	Battery Compartment Temp. 42 C	P
	Vibration		P
	Distance		P
	Insulation		P
	Wiring	See IEC/EN60950 Test report for details	P
	Electrolytic spillage	Sealed Battery	P
	Ventilation		P
	Charging voltages (V).....		P



Cl.	Requirement – Test	Result	Verdict
5	THERMAL AND ELECTRICAL REQUIREMENTS		
5.1	Heating		P
	Heating tests	See IEC/EN60950 Test report for details	P
5.2	Earth leakage current (see appended table)		P
5.2.1 5.2.1/RD	Protective earth conductor carrying the sum of UPS and connected load earth leakage currents General	See IEC/EN60950 Test report for details	P
5.2.2	Non-detachable power supply cord for pluggable type B equipment		N
5.2.2/RD	Leakage current	See IEC/EN60950 Test report for details	P
5.2.3/RD	Single-phase equipment		P
	Test voltage (V)		
	Measured current (mA)		
	Max. allowed current (mA)		
5.2.4/RD	Three-phase equipment		N
	Test voltage (V)		
	Measured current (mA)		
	Max. allowed current (mA)		
5.2.5/RD	Equipment with earth leakage current exceeding 3,5 mA	See IEC/EN60950 Test report for details	N
	Test voltage (V)		
	Measured current (mA)		
	Max. allowed current (mA)		
	Cross-sectional area (mm ²) of internal protective earthing conductor		
	Warning label		N
5.3	Electric strength		
5.3.1/RD	General	See IEC/EN60950 Test report for details	P
5.3.2/RD	Test procedure		P



Cl.	Requirement – Test	Result	Verdict
5.4	Abnormal operating and fault conditions		
5.4.1 5.4.1/RD	Simulating faults	See IEC/EN60950 Test report for details	P
5.4.2 5.4.2/RD	Testing in normal use and foreseeable misuse Motors	No Motors	N
5.4.3/RD	Transformers	See IEC/EN60950 Test report for details	P
5.4.4/RD	Compliance of operational insulation		P
	Method used :	See IEC/EN60950 Test report for details	P
5.4.5	Electromechanical components in secondary circuits		N
5.4.8/RD	Unattended use of equipment having thermostats, temperature limiters etc.		N
5.4.9/RD	Compliance	See IEC/EN60950 Test report for details	P
5.4.10/RD	Ball-pressure test of thermoplastic parts; impression shall not exceed 2 mm	See IEC/EN60950 Test report for details	P

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Cl.	Requirement – Test	Result	Verdict
A/RD	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		
A.1/RD	Flammability test for fire enclosures of moveable equipment having a total mass exceeding 18 kg, and of stationary equipment		N
A.2/RD	Flammability test for fire enclosures of moveable equipment having a total mass not exceeding 18 kg, and for materials located within fire enclosures		N
A.3/RD	High current arcing ignition test		N
A.3.6/RD	Number of arcs		N
A.4/RD	Hot wire ignition test		N
A.4.6/RD	Ignition time (s)		N
A.5/RD	Hot flaming oil test		N
A.6/RD	Flammability test for classifying materials V-0, V-1 or V-2		N
A.7/RD	Flammability test for classifying foamed materials HF-1, HF-2 or HBF		N
A.8/RD	Flammability test for classifying materials HB		N
A.9/RD	Flammability test for classifying materials 5V		N
A/RD	Tested material		N
	Preconditioning: 7 days (168 h); temperature (°C):		
	Mounting of samples during test		
	Wall thickness		
	Sample 1 burning time		N
	Sample 2 burning time		N
	Sample 3 burning time		N
	Material: compliance with the requirements		N
	Manufacturer of tested material		
	Type of tested material		
	Additional information		



Cl.	Requirement – Test	Result	Verdict
B/RD	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS		
B.1/RD	General requirements	No Motors	N
	Position		N
	Manufacturer		N
	Type		N
	Rated voltage (V) or current (A)		N
B.2/RD	Test conditions		N
B.3/RD	Maximum temperatures		N
B.4/RD	Running overload test		N
B.5/RD	Locked-rotor overload test		N
	Test duration (days)		N
	Electric strength test: test voltage (V)		N
B.6/RD	Running overload test for DC motor in secondary circuits		N
B.7/RD	Locked-rotor overload test for DC motor in secondary circuits		N
B.7.2/RD	Test time (h)		N
B.7.3/RD	Test time (h)		N
B.8/RD	Test for motors with capacitors		N
B.9/RD	Test for three-phase motors		N
B.10/RD	Test for series motors		N
	Test voltage (V)		—

C/RD	ANNEX C, TRANSFORMERS		
	Position	See IEC/EN60950 Test report for details	
	Manufacturer		
	Type		
	Rated values		
	Temperatures		P
	Thermal cut-out		N
C.1/RD	Overload test		N
	Conventional transformer		N
C.2/RD	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test		P



Cl.	Requirement – Test	Result	Verdict
H	ANNEX H, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER AND FOREIGN OBJECTS		
H.1	Protection selected from IEC 529		N
L	ANNEX L, BACKFEED PROTECTION TEST		
L.1	Test for pluggable type A or B UPS		P
	1. Current (mA) under no fault and any single fault condition	2.8	P
	2. Protection provided by, internal system operation time(s)	< 1 second	P
L.2	Test for permanently connected UPS (only for UPS with backfeed protection)		N
	Current (mA) under no fault and any single fault condition		N
	Operation time(s)		N
M	ANNEX M, REFERENCE LOAD CONDITIONS		
	Type of load used	RLC load	P
N	ANNEX N, VENTILATION OF BATTERY COMPARTMENTS		
	Ventilation arrangements		P



Cl.	Requirement – Test	Result	Verdict
-----	--------------------	--------	---------

1.5.1	TABLE: list of critical components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity	
See IEC/EN60950 Test report for details						

1.6	TABLE: electrical data (in normal conditions)						P
	I rated (A)	U (V)	P (W)	I (A)	I fuse (A)	condition/status	
See IEC/EN60950 Test report for details							

2.9.2 and 2.9.3	TABLE: clearance and creepage distance measurements						P
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)	
See IEC/EN60950 Test report for details							

2.9.4.1	TABLE: distance through insulation measurements				P
distance through insulation di at/of:	U r.m.s. (V)	test voltage (V)	required di (mm)	di (mm)	
See IEC/EN60950 Test report for details					



Cl.	Requirement – Test		Result		Verdict	
5.1	TABLE: temperature rise measurements				P	
	test voltage (V)					
	t1 (°C)					
	t2 (°C)					
rise dT of part/at:			dT (K)		required dT (K)	
See IEC/EN60950 Test report for details						
temperature rise dT of winding:			R ₁ (Ω)	R ₂ (Ω)	dT (K)	required dT (K)
						insulation class

5.2.2	TABLE: leakage current	P
See IEC/EN60950 Test report for details		

5.3	TABLE: electric strength measurements		P
test voltage applied between:		test voltage (V)	breakdown Yes / No
See IEC/EN60950 Test report for details			
supplementary information			



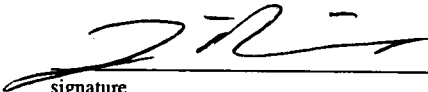
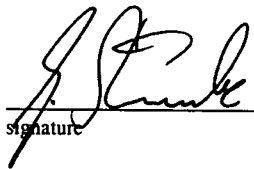
Cl.	Requirement – Test					Result	Verdict
5.4	TABLE: fault condition tests						P
	ambient temperature (°C)						
	model/type of power supply						
	manufacturer of power supply						
	rated markings of power supply						
	component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
See IEC/EN60950 Test report for details							
supplementary information							

5.4.10	TABLE: ball pressure test of thermoplastics			P
	required impression diameter (mm)	≤ 2 mm		
		test temperature (°C)	impression diameter (mm)	
See IEC/EN60950 Test report for details				

TEST REPORT
IEC 146-4 (1986) 1st Edition,

Product name:	Uninterruptible Power Supply (UPS)
Model/Type:	SU7500RMI1U, SU1000RMI1U
Trademark:	APC
Serial no.:	---
Name and address of the Applicant:	see IEC 950 Test Report
Name and address of the Responsible Organization:	see IEC 950 Test Report
Name and address of the Factory:	see IEC 950 Test Report

	RESULTS			
	PASS	FAIL	N/A	ENCL.
The equipment complies with the publication	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
National deviations:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Other requirements:	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Name and address of the testing laboratory: VDE Testing and Certification Institute APC, 85 Rangeway Road, N. Billerica, MA USA SMP (TDAP) under File #19244-9501-0001	
Tested by:  signature Jurgen Barwinkel	date 17.07.2002
Approved by:  signature	date 24.10.02

EXPLANATIONS FOR ABBREVIATIONS OF THE RESULT COLUMN:
N/A = Not Applicable, ENCL. = Enclosure

FACTORY LOCATIONS

1. American Power Conversion (APC) Blk. 3, Lot 14, Phase 3, PEZA, Cavite Economic Zone, Rosario, Philippines
2.
3.
4.

7. TESTS FOR UPS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
7.4	Test Specifications	[X]	[]	[]	[]
7.4.1	Interconnection Cable Check	[]	[]	[X]	[]
7.4.2	Light Load Test	[X]	[]	[]	[]
7.4.3	Checking of Auxiliary Devices	[]	[]	[X]	[]
7.4.4	Synchronization Tests	[]	[]	[X]	[]
7.4.5	AC Input Failure Test	[X]	[]	[]	[]
7.4.6	AC Input Return Test	[X]	[]	[]	[]
7.4.7	Simulation of Parallel Redundant UPS Fault	[]	[]	[X]	[]
7.4.8	Transfer Test	[X]	[]	[]	[]
7.4.9	Full Load Test	[X]	[]	[]	[]
7.4.10	UPS Efficiency	[X]	[]	[]	[]
Comments:					
7.4	Equipment tested per manufacturer's instructions				
7.4.2	Functional test done. No problems				
7.4.5/7.4.6	See EN50091 Test Report for photos of output				
7.4.9	See EN50091 Test Report Heating Test				

7. TESTS FOR UPS (con't)

		RESULTS			
		PASS	FAIL	N/A	ENCL.
7.4.11	Unbalanced Load Test	[]	[]	[X]	[]
7.4.12	Output Voltage Unbalance	[]	[]	[X]	[]
7.4.13	Actual Load Test	[X]	[]	[]	[]
7.4.14	Current Division in Parallel UPS	[]	[]	[X]	[]
7.4.15	Rated Stored Energy Time (Battery Test)	[X]	[]	[]	[]
7.4.16	Rated Restored Energy Time	[X]	[]	[]	[]
7.4.17	Battery Ripple Current	[]	[]	[X]	[]
7.4.18	On-Site Ventilation Test	[]	[]	[X]	[]
7.4.19	Overload Capability Test	[X]	[]	[]	[]
7.4.20	Short-Circuit Current Capability	[]	[]	[X]	[]
Comments:					
7.4.13 See EN50091 Heating Test					
7.4.15 See EN50091 Heating Test and attached Performance Test Data					
7.4.19 Tested at +/- 10% rated Voltage					
7.4.20 Not Specified					

7. TESTS FOR UPS (con't)

		RESULTS			
		PASS	FAIL	N/A	ENCL.
7.4.21	Short Circuit Fuse Test	[]	[]	[X]	[]
7.4.22	Restart	[X]	[]	[]	[]
7.4.23	Output Overvoltage	[]	[]	[X]	[]
7.4.24	Parallel Output Voltage Modulation	[]	[]	[X]	[]
7.4.25	Frequency Modulation	[]	[]	[X]	[]
7.4.26	Radio Freq. Interference & Conducted Noise	[X]	[]	[]	[]
7.4.27	Harmonic Components	[]	[]	[X]	[]
7.4.28	Audible Noise	[]	[]	[X]	[]
7.4.29	Earth Fault Test	[X]	[]	[]	[]
7.4.30	Additional Tests	[]	[]	[X]	[]
Comments:					
7.4.21 Not Specified					
7.4.26 Test Data provided					
7.4.29 See Test data results. No Hazard					

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COMMENTS

$$\frac{h}{d}$$

DVT REPORT

Revision: 0

Test Status: Done - Pending Review

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: Efficiency	Test Group:
Test Category: Electrical Performance	Test Setup: Both On-Line and On-Battery
Division: NETWORK POWER SOLUTIONS	Test Type: Output Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMIU	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: Unit specification	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Determine inverter (on-battery) efficiency at 10%, 25%, 50%, 80% and 100% of rated resistive or PFC loads at battery capacities of 90% and 20% (or equivalent battery voltages as close as possible). Determine on-line efficiency at 10%, 25%, 50%, 80% and 100% of rated resistive or PFC loads at maximum and minimum battery charging conditions. Determine power dissipated on-line and on-battery in BTU/hr.

Test Equipment (use the following equipment or equivalent): DVT rack (test computer, AC source, power meter, full rated resistive or PFC load, voltmeter); current shunt; RUNTIME DVT software

Setup:

- Connect the UUT to the DVT rack
 - Continuously measure battery current using a current shunt via voltmeter.
 - Continuously measure battery voltage via voltmeter.

Procedure:

1. Start the RUNTIME DVT software
 - Setup for a full discharge.
 - Set data sampling rate to the highest rate.
2. Perform a full discharge (from 100% to 0% battery capacity) at 100% full rated resistive or PFC load.
3. Graph for the discharge on-battery efficiency versus battery capacity (UPS-Link "f"). Curve fit the data points.
 - On-battery efficiency is defined as 100% multiplied by output power over battery power. Battery power which is the power produced by the battery (multiply battery current and battery voltage). Output power is the power consumed by the load.
4. Place UUT on-line. With unit now under maximum charging conditions (0% battery capacity), measure and record input and output power.
5. Turn off UUT, recharge (or replace) batteries of UUT so they are at full capacity and place the UUT on-line. With unit now under minimum charging conditions (100% battery capacity), record input and output power.
6. Repeat steps# 2 through 5 for the rest of the required loads.
7. Graph at 20% and 90% battery capacities (or as close as possible) on-battery efficiency versus load. Curve fit the data points. Include actual battery capacities in graph title.

- Obtain on-battery efficiency from each discharge graph (from step# 3) at two points only, 20% and 90% battery capacities.
- 8. Graph at 20% and 90% battery capacities power dissipated in BTU/hr versus load . Curve fit the data points.
 - Power dissipated is derived from the power difference (battery power minus output power) multiplied by the conversion formula, 3.41 BTU/hr over watts.
 - Obtain battery and output power from each discharge the data used to calculate on-battery efficiency in step# 3 at two points only, 20% and 90% battery capacities.
- 9. Graph at maximum and minimum battery charging conditions on-line efficiency versus load. Curve fit the data points.
 - On-line efficiency is defined as 100% multiplied by output power over input power.
 - Output and input power is the data gathered from steps# 4 and 5.
- 10. Graph at maximum and minimum battery charging conditions power dissipated in BTU/hr versus load. Curve fit the data points.
 - Power dissipated is derived from the power difference (input power minus output power) multiplied by the conversion formula, 3.41 BTU/hr over watts.
 - Output and input power is the data gathered from steps# 4 and 5.

Test Specifications: Determining characteristics.

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

SPECIFIC TEST INFORMATION:

Tester Operator(s): Scott Derushia	Date Completed: 05/01/2002
Test Location: 85 Rangeway Rd.	Test Actual Time (in hours):
SKU #: SUA1000RM11U	F/W Rev #: 3
Build Phase: Pilot	Serial#: DVT-1
Comments:	

Final Result:

Summary Results:

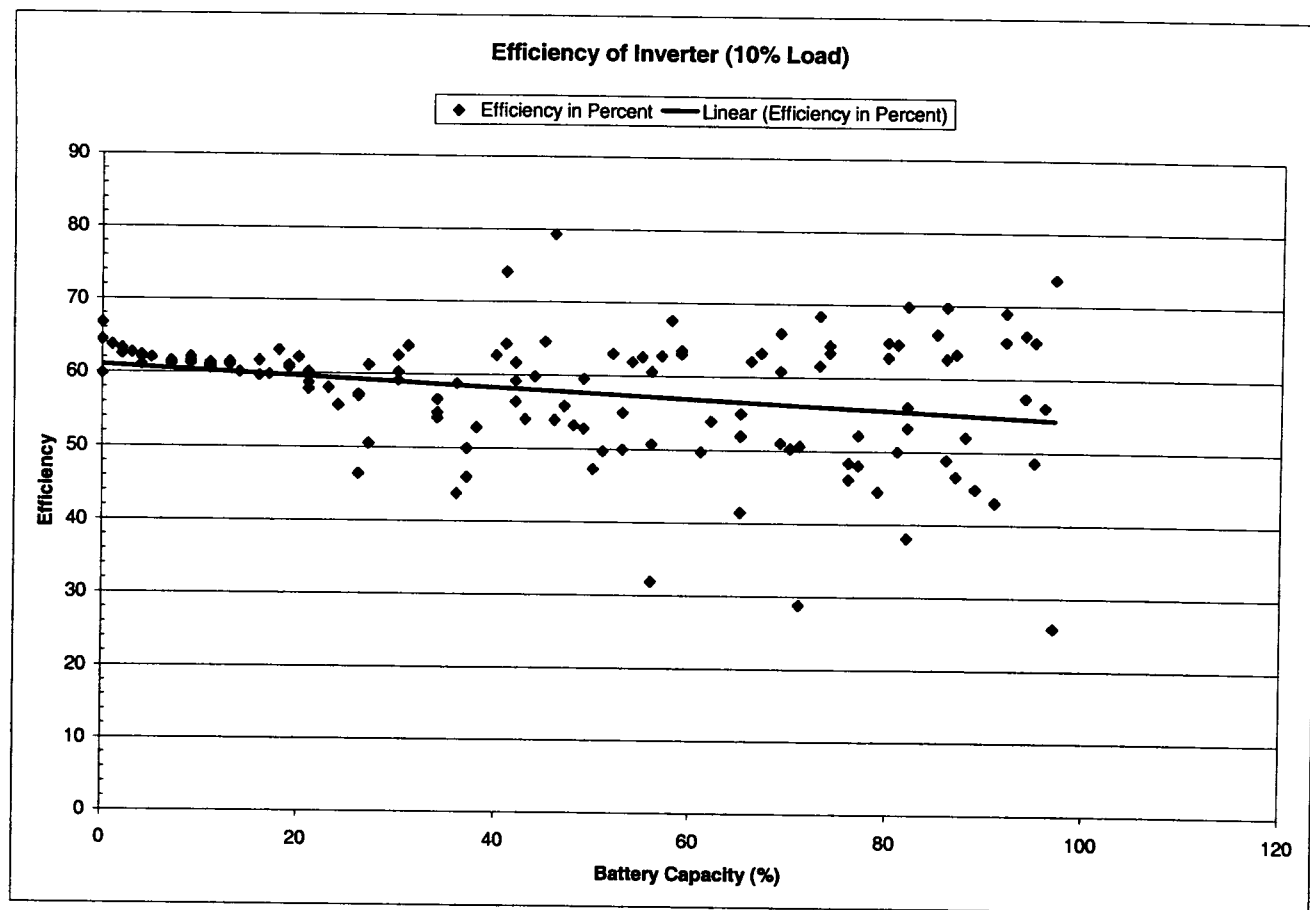
Test Data:

Below is a graph of on-battery efficiency vs. battery capacity at 10% load:

VDE File:1924400-3335-0030

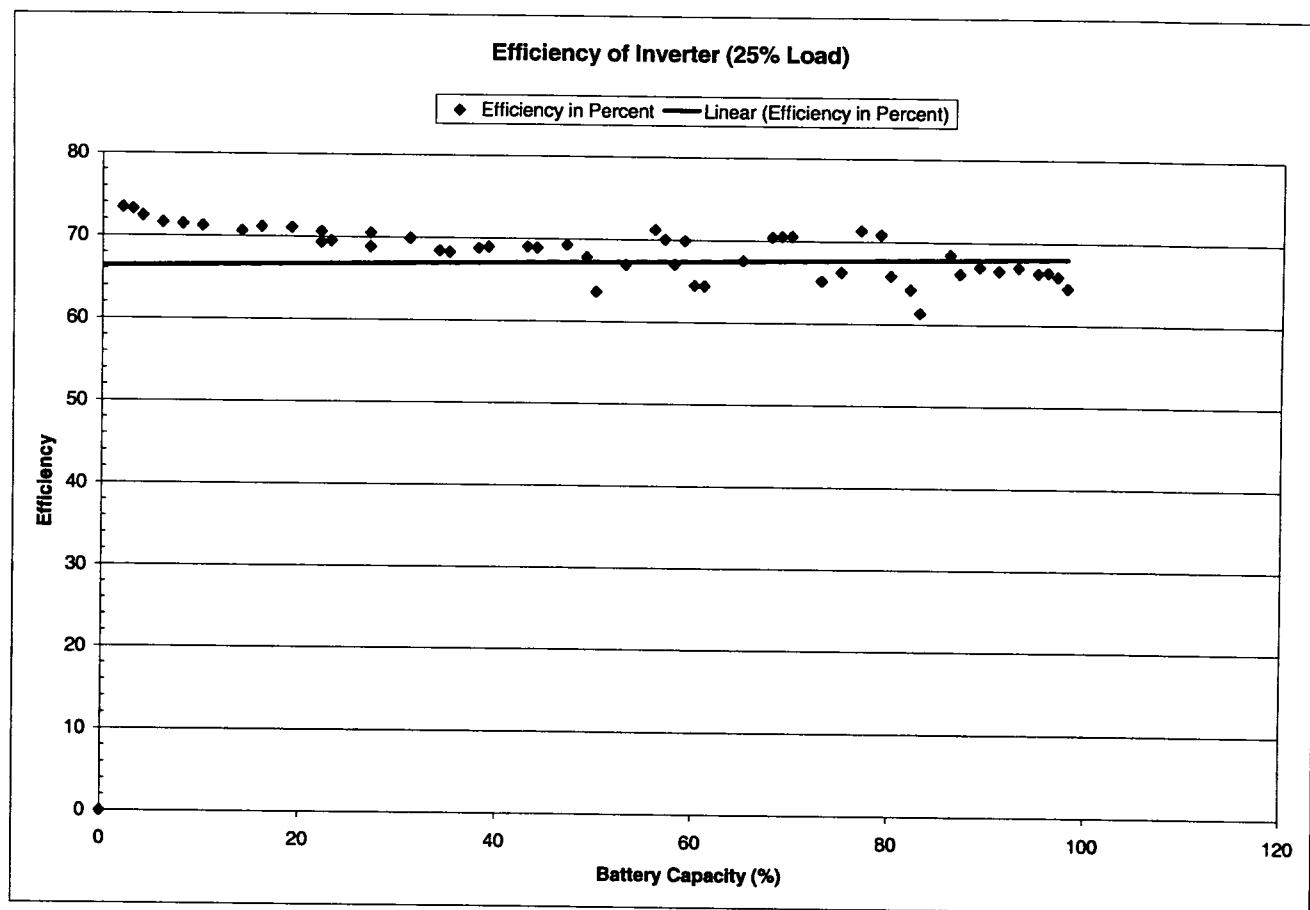
CB DE1-16215

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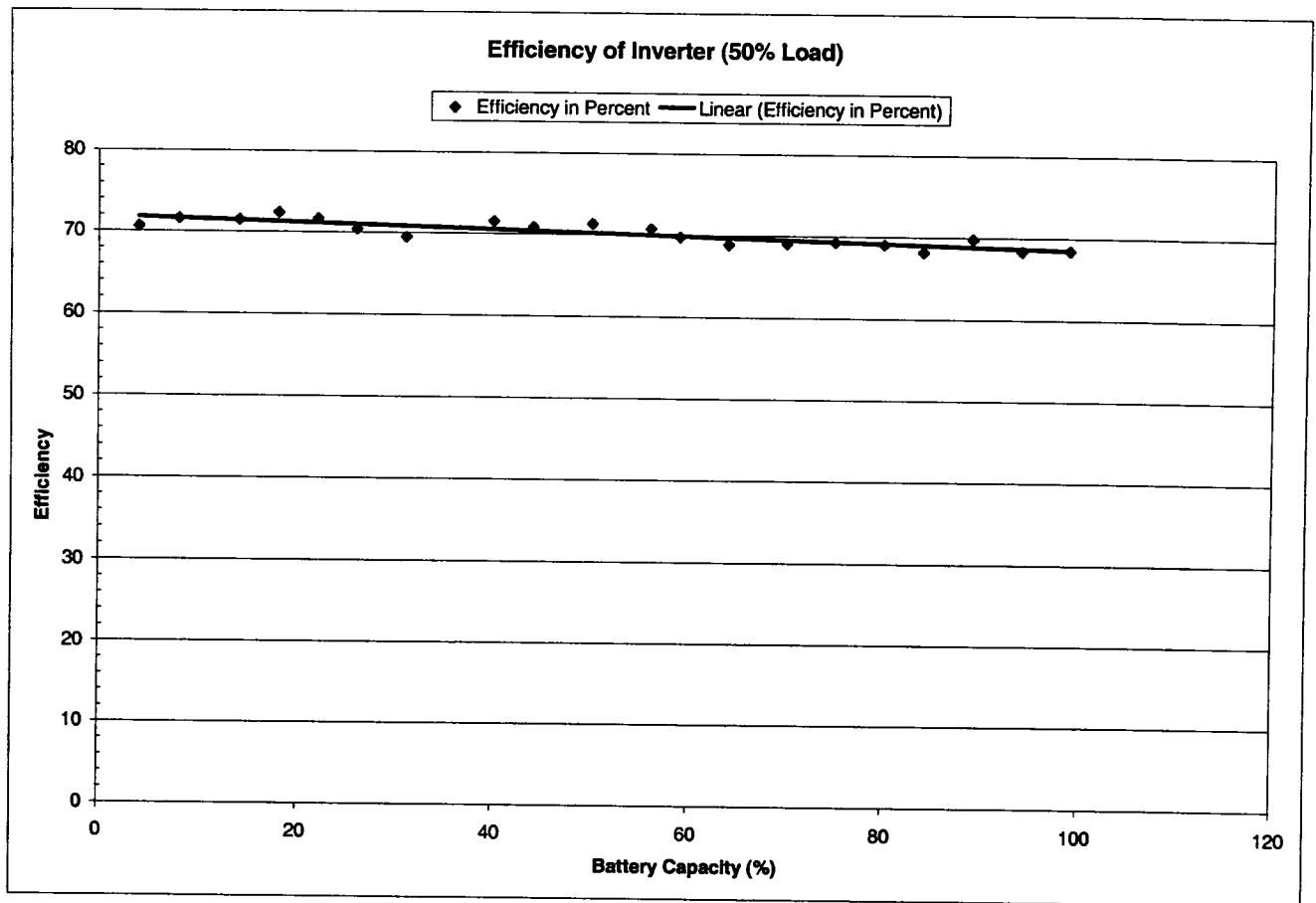
Below is a graph of on-battery efficiency vs. battery capacity at 25% load:

VDE File:1924400-3335-0030
CB DE1-16215
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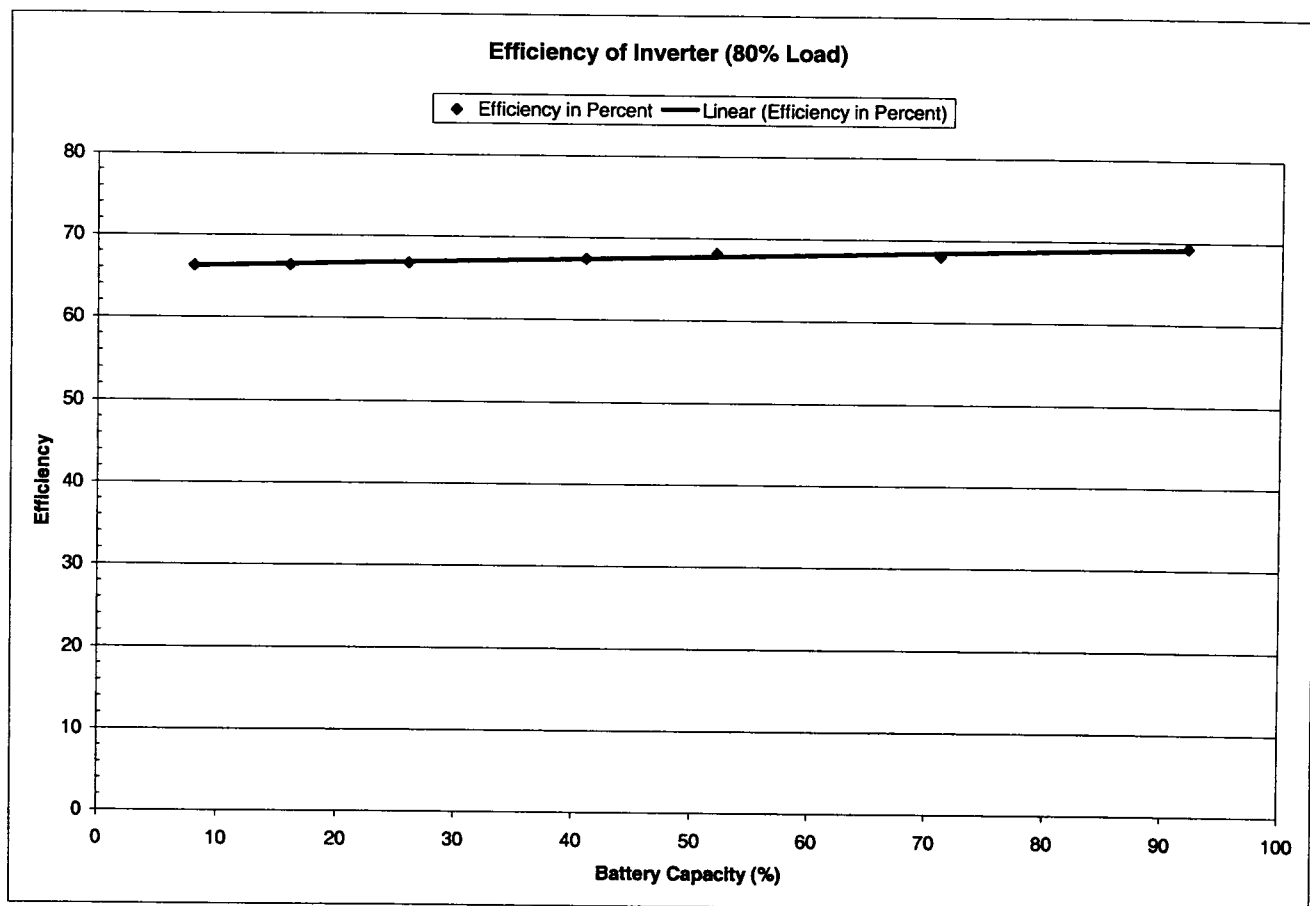
Below is a graph of on-battery efficiency vs. battery capacity at 50% load:

VDE File:1924400-3335-0030
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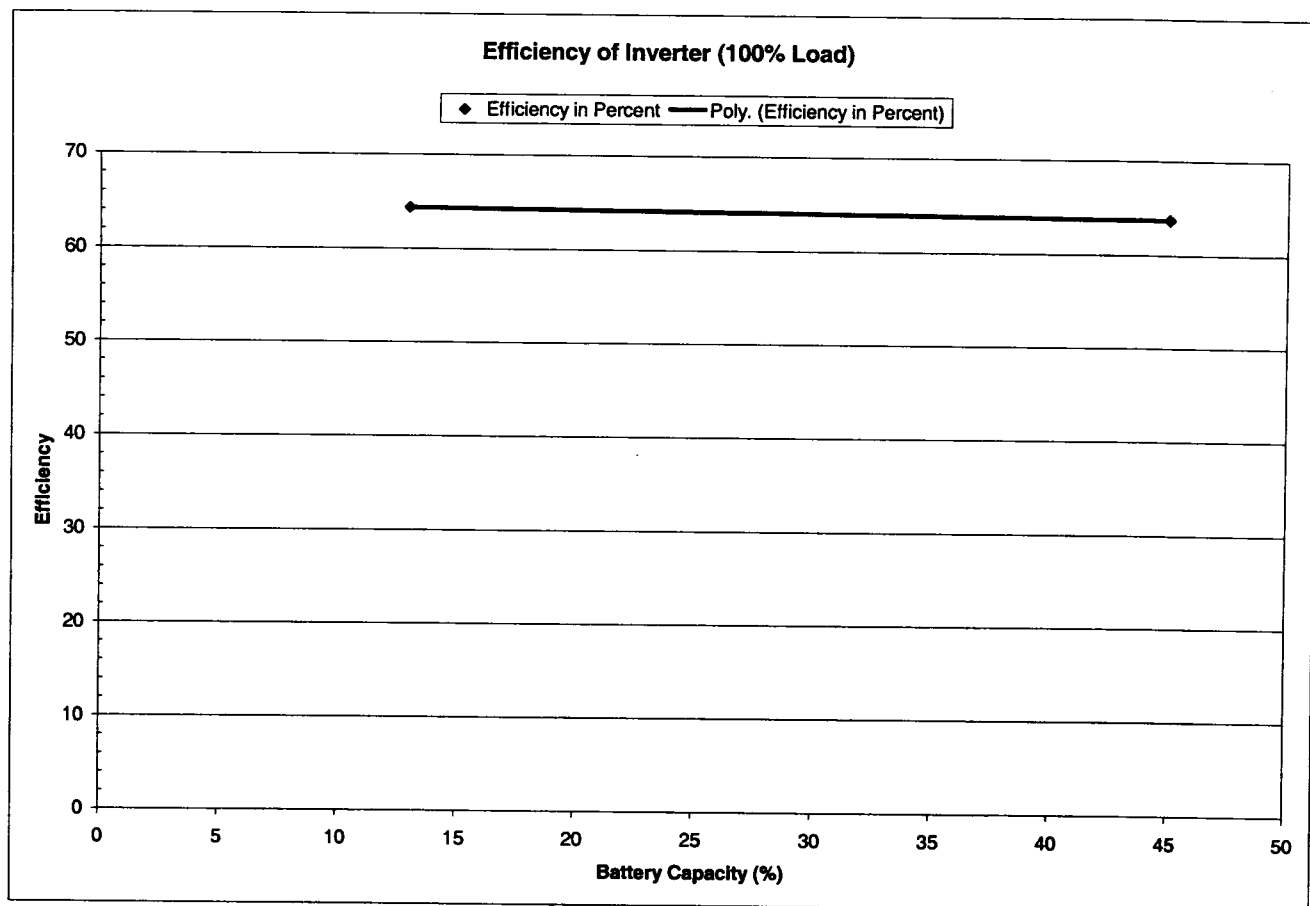
Below is a graph of on-battery efficiency vs. battery capacity at 80% load:

VDE File:1924400-3335-0030
CB DE1-16215
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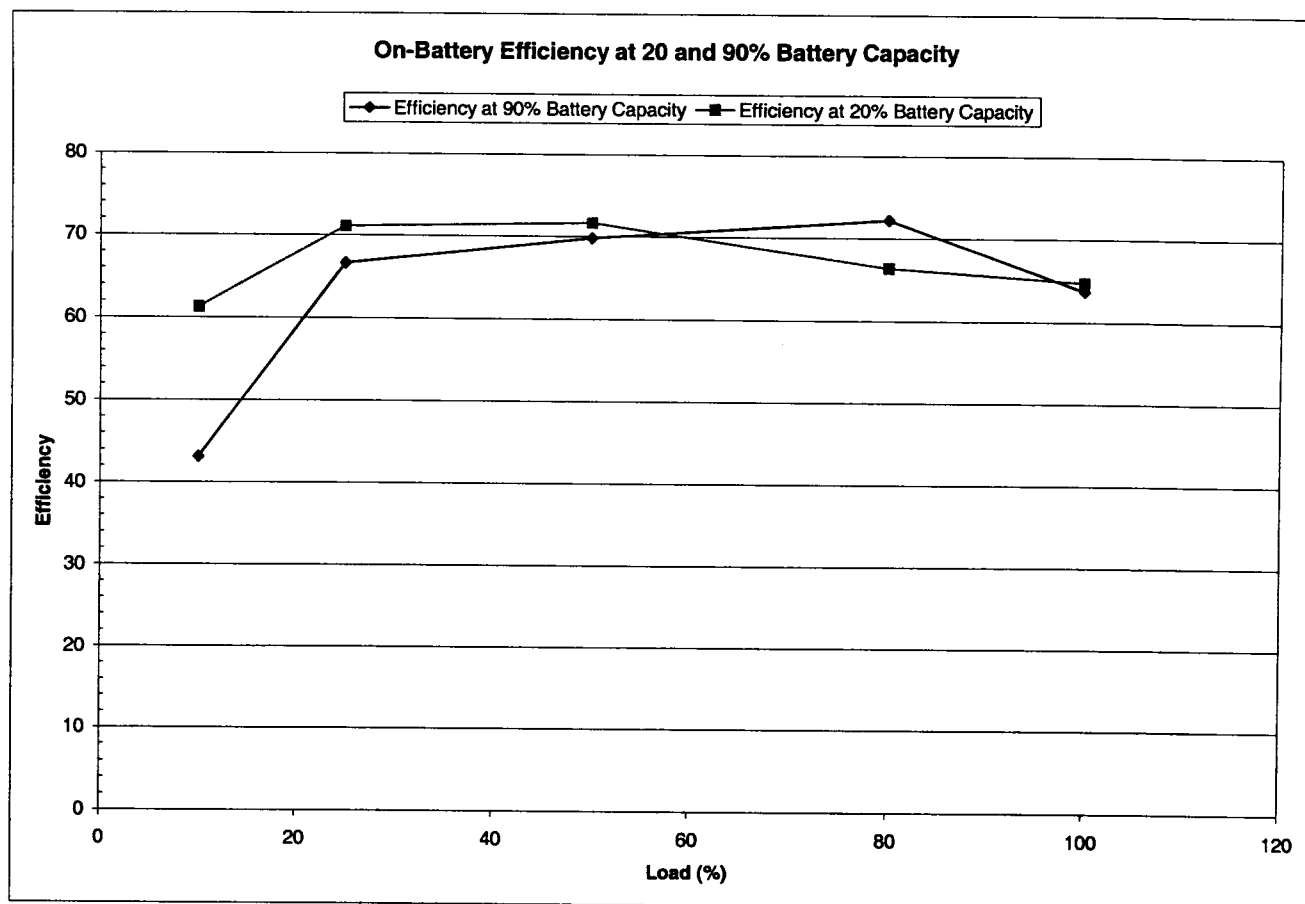


Below is a graph of on-battery efficiency vs. battery capacity at 100% load:

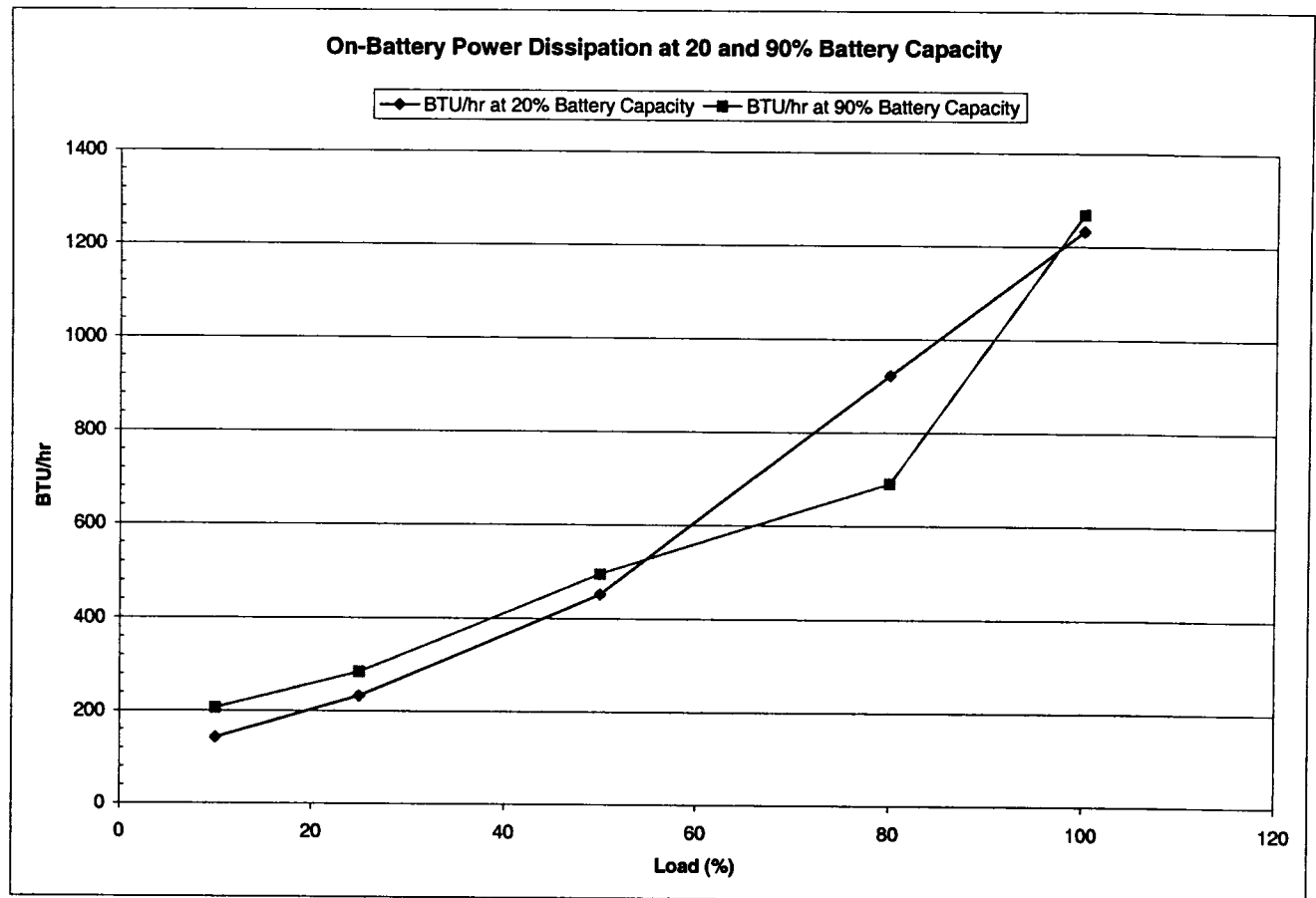
VDE File:1924400-3335-0030
CB DE1-16215
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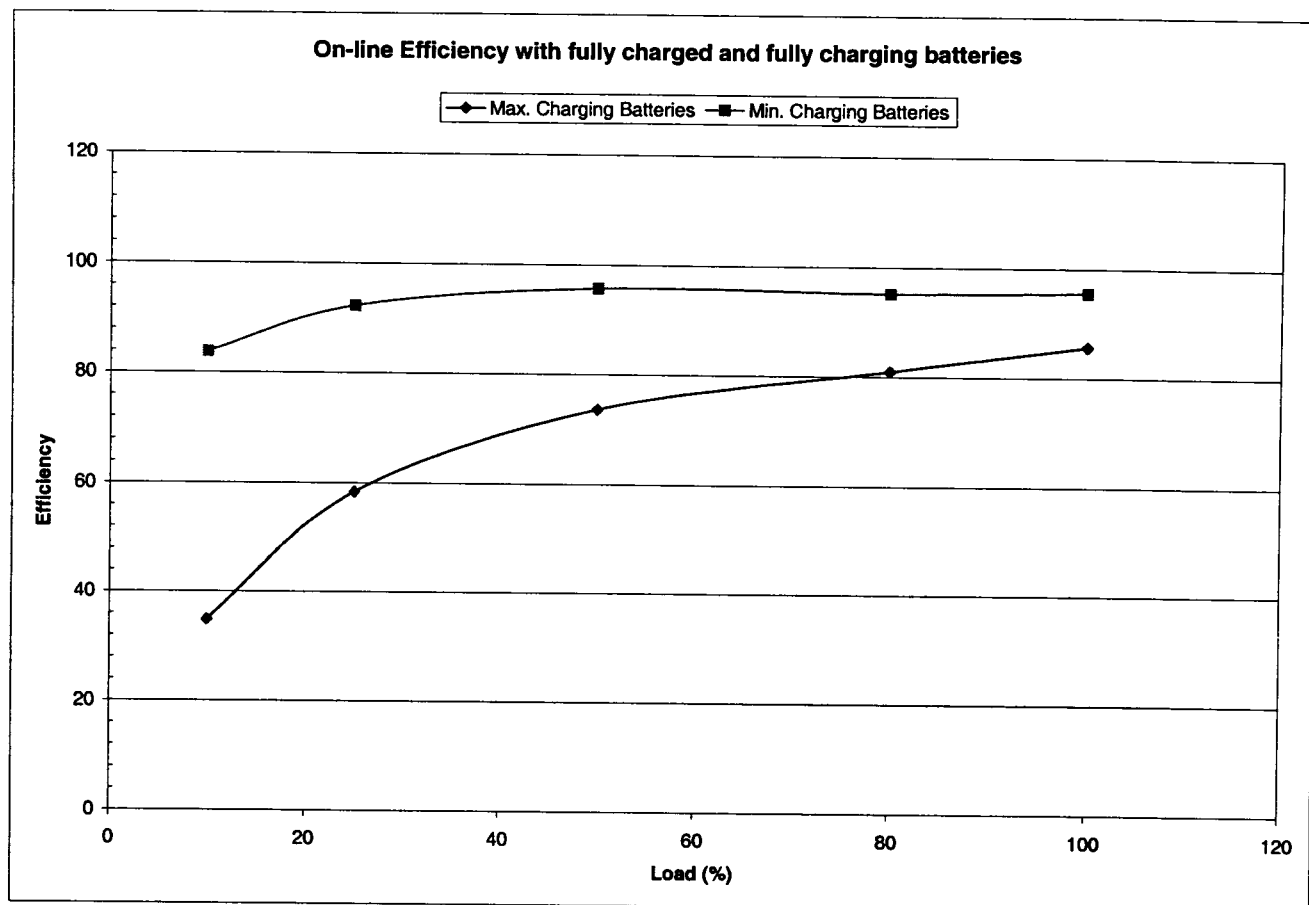
VDE File:1924400-3335-0030
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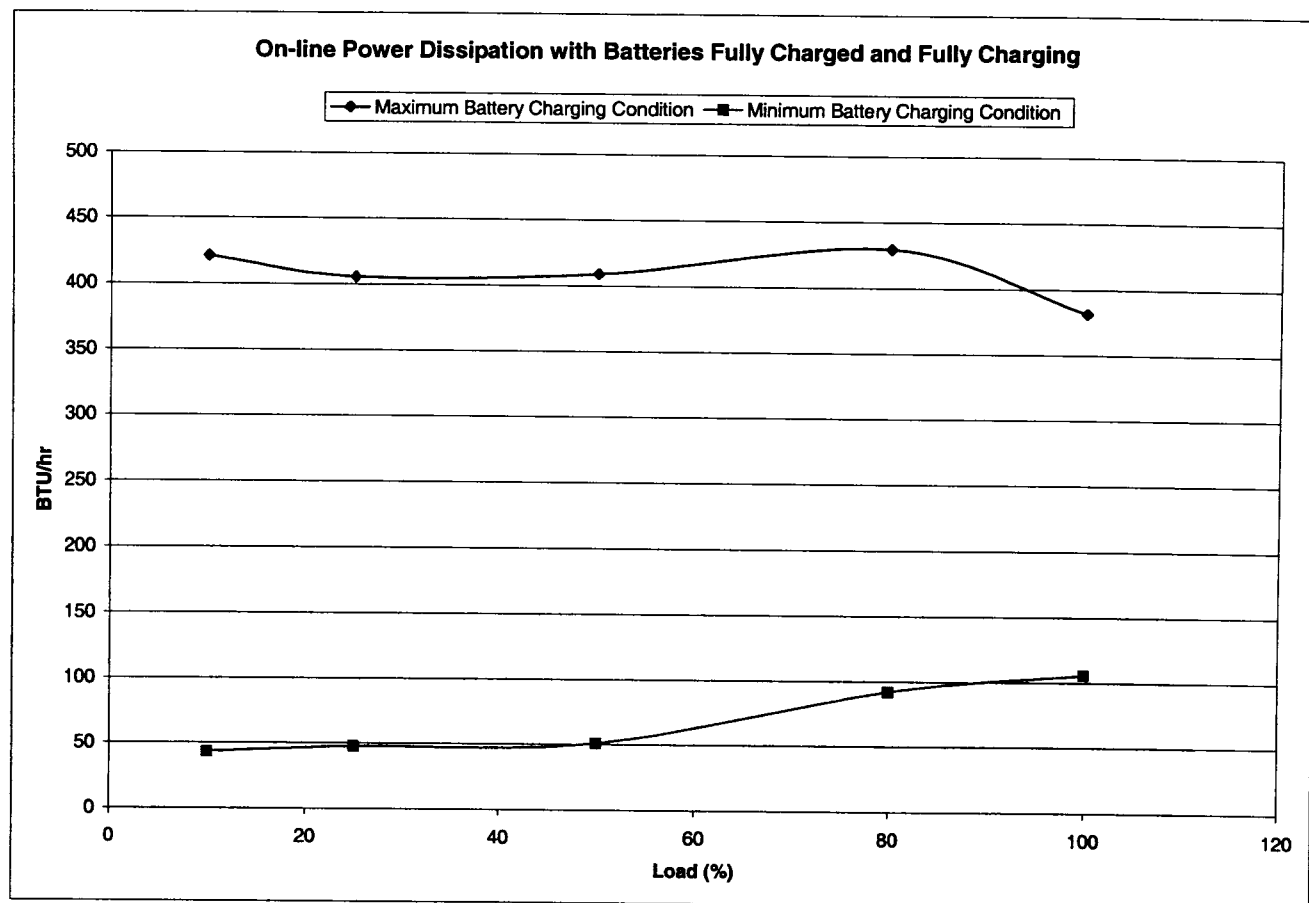
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Revision History:

Rev	Author	Date
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0	06 - Mar - 2002 by Dan Turley	Status: Proposed
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	02 - May - 2002 by Scott Derushia	Status: Approved
0	02 - May - 2002 by Scott Derushia	Status: Done - Pending Review
0	02 - May - 2002 by Scott Derushia	Status: Done - Pending Review

Change made:

VDE File:1924400-3335-0030
 CB DE1-16215
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DVT REPORT

Revision: 0

Test Status: Done - Pending Review

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: Run time verification	Test Group:
Test Category: Electrical Performance	Test Setup: On-Battery
Division: NETWORK POWER SOLUTIONS	Test Type: Battery Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMI1U	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: Unit specification	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Determine ambient run time at loads of 10%, 50%, 80% and 100% of full rated load and if an XL with 1, 5 and 10 battery packs (see Table 1 below). Investigate run times at 50% and 100% of full rated load over all environmental extremes. Monitor accuracy of run time meter (with all battery vendors), verify low battery times selectable with UPS-Link.

Test Equipment (use the following equipment or equivalent): DVT rack (test computer, AC source, power meter, full rated load, voltmeter, temperature monitor); RUNTIME DVT software; environmental chamber

Setup:

- Connect the UUT in the environmental chamber to the DVT rack.
 - Set temperature monitor to monitor the environmental chamber environment.
 - Continuously measure battery voltage via voltmeter.
 - Set the output AC voltage to nominal.

Procedure: Table 1: Discharges required at ambient for Run time verification by UUT battery configuration

% of full rated load >>>	10	50	80	100
Number of battery packs V				
0	XL, non-XL	XL, non-XL	XL, non-XL	XL, non-XL
1	-	XL only	-	XL only
5	-	-	-	XL only
10	-	-	-	XL only

1. Start the RUNTIME DVT software.
 - Setup a multiple charge and discharge as per Table 1 at ambient.
 - Setup a multiple charge and discharge at 50% and 100% rated load over all environmental extremes (if XL use one external battery pack only in chamber with UUT).
2. Graph the following discharges as listed under Test Data below of run time meter output, AC output voltage (UPS-Link "O"), battery capacity and state register (UPS-Link "Q") versus time. Include on the second y-axis run time meter output error, and battery voltage.
 - Determining run time meter output error. First, determine the measured run time remaining which is the

difference between total measured runtime and the measured current timestamp. Second, multiply 100% by the difference of the calculated measured runtime remaining and the runtime meter output (UPS-Link "j"), then divide by the total measured runtime.

3. Fill out enclosed Excel spreadsheet below <Run time verification curves & calculations for SmartUPS.xls>:
- Enter Project name and SKU# in cell B1.
 - Enter in tare loss in cell B34 which is the difference between output power and input power (load consumed just by the UUT).
 - Enter in battery data, battery pack data and full rated load in watts in cells B149 through B153.
 - Enter in run time, rounded to the nearest minute, for the load the test was run at, rounded to the nearest watt amount displayed, in cells B49 through B137. If XL, enter run times for the various external battery pack setups in cells through to column E.
 - Adjust "Scaling for VAhr" to adjust entered data (in the form of data points) with the curves displayed. Ensure consistency with battery pack amounts.

Test Specifications: Determining characteristics. Note any scaling for VAhr values >1.15 or <0.85.

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

SPECIFIC TEST INFORMATION:

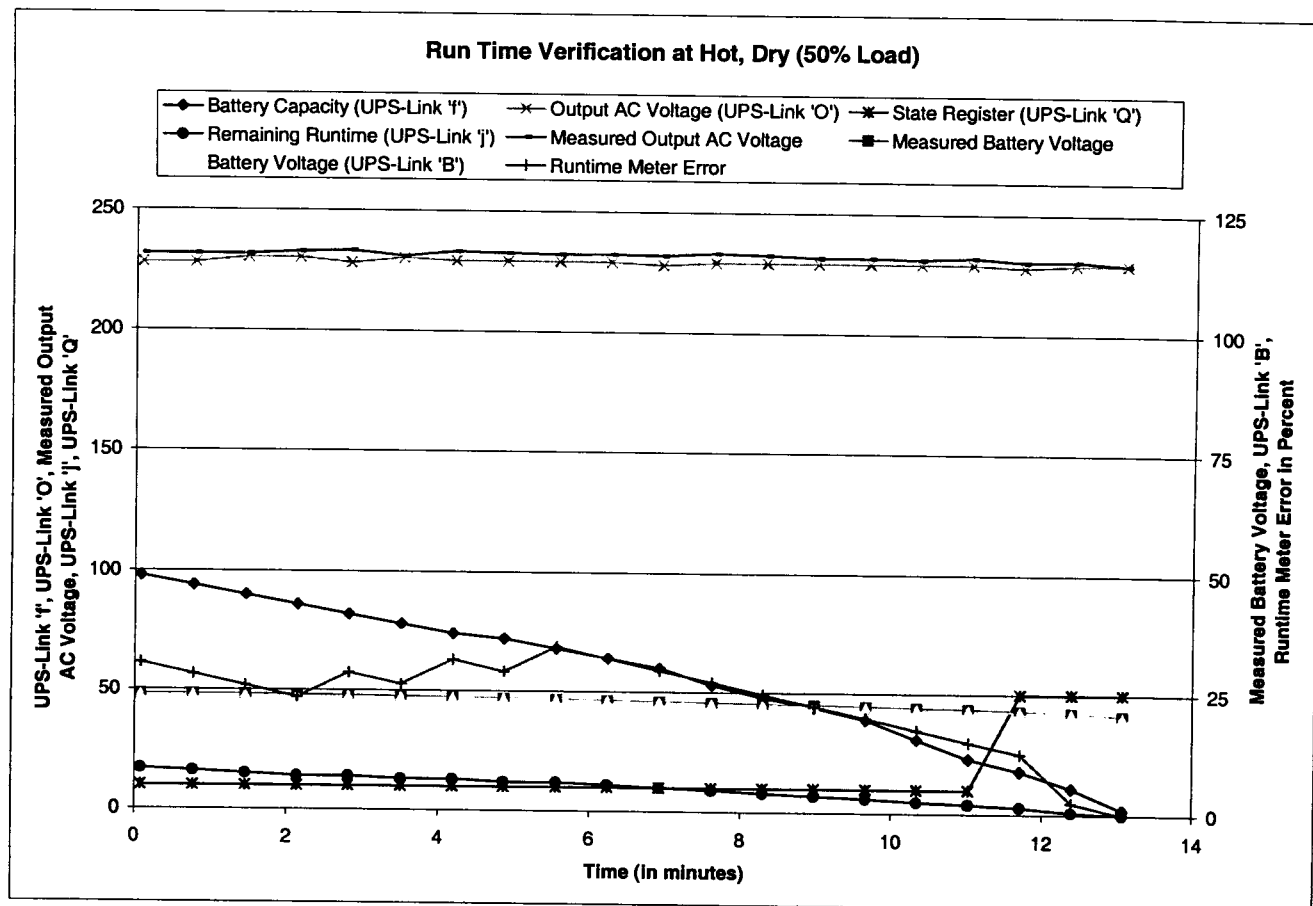
Tester Operator(s):	Date Completed:
Test Location:	Test Actual Time (in hours):
SKU #:	F/W Rev #:
Build Phase:	Serial#:
Comments:	

Final Result:
INCOMPLETE

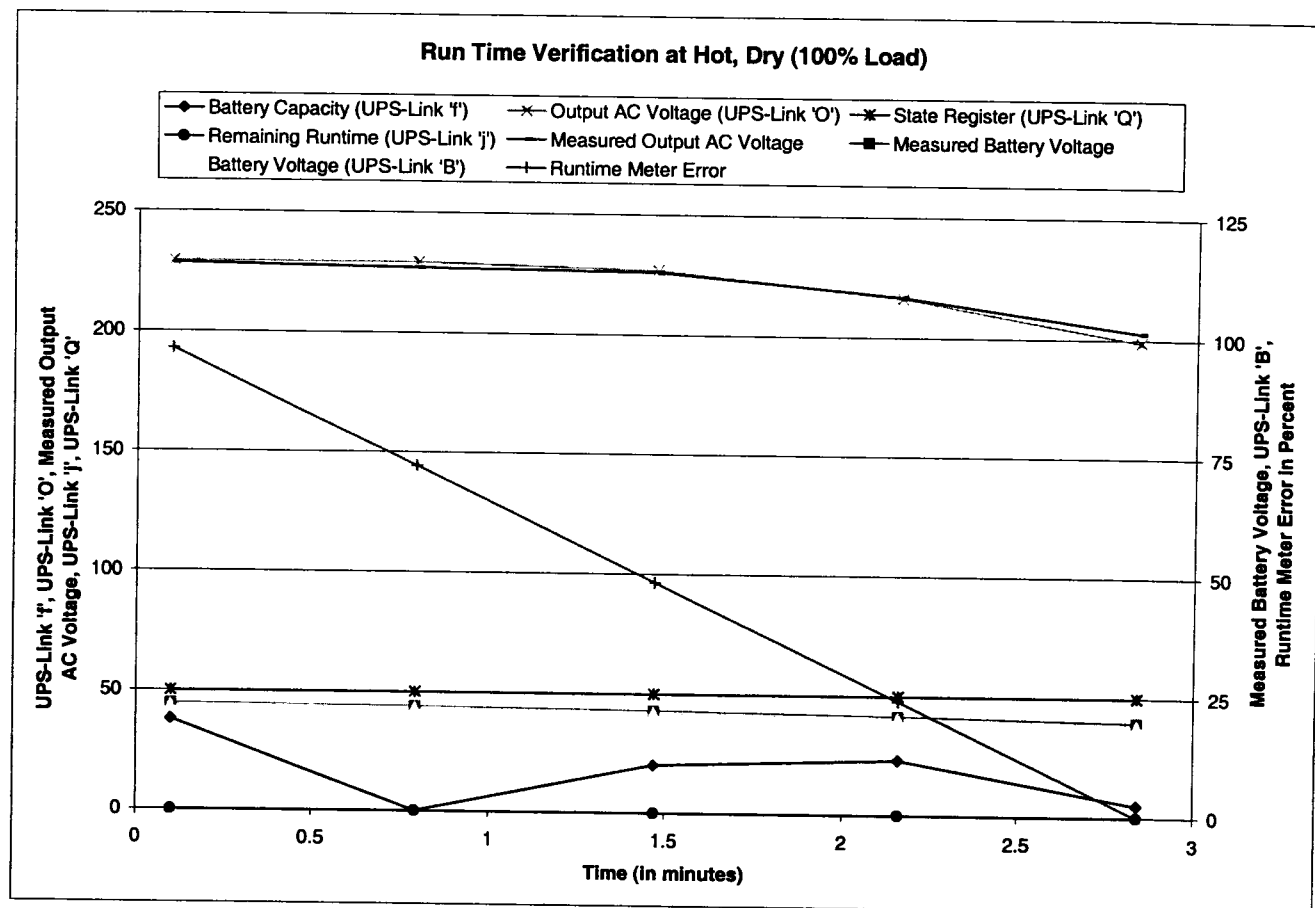
Summary Results:

Test Data:

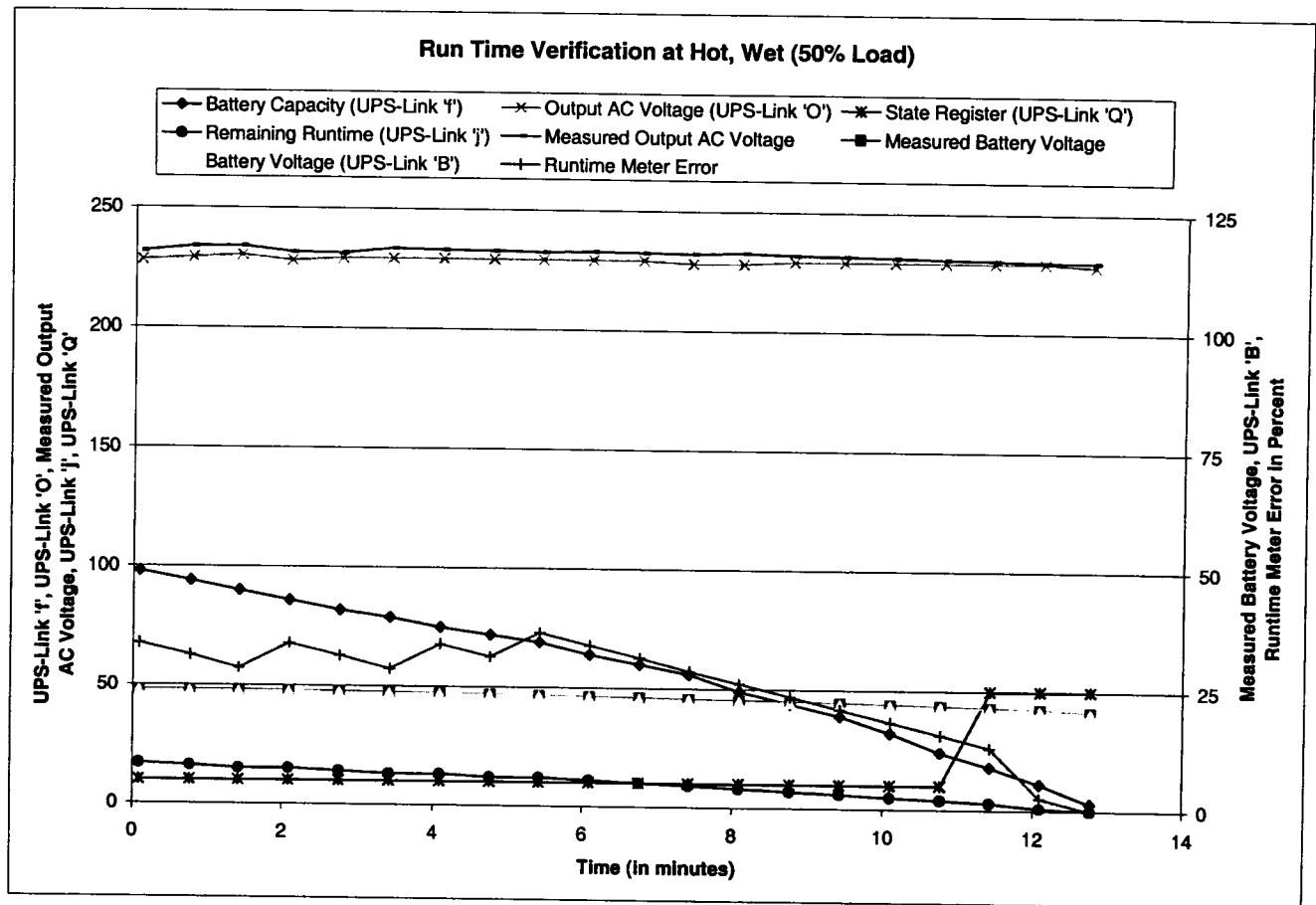
Below is graph of run time meter error during 50% load discharge at hot, dry environmental conditions:



Below is graph of run time meter error during 100% load discharge at hot, dry environmental conditions:

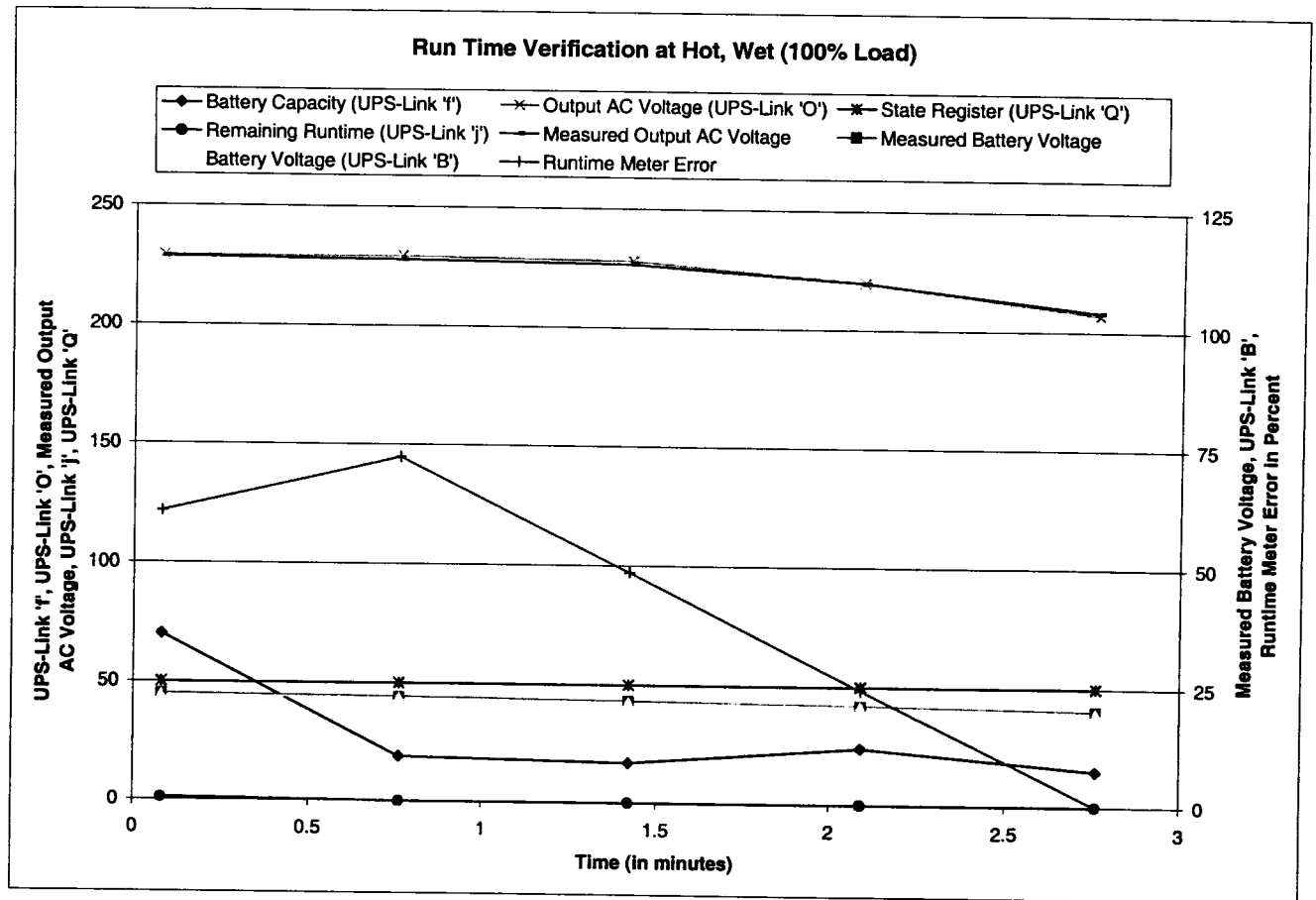


Below is graph of run time meter error during 50% load discharge at hot, wet environmental conditions:



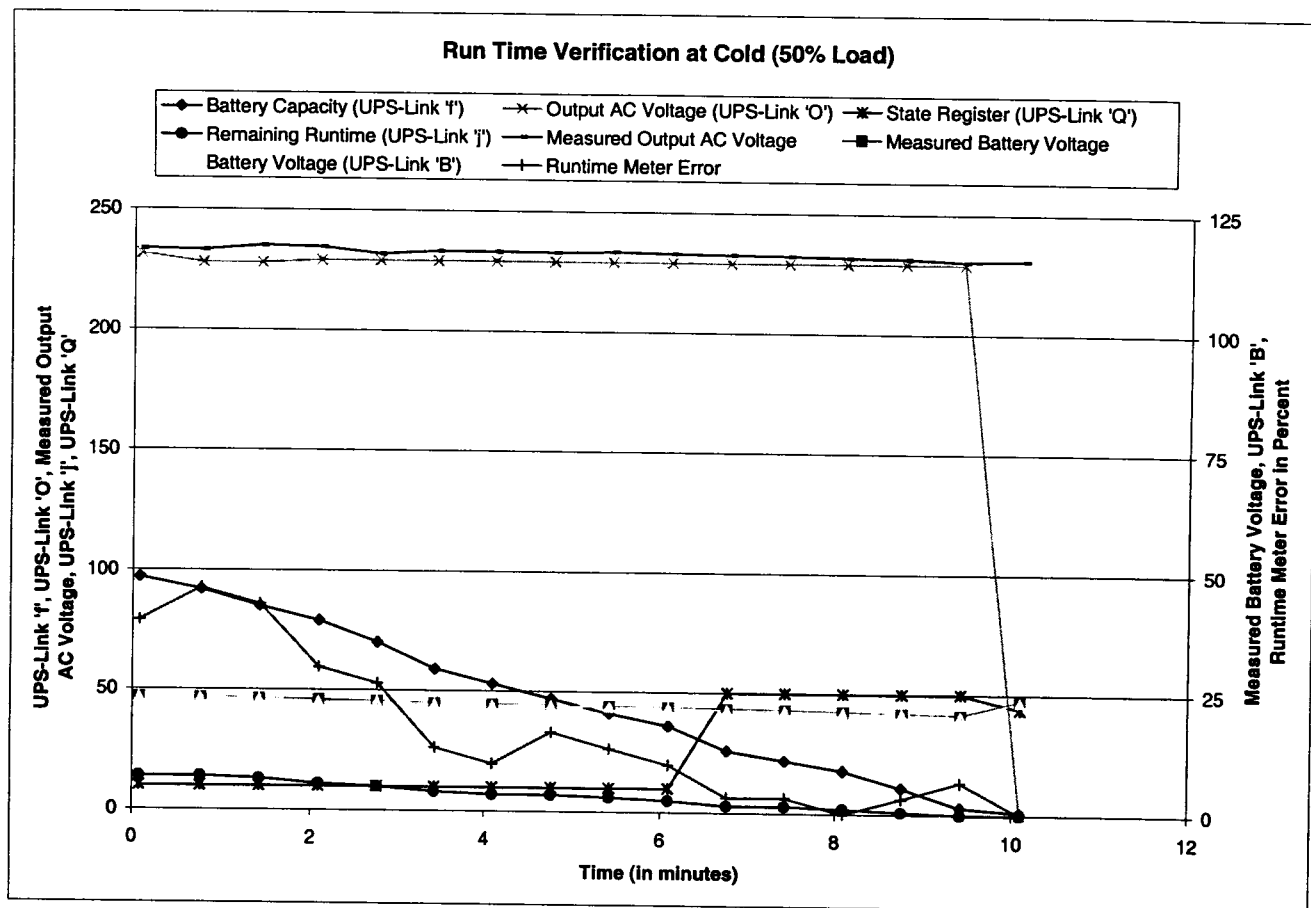
Below is graph of run time meter error during 100% load discharge at hot, wet environmental conditions:

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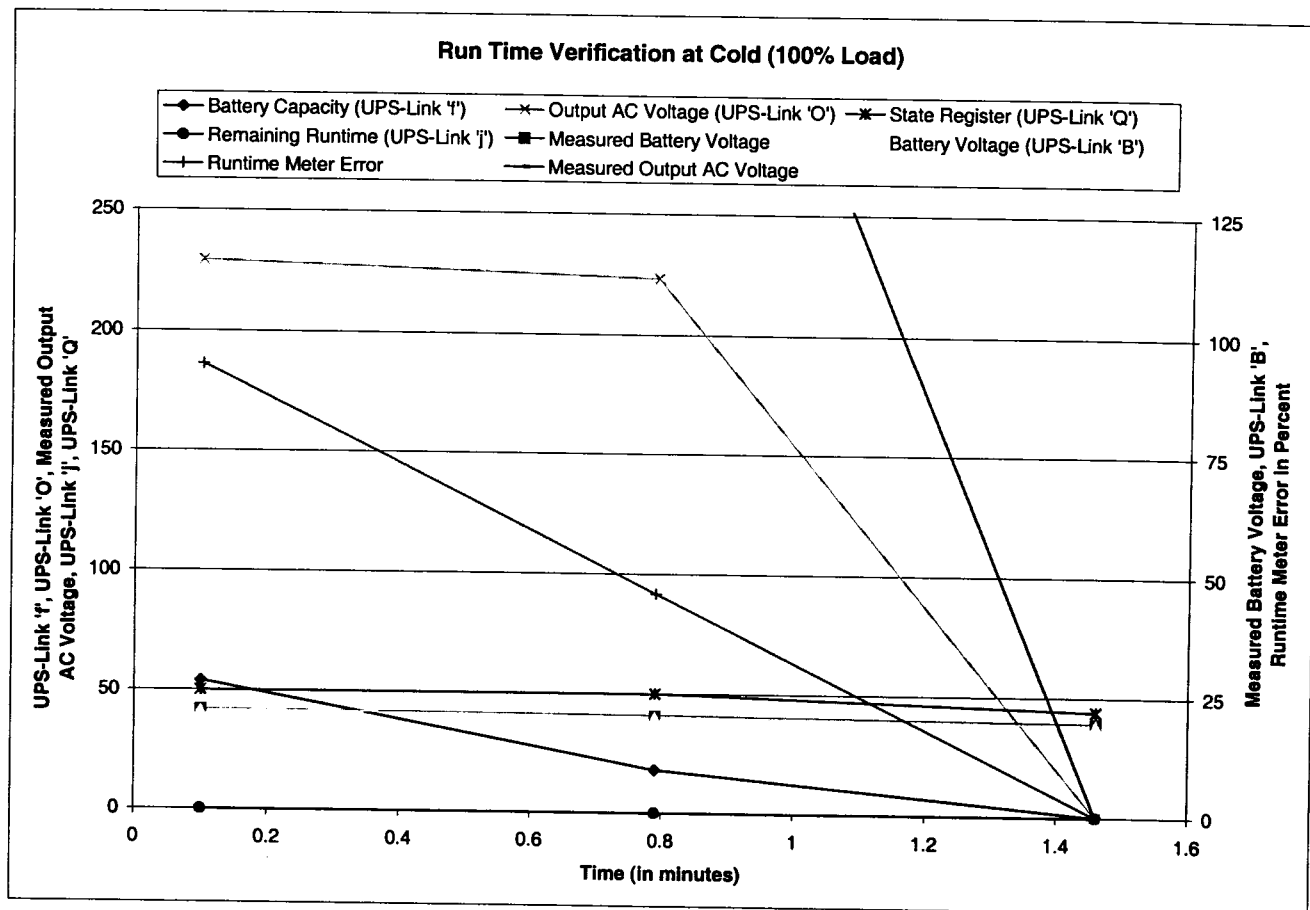
Below is graph of run time meter error during 50% load discharge at cold environmental conditions:

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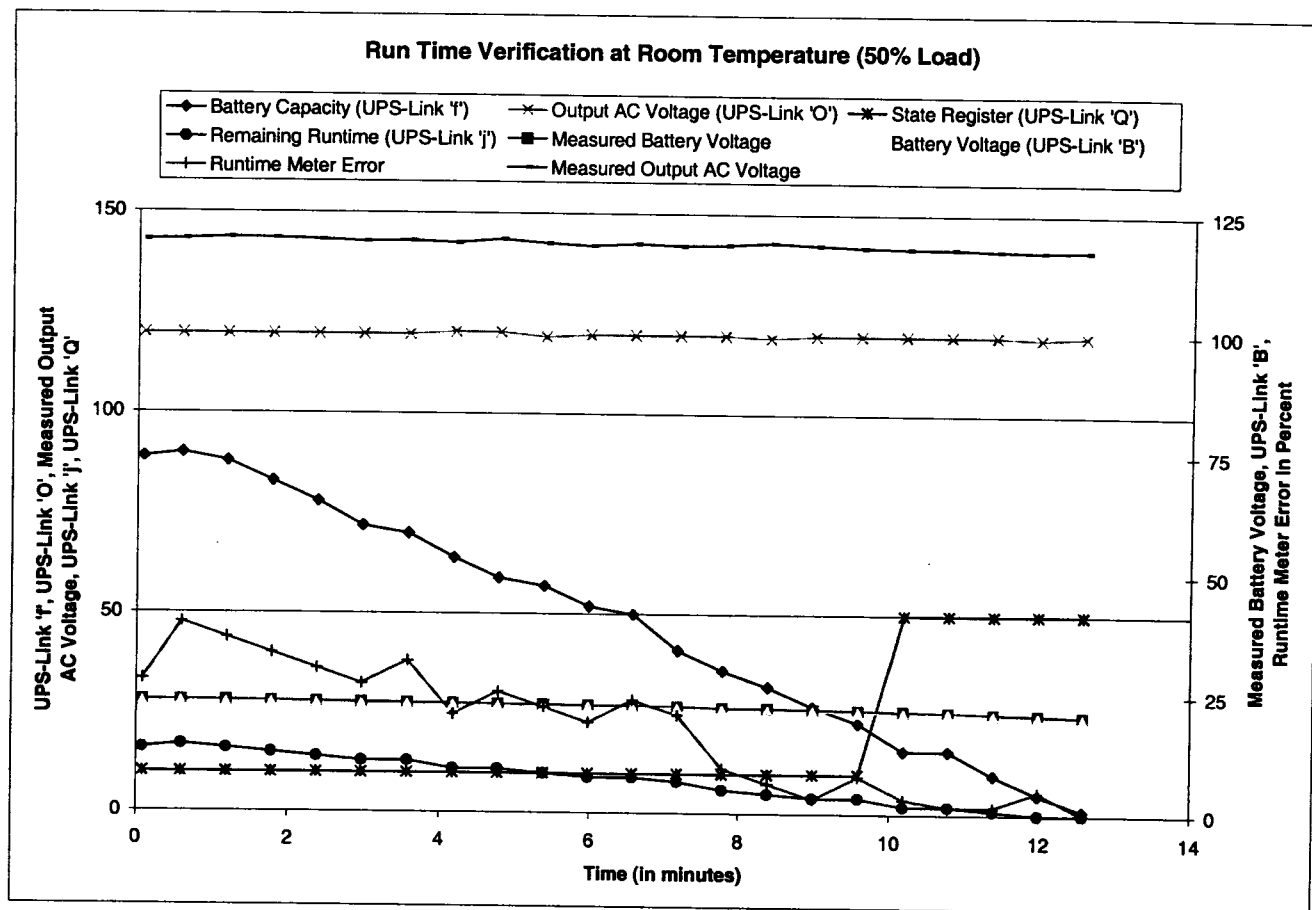


Below is graph of run time meter error during 100% load discharge at cold environmental conditions:

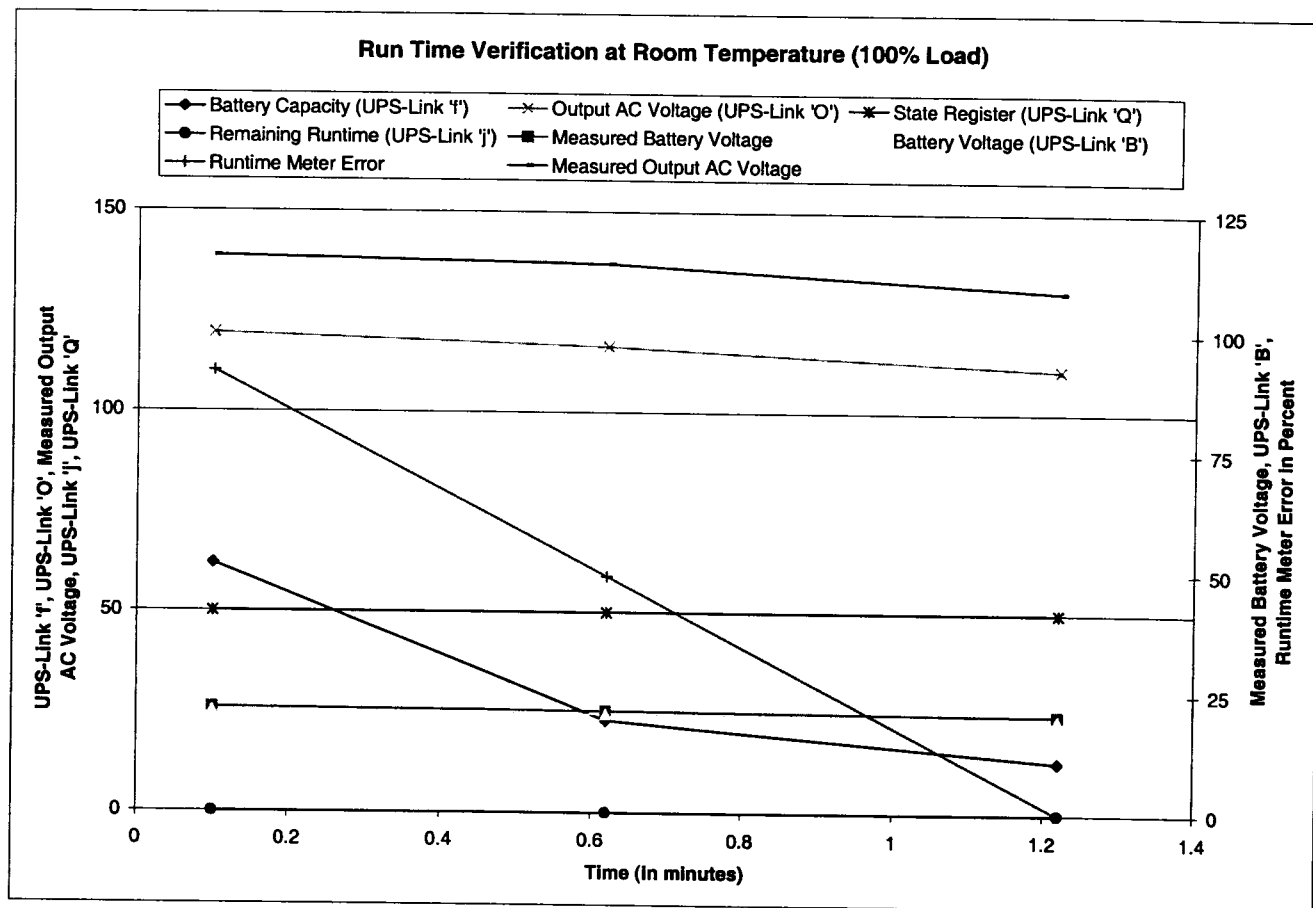
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Below is graph of run time meter error during 50% load discharge internal batteries only at ambient conditions:



Below is graph of run time meter error during 100% load discharge internal batteries only at ambient conditions:



Run time verification curves & calculations for SmartUPS.re

Revision History:

Rev	Author	Date
0	06 - Mar - 2002 by Dan Turley	Status: Proposed
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	29 - Apr - 2002 by Scott Derushia	Status: Approved
0	29 - Apr - 2002 by Scott Derushia	Status: Done - Pending Review
0	29 - Apr - 2002 by Scott Derushia	Status: Done - Pending Review

Change made:

VDE File:1924400-3335-0030
 CB DE1-16215
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DVT REPORT

Revision: 0

Test Status: Done - Pending Review

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: Transfer/retransfer dropouts: time and voltages	Test Group:
Test Category: Operational Performance	Test Setup: Both On-Line and On-Battery
Division: NETWORK POWER SOLUTIONS	Test Type: Transient Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMI1U	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: Unit specification	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Investigate transfer/retransfer operation versus input voltage (at nominal and at limits) at different phase angle steps and dropouts. Perform at no load and full computer load.

Test Equipment (use the following equipment or equivalent): DVT rack; TRANSIT DVT software; digital storage oscilloscope

Setup:

- Connect the UUT to the DVT rack.
 - Connect the DMM to measure the UUT's battery voltage.
- Start TRANSIT DVT software.
 - Utilize the digital storage oscilloscope capture software.

Procedure:

1. Set input AC voltage to nominal and load to full computer load.
2. Step through the waveform in 45 degree steps with 0.2 msec dropout width. Investigate the synchronization of the UUT at each dropout.
3. Repeat with dropout widths at 0.5, 1.0, 4, 8 and 16 msec.
4. Repeat steps 2 and 3 at low and high operating limits of input AC voltage.
5. Repeat steps 2 through 4 with no load.

Test Specifications: Determining characteristics. Any questionable dropouts listed as not acceptable synchronizations are to be accompanied by a comment.

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

SPECIFIC TEST INFORMATION:

Tester Operator(s): Scott Derushia	Date Completed: 05/03/2002
------------------------------------	----------------------------

Test Location: 85 Rangeway Rd.	Test Actual Time (in hours):
SKU #: SUA1000RMI1U	F/W Rev #: 3
Build Phase: Pilot	Serial#: DVT-1
Comments:	

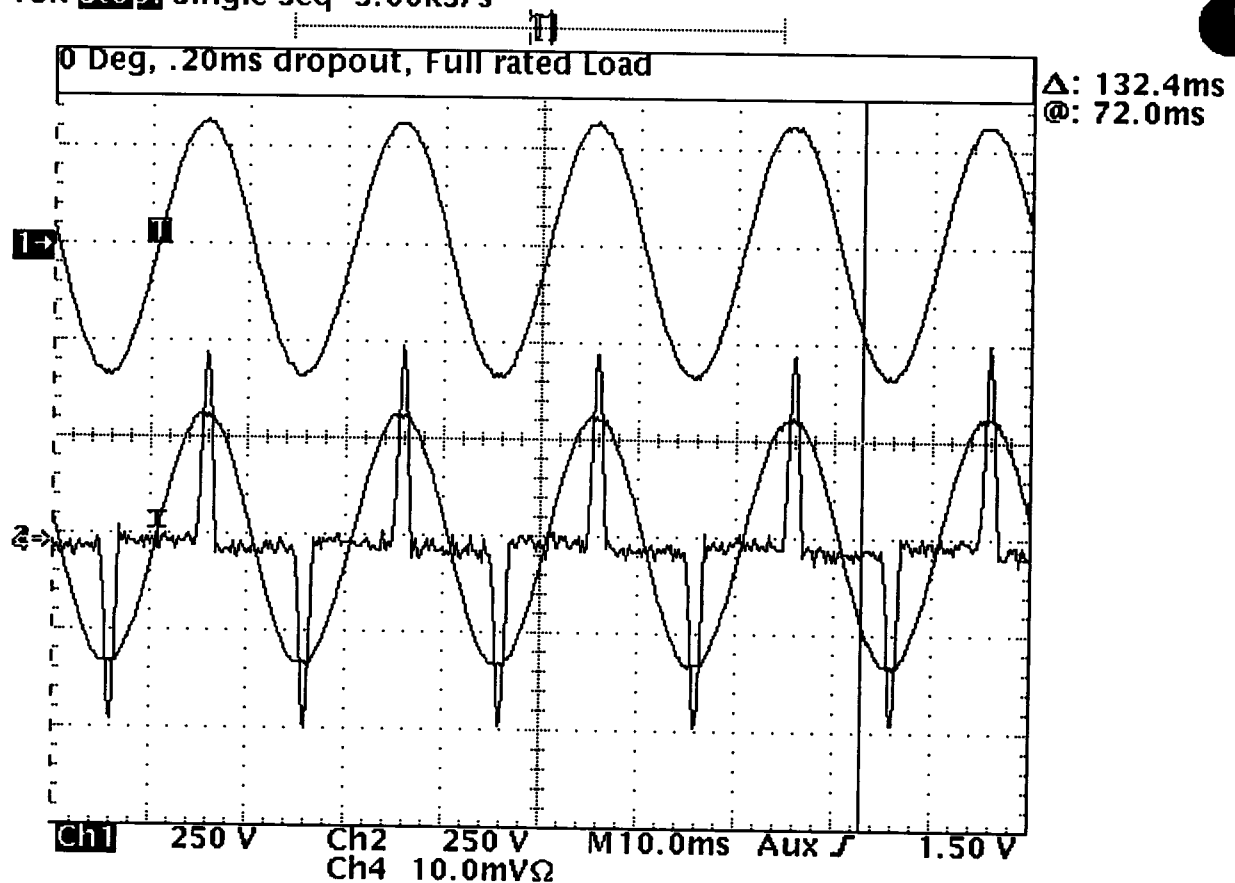
Final Result:

Summary Results:

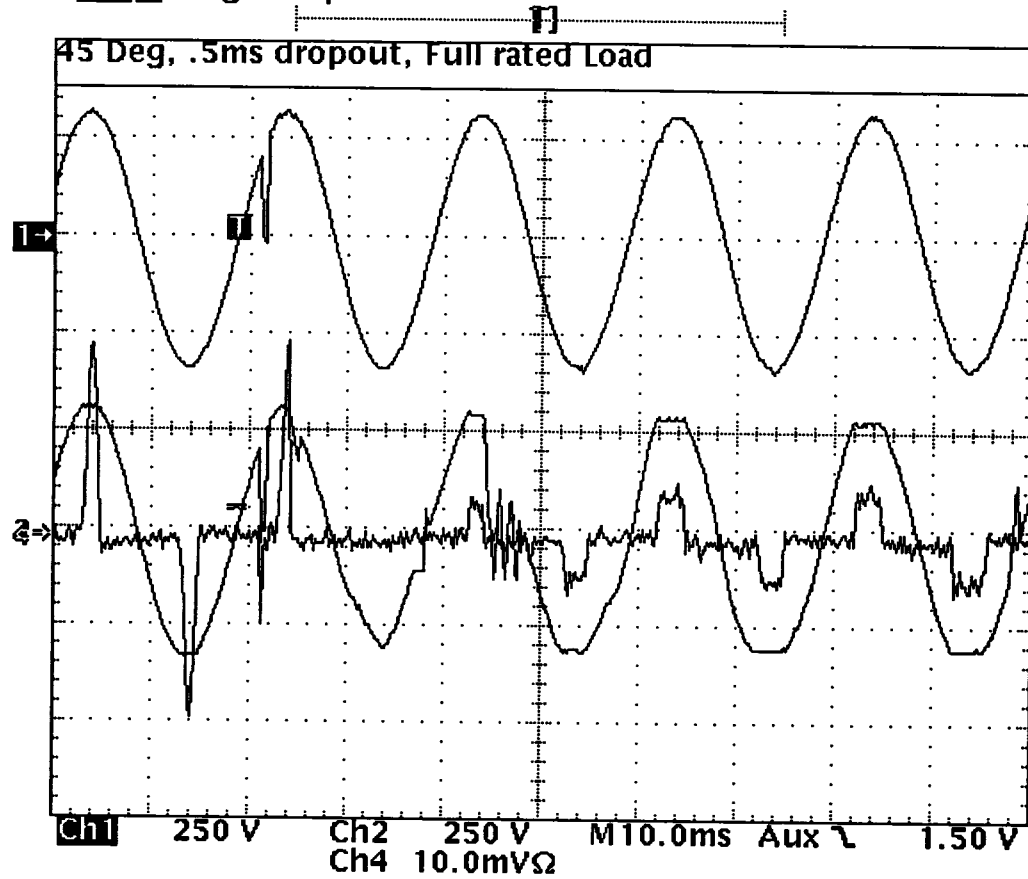
There appears to be an anomaly at the 0 crossing which seems to be either ringing or relay chatter.

Test Data:

Tek **Stop** Single Seq 5.00kS/s

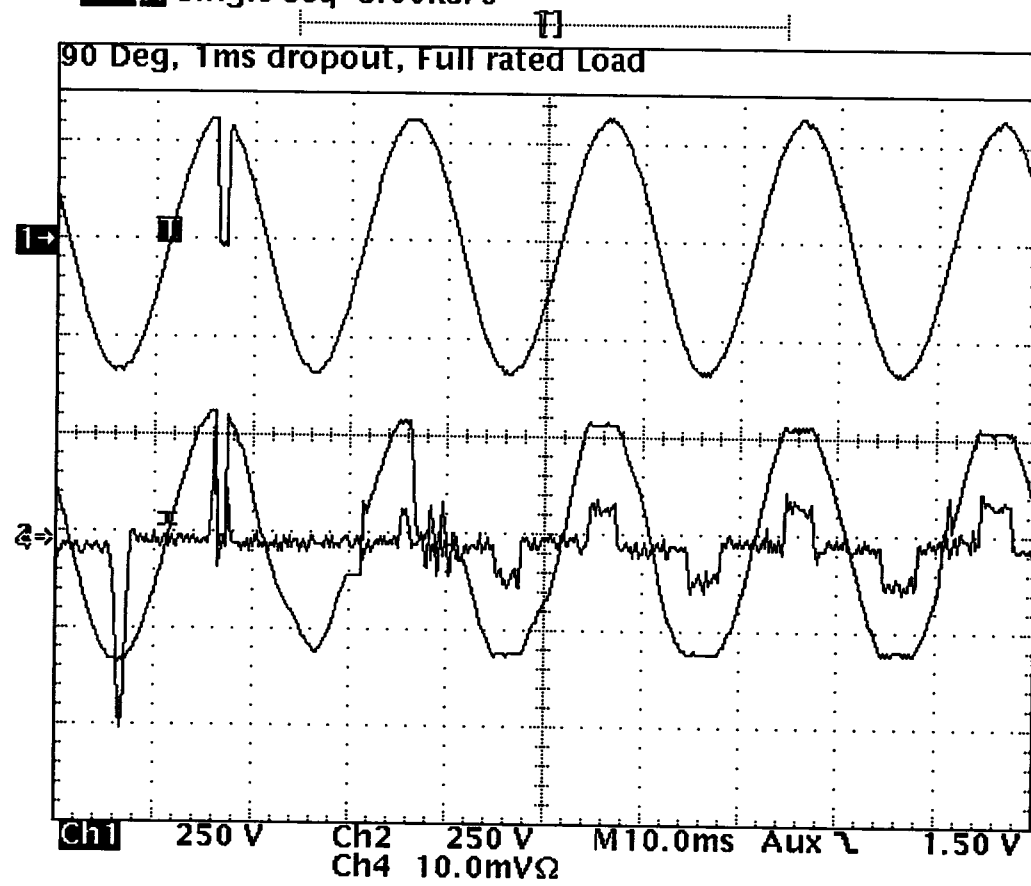


Tek Stop: Single Seq 5.00ks/s



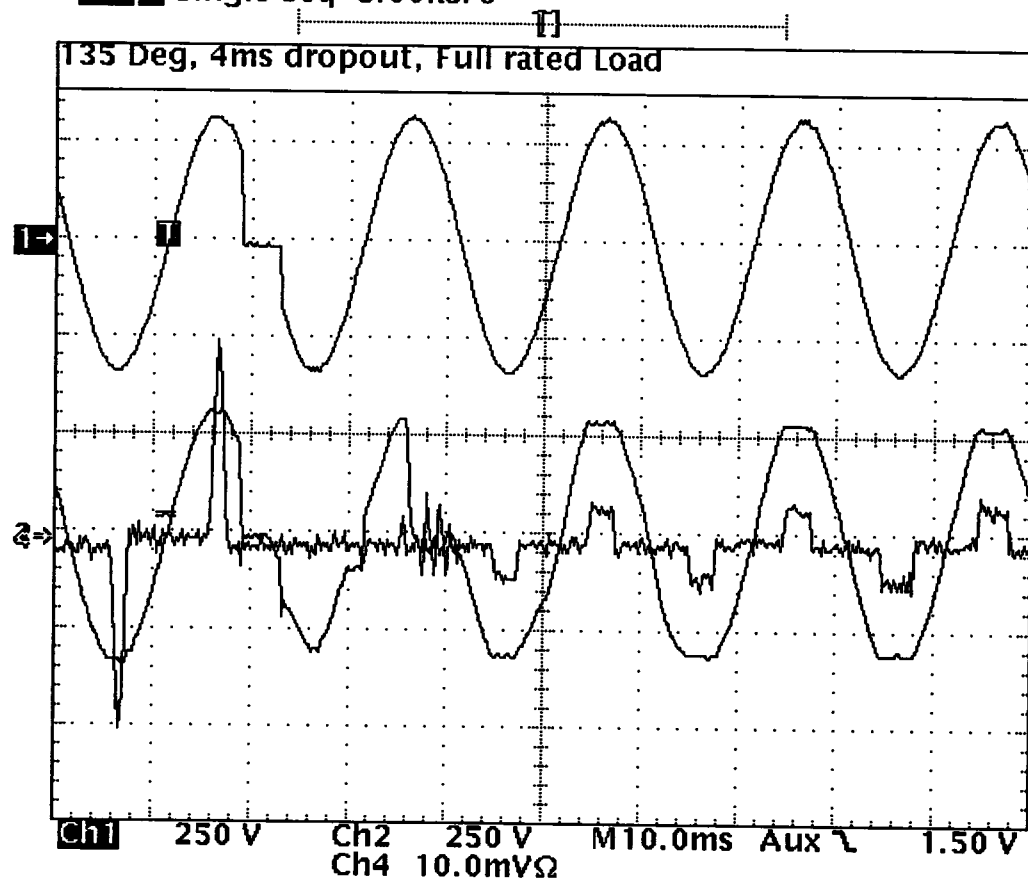
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CB DE1-16215
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Tek **Stop**: Single Seq 5.00kS/s



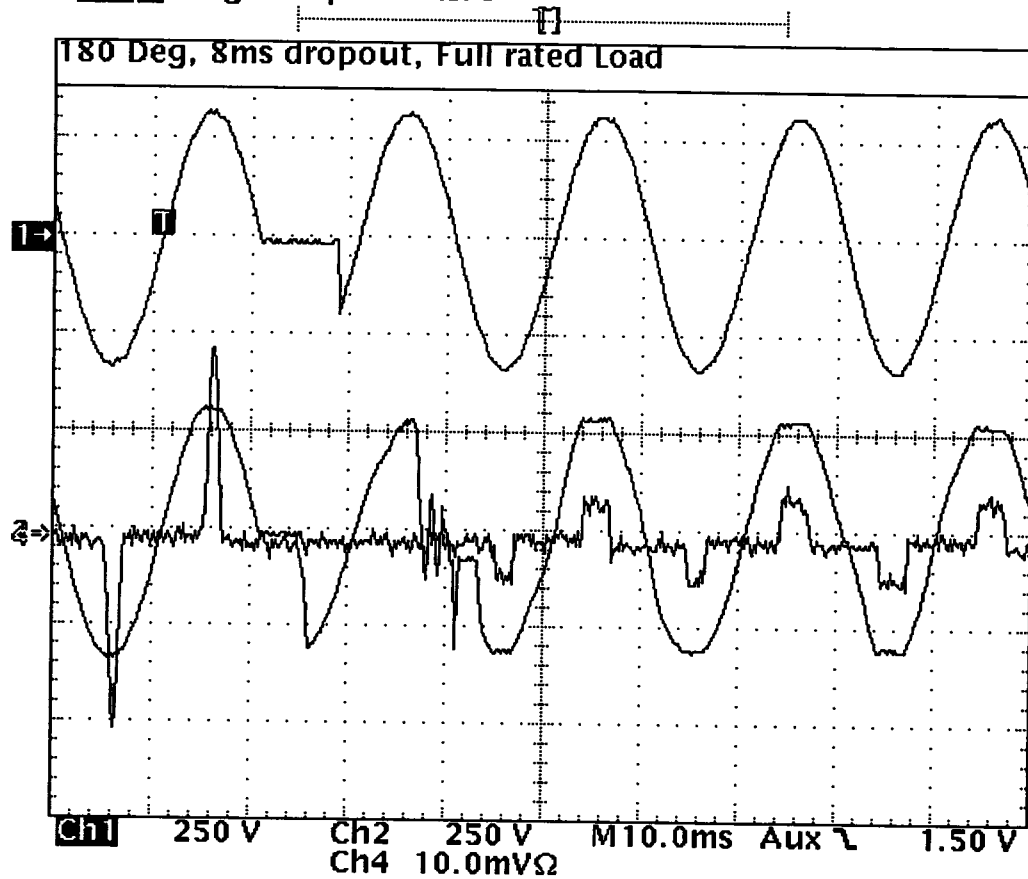
VDE File:1924400-3335-0030
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Tek **Stop** Single Seq 5.00kS/s



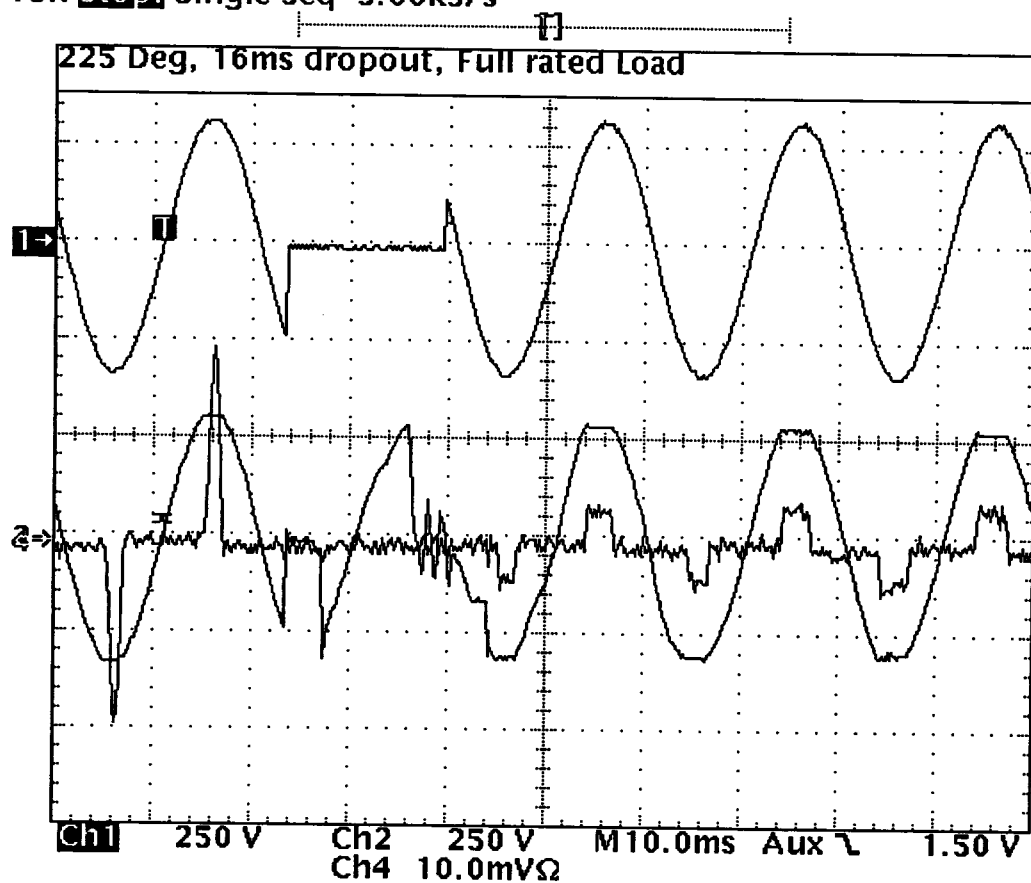
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Tek Stop: Single Seq 5.00ks/s



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CB DE1-16215
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Tek **Stop** Single Seq 5.00kS/s

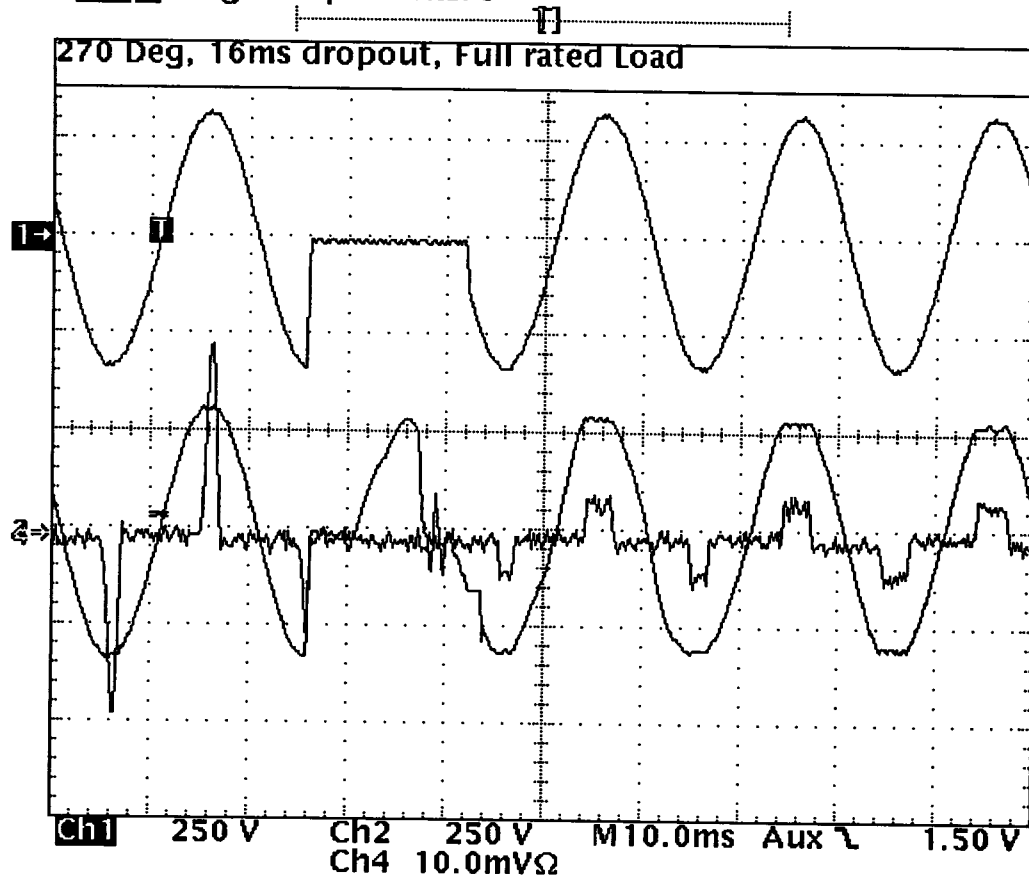


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Tek Stop Single Seq 5.00kS/s



Load	Input AC voltage	Dropout width (msec)	Acceptable synchronization at all phase angles?	Comments
full computer	nominal	0.2	YES	
full computer	nominal	0.5	YES	
full computer	nominal	1.0	YES	
full computer	nominal	4	YES	
full computer	nominal	8	YES	
full computer	nominal	16	YES	
full computer	hi operating limit	0.2	YES	
full computer	hi operating limit	0.5	YES	
full computer	hi operating limit	1.0	YES	
full computer	hi operating limit	4	YES	
full computer	hi operating limit	8	YES	
full computer	hi operating limit	16	YES	
full computer	low operating limit	0.2	YES	
full computer	low operating limit	0.5	YES	
full computer	low operating limit	1.0	YES	
full computer	low operating limit	4	YES	
full computer	low operating limit	8	YES	
full computer	low operating limit	16	YES	
none	nominal	0.2	YES	
none	nominal	0.5	YES	

none	nominal	1.0	YES	
none	nominal	4	YES	
none	nominal	8	YES	
none	nominal	16	YES	
none	hi operating limit	0.2	YES	
none	hi operating limit	0.5	YES	
none	hi operating limit	1.0	YES	
none	hi operating limit	4	YES	
none	hi operating limit	8	YES	
none	hi operating limit	16	YES	
none	low operating limit	0.2	YES	
none	low operating limit	0.5	YES	
none	low operating limit	1.0	YES	
none	low operating limit	4	YES	
none	low operating limit	8	YES	
none	low operating limit	16	YES	

Revision History:

Rev Author Date

0 06 - Mar - 2002 by Dan Turley Status: Proposed
0 06 - Mar - 2002 by Dan Turley Status: Proposed - Pending Approval
0 06 - Mar - 2002 by Dan Turley Status: Proposed - Pending Approval
0 16 - Apr - 2002 by Dan Turley Status: Proposed - Pending Approval
0 16 - Apr - 2002 by Dan Turley Status: Approved
0 16 - Apr - 2002 by Dan Turley Status: Approved
0 13 - May - 2002 by Scott Derushia Status: Approved
0 13 - May - 2002 by Scott Derushia Status: Done - Pending Review
0 13 - May - 2002 by Scott Derushia Status: Done - Pending Review

Change made:

VDE File:1924400-3335-0030
CB DE1-16215
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DVT REPORT

Revision: 0

Test Status: Done - Pending Review

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: Transfer/retransfer dropouts: capacitive and inductive loads	Test Group:
Test Category: Operational Performance	Test Setup: Both On-Line and On-Battery
Division: NETWORK POWER SOLUTIONS	Test Type: Transient Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMI1U	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: APC design standard #57	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Investigate transfer/retransfer operation with full capacitive and inductive loading.

Test Equipment (use the following equipment or equivalent): DVT rack; TRANSIT DVT software; oscilloscope; approved capacitive load; approved inductive load

Setup:

- Connect the UUT to the DVT rack.
 - Connect the DMM to measure the UUT's battery voltage.
- Start TRANSIT DVT software.
 - Utilize the oscilloscope capture software.

Procedure:

1. Set input AC voltage to nominal and load to the capacitive load.
2. Step through the waveform in 45 degree steps with 0.2 msec dropout width. Investigate the synchronization of the UUT at each dropout.
3. Repeat with dropout widths at 0.5, 1.0, 4, 8 and 16 msec.
4. Set load to the inductive load.
5. Step through the waveform in 45 degree steps with 0.2 msec dropout width. Investigate the synchronization of the UUT at each dropout.
6. Repeat with dropout widths at 0.5, 1.0, 4, 8 and 16 msec.

Test Specifications: Determining characteristics. Any questionable dropouts listed as not acceptable synchronizations are to be accompanied by a comment.

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

SPECIFIC TEST INFORMATION:

Tester Operator(s): Scott Derushia	Date Completed: 05/03/2002
Test Location: 85 Rangeway Rd.	Test Actual Time (in hours):

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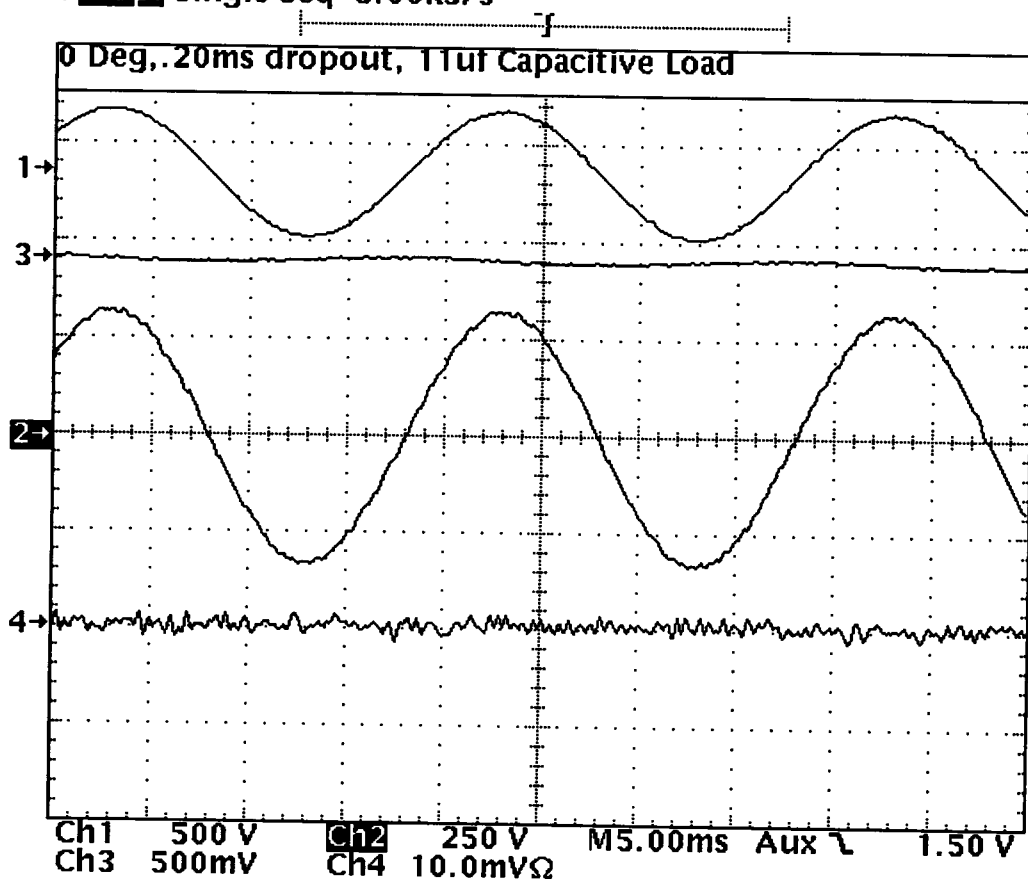
SKU #: SUA1000RMI1U	F/W Rev #: 3
Build Phase: Pilot	Serial#: DVT-1
Comments:	

Final Result:
INCOMPLETE

Summary Results:

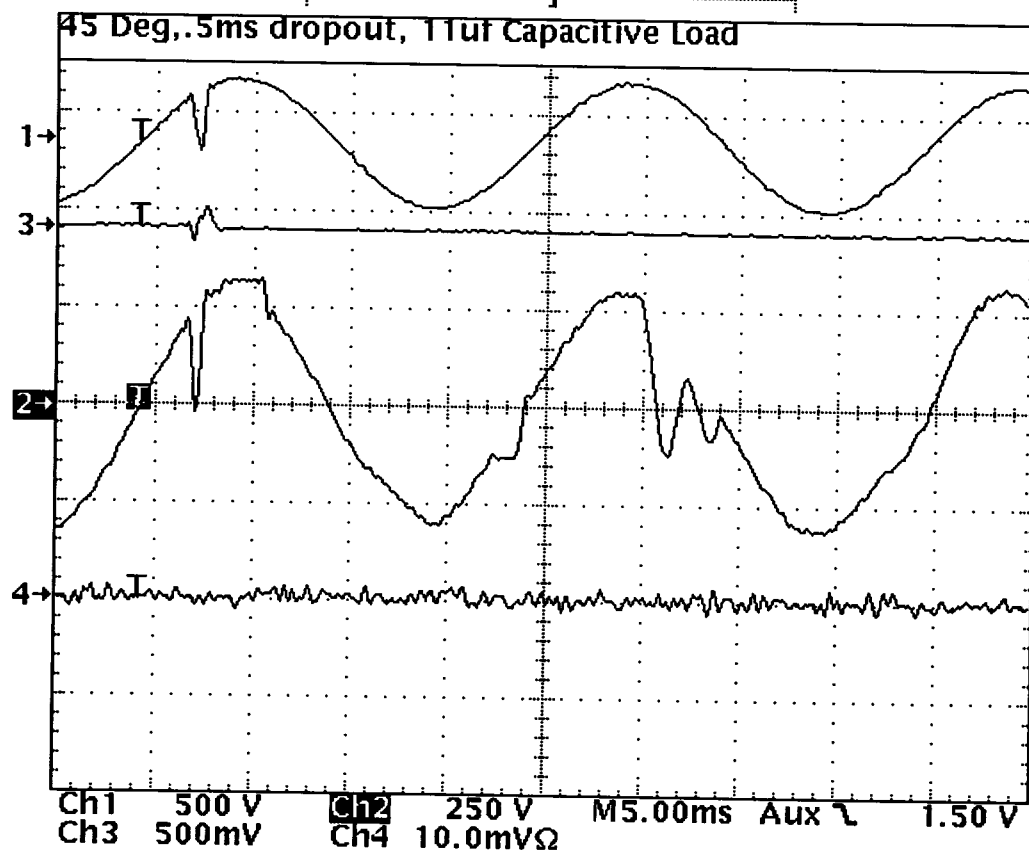
Test Data:

Tek **Stop** Single Seq 5.00kS/s



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Tek Run: 5.00kS/s Sample 11102

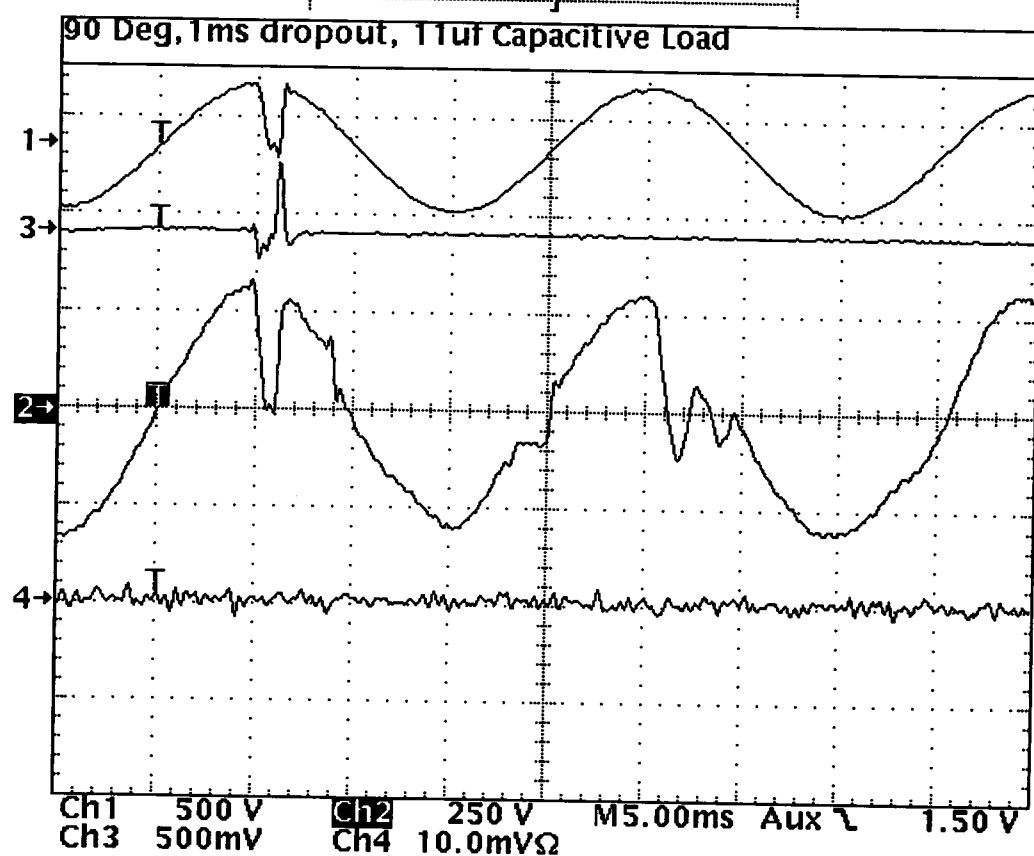


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Tek Run: 5.00kS/s Sample 1192

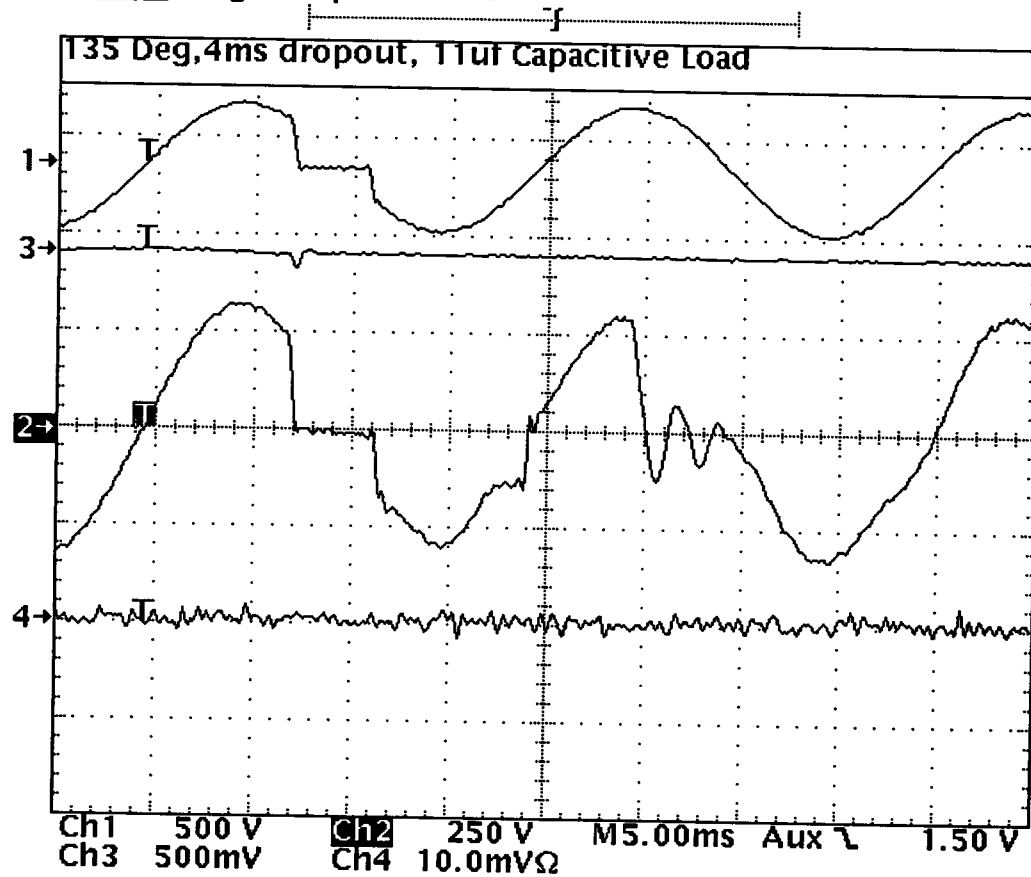


VDE File:1924400-3335-0030

CB DE1-16215

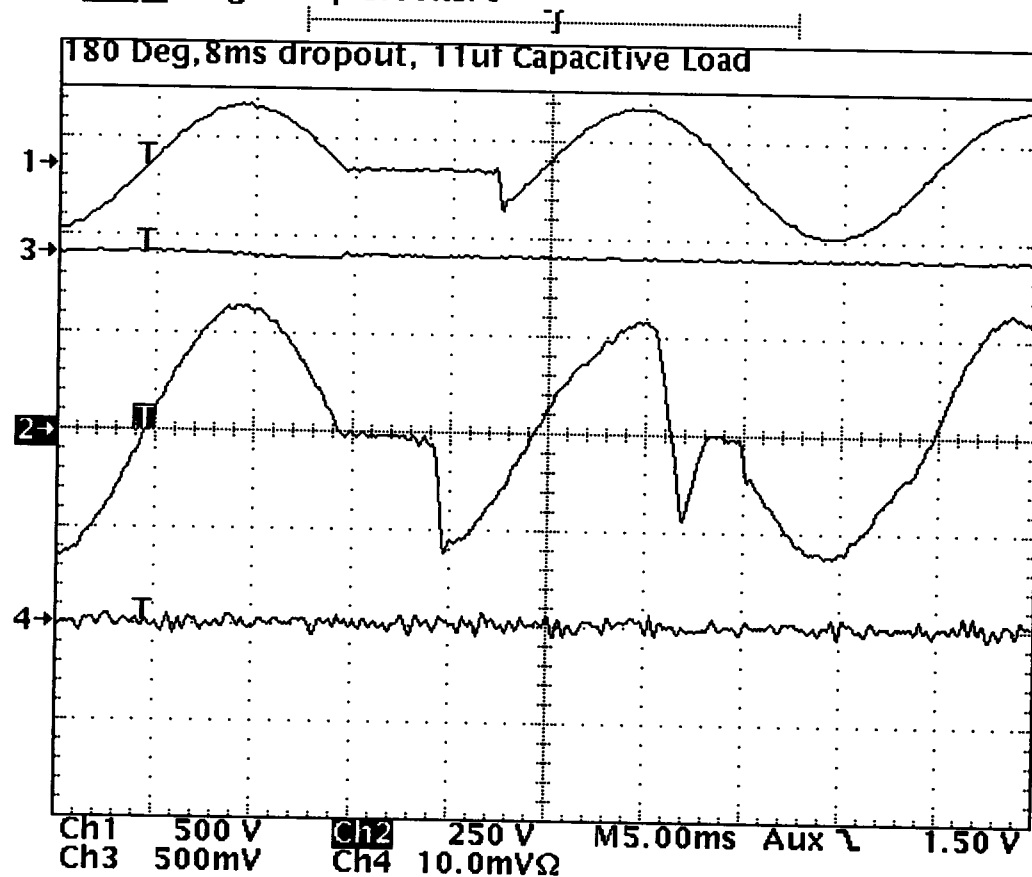
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Tek **Stop**: Single Seq 5.00kS/s



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Tek **Stop** Single Seq 5.00kS/s

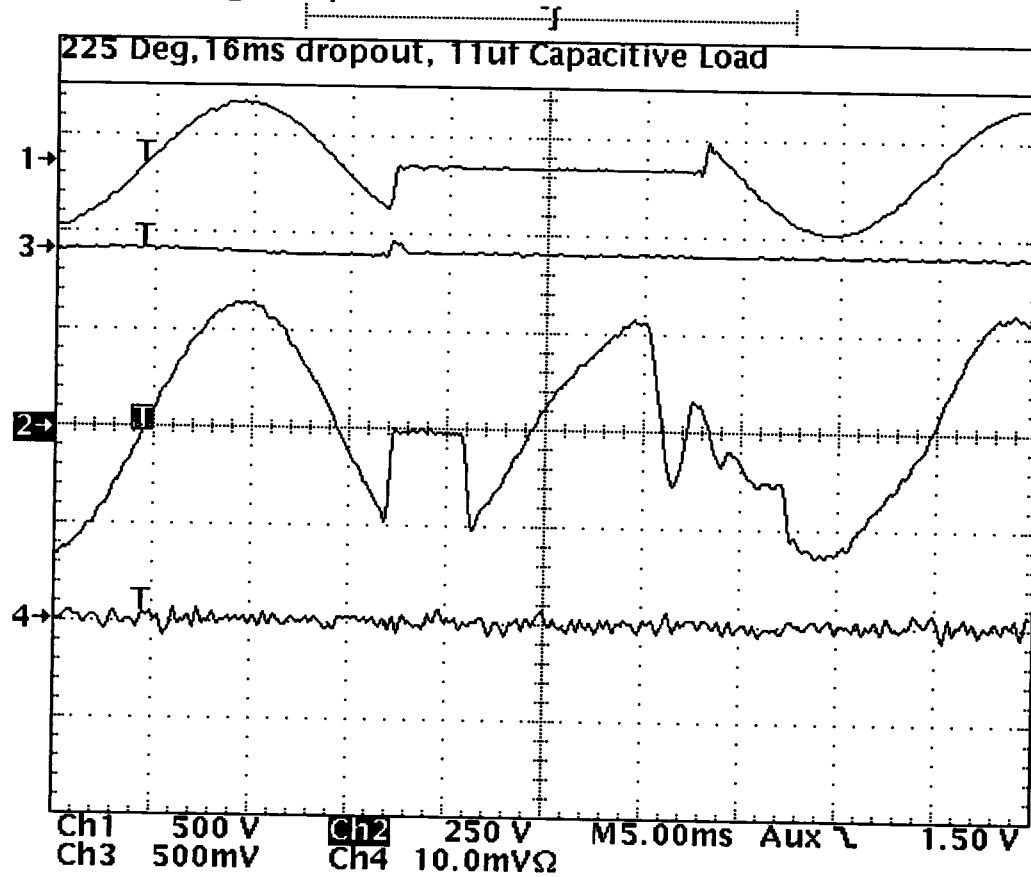


VDE File:1924400-3335-0030

CB DE1-16215

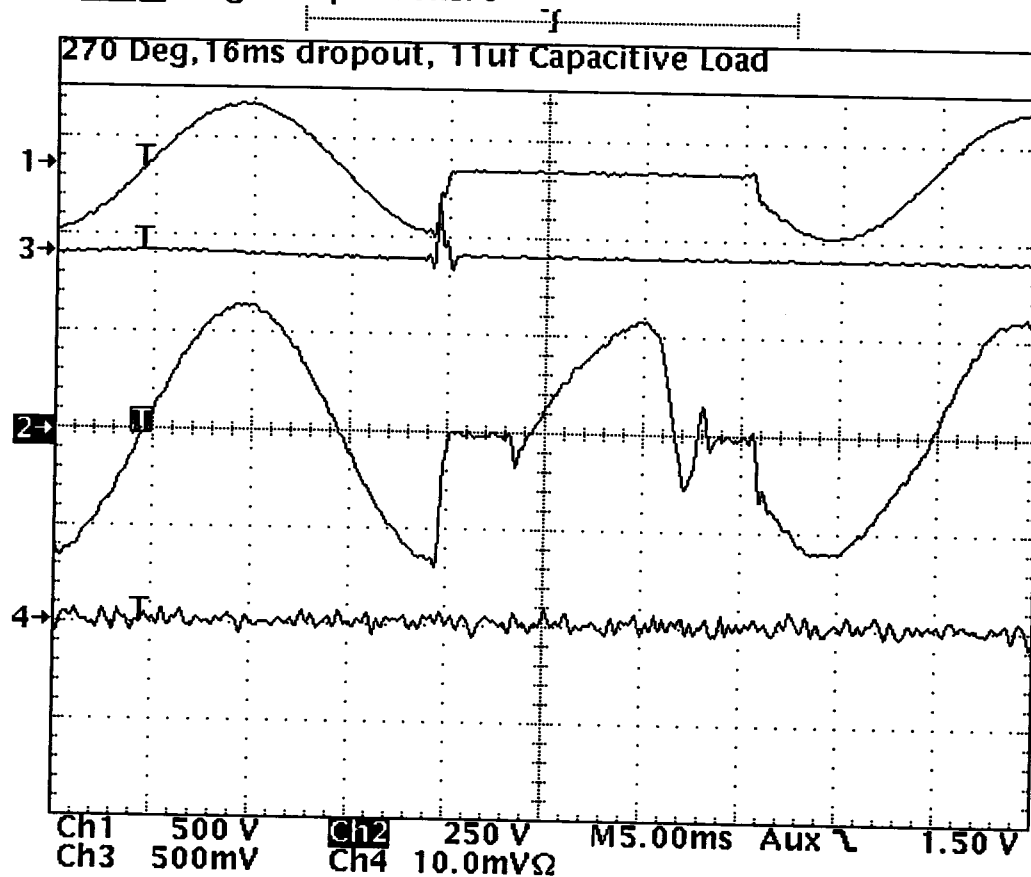
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Tek **Stop** Single Seq 5.00kS/s



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Tek **Stop**: Single Seq 5.00kS/s



Load	Input AC voltage	Dropout width (msec)	Acceptable synchronization at all phase angles?	Comments
capacitive	nominal	0.2	YES	
capacitive	nominal	0.5	YES	
capacitive	nominal	1.0	YES	
capacitive	nominal	4	YES	
capacitive	nominal	8	YES	
capacitive	nominal	16	YES	
inductive	nominal	0.2	YES	
inductive	nominal	0.5	YES	
inductive	nominal	1.0	YES	
inductive	nominal	4	YES	
inductive	nominal	8	YES	
inductive	nominal	16	YES	

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Revision History:

Rev	Author	Date
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0 06 - Mar - 2002 by Dan Turley Status: Proposed
0 06 - Mar - 2002 by Dan Turley Status: Proposed - Pending Approval
0 06 - Mar - 2002 by Dan Turley Status: Proposed - Pending Approval
0 16 - Apr - 2002 by Dan Turley Status: Proposed - Pending Approval
0 16 - Apr - 2002 by Dan Turley Status: Approved
0 16 - Apr - 2002 by Dan Turley Status: Approved
0 13 - May - 2002 by Scott Derushia Status: Approved
0 13 - May - 2002 by Scott Derushia Status: Done - Pending Review
0 13 - May - 2002 by Scott Derushia Status: Done - Pending Review

Change made:

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DVT REPORT

Revision: 0

Test Status: Done - Pending Review

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: Output voltage regulation (on-line)	Test Group:
Test Category: Electrical Performance	Test Setup: On-Line
Division: NETWORK POWER SOLUTIONS	Test Type: Output Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMI1U	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: Unit specification	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Determine output voltage regulation over all applicable input voltages at rated load extremes.

Test Equipment (use the following equipment or equivalent): DVT rack (test computer, AC source, power meter, full rated load); STEADY DVT software

Setup:

- Connect the UUT to the DVT rack.
- Initially set the UUT to the following transfer points:
 - Change the upper (UPS-Link "u") transfer point to it's maximum value.
 - Change the lower (UPS-Link "l") transfer point to it's minimum value.
- Prior to each voltage sweep below, start STEADY DVT software and setup for a voltage sweep over the full rated AC voltage range.

Procedure:

1. Connect the UUT to full rated load.
2. Perform a voltage sweep.
3. Graph output voltage (UPS-Link "O") and measured input AC voltage versus data points.
 - Display upper (UPS-Link "u") and lower (UPS-Link "l") transfer points as limits.
4. Change transfer points:
 - Change the upper (UPS-Link "u") transfer point to it's default value.
 - Change the lower (UPS-Link "l") transfer point to it's default value.
5. Perform a voltage sweep.
6. Graph output voltage (UPS-Link "O") and measured input AC voltage versus data points.
 - Display upper (UPS-Link "u") and lower (UPS-Link "l") transfer points as limits.
7. Disconnect all loads from the UUT.
8. Change transfer points:
 - Change the upper (UPS-Link "u") transfer point to it's maximum value.
 - Change the lower (UPS-Link "l") transfer point to it's minimum value.
9. Perform a voltage sweep.

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10. Graph output voltage (UPS-Link "O") and measured input AC voltage versus data points.
 - Display upper (UPS-Link "u") and lower (UPS-Link "l") transfer points as limits.
11. Change transfer points:
 - Change the upper (UPS-Link "u") transfer point to (1) one setting below the maximum.
 - Change the lower (UPS-Link "l") transfer point to (1) one setting above the minimum.
12. Perform a voltage sweep.
13. Graph output voltage (UPS-Link "O") and measured input AC voltage versus data points.
 - Display upper (UPS-Link "u") and lower (UPS-Link "l") transfer points as limits.
14. Change transfer points:
 - Change the upper (UPS-Link "u") transfer point to (2) two setting below the maximum value.
 - Change the lower (UPS-Link "l") transfer point to (2) two setting above the minimum value.
15. Perform a voltage sweep.
16. Graph output voltage (UPS-Link "O") and measured input AC voltage versus data points.
 - Display upper (UPS-Link "u") and lower (UPS-Link "l") transfer points as limits.
17. Change transfer points:
 - Change the upper (UPS-Link "u") transfer point to (3) three setting below the maximum value.
 - Change the lower (UPS-Link "l") transfer point to (3) three setting above the minimum value.
18. Perform a voltage sweep.
19. Graph output voltage (UPS-Link "O") and measured input AC voltage versus data points.
 - Display upper (UPS-Link "u") and lower (UPS-Link "l") transfer points as limits.

Test Specifications: Ensure each UUT output AC voltage (UPS-Link "O") remains between the applicable upper (UPS-Link "u") and lower (UPS-Link "l") transfer limits.

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

SPECIFIC TEST INFORMATION:

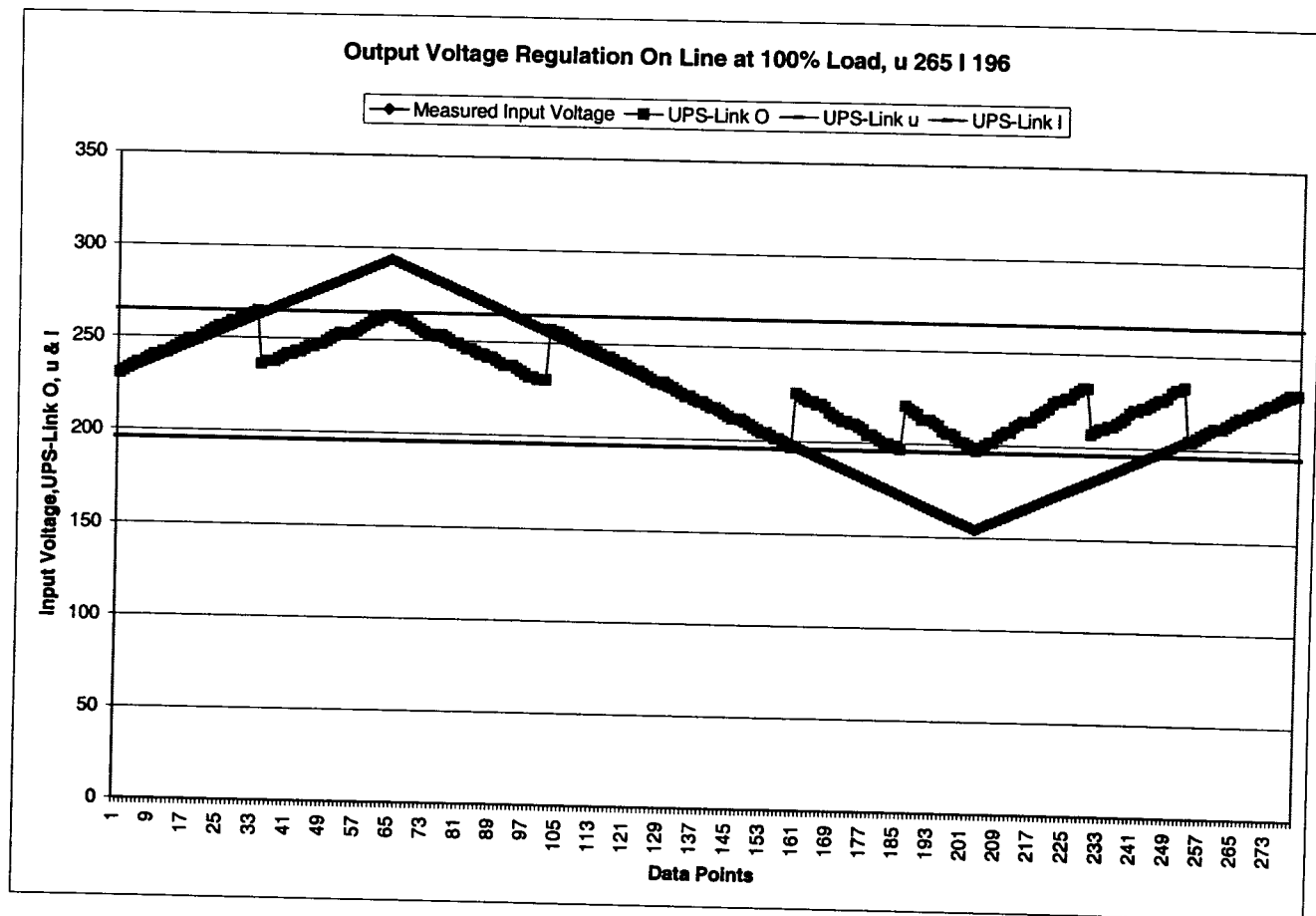
Tester Operator(s): Scott Derushia	Date Completed: 04/24/2002
Test Location: 85 Rangeway Rd.	Test Actual Time (in hours):
SKU #: SUA1000IRM1U	F/W Rev #: 3
Build Phase: Pilot	Serial#: DVT-1
Comments:	

Final Result:

Summary Results:

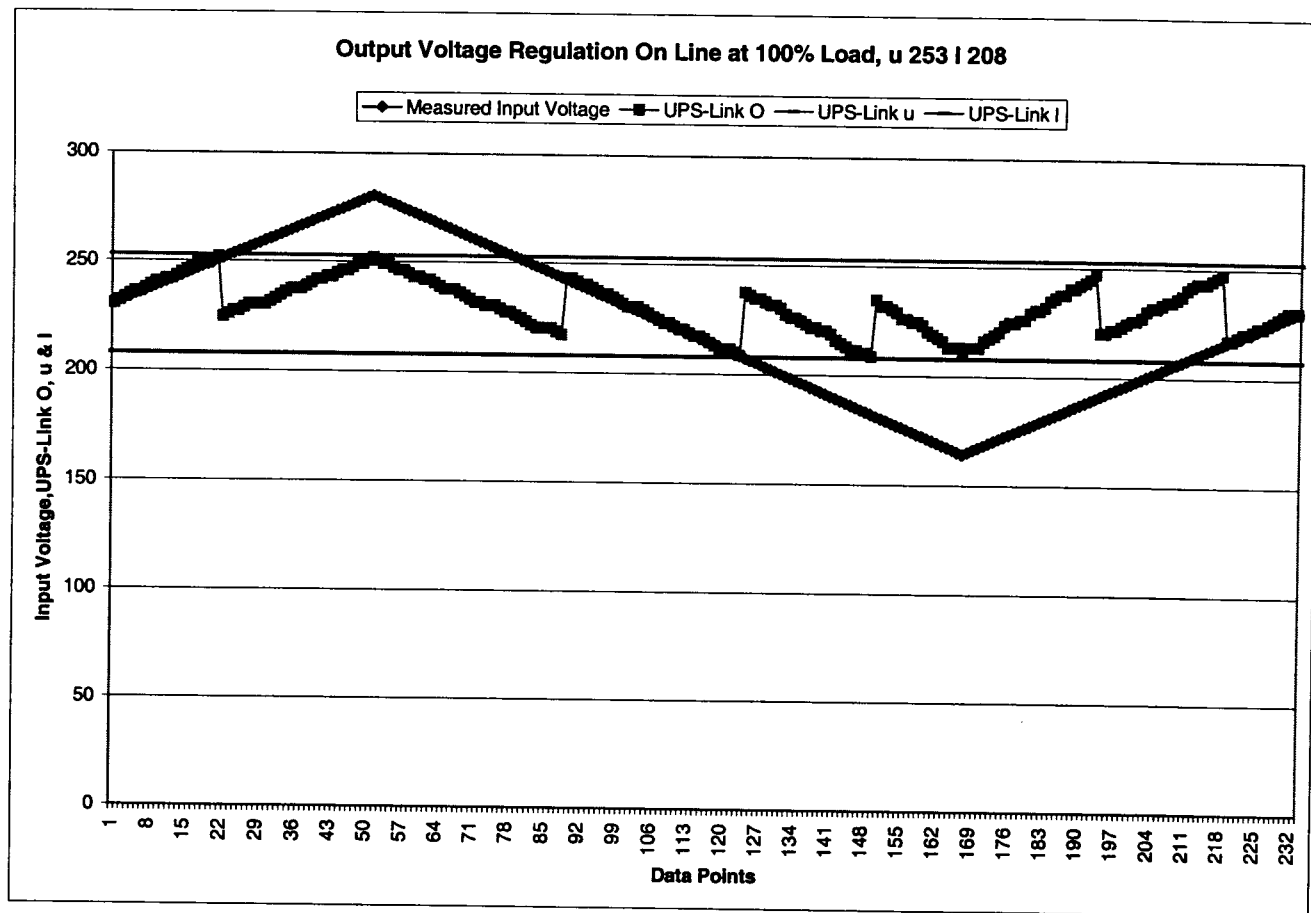
Test Data:

Below is graph of output voltage (UPS-Link "O") in relation to maximized upper and minimized lower transfer points with full rated load:

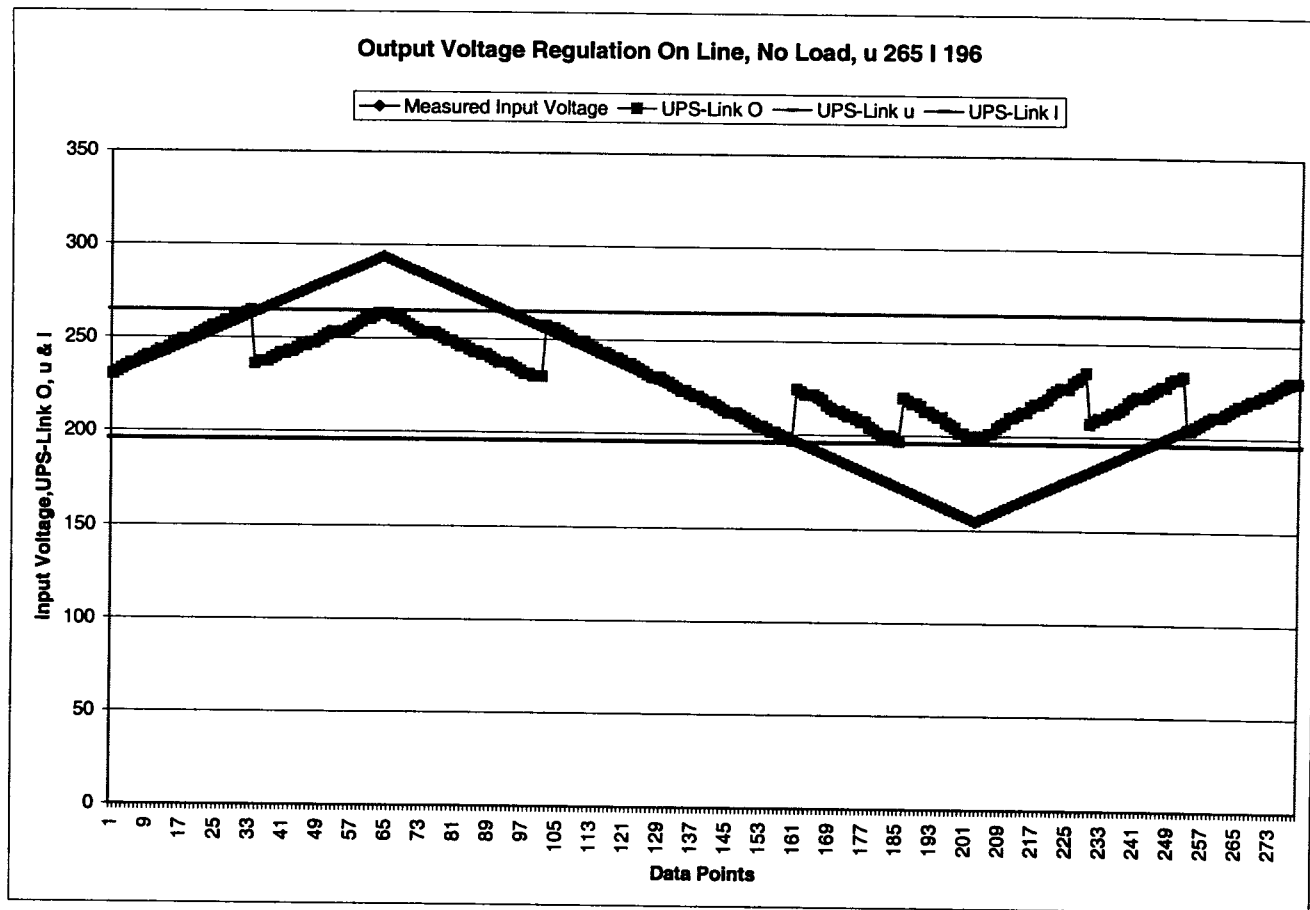


Below is graph of output voltage (UPS-Link "O") in relation to default transfer points with full rated load:

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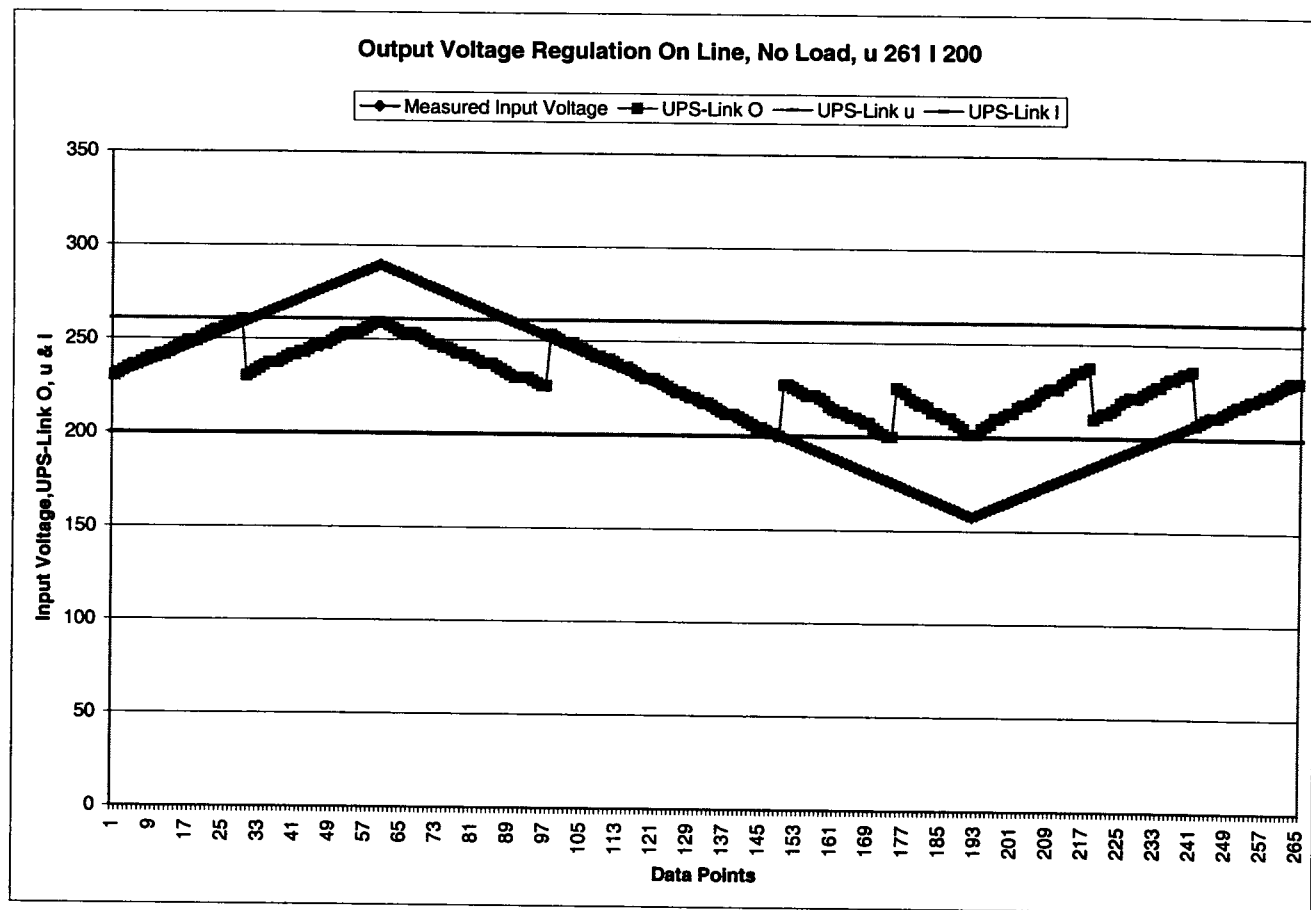


Below is graph of output voltage (UPS-Link "O") in relation to maximized upper and minimized lower transfer points with no load:



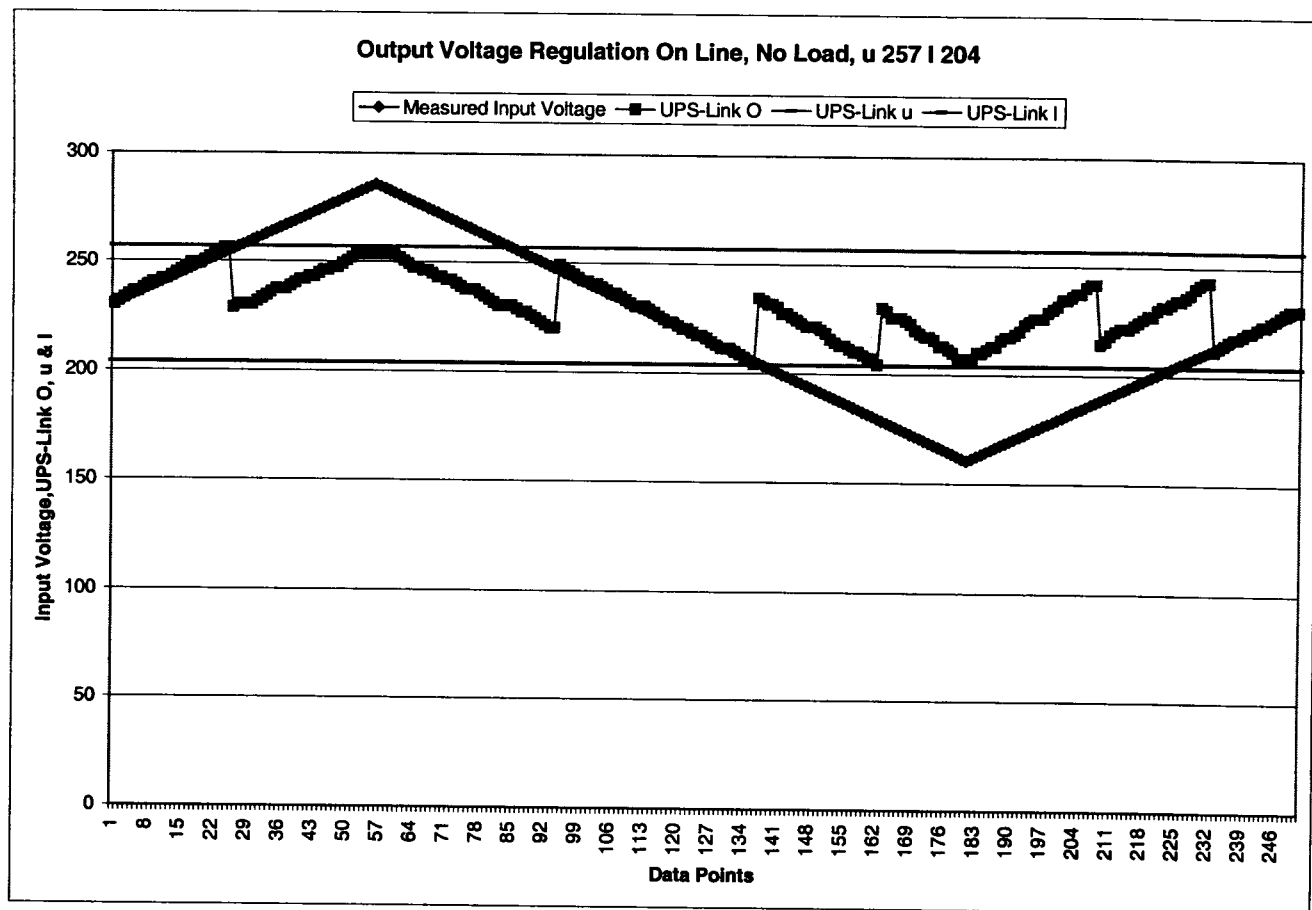
Below is graph of output voltage (UPS-Link "O") in relation to (1) one setting below maximized upper and one setting above minimized lower transfer points with no load:

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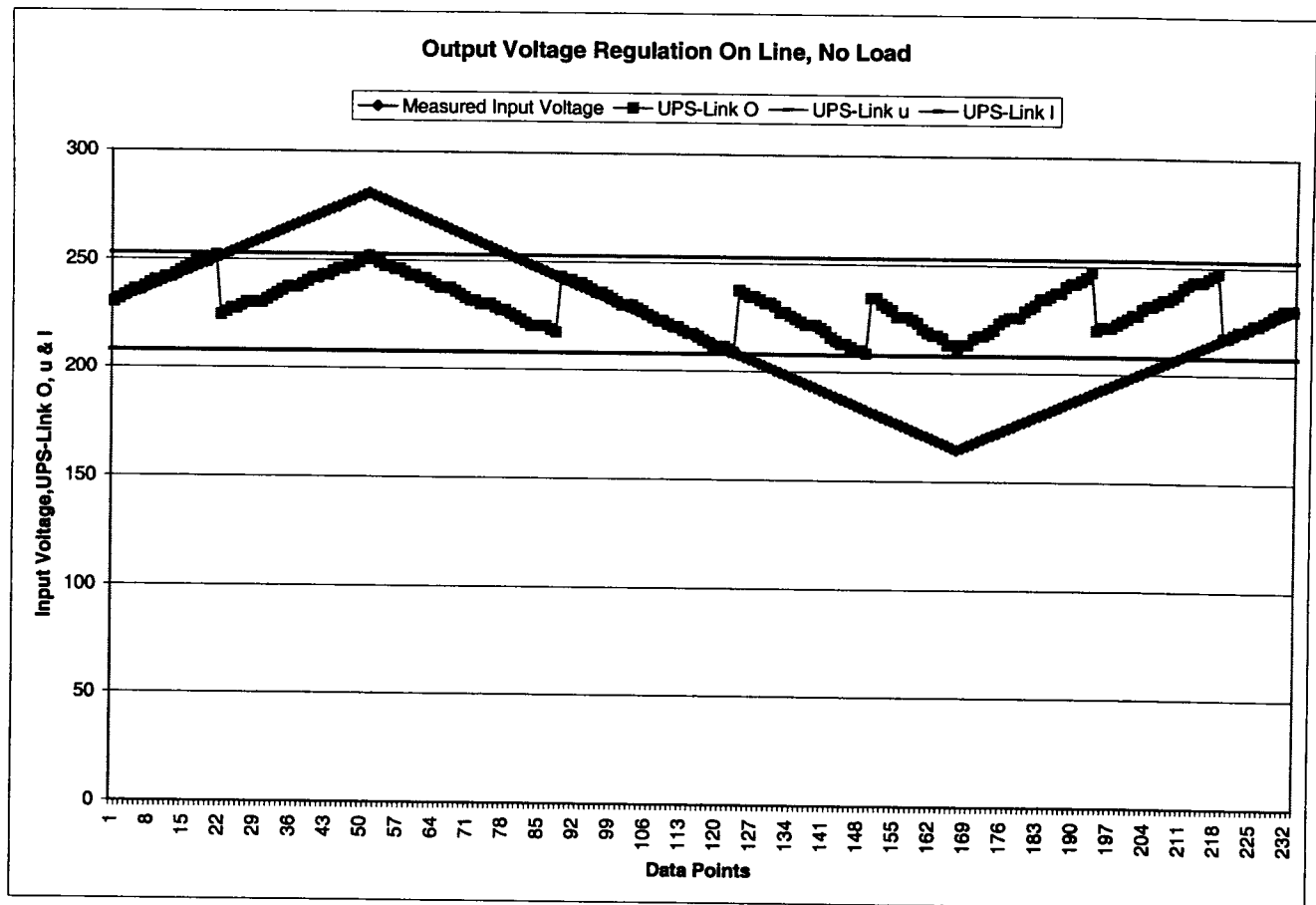
Below is graph of output voltage (UPS-Link "O") in relation to (2) two settings below maximized upper and two settings above minimized lower transfer points with no load:

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Below is graph of output voltage (UPS-Link "O") in relation to (3) three settings below maximized upper and three settings above minimized lower transfer points with no load:

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Revision History:

Rev	Author	Date
0	06 - Mar - 2002 by Dan Turley	Status: Proposed
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	24 - Apr - 2002 by Dan Turley	Status: Approved
0	25 - Apr - 2002 by Scott Derushia	Status: Approved
0	25 - Apr - 2002 by Scott Derushia	Status: Done - Pending Review
0	25 - Apr - 2002 by Scott Derushia	Status: Done - Pending Review

Change made:

VDE File:1924400-3335-0030
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DVT REPORT

Revision: 0

Test Status: Done - Pending Review

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: Operating frequency measurement	Test Group:
Test Category: Electrical Performance	Test Setup: On-Line
Division: NETWORK POWER SOLUTIONS	Test Type: Output Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMI1U	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: Unit specification	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Determine accuracy of operating frequency as reported by the UUT over all rated input voltages, frequencies and environmental extremes.

Test Equipment (use the following equipment or equivalent): DVT rack (test computer, AC source, power meter, full rated load); STEADY DVT software; environmental chamber.

Setup:

- Connect the UUT in the environmental chamber to the DVT rack.
 - Load can be set to any one value within specification.
 - Set the input AC frequency to nominal during voltage sweeps.
 - Set the input AC voltage to nominal during frequency sweeps.

Procedure:

1. Start STEADY DVT software.
 - Setup voltage and frequency sweeps.
2. Run voltage and frequency sweeps within each environmental extreme for a total of six (6) sweeps.
3. Graph for each voltage sweep measured input AC voltage, measured output AC frequency and operating AC frequency (UPS-Link "F") versus data points. Include on the second y-axis operating AC frequency error. Include load level in graph title.
 - Operating AC frequency error is defined as 100% multiplied by the difference between operating AC frequency (UPS-Link "F") and measured output AC frequency over measured output AC frequency.
4. Graph for each frequency sweep measured input AC frequency, measured output AC frequency and operating AC frequency (UPS-Link "F") versus data points. Include on the second y-axis operating AC frequency error. Include load level in graph title.

Test Specifications: Usually within +/- 1% of operating AC frequency error.

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

VDE File:1924400-3335-0030

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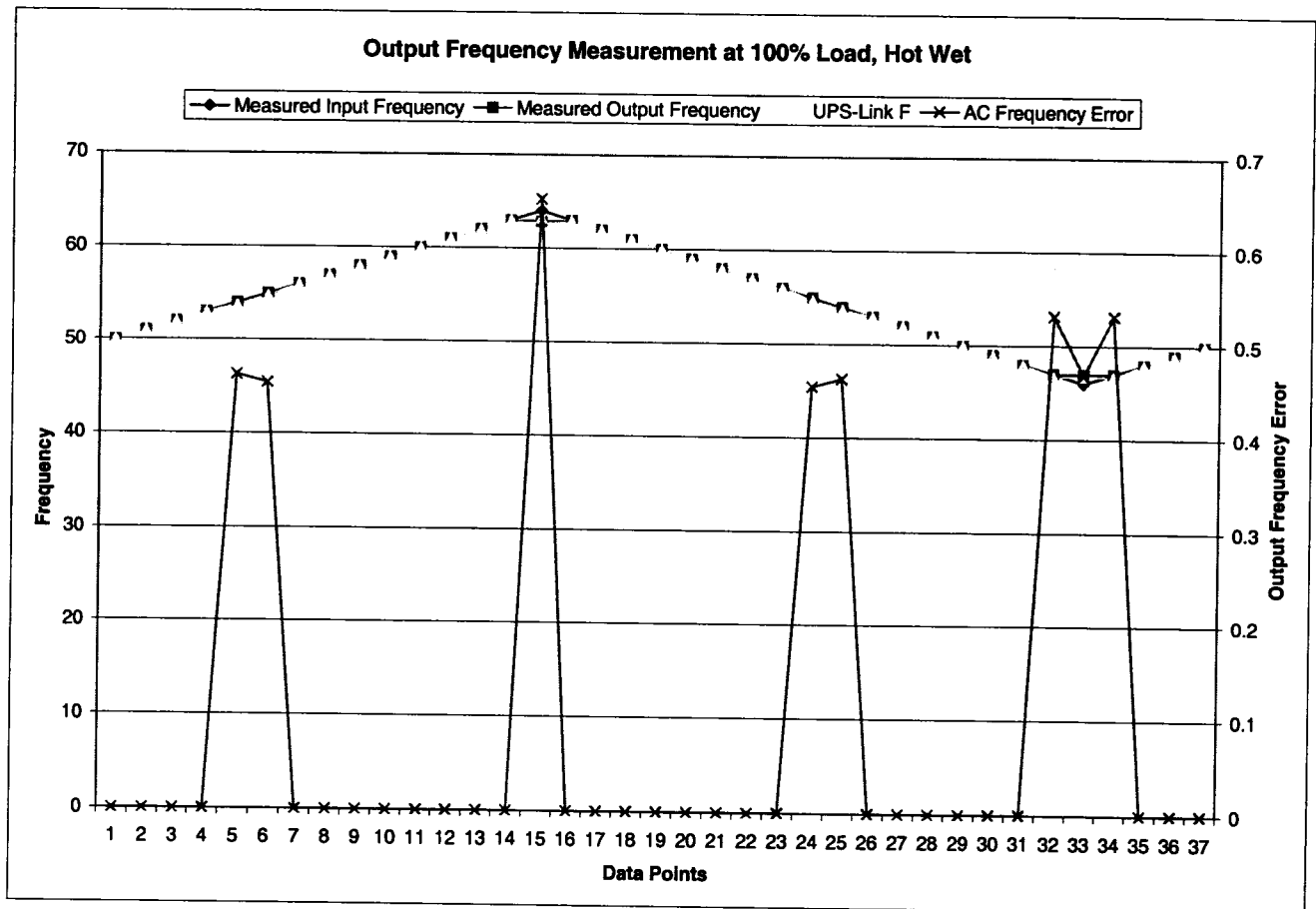
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SPECIFIC TEST INFORMATION:

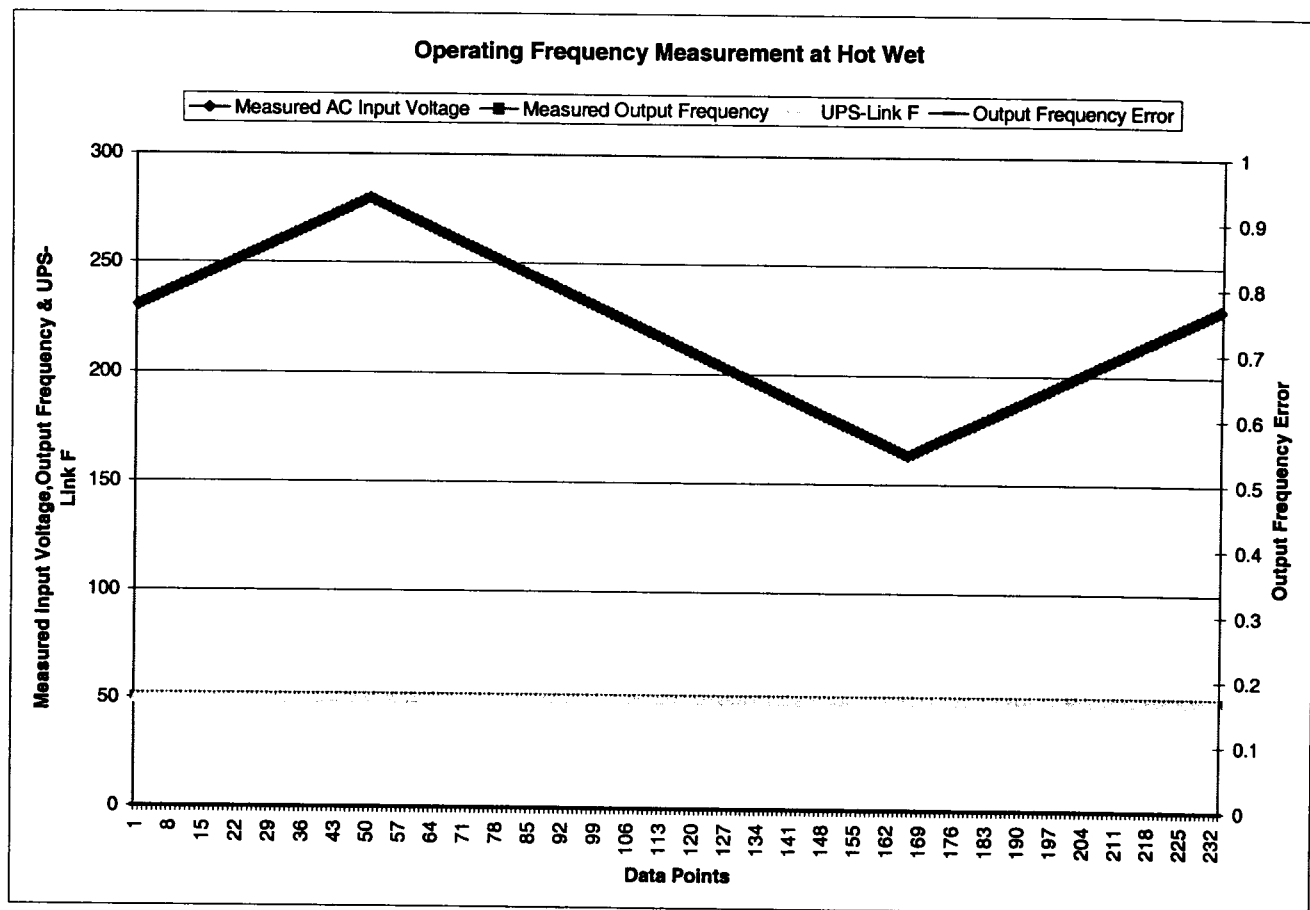
Tester Operator(s): Scott Derushia	Date Completed: 04/24/2002
Test Location: 85 Rangeway Rd.	Test Actual Time (in hours):
SKU #: SUA1000IRM1U	F/W Rev #: 3
Build Phase: Pilot	Serial#: DVT-1
Comments:	

Final Result:**Summary Results:****Test Data:**

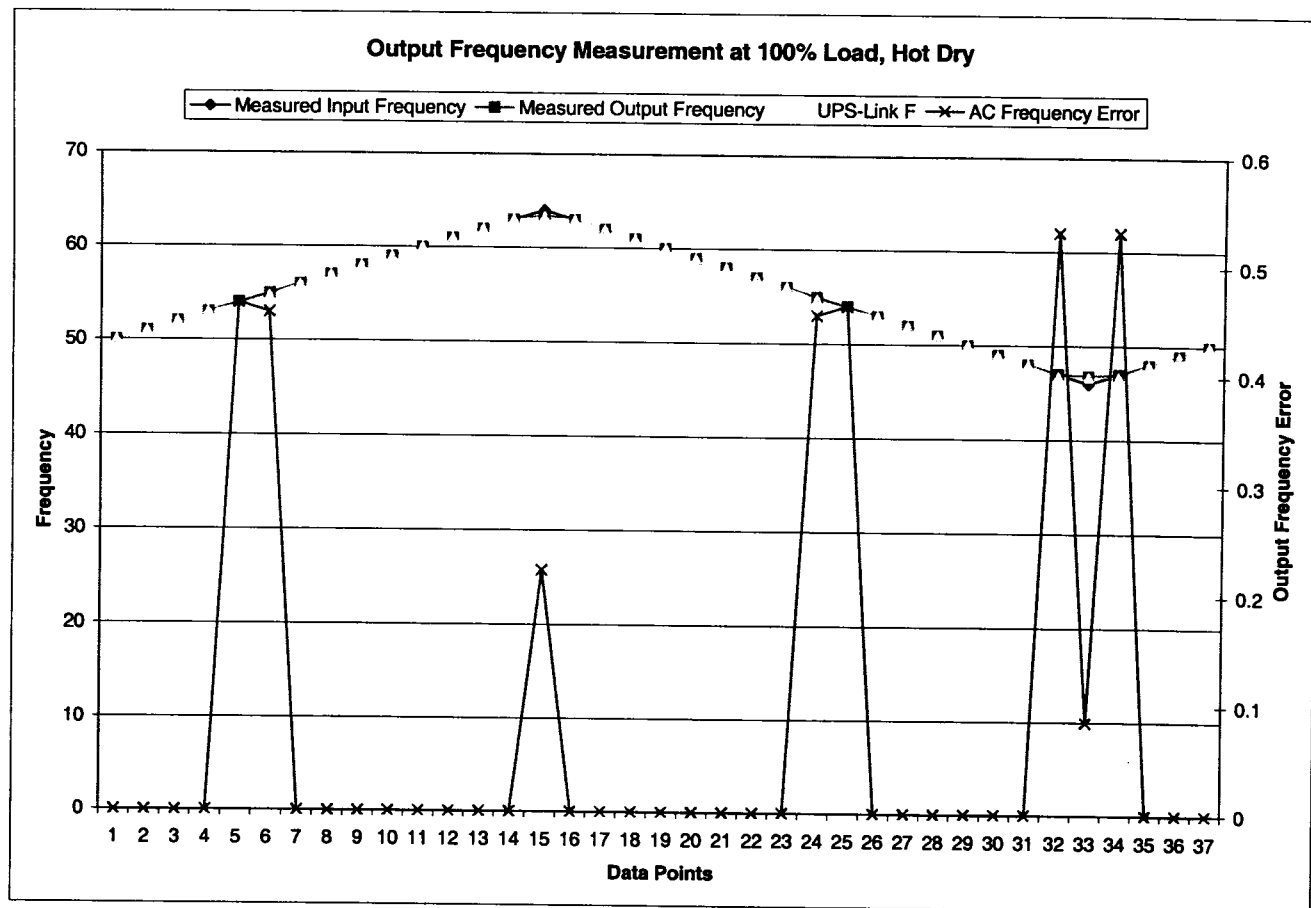
Below is graph of operating AC frequency error during a frequency sweep at hot, wet environmental conditions:



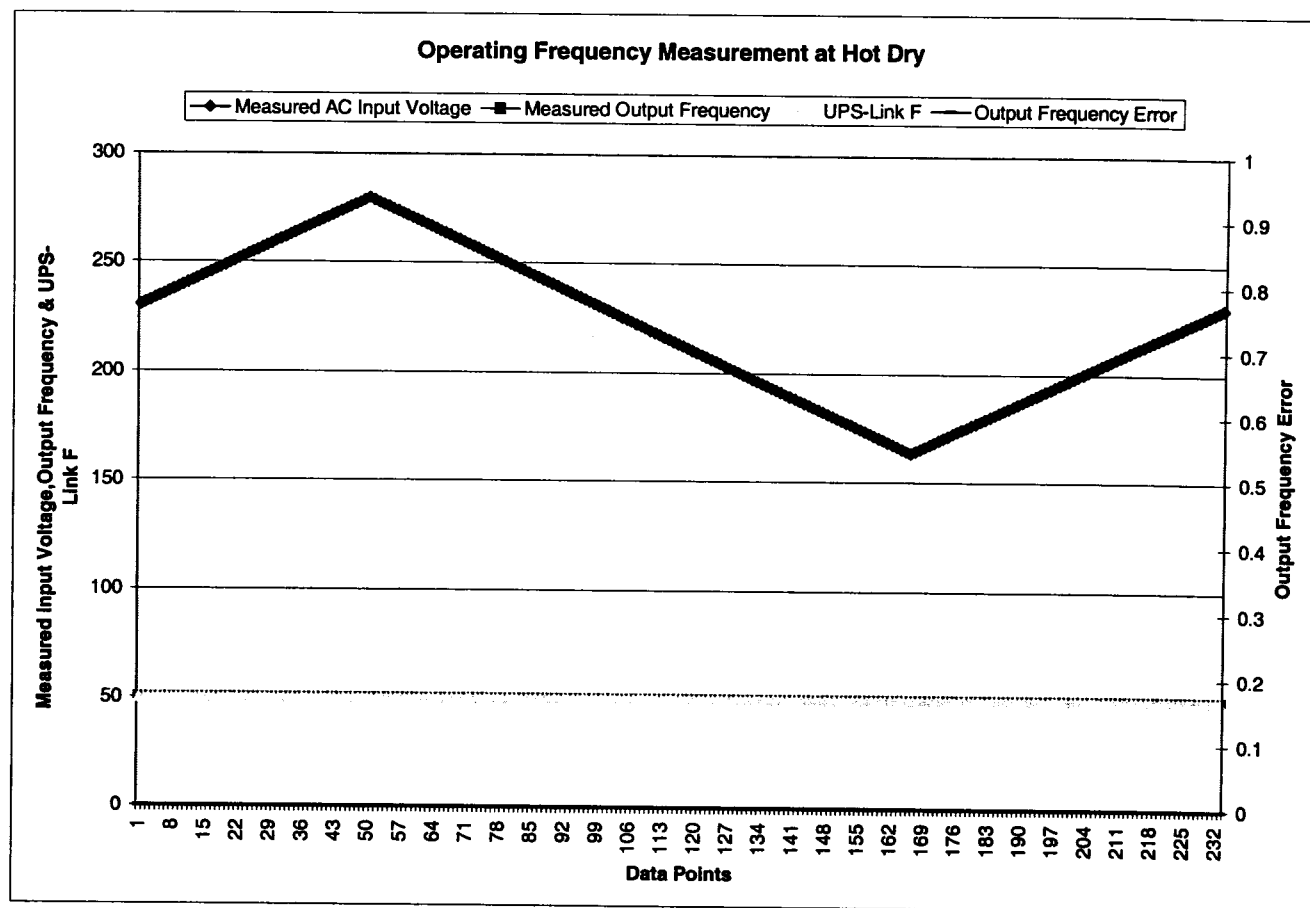
Below is graph of operating AC frequency error during a voltage sweep at hot, wet environmental conditions:



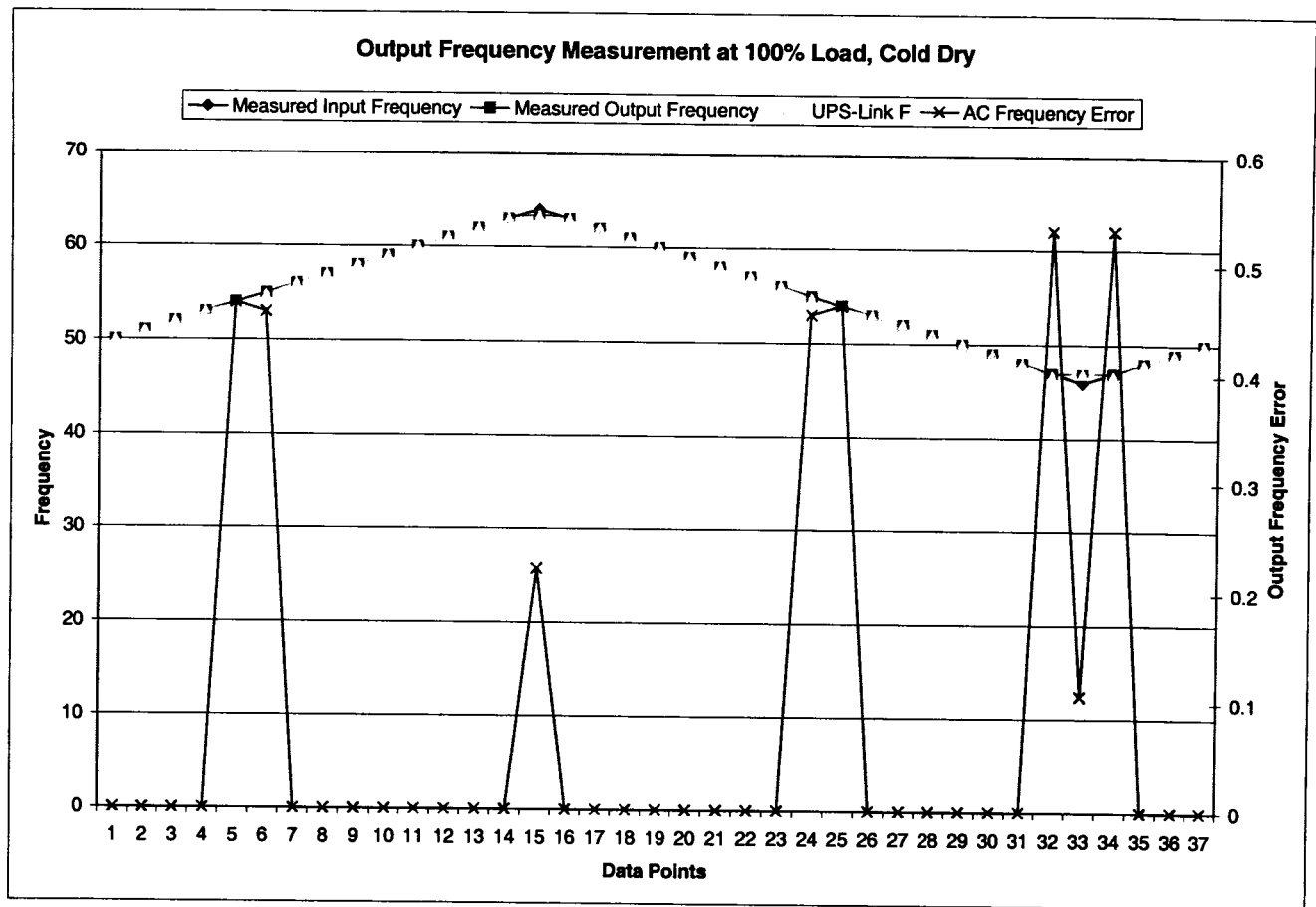
Below is graph of operating AC frequency error during a frequency sweep at hot, dry environmental conditions:



Below is graph of operating AC frequency error during a voltage sweep at hot, dry environmental conditions:

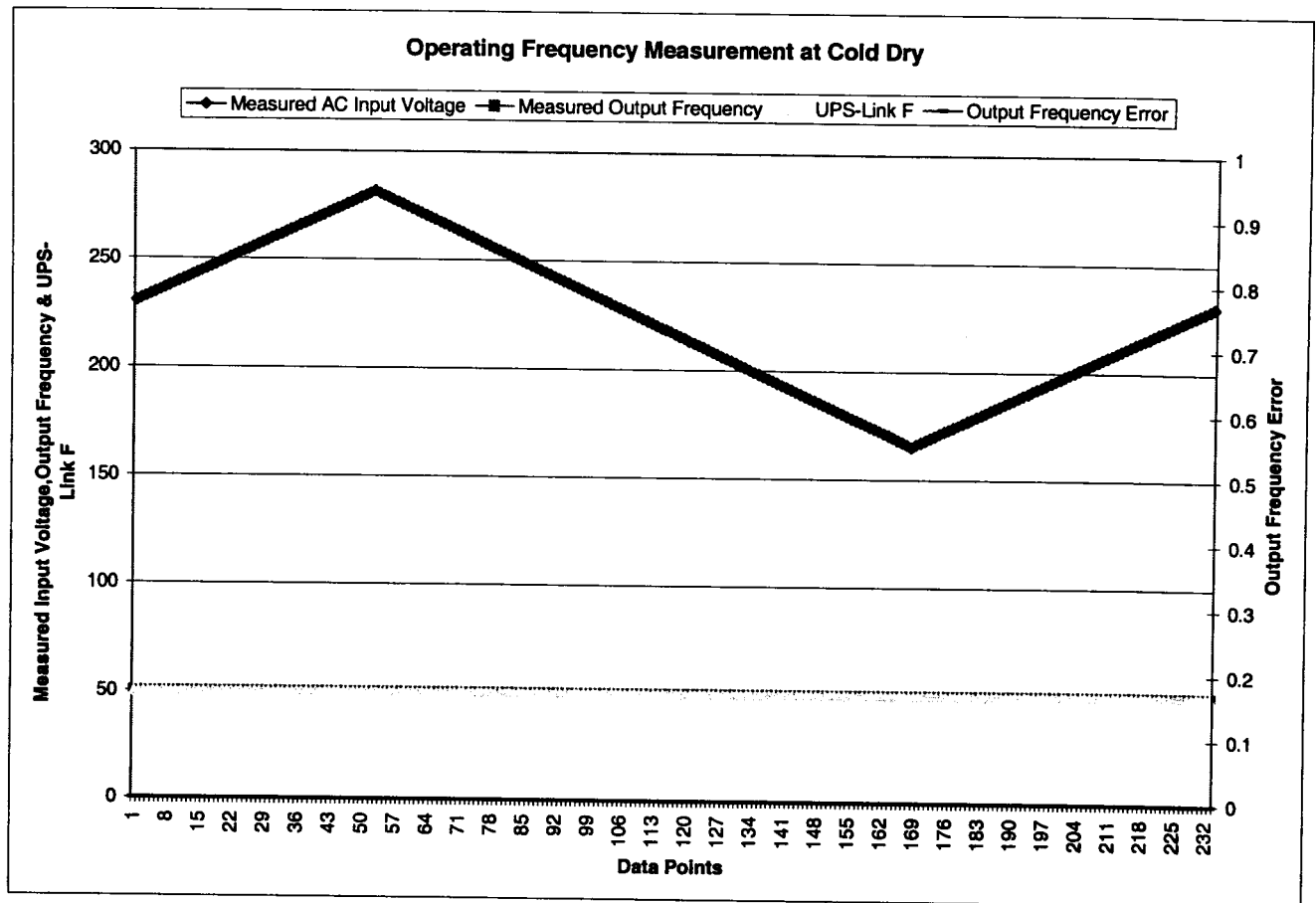


Below is graph of operating AC frequency error during a frequency sweep at cold environmental conditions:



Below is graph of operating AC frequency error during a voltage sweep at cold environmental conditions:

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Revision History:

Rev	Author	Date
0	06 - Mar - 2002 by Dan Turley	Status: Proposed
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	25 - Apr - 2002 by Scott Derushia	Status: Approved
0	25 - Apr - 2002 by Scott Derushia	Status: Done - Pending Review
0	25 - Apr - 2002 by Scott Derushia	Status: Done - Pending Review

Change made:

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DVT REPORT

Revision: 4

Test Status: Complete

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: Unique loads stability	Test Group:
Test Category: Electrical Performance	Test Setup: Both On-Line and On-Battery
Division: NETWORK POWER SOLUTIONS	Test Type: Output Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMI1U	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: APC design standard #57	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Determine stability of UPS inverter with unique loads such as capacitive, inductive and PFC.

Test Equipment (use the following equipment or equivalent): DVT rack (test computer, AC source, power meter); RUNTIME DVT software; a capacitor load conforming to design standard #57; inductive load (< 0.1 power factor); PFC load within 10% of the output power capability of UUT; oscilloscope

Setup:

- Connect the UUT to the DVT rack.
- If XL, use maximum external battery packs to maintain discharge for as long as it takes for the UUT to reach thermal equilibrium. Otherwise use internal batteries only.
- Connect oscilloscope to monitor and record the UUT output.

Procedure:

On-Battery:

Part A.

1. Connect capacitive load to UUT output.
2. Start RUNTIME DVT software.
 - Setup a discharge. If XL, set length of discharge to meet or exceed the time it takes for the UUT to reach thermal equilibrium. Otherwise set length of discharge to meet or exceed the runtime of the internal batteries only.
 - Ensure UUT internal thermistor (UPS-Link "C") is monitored.
 - Perform the discharge. Periodically monitor UUT output via the oscilloscope.
3. After the discharge review the test data. Comment on any inconsistencies and instabilities in oscilloscope monitoring or test data review.
4. Disconnect the capacitive load.

Part B.

1. Remove the input AC voltage and allow the UUT to switch to inverter. Connect the capacitive load to UUT and monitor output.
2. Comment on any inconsistencies and instabilities found when load is applied to the UUT.

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3. Disconnect the capacitive load to UUT and monitor output.
4. Comment on any inconsistencies and instabilities found when load is removed from the UUT.
5. Repeat step#1 for inductive and PFC loads.

On-Line:

Part A.

1. Reconnect the input AC voltage and verify UUT is on-line.
2. With the UUT at nominal input AC voltage, connect the capacitive load to the output of the UUT while monitoring output. Remove the capacitive load while monitoring output.
3. Repeat step#2 with inductive and PFC loads.
4. Comment on any inconsistencies and instabilities found while load is applied and/or removed from the UUT. Complete the data table for each load type.

Part B.

1. Increase the input AC voltage until the UUT is four (4) volts below the transfer point to trim and connect the capacitive load to the output of the UUT while monitoring the output. Increase the voltage until the UUT transfers while monitoring the output. Remove the capacitive load while monitoring the output.
2. Decrease the input AC voltage until the UUT is four (4) volts above the transfer point to trim from inverter and connect the capacitive load to the output of the UUT while monitoring the output. Decrease the voltage until the UUT transfers while monitoring the output. Remove the capacitive load while monitoring the output.
3. Repeat steps 1 and 2 at four (4) volts below and above the upper transfer point to inverter while increasing and decreasing the input AC voltage. (This is done while the input AC voltage is outside the high and low voltage range of the UUT)
4. Repeat steps 1 and 2 at four (4) volts below and above the transfer point to nominal line, from boost and trim respectively, while increasing and decreasing the input AC voltage.
5. Repeat steps 1 and 2 at four (4) volts below and above the transfer point to boost, from inverter and nominal line respectively, while increasing and decreasing the input AC voltage.
6. Comment on any inconsistencies and instabilities found while load is applied and/or removed from the UUT. Complete the data table for each load type.

In UUT's, where double-boost is applicable:

1. Repeat steps 1 and 2 from Part B. at four (4) volts below and above the transfer point to double-boost, from inverter and boost respectively, while increasing and decreasing the input AC voltage.
2. Comment on any inconsistencies and instabilities found while load is applied and/or removed from the UUT. Complete the data table for each load type.
3. Repeat step#1 for inductive and PFC loads.

Test Specifications: Ensure UPS inverter remains stable with the presence of each load as well as normal on-line operation.

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

SPECIFIC TEST INFORMATION:

Tester Operator(s): Scott Derushia	Date Completed: 05/10/2002
Test Location: 85 Rangeway Rd.	Test Actual Time (in hours):
SKU #: SUA1000RMI1U	F/W Rev #: 3
Build Phase: Pilot	Serial#: DVT-1
Comments:	

Final Result:

Summary Results:

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Test Data:

On-Battery:

Part B.

Load	Load (applied/removed)	UUT State	Output (stable/unstable)	Comments
Capacitive	X	Inverter	Yes	
Inductive	X		Yes	
PFC	X		Yes	

On-Line:

Part A.

Load	Load (applied/removed)	UUT State	Output (stable/unstable)	Comments
Capacitive	X	Line	Yes	
Inductive	X		Yes	
PFC	X		Yes	

Part B.

Load	Load (applied/removed)	UUT State	Output (stable/unstable)	Comments
Capacitive		Trim		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	
Capacitive				
4 volts below transfer	X		Yes	

Transfer with load applied	X	Inverter	Yes	
4 volts above transfer	X		Yes	
Capacitive		Line		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	
Capacitive		Boost		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	
Capacitive		Double boost (if applicable)		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	

Load	Load (applied/removed)	UUT State	Output (stable/unstable)	Comments
Inductive		Trim		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	
Inductive		Inverter		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	

Inductive				
4 volts below transfer	X	Line	Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	
Inductive		Boost		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X	Double boost (if applicable)	Yes	
Inductive				
4 volts below transfer	X		Yes	
Transfer with load applied	X	Double boost (if applicable)	Yes	
4 volts above transfer	X		Yes	

Load	Load (applied/removed)	UUT State	Output (stable/unstable)	Comments
PFC		Trim		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X	Inverter	Yes	
PFC				
4 volts below transfer	X		Yes	
Transfer with load applied	X	Line	Yes	
4 volts above transfer	X		Yes	
PFC				
4 volts below transfer	X	Line	Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	

PFC		Boost		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	
PFC		Double boost (if applicable)		
4 volts below transfer	X		Yes	
Transfer with load applied	X		Yes	
4 volts above transfer	X		Yes	

Notification sent to: Marlon McDonald by Bryce Capodiecici on 07/10/2002

Revision History:

Rev	Author	Date
0	06 - Mar - 2002 by Dan Turley	Status: Proposed
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	06 - Mar - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	08 - Apr - 2002 by Marlon McDonald	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Proposed - Pending Approval
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	16 - Apr - 2002 by Dan Turley	Status: Approved
0	10 - May - 2002 by Scott Derushia	Status: Approved
0	10 - May - 2002 by Scott Derushia	Status: Done - Pending Review
0	10 - May - 2002 by Scott Derushia	Status: Done - Pending Review
1	10 - Jul - 2002 by Bryce Capodiecici	Status: Done - Pending Review
2	11 - Jul - 2002 by Marlon McDonald	Status: Done - Pending Review
3	11 - Jul - 2002 by Marlon McDonald	Status: Complete
4	11 - Jul - 2002 by Marlon McDonald	Status: Complete

Change made:

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DVT REPORT

Revision: 0

Test Status: Done - Pending Review

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: THD at full resistive load (on-battery)	Test Group:
Test Category: Electrical Performance	Test Setup: On-Battery
Division: NETWORK POWER SOLUTIONS	Test Type: Output Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMI1U	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: Unit specification	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Determine inverter current THD at full resistive load over a full discharge.

Test Equipment (use the following equipment or equivalent): DVT rack (test computer, AC source, power meter that also reads current THD, full rated resistive load, voltmeter); RUNTIME DVT software.

Setup:

- Connect the UUT to the DVT rack.
 - Set load to 100% full rated resistive load.
 - Continuously measure battery voltage via voltmeter.
- Internal batteries only may be used.

Procedure:

1. Start RUNTIME DVT software.
 - Setup for a full discharge.
2. Perform a discharge.
3. Graph for the discharge output current THD versus time. Include on the second y-axis measured battery voltage and output power (UPS-Link "P").

Test Specifications: Determining characteristics.

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

SPECIFIC TEST INFORMATION:

Tester Operator(s): Scott Derushia	Date Completed: 04/24/2002
Test Location: 85 Rangeway Rd.	Test Actual Time (in hours):
SKU #: SUA1000IRM1U	F/W Rev #: 3
Build Phase: Pilot	Serial#: DVT-1

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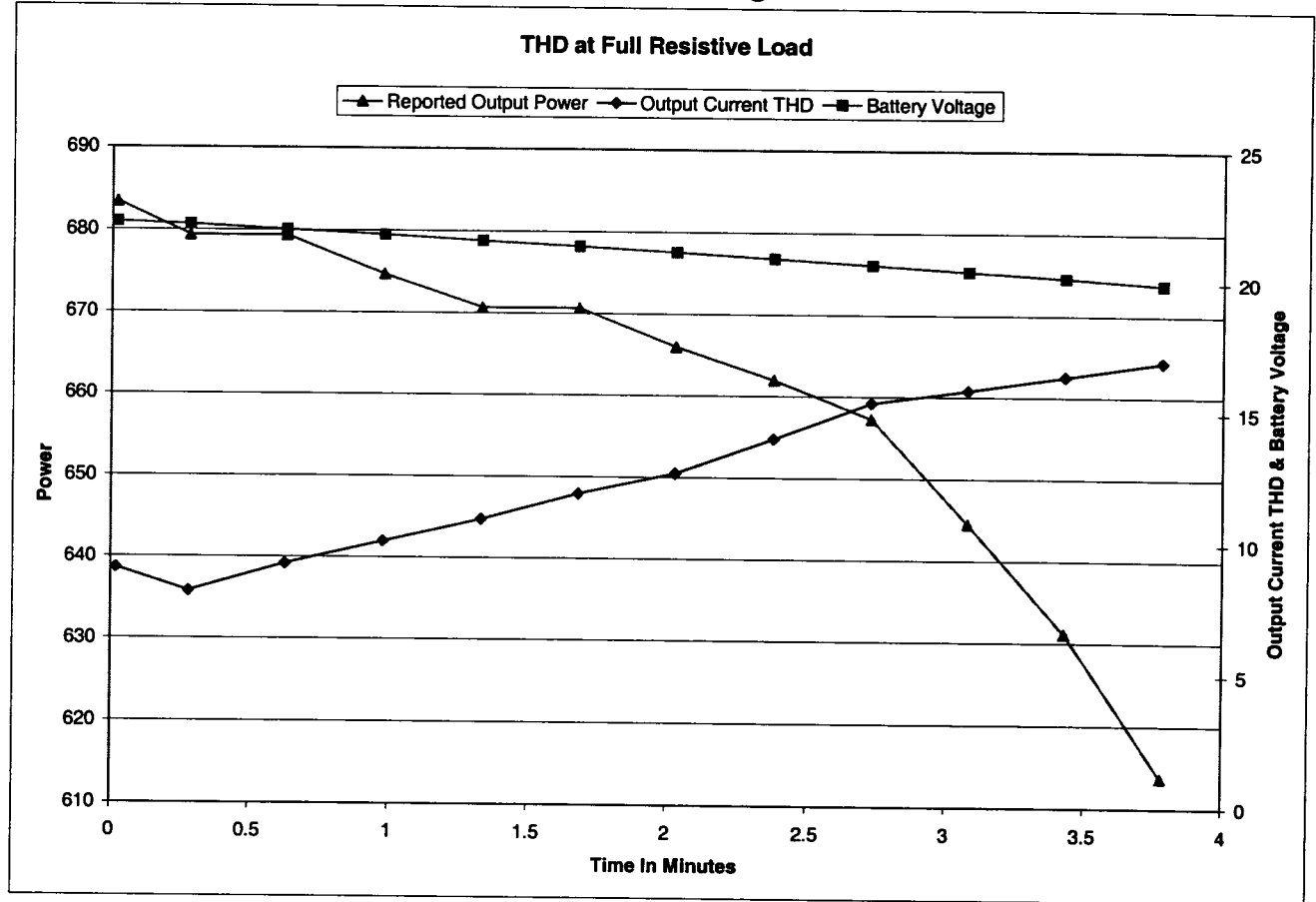
Comments:

Final Result:

Summary Results:

Test Data:

Below is graph of output current THD during a discharge:



Revision History:

Rev Author Date

0 06 - Mar - 2002 by Dan Turley Status: Proposed
0 06 - Mar - 2002 by Dan Turley Status: Proposed - Pending Approval
0 06 - Mar - 2002 by Dan Turley Status: Proposed - Pending Approval

0 16 - Apr - 2002 by Dan Turley Status: Proposed - Pending Approval
0 16 - Apr - 2002 by Dan Turley Status: Approved
0 16 - Apr - 2002 by Dan Turley Status: Approved
0 26 - Apr - 2002 by Scott Derushia Status: Approved
0 26 - Apr - 2002 by Scott Derushia Status: Done - Pending Review
0 26 - Apr - 2002 by Scott Derushia Status: Done - Pending Review

Change made:

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DVT REPORT

Revision: 0

Test Status: Done - Pending Review

Created on Date: 03/06/2002

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

GENERAL TEST INFORMATION:

Test Title: Maximum input current	Test Group:
Test Category: Electrical Performance	Test Setup: On-Line
Division: NETWORK POWER SOLUTIONS	Test Type: Input Characteristics
Platform: Smart-UPS	Program: Ferret
SKU's: SUA1000RMI1U	Program Subset: System
Sequence by Group:	DVT Engineer: Marlon McDonald
Test Planned Time (in hours):	
Applicable Standards: Unit specification	

TEST METHOD

If the Status is PROPOSED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

Test Objective: Find maximum input current at full rated VA with fully charged batteries and with batteries under full charging conditions as well as under minimum input AC voltage.

Test Equipment (use the following equipment or equivalent): DVT rack (AC source, power meter, full load by VA, voltmeter)

Setup:

- Connect the UUT to the DVT rack.
 - Set load to full rated VA.
 - Set the UUT's AC input voltage to nominal.
 - Set the UUT's AC input frequency to nominal.
 - Verify battery capacity by battery voltage via voltmeter.

Procedure:

1. Ensure UUT is connected to fully charged batteries. Measure and record UUT AC input current.
2. Set input voltage to minimum input AC voltage. Measure and record UUT AC input current.
3. Ensure UUT is connected with batteries under full charging conditions. Measure and record UUT AC input current.
4. Set input voltage to nominal input AC voltage. Measure and record UUT AC input current.

Test Specifications: Determining characteristics (may be limited by unit specification or Safety).

TEST RESULTS

If the Status is PROPOSED or APPROVED anyone can edit this section otherwise this section is LOCKED and only editable by the DVT Engineer and Program Manager.

SPECIFIC TEST INFORMATION:

Tester Operator(s): Scott Derushia	Date Completed: 05/01/2002
Test Location: 85 Rangeway	Test Actual Time (in hours):

VDE File:1924400-3335-0030

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SKU #: SUA1000RMI1U	F/W Rev #: 3
Build Phase: Pilot	Serial#: DVT-1
Comments:	

Final Result:
INCOMPLETE

Summary Results:

Test Data:

	Fully charged batteries	Batteries under full charging conditions
UUT AC input current (Arms) at the nominal input AC voltage	5.55	5.90
UUT AC input current under minimum input AC voltage (Arms)	6.65	7.17

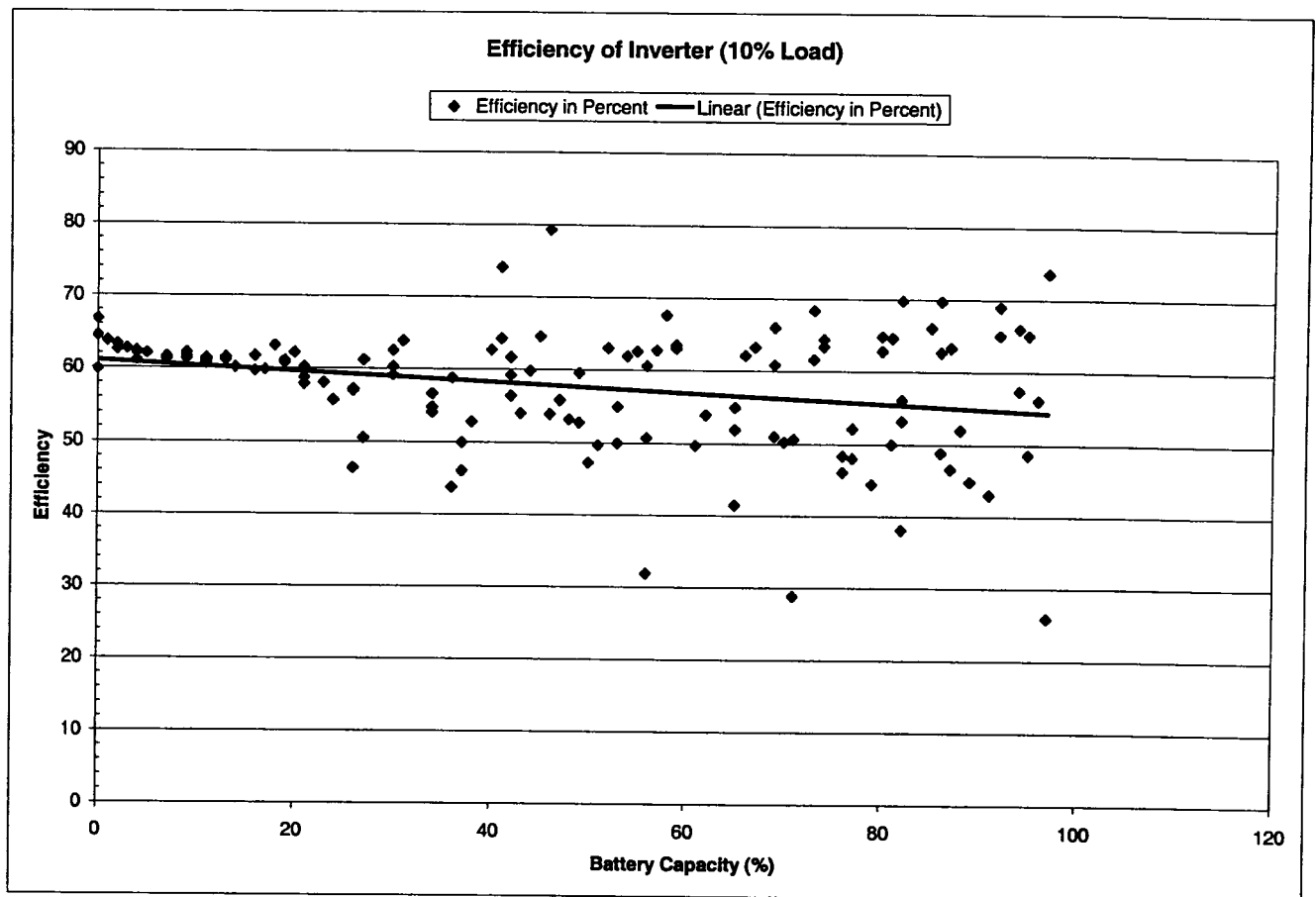
Revision History:

Rev Author Date

0 06 - Mar - 2002 by Dan Turley Status: Proposed
0 06 - Mar - 2002 by Dan Turley Status: Proposed - Pending Approval
0 06 - Mar - 2002 by Dan Turley Status: Proposed - Pending Approval
0 16 - Apr - 2002 by Dan Turley Status: Proposed - Pending Approval
0 16 - Apr - 2002 by Dan Turley Status: Approved
0 16 - Apr - 2002 by Dan Turley Status: Approved
0 30 - Apr - 2002 by Marlon McDonald Status: Approved
0 02 - May - 2002 by Scott Derushia Status: Approved
0 02 - May - 2002 by Scott Derushia Status: Done - Pending Review
0 02 - May - 2002 by Scott Derushia Status: Done - Pending Review

Change made:

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Below is a graph of on-battery efficiency vs. battery capacity at 25% load:

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

Merianstrasse 28 · 53099 Offenbach Tel. (+49) (69) 83 06-0 Fax (+49) (69) 83 06-555

VDE

Appendix No.:

Marka licence No.:

File ref.:

Constructional data for isolating transformers and safety isolating transformers to EN 60742 DIN VDE 0551

Form 42E

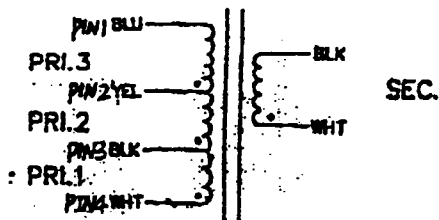
- Translation of the VDE Testing and Certification Documents -

- 1.1 Manufacturer: LEADER ELECTRONICS INC.
 1.2 Place of manufacture: No.1 Industrial Area Tangda Town, Dongguan City, Guangdong Province, China.
 1.3 Reference of type: LS-A6899-PT2
 1.4 Trade Mark: LEI
 1.5 Other markings:
 1.6 Reference number: 430-1222 Rev.0

- 2.1 Protection against electric shock: Class 2
 2.2 Class of protection to IEC 539: IP.....
 2.3 Type of construction (isolating transformer for toys.....): Isolating Transformer
 2.4 Transformer, stationary - portable *):
 2.5 Protection against short-circuit according to sub clause 6.2 *):
 inherently short-circuit proof:
 non-inherently short-circuit proof:
 non short-circuit proof:
 fail safe:
 (rated current of the cutout: A)
 2.6 Rated maximum ambient temperature: $t_a =$ °C
 2.7 Class: H Insulation; Declaration of insulation see VDE-Form 187 (according to IEC 85)
 2.8 CTI - Value (according to IEC 112, Method A):

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	Pr1 (Pin 4-3): 230Vac	Pr1.2 (Pin 3-2): 33.84Vac; Pr1.3 (Pin 2-1): 34.75Vac; Sec (Wht-Bk): 15.08Vac.
3.2 Rated frequency	Hz:	50 Hz	
3.3 Rated current	A:		
3.4 Rated output	VA:		
3.5 Rated power factor cos phi:			
4 Windings			
4.1 Coil base	number: material:	Rynite FR-530	
4.2 Material of layer insulation	material:	Polyester film 0.05mm thickness.	
4.3 Windings	number: material:	Polyester Copper Wire.	Polyester Copper Wire
4.4 Taps	number:		
4.5 Diameter of wire	mm:	Pr1.1: 0.65 mm DIA; Pr1.2&3: 0.80mm DIA	Sec: AWG#10 Square Wire
4.6 Winding of insulation	material:	Polyester film tape; Nomex paper	Polyester film
4.7 Cord insulation material	innere: äußere:		
4.8 Cold resistance in Ω at: 25 °C =		Pr1.1,2,&3: XLPE; Pr1.1: 8.0 Ohm Max; Pr1.2: 650mOhms Max; Pr1.3: 650 mOhms Max.	Sec: XLPE Sec: 28 mOhms Max.

4.9 Circuit diagram (which terminal markings, color of wires etc.):

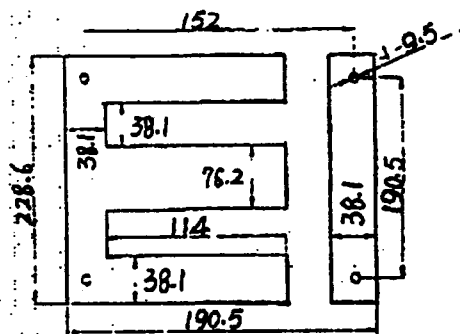


5 Iron core

5.1 Sheet metal, material:
main dimensions:

5.2 Cross-sectional drawing:

Unit: mm



6 Type of construction

6.1 Open - covered - in case protection *)

6.2 Impregnated - undrowned - drowned *) Impregnated

6.3 Soaking (liquor):

6.4 Underpressure - Overpressure - Soaking at °C *)

6.5 Drown material: WVP2852F-5 (Hitachi Chemical Co., Ltd)

6.6 Material of the cover:

of the case:

of the socket (support):

6.7 Flammability class for insulation material:

7.1 Other data (special constructional feature, etc.):

8.1 Components built - in the transformer: (switches, plugs, thermal cut off, cables.....etc.):

Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No - Yes

Offenbach,

16.07.02

Place:

Date: April 20th.2002

VDE Testing and Certification Institute

Department FA3

hr m. (Lw 22/4/02

(Place and signature of the manufacturer)

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VDE File:1924400-3335-0030

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FROM : LEI TX

PHONE NO. : 3239

APR. 22 2002 09:28PM P3

VDE Prüf- und Zertifizierungsinstitut
Merianstrasse 28

D-63069 Offenbach

Abkürzungen / Abb. ref.

ISOLATIONSERKLÄRUNG

DECLARATION OF INSULATION

Betriebsmittel (Bauteil)/
Equipment (Component): 430-1222 Rev.0

Typenbezeichnung/
Type designation: LS-A6899-PT2

Hersteller/
Manufacturer: LEADER ELECTRONICS INC.

Hiermit wird bestätigt, daß die im o. g. elektrischen Betriebsmittel (Bauteil) verwendeten und wie auf der Folgesseite beschriebenen Isolierstoffe der jeweils dazu angegebenen IEC-Norm und dem daraus entnommenen IEC-Type entsprechen.

It is herewith confirmed that the overleaf specified insulation materials used in the a. m. electrical equipment (component) comply with the indicated IEC-Publication and to the therefore quoted IEC-Type.

Das o. g. elektrische Betriebsmittel (Bauteil) entspricht der Thermischen Klasse H gemäß IEC-Publikation 85.

The a.m. electrical equipment (component) comply with the Thermal class H according to IEC Publication 85.

No.1 Industrial Area Tangxia Town, Dongguan City, Guangdong
Province, China. APR 20 2002

Ort und Datum / Place and date

Unterschrift des Herstellers / Manufacturer's signature

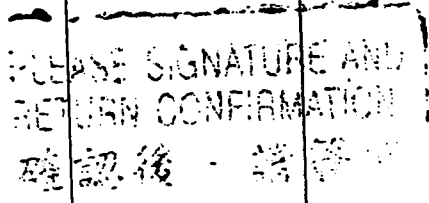
VDE File:1924400-3335-0030
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Spezifikation über Isolierstoffe / Specification of Insulation materials

Isolierstoff Insulation	Hersteller Manufacturer	Handelsname (Typ) Tradename	Chemische Bezeichnung Chemical Name	Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffher- stellers Acc. to IEC Norm IEC Type see enc. No. of the insulation manufacturer	Temperatur-Index Temperature index
Isolierung zwischen Wicklungen <i>Insulation between windings</i>	3M Electrical Corp. Nitto Denko Corp. Dupont De Nemours & Co., Inc.	No. 56, 1318, 1350 No. 31CT, 316 No. 410	Polyester film tape Polyester film tape Nortex paper web reinforced		130 °C 220 °C
Spulenkörper- Isolierung <i>Coil base insulation</i>	Dupont De Nemours & Co., Inc.	Rynite FR530, FR530L	PET + 30% Glass Fiber		150°C
Lagenisolierung <i>Layer insulation</i>	Toray Industries Inc. Film Div.	Lumirror X-10	PET furnished in the form of sheets		140°C
Tränkmittel <i>Impregnation substances</i>	HITACHI Chemical Co. Ltd.	WP-2952-F5	Varnish		200°C
Vergußmasse <i>Drown material</i>					
Drahtisolierung <i>Windings insulation</i>	Tian Shun, Essex, Foshan Transformer Wire, Xianglan Dayang		Polyester base coat with a polyamide topcoat.	MW36C, MW73C	200°C
Leitungsisolierung <i>Cord insulation</i>	Hannstar, Wonderful, LG, Lucky United;		XL PE	UL3321	150°C

SPECIFICATION SHEET

CUSTOMER : APC
PART NO. : 430-1222 REV.EI TYPE EI-228X16.5
DESIGN NO.: LS-A6899-PT2 REV. 0
DATE : JUN.20.2001 DATE CODE: 1E24

Authorized Signature			
 PLEASE SIGNATURE AND RETURN CONFIRMATION 確認後 - 請寄回			

LEADER ELECTRONICS INC.

TAIWAN : No.2, Lane 87, Pao Hsin Rd., Hsin Tien, Taipei, Taiwan, R.O.C.
TEL: +886 (0) 2 2917 0252 FAX: +886 (0) 2 2917 6809
SOUTH CHINA: No.1, Industrial Area, Tangxia Town, Dongguan City, Guangdong
Province, China
TEL: +86 (0) 769 772 3511, 772 7748 FAX: 086 (0) 769 772 2824
EAST CHINA: Zhangxiang, Sanshan Town, Dantu County, Zhenjiang City, Jiangsu
Province, China
TEL: +86 (0) 511 456 2484 FAX: +86 (0) 511 456 1309

LEADER ELECTRONICS (N.A.) INC.

NORTH AMERICA: 3260 Pointe Pkwy, Ste. 200, Norcross, GA 30092, USA
TEL: +1 678 380 2124 FAX: +1 678 380 2125

LEADER ELECTRONICS (EUROPE) B.V.

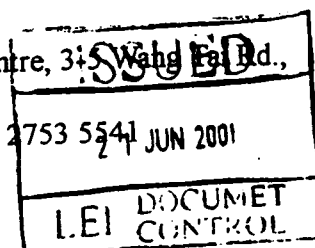
EUROPE: Ambachtsweg 80, 3606 AP, Maarssen, The Netherlands
TEL: +31 (0) 30 247 0066 FAX: +31 (0) 30 247 0068

LEI INTERNATIONAL LIMITED

HONG KONG: Unit 6-7, 6/F, Block A, Hopelite Industrial Centre, 315 Wang Fa Rd.,
Kowloon Bay, Hongkong, China
TEL: +852 2 2757 6683 FAX: +852 2 2753 5541 JUN 2001

LEI JAPAN CO., LTD.

JAPAN: No. 102, 1-8-9 Hiroo Shibuya-Ku, Tokyo, Japan
TEL: +81 (0) 3 5475 7877 FAX: +81 (0) 3 5475 5878





CONTENTS

[illegible]



立德電子股份有限公司
 LEADER ELECTRONICS INC.

CUSTOMER	APC	MODEL NO.		DATE	JUN.20.2001
PART NO.	430-1222 REV.E	DESIGN NO.	LS-A6899-PT2 REV.0	SIZE	EI-228X16.5

Design Revision History


Rev.	Date	By:	Description of change
0	JUN.20.2001	FYF	submitted to customer 's 430-1222 REV.E1

Notice of Deviation

Customer Request	Submitted Sample	Mass Production

Notice of Items That Shall Be Completed Before Mass Production

Notice of Items That Shall Be Completed Before Mass Production

Item no.	Description	L/T	Remark		
 立德電子股份有限公司 LEADER ELECTRONICS INC.		Designed by:	Reviewed by:	Approved by:	Revision:
		FYF	H. J. Yang	Heuer	0

R333H E154515
Class H (180°C)

SPECIFICATION

CUSTOMER APC
用 戶
PART NO. 430-1222 REV.B
料 號

規 格 書
MODEL NO.
型 號
DESIGN NO. LS-A6899-PT2
編 號

DATE JUN.20.2001
日 期
SIZE EI-228X16.5
規 格

A. ELECTRICAL PERFORMANCE / 電氣特性:

1.Primary rated voltage and frequency: 230 VAC 50 Hz. (PINS:4-3)
初級額定電壓及頻率: 230 VAC 50 Hz.(PINS:4-3)

2.Secondary rated voltage and current / 次級額定電壓及電流:

WINDING 線 圈	CIRCUIT DESCRIPTION 電路說明	SECONDARY VOLTAGE/ 次級輸出電壓	
		LOADING / 負載	NO LOAD / 空載
PINS:4-3	230VAC 50Hz INPUT	/	33.83VAC± 0.1V
PINS:3-2		/	34.75VAC± 0.1V
PINS:2-1		/	15.09VAC± 0.1V
WHT-BLK		/	

3.Primary exciting current (I_0): 1.2 A rms max, at input 230 VAC 47 Hz. PINS:4-3
初級空載電流(I_0): 有效值最大 1.2 A, 輸入 230 VAC 47 Hz. PINS:4-3

4.D.C.Resistance: Pri.1 : 8.0 Ω MAX PINS:4-3

Pri.2 : 800 m Ω MAX PINS:3-2

Pri.3 : 800 m Ω MAX PINS:2-1

Sec.1 : 30 m Ω MAX WHT-BLK

measured at 25°C.

直流電阻: 初級1組: 8.0 Ω 最大, 初級2組: 800 m Ω 最大, 初級3組: 800 m Ω 最大, 次級1組: 30 m Ω 最大, 環境溫度 25°C.

5.Core loss: 25 watts max, at input 230 VAC 47 Hz.(PINS:4-3)
最大鐵耗: 25 watts, 輸入 230 VAC 47 Hz.(PINS:4-3)

6.Temperature rise: 135 °C max at 25 °C ambient, rated load condition.
額定負載下電阻法線圈最大溫升 135 °C, 環境溫度 25 °C.

7.Insulation resistance: 500VDC supplied, 100M ohms minimum between winding & core.
絕緣電阻: 線圈與鐵芯間加 500VDC, 絕緣電阻不小于 100M Ω .

8. HI-pot test:

3000 VAC for 1 minute or 3600 VAC for 1 second between primary and secondary.
primary and core & secondary and core. There shall be no breakdown. (Leakage: 3.0mA)

耐壓強度測試: 初級與次級, 初級與鐵芯, 次級與鐵芯間需耐壓 3000 VAC 1分鐘或 3600 VAC 1秒. 1秒鐘.


無擊穿. (漏電流 3.0mA)

9, leakage inductance test: 9.0~16.0 μ H for Sec, and Pri (1-4) short; 6.0 mH max for Pri (1-4),
and Sec short; at 120Hz 0.1V.

漏感測試: 在 120Hz 0.1V 條件下; 初級短路, 次級漏感為 9.0~16.0 微亨; 次級短路, 初級漏感不大于 6.0 毫亨

10.Induce voltage: All secondary opened, primary should withstand 1 VAC 1 Hz for 1 second without breakdown.

倍頻倍壓測試: 所有次級開路, 初級需承受電壓 1 VAC 1 Hz 1 秒鐘而無擊穿.

3.				TEXT/ 內容:	Sheet / 頁次 1 / 3	
2.						
1.						
No.	REVISION	SING	DATE	Designed By 設計 FYF	Reviewed By 審查 H. J. Liu	Approved By 核准 H. J. Liu
 立德電子股份有限公司 LEADER ELECTRONICS INC.					Revision 版本號 C	

SPECIFICATION

規格書

CUSTOMER APC

PART NO.

料號

430-1222 REV.1

MODEL NO.

型號

DESIGN NO.

編號

LS-A6899-PT2

DATE

日期

SIZE

規格

JUN.20.2001

EI-228X16.5

11. Life test: In an ambient temperature of 25°C, 90-95%R.H., applying a power source of VAC Hz to primary, with full load mA for hours continuously, unit output normally and meet the requirements of item A-7, A-8.

壽命測試: 環境溫度 25°C, 相對濕度 90-95%, 輸入電壓 VAC Hz 時, 帶額定負載 mA 連續工作 8 小時, 產品輸出正常且滿足 A-7, A-8 項特性要求。

12. Humidity test: In an ambient temperature of 30±2 °C and 90-95%R.H. for 48 hours, after 10 minutes out of the oven, the unit should meet item A-8 requirements, and insulation resistance shall be 10 M ohms minimum.

耐濕測試: 在環境溫度 30±2 °C, 相對濕度 90-95% 條件下放置 48 小時, 取出 10 分鐘後, 產品需滿足第 A-8 項要求, 且絕緣電阻不小于 10MΩ。

B. MECHANICAL CHARACTERISTICS / 機械特性:

1. Strength test: All pins or leads should withstand pull force equal to weight of transformer and neither less than 3 lbs nor more 10 lbs for 60 sec, no damage occurred.

拉力測試: 所有的 pin 或引線承受等於變壓器本體重量, 且不小于 3 磅, 不大于 10 磅的力量 60 秒, 沒有不良發生。

2. Appearance: Damage and rusting are not permitted.

外觀: 無損傷無鏽跡。

3. Dimension: as drawing.

尺寸: 依外觀藍圖。

C. SAFETY STANDARD / 安規標準:

◇. Meet / 符合 ◆. Approved / 認可

◆. UL1446 ◇. UL1585 ◇. UL1950 ◇. other:

D. INSULATION SYSTEM / 絕緣系統:

◇. CLASS A(105°C) ◇. CLASS E(120°C) ◇. CLASS B(130°C) ◇. CLASS F(155°C)

◆. CLASS H(180°C)

E. ENVIROMENTAL CONDITION / 外部條件:

1. Operating temperature range: -10°C---+40°C


正常工作溫度: -10°C---+40°C

2. Storage temperature range: -20°C---+80°C

存貯溫度: -20°C---+80°C

3. Operation humidity range: 30---85%R.H

正常工作濕度: 30---85%R.H.

3.				TEXT/ 內容:	Sheet / 頁次 2 / 3
2.					
1.					
No.	REVISION	SING	DATE	Designed By 計 FYF	Reviewed By 審查 H. J. Yang
 立德電子股份有限公司 LEADER ELECTRONICS INC.				Approved By 核準 Hua	Revsn 版本號 0

R333H E154515
 Class H (180°C)

SPECIFICATION

規格書

CUSTOMER APC

PART NO. 430-1222 REV.0
 料號

MODEL NO.

型號
 DESIGN NO. LS-A6899-PT2
 編號

DATE
 日期
 SIZE
 規格

JUN.20.2001

EI-228X16.5

F. INSPECTION ON LINE / 線上檢測:

1.The test items for each product / 全檢項目

- ◆. Primary exciting current / 初級激磁電流 ◆. Core loss / 鐵芯損耗
- ◆. Output voltage / 輸出電壓 ◆. Hi-pot test / 耐壓測試
- ◆. Apperance / 外觀檢查 ◆. Leakage inductance test / 漏感測試

2.The test item for part of products / 抽測項目:

- ◇. Hum operating at rated load / 額定負載時哼聲 ◆. D.C. Resistance / 直流電阻
- ◆. Insulation test / 絕緣測試 ◇. Life test / 壽命測試
- ◇. Lightning surge test / 突波測試

G. LAMINATION METHOD / 插片方式:

a.) LEI samples / 樣品:


- ◆. interleaving · A type / 對插 · A型 ◇. argon welding · B type / 氬焊 · B型

b.) Customer approved / 客戶認可:

- ◆. interleaving · A type / 對插 · A型 ◇. argon welding · B type / 氬焊 · B型

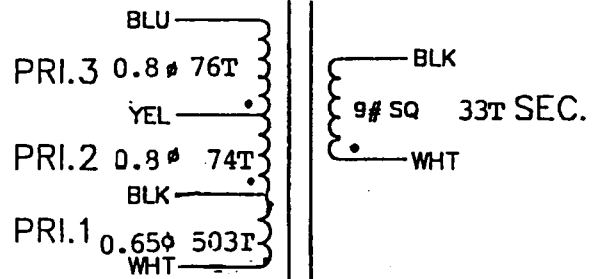
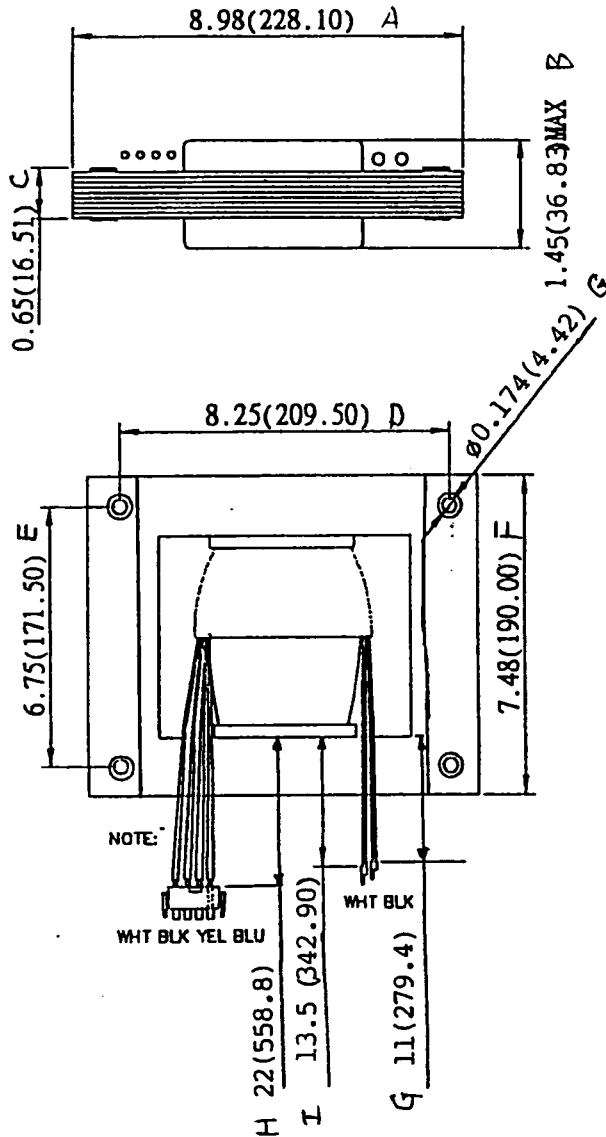
H. NET WEIGHT / 單體淨重: 5.5Kg ± 1%

I. CUSTOMER SPECIAL REQUEST / 客戶特殊要求:

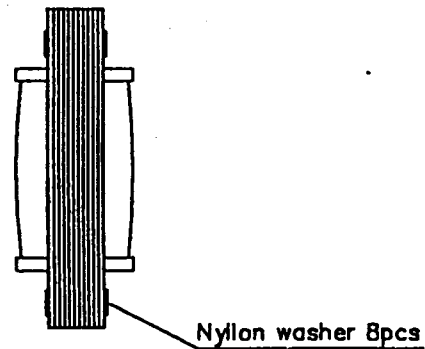
3.				TEXT 內容:	Sheet / 頁次 3 / 3		
2.							
1.							
No.	REVISION	SING	DATE	Designed By 設計 FYF	Reviewed By 審查 H. J. Yang	Approved By 核準 Hua	Revsn 版本號 0
 立德電子股份有限公司 LEADER ELECTRONICS INC.							

INSULATION SYSTEMS
 CLASS H (180°C)

FILE NAME D:\WQB



WINDING ORDER: PRI.2; PRI.3; PRI.1; SEC.

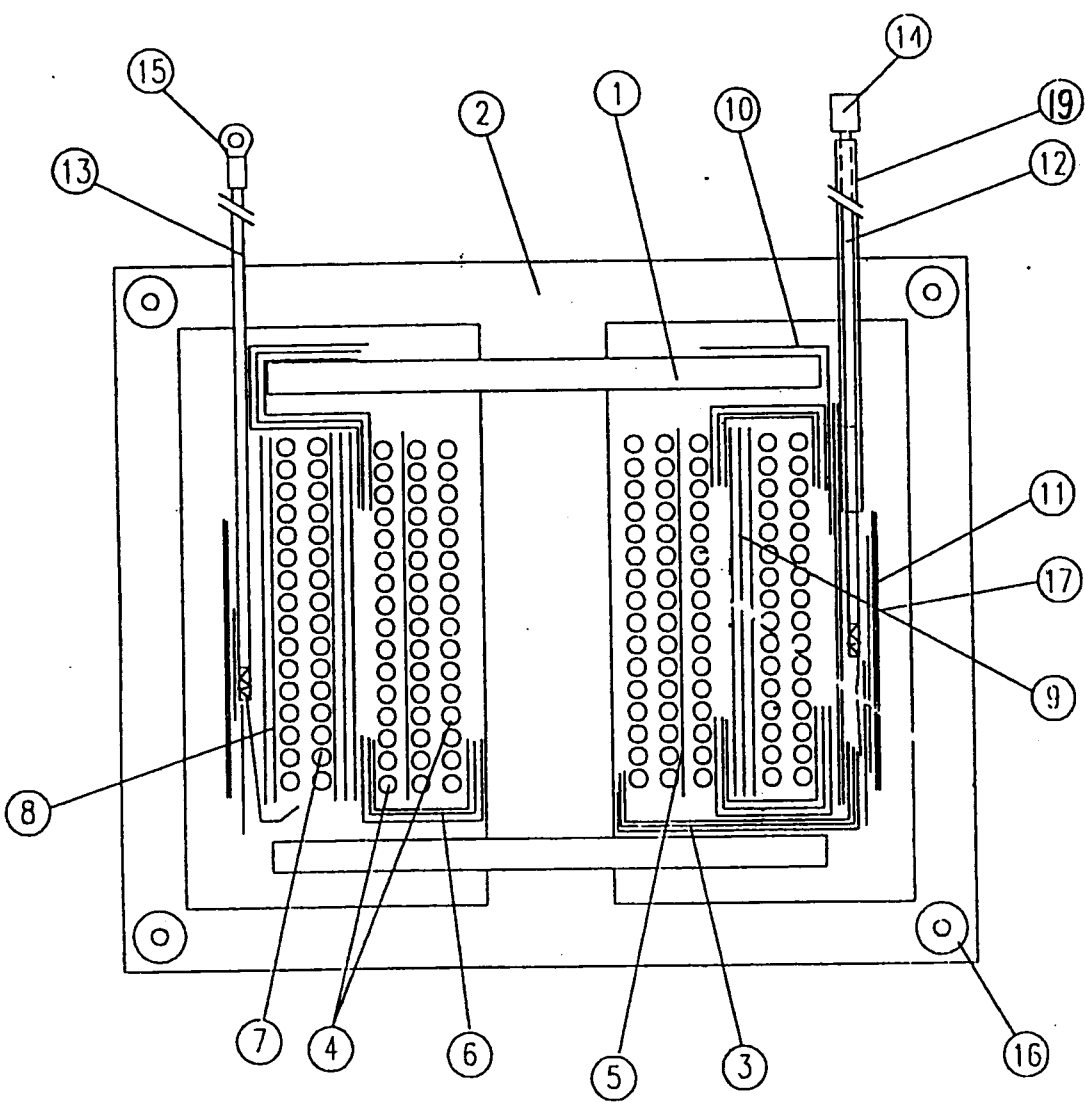


NOTE:
 SLEEVE PRIMARY LEAD
 WIRES WITH CLEAR PVC
 TUBING CLASS A 105°C,
 UL-VW-1.

EXTERNAL LEADS			
PRI.	TYPE	UL 150' 600V, CSA 150' 600V min	
	AWG	16 (LEAD LENGTH TOLERANCE $\pm 0.25"$)	
	TERM	Term AMP 350537-3 inserted in husing AMP 1-480702-0 or Equivalent.	
SEC.	TYPE	UL 150' 600V, CSA 150' 600V min	
	AWG	10 (LEAD LENGTH TOLERANCE $\pm 0.25"$)	
	TERM	INSULATED TERM AMP 36161 OR EQUIVALENT	

UNIT: inch (mm)	SHEET:	DATE: JUN.22.2001	TEXT: P/N 430-1222 REV.E1	DRAWING NO: LS-A6 899-PT2
立德電子股份有限公司 LEADER ELECTRONICS INC.			DRAWN BY: FVF	CHECKED BY: H. J. Yeh
			APPROVED BY: 	TOLERANCE: .XX ± 0.05 .XXX ± 0.02
			REVISION: 	


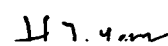

CONSTRUCTION



MATERIAL LIST

R333H E154515
 Class H (180°C)


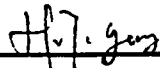

NO.	COMPONENT	MATERIAL	MANUFACTURER	FILE NO.
1.	Bobbin	Rynite FR-530	Dupont De Nemours & Co., Inc.	E69578(M)
2.	Core	Silicon steel strip 35Z155	New Nippon Steel Corp.	
3.	Cross over	Epoxy Film 0.15 mm x 3 layer	3M Electrical Corp.	E17385(N)
4.	Pri. winding (2&3&1)	Magnet wire ANSI-MW35C or MW74C 0.8Ø & 0.8Ø & 0.65Ø	Nitto Denko Corp. Pacific Electric Wire & Cable Co., Ltd. Totoku Electric (Jun Shing wire) Co., Ltd. Tai-I Wire Industrial Co., Ltd. Xin Long Magnet Wire Co.Ltd. Ta Ya Electric Wire & Cable Co. Ltd Hung Hsang Wire Mfg. Co. Ltd. WUXI Ju Feng Compound Line Co.Ltd. Including Other UL Recognized Sourcing.	E34883 E84081(S) E79029(S) (E174837) E85640(S) E171082 E50032 E158025. E206882
5.	Insulation between Pri.3 and Pri.1	Polyester tape 0.09 mm x1 turns	3M Electrical Corp.	E17385(N)
6.	Creepage	Polyester tape 0.05mm 2 Layer	Notto denko corp.	E34833(M)
7.	Sec. Winding	Magnet wire ANSI-MW35C or MW74C - SQUARE 9#	3M Electrical Corp. Nitto Denko Corp. Tian Shun Electrical Equipment Co.Ltd ESSEX Group Inc. M.W. Products Foshan Transformer Wire Rod Factory Xiangtan Dayang Magnetic Wire Co.Ltd. Including Other UL Recognized Sourcing.	E17385(N) E34883 E210986 E32638 E210957 E205311
8.	Sec. Wrapper	Polyester tape 0.09mmx1.5 turns W110mm & Nomex paper No. 410 0.25mmx42X108 2 Sheet (Pri&sec.)	3M Electrical Corp. Nitto Denko Corp.	E17385(N) E34883
9.	Pri. winding to Sec. Winding	Nomex paper No.410 0.13mmx3turns W105 mm	Dupont De Nemours & Co., Inc. Dupont De Nemours & Co., Inc.	E34739(A) E34739(A)
10.	End cover	Polyester tape 0.09mmx1 layer	3M Electrical Corp. Nitto Denko Corp.	E17385(N) E34883
11.	Outer wrapper	Polyester tape 0.09mmx2 turns W50mm Polyester tape 0.09mmx2 turns W80mm & Nomex paper No. 410 0.25mmx42X50 2 Sheet (Pri&sec.) 0.25 mmx42X78 2 Sheet (Pir&Sec.)	3M Electrical Corp. Nitto Denko Corp. Dupont De Nemours & Co., Inc.	E17385(N) E34883 E34739(A)
12.	Pri. lead wire	UL 150°C/600V, CSA 150°C/600V MIN. per UL 180°C insulation system UL3321 AWG#16	Hannstar Elec. Co. Ltd. Wonderful Wire & Cable Co. Ltd. LG Cable & Machinery Ltd	E52534 E77981 E52853
13.	Sec lead wire	UL 150°C/600V, CSA 150°C/600V MIN. per UL 180°C Insulation System UL3321 AWG# 10	Lucky Unite Elec Cable & Wire Co.Ltd. Including Other UL Recognized Sourcing.	E162697
14.	Pri. Terminal & housing	Universal Mate-N-Lock Socket Terminal: AMP P/N 350536-3 or Equivalent inserted in Housing: AMP P/N 1-480702-0 or Equivalent.		

PAGE: 2/2	DATE: JUN.20.2001	PART NO.: 430-1222 REV. E1	REF.: LS-A6899-PT1		
 立德電子股份有限公司 LEADER ELECTRONICS INC.		ISSUED BY: FYF	CHECKED BY: 	APPROVED BY: 	REVISION: 0

MATERIAL LIST

R333H E154515
Class H (180°C)

NO.	COMPONENT	MATERIAL	MANUFACTURER	FILE NO.
15.	Sec. Terminal	Insulated ring terminal APM P/N: 36161 or Equivalent		
16.	Insulation washer	Rynite FR-530 or NY66	Dupont De Nemours & Co., Inc.	E69578(M)
17.	Hold down	Polyester tape 0.05mm 1.5 turn	3M Electrical Corp.	E17385(N)
			Nitto Denko Corp.	E34883
18.	Varnish	V1630/V1630FS	Viking Proudcts.	E73071(M)
		WP2952F-2GY	Hitachi Chemical Co., Ltd.	E72979M)
19.	Pri. insulation sleeve	Clear PVC tubing 105°C 600V VW-1.	Dae Chang Electrical Co.	E152386
			TA YA Electric Co.	E81148
			Longwell Elec. Co.Ltd.	E56118
			LG Cable & Machinery Ltd	E84393
			Develop Elec. Co.Ltd.	E152386
			Chern Fwuh Enterprise Co.Ltd.	E152385
			Chi Yuan PLASTIC Industrisl Co.Ltd.	E154779

PAGE: 2/2	DATE: JUN.20.2001	PART NO.: 430-1222 REV.E1	REF.: LS-A6899-PT1
 立德電子股份有限公司 LEADER ELECTRONICS INC.		ISSUED BY: FYF	CHECKED BY:  APPROVED BY:  REVISION: 0



VDE File:1924400-3335-0030

CB DE1-16215

Appendix 6, Page 15 of 37

LEADER ELECTRONICS INC.

TEST CONDITION:

WATTMETER: 201585

VOLTMETER: 201694

AMPERMETER: 201938

AMBIENT TEMP.: 28°C

TEST REPORT

CUSTOMER	APC	DESIGN NO.	LS-A6899-PT2	DATE	JUN.20.2001
PART NO.	430-1222 E1	SIZE	EI-228X16.5	AMB. TEMP.	27°C

SAMPLE NO.	230VAC 47 Hz Exciting Current 1.2A MAX PIN: 4-3	Core Loss Watts PIN4-3:230VAC 47Hz 25.0W Max	PR12. PIN: 3-2 NO LOAD 33.83VAC± 0.1V	PR13. PIN: 2-1 NO LOAD 34.75VAC± 0.1V	SEC. WHT-BLK No Loaded 15.09VAC ± 0.1V	DC RESISTANCE PIN: 4-3 8.0Ω MAX	DC RESISTANCE PIN: 3-2 800 mΩ MAX	DC RESISTANCE PIN: 2-1 800 mΩ MAX	DC RESISTANCE WHT-BLK 30mΩ MAX	Leakage inductance at 120Hz 0.1V PR11-4: 6.0mH max	Leakage inductance at 120Hz 0.1V Sec: 9.0~16.0uH
1	0.73	16.5	33.88	34.75	15.10	5.98	585	605	22	4.18	10.8
2	0.78	16.8	33.87	34.75	15.09	5.91	591	602	23	4.20	10.5
3	0.76	15.4	33.85	34.74	15.11	5.67	576	610	22	4.17	10.7
4	0.83	17.2	33.89	34.80	15.08	5.73	584	607	21	4.15	10.2
5	0.86	16.5	33.81	34.78	15.09	5.88	592	608	23	4.21	11.0
6											
7											
8											
9											
10											

尺寸	A	B	C	D	E	F	G	H	I	J		
量值	228.10	36.83	16.51	209.50	171.50	190.00	4.42	558.8	342.9	279.4		
规格	± 1.27	max	± 1.27	± 1.27	± 1.27	± 1.27	± 0.5	± 6.35	± 6.35	± 6.35		
判定												
1	OK	228.20	36.14	16.54	209.46	171.20	190.10	4.43	558.8	342.0	280.0	
2	OK	228.10	36.25	16.54	209.45	171.20	190.10	4.42	559.1	342.0	280.5	
3	OK	228.20	36.15	16.52	209.45	171.25	190.10	4.43	559.0	342.0	279.5	
4	OK	228.12	36.16	16.52	209.54	171.24	190.10	4.43	558.9	342.5	281.5	
5	OK	228.15	36.24	16.51	209.45	171.20	190.10	4.43	558.0	342.5	279.0	
6												
7												
8												
9												
10												

Measurement: NO.503009 Unit: mm

APPROVED BY: [Signature]CHECKED BY: [Signature]TESTED BY: FYF

24

VDE Testing and Certification Institute
Merianstra83 28 D-63069 Offenbach a.M. Tel.(+49)(69)8306-0 Fax (+49)(69)8306-555

Appendix No.: to Marks license No.: file ref.:

Constructional data for isolating transformers and safety isolating transformers to EN 60742 DIN VDE 0551 Form 42E

-Translation of the VDE Testing and Certification Documents-

1 Manufacturer: Eastar
2 Place of manufacture: Dongguan Eastar Electronics Co., LTD. Chashan, Dongguan
3 Reference of type: 430-0030
4 Trade Mark: : Eastar
5 Other markings:
6 Reference number: 430-0030

1 Protection against electric shock: Reinforced Insulation
2 Class of protection to
3 Type of construction (isolating transformer, Transformer for toys): Isolating
4 Stationary transformer*):
5 Portable transformers:
6 Protection against short-circuit according to Sub-clause 6.2*)
inherently short-circuit proof
non-inherently short-circuit proof
non short-circuit proof
fail safe:
(rated current of the cutout: A)
2.6 Rated maximum ambient temperature:ta °C
Class: Insulation; Declaration of Insulation see VDE-Form 187 Insulationclass H
(acc to IEC 85)

Electrical values	Input	Output (AC/DC)
Rated voltage(s) V:	see next pages	
Rated frequency Hz:		
Rated current A:		
Rated output VA:		
Rated power factor cos phi:		

5 Windings
6 Coil base, number: material:
7 Material of layer insulation: see Appendix
8 Windings, number: material:
9 Taps, number:
10 Diameter of wire (mm):
11 Windings insulation, material:
12 Cord insulation material
internal:
external:

13 Cold resistance in Ω at °C=
14 Circuit diagram (with terminal markings, color of wires etc.):

Please insert what is applicable please turn over!

0 Iron core
1 Sheet metal, material:
2 main dimensions:
3 Cross-sectional drawing:

VDE File:1924400-3335-0030
CB DE1-16215
Appendix 6, Page 17 of 37

0 Type of construction
1 Open - covered - in case protection*)
2 Impregnated - undrowned - drowned*)
3 Soaking (liquor):
4 Underpressure - Overpressure - Soaking at °C*)
5 Drown material:
6 Material of the cover:
of the case:
of the socket (support):

1 Other data (special constructional feature, etc.):

1 Components built - in the transformer: (switches, plugs, protectors cables etc.)

*)Delete if not applicable

Error! Bookmark not defined. Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No - Yes
		See next page	

Henbach,

13.2.01 -

Place:

Date:2/13/01

VDE Testing and Certification Institute
Department TS VDE-Prüfstelle

i. A. J. J. J. J.

16.07.02

i. H. 2 1 2 2

Richard J. Evers

(Stamp and signature of the manufacturer)



EASTAR (H.K.) LTD.

BLOCK H, FLOOR 9, SELWYN FTY., BLDG., 404 KWUN TONG ROAD,
HONG KONG. TEL: (352)342-7633 FAX: (352)343-3073, 763-7223

430-0030 CONSTRUCTION SHEET

1. PRIMARY WINDING	ENAMELED COPPER WIRE AWG#44, 10350T	TOTOKU ELECTRONICS (JUNG SHING) UL#E79029(S) OR EQUIVALENT
2. PRIMARY WINDING INSULATION	0.05MM POLYESTER TAPE	P. LEO UL#E126174 OR EQUIVALENT
3. SEPARATED TYPE BOBBIN	MIN. 1 MM SEPARATION DUPONT 70G33HS1L UL#E41938(M)	LIK WAI PLASTIC WARE OR EQUIVALENT
4. CROSSOVER TAPE	0.2MM TAPE 1 PLY 0.05MM POLYESTER TAPE 1 PLY	P. LEO 1PN828 UL#E126174 P. LEO 1P130 UL#E126174 OR EQUIVALENT
5. PRIMARY LEAD OUT	0.3MM COPPER WIRE WITH TIN PLATE	KING'S ELECTRIC CO. OR EQUIVALENT
6. FIXED TAPE (PRIMARY)	0.05MM POLYESTER TAPE 3 LAYER	P. LEO UL#E126174 OR EQUIVALENT
7. OUTER WRAP PRIMARY	0.05MM POLYESTER TAPE 3 LAYER	P. LEO UL#E126174 OR EQUIVALENT
8. FIXED BOARD	0.1MM MYLAR 2 PLY	ASIA ENTERPRISE CO. OR EQUIVALENT
9. PRIMARY LEAD OUT COMBINATION	2 LAYERS POLYESTER TAPE	P. LEO UL#E126174 OR EQUIVALENT
10. LAMINATION SHEET	STEEL 35MMX30MMX14MM	HONG KONG YAU HING, CHUN YUAN STEEL IND., OR EQUIVALENT
11. BOBBIN COVER	0.5MM DUPONT ZYTEL 101F UL#E419380(M)	LIK WAI PLASTIC WARE OR EQUIVALENT
12. SECONDARY WINDING #1	ENAMELED COPPER WIRE AWG#35 455T	TOTOKU ELECTRONICS (JUNG SHING) UL#E79029(S) OR EQUIVALENT
13. SECONDARY WINDING #2	ENAMELED COPPER WIRE AWG#35 455T	TOTOKU ELECTRONICS (JUNG SHING) UL#E79029(S) OR EQUIVALENT

VDE File:1924400-3335-0030

CB DE1-16215

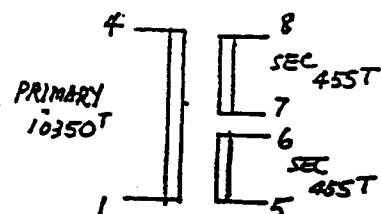
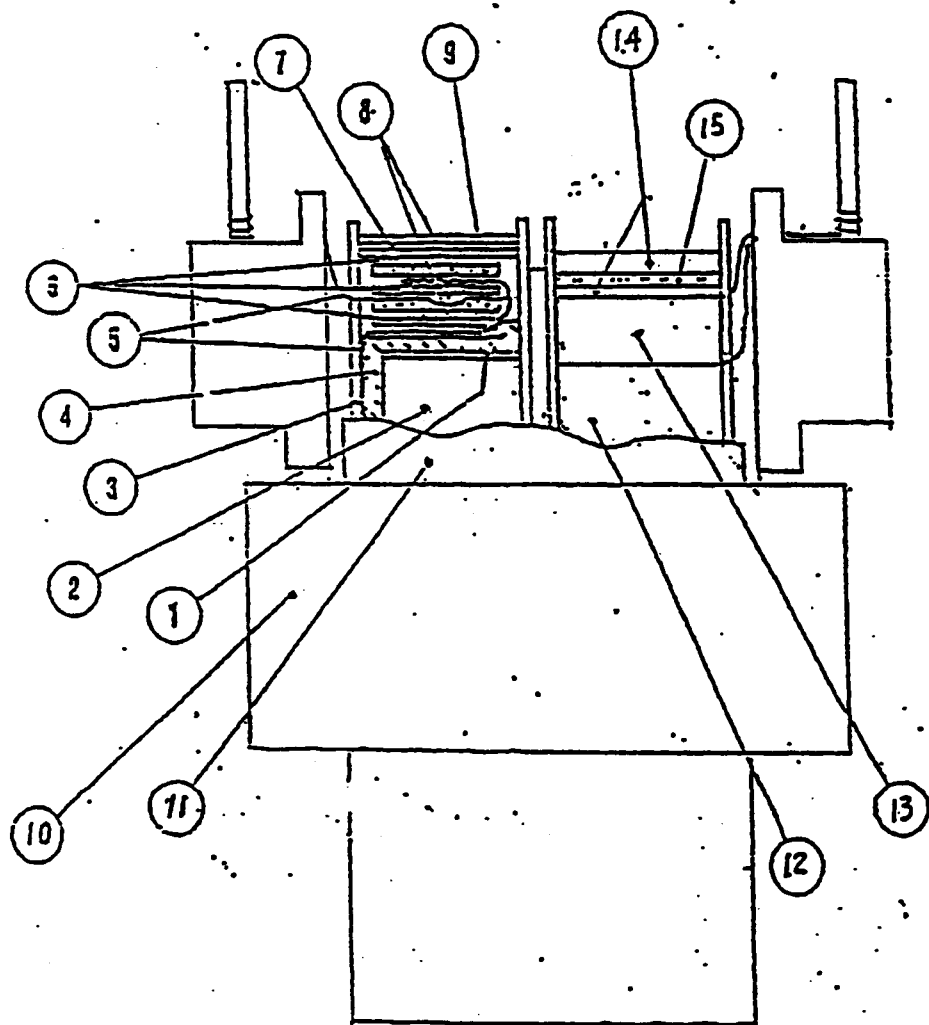
Appendix 6, Page 18 of 37

CONSTRUCTION OF 430-0030

VDE File:1924400-3335-0030

CB DE1-16215

Appendix 6, Page 19 of 37



VDE Testing and Certification Institute

Merianstraße 3 28 D-63069 Offenbach a.M. Tel. (+49)(69)8306-0 Fax (+49)(69)8306-555

Appendix No.:

to Marks license No.:

file ref.:

(filled in by the Institution)

Constructional data for isolating transformers and safety isolating transformers to EN 60742 DIN VDE 0551

Form 42E

-Translation of the VDE Testing and Certification Documents-

- 1.1 Manufacturer: Leader
1.2 Place of manufacture: No. 1, Industrial Area, Tang XIA Town, Dong Guan City, Guang Dong Province China
1.3 Reference of type: 430-0030
1.4 Trade Mark: : Leader
1.5 Other markings:
1.6 Reference number: 430-0030

- 2.1 Protection against electric shock: Reinforced Insulation
2.2 Class of protection to
2.3 Type of construction (isolating transformer, Transformer for toys): Isolating
2.4 Stationary transformer*):
Portable transformers:
2.5 Protection against short-circuit according to Sub-clause 6.2*)
inherently short-circuit proof:
non-inherently short-circuit proof:
non short-circuit proof:
fail safe:

(rated current of the cutout: A)

- 2.6 Rated maximum ambient temperature: t_a °C

- 2.7 Class: Insulation; Declaration of Insulation see VDE-Form 187 Insulationclass H
(acc to IEC 85)

3.0 Electrical values

- 3.1 Rated voltage(s) V: see next pages Input
3.2 Rated frequency Hz:
3.3 Rated current A:
3.4 Rated output VA:
3.5 Rated power factor cos phi:

Output (AC/DC)

4.0 Windings

- 4.1 Coil base, number:
material:

see Appendix

4.2 Material of layer insulation:

- 4.3 Windings, number:
material:
4.4 Taps, number:

4.5 Diameter of wire (mm):

- 4.6 Windings insulation, material:
4.7 Cord insulation material

internal:
external:

- 4.8 Cold resistance in Ω at: °C=

- 4.9 Circuit diagram (with terminal markings, color of wires etc.):

*) Please insert what is applicable

please turn over!

VDE File:1924400-3335-0030
CB DE1-16215
Appendix 6, Page 20 of 37

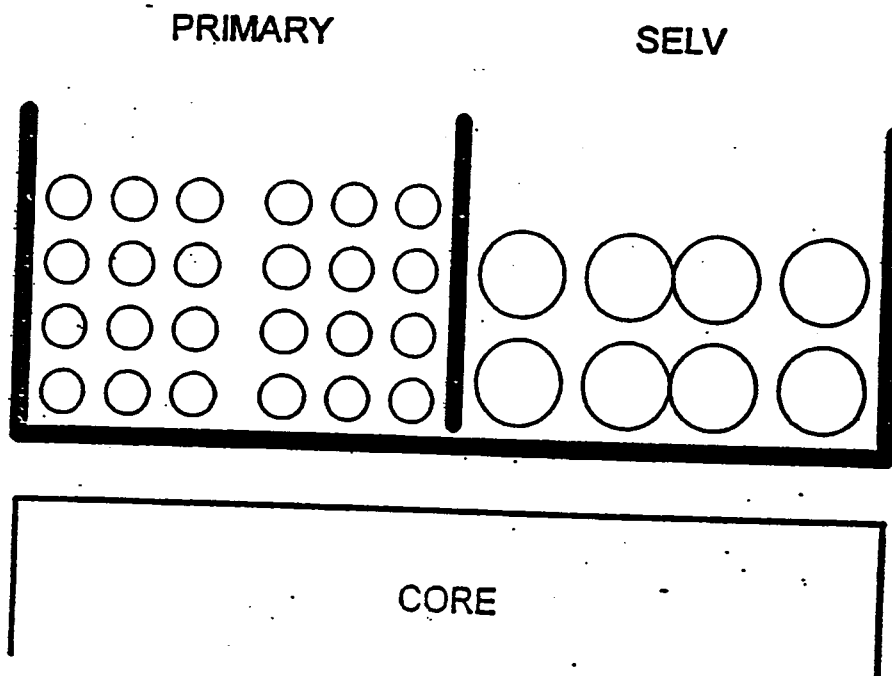
DE-Form 42E.1092

please return 2 copies

SAVE\07941103 DH

VDE File:1924400-3335-0030
CB DE1-16215
Appendix 6, Page 22 of 37

Split Bobbin Transformer
Center Flange = 3.5 mm
Groove in Edge of Center Flange = 1.5 mm wide by 3 mm deep

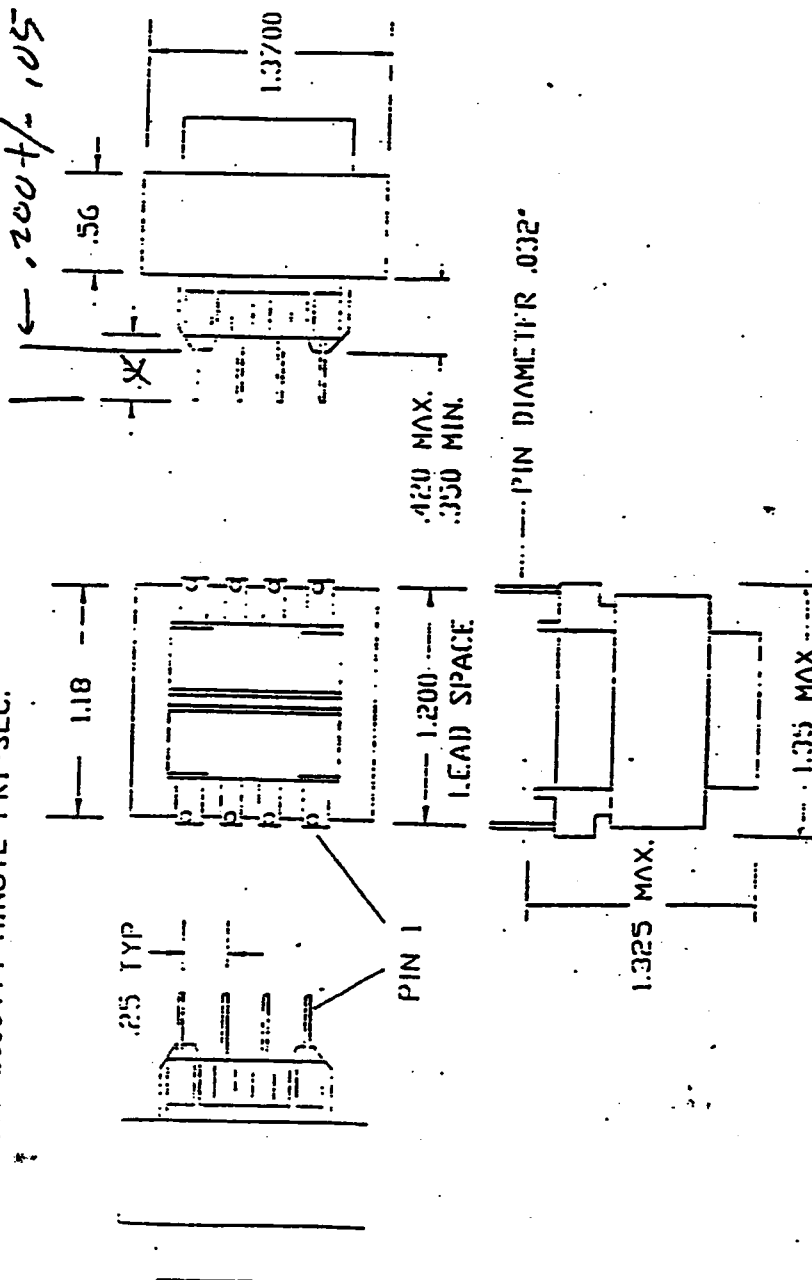


1. CIRC. DIA. 35mm (1.375), MATL. 35mm ZN(C9GALMG), STACK 14mm (9/16")
2. PRI. 10350 TURNS 144 AWG
RESISTANCE 6.6K
- SEC. 1-455 TURNS 1135 AWG
RESISTANCE 37 ohm
- SEC. 2-455 TURNS 1135 AWG
RESISTANCE 42 ohm
3. 150 DEG. C. ON APPROVED SYSTEM
4. MAGNETIZING CURRENT 0.5mA MAX AT 230V/60Hz.
5. MARK PIN 1 WITH A DOT VISIBLE FROM THE TOP.
6. MINIMUM PIN PULL DOT FORCE 10 LBS.
7. SPECIAL SURROUNDED VIDE ROBBIN, NO MISSING MOUNTING PINS.
PRI-SEC MINIMUMS. CREEPAGE 5mm, CLEARANCE 4mm, THROUGH INS.
8. INDIRECT TERMINATION WITH LARGER WIRE FROM WINDING TO PIN. A
9. HI-POT TEST 3000V/1 MINUTE PRI-SEC.

PINKUS, BORIS VILW. 1911. THE ARTS OF THE

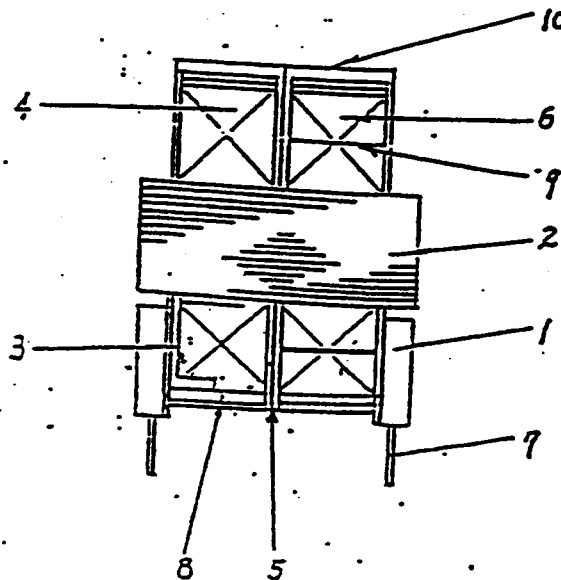
SPECIAL SURVEYED VIDE ROBBIN, NO MISSING MOUNTING PINS.

8. INDIRECT TERMINATION WITH LARGER WIRE FROM WINDING TO PIN. WITH STRAIN RELIEF LOOP.

[illegible]

7. **TERMINAL** COPPER TENSER 0.8mm MIN, LEADER ELECTRONICS, INC.
 THICKNESS
8. **CUTTER TRAPPED** POLYESTER TAPE 0.025mm
 THICK 2 TURNS.
 a. NO 316 CL
 b. NO N765
 c. NO 64
 a. NITTO DEXCO CORP E34883 (X)
 b. CHR INDUSTRIES INC E51201.
 c. TESA TECK INC E20780 (X).
9. **BETWEEN SEC1 TO SEC2** POLYESTER TAPE 0.025mm
 2 TURNS
 a. NO 316 CL
 b. NO N765
 c. NO 64
 a. NITTO DEXCO CORP E34883 (X)
 b. CHR INDUSTRIES INC E51201.
 c. TESA TECK INC E20780 (X)
10. **INSULATION COVER** RYHYTE FR-530 (PET) DUPONT DE NEMOURS CO., LTD. E69578
 RYHYTE FR-50 \ POLYAMIDE
 ZITEL 1011 / TYPE 66
 STOS
- FURNISH** TYPE BC346A OR TYPE AC43 JOHN C DOLPH CO., E76517.

Construction



立德電子股份有限公司
 LEADER ELECTRONICS INC.
 MANUFACTURER & EXPORTER



REV.

430-0030

DRAWING NO.

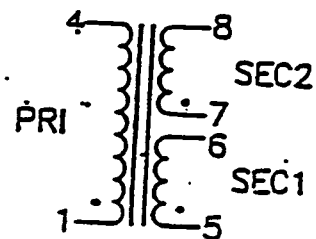
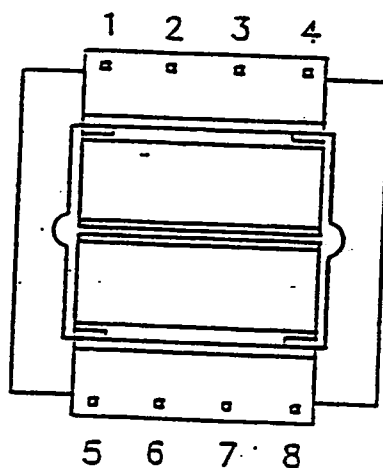
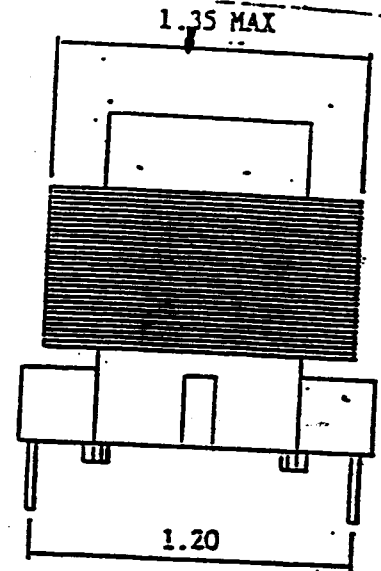
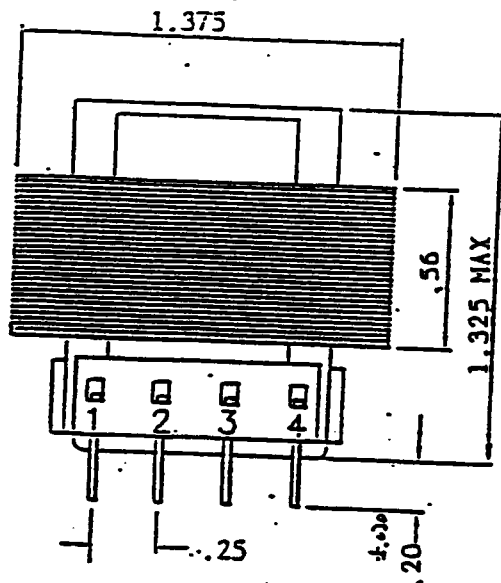
LS-A472-PT

REVISION

DATE

DRAWN BY

CHECKED BY



UNIT: inch	SHEET:	DATE 30/OCT/93	TEXT: 430-0030	DRAWING NO: LS-A472-PT
立德電子股份有限公司 LEADER ELECTRONICS INC. MANUFACTURER & EXPORTER			DRAWN BY: 2.4.4	CHECKED BY: [Signature]
			APPROVED BY: [Signature]	TOLERANCE: .X ±0.02 .XX ±0.01
			REVISION	



VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

Merianstraße 28 · D-63069 Offenbach · Tel: (+49) (69) 83 06-0 · Fax: (+49) (69) 83 06-555

Appendix No.:

Marken-Schema No.:

File ref.:

VDE

Constructional data for isolating transformers and safety isolating transformers to
EN 60742 DIN VDE 0551

Form 42E

- Translation of the VDE Testing and Certification Documents -

- 1.1 Manufacturer: SHANGHAI SK TRANSFORMER Co; LTD
1.2 Place of manufacture: No. 337 Shang Nan Road New Pudong Area Shanghai
1.3 Reference of type:
1.4 Trade Mark: SHANGHAI SK
1.5 Other markings:
1.6 Reference number: 430-0030 B Rev. 6

- 2.1 Protection against electric shock: Class B
2.2 Class of protection to IEC 539: IP
2.3 Type of construction (isolating transformer for toys): Isolating Transformer
2.4 Transformer, stationary - portable: Transformer Portable

- 2.5 Protection against short-circuit according to sub clause 6.2.7:
inherently short-circuit proof:
non-inherently short-circuit proof:
non short-circuit proof:
fail safe:

- (rated current of the circuit) A)
2.6 Rated maximum ambient temperature: $t_a =$ °C
2.7 Class: Insulation; Declaration of Insulation see VDE-Form 167
(according to IEC 85)
2.8 CTI - Value (according to IEC 112, Method A):

3 Electrical values

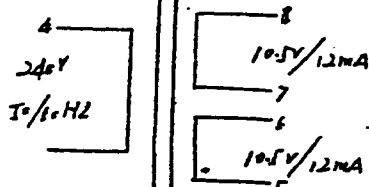
- 3.1 Rated voltage(s): V: -A Input Output (AC/DC)
3.2 Rated frequency: Hz: 200 5-6; 7-8 16.5V AC
3.3 Rated current: A: 10/10
3.4 Rated output: VA: 3VA
3.5 Rated power factor cos ϕ :

4 Windings

- 4.1 Coil base, number:
material: PET 94V-2
4.2 Material of layer insulation: Mylar number:
4.3 Windings, material: Polyurethane Enamelled Copper Wire
4.4 Taps, number:
4.5 Diameter of wire (mm): 0.05 Sec: 10-14
4.6 Windings insulation, materials: Nomex and Mylar
4.7 Cord insulation material, internal:
external:

- 4.8 Cold resistance in Ω

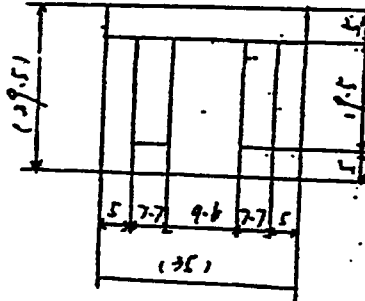
- 4.9 Circuit diagram (with terminal markings, color of wires etc.)



VDE File: 1924400-3335-0030
CB DE1-16215
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please turn over

- 5 Iron core
 5.1 Sheet metal, material: *Silicon Steel 2ⁿ - aust*
 main dimensions:
 5.2 Cross-sectional drawing:



- 6 Type of construction
 6.1 Open - covered - in case protection *)
 6.2 Impregnated - undrowned - drowned *)
 6.3 Soaking (liquor):
 6.4 Underpressure - Overpressure - Soaking at °C
 6.5 Drown material:
 6.6 Material of the cover:
 of the case:
 of the socket (support):
 6.7 Flammability class for insulation material:
 7.1 Other data (special constructional feature, etc.):

8.1 Components built - in the transformer: (switches, plugs, thermal cut off, cables etc.)

Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No - Yes

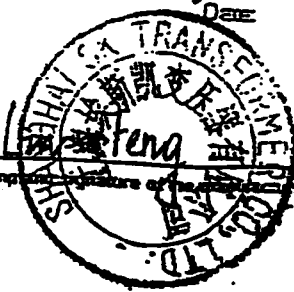
*) Omission if not applicable (continue on separate sheet, if necessary)

Offenbach, 18.7.00

VDE Testing and Certification Institut
 Department

Place:

Date



(Stamp and signature of the responsible person)

VDE File:1924400-3335-0030

CB DE1-16215

Appendix 6, Page 28 of 37

VDE Prüf- und Zertifizierungsinstitut
VDE-Prüfstelle
Merianstraße 28

D-63069 Offenbach

Altenszeichen / file ref.

ISOLATIONSERKLÄRUNG

DECLARATION OF INSULATION

Betriebsmittel (Bauteil): 410-0030B Rev 6
Equipment (Component)

Typenbezeichnung:
Type designation

Hersteller: SHANGHAI SK TRANSFORMER Co., LTD
Manufacturer

Hiermit wird bestätigt, daß die im o. g. elektrischen Betriebsmittel (Bauteil) verwendeten und wie auf der Rückseite beschriebenen Isolierstoffe der jeweils dazu angegebenen IEC-Norm und dem daraus entnommenen IEC-Typ entsprechen.

Das o. g. elektrische Betriebsmittel (Bauteil) entspricht der Thermischen Klasse _____ gemäß IEC-Publikation 85.

It is herewith confirmed that the overleaf specified insulation materials used in the a. m. electrical equipment (component) comply with the indicated IEC-Publication and to the therefore quoted IEC-Type.

The a. m. electrical equipment (component) comply with the Thermal class _____ according to IEC Publication 85.

No. 3327 Shang Nan Road New Pudong Area Shanghai
Ort und Datum / Place and date

Appendix No.: Marks licence No.: file ref.:

VDE File:1924400-3335-0030

CB DE1-16215

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(filled in by the Institute)

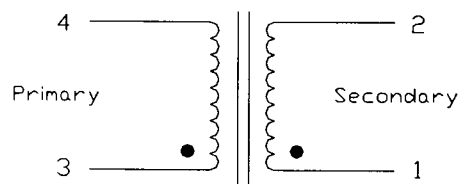
**Constructional data for isolating transformers and safety isolating
transformers to EN 60742 DIN VDE 0551**

Form 42E

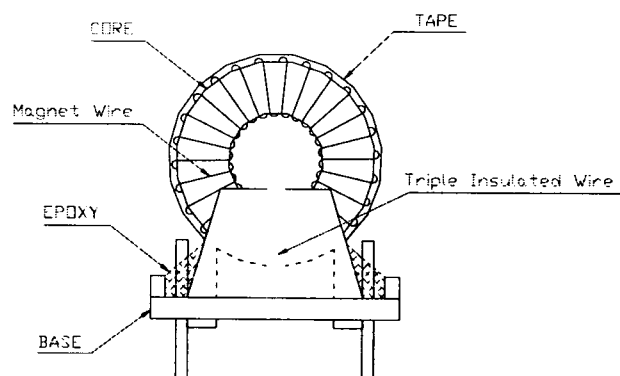
- Translation of the VDE Testing and Certification Documents -

- 1.1 Manufacturer: **EASTAR (H.K) LTD**
1.2 Place of manufacture: **UNIT G,19 FLOOR, WORLD TECH CENTRE, 95 HOW MING STREET, KWUN TONG, HONG KONG**
1.3 Reference of type: **N/A**
1.4 Trade Mark: **EASTAR**
1.5 Other markings: **460-0006 , Date Code**
1.6 Reference number: **N/A**
- 2.1 Protection against electric shock: **N/A**
2.2 Class of protection to IEC 539: IP..... **Class III , SELV**
2.3 Type of construction (Isolating transformer for toys.....): **CURRENT XMFR**
2.4 Transformer, stationary - portable *): **PORTABLE**
2.5 Protection against short-circuit according to sub clause 6.2 *): **N/A**
inherently short-circuit proof:
non-inherently short-circuit proof:
non short-circuit proof : **YES**
fail safe:
(rated current of the cutout: A)
2.6 Rated maximum ambient temperature: $t_a = 45 \text{ }^{\circ}\text{C}$
2.7 Class: **A 105 °C** Insulation; Declaration of Insulation see VDE-Form 187
(according to IEC 85)
2.8 CTI - Value (according to IEC 112, Method A): **N/A**

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	N/A	N/A
3.2 Rated frequency	Hz:	N/A	N/A
3.3 Rated current	A:	5.0A Max.	N/A
3.4 Rated output	VA:	N/A	N/A
3.5 Rated power factor cos phi:		N/A	
4 Windings			
4.1 Coil base	Number:	Base P/N #430-0033-00 Rynite FR530 Polyester film tape 1 Triple Insulated Wire N/A 1.0mm Dia. Rynite FR530 N/A N/A 0.001 Max.	
	Material:		
4.2 Material of layer insulation	Material:		Polyester film tape
4.3 Windings	Number:		1
	Material:		Magnet Wire
4.4 Taps	Number:		N/A
4.5 Diameter of wire	mm:		0.16mm Dia.
4.6 Winding of insulation	Material:		Rynite FR530
4.7 Cord insulation material			
	innere:	N/A	N/A
	Äußere:	N/A	N/A
4.8 Cold resistance in Ω at:	$^{\circ}\text{C} = 20 \text{ }^{\circ}\text{C}$		4.5 Max.
4.9 Circuit diagram (which terminal markings, color of wires etc.):			

**5 Ferrite core**5.1 Sheet metall, material: **FERRITE 5000MU**main dimensions: **0.50"(OD) x 0.312"(ID) x 0.25" (Ht)**

5.2 Cross-sectional drawing:

**6 Type of construction**6.1 Open - covered - in case protection *) **Open**6.2 Impregnated - undrowned - drowned *) **Impregnated**6.3 Soaking (liquor): **Schenectady # 642 Varnish**6.4 Underpressure - Overpressure - Soaking at **25 °C ***6.5 Drown material: **N/A**6.6 Material of the cover: **N/A**of the case: **N/A**of the socket (support): **N/A**6.7 Flammability class for insulation material: **UL 94V-0**7.1 Other data (special constructional feature, etc.): **N/A**

8.1 Components built - in the transformer: (switches, plugs, thermal cut off, cables.....etc.):

Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No - Yes
Base	Lik Wai	P/N # 430-0033-00	NO
Insulation tape	P.LEO	1P801 or 1P802	NO
Magnet wire	ESSEX	#34AWG ; ANSI MW28 or MW75 ; Heavy	NO
Triple insulated wire	FURUKAWA	TEX - E ; #18AWG ; 1.0mm Dia.	Yes
Varnish	Schenectady	#642	NO
EPOXY	CIBA	Hardener HW2939 and Araldite AW2104	NO

Offenbach,

VDE Testing and Certification Institute
Department

Place:

Date:

(Stamp and signature of the manufacturer)

Please return this file

Appendix No.:

Marks licence No.:

file ref.:

(filled in by the Institute)

Constructional data for isolating transformers and safety isolating transformers to EN 60742 DIN VDE 0551

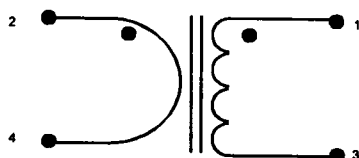
Form 42E

- Translation of the VDE Testing and Certification Documents -

- 1.1 Manufacturer: **FALCO ELECTRONICS**
 1.2 Place of manufacture: **P.R. CHINA**
 1.3 Reference of type: **CURRENT TRANSFORMER**
 1.4 Trade Mark: **N/A**
 1.5 Other markings: **APBILL 460-0006 REV. 4**
 1.6 Reference number: **T50A82**
- 2.1 Protection against electric shock: **N/A**
 2.2 Class of protection to IEC 539: IP..... **N/A**
 2.3 Type of construction (Isolating transformer for toys.....): **CURRENT TRANSFORMER**
 2.4 Transformer, stationary - portable *): **STATIONARY**
 2.5 Protection against short-circuit according to sub clause 6.2 *): **N/A**
 inherently short-circuit proof: **N/A**
 non-inherently short-circuit proof: **N/A**
 non short-circuit proof: **N/A**
 fail safe: **N/A**
 (rated current of the cutout: **N/A** A)
 2.6 Rated maximum ambient temperature: $t_a = 85$ °C
 2.7 Class: **N/A** Insulation; Declaration of Insulation see VDE-Form 187
 (according to IEC 85)
 2.8 CTI - Value (according to IEC 112, Method A): **N/A**

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	N/A	0.5
3.2 Rated frequency	Hz:	N/A	N/A
3.3 Rated current	A:	5	N/A
3.4 Rated output	VA:	N/A	N/A
3.5 Rated power factor cos phi:		N/A	N/A
4 Windings			
4.1 Coil base	number:	CORE PAINTED	CORE PAINTED
	material:	POLYURETHANE ENAMEL F63A31 CATALYST	POLYURETHANE ENAMEL F63A31 CATALYST
4.2 Material of layer insulation	material:	N/A	N/A
4.3 Windings	number:	1	1
	material:	SOLID TINNED COPPER PET INSULATION	COPPER MAGNET WIRE HEAVY INSUL
4.4 Taps	number:	N/A	N/A
4.5 Diameter of wire	mm:	1.0	0.16
4.6 Winding of insulation	material:	1. TOTOKU TRIPLE INSULATED TIW-2 2. FURUKAWA TRIPLE INSULATED TEX-E 3. 3 LAYERS OF MYLAR TAPE 0.001" THICK.	POLYURETHANE POLYAMIDE
4.7 Cord insulation material	innere:	N/A	N/A
	äußere:	N/A	N/A
4.8 Cold resistance in Ω at:	°C =25	N/A	4.5 MAX

4.9 Circuit diagram (which terminal markings, color of wires etc.):



5 Iron core

- 5.1 Sheet metall, material: Mn-Zn
main dimensions(mm): OD 12.7, ID 7.92, HT 6.35.
5.2 Cross-sectional drawing: N/A

6 Type of construction

- 6.1 Open - covered - in case protection *): OPEN
6.2 Impregnated - undrowned - drowned *): N/A
6.3 Soaking (liquor): N/A
6.4 Underpressure - Overpressure - Soaking at: N/A °C *)
6.5 Drown material: N/A
6.6 Material of the cover: N/A
of the case: RYNITE FR530L
of the socket (support): N/A
6.7 Flammability class for insulation material: UL 94V-0
7.1 Other data (special constructional feature, etc.): N/A

8.1 Components built - in the transformer: (switches, plugs, thermal cut off, cables.....etc.): N/A

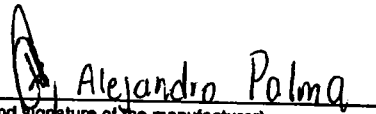
Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No - Yes

Offenbach,

VDE Testing and Certification Institute
Department

Place: MERIDA, YUCATAN, MEXICO

Date: 8/AUG/2002


(Stamp and signature of the manufacturer)

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*) Delete if not applicable
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VDE File: 1924400-3335-0030
CB DE1-16215
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Appendix No.:

Marks licence No.:

file ref.:

(filled in by the Institute)

Constructional data for isolating transformers and safety isolating transformers to EN 60742 DIN VDE 0551

Form 42E

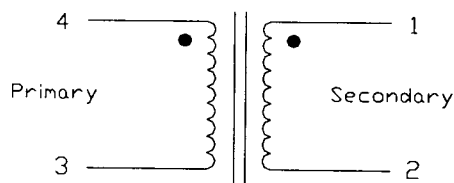
- Translation of the VDE Testing and Certification Documents -

- 1.1 Manufacturer: **EASTAR (H.K) LTD**
1.2 Place of manufacture: **UNIT G,19 FLOOR, WORLD TECH CENTRE, 95 HOW MING STREET, KWUN TONG, HONG KONG**
1.3 Reference of type: **N/A**
1.4 Trade Mark: **EASTAR**
1.5 Other markings: **460-1501-A, Date Code**
1.6 Reference number: **N/A**
- 2.1 Protection against electric shock: **N/A**
2.2 Class of protection to IEC 539: IP..... **Class III, SELV**
2.3 Type of construction (Isolating transformer for toys.....): **CURRENT XMFR**
2.4 Transformer, stationary - portable *): **PORTABLE**
2.5 Protection against short-circuit according to sub clause 6.2 *): **N/A**
inherently short-circuit proof:
non-inherently short-circuit proof:
non short-circuit proof : **YES**
fail safe:
(rated current of the cutout: **A**)
2.6 Rated maximum ambient temperature: $t_a = 60$ °C
2.7 Class: **B 130 °C** Insulation; Declaration of Insulation see VDE-Form 187
(according to IEC 85)
2.8 CTI - Value (according to IEC 112, Method A): **N/A**

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	N/A	N/A
3.2 Rated frequency	Hz:	N/A	N/A
3.3 Rated current	A:	6.0A Max.	N/A
3.4 Rated output	VA:	N/A	N/A
3.5 Rated power factor cos phi:		N/A	
4 Windings			
4.1 Coil base	number:	Bobbin P/N #100-0063-00 Rynite FR530 Polyester film tape 1 Triple Insulated Wire N/A 1.63mm Dia. Rynite FR530	Polyester film tape 1 Magnet Wire N/A 0.08mm Dia. Rynite FR530
	material:		
4.2 Material of layer insulation	material:		
4.3 Windings	number:		
	material:		
4.4 Taps	number:		
4.5 Diameter of wire	mm:		
4.6 Winding of insulation	material:	N/A N/A N/A	N/A N/A N/A
4.7 Cord insulation material	innere:		
	äußere:		
4.8 Cold resistance in Ω at:	°C =20 °C	0.00035 Max.	175 ± 20%

4.9 Circuit diagram (which terminal markings, color of wires etc.):

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CB DE1-16215
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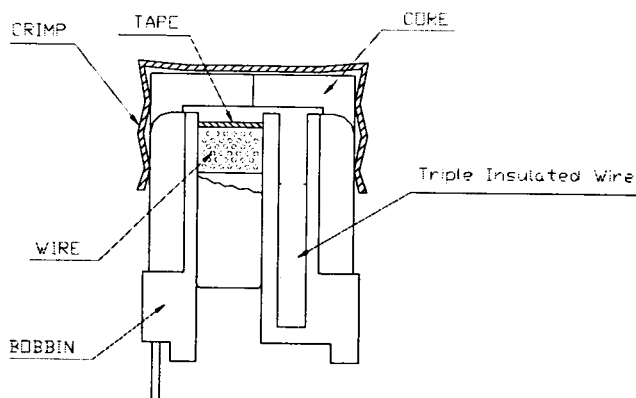


5 Ferrite core

5.1 Sheet metal, material: **FERRITE 10000MU**

main dimensions: **0.630" (Length) x 0.425" (Width) x 0.200" (Height)**

5.2 Cross-sectional drawing:



6 Type of construction

6.1 Open - covered - in case protection *) **Open**

6.2 Impregnated - undrowned - drowned *) **Impregnated**

6.3 Soaking (liquor): **Schenectady # 642 Varnish**

6.4 Underpressure - Overpressure - Soaking at **25 °C ***

6.5 Drown material: **N/A**

6.6 Material of the cover: **N/A**

of the case: **N/A**

of the socket (support): **N/A**

6.7 Flammability class for insulation material: **UL 94V-0**

7.1 Other data (special constructional feature, etc.): **N/A**

8.1 Components built - in the transformer: (switches, plugs, thermal cut off, cables.....etc.):

Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No - Yes
Bobbin	Lik Wai	UU10.5 x 5 P/N # 100-0063-00	NO
Insulation tape	P.LEO	1P801 or 1P802	NO
Magnet wire	YUNG SHING	2UEW ; 0.08mm Dia.	NO
Triple insulated wire	RUBADUE	T14A01Fxxx-3	Yes
Varnish	Schenectady	#642	NO

Offenbach,

VDE Testing and Certification Institute
 Department

Place:

Date:

(Stamp and signature of the manufacturer)

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

Merianstrasse 28 · D-63069 Offenbach · Tel. (+49) (69) 83 06-0 · Fax (+49) (69) 83 06-555

VDE

Appendix No.:

VDE File: 1924400-3335-0030

CB DE1-16215

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(filled in by the Institute)

Constructional data for isolating transformers and safety isolating transformers to EN 60742 DIN VDE 0551

Form 42E

- Translation of the VDE Testing and Certification Documents -

1.1 Manufacturer: **FALCO ELECTRONICS**

1.2 Place of manufacture: **P.R. CHINA**

1.3 Reference of type: **TRANSFORMER**

1.4 Trade Mark: **N/A**

1.5 Other markings: **ACN CSU10-091500-11-520**

1.6 Reference number: **U10004 (460-1501-A)**

2.1 Protection against electric shock: **N/A**

2.2 Class of protection to IEC 539: **IP.....N/A**

2.3 Type of construction (Isolating transformer for toys.....): **N/A**

2.4 Transformer, stationary - portable *): **N/A**

2.5 Protection against short-circuit according to sub clause 6.2 *): **N/A**

inherently short-circuit proof: **N/A**

non-inherently short-circuit proof: **N/A**

non short-circuit proof: **N/A**

fail safe: **N/A**

(rated current of the cutout: **A**)

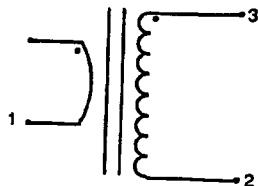
2.6 Rated maximum ambient temperature: **ta = +85 °C**

2.7 Class: **B** Insulation; Declaration of Insulation see VDE-Form 187 (according to IEC 85)

2.8 CTI - Value (according to IEC 112, Method A): **N/A**

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	N/A	0.8 Vrms
3.2 Rated frequency	Hz:	60	60
3.3 Rated current	A:	6.0	0.004 Arms
3.4 Rated output	VA:	N/A	N/A
3.5 Rated power factor cos phi:		N/A	N/A
4 Windings			
4.1 Coil base	number:	UU10.5 2 SECTION PHENOLIC 94V-0 MET. 1) 4xMYLAR TAPE 0.001" MET. 2) RUBADUE P/N: T14A01FXXX-3	UU10.5 2 SECTION PHENOLIC 94V-0 2xMYLAR TAPE 0.001"
4.2 Material of layer insulation	material:		
4.3 Windings	number:		
4.4 Taps	material:		
4.5 Diameter of wire	mm:	1 X 1.6	1 X 0.08
4.6 Winding of insulation	material:	MET. 1) 4xMYLAR TAPE 0.001" MET. 2) TRIPLE TEFLON 0.003"	MW-75
4.7 Cord insulation material	innere:	N/A	N/A
	äußere:	N/A	N/A
4.8 Cold resistance in Ω at:	°C =25	N/A	95.5 MAX

4.9 Circuit diagram (which terminal markings, color of wires etc.): Schematic, diagram.

**5 Iron core**

5.1 Soft Ferrite: Mn-Zn

Main dimension : 10.5 mm LENGTH 7.8mm WIDTH 5.3mm THICKNESS.

5.2 Cross-sectional drawing: N/A

6 Type of construction

6.1 Open - covered - in case protection *) OPEN

6.2 Impregnated - undrowned - drowned *) IMPREGNATED

6.3 Soaking (liquor): BAKING VARNISH PDG

6.4 Underpressure - Overpressure - Soaking at N/A °C *)

6.5 Drown material: N/A

6.6 Material of the cover: N/A

of the case: : N/A

of the socket (support): N/A

6.7 Flammability class for insulation material: UL94V-0

7.1 Other data (special constructional feature, etc.): SEE ATTACHED SPECIFICATION

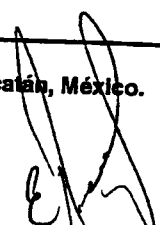
8.1 Components built - in the transformer: (switches, plugs, thermal cut off, cables.....etc.): N/A

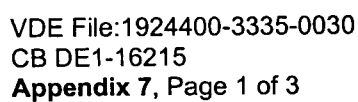
Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No - Yes

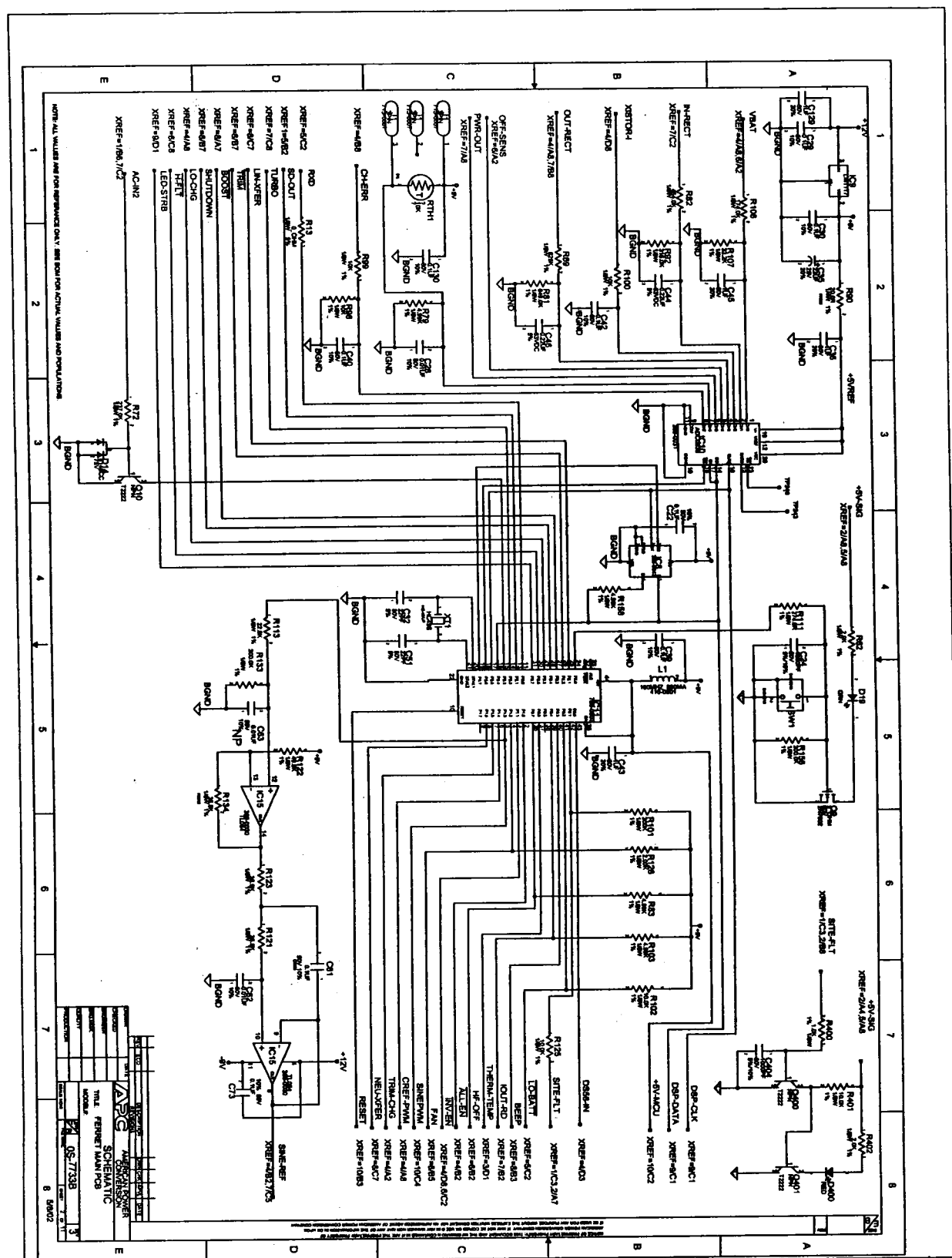
Offenbach,

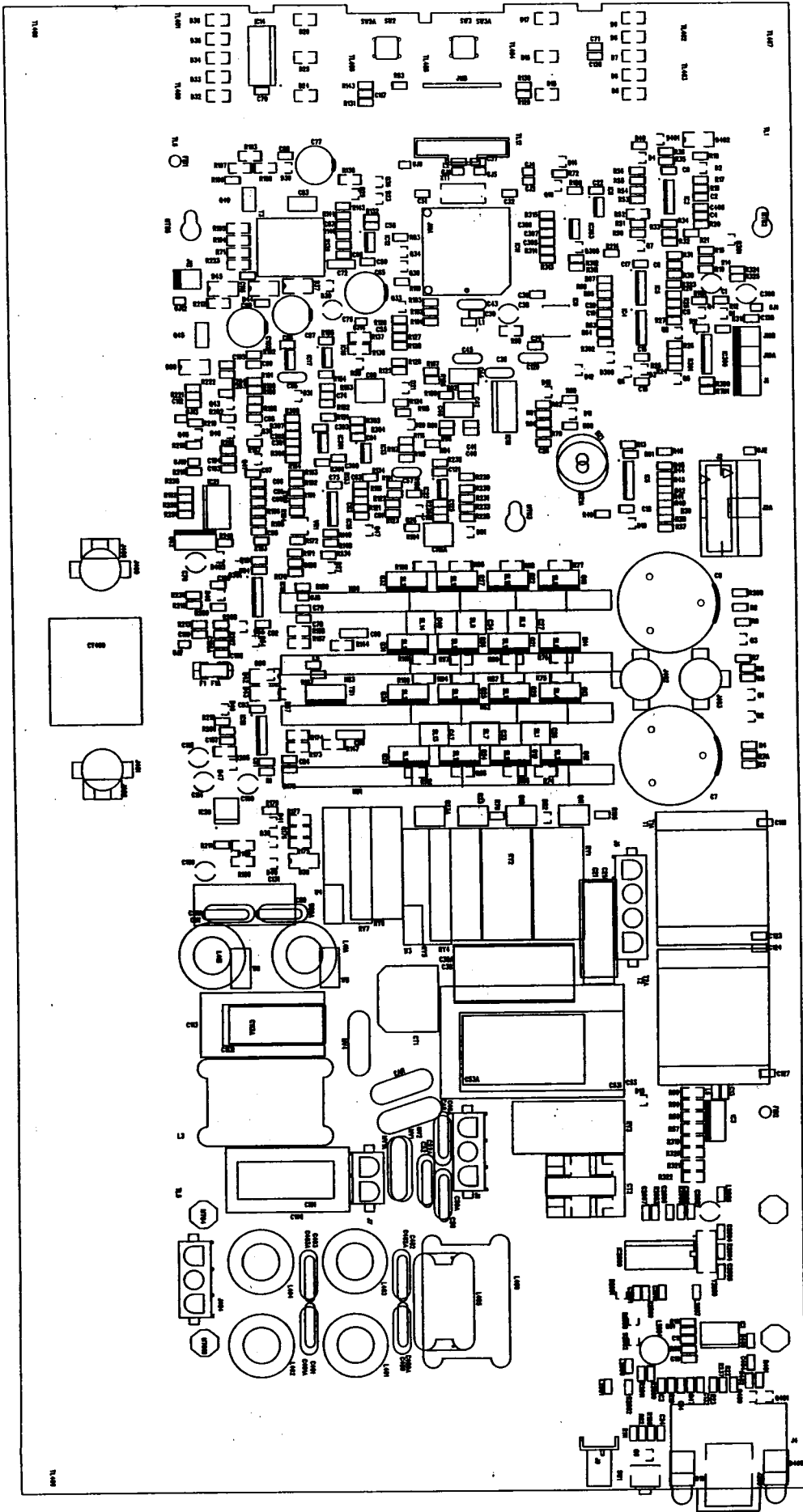
VDE Testing and Certification Institute
Department

Place: Mérida, Yucatán, México. Date: 18/Ju/ 2002

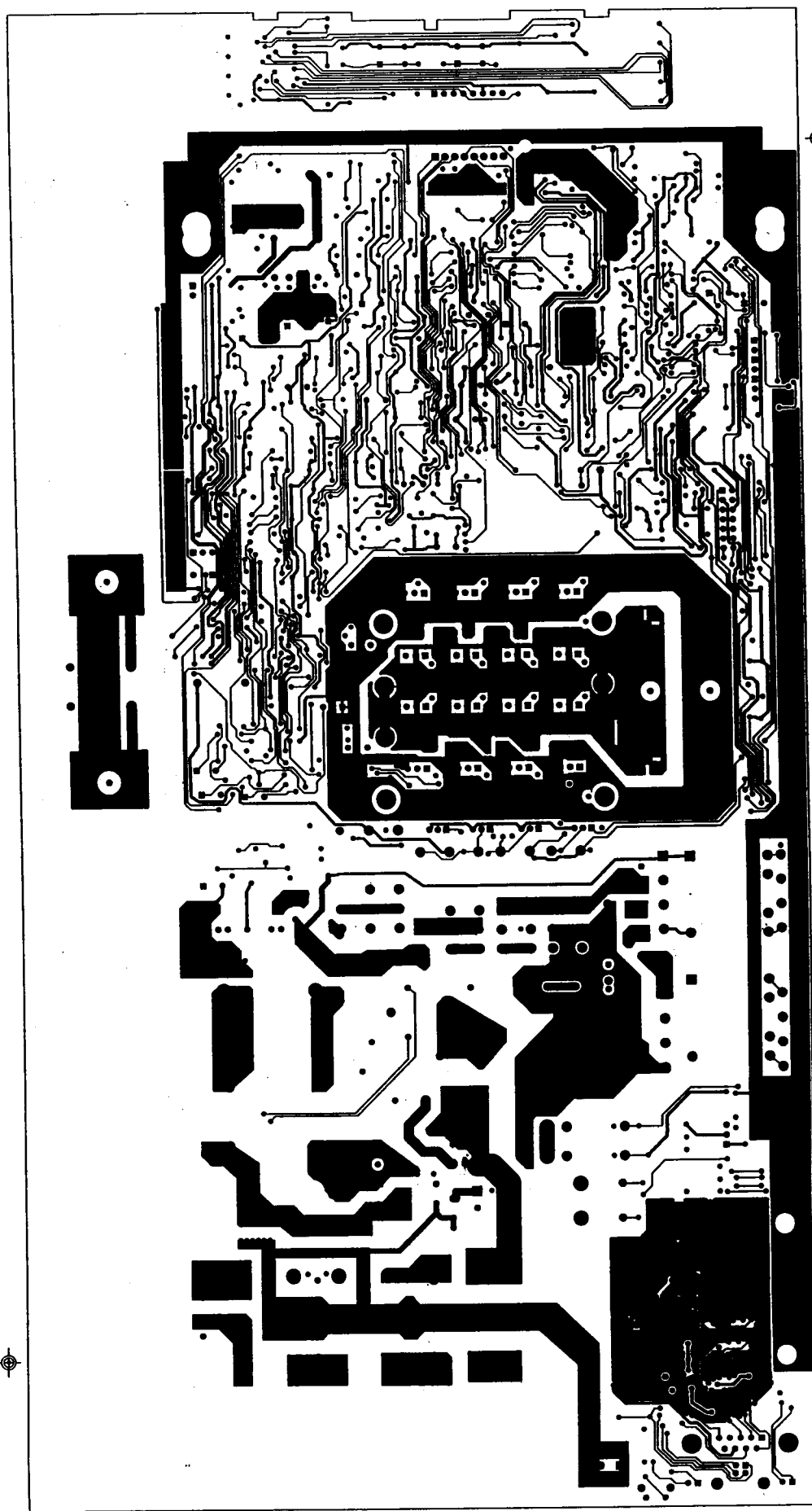

(Stamp and signature of the manufacturer)

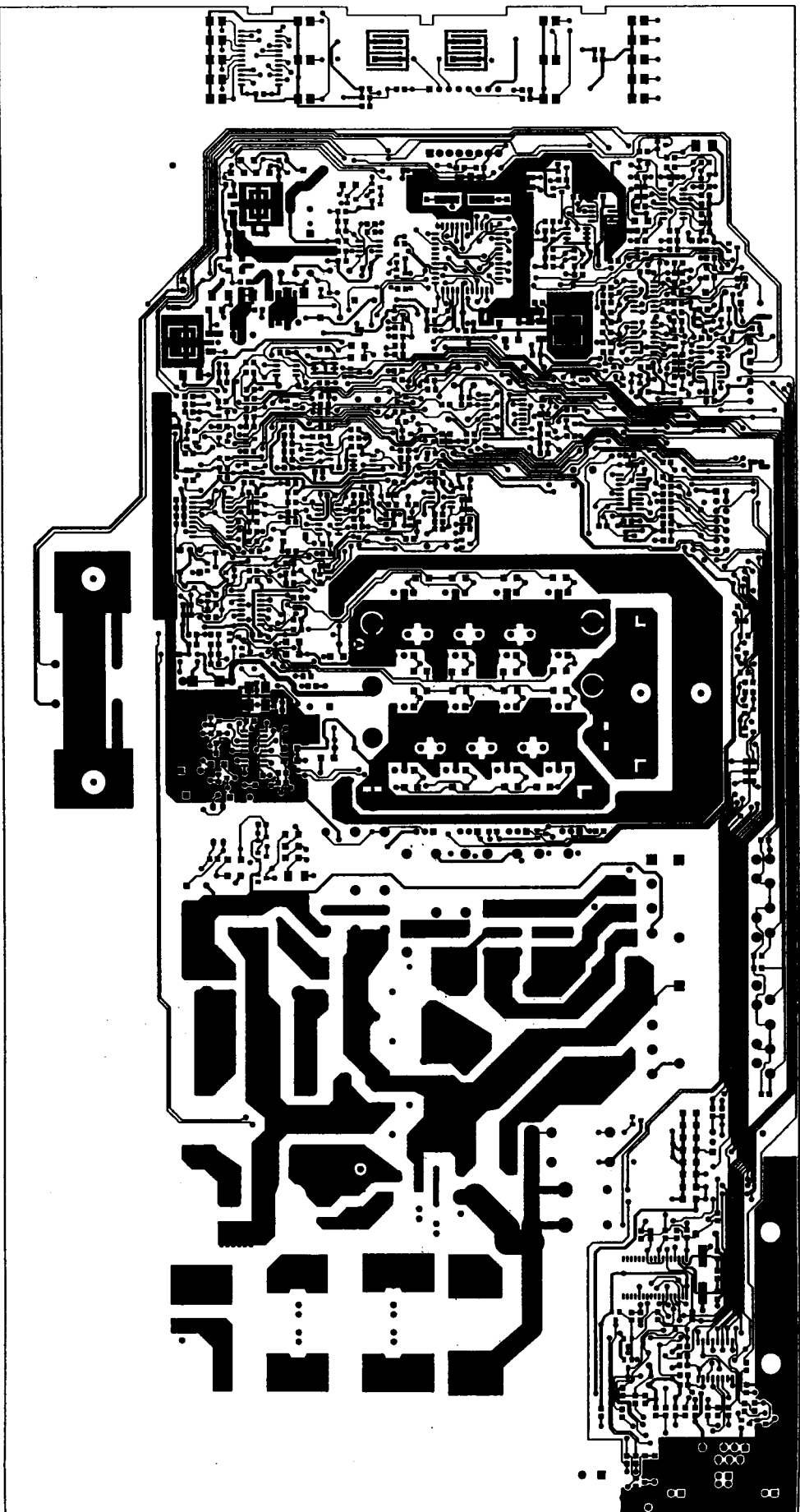






AMERICAN POWER CONVERSION			
DESIGNED BY: 1 AUGUST AMERICAN-3444	TITLE: NPS SMARTUPS FERRET MAIN PCB	30 TOWNSEND RD PO BOX 1000 FAL CONN 06424 E-MAIL: AMERICAN-PC@COM	
DESIGNED BY: KATKATA	PART NO.: 640-77338	REV: 3	DATE: 05/31/02
CMT FILE: P77338REV3.DP			
CNAME: 640-77338REV3SEC.pho			





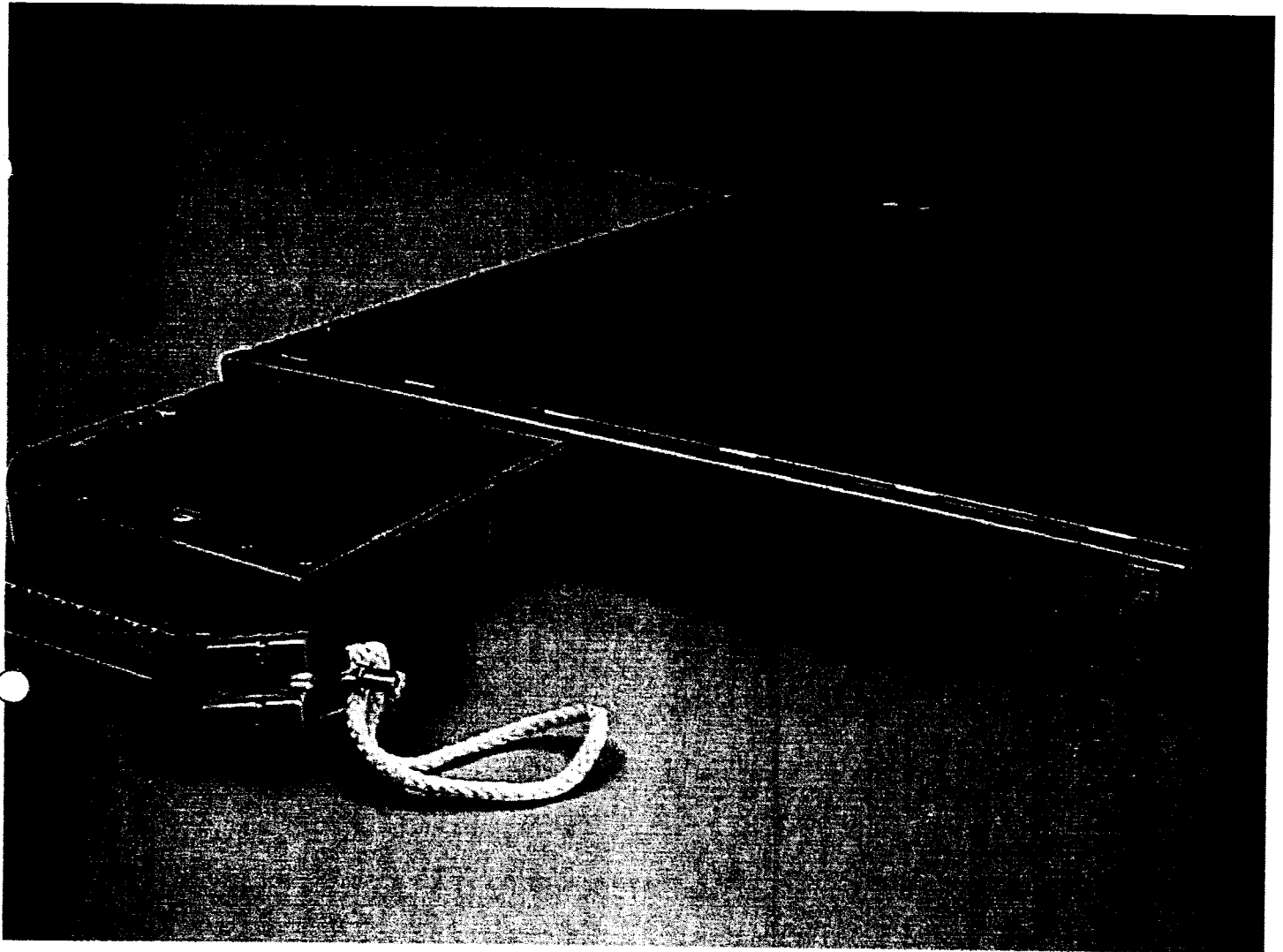
AMERICAN POWER CONVERSION	
DESIGNED BY: J. AUGUST 7/20/02/07/20-344	TITLE: NPS SMARTIPS FERRET MAIN PCB
DRAWN BY: XXXXXXXX	PART NO.: 640-77338
DATE: 05/31/02	REV.: 3
CSD FILE: 77338REV3.PRI	
Q3 SMARTIPS NO. BILLYEVA 1A 0802 P/N: (003) 200-000 P/N: 1000000000	

VDE File:1924400-3335-0030
CB DE1-16215
Appendix 8, Page 3 of 3

0-77338REV_03.pcb - Tue Jun 20 10:37:31 2007



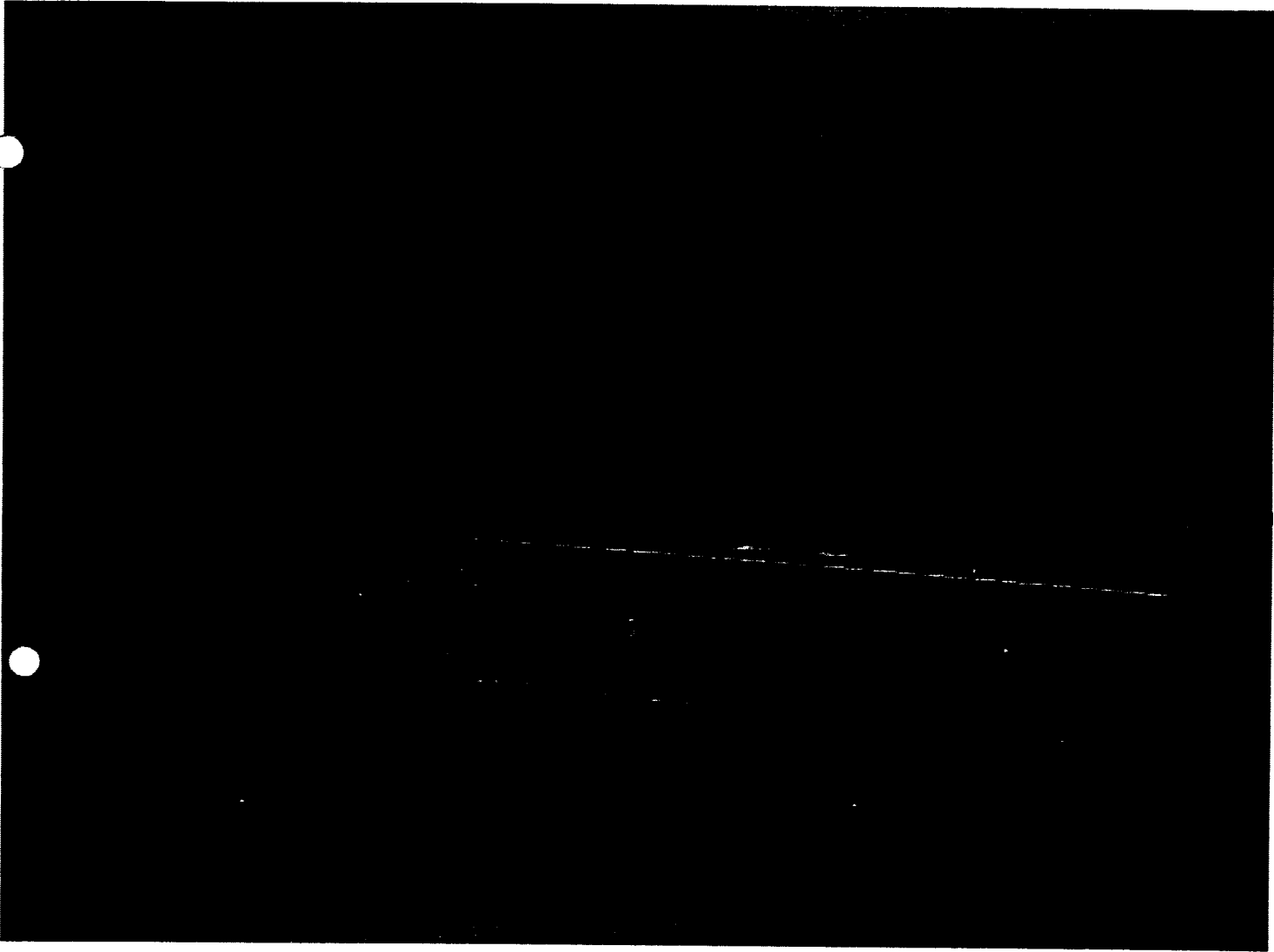
VDE File:1924400-3335-0030
CB DE1-16215
Appendix 9, Page 1 of 7



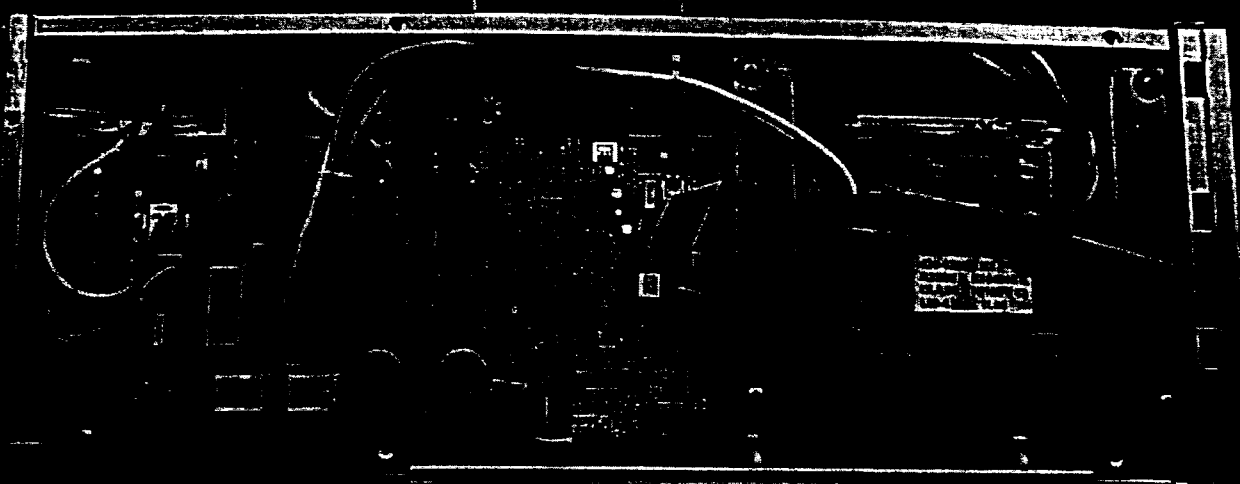
VDE File:1924400-3335-0030
CB DE1-16215
Appendix 9, Page 2 of 7



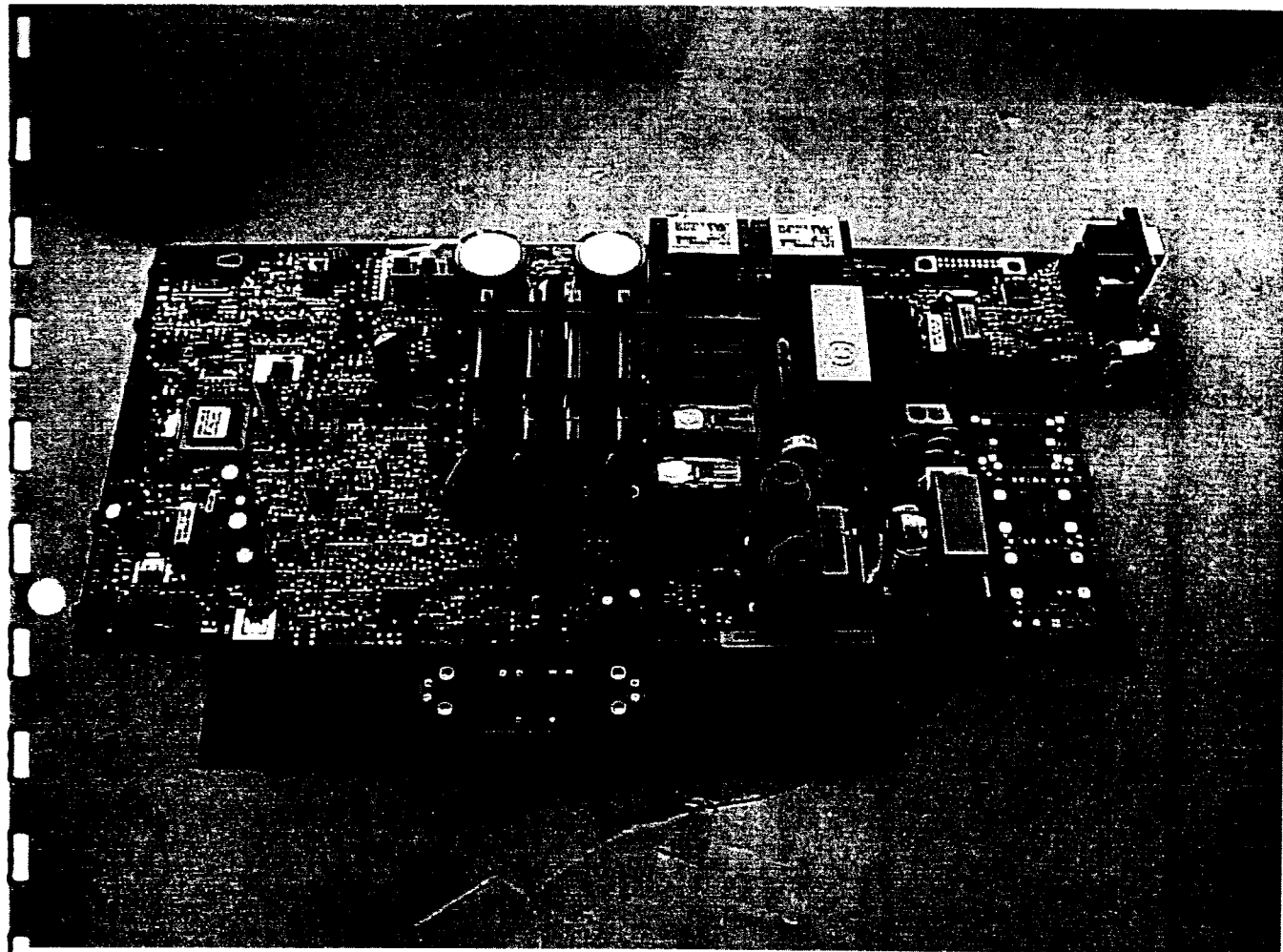
VDE File:1924400-3335-0030
CB DE1-16215
Appendix 9, Page 3 of 7



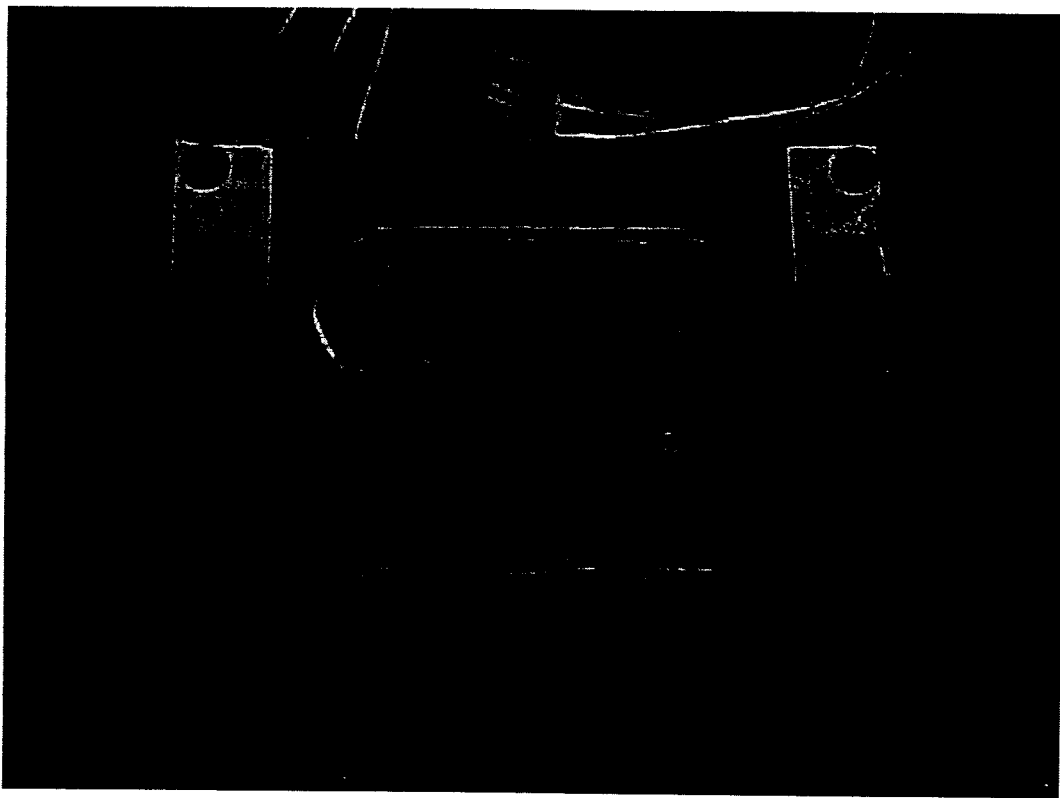
VDE File:1924400-3335-0030
CB DE1-16215
Appendix 9, Page 4 of 7



VDE File:1924400-3335-0030
CB DE1-16215
Appendix 9, Page 5 of 7



VDE File:1924400-3335-0030
CB DE1-16215
Appendix 9, Page 6 of 7



VDE File:1924400-3335-0030
CB DE1-16215
Appendix 9, Page 7 of 7

APC Part Number: 450-0012A Status of Spec: Draft Production Rev:9

APCC Proprietary

APC

Part Specification Cover Sheet

Originator: Robert Thibodeau On: 08/02/1999
Last Editor: Robert Thibodeau On: 01 - Jul - 2002
Requestor: Robert Thibodeau On:06/18/2002

X-Reference Part Number:

"Oracle" Description of Specification:
**RELAY PWR 16A/125VAC
24VDC VDE**

PreRelease Rev:
(use this for controlled release revisions)

0

Parts Description may not exceed 45
characters

Oracle Status:

** NOTE: When changing/updating the Revision History keep in mind that the Revision should be 1 more then currently stated in the Production Rev Field; the Revision is incremented by 1 ONCE THE PART SPECIFICATION IS APPROVED.

REVISION HISTORY TABLE:

Rev: 10	Date: Jun/18/2002	By: (full name) R Thibodeau	ECO #:	Alpha Letter:	Description of Change Change descriptions from 16A/125V to 16A/250V, delete dual rating in expanded description
---------	-------------------	-----------------------------------	--------	---------------	---

OLD Revision Table - for Reference Only

Rev.	Date	By:	ECO #	Alpha Letter	Description of change
8	8/6/99	ML	H485	A	"A" Revision with selected Vendors
9	3/2/01	EEL			Change VDE requirement to allow other if approved by VDE.

Specification consists of the following:

Product Line Smart-UPS (under 1.5 kVA)	Project (End Item Part Number(s))
---	-----------------------------------

FOR CONTROLLED RELEASE ONLY

Complete the following information before completing the section on controlled release (see Appendix 10, Page 1 of 8)

Requestor's Name	Approval Date
Requestor's Title	Vendor's Name
Requestor's Company	Quantity

Drawing Package:

* Safety Critical Components:

AutoCad

* PL Chief Engineer approval required ?

Yes

No

VDE File:1924400-3335-0030

CB DE1-16215

Appendix 10, Page 1 of 8

* Will this Part be mounted on a Printed Circuit Board: No

Expanded description


RELAY POWER, 16A/250V, COIL=24VDC SPDT, (selected vendors for selected products)

APC Standards:

Applicable APC standards

0S-ME-PKG


Applicable industry standards

Specs Directory File Name: Indicate the file name for the zip file per the File Naming Convention found in APC Design Standards #105. 

Enter zip file name here --> 450-0012_REV02zip example: 640-9205B_REV03.Zip Attach zip file here -->

Press the Drawing File Attachment Table and attach the .pdf files of drawings of the part , one per row, in the table and indicate the revision of each file attached.

Exception: If the part is a User Manual, put the .pdf files in the User Manual database and create a doclink to the entry. Attach the doclink in the Drawing File Attachment Table.

Drawing File attachments	Drawing Revision (revision number of current attachment.)
 450-0012A_REV02.pdf	450-0012A-2.pdf Revision 2

Same mechanical as non"A" version

Notice of Deviation:

(Description of deviation from current release of drawings.)

Special Instructions

APC Part Number 450-0012A – Production Rev. 9

Shipping Packaging:

Method and materials:

Egg Crate in Boxes

(editor to leave only the acceptable methods)

Package Marking requirements:

Note: the packing list is not considered as package marking

APCC Part Number, Revision, Date Code or Lot Code, Quantity, APCC Purchase Order Number and Manufacture Identification.

Part Markings:

Manufacture Part Number, Manufacturer Identification, date code or lot code, country of origin.

Special Qualifying Instructions / Drawings:

ELECTRICAL PARAMETERS:

Parameter	Min.	Max.	Units:
Coil Voltage Rating		26.4	Volt DC
Pull-in Voltage		18	Volt DC
Drop-Out Voltage	2.4		Volt DC
Coil Resistance	935	1265	Ohms

VDE File:1924400-3335-0030

CB DE1-16215

Appendix 10, Page 2 of 8

Vendors Removed from Approved Vendors List:
(For Part Revision 9)

Attach schematic symbol here. If device needs multiple orientations, i.e. a resistor needs up/down and left/right views attach both here. If a generic symbol is used state which symbol to use, i.e. RES.1 or CAP.1 here.

II. Pads PCB Information

Place the decal from your user library into a blank Pads PCB database using the ECO tools in Pads. Save the database under the device part number. Attach that .pcb file here. If a generic decal is to be used, i.e. R1/4W or C1206 then state what decal to use here.

Submit for CAD Library Approval

Submitted by:

IV. PADS/ViewLogic Administrator Section

APC Part Number: 450-2151 Status of Spec: Released Production Rev:3

APCC Proprietary

APC

Part Specification Cover
Sheet

Originator: Liam Devaney On: 05/14/1996
Last Editor: Annette D'elia On: 01/20/2001
Requestor: Liam Devaney On:01/08/2001

X-Reference Part Number:

"Oracle" Description of Specification:

**RELAY,24V,DPST,8A,25
0V,1.5MM**

Parts Description may not exceed 45
characters

PreRelease Rev:
(use this for controlled release revisions)

0

Oracle Status:
Released in Oracle

** NOTE: When changing/updating the Revision History keep in mind that the Revision should be 1 more then currently stated in the
Production

Rev Field; the Revision is incremented by 1 ONCE THE PART SPECIFICATION IS APPROVED.

REVISION HISTORY TABLE:

Rev: 1	Date:	By: (full name)	ECO #:	Alpha Letter:	Description of Change
--------	-------	--------------------	--------	---------------	-----------------------

OLD Revision Table - for Reference Only

Rev.	Suffix Rev.	Date	By:	ECO #	Description of change
1		1/21/94	JCB		New Released
2		05/23/96	JCB		Add Schrack (qual# 654),chg insul. sys. to insul. components, clearly specified sealed, added required approvals
3		8th Jan 01	LD		Update AML due to takeover of SHRACK COMPONENTS, INC., by TYCO.

Specification consists of the following:

Product Line
BNS

Project (End Item Part Number(s))

FOR CONTROLLED RELEASE ONLY

You must fill in the information listed below before completing this form. It is required to be filled in before the form is submitted.

Requestor's Name	Requestor's Title
Program Manager's Name	Vendor/Manufacturer Part Number
Cost Limit	Quantity Limit

Drawing Package:

N/A

*** Safety Critical Components:**

Yes

*** PL Chief Engineer approval required ?**

No

*** Will this Part be mounted on a Printed Circuit Board: No**

Expanded description


RELAY, 8 AMP, 240 VOLT, 24 VOLT COIL, DPST, 1.5mm MIN. GAP BETWEEN OPEN CONTACTS, SEALED

APC Standards:

Applicable APC standards

0S-ME-PKG

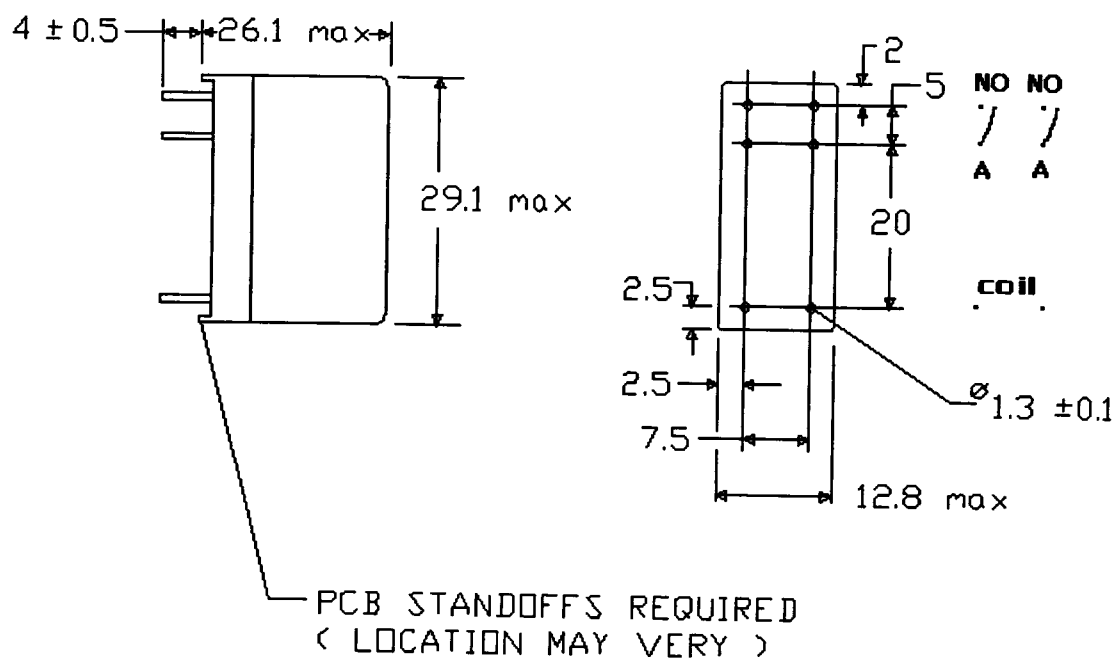
Applicable industry standards

Specs Directory File Name: Indicate the file name for the zip file per the File Naming Convention found in APC Design Standards #105. 

Enter zip file name here --> Specs\ example: 640-9205B_REV03.Zip Attach zip file here -->

Press the Drawing File Attachment Table and attach the .pdf files of drawings of the part , one per row, in the table and indicate the revision of each file attached.

Exception: If the part is a User Manual, put the .pdf files in the User Manual database and create a doclink to the entry. Attach the doclink in the Drawing File Attachment Table.



Notice of Deviation:

(Description of deviation from current release of drawings.)

Place the decal from your user library into a blank Pads PCB database using the ECO tools in Pads. Save the database under the device part number. Attach that .pcb file here. If a generic decal is to be used, i.e. R1/4W or C1206 then state what decal to use here.

Submit for CAD Library Approval

Submitted by:

IV. PADS/ViewLogic Administrator Section

APC Part Number: 379-0001 Status of Spec: Released Production Rev:2

APCC Proprietary

Part Specification Cover Sheet

Originator: John Berry On: 01/11/1999
Last Editor: Brooke Eklund On: 01/26/2000
Requestor: John Berry On: 01/26/2000

X-Reference Part Number:

"Oracle" Description of Specification:
LED RED 3.5X2.3MM SMD
Parts Description may not exceed 45
characters

PreRelease Rev:
(use this for controlled release only)
0

Oracle Status:
Released in Oracle

**** NOTE:** When changing/updating the Revision History keep in mind that the Revision should be 1 more then currently stated in the Production Rev Field; the Revision is incremented by 1 ONCE THE PART SPECIFICATION IS APPROVED.

REVISION HISTORY TABLE:

Rev: 1	Date:	By: (full name)	ECO #:	Alpha Letter:	Description of Change
--------	-------	--------------------	--------	---------------	-----------------------

OLD Revision Table - for Reference Only

Rev.	Date	By:	ECO #	Alpha Letter	Description of change
1	9/9/99	JB			Initial Release
2	1/26/0	JB			Corrected mfg part #

Specification consists of the following:

Product Line
BNS

Project (End Item Part Number(s))

FOR CONTROLLED RELEASE ONLY

Drawing Package:

* Safety Critical Components:

* PL Chief Engineer approval required ?

* Will this Part be mounted on a Printed Circuit Board: No

Expanded description

LIGHT EMMITING DIODE, SURFACE MOUNT, RED, 3.5L X 2.8W X 1.9H (MM), 625 nM WAVELENGTH, TINTED

N/A
No
No

VDE File:1924400-3335-0030

CB DE1-16215

Appendix 11, Page 1 of 17

Method and materials:

Tape on 7 inch reels, 8mm wide, pitch of 4.0mm per EIA spec 481 - 1A, with the cathode terminal orientated next to the sprocket holes. Sufficiently boxed to prevent shipping and handling damage.
(editor to leave only the acceptable methods)

Package Marking requirements:

Note: the packing list is not considered as package marking

See OS-ME-PKG. The APC part number must be bar coded on each reel using Code 39 with NO Data Identifiers. The bar code must be a minimum of .25 inches (6 mm) high. The APC part number must be on a line by itself.

Part Markings:

Not required

Special Qualifying Instructions / Drawings:**ELECTRICAL CHARACTERISTICS:**

Absolute Maximum Ratings: Unless otherwise specified $T_A=25^{\circ}\text{C}$.

Parameter	Symbol	Value	Units
Maximum Average Forward Current	$I_{F(\text{avg})}$	30	mA
Maximum Peak Forward Current (0.1 Duty Cycle, 0.1ms pulse)	$I_{F(\text{peak})}$	150	mA
Maximum DC Reverse Current at Rated DC Blocking Voltage	I_R	10	μA
Maximum Power Dissipation	P_D	105	mW
Operating Temperature Range	T_{OPT}	-40 to +85	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +85	$^{\circ}\text{C}$

Parameter	Symbol	Min.	Max.	Units
Reverse Breakdown Voltage ($I_R = 10\mu\text{A}$)	V_R	5		Volt
Forward Voltage ($I_F = 20\text{mA}$)	V_F	2.0	2.5	Volt
Typical Peak Wavelength $I_F = 20\text{mA}$	$\lambda_{(\text{peak})}$	625		nm (typ)
Luminous Intensity ($I_F = 20\text{mA}$)	I_V	12.5	30	mcd
Reverse Current at Rated DC Blocking Voltage	I_R		10	μA
Luminous Intensity Points (View Angle)		120		Degree
Spectral Line Halfwidth $I_F=20\text{mA}$	$\lambda_{1/2}$	45		nm (typ)
Capacitance $V_F=0$; $F=1\text{MHz}$	C	12		pF (typ)

NOTES: Semiconductor Material: GaAsP/GaP

Approved Manufacturer List

APC Part Number **379-0001** – Production Rev. 2

Commodity Type is : Electronics

(**Only manufacturers' qualified for the commodity type of this part can be added below.**)

for approval. Removing a manufacturer requires that a manuf. disqual has been started.			
1. KINGBRIGHT CORP.	11036	KA-252MTW3-APC	
2. CHICAGO MINIATURE LAMP	30078	CMD57-21VRF/TR3	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

**Vendors Removed from Approved Vendors List:
(For Part Revision 2)**

Attach schematic symbol here. If device needs multiple orientations, i.e. a resistor needs up/down and left/right views attach both here. If a generic symbol is used state which symbol to use, i.e. RES.1 or CAP.1 here.

II. Pads PCB Information

Place the decal from your user library into a blank Pads PCB database using the ECO tools in Pads. Save the database under the device part number. Attach that .pcb file here. If a generic decal is to be used, i.e. R1/4W or C1206 then state what decal to use here.

Submit for CAD Library Approval

Email Notification sent to Joyce Graffeo on 06/29/99 11:37:59 AM; Email Notification sent to Kim Bohannon on 06/29/99 11:37:59 AM 06/29/99 11:37:59 AM

Submitted by: Robert Morley

IV. PADS/ViewLogic Administrator Section

06/30/99 01:44:19 PM

Yes

APC Part Number: 379-0002 Status of Spec: Released Production Rev:2

APCC Proprietary

Part Specification Cover Sheet

Originator: John Berry On: 01/11/1999
Last Editor: David Wu On: 08/02/2000
Requestor: John Berry On:01/26/2000

X-Reference Part Number:

"Oracle" Description of Specification:
**LED YELLOW 3.5X2.8MM
SMD**

PreRelease Rev:
(use this for controlled release revisions)

0

Parts Description may not exceed 45
characters

Oracle Status:
Released in Oracle

**** NOTE:** When changing/updating the Revision History keep in mind that the Revision should be 1 more then currently stated in the Production Rev Field; the Revision is incremented by 1 ONCE THE PART SPECIFICATION IS APPROVED.

REVISION HISTORY TABLE:

Rev: 1	Date:	By: (full name)	ECO #:	Alpha Letter:	Description of Change
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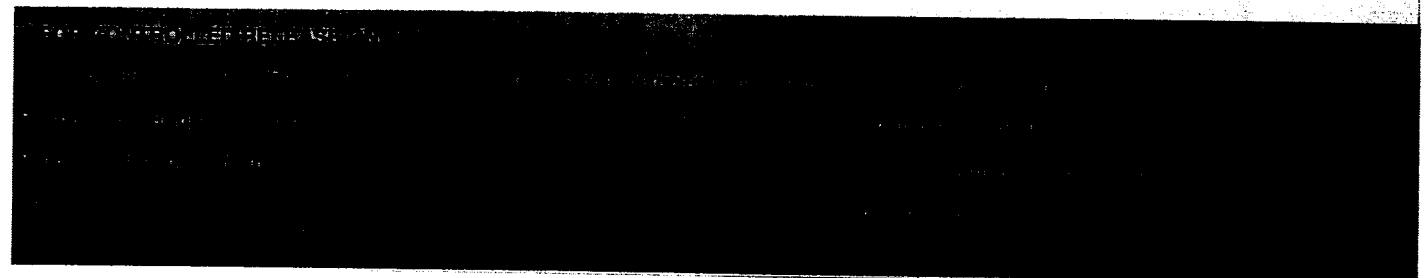
OLD Revision Table - for Reference Only

Rev.	Date	By:	ECO #	Alpha Letter	Description of change
1	9/9/99	JB			Initial Release
2	1/26/0	JB			Corrected mfg part #

Specification consists of the following:

Product Line
BNS

Project (End Item Part Number(s))



Drawing Package:

* Safety Critical Components:

* PL Chief Engineer approval required ?

* Will this Part be mounted on a Printed Circuit Board: No
Expanded description

N/A

No

No

VDE File:1924400-3335-0030

CB DE1-16215

Appendix 11, Page 4 of 17

LIGHT EMMITING DIODE, SURFACE MOUNT, YELLOW, 3.5L X 2.8W X 1.9H (MM), 590 nM
WAVELENGTH, TINTED LENS, FLAT TOP

APC Standards:

Applicable APC standards

0S-ME-PKG

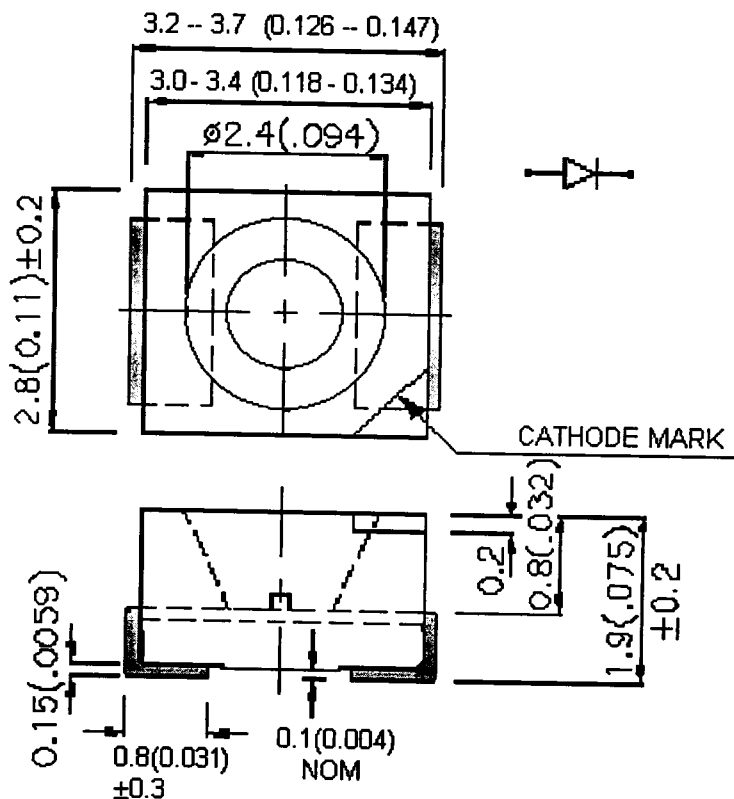
Applicable industry standards

EIA 481-A Taping of Surface Mount Components for Automatic Placement

Specs Directory File Name: Indicate the file name for the zip file per the File Naming Convention found in APC Design Standards #105. ☐

Enter zip file name here --> Specs\ example: 640-9205B_REV03.Zip Attach zip file here -->
Press the Drawing File Attachment Table and attach the .pdf files of drawings of the part , one per row, in the table and indicate the revision of each file attached.

Exception: If the part is a User Manual, put the .pdf files in the User Manual database and create a doclink to the entry. Attach the doclink in the Drawing File Attachment Table.



Lens Type - Yellow Transparent

Notice of Deviation:

(Description of deviation from current release of drawings.)

Special Instructions
APC Part Number 379-0002 - Production Rev. 2

VDE File:1924400-3335-0030

CB DE1-16215

Appendix 11, Page 5 of 17

Shipping Packaging:

Method and materials:

Tape on 7 inch reels, 8mm wide, pitch of 4.0mm per EIA spec 481 - 1A, with the cathode terminal orientated next to the sprocket holes. Sufficiently boxed to prevent shipping and handling damage.
(editor to leave only the acceptable methods)

Package Marking requirements:

Note: the packing list is not considered as package marking

see 0S-ME-PKG. The APC part number must be bar coded on each reel using Code 39 with NO Data Identifiers. The bar code must be a minimum of .25 inches (6 mm) high. The APC part number must be on a line by itself.

Part Markings:

none required

Special Qualifying Instructions / Drawings:

ELECTRICAL CHARACTERISTICS:

Absolute Maximum Ratings: Unless otherwise specified $T_A=25^{\circ}\text{C}$.

Parameter	Symbol	Value	Units
Maximum Average Forward Current	$I_{F(\text{avg})}$	30	mA
Maximum Peak Forward Current (0.1 Duty Cycle, 0.1ms pulse)	$I_{F(\text{peak})}$	150	mA
Maximum DC Reverse Current at Rated DC Blocking Voltage	I_R	10	μA
Maximum Power Dissipation	P_D	105	mW
Operating Temperature Range	T_{OPT}	-40 to +85	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +85	$^{\circ}\text{C}$

Parameter	Symbol	Min.	Max.	Units
Reverse Breakdown Voltage ($I_R=10\mu\text{A}$)	V_R	5		Volt
Forward Voltage ($I_F=20\text{mA}$)	V_F	2.1	2.5	Volt
Typical Peak Wavelength $I_F=20\text{mA}$	$\lambda_{(\text{peak})}$	590		nm (typ)
Luminous Intensity ($I_F=20\text{mA}$)	I_V	8	15	mcd
Reverse Current at Rated DC Blocking Voltage	I_R		10	μA
Luminous Intensity Points (View Angle)		120		Degree
Spectral Line Halfwidth $I_F=20\text{mA}$	$\lambda_{1/2}$	35		nm (typ)
Capacitance $V_F=0$; $F=1\text{MHz}$	C	10		pF (typ)

NOTES: Semiconductor Material: GaAsP/GaP

Approved Manufacturer List
APC Part Number 379-0002 - Production Rev. 2
Commodity Type Is : Electronics

(**Only manufacturers' qualified for the commodity type of this part can be added below.**)

Qualified before submitting this part specification for approval. Removing a manufacturer requires that a manuf. disqual has been started.			
1. KINGBRIGHT CORP.	11036	KA-3528YTW3-APC	
2. CHICAGO MINIATURE LAMP	30078	CMD67-21VYT/TR8	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

Vendors Removed from Approved Vendors List:
(For Part Revision 2)

Attach schematic symbol here. If device needs multiple orientations, i.e. a resistor needs up/down and left/right views attach both here. If a generic symbol is used state which symbol to use, i.e. RES.1 or CAP.1 here.

II. Pads PCB Information

Place the decal from your user library into a blank Pads PCB database using the ECO tools in Pads. Save the database under the device part number. Attach that .pcb file here. If a generic decal is to be used, i.e. R1/4W or C1206 then state what decal to use here.

Submit for CAD Library Approval

Email Notification sent to Joyce Graffeo on 06/29/99 11:38:23 AM; Email Notification sent to Kim Bohannon on 06/29/99 11:38:23 AM 06/29/99 11:38:23 AM

Submitted by: Robert Morley

IV. PADS/ViewLogic Administrator Section

06/30/99 01:44:44 PM

Yes

APC Part Number: 379-0003 Status of Spec: Released Production Rev:2

APCC Proprietary

Part Specification Cover Sheet

Originator: John Berry On: 01/11/1999
Last Editor: Brooke Eklund On: 01/26/2000
Requestor: John Berry On: 01/26/2000

X-Reference Part Number:

"Oracle" Description of Specification:

PreRelease Rev:

SMD

Parts Description may not exceed 45 characters

Oracle Status:
Released in Oracle

** NOTE: When changing/updating the Revision History keep in mind that the Revision should be 1 more then currently stated in the Production Rev Field; the Revision is incremented by 1 ONCE THE PART SPECIFICATION IS APPROVED.

REVISION HISTORY TABLE:

Rev: 1	Date:	By: (full name)	ECO #:	Alpha Letter:	Description of Change
--------	-------	--------------------	--------	---------------	-----------------------

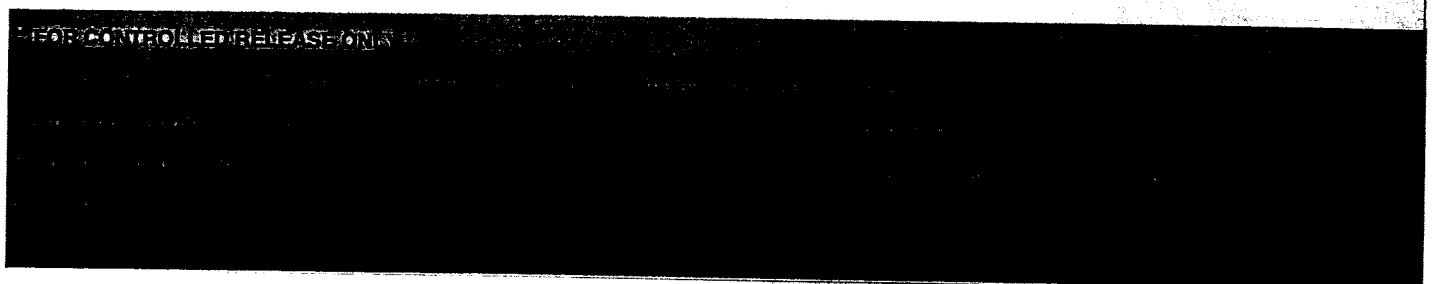
OLD Revision Table - for Reference Only

Rev.	Date	By:	ECO #	Alpha Letter	Description of change
1	9/9/99	JB			Initial Release
2	1/26/0	JB			Corrected mfg part #

Specification consists of the following:

Product Line
BNS

Project (End Item Part Number(s))



Drawing Package:

* Safety Critical Components:

* PL Chief Engineer approval required ?

* Will this Part be mounted on a Printed Circuit Board: No
Expanded description

N/A
No
No

LIGHT EMMITING DIODE, SURFACE MOUNT, GREEN, 3.5L X 2.8W X 1.9H (MM), 570 nM WAVELENGTH, TINTED LENS, FLAT TOP

APC Standards:

Applicable APC standards

0S-ME-PKG

Applicable industry standards

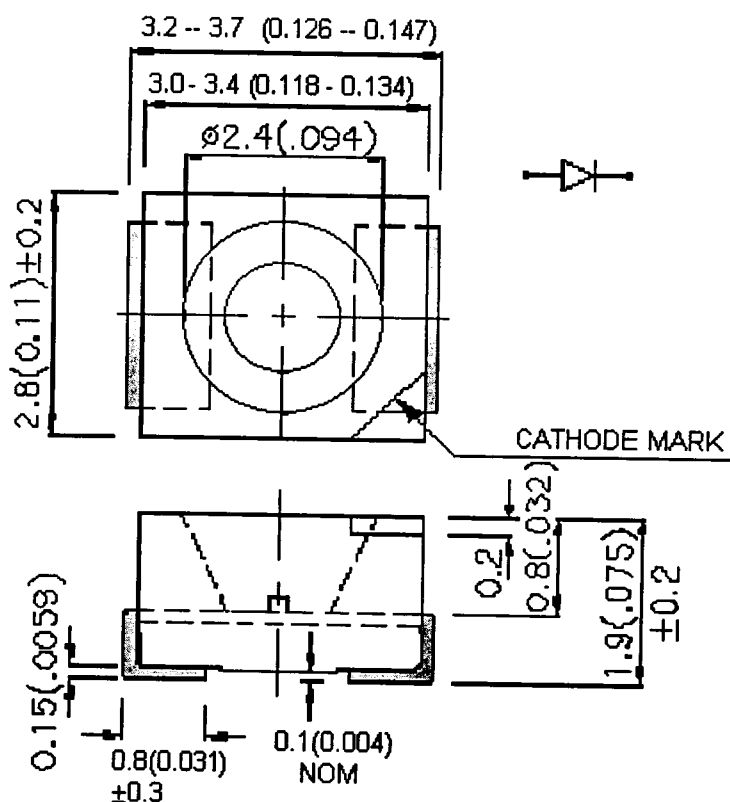
EIA 431-A Taping of Surface Mount Components for Automatic Placement

Specs Directory File Name: Indicate the file name for the zip file per the File Naming Convention found in the Design Standards Manual.

Enter zip file name here --> Specs\ example: 640-9205B_REV03.Zip Attach zip file here -->

Press the Drawing File Attachment Table and attach the .pdf files of drawings of the part, one per row, in the table and indicate the revision of each file attached.

Exception: If the part is a User Manual, put the .pdf files in the User Manual database and create a doclink to the entry. Attach the doclink in the Drawing File Attachment Table.



Notice of Deviation:

(Description of deviation from current release of drawings.)

Special Instructions

APC Part Number 379-0003 - Production Rev. 2

Shipping Packaging:

VDE File:1924400-3335-0030

CB DE1-16215

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Method and materials:

Tape on 7 inch reels, 8mm wide, pitch of 4.0mm per EIA spec 481 - 1A, with the cathode terminal orientated next to the sprocket holes. Sufficiently boxed to prevent shipping and handling damage.
(Editor to have only the accepted methods)

Package Marking requirements:

Note: the packing list is not considered as package marking

See 0S-ME-PKG. The APC part number must be bar coded on each reel using Code 39 with NO Data Identifiers. The bar code must be a minimum of .25 inches (6 mm) high. The APC part number must be on a line by itself.

Part Markings:**Special Qualifying Instructions / Drawings:****ELECTRICAL CHARACTERISTICS:**

Absolute Maximum Ratings: Unless otherwise specified $T_A=25^{\circ}\text{C}$.

Parameter	Symbol	Value	Units
Maximum Average Forward Current	$I_{F(\text{avg})}$	25	mA
Maximum Peak Forward Current (0.1 Duty Cycle, 0.1ms pulse)	$I_{F(\text{peak})}$	150	mA
Maximum DC Reverse Current at Rated DC Blocking Voltage	I_R	10	μA
Maximum Power Dissipation	P_D	105	mW
Operating Temperature Range	T_{OPT}	-40 to +85	$^{\circ}\text{C}$
Storage Temperature Range	T_{STG}	-40 to +85	$^{\circ}\text{C}$

Parameter	Symbol	Min.	Max.	Units
Reverse Breakdown Voltage ($I_R=10\mu\text{A}$)	V_R	5		Volt
Forward Voltage ($I_F=20\text{mA}$)	V_F	2.2	2.5	Volt
Typical Peak Wavelength $I_F=20\text{mA}$	λ_{peak}	565		nm (typ)
Luminous Intensity ($I_F=20\text{mA}$)	I_V	12.5	30	mcd
Reverse Current at Rated DC Blocking Voltage	I_R		10	μA
Luminous Intensity Points (View Angle)		120		Degree
Spectral Line Halfwidth $I_F=20\text{mA}$	$\lambda_{1/2}$	30		nm (typ)
Capacitance $V_F=0$; $F=1\text{MHz}$	C	45		pF (typ)

NOTES: Semiconductor Material: GaP

Approved Manufacturer List

APC Part Number ~~575-0005~~ - Production Rev. 2

Commodity Type is : Electronics

(**Only manufacturers' qualified for the commodity type of this part can be added below.**)

amanu: disqual has been started			
1. KINGBRIGHT CORP.	11035	KA-3528SGTW8-APC	
2. CHICAGO MINIATURE LAMP	30073	CMID57-21VGT,TR3	
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			

**Vendors Removed from Approved Vendors List:
(For Part Revision 2)**

Attach schematic symbol here. If device needs multiple orientations, i.e. a resistor needs up/down and left/right views attach both here. If a generic symbol is used state which symbol to use, i.e. RES.1 or CAP.1 here.

II. Pads PCB Information

Place the decal from your user library into a blank Pads PCB database using the ECO tools in Pads. Save the database under the device part number. Attach that .pcb file here. If a generic decal is to be used, i.e. R1/4W or C1206 then state what decal to use here.

Submit for CAD Library Approval

Email Notification sent to Joyce Graffeo on 06/29/99 11:38:50 AM; Email Notification sent to Kim Bohannon on 06/29/99 11:38:50 AM 06/29/99 11:38:50 AM

Submitted by: Robert Morley

IV. PADS/ViewLogic Administrator Section

06/30/99 01:45:09 PM

Yes

APC Part Number: 370-0011 Status of Spec: Released Production Rev:6

APCC Proprietary



Part Specification Cover Sheet

Originator: Robert Thibodeau On: 01/19/1999
Last Editor: Annette D'elia On: 22 - Apr - 2002
Requestor: Robert Thibodeau On:04/22/2002

X-Reference Part Number:

"Oracle" Description of Specification:
**LED T-1 3/4 GRN RTANG
STAND**

Parts Description may not exceed 45
characters

PreRelease Rev:
(use this for controlled release revisions)

Oracle Status:
Released in Oracle

** NOTE: When changing/updating the Revision History keep in mind that the Revision should be 1 more then currently stated in the Production Rev Field; the Revision is incremented by 1 ONCE THE PART SPECIFICATION IS APPROVED.

REVISION HISTORY TABLE:

Rev: 6 Date: Apr/22/2002 By: (full name) R thibodeau ECO #: Alpha Letter: Description of Change Update to agree with all vendors specs

OLD Revision Table - for Reference Only

Rev.	Date	By:	ECO #	Description of change
1	6/24/92	MG		Release
2	8/8/95	JK		Add vendor to AVL.
3	2/25/98	J.O		RE-ACTIVATING PART SPEC. (FROM OBSOLETE)
4	1/15/99	KK		Add vendor to the AVL and correct vendor #2 P/N
5	1/11/00	ret		Vendor part number incorrect as parts are too wide, correct p/n

Specification consists of the following:

Product Line
Smart-UPS (under 1.5 kVA)

Project (End Item Part Number(s))

FOR CONTROLLED RELEASE ONLY

You must select a current Product Line in the field above before completing this section or submitting to Controlled Release.

Responsible Engineer's Name:

Acquisition Contact:

Program Manager's Name:

Vendor/Manufacturer Part Number:

VDE File:1924400-3335-0030
CB DE1-16215

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Cost Limit:

Quantity Limit:

Drawing Package:

Cadkey

* Safety Critical Components:

No

* PL Chief Engineer approval required ?

No

* Will this Part be mounted on a Printed Circuit Board: Yes - PCAD Legacy

Expanded description

None


APC Standards:

Applicable APC standards

0S-ME-PKG

Applicable industry standards


N/A

Specs Directory File Name: Indicate the file name for the zip file per the File Naming Convention found in APC Design Standards #105. 

Enter zip file name here --> 370-0011_REV02.zip example: 640-9205B_REV03.Zip Attach zip file here -->

Press the Drawing File Attachment Table and attach the .pdf files of drawings of the part, one per row, in the table and indicate the revision of each file attached.

Exception: If the part is a User Manual, put the .pdf files in the User Manual database and create a doclink to the entry. Attach the doclink in the Drawing File Attachment Table.

Drawing File attachments	Drawing Revision (revision number of current attachment.)
 37000112.pdf	37000112.pdf Revision 2

Notice of Deviation:

(Description of deviation from current release of drawings.)

4/22/02 Max Height and Width increased from .245" to .250" Max.

Special Instructions

APC Part Number 370-0011 – Production Rev. 6

Shipping Packaging:

Method and materials:

Tubes - Sufficient to prevent shipping and handling damage.

(editor to leave only the acceptable methods)

Package Marking requirements:

Note: the packing list is not considered as package marking

APCC Part Number, Revision, Date Code or Lot Code, Quantity, APCC Purchase Order Number, Manufacture Part Number, and Manufacturer Identification.

Part Markings:

Special Qualifying Instructions / Drawings:

ELECTRICAL CHARACTERISTICS:

Absolute Maximum Ratings: Unless otherwise specified $T_a = 25^\circ\text{C}$.

Parameter

VDE File:1924400-3335-0030

Value

Units

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Maximum Average Forward Current	$I_{F(avg)}$	20	mA
Maximum Peak Forward Current (1ms pulse repetitive)	$I_{F(peak)}$	60	mA
Maximum DC Forward Current	I_F	25	mA
Maximum DC Reverse Current at Rated DC Blocking Voltage	I_R	100	μA
Maximum Power Dissipation	PD	75	mW
Maximum LED Junction Temperature	T_J	110	$^{\circ}C$
Operating Temperature Range	T_{OPT}	-20 to +85	$^{\circ}C$
Storage Temperature Range	T_{STG}	-30 to +85	$^{\circ}C$

Parameter	Symbol	Min.	Typ	Max.	Units
Reverse Breakdown Voltage ($I_R = 10\mu A$)	V_R	5.0			Volt
Forward Voltage ($I_F = 10mA$)	V_F	1.7	2.2	3.0	Volt
Typical Peak Wavelength	$\lambda_{(peak)}$		565		nm
Luminous Intensity ($I_F = 10mA$)	I_V	3.6	10		mcd
Reverse Current at Rated DC Blocking Voltage	I_R			10	μA
Luminous Intensity Points (View Angle)			60		Degree
Junction to Lead Thermal Resistance	$R\theta_{J-PIN}$			210	$^{\circ}C/W$

Approved Manufacturer List
APC Part Number 370-0011 – Production Rev. 6

Commodity Type Is : Electronics

(**Only manufacturers' qualified for the commodity type of this part can be added below.**)

Manufacturer Name	Vendor ID	Part Number	Quantity
1. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
2. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
3. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
4. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
5. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
6. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
7. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
8. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
9. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			
10. CHICAGO MINN. TEL. & TEL. CO. 1000 N. LAKE ST. CHICAGO, ILL. 60606 773-380-1000			

Is the symbol pins information correct and are pin property boxes verified?	
Is the symbol saved in the correct area: J:\VL\TEMPLIB?	

II. Pads PCB Information

Place the decal from your user library into a blank Pads PCB database using the ECO tools in Pads. Save the database under the device part number. Attach that .pcb file here. If a generic decal is to be used, i.e. R1/4W or C1206 then state what decal to use here.

DECALS	YES OR NO (COMMENTS)
Does a generic decal already exist in the APC PADS Libraries that meets the specifications of this part? If yes, decal name	yes
If yes to the above questions, go directly to the Part Section. If no, complete the remainder of this section.	
Through hole - SMT	
Pin 1, or centroid on 0-0 location	
Number of electrical device pins	
Number of mounting holes	
Did Symbol package to Decal correctly?	
Are padstack layers standard built correctly? - Comment if No	
Are silkscreen, component courtyard and ref des on correct layer and located properly?	
Is this Decal saved in J:\PADS\TEMPLIB?	

Submit for CAD Library Approval

Submitted by:

IV. PADS/ViewLogic Administrator Section

Yes



Issues

A CERTIFICATE OF TEST:

To

***American Power Conversion
85 Rangeway Road
North Billerica, MA 01821, U.S.A.***

For

Product: Uninterruptible Power System

Model: SUA1000RMI1U and SUA750RMI1U

Date: August 19, 2002

Quest Engineering Solutions, a U.S. and internationally approved test house, attests that compliance testing was completed satisfactorily on the aforementioned equipment as specified by the manufacturer and reported in Quest's test report number: Q02140. Quest Engineering Solutions acknowledges that the Equipment Under Test was found to have passed the following standards:

EN50091-2, Uninterruptable Power Systems (UPS)

**EN55022, 1994, Limits and Methods of Measurement of Radio
Disturbance Characteristics of Information Technology Equipment,
Class A**

Q02140

TEL 978-667-7000 ♦ FAX 978-667-3388 ♦ Email info@QES.com
World Wide Web <http://www.QES.com>

VDE File:1924400-3335-0030
CB DE1-16215
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SECTION 1 OVERVIEW

1.1 Purpose of Test

To determine if the Uninterruptible Power System will meet the EN55022 Class A requirements for radiated and conducted emissions.

1.2 Date of Test

August 19, 2002

1.3 Statement of Compliance

The Uninterruptible Power System unit that was tested and referenced in this test report was found to comply with the requirements of:

EN55022, Class A

SECTION 2 REFERENCES

2.1 Procedures/Standards

- ° CISPR Publication 22, 1993, Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment
- ° EN55022, 1998, Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment

2.2 Deviations from Standards

None

SECTION 3 DETAILS

3.1 Description of Product

The Equipment Under Test (EUT) consisted of a single unit, the Uninterruptible Power System.

The EUT was configured as given in Appendix A.

3.2 Test Software/Operating Mode

No Software Required

3.3 Laboratory Test Configuration

The test setup was per the procedures and standards referenced in section 2.1. The voltage supplied to the EUT was 230 VAC, 50 Hz. All support equipment was powered by 120 VAC/60Hz.

Radiated Test

The EUT was installed on the 80 cm high wooden table on the five meter diameter turntable which is located in the protective dome area of the Free Field Site (FFS). A 10-meter distance was used for EUT to antenna separation. The free field ground plane consists of a uniform wire mesh 12 meters wide and 42 meters long. The product was scanned from 1-4 meters in height and 360 degrees around it. The frequency range scanned was from 30 to 1000 MHz for all configurations. All test equipment was kept below the ground plane with the exception of the antenna and associated cables required for measurements. The cable positioning, antenna height/polarization, and turntable orientation were all chosen to maximize the emissions in order to represent a worst case condition.

Conducted Test

The EUT was installed on the 80 cm high wooden table in the FFS conducted emissions test area. A 40 cm distance between the vertical plane and the EUT was maintained. Measurements were made to determine the levels of RF noise induced into the AC power line. Power for the EUT was supplied via a filter bank and a Line Impedance Stabilization Network (LISN). The LISN was electrically bonded to the ground plane. The frequency range scanned was from 10 kHz to 30 MHz. All support equipment was powered via separate LISNs.

Test Equipment Used

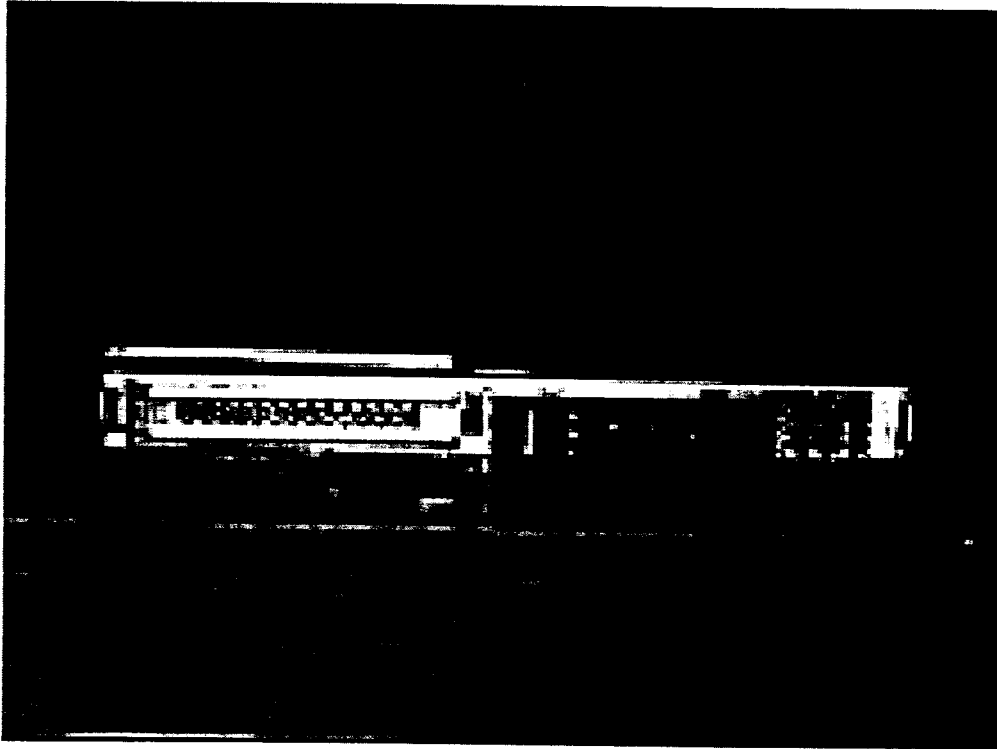
Date of Calibration

EMCO Biconilog Antenna (30-1000 MHz) Model 3143, s/n 1118.....	10/01
HP8566B Spectrum Analyzer, s/n 2928A05991.....	2/02
HP85662A Display Section, s/n 2848A17920.....	2/02
HP85650A Quasi Peak Adapter, s/n 2430A00452.....	2/02
HP85685A RF Preselector, s/n 2620A00342.....	2/02
HP11947A Transient Limiter, s/n 2820A00193.....	1/02
EMCO LISN, 50 Ohm, Single Phase, 25 Amp, DC/50/60 Hz, s/n 1291 (for EUT).....	3/02
EMCO LISN, 50 Ohm, Single Phase, 25 Amp, DC/50/60 Hz, s/n 1290 (for support equipment)...	3/02
Bull 10 meter Cable s/n FFS10M.....	1/02
Bull LISN Cable s/n FFS LISN.....	1/02
HP98580A Technical Computer Model 310	
REMS Software Radiated Emissions	
EMI Software Conducted Emissions	

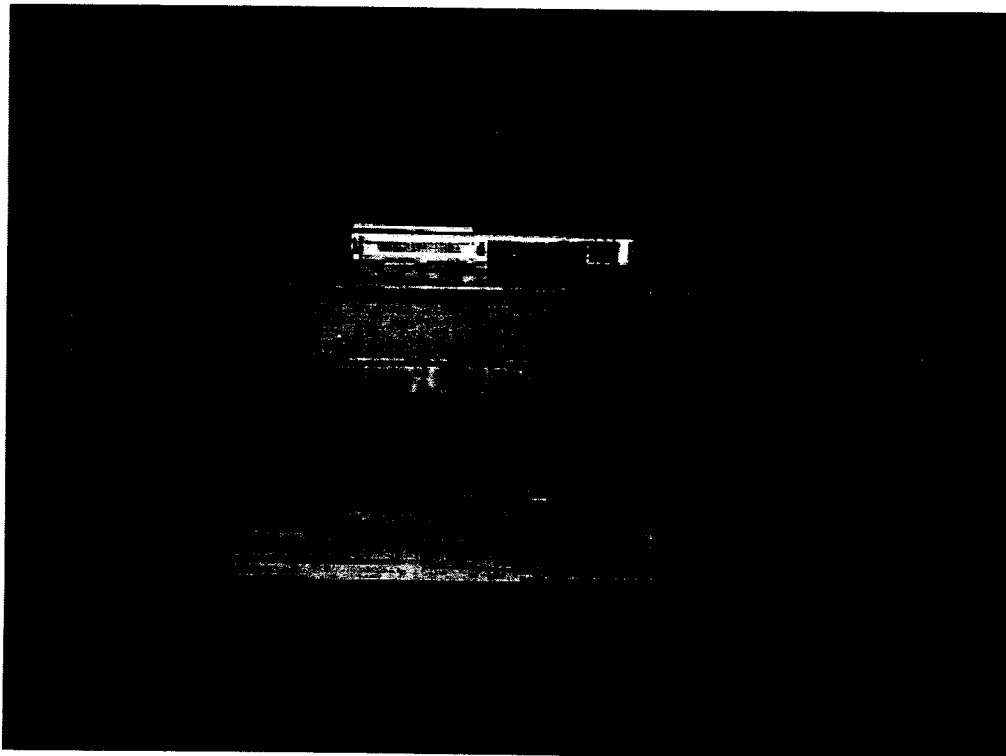
All test equipment used was calibrated and traceable to the U.S. Department of Commerce, National Institute of Standards and Technology (NIST).

Test Environment: Temp. = 68°F, Relative Humidity = 48%

3.4 Pictures

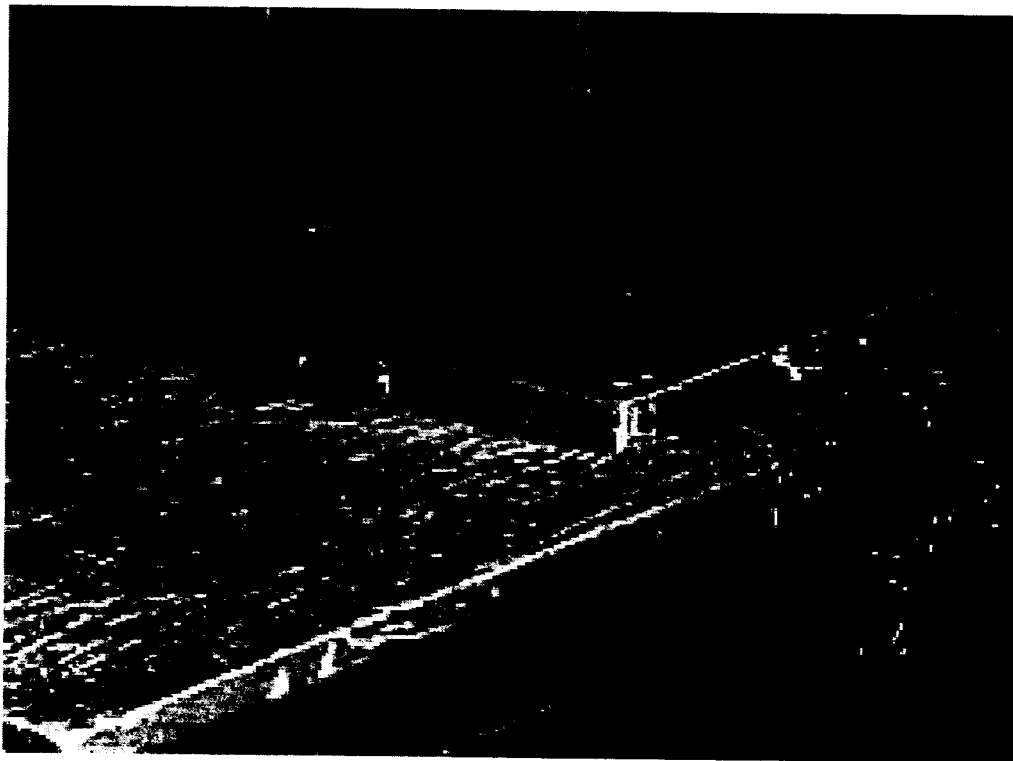


Configuration for Radiated Emissions (Front Closeup)

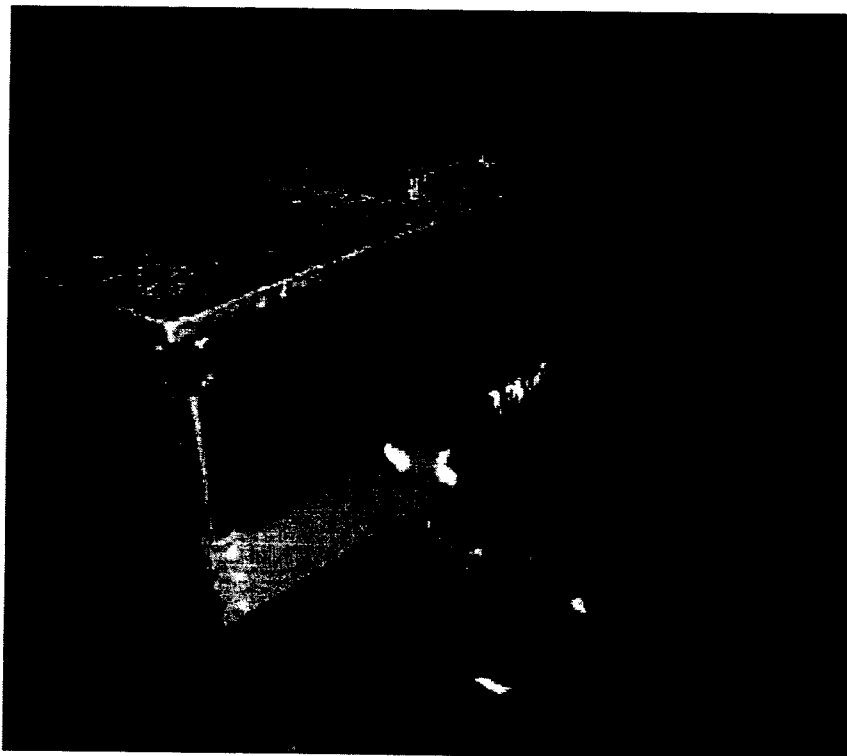


Configuration for Radiated Emissions (Front)

3.4 Pictures

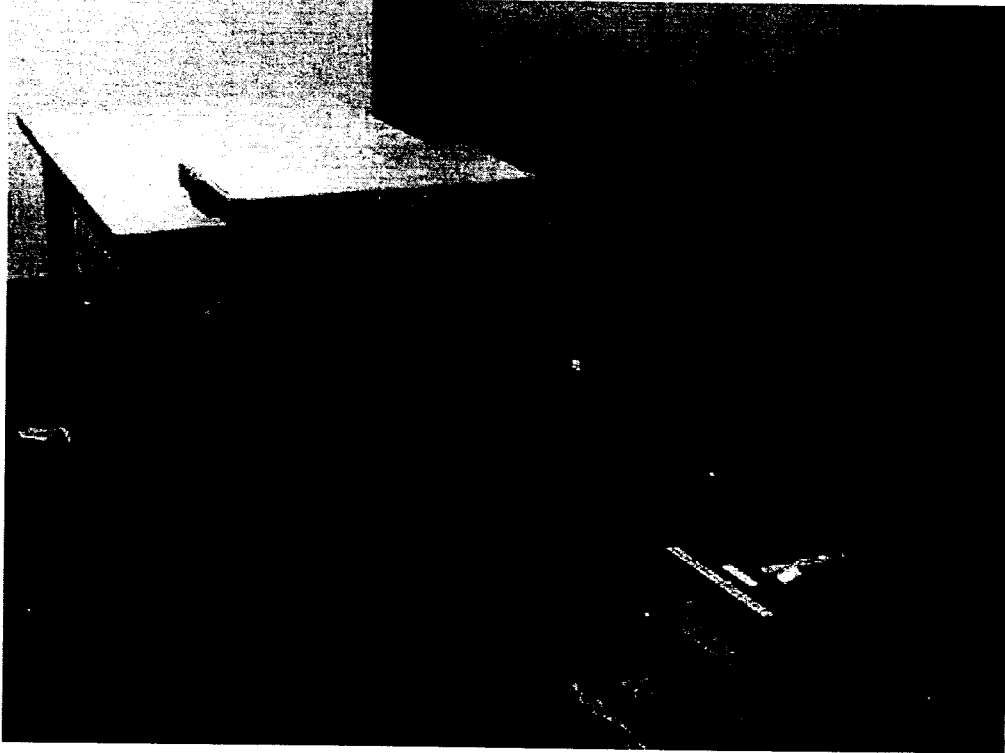


Configuration for Radiated Emissions (Rear Closeup)

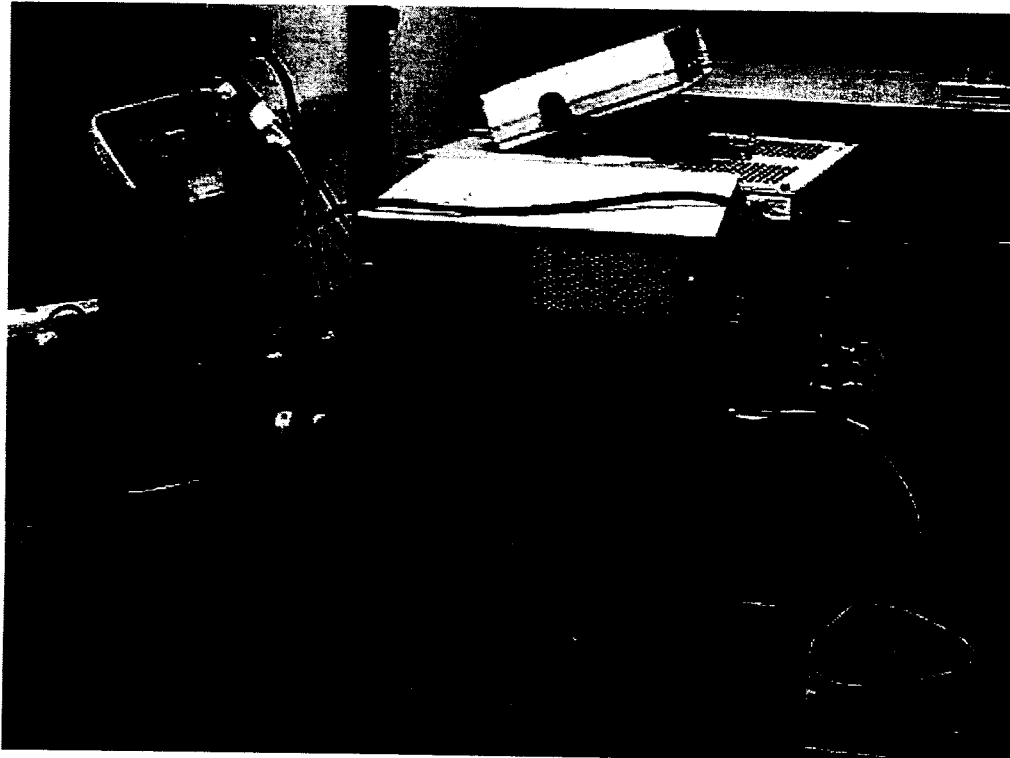


Configuration for Radiated Emissions (Rear)

3.4 Pictures (continued)



Configuration for Conducted Emissions



Support Equipment

SECTION 4 CONCLUSIONS

4.1 Summary of Test Results

FCC, Class A: **Passed**

EN55022, Class A: **Passed**

4.2 Special Notes

The test engineer was D. Kutz.

The test results set forth in this report are expressly limited to the configuration and tests herein. Any changes in configuration may void test results. Quest agrees to quote charges for any retesting requested by the customer.

This report must not be used by the customer to claim product endorsement by NVLAP or any agency of the U.S. Government.

4.3 Required Compliance Modifications

Ferrite beads added to transformer output and inverter leads.

SECTION 5 DATA

5.1 Data Table Explanation/Calculation

SPEC LIMIT - specification limit at 10 meters for CISPR 22 Class A

ABS - final reading including antenna factor and cable loss

dLIM - ABS relativity to the SPEC LIMIT calculated as follows:

$$dLIM = ABS - SPEC\ LIMIT \ [dB]$$

MODE - measurement detector mode, QP: Quasi-peak, P: Peak

POL - antenna polarity, H: Horizontal, V: Vertical

HGT - antenna height in centimeters

AZM - turntable angle in degrees

CORR FACTOR - correction factor includes antenna factor and cable loss

The CORR FACTOR is used to determine the ABS as follows:

$$CORR\ FACTOR \ [dB/m] = ANTENNA\ FACTOR \ [dB/m] + CABLE\ LOSS \ [dB]$$

$$ABS \ [dB\mu V/m] = ACTUAL\ MEASUREMENT \ [dB\mu V] + CORR\ FACTOR \ [dB/m]$$

Assume a receiver reading of 23.5 dB μ V is obtained. The antenna factor of 7.4 dB/m and a cable factor of 1.1 dB is added, giving a field strength (FS) of 32 dB μ V/m.

$$FS = 23.5 \ [dB\mu V] + 7.4 \ [dB/m] + 1.1 \ [dB] = 32.0 \ [dB\mu V/m]$$

The 32.0 dB μ V/m value can be mathematically converted to its corresponding level in μ V/m.

$$Level \ in \ \mu V/m = Common \ Antilogarithm \ ((32.0 \ dB\mu V/m)/20) = 39.8 \ \mu V/m$$

5.2 Measurement Uncertainty

Reference: NIST NIS 8, Edition 1, May 1994 The Treatment of Uncertainty in EMC Measurements			
Radiated Emissions (using the EMC0 Biconilog Antenna Model 3143, frequency range of 30-1000 MHz at 10 meter test distance)			
Contribution	Probability Distribution	Uncertainty (dB) (+/-)	Uncertainty (dB) (+/-)
Antenna Factor Calibration	normal (k=2)	1.00	-1.00
Cable Loss Calibration	normal (k=2)	0.50	-0.50
Receiver Specification:			
HP8566B Spectrum Analyzer	rectangular	0.60	-0.60
HP85685A RF Preselector	rectangular	1.60	-1.60
Antenna directivity	rectangular	2.00	0.00
worst-case, 1 GHz @ 4m height			
Antenna factor variation with height	rectangular	0.50	-0.50
Antenna phase center variation	rectangular	0.50	-0.50
Antenna factor frequency interpolation	rectangular	0.25	-0.25
Measurement distance variation	rectangular	0.50	-0.50
Site imperfections	rectangular	1.00	-1.00
Mismatch:			
Receiver VRC:			
Antenna VRC: U-shaped		0.50	-0.50
Uncertainty limits			
System repeatability	Std Deviation	0.50	-0.50
Combined standard uncertainty, $u_c(y)$	normal	1.8969	-1.1365
Expanded uncertainty, U	normal (k=2)	3.79	-2.27
Conducted Emissions (using the EMC0 3825 LISNs, frequency range of 9kHz - 30MHz)			
Contribution	Probability Distribution	Uncertainty (dB) (+/-)	
Receiver Specification:			
HP8566B Spectrum Analyzer	rectangular	0.60	
HP85685A RF Preselector	rectangular	1.60	
LISN coupling specification:	rectangular	1.50	
insertion loss uncertainty which includes LISN to LISN and Line to Line			
Cable and input attenuator calibration	normal (k=2)	0.30	
Mismatch:			
Receiver VRC:			
Antenna VRC: U-shaped		0.20	
Uncertainty limits			
System repeatability	Std Deviation	0.20	
Combined standard uncertainty, $u_c(y)$	normal	1.3438	
Expanded uncertainty, U	normal (k=2)	2.69	
Use of the uncertainty calculation: Measurement results are: y dBV $\pm U$ dB for a level of confidence of approximately 95% (k=2)			

Q02140 August 19, 2002

5.3 Radiated E Field Emissions Data

FREE FIELD TEST FACILITY TEST REPORT DATA

DATE: 08/19/02

TIME: 14:40

EUT DESCRIPTION: SWA1000MH11U W/ FULL LOAD AND BATTERY CHARGING

TYPE TEST: RADIATED E FIELD EMISSIONS EN55022 CLASS A @10M

FREQUENCY RANGE: 30-1000 MHz

SUPPORT EQUIP. DESCRIPTION: SEE REPORT

TEST PERFORMED BY: D. KUTZ

TEST RESULTS: PASS

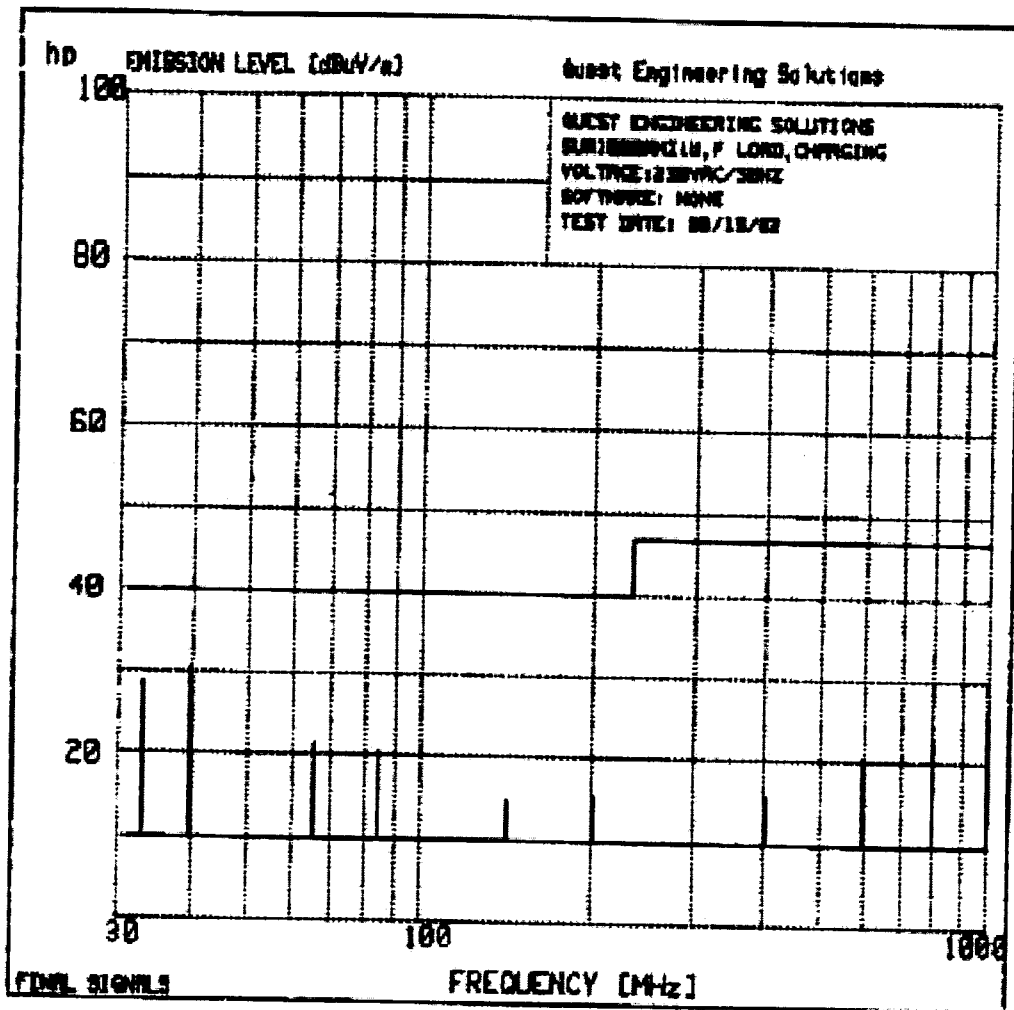
PRODUCT EMISSIONS

QUEST ENGINEERING SOLUTIONS

Date File: 30-1000MHZ 010M 19 Aug 2002 14:28

No	EMISSION FREQUENCY MHz	SPEC LIMIT dBuV/m	MEASUREMENTS		MODE	POL	SITE		CORR FACTOR dB	COMMENTS
			ABS	dLIM			HGT	AZH		
				dB			cm	deg		
1	32.001	40.0	28.8	-11.2	QP	U	100	330	11.5	
2	38.705	40.0	30.7	-9.3	QP	U	100	330	10.3	BROADBAND
3	64.002	40.0	21.6	-18.5	PK	U	100	330	N/T	
4	82.461	40.0	20.5	-19.5	PK	U	100	330	N/T	BROADBAND
5	139.74	40.0	15.2	-24.8	PK	U	100	330	N/T	Avg NOISE FLOOR
6	200.13	40.0	15.6	-24.4	PK	U	100	330	N/T	Avg NOISE FLOOR
7	399.57	47.0	15.7	-31.4	PK	U	100	330	N/T	Avg NOISE FLOOR
8	599.29	47.0	20.6	-26.5	PK	U	100	330	N/T	Avg NOISE FLOOR
9	802.95	47.0	23.1	-23.9	PK	U	100	330	N/T	Avg NOISE FLOOR
10	998.5	47.0	25.7	-21.3	PK	U	100	330	N/T	Avg NOISE FLOOR

N/T in CORR FACTOR column denotes a non-traceable signal.



Radiated E Field Emissions CISPR 22, Class A @ 10 meters

5.4 Conducted Emissions Data

FREE FIELD TEST FACILITY
CONDUCTED EMISSIONS TEST RESULTS

19 Aug 1982 09:25:21

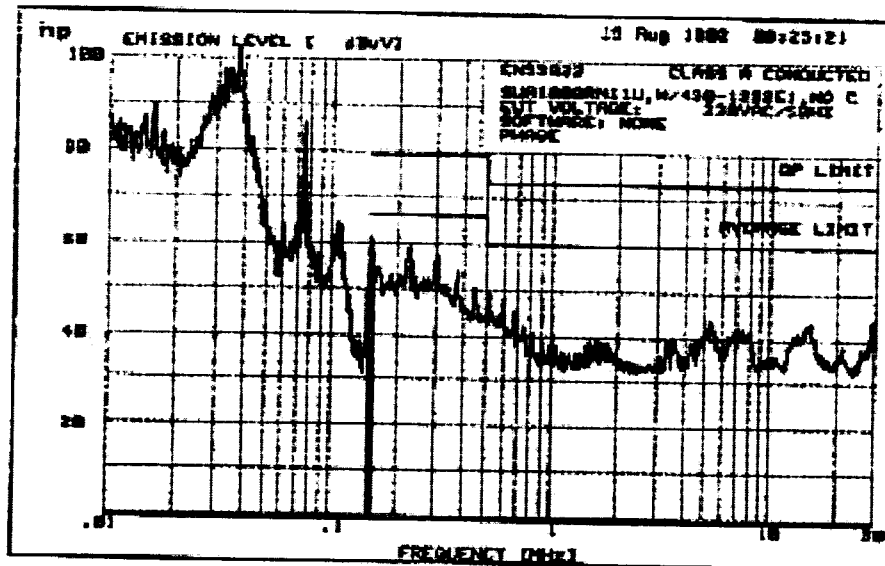
1. CONDUCTED
1.2 E65022 CLASS A CONDUCTED

SUM1000M11U, W/430-1232E1, NO C
EUT VOLTAGE: 230VAC/50HZ
SOFTWARE: NONE
PHASE

10 highest peaks above -30 dB of Limit Line 02
peak criteria = 1 dB

PEAKS	FREQ (MHz)	(dBuV)	DELTA
1	.83713	102.3	0.0000
2	.83772	102.3	0.0000
3	.1905	61.6	-4.4
4	.167	54.0	-11.2
5	.1868	53	-13.0
6	.2873	52.5	-13.5
7	.2263	50	-7.0
8	.2413	52.5	-13.5
9	.3818	52.1	-8.9
10	.3716	54.1	-11.9

← $9.9 = -4.3$



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FREE FIELD TEST FACILITY
CONDUCTED EMISSIONS TEST RESULTS

19 Aug 1982 09:15:25

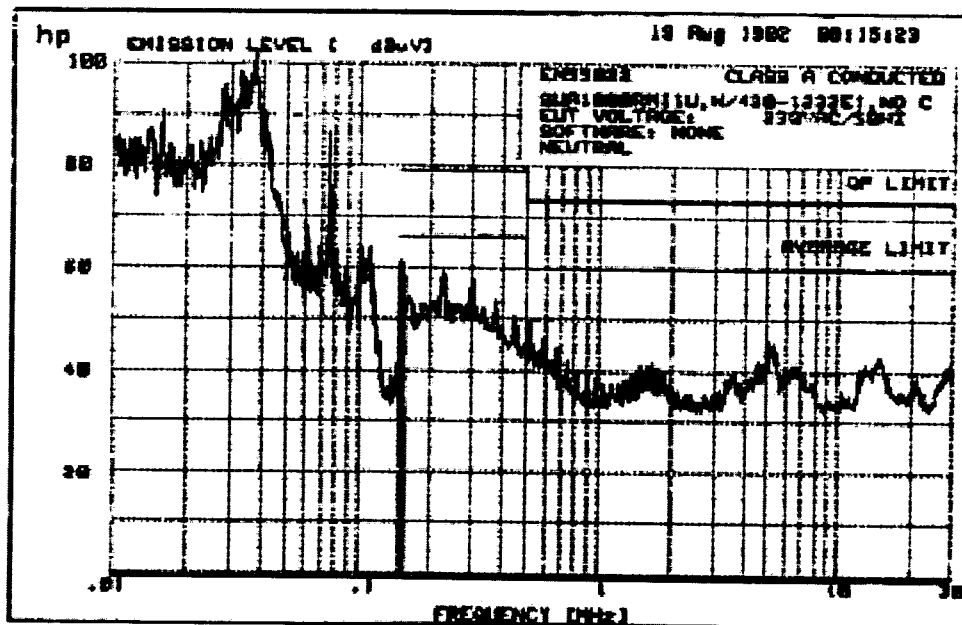
1. CONDUCTED
1.2 EN65022 CLASS A CONDUCTED

SUA1800RTH11U, W/430-1232E1, NO C
EUT VOLTAGE: 230VAC/50HZ
SOFTWARE: NONE
NEUTRAL

10 highest peaks above -30 dB of Limit Line #2
peak criteria = 1 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	.03772	102.3 DURING	-27.7
2	.1545	61	-5.0
3	.1617	54.3	-11.7
4	.1853	52.8	-13.2
5	.2089	53.2	-12.8
6	.2281	59.1	-6.9
7	.2394	53.2	-12.8
8	.2854	52.8	-13.2
9	.2994	57.6	-8.4
10	.3776	53.5	-12.5

← QP2 - 6.1



FREE FIELD TEST FACILITY CONDUCTED EMISSIONS TEST RESULTS

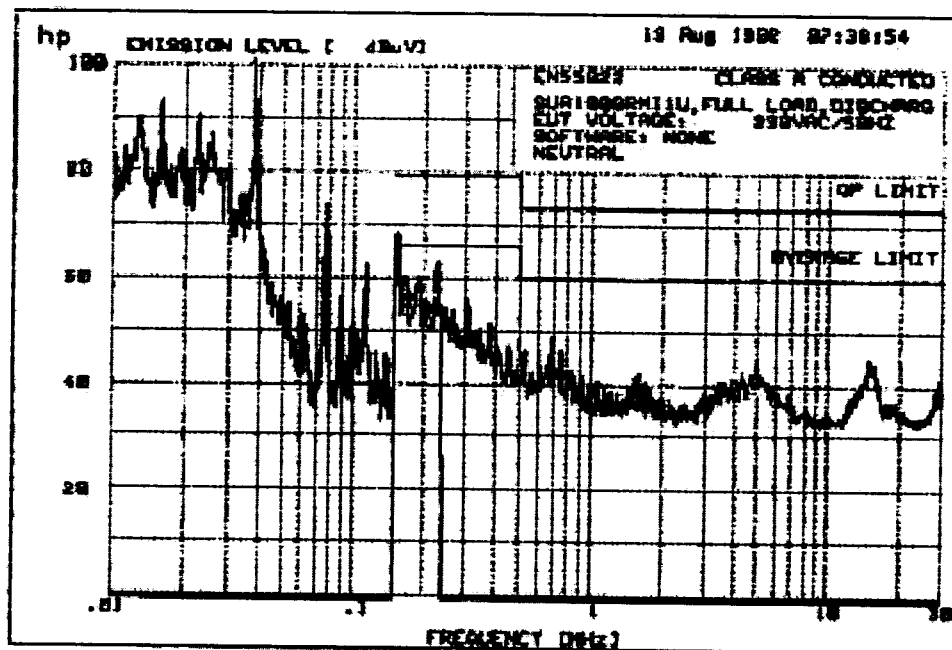
19 Aug 1982 07:38:54

1. CONDUCTED
1.2 EN55022 CLASS A CONDUCTED

SUR1000RM11U, FULL LOAD, DISCHARG
ELI VOLTAGE: 230VAC/50HZ
SOFTWARE: NONE
NEUTRAL

10 highest peaks above -30 dB of Limit Line #2
peak criteria = 1 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	.03033	100.8	-29.2
2	.1517	68.3	2.3
3	.167	68.1	-5.9
4	.1724	56.9	-9.1
5	.1898	68.2	-5.8
6	.2007	55.6	-10.4
7	.2054	56	-10.0
8	.2104	55	-11.0
9	.2243	62.7	-3.3
10	.3067	56	-10.0



FREE FIELD TEST FACILITY
CONDUCTED EMISSIONS TEST RESULTS

19 Aug 1902 07:38:54

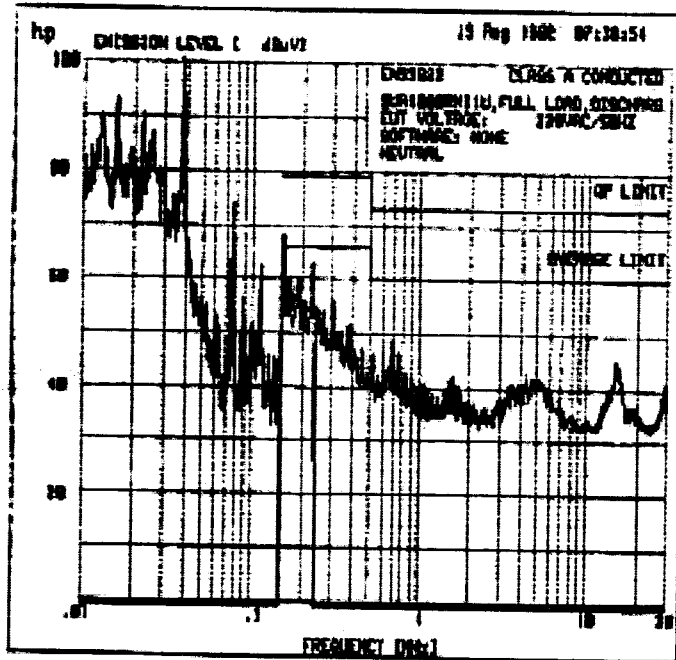
1. CONDUCTOR
1.2 EN65422 CLASS A CONDUCTED

REMARKS: (1) FULL LOAD DISCHARGE
EMI VOLTAGE: 250VAC/50HZ
SOFTWARE: NONE
NEUTRAL

10 highest quasi-peaks above -30 dB of Limit Line #2
peak criteria = 1 dB

PEAK	FREQ (MHz)	(dBuV)	DELTA
1	.1542	67.6	1.6
2	.167	56.8	-9.2
3	.1890	58.8	-7.2
4	.2007	54	-12.8
5	.7201	62.5	-3.5

$\Delta_{avg} = 57.68 \pm 10 = 57.1 \text{ dBuV (limit} = 66 \text{ dBuV, Margin} = -8.9 \text{ dB)}$



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FREE FIELD TEST FACILITY
CONDUCTED EMISSIONS TEST RESULTS

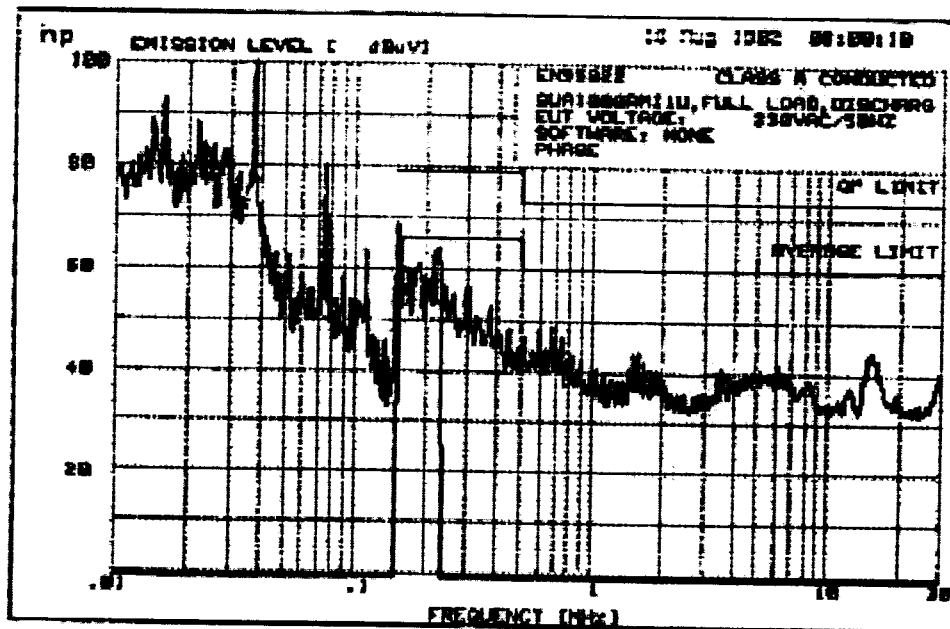
19 Aug 1902 00:00:16

1. CONDUCTED
1.2 EN55022 CLASS A CONDUCTED

SUM1000RM11U, FULL LOAD, DISCHRG
EUT VOLTAGE: 230VAC/50HZ
SOFTWARE: NONE
PHASE

10 highest peaks above -30 dB of Limit Line #2
peak criteria = 1 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	.03772	100.2	OVERNG
2	.1517	68.8	2.8
3	.1605	68.1	-5.9
4	.1711	58.3	-7.7
5	.1752	59.5	-6.5
6	.1795	58.4	-7.6
7	.1803	68.9	-5.1
8	.1975	57.8	-8.2
9	.2056	57.6	-8.4
10	.2201	63.9	-2.1



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FREE FIELD TEST FACILITY
CONDUCTED EMISSIONS TEST RESULTS

19 Aug 1982 00:00:15

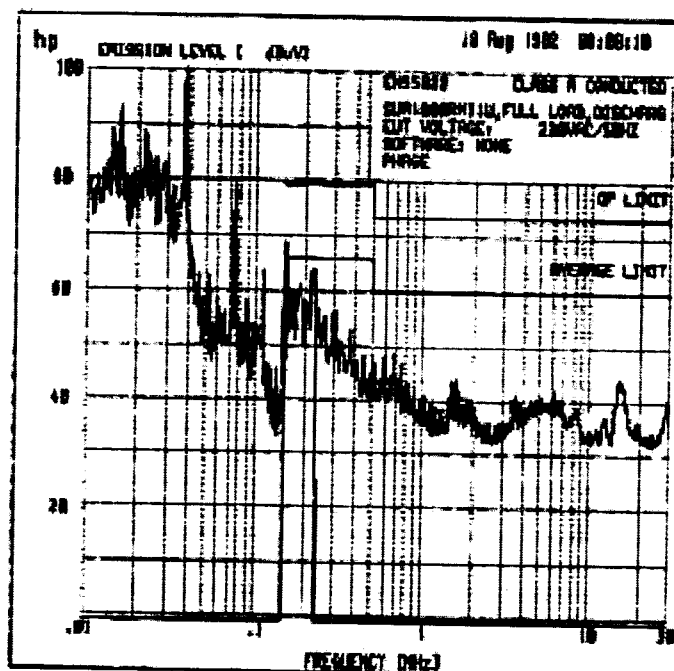
1. CONDUCTED
1.2 E057022 CLASS A CONDUCTED

SURROUNDING FULL LOAD DISCHARGE
EUT VOLTAGE: 250VAC/50HZ
SOFTWARE: NONE
PHASE

10 highest quasi-peaks above -31 dB of Limit Line #2
peak criteria = 1 dB

PEAK#	FREQ (MHz)	(dBuV)	DELTA
1	.1517	68.2	2.2
2	.167	57.1	-8.9
3	.1853	59.6	-6.4
4	.221	43.9	-2.5

$AVG = 37.86 + 10 = 47.86$ (Limit = 66 dBuV Margin)



APPENDIX A

EMI Emissions and Immunity Test Form

The information contained in this Appendix was provided by Rick Everett of American Power Conversion. It contains specific configuration details of the system as tested.

Quest Engineering Solutions EMI Emissions and Immunity Test Form

Please complete all that applies for the equipment under test (EUT). Include a block diagram showing the EUT and all support equipment.

Date: 07/18/02
Company: American Power Conversion **Contact:** Bryce Capodieci, Rick Everett
Street: 85 Rangeway Road
City, State ZIP: North Billerica, MA 01821
Telephone: 978 - 670 - 2440 x 17275 **FAX:** 978-670-3747

Test Type:

Emissions

CISPR 11	<input type="checkbox"/>		
CISPR 22	<input checked="" type="checkbox"/>	VDE	<input type="checkbox"/>
VCCI	<input type="checkbox"/>	Other	<input type="checkbox"/>
AUSTEL	<input type="checkbox"/>		
Class A (1)	<input checked="" type="checkbox"/>		
Class B (2)	<input type="checkbox"/>		

Immunity

EN50082-1	<input type="checkbox"/>	EN50082-2	<input type="checkbox"/>	IEC60601-1-2	<input type="checkbox"/>
EN61326	<input type="checkbox"/>	EN61000-6-2	<input type="checkbox"/>		
EN61000-4-2	<input checked="" type="checkbox"/>	EN61000-4-6	<input checked="" type="checkbox"/>	Test Level 1	<input type="checkbox"/>
EN61000-4-3	<input checked="" type="checkbox"/>	EN61000-4-8	<input type="checkbox"/>	Test Level 2	<input type="checkbox"/>
EN61000-4-4	<input checked="" type="checkbox"/>	EN61000-4-11	<input checked="" type="checkbox"/>	Test Level 3	<input type="checkbox"/>
EN61000-4-5	<input checked="" type="checkbox"/>			Test Level 4	<input type="checkbox"/>
Special <u>IEC 61000-2-2, EN 61000-3-2, EN 61000-3-3</u>					
Add EN 61000-4-1 General Requirements to Certificate					

Equipment Under Test (EUT) Description:

Uninterruptible Power Supply (UPS)

Model Number(s): SUA750RMI1U, SUA1000RMI1U **Serial Number(s):** N/A

EUT Weight(lb.): 39 lb. **EUT Size (LxWxH):** 25.75 x 17 x 1.76 inches

Power Interface:

Frequency 50/60 Hz
 Voltage 220 - 240Vac
 No. of Phases 1
 Current 10A
 Plug Type IEC
 Cord Type _____

Power Supply:

Description _____
 Manufacturer _____
 Model Number _____
 Switching Freq. _____
 RF Filter Manufac. _____
 RF Filter Model _____

Equipment Cycle Time: _____

Failure Criteria: _____

Equipment Configuration	Slot No.	Board Type
	N/A	

Equipment Internal Devices (e.g. disks, tapes)	Manufacturer	Part No.	Serial No.
	N/A		

Oscillator Frequencies of EUT (Please list all):

Main is 16 MHz, USB 24 MHz, Inverter 10-40 MHz,

Battery Charger 30-70 MHz, See Attachment

RF Suppression Components of EUT (i.e., ferrites, gasketting, filters, etc.):

Manufacturer	Part No.	Locations used
--------------	----------	----------------

Cabinet Shielding/Construction of EUT:

	N/A

I/O Cables:

Note: Interconnecting cables shall be connected to one of each type of functional port of the EUT. Where there are multiple ports of the same type, additional cables shall be attached to each of these ports. These additional cables do not need to be terminated.

Quantity	Part No.	Function	Shield description (e.g. braid, foil, none)
1		DB9	
1		USB	

Software Description:

Note: The EUT must be exercised by software or other means so as to ensure that the various parts of the system are active. The exercise shall generate traffic representative of typical equipment usage. For immunity testing, the software must be capable of reporting any errors that may occur.

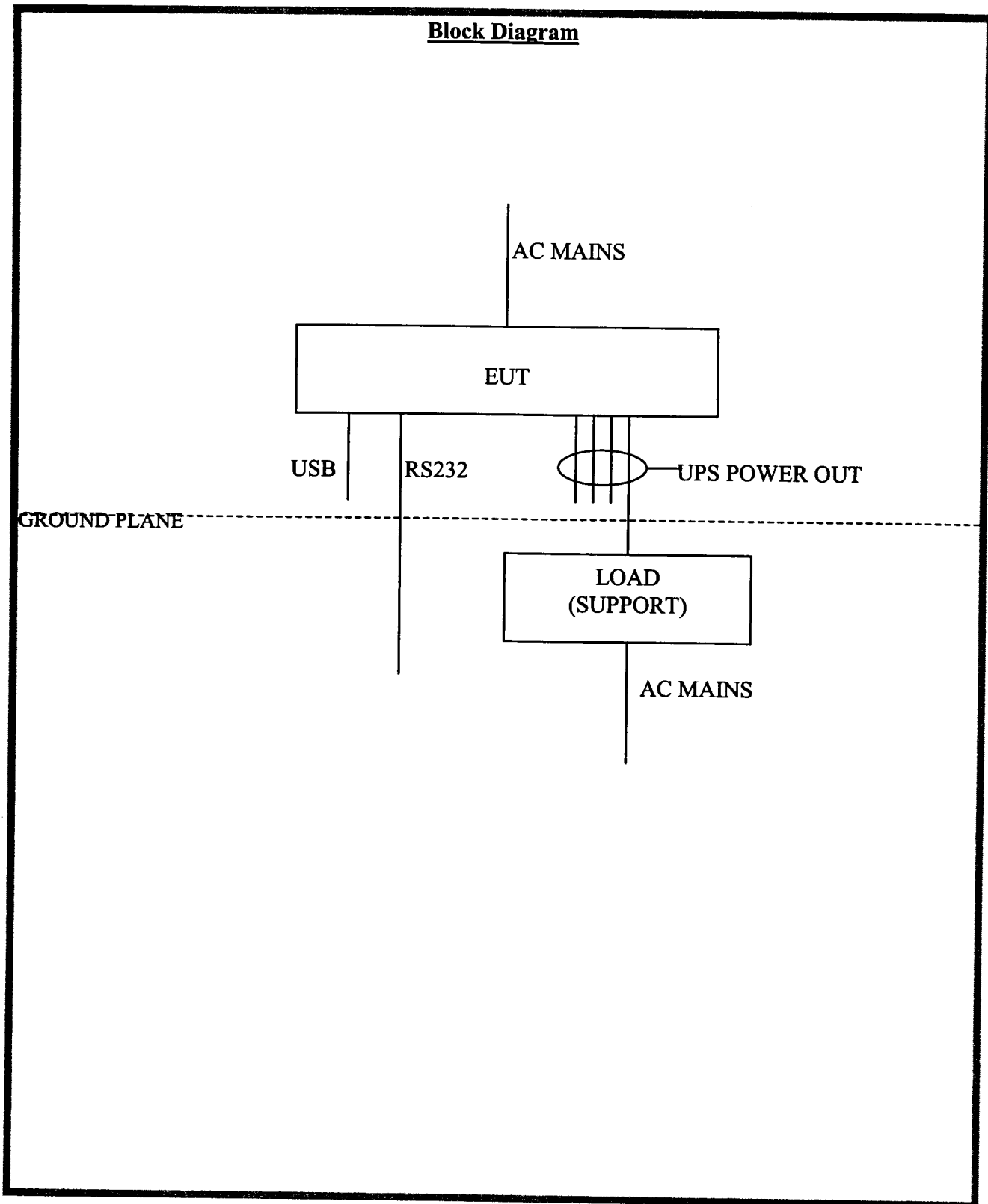
Internal Firmware

Support Equipment Description (Manufacturer, model number, serial number, cable numbers):

AC Load, 10 kW Avtron

Additional Information:

Block Diagram



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APPENDIX B

QUEST CREDENTIALS

Q02140 August 19, 2002

FCC registered test site

NVLAP Lab Code 200036-0

FCC Method-47 CFR Part 15 – Digital Devices

Conducted Emissions, Power Lines, 450 kHz to 30 MHz

Radiated Emissions

International Special Committee on Radio Interference (CISPR) Methods

IEC/CISPR 22:1993

IEC/CISPR 22:1993, Amendment 1:1995, and Amendment 2:1996

CNS 13438:1997

Australian Standards referred to by clauses in ACA Technical Standards

AS/NZS 3548

Conformity Assessment Body (CAB) For the EMC annex

VCCI Registration Numbers R-712 and C732

Austel A96/TH/0079

AS/NZS 3584



Issues

A CERTIFICATE OF TEST:

To

*American Power Conversion
85 Rangeway Road
North Billerica, MA 01821, U.S.A.*

For

**Product: Uninterruptible Power System
MODEL: SUA1000RMI1U and SUA750RMI1U**

Date: August 21, 2002

Quest Engineering Solutions, a US and internationally approved test house, attests that compliance testing was completed satisfactorily on the aforementioned equipment as specified by the manufacturer and reported in Quest's test report number: Q02141. Quest Engineering Solutions acknowledges that the Equipment Under Test was found to be in compliance with the following standards:

EN50091-2, Uninterruptable Power Systems (UPS)

EN 61000-4-1

EN61000-4-2, Electrostatic Discharge

EN61000-4-3, Radiated Electromagnetic Fields

ENV50204, Radiated Electromagnetic Field From Digital Radio Telephones

EN61000-4-4, Electrical Fast Transient/Burst

EN61000-4-5, Surge Immunity Requirements

EN61000-4-6, Conducted Disturbances Induced By Radio-Frequency Fields

EN61000-4-11, Voltage Dips, Short Interruptions and Voltage Variations

Immunity Tests

EN61000-2-2, Compatibility levels for low-frequency conducted disturbances and signaling in public low-voltage supply systems

Q02141

TEL 978-667-7000 ♦ FAX 978-667-3388 ♦ Email info@QES.com
World Wide Web <http://www.QES.com>

VDE File:1924400-3335-0030

CB DE1-16215

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SECTION 1 OVERVIEW**1.1 Purpose of Test**

To determine if the Uninterruptible Power System will meet the following immunity requirements:

- EN50091-2, Uninterruptible Power Systems (UPS)
- EN61000-4-2, Electrostatic Discharge (ESD), 4 kV contact discharge, 8 kV air discharge, 4 kV Horizontal and Vertical Coupling Planes (HCP and VCP respectively)
- EN61000-4-3, Radiated Electromagnetic Fields, 3 V/m, 80-1000 MHz
- ENV 50204, Radiated Electromagnetic Field From Digital Radio Telephones, 3 V/m, 900 \pm 5 MHz
- EN61000-4-4, Electrical Fast Transient/Burst (EFT), 1 kV mains, 0.5kV on data cables
- EN61000-4-5, Surge Immunity Requirements, 2 kV on mains
- EN61000-4-6, Conducted Immunity Requirements, 3 V on mains and data cables, .15 - 80 MHz.
- EN61000-4-11, Voltage Dips, 30%/10ms, 60%/100ms, Short Interruptions >95%/5sec.
- IEC 1000-2-2, Compatibility levels for low-frequency conducted disturbances and signaling in public low-voltage supply systems

1.2 Dates of Test

August 21, 2002

1.3 Summary of Test Results

<u>Test</u>	<u>Result</u>	<u>Comments</u>
EN61000-4-2 Air Discharge	PASSED	
EN61000-4-2 Contact Discharge	PASSED	
EN61000-4-2 HCP	PASSED	
EN61000-4-2 VCP	PASSED	
EN61000-4-3	PASSED	
EN61000-4-4	PASSED	
EN61000-4-5	PASSED	
EN61000-4-6	PASSED	
EN61000-4-11	PASSED	
IEC 1000-2-2	PASSED	

All of the above tests meet or exceed the required levels of EN50091-2. Refer to Section 4.0 for Test Result details.

SECTION 2 REFERENCES**2.1 Procedures/Standards**

- EN61000-4-1, 1994, Testing and Measurement Techniques
- ° EN50091-2, Uninterruptable Power Systems (UPS)
 - ° EN61000-4-2, 1995, First Edition, Electrostatic Discharge
 - ° EN61000-4-3, 1995, Radiated, radio-frequency, electromagnetic field immunity test
 - ° ENV 50204, 1996, Radiated Electromagnetic Field From Digital Radio Telephones
 - ° EN61000-4-4, 1988, Electrical Fast Transient Burst
 - ° EN61000-4-5, 1995, Surge Immunity Test
 - ° EN61000-4-6, 1996, Conducted disturbances induced by radio-frequency fields - immunity test.
 - ° EN61000-4-11, 1994, Voltage dips, short interruptions and voltage variations immunity tests
 - EN61000-2-2, 1990, Compatibility levels for low-frequency conducted disturbances and signaling in public low-voltage supply systems

SECTION 3 DETAILS**3.1 Description of Product**

The Equipment Under Test (EUT) consisted of a Uninterruptible Power System. The voltage supplied to the EUT was 230 VAC, 60 Hz. The voltage supplied to the support equipment was 120 VAC, 60 Hz.

The specific EUT information is listed in Appendix A.

3.2 Test Software/Operating Mode:

No Software Required

3.3 Laboratory Test Configuration**Test Equipment:**

MANUF.	EQUIPMENT	MODEL	SERIAL #	CAL. FREQ.	DUE
GENERAL	TEST EQUIPMENT:				
HP	SPECTRUM ANALYZER	8568B	2634A02760	12 MONTHS	1/03
HP	FUNCTION GENERATOR	3312A	1432A13018	NO CAL NEEDED	
TANDY	THERMO & HYGRO.	63-855		12 MONTHS	04/03
SINGER	MONITOR CLAMP	CP-105	NONE	12 MONTHS	09/02

Q02141 August 21, 2002

MANUF.	EQUIPMENT	MODEL	SERIAL #	CAL. FREQ.	DUE
RADIATED TEST EQUIPMENT:					
PANASHIELD	FERRITE CHAMBER	N/A	EMI#1	12 MONTHS	09/02
KALMUS	RF AMPLIFIER	757LCB-CE	7762-1	NO CAL NEEDED	
WANDEL & GOLTERMANN	FIELD SENSOR	EMR-200	2240/21	24 MONTHS	10/02
WANDEL & GOLTERMANN	PROBE	Type 8	0099	24 MONTHS	10/02
HP	POWER METER	436A	1803A03376	NO CAL NEEDED	
HP	POWER SENSOR	8482A	US37292933	NO CAL NEEDED	
WERLATONE	DIRECTIONAL COUPLER (HIGH)	C1500	7236	NO CAL NEEDED	
WERLATONE	DIRECTIONAL COUPLER (LOW)	C3908	7192	NO CAL NEEDED	
EMCO	BICONICAL (EMS)	3109	2314	NO CAL NEEDED	
EMCO	LOG PERIODIC (EMS)	3146	9203-3378	NO CAL NEEDED	

CONDUCTED	TEST EQUIPMENT:				
FISCHER	CDN	FCC-801-M3- 25	100	12 MONTHS	09/02
FISCHER	CDN	FCC-801-M2- 32	101	12 MONTHS	09/02
FISCHER	CDN	FCC-801-M1- 25	29	12 MONTHS	09/02
FISCHER	INJECTION PROBE	F-120-9B	22	12 MONTHS	09/02
BIRD	50 OHM LOAD	8166	4397	NO CAL NEEDED	
WEINSCHEL	10DB ATTENUATOR, 50W	24-10-43	AG6340	NO CAL NEEDED	
WEINSCHEL	20DB ATTENUATOR, 50W	40-20-43	GP368	12 MONTHS	10/02

EFT/SURGE	TEST EQUIPMENT:				
KEYTEK	ECAT SYSTEM WITH EFT/B SOURCE SURGE NETWORK COUPLER/DECOUPLER	E103 E411 E501 E4554	9309426	12 MONTHS	11/02
KEYTEK	COUPLING CLAMP	CCL - 4/S	9309209	NO CAL NEEDED	
TEKTRONIX	FUNCTION GENERATOR	TM503	B127178	NO CAL NEEDED	
TEKTRONIX	OSCILLOSCOPE	7104	B021171	NO CAL NEEDED	
TEKTRONIX	OSCILLOSCOPE	7603	B378014	12 MONTHS	05/03

ESD	TEST EQUIPMENT:				
SCHAFFNER	ESD SIMULATOR	NSG-432	00193	12 MONTHS	09/02
SCHAFFNER	ADAPTER HEAD	402-568	193-B	12 MONTHS	09/02
SCHAFFNER	ADAPTER HEAD	402-580	193-C	12 MONTHS	09/02

Q02141 August 21, 2002					
SCHAFFNER	ADAPTER HEAD	402-628	9237	12 MONTHS	09/02
SCHAFFNER	ADAPTER HEAD	402-645	9244	12 MONTHS	09/02
SCHAFFNER	REAL ESD ADAPT.	SL402-619	116	12 MONTHS	09/02

VOLTAGE DIPS, INTERRUPTIONS & VARIATION TEST EQUIPMENT					
BEHLMAN	POWER SOURCE	ACP-3000-100	3209	NO CAL NEEDED	
TEKTRONIX	OSCILLOSCOPE	7603	B378014	12 MONTHS	05/03
TEKTRONIX	PROGRAMMABLE DIGITIZER	7D20	B063600	12 MONTHS	05/03

EMI #1 A 16 foot wide, 24 foot long, 12 foot high chamber with a 12 inch raised floor. The 4 walls and ceiling are covered with ferrite tile. The floor has a 10 foot by 10 foot ferrite patch that covers the area under the antenna and extends toward the EUT. All power and signal cables are run under the raised floor. An 8 foot wide, 12 foot long, 7 foot high control room is attached to the EUT end. Bulkheads and waveguides are provided to bring cables into the control room. All power entering the two rooms is filtered. The ferrite chamber is calibrated for Field Uniformity.

EMI #2 A 14 foot wide, 24 foot long 10 foot high screen room with no ferrite tiles or absorber cones.

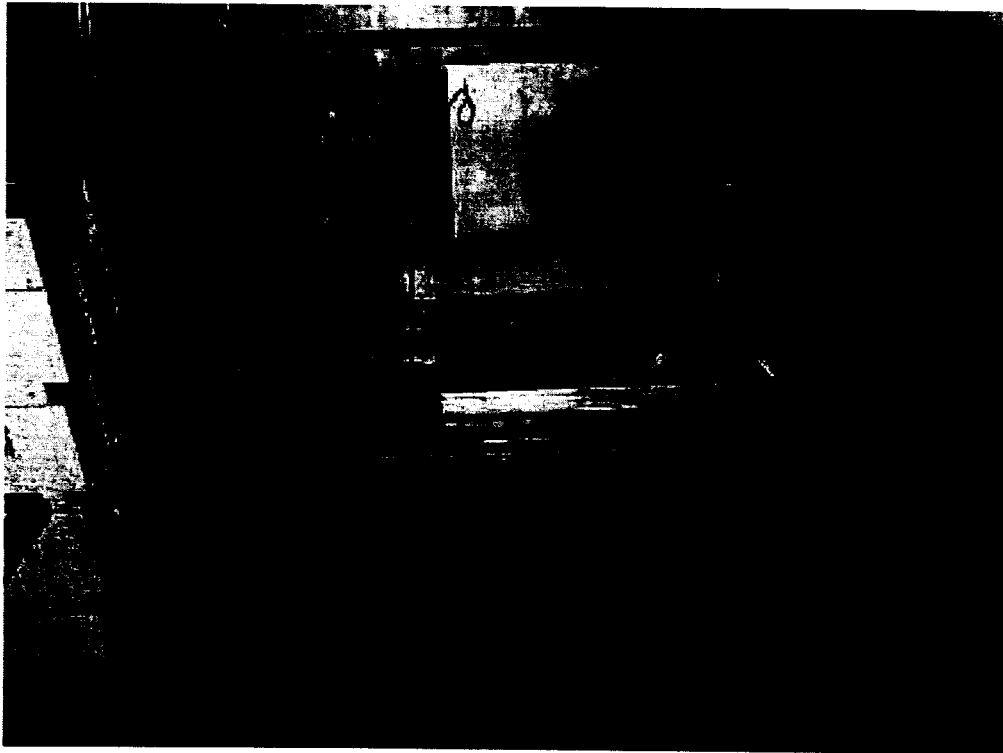
EMI #3 An 8 foot wide, 8 foot long ground plane.

All test equipment used for measurements was calibrated and traceable to the US Department of Commerce, National Institute of Standards and Technology (NIST).

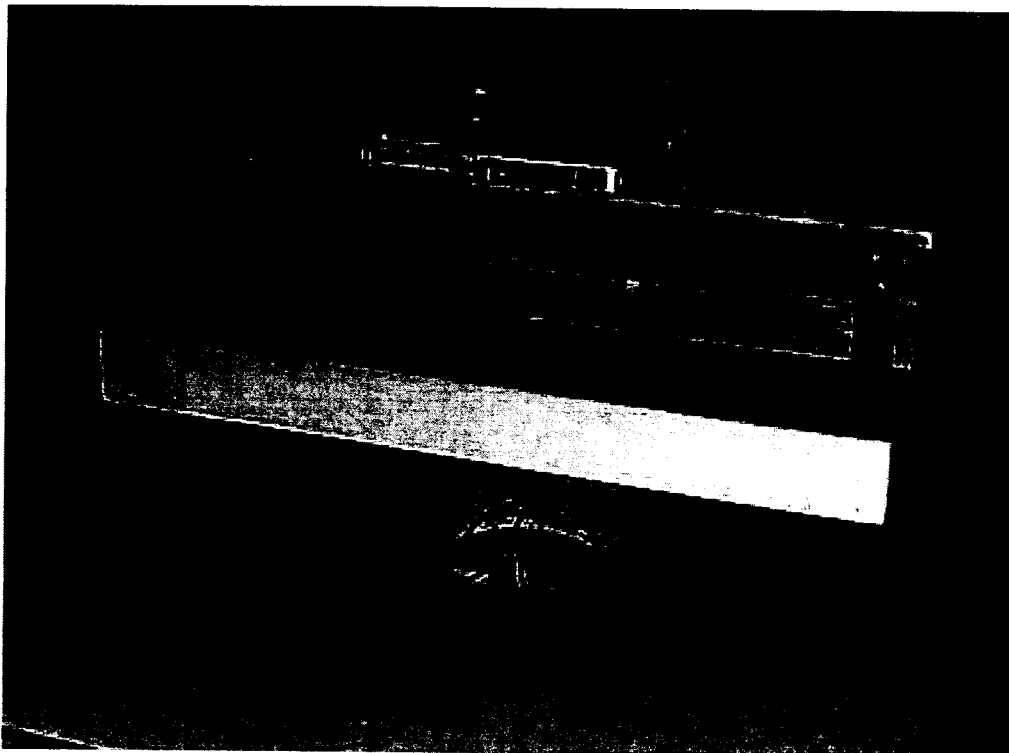
Test Environment: Temp.= 71°F, Relative Humidity = 46%

Note: In general, relative humidity levels below 30% represent conditions slightly more severe than required for some tests (i.e., ESD and EFT).

3.4 Pictures



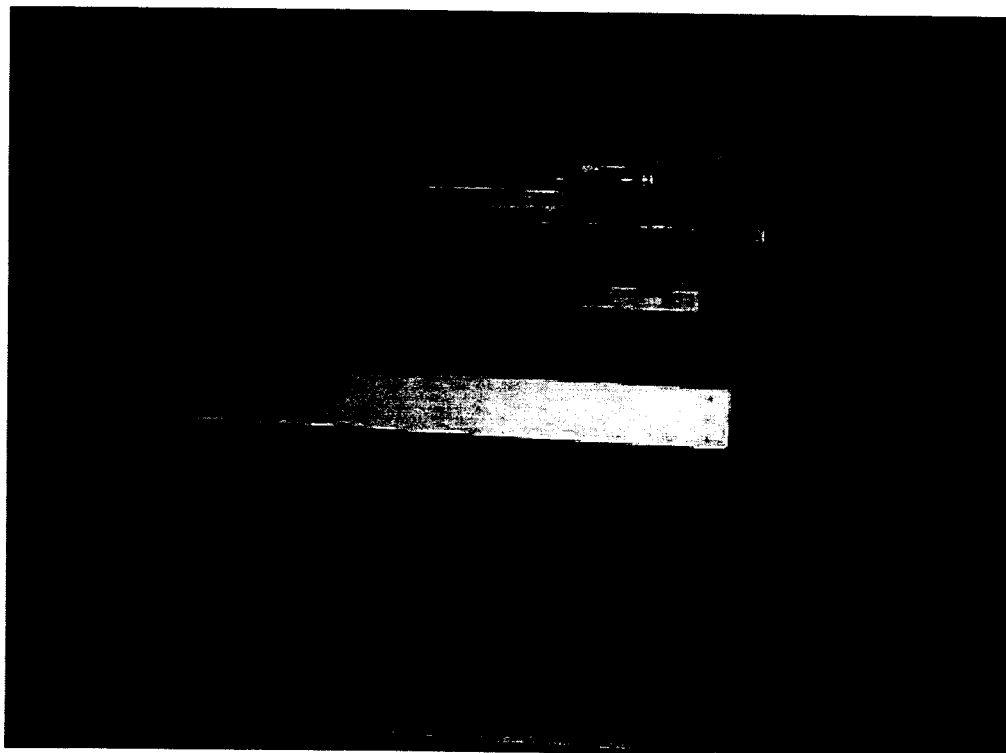
EUT Setup for EN61000-4-2



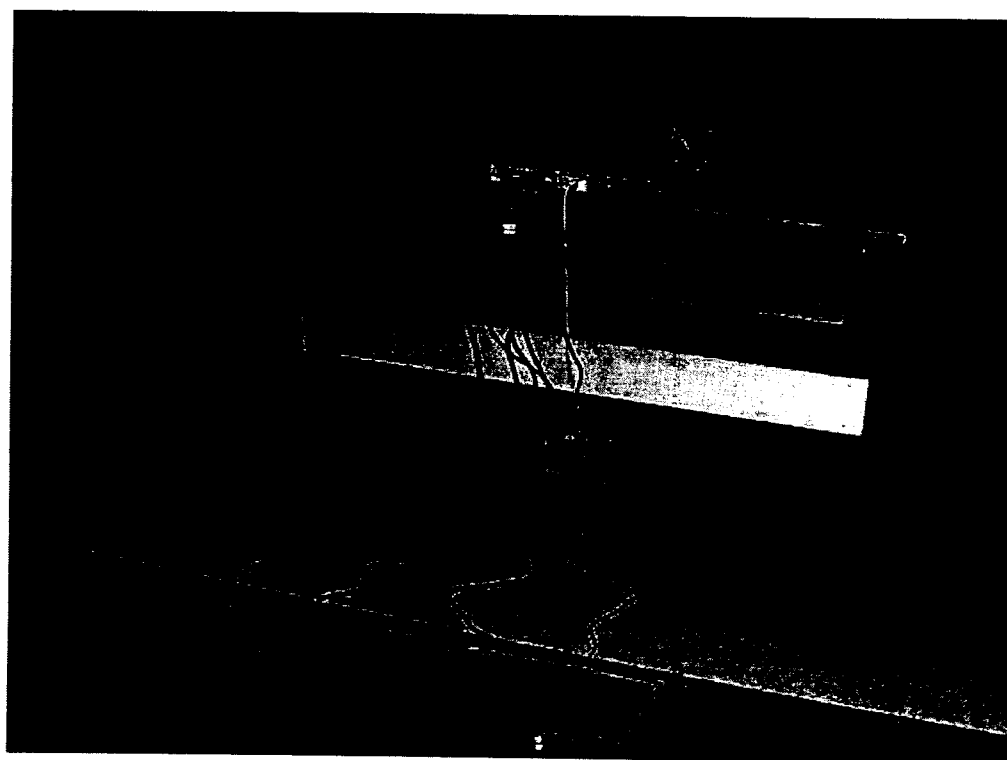
EUT Setup for EN61000-4-3 (0°)

3.4 Pictures (continued)

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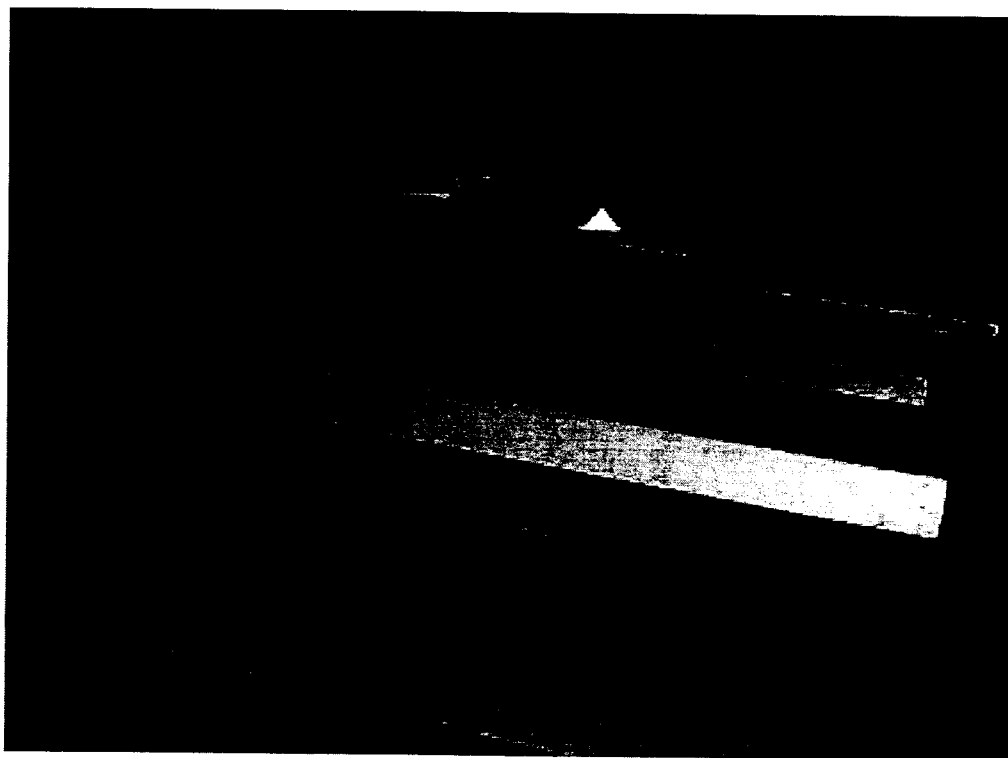
EUT Setup for EN61000-4-3 (90°)



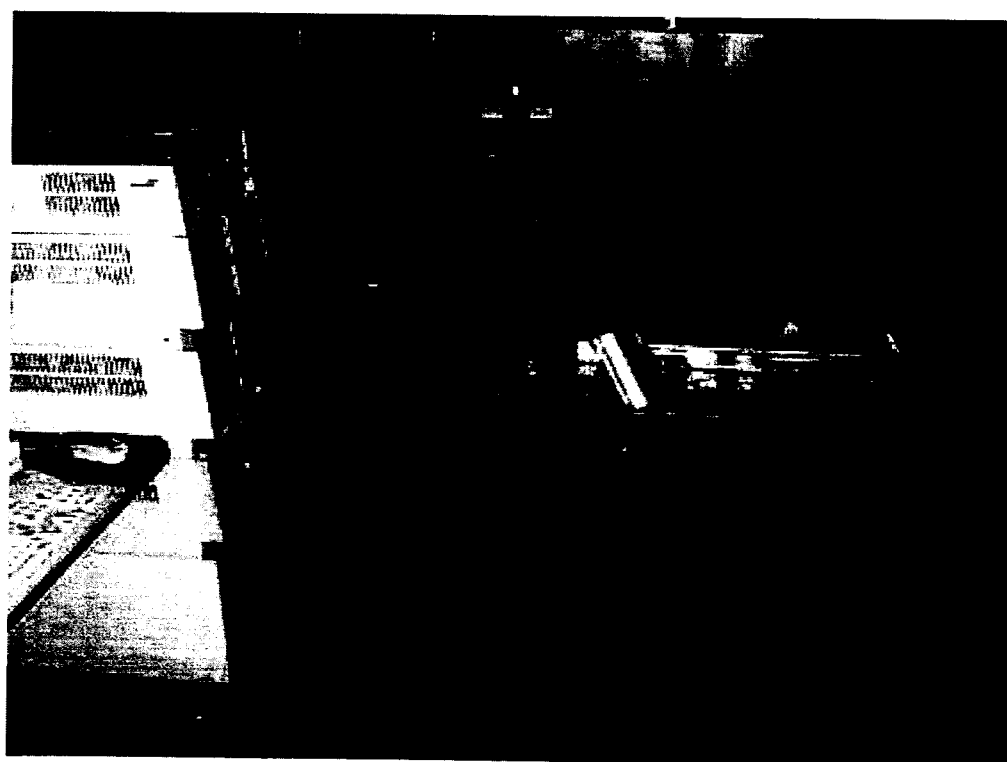
EUT Setup for EN61000-4-3 (180°)

3.4 Pictures (continued)

Q02141 August 21, 2002



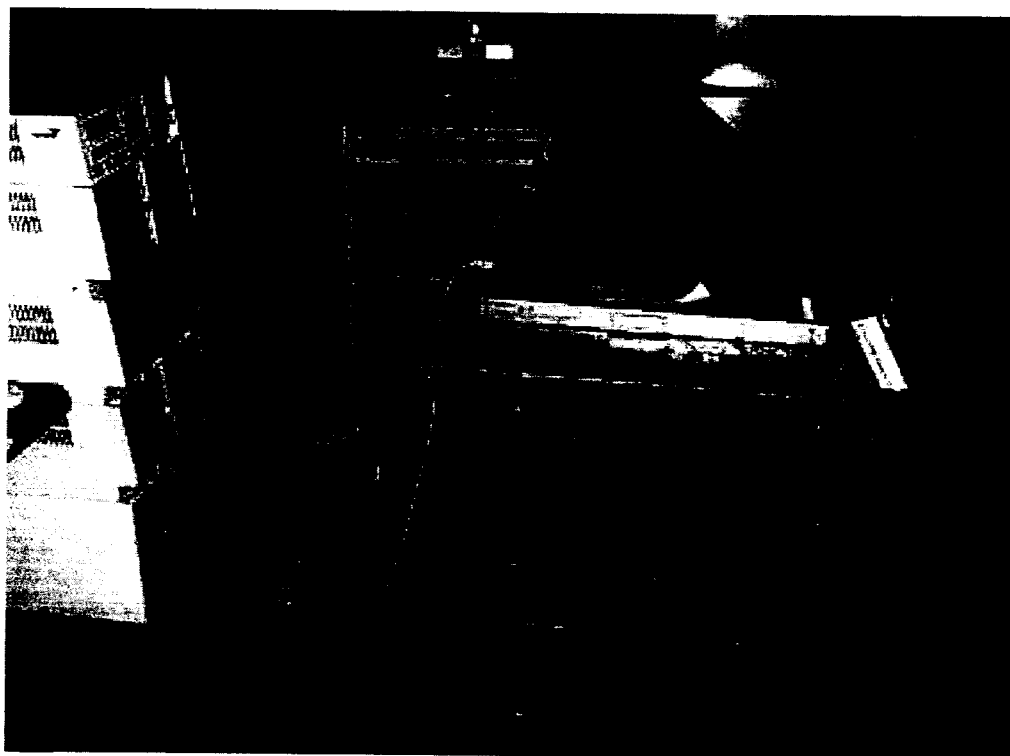
EUT Setup for EN61000-4-3 (270°)



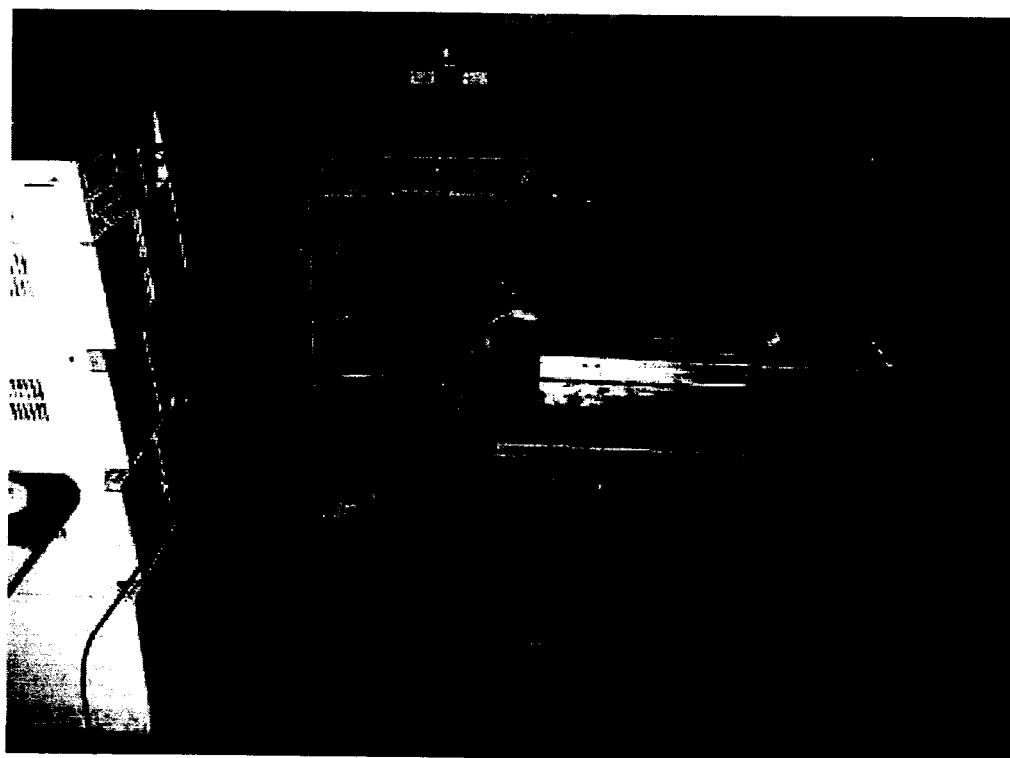
EUT Setup for EN61000-4-4 on Mains

3.4 Pictures (continued)

Q02141 August 21, 2002



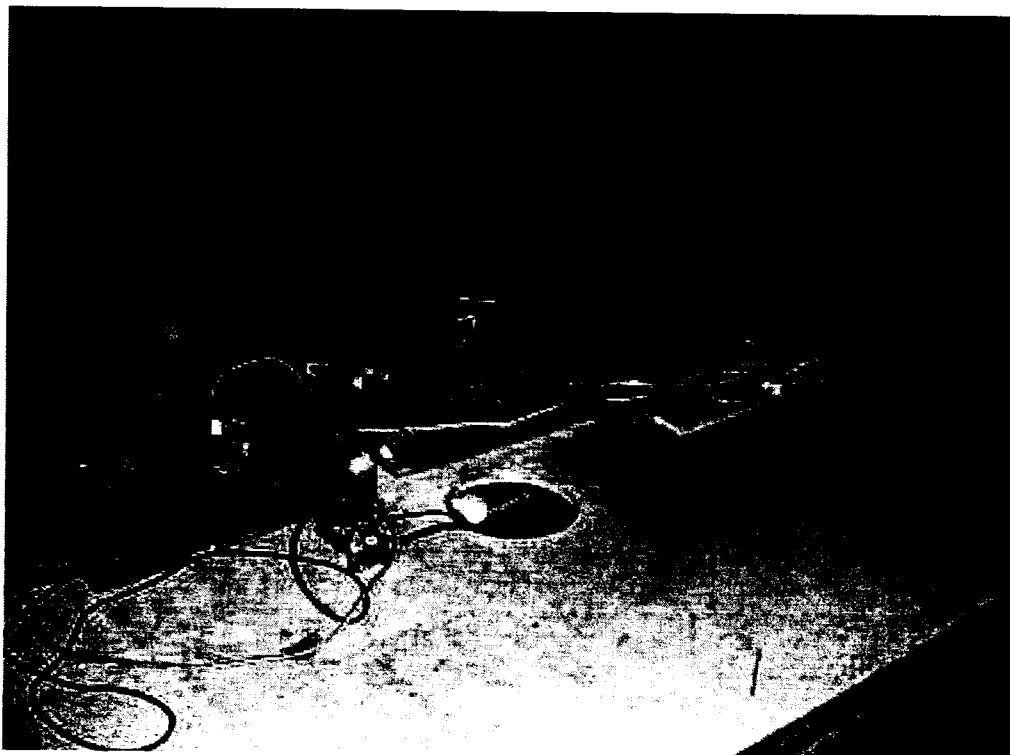
EUT Setup for EN61000-4-4 on Data Cables



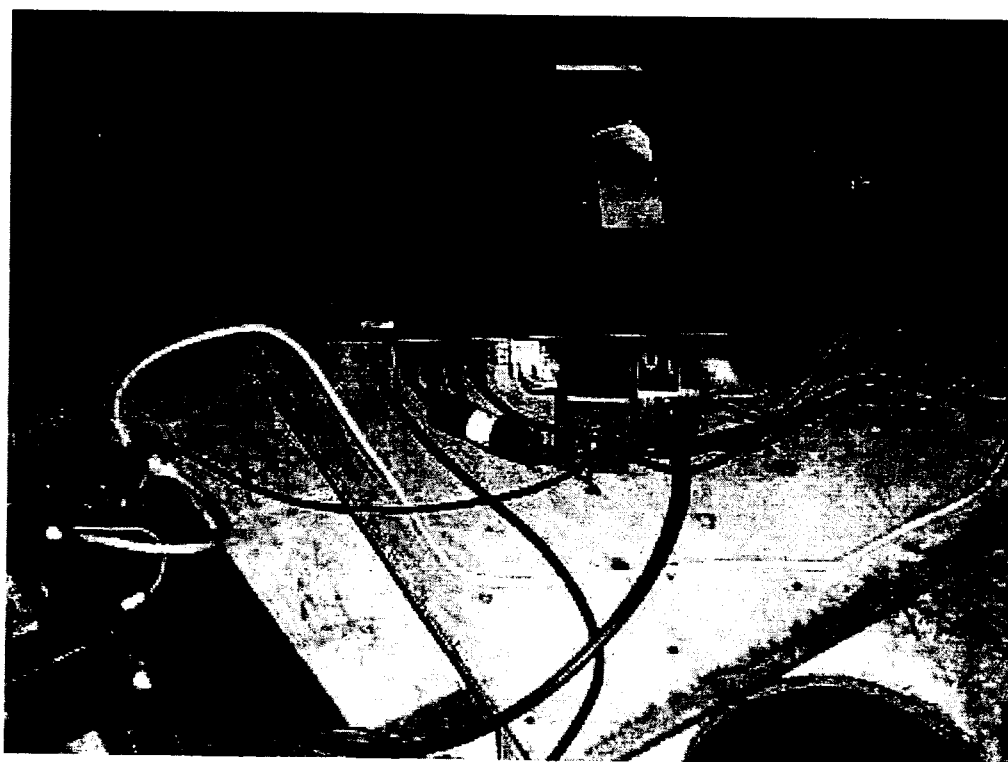
EUT Setup for EN61000-4-5 on Mains

3.4 Pictures (continued)

Q02141 August 21, 2002



EUT Setup for EN61000-4-6 on Mains



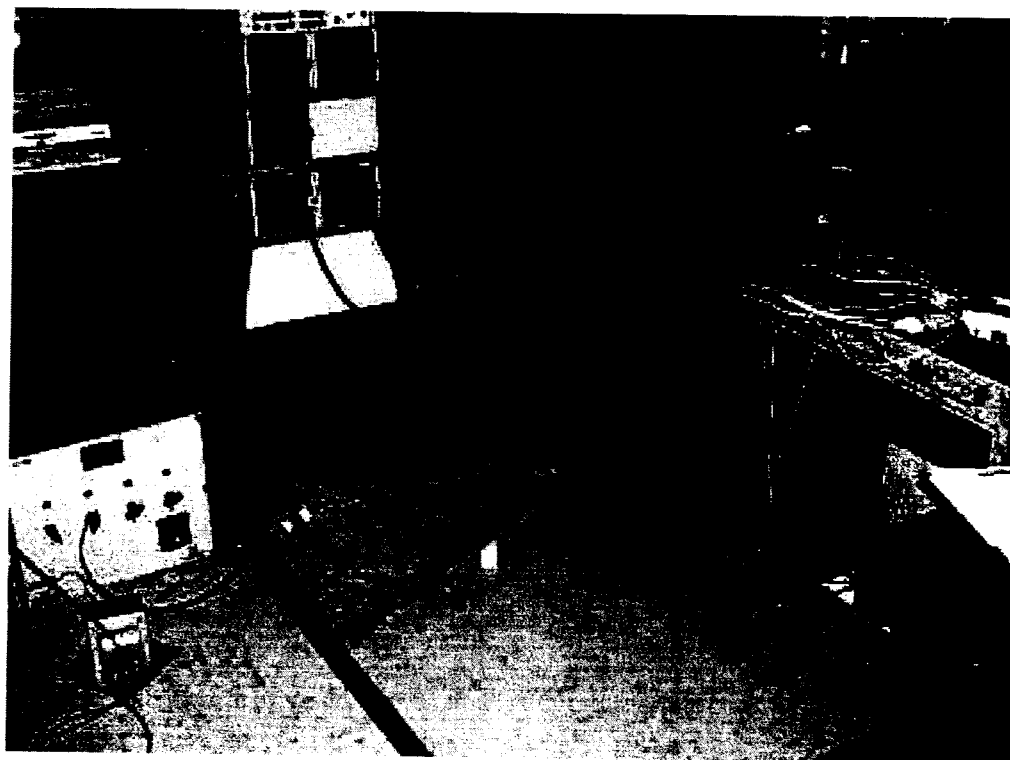
EUT Setup for EN61000-4-6 on Data Cables

3.4 Pictures (continued)

Q02141 August 21, 2002



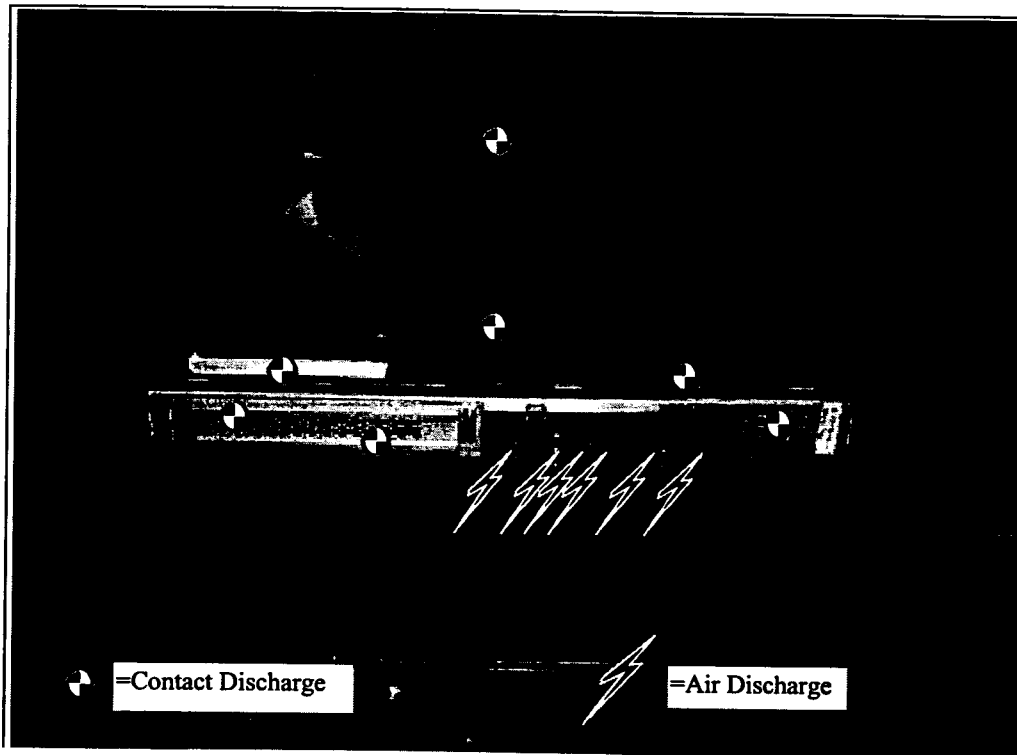
EUT Setup for EN61000-4-11



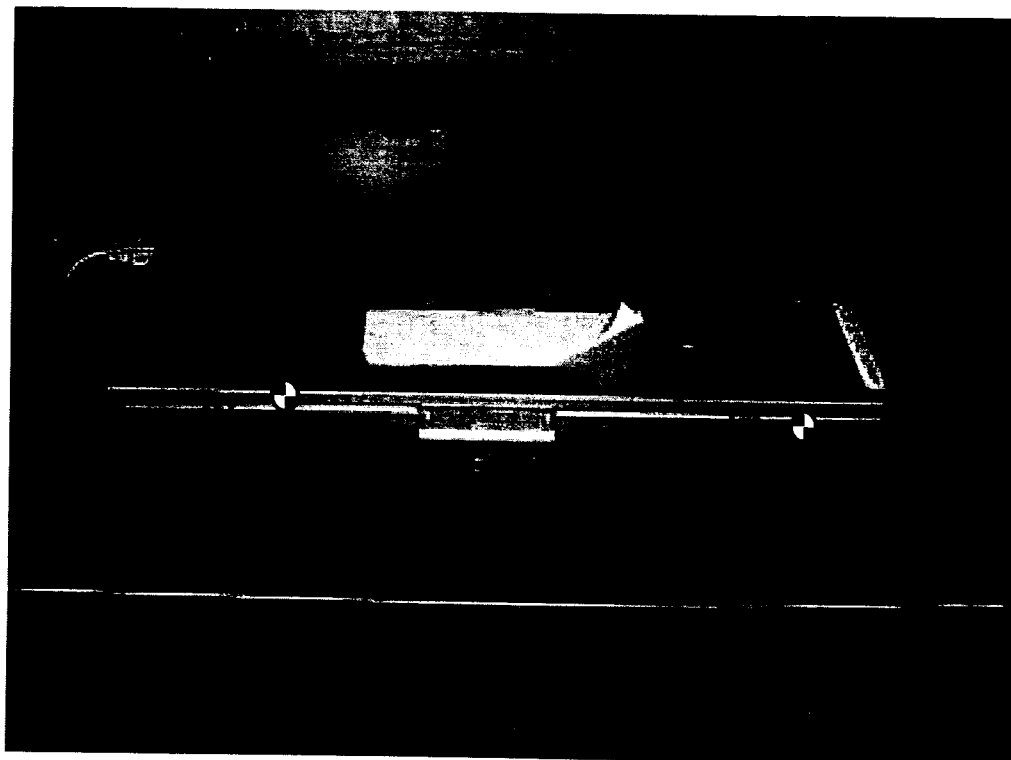
EUT Setup for IEC 1000-2-2

3.4 Pictures (continued)

Q02141 August 21, 2002



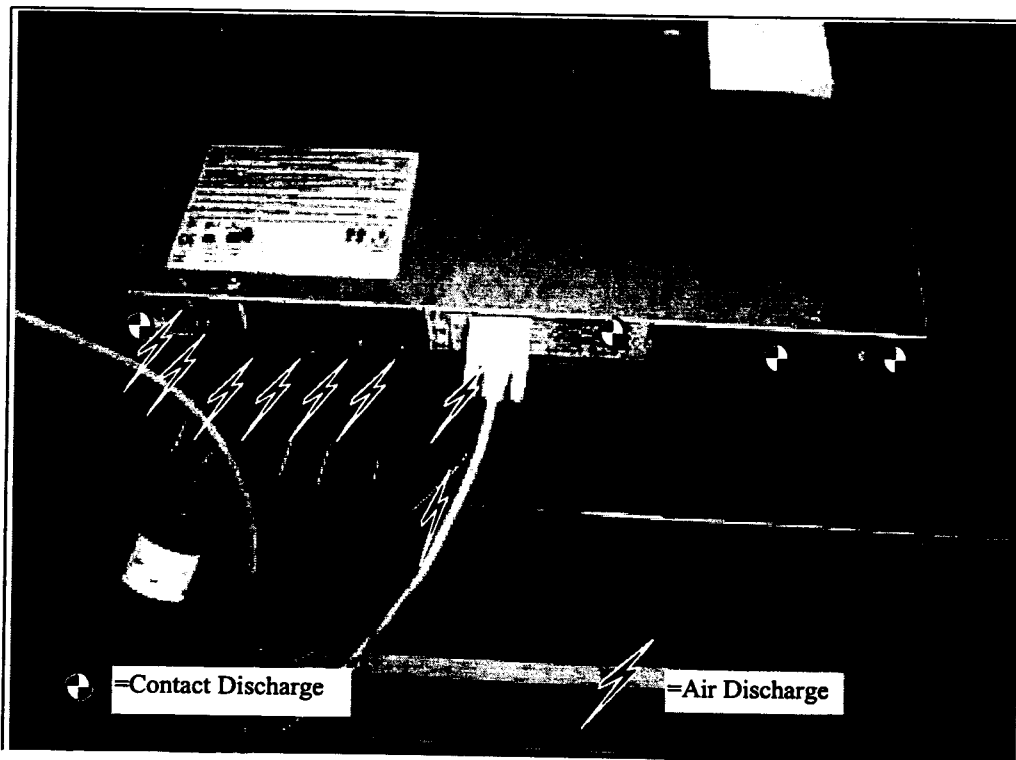
ESD Discharge Points



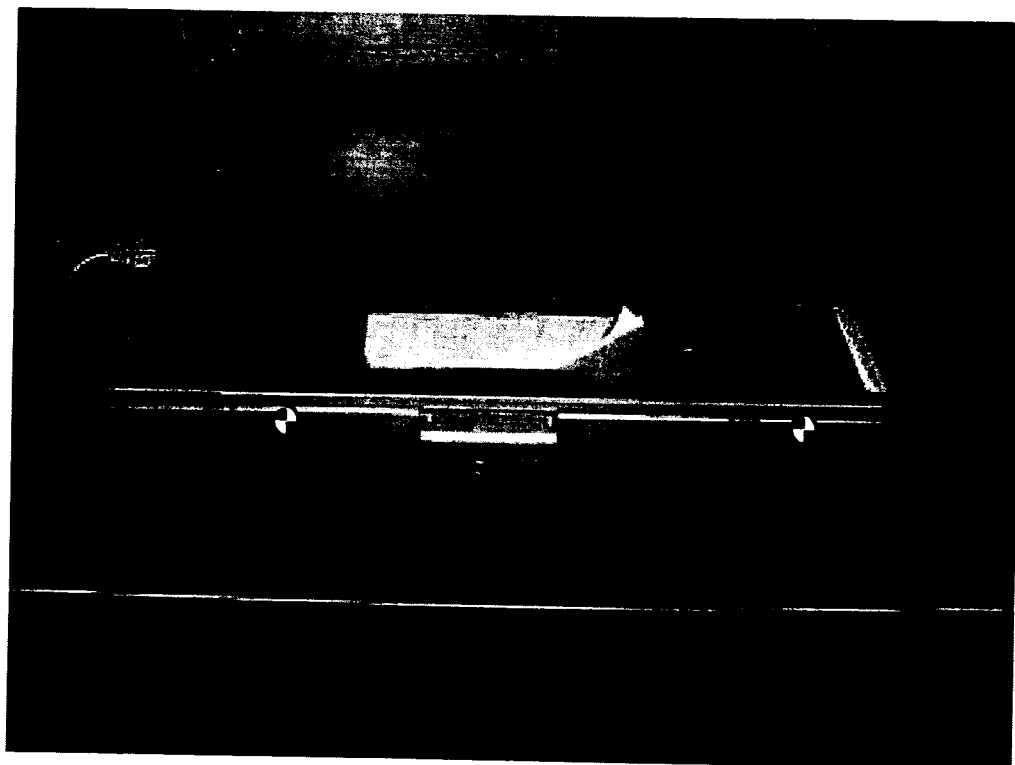
ESD Discharge Points

3.4 Pictures (continued)

Q02141 August 21, 2002



ESD Discharge Points



ESD Discharge Points

SECTION 4 CONCLUSIONS**4.1 Test Results****EN61000-4-2, ELECTROSTATIC DISCHARGE**

Test facility used: EMI #2

<u>TEST</u>	<u>LEVEL</u>	<u>RESULTS</u>	<u>COMMENTS</u>
Air Discharge	± 8kV	PASSED	CRITERIA A
Direct Contact Discharge	± 4kV	PASSED	CRITERIA A
Horizontal Coupling Plane	± 4kV	PASSED	CRITERIA A
Vertical Coupling Plane	± 4kV	PASSED	CRITERIA A

Performance Criterion B of EN50091-2 was used in determining the results.

Note: Reference EN50091-2, Contact discharge points were applied to conductive surfaces of the EUT. Air discharge points were applied to non-conductive surfaces of the EUT. HCP was done with an insulating distance of 0.5 mm.

EN61000-4-3, RADIATED ELECTROMAGNETIC FIELDS

Test facility used: EMI #1

<u>TEST</u>	<u>LEVEL</u>	<u>RESULTS</u>	<u>COMMENTS</u>
26 to 1000 MHz at (80% AM @ 1 kHz)	3 V/M	PASSED	
900 ±5 MHz (95% PM @ 200 Hz)	3 V/M	PASSED	(per ENV 50204)

Performance Criterion A of EN50091-2 was used in determining the results.

Note: The field uniformity was calibrated per EN61000-4-3. The frequency sweep rate 1% step size with a dwell of 3 seconds. Additional dwells were made to the 10th harmonic of the EUT clock frequencies or 1000MHz. For the frequency ranges that call for the use of the BICONICAL and Log Periodic antennas, both the horizontal and vertical polarities were done. The EUT to antenna distance was 3 meter(s). Testing was done with 80% AM at 1kHz applied.

EN61000-4-4, ELECTRICAL FAST TRANSIENT/BURST

Test facility used: EMI #2

<u>TEST</u>	<u>LINE</u>	<u>RESULTS</u>	<u>COMMENTS</u>
FAST TRANSIENTS/BURST TEST ON MAINS			
± 1 kV pulses, 5 nsec rise/50 nsec duration	Phase	PASSED	CRITERIA A
5.0 kHz pulse repetition rate	Neutral	PASSED	CRITERIA A
15 msec ± 20% burst length	Ground	PASSED	CRITERIA A
300 msec ± 20% burst period			
Applied for 1 minutes per polarity			

FAST TRANSIENTS/BURST TEST ON DATA CABLES

± 0.5kV pulses, 5 nsec rise/50 nsec duration	All copper I/O cables, PASSED	CRITERIA A
5.0 kHz pulse repetition rate	refer to Test Form for details.	
15 msec ± 20% burst length		
300 msec ± 20% burst period.		
Applied for 1 minutes per polarity		

Performance Criterion B of EN50091-2 was applied in determining the results.

EN61000-4-5, SURGE IMMUNITY

Open circuit voltage: 1.2/50µs 6kV Maximum

Short circuit current: 8/20µs 3kA Maximum

The EUT is a single phase unit.

EUT Voltage = 230 VAC/50 Hz

Test facility used: EMI #2

MAINS: <u>TEST</u>	<u>LEVEL</u>	<u>RESULTS</u>	<u>COMMENTS</u>
Phase to Ground: Combination Wave			
1.2/50, 8/20, with a 12 ohm resistor	± 2 kV	PASSED	CRITERIA A
Neutral to Ground: Combination Wave			
1.2/50, 8/20, with a 12 ohm resistor	± 2 kV	PASSED	CRITERIA A
Phase to Neutral: Combination Wave			
1.2/50, 8/20, with a 2 ohm resistor			

Note: Phase to Neutral test not performed at customer request

Performance Criterion B of EN50091-2 was used in determining the results.

EN61000-4-6, CONDUCTED DISTURBANCES BY RF FIELDS

Test facility used: EMI #1

CONDUCTED DISTURBANCES ON MAINS

<u>TEST</u>	<u>LEVEL</u>	<u>LINE</u>	<u>RESULTS</u>	<u>COMMENTS</u>
0.150 to 80 MHz	1kV	Phase, Neutral, Ground	PASSED	

(80% AM @ 1 kHz)

CONDUCTED DISTURBANCES ON DATA CABLES

<u>TEST</u>	<u>LEVEL</u>	<u>LINE</u>	<u>RESULTS</u>	<u>COMMENTS</u>
0.150 to 80 MHz (80% AM @ 1 kHz)	0.5kV	All copper I/O, refer to Test Form for details.	PASSED	

Performance Criterion A of EN50091-2 was applied in determining the results.

Note: Coupling Decoupling Networks (CDNs) were used for the mains testing. The Coupling Factor of the CDNs was 0 ± 1 dB from 0.150 to 80 MHz. Injection Probe was used for the data cables testing. The frequency sweep rate was less than 1.5×10^{-3} decades/sec.

EN61000-4-11, Voltage Dips, Interruptions and Variations

Test facility used: Safety Lab.

Voltage Dips

<u>TEST</u>	<u>RESULTS</u>	<u>COMMENTS</u>
30% for 10 ms	Passed	
60% for 100 ms	Passed	

Voltage Interruptions

<u>TEST</u>	<u>RESULTS</u>	<u>COMMENTS</u>
95% for 5000 ms	Passed	CRITERIA A

Performance Criterion EN50091-2 was applied in determining the results.

IEC 1000-2-2, Low Frequency Disturbances

Test facility used: EMI #2

<u>TEST</u>	<u>RESULTS</u>	<u>COMMENTS</u>
10V RMS from 140Hz to 360Hz	Passed	CRITERIA A

Performance Criterion B of EN50091-2 was applied in determining the results.

4.2 Special Notes

The test engineer was F. Maglio, B. Melanson and R. Ferris.

The test results set forth in this report are expressly limited to the configuration and tests herein. Any changes in configuration may void test results. Quest agrees to quote charges for any retesting requested by the customer.

4.3 Required Compliance Modifications

None

APPENDIX A

EMI Emissions and Immunity Test Form

The information contained in this Appendix was provided by Rick Everett of American Power Conversion .
It contains specific configuration details of the system as tested.

Quest Engineering Solutions EMI Emissions and Immunity Test Form

Please complete all that applies for the equipment under test (EUT). Include a block diagram showing the EUT and all support equipment.

Date: 07/18/02
Company: American Power Conversion **Contact:** Bryce Capodieci, Rick Everett
Street: 85 Rangeway Road
City, State ZIP: North Billerica, MA 01821
Telephone: 978 - 670 - 2440 x 17275 **FAX:** 978-670-3747

Test Type:

Emissions	
CISPR 11	<input type="checkbox"/>
CISPR 22	<input checked="" type="checkbox"/>
VCCI	<input type="checkbox"/>
AUSTEL	<input type="checkbox"/>
Class A (1)	<input checked="" type="checkbox"/>
Class B (2)	<input type="checkbox"/>

Immunity	
EN50082-1	<input type="checkbox"/>
EN61326	<input type="checkbox"/>
EN61000-4-2	<input checked="" type="checkbox"/>
EN61000-4-3	<input checked="" type="checkbox"/>
EN61000-4-4	<input checked="" type="checkbox"/>
EN61000-4-5	<input checked="" type="checkbox"/>
EN50082-2	<input type="checkbox"/>
EN61000-6-2	<input type="checkbox"/>
EN61000-4-6	<input checked="" type="checkbox"/>
EN61000-4-8	<input type="checkbox"/>
EN61000-4-11	<input checked="" type="checkbox"/>
IEC60601-1-2	<input type="checkbox"/>
Test Level 1	<input type="checkbox"/>
Test Level 2	<input type="checkbox"/>
Test Level 3	<input type="checkbox"/>
Test Level 4	<input type="checkbox"/>
Special <u>IEC 61000-2-2, EN 61000-3-2, EN 61000-3-3</u>	
Add EN 61000-4-1 General Requirements to Certificate	

Equipment Under Test (EUT) Description:

Uninterruptible Power Supply (UPS)

Model Number(s): SUA750RMI1U, SUA1000RMI1U **Serial Number(s):** N/A

EUT Weight(lb.): 39 lb. **EUT Size (LxWxH):** 25.75 x 17 x 1.76 inches

Power Interface:

Frequency 50/60 Hz
 Voltage 220 - 240Vac
 No. of Phases 1
 Current 10A
 Plug Type IEC
 Cord Type _____

Power Supply:

Description _____
 Manufacturer _____
 Model Number _____
 Switching Freq. _____
 RF Filter Manufac. _____
 RF Filter Model _____

Equipment Cycle Time: _____

Failure Criteria: _____

Equipment Configuration

Slot No.

Board Type

N/A

Equipment Internal Devices (e.g. disks, tapes)

Manufacturer

Part No.

Serial No.

N/A

Oscillator Frequencies of EUT (Please list all):

Main is 16 MHz, USB 24 MHz, Inverter 10-40 MHz,

Battery Charger 30-70 MHz, See Attachment

RF Suppression Components of EUT (i.e., ferrites, gasketting, filters, etc.):

Manufacturer

Part No.

Locations used

Cabinet Shielding/Construction of EUT:

N/A

I/O Cables:

Note: Interconnecting cables shall be connected to one of each type of functional port of the EUT. Where there are multiple ports of the same type, additional cables shall be attached to each of these ports. These additional cables do not need to be terminated.

Quantity	Part No.	Function	Shield description (e.g. braid, foil, none)
1		DB9	
1		USB	

Software Description:

Note: The EUT must be exercised by software or other means so as to ensure that the various parts of the system are active. The exercise shall generate traffic representative of typical equipment usage. For immunity testing, the software must be capable of reporting any errors that may occur.

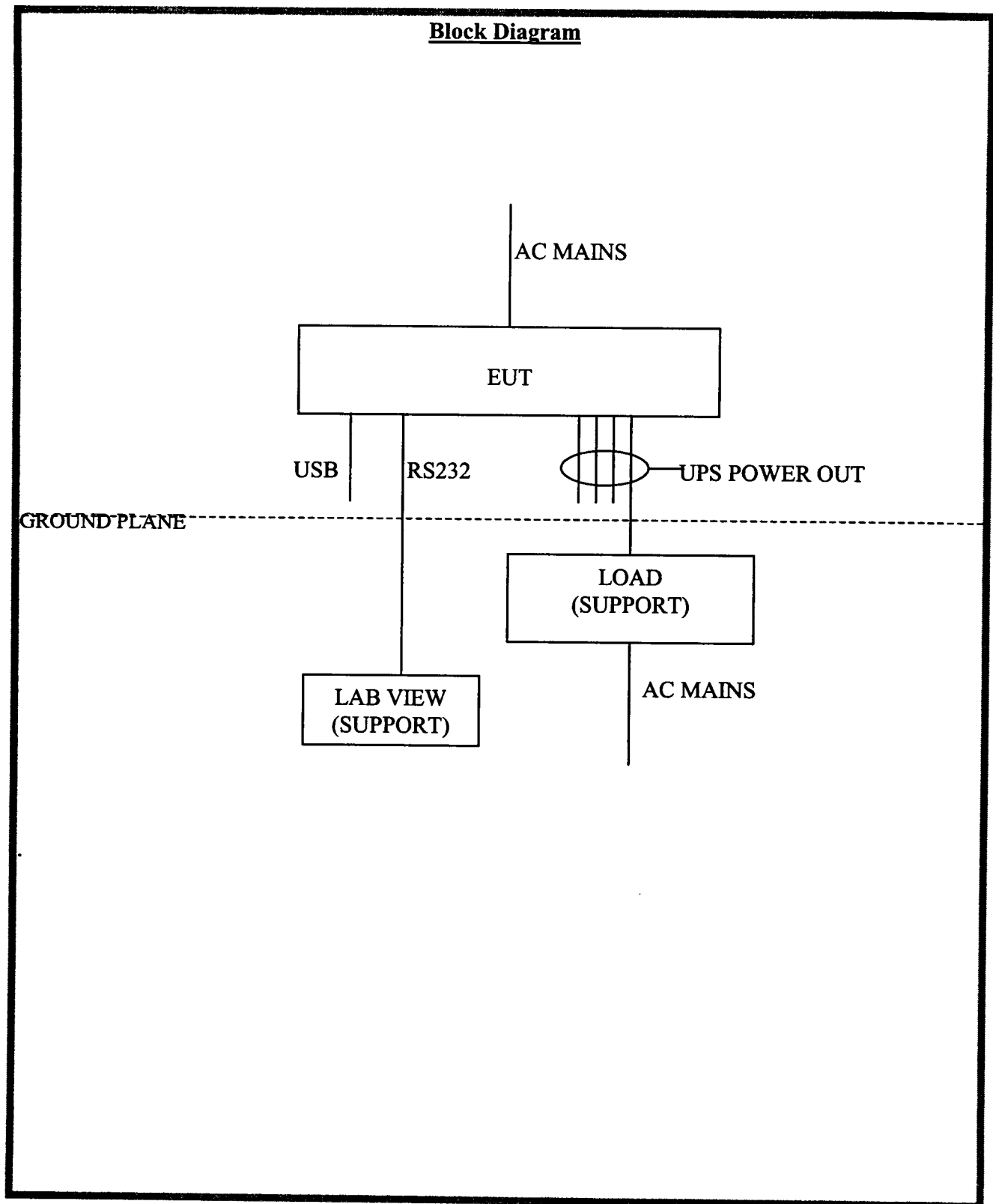
Internal Firmware

Support Equipment Description (Manufacturer, model number, serial number, cable numbers):

AC Load, 10 kW Avtron

Additional Information:

Block Diagram



APPENDIX B

QUEST CREDENTIALS

FCC registered test site

NVLAP Lab Code 200036-0

FCC Method-47 CFR Part 15 – Digital Devices

Conducted Emissions, Power Lines, 450 kHz to 30 MHz

Radiated Emissions

International Special Committee on Radio Interference (CISPR) Methods

IEC/CISPR 22:1993

IEC/CISPR 22:1993, Amendment 1:1995, and Amendment 2:1996

CNS 13438:1997

Australian Standards referred to by clauses in ACA Technical Standards

AS/NZS 3548

Conformity Assessment Body (CAB) For the EMC annex

VCCI Registration Numbers R-712 and C732

Austel A96/TH/0079

AS/NZS 3584



Issues

A CERTIFICATE OF TEST:

To

American Power Conversion

For

Product: Uninterruptible Power System

Model: SUA1000RMI1U and SUA750RMI1U

Date: August 19, 2002

Quest Engineering Solutions, a US and internationally approved test house, attests that compliance testing was completed satisfactorily on the aforementioned equipment as specified by the manufacturer and reported in Quest's test report number: Q02142. Quest Engineering Solutions acknowledges that the Equipment Under Test was found to be in compliance with the following standards:

**EN61000-3-2, 1995, Section 2, Limits for Harmonic Current Emissions
(Equipment Input Current \leq 16 Amps per Phase), Class A**

**EN61000-3-3, 1995, Section 3, Limitations of Voltage Fluctuations and
Flicker in Low-Voltage Supply Systems for Equipment with Rated
Current \leq 16 Amps**

CQ02142

TEL 978-667-7000 ♦ FAX 978-667-3388 ♦ Email info@QES.com
World Wide Web <http://www.QES.com>

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CB DE1-16215
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SECTION 1 OVERVIEW

1.1 Purpose of Test

To determine if the Uninterruptible Power System will meet the EN61000-3-2 and EN61000-3-3 requirements for harmonics and flicker.

1.2 Date of Test

August 19, 2002

1.3 Statement of Compliance

The Uninterruptible Power System unit that was tested and referenced in this test report was found to comply with the requirements of:

EN61000-3-2, Class A
EN61000-3-3

SECTION 2 REFERENCES

2.1 Procedures/Standards

- ° EN61000-3-2, 1995, Section 2, Limits for Harmonic Current Emissions (Equipment Input Current \leq 16 Amps per Phase)
- ° EN61000-3-3, 1995, Section 3, Limitations of Voltage Fluctuations and Flicker in Low-Voltage Supply Systems for Equipment with Rated Current \leq 16 Amps

2.2 Deviations from Standards

None

SECTION 3 DETAILS

3.1 Description of Product

The Equipment Under Test (EUT) consisted of a single unit, the Uninterruptible Power System.

The EUT was configured as given in Appendix A.

3.2 Test Software / Operating Mode

No Software Required

3.3 Laboratory Test Configuration

The test setup was per the procedures and standards referenced in section 2.1. The voltage supplied to the EUT was 230 VAC, 50 Hz.

Harmonics and Flicker Test

Testing was performed in the Quest Immunity Lab. The power supplied to the EUT was 230VAC/50HZ from the Behlman ACP-3000-100 AC Source. The support equipment was supplied with 120VAC/60HZ. The IEC555 Impedance Box (required for Flicker testing) was bypassed during Harmonics testing.

Test Equipment Used

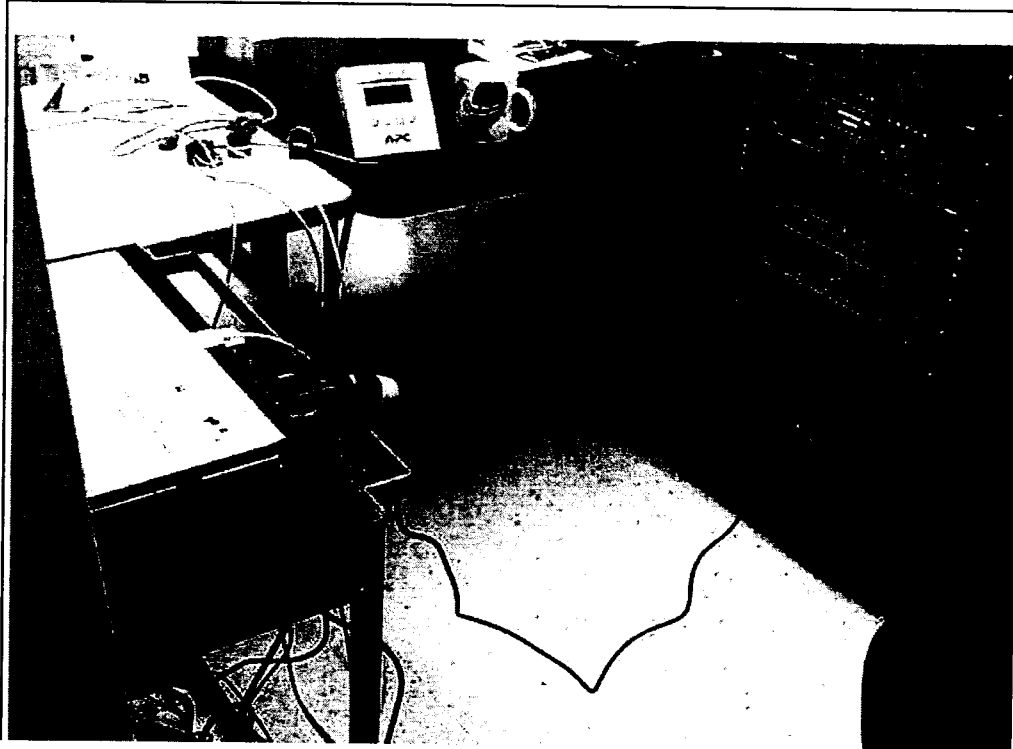
Date of Calibration

Voltek PM3000A Analyzer, s/n AI18/0990.....	11/29/01
Voltek IEC555 Source Impedance Box, s/n 6808.....	11/29/01
Behlman ACP-3000-100 AC Power Source, s/n 3209..	NO CALIBRATION REQUIRED

All test equipment used was calibrated and traceable to the U.S Department of Commerce, National Institute of Standards and Technology (NIST).

Test Environment: Temp.= 70°C, Relative Humidity = 46%

3.4 Pictures



Test Setup

SECTION 4 CONCLUSIONS

4.1 Summary of Test Results

EN61000-3-2, Class A: **Passed**

EN61000-3-3: **Passed**

4.2 Special Notes

The test engineer was F. Maglio.

The test results set forth in this report are expressly limited to the configuration and tests herein. Any changes in configuration may void test results. Quest agrees to quote charges for any retesting requested by the customer.

This report must not be used by the customer to claim product endorsement by NVLAP or any agency of the U.S. Government.

4.3 Required Compliance Modifications

None

SECTION 5 DATA

Product:		Aug 19 2002 12:32pm	
Serial no:		Page 1 of 1	
Description:			
Result Name:		SUA1000RM1U	
Voltech IEC1000-S Windows Software 3.01.03		Test Date: Aug 19 2002 12:30pm	
Type of Test: Repeatability Check - Table			
Power Analyzer: Voltech PM3000A v1.67 s/n 0990			
AC Source: Mains / Manual Source			
Overall Result:			
PASS			

Result Name	Time	Date	Duration	Class	Limit	Check
SUA1000RM1U2	9:48am	8/19/02	00:02:30	Class A	Pass	Pass
SUA1000RM1U3	9:52am	8/19/02	00:02:30	Class A	Pass	Pass

Maximum Differences:

Item	First name	Amps	Second name	Amps	Difference
AH4	SUA1000RM1U2	9.47mA	SUA1000RM1U3	9.68mA	2.14%
AH2	SUA1000RM1U2	50.88mA	SUA1000RM1U3	51.67mA	1.53%

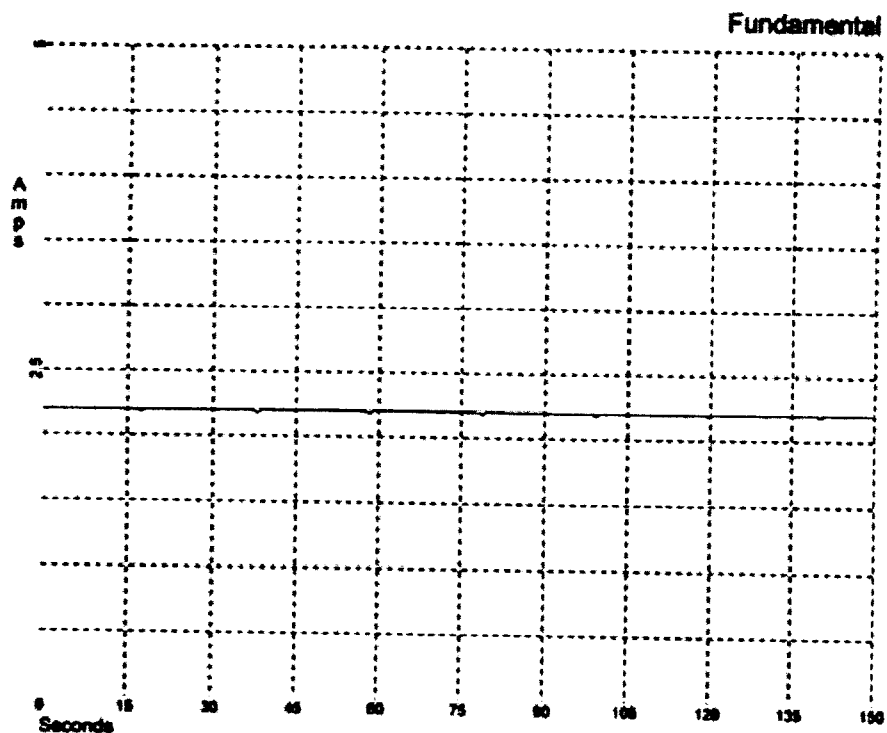
Q02142 August 19, 2002

Product: SUA1000RM1U		Aug 19 2002 12:33pm Page 1 of 1
Serial no: A30230111529		
Description: APC ups		
Test Date: Aug 19 2002 9:48am		
Result Name: SUA1000RM1U2		
Type of Test: EN61000-2001 Harmonics		
Limits: Class A		
Power Analyzer: Voltech PM3000A v1.67 s/n 0990		
AC Source: Mains / Manual Source		
Overall Result: PASS		Notes:
Test Parameter Details		
Operating Frequency:	User Entered 50	Measured 49.9941
Operating Voltage:	230	230.7000
Specified Power:	0.0000	505.6406
Fundamental Current:	0.0000	2.2035
Power Factor:	0.0000	0.9858
Average Input Current:		0.3478
Maximum POHC:		0.0020
POHC Limit:		0.0779
Maximum THC:		0.0107
Minimum Power:	75	
Class Multiplier:	1.0000	
Test Duration:	00:02:30	

VDE File:1924400-3335-0030
CB DE1-16215
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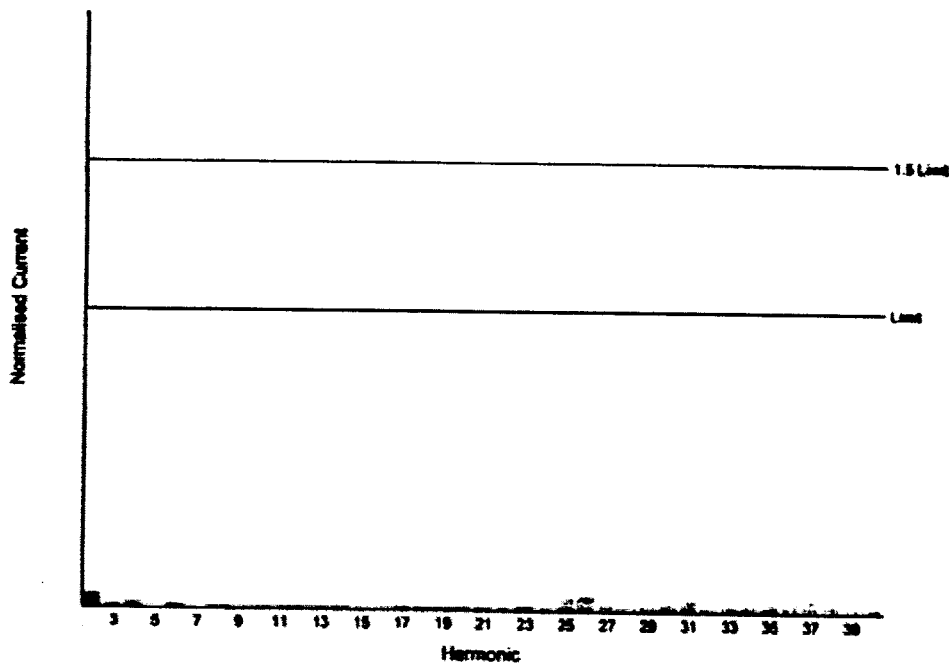
Product:	SUA1000RM1U	Aug 19 2002 12:33pm
Serial no:	AS0230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RM1U2	
Voltech IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 9:48am
Type of Test:	Fluctuating Harmonics Test - Single Harmonic Plot (2001)	
Power Analyzer:	Voltech PM3000A v1.67 s/n 0990	
AC Source:	Mains / Manual Source	
Overall Result:		
PASS		



Q02142 August 19, 2002

Product:	SUA1000RM1U	Aug 19 2002 12:33pm
Serial no:	A90230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RM1U2	
Votach IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 9:48am
Type of Test:	Fluctuating Harmonics Test - Normalised Worst Case Bar Chart (2001)	
Power Analyzer:	Votach PM3000A v1.67 s/n 0990	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

Class	Class A
Class Multiplier	1



Product:	SUA1000RM1U	Aug 19 2002 12:33pm
Serial no:	AS0230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RM1U2	
Voltech IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 9:45am
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2001)	
Power Analyzer:	Voltech PM3000A v1.67 s/n 0690	
AC Source:	Mains / Manual Source	
Overall Result:		
PASS		

Class	Class A
Class Multiplier	1

Item	Limit 1	Limit 2	Average Reading	<1 <2	Min Reading	<1 <2	Pass Fail	Item	Limit 1	Limit 2	Average Reading	<1 <2	Min Reading	<1 <2	Pass Fail
3	1.00A	1.00A	0.600mA	✓	0.400mA	✓	Pass	3	2.00A	2.00A	0.600mA	✓	0.400mA	✓	Pass
4	400.00mA	400.00mA	0.400mA	✓	10.00mA	✓	Pass	5	1.00A	1.00A	4.700mA	✓	0.00mA	✓	Pass
6	200.00mA	200.00mA	0.200mA	✓	0.00mA	✓	Pass	7	770.00mA	1.00A	0.00mA	✓	0.00mA	✓	Pass
8	200.00mA	200.00mA	0.00mA	✓	0.00mA	✓	Pass	8	400.00mA	400.00mA	0.00mA	✓	0.00mA	✓	Pass
9	100.00mA	100.00mA	1.00mA	✓	1.00mA	✓	Pass	11	200.00mA	200.00mA	0.00mA	✓	0.00mA	✓	Pass
10	100.00mA	100.00mA	1.700mA	✓	0.00mA	✓	Pass	12	210.00mA	210.00mA	0.00mA	✓	0.00mA	✓	Pass
11	100.00mA	100.00mA	1.700mA	✓	0.00mA	✓	Pass	13	100.00mA	100.00mA	1.00mA	✓	0.00mA	✓	Pass
12	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	14	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
13	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	15	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
14	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	16	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
15	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	17	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
16	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	18	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
17	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	19	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
18	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	20	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
19	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	21	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
20	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	22	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
21	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	23	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
22	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	24	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
23	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	25	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
24	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	26	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
25	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	27	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
26	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	28	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
27	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	29	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
28	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	30	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
29	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	31	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
30	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	32	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
31	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	33	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
32	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	34	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
33	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	35	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
34	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	36	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
35	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	37	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
36	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	38	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
37	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	39	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
38	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass	40	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass
39	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass								
40	100.00mA	100.00mA	0.00mA	✓	0.00mA	✓	Pass								

<1 Reading is below limit 1

<2 Reading is below limit 2

N/A Harmonics appear below 0.0% of rated current or 5mA, whichever is greater, are disregarded

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Product:	SUA1000RMI1U	Aug 19 2002 12:33pm
Serial no:	AS0230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RMI1U2	
Votach IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 9:48am
Type of Test:	Fluctuating Harmonics Test - Source Qualification (2001)	
Power Analyzer:	Votach PM3000A v1.67 sh 0990	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

	Nominal	Measured	Deviation	Allowed Deviation	Result
Supply Voltage	230.00V	230.70V	0.70V	4.60V	Pass
Supply Frequency	50.00Hz	49.99Hz	0.01Hz	0.26Hz	Pass

Harmonic	Reading	Limit	Result	Harmonic	Reading	Limit	Result
2	0.09%	0.20%	Pass	3	0.34%	0.90%	Pass
4	0.06%	0.20%	Pass	5	0.16%	0.40%	Pass
6	0.03%	0.20%	Pass	7	0.06%	0.30%	Pass
8	0.03%	0.20%	Pass	9	0.06%	0.20%	Pass
10	0.03%	0.20%	Pass	11	0.06%	0.10%	Pass
12	0.04%	0.10%	Pass	13	0.06%	0.10%	Pass
14	0.03%	0.10%	Pass	15	0.03%	0.10%	Pass
16	0.02%	0.10%	Pass	17	0.04%	0.10%	Pass
18	0.03%	0.10%	Pass	19	0.01%	0.10%	Pass
20	0.03%	0.10%	Pass	21	0.03%	0.10%	Pass
22	0.01%	0.10%	Pass	23	0.03%	0.10%	Pass
24	0.02%	0.10%	Pass	25	0.06%	0.10%	Pass
26	0.06%	0.10%	Pass	27	0.03%	0.10%	Pass
28	0.01%	0.10%	Pass	29	0.01%	0.10%	Pass
30	0.03%	0.10%	Pass	31	0.02%	0.10%	Pass
32	0.01%	0.10%	Pass	33	0.02%	0.10%	Pass
34	0.01%	0.10%	Pass	35	0.02%	0.10%	Pass
36	0.02%	0.10%	Pass	37	0.02%	0.10%	Pass
38	0.01%	0.10%	Pass	39	0.01%	0.10%	Pass
40	0.01%	0.10%	Pass				

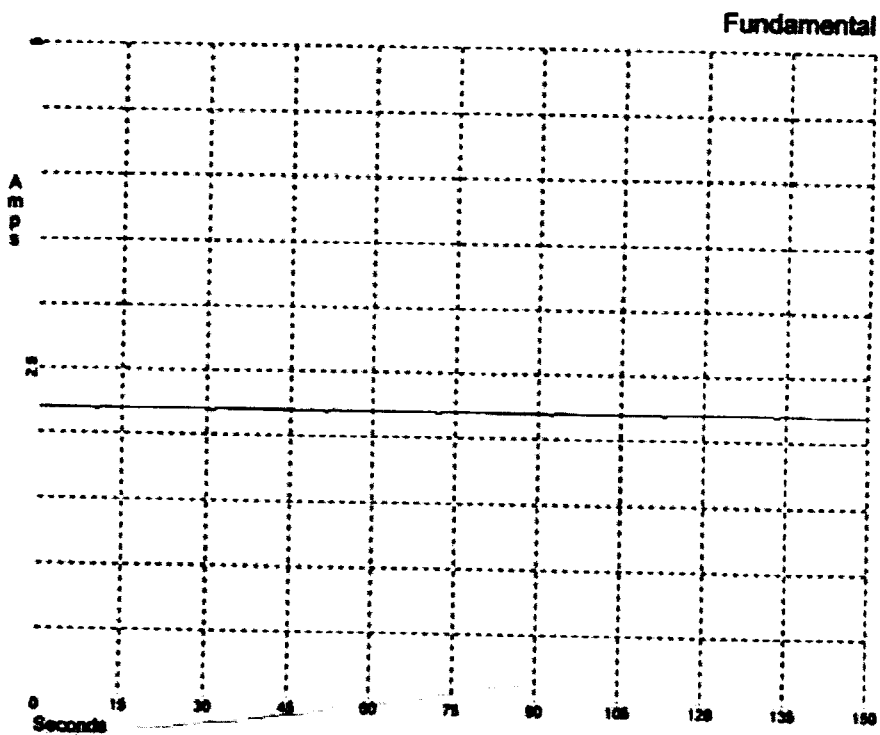
VDE File:1924400-3335-0030
 CB DE1-16215
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Q02142 August 19, 2002

Product: SUA1000RM1U		Aug 19 2002 12:34pm Page 1 of 1																																							
Serial no: AS0230111529																																									
Description: APC ups																																									
Test Date: Aug 19 2002 9:52am																																									
Result Name: SUA1000RM1U3																																									
Type of Test: EN61000-2001 Harmonics																																									
Limits: Class A																																									
Power Analyzer: Voltech PM3000A v1.67 s/n 0990																																									
AC Source: Mains / Manual Source																																									
Overall Result: PASS	Notes:																																								
<table><thead><tr><th>Test Parameter Details</th><th>User Entered</th><th>Measured</th></tr></thead><tbody><tr><td>Operating Frequency:</td><td>50</td><td>49.9941</td></tr><tr><td>Operating Voltage:</td><td>230</td><td>230.7000</td></tr><tr><td>Specified Power:</td><td>0.0000</td><td>508.4297</td></tr><tr><td>Fundamental Current:</td><td>0.0000</td><td>2.2026</td></tr><tr><td>Power Factor:</td><td>0.0000</td><td>0.9857</td></tr><tr><td>Average Input Current:</td><td></td><td>0.3481</td></tr><tr><td>Maximum POHC:</td><td></td><td>0.0020</td></tr><tr><td>POHC Limit:</td><td></td><td>0.0779</td></tr><tr><td>Maximum THC:</td><td></td><td>0.0108</td></tr><tr><td>Minimum Power:</td><td>75</td><td></td></tr><tr><td>Class Multiplier:</td><td>1.0000</td><td></td></tr><tr><td>Test Duration:</td><td>00:02:30</td><td></td></tr></tbody></table>			Test Parameter Details	User Entered	Measured	Operating Frequency:	50	49.9941	Operating Voltage:	230	230.7000	Specified Power:	0.0000	508.4297	Fundamental Current:	0.0000	2.2026	Power Factor:	0.0000	0.9857	Average Input Current:		0.3481	Maximum POHC:		0.0020	POHC Limit:		0.0779	Maximum THC:		0.0108	Minimum Power:	75		Class Multiplier:	1.0000		Test Duration:	00:02:30	
Test Parameter Details	User Entered	Measured																																							
Operating Frequency:	50	49.9941																																							
Operating Voltage:	230	230.7000																																							
Specified Power:	0.0000	508.4297																																							
Fundamental Current:	0.0000	2.2026																																							
Power Factor:	0.0000	0.9857																																							
Average Input Current:		0.3481																																							
Maximum POHC:		0.0020																																							
POHC Limit:		0.0779																																							
Maximum THC:		0.0108																																							
Minimum Power:	75																																								
Class Multiplier:	1.0000																																								
Test Duration:	00:02:30																																								

Q02142 August 19, 2002

Product:	SUA1000RME1U	Aug 19 2002 12:34pm
Serial no:	AS0230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RME1U3	
Voltech IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 9:52am
Type of Test:	Fluctuating Harmonics Test - Single Harmonic Plot (2001)	
Power Analyzer:	Voltech PM3000A v1.67 s/n 0900	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

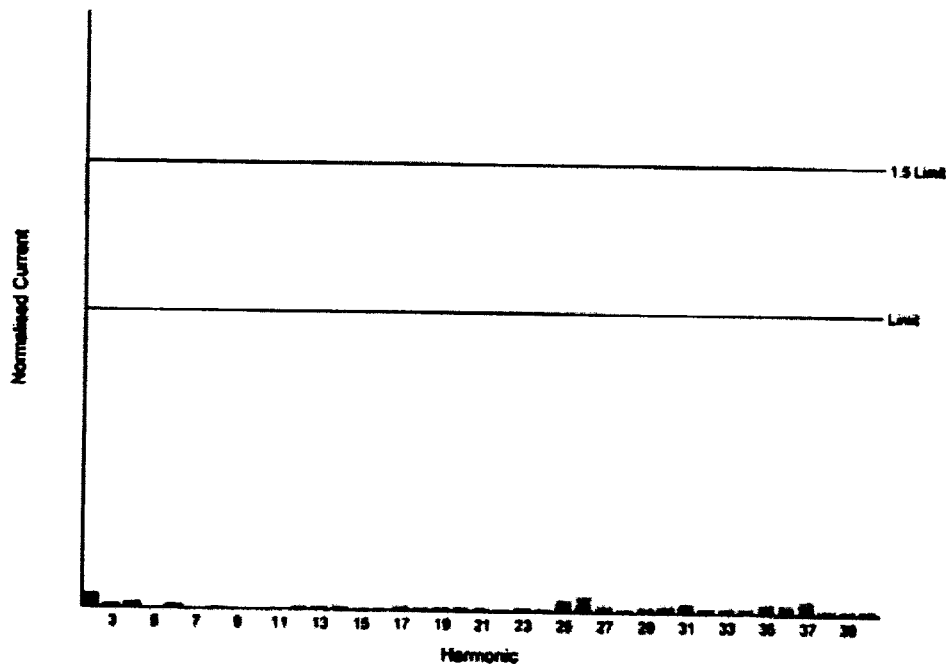


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Product:	SUA1000RMI1U	Aug 19 2002 12:34pm
Serial no:	AS0230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RMI1U3	
Votach IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 9:52am
Type of Test:	Fluctuating Harmonics Test - Normalised Worst Case Bar Chart (2001)	
Power Analyzer:	Votach PM3000A v1.67 s/n 0990	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

Class	Class A
Class Multiplier	1



Product:	SUA1000RM1U	Aug 19 2002 12:35pm
Serial no:	AS0230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RM1U3	
Votach REC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 9:52am
Type of Test:	Fluctuating Harmonics Test - Worst Case Table (2001)	
Power Analyzer:	Votach PM3000A v1.67 s/n 0990	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

Class	Class A
Class Multiplier	1

Item	Limit 1	Limit 2	Average Reading	<1 <2	Max Reading	<2	Pass Fail	Item	Limit 1	Limit 2	Average Reading	<1 <2	Max Reading	<2	Pass Fail
3	1.00A	1.00A	0.00mA	✓	0.00mA	✓	Pass	3	3.20A	3.40A	0.00mA	✓	0.00mA	✓	Pass
4	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	6	1.10A	1.70A	0.00mA	✓	0.00mA	✓	Pass
5	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	7	7.00mA	1.00A	0.00mA	✓	0.00mA	✓	Pass
6	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	8	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
10	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	11	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
12	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	13	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
14	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	15	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
16	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	17	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
18	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	19	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
20	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	21	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
22	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	23	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
24	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	25	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
26	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	27	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
28	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	29	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
30	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	31	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
32	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	33	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
34	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	35	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
36	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	37	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
38	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	39	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass
40	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass	41	0.00mA	0.00mA	0.00mA	✓	0.00mA	✓	Pass

<1: Reading to tolerance 1

<2: Reading to tolerance 2

N/A: Readings cannot be less than 0.0% of rated current or less, whichever is greater, are designated

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Product:	SUA1000RM1U	Aug 19 2002 12:35pm
Serial no:	A80230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RM1U3	
Votfach IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 9:52am
Type of Test:	Fluctuating Harmonics Test - Source Qualification (2001)	
Power Analyzer:	Votfach PM3000A v1.57 s/n 0990	
AC Source:	Mains / Manual Source	
Overall Result:	PASS	

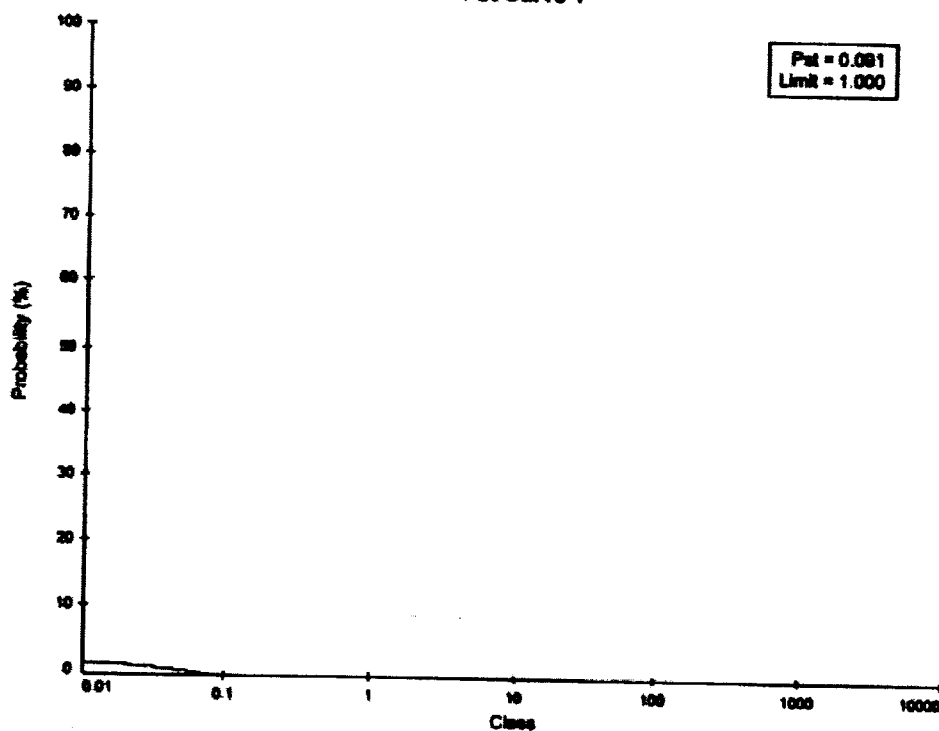
	Nominal	Measured	Deviation	Allowed Deviation	Result
Supply Voltage	230.00V	230.70V	0.70V	4.60V	Pass
Supply Frequency	50.00Hz	49.99Hz	0.01Hz	0.25Hz	Pass

Harmonic	Reading	Limit	Result	Harmonic	Reading	Limit	Result
2	0.00%	0.20%	Pass	3	0.34%	0.90%	Pass
4	0.05%	0.20%	Pass	5	0.16%	0.40%	Pass
6	0.03%	0.20%	Pass	7	0.08%	0.30%	Pass
8	0.03%	0.20%	Pass	9	0.08%	0.20%	Pass
10	0.03%	0.20%	Pass	11	0.06%	0.10%	Pass
12	0.06%	0.10%	Pass	13	0.06%	0.10%	Pass
14	0.03%	0.10%	Pass	15	0.03%	0.10%	Pass
16	0.02%	0.10%	Pass	17	0.04%	0.10%	Pass
18	0.03%	0.10%	Pass	19	0.01%	0.10%	Pass
20	0.03%	0.10%	Pass	21	0.03%	0.10%	Pass
22	0.01%	0.10%	Pass	23	0.02%	0.10%	Pass
24	0.02%	0.10%	Pass	25	0.06%	0.10%	Pass
26	0.06%	0.10%	Pass	27	0.03%	0.10%	Pass
28	0.01%	0.10%	Pass	29	0.02%	0.10%	Pass
30	0.03%	0.10%	Pass	31	0.02%	0.10%	Pass
32	0.01%	0.10%	Pass	33	0.02%	0.10%	Pass
34	0.01%	0.10%	Pass	35	0.02%	0.10%	Pass
36	0.02%	0.10%	Pass	37	0.02%	0.10%	Pass
38	0.01%	0.10%	Pass	39	0.61%	0.10%	Pass
40	0.01%	0.10%	Pass				

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Product:	SUA1000RM1U	Aug 19 2002 12:31pm
Serial no:	AS0230111529	Page 1 of 1
Description:	APC ups	
Result Name:	SUA1000RM1U	
Voltech IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 7:23am
Type of Test:	Flickermeter Test - Pst Curve	
Power Analyzer:	Voltech PM3000A v1.67 s/n 0990	
AC Source:	Mains / Manual Source	
Overall Result:	Notes: Measurement method - Voltage	
PASS		

Pst Curve 1



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Product:	SUA1000RM1U	Aug 19 2002 12:31pm Page 1 of 1
Serial no:	AS0230111529	
Description:	APC ups	
Result Name:	SUA1000RM1U	
Votach IEC1000-3 Windows Software 3.01.03		Test Date: Aug 19 2002 7:23am
Type of Test:	Flicker Test - Table	
Power Analyzer:	Votach PM3000A v1.67 s/n 0990	
AC Source:	Mains / Manual Source	
Overall Result:	Notes:	
PASS	PR test duration 120 minutes Measurement method - Voltage	

	PR
Limit	0.650
Reading	0.103

	Pst	dc (%)	dmax (%)	d(t) > 3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.091	0.038	0.281	0
Reading 2	0.103	0.032	0.291	0
Reading 3	0.101	0.024	0.278	0
Reading 4	0.103	0.024	0.278	0
Reading 5	0.103	0.032	0.293	0
Reading 6	0.108	0.032	0.285	0
Reading 7	0.104	0.024	0.285	0
Reading 8	0.104	0.024	0.270	0
Reading 9	0.108	0.032	0.283	0
Reading 10	0.105	0.024	0.282	0
Reading 11	0.105	0.032	0.285	0
Reading 12	0.108	0.032	0.285	0

VDE File:1924400-3335-0030
CB DE1-16215
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APPENDIX A

PRODUCT INFORMATION

The information contained in this Appendix was provided by Rick Everett of American Power Conversion.
It contains specific configuration details of the system as tested.

Quest Engineering Solutions EMI Emissions and Immunity Test Form

Please complete all that applies for the equipment under test (EUT). Include a block diagram showing the EUT and all support equipment.

Date: 07/18/02
Company: American Power Conversion **Contact:** Bryce Capodieci, Rick Everett
Street: 85 Rangeway Road
City, State ZIP: North Billerica, MA 01821
Telephone: 978 - 670 - 2440 x 17275 **FAX:** 978-670-3747

Test Type:

Emissions	
CISPR 11	<input type="checkbox"/>
CISPR 22	<input checked="" type="checkbox"/>
VCCI	<input type="checkbox"/>
AUSTEL	<input type="checkbox"/>
Class A (1)	<input checked="" type="checkbox"/>
Class B (2)	<input type="checkbox"/>

VDE ☐
 Other ☐

Immunity	
EN50082-1	<input type="checkbox"/>
EN61326	<input type="checkbox"/>
EN61000-4-2	<input checked="" type="checkbox"/>
EN61000-4-3	<input checked="" type="checkbox"/>
EN61000-4-4	<input checked="" type="checkbox"/>
EN61000-4-5	<input checked="" type="checkbox"/>

EN50082-2 ☐ IEC60601-1-2 ☐
 EN61000-6-2 ☐
 EN61000-4-6 ☒ Test Level 1 ☐
 EN61000-4-8 ☐ Test Level 2 ☐
 EN61000-4-11 ☒ Test Level 3 ☐
 Test Level 4 ☐

Special IEC 61000-2-2, EN 61000-3-2, EN 61000-3-3
 Add EN 61000-4-1 General Requirements to Certificate

Equipment Under Test (EUT) Description:

Uninterruptible Power Supply (UPS)

Model Number(s): SUA750RMI1U, SUA1000RMI1U **Serial Number(s):** N/A

EUT Weight(lb.): 39 lb. **EUT Size (LxWxH):** 25.75 x 17 x 1.76 inches

Power Interface:

Frequency 50/60 Hz
 Voltage 220 - 240Vac
 No. of Phases 1
 Current 10A
 Plug Type IEC
 Cord Type _____

Power Supply:

Description _____
 Manufacturer _____
 Model Number _____
 Switching Freq. _____
 RF Filter Manufac. _____
 RF Filter Model _____

Equipment Cycle Time: _____

Failure Criteria: _____

Equipment Configuration	Slot No.	Board Type
	N/A	

Equipment Internal Devices (e.g. disks, tapes)	Manufacturer	Part No.	Serial No.

Oscillator Frequencies of EUT (Please list all):

Main is 16 MHz, USB 24 MHz, Inverter 10-40 MHz,

Battery Charger 30-70 MHz, See Attachment

RF Suppression Components of EUT (i.e., ferrites, gasketting, filters, etc.):

Manufacturer	Part No.	Locations used

Cabinet Shielding/Construction of EUT:**I/O Cables:**

Note: Interconnecting cables shall be connected to one of each type of functional port of the EUT. Where there are multiple ports of the same type, additional cables shall be attached to each of these ports. These additional cables do not need to be terminated.

Quantity	Part No.	Function	Shield description (e.g. braid, foil, none)
1		DB9	
1		USB	

Software Description:

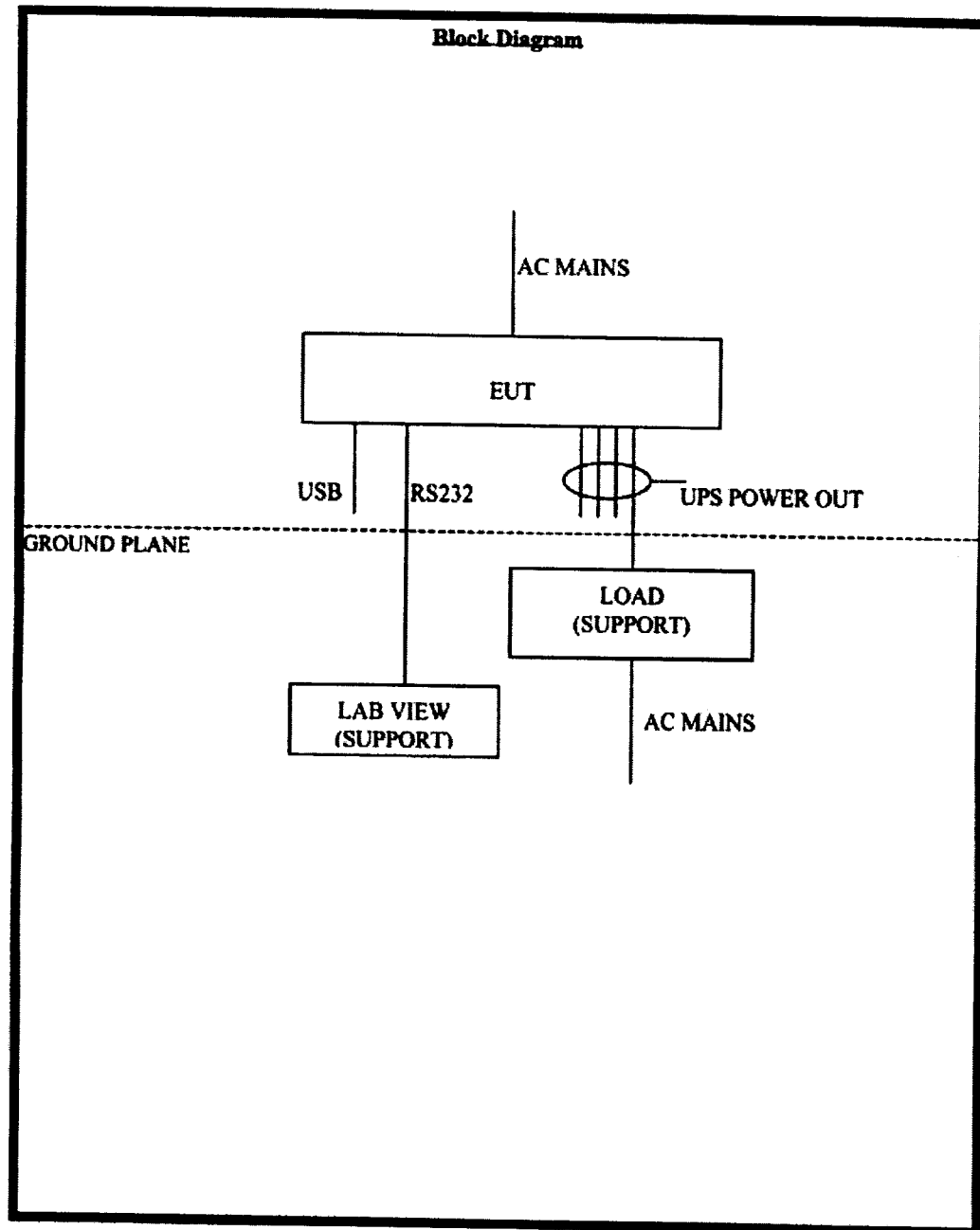
Note: The EUT must be exercised by software or other means so as to ensure that the various parts of the system are active. The exercise shall generate traffic representative of typical equipment usage. For immunity testing, the software must be capable of reporting any errors that may occur.

Internal Firmware

Support Equipment Description (Manufacturer, model number, serial number, cable numbers):

AC Load, 10 kW Avtron

Additional Information:



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APPENDIX B

QUEST CREDENTIALS

FCC registered test site

NVLAP Lab Code 200036-0

FCC Method-47 CFR Part 15 – Digital Devices

Conducted Emissions, Power Lines, 450 kHz to 30 MHz

Radiated Emissions

International Special Committee on Radio Interference (CISPR) Methods

IEC/CISPR 22:1993

IEC/CISPR 22:1993, Amendment 1:1995, and Amendment 2:1996

CNS 13438:1997

Australian Standards referred to by clauses in ACA
Technical Standards

AS/NZS 3548

Conformity Assessment Body (CAB) For the EMC annex

VCCI Registration Numbers R-712 and C732

Austel A96/TH/0079

AS/NZS 3584

Regulatory Compliance Test Equipment

<u>Equipment</u>	<u>Manufacturer</u>	<u>Model</u>	<u>Serial No.</u>	<u>APC No.</u>	<u>Calibration Date</u>
Watt Meter	Yokogowa Power Meter	WT130	2535GA052	2719	07/30/03
Watt Meter	Yokogowa Power Meter	WT130	27BW0085	1864	08/12/03
Power Analyzer	Voltec	PM3000A	5514	1368	10/15/02
Power Analyzer	Voltech	PM3000A	5590	523	10/22/02
Hipot Tester	Hypotronics	HD100 Series	00000	2412	10/12/02
Impedance Tester	Associated Research	3030D	A140024	2411	10/15/02
Data Acquisition and Switching System	Agilent	34970A	US37036764	3212	07/09/03
Data Acquisition and Switching System	Agilent	34970A	US37037469	3213	07/30/03
Data Acquisition and Switching System	Agilent	34970A	US37043432	3328	09/03/03
Data Acquisition and Switching System	Agilent	34970A	US37037447	3329	08/15/03
Oscilloscope	Tektronix	TDS430A	B062324	2939	12/18/02
Differential Probe	Tektronix	P5205	B016520	3382	07/13/03
Differential Probe	Tektronix	P5200	B017885	2940	12/19/02
Leakage Tester	ED & D	LT-30HC053	A02250053	676	12/04/02
Sharp Edge Tester	Technical Eng. Service	SET - 50			10/16/02
Digital Force Gauge	Chatillon	DFIS 200	25605	1209	12/18/02