



TEST REPORT

EN / IEC 62040-1-1 combined

Uninterruptible power systems (UPS) –

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

Report reference No. : 1924400-3335-0020 (48125) CB/DE1-31415
Tested by : Günter Straube
Name in block letters and title
Approved by : Jürgen Bärwinkel
Name in block letters and title
Date of issue : 12.11.2004

Günter Straube
Signature
Jürgen Bärwinkel
Signature

Testing Laboratory Name: VDE Testing and Certification Institute
Address: Merianstraße 28, D-63069 Offenbach
Testing location: CBTL ☐ SMT ☐ WMT ☒ TDAP ☒
Name: American Power Conversion Corp.
Address: 85 Rangeway Road Bldg. #2 , N. Billerica, MA USA
WMT (TDAP File no. 1924400-9501-0001)

Applicant's Name: American Power Conversion (APC)
Address: 85 Rangeway Road Bldg #2, N. Billerica, MA, 01862

Manufacturer's Name: American Power Conversion (APC)
Address: 85 Rangeway Road Bldg #2, N. Billerica, MA, 01862

Factory: See page 3

Test specification

Standard: IEC 62040-1-1:2002 (1st Edition) + corrigendum 1
EN 62040-1-1:2003-01
DIN EN 62040-1-1 (VDE 0558 Teil 511):2003

Test procedure: VDE, CB –scheme

Non-standard test method:

Test Report Form No.: IEC62040_1_1A
TRF originator: SGS Fimko Ltd modified by VDE for EN
Master TRF: dated 2003-03

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Test item

Description : Uninterruptible Power Supply (UPS)

Trademark: APC

Model and/or type reference: 1 a) SUOL1000XLI, SUOL1000UXI
2 a) SUOL2000XLI, SUOL2000UXI
1 b) SURT1000XLI, SURT1000UXI, SURT1000XLICH, SURT1000UXICH,
2 b) SURT2000XLI, SURT2000UXI, SURT2000XLICH, SURT2000UXICH.

Serial number : ---

Ratings : Input: 1a,b) AC 220-240 V, 6 A, 50 / 60 Hz
2a,b) AC 220-240 V, 12 A, 50 / 60 Hz

Output: 1a,b) AC 220-240 V, 4.6 A, 700 W, 1000 VA,
50/60 Hz
2a,b) AC 220-240 V, 9.1 A, 1400 W, 2000 VA,
50/60 Hz

Ambient: 40 °C

Particulars: test item vs. test requirements

Equipment mobility : Rack mount or Floor Standing

Operating condition : continuous

Mains supply tolerance (%) : -10 % / +6 %

Tested for IT power systems : Yes / 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 : 01.07.2004

Date(s) of performance of test : 29.07.2004 – 12.11.2004

General remarks

This is a combined Test Report for IEC and EN marked with CENELEC and CENELEC Info
CENELEC Info DE for Annex H and NO for Annex G



"This report is not valid as a CB Test Report unless appended to a CB Test Certificate issued by a NCB, in accordance with IEC 02".

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.

Factory:

Name: APC Suzhou UPS Co. LTD

Address: No. 189 Suhong Road China-Singapore Suzhou Industry Park, 215021 SUZHOU JIANGSU, P.R. China

Name: APC India

Address: No. 187/3, 188/3 Jigani, Bangalore, Karnataka, 562 106 India

Name: American Power Conversion (APC)

Address: Ballybrit Business Park, Galway, Ireland

Name: American Power Conversion (APC)

Address: 2nd Street EPZA, Rosario Cavite, Philippines

Name: American Power Conversion (APC)

Address: Lot 32 Phase I Carmelray Ind. PK Canlubang, Calamba
Laguna, Philippines

Copy of marking plate:

See IEC/EN60950 Test Report for details



Information/comments:

The text of the International Standard IEC 62040-1-1:2002 and its corrigendum December 2002 was approved by CENELEC as an European Standard without any modification. Clauses marked in Test Report with corr.

Annex ZA has been added by CENELEC. The normative references to international publications with their corresponding European publications are regarded.

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

Product description:

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

This test report includes the following appendices:

Appendix 1	Testreport IEC 60950-1:2001, First Edition modified, EN 60950-1:2001, DIN EN 60950-1 (VDE 0805 Teil 1)2003-03	539	Pages
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Clause	Requirement – Test	Result – Remark	Verdict
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4	GENERAL CONDITIONS FOR TESTS		—
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4.3	Components		—
1.5.1/RD	General		P
	Comply with IEC 60950-1 or relevant component standard	1.5.1 – 1.5.8/RD See IEC/EN60950 Test Report for details	P
1.5.2/RD	Evaluation and testing of components		P
1.5.4/RD	Transformers		P
1.5.5/RD	Interconnecting cables		N
1.5.6/RD	Capacitors in primary circuits		P
1.5.7/RD	Double insulation or reinforced insulation bridged by components		P
1.5.7.1/RD	General		P
1.5.7.2/RD	Bridging capacitors		N
1.5.7.3/RD	Bridging resistors		N
1.5.7.4/RD	Accessible parts		P
1.5.8/RD	Components in equipment for IT power systems		N

4.4	Power interface		—
1.6.1/RD	AC power distribution systems	1.6.1 – 1.6.4/RD See IEC/EN60950 Test Report for details	P
1.6.2/RD	Input current	(see appended table 4.4)	P
4.4 1.6.4/RD	Neutral conductor		P

4.5	Marking and instructions		—
4.5.1	General		P
4.5.2	Power rating	Refer to copy of rating label	P
	Input rated voltage/range (V).....	AC 220 - 240V	P
	Input rated current/range (A)	See page 2	P
	Input symbol for nature of supply (d.c.)	AC Unit	P
	Input rated frequency/range (Hz).....	50 / 60 Hz	P
	Output rated voltage/range (V)	220 – 240 V	P
	Output rated current/range (A)	See page 2	P
	Number of output phases (1 ϕ - 3 ϕ) with/without neutral	See page 2	P



Clause	Requirement – Test	Result – Remark	Verdict
	Output rated active power (W)	See page 2	P
	Output rated apparent power (VA)	See page 2	P
	Output symbol for nature of supply (d.c.)	AC Unit	N
	Rated frequency or rated frequency range (Hz):	50 / 60 Hz	P
	Max. ambient operating temperature range (°C).....	40 °C	P
	Manufacturer's name or trademark or identification mark	APC	P
	Type/model or type reference	See page 6	P
	Symbol for Class II equipment only	Class I equipment	N
	Other symbols		P
	Certification marks	VDE	P
	Instructions for units with automatic bypass/maintenance bypass, additional input a.c. supply, or external batteries, having text "See installation instructions before connecting to the supply"	See Safety Instructions included in attached IEC/EN60950-1 report	P
4.5.3	Safety instructions	See Safety Instructions included in attached IEC/EN60950-1 report	P
	Guidance for installation for operator and service person	See Safety Instructions included in attached IEC/EN60950-1 report	P
	Warning label with text "Isolate uninterruptible power supply (UPS) before working on this circuit"		N
4.5.4	Main voltage adjustment	220 – 240 V	N
1.7.4/RD	Supply voltage adjustment	See IEC/EN60950 Test Report for details	P
	Methods and means of adjustment; reference to installation instructions	Unit is an auto-ranging type	N
4.5.5 1.7.5/RD	Power outlets.....	See IEC/EN60950 Test Report for details	P
4.5.6 1.7.6/RD	Fuse identification (marking, special fusing characteristics, cross-reference)	See IEC/EN60950 Test Report for details	P
4.5.7 1.7.7/RD	Wiring terminals	See IEC/EN60950 Test Report for details	P
1.7.7.1/RD	Protective earthing and bonding terminals	See IEC/EN60950 Test Report for details	P
1.7.7.2/RD	Terminal for a.c. mains supply conductors	See IEC/EN60950 Test Report for details	P
1.7.7.3/RD	Terminals for d.c. mains supply conductors	See IEC/EN60950 Test Report for details	P



Clause	Requirement – Test	Result – Remark	Verdict
4.5.8	Battery terminals	Battery connectors are marked with “+” and “-“	P
4.5.9 1.7.8/RD	Controls and indicators	See IEC/EN60950 Test Report for details	P
1.7.8.1/RD	Identification, location and marking	See IEC/EN60950 Test Report for details	P
1.7.8.2/RD	Colours	See IEC/EN60950 Test Report for details	P
1.7.8.3/RD	Symbols according to IEC 60417	See IEC/EN60950 Test Report for details	P
1.7.8.4/RD	Markings using figures		N
4.5.10 1.7.9/RD	Isolation of multiple power sources		N
4.5.11	IT power systems		N
1.7.10/RD	IT power distribution systems		N
4.5.12	Protection in building installations		N
4.5.13 5.1/RD	High leakage current (mA)		N
4.5.14 1.7.11/RD	Thermostats and other regulating devices		N
4.5.15 1.7.12/RD	Language(s)	German / English	—
4.5.16 1.7.13/RD	Durability of markings		P
4.5.17 1.7.14/RD	Removable parts	No marking on removable parts	P
4.5.18 1.7.15/RD	Replaceable batteries	Replaceable Lead Acid Batteries	P
	Language(s)	German and English	—
4.5.19 1.7.16/RD	Operator access with a tool.....	No hazards accessible	P
4.5.20	Battery		P
	Clearly legible information		P
	Battery type	Lead Acid	P
	Nominal voltage of total battery (V)	See IEC/EN60950 Test Report for details	P
	Nominal capacity of total battery (optional)	See IEC/EN60950 Test Report for details	P
	Warning label		P
	Instructions	See IEC/EN60950 Test Report for details	P



Clause	Requirement – Test	Result – Remark	Verdict
4.5.21	Installation instructions	See IEC/EN60950 Test Report for details	P
5	FUNDAMENTAL DESIGN REQUIREMENTS		—
5.1	Protection against electric shock and energy hazards		P
2.1.1.2/RD	Battery compartments	2.1.1.2 – 2.1.1.6/RD See IEC/EN60950 Test Report for details	N
2.1.1.4/RD	Access to hazardous voltage circuit wiring		P
2.1.1.5/RD	Energy hazards		P
2.1.1.6/RD	Manual controls		P
5.1.1	Operator access	See IEC/EN60950 Test Report for details	P
	category a)		P
	category b)		P
5.1.2 2.1.1.3/RD	Access to ELV wiring	No ELV circuits	N
	Working voltage (V_{peak} or V_{rms}); minimum distance (mm) through insulation	(see appended table 5.1.2)	—
5.1.3	Discharge of capacitors in the primary circuit		P
2.1.1.7/RD	Discharge of capacitors in equipment	See IEC/EN60950 Test Report for details	P
	Time-constant (s); measured voltage (V).....		—
5.1.4	Backfeed protection corr.	See IEC/EN60950 Test Report for details	—
	Description of the construction	Output is not grounded, Relays with 2x 1,5 mm (3.0 mm) gap are provided	P
5.1.5	Emergency switching device	Output circuit Breaker are provided	P

5.2	Insulation		—
2.2.3.1/RD	Separation by double insulation or reinforced insulation (method 1)	2.2.3.1 – 2.2.3.3/RD See IEC/EN60950 Test Report for details	P
2.2.3.2/RD	Separation by earthed screen (method 2)		N
2.2.3.3/RD	Protection by earthing of the SELV circuit (method 3)		N



Clause	Requirement – Test	Result – Remark	Verdict
5.3	Limited current circuits		—
2.4.1/RD	General requirements	2.4.1/RD - 2.4.2/RD See IEC/EN60950 Test Report for details	N
2.4.2/RD	Limit values		N
	Frequency (Hz).....:		—
	Measured current (mA)		—
	Measured voltage (V).....:		—
	Measured capacitance (μF)		—
2.4.3/RD	Connection of limited current circuits to other circuits		N
5.4	Provisions for protective earthing		—
2.6/RD	Provisions for earthing and bonding	2.6 – 2.6.1/RD, 4.2.3/RD, 5.3/RD See IEC/EN60950 Test Report for details	P
5.4.1 2.6.1/RD	Protective earthing		P
5.4.1 4.2.3/RD	Steady force test, 30 N		P
5.4.1 5.3/RD	Abnormal operating and fault conditions		P
5.4.2	Bonding	See IEC/EN60950 Test Report for details	P
5.5	AC and d.c. power isolation		—
2.6.2/RD	Functional earthing	2.6.2 – 2.6.4.2/RD See IEC/EN60950 Test Report for details	P
2.6.3/RD	Protective earthing and protective bonding conductors		P
2.6.3.1/RD	General		P
2.6.3.2/RD	Size of protective earthing conductors		P
	Rated current (A), cross-sectional area (mm ²), AWG		—
2.6.3.3/RD	Size of protective bonding conductors		P
	Rated current (A), cross-sectional area (mm ²), AWG		—
2.6.3.4/RD	Resistance (Ω) of earthing conductors and their terminations, test current (A)	See IEC/EN60950 Test Report for details	P



Clause	Requirement – Test	Result – Remark	Verdict
2.6.3.5/RD	Colour of insulation :		P
2.6.4/RD	Terminals		P
2.6.4.1/RD	General		P
2.6.4.2/RD	Protective earthing and bonding terminals		P
	Rated current (A), type and nominal thread diameter (mm) :		—
2.6.4.3/RD	Separation of the protective earthing conductor from protective bonding conductors		P
2.6.5/RD	Integrity of protective earthing	2.6.5 – 2.6.5.8/RD See IEC/EN60950 Test Report for details	P
2.6.5.1/RD	Interconnection of equipment		P
2.6.5.2/RD	Components in protective earthing conductors and protective bonding conductors		P
2.6.5.3/RD	Disconnection of protective earth		N
2.6.5.4/RD	Parts that can be removed by an operator		P
2.6.5.5/RD	Parts removed during servicing		P
2.6.5.6/RD	Corrosion resistance		P
2.6.5.7/RD	Screws for protective bonding		P
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system		N
5.5.1	Disconnect devices	See IEC/EN60950 Test Report for details	P
5.5.2	Three-phase equipment		N
	Interrupting neutral and phase conductors		P
5.5.3	Switch as a disconnect device	No Switch	N
1.7.8/RD	Controls and indicators		N
1.7.8.1/RD	Identification, location and marking :		N
1.7.8.2/RD	Colours :		N
1.7.8.3/RD	Symbols according to IEC 60417 :		N
1.7.8.4/RD	Markings using figures :		N
5.5.4	Multiple power sources		N
5.5.5	Ungrounded conductors		P
5.6	Overcurrent and earth fault protection		—
2.7.3/RD	Short-circuit backup protection	2.7.3 – 2.7.6/RD See IEC/EN60950 Test Report for details	P



Clause	Requirement – Test	Result – Remark	Verdict
2.7.4/RD	Number and location of protective devices :		P
2.7.5/RD	Protection by several devices		P
2.7.6/RD	Warning to service personnel..... :		N
5.6.1	Basic requirements	See IEC/EN60950 Test Report for details	P
5.6.2	Battery circuit protection	Battery has reference to ground, two fuses (30 A) in + circuit	P
5.6.3	Location of protective device		N
5.6.4	Rating of protective device		P
5.3.1/RD	Protection against overload and abnormal operation	See IEC/EN60950 Test Report for details	P

5.7	Protection of personnel – Safety interlocks		—
5.7.1	Operator protection	No Safety Interlocks	N
2.8/RD	Safety interlocks		N
2.8.1/RD	General principles		N
2.8.2/RD	Protection requirements		N
2.8.3/RD	Inadvertent reactivation		N
2.8.4/RD	Fail-safe operation		N
2.8.5/RD	Moving parts		N
2.8.6/RD	Overriding		N
2.8.7/RD	Switches and relays		N
2.8.7.1/RD	Contact gaps (mm):		N
2.8.7.2/RD	Overload test		N
2.8.7.3/RD	Endurance test		N
2.8.7.4/RD	Electric strength test	(see appended table 5.8)	N
2.8.8/RD	Mechanical actuators		N
5.7.2	Service person protection		N
5.7.2.1	Covers		N
5.7.2.2	Location and guarding of parts		N
5.7.2.3	Parts on doors		N
5.7.2.4	Component access		N
2.8.3/RD	Inadvertent reactivation		N
5.7.2.5	Moving parts		N
5.7.2.6	Capacitor banks		N



Clause	Requirement – Test	Result – Remark	Verdict
5.7.2.7	Internal batteries		N
5.8 2.10/RD	Clearances, creepage distances and distances through insulation		—
2.10.1/RD	General	2.10.1 – 2.10.6/RD See IEC/EN60950 Test Report for details	P
2.10.2/RD	Determination of working voltage		P
2.10.3/RD	Clearances		P
2.10.3.1/RD	General		P
2.10.3.2/RD	Clearances in primary circuits	(see appended table 5.8)	P
2.10.3.3/RD	Clearances in secondary circuits	(see appended table 5.8)	P
2.10.3.4/RD	Measurement of transient voltage levels		N
2.10.4/RD	Creepage distances	(see appended table 5.8)	P
	CTI tests		—
2.10.5/RD	Solid insulation		P
2.10.5.1/RD	Minimum distance through insulation	(see appended table 5.1.2)	P
2.10.5.2/RD	Thin sheet material		P
	Number of layers (pcs)		—
	Electric strength test	(see appended table 5.8)	—
2.10.5.3/RD	Printed boards		N
	Distance through insulation		N
	Electric strength test for thin sheet insulating material	(see appended table 5.8)	—
	Number of layers (pcs)		N
2.10.5.4/RD	Wound components	See IEC/EN60950 Test Report for details	P
	Number of layers (pcs)	3	P
	Two wires in contact inside wound component; angle between 45° and 90°		P
2.10.6/RD	Coated printed boards		N
2.10.6.1/RD	General		N
2.10.6.2/RD	Sample preparation and preliminary inspection		N
2.10.6.3/RD	Thermal cycling		N
2.10.6.4/RD	Thermal ageing (°C)		N
2.10.6.5/RD	Electric strength test	(see appended table 5.8)	—
2.10.6.6/RD	Abrasion resistance test		N
	Electric strength test	(see appended table 5.8)	—



Clause	Requirement – Test	Result – Remark	Verdict
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2.10.7/RD	Enclosed and sealed parts.....:	2.10.7 – 2.10.10/RD See IEC/EN60950 Test Report for details	P
	Temperature $T_1 = T_2 + T_{ma} - T_{amb} + 10K$ (°C)		—
2.10.8/RD	Spacings filled by insulating compound.....:		P
	Electric strength test	(see appended table 5.8)	—
2.10.9/RD	Component external terminations		P
2.10.10/RD	Insulation with varying dimensions		N

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

5.10 2.5/RD	Limited power sources		—
	Inherently limited output	No Limited Power Sources	N
	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 over current protective device limited output under single fault condition		N
	Output voltage (V), output current (A), apparent power (VA)		—
	Current rating of over current protective device (A)		—



Clause	Requirement – Test	Result – Remark	Verdict
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6	WIRING, CONNECTIONS AND SUPPLY		—
6.1 3.1/RD	General		—
3.1.1/RD	Current rating and over current protection	3.1 – 3.1.10/RD See IEC/EN60950 Test Report for details	P
3.1.2/RD	Protection against mechanical damage		P
3.1.3/RD	Securing of internal wiring		P
3.1.4/RD	Insulation of conductors	(see appended table 6)	P
3.1.5/RD	Beads and ceramic insulators		N
3.1.6/RD	Screws for electrical contact pressure		P
3.1.7/RD	Insulating materials in electrical connections		P
3.1.8/RD	Self-tapping and spaced thread screws		P
3.1.9/RD	Termination of conductors		P
	10 N pull test		N
3.1.10/RD	Sleeving on wiring		P

6.2	Connection to power		—
3.2.2/RD	Multiple supply connections		N
3.2.3/RD	Permanently connected equipment		P
	Number of conductors, diameter (mm) of cable and conduits		—
3.2.4/RD	Appliance inlets		P
3.2.5/RD	Power supply cords		N
3.2.5.1/RD	AC power supply cords		N
	Type		—
	Rated current (A), cross-sectional area (mm ²), AWG		—
3.2.5.2/RD	DC power supply cords		N
3.2.7/RD	Protection against mechanical damage		N
3.2.8/RD	Cord guards		N
	D (mm); test mass (g)		—
	Radius of curvature of cord (mm)		—
6.2.1	Means of connection	See IEC/EN60950 Test Report for details	P
	More than one supply connection		P



Clause	Requirement – Test	Result – Remark	Verdict
6.3	Wiring terminals for external power conductors		—
3.3.1/RD	Wiring terminals	3.3.1 – 3.3.8/RD See IEC/EN60950 Test Report for details	P
3.3.2/RD	Connection of non-detachable power supply cords		P
3.3.3/RD	Screw terminals		N
3.3.4/RD	Conductor sizes to be connected		N
	Rated current (A), cord/cable type, cross- sectional area (mm ²).....:		—
3.3.5/RD	Wiring terminal sizes		N
	Rated current (A), type and nominal thread diameter (mm)		—
3.3.6/RD	Wiring terminals design		N
3.3.7/RD	Grouping of wiring terminals		N
3.3.8/RD	Stranded wire		N

7	PHYSICAL REQUIREMENTS		—
7.1	Enclosure	See IEC/EN60950 Test Report for details	P
7.2	Stability	See IEC/EN60950 Test Report for details	P
4.1/RD	Angle of 10°	See IEC/EN60950 Test Report for details	P
	Test: force (N)		P

7.3	Mechanical strength		—
4.2.1/RD	General	4.2.1 – 4.2.10/RD See IEC/EN60950 Test Report for details	P
4.2.2/RD	Steady force test, 10 N		P
4.2.3/RD	Steady force test, 30 N		P
4.2.4/RD	Steady force test, 250 N		P
4.2.5/RD	Impact test		P
	Fall test		P
	Swing test		P
4.2.6/RD	Drop test		N
4.2.7/RD	Stress relief test		N



Clause	Requirement – Test	Result – Remark	Verdict
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4.2.8/RD	Cathode ray tubes		N
	Picture tube separately certified	(see separate test report or attached certificate)	N
4.2.9/RD	High pressure lamps		N
4.2.10/RD	Wall or ceiling mounted equipment; force (N) ..		N

7.4	Construction details		—
4.3.1/RD	Edges and corners	4.3.1 – 4.3.13.6/RD See IEC/EN60950 Test Report for details	P
4.3.2/RD	Handles and manual controls; force (N)		N
4.3.3/RD	Adjustable controls		P
4.3.4/RD	Securing of parts		P
4.3.5/RD	Connection of plugs and sockets		P
4.3.6/RD	Direct plug-in equipment		N
	Dimensions (mm) of mains plug for direct plug-in		—
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N).....		—
4.3.7/RD	Heating elements in earthed equipment		N
4.3.8/RD	Batteries (see also 4.5.20)	See 4.5.20	P
4.3.9/RD	Oil and grease		N
4.3.10/RD	Dust, powders, liquids and gases		N
4.3.11/RD	Containers for liquids or gases		N
4.3.12/RD	Flammable liquids.....		N
	Quantity of liquid (l).....		—
	Flash point (°C)		—
4.3.13/RD	Radiation; type of radiation		N
4.3.13.1/RD	General		N
4.3.13.2/RD	Ionizing radiation		N
	Measured radiation (pA/kg)		—
	Measured high-voltage (kV)		—
	Measured focus voltage (kV)		—
	CRT markings		—
4.3.13.3/RD	Effect of ultraviolet (UV) radiation on materials	(see appended Annex Y)	N
	Part, property, retention after test, flammability classification		N



Clause	Requirement – Test	Result – Remark	Verdict
4.3.13.4/RD	Human exposure to ultraviolet (UV) radiation ..		N
4.3.13.5/RD	Laser (including LEDs)		P
	Laser class	Class I	—
4.3.13.6/RD	Other types		N
7.4.1	Openings	See IEC/EN60950 Test Report for details	P
7.4.2	Gas concentration	Seald Lead Acid Battery	P
7.4.3	Equipment movement		N

7.5 4.7/RD	Resistance to fire		—
4.7.1/RD	Reducing the risk of ignition and spread of flame	4.7.1 – 4.7.3.6/RD See IEC/EN60950 Test Report for details	P
	Method 1, selection and application of components wiring and materials	(see appended table 7.5)	P
	Method 2, application of all of simulated fault condition tests	(see appended table 7.5)	P
4.7.2/RD	Conditions for a fire enclosure		P
4.7.2.1/RD	Parts requiring a fire enclosure		P
4.7.2.2/RD	Parts not requiring a fire enclosure		P
4.7.3/RD	Materials		P
4.7.3.1/RD	General		P
4.7.3.2/RD	Materials for fire enclosures		P
4.7.3.3/RD	Materials for components and other parts outside fire enclosures		P
4.7.3.4/RD	Materials for components and other parts inside fire enclosures		P
4.7.3.5/RD	Materials for air filter assemblies		N
4.7.3.6/RD	Materials used in high-voltage components		N

7.6	Battery location	Battery Compartment Unit	—
7.6.1	Accessibility and maintainability	see Instructions for details	P
7.6.2	Vibration		P
7.6.3	Distance		P
7.6.4	Insulation		P
7.6.5	Wiring		P



Clause	Requirement – Test	Result – Remark	Verdict
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7.6.6	Electrolyte spillage	Seald Lead Acid Battery inside Battery compartment	P
7.6.7	Ventilation	Seald Lead Acid Battery	P
7.6.8	Charging voltages	See battery information	P

7.7	Temperature rise		—
	Maximum temperatures	(See IEC/EN 60950 Test Report for details)	P
4.5.2/RD	Resistance to abnormal heat		P

8	ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS		—
8.1 5.1.1/RD	General	See IEC/EN60950 Test Report for details	P
8.1.1	Earth leakage current	See IEC/EN60950 Test Report for details	P
5.1.2/RD	Equipment under test (EUT)		P
5.1.7/RD	Equipment with touch current exceeding 3.5 mA	See IEC/EN60950 Test Report for details	P
8.1.2	Pluggable equipment type B UPS		N
3.2.5/RD	Power supply cords		N
3.2.5.1/RD	AC power supply cords		N
	Type		—
	Rated current (A), cross-sectional area (mm ²), AWG		—
3.2.5.2/RD	DC power supply cords		N

8.2	Electric strength		—
5.2.1/RD	General	(See IEC/EN60950 Test Report for details)	P
5.2.2/RD	Test procedure	(See IEC/EN60950 Test Report for details)	

8.3	Abnormal operating and fault conditions		—
5.3.1/RD	Protection against overload and abnormal operation	(See IEC/EN60950 Test Report for details)	P
5.3.2/RD	Motors	(See IEC/EN60950 Test Report for details)	P
5.3.3/RD	Transformers	(See IEC/EN60950 Test Report for details)	P



Clause	Requirement – Test	Result – Remark	Verdict
5.3.4/RD	Functional insulation		P
5.3.5/RD	Electromechanical components		N
5.3.8/RD	Compliance criteria for abnormal operating and fault conditions	See IEC/EN60950 Test Report for details	P
8.3.1	Simulation of faults	See IEC/EN60950 Test Report for details	P
8.3.2	Conditions for tests		P

9	CONNECTION TO TELECOMMUNICATION NETWORKS		—
6.1/RD	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		N
6.1.1/RD	Protection from hazardous voltages		N
6.1.2/RD	Separation of the telecommunication network from earth		N
6.1.2.1/RD	Requirements	(see appended table 9)	N
	Test voltage (V)		—
	Current in the test circuit (mA)		—
6.1.2.2/RD	Exclusions		N

6.2/RD	Protection of equipment users from overvoltages on telecommunication networks		—
6.2.1/RD	Separation requirements		N
6.2.2/RD	Electric strength test procedure		N
6.2.2.1/RD	Impulse test	(see appended table 9)	N
6.2.2.2/RD	Steady-state test	(see appended table 9)	N
6.2.2.3/RD	Compliance criteria		N

6.3/RD	Protection of the telecommunication wiring system from overheating		—
	Max. output current (A)		—
	Current limiting method		—
1.4.8/RD	Normal operating voltages		N
1.4.11/RD	Power from a telecommunication network		N
2.1.1/RD	Protection in operator access areas		N

2.1.1.1/RD	Access to energized parts		N
	Test by inspection		N
	Test with test finger		N
	Test with test pin		N
	Test with test probe		N



Clause	Requirement – Test	Result – Remark	Verdict
2.1.1.2/RD	Battery compartments		N
2.1.3/RD	Protection in restricted access locations		N
2.3/RD	TNV circuits		N
2.3.1/RD	Limits		N
	Type of TNV circuits		—
2.3.2/RD	Separation from other circuits and from accessible parts		N
	Insulation employed.....		—
2.3.3/RD	Separation from hazardous voltages		N
	Insulation employed.....		—
2.3.4/RD	Connection of TNV circuits to other circuits		N
	Insulation employed.....		—
2.3.5/RD	Test for operating voltages generated externally		N
2.6.1/RD	Protective earthing		N
2.6.5.8/RD	Reliance on telecommunication network or cable distribution system		N
2.9.3/RD	Grade of insulation		N
2.10.3.3/RD	Clearances in secondary circuits	(See IEC/EN60950 Test Report for details)	N
2.10.3.4/RD	Measurement of transient voltage levels		N
2.10.4/RD	Creepage distances	(See IEC/EN60950 Test Report for details)	N
3.5/RD	Interconnection of equipment		N
3.5.1/RD	General requirements		N
3.5.2/RD	Types of interconnection circuits		N

M/RD	ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		—
M.1/RD	Introduction		N
M.2 /RD	Method A		N
M.3/RD	Method B		N
M.3.1/RD	Ringing signal		N
M.3.1.1/RD	Frequency (Hz)		—
M.3.1.2/RD	Voltage (V)		—
M.3.1.3/RD	Cadence; time (s), voltage (V)		—
M.3.1.4/RD	Single fault current (mA)		—
M.3.2/RD	Tripping device and monitoring voltage		N



Clause	Requirement – Test	Result – Remark	Verdict
M.3.2.1/RD	Conditions for use of a tripping device or a monitoring voltage		N
M.3.2.2/RD	Tripping device		N
M.3.2.3/RD	Monitoring voltage (V).....:		N

A/RD	ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE		—
A.1/RD	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/RD	Samples	:	—
	Wall thickness (mm)	:	—
A.1.2/RD	Conditioning of samples; temperature (°C).....	:	N
A.1.3/RD	Mounting of samples.....	:	N
A.1.4/RD	Test flame (see IEC 60695-11-3)		N
	Flame A, B, C or D	:	—
A.1.6/RD	Compliance criteria		N
	Sample 1 burning time (s).....	:	—
	Sample 2 burning time (s).....	:	—
	Sample 3 burning time (s).....	:	—
A.2/RD	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/RD	Samples, material.....	:	—
	Wall thickness (mm)	:	—
A.2.2/RD	Conditioning of samples		N
A.2.3/RD	Mounting of samples		N
A.2.4/RD	Test flame (see IEC 60695-11-4)		N
	Flame A, B or C	:	—
A.2.5/RD	Test procedure		N
A.2.6/RD	Compliance criteria		N
	Sample 1 burning time (s).....	:	—
	Sample 2 burning time (s).....	:	—
	Sample 3 burning time (s).....	:	—
A.2.7/RD	Alternative test acc. to IEC 60695-2-2, cl. 4 and 8		N
	Sample 1 burning time (s).....	:	—
	Sample 2 burning time (s).....	:	—



Clause	Requirement – Test	Result – Remark	Verdict
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	Sample 3 burning time (s)..... :		—
A.3/RD	Hot flaming oil test (see 4.6.2)		N
A.3.1/RD	Mounting of samples		N
A.3.2/RD	Test procedure		N
A.3.3/RD	Compliance criterion		N

B/RD	ANNEX B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		—
B.1/RD	General requirements	B.1 – B10/RD See IEC/EN60950 Test Report for details	P
	Position		—
	Manufacturer		—
	Type		—
	Rated values		—
B.2/RD	Test conditions		N
B.3/RD	Maximum temperatures	(see appended table 7.5 and 8.3)	P
B.4/RD	Running overload test	(see appended table 7.5 and 8.3)	N
B.5/RD	Locked-rotor overload test		N
	Test duration (days)		—
	Electric strength test: test voltage (V)		—
B.6/RD	Running overload test for d.c. motors in secondary circuits		N
B.7/RD	Locked-rotor overload test for d.c. motors in secondary circuits		P
B.7.1/RD	Test procedure	(see appended table 7.5 and 8.3)	P
B.7.2/RD	Alternative test procedure; test time (h)..... :		N
B.7.3/RD	Electric strength test	See IEC/EN60950 Test Report for details	N
B.8/RD	Test for motors with capacitors	(see appended table 7.5 and 8.3)	N
B.9/RD	Test for three-phase motors	(see appended table 7.5 and 8.3)	N
B.10/RD	Test for series motors		N
	Operating voltage (V)		—

C/RD	ANNEX C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	See IEC/EN60950 Test Report for details	—
	Manufacturer		—



Clause	Requirement – Test	Result – Remark	Verdict
	Type	See IEC/EN60950-1 Test Report for details	—
	Rated values	See IEC/EN60950-1 Test Report for details	—
	Method of protection		—
C.1/RD	Overload test	(see appended table 7.5 and 8.3)	P
C.2/RD	Insulation	(see appended table 5.8, 8.2 and 9)	P
	Protection from displacement of windings		P
D/RD	ANNEX D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS (see 5.1.4)		—
D.1/RD	Measuring instrument		P
D.2/RD	Alternative measuring instrument		P
E/RD	ANNEX E, TEMPERATURE RISE OF A WINDING (see 1.4.13)		P
F/RD	ANNEX F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10)		P
G/RD	ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		—
G.1/RD	Summary of the procedure for determining minimum clearances		N
G.2/RD	Determination of mains transient voltage (V)...		N
G.2.1/RD	AC mains supply		N
G.2.2/RD	DC mains supply		N
G.3/RD	Determination of telecommunication network transient voltage (V).....		N
G.4/RD	Determination of required withstand voltage (V)		N
G.5/RD	Measurement of transient levels (V).....		N
G.6/RD	Determination of minimum clearances		N
H	ANNEX H, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER AND FOREIGN OBJECTS (see IEC 60529)		N
J/RD	ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		P



Clause	Requirement – Test	Result – Remark	Verdict
	Metal used		—
K/RD	ANNEX K, THERMAL CONTROLS (see 1.5.3 and 5.3.7)		—
K.1/RD	Making and breaking capacity		N
K.2 /RD	Thermostat reliability; operating voltage (V).....:		N
K.3/RD	Thermostat endurance test; operating voltage (V)		N
K.4/RD	Temperature limiter endurance; operating voltage (V)		N
K.5/RD	Thermal cut-out reliability		N
K.6/RD	Stability of operation	(see appended table 7.5 and 8.3)	N
L	ANNEX L, BACKFEED PROTECTION TEST	corr. Figure L.1	N
L.1	General		N
L.2	Test for pluggable equipment type A or pluggable equipment type B UPS		N
L.3	Test for permanently connected UPS		N
L.4	Single-fault conditions		N
M	ANNEX M, EXAMPLES OF REFERENCE LOAD CONDITIONS		—
M.1	General	See IEC/EN60950 Test Report for details	P
M.2	Reference resistive load		P
M.3	Reference inductive-resistive load corr.		P
M.4	Reference capacitive-resistive loads		P
M.5	Reference non-linear load corr.		P
M.5.1	Test method		P
M.5.2	Connection of the non-linear reference load		P
N	ANNEX N, VENTILATION OF BATTERY COMPARTMENTS		—
N.1	General	See Battery Information	P
N.2	Hydrogen concentration		P
N.3	Blocked conditions		P
N.4	Overcharge test corr.		P
U/RD	ANNEX U, INSULATED WINDING WIR ES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		P



Clause	Requirement – Test	Result – Remark	Verdict
		See IEC/EN60950 Test Report for details	—

X	ANNEX X, GUIDANCE FOR DISCONNECTION OF BATTERIES DURING SHIPMENT		—
X.1	Applicable products	See User Manual for details	P
X.2	Battery disconnection		P
X.3	Package labelling/markings		P
X.4	Damage inspection		P
X.5	The importance of safe handling procedures		P

Y/RD	ANNEX Y, ULTRAVIOLET LIGHT CONDITIONING TEST (see 4.3.13.3)		—
Y.1/RD	Test apparatus		N
Y.2/RD	Mounting of test samples		N
Y.3/RD	Carbon-arc light-exposure apparatus		N
Y.4/RD	Xenon-arc light exposure apparatus		N



4.3	TABLE: list of critical components					P
object/part No.	manufacturer/ trademark	type/model	technical data	standard	mark(s) of conformity ¹⁾	
See IEC/EN60950 Report for details						
¹⁾ an asterisk indicates a mark which assures the agreed level of surveillance						

4.4	TABLE: electrical data (in normal conditions)					P
fuse #	I _{rated} (A)	U (V)	P (W)	I (mA)	I _{fuse} (mA)	condition/status
See IEC/EN60950 Report for details						

5.1.2	TABLE: distance through insulation measurements				P
distance through insulation d _i at/of:		U _p (V)	test voltage (V)	required d _i (mm)	d _i (mm)
See IEC/EN60950 Report for details					



5.8 and 9	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 Report for details						

5.8, 6, 8.2 and 9	TABLE: electric strength tests, impulse tests and voltage surge tests		P
test voltage applied between:	test voltage (V) a.c. / d.c.	breakdown Yes / No	
See IEC/EN60950 Report for details			
supplementary information			

7.5	TABLE: resistance to fire				P
part	manufacturer of material	type of material	thickness (mm)	flammability class	
See IEC/EN60950 Report for details					



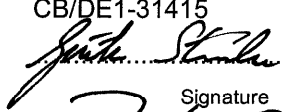
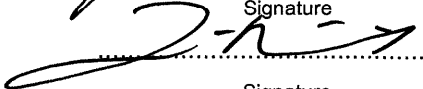
7.5 and 8.3	TABLE: fault condition tests						P
	ambient temperature (°C)					—	
	model/type of power supply					—	
	manufacturer of power supply					—	
	rated markings of power supply					—	
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result	
See IEC/EN60950 Report for details							
supplementary information							



7.7	TABLE A: maximum temperatures						P
	test voltage (V)						—
	t _{amb1} (°C)						—
	t _{amb2} (°C)						—
maximum temperature T of part/at::		T (°C)					allowed T _{max} (°C)
See IEC/EN60950 Report for details							
temperature T of winding:		R ₁ (Ω)	R ₂ (Ω)	T (°C)	allowed T _{max} (°C)	insulation class	

7.7	TABLE B: ball pressure test of thermoplastic parts		N
	allowed impression diameter (mm): ≤ 2 mm	—	
part		test temperature (°C)	impression diameter (mm)
See IEC/EN60950 Report for details			



TEST REPORT	
IEC/EN 60950-1 First Edition	
Information technology equipment – Safety –	
Part 1: General requirements	
Report reference No.	1924400-3335-0020 48125 CB/DE1-31415
Tested by	Günter Straube Name in block letters and title  Signature
Approved by	Jürgen Bärwinkel Name in block letters and title  Signature
Date of issue	12.11.2004
Testing Laboratory Name:	VDE Testing and Certification Institute
Address:	Merianstraße 28, D-63069 Offenbach
Testing location:	CBTL <input type="checkbox"/> SMT <input type="checkbox"/> WMT <input checked="" type="checkbox"/> TDAP <input checked="" type="checkbox"/>
Name:	American Power Conversion Corp.
Address:	85 Rangeway Road Bldg. #2 , N. Billerica, MA USA Section FG13 WMT (TDAP File no. 1924400-9501-0001)
Applicant's Name:	American Power Conversion (APC)
Address:	85 Rangeway Road Bldg #2, N.Billerica, MA, 01862
Manufacturer's Name:	American Power Conversion (APC)
Address:	85 Rangeway Road Bldg #2, N.Billerica, MA, 01862
Factory:	See page 3
Test specification	
Standard:	IEC 60950-1:2001, First Edition modified, EN 60950-1:2001, DIN EN 60950-1 (VDE 0805 Teil 1)2003-03
Test procedure:	VDE, CB –scheme
Non-standard test method:	
Test Report Form No.:	IEC60950_1A modified
TRF originator:	SGS Fimko Ltd modified by VDE
Master TRF:	Dated 2001-12 modified by VDE
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Test item

Description :	Uninterruptible Power Supply (UPS)
Trademark:	APC
Model and/or type reference:	1 a) SUOL1000XLI, SUOL1000UXI 2 a) SUOL2000XLI, SUOL2000UXI 1 b) SURT1000XLI, SURT1000UXI, SURT1000XLICH, SURT1000UXICH, 2 b) SURT2000XLI, SURT2000UXI, SURT2000XLICH, SURT2000UXICH.
Serial number :	---
Ratings :	Input: 1a,b) AC 220-240 V, 6 A, 50 / 60 Hz 2a,b) AC 220-240 V, 12 A, 50 / 60 Hz Output: 1a,b) AC 220-240 V, 4.6 A, 700 W, 1000 VA, 50/60 Hz 2a,b) AC 220-240 V, 9.1 A, 1400 W, 2000 VA, 50/60 Hz Ambient: 40 °C

Particulars: test item vs. test requirements

Equipment mobility :	movable / hand-held / stationary / fixed / permanent connection / direct plug-in / <u>for building-in (Rack mount or floor standing)</u>
Operating condition :	continuous
Mains supply tolerance (%) :	-10 % / +6 %
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 : 01.07.2004
Date(s) of performance of test : 29.07. –12.11.2004

General remarks

This is a combined Test Report for IEC and EN marked with CENELEC and CENELEC Info
CENELEC Info DE for Annex H and NO for Annex G

**"This report is not valid as a CB Test Report unless appended to a CB Test Certificate issued by a
NCB, in accordance with IECEE 02".**

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.

Factory:

Name: APC Suzhou UPS Co. LTD

Address: No. 189 Suhong Road China-Singapore Suzhou Industry Park, 215021 SUZHOU JIANGSU,
P.R. China

Name: APC India

Address: No. 187/3, 188/3 Jigani, Bangalore, Karnataka, 562 106 India

Name: American Power Conversion (APC)

Address: Ballybrit Business Park, Galway, Ireland

Name: American Power Conversion (APC)

Address: 2nd Street EPZA, Rosario Cavite, Philippines

Name: American Power Conversion (APC)

Address: Lot 32 Phase I Carmelray Ind. PK Canlubang, Calamba
Laguna, Philippines

Copy of marking plate:

See Appendix 1



Information/comments:

Annex ZA has been added by CENELEC. The normative references to international publications with their corresponding European publications are regarded.

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

Product description:

Model SURT1000XLI is identical to SUOL1000XLI, Model SURT2000XLI is identical to SUOL2000XLI. All compliance tests were performed on Models SUOL1000XLI and SUOL2000XLI.

The suffix UXI indicates a UPS without an internal battery. A connector is provided for connection to an external battery. The suffix CH indicates that the unit was manufactured in China.

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

Optional parts : Battery Model SURT48XLBP - 12 V, 9 Ah.

This test report includes the following appendices:

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Appendix 9	Manual	Page 1-22
Appendix 10	EMC Report	Page 1-61
Appendix 11	Test Equipment List	Page 1-4
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Appendix 13	Opto-coupler Information	Page 1-18
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Clause	Requirement – Test	Result – Remark	Verdict
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1	GENERAL		—
1.5	Components		—
1.5.1	General	CENELEC Info SE, CH	P
	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 60950.	P
1.5.3	Thermal controls		N
1.5.4	Transformers	See annex C for details	P
1.5.5	Interconnecting cables	Interconnecting cables are not used in this application	N
1.5.6	Capacitors in primary circuits	All X capacitors are IEC certified or in compliance with IEC 384-14 2 nd Edition, see critical components list	P
1.5.7	Double insulation or reinforced insulation bridged by components	Double or reinforced insulation bridged by transformers and opto-isolators	P
1.5.7.1	General		N
1.5.7.2	Bridging capacitors		N
1.5.7.3	Bridging resistors		N
1.5.7.4	Accessible parts		N
1.5.8	Components in equipment for IT power systems	CENELEC NO Not for use on IT-system	N



Clause	Requirement – Test	Result – Remark	Verdict
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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	Neutral is insulated from earth with basic insulation. Components connected between phases and earth are rated and certified for a minimum working voltage of 250 V. See list of Critical Components	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 220-240 V	P
	Symbol for nature of supply, for d.c. only	AC Unit	N
	Rated frequency or rated frequency range (Hz)	50 / 60 Hz	P
	Rated current (mA or A)	See page 2	P
	Manufacturer's name or trademark or identification mark	APC	P
	Type/model or type reference	See page 2	P
	Symbol for Class II equipment only	Class I equipment	N
	Other symbols		P
	Certification marks	VDE	P
1.7.2	Safety instructions	CENELEC FI, NO, SE CENELEC Info DK	P
1.7.3	Short duty cycles	See manual for run times	N
1.7.4	Supply voltage adjustment	Unit is an auto-ranging type	P
1.7.5	Power outlets on the equipment	CENELEC DK CENELEC Info DK 220-240 V, 50/60 Hz MOD 1000 VA, 700 W, 4.6 A MAX MOD 2000 VA, 1400 W, 9.1 A MAX	P
1.7.6	Fuse identification	All fuses are marked with ratings or symbols like F1	P
1.7.7	Wiring terminals		
1.7.7.1	Protective earthing and bonding terminals	Ground symbol (60417-2-IEC-5019)	P



Clause	Requirement – Test		Result – Remark	Verdict
1.7.7.2	Terminal for a.c. mains supply conductors		L1 for line, N for neutral or appliance inlet	P
1.7.7.3	Terminals for d.c. mains supply conductors		Battery connectors are marked with “+” and “-“	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			N
1.7.9	Isolation of multiple power sources			N
1.7.10	IT power distribution systems -		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	CENELEC Info DE	German / English	—
1.7.13	Durability			P
1.7.14	Removable parts		No marking on removable parts	P
1.7.15	Replaceable batteries	CENELEC Info CH	Optional: Replaceable Lead Acid Battery Module	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	All wires in the front of the unit which are accessible with the test pin are double insulated or have an thickness of insulation >> 0.4 mm	P
	Test with test probe		N
2.1.1.2	Battery compartments	No TNV circuits	N



Clause	Requirement – Test	Result – Remark	Verdict
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2.1.1.3	Access to ELV wiring	No ELV circuits	N
	Working voltage (V); minimum distance (mm) through insulation	(see appended table 2.10.5)	—
2.1.1.4	Access to hazardous voltage circuit wiring	See 2.1.1.1	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 equipment		P
	Time-constant (s); measured voltage (V)	see appendix 17	—
2.1.2	Protection in service access areas		P
2.1.3	Protection in restricted access locations	Not evaluated for use in a restricted access area	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	0	12
Phase to Neutral	Off	254	360	133	0	12

Note: Printouts see Appendices

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 V _{pk} or 60 V _{dc} See Abnormals for SELV Reliability test	P
2.2.3	Voltages under fault conditions (V)	Less than or equal to 42.4 V _{pk} or 60 V _{dc} See Abnormals for SELV Reliability test	P
2.2.3.1	Separation by double insulation 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	CENELEC NO SELV circuits are not connected to other circuits	P



Clause	Requirement – Test		Result – Remark	Verdict
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	CENELEC NO		N
	Insulation employed			—
2.3.3	Separation from hazardous voltages			N
	Insulation employed	CENELEC NO		—
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 (µF)	---		—
2.4.3	Connection of limited current circuits to other circuits			N
2.5	Limited power sources			—
	Inherently limited output		No limited power sources	N
	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)			—
	Current rating of overcurrent protective device (A)			—



Clause	Requirement – Test	Result – Remark	Verdict
2.6	Provisions for earthing and bonding		—
2.6.1	Protective earthing	Accessible metal parts are reliably earthed refer to installation instructions. Approved appliance inlet.	P
2.6.2	Functional earthing		N
2.6.3	Protective earthing and protective bonding conductors	Approved appliance inlet	P
2.6.3.1	General		P
2.6.3.2	Size of protective earthing conductors		P
	Rated current (A), cross-sectional area (mm ²), AWG	23 A, 4 mm ²	—
2.6.3.3	Size of protective bonding conductors	CENELEC UK	P
	Rated current (A), cross-sectional area (mm ²), AWG	23 A, 4 mm ²	—
2.6.3.4	Resistance (Ohm) of earthing conductors and their terminations, test current (A)	See results below	P
2.6.3.5	Colour of insulation	Green/Yellow used only for protective earthing	P
2.6.4	Terminals	VDE certified terminal block	
2.6.4.1	General	VDE certified terminal block	
2.6.4.2	Protective earthing and bonding terminals	VDE certified terminal block	
	Rated current (A), type and nominal thread diameter (mm)		—
2.6.4.3	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		P
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 or cable distribution system	No TNV circuits	N



Clause	Requirement – Test	Result – Remark	Verdict
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2.6.3.4 - Resistance (Ohm) of earthing conductors and their terminations, test current (A)				
Test Point (from)	Test Point (to)	Current (A)	Time (minutes)	Resistance (Ohms)
Inlet	Front Left Corner	25	2	0.016
Inlet	Front Left Corner	30	2	0.017
Inlet	Front Left Corner	25	2	0.016
Inlet	Front Left Corner	30	2	0.017
2.6.3.4 - Resistance (Ohm) of earthing conductors and their terminations, test current (A) < 0.1 Ohm, see appendix 17.				

2.7	Overcurrent and earth fault protection in primary circuits			—
2.7.1	Basic requirements	CENELEC CENELEC UK	Fuses or Circuit Breakers are used, see schematics and component list for details on position and ratings.	P
	Instructions when protection relies on building installation		See Installation Instructions	P
2.7.2	Faults not covered in 5.3	CENELEC	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	Moving parts		N
2.8.6	Overriding		N
2.8.7	Switches and relays		N
2.8.7.1	Contact gaps (mm)		N
2.8.7.2	Overload test		N



Clause	Requirement – Test	Result – Remark	Verdict
2.8.7.3	Endurance test		N
2.8.7.4	Electric strength test	(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		P
	Humidity (%)	95	P
	Temperature (°C)	25°C	P
2.9.3	Grade 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	CENELEC	Max. 250 Vrms
2.10.3	Clearances	See General	P
2.10.3.1	General	CENELEC NO	See General
2.10.3.2	Clearances in primary circuit	(see appended table 2.10.3 and 2.10.4)	P
2.10.3.3	Clearances in secondary circuits	(see appended table 2.10.3 and 2.10.4)	P
2.10.3.4	Measurement of transient voltage levels		N
2.10.4	Creepage distances	(see appended table 2.10.3 and 2.10.4)	P
	CTI tests	---	—
2.10.5	Solid insulation		P
2.10.5.1	Minimum distance through insulation	(see appended table 2.10.5)	P
2.10.5.2	Thin sheet material	Used in transformers	N
	Number of layers (pcs)	2 minimum. See Annex C	—
	Electric strength test	(see appended table 5.2)	—
2.10.5.3	Printed boards	See Appendix 18	P
	Distance through insulation		P
	Electric strength test for thin sheet insulating material	(see appended table 5.2)	—
	Number of layers (pcs)		P



Clause	Requirement – Test	Result – Remark	Verdict
2.10.5.4	Wound components	Used in Sence transformers, see annex for details	P
	Number of layers (pcs)	3	P
	Two wires in contact inside wound 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 :	Opto-isolators have an internal creepage distance of > 4 mm. A Thermal Cycling Test was performed and Pollution Degree 1 is used. All Opto-isolators are also VDE 0884 certified. See critical component list for details on opto-isolators	P
	Temperature $T_1 = T_2 = T_{ma} - T_{amb} + 10K$ (°C) :		P
2.10.8	Spacings filled by insulating compound	All optoisolators have an internal distance through insulation of > 0.4 mm. A Thermal Cycling Test was performed with an electric strength test of AC 5300 V. All Opto-isolators are also VDE 0884 certified. See critical component list for details on opto-isolators	P
	Electric strength test	(see appended table 5.2)	—
2.10.9	Component external terminations		P
2.10.10	Insulation with varying dimensions		N



Clause	Requirement – Test	Result – Remark	Verdict
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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	P
3.1.6	Screws for electrical contact pressure		P
3.1.7	Insulating 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 electrical connections.	N
3.1.9	Termination of conductors	Display Panel cable	P
	10 N pull test	Display Panel cable	P
3.1.10	Sleeving on wiring		P



Clause	Requirement – Test	Result – Remark	Verdict
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3.2	Connection to an a.c. mains supply or a d.c. mains supply		—
3.2.1	Means of connection	Appliance inlet IEC approved	P
3.2.1.1	Connection to an a.c. mains supply	CENELEC CH, DK, ES, UK, IE Appliance inlet IEC approved	P
3.2.1.2	Connection to a d.c. mains supply	Connection for external Batteries uses a special DC - connector	P
3.2.2	Multiple supply connections		N
3.2.3	Permanently connected equipment		P
	Number of conductors, diameter (mm) of cable and conduits		—
3.2.4	Appliance inlets		N
3.2.5	Power supply cords	Mains Input power cord was not part of this investigation	N
3.2.5.1	AC power supply cords	CENELEC CENELEC UK	N
	Type :		—
	Rated current (A), cross-sectional area (mm ²), AWG :		—
3.2.5.2	DC power supply cords		N
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		N

3.3	Wiring terminals for connection of external conductors		—
3.3.1	Wiring terminals	Appliance Inlet	P
3.3.2	Connection of non-detachable power supply cords		N
3.3.3	Screw terminals		N



Clause	Requirement – Test		Result – Remark	Verdict
3.3.4	Conductor sizes to be connected	CENELEC CENELEC UK		N
	Rated current (A), cord/cable type, cross-sectional area (mm ²)			N
3.3.5	Wiring terminal sizes			N
	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 mains supply			—
3.4.1	General requirement	appliance inlet		P
3.4.2	Disconnect devices	appliance inlet		P
3.4.3	Permanently connected equipment	See 3.4.1		P
3.4.4	Parts which remain energized			P
3.4.5	Switches in flexible cords			N
3.4.6	Single-phase equipment and d.c. equipment	See 3.4.1		P
3.4.7	Three-phase equipment			N
3.4.8	Switches as disconnect devices			N
3.4.9	Plugs as disconnect devices	appliance inlet		P
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



Clause	Requirement – Test	Result – Remark	Verdict
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4	PHYSICAL REQUIREMENTS		—
4.1	Stability		—
	Angle of 10°	10 °	P
	Test: force (N)	250 N, 800 N	P
800 N Test			
Location	Height (cm)	With / Without Batteries	Did unit tip over ?
Right side center edge	44	With	No
Right side center edge	44	Without	No
Left side center edge	44	With	No
Left side center edge	44	Without	No

4.2	Mechanical strength		—
4.2.1	General		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	Test performed on the top and on the side of the unit – no hazard	P
	Fall test		P
	Swing test		P
4.2.6	Drop test		N
4.2.7	Stress relief test		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



Clause	Requirement – Test		Result – Remark	Verdict
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	CENELEC UK, IE		N
	Dimensions (mm) of mains plug for direct plug-in			N
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N)			—
4.3.7	Heating elements in earthed equipment		No heating element in the unit	N
4.3.8	Batteries		See IEC/EN62040-1-1 report for details	P
4.3.9	Oil and grease		Insulation is not exposed to oil, grease, etc.	P
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			N
4.3.13.1	General			N
4.3.13.2	Ionizing radiation			N
	Measured radiation (pA/kg)			N
	Measured high-voltage (kV)			N
	Measured focus voltage (kV)			N
	CRT markings			N
4.3.13.3	Effect of ultraviolet (UV) radiation on materials			N
4.3.13.4	Human exposure to ultraviolet (UV) radiation			N
	Part, property, retention after test, flammability classification			N



Clause	Requirement – Test		Result – Remark	Verdict
4.3.13.5	Laser (including LEDs)		LED with diffuse light emission under normal and abnormal condition remains in Laser class1 (see appendix 6)	P
	Laser class		Laser class 1	P
4.3.13.6	Other types	CENELEC		N

4.4	Protection against hazardous moving parts			—
4.4.1	General		Unit is provided with one DC fans.	P
4.4.2	Protection in operator access areas		Unit is provided with fan guards.	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	Maximum temperatures		(see appended table 4.5)	P
	Normal load condition per Annex L			N
4.5.2	Resistance to abnormal heat			N

4.6	Openings in enclosures			—
4.6.1	Top and side openings		No Top and side openings	P
	Dimensions (mm)			—
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			N

4.6.4	Openings in transportable equipment			N
4.6.5	Adhesives for constructional purposes			N
	Conditioning temperature (°C)/time (weeks)			—

4.7	Resistance to fire			—
4.7.1	Reducing the risk of ignition and spread of flame		All components are used with-in their temperature ratings, no fire hazard.	P



Clause	Requirement – Test	Result – Remark	Verdict
	Method 1, selection and application of components wiring and materials	(see appended table 4.7)	P
	Method 2, application of all of simulated fault condition tests	(see appended table 5.3)	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		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 and Side Bezel rated HB (decorative only), Bezel for Display (SELV circuits)	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



Clause	Requirement – Test	Result – Remark	Verdict
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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 touch current (mA)		Max. 2.62 mA see table below			—
	Max. allowed touch current (mA)		3,5			—
	Measured protective conductor current (mA)					—
	Max. allowed protective conductor current (mA)					—
5.1.7	Equipment with touch current exceeding 3.5 mA					N
5.1.8	Touch currents to and from telecommunication networks and cable distribution systems and from telecommunication networks					N
5.1.8.1	Limitation of the touch current to a telecommunication network and a cable distribution system					N
	Test voltage (V)					—
	Measured touch current (mA)					—
	Max. allowed touch current (mA)					—
5.1.8.2	Summation of touch currents from telecommunication networks					N
Mode of operation	EUT Power Switch ON Forward	EUT Power Switch ON Reverse	EUT Power Switch OFF Forward	EUT Power Switch OFF Reverse	Load	Switch (e)
Normal	2.62 mA	1.174 mA	0.566 mA	1.161 mA	No	open
Discharge	2.62 mA	1.19 mA	---	---	No	closed
Recharge	2.60 mA	1.12 mA	---	---	No	closed
See Appendix 21 (SURT1000XLI)						



Clause	Requirement – Test	Result – Remark	Verdict
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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	Abnormal operating and fault conditions		P
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

6	CONNECTION TO TELECOMMUNICATION NETWORKS		—
6.1	Protection of telecommunication network service persons, and users of other equipment connected to the network, from hazards in the equipment		—
6.1.1	Protection from hazardous voltages		N
6.1.2	Separation of the telecommunication network from earth		N
6.1.2.1	Requirements	CENELEC FI, NO, SE	(see appended table 5.2)
	Test voltage (V)		—
	Current in the test circuit (mA) :		—
6.1.2.2	Exclusions	CENELEC FI, NO, SE	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



Clause	Requirement – Test	Result – Remark	Verdict
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6.3	Protection of the telecommunication wiring system from overheating		—
	Max. output current (A)		N
	Current limiting method		—

7	CONNECTION TO CABLE DISTRIBUTION SYSTEMS			—
7.1	Protection of cable distribution system service persons, and users of other equipment connected to the system, from hazardous voltages in the equipment	CENELEC FI, NO, SE		N
7.2	Protection of equipment users from over voltages on the cable distribution system			N
7.3	Insulation between primary circuits and cable distribution systems			N
7.3.1	General			N
7.3.2	Voltage surge test	(see appended table 5.2)		—
7.3.3	Impulse test	(see appended table 5.2)		—

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			—
	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.2.2	Conditioning of samples			N



Clause	Requirement – Test	Result – Remark	Verdict
A.2.3	Mounting of samples		N
A.2.4	Test flame		N
A.2.5	Test procedure		N
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	Hot flaming oil test (see 4.6.2)		N
A.3.1	Mounting of samples		N
A.3.2	Test procedure		N
A.3.3	Compliance criterion		N

B	Annex B, MOTOR TESTS UNDER ABNORMAL CONDITIONS (see 4.7.2.2 and 5.3.2)		—
B.1	General requirements		P
	Position	DC Fan	—
	Manufacturer	Sunon	—
	Type	KDE2408PTB3-6	—
	Rated values	24VDC, 0.10A	—
B.2	Test conditions		N
B.3	Maximum temperatures	(see appended table 5.3)	P
B.4	Running overload test	(see appended table 5.3)	N
B.5	Locked-rotor overload test		N
	Test duration (days)		—
	Electric strength test: test voltage (V)		—
B.6	Running overload test for d.c. motors in secondary circuits	Fans are VDE certified to IEC/EN60950 or locked rotor test = max temp.68°C	P
B.7	Locked-rotor overload test for d.c. motors in secondary circuits	IEC/EN60950 or locked rotor test = max.68°C	P
B.7.1	Test procedure	(see appended table 5.3)	



Clause	Requirement – Test	Result – Remark	Verdict
B.7.2	Alternative test procedure; test time (h) :		
B.7.3	Electric strength test	(see appended table 5.2)	
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	Output transformer	—
	Manufacturer	Eastar, LEI	—
	Type	APC 430-0025	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P

Comments: See appendix 2 for transformer construction data.



Clause	Requirement – Test	Result – Remark	Verdict
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C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Output transformer	—
	Manufacturer	JML Enterprises; Falco	—
	Type	APC 430-7200	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P
Comments: See appendix 2 for transformer construction data. Triple insulation wire used from Furukawa Type TEX-E.			

C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Output transformer	—
	Manufacturer	Falco	—
	Type	APC 430-7203	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P
Comments: See appendix 2 for transformer construction data. Insulations between primary and secondary four layers of mylar.			



Clause	Requirement – Test	Result – Remark	Verdict
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C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Output transformer	—
	Manufacturer	JML Enterprises; Falco	—
	Type	APC 430-7205	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P
Comments: See appendix 2 for transformer construction data. Triple insulation wire used from Furukawa Type TEX-E.			

C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Output transformer	—
	Manufacturer	JML Enterprises; Falco	—
	Type	APC 430-7207	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P
Comments: See appendix 2 for transformer construction data. Triple insulation wire used from Furukawa Type TEX-E.			



Clause	Requirement – Test	Result – Remark	Verdict
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C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Output transformer	—
	Manufacturer	JML Enterprises; Falco	—
	Type	APC 430-7208	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P
Comments: See appendix 2 for transformer construction data. Triple insulation wire used from Furukawa Type TEX-E.			

C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Falco	—
	Manufacturer	APC 460-0016	—
	Type	see appendix 2	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P
Comments: See appendix 2 for transformer construction data. Triple insulation wire used from Furukawa Type TEX-E.			



Clause	Requirement – Test	Result – Remark	Verdict
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C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Output transformer	—
	Manufacturer	Falco	—
	Type	APC 460-7200	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P
Comments: See appendix 2 for transformer construction data. Triple insulation wire used from Furukawa Type TEX-E.			

C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Output transformer	—
	Manufacturer	Falco	—
	Type	APC 460-0358 (only in SURT1000XLI)	—
	Rated values	see appendix 2	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test	see appendix 17	P
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P
Comments: See appendix 2 for transformer construction data. Triple insulation wire used from Furukawa Type TEX-E.			



Clause	Requirement – Test	Result – Remark	Verdict
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C	Annex C, TRANSFORMERS (see 1.5.4 and 5.3.3)		—
	Position	Gate drive transformer	—
	Manufacturer	Falco Electronics, Leader Electric	—
	Type	430-0357 (LS-A9782-ST1) (SURT1000)	—
	Rated values	see appendix 19	—
	Temperatures	see attached pages	P
	Thermal cut-out		N
C.1	Overload test		N
	Conventional transformer		N
C.2	Insulation		P
	Precautions		P
	Retaining of end turns of all windings		P
	Earthing test at 25 A		N
	Electric strength test	see attached pages	P

Comments: See appendix 2 and appendix 19 for transformer construction data.
Triple insulation wire used from Furukawa Type TEX-E.

D	Annex D, MEASURING INSTRUMENTS FOR TOUCH-CURRENT TESTS		—
D.1	Measuring instrument		P
D.2	Alternative measuring instrument		N

E	Annex E, TEMPERATURE RISE OF A WINDING		—
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F	Annex F, MEASUREMENT OF CLEARANCES AND CREEPAGE DISTANCES (see 2.10)		—
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G	Annex G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES		—
G.1	Summary of the procedure for determining minimum clearances		N
G.2	Determination of mains transient voltage (V)		N
G.2.1	AC mains supply		N
G.2.2	DC mains supply		N
G.3	Determination of telecommunication network transient voltage (V)		N
G.4	Determination of required withstand voltage (V)		N



Clause	Requirement – Test	Result – Remark	Verdict
G.5	Measurement of transient levels (V)		N
G.6	Determination of minimum clearances		N
H	Annex H, IONIZING RADIATION (see 4.3.13)		—
J	Annex J, TABLE OF ELECTROCHEMICAL POTENTIALS (see 2.6.5.6)		—
	Metal used		P
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
L	Annex L, NORMAL LOAD CONDITIONS FOR SOME TYPES OF ELECTRICAL BUSINESS EQUIPMENT (see 1.2.2.1 and 4.5.1)		—
L.1	Typewriters		N
L.2	Adding machines and cash registers		N
L.3	Erasers		N
L.4	Pencil sharpeners		N
L.5	Duplicators and copy machines		N
L.6	Motor-operated files		N
L.7	Other business equipment		N
M	Annex M, CRITERIA FOR TELEPHONE RINGING SIGNALS (see 2.3.1)		—
M.1	Introduction		N
M.2	Method A		N
M.3	Method B		N
M.3.1	Ringling signal		N
M.3.1.1	Frequency (Hz)		—



Clause	Requirement – Test	Result – Remark	Verdict
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
N	Annex N, IMPULSE TEST GENERATORS (see 2.10.3.4, 6.2.2.1, 7.3.2 and clause G.5)		—
N.1	ITU-T impulse test generators		N
N.2	IEC 60065 impulse test generator		N
P	Annex P, NORMATIVE REFERENCES		—
Q	Annex Q, BIBLIOGRAPHY		—
R	Annex R, EXAMPLES OF REQUIREMENTS FOR QUALITY CONTROL PROGRAMMES		—
R.1	Minimum separation distances for unpopulated coated printed boards (see 2.10.6)	See appendix 15	P
R.2	Reduced clearances (see 2.10.3)	See appendix 15	P
S	Annex S, PROCEDURE FOR IMPULSE TESTING (see 6.2.2.3)		—
S.1	Test equipment		N
S.2	Test procedure		N
S.3	Examples of waveforms during impulse testing		N
T	Annex T, GUIDANCE ON PROTECTION AGAINST INGRESS OF WATER (see 1.1.2)		—
		See separate test report	N



Clause	Requirement – Test	Result – Remark	Verdict
U	Annex U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (see 2.10.5.4)		—
		Transformers are using VDE approved triple insulating wires under File no. 21356 (Furukawa Electric, TEX-E); Circle Cycling test pass	P



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 No. 6 for details						
¹⁾ an asterisk indicates a mark which assures the agreed level of surveillance						

1.6.2	TABLE 2: electrical data (in normal conditions)					P
	I rated (A)	U (V)	P (W)	I (A)	I fuse (A)	condition/status
INPUT						
SURT2000XLI	12 A	229 V	1660 W	9.0 A	N	Charge Mode
	12 A	229.1	1700 W	9.1 A	N	Recharge Mode
	12 A	206.3V	1660 W	9.86 A	N	Charge Mode
	12 A	205.9 V	1680 W	10.11 A	N	Recharge Mode
	12 A	242 V	1610 W	8.10 A	N	Charge Mode
	12 A	242.2 V	1680 W	8.45 A	N	Recharge Mode
OUTPUT						
SURT2000XLI	9.1 A	228.3 V	1360 W	8.61 A	N	Charge Mode
	9.1 A	227 V	1400 W	8.83 A	N	Recharge Mode
	9.1 A	229.2 V	1420 W	8.80 A	N	Charge Mode
	9.1 A	228.1 V	1380 W	8.78 A	N	Recharge Mode
	9.1 A	229 V	1400 W	8.83 A	N	Charge Mode
	9.1 A	227.1 V	1400 W	8.83 A	N	Recharge Mode



INPUT						
SURT1000XLI	6 A	230.3 V	782 W	3.45 A	N	Charge Mode
	6 A	233 V	872 W	3.84 A	N	Recharge Mode
	6 A	207 V	787 W	3.87 A	N	Charge Mode
	6 A	207 V	811 W	4.24 A	N	Recharge Mode
	6 A	254.1 V	807.3 W	3.22 A	N	Charge Mode
	6 A	242.2 V	878 W	3.52 A	N	Recharge Mode
OUTPUT						
SURT1000XLI	4.6 A	232.8 V	704 W	4.26 A	N	Charge Mode
	4.6 A	232.8 V	707 W	4.27 A	N	Recharge Mode
	4.6 A	233.1 V	706.5 W	4.13 A	N	Charge Mode
	4.6 A	231.7 V	706.7 W	4.11 A	N	Recharge Mode
	4.6 A	232.8 V	709 W	4.16 A	N	Charge Mode
	4.6 A	232.8 V	717 W	4.29 A	N	Recharge Mode



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)
Clearance (Cl) and Creepage distance (Cr) of:	Up (V)	U r.m.s. (V)	Required Cl (mm)	Measured Cl (mm)	Required Cr (mm)	Measured Cr (mm)
Transformer Type 430-0358 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	700	460	4.8	6.5	9.4	10.0
Transformer Type 430-0357 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	700	460	4.8	6.5	9.4	10.0
Transformer Type 430-7207 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	700	460	4.8	6.5	9.4	10.0
Primary to Secondary Traces near Type 430-7207	700	460	4.8	6.5	9.4	10.0
Transformer Type 430-7208 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	700	460	4.8	6.5	9.4	10.0
Primary to Secondary Traces near Type 430-7208	700	460	4.8	6.5	9.4	10.0
Transformer Type 430-7200 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	330	230	4	4	5	5
Primary to Secondary Traces near T 430-7200	330	230	4	4	5	5
Transformer Type 430-7203 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	700	460	4.8	6.5	9.4	10.0
Primary to Secondary Traces near T 430-7203	700	460	4.8	6.5	9.4	10.0



Transformer Type 460-7200 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	330	230	4	4	5	5
Primary to Secondary Traces near T 460-7200	330	230	4	4	5	5
Transformer Type 460-0016 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	330	230	4	4	5	5
Primary to Secondary Traces near T 460-0016	330	230	4	4	5	5
Transformer Type 430-7205 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	330	230	4	4	5	5
Primary to Secondary Traces near T 430-7205	330	230	4	4	5	5
Transformer Type 430-0025 (Primary to Secondary) Triple insulated wire certified to EN60950 / Annex U is used as secondary winding	330	230	4	4	5	5
Primary to Secondary Traces near T 430-0025	330	230	4	4	5	5
Primary to Ground Traces	330	230	2	2	2.5	2.5
Primary to SELV Traces	330	230	4	4	5	5
Network protector Board Pri Circuit of unit to board	330	230	4	4	5	5
Relays (all)	330	230	4	4	5	5
Backfeed protection 1 relay * contact airgap to comply with EN50091/EN60950	330	230	1.4	1.4	5	5
Note: *) see appendix 15 for attached relay datasheets for annex R2 of IEC60950 information.						



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)
Transformer bobbins		250	5000	0.4	>0.4
Relays		250	3000	0.4	>0.4
Optoisolator Pri to SELV		250	5000	0.4	>0.4
Shrink tubing on wires		250	3000	0.4	>0.4
Insulation sheets (Basic insulation)		250	1500	---	0.6



4.5		TABLE: temperature rise measurements			P
		test voltage (V)	See Appendices (AC 207V)		
		t1 (°C)	40		
		t2 (°C)	40		
rise dT of part/at:		dT (K)	allowed dT (K)		
Component	Normal Mode	Recharge Mode	Component	Discharge Mode	
RMAMB	27.7	26.6	RMAMB	28.5	
BTBATT1	1.969	3.346	AMBFAN	32.192	
TPBATT1	2.319	3.651	TPBATT1	2.356	
BTBATT2	4.589	6	Q8HS	15.486	
TPBATT2	3.199	4.458	Q16HS	32.152	
BTBATT3	4.907	6.234	BTBATT3	3.349	
T6	5.776	6.595	C12	20.166	
CORE	3.631	4.814	T1CORE	39.142	
SEC1-2	2.971	4.231	T1SEC1-2	36.586	
SEC3-7	4.025	5.273	T1SEC3-7	40.565	
PRI8-5	3.501	4.732	T1PRI8-5	44.335	
Q4	60.026	61.743	Q4	32.248	
T4CORE	32.44	33.133	T4CORE	14.725	
T4SIDE	-0.964	0.621	T4SIDE1	17.717	
T4SIDE2	39.996	38.506	T4SIDE2	16.986	
T3	21.275	22.689	T3	18.747	
T5	29.894	31.554	T5	22.01	
HSBOTT	65.859	68.197	HSBOTR85	60.52	
HSTOP	63.932	66.052	HSTOPQ13	43.032	
Q7	3.674	4.872	Q7	22.274	
Q15	1.942	3.067	TH2	24.879	
T5CORE	31.497	32.993	PROCESSOR	24.941	
C25	1.758	2.856	C25	9.516	
CT2	33.704	35.278	CT2	26.848	
L4TOP	89.28	89.992	L4TOP	86.752	
L4BOTT	73.929	75.275	L4BOTT	70.148	
CT4	11.039	12.117	CT1	15.334	
C17	25.89	26.829	Q10	63.776	
RY3	24.573	25.522	RY3	18.773	
L5	68.02	69.283	L5	63.637	
INTAMB	8.705	7.973	INTAMB	14.749	
D22	38.371	40.337	D22	37.105	



4.5	TABLE: temperature rise measurements				P
	test voltage (V)	See Appendices (AC 230 V)			
	t1 (°C)	40			
	t2 (°C)	40			
rise dT of part/at:		dT (K)	allowed dT (K)		
Component	Normal Mode	Recharge Mode	Component	Bypass Mode	
RMAMB	25.08608	25.92707	26.73046		
BTBATT1	3.068	4.559	3.669		
TPBATT1	3.625	4.611	4.061		
BTBATT2	5.464	6.502	6.092		
TPBATT2	4.27	5.557	5.054		
BTBATT3	5.789	6.775	6.262		
T6	6.676	13.301	11.139		
CORE	4.846	38.692	32.168		
SEC1-2	4.375	37.185	28.803		
SEC3-7	5.108	48.801	32.668		
PRI8-5	4.617	44.683	35.062		
Q4	51.629	33.634	61.436		
T4CORE	28.301	18.522	36.513		
T4SIDE	1.852	0.398	0.464		
T4SIDE2	33.312	18.664	43.826		
T3	21.158	20.111	22.007		
T5	25.75	26.698	31.07		
HSBOTT	65.361	56.361	67.425		
HSTOP	57.429	45.051	65.235		
Q7	3.916	19.91	15.147		
Q15	3.791	29.585	17.373		
T5CORE	27.278	28.567	32.814		
C25	3.369	19.734	17.217		
CT2	33.767	32.965	33.883		
L4TOP	81.482	80.727	88.786		
L4BOTT	67.074	65.932	73.313		
CT4	11.367	14.103	12.978		
C17	23.583	22.562	26.533		
RY3	22.851	21.725	24.922		
L5	51.932	49.958	60.066		
INTAMB	8.237	20.44	11.648		
D22	37.067	31.11	39.542		



4.5		TABLE: temperature rise measurements			P
		test voltage (V)	See Appendices (AC 254V)		
		t1 (°C)	40		
		t2 (°C)	40		
rise dT of part/at:			dT (K)	allowed dT (K)	
Component	Normal Mode	Recharge Mode	Component	Bypass Mode	
RMAMB	28.20406	27.59675	26.73045		
BTBATT1	1.564	3.22	3.995		
TPBATT1	1.803	3.273	3.884		
BTBATT2	3.823	5.455	5.873		
TPBATT2	2.498	4.217	4.907		
BTBATT3	4.096	5.729	6.21		
T6	5.008	9.071	7.15		
CORE	2.674	37.555	17.237		
SEC1-2	2.345	36.033	15.152		
SEC3-7	3.252	47.516	17.117		
PRI8-5	2.714	43.189	18.485		
Q4	57.282	46.625	59.701		
T4CORE	28.304	28.892	32.185		
T4SIDE	0.289	0.567	0.847		
T4SIDE2	32.555	32.406	36.969		
T3	18.644	19.205	20.687		
T5	27.788	29.866	30.697		
HSBOTT	63.208	63.362	65.805		
HSTOP	55.83	59.987	63.492		
Q7	2.899	18.46	6.206		
Q15	1.307	27.718	5.895		
T5CORE	28.48	30.333	31.899		
C25	1.123	14.428	9.058		
CT2	29.371	31.489	33.953		
L4TOP	81.25	80.918	83.264		
L4BOTT	66.039	66.382	69.29		
CT4	9.821	12.567	12.085		
C17	22.302	22.582	24.723		
RY3	20.59	21.272	22.168		
L5	53.018	49.627	52.124		
INTAMB	6.675	8.943	8.72		
D22	35.994	35.249	38.495		



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

4.7	TABLE: resistance to fire				P
part	manufacturer of material	type of material	thickness (mm)	flammability class	
See Component List					



5.2	TABLE: electric strength tests and impulse tests	P
test voltage applied between:		breakdown Yes / No
test voltage (V)		
Unit Primary to Ground	AC 1500	No
Unit Primary to Chassis	AC 1500	No
Unit Primary to SELV	AC 3000	No
PWB Primary to Ground	AC 1500	No
PWB Primary to SELV	AC 3000	No
Phase & Neutral pins to ground pin of power supply cord	AC 1500	No
Phase and Neutral pins to ground pin of outlet receptacles	AC 1500	No
Transformer between Primary and Secondary windings APC # 430-0358	AC 3000	No
Transformer between Primary and Secondary windings APC # 430-0357	AC 3000	No
Transformer between Primary and Secondary windings APC # 430-0025	AC 3000	No
Transformer between Primary and Secondary windings APC # 430-7200	AC 3000	No
Transformer between Primary and Secondary windings APC # 430-7203	AC 3000	No
Transformer between Primary and Secondary windings APC # 430-7205	AC 3000	No
Transformer between Primary and Secondary windings APC # 430-7207	AC 3000	No
Transformer between Primary and Secondary windings APC # 430-7208	AC 3000	No
Transformer between Primary and Secondary windings APC # 460-0016	AC 3000	No
Transformer between Primary and Secondary windings APC # 460-7200	AC 3000	No
Relay contact to contact APC # 450-2151	AC 3000	No
Relay contact to coil APC # 450-2151	AC 3000	No
Relay contact to coil APC # 450-2151a (GRUNER)	AC 3000	No
Primary and SELV	AC 3000	No
Opto-isolators	AC 3000	No
supplementary information		
Test voltage a.c. / d.c.		



5.3	TABLE: fault condition and SELV reliability tests					P
	ambient temperature (°C)				25	—
	model/type of power supply				See Appendices	—
	manufacturer of power supply				APC	—
	rated markings of power supply				See Appendices	—
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result
See Appendices 17 for more details						
		FAN	Blocked Vent	206.3 Vac	32 mins	Processor controlled shut down
		FAN	Stalled Rotor	206 Vac	28 mins	Processor controlled shut down
		Output	Short	230 Vac	2 Seconds	Supplementary protector opened and reset 10 times
		Component	Fault	Input Voltage	Test Time	Results
		IC 37 backfeed driver	short	230 Vac	2 seconds	Unit went to overload in 2 seconds and shut down
		Q18	short	230 Vac	4 seconds	Unit shut dow in 4 seconds
		Q2	short	230 Vac	2 seconds	Unit shut down in 2 seconds
		Output	Overload	229.1 Vac	92 seconds	10% shut down above rated load
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



Annex ZA	SPECIAL NATIONAL CONDITIONS AND NATIONAL DEVIATIONS A = National Deviation (A-deviation) C = CENELEC Common Modification S = Special National Condition					
	C: Delete all the "country" notes in the reference document according to the following list:					P
	1.5.1	Note 2	1.5.8	Note 2	1.6.1	Note
	1.7.2	Note 4	1.7.12	Note 2	2.1	Note
	2.2.3	Note	2.2.4	Note	2.3.2	Note 2, Note 7 & Note 8
	2.3.3	Note 1 & Note 2	2.3.4	Note 2 & Note 3	2.7.1	Note
	2.10.3.1	Note 4	3.2.1.1	Note	3.2.3	Note 1 & Note 2
	3.2.5.1	Note 2	4.3.6	Note 1 & Note 2	4.7.2.2	Note
	4.7.3.1	Note 2	6.1.2.1	Note	6.1.2.2	Note
	6.2.2	Note	6.2.2.1	Note 2	6.2.2.2	Note
	7	Note 4	7.1	Note		
	G2.1	Note 1 & Note 2	Annex H	Note 2		
2.7.1	C: Replace the subclause as follows: <i>Basic requirements</i> 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): a) except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as parts of the equipment; 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; 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 instructions.					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.		
2.7.2	C:	This subclause has been declared 'void'.		P
2.10.2	C:	Replace in the first line "(see also 1.4.7)" by "(see also 1.4.8)".		P
3.2.3	C:	Delete Note 1 and in Table 3A, delete the conduit sizes in parentheses.		P
3.2.5.1	C:	Replace "60245 IEC 53" by "H05 RR-F"; "60227 IEC 52" by "H03 VV-F or H03 VVH2-F"; "60227 IEC 53" by "H05 VV-F or H05 VVH2-F2". In Table 3B, replace the first four lines by the following: Up to and including 6 0,75 ¹⁾ Over 6 up to and including 10 (0,75) ²⁾ 1,0 Over 10 up to and including 16 (1,0) ³⁾ 1,5 In the Conditions applicable to Table 3B delete the words "in some countries" in condition ¹⁾ . In Note 1, applicable to Table 3B, delete the second sentence.		P
3.3.4	C:	In Table 3D, delete the fourth line: conductor sizes for 10 to 13 A, and replace with the following: " Over 10 up to and including 16 1,5 to 2,5 1,5 to 4 " Delete the fifth line: conductor sizes for 13 to 16 A.		P
4.3.13.6	C:	Add the following note: NOTE Attention is drawn to 1999/519/EC: Council Recommendation on the limitation of exposure of the general public to electromagnetic fields 0 Hz to 300 GHz. Standards taking into account this Recommendation are currently under development.		P



Annex H	C:	<p>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 _Sv/h (0,1 mR/h) (see note). Account is taken of the background level.</p> <p>Replace the notes as follows: NOTE These values appear in Directive 96/29/Euratom.</p> <p>Delete Note 2.</p>		P
Annex P	C:	<p>Replace the text of this annex by: See annex ZA.</p>		P
Annex Q	C:	<p>Replace the title of IEC 61032 by "Protection of persons and equipment by enclosures – Probes for verification".</p> <p>Add the following notes for the standards indicated: IEC 60127 NOTE Harmonized as EN 60127 (Series) (not modified). IEC 60269-2-1 NOTE Harmonized as HD 630.2.1 S4:2000 (modified). IEC 60529 NOTE Harmonized as EN 60529:1991 (not modified). IEC 61032 NOTE Harmonized as EN 61032:1998 (not modified). IEC 61140 NOTE Harmonized as EN 61140:2001 (not modified). ITU-T Recommendation K.31 NOTE In Europe, the suggested document is EN 50083-1.</p>		P



Annex ZB		(normative) Special national conditions	
Special national condition: national characteristic or practice that cannot be changed even over a long period, e.g. climatic conditions, electrical earthing conditions. If it affects harmonization, it forms part of the European Standard. For the countries in which the relevant special national conditions apply, these provisions are normative; for other countries, they are informative.			
1.2.4.1	S:	In Denmark , certain types of Class I appliances (see 3.2.1.1) may be provided with a plug not establishing earthing conditions when inserted into Danish socket-outlets.	N
1.5.8	S:	In Norway , due to the IT power system used (see annex V, Figure V.7), capacitors are required to be rated for the applicable line-to-line voltage (230 V).	N
1.7.2	S:	In Finland, Norway and Sweden , CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment must be connected to an earthed mains socket-outlet. The marking text in the applicable countries shall be as follows: In Finland: "Laite on liitettävä uojamaadoituskoskettimilla varustettuun pistorasiaan " In Norway: "Apparatet må tilkoples jordet stikkontakt" In Sweden: "Apparaten skall anslutas till jordat uttag"	N
1.7.5	S:	In Denmark , 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. For STATIONARY EQUIPMENT the socketoutlet shall be in accordance with Standard Sheet DK 1-1b or DK 1-5a.	P
2.2.4	S:	In Norway , requirements according to this annex, 1.7.2 and 6.1.2.1 apply.	P
2.3.2	S:	In Norway , requirements according to this annex, 6.1.2.1 apply.	P
2.3.3	S:	In Norway , requirements according to this annex, 1.7.2 and 6.1.2.1 apply.	P



2.3.4	S:	In Norway , requirements according to this annex, 1.7.2 and 6.1.2.1 apply.	N
2.6.3.3	S:	In the United Kingdom , the current rating of the circuit shall be taken as 13 A, not 16 A.	N
2.7.1	S:	In the United Kingdom , to protect against excessive currents and short-circuits in the PRIMARY CIRCUIT of DIRECT PLUG-IN EQUIPMENT , protective devices shall be included as integral parts of the DIRECT PLUG-IN EQUIPMENT .	N
2.10.3.1	S:	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
3.2.1.1	S:	<p>In Switzerland, supply cords of equipment having a RATED CURRENT not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 60884-1 and one of the following dimension sheets:</p> <p>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> <p>In general, EN 60309 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> <p>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</p>	N
		<p>In Denmark, supply cords of single-phase equipment having a rated current not exceeding 13 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 13 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations, Section 107-2-D1 or EN 60309-2.</p>	N



3.2.1.1	S:	<p>In Spain, 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 in 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>In the United Kingdom, 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>In Ireland, 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
3.2.5.1	S:	<p>In the United Kingdom, a power supply cord with conductor of 1,25 mm² is allowed for equipment with a rated current over 10 A and up to and including 13 A.</p>		N
3.3.4	S:	<p>In the United Kingdom, the range of conductor sizes of flexible cords to be accepted by terminals for equipment with a RATED CURRENT of over 10 A up to and including 13 A is: - 1,25 mm² to 1,5 mm² nominal cross-sectional area.</p>		N



4.3.6	S:	In the United Kingdom , the torque test is performed using a socket outlet complying with BS 1363 and the plug part of DIRECT PLUG-IN EQUIPMENT shall be assessed to BS 1363: Part 1, 12.1, 12.2, 12.3, 12.9, 12.11, 12.12, 12.16 and 12.17, except that the test of 12.17 is performed at not less than 125 °C.		N
		In Ireland , DIRECT PLUG-IN EQUIPMENT is known as plug similar devices. Such devices shall comply with Statutory Instrument 526:1997 - National Standards Authority of Ireland (Section 28) (Electrical plugs, plug similar devices and sockets for domestic use) Regulations, 1997.		N





6.1.2.1	<p>S:</p> <p>In Finland, Norway and Sweden, 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 subject 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>A capacitor classified Y3 according to EN 132400:1994, may bridge this insulation under the following conditions:</p> <ul style="list-style-type: none">- the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 132400, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 60950:2000, 6.2.2.1;- the additional testing shall be performed on all the test specimens as described in EN 132400;- the impulse test of 2,5 kV is to be performed before the endurance test in EN 132400, in the sequence of tests as described in EN 132400.		N
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6.1.2.2	S:	In Finland, Norway and Sweden , the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a service person.		N
7.1	S:	In Finland, Norway and Sweden , requirements according to this annex, 6.1.2.1 and 6.1.2.2 apply with the term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.		N
G.2.1	S:	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



Annex ZC	(informative) A-deviations	
<p>A-deviation: national deviation due to regulations, the alteration of which is for the time being outside the competence of the CENELEC member.</p> <p>This European Standard falls under Directive 73/23/EEC.</p> <p>NOTE (from CEN/CENELEC IR Part 2, 3.1.9) Where standards fall under EC Directives, it is the view of the Commission of the European Communities (OJ No. C 59, 9.3.1982) that the effect of the decision of the Court of Justice in case 815/79 Cremonini/Vrankovich (European Court Reports 1980, p.3583) is that compliance with A-deviations is no longer mandatory and that the free movement of products complying with such a standard should not be restricted except under the safeguard procedure provided for in the relevant Directive.</p> <p>A-deviations in an EFTA-country are valid instead of the relevant provisions of the European Standard in that country until they have been removed.</p>		
1.5.1	A: Sweden (Ordinance 1990:944) Add the following: NOTE In Sweden, switches containing mercury such as thermostates, relays and level controllers are not allowed.	P
	A: Switzerland (Ordinance on environmentally hazardous substances SR 814.013, Annex 3.2, Mercury) Add the following: NOTE In Switzerland, switches containing mercury such as thermostats, relays and level controllers are not allowed.	P
1.7.2	A: Denmark (Heavy Current Regulations) Supply cords of CLASS I EQUIPMENT, which is delivered without a plug, must be provided with a visible tag with the following text: <div style="text-align: center;">Vigtigt! Lederen med grøn/gul isolation må kun tilsluttes en klemme mærket</div> <div style="text-align: center;"> eller </div> 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



1.7.5	A:	Denmark (Heavy Current Regulations) CLASS II EQUIPMENT shall not be fitted with socket-outlets for providing power to other equipment.		N
1.7.12	A:	Germany (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). 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. NOTE Of this requirement, rules for use even only by service personnel are not exempted.		P
1.7.15	A:	Switzerland (Ordinance on environmentally hazardous substances SR 814.013) Annex 4.10 of SR 814.013 applies for batteries.		P



Annex H	A:	<p>Germany (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 clause 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> <ol style="list-style-type: none">1) the local dose rate at a distance of 0,1 m from the surface does not exceed 1 _Sv/h, and2) it is adequately indicated on the X-ray emission source that<ol style="list-style-type: none">i) X-rays are generated, andii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer. <p>c) A licence in accordance with clause 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> <ol style="list-style-type: none">1) the X-ray emission source has been granted a type approval, and2) it is adequately indicated on the X-ray emission source that<ol style="list-style-type: none">i) X-rays are generated,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, andiii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer. <p>d) Furthermore, a licence in accordance with clause 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> <ol style="list-style-type: none">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, and3) it is adequately indicated on the X-ray emission source that the X-rays generated are adequately screened by the intrinsically safe CRT.		N
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	(informative) CB Bull. NATIONAL DIFFERENCES IEC 60950-1		
IEC 60950-1, 1st edition (2001) Information technology equipment including electrical business equipment – General requirements			
1.5.1	Sweden (Ordinance 1990:944) Add the following: NOTE In Sweden, switches containing mercury such as thermostates, relays and level controllers are not allowed.		P
1.5.101	Korea Addition: Plugs for the connection of the apparatus to the supply mains shall comply with the Korean requirement (KSC 8305 and 8305).		P
1.7.2	Sweden The following text is added: NOTE - In Sweden, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a network shall, if safety relies on connection to protective earth or if surge suppressors are connected between the network terminals and accessible parts, have a marking stating that the equipment 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."		N



6.1.2.1	<p>Sweden</p> <p>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"><li>- two layers of thin sheet material, each of which shall pass the electric strength test below, or<li>- 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"><li>- 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<li>- is subject 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>A capacitor classified Y3 according to EN 132400:1994, may bridge this insulation under the following conditions:</p> <ul style="list-style-type: none"><li>- the insulation requirements are satisfied by having a capacitor classified Y3 as defined by EN 132400, which in addition to the Y3 testing, is tested with an impulse test of 2,5 kV defined in EN 60950:2000, 6.2.2.1;<li>- the additional testing shall be performed on all the test specimens as described in EN 132400;<li>- the impulse test of 2,5 kV is to be performed before the endurance test in EN 132400, in the sequence of tests as described in EN 132400.		N
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6.1.2.2		Sweden , the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B and equipment intended to be used in a RESTRICTED ACCESS LOCATION where equipotential bonding has been applied, e.g. in a telecommunication centre, and which has provision for a permanently connected PROTECTIVE EARTHING CONDUCTOR and is provided with instructions for the installation of that conductor by a service person.		N
7.1		Sweden , requirements according to this annex, 6.1.2.1 and 6.1.2.2 apply with the term TELECOMMUNICATION NETWORK in 6.1.2 being replaced by the term CABLE DISTRIBUTION SYSTEM.		N
7	A:	Korea Addition: EMC The apparatus shall comply with the relevant CISPR standards		P



VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 1

Applicable Drawing

VDE File: 19244-3335-0020/1
Appendix 1, Page 2 of 7

Part # 885-6854_REV05

Page 1 of 1

Warning: 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 adequate measures.



>18kg (40lbs)
SEE OWNER'S
MANUAL



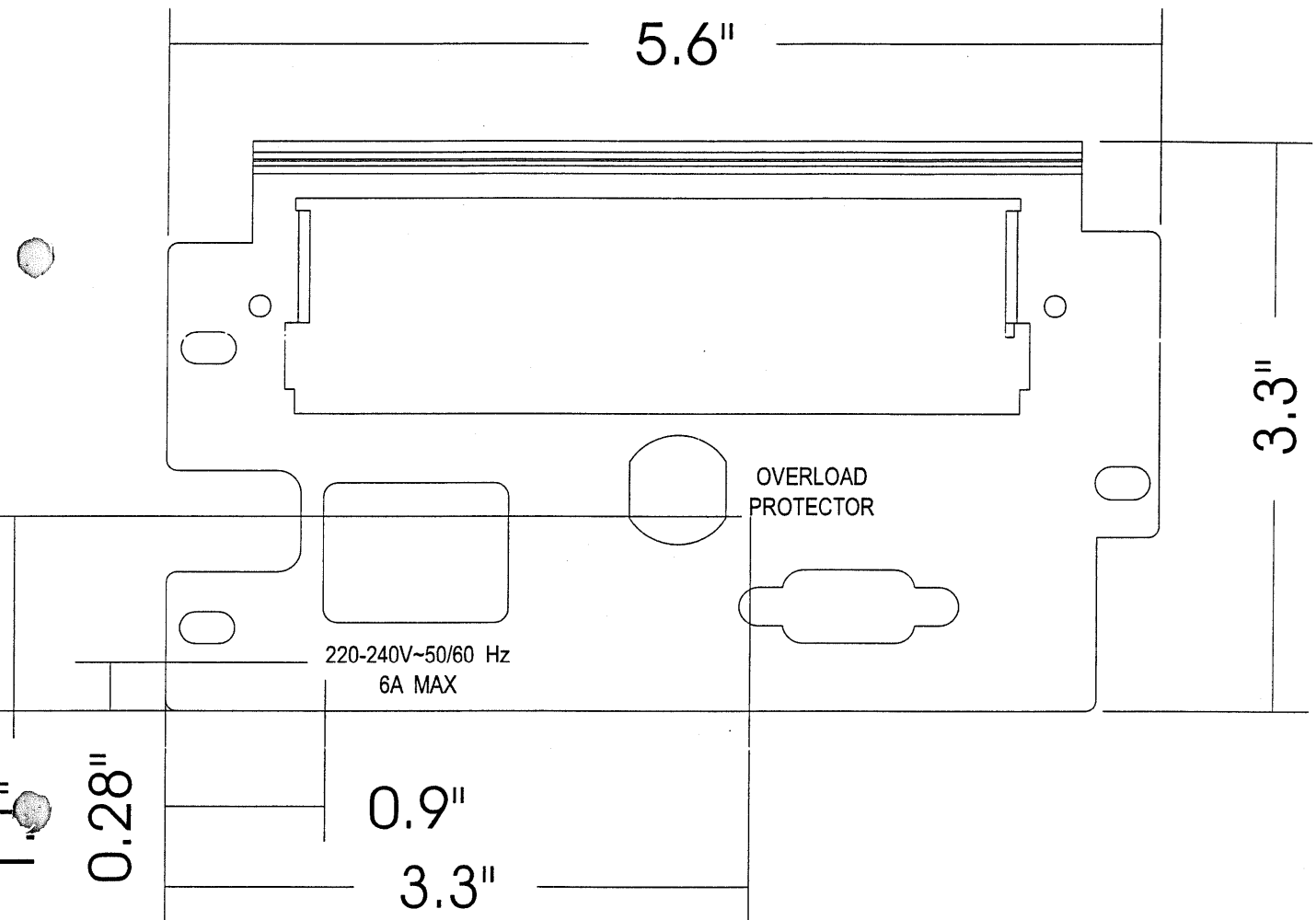
220-240V 50/60 Hz
MOD 1000VA: 700W 4.6A MAX
MOD 2000VA: 1400W 9.1A MAX

SUOL 1000XLI Applicable Drawing

VDE File: 19244-3335-0020/
Appendix 1, Page 3 of 7

Part # 870-1259_REV06

Page 1 of 1



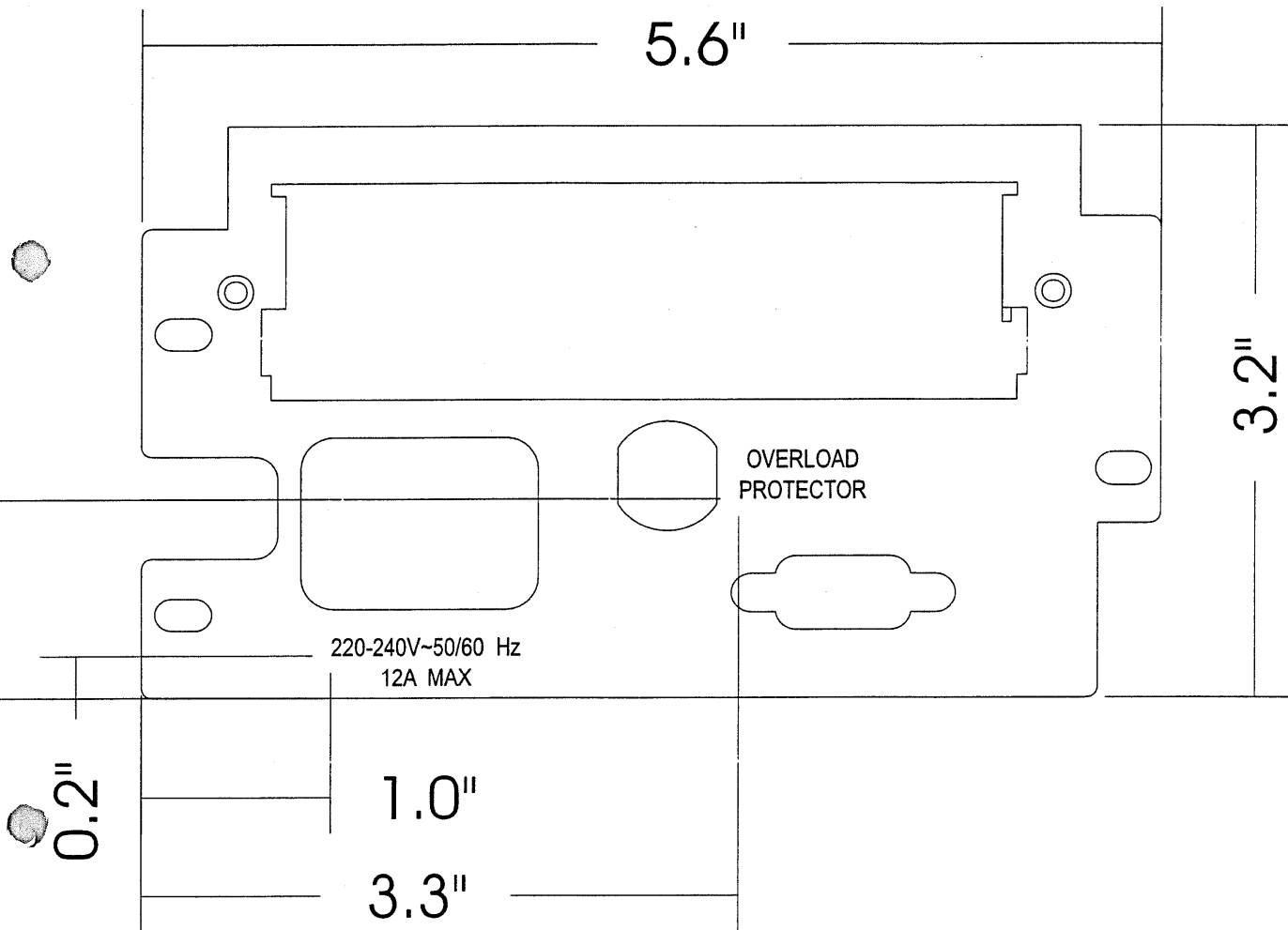
SUOL 2000XLI

Applicable Drawing

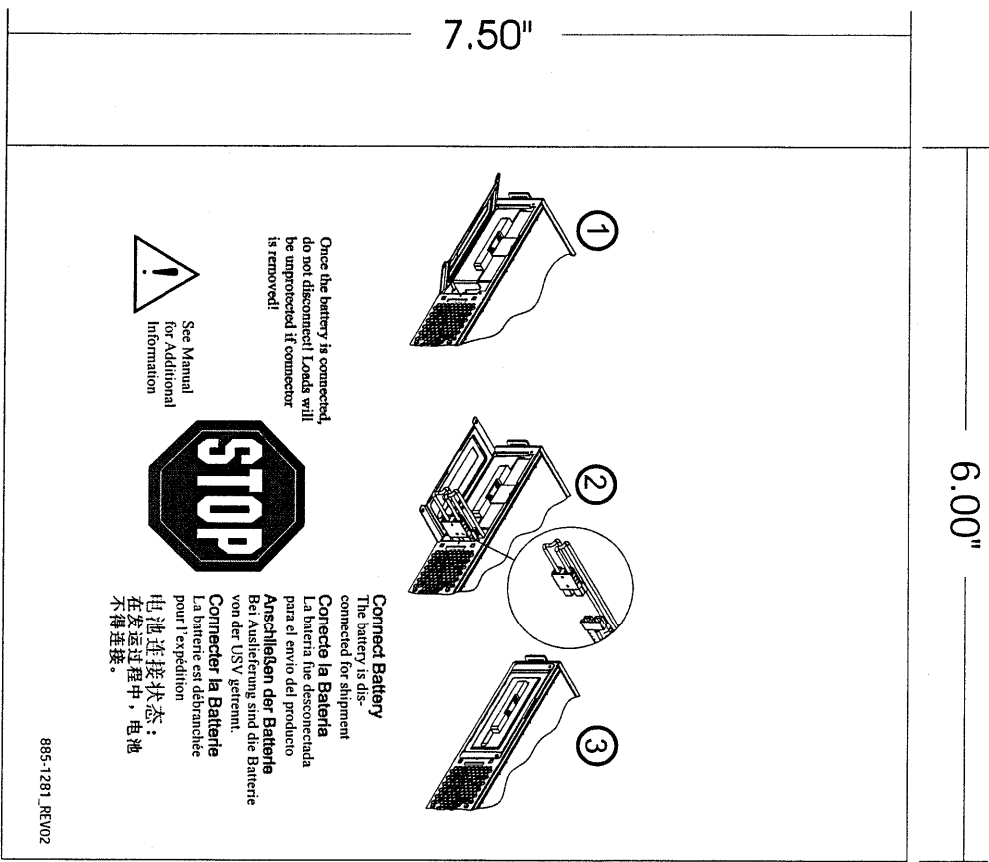
VDE File: 19244-3335-0020/
Appendix 1, Page 4 of 7

Part # 870-6855_REV06

Page 1 of 1



Applicable Drawing



Applicable Drawing

Part # 885-1282-1
Rev. 1
Page 1 of 1

5.00"

3.00"



CONTAINS SEALED NON SPILLABLE LEAD-ACID BATTERIES
MUST BE RECYCLED



CAUTION:

This equipment contains potentially hazardous voltages. The output may be energized when the unit is not connected to an AC power outlet. Do not attempt to disassemble the unit. Except for the battery, the unit contains no user serviceable parts. Repairs are performed only by factory trained service personnel.

ATTENTION:

Cet appareil fonctionne à des tensions potentiellement dangereuses. La sortie peut alors être activée même si l'appareil n'est pas branché à une prise de courant alternatif. Ne pas essayer de démonter l'appareil. À l'exception de la batterie, l'appareil ne contient aucune autre pièce sur laquelle un utilisateur pourrait intervenir. Toute réparation doit être faite uniquement par du personnel correctement formé en usine.

PRECAUCION:

Este equipo contiene tensión potencialmente peligrosa. La salida se puede energizar cuando la unidad no está conectada a una toma de CA. No intente desarmar la unidad. Salvo por la batería, la unidad no incluye partes a las que se pueda realizar mantenimiento. Las reparaciones son realizadas sólo por personal entrenado en fábrica.

ACHTUNG:

Dieses Gerät birgt potenziell gefährliche Spannungen. Können die Ausgänge auch dann unter Strom stehen, wenn die Einheit nicht an einer Wechselstromsteckdose angeschlossen ist. Nicht versuchen, die Einheit zu zerlegen. Mit Ausnahme der Batterie enthält die Einheit keine Teile, die durch den Benutzer gewartet werden können. Reparaturen dürfen nur von Servicepersonal durchgeführt werden, das im Werk ausgebildet wurde.

警告:

这种设备具有潜在的危险电压。即使该设备未和交流电源相连，其输出端也可能带电。不要把它拆开。除了电池以外，该设备中没有用户可以维修的部件。修理工作只能由经过工厂培训的维修人员进行。

885-1282

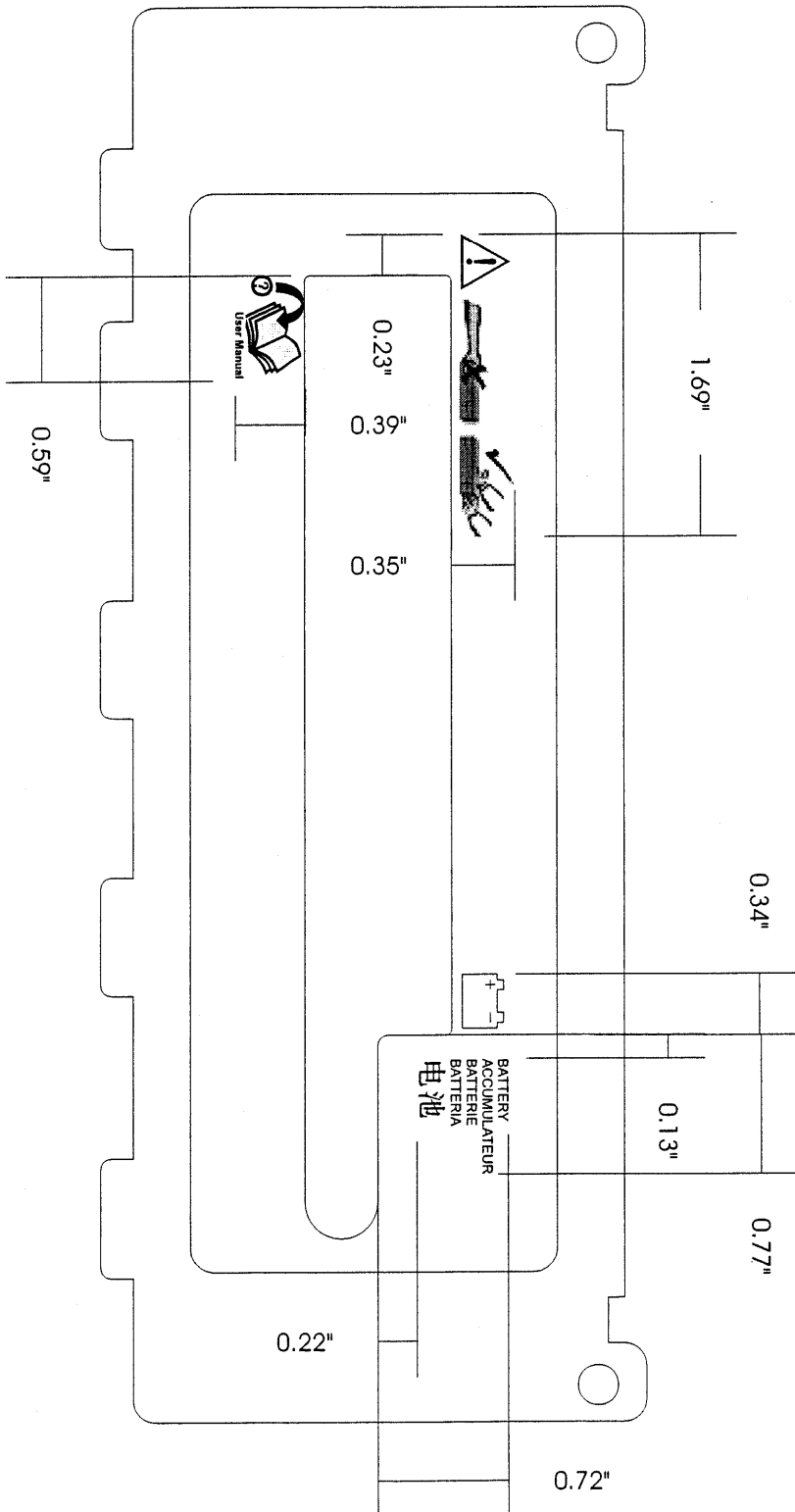
R.06

DIE CUT TOLERANCE +/- .020
GRAPHICS TOLERANCE +/- .010

885 1282 1 CND

Applicable Drawing

Part # 870-6851_1
Rev. 1
Page 1 of 1





VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 2

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.:

Marks licence No.:

VDE File: 19244-3335-0020/

Appendix 2, Page 2 of 95

(filled in by the Institute)

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

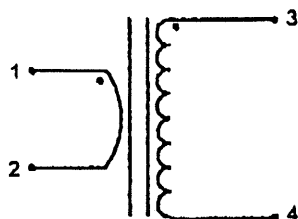
Form 42E

- Translation of the VDE Testing and Certification Documents -

- 1.1 Manufacturer: Falco Electronics Mexico.
 1.2 Place of manufacture: Fracc. Itzincab, Merida Yucatan, Mexico
 1.3 Reference of type: NA
 1.4 Trade Mark: NA
 1.5 Other markings: 460-7200, Rev 0, Date Code, Falco.
 1.6 Reference number: CST013-040200-11-010
 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: N/A A)
 2.6 Rated maximum ambient temperature: $t_a =$ °C N/A
 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:	N/A	N/A
3.4 Rated output	VA:	N/A	N/A
3.5 Rated power factor cos phi:			
4 Windings			
4.1 Coil base	number:	N/A	N/A
	material:	N/A	N/A
4.2 Material of layer insulation	material:	NA	NA
4.3 Windings	number:	1	1
	material:	Magnet Wire	Magnet Wire
4.4 Taps	number:	NA	NA
4.5 Diameter of wire	mm:	1.6 mm	0.2 mm
4.6 Winding of insulation	material:	130°C	Single 130°C
4.7 Cord insulation material	innere:	N/A	N/A
	äußere:	N/A	N/A
4.8 Cold resistance in Ω at: 20°C	°C =		2.5 ohms
4.9 Circuit diagram (which terminal markings, color of wires etc.):			

SCHEMATIC



VDE File: 19244-3335-0020/
Appendix 2, Page 3 of 95

5 Iron core

5.1 Sheet metall, material: Ferrite toroid / 2.4 grs
main dimensions: /12.7-7.93-6.35 (mm)

5.2 Cross-sectional drawing: N/A

6 Type of construction

6.1 Open - covered - in case protection *) Potted

6.2 Impregnated - undrowned - drowned *)

6.3 Soaking (liquor):

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

6.5 Drown material: CIRCALOK 6063A/B

6.6 Material of the cover:

of the case: VALOX DR48

of the socket (support): N/A

6.7 Flammability class for insulation material: UL 94 V-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,

03.09.01

Place: Merida, Yucatan

Date: 05/22/01

VDE Testing and Certification Institute
Department

[Signature]

[Signature]

(Stamp and signature of the manufacturer)

FALCO ELECTRONICS MEXICO
S.A. de C.V.
FEM-960604-E15

INFORMATION REQUIRED BY SAFETY AGENCIES

TRANSFORMERS AND INDUCTOR CONSTRUCTION DESCRIPTION

VDE File: 19244-3335-0020

Appendix 2, Page 4 of 95

1. IDENTIFICATION

1.1 CUSTOMER: APC PART NO: 430-7200 REVISION: E8

1.2 MAGNETIC TYPE: TRANSFORMER

1.3 TYPE: Linear ☐ Switching ☒ Other (specify) _____

1.4 MANUFACTURER FALCO ELECTRONICS MEXICO MANUFACTURER PART No. E16016

1.5 MAGNETIC UL RECOGNIZED: YES ☐ NO ☒ VENDOR FILE NO.: N/A

1.6 IF USING (OBJY2) R/C INSULATION CLASS SYSTEM UL FILE NO.: N/A

1.7 FOLLOW INFORMATION IS NOT REQUIRED IF MAGNETIC COMPONENT IS RECOGNIZED BY UL PRIOR TO TEST OF UPS

2. CORE

2.1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS **NO** THE FOLLOWING INFORMATION MUST BE FILL

2.2 DESCRIPTION Powdered ☐ Lamination ☐ Ferrite ☐ Other (Specify) _____

2.3 CORE MATERIAL GRADE MN-ZN ☐ NI-ZN ☐ SHAPE OF CORE _____

2.4 DIMENSION (mm) LENGTH / OUTER DIAMETER WIDTH / INNER DIAMETER THICKNESS / HEIGHT

3. BOBBIN INFORMATION

3.1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS **NO** THE FOLLOWING INFORMATION MUST BE FILL

3.2 BOBBIN RAW MATERIAL MANUFACTURER: DUPONT PART NO. RYNITE FR530

3.3 RAW MATERIAL DESIGNATION PET (MUST BE UL RECOGNIZED)

3.4 UL FILE NO.: E69578 (M) BOBBIN WALL THICKNESS: 0.7mm

3.5 FLAMMABILITY RATING UL94 VO TEMPERATURE RATING 180° C

3.6 BOBBIN DIMENSION (mm): LENGTH WIDTH HEIGHT THICKNESS

4. WINDING INFORMATION

	AWG or mm ²	No. TURN	No. LAYERS	WIRE INSULATION COATING	UL FILE	DC RESISTANCE	TEMP. (°C)
1. PRIMARY 1	2 X 28 AWG	23		HEAVY	MANY		
2. PRIMARY 2	2 X 34AWG	44		HEAVY	MANY		
3. PRIMARY 3	2X36AWG	13		HEAVY	MANY		
	2X34AWG	10		HEAVY	MANY		
	2X38AWG	17		HEAVY	MANY		
4. SECONDARY1	0.20MM TEX E	44		TRIPLE INSUL			
5. PRIMARY MAGNET WIRE:	TYPE ANSI MW	28-C		TEMPERATURE CLASS	B	RATING: 130	°C
6. SECONDARY MAGNET WIRE:	TYPE ANSI MW			TEMPERATURE CLASS		RATING: 125	°C

Safety Data Form

S: 02/07/01; REV. A1; S:\DC\GRID\SAFETYDATA.XLS

INSULATION SYSTEM

	MATERIAL	MAT. THK	No. OF LAYERS	TEMP. RATING (°C)	MANUFACTURER	UL FILE	
1 PRIMARY / CORE	BOBBIN						
2 PRIMARY / SHIELD	N/A						
3 PRIMARY / SECONDARY	TRIPLE INS	0.100mm	3	125	FURUKAWA		
4 SEC. No. 1 / CORE	TRIPLE INS	0.100mm	3	125	FURUKAWA		
	MATERIAL	PART No.	TEMPERATURE RATING (°C)	MANUFACTURER	UL FILE	RCD PAGE No.	
9 CROSSOVER INSULATION	MYLAR TAPE		130	MANY	MANY		
10 WINDOW INSULATION							
11 OUTER WRAP	2 XMYLAR TAPE		130	MANY	MANY		
12 LEAD WIRE							
13 IMPREGNATION / VARNISH							
14 SLEEVING							

POTTED COMPONENT INFORMATION

1 CASE MANUFACTURER	N/A	CASE PART No.	
2 CASE RAW MATERIAL MANUFACTURER		PART No.	
3 RAW MATERIAL DESIGNATION:		(MUST BE UL RECOGNIZED)	
4 UL FILE No. E	BOBBIN WALL THICKNESS		
5 FLAMMABILITY RATING: UL 94	TEMPERATURE RATING (°C):		
6 CASE DIMENSION (mm):	LENGTH	WIDTH	HIEGHT THICNESS
7 POTTING MATERIAL MANUFACTURER:		PART No.:	
8 POTTING MATERIAL DESIGNATION:		MUST BE UL RECOGNIZED	
9 UL FILE No. : E	FLAMMABILITY RATING : UL 94	TEMPERATURE RATING (°C):	

ELECTRICAL RATINGS

	FREQUENCY	VOLTAGE	CURRENT	POWER / CAPACITY
1 PRIMARY				VA
2 SECONDARY No.				VA
3 SECONDARY No.				VA
4 SECONDARY No.				VA
5 SECONDARY No.				VA
6 SECONDARY No.				VA

3 SPACING DATA (CREEPAGE / CLEARANCE)

3.1 PRIMARY TO SECONDARIES

LAYER MATERIAL (SPECIFY MATERIAL USAGE, SEE SECTION 5) TAPE / FLEXIBLE INSULATION / SLEEVING

3.1.1	5	mm
3.1.2	2.5	mm + 1 LAYER
3.1.3	3	LAYERS
3.2	PRIMARY TO GROUND	
3.2.1	BOBBIN 0.7mm	mm (1/2 OF 8.1.1)
3.2.2		LAYERS
3.3	ADD CROSS SECTION OF BOBBIN DRAWING.	

COMPANY INFORMATION

Mexico Factory:
Calle 23 # 311 x 46 Fracc. Itzincab
Merida, Yucatan, Mexico, 97392

Place : MERIDA, YUCATAN.

Date : 02/12/01

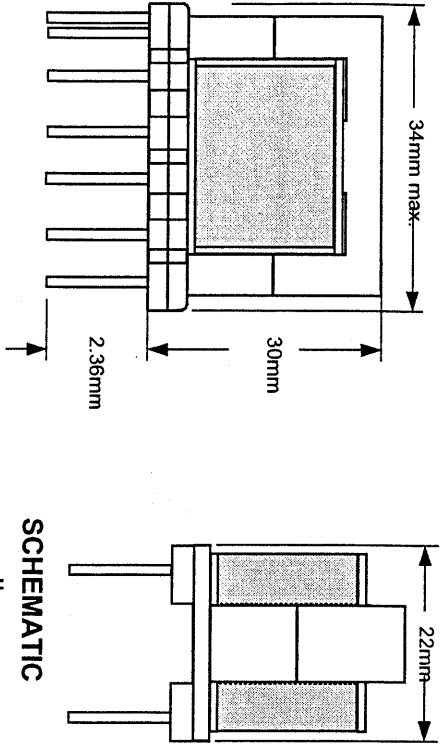
Approved by

Ing. Jeronimo Ramos

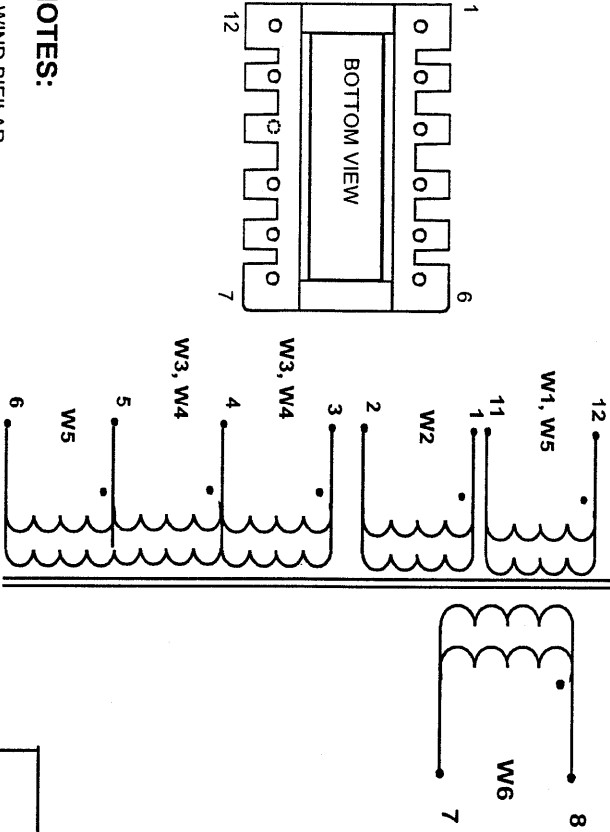
Engineering Manager (Name + Signature)

Ing. Antonio Vallado

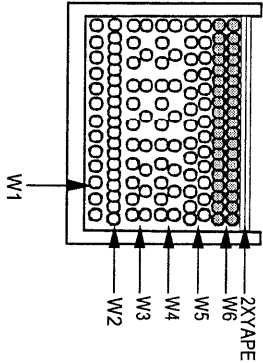
QC Manager (Name + Signature)



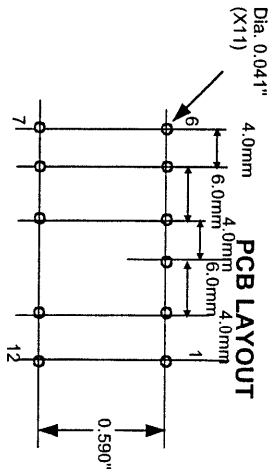
SCHEMATIC



WINDING DETAIL



WINDING ORDER	PIN NOS ST FIN	WIRE (FSN) (MMR)	TURNS EXACT	WINDING WRAP (TAP)	NOTES
1	12 - 11	28 AWG	23		
2	1 - 2	2 X 34AWG	44		
3	3 - 4 4 - 5	36AWG 34AWG	13 10		
4	3 - 4 4 - 5	36AWG 34AWG	13 10		1
5	5 - 6 12 - 11	2 X 30AWG 28 AWG	17 23		
6	8 - 7	2 X 0.20mm TENS E	44	2 X 30AWG TAP	1




ELECTRICAL REQUIREMENT

- 1.- INDUCTANCE (1-2): 43μH MAX. 37μH MIN.@1khz, 0.25v
2.-HI-POT(8 TO 12,1,3): 3750VAC, 1 SEC.

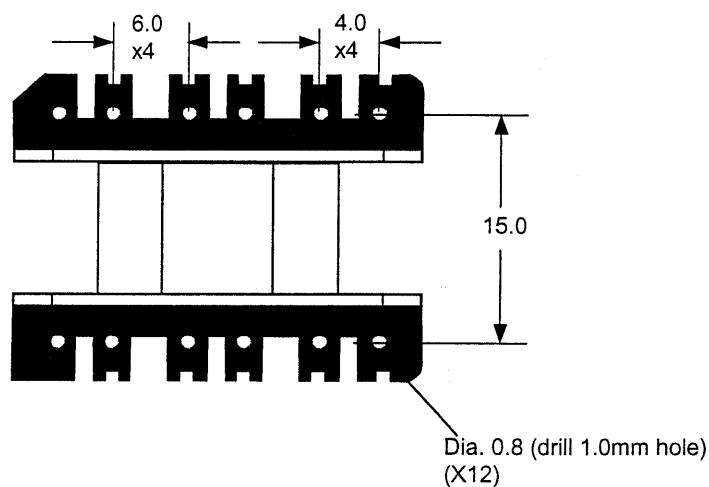
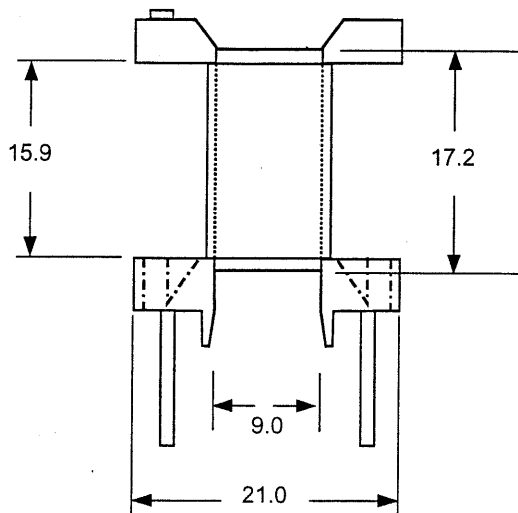
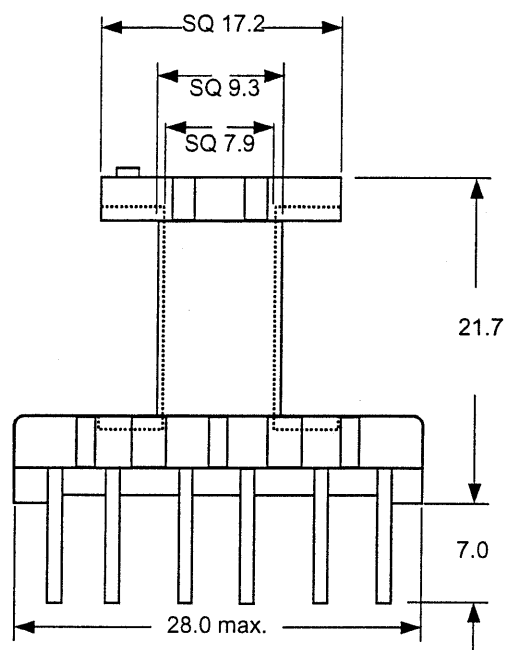
NOTES:

- 1.-WIND BIFILAR
- 2.- GAP CENTER LEG TO OBTAIN INDUCTANCE (1-2).
- 3.- REMOVE PIN 10.

B O M			FALCO CATALOG NO:	REV
ITEM	DEPTO.	FSN-DESCRIPTION	TRE25N-0501-406	FA1
1	MWR	1228-2102	DESCRIPTION: L/VNX NEUTRAL SIDE BIAS FL/YBACK	
2	MWR	1234-2102		
3	MWR	1236-2102		
4	MWR	1238-2102		
4	LWR	1392-020-042		
5	ECO	1916-10-000	CUSTOMER PN: 430-7200-E8	WEIGHT (Kg):
			SCALE REQUEST:	DATE:
			4862	9.06.00
			SCALE:	SHEET:
				1 OF 2
TOLERANCES: UNLESS OTHERWISE SPECIFIED DECIMALS/ FRACTIONS				
.XXX +/- .010 .XX +/- .030 .X +/- .1				
FILE: S:\DCIM\SAMPLES\4862.DSF				

430-7200

VDE File: 19244-3335-0020
Appendix 2, Page 8 of 95



1. All measurement are in millimeters. 2. Windings are contained in bobbin footprint. 3. Remove pin 10 for keying

FALCO
Falco Electronics Mexico

DRAWING BY:
MANUEL MARTIN 08.04.00

REF.No.:
S:\DCIMCO\TOOLINGS\EF-25.DSF

CHECKED BY ENGINEERING:

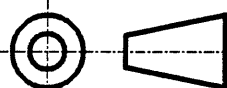
CHECKED BY ENGINEERING:

PART NUMBER:
EF-25

MATERIAL
PHENOLIC

DWG.No.: REV. 001

SCALE: NONE SHEET: 1



Powers 8/25/2000 E8 mod for new bobbin

MATERIAL MECHANICAL & ELECTRICAL SPECIFICATIONS

MMES: STK1831-431-002

REV: F1

MCO # 4605

DATE: 31-Jul-00

Falco Electronics Mexico

FALCO

DESCRIPCION:
BOBINA E375 VERTICAL

MATERIAL: RYNITE FR-530L (F1)
POLYBUTYLENE TEREPHTHALATE

NOMBRE DEL MANUFACTURADOR:
EI DUPONT DE NEMOURS & CO INC

FLAMABILIDAD UL: 94V-0

GROSOR MINIMO: 0.81mm

ARCHIVO UL: E69578 (M)

CLASE DE MATERIAL: B (130°C)

SOLDABILIDAD: 3 A 5 SEG.
@490°F

PINES: 6

SECCIONES: 1

STAND-OFF: 0.055

SOLDABILIDAD DE 3 A 5 SEGS. @
490°F

COLOCAR FECHA DE EXPIRACION
DE PINES 6 MESES DESPUES DE
LA FECHA DE INSPECCION

DESCRIPTION:
E375 VERTICAL BOBBIN

MATERIAL: RYNITE FR-530L (F1)
POLYBUTYLENE TEREPHTHALATE

MANUFACTURER NAME:
EI DUPONT DE NEMOURS & CO INC

UL FLAMMABILITY: 94V-0

MINIMUM THICKNESS: 0.81mm

UL FILE: E69578 (M)

MATERIAL CLASS: B (130°C)

SOLDERABILITY: 3 TO 5 SEC.
@490°F

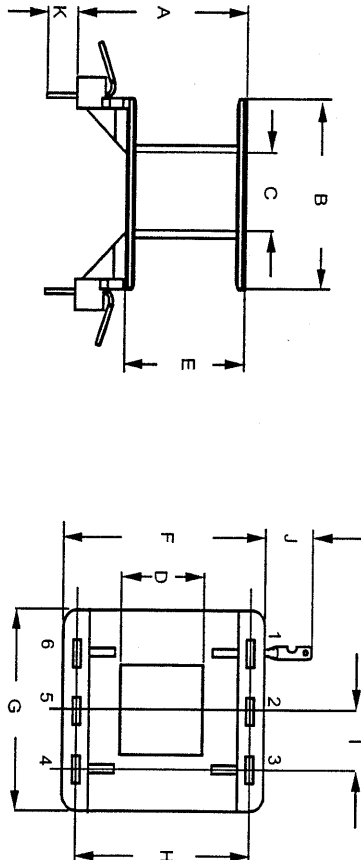
PIN: 6

FLANGES: 1

STAND-OFF: 0.055

SOLDERABILITY 3 TO 5 SEC. @
490°F

PLACE PINS EXPIRATION DATE
OF 6 MONTHS AFTER IT HAS BEEN
INSPECTED



FSN	A		B		C		D		E		F	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
STK1831-431-002	0.925	23.50	0.955	24.26	0.957	24.31	0.980	24.89	0.385	9.78	0.398	10.11
	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm

FSN	G		H		I		J		K		STAND OFF	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
STK1831-431-002	0.969	24.61	0.984	24.99	0.996	25.30	1.033	26.24	0.302	7.67	0.322	8.18
	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm

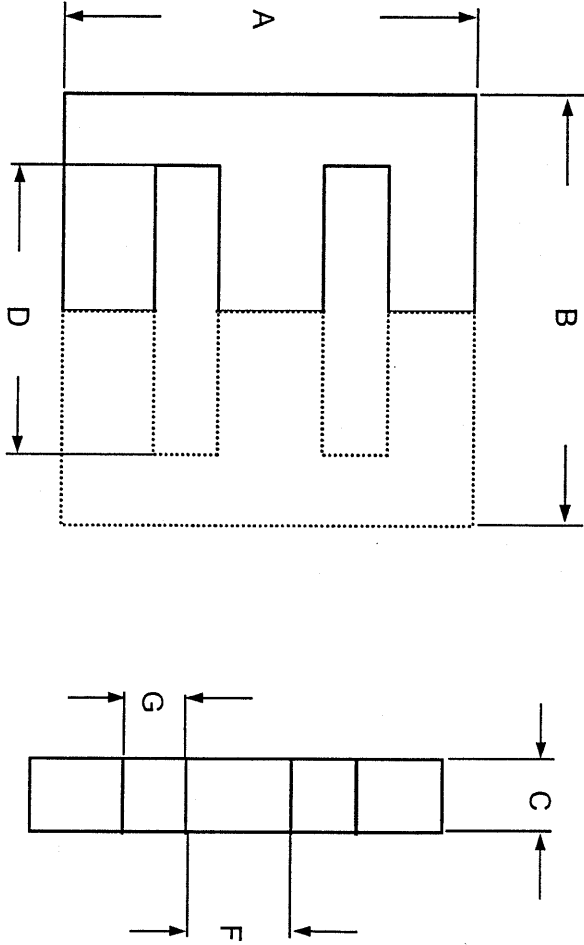
MATERIAL MECHANICAL & ELECTRICAL SPECIFICATIONS

GENERIC : IEC19XX-PP-XXX

REV: A1

FALCO

Falco Electronics Mexico



DESCRIPCION:
NUCLEO EN FORMA DE E

DESCRIPTION:
E CORE TYPE E

MATERIAL:
POLVO DE HIERRO

MATERIAL:
IRON POWDER

PERMEABILIDAD:
VER TABLA

PERMEABILITY:
SEE CHART

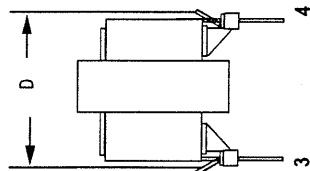
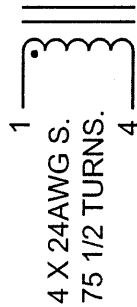
BOBINA PARA EL CHEQUEO
DE INDUCCION:
DEBE ESTAR RELLENA A UN
90% MINIMO

INDUCTION TEST BOBBIN:
BOBBIN SHOULD BE FILLED
TO 90% MINIMUM

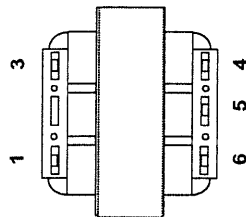
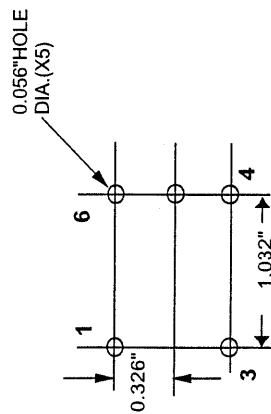
FSN	A				E/2				G				D/2				F				G			
	IN.	mm	IN.	MAX	IN.	mm	IN.	MAX	IN.	mm	IN.	MAX	IN.	mm	IN.	MAX	IN.	mm	IN.	MAX	IN.	mm	IN.	MAX
IEC1912-75-000	0.740	18.80	0.770	19.56	0.312	7.92	0.335	8.51	0.179	4.55	0.195	4.95	0.223	5.66	0.233	5.92	0.182	4.62	0.192	4.88	0.185	4.70	0.198	5.03
IEC1914-75-000	---	---	1.010	25.65	---	---	0.380	9.65	---	---	0.258	6.55	0.245	6.22	---	---	0.255	6.48	0.240	6.10	---	---	---	---
IEC1914-76-000	---	---	1.010	25.65	---	---	0.380	9.65	---	---	0.258	6.55	0.245	6.22	---	---	0.255	6.48	0.235	5.97	---	---	---	---
IEC1931-55-000	1.365	34.67	1.385	35.18	0.562	14.27	0.582	14.78	0.369	9.37	0.382	9.70	0.375	9.53	0.395	10.03	0.370	9.40	0.380	9.65	0.302	7.67	0.322	8.18
IEC1931-76-000	1.360	34.54	1.390	35.31	0.547	13.89	0.577	14.66	0.367	9.32	0.383	9.73	0.365	9.27	0.385	9.78	0.368	9.35	0.382	9.70	0.307	7.80	0.317	8.05
IEC1942-76-000	1.615	41.02	1.635	41.53	0.663	16.84	0.678	17.22	0.493	12.52	0.507	12.88	0.832	21.13	0.852	21.64	0.493	12.52	0.507	12.88	---	---	---	---

FSN	PERMEABILIDAD		AL (H/100000T)	L (100 VUELTA)		COLOR
	IN.	mm		MIN	MAX	
IEC1912-75-000	75	---	637	5.700	7.040	N/A
IEC1914-75-000	75	---	82.8 MIN - 103.5 MAX	0.828	1.035	N/A
IEC1914-76-000	75	---	85	0.765	0.935	N/A
IEC1931-55-000	55	---	100	0.900	1.100	VERDE - ROJO / GREEN - RED
IEC1931-76-000	75	---	131	1.179	1.441	N/A
IEC1942-76-000	10	---	199	1.791	2.189	N/A

SCHEMATIC



PC BOARD LAYOUT GRID



ELECTRICAL PARAMETERS:

1. INDUCTANCE (1-4) : 560 μ H \pm 15% @ 10 KHz, 0.25V (0 ADC).
2. DCR (1-4) : 105 m Ω NOM. @ 20°C, 125 m Ω MAX.

NOTES:

- 1.- REMOVE PIN 2 AND PINS TAIL 3,5,6..
- 2.- VARNISH THE UNIT WITH AIR DRY VARNISH.
- 3.- NO WRAPER TAPE NEEDED.
- 4.- PLACE A COMPOSITE RISER TAPE ON THE START LEAD OF THE WINDING.

A	B	C	D
MAX	MAX	$\pm 0.020"$	MAX
1.440"	1.270"	0.150"	1.250"

FALCO CATALOG P/N:	REV
PIEP3515-531-405	FA2
DESCRIPTION:	INDUCTOR
CUSTOMER P/N:	WEIGHT (KG):
420-7200-ENG	81.5
SAMPLE REQUEST:	DATE:
5141	11.06.00
SCALE:	SHEET:
NONE	1 OF 3

FALCO

Falco Electronics Mexico S.A DE C.V.
WWW.FALCOMEX.COM

TOLERANCES:
UNLESS OTHERWISE SPECIFIED
DECIMALS/ FRACTIONS
XXX \pm /.010 \pm /.1/4
XX \pm /.030
X \pm /.1

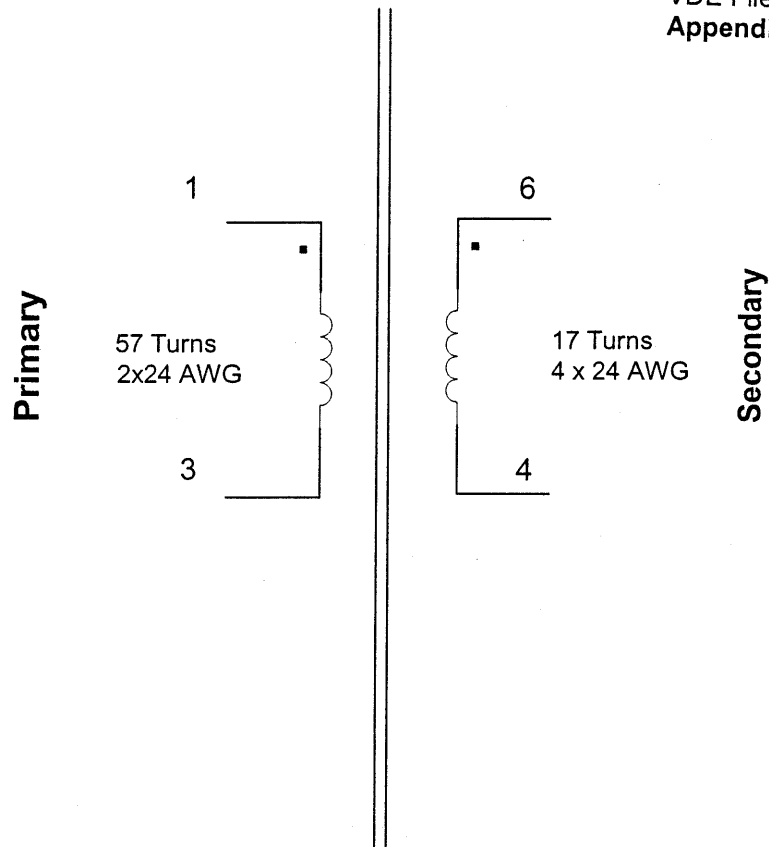
FILE: S/DC/IML/SAMPLE/S5141.DSF

THIS DOCUMENT MAY CHANGE WITHOUT NOTICE- CONSULT WITH SALES
PRIOR TO PLACING ORDER

Core Type: Magnetics EE 44317 (E21)
Material: "P"
Rev E4

Wiring diagram for Battery Charger
Freq = 70Khz
430-7201

VDE File: 19244-3335-0020
Appendix 2, Page 13 of 95



ELV insulation system between 5mm creepage primary and secondary.

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.:

Marks licence No.:

file ref.:

VDE File: 19244-3335-0020
Appendix 2, Page 14 of 95

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 Mexico**
 1.2 Place of manufacture: **Fracc. Itzincab, Merida Yucatan, Mexico**
 1.3 Reference of type: **N/A**
 1.4 Trade Mark: **N/A**
 1.5 Other markings: **460-0016-Rev:0, Date Code, Falco**
 1.6 Reference number: **CLS19-2000-21-5000**

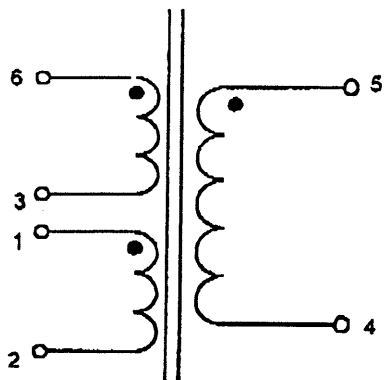
- 2.1 Protection against electric shock: **N/A**
 2.2 Class of protection to IEC 539: IP..... **N/A**
 2.3 Type of construction (Isolating transformer for toys.....): **N/A**
 2.4 Transformer, stationary - portable *): **N/A**
 2.5 Protection against short-circuit according to sub clause 6.2 *): **N/A**
 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: $t_a = \text{N/A } ^\circ\text{C}$
 2.7 Class: **'A' 105°** 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:	N/A	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:	STK 1812-331-003	
	material:		
4.2 Material of layer insulation	material:	2	MYLAR TAPE
4.3 Windings	number:		1
	material:	TEX-E	MAGNET WIRE
4.4 Taps	number:	N/A	
4.5 Diameter of wire	mm:	1 mm / 1 mm	0.08 mm
4.6 Winding of insulation	material:		
4.7 Cord insulation material		N/A	
	innere:		
	äußere:		
4.8 Cold resistance in Ω at: 25°	$^\circ\text{C} =$	1.7 mOhms / 1.7 mOhms	273 Ohms

SCHEMATIC

VDE File: 19244-3335-0020

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5 Core type

5.1 Sheet metal, material: Lamination/ EE187/ 19.05 x 0.35mm / 0.00045 gr
main dimensions:

5.2 Cross-sectional drawing: N/A

6 Type of construction

6.1 Open - covered - in case protection *) Open

6.2 Impregnated - undrowned - drowned *) P.D. GEORGE 434, dipped only.

6.3 Soaking (liquor):

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

6.5 Drown material:

6.6 Material of the cover: N/A

of the case:

of the socket (support):

6.7 Flammability class for insulation material: N/A

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

Offenbach,

VDE Testing and Certification Institute
Department

Place: Merida Yucatan, Mexico Date: 02/13/01

FALCO

FALCO ELECTRONICS MEXICO
S.A. de C.V.

FEM-900004-E15

(Stamp and signature of the manufacturer)

INFORMATION REQUIRED BY SAFETY AGENCIES

TRANSFORMERS AND INDUCTOR CONSTRUCTION DESCRIPTION

VDE File: 19244-3335-0020/

Appendix 2, Page 16 of 95

IDENTIFICATION

1 CUSTOMER: APC PART NO: 460-0016 REVISION: 0

2 MAGNETIC TYPE: TRANS FORMER

3 TYPE: Linear ☒ Switching ☐ Other (specify) _____

4 MANUFACTURER FALCO ELECTRONICS MEXICO MANUFACTURER PART No. _____

5 MAGNETIC UL RECOGNIZED: YES ☐ NO ☒ VENDOR FILE NO.: N/A

6 IF USING (OBJY2) R/C INSULATION CLASS SYSTEM UL FILE NO.: N/A

7 FOLLOW INFORMATION IS NOT REQUIRED IF MAGNETIC COMPONENT IS RECOGNIZED BY UL PRIOR TO TEST OF UPS

CORE

1 SEE ATTACHED FALCO DRAWING YES ☐ NO ☒ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

2 DESCRIPTION Powdered ☐ Lamination ☒ Ferrite ☐ Other (Specify) NICKER 49%

3 CORE MATERIAL GRADE MN-ZN ☐ NI-ZN ☐ SHAPE OF CORE EE-187

4 DIMENSION (mm) LENGTH / OUTER DIAMETER WIDTH / INNER DIAMETER THICKNESS / HEIGHT
0.014"

BOBBIN INFORMATION

STK1812-331-003

1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

2 BOBBIN RAW MATERIAL MANUFACTURER: _____ PART NO. _____

3 RAW MATERIAL DESIGNATION _____ (MUST BE UL RECOGNIZED)

4 UL FILE NO.: _____ BOBBIN WALL THICKNESS: _____

5 FLAMMABILITY RATING UL94 TEMPERATURE RATING C

6 BOBBIN DIMENSION (mm): LENGTH WIDTH HEIGHT THICKNESS

WINDING INFORMATION

	AWG or mm ²	No. TURNS	No. LAYERS	WIRE INSULATION COATING	UL FILE	DC RESISTANCE	TEMP. (°C)
1 PRIMARY 1	18	1	1	TRIPLE INSULATED		1.7 mOHM	
2 PRIMARY 2	18	1	1	TRIPLE INSULATED		1.7 mOHM	
3 SHIELD							
4 SECONDARY							
No. 1	40	2000		SNS	MANY	273 OHM	
No. 2							
No. 3							
No. 4							
No. 5							
5 PRIMARY MAGNET WIRE:	TYPE ANSI MW	FURUKAWA	TEMPERATURE CLASS		RATING:	125	°C
6 SECONDARY MAGNET WIRE:	TYPE ANSI MW	28-C	TEMPERATURE CLASS	B	RATING:	130	°C

Safety Data Form

02/07/01; REV. A1; S:\DC\GRID\SAFETYDATA.XLS

INSULATION SYSTEM

	MATERIAL	MAT. THK	No. OF LAYERS	TEMP. RATING (°C)	MANUFACTURER	UL FILE	RCD PAGE No.
1 PRIMARY / CORE	BOBBIN						
2 PRIMARY / SHIELD	N/A						
3 PRIMARY / SECONDARY	BOBBIN						
4 SEC. No. 1 / CORE	TRIPLE INSULATED				FURUKAWA		
	MATERIAL PART No.		TEMPERATURE RATING (°C)		MANUFACTURER	UL FILE	RCD PAGE No.
6 CROSSOVER INSULATION	N/A						
7 WINDOW INSULATION							
8 OUTER WRAP	MYLAR		130		MANY		
9 LEAD WIRE							
10 IMPREGNATION / VARNISH	PDG 434		130		PDG		
11 SLEEVING							

POTTED COMPONENT INFORMATION

1 CASE MANUFACTURER		CASE PART No.	
2 CASE RAW MATERIAL MANUFACTURER		PART No.	
3 RAW MATERIAL DESIGNATION:		(MUST BE UL RECOGNIZED)	
4 UL FILE No. E	BOBBIN WALL THICKNESS		
5 FLAMMABILITY RATING: UL 94	TEMPERATURE RATING (°C):		
6 CASE DIMENSION (mm):	LENGTH	WIDTH	HIEGHT THICNESS
7 POTTING MATERIAL MANUFACTURER:		PART No.:	
8 POTTING MATERIAL DESIGNATION:		MUST BE UL RECOGNIZED	
9 UL FILE No. : E	FLAMMABILITY RATING : UL 94	TEMPERATURE RATING (°C):	

ELECTRICAL RATINGS

	FREQUENCY	VOLTAGE	CURRENT	POWER / CAPACITY
PRIMARY				VA
2 SECONDARY No.				VA
3 SECONDARY No.				VA
SECONDARY No.				VA
SECONDARY No.				VA
SECONDARY No.				VA
SECONDARY No.				VA

SPACING DATA (CREEPAGE / CLEARANCE)

- 1.1 PRIMARY TO SECONDARIES
LAYER MATERIAL (SPECIFY MATERIAL USAGE, SEE SECTION 5) TAPE / FLEXIBLE INSULATION / SLEEVING
- 1.1.1 6 mm
- 1.2 mm + 1 LAYER
- 1.3 3 LAYERS
- 2 PRIMARY TO GROUND
- 2.1 mm (1/2 OF 8.1.1)
- 2.2 3 LAYERS
- 3 ADD CROSS SECTION OF BOBBIN DRAWING.

COMPANY INFORMATION

Mexico Factory:
Calle 23 # 311 x 46 Fracc. Itzincab
Merida, Yucatan, Mexico, 97392

Place :

te :

proved by

Jerónimo Ramos

Engineering Manager (Name + Signature)

Ing. Antonio Vallado

QC Manager (Name + Signature)

FALCO

Falco Electronics Mexico

MATERIAL MECHANICAL & ELECTRICAL SPECIFICATIONS

MMES: STK1812-331

REV: F1

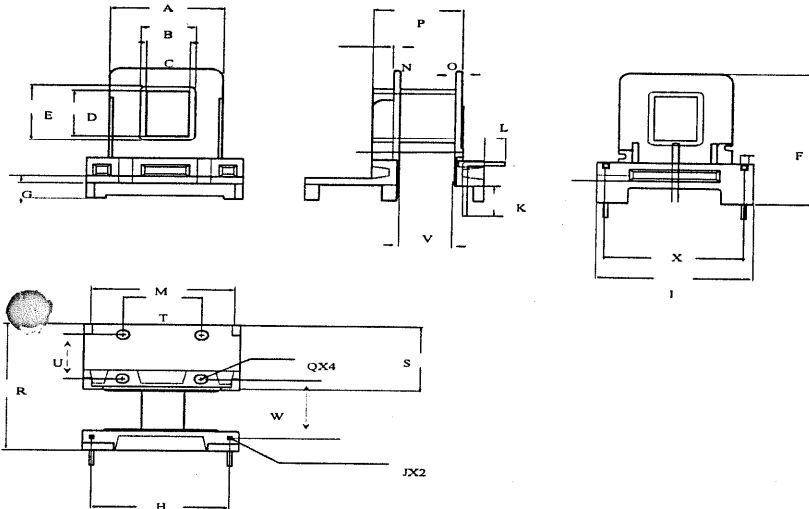
MCO #:

4945

DATE: 29-Nov-00

ORIGINATOR: MARY C

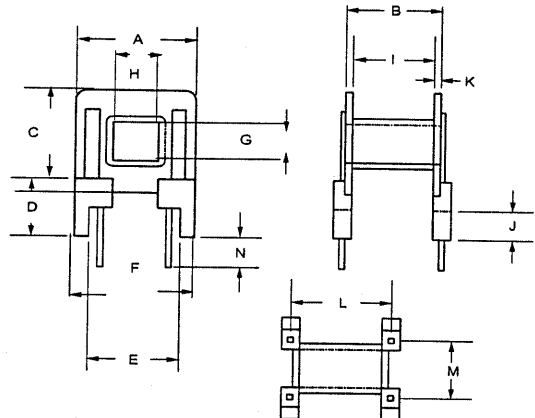
FIG1



HORIZONTAL BOBBIN

PLACE PINS EXPIRATION DATE
OF 6 MONTHS AFTER IT HAS BEEN
INSPECTED

FIG 2



PSN	A				B				C				D				E				F			
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
STK1812-331-001	0.535	13.59	0.545	13.84	0.255	6.48	0.265	6.73	0.195	4.95	0.205	5.21	0.295	7.49	0.305	7.75	0.355	9.02	0.365	9.27	0.863	21.92	0.883	22.43
STK1812-331-002	0.515	13.08	0.545	13.84	0.405	10.29	0.435	11.05	0.515	13.08	0.545	13.84	0.285	7.24	0.315	8.00	0.395	10.03	0.415	10.54	0.505	12.83	0.535	13.59
STK1812-331-003	0.535	13.59	0.545	13.84	0.255	6.48	0.265	6.73	0.195	4.95	0.205	5.21	0.295	7.49	0.305	7.75	0.355	9.02	0.365	9.27	0.863	21.92	0.883	22.43

PSN	G				H				I				J				K				L			
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
STK1812-331-001	0.090	2.29	0.110	2.79	0.655	16.64	0.665	16.89	0.745	18.92	0.755	19.18	0.023	0.58	0.028	0.71	0.215	5.46	0.235	5.97	0.095	2.41	0.105	2.67
STK1812-331-002	0.190	4.83	0.210	5.33	0.190	4.83	0.210	5.33	0.350	8.89	0.370	9.40	0.140	3.56	0.160	4.06	0.025	0.64	0.035	0.89	0.435	11.05	0.445	11.30
STK1812-331-003	0.090	2.29	0.110	2.79	0.655	16.64	0.665	16.89	0.745	18.92	0.755	19.18	0.023	0.58	0.028	0.71	0.215	5.46	0.235	5.97	0.085	2.16	0.115	2.92

PSN	M				N				O				P				QX4				R			
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
STK1812-331-001	0.295	7.49	0.305	7.75	0.028	0.71	0.032	0.81	0.028	0.71	0.032	0.81	0.415	10.54	0.425	10.80	0.059	1.50	0.065	1.65	0.855	21.72	0.865	21.97
STK1812-331-002	0.295	7.49	0.305	7.75	0.197	5.00	0.212	5.38	0.028	0.71	0.032	0.81	0.415	10.54	0.425	10.80	0.059	1.50	0.065	1.65	0.855	21.72	0.865	21.97
STK1812-331-003	0.295	7.49	0.305	7.75	0.028	0.71	0.032	0.81	0.028	0.71	0.032	0.81	0.415	10.54	0.425	10.80	0.059	1.50	0.065	1.65	0.855	21.72	0.865	21.97

PSN	S				T				U				V				W				X			
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
STK1812-331-001	0.445	11.30	0.455	11.56	0.365	9.27	0.375	9.53	0.295	7.49	0.305	7.75	0.263	6.68	0.273	6.93	0.390	9.91	0.375	9.53	0.365	9.27	0.375	9.53
STK1812-331-002	0.445	11.30	0.455	11.56	0.365	9.27	0.375	9.53	0.295	7.49	0.305	7.75	0.263	6.68	0.273	6.93	0.390	9.91	0.375	9.53	0.365	9.27	0.375	9.53
STK1812-331-003	0.445	11.30	0.455	11.56	0.365	9.27	0.375	9.53	0.295	7.49	0.305	7.75	0.263	6.68	0.273	6.93	0.390	9.91	0.375	9.53	0.365	9.27	0.375	9.53

PSN	PLASTIC DESCRIPTION									
	MATERIAL	FLAMMABILITY	UL FILE	MANUFACTURER	NUMBER	SECTIONS	C.O.C.	THICK	FIG	
STK1812-331-001	RYNITEFR-530	94V-0	E69578-M	EI DUONT DE NEMOURS	2	1	YES	0.35	1	
STK1812-331-002	RYNITEFR-530	94V-0	E69578-M	EI DUONT DE NEMOURS	4	1	YES	0.35	2	
STK1812-331-003	RYNITEFR-530	94V-0	E69578-M	EI DUONT DE NEMOURS	2	1	YES	0.35	1	

VDE Prüf. und Zertifizierungsinstitut
VDE Testing and Certification Institute

Merianstrasse 28 · D-63069 Offenbach · Tel. (149) (09) 83 06-0 · Fax (+49) (69) 83 06-555

VDE

Appendix No.:

Marks licence No.:

file ref.:

VDE File: 19244-3335-002C

Appendix 2, Page 20 of 95

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

(filled in by the Institute)

Form 42E

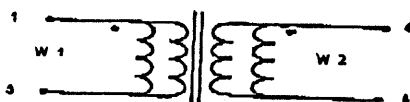
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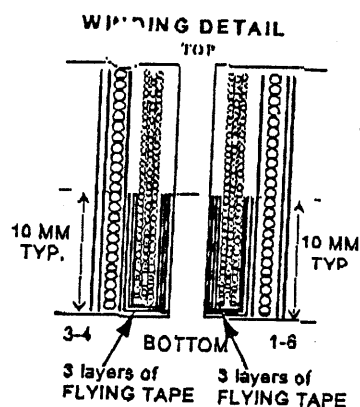
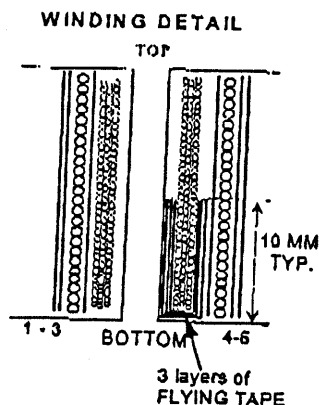
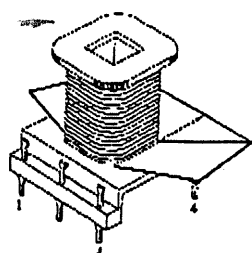
- 1.1 Manufacturer: Falco Electronics Mexico.
 1.2 Place of manufacture: Fracc. Itzincab, Merida, Yucatan Mexico.
 1.3 Reference of type: N/A
 1.4 Trade Mark: N/A
 1.5 Other markings: 430-7208-E1, Date Code, Falco.
 1.6 Reference number: TRE421-0101-304
- 2.1 Protection against electric shock: N/A
 2.2 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:
 non-inherently short-circuit proof:
 non short-circuit proof:
 fail safe:
 (rated current of the cutout: A) N/A
 2.6 Rated maximum ambient temperature: $t_a =$ °C N/A
 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	
3.2 Rated frequency	Hz:	35KHz	
3.3 Rated current	A:	N/A	
3.4 Rated output	VA:	N/A	
3.5 Rated power factor cos phi:		N/A	
4 Windings			
4.1 Coil base	number:	PLASTRON 0363M-46-90 RY	
4.2 Material of layer insulation	material:	RYNITE FR-530	
4.3 Windings	number:	1xMYLAR TAPE (.001" THICK.)	2xMYLAR TAPE(.001" THICK.)
	material:	1	1
4.4 Taps	number:	MAGNET WIRE	TEX-E
4.5 Diameter of wire	mm:	N/A	N/A
4.6 Winding of insulation	material:	2x0.55	2X0.65
4.7 Cord insulation material		NEMA MW-28C MIN.	TEX-E
	innere:	N/A	N/A
	äußere:		
4.8 Cold resistance in Ω at:	°C = 25°C	0.288 MAX.	0.036 MAX.

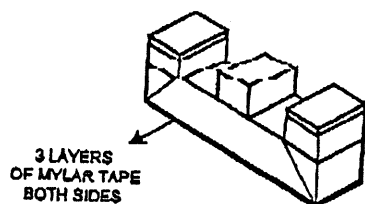
4.9 Circuit diagram (which terminal markings, color of wires etc.): Schematic Diagram

SCHEMATIC



**5 Iron core****5.1 Core material: MN-ZN**

main dimensions: 40.6mm / 16.5mm / 12.5mm / 01 g

5.2 Cross-sectional drawing: SCHEMATIC DIAGRAMVDE File: 19244-3335-0020.
Appendix 2, Page 21 of 95**6 Type of construction OPEN****6.1 Open - covered - in case protection *)****6.2 Impregnated - undrowned - drowned *) VARNISH, DIPPED ONLY.****6.3 Soaking (liquor): AIR DRY VARNISH, PD GEORGE 434.****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:

of the socket (support):

6.7 Flammability class for insulation material: N/A**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

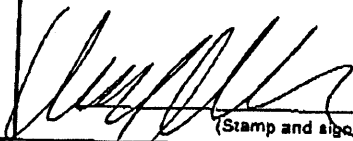
Offenbach,

VDE Testing and Certification Institute
Department

Place: Merida, Yucatan Mexico Date: 05/24/01

FALCO

FALCO ELECTRONICS MEXICO
S.A. de C.V.
FEM-960804-E15



(Stamp and signature of the manufacturer)

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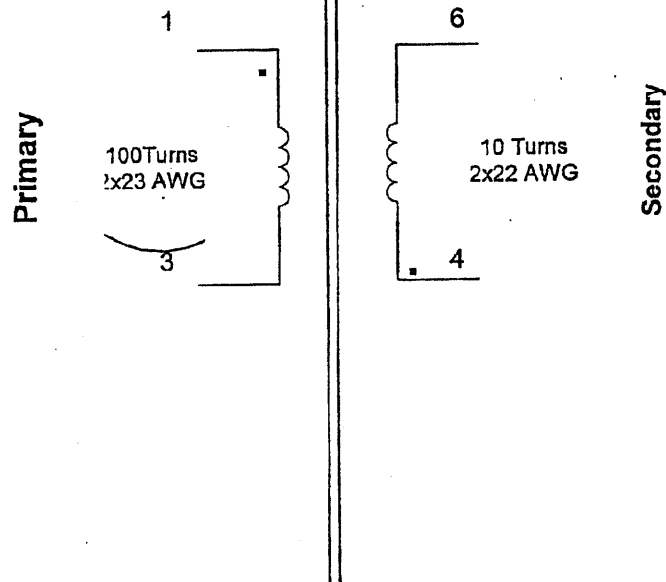
VDE File: 19244-3335-0020
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9695

Core Type: Magnetics EE 44317 (E21)
Material: "P"
Rev E1

Lynx Battery Charger Flyback
Freq = 35Khz 100 Watts
430-7208

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SELV insulation system between primary and secondary
Creepage = 10mm (Voltage 461rms)
Clearance 6.5mm (Voltage 840peak)

AI = 300 mH/1000t
Primary Inductance 3.0mH
Secondary Inductance 30uH

Pin Lengths are .150 +/- .01

R. Powers 3/7/2001

MATERIAL MECHANICAL & ELECTRICAL SPECIFICATIONS

FALCO

MMES: STK1842-431-001

REV: F1

MCO #:

4610

DATE: 31-Jul-00

Falco Electronics Mexico

DESCRIPCION:
BOBINA TIPO: EI 21 x 1/2 RY

DESCRIPCION:
BOBINA TIPO: EI 21 x 1/2 RY

MATERIAL: PET POLYESTER
RYNITE
FLAME RETARDANT
30% GLASS FILLED

MATERIAL: PET POLYESTER
RYNITE
FLAME RETARDANT
30% GLASS FILLED

CLASE DE MATERIAL: H (180°C)

MATERIAL CLASS: H (180°C)

INDICE DE FLAMABILIDAD : 94 V0

FLAMMABILITY RATING: 94 V0

PINES : 6
BRASS 0.018X0.041
60/40 SOLDER
0.0001-0.0003 GROSOR DE
ESTANADO

PIN : 6
BRASS 0.018X0.041
60/40 SOLDER
0.0001-0.0003 PLATING THICKNESS

SECCIONES : 1

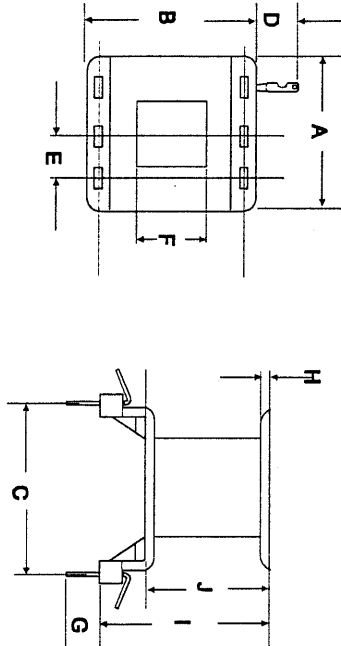
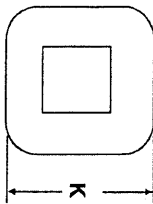
FLANGES : 2

STANDOFFS : 0.060"

STAND OFFS : 0.060"

COLOCAR FECHA DE EXPIRACION
DE PINES 6 MESES DESPUES DE
LA FECHA DE INSPECCION

PLACE PINS EXPIRATION DATE
OF 6 MONTHS AFTER IT HAS BEEN
INSPECTED



FSN	A		B		C		D		E		F	
	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX
STK1842-431-001	1.090	27.69	1.110	28.19	1.210	30.73	1.230	31.24	1.115	28.32	1.135	28.83
	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm	IN	mm

FSN	SPIRE LENGTH		TAIL LENGTH	
	MIN	MAX	MIN	MAX
STK1842-431-001	0.030	0.76	0.034	0.86
	IN	mm	IN	mm

INFORMATION REQUIRED BY SAFETY AGENCIES

TRANSFORMERS AND INDUCTOR CONSTRUCTION DESCRIPTION

VDE File: 19244-3335-0020

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IDENTIFICATION

1 CUSTOMER: APC-BILLERICA NORTH PART NO: 430-7208-E1 REVISION: E1

2 MAGNETIC TYPE: TRANSFORMER

3 TYPE: Linear Switching X Other (specify)

4 MANUFACTURER FALCO ELECTRONICS MEXICO MANUFACTURER PART No. TRE421-0101-304

5 MAGNETIC UL RECOGNIZED: NO VENDOR FILE NO.:

6 IF USING (OBJY2) R/C INSULATION CLASS SYSTEM UL FILE NO.:

7 FOLLOW INFORMATION IS NOT REQUIRED IF MAGNETIC COMPONENT IS RECOGNIZED BY UL PRIOR TO TEST OF UPS

CORE

1 DESCRIPTION Powdered Iron Lamination Ferrite C-Core Other (Specify) X

2 CORE MATERIAL GRADE MN-ZN SHAPE OF CORE EE

3 DIMENSION LENGTH / OUTER DIAMETER WIDTH / INNER DIAMETER THICKNESS / HEIGHT
1.609" ± 0.015" 0.650" ± 0.006" 0.493" ± 0.007"

BOBBIN INFORMATION

1 BOBBIN MANUFACTURER PLASTRON CORPORATION PART NO. 0363M-46-90 RY

2 BOBBIN RAW MATERIAL MANUFACTURER: DUPONT PART NO. RYNITE FR530

3 RAW MATERIAL DESIGNATION PET GLASS REINFORCED (MUST BE UL RECOGNIZED)

4 UL FILE NO.: E69578 BOBBIN WALL THICKNESS: 0.032"

5 FLAMMABILITY RATING UL94VO TEMPERATURE RATING 180° C

6 BOBBIN DIMENSION: LENGTH WIDTH HEIGHT THICKNESS
SEE DRAWING ATTACHED

WINDING INFORMATION

	AWG or mm ²	No. TURNS	No. LAYERS	WIRE INSULATION COATING	UL FILE	DC RESISTANCE	TEMP. (°C)
1 PRIMARY 1	2X23	100	6	SINGLE	MANY	0.288Ω MAX.	25
2 PRIMARY 2	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3 SHIELD	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4 SECONDARY	2x22	10	1	TRIPLE (TEX-E)	E157568	0.036Ω MAX.	25
No. 1	N/A	N/A	N/A	N/A	N/A	N/A	N/A
No. 2							
No. 3							
No. 4							
No. 5							
5 PRIMARY MAGNET WIRE:	TYPE ANSI MW	80	TEMPERATURE CLASS	F	RATING:	155	°C
6 SECONDARY MAGNET WIRE:	TYPE ANSI MW	N/A	TEMPERATURE CLASS	A	RATING:	105	°C

INSULATION SYSTEM

	MATERIAL	MAT. THK	No. OF LAYERS	TEMP. RATING (°C)	MANUFACTURER	UL FILE	RCD PAGE No.
5.1 PRIMARY / CORE	RYNITE FR530L	0.032"	1	200	PLASTRON	E69578	
5.2 PRIMARY / SHIELD	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5.3 PRIMARY / SECONDARY		TEX-E	PLUS	MYLAR	TAPE		
5.4 SEC. No. 1 / CORE		TEX-E	PLUS	MYLAR	TAPE		
5.5 SEC. No. 2 / SEC. No. 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5.6 SEC. No. 3 / SEC. No. 4							
5.7 SEC. No. 4 / SEC. No. 5							
5.8 SEC. No. 5 / SEC. No. 6							
	MATERIAL PART No.		TEMPERATURE RATING (°C)		MANUFACTURER	UL FILE	RCD PAGE No.
5.9 CROSSOVER INSULATION	COMPOSITE TAPE		130		PERMACEL		
5.10 WINDOW INSULATION							
5.11 OUTER WRAP	MYLAR TAPE		130		YAHUA		
5.12 LEAD WIRE	TRIPLE INSULATED TEX-E		105		FURUKAWA		
5.13 IMPREGNATION / VARNISH	434-PDG				PD GEORGE	E75225	N/A
5.14 SLEEVING	N/A		N/A		N/A	N/A	N/A

POTTED COMPONENT INFORMATION

1	CASE MANUFACTURER	N/A	CASE PART No.	N/A
2	CASE RAW MATERIAL MANUFACTURER	N/A	PART No.	
3	RAW MATERIAL DESIGNATION:		(MUST BE UL RECOGNIZED)	
4	UL FILE No. E	BOBBIN WALL THICKNESS		
5	FLAMMABILITY RATING: UL 94	TEMPERATURE RATING (°C):		
6	CASE DIMENSION (mm):	LENGTH	WIDTH	HIEGHT THICNESS
7	POTTING MATERIAL MANUFACTURER:		PART No.:	
8	POTTING MATERIAL DESIGNATION:		MUST BE UL RECOGNIZED	
9	UL FILE No. : E	FLAMMABILITY RATING : UL 94	TEMPERATURE RATING (°C):	

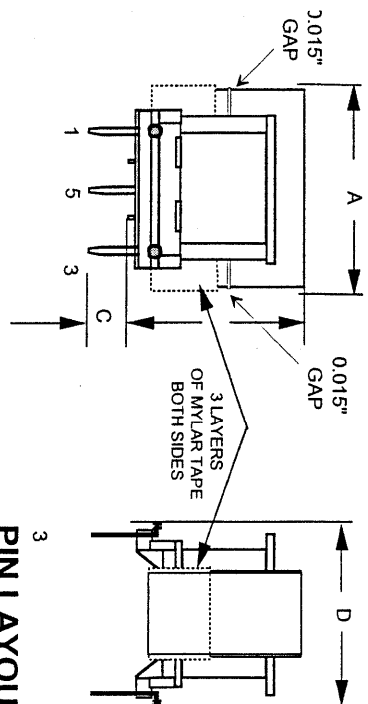
ELECTRICAL RATINGS

	FREQUENCY	VOLTAGE	CURRENT	POWER / CAPACITY
5.1 PRIMARY				VA
5.2 SECONDARY No.				VA
5.3 SECONDARY No.				VA
5.4 SECONDARY No.				VA
5.5 SECONDARY No.				VA
5.6 SECONDARY No.				VA

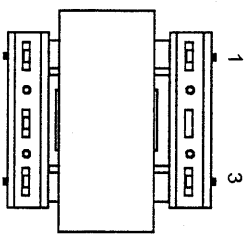
FRONT VIEW.

RIGHT VIEW.

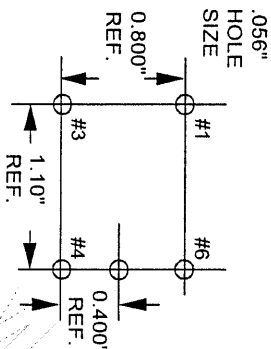
WINDING CHART.



BOTTOM VIEW



PIN LAYOUT

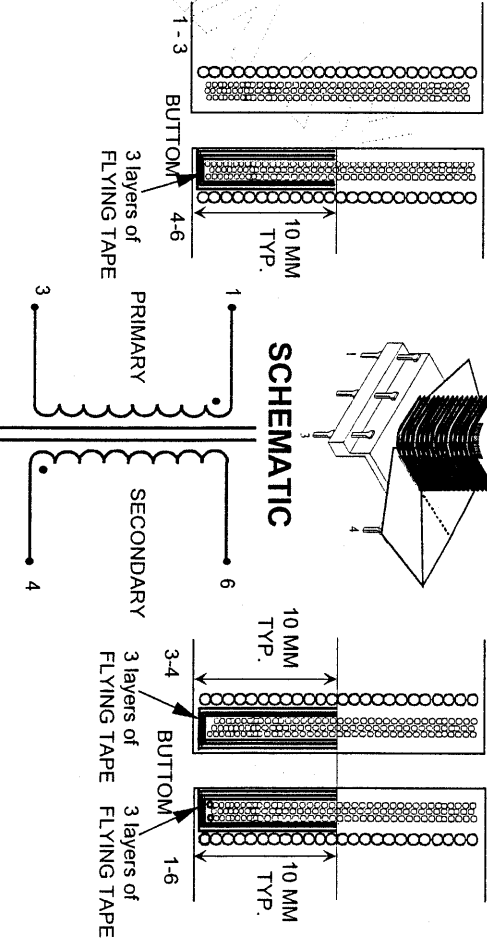


WINDING SEQ.	ST - FN	WIRE/FOIL	TURNS	TURNS/ LAYER	WRAP INSULATION	SLEEVE	MARGIN SIDES	NOTES
1	1 - 3	2x23AWG SN	100	---	2 x MYLAR TAPE	---	---	1
2	4 - 6	2x0.65MMTEX-E	10	---	1 X MYLAR TAPE	---	---	---

WINDING DETAIL

TOP

SCHEMATIC



MECHANICAL PARAMETERS:

A	B	C	D
MAX.	MAX.	±0.020"	MAX.
1.690"	1.400"	0.150"	1.400"

NOTES:

1. FLYING TAPE ON PRIMARY WINDING, PIN 4 TO PIN 6 SIDE.
2. REMOVE THE PIN #2.
3. GAP OUTER LEGS TO OBTAIN PRIMARY INDUCTANCE

ELECTRICAL PARAMETERS:

1. PRIMARY INDUCTANCE (1-3): 3.0 mH ± 10% @ 1KHz, 0.25V(0ADC).
2. SECONDARY INDUCTANCE(4-6): 30 µH ±10% @ 1KHz, 0.25V(0ADC).
3. DCR (1-3): 288 mΩMAX @ 25°C.
4. DCR (4-6): 36 mΩMAX @ 25°C.
5. HI-POT (1-4): 3000 Vrms, 1SEC.
6. HI-POT (1,4 to CORE): 1500 Vrms, 1SEC.

CREEPAGE / LAYER #	SAFETY COMPONENT	FALCO CATALOG NUMBER:	TRE421-0101-304
mm	UL=	FALCO PART NUMBER: TBD	IML REV. N/A
	VDE=	DESCRIPTION: LINK BATTERY CHARGER FLYBACK	
	IEC=	CUSTOMER PN:430-7208-E1	REV. E1
	OTHER=	SAMPLE REQUEST: 5689	DATE: (MM/DD/YY)* 03.09.01
		SCALE: NONE	SHEET: 1 OF 1
			UNLESS OTHERWISE SPECIFIED DECIMALS/ FRACTIONS XXX +/- .010 XX +/- .030 X +/- .1
		APPROVED BY: ALEJANDRO PALMA	Falco Electronics WWW.FALCOELECT.COM



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.: Marks licence No.: file ref.:

VDE File: 19244-3335-0020

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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 MEXICO**
 1.2 Place of manufacture: **FRACC. ITZINCAB, MERIDA YUCATAN, MX.**
 1.3 Reference of type: **N/A**
 1.4 Trade Mark: **N/A**
 1.5 Other markings: **430-7207, REV: 0, DATE CODE, FALCO.**
 1.6 Reference number: **TRE25N-0303-706**

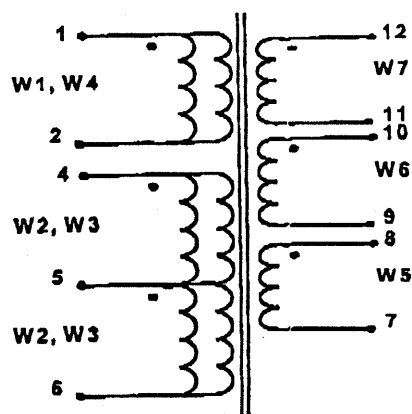
- 2.1 Protection against electric shock: **N/A**
 2.2 Class of protection to IEC 539: IP..... **N/A**
 2.3 Type of construction (Isolating transformer for toys.....): **N/A**
 2.4 Transformer, stationary - portable *): **N/A**
 2.5 Protection against short-circuit according to sub clause 6.2 *): **N/A**
 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: **N/A** A)
 2.6 Rated maximum ambient temperature: $t_a =$ **N/A** °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	
3.2 Rated frequency	Hz:	N/A	
3.3 Rated current	A:	N/A	
3.4 Rated output	VA:	N/A	
3.5 Rated power factor cos phi:			
4 Windings			
4.1 Coil base	Number:	STK1816-413-003	
	Material:	RYNITE FR-530	
4.2 Material of layer insulation	Material:	MYLAR TAPE	
4.3 Windings	Number:	3	3
	Material:	MAGNET WIRE	TEX-E
4.4 Taps	number:	1	
4.5 Diameter of wire	mm:	0.40, 0.25, 0.12	0.20, 0.20, 0.20
4.6 Winding of insulation	Material:	130°C Single	TEX-E
4.7 Cord insulation material	Innere:	N/A	
	äußere:	N/A	
4.8 Cold resistance in Ω at:	°C = 25	0.065, 0.630 (4-6)	1.0, 1.0, 1.15

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

VDE File: 19244-3335-0020

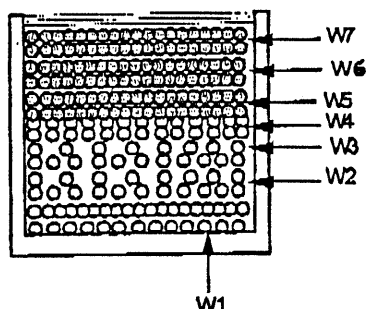
Appendix 2, Page 29 of 95



Iron core

- 5.1 Sheet metal, material: **FERRITE -EF25**
main dimensions: 25.0mm / 12.50mm / 9.10mm / 32.76 gr
- 5.2 Cross-sectional drawing:

WINDING DETAIL



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 °C *) **N/A**
- 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: **N/A**

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

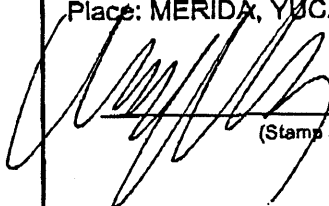
8.1 Components built - In the transformer: (switches, plugs, thermal cut off, cables.....etc.): N/A

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

Offenbach,

VDE Testing and Certification Institute
Department

Place: MERIDA, YUCATAN Date: 05/28/2001

**FALCO**
FALCO ELECTRONICS MEXICO
S.A. de C.V.
(Stamp and signature of the manufacturer)
FEM-980804-E15

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INFORMATION REQUIRED BY SAFETY AGENCIES

TRANSFORMERS AND INDUCTOR CONSTRUCTION DESCRIPTION

VDE File: 19244-3335-0020

Appendix 2, Page 31 of 95

IDENTIFICATION

1 CUSTOMER: APC PART NO: 430-7207 REVISION: E3

2 MAGNETIC TYPE: TRANSFORMER

3 TYPE: Linear ☐ Switching ☒ Other (specify) _____

4 MANUFACTURER FALCO ELECTRONICS MEXICO MANUFACTURER PART No. E16014

5 MAGNETIC UL RECOGNIZED: YES ☐ NO ☒ VENDOR FILE NO.: N/A

6 IF USING (OBJY2) R/C INSULATION CLASS SYSTEM UL FILE NO.: N/A

7 FOLLOW INFORMATION IS NOT REQUIRED IF MAGNETIC COMPONENT IS RECOGNIZED BY UL PRIOR TO TEST OF UPS

CORE ECO1916-10-000

1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

2 DESCRIPTION Powdered ☐ Lamination ☐ Ferrite ☐ Other (Specify) _____

3 CORE MATERIAL GRADE MN-ZN ☐ NI-ZN ☐ SHAPE OF CORE _____

4 DIMENSION (mm) LENGTH / OUTER DIAMETER WIDTH / INNER DIAMETER THICKNESS / HEIGHT

BOBBIN INFORMATION

1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

2 BOBBIN RAW MATERIAL MANUFACTURER: DUPONT PART NO. RINYTE FR530

3 RAW MATERIAL DESIGNATION _____ (MUST BE UL RECOGNIZED)

4 UL FILE NO.: E69578 (M) BOBBIN WALL THICKNESS: 0.7mm

5 FLAMMABILITY RATING UL94 VO TEMPERATURE RATING 180° C

6 BOBBIN DIMENSION (mm): LENGTH WIDTH HEIGHT THICKNESS

WINDING INFORMATION

	AWG or mm ²	No. TURNS	No. LAYES	WIRE INSULATION COATING	UL FILE	DC RESISTANCE	TEMP. (°C)
PRIMARY 1	2X26 AWG	23		HEAVY	MANY	72.5mΩ NOM	
PRIMARY 2	2X30AWG/2X36 AWG	16/16		HEAVY	MANY	580mΩ NOM	
SECONDARY1	0.20MM TEX E	40		TRIPLE INS		956mΩ NOM	
SECONDARY2	0.20MM TEX E	40		TRIPLE INS		1.04mΩ NOM	
SECONDARY3	0.20MM TEX E	40		TRIPLE INS		1.1mΩ NOM	
PRIMARY MAGNET WIRE:	TYPE ANSI MW	28-C		TEMPERATURE CLASS	B	RATING: 130°	°C
SECONDARY MAGNET WIRE:	TYPE ANSI MW			TEMPERATURE CLASS		RATING: 125	°C

INSULATION SYSTEM

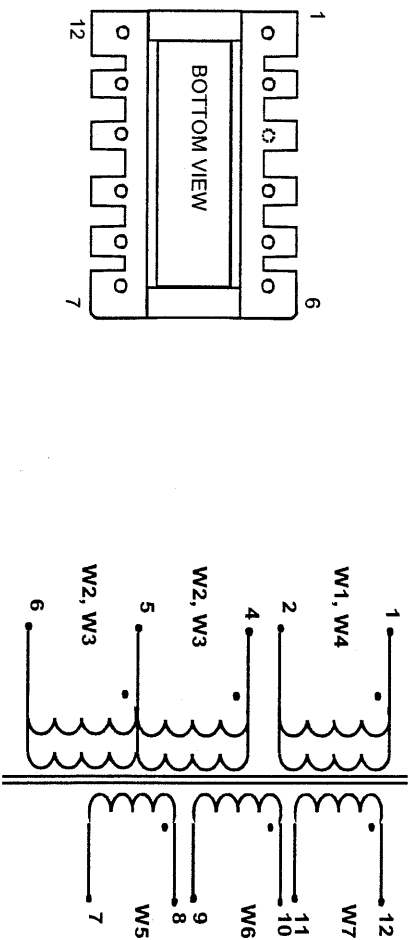
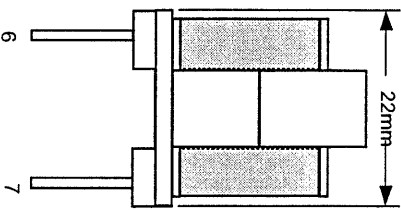
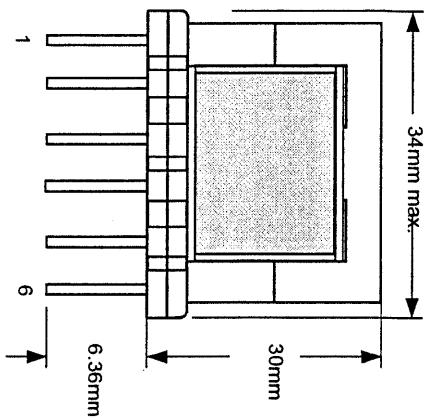
	MATERIAL	MAT. THK	No. OF LAYERS	TEMP. RATING (°C)	MANUFACTURER	UL FILE
1 PRIMARY / CORE	BOBBIN			180	DUPONT	
2 PRIMARY / SHIELD	N/A					
3 PRIMARY / SECONDARY	TRIPLE INS.	0.100mm	1	125	FURUKAWA	
4 SEC. No. 1 / CORE	TRIPLE INS.	0.100mm	1	125	FURUKAWA	
5 SEC. No. 2 / SEC. No. 3	TRIPLE INS.	0.100mm	1	125	FURUKAWA	
6 SEC. No. 3 / SEC. No. 4						
7 SEC. No. 4 / SEC. No. 5						
8 SEC. No. 5 / SEC. No. 6						
	MATERIAL PART No.		TEMPERATURE RATING (°C)		MANUFACTURER	UL FILE
9 CROSSOVER INSULATION	MYLAR TAPE		130		MANY	MANY
10 WINDOW INSULATION						
11 OUTER WRAP	2 X MYLAR TAPE		130		MANY	MANY
12 LEAD WIRE						
13 IMPREGNATION / VARNISH						
14 SLEEVING						

POTTED COMPONENT INFORMATION

CASE MANUFACTURER	N/A	CASE PART No.	
CASE RAW MATERIAL MANUFACTURER		PART No.	
RAW MATERIAL DESIGNATION:		(MUST BE UL RECOGNIZED)	
UL FILE No. E	BOBBIN WALL THICKNESS		
FLAMMABILITY RATING: UL 94	TEMPERATURE RATING (°C):		
CASE DIMENSION (mm):	LENGTH	WIDTH	HIEGHT THICNESS
POTTING MATERIAL MANUFACTURER:		PART No.:	
POTTING MATERIAL DESIGNATION:		MUST BE UL RECOGNIZED	
UL FILE No. : E	FLAMMABILITY RATING : UL 94	TEMPERATURE RATING (°C):	

ELECTRICAL RATINGS

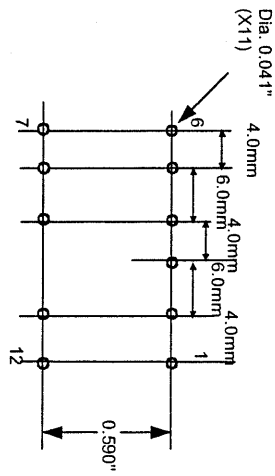
	FREQUENCY	VOLTAGE	CURRENT	POWER / CAPACITY
PRIMARY				VA
SECONDARY No.				VA
SECONDARY No.				VA
SECONDARY No.				VA
SECONDARY No.				VA
SECONDARY No.				VA



SCHEMATIC

WINDING ORDER	PIN NOS ST FIN	WIRE (FSN) (MMR)	TURNS EXACT	WINDING WRAP(TAP)	NOTES
1	1 - 2	26 AWG	23		
2	4 - 5	30AWG	16		
3	5 - 6	36AWG	16		
4	4 - 5	30AWG	16		
5	5 - 6	36AWG	16		
6	1 - 2	26 AWG	23		1
7	8 - 7	0.20mm TEX-E	40		
8	10 - 9	0.20mm TEX-E	40		
9	12 - 11	0.20mm TEX-E	40	2 X MYLAR TAPE	

PCB LAYOUT



ELECTRICAL PARAMETERS:

- 1.- INDUCTANCE (1-2): 75µH MAX. 65µH MIN.
- 2.- DC RESISTANCE:
 - (1-2) 72.5mΩ. NOM.
 - (4-6) 580mΩ. NOM.
 - (8-7) 956mΩ. NOM.
 - (10-9) 1.04Ω. NOM.
 - (12-11) 1.1Ω. NOM.
- 2.-HI-POT(1,4 TO 12,10,8): 3750VAC, 1 SEC.

- NOTES:
- 1.-WIND BIFILAR
 - 2.-GAP CENTER LEG TO OBTAIN (1-2) INDUCTANCE.
 - 3.- REMOVE PIN 3.

THIS DOCUMENT MAY CHANGE WITHOUT NOTICE. CONSULT WITH SALES PRIOR TO PLACING ORDER

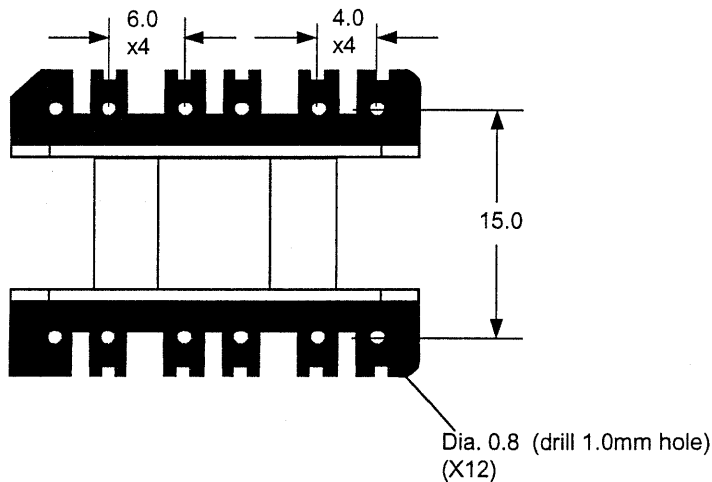
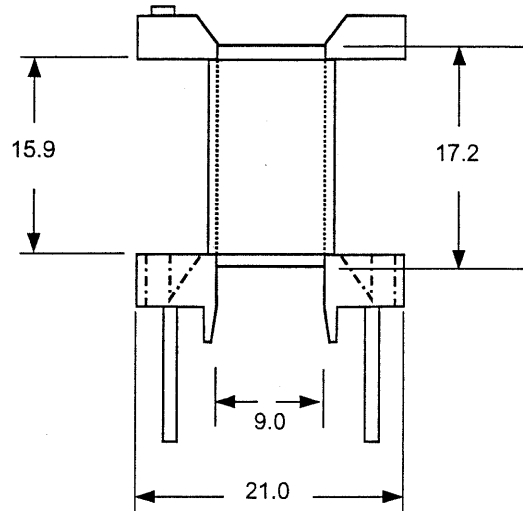
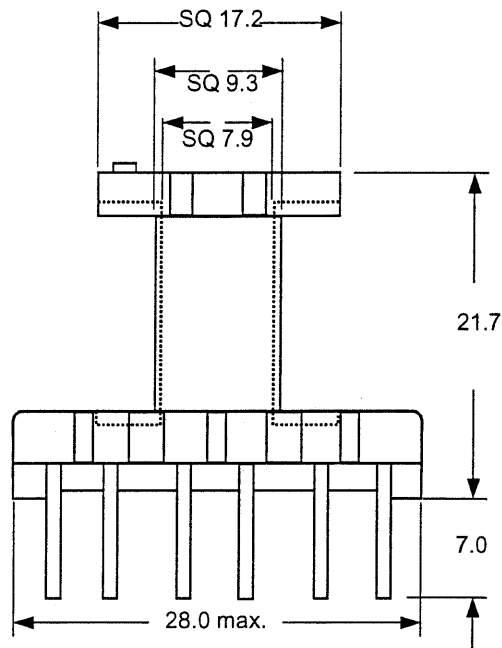
B O M		FALCO CATALOG NO:	REV
ITEM	DEPTO.	FSN-DESCRIPTION	FA1
1	MMWR	1236-2102	
2	MMWR	1230-2102	
3	MMWR	1226-2102	
4	LWR	1392-020-042	
5	ECO	1916-10-000	
CUSTOMER PN:		WEIGHT (KG):	
430-7207-E3		26.5	
SAMPLE REQUEST:		DATE:	
4967		9.06.00	
SCALE:		SHEET:	
1 OF 2		1 OF 2	
TOLERANCES: UNLESS OTHERWISE SPECIFIED DECIMALS/ FRACTIONS			
XXX +/- .010 XX +/- .030 X +/- .1			
+/- 1/4			
FILE: S:\DCIM\LSAMPLES\4967.DSF			

Falco Electronics Mexico S.A DE C.V
www.falconex.com



430-7207

VDE File: 19244-3335-0020
Appendix 2, Page 34 of 95



1. All measurement are in millimeters. 2. Windings are contained in bobbin footprint. 3. Remove pin 3 for keying

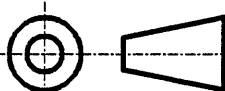
FALCO
Falco Electronics Mexico

DRAWING BY:
MANUEL MARTIN 08.04.00

PART NUMBER: EF-25

REF.No.:
S:\DC\MC\TOOLINGS\EF-25.DSF

MATERIAL: PHENOLIC



CHECKED BY ENGINEERING:

DWG.No.:

REV.

001

CHECKED BY ENGINEERING:

SCALE:

NONE

SHEET:

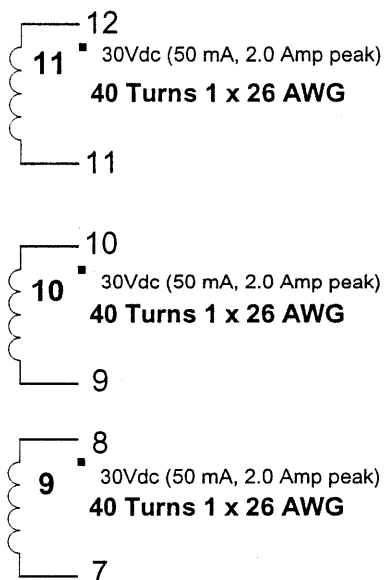
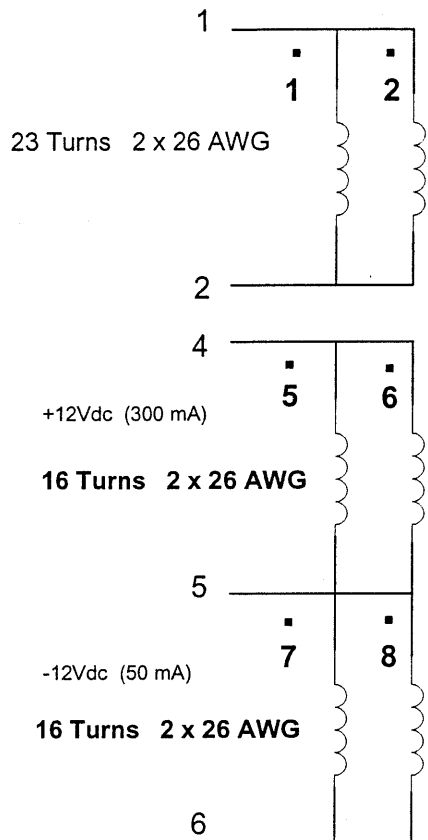
1

Core Type: EE Magnetics
Material : Magnetics Type "P"
Rev E3

Lynx Nuetril Side Bias Flyback
430-7207 9.0 Watts

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Nuetril Ref



Winding #	Order
1	1
2	4
5-7	2
6-8	3
9	5
10	6
11	7

. Powers 8/25/2000 E3 mod for new bobbin

TES:

Basic insulation for 800 Vdc is required for windings 9,10, and 11
Creepage from the neutral windings is 5mm for windings 9,10, and 11
Windings 5-6 and 7-8 are Bifilar
Inductance windings 1 and 2 = Max 75uH, Min 65uH

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: 19244-3335-0020
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Marks licence No.:

file ref.:

(filled in by the Institute)

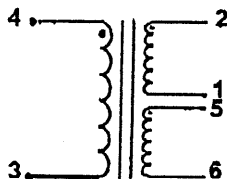
Constructional data for isolating transformers and safety isolating transformers to EN 60742 DIN VDE 0551
Form 42E

- Translation of the VDE Testing and Certification Documents -

- 1.1 Manufacturer: Falco Electronics Mexico.
 1.2 Place of manufacture: Fracc. Itzincab, Merida, Yucatan, Mexico.
 1.3 Reference of type: N/A
 1.4 Trade Mark: N/A
 1.5 Other markings: APC 430-7205, Rev: E2, Date Code, Falco
 1.6 Reference number: BDT13V-332-32B
- 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:
 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 N/A
 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	
3.2 Rated frequency	Hz:	20K	
3.3 Rated current	A:	N/A	
3.4 Rated output	VA:	N/A	
3.5 Rated power factor cos phi:		N/A	
4 Windings			
4.1 Coil base	number:	STK2765-121-039	
	material:	RYNITE 530FR	
4.2 Material of layer insulation	material:	N/A	
4.3 Windings	number:	1	2
	material:	MAGNET WIRE	TEX-E
4.4 Taps	number:	N/A	N/A
4.5 Diameter of wire	mm:	0.25mm	0.25mm / 0.25mm
4.6 Winding of insulation	material:		
4.7 Cord insulation material		N/A	N/A
	innere:		
	äußere:		
4.8 Cold resistance in Ω at: 25°C	°C =	180 m Ω	320 m Ω / 320 m Ω

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



VDE File: 19244-3335-0020
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5 Core Ferrite (Mn-Zn)

5.1 Material: 0.5"X0.31"X0.25" / 0.0020 kgr
main dimensions:

5.2 Cross-sectional drawing: N/A

6 Type of construction

6.1 Open - covered - in case protection *) Open

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: N/A
of the case:

of the socket (support):

6.7 Flammability class for insulation material: N/A

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: 05/22/01

FALCO

FALCO ELECTRONICS MEXICO
S.A. de C.V.
FEM-960604-E15

(Stamp and signature of the manufacturer)

INFORMATION REQUIRED BY SAFETY AGENCIES

TRANSFORMERS AND INDUCTOR CONSTRUCTION DESCRIPTION

VDE File: 19244-3335-0020

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IDENTIFICATION

1.1 CUSTOMER: APC PART NO: 430-7205 REVISION: E2

1.2 MAGNETIC TYPE:

1.3 TYPE: Linear ☐ Switching ☒ Other (specify)

1.4 MANUFACTURER FALCO ELECTRONICS MEXICO MANUFACTURER PART No. BDT13-332-325

1.5 MAGNETIC UL RECOGNIZED: YES ☐ NO ☒ VENDOR FILE NO.:

1.6 IF USING (OBJY2) R/C INSULATION CLASS SYSTEM UL FILE NO.: NO

1.7 FOLLOW INFORMATION IS NOT REQUIRED IF MAGNETIC COMPONENT IS RECOGNIZED BY UL PRIOR TO TEST OF UPS

CORE KPT24050-04-13

1.1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

1.2 DESCRIPTION Powdered ☐ Lamination ☐ Ferrite ☐ Other (Specify)

1.3 CORE MATERIAL GRADE MN-ZN ☐ NI-ZN ☐ SHAPE OF CORE

1.4 DIMENSION (mm) LENGTH / OUTER DIAMETER WIDTH / INNER DIAMETER THICKNESS / HEIGHT

BOBBIN INFORMATION

N/A

1.1 SEE ATTACHED FALCO DRAWING YES ☐ NO ☐ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

1.2 BOBBIN RAW MATERIAL MANUFACTURER: PART NO.

1.3 RAW MATERIAL DESIGNATION (MUST BE UL RECOGNIZED)

1.4 UL FILE NO.: BOBBIN WALL THICKNESS:

1.5 FLAMMABILITY RATING UL94 TEMPERATURE RATING C

1.6 BOBBIN DIMENSION (mm): LENGTH WIDTH HEIGHT THICKNESS

WINDING INFORMATION

	AWG or mm ²	No. TURNS	No. LAYES	WIRE INSULATION COATING	UL FILE	DC RESISTANCE	TEMP. (°C)
1 PRIMARY 1	30AWG	18		HEAVY		140mΩ	25
2 PRIMARY 2							
3 SHIELD							
4 SECONDARY							
No. 1	30	36		TRIPLE INSULATED		280mΩ	25
No. 2	30	36		TRIPLE INSULATED		280mΩ	25
No. 3							
No. 4							
No. 5							
5 PRIMARY MAGNET WIRE:	TYPE ANSI MW	28-C	TEMPERATURE CLASS	B	RATING:	130	°C
6 SECONDARY MAGNET WIRE:	TYPE ANSI MW	FURUKAWA	TEMPERATURE CLASS		RATING:	125	°C

Safety Data Form

02/07/01; REV. A1; S:\DC\GRID\SAFETYDATA.XLS

INSULATION SYSTEM

	MATERIAL	MAT. THK	No. OF LAYERS	TEMP. RATING (°C)	MANUFACTURER	UL FILE
1	PRIMARY / CORE	N/A				
2	PRIMARY / SHIELD					
3	PRIMARY / SECONDARY	TRIPLE INSULATED	3	125	FURUKAWA	
4	SEC. No. 1 / CORE	TRIPLE INSULATED	3	125	FURUKAWA	
5	SEC. No. 2 / SEC. No. 3	TRIPLE INSULATED	3	125	FURUKAWA	
6	SEC. No. 3 / SEC. No. 4					
7	SEC. No. 4 / SEC. No. 5					
8	SEC. No. 5 / SEC. No. 6					
		MATERIAL PART No.		TEMPERATURE RATING (°C)	MANUFACTURER	UL FILE RCD PAGE No.
9	CROSSOVER INSULATION					
10	WINDOW INSULATION					
11	OUTER WRAP					
12	LEAD WIRE					
13	IMPREGNATION / VARNISH					
14	SLEEVING					

POTTED COMPONENT INFORMATION N/A

1	CASE MANUFACTURER		CASE PART No.	
2	CASE RAW MATERIAL MANUFACTURER		PART No.	
3	RAW MATERIAL DESIGNATION:		(MUST BE UL RECOGNIZED)	
4	UL FILE No. E		BOBBIN WALL THICKNESS	
5	FLAMMABILITY RATING: UL 94		TEMPERATURE RATING (°C):	
6	CASE DIMENSION (mm):	LENGTH	WIDTH	HIEGHT THICNESS
7	POTTING MATERIAL MANUFACTURER:		PART No.:	
8	POTTING MATERIAL DESIGNATION:		MUST BE UL RECOGNIZED	
9	UL FILE No. : E	FLAMMABILITY RATING : UL 94	TEMPERATURE RATING (°C):	

ELECTRICAL RATINGS

	FREQUENCY	VOLTAGE	CURRENT	POWER / CAPACITY
1	PRIMARY			VA
2	SECONDARY No.			VA
3	SECONDARY No.			VA
4	SECONDARY No.			VA
5	SECONDARY No.			VA
6	SECONDARY No.			VA

SPACING DATA (CREEPAGE / CLEARANCE)

PRIMARY TO SECONDARIES

LAYER MATERIAL (SPECIFY MATERIAL USAGE, SEE SECTION 5) TAPE / FLEXIBLE INSULATION / SLEEVING

5mm mm

2.5 mm + 1 LAYER

3 LAYERS

PRIMARY TO GROUND

N/A mm (1/2 OF 8.1.1)

LAYERS

ADD CROSS SECTION OF BOBBIN DRAWING.

COMPANY INFORMATION

Mexico Factory:
Calle 23 # 311 x 46 Fracc. Itzincab
Merida, Yucatan, Mexico, 97392

Place :

Date :

Approved by

Ing. Animo Ramos

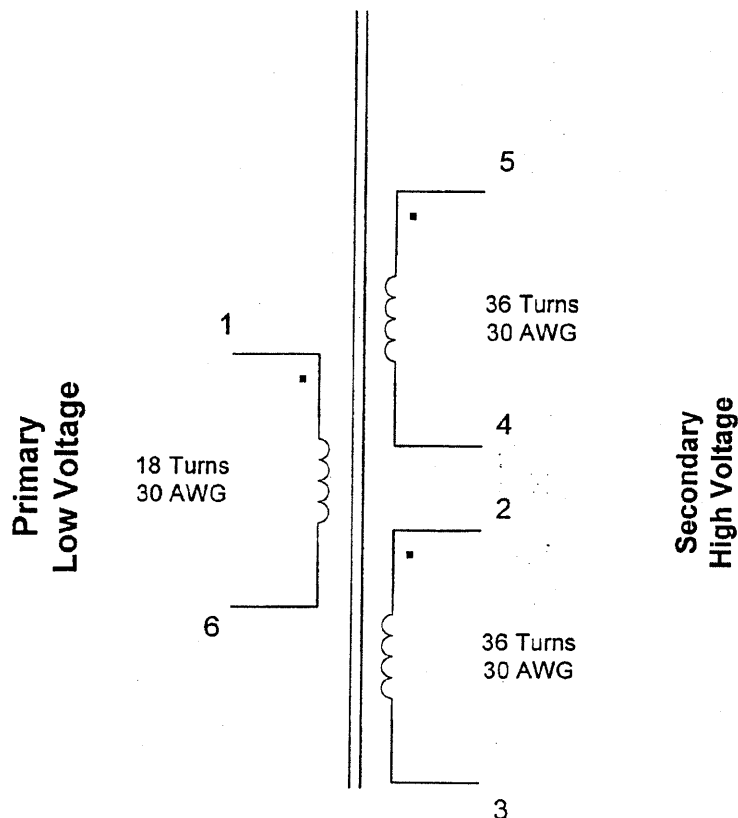
Engineering Manager (Name + Signature)

Ing. Antonio Vallado

QC Manager (Name + Signature)

Core Type: Toriod 0.5" O.D. Mag Inc #41306
Material: J
Rev E2 (same as Rev E0b)

Wiring diagram for Gate drive
Freq = 20Khz
430-7205



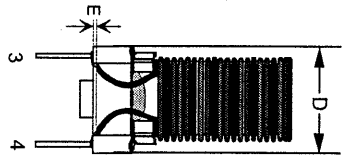
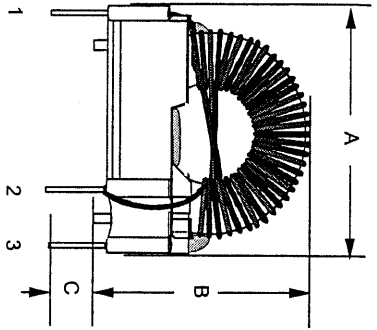
NOTES:

- 1) SELV isolation is required between the Primary and secondary
- 2) When you send the documentation indicate what core and material you are using, along with pricing.

6/26/00 Changed pin out for small base changed O.D. of toroid

R. Powers 8/2/2000

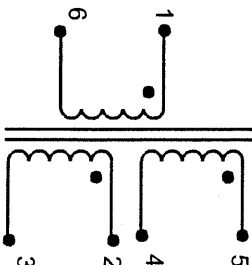
FRONT VIEW



WINDING CHART

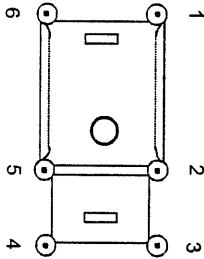
WINDING SEQ.	ST - FN	WIRE/FOIL	TURNS	TURNS/WRAP LAYER	INSULATION	SLEEVE	MARGIN SIDES	NOTES
1	1 - 6	30 AWG SN	18	---	---	---	---	---
2	5 - 4	30 AWG TEX-E	36	---	---	---	---	---
3	2 - 3	30 AWG TEX-E	36	---	---	---	---	---

SCHEMATIC



ELECTRICAL PARAMETERS:

1. INDUCTANCE (1-6) : 685 μ H MIN. @ 1 KHz, 0.25V/(0ADC).
2. DCR (1-6) : 180 m Ω MAX. @ 25°C
3. DCR (2-3) & (5-4) : 320 m Ω MAX. @ 25°C
4. HIPOT (1 TO 3,4) : 3750 Vrms, 60 Hz, 1 SEC.



A	B	C	D	E
MAX.	MAX.	$\pm .020^{\circ}$	MAX.	MAX.
0.815"	0.930"	0.15"	0.465"	0.070"

FALCO CATALOG NUMBER: BDT13V-332-32B

FALCO PART NUMBER: TBD IML REV. N/A

DESCRIPTION:

GATE DRIVER

CUSTOMER PN: 430-7205-E2 REV. E2

SAMPLE REQUEST: 5331 DATE: (MM/DD/YY) 12.27.00

SCALE: NONE SHEET: 1 OF 1



Falco Electronics Mexico S.A DE C.V.
WWW.FALCOMEX.COM

ORIGINATOR: JAMERIO POOT MONSREAL

APPROVED BY: ALEJANDRO PALMA

APPROVED BY:

TOLERANCES:
UNLESS OTHERWISE SPECIFIED
DECIMALS/ FRACTIONS
XXX +/- .010
XX +/- .030
X +/- .1
+/- 1/4

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.:

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 MEXICO**
 1.2 Place of manufacture: **FRACC. ITZINCAB, MERIDA, YUCATAN, MEXICO.**
 1.3 Reference of type: **N/A**
 1.4 Trade Mark: **N/A**
 1.5 Other markings: **430-7203 / REV E7 / DATE CODE / FALCO**
 1.6 Reference number: **TRE55V-0102-926H**

- 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:
 non-inherently short-circuit proof:
 non short-circuit proof:
 fail safe:

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

- 2.6 Rated maximum ambient temperature: $t_a =$ **N/A** °C

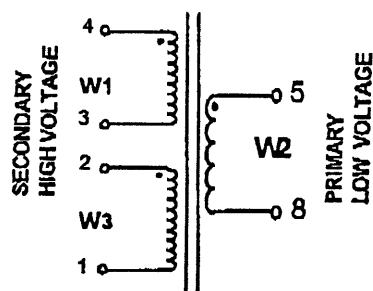
- 2.7 Class: **B Min** Insulation; Declaration of Insulation see VDE-Form 187
 (according to IEC 85)

- 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	25KHz:	N/A	N/A
3.3 Rated current	A:	N/A	N/A
3.4 Rated output	2.4KVA	N/A	N/A
3.5 Rated power factor cos phi:		N/A	N/A
4 Windings			
4.1 Coil base	number:	MYLAR FILM 0.005"	
	material:	6 X 0.005" MYLAR	
4.2 Material of layer insulation	material:	0.001" MYLAR TAPE	0.002"MYLAR FILM
4.3 Windings	number:	1	2
	material:	CU FOIL	MAGNET WIRE
4.4 Taps	number:	N/A	
4.5 Diameter of wire	mm:	0.5X34.29	3X0.7 / 3X0.7
4.6 Winding of insulation	material:	0.001"MYLAR TAPE + NOMEX	MW-28C MIN HEAVY
4.7 Cord Insulation material	innere:	N/A	N/A
	äußere:	N/A	N/A
4.8 Cold resistance in Ω at: 25 °C =		0.73 m Ω	51 m Ω / 65 m Ω

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

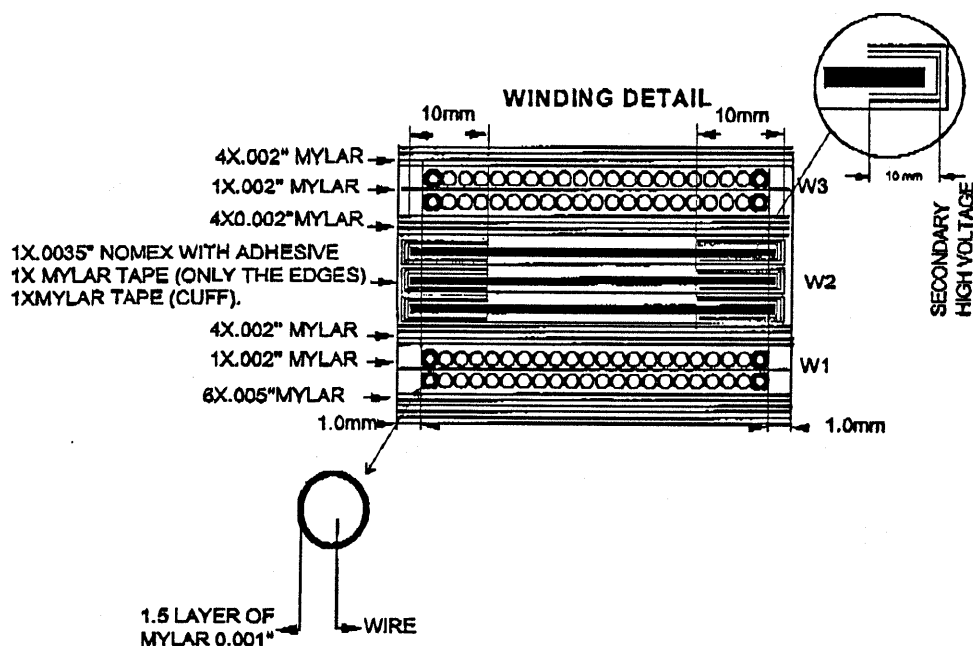
SCHEMATIC



5 Iron core

5.1 Sheet metal, material: SOFT FERRITE / E55 / 55 X 28 X 25 mm / 256 grs
main dimensions:

5.2 Cross-sectional drawing:



6 Type of construction

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

6.2 Impregnated - undrowned - drowned *) SOAKED

6.3 Soaking (liquor): CLASS B / P.D. GEORGE 777

6.4 Underpressure - Overpressure - Soaking at °C *)

6.5 Drown material: CLASS B / P.D. GEORGE 777

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: N/A

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

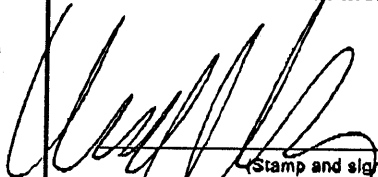
8.1 Components built - in the transformer: (switches, plugs, thermal cut off, cables.....etc.): NONE

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

Offenbach,

Place: Merida Yucatan Mexico

Date: 05/22/01

VDE Testing and Certification Institute
Department**FALCO**
FALCO ELECTRONICS MEXICO
S.A. de C.V.
FEM 960804-E15
(Stamp and signature of the manufacturer)

Copyright - all rights reserved. In any case the German version shall prevail

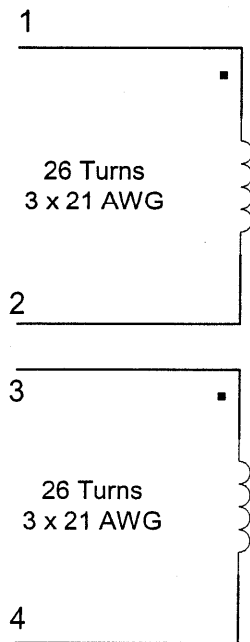
VDE File: 19244-3335-0020
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Core Type: Magnetics 45528 (55/21) x2
Material: Magnetics "P" type
Rev E7

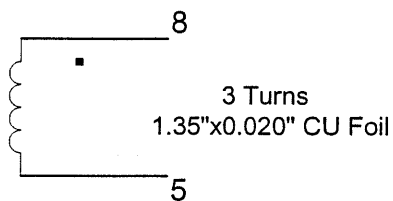
Wiring diagram for EE 1.6KW
Freq = 30Khz
International APC 430-7203

VDE File: 19244-3335-0020
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Secondary
High Voltage



Primary
Low Voltage



The secondary pin 1 to pin 2 and pin 3 to pin 4 creepage is 5.0mm, and the clearance is 2.5mm.

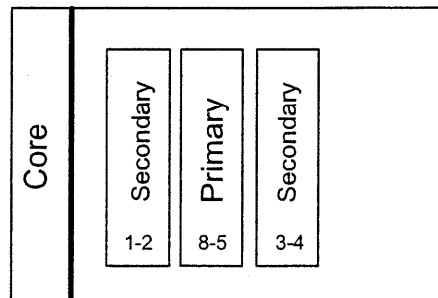
The secondary pin 1 to pin 4 creepage is 10.0mm, and the clearance is 5.0mm.

The primary to secondary winding creepage is 10.0mm, and the clearance is 5.0mm.

Winding Order:

- 1) Sec 1-2
- 2) Pri 8-5
- 3) Sec 3-4

WINDING DETAIL



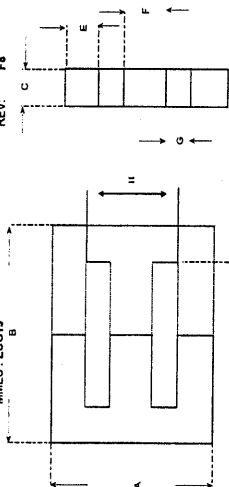
K. Colby 03/14/2001

DATE: 16-Mar-01
ORIGINATOR: MARY C.

MCO #: 5204

REV: F8

WMS: ECO19



DESCRIPTION:
FERRITE CORE SHAPE E

VDE File: 19244-3335-0020:
Appendix 2, Page 50 of 95

NOTE:

E CORE LOW LOSS TO MIDDLE
FREQUENCY

COMENTARIOS: VER TABLA

FSN	A		B/2		C		D/2		F		H		AL	μ ¹⁰	L (100 TURNS)							
	IN.	MM	MAX	MIN	IN.	MM	MAX	MIN	IN.	MM	MAX	MIN			MM	MAX	MIN	MM				
ECO1971-10-000	2.695	68.45	2.805	71.25	1.330	33.78	1.225	31.12	1.275	32.39	0.885	22.48	0.883	21.77	1.889	47.99	1.949	49.50	11358 ± 38%	2000 ± 38%	70.41	156.7
ECO1971-10-000-2	2.736	69.49	2.815	71.50	1.287	32.69	1.307	33.20	1.228	31.19	1.259	31.98	0.862	21.89	0.889	22.58	0.857	21.77	11500 ± 25%	2000 ± 20%	86.25	143.75
ECO1971-12-000	2.695	68.45	2.805	71.25	1.302	33.07	1.312	33.32	1.275	32.39	0.857	21.77	0.881	22.38	0.857	21.77	0.893	22.68	11700 ± 20%	2000 ± 20%	93.6	140.4
ECO1974-14-000	2.772	70.41	2.780	70.61	1.296	32.92	1.298	32.97	1.572	39.93	1.578	40.08	0.886	22.50	0.913	23.19	0.839	21.31	14500 ± 25%	2300 ± 25%	108.7	181.2
ECO1975-10-000	2.166	55.02	2.254	57.25	0.924	23.47	0.934	23.72	0.725	18.42	0.755	19.18	0.565	14.35	0.585	14.86	0.725	18.42	8815 ± 20%	2200 ± 20%	70.52	105.8
ECO1980-10-000	3.087	78.41	3.213	81.61	1.495	37.97	1.505	38.23	0.764	19.41	0.796	20.22	1.100	27.94	1.120	28.45	2.322	58.98	5880 ± 20%	2200 ± 20%	47.04	70.56
ECO1980-12-000	3.087	78.41	3.213	81.61	1.495	37.97	1.51	38.23	0.764	19.41	0.796	20.22	1.100	27.94	1.120	28.45	2.322	58.98	4762 ± 20%	2200 ± 20%	38.08	57.14
ECO1980-14-000	3.115	79.12	3.185	80.90	1.487	37.77	1.51	38.43	0.768	19.51	0.792	20.12	1.110	28.19	1.120	28.45	2.322	58.98	3505 MIN.	2300 ± 25%	35.05	52.27
FSN	COMENTARIOS																COMENTARIOS					
ECO1914-10-000	PINTURA DE IDENTIFICACION BLANCA EN LA ESPALDA DEL NUCLEO. PINTAR FERRITAS ANTES DE ENTREGAR A ALMACEN																UNGAPPED CORE MATERIAL: LOW LOSSES AND HIGH FLUX DENSITY. WHITE COLOR STRIPE ON BACK WALL. TO PAINT FERRITES BEFORE PUTTING THEM TO THE STOCK					
ECO1914-10-058	PINTURA DE IDENTIFICACION BLANCA EN LA ESPALDA DEL NUCLEO. PINTAR FERRITAS ANTES DE ENTREGAR A ALMACEN																UNGAPPED CORE MATERIAL: LOW LOSSES AND HIGH FLUX DENSITY. WHITE COLOR STRIPE ON BACK WALL. TO PAINT FERRITES BEFORE PUTTING THEM TO THE STOCK					
ECO1914-10-060	PINTURA DE IDENTIFICACION BLANCA EN LA ESPALDA DEL NUCLEO. PINTAR FERRITAS ANTES DE ENTREGAR A ALMACEN																UNGAPPED CORE MATERIAL: LOW LOSSES AND HIGH FLUX DENSITY. WHITE COLOR STRIPE ON BACK WALL. TO PAINT FERRITES BEFORE PUTTING THEM TO THE STOCK					
ECO1914-10-100	PINTURA DE IDENTIFICACION BLANCA EN LA ESPALDA DEL NUCLEO. PINTAR FERRITAS ANTES DE ENTREGAR A ALMACEN																UNGAPPED CORE MATERIAL: LOW LOSSES AND HIGH FLUX DENSITY. WHITE COLOR STRIPE ON BACK WALL. TO PAINT FERRITES BEFORE PUTTING THEM TO THE STOCK					
ECO1914-10-222	PINTURA DE IDENTIFICACION BLANCA EN LA ESPALDA DEL NUCLEO. PINTAR FERRITAS ANTES DE ENTREGAR A ALMACEN																UNGAPPED CORE MATERIAL: LOW LOSSES AND HIGH FLUX DENSITY. WHITE COLOR STRIPE ON BACK WALL. TO PAINT FERRITES BEFORE PUTTING THEM TO THE STOCK					
ECO1914-12-000	PINTURA DE IDENTIFICACION AMARILLA EN LA ESPALDA																UNGAPPED CORE MATERIAL: LOW LOSSES AND HIGH FLUX DENSITY. WHITE COLOR STRIPE ON BACK WALL. TO PAINT FERRITES BEFORE PUTTING THEM TO THE STOCK					
ECO1980-14-200	PINTURA DE IDENTIFICACION AMARILLA EN LA ESPALDA DEL NUCLEO																YELLOW PAINTING AT BACK LIKE IDENTIFICATION					
ECO1980-14-200	PINTURA DE IDENTIFICACION AMARILLA EN LA ESPALDA DEL NUCLEO																YELLOW COLOR STRIPE ON BACK WALL TO PAINT FERRITE					

INFORMATION REQUIRED BY SAFETY AGENCIES

TRANSFORMERS AND INDUCTOR CONSTRUCTION DESCRIPTION

VDE File: 19244-3335-0020

Appendix 2, Page 51 of 95

IDENTIFICATION

1 CUSTOMER: APC PART NO: 430-7203 REVISION: E7

2 MAGNETIC TYPE: TRANSFORMER

3 TYPE: Linear ☐ Switching ☒ Other (specify) _____

4 MANUFACTURER FALCO ELECTRONICS MEXICO MANUFACTURER PART No. TRE55V-0102-926H

5 MAGNETIC UL RECOGNIZED: YES ☐ NO ☒ VENDOR FILE NO.: _____

6 IF USING (OBJY2) R/C INSULATION CLASS SYSTEM UL FILE NO.: NO

7 FOLLOW INFORMATION IS NOT REQUIRED IF MAGNETIC COMPONENT IS RECOGNIZED BY UL PRIOR TO TEST OF UPS

CORE

1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

2 DESCRIPTION Powdered ☐ Lamination ☐ Ferrite ☐ Other (Specify) _____

3 CORE MATERIAL GRADE MN-ZN ☐ NI-ZN ☐ SHAPE OF CORE _____

4 DIMENSION (mm) LENGTH / OUTER DIAMETER WIDTH / INNER DIAMETER THICKNESS / HEIGHT

BOBBIN INFORMATION

1 SEE ATTACHED FALCO DRAWING YES ☐ NO ☒ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

2 BOBBIN RAW MATERIAL MANUFACTURER: GARAWARE PART NO. ER _____

3 RAW MATERIAL DESIGNATION PET (MUST BE UL RECOGNIZED)

4 UL FILE NO.: E110983 BOBBIN WALL THICKNESS: 0.762mm

5 FLAMMABILITY RATING N/A TEMPERATURE RATING 130 C

6 BOBBIN DIMENSION (mm):

LENGTH	WIDTH	HEIGHT	THICKNESS
36.83	20.1	44.4	0.762

WINDING INFORMATION

	AWG o	No. TURNS	No. LAYERS	WIRE INSULATION COATING	UL FILE	DC RESISTANCE	TEMP. (°C)
1 PRIMARY 1	134.29 X0.508	3	3	N/A		0.73mΩ	25
2 PRIMARY 2							
3 SHIELD							
4 SECONDARY							
No. 1	3X21	26	2	HEAVY	MANY	51mΩ	25
No. 2	3X21	26	2	HEAVY	MANY	65mΩ	25
No. 3							
No. 4							
No. 5							

4.5 PRIMARY MAGNET WIRE: TYPE ANSI MW N/A TEMPERATURE CLASS N/A RATING: N/A °C
4.6 SECONDARY MAGNET WIRE: TYPE ANSI MW 80C TEMPERATURE CLASS F RATING: 155 °C

VDE File: 19244-3335-0020
Appendix 2, Page 52 of 95

5 INSULATION SYSTEM

	MATERIAL	MAT. THK	No. OF LAYERS	TEMP. RATING (°C)		
5.1	PRIMARY / CORE					
5.2	PRIMARY / SHIELD					
5.3	PRIMARY / SECONDARY	MYLAR FILM	0.0762	4	130"	GARWARE E110983
5.4	SEC. No. 1 / CORE	MYLAR FILM	0.0762	10	130°	GARWARE E110983
5.5	SEC. No. 2 / SEC. No. 3					
5.6	SEC. No. 3 / SEC. No. 4					
5.7	SEC. No. 4 / SEC. No. 5					
5.8	SEC. No. 5 / SEC. No. 6					
		MATERIAL PART No.		TEMPERATURE RATING (°C)	MANUFACTURER	UL FILE RCD PAGE No.
5.9	CROSSOVER INSULATION					
5.10	WINDOW INSULATION					
5.11	OUTER WRAP					
5.12	LEAD WIRE					
5.13	IMPREGNATION / VARNISH	PD G777SC		130	PD GEORGE	
5.14	SLEEVING	KAPTON		200	PERMACEL	E20392

6 POTTED COMPONENT INFORMATION

N/A

6.1 CASE MANUFACTURER CASE PART No. _____
6.2 CASE RAW MATERIAL MANUFACTURER PART No. _____
6.3 RAW MATERIAL DESIGNATION: (MUST BE UL RECOGNIZED)
6.4 UL FILE No. E _____ BOBBIN WALL THICKNESS _____
6.5 FLAMMABILITY RATING: UL 94 _____ TEMPERATURE RATING (°C): _____
6.6 CASE DIMENSION (mm): LENGTH _____ WIDTH _____ HIEGHT _____ THICNESS _____
6.7 POTTING MATERIAL MANUFACTURER: _____ PART No.: _____
6.8 POTTING MATERIAL DESIGNATION: _____ MUST BE UL RECOGNIZED
6.9 UL FILE No. : E _____ FLAMMABILITY RATING : UL 94 _____ TEMPERATURE RATING (°C): _____

ELECTRICAL RATINGS

	FREQUENCY	VOLTAGE	CURRENT	POWER / CAPACITY
7.1	PRIMARY			VA
7.2	SECONDARY No.			VA
7.3	SECONDARY No.			VA
7.4	SECONDARY No.			VA
7.5	SECONDARY No.			VA
7.6	SECONDARY No.			VA

Safety Data Form

s 02/07/01; REV. A1; S:\DC\GRID\SAFETYDATA.XLS

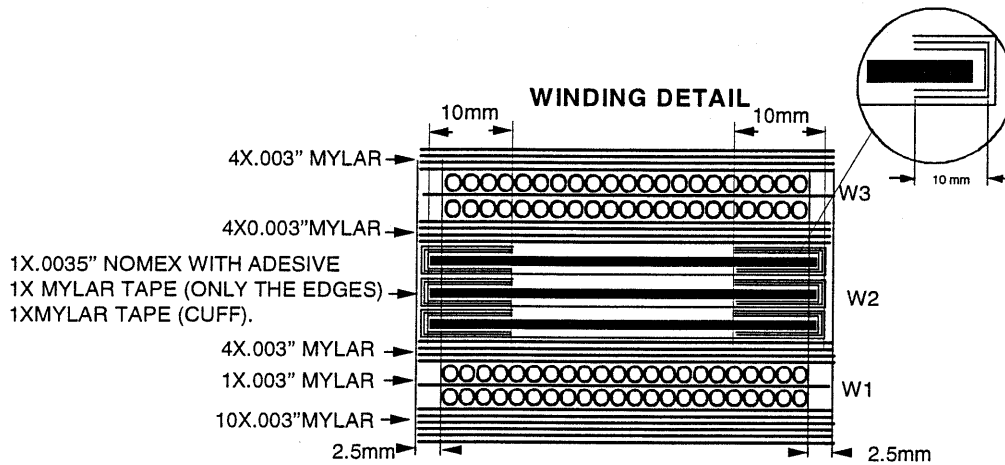
SPACING DATA (CREEPAGE / CLEARANCE)

1. PRIMARY TO SECONDARIES

LAYER MATERIAL (SPECIFY MATERIAL USAGE, SEE SECTION 5) TAPE / FLEXIBLE INSULATION / SLEEVING

- 1.1 9.5 mm
- 1.2 mm + 1 LAYER
- 1.3 3 LAYERS
2. PRIMARY TO GROUND
- 2.1 mm (1/2 OF 8.1.1)
- 2.2 LAYERS
3. ADD CROSS SECTION OF BOBBIN DRAWING.

VDE File: 19244-3335-0020
Appendix 2, Page 53 of 95



COMPANY INFORMATION

Mexico Factory:
Calle 23 # 311 x 46 Fracc. Itzincab
Merida, Yucatan, Mexico, 97392

Place :

Date :

Approved by

Ing. Jeronimo Ramo

Engineering Manager (Name + Signature)

Ing. Antonio Vallado

QC Manager (Name + Signature)

Safety Data Form

02/07/01; REV. A1; S:\DC\GRID\SAFETYDATA.XLS

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

p-...div No.:

Marks licence No.:

file ref.:

VDE File: 19244-3335-0020

Appendix 2, Page 54 of 95

(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 MEXICO.**
 1.2 Place of manufacture: **FRACC. ITZINCAB, MERIDA, YUCATAN, MEXICO.**
 1.3 Reference of type: **N/A**
 1.4 Trade Mark: **N/A**
 1.5 Other markings: **430-7200, REV: 0, DATE CODE, FALCO.**
 1.6 Reference number: **TRE25N-0501-406**

- 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:
 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 **N/A**

- 2.7 Class: **A (105°C)** Insulation; Declaration of Insulation see VDE-Form 187
 (according to IEC 85)

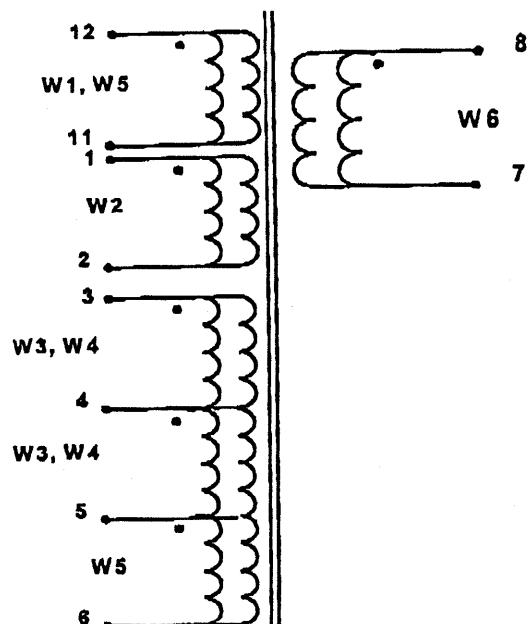
- 2.8 CTI - Value (according to IEC 112, Method A): **N/A**

3 Electrical values			Input	Output (AC/DC)
3.1	Rated voltage(s)	V:	N/A	
3.2	Rated frequency	Hz:	N/A	
3.3	Rated current	A:	N/A	
3.4	Rated output	VA:	N/A	
3.5	Rated power factor cos phi:		N/A	
4 Windings				
4.1	Coil base	Number:	STK1816-431-002	
		Material:	RYNITE FR-530	
4.2	Material of layer insulation	Material:	MYLAR TAPE OUTER WRAP	
4.3	Windings	Number:	5	1
		Material:	MAGNET WIRE	TEX-E
4.4	Taps	Number:	2	
4.5	Diameter of wire	mm:	0.32, 0.20, 0.16, 0.20, 0.12	0.25
4.6	Winding of insulation	Material:	130°C SINGLE	TEX-E
4.7	Cord insulation material		N/A	
		Innere:	N/A	
		Äußere:	N/A	
4.8	Cold resistance in Ω at:	°C =	0.105, 0.535, 0.270, 0.135, 0.590	0.425

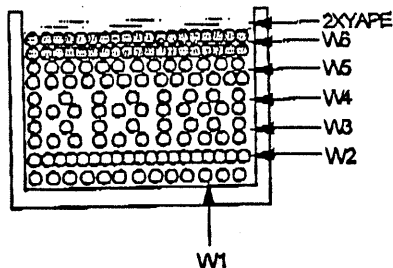
4.9 Circuit diagram (which terminal markings, color of wires etc.): SCHEMATIC DIAGRAM

VDE File: 19244-3335-0020
Appendix 2, Page 55 of 95

SCHEMATIC



- 5.1 Sheet metall, material: **FERRITE-EF25**
main dimensions: **25.0mm / 12.50mm / 9.10mm / 32.76 gr**
- 5.2 Cross-sectional drawing: **WINDING DETAIL**

WINDING DETAIL**6 Type of construction OPEN**

- 6.1 Open - covered - in case protection *)
- 6.2 Impregnated - undrowned - drowned *) **N/A**
- 6.3 Soaking (liquor): **N/A**
- 6.4 Underpressure - Overpressure - Soaking at °C *) **N/A**
- 6.5 Drown material: **N/A**
- 6.6 Material of the cover: **N/A**
of the case:
of the socket (support):
- 6.7 Flammability class for insulation material: **N/A**

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

Offenbach,

**VDE Testing and Certification Institute
Department**

Place:

MERIDA, YUC, MEXICO

Date: 05/30/01

FALCO**FALCO ELECTRONICS MEXICO**
S.A. de C.V.
FEM-960604-E15

(Stamp and signature of the manufacturer)

INFORMATION REQUIRED BY SAFETY AGENCIES

TRANSFORMERS AND INDUCTOR CONSTRUCTION DESCRIPTION

VDE File: 19244-3335-0020/
Appendix 2, Page 57 of 95

IDENTIFICATION

1 CUSTOMER: APC PART NO: 430-7200 REVISION: E8

2 MAGNETIC TYPE: TRANSFORMER

3 TYPE: Linear ☐ Switching ☒ Other (specify) _____

4 MANUFACTURER FALCO ELECTRONICS MEXICO MANUFACTURER PART No. E16016

5 MAGNETIC UL RECOGNIZED: YES ☐ NO ☒ VENDOR FILE NO.: N/A

6 IF USING (OBJY2) R/C INSULATION CLASS SYSTEM UL FILE NO.: N/A

7 FOLLOW INFORMATION IS NOT REQUIRED IF MAGNETIC COMPONENT IS RECOGNIZED BY UL PRIOR TO TEST OF UPS

CORE

1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

2 DESCRIPTION Powdered ☐ Lamination ☐ Ferrite ☐ Other (Specify) _____

3 CORE MATERIAL GRADE MN-ZN ☐ NI-ZN ☐ SHAPE OF CORE _____

4 DIMENSION (mm) LENGTH / OUTER DIAMETER WIDTH / INNER DIAMETER THICKNESS / HEIGHT

BOBBIN INFORMATION

1 SEE ATTACHED FALCO DRAWING YES ☒ NO ☐ IF IS NO THE FOLLOWING INFORMATION MUST BE FILL

2 BOBBIN RAW MATERIAL MANUFACTURER: DUPONT PART NO. RYNITE FR530

3 RAW MATERIAL DESIGNATION PET (MUST BE UL RECOGNIZED)

4 UL FILE NO.: E69578 (M) BOBBIN WALL THICKNESS: 0.7mm

5 FLAMMABILITY RATING UL94 VO TEMPERATURE RATING 180° C

6 BOBBIN DIMENSION (mm): LENGTH WIDTH HEIGHT THICKNESS

WINDING INFORMATION

	AWG or mm ²	No. TURN	No. LAYERS	WIRE INSULATION COATING	UL FILE	DC RESISTANCE	TEMP. (°C)
1 PRIMARY 1	2 X 28 AWG	23		HEAVY	MANY		
2 PRIMARY 2	2 X 34AWG	44		HEAVY	MANY		
3 PRIMARY 3	2X36AWG	13		HEAVY	MANY		
	2X34AWG	10		HEAVY	MANY		
	2X38AWG	17		HEAVY	MANY		
4 SECONDARY1	0.20MM TEX E	44		TRIPLE INSUL			
5 PRIMARY MAGNET WIRE:	TYPE ANSI MW	28-C		TEMPERATURE CLASS	B	RATING: 130	°C
6 SECONDARY MAGNET WIRE:	TYPE ANSI MW			TEMPERATURE CLASS		RATING: 125	°C

INSULATION SYSTEM

	MATERIAL	MAT. THK	No. OF LAYERS	TEMP. RATING (°C)	MANUFACTURER	UL FILE	
1 PRIMARY / CORE	BOBBIN						
2 PRIMARY / SHIELD	N/A						
3 PRIMARY / SECONDARY	TRIPLE INS	0.100mm	3	125	FURUKAWA		
4 SEC. No. 1 / CORE	TRIPLE INS	0.100mm	3	125	FURUKAWA		
	MATERIAL PART No.		TEMPERATURE RATING (°C)	MANUFACTURER	UL FILE	RCD PAGE No.	
9 CROSSOVER INSULATION	MYLAR TAPE		130	MANY	MANY		
10 WINDOW INSULATION							
11 OUTER WRAP	2 XMYLAR TAPE		130	MANY	MANY		
12 LEAD WIRE							
13 IMPREGNATION / VARNISH							
14 SLEEVING							

POTTED COMPONENT INFORMATION

1 CASE MANUFACTURER	N/A	CASE PART No.	
2 CASE RAW MATERIAL MANUFACTURER		PART No.	
3 RAW MATERIAL DESIGNATION:		(MUST BE UL RECOGNIZED)	
4 UL FILE No. E	BOBBIN WALL THICKNESS		
5 FLAMMABILITY RATING: UL 94	TEMPERATURE RATING (°C):		
6 CASE DIMENSION (mm):	LENGTH	WIDTH	HIEGHT THICKNESS
7 POTTING MATERIAL MANUFACTURER:		PART No.:	
8 POTTING MATERIAL DESIGNATION:		MUST BE UL RECOGNIZED	
9 UL FILE No. : E	FLAMMABILITY RATING : UL 94	TEMPERATURE RATING (°C):	

ELECTRICAL RATINGS

	FREQUENCY	VOLTAGE	CURRENT	POWER / CAPACITY	
1 PRIMARY					VA
2 SECONDARY No.					VA
3 SECONDARY No.					VA
4 SECONDARY No.					VA
5 SECONDARY No.					VA
6 SECONDARY No.					VA

SPACING DATA (CREEPAGE / CLEARANCE)

PRIMARY TO SECONDARIES

LAYER MATERIAL (SPECIFY MATERIAL USAGE, SEE SECTION 5) TAPE / FLEXIBLE INSULATION / SLEEVING

3.1.1	5	mm
3.1.2	2.5	mm + 1 LAYER
3.1.3	3	LAYERS
3.2	PRIMARY TO GROUND	
3.2.1	BOBBIN 0.7mm	mm (1/2 OF 8.1.1)
3.2.2		LAYERS
3.3	ADD CROSS SECTION OF BOBBIN DRAWING.	

COMPANY INFORMATION

Mexico Factory:
Calle 23 # 311 x 46 Fracc. Itzincab
Merida, Yucatan, Mexico, 97392

Place : MERIDA, YUCATAN.

Date : 02/12/01

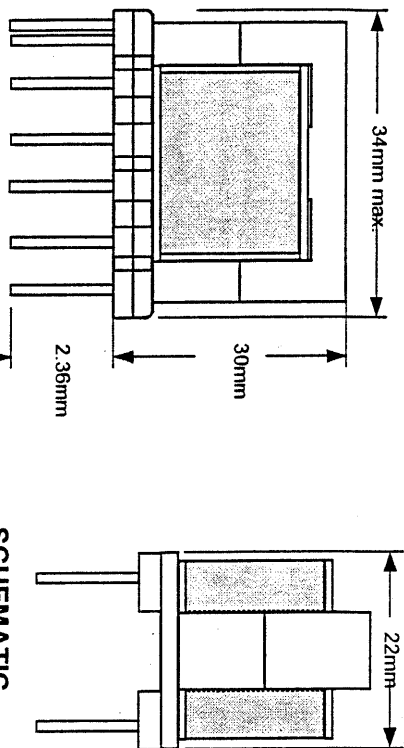
Approved by

Ing. Jeronimo Ramos

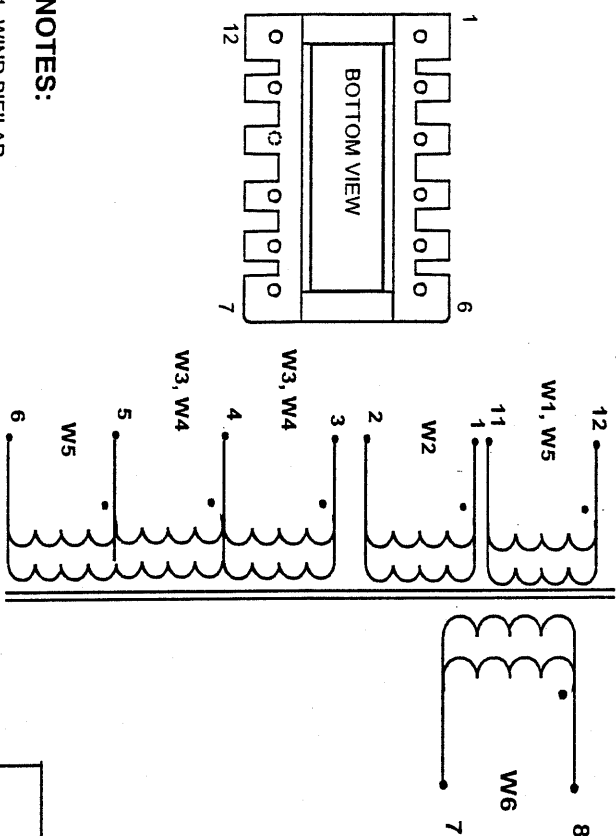
Engineering Manager (Name + Signature)

Ing. Antonio Vallado

QC Manager (Name + Signature)

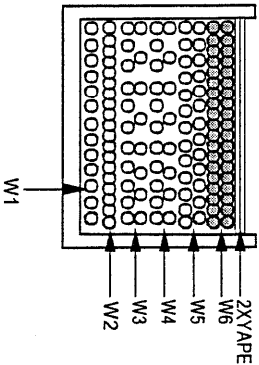


SCHEMATIC



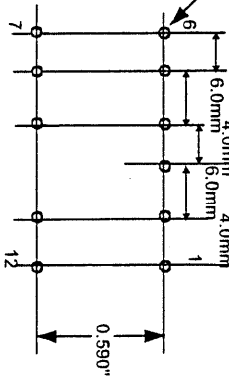
WINDING ORDER	PIN NOS ST FIN	WIRE (FSN) (MWR)	TURNS EXACT	WINDING WRAP (TAP)	NOTES
1	12 - 11	28 AWG	23		
2	1 - 2	2 X 34AWG	44		
3	3 - 4	36AWG	13		
4	4 - 5	34AWG	10		
5	5 - 6	34AWG	10		
6	12 - 11	28 AWG	23		
7	8 - 7	2 X 0.20mm TEXE	44	2 X AMP-LAR TAPE	1

WINDING DETAIL



Dia. 0.041" (X11)

PCB LAYOUT



ELECTRICAL REQUIREMENT

1- INDUCTANCE (1-2): 43µH MAX. 37µH MIN.@1kHz, 0.25V
2-HI-POT(8 TO 12,1,3): 3750VAC, 1 SEC.

NOTES:

- 1.-WIND BIFILAR
- 2.- GAP CENTER LEG TO OBTAIN INDUCTANCE (1-2).
- 3.- REMOVE PIN 10.

THIS DOCUMENT MAY CHANGE WITHOUT NOTICE. CONSULT WITH SALES PRIOR TO PLACING ORDER

B O M		FALCO CATALOG NO:		REV
ITEM	DEPTO.	FSN-DESCRIPTION	TRE25N-0501-406	FA1
1	MWR	1228-2102	DESCRIPTION: LYNX NEUTRAL SIDE BIAS FLYBACK	
2	MWR	1234-2102		
3	MWR	1236-2102		
4	MWR	1238-2102	CUSTOMER PN:	WEIGHT (KG):
4	LWR	1392-020-042	430-7200-E8	
5	ECO	1916-10-000	SAMPLE REQUEST:	DATE:
			4862	9.06.00
			SCALE:	SHEET:
			ONE	1 OF 2
TOLERANCES: UNLESS OTHERWISE SPECIFIED DECIMALS/ FRACTIONS				
XXX +/- .010 XX +/- .030 X +/- .1				
+/- 1/4				
FILE: S:\DC\ML\SAMPLE\S4862.DSF				

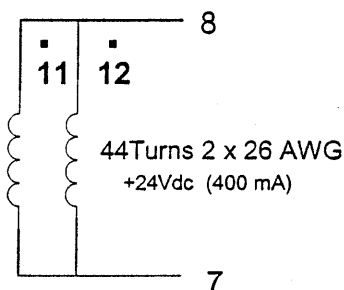
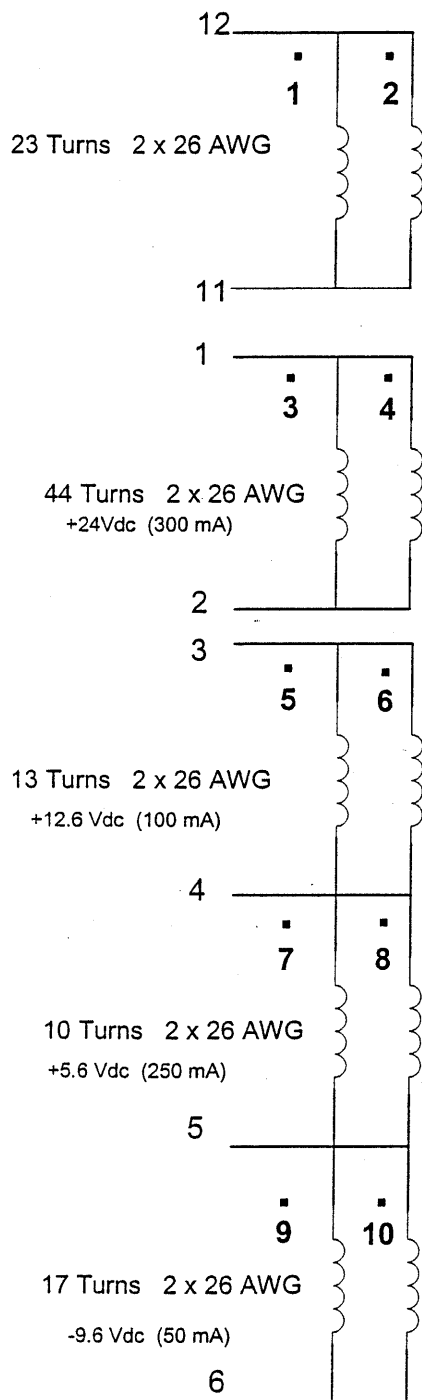
Falco Electronics Mexico S.A DE C.V
www.falcomex.com

Core Type: EE Magnetics
Material : Magnetics Type "P"
Rev E8

Wiring diagram for Lynx Bias Flyback 430-7200

VDE File: 19244-3335-0020.
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SELV Voltage

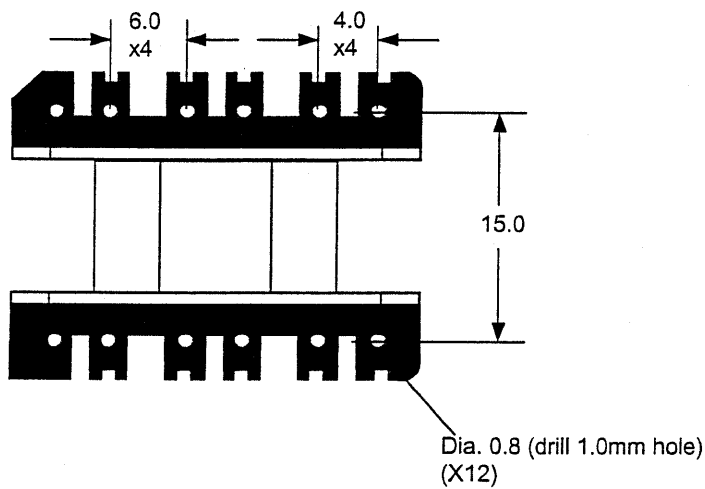
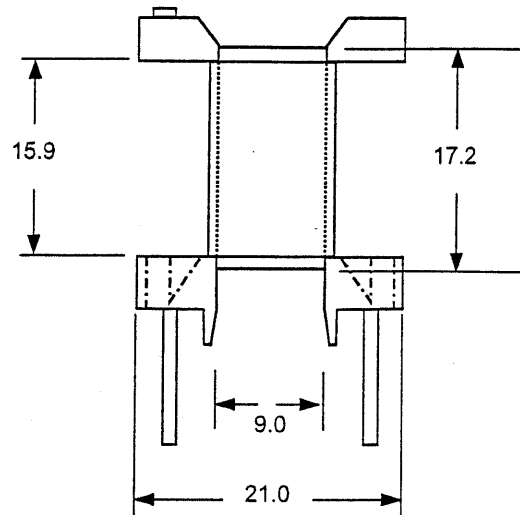
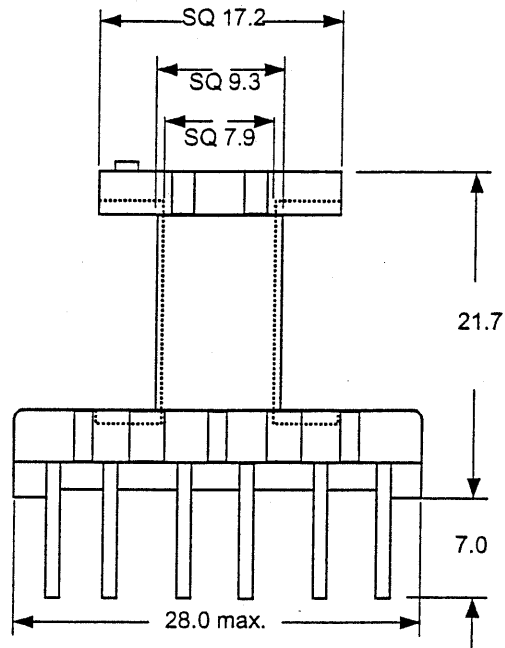


Neutral Ref

. Powers 8/25/2000 E8 mod for new bobbin

NOTES:	
SELV insulation is required for windings 11 and 12 (5mm)	
Windings 5-6 and 7-8 are Bifilar	
Inductance windings 1 and 2 inductance Max 43uH Min 37uH	

Winding #	Order
1	1
2	5
3	2
4	2
5-7	3
6,8	4
9	5
10	5
11	6
12	6



1. All measurement are in millimeters. 2. Windings are contained in bobbin footprint. 3. Remove pin 10 for keying

FALCO
Falco Electronics Mexico

DRAWING BY:
MANUEL MARTIN 08.04.00

REF.No.:
S:\DC\MC\TOOLINGS\EF-25.DSF

CHECKED BY ENGINEERING:

CHECKED BY ENGINEERING:

PART NUMBER: EF-25

MATERIAL: PHENOLIC

DWG.No.:

SCALE:

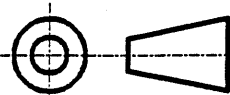
NONE

REV.

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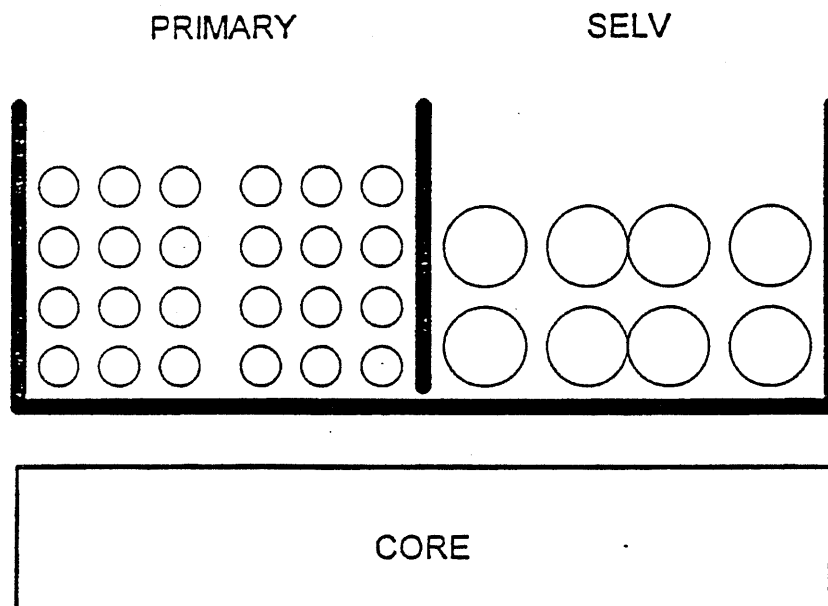
1



TRANSFORMERS

[illegible]

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

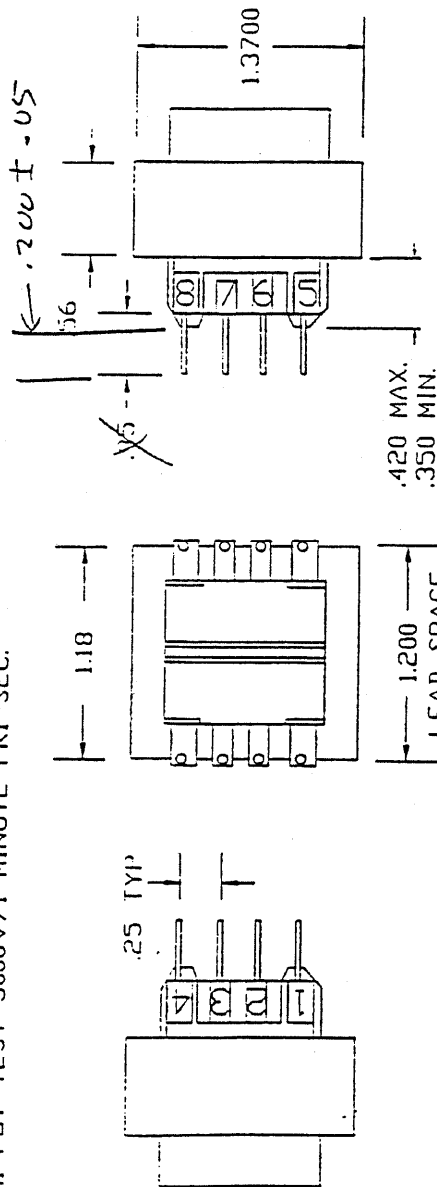


NOTES

1. CORE; 29X35mm(EI375), MATL .35mmZ11(29GAM6), STACK 14mm(9/16")
2. PRI 10350t of .05mm(AWG 44)

RESISTANCE	6.6K	
SEC 1: 682T OF .08mm (AWG 40)	RESISTANCE	134
SEC 2: 682T OF .08mm (AWG 40)	RESISTANCE	148
3. 130 DEG C UL APPROVED SYSTEM
4. MAGNETIZING CURRENT 0.5mA MAX AT 230V/60Hz.
5. MARKING TO INDICATE PIN 1.
6. TURNS RATIO TO BE 7.59
7. SPECIAL SHROUDED VDE BOBBIN, NO MISSING MOUNTING PINS.
PRI-SEC MINIMUMS, . CREEPAGE 5mm, CLEARANCE 4mm, THROUGH INS
8. INDIRECT TERMINATION WITH LARGER WIRE FROM WINDING TO PIN.
9. HI-PUT TEST 3000V/1 MINUTE PRI-SEC.

PINBALL, BOTTOM VIEW. NINE PINBALLS



PIN DIAMETER .032"

AMERICAN POWER CONVERSION CORP.					
INTERNATIONAL SCORE INFORMATION (VUL)					
NAME:	DATE TEST:	INTERNATIONAL VUL IN RD	4-10 OUTS		
DOB 4/17/91	8' 11.4"	200.0	4.400	4	X



EASTAR (H.K.) LTD.

BLOCK H, FLOOR 9, SELWYN FTY., BLDG., 404 KWUN TONG ROAD,
HONG KONG. TEL.: (852) 343-7633 FAX: (852) 343-8073, 763-7223

430-0025 CONSTRUCTION SHEET

1. PRIMARY WINDING	ENAMELED COPPER WIRE 0.05MM 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. 1MM SEPARATION DUPONT 70G33HS1L UL#E41938(M)	LIK WAI PLASTIC WARE OR EQUIVALENT
4. CROSSOVER TAPE	0.2MM TAPE 1 PLY 0.05MM POLYESTER TAPE 1T	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 3T	P. LEO UL#E126174 OR EQUIVALENT
7. OUTER WRAP PRIMARY	0.05MM POLYESTER TAPE 3T	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. SECONDARY LEAD OUT COMBINATION	2 LAYERS POLYESTER TAPE	P. LEO UL#E126174 OR EQUIVALENT
11. OUTER WRAP SECONDARY	0.05MM POLYESTER TAPE 3T	P. LEO UL#E126174 OR EQUIVALENT
12. FIXED BOARD	0.1MM MYLAR 2 PLY	ASIA ENTERPRISE CO. OR EQUIVALENT
13. FIXED TAPE	0.05MM POLYESTER TAPE 3T	P. LEO UL#E126174 OR EQUIVALENT
14. INSULATION BETWEEN SECONDARY	0.05MM POLYESTER TAPE 1 PLY	P. LEO UL#E126174 OR EQUIVALENT



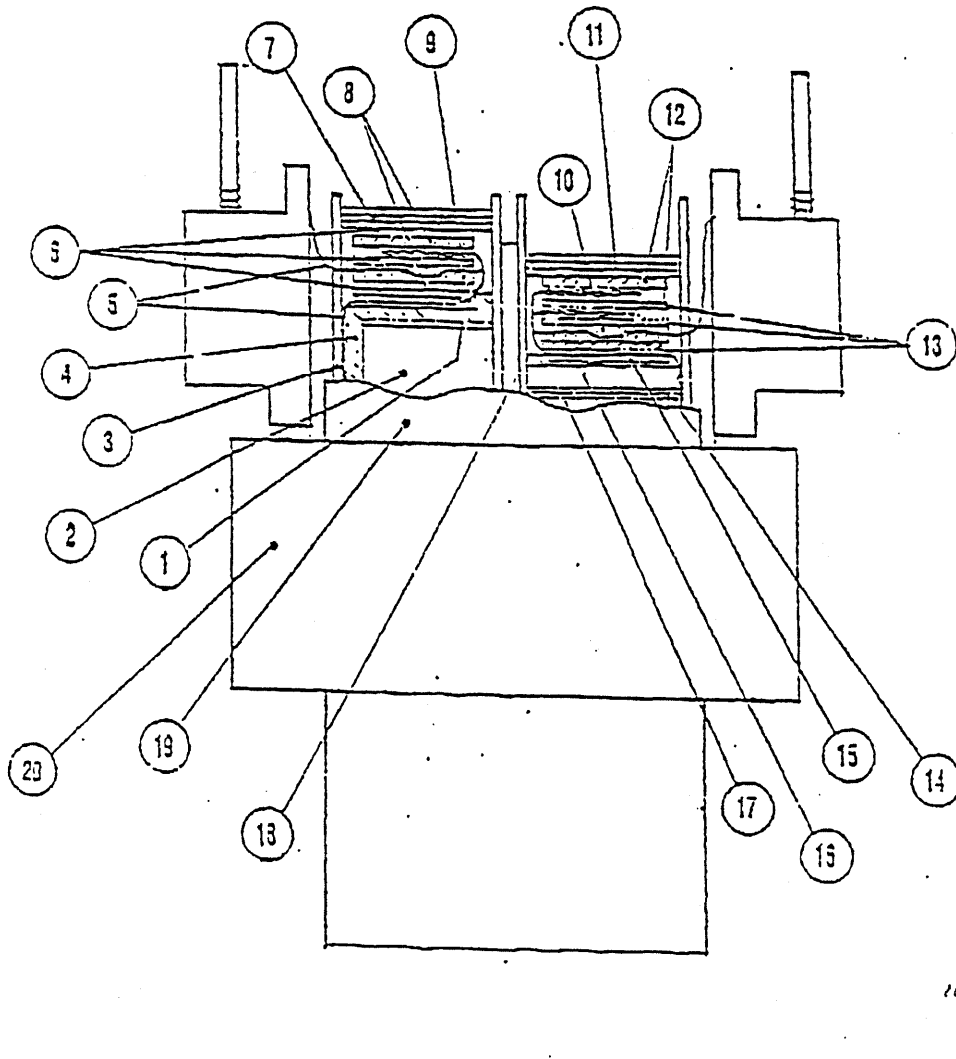
EASTAR (H.K.) LTD.

BLOCK H, FLOOR 9, SELWYN FTY., BLDG., 404 KWUN TONG ROAD,
HONG KONG. TEL.: (852)342-7623 FAX: (852)343-8073, 763-7223

430-0025 CONSTRUCTION SHEET (CONTD)

- | | | |
|--------------------------|---|--|
| 15. SECONDARY INSULATION | 0.05MM POLYESTER TAPE
2T | P. LEO UL#E126174
OR EQUIVALENT |
| 16. SECDONARY WINDING #1 | ENAMELED COPPER WIRE
0.08MM 682T | TOTOKU ELECTRONICS
(JUNG SHING) UL#E79029(S)
OR EQUIVALENT |
| 17. SECONDARY WINDING #2 | ENAMELED COPPER WIRE
0.08MM 682T | TOTOKU ELECTRONICS
(JUNG SHING) UL#E79029(S)
OR EQUIVALENT |
| 18. SECONDARY LEAD OUT | 0.3MM COPPER WIRE WITH
TIN PLATE | KING'S ELECTRIC CO.
OR EQUIVALENT |
| 19. BOBBIN COVER | 0.5MM DUPONT ZYTEL 101F
UL#E41938(M) | LIK WAI PLASTIC WARE
OR EQUIVALENT |
| 20. LAMINATION SHEET | STEEL 35MMX30MMX14MM | HONG KONG YAU HING
CHUN YUAN STEEL IND.
OR EQUIVALENT |

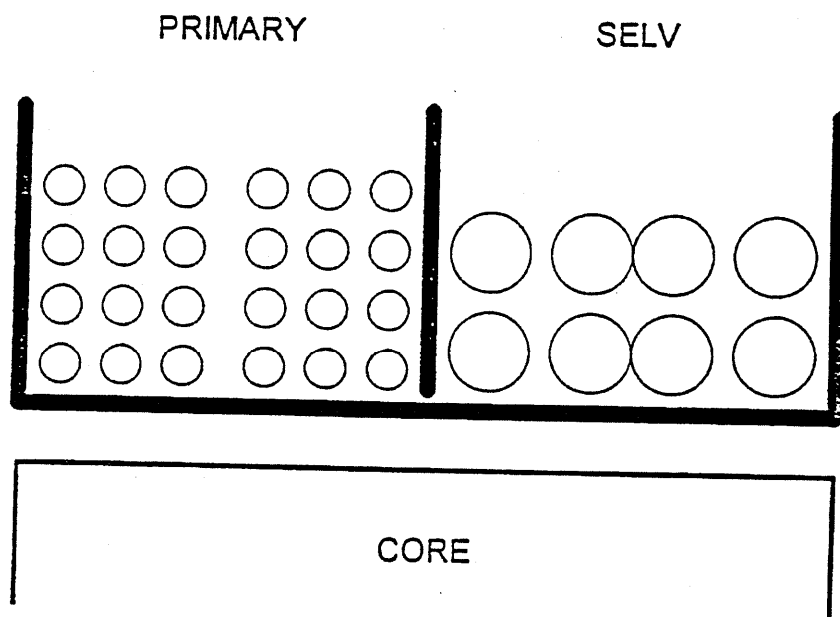
CONSTRUCTION OF 430-0025



TRANSFORMERS

[illegible]

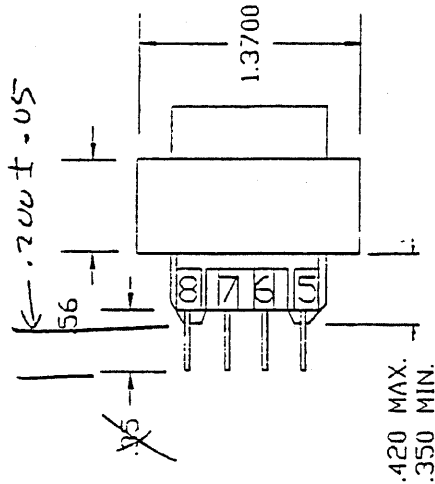
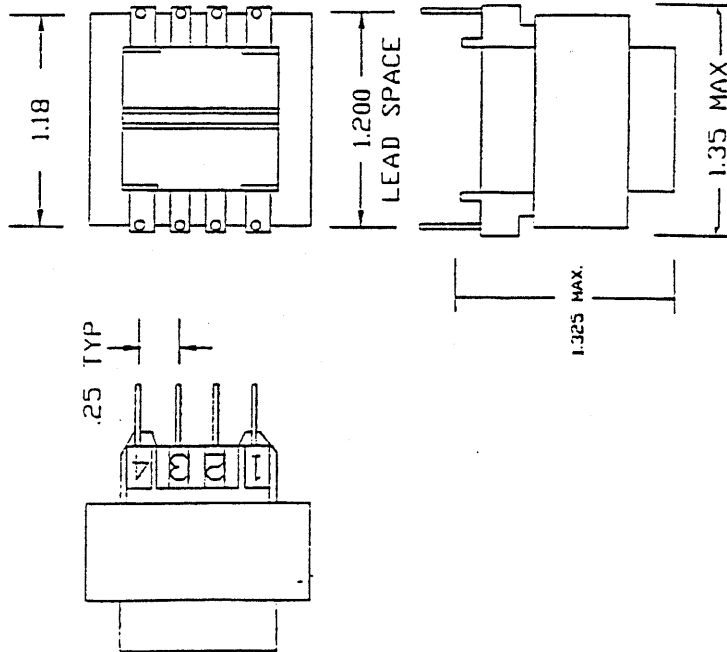
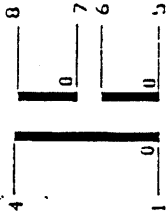
Split Bobbin Transformer
Center Flange = 3.5 mm
Groove in Edge of Center Flange = 1.5 mm wide by 3 mm deep



NOTES

1. CORE; 29X35mm(EI375), MATL .35mmZ11(29GAM6), STACK 14mm(9/16")
2. pri 10350t of .05mm(AVG 44) RESISTANCE 6.6K
SEC 1: 682T OF .08mm (AVG 40) RESISTANCE 134
SEC 2: 682T OF .08mm (AVG 40) RESISTANCE 148
3. 130 DEG C UL APPROVED SYSTEM
4. MAGNETIZING CURRENT 0.5mA MAX AT 230V/60Hz.
5. MARKING TO INDICATE PIN 1.
6. TURNS RATIO TO BE 7.59
7. SPECIAL SHROUDED VDE BOBBIN, NO MISSING MOUNTING PINS.
PRI-SEC MINIMUMS, CREEPAGE 5mm, CLEARANCE 4mm, THROUGH INSULATION 0.4mm
8. INDIRECT TERMINATION WITH LARGER WIRE FROM WINDING TO PIN.
9. HI-POT TEST 3000V/1 MINUTE PRI-SEC.

PINOUT, BOTTOM VIEW, NOTE POLARITY DOTS

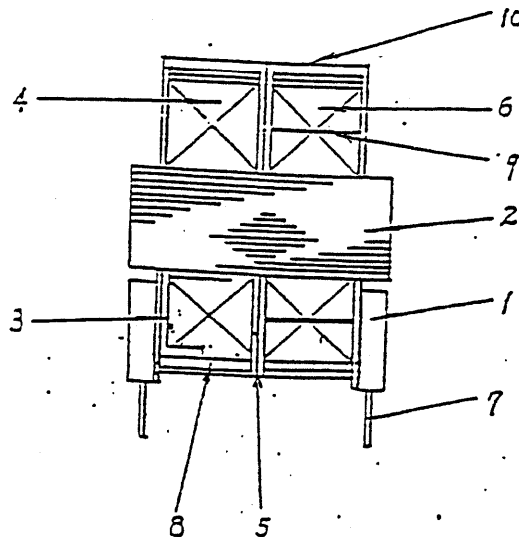


PIN DIAMETER .032"

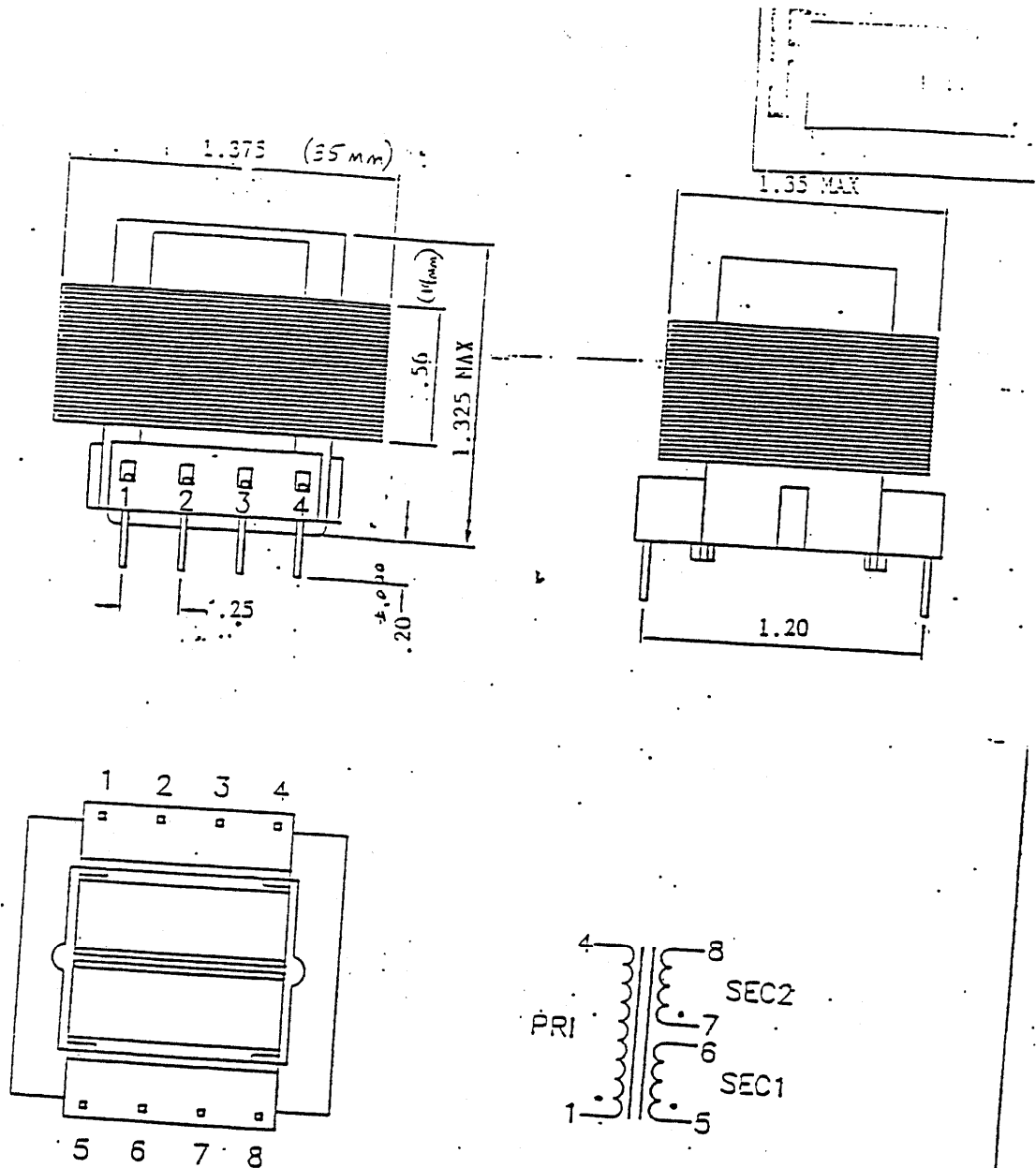
AMERICAN POWER CONVERSION CORP.	
USE INTERNATIONAL SENSE TRANSFORMER (VDE)	DATE 4/17/79
DATE 4/17/79	4 IN 0020

7. TERMINAL COPPER TINNER 0.2mm MIN, LEADER ELECTRONICS, INC.
THICKNESS
8. OUTER WRAPPER POLYESTER TAPE 0.025mm
THICK 2 TURNS.
a. NO 316 EL a. NITTO DEXCO CORP E34883 (M).
b. NO M765 b. CHR INDUSTRIES INC E51201.
c. NO 64 c. TESA TUCK INC E20780 (M).
9. BETWEEN SEC1 TO SEC2 ~~CONDUCTIVE~~ POLYESTER TAPE 0.025mm
2 TURNS
a. NO 316 EL a. NITTO DEXCO CORP E34883 (M).
b. NO M765 b. CHR INDUSTRIES INC E51201.
c. NO 64 c. TESA TUCK INC E20780 (M).
INSULATION
10. INSULATION COVER RYNITE FR-530 (PET) DUPONT DE NEMOURS CO., LTD. E66578
RYNITE FR-50 \ POLYAMIDE
ZYTEL 101L / TYPE 66
NYON
VARNISH 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 TAIPEI, TAIWAN, R.O.C.		TEXT 430-0025		DRAWING NO. LS-A44P-DT	
REVISION:	DATE 30/04/93	DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE SHEET 2 OF 2



UNIT: inch	SHEET:	DATE: 30/OCT/93	TEXT: 430-0025	DRAWING NO: LS-A449-PT
立德電子股份有限公司 LEADER ELECTRONICS INC. MANUFACTURER & EXPORTER			DRAWN BY: 王. Y. Y.	CHECKED BY: [Signature]
			APPROVED BY: [Signature] Co.	TOLERANCE: .X = .3 .XX = .1
			REVISION:	

1 of 3

VDE-Prüf- und Zertifizierungsinstitut - VDE - Prüfstelle

VDE Testing and Certification Institute

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

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

VDE File: 19244-3335-0020

Appendix 2, Page 74 of 95

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 Manufacture : LEADER ELECTRONICS INC.
- 1.2 Place of Manufacture : No.1 Industrial Area Tangxia Town, Dongguan city, Guangdong Province, CHINA
- 1.3 Reference of type : LS-A449-PT1A
- 1.4 Trade Mark : LEI
- 1.5 Other markings :
- 1.6 Reference number : 430-0025B

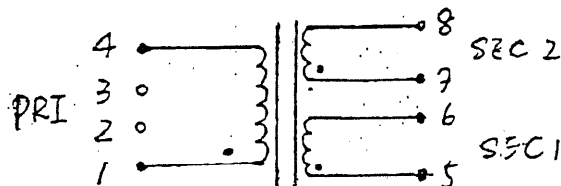
- 2.1 Protection against electric shock: CLASS 2
- 2.2 Class of protection to IEC 539 :
- 2.3 Type of construction (isolating transformer, Transformer for toys): Isolating Transformer
- 2.4 Stationary transformers:
Portable transformers :
- 2.5 Protection against short-circuit according to sub-clause 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 : °C
- 2.7 Class : B insulation ; Declaration of insulation see VDE-Form 187
(acc to IEC 85)

- 3.0 Electrical value
- 3.1 Rated voltage(s) V: Pri.: 230 Vac
- 3.2 Rated frequency Hz: 50Hz
- 3.3 Rated current A :
- 3.4 Rated output VA:
- 3.5 Rated power factor cos phi : N/A

Output(AC/DC)
Sec1:15.16 Vac, Sec 2:15.16 Vac

- 4.0 Windings
- 4.1 Coil base
number:
material: RYNITE FR-530
- 4.2 Material of layer insulation : Polyester Film Tape,
- 4.3 Windings
number:
material: Polyester Copper Wire (UEW)
- 4.4 Taps,
number :
- 4.5 Diameter of wire (mm) Pri.: 0.05 DIA ; Sec.1: 0.08 DIA ; Sec.2 : 0.08 DIA
- 4.6 Winding insulation,
material :
- 4.7 Cord insulation material
internal:
external:
- 4.8 Cord resistance in Ω at 25°C: Pri.: 6.3 K ; Sec.1: 130 Sec.2 : 145
- 4.9 Circuit diagramm (with terminal markings ,color of wires etc.):



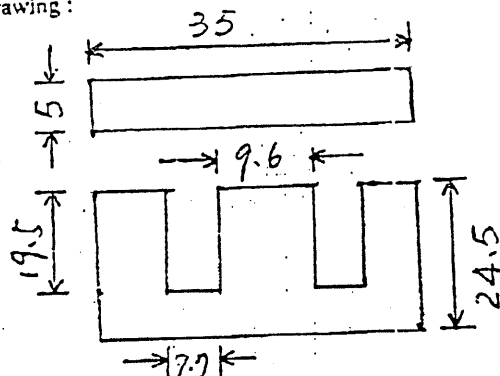
*Please insert what is applicable

5.0 Iron core

5.1 Sheet metal, material : Lamination Steel

5.2 Main dimension :

5.3 Cross-sectional drawing :



VDE File: 19244-3335-0020

Appendix 2, Page 75 of 95

6.0 Type of construction

6.1 Open-covered -in case protection *)

6.2 Impregnated - undrowned-drowned *) Drowned

6.3 Soaking (liquor)

6.4 Underpressure-Overpressure-Soaking at °C)

6.5 Drown material : varnish WP2952F-2GY (Hitachi Chemical Co., Ltd.)

6.6 Material of the cover :

of the case :

of the socket (support)

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

8.1 Components built-in the transformer : (switches, plug, protector cable etc.)

Type	Manufacture	Details about type, circuit, power or similar	VDE-Mark No-Yes

Offenbach,

Place : N/A

Date : AUG 10, 2001

VDE Testing and Certification Institute
Department TS VDE-Prüfstelle

[Signature]
(Stamp and signature of the manufacture)

VDE-Pruf-und Zertifizierungsinstitut
VDE-Prufstelle
Merianstra ß c 2B
D-6050 Offenbach

AZ:-----

ISOLATIONSERKLARUNGDECLARATION OF INSULATION

Gegenstand/Component : 430-0025B

Typenbezeichnung/Type designation : LS-A449-PT1A

Herstell/Manufacture : LEADER ELECTRONICS INC.

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

Das o.g. elektrische Betriebsmittel (Bauteil) entspricht
Der Thermische Klasse.....gemäß ß IEC-
Publication 85.

It is hereby declared that in the above mentioned electrical
equipment (component) used and on the rear specified
insulation material agree to the indicated IEC-Norm and
the IEC-Type take out of them

The above mentioned electrical equipment (component)
agree to the Thermal class.....according to IEC-
Publication 85

No1 Industrial Area TangxiaTown ,Dongguan city ,Guangdong Province ,CHINA / AUG 10,2001

Ort und Datum/Place and date :

Unterschrift des herstelllers/Manufacturers signature :

Am. Leo 11/08/01

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

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

VDE

Appendix No.:

Marks licence No.:

file ref.:

VDE File: 19244-3335-0020

Appendix 2, Page 77 of 95

(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: JML Enterprises
 1.2 Place of manufacture: JML Enterprises, One Barlo Circle, P.O. Box 447, Dillsburg, PA 17025.
 1.3 Reference of type: -NA-
 1.4 Trade Mark: -NA-
 1.5 Other markings: Label on part reflects (430-7200 rev#, JML, DATE code.)
 1.6 Reference number: JML P/N 2073

- 2.1 Protection against electric shock: -NA-
 2.2 Class of protection to IEC 539: IP..... -NA-
 2.3 Type of construction (Isolating transformer for toys.....): -NA-
 2.4 Transformer, stationary - portable *): -NA-
 2.5 Protection against short-circuit according to sub clause 6.2 *): -NA-
 inherently short-circuit proof: -NA-
 non-inherently short-circuit proof: -NA-
 non short-circuit proof: -NA-
 fail safe: -NA-
 (rated current of the cutout: -NA- A)
 2.6 Rated maximum ambient temperature: t_a = -NA- °C
 2.7 Class: E (120 °C) Insulation; Declaration of Insulation see VDE-Form 187
 (according to IEC 85)
 2.8 CTI - Value (according to IEC 112, Method A): -NA-

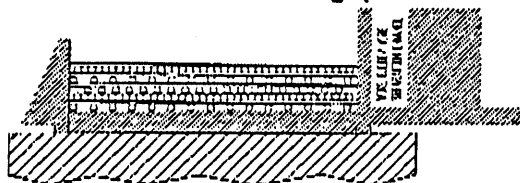
3 Electrical values			Input	Output (AC/DC)	
3.1	Rated voltage(s)	V:	30Vdc-60Vdc	1A 20VA	
3.2	Rated frequency	Hz:	100kHz		
3.3	Rated current	A:	1A		
3.4	Rated output	VA:			
3.5	Rated power factor cos phi:		-NA-		
4 Windings					
4.1	Coil base	number:	N46 (DSM Polymers) 3M 56 Tape	(S5)TEX-E Triple Insulated	
		material:			
4.2	Material of layer insulation	material:	Heavy Polyurethane		
4.3	Windings	number:			
		material:	-NA-		
4.4	Taps	number:	0.361mm	0.361mm	
4.5	Diameter of wire	mm:			
4.6	Winding of insulation	material:	Heavy Polyurethane	(S5)TEX-E Triple insulated	
4.7	Cord insulation material		-NA-		
		innere:			
		äußere:			
4.8	Cold resistance in Ω at 20 °C =		0.065 Ω	(S1)0.235 Ω , (S2)0.068 Ω , (S3)0.060 Ω , (S4)0.102 Ω , (S5)0.310 Ω ,	

5 Iron core

- 5.1 Sheet metall, material: Soft Ferrite
main dimensions:25.4mmX25.4mmX7mm
- 5.2 Cross-sectional drawing: (See attached drawing)

VDE File: 19244-3335-0020

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**6 Type of construction**

- 6.1 Open - covered - in case protection *) OPEN
- 6.2 Impregnated - undrowned - drowned *) Impregnated
- 6.3 Soaking (liquor):Dolph AC43
- 6.4 Underpressure - Overpressure - Soaking at 85 °C *)
- 6.5 Drown material:Dolph AC-43
- 6.6 Material of the cover:
of the case:
of the socket (support): N46
- 6.7 Flammability class for insulation material: 94V-0

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
NONE			

Offenbach,

VDE Testing and Certification Institute
Department

Place: JML

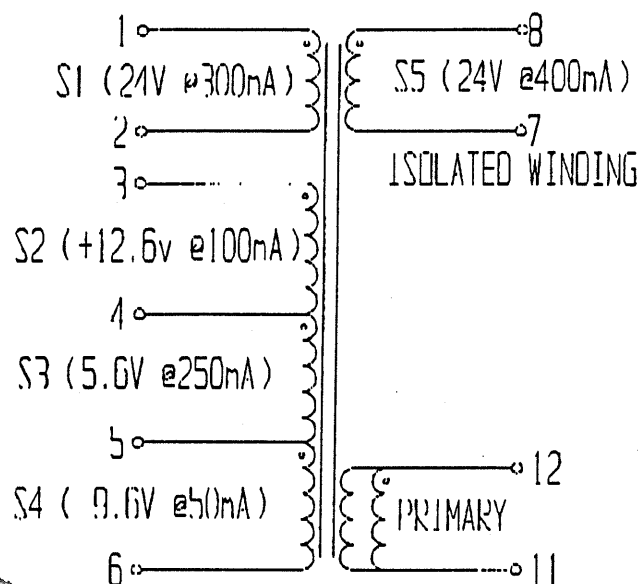
Date: 2-9-01

(Stamp and signature of the manufacturer)

Please return 2 copies

430-7200 3/4

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



VDE File: 19244-3335-0020
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430-7200 2/4

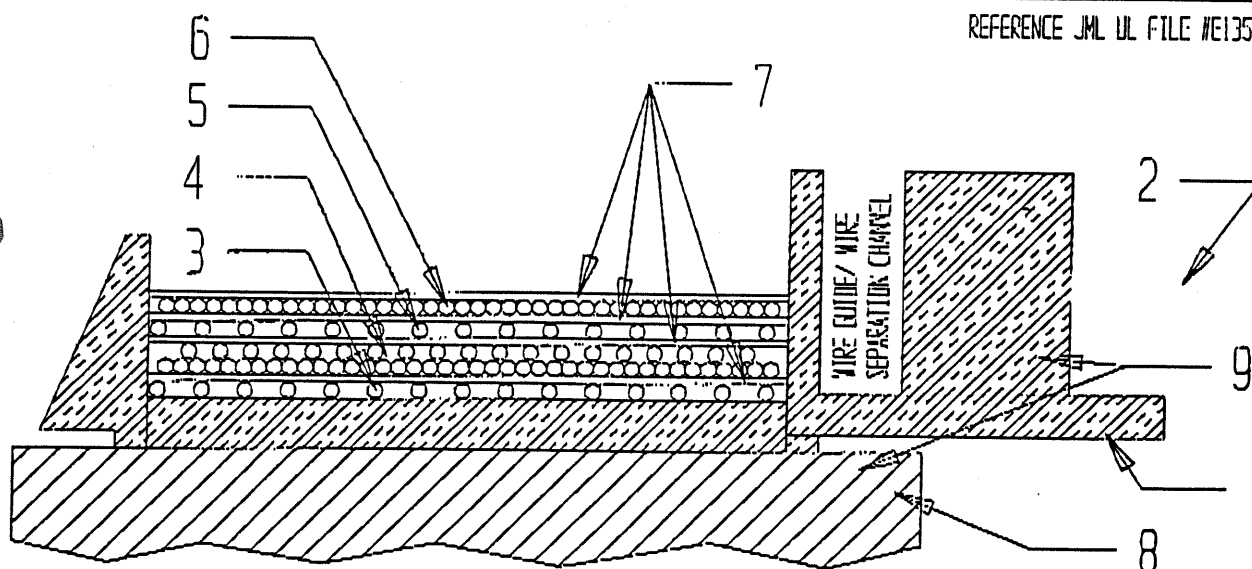
VDE File: 19244-3335-0020

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INSULATION / MATERIAL IDENTIFICATION AND DESCRIPTION

	COMPONENT	MATERIAL DESCRIPTION	FUNCTION	MANUFACTURER	UL FILE#
1	BOBBIN (CORE TUBE) 0.030" MIN WALL THICKNESS	"STANYL" #TE250F6, TYPE N46 30% GLASS REINFORCED FLAME RETARDANT NYLON, RATED 180C (CLASS H) 94V-0	WINDING / CORE SUPPORT	D.S.M. POLYMER	E119177M
2	TERMINAL PINS	METAL 0.7mm SQUARE	WIRE TERMINATION	-NA-	-NA-
3	MAGNET WIRE PRIMARY 1/2	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 27 AWG HEAVY	CONDUCTOR P1oF2	ELEKTRISOLA TOTOKU TAI-ELECTRIC	E63382 E79029S E85840S
4	MAGNET WIRE PRIMARY SIDE SECONDARY WINDS	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 27 AWG HEAVY	CONDUCTOR S1, S2 S3, S4	ELEKTRISOLA TOTOKU TAI-ELECTRIC	E63382 E79029S E85840S
5	MAGNET WIRE PRIMARY 2/2	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 27 AWG HEAVY	CONDUCTOR P2oF2	ELEKTRISOLA TOTOKU TAI-ELECTRIC	E63382 E79029S E85840S
6	TEX-E T.I.P. WIRE 0.4MM (26AWG)	TRIPLE INSULATED WINDING WIRE UL CLASS A (105C), BUT RATED AT 120C (VDE CLASS E), 26 AWG	CONDUCTOR S5	FURUKAWA	E157568(S)
7	WINDING INSULATION TAPE (2 WRAPS EACH)	POLYESTER TAPE, (130C) 0.05mm THICK (0.002") 2 WRAPS	INSULATION	PERMACEL P256 3M 56	E20392 E17385
8	CORE AND CLIP ASSEMBLY	FERRITE CORE AND SPRING CLIP EF25 SIZE CENTER LEG GAPPED	CORE	TDK PC40 or Equiv.	-NA-
9	VARNISH	LOW TEMPERATURE SOLVENT (130C RATED)	COATING	J. DOLPH	E51047

REFERENCE JML UL FILE #E135079



TOLERANCES: (EXCEPT AS NOTED)

REVISIONS		
NO.	DATE	BY
1		
2		
3		
4		
5		

JML ENTERPRISES, INC

INSULATION SYSTEM FOR APC P/N-430-7200
FLYBACK TRANSFORMER-LYNX BIAS

DRAWN BY T SNEDEKER

STAFF

MATERIAL

JML P/N- 031-2073-0

DATE 11-28-00

DRAINAGE

REF ID: A6036

14750

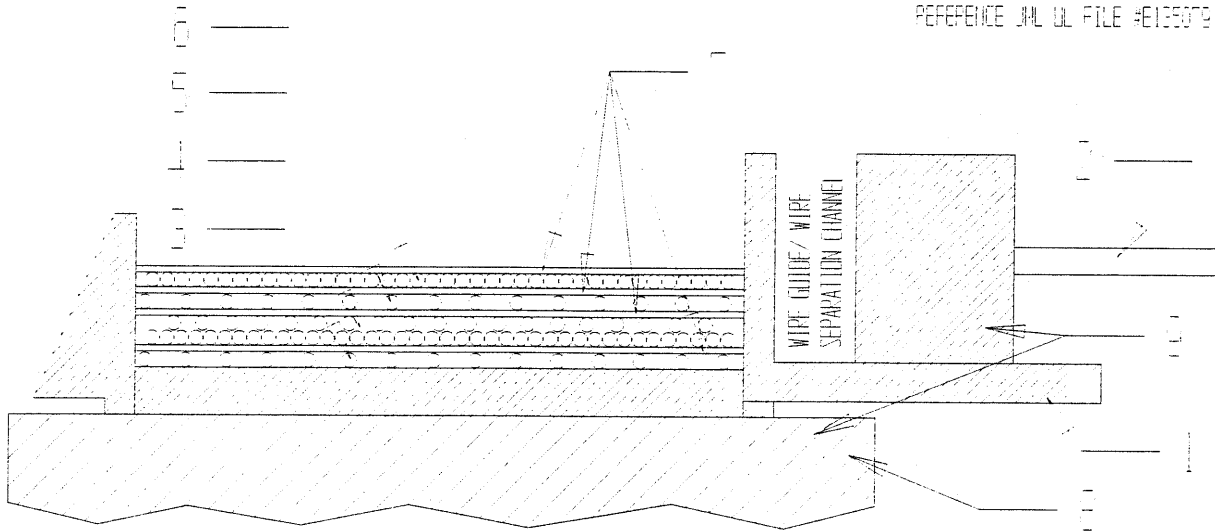
IS-2073

430-7200 4/4

INSULATION / MATERIAL IDENTIFICATION AND DESCRIPTION

COMPONENT	MATERIAL DESCRIPTION	FUNCTION	MANUFACTURER	UL FILE#
1 BOBBIN (CORE TUBE) 0.030" MIN WALL THICKNESS	"STANYL" #TE250F6, TYPE N46 30% GLASS REINFORCED FLAME RETARDANT NYLON, RATED 180C (CLASS H) 94V-0	WINDING / CORE SUPPORT	D.S.M. POLYMER	E119177M
2 TERMINAL PINS	METAL 0.7mm SQUARE	WIRE TERMINATION	-NA-	-NA-
3 MAGNET WIRE PRIMARY 1/2	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 27 AWG HEAVY	CONDUCTOR P1of2(15T) T=Turns	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E63382 E79029S E85640S
4 MAGNET WIRE PRIMARY SIDE SECONDARY WINDS	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 27 AWG HEAVY	CONDUCTOR S1(30T), S2(8T) S3(7T), S4(12T)	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E63382 E79029S E85640S
5 MAGNET WIRE PRIMARY 2/2	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 27 AWG HEAVY	CONDUCTOR P2of2(15T)	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E63382 E79029S E85640S
6 TEX-E T.I.P. WIRE 0.4MM (26AWG)	TRIPLE INSULATED WINDING WIRE UL CLASS A (105C), BUT RATED AT 120C (VDE CLASS E), 26 AWG	CONDUCTOR S5(30T)	FURUKAWA	E157568(S)
7 WINDING INSULATION TAPE (2 WRAPS EACH)	POLYESTER TAPE, (130C) 0.05mm THICK (0.002") 2 WRAPS	INSULATION	PERMACEL P256 3M 56	E20392 E17385
8 CORE AND CLIP ASSEMBLY VARNISH	FERRITE CORE AND SPRING CLIP EF25 SIZE CENTER LEG GAPPED	CORE	TDK PC40 or Equiv.	-NA-
9 VARNISH	LOW TEMPERATURE SOLVENT (130C RATED)	COATING	J. DOLPH	E51047

REFERENCE JNL UL FILE #E125079



TOLEARNCE: EXCEPT AS NOTED

REVISION

NO	DATE	BY
1		
2		
3		
4		
5		

JNL ENTERPRISE, INC.

INSULATION SYSTEM FOR APC P-11-130-7000
FLYBACK TRANSFORMER-LIN. BLOC

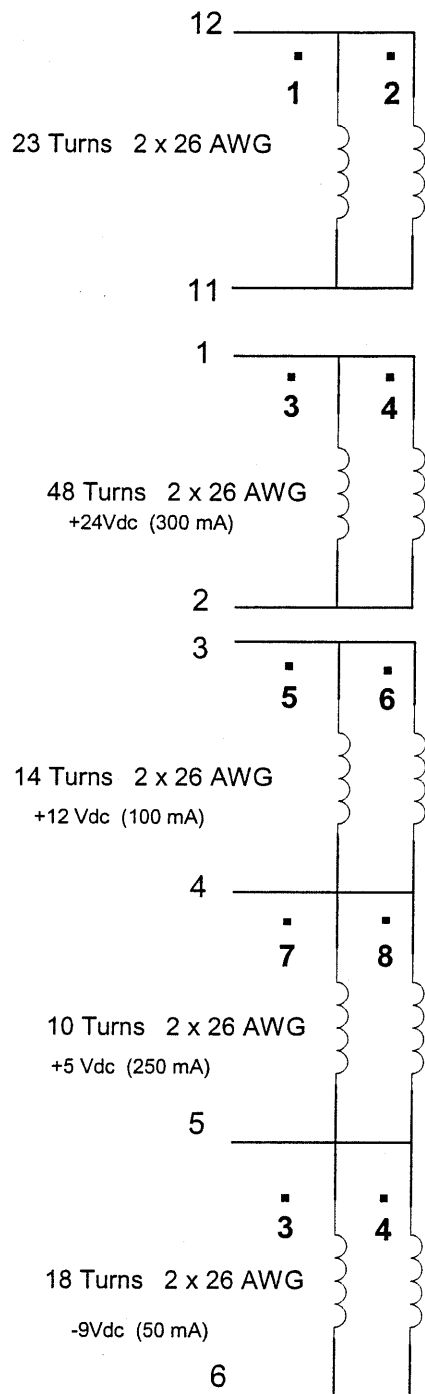
DATE: 11-18-00
REF: 07-000F

Core Type: EF 25
Material : PC40
Production Rev 1

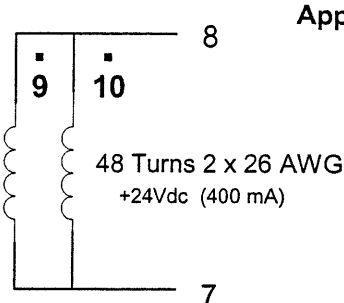
Wiring diagram for Lynx Bias Flyback
Turn#'s are for ratio information only
430-7200

VDE File: 19244-3335-0020.
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SELV Voltage



Neutral Ref



Powers 4/16/2001 Rev1

TES:

SELV insulation is required for windings 9 and 10

Clearance 4.0mm (326Volts Peak) Creepage 2.5mm (230Volts rms)

VDE thermal Class E

Inductance windings 1 and 2 inductance Max 43uH Min 37uH

Windings 5-6 and 7-8 are Bifilar

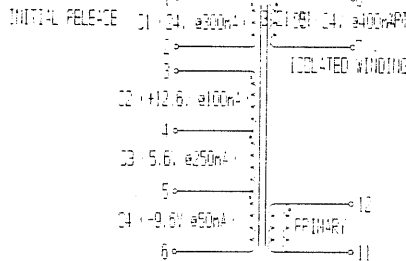
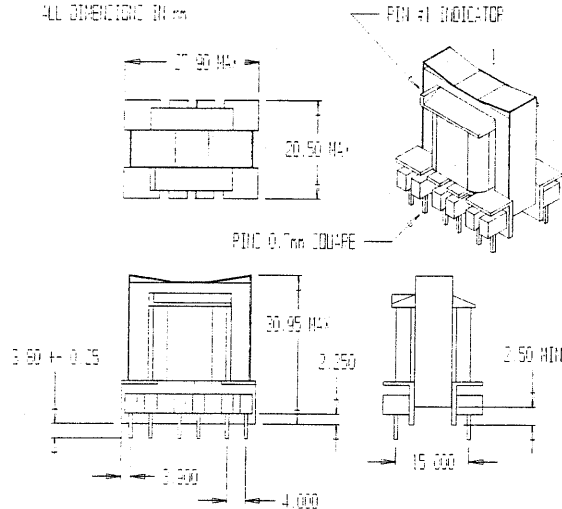
Remove pin 10 for keying

Winding #	Order
1	1
2	5
3	2
4	2
5	3
6	4
7	3
8	4
9	6
10	6

THIS DRAWING AND SPECIFICATIONS HEREIN ARE THE PROPERTY OF AMERICAN POWER CON. AND SHALL NOT BE REPRODUCED OR COPIED OR USED IN WHOLE OR PART AS THE BASIS FOR THE MANUFACTURE OR SALE OF ITEMS WITHOUT WRITTEN PERMISSION FROM APC

REVISIONS			
REV.	DESCRIPTION	DATE	APPROVED

ALL DIMENSIONS IN MM



MATERIAL AND CONSTRUCTION NOTES:
CORE TYPE: EF-25 WITH CENTER LEG GAPPED
CORE MATERIAL: PC-40 OR EQUIVALENT
BOBBIN: JML #B803-2 WITH PIN #10 REMOVED, EF-25 SIZE,
VERTICAL, 12 PINS @ 0.70mm SQUARE, MATERIAL
- N46, COLOR BLACK
CORE CLIP (OR TAPE): EF-25 SPRING CLIP OR 1/4" WIDE BLACK TAPE
MAGNET WIRE: AWG #27HP (HEAVY POLYURETHANE)
TRIPLE INSULATED WIRE: #27 TEX-E (0.37mm) TEX-E
TAPE COIL: PERMACEL #P256 @ 41/64" (16.25mm) WIDE
LABEL: (POSITION ON CLIP TOP) MARK WITH P/N #430-7200, JML & DATE CODE
VARNISH: J. DOLPH'S #AC-43 OR EQUIVALENT
INSULATION SYSTEM: UL RECOGNIZED CLASS "B" (130°C)

2. LEAKAGE INDUCTANCE (11-12) @ 0.5μH MAX. @ 100 kHz WITH ALL SECONDARIES SHORTED.
3. DC WINDING RESISTANCE (OHMS, MAX. @ 25°C)
 - a) PRIM (12-11): 0.065Ω
 - b) SEC #1 (1-2): 0.235Ω
 - c) SEC #2 (3-4): 0.068Ω
 - d) SEC #3 (4-5): 0.060Ω
 - e) SEC #4 (5-6): 0.102Ω
 - f) SEC #5 (7-8): 0.310Ω

4. TURNS RATIO:					
(12-11)	(1-2)	(3-4)	(4-5)	(5-6)	(8-7)
Primary	Sec #1	Sec #2	Sec #3	Sec #4	Sec #5
1.000	2.000	0.533	0.467	0.800	2.133

ELECTRICAL TESTS (100%) ON ALL UNITS

USE EITHER AUTOMATIC (HI-SPEED) COMPUTERIZED TESTER OR DISCRETE EQUIPMENT AND TEST ALL UNITS FOR FOLLOWING:

1. PRIMARY INDUCTANCE (11-12) @ 40μH ± 3μH @ 100kHz:

REF: JML P/N #DT-803H

PARTS LIST

UNLESS OTHERWISE SPECIFIED, DIMENSIONS ARE IN MILLIMETERS TOLERANCES ARE	DRAWN	3-21-01	<div style="text-align: center;"> <p>BIAS FLYBACK TRANSFORMER</p> </div>		
	ENGINEER	3-21-01			
	CHECKED	10			
	ISSUED	12			
MATERIAL	ARCHIVE MEDIA	CODE	DATE FROM NO	DATE TO NO	REV.
FINISH	THIRD ANGLE PROJECTION	1	430-7200	1	1
DO NOT SCALE DRAWING	SCALE	DATE	CHEST	OF	

Appendix No.:

Markenlizenz Nr.:

File ref.:

VDE File: 19244-3335-0020

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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: JML Enterprises
- 1.2 Place of manufacture: JML Enterprises, One Barlo Circle, P.O. Box 447, Dillsburg, PA 17025.
- 1.3 Reference of type: -NA-
- 1.4 Trade Mark: -NA-
- 1.5 Other markings: Label on part reflects (430-7205 rev#, JML, DATE code.)
- 1.6 Reference number: JML P/N 2077

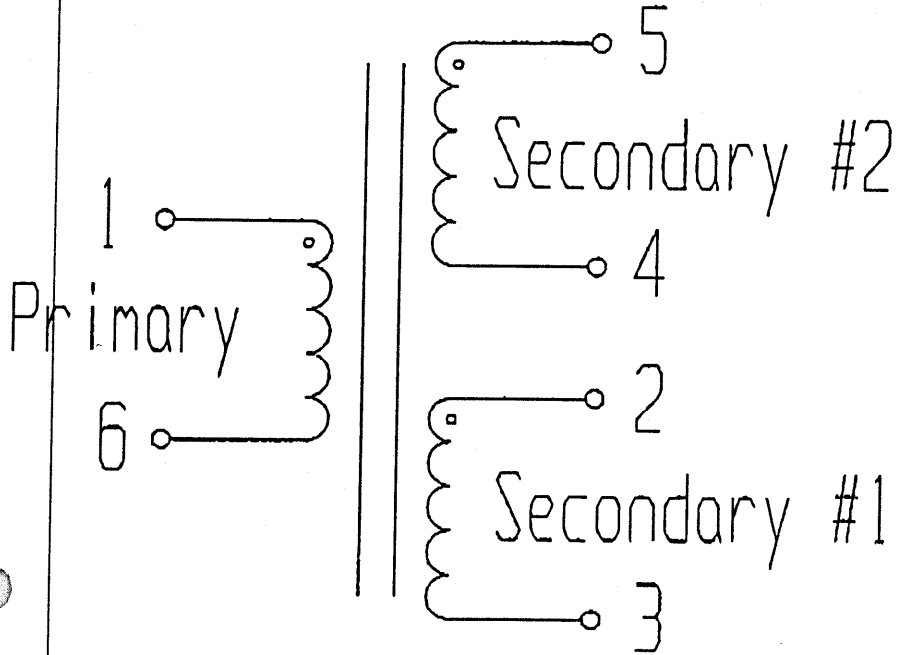
- 2.1 Protection against electric shock: NO
- 2.2 Class of protection to IEC 539: IP..... -NA-
- 2.3 Type of construction (Isolating transformer for toys.....): -NA-
- 2.4 Transformer, stationary - portable *): -NA-
- 2.5 Protection against short-circuit according to sub clause 6.2 *): -NA-
inherently short-circuit proof: -NA-
non-inherently short-circuit proof: -NA-
non short-circuit proof: -NA-
fail safe: -NA-
(rated current of the cutout: -NA- A)
- 2.6 Rated maximum ambient temperature: $t_a =$ °C
- 2.7 Class: E (120 °C) Insulation; Declaration of Insulation see VDE-Form 187
(according to IEC 85)
- 2.8 GTI - Value (according to IEC 112, Method A): -NA-

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	-NA-	
3.2 Rated frequency	Hz:	20kHz Working	
3.3 Rated current	A:	0.5A rms	
Rated output	VA:	-NA-	
3.5 Rated power factor cos phi: -		-NA-	
4 Windings			
4.1 Coil base	number:		
	material:	Stanyl N46	
4.2 Material of layer insulation	material:	-NA-	-NA-
4.3 Windings	number:	1	2
	material:	TEX-E Triple Insulatedwire	TEX-E Triple Insulatedwire
4.4 Taps	number:	-NA-	
4.5 Diameter of wire	mm:	0.25mm Conductor	All windings
4.6 Winding of insulation	material:	TEX-E Triple Insulatedwire	TEX-E Triple Insulatedwire
4.7 Cord insulation material		-NA	
	innere:		
	äußere:		
4.8 Cold resistance in Ω at: 20 °C =		140m Ω nom	280 m Ω nom X2 windings

430-7205 1/4

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

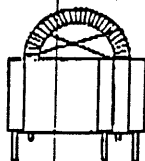
VDE File: 19244-3335-0020
Appendix 2, Page 85 of 95



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- 5.1 Sheet metall, material:
main dimensions:
- 5.2 Cross-sectional drawing: (See attached drawing)

VDE File: 19244-3335-0020
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- 6 Type of construction
- 6.1 Open - covered - in case protection *) OPEN
- 6.2 Impregnated - undrowned - drowned *) NO
- 6.3 Soaking (liquor): -NA-
- 6.4 Underpressure - Overpressure - Soaking at -NA- °C *)
- 6.5 Drown material: -NA-
- 6.6 Material of the cover: -NA-
of the case: -NA-
of the socket (support): Stanyl (supports pins)
- 6.7 Flammability class for insulation material: Class E -120 C
- 7.1 Other data (special constructional feature, etc.):
Coll is Epoxied into header as an added measure.

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

Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No - Yes
NONE			

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Department

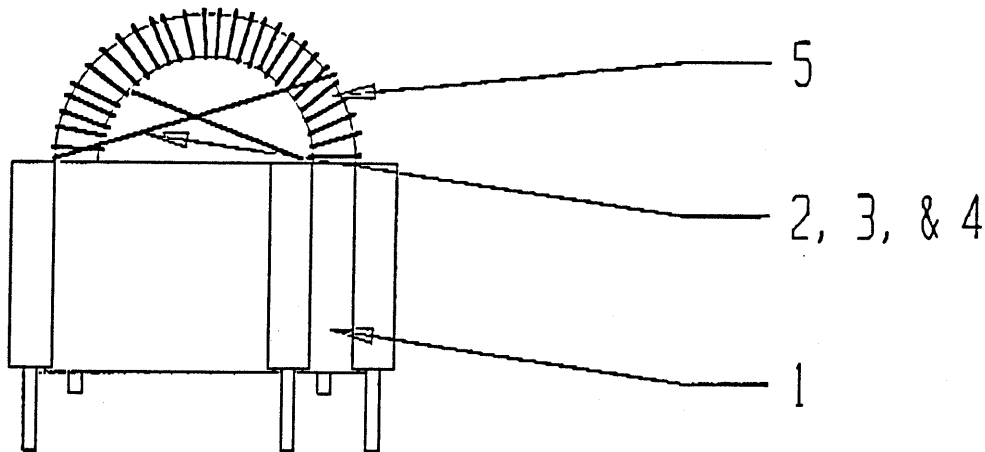
Place: JML ENTERPRISES Date: 8-13-01

(Signature)
(Stamp and signature of the manufacturer)

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430-7205 3/4



INSULATION/MATERIAL IDENTIFICATION AND DESCRIPTION

COMPONENT	MATERIAL DESCRIPTION	MANUFACTURER	UL FILE #
1 MOUNT, TOROID, VERTICAL, 6 PIN	"STANYL" #IE250F8, TYPE N46 40% GLASS REINFORCED, FLAME RETARDANT NYLON, 180°C, 94-V0	DSM POLYMER	#E119177 M
2 PRIMARY WINDING	TRIPLE INSULATED COPPER WIRE, TYPE TEX-E, 0.25mm, RATED 120°C (VDE CLASS E) (18 TURNS @ 30 AWG)	FURUKAWA	#E157568S
3 SECONDARY #1 WINDING	TRIPLE INSULATED COPPER WIRE, TYPE TEX-E, 0.25mm, RATED 120°C (VDE CLASS E) (36 TURNS @ 30 AWG)	FURUKAWA	#E157568S
4 SECONDARY #2 WINDING	TRIPLE INSULATED COPPER WIRE, TYPE TEX-E, 0.25mm, RATED 120°C (VDE CLASS E) (36 TURNS @ 30 AWG)	FURUKAWA	#E157568S
5 CORE	FERRITE TOROID	NA	NA

NOTES: (1) INSULATION SYSTEM FOR APC #430-7205
(1:2:2 GATE DRIVE TRANSFORMER)
(2) FORMERLY JML DEVELOPMENT NO DT-805A

TOLERANCES: (EXCEPT AS NOTED)	REVISIONS			JML ENTERPRISES, INC.		
	NO.	DATE	BY			
	1			INSULATION SYSTEM FOR APC #430-7205 1:2:2 GATE DRIVE TRANSFORMER		
	2					
	3			DRAWN BY T. SNEDEKER	SCALE	MATERIAL
	4			JML P/N- 061-2077-0	DATE 12-4-00	DRAWING #
	5			REF DT-805A	APP'D J.P. TILL	IS-2077

430-7205 9/4

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.:

Marks licence No.:

file ref.:

VDE File: 19244-3335-0020

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(used in by the Institute)

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

Form 42E

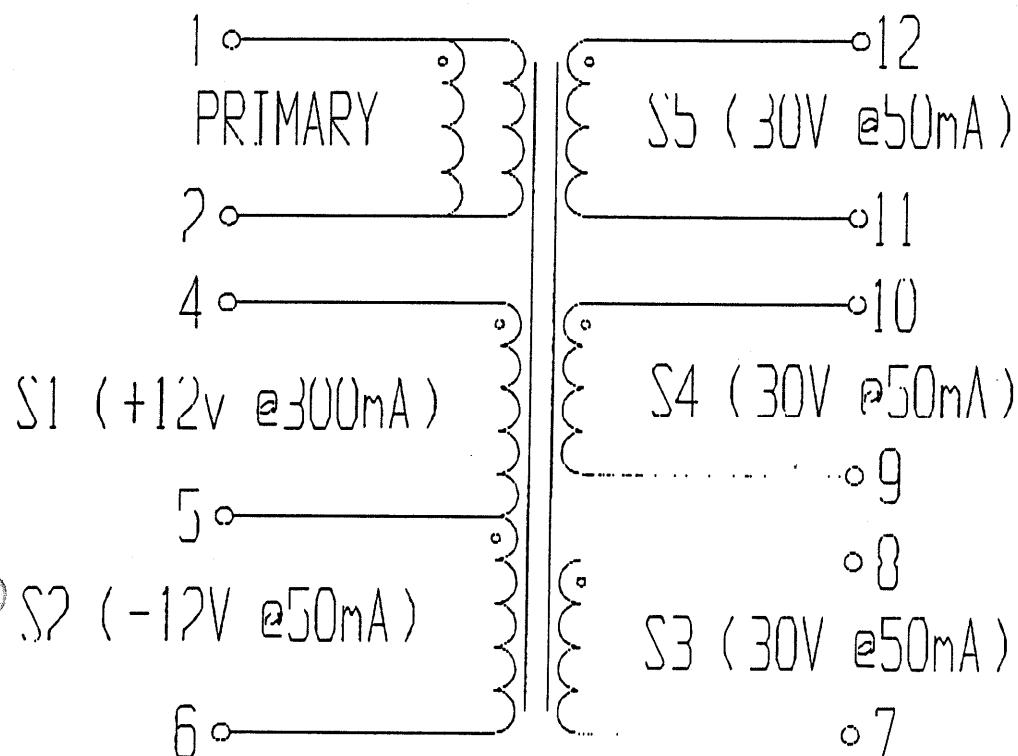
- Translation of the VDE Testing and Certification Documents -

- 1.1 Manufacturer: JML Enterprises
 1.2 Place of manufacture: JML Enterprises, One Barlo Circle, P.O. Box 447, Dillsburg, PA 17025.
 1.3 Reference of type: -NA-
 1.4 Trade Mark: -NA-
 1.5 Other markings: Label on part reflects (430-7207 rev#, JML, DATE code.)
 1.6 Reference number: JML P/N 2074
- 2.1 Protection against electric shock: -NA-
 2.2 Class of protection to IEC 539: IP..... -NA-
 2.3 Type of construction (Isolating transformer for toys.....): -NA-
 2.4 Transformer, stationary - portable *): -NA-
- 2.5 Protection against short-circuit according to sub clause 6.2 *): -NA-
 inherently short-circuit proof: -NA-
 non-inherently short-circuit proof: -NA-
 non short-circuit proof: -NA-
 fail safe: -NA-
 (rated current of the cutout: -NA- A)
- 2.6 Rated maximum ambient temperature: $t_a =$ -NA- °C
 2.7 Class: E (120 °C) Insulation; Declaration of Insulation see VDE-Form 187 (according to IEC 85)
 2.8 CTI - Value (according to IEC 112, Method A): -NA-

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	30-60Vdc	1A 9VA
3.2 Rated frequency	Hz:	100kHz	
3.3 Rated current	A:	1A	
3.4 Rated output	VA:		
3.5 Rated power factor cos phi:		-NA-	
4 Windings			
4.1 Coil base	number:	N46 (DSM Polymers) 3M 56 Tape	0.269mm
	material:		
4.2 Material of layer insulation	material:		
4.3 Windings	number:		
	material:		
4.4 Taps	number:	Heavy Polyurethane	0.269mm
4.5 Diameter of wire	mm:	-NA-	
4.6 Winding of insulation	material:	0.269mm	
4.7 Cord insulation material		Heavy Polyurethane	
		-NA-	
4.8 Cold resistance in Ω at: 20 °C =	innere: äußere:	0.075 Ω	(S1)0.067 Ω , (S2)0.067 Ω , (S3)0.270 Ω , (S4)0.290 Ω , (S5)0.310 Ω .

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

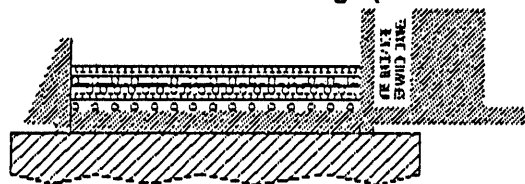


VDE File: 19244-3335-0020
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- 5.1 Sheet metall, material: Soft Ferrite
main dimensions: 25.4mmX25.4mmX7mm
- 5.2 Cross-sectional drawing: (See attached drawing)

VDE File: 19244-3335-0020
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6 Type of construction

- 6.1 Open - covered - in case protection *) OPEN
- 6.2 Impregnated - undrowned - drowned *) Impregnated
- 6.3 Soaking (liquor): Dolph AC43
- 6.4 Underpressure - Overpressure - Soaking at 85 °C *)
- 6.5 Drown material: Dolph AC-43
- 6.6 Material of the cover:
of the case:
of the socket (support): N46
- 6.7 Flammability class for insulation material: 94V-0
- 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
NONE			

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Department

Place: JML

Date: 2-9-01

A handwritten signature in black ink, appearing to read 'Gerd S. ...'.

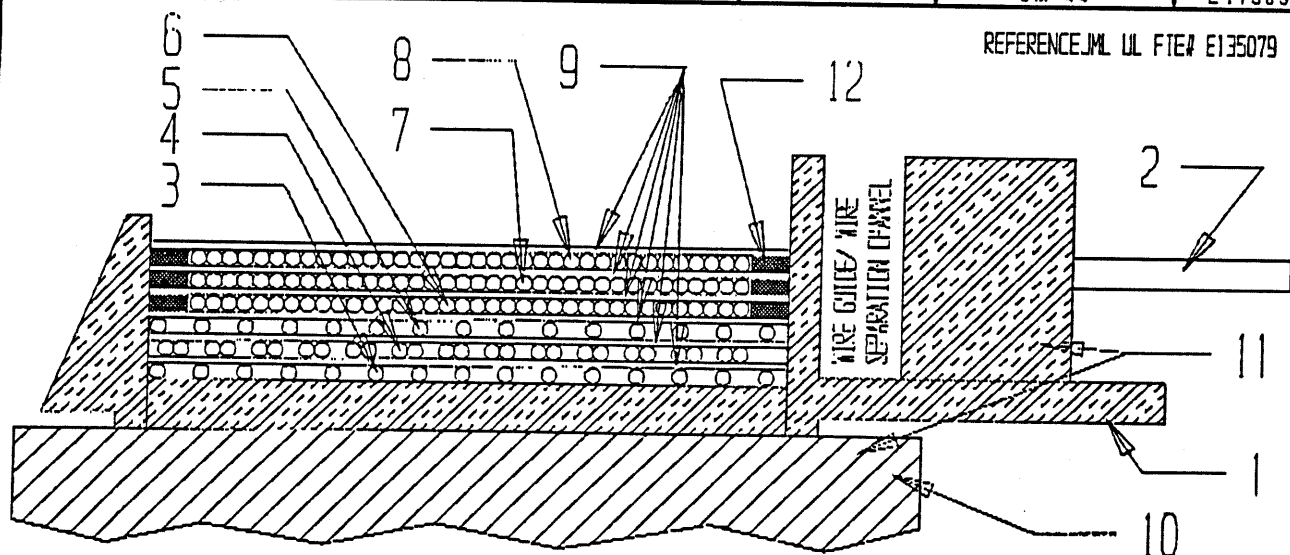
(Stamp and signature of the manufacturer)

Please return 2 copies

430-7207 3/4

INSULATION / MATERIAL IDENTIFICATION AND DESCRIPTION

COMPONENT	MATERIAL DESCRIPTION	FUNCTION	MANUFACTURER	UL FILE#
1 BOBBIN (CORE TUBE) 0.030" MIN WALL THICKNESS	"STANYL" #TE250F0, TYPE N40 30% CLASS REINFORCED FLAME RETARDANT NYLON, RATED 180C (CLASS H) 94V-0	WINDING / CORE SUPPORT	D.S.M. POLYMER	E118177M
2 TERMINAL PINS	METAL 0.7mm SQUARE	WIRE TERMINATION	-NA-	-NA-
3 MAGNET WIRE PRIMARY 1/2	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 29 AWG HEAVY	CONDUCTOR P1012	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E83382 E790298 E85840S
4 MAGNET WIRE SECONDARIES S1 & S2	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 27 AWG HEAVY	CONDUCTOR S1 S2	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E83382 E790298 E85840S
5 MAGNET WIRE PRIMARY 2/2	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 29 AWG HEAVY	CONDUCTOR P2012	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E83382 E790298 E85840S
6 MAGNET WIRE S3	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 29 AWG HEAVY	CONDUCTOR S3	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E83382 E790298 E85840S
7 MAGNET WIRE S4	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 29 AWG HEAVY	CONDUCTOR S4	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E83382 E790298 E85840S
8 MAGNET WIRE S5	POLYURETHANE INSULATED COPPER WIRE (RATED 130C) MW-79, 29 AWG HEAVY	CONDUCTOR S5	ELEKTRISOLA TOTOKU TAI-I-ELECTRIC	E83382 E790298 E85840S
9 WINDING INSULATION TAPE (2 WRAPS EACH)	POLYESTER TAPE, (130C) 0.05mm THICK (0.002") 2 WRAPS	INSULATION	PERMACEL P258	E20002
10 CORE AND CLIP ASSEMBLY VARNISH	FERRITE CORE AND SPRING CLIP EF25 SIZE CENTER LEG GAPPED	CORE	3M 68 TDK PC40 or Equiv.	E17385 -NA-
11 VARNISH	LOW TEMPERATURE SOLVENT (130C RATED)	COATING	J. DOLPH	E51047
12 MARGIN TAPE	POLYESTER TAPE (130C) 0.008" THICK 2 WRAPS	BARRIER TAPE	PERMACEL P248 3M 44	E20002 E17385



REFERENCE JML UL FILE# E135079

TOLERANCES: (EXCEPT AS NOTED)

REVISIONS

NO.	DATE	BY
1	Margin tape added.	JMS 5-25-01
2		
3		
4		
5		

JML ENTERPRISES, INC.

INSULATION SYSTEM FOR APC P/N-430-7207
FLYBACK TRANSFORMER-LYNX NEUTRAL BIAS

DRAWN BY J. SNEDEKER

SCALE

MATERIAL

JML P/N- 031-2074-0

DATE

11-29-00

DRAWING #

REF DT-U040

APPRO

J.P. ILLI

IS-2074

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Appendix No.:

Marks licence No.:

file ref.:

VDE File: 19244-3335-0020

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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: JML Enterprises
- 1.2 Place of manufacture: JML Enterprises, One Barlo Circle, P.O. Box 447, Dillsburg, PA 17025.
- 1.3 Reference of type: -NA-
- 1.4 Trade Mark: -NA-
- 1.5 Other markings: Label on part reflects (430-7208 rev#, JML, DATE code.)
- 1.6 Reference number: JML P/N 032-2087-0
- 2.1 Protection against electric shock: -NA-
- 2.2 Class of protection to IEC 539: IP..... -NA-
- 2.3 Type of construction (Isolating transformer for toys.....): -NA-
- 2.4 Transformer, stationary - portable *): -NA-
- 2.5 Protection against short-circuit according to sub clause 6.2 *): -NA-
inherently short-circuit proof: -NA-
non-inherently short-circuit proof: -NA-
non short-circuit proof: -NA-
fail safe: -NA-
(rated current of the cutout: -NA- A)
- 2.6 Rated maximum ambient temperature: $t_a =$ -NA- °C
- 2.7 Class: E (120 °C) Insulation; Declaration of Insulation see VDE-Form 187 (according to IEC 85)
- 2.8 CTI - Value (according to IEC 112, Method A): -NA-

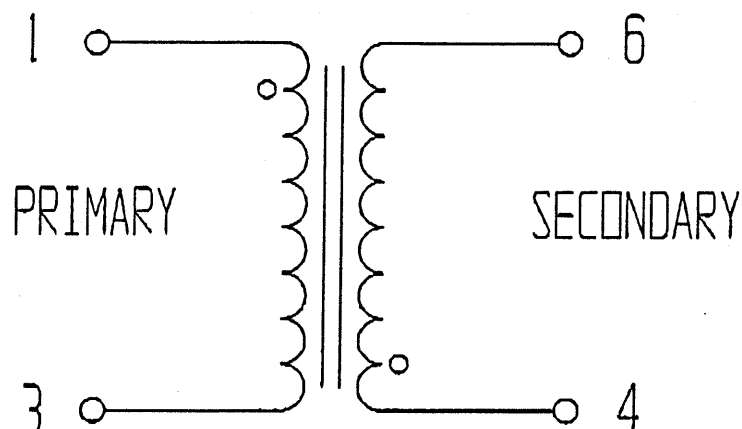
3 Electrical values			Input	Output (AC/DC)
3.1 Rated voltage(s)	V:		800Vdc max	
3.2 Rated frequency	Hz:		70kHz	
3.3 Rated current	A:			
3.4 Rated output	VA:			100VA
3.5 Rated power factor cos phi:			-NA-	
4 Windings				
4.1 Coil base	number:			
	material:		ZYTEL , GF	
4.2 Material of layer insulation	material:		3M 56 Tape	
4.3 Windings	number:		1	1
	material:		Heavy Polyurethane	TEX-E Triple insulated
4.4 Taps	number:		-NA-	
4.5 Diameter of wire	mm:		0.574 X 2(Bifilar)	0.643 X 2(Bifilar)
4.6 Winding of insulation	material:		Heavy Polyurethane	TEX-E Triple Insulated
4.7 Cord insulation material			-NA-	
	innere:			
	äußere:			
4.8 Cold resistance in Ω at: 20 °C =			0.262	0.050

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

VDE File: 19244-3335-0020

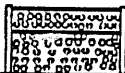
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Seite 2/2

- 5.1 Sheet metall, material: Soft Ferrite
main dimensions:40.64mmx33mmx12.5
- 5.2 Cross-sectional drawing:



VDE File: 19244-3335-0020
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- 6 Type of construction
- 6.1 Open - covered - in case protection *) OPEN
- 6.2 Impregnated - undrowned - drowned *) Impregnated
- 6.3 Soaking (liquor):Dolph AC43
- 6.4 Underpressure - Overpressure - Soaking at °C *)
- 6.5 Drown material:Dolph AC-43
- 6.6 Material of the cover:-NA-
of the case:
of the socket (support): ZYTEL, GF
- 6.7 Flammability class for insulation material: 94V-HB
- 7.1 Other data (special constructional feature, etc.): -NA-

- 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
NONE			

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Department

Place: JML ENTERPRISES Date: 8-13-01

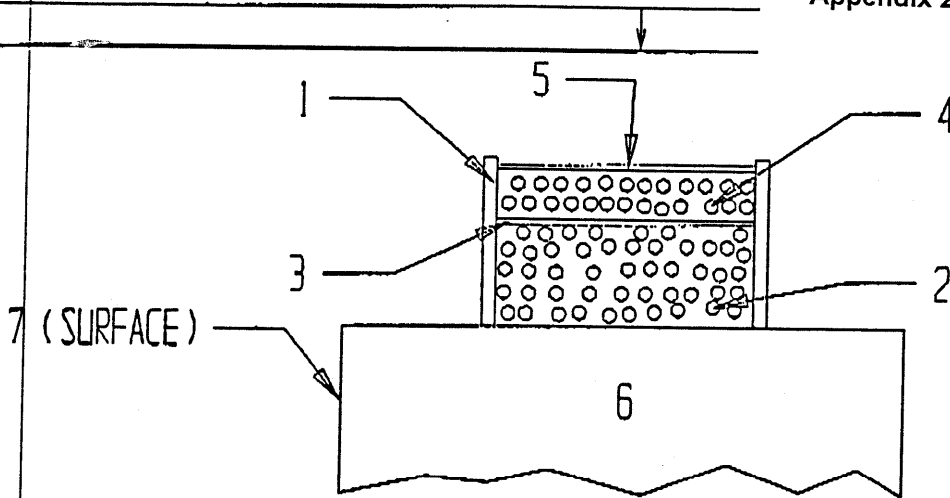
[Signature]

(Stamp and signature of the manufacturer)

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430-7208 3/4



INSULATION/MATERIAL IDENTIFICATION AND DESCRIPTION

COMPONENT	MATERIAL DESCRIPTION	MANUFACTURER	UL FILE #
1 BOBBIN	1.2mm THICK, GLASS FILLED NYLON, TWO FLANGE, TYPE ZYTEL #70G33L, 94-HB, CLASS B (130°C)	EI DUPONT	#E41938
2 PRIMARY WINDING	POLYURETHANE HEAVY INSULATED COPPER WIRE 130°C, MW-79, UEW OR EQUIVALENT (100 TURNS @ 23 AWG BIFILAR 5 LAYERS)	ELECTRISOLA TOTOKU TAI-I ELEKTIC	#EG3382 #E79028S #E85640S
3 INNER PRIMARY TAPE	POLYESTER TAPE, 130°C, 0.05mm THICK, 1 WRAP, TYPE P256 OR #56	PERMACEL 3-M	#E20392 #E17385
4 SECONDARY WINDING	TRIPLE INSULATED COPPER WIRE, TYPE TEX-E, 0.65mm, RATED 120°C (VDE CLASS E) (10 TURNS @ 2X22 AWG - BIFILAR, 1 LAYER)	FURUKAWA	#E157568S
5 OUTER TAPE	POLYESTER TAPE, 130°C, 0.05mm THICK, 3 WRAPS, TYPE P256 OR #56	PERMACEL 3-M	#E20392 #E17385
6 CORE	FERRITE CORE	N/A	N/A
7 VARNISH	LOW TEMPERATURE SOLVENT TYPE AC-43, RATED CLASS B (130°C)	J. DOLPH	#E51047

- NOTES: (1) INSULATION SYSTEM FOR APC #430-7208
(TRANSFORMER, FLYBACK - BATTERY CHARGER)
(2) FORMERLY JML DEVELOPMENT NO DT-871
(3) REFERENCE: JML UL FILE #E135079

TOLERANCES: (EXCEPT AS NOTED)		REVISIONS			JML ENTERPRISES, INC.					
		NO.	DATE	BY						
		1	PRIMARY FROM 20AWG TO 2X 23AWG TYPE	IMS 4-3-01	INSULATION SYSTEM FOR APC #430-7208 FLYBACK TRANSFORMER-BATTERY CHARGER					
		2								
		3								
		4								
		5								
			DRAWN BY		T.SNEDEKER		SCALE		MATERIAL	
			JML P/N-		032-2087-0		DATE		12-4-00	
			REF DT-871		APP'D		J.P. TILL		DRAWING # IS-2087	

430-7208 4/4

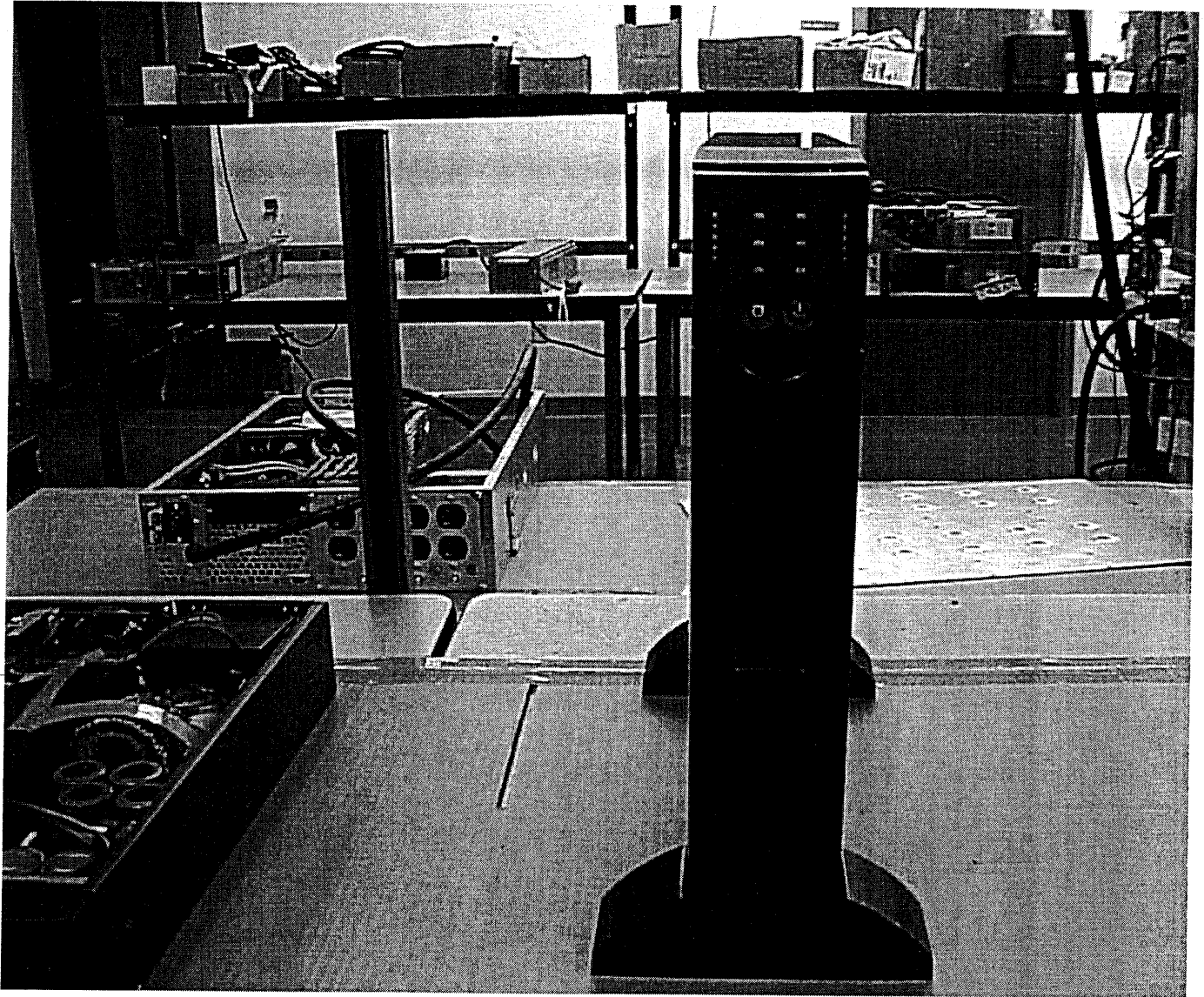


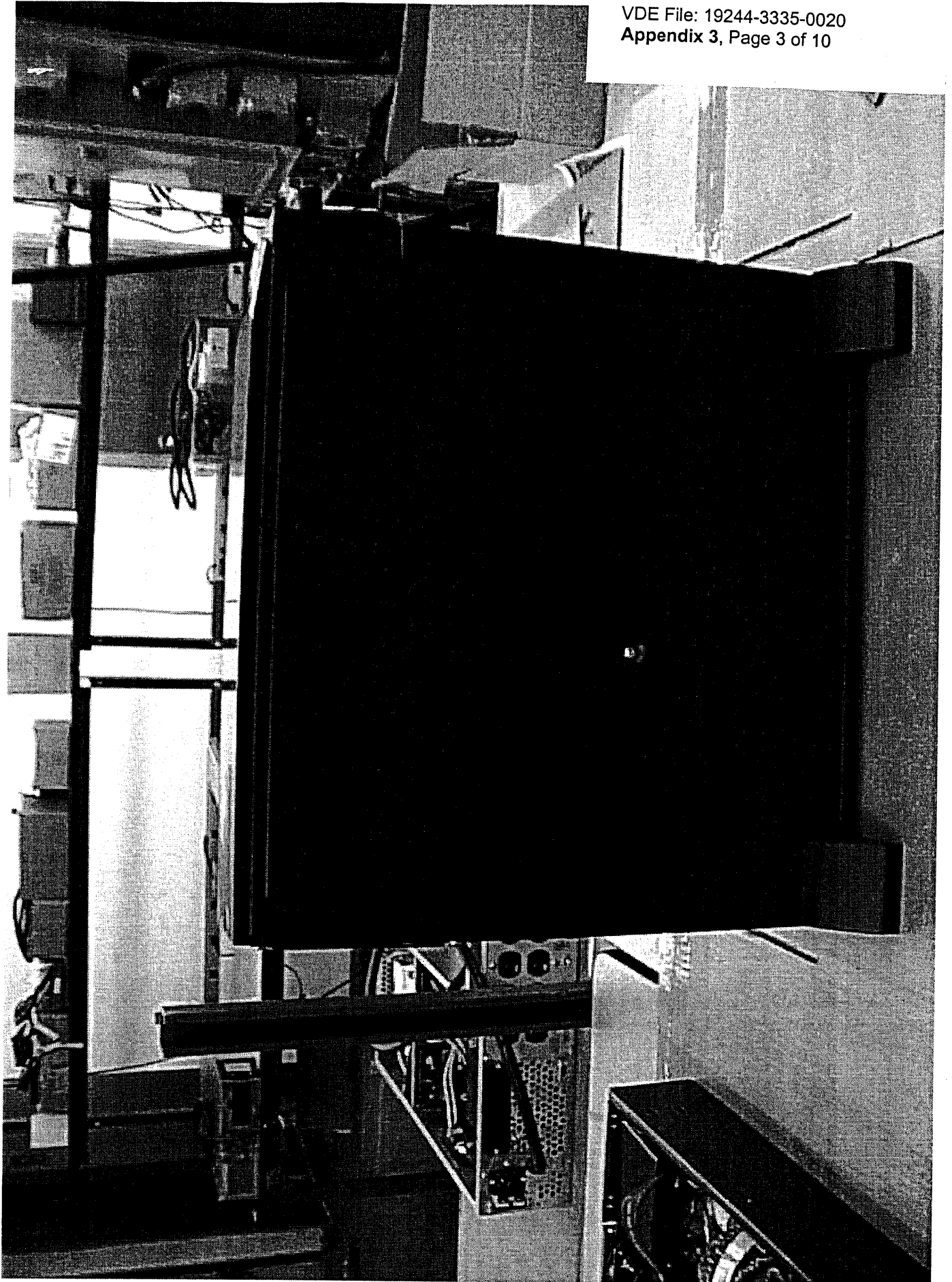
VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

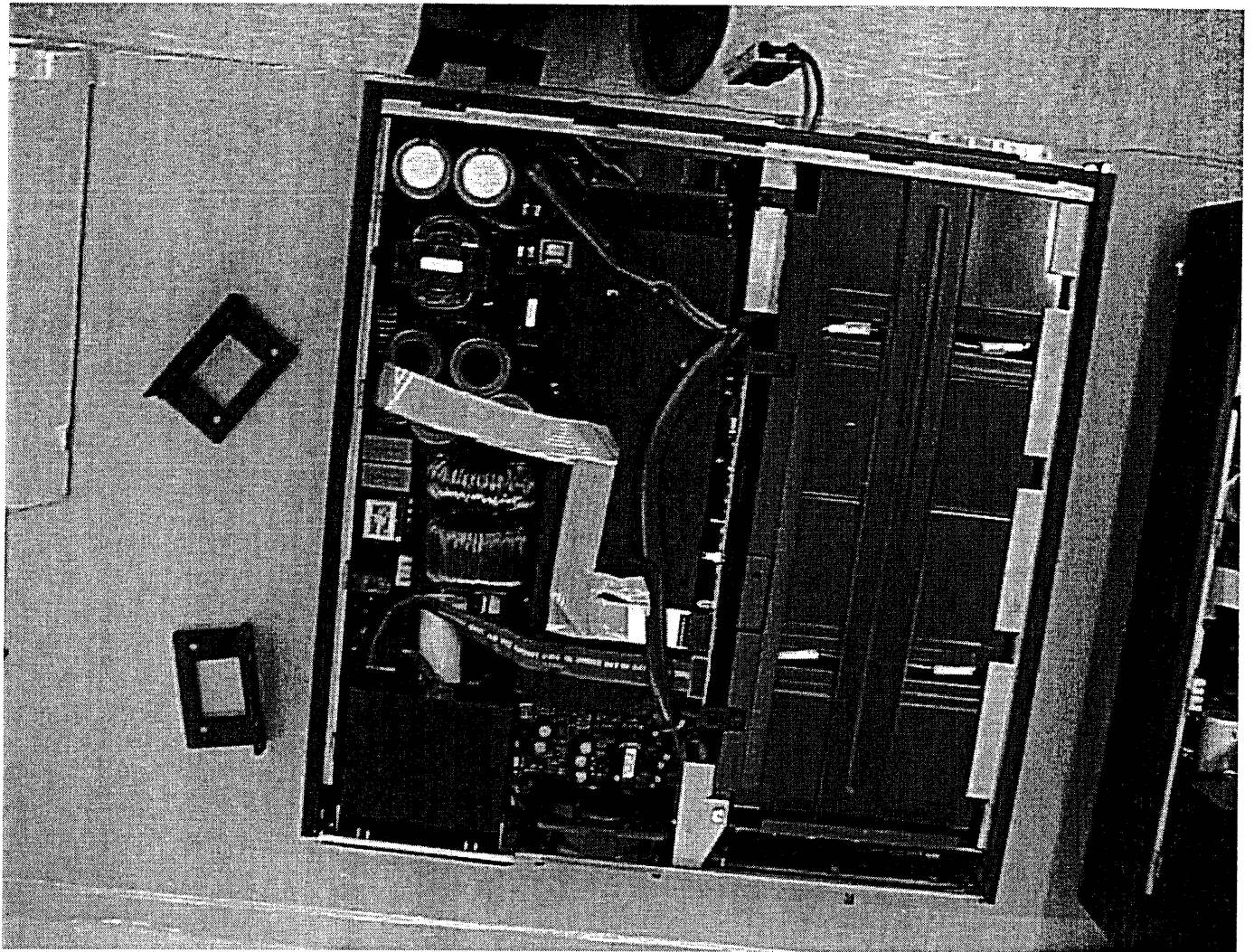
Clause	Requirement and Test	Result - Remark	Verdict
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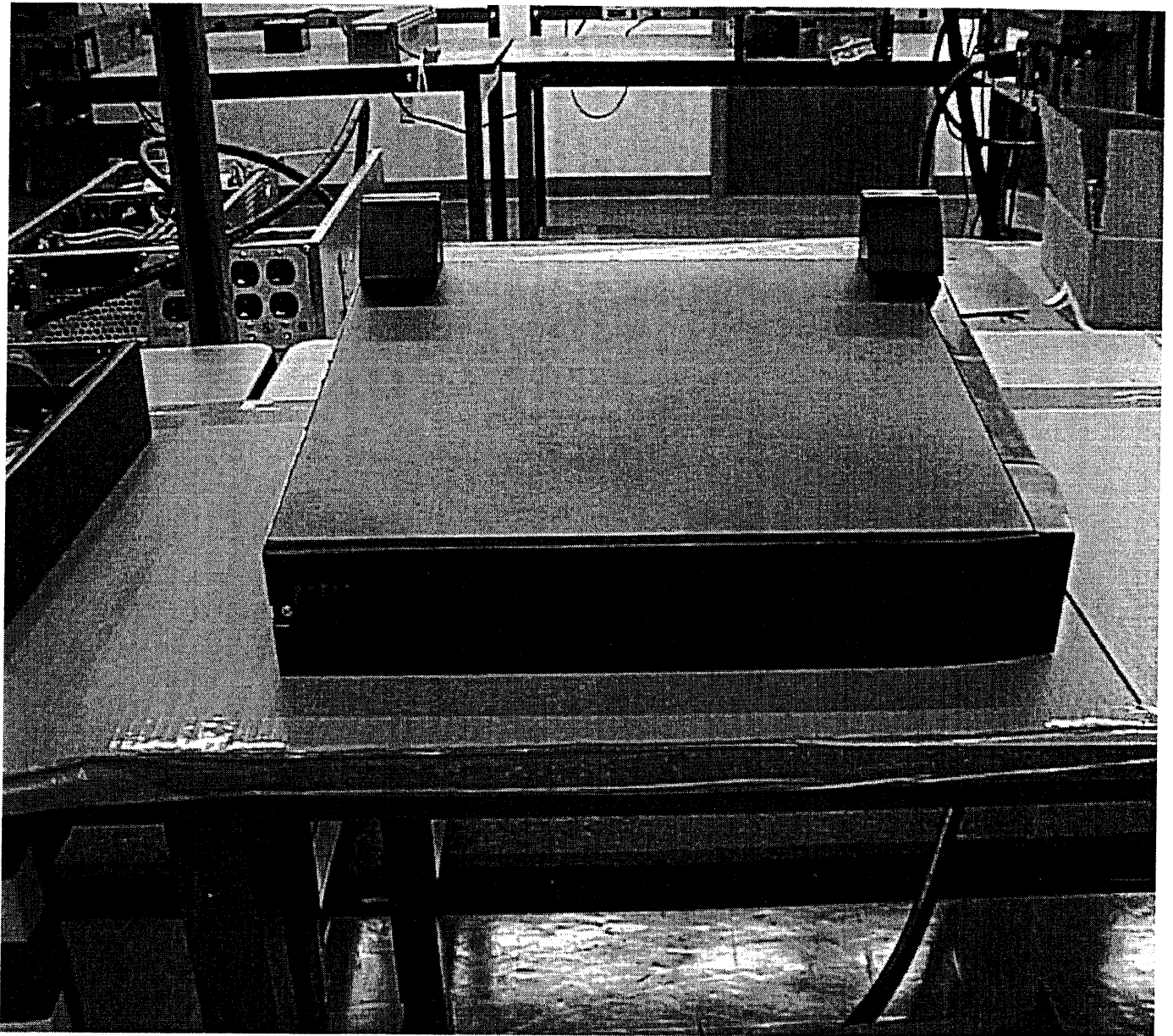
APPENDIX 3



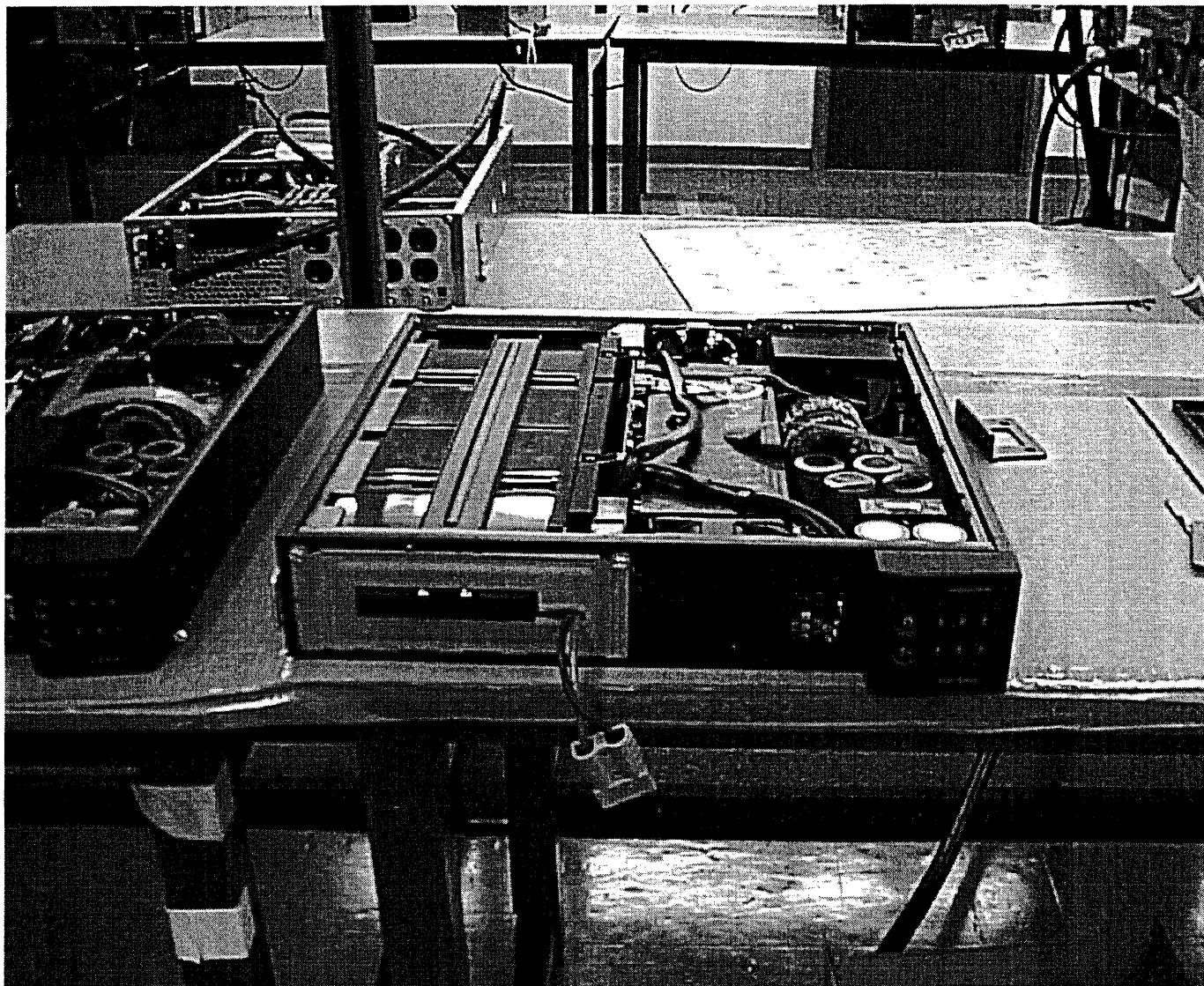




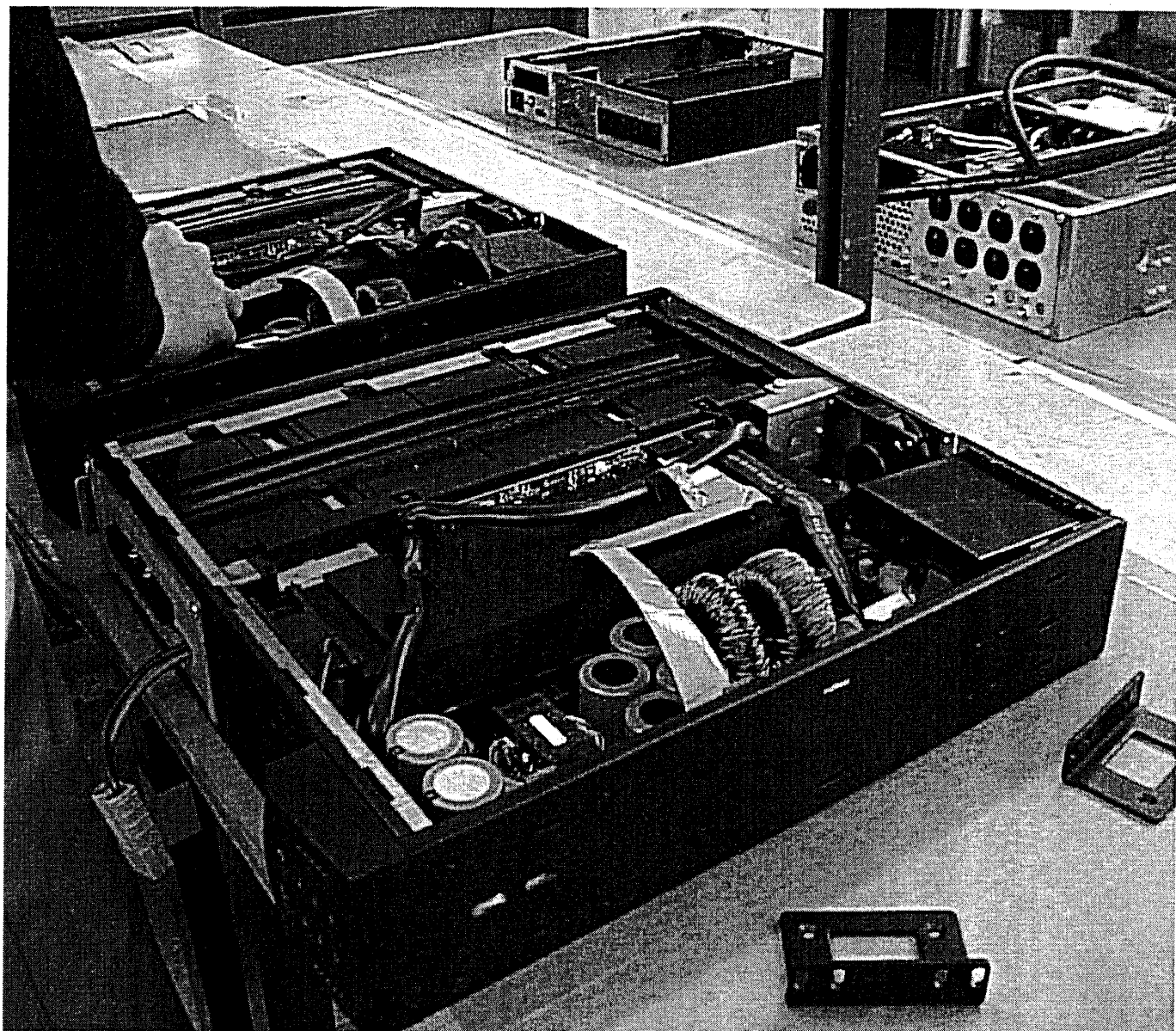














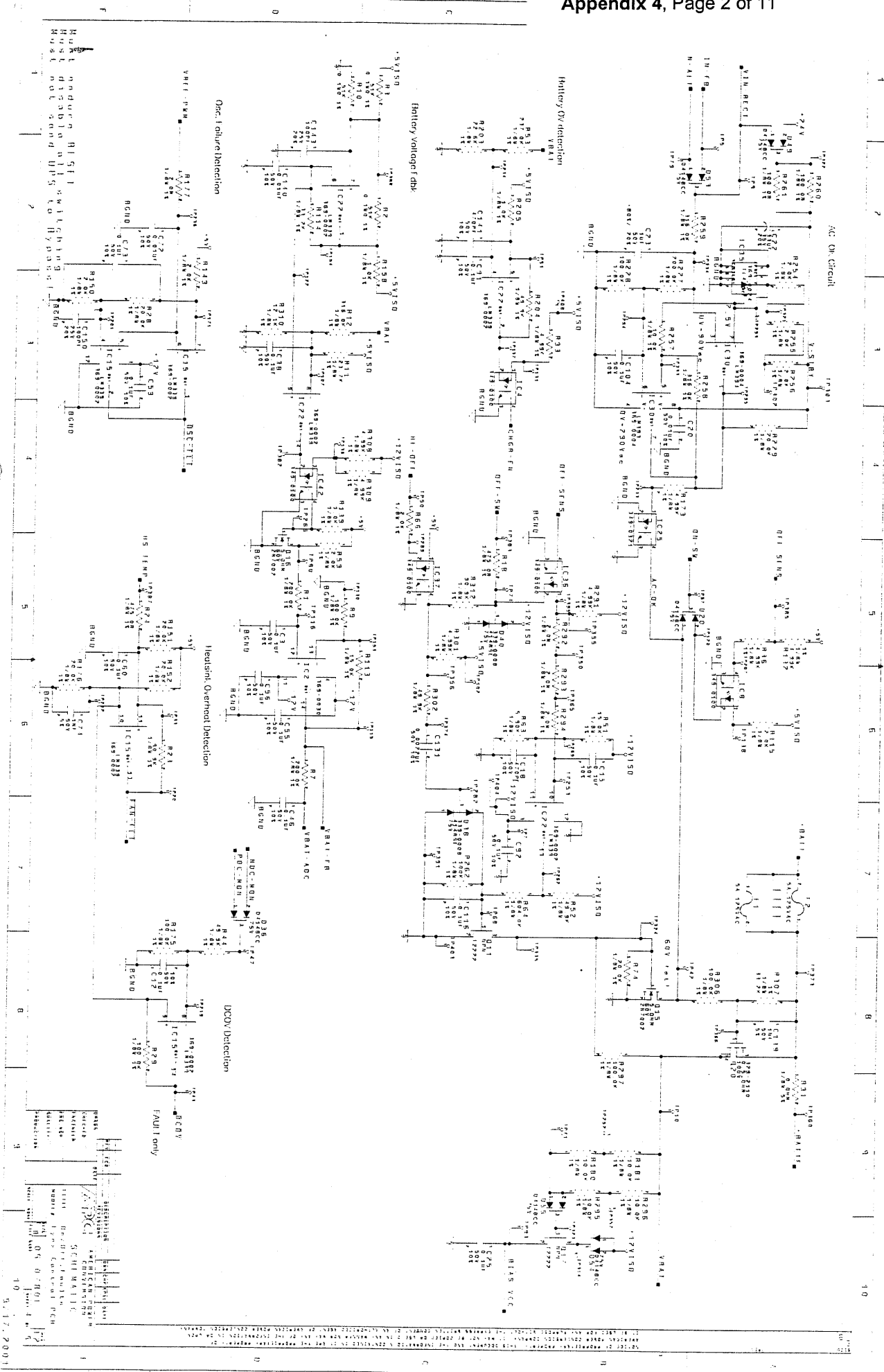
VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

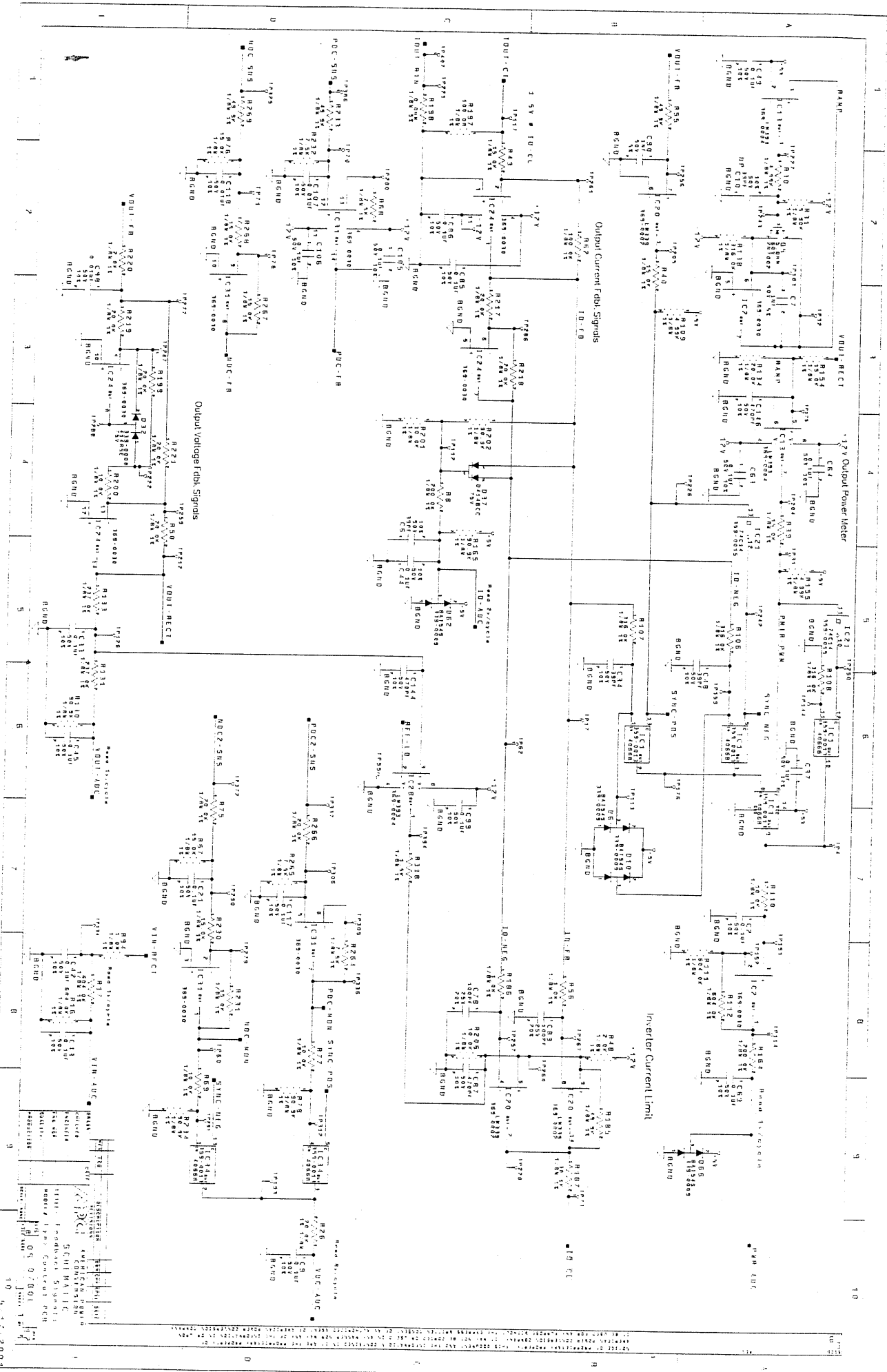
VDE

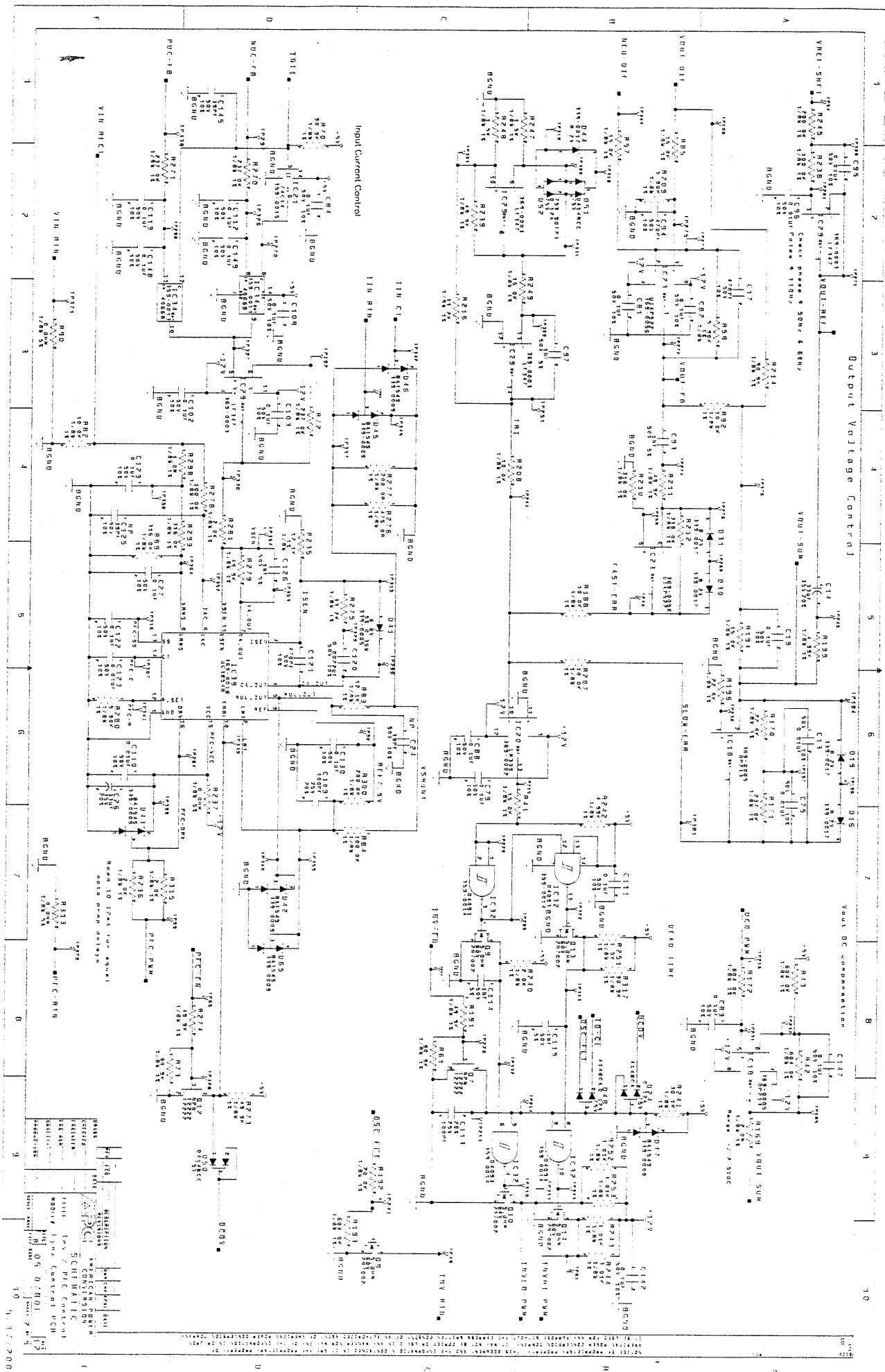
Clause	Requirement and Test	Result - Remark	Verdict
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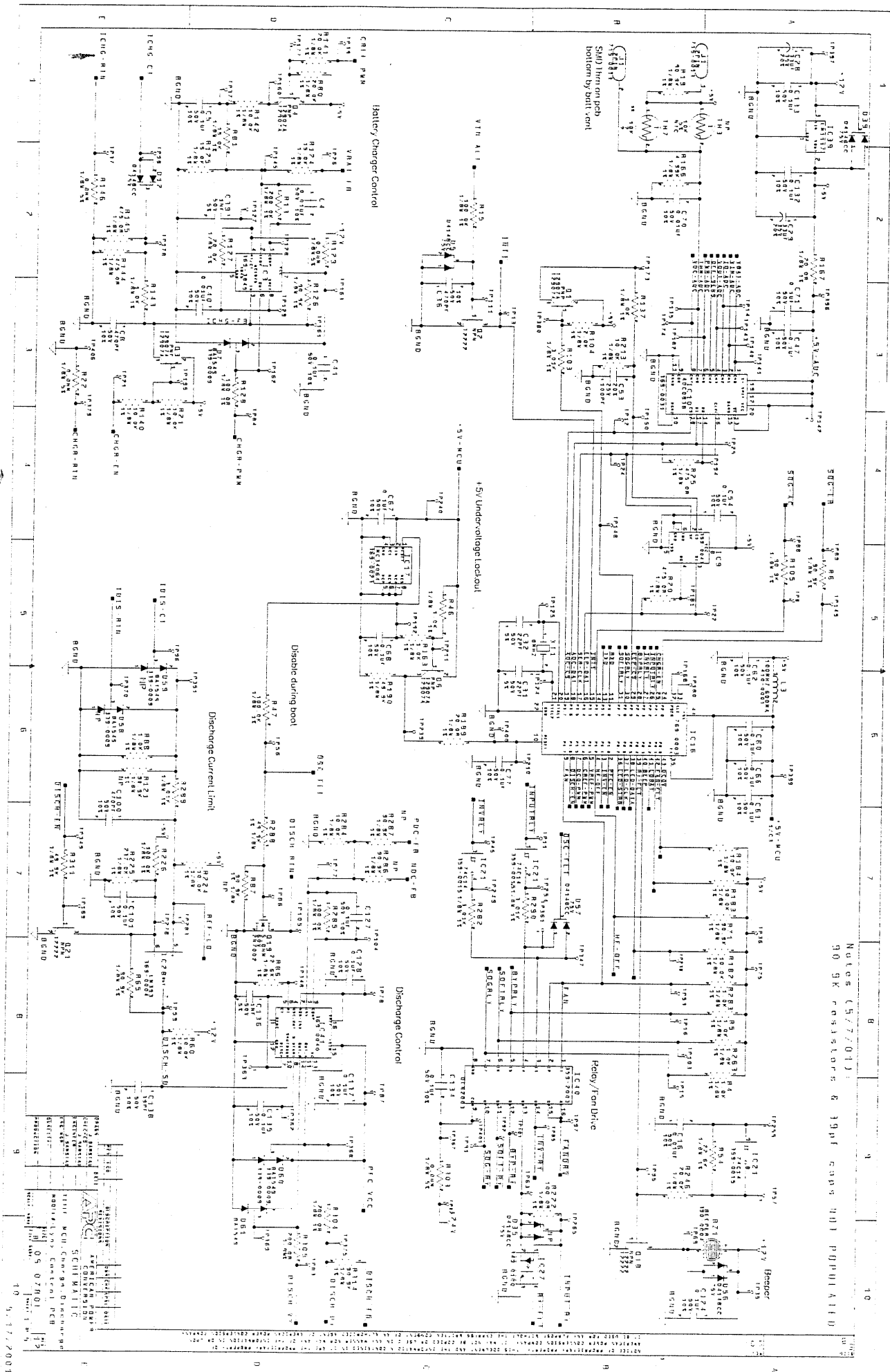
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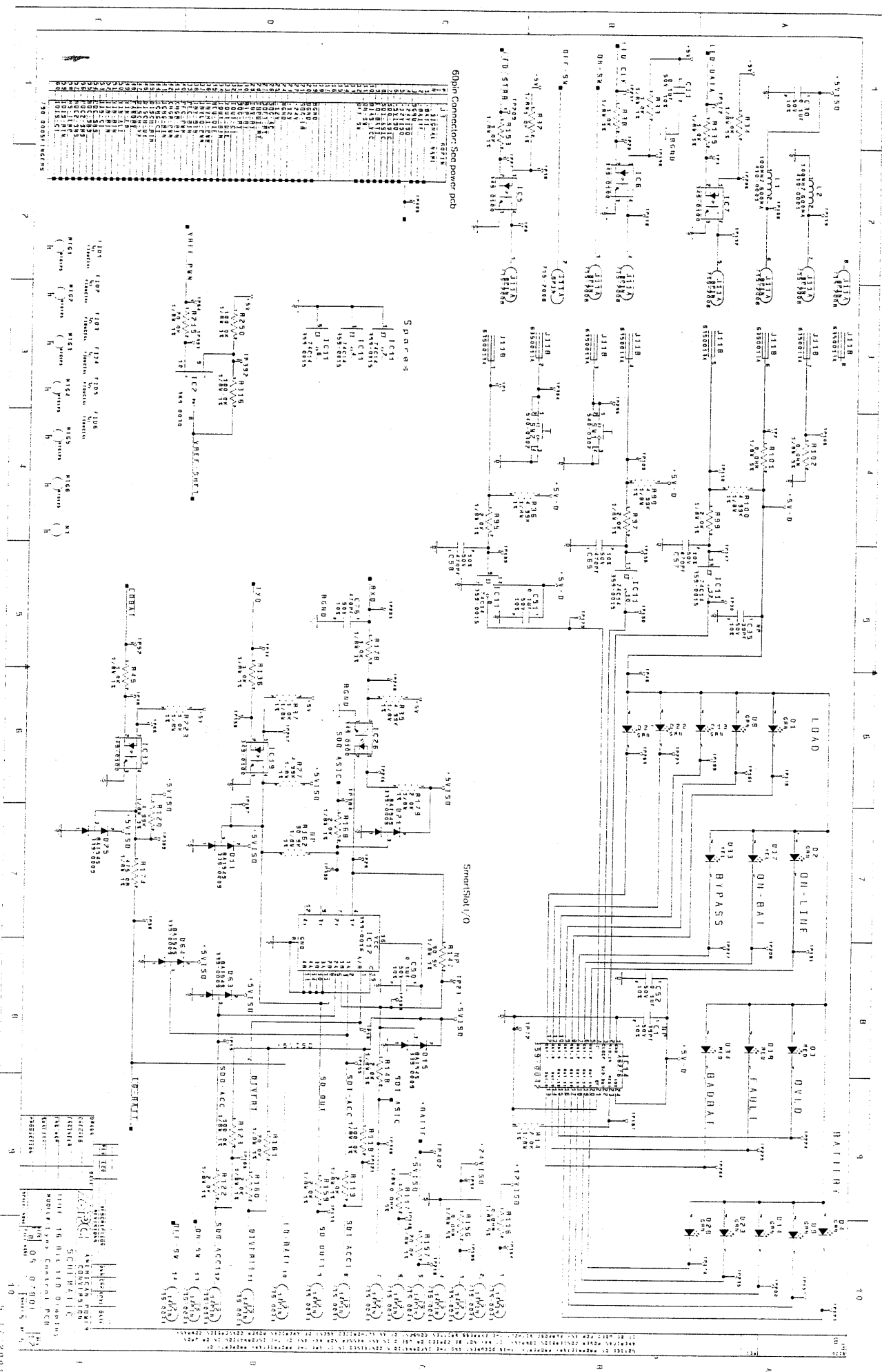
VDE File: 19244-3335-0020
Appendix 4, Page 1 of 11

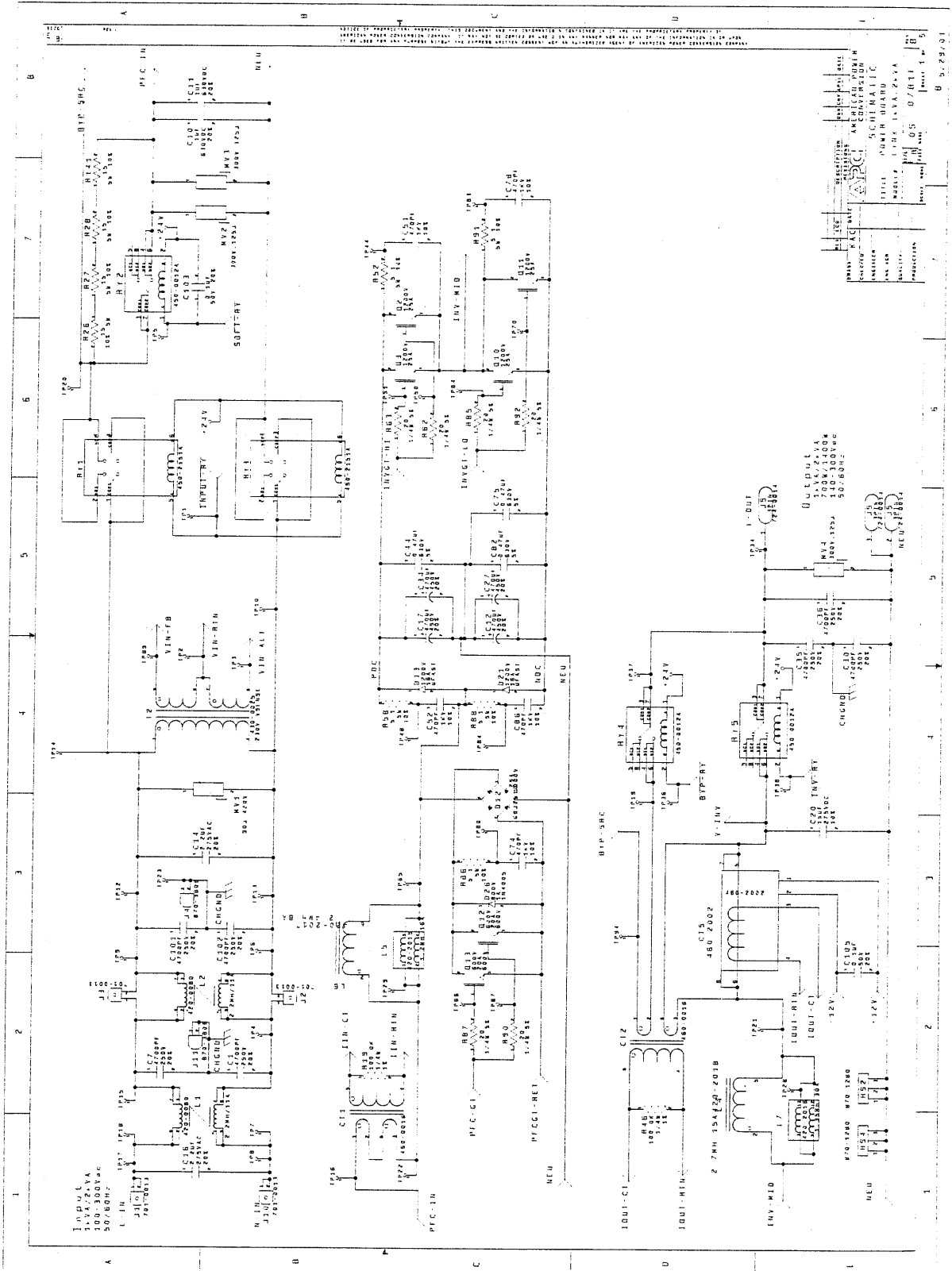


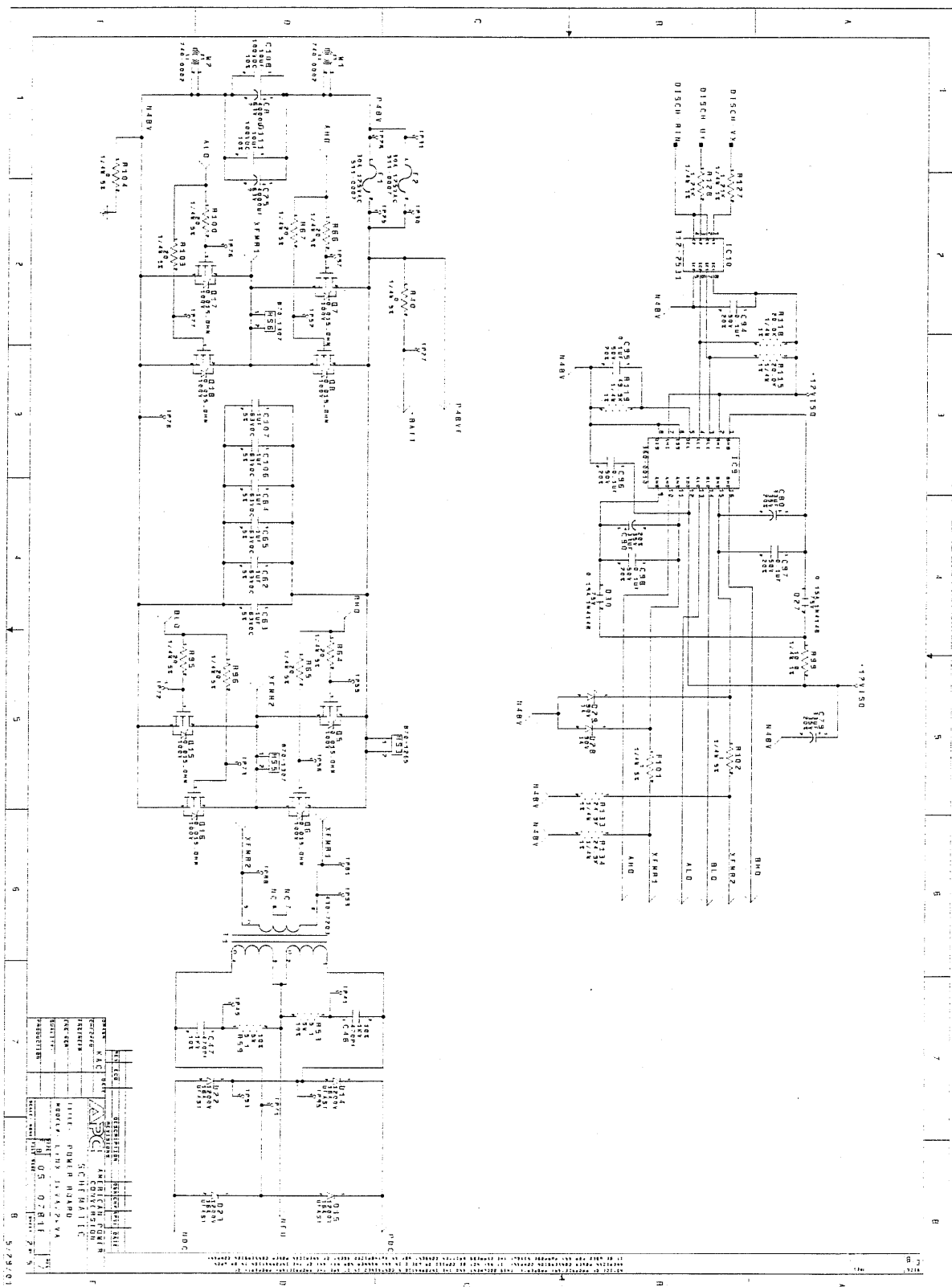


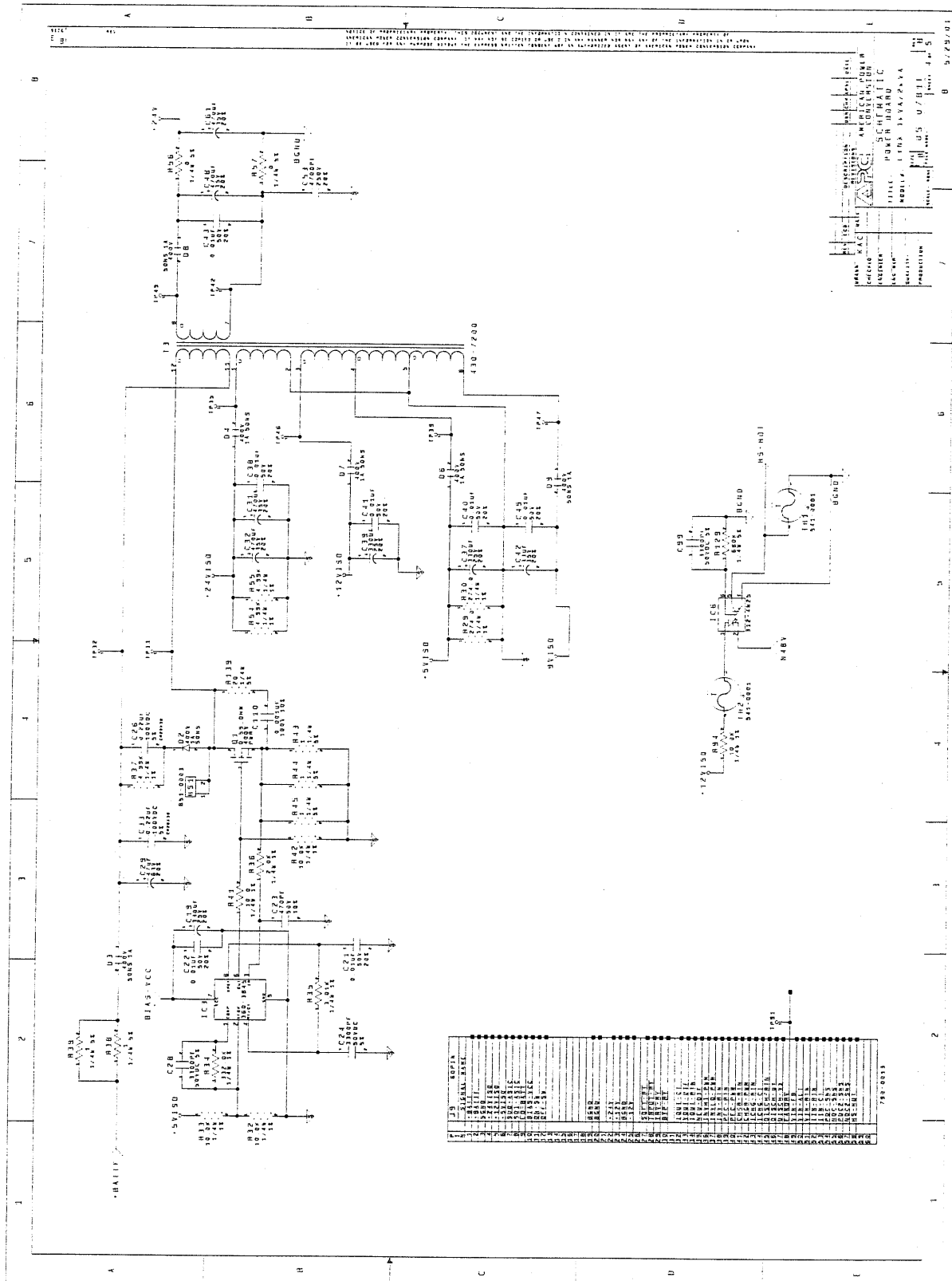














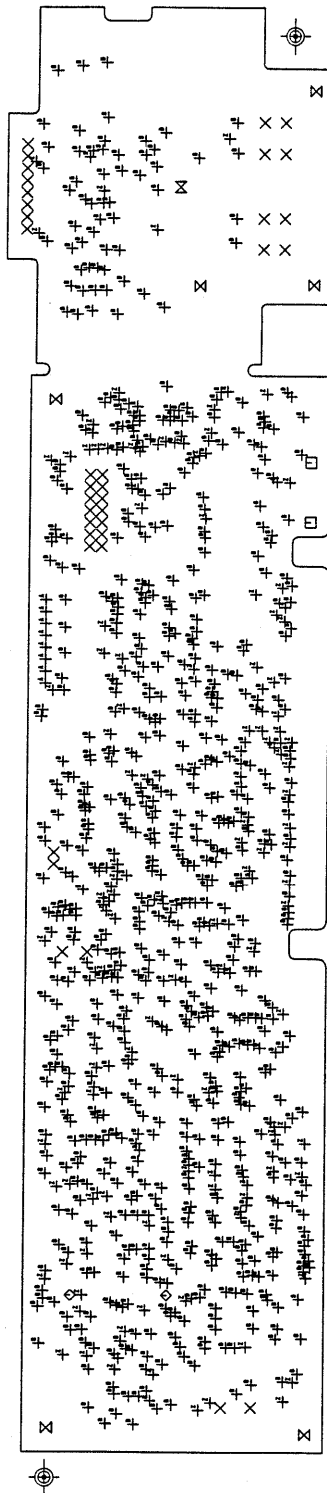
VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

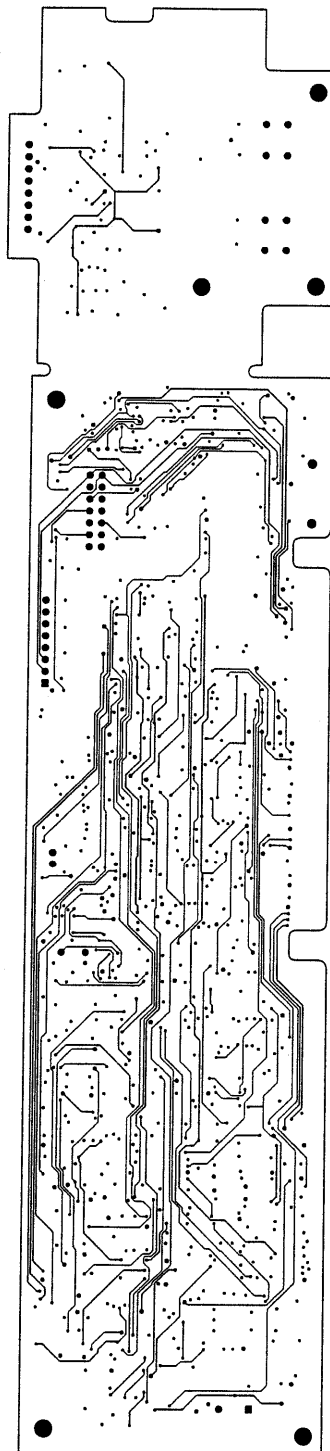
Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 5

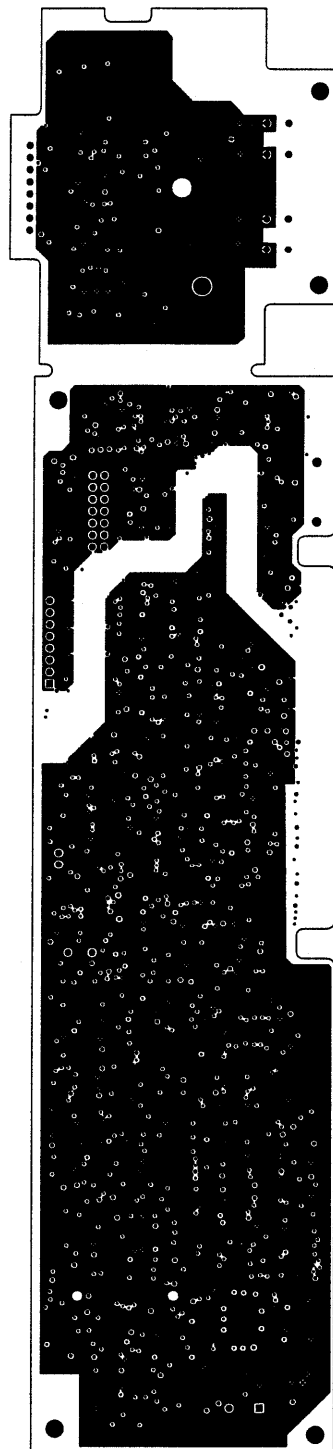
VDE File: 19244-3335-0020
Appendix 5, Page 1 of 22



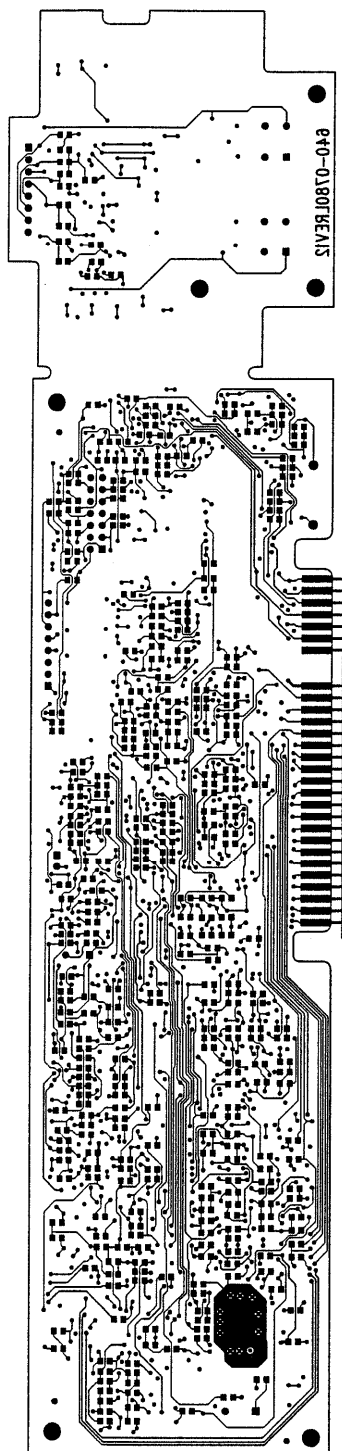
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725 MONROE STREET BALFOUR, MA 01821-3945 FAX: (978) 232-1111 E-MAIL: INFO@APC.COM		CAGE CODE: 640-0780L		REV: 12	
PART NO:		640-0780L		DATE: 17MAY2001	
GERBER:					



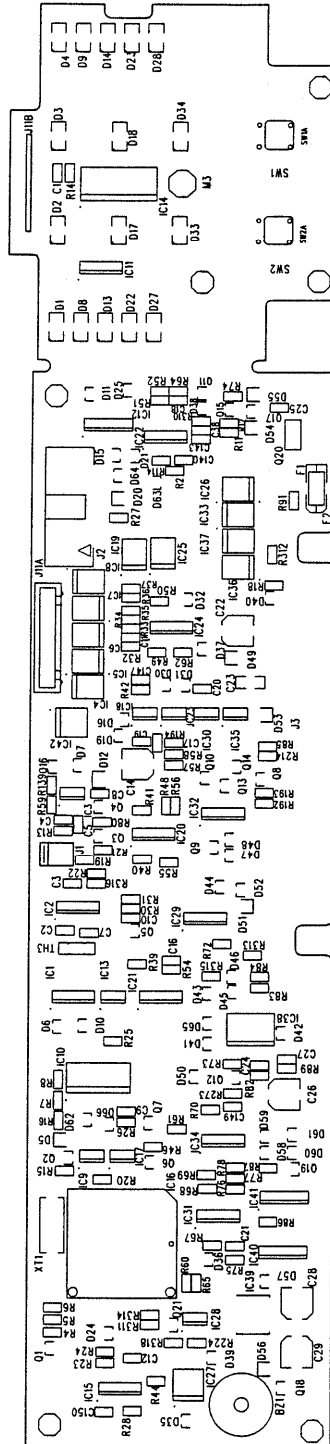
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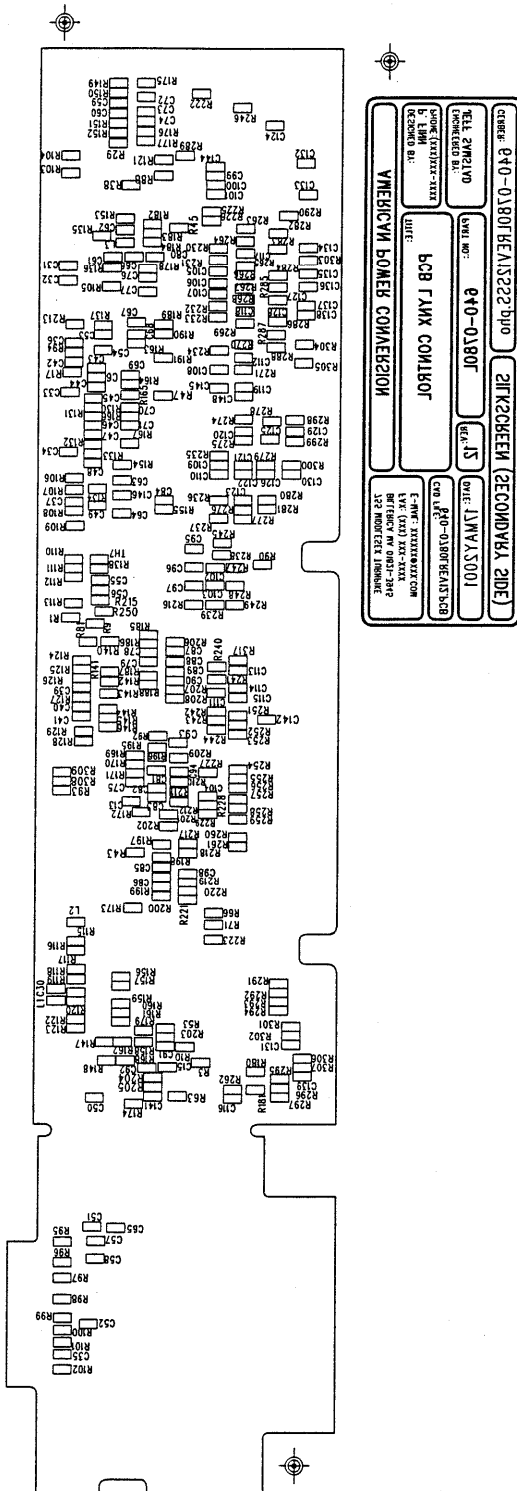


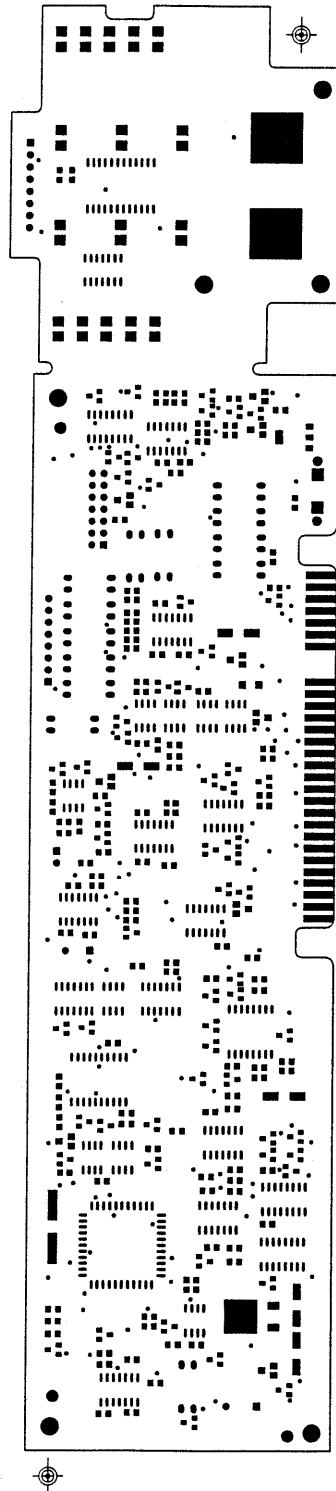
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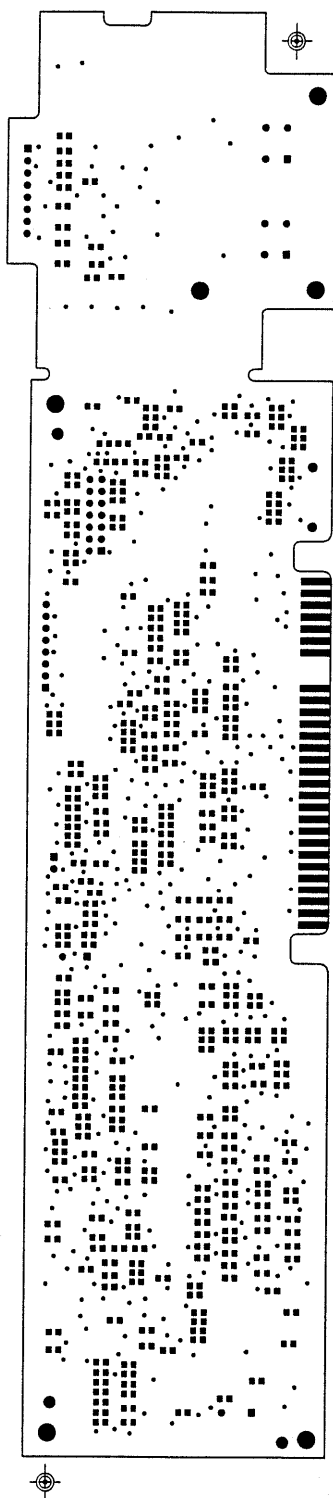
640-0781REV12SEC.pho SECONDARY SIDE (LAYER 4)



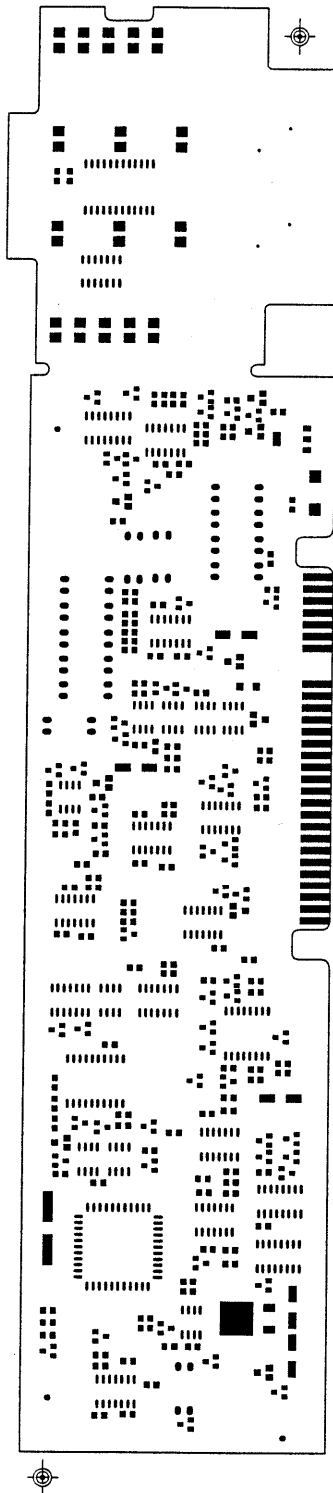




AMERICAN POWER CONVERSION		755 INDUSTRIAL TURNPIKE BELLEROSA MA 01821-5945 FAX: (413) 333-3333 E-MAIL: JEFF@APC.COM	
DESIGNED BY: JEFF JONES	TITLE: PCB LYNX CONTROL	CAD FILE: 640-0780L REV12.PCB	DATE: 17MAY2001
POWERED BY: JEFF JONES	PART NO.: 640-0780L	REV: 12	SOLDERMASK (PRIMARY SIDE)
640-0780L REV12.PCB			

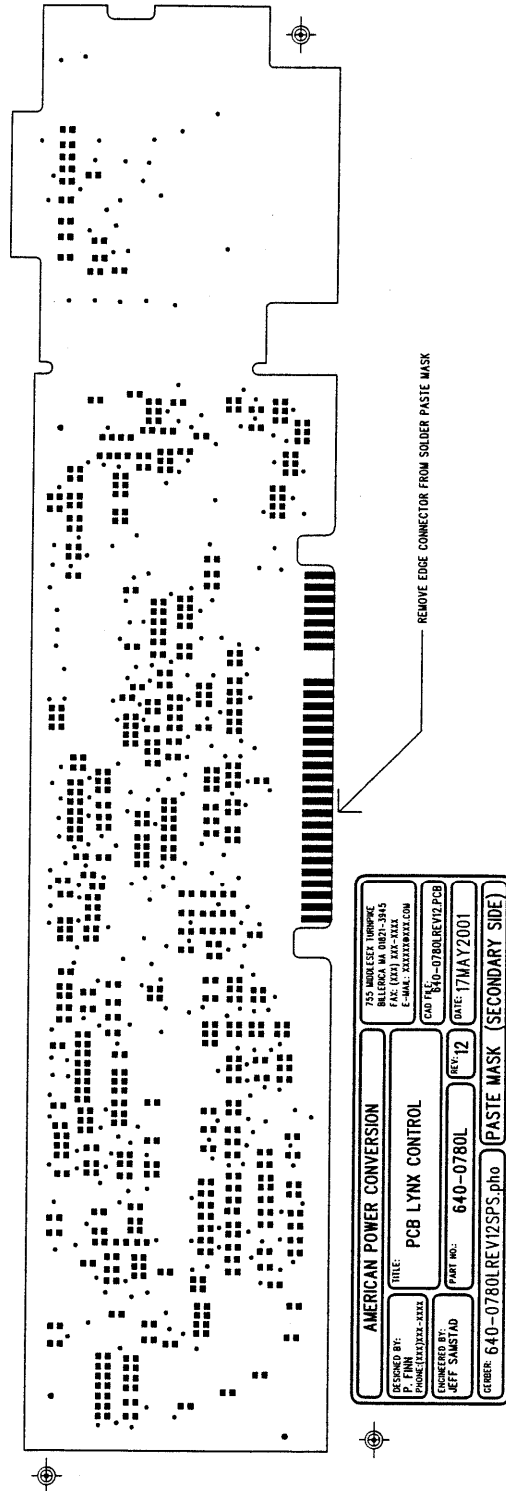


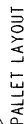
DESIGNED BY: P. FINN DATE: 12/21/98		AMERICAN POWER CONVERSION		725 WINDY LANE BALFOUR MA 01801-3845 FAX: (408) 252-5335 E-MAIL: INFO@APC.COM	
ENGINEERED BY: JEFF SAMSTAD		TITLE: PCB LYNX CONTROL		CAB TAG: 640-0780LREV12.PCB	
PART NO.: 640-0780L		REV: 12		DATE: 17MAY2001	
GERBER: 640-0780LREV12SMS.pho (SOLDERMASK (SECONDARY SIDE))					



REMOVE EDGE CONNECTOR FROM SOLDER PASTE MASK

DESIGNED BY: P. FINN		PHONE (313) 312-3333		FAX (313) 312-3333		E-MAIL: 313123@XXX.COM	
ENGINEERED BY: JEFF SAMSTAD		PART NO.: 640-0780L		REV: '12		DATE: 17MAY2001	
GERBER: 640-0780LREV12SPP.pho		PART NO.: 640-0780LREV12.PCB		DATE: 17MAY2001		PASTE MASK (PRIMARY SIDE)	
AMERICAN POWER CONVERSION 725 MIDLAND TURNPIKE FARMINGTON, CT 06031-3445 TEL: (313) 312-3333 FAX: (313) 312-3333 E-MAIL: 313123@XXX.COM							





SIZE	QTY	SYM	PLTD
40	36	X	PLTD
50	2	□	PLTD
67	2	◇	NPLTD
125	6	⊗	NPLTD
146	1	⊗	NPLTD
35	8	A	PLTD
14.5	737	B	PLTD
15	123	Z	PLTD

LAYER STACK-UP	
1	PRIMARY SOLE, JACK CORN
2	PRIMARY SOLE, FORMER MARK
3	PRIMARY SOLE, LAYER 1
4	BULLETPROOF
5	LAYER 2
6	BULLETPROOF
7	LAYER 3
8	BULLETPROOF
9	SECONDARY SOLE, LAYER 4
10	SECONDARY SOLE, FORMER MARK
11	SECONDARY SOLE, JACK CORN

40-07601 RE V12DRI p.40

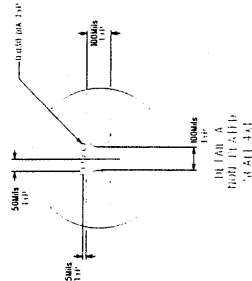
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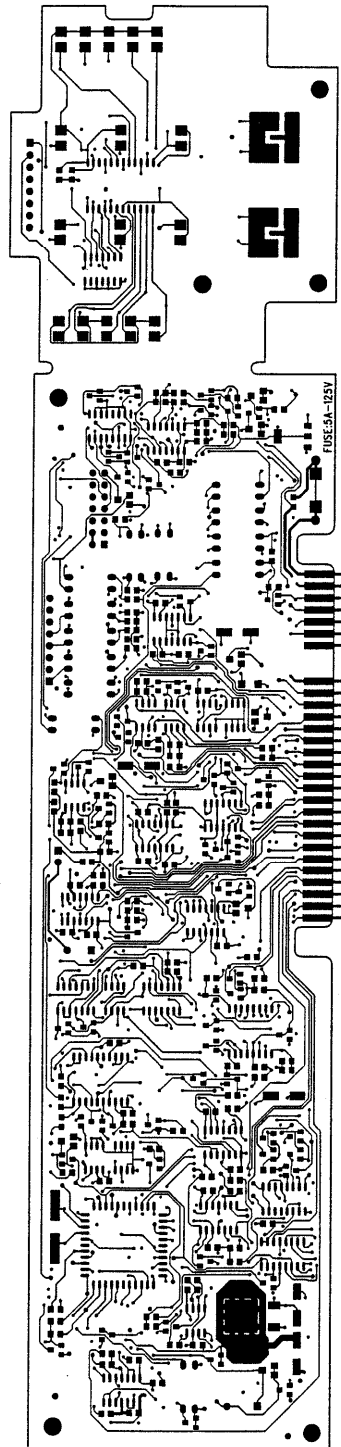
ARE YOU A TACKLER?

.....	FRIEDRYK SIEC	JIF. SCHULM
.....	FRIEDRYK SIEC	"OLDER MAIR
.....	FRIEDRYK SIEC	LAYER 1
.....	JOELTIC	LAYER 1
.....	JOELTIC	LAYER 2
.....	JOELTIC	LAYER 3
.....	JOELTIC	LAYER 4
.....	SECONDARY	"OLDER MAIR
.....	SECONDARY	SIEC "OLDER MAIR

5.4105

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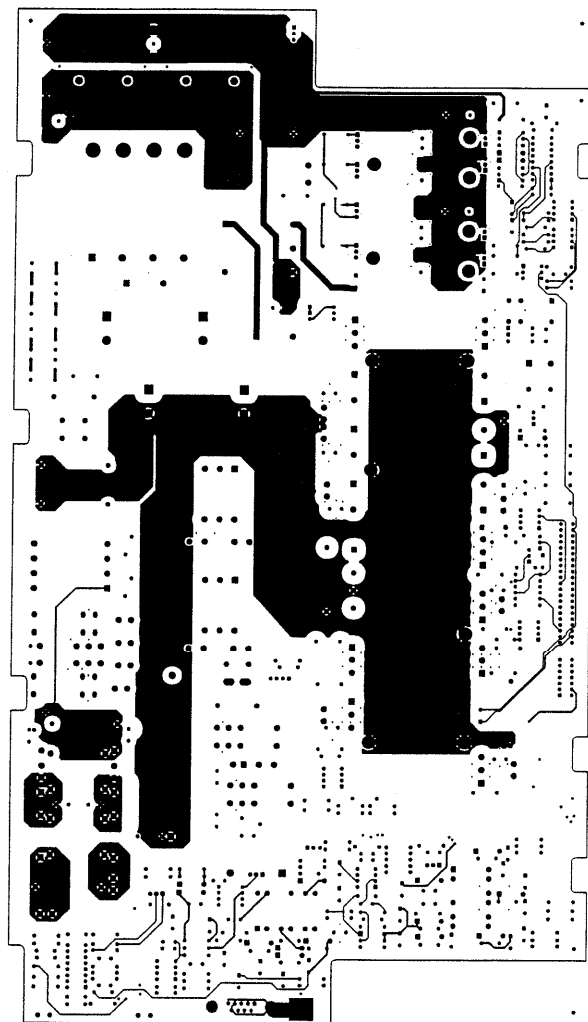
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640-0780LREV12PRI.pho

PRIMARY SIDE (LAYER 1)

VDE File: 19244-3335-0020
Appendix 5, Page 14 of 22



640-078FEC48P00.pas PRIMARY S02 (LAYER 1)

[illegible]

CHAPMAN, L. A. 1997. 10

LAYER STACK-UP	
1	PRIMARY SOLDER CORE IN
2	PRIMARY SOLDER MARK
3	PRIMARY SOLDER LAYER 1
4	INSULATING LAYER 1
5	INSULATING LAYER 2
6	INSULATING LAYER 3
7	INSULATING LAYER 4
8	INSULATING LAYER 5
9	INSULATING LAYER 6
10	INSULATING LAYER 7
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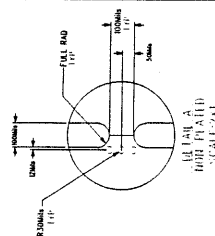


PLATE IX
PLATE X
PLATE XI

THE FAIR

WILEY

- [illegible]

NOTE TO THE FABRICATION VENDOR: DUPLICATE SILKSCREEN ON THE BOTTOM SIDE OF PCB WITH THE SILKSCREEN GERBER FILE PROVIDED.

[illegible]

DEPARTMENT OF THE ARMY
WASHINGTON, D. C. 20315

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7710866 07/13/2017

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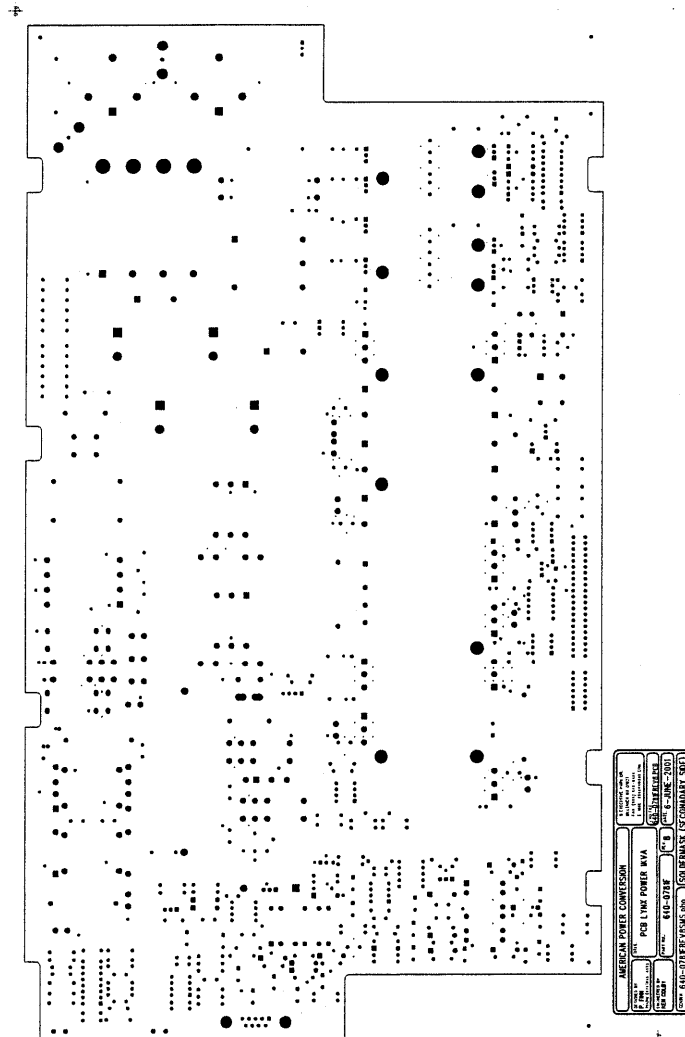
Appendix F Page 15 of 20

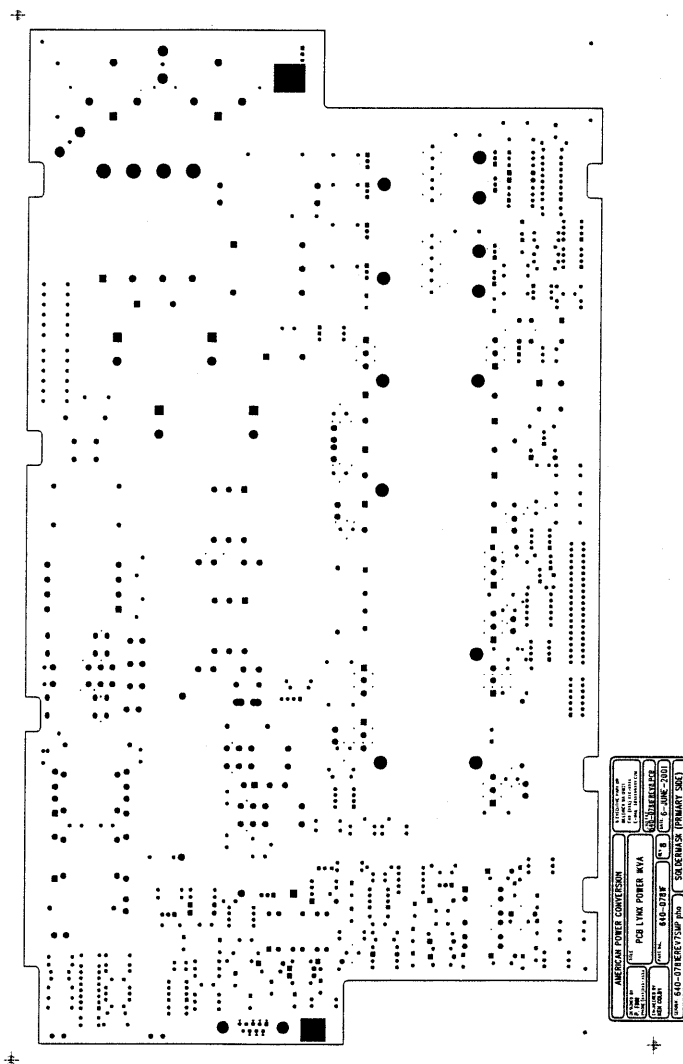
Appendix 3, Page 13 of 22

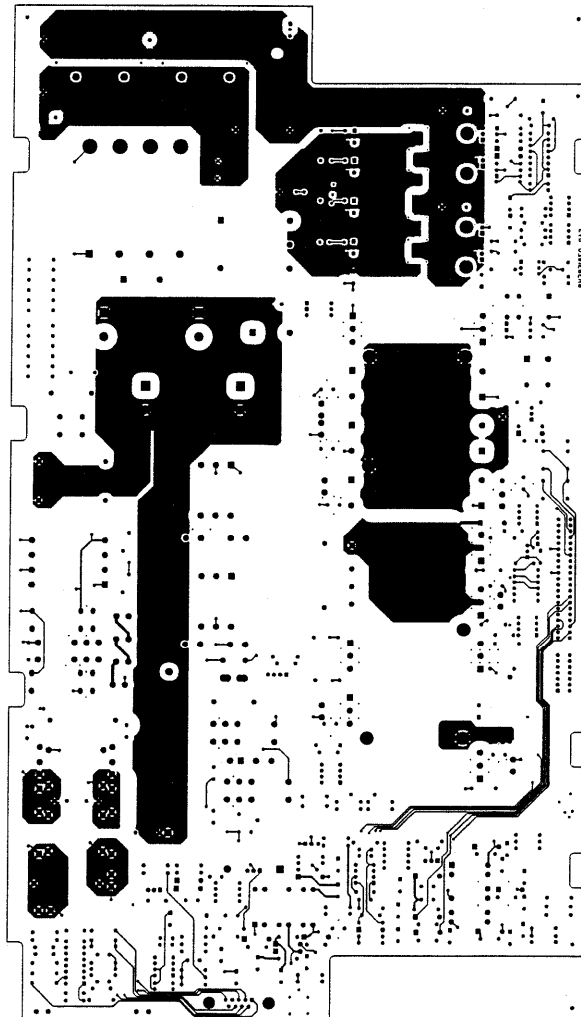
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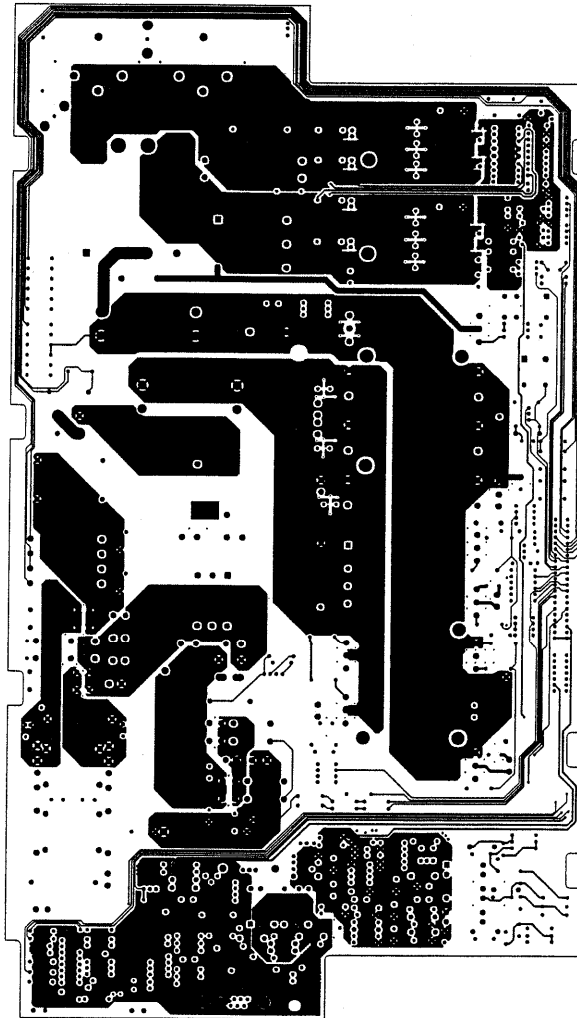
VDE File: 19244-3335-0020
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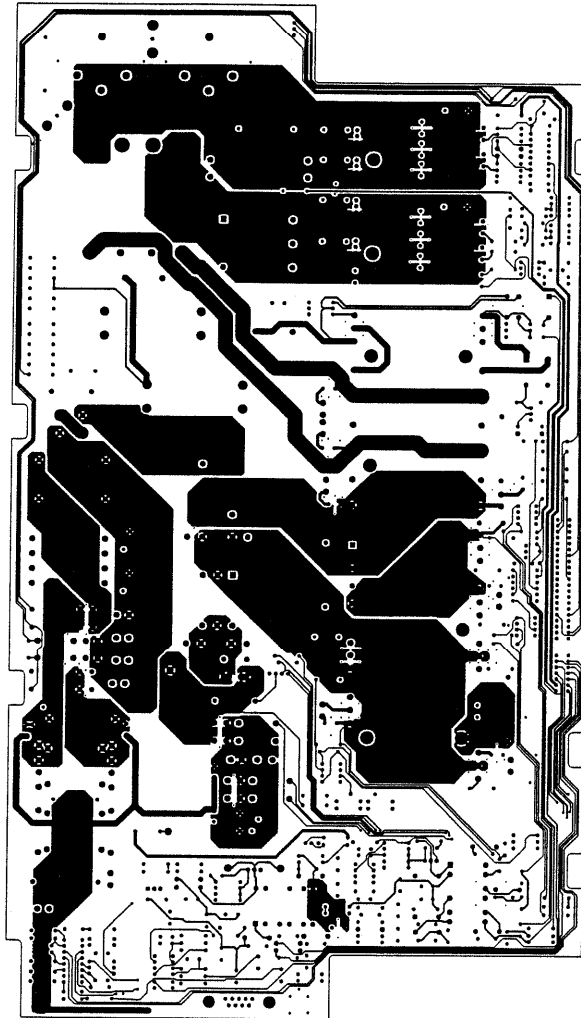




610-078REVIS5C.PRG SECONDARY SMC (LAYER 4)



610-078F0002.PRG INDEX LAYER (LAYER 3)



640-07085-0001/20 INNER LAYER (LAYER 2)

[illegible][illegible]



VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 6

VDE File: 19244-3335-0020
Appendix 6, Page 1 of 9

APCC Proprietary	APC	Part Specification Cover Sheet
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APC Part Number:
379-0003

LED GREEN 3.5X2.8MM SMD

Production:

X-Reference Part Number:

Status of Specification:
Approved

Production Revision History:

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

Detailed Specification

APC Part Number: 379-0003 -- Production Rev. 2

Description:

Expanded description

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

Primary Application (Business Unit)

NPS

Project (End Item Part Number(s))

APC Standards:

Applicable APC standards

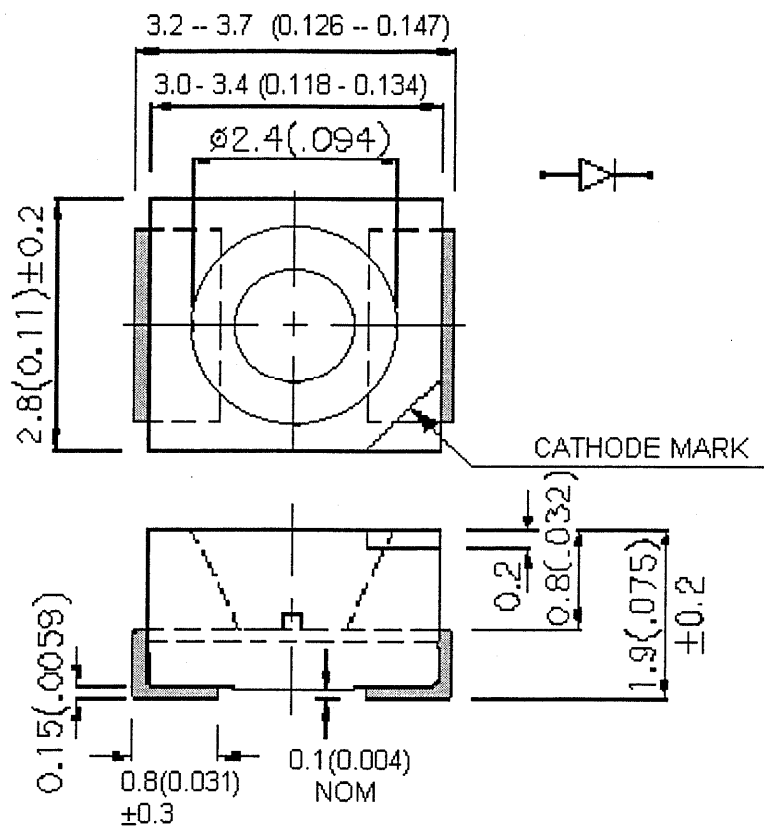
Applicable industry standards

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

Specs Directory

Drawing Image:

Drawing Images not to exceed 5" x 3" otherwise attach Acrobat (.PDF) file



Lens Type - Green Transparent

Notice of Deviation:

Special Instructions

APC Part Number 379-0003 -- Production Rev. 2

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.

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:

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	$I_{F(\text{avg})}$	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 $I_F=20\text{mA}$	$\lambda_{(\text{peak})}$	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

< Link to Manufacturer's Qual. database (Sorted by Name)

< Link to Component Qualifications dB. (Sorted P/N)

APCC Proprietary



Part Specification Cover Sheet

APC Part Number:
379-0002

LED YELLOW 3.5X2.8MM SMD

Production

X-Reference Part Number:

Status of Specification:
Approved**Production Revision History:**

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

Detailed Specification

APC Part Number: 379-0002 -- Production Rev. 2

Description:**Expanded description**LIGHT EMMITING DIODE, SURFACE MOUNT, YELLOW, 3.5L X 2.8W X 1.9H (MM), 590 nM
WAVELENGTH, TINTED LENS, FLAT TOP**Primary Application (Business Unit)**

NPS

Project (End Item Part Number(s))**APC Standards:****Applicable APC standards****Applicable industry standards**

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

[Specs Directory](#)**Drawing Image:**

Drawing Images not to exceed 5" x 3" otherwise attach Acrobat (.PDF) file

Special Instructions

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

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.

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

- < Link to Manufacturer's Qual. database (Sorted by Name)
- < Link to Component Qualifications dB. (Sorted P/N)

Special Instructions

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

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.

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 $T_A=25^{\circ}\text{C}$.

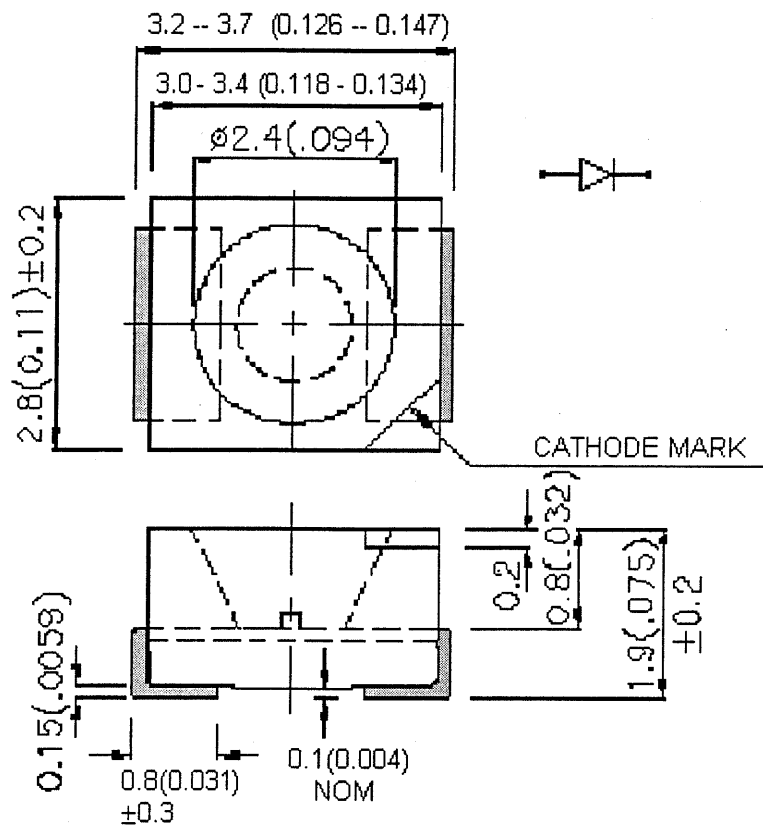
Parameter	Symbol	Value	Units
Maximum Average Forward Current	$I_{F(\text{avg})}$	30	mA
Maximum Peak Forward Current (0.1 Duty Cycle, 0.1ms pulse)	$I_{F(\text{peak})}$	150	mA
Maximum DC Reverse Current at Rated DC Blocking Voltage	I_R	10	μA
Maximum Power Dissipation	P_D	105	mW
Operating Temperature Range	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

- < Link to Manufacturer's Qual. database (Sorted by Name)
- < Link to Component Qualifications dB. (Sorted P/N)



Lens Type - Red Transparent

Notice of Deviation:

APCC Proprietary



Part Specification Cover Sheet

APC Part Number:
379-0001

LED RED 3.5X2.8MM SMD

Production

X-Reference Part Number:

Status of Specification:
Approved

Production Revision History:

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

Detailed Specification

APC Part Number: 379-0001 -- Production Rev. 2

Description:

Expanded description

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

Primary Application (Business Unit)

NPS

Project (End Item Part Number(s))

APC Standards:

Applicable APC standards

Applicable industry standards

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

[Specs Directory](#)

Drawing Image:

Drawing Images not to exceed 5" x 3" otherwise attach Acrobat (.PDF) file

List of Critical Components 1924400-3335-0020

object/part No.	manufacturer/ trademark	type/model	technical data	stan- dard	mark(s) of conformity ¹⁾
Metal Oxide Varistor (MV2, MV3, MV4) (APC 380-0010)	Panasonic	ERZV14D471	Rated 300 Volt, 125 J		VDE
Capacitor X2 (C14, C16) (APC 222-1225)	Nissei Arcotronics APC Boroughbridge	R40225M275BSCXA2U 20PM1	275 V, 2.2 µF		VDE
Capacitor Y2 (C1, C7, C30, C35, C36, C53) (APC 221-0001)	Vishay/Draloric BC Components	WY0472MCMUARK B472M43Y5UQ WJSP	4700PF 250VAC		VDE
Metal Oxide Varistor (APC 380-4200)	Infineon Technologies Panasonic Industrial Co.	SIOV – S14K420 ERZ – V14D681	420V, 14MM, 90J		VDE
Relay (RY1, RY2, RY3, RY4, RY5) (APC 450-0012A) (APC 450-2151A)	American Zettler Gruner O/E/N India Limited Tyco/Schrack	AZ-755-1C-24B 280D-R2A-G740-036 68-24-2AE RP920124	24V 2/C 8A, 250V 1.5MM 5 CRP		Tested by VDE to EN 60950
Fuse (F1, F2) (APC 512-0030)	Busmann	MDA-V-30BX	30 A / 250 V		
Battery (4) (SURT1000XLI) (APC 910-8011)	CSB Battery Of America Corp. Panasonic Industry B & B Battery Co. Exide Industries	GP1270F2 LC-R127R2P1 BP7-12 EP 7-12 (12M 7)	12 V / 7-7.2 Ah		Tested by UL
Battery (4) (SURT2000XLI) (APC 910-1209)	CSB Battery Of America Corp. Panasonic Industry Co.	HR 1234W F2 UP-RW1245P1	12 V, 9 Ah		Tested by UL
Opto-coupler (APC 349-0100)	Isocom, Inc. Infineon	ISP817X-77SMT+R SFH6156-4T			VDE VDE
Opto Coupler (APC 349-0321)	Isocom, Inc.	ISP321-1BLX-SMD+R			VDE
Transformer, Sense (APC 430-0025)	Eastar Leader	430-0025 430-0025	Rated 230V, Type 2		Evaluated to EN60950 by VDE
Transformer (APC 430-7200)	JML Enterprises, Inc Falco Electronics	430-7200 430-7200	Transformer Flyback (Lynx)		Evaluated to EN60950 by VDE
Transformer (APC 430-7203)	Falco Electronics	430-7203	Transformer 2.0 KVA Push Pull		Evaluated to EN60950 by VDE

Transformer (APC 430-7205)	Falco Electronics, Ltd JML Enterprises, Inc.	430-7205 430-7205	XFMR Gate Drive Lynx		Evaluated to EN60950 by VDE
Transformer (APC 430-7207)	Falco Electronics, Ltd JML Enterprises, Inc.	430-7207 430-7207	Transformer, Flyback 100W Battery Charger		Evaluated to EN60950 by VDE
Transformer (APC 430-7208)	Falco Electronics, Ltd JML Enterprises, Inc.	430-7207 430-7207	Transformer, Flyback 7 Watt		Evaluated to EN60950 by VDE
Fan (2) (APC 490-0004)	Sunon	KDE2408PTB3	24 Vdc, 0.10AMPS		UL, CSA, TUV
Front Bezel (APC 870-6858)	Yong Ru	PA-717C+	1.57MM Rated 94 V-0		
Display Bezel (APC 870-6858)	Yong Ru	PA-717C+	1.57 MM Rated 94 V-0		
Top Panel (Tower) (APC 870-1269)	Yong Ru	PA-717C+	1.57 MM Rated 94 V-0		
Fan Baffle (APC 870-6860)	Yong Ru	PA-765A	2.12 MM Rated 94V-0		
Heat Sink Shroud (APC 870-6861)	Yong Ru	PA-765A	2.12 MM Rated 94V-0		
Circuit Breaker (SURT2000XLI) (APC 530-1200)	Mechanical Product Inc Snap Action, Inc Rototech Electrical Co., Inc	1600-254-200 MB1-20-s MDL B120	20 A/250 V		VDE
Circuit Breaker (SURT1000XLI) (APC 530-0004)	Mechanical Product Inc Snap Action, Inc Rototech Electrical Co., Inc	1600-254-120 MB1-12-S B112S	12 A/250 V		VDE
AC Connector Inlet (SURT2000XLI) (APC 770-0040)	Power Dynamics, Inc Qualtek Electronics Corp	42R 07-3121-150 742R07-3121-150	16 A/250 V		VDE
AC Connector Inlet (SURT1000XLI) (APC 770-0069)	WSP, Inc. Qualtek Electronics Corp.	0711-1-PW 701W-X2/04	16 A/250 V		VDE
AC Connector Outlet (APC 770-0091)	Qualtek Electronics Corp. Power Dynamics, Inc.	742W-15/12 44R02-3121-150	10 A./250 V		VDE
PCB Control Board (640-0780L) (SURT1000XLI) (SURT2000XLI)	Proto Technology	640-0780L	Rated 94V-0		UL, Evaluated by VDE to 2.10.6.3 Thermal Cycling of 60950

PCB Power Board (640-0781G) (SURT1000XLI) (SURT2000XLI)	Proto Technology	640-0781G	Rated 94V-0		UL, Evaluated by VDE to 2.10.6.3 Thermal Cycling of 60950
PCB Display Board (640-0780L) (SURT1000XLI) (SURT2000XLI)	Proto Technology	640-0780L	Rated 94V-0		UL, Evaluated by VDE to 2.10.6.3 Thermal Cycling of 60950
Inductor (APC 420-7200)	Falco Electronics, Ltd	420-7200	Inductor Battery 400µH, 4A ,40 kHz		Evaluated to EN60950 by VDE
Transformers (APC 460-0016)	Falco Electronics, Ltd	460-0016	CUR XFMR 1:1:2000T		Evaluated to EN60950 by VDE
Transformers (APC 460-7200)	Falco Electronics, Ltd	460-7200	Current Transformer 200:1		Evaluated to EN60950 by VDE
Transformer T1 (APC 430-0358)	Falco Electronics, Ltd.	E55008	Class 180		
Transformer (T7, T8) (APC 430-0357)	Leader Electronics Corp. Falco Electronics, Ltd.	LS-A9782-ST 0410	Class 130		UL
Inductor L4 (APC 420-0192)	Parker Overseas PVT Ltd.	420-0192	Class 155, 2.2 mH, 15 A		
Inductor L6 (APC 420-0193)	Parker Overseas PVT Ltd.	420-0193	Class 155, 1.8 mH, 8 A		
Relay RY2 (APC 450-2151A)	Gruner O/E/N India Ltd.	280D-R2A-G740-036 68-24-2AE	8 A, 240 V, 24 Vdc Coil	IEC 384-14	VDE
P.C. Board (APC 640-0783)	China Circuit Technology (Shantou) Corporation	640-0783	94V-0		UL

APC Part Number: 450-2151A Status of Spec: Released Revision of Spec:2

APCC Proprietary

APC

Part Specification Cover Sheet

Originator: On: 05/10/2001
Last Editor: Sandra Buker On: 05 - Feb - 2002
Requestor: Manny Landsman On:12/30/2001

X-Reference Part Number:

Oracle Description of Specification:
RLY 24V DPST 8A250V 1.5MM 5 CRP

Oracle Status:
Released in Oracle

Specification Revision History:

- ② Last Controlled Release Revision:
- ② Last Revision of Spec:

REVISION HISTORY TABLE:

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

* - denotes required data fields
Specification Details:

Product Line: *
NPS

Project Name or SKU numbers where first used:

FOR CONTROLLED RELEASE ONLY (Fill in Product Line field above before completing this section or submitting for Controlled Release)

Responsible Engineer's Name: *
Program Manager's Name: *
Cost Limit: *
Quantity Limit: *

Purchasing Agent: *
MFG Org part to be purchased: *
Vendor/Manufacture Part Number: *

Drawing Package:

- * Safety Critical Components: - - - - - Yes
- * PL Chief Engineer approval required ? - - - - - Yes
- * Will this Part be mounted on a Printed Circuit Board? - - - - - Yes
- * Will there be a Solid Works model created for this part? - - - - - Yes

Expanded description:

RELAY, 8 AMP, 240 VOLT, 24 VOLT COIL, DPST, 1.5mm MIN. 5.0MM CREEPAGE OR EQUIVALENT CTI per reinforced requirements of IEC60950

Applicable Standards:

APC standards:

OS-ME-PKG



Industry standards:

Drawing / File Attachments:

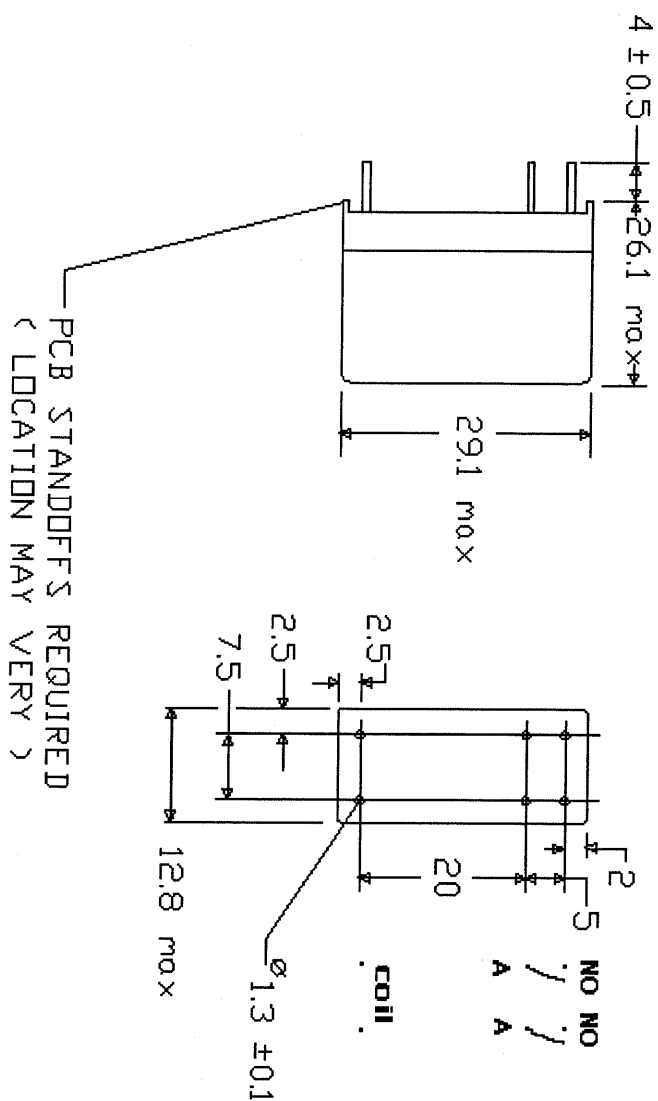
Retrieve Drawing File open specs directory

Latest Zip File On Record: 450-2151A_REV01.zip
(format is part number_dateftp.d.zip)
(READ ONLY - ZIP FILES SHOULD NOW BE FTP'd BY USING THE BUTTON ABOVE.)

ONLY PDF FILES ARE TO BE ATTACHED. ZIP FILES SHOULD BE FTP'D

Drawing File attachments	Drawing Revision (revision number of current attachment.)
 450-2151A_REV01.pd (Important details of ribs on relay bottom)  relay side creepage, pc relay bottom creepage, pi	450-2151A_REV01.pdf Revision 1

General Relay Dimensions



Component Parameters:

ELECTRICAL PARAMETERS:

Parameter	Min.	Nominal	Max.	Units:
Coil Voltage Rating		24		Volt DC
Pull-In Voltage			20	Volt DC
Drop-Out Voltage			10	Volt DC
Coil Resistance	560		840	Ohm
Contact Rated Voltage		240		Volt AC
Contact Current Rating at Rated Voltage	8			Amp rms
Initial Contact Resistance			50	mOhm
Electrical Life make and break at Full Load(1)	120,000			Cycles
Mechanical Life	1 million			Cycles
Operating Temperature Range	-40		+70	°C
Storage Temperature Range	-40		+70	°C
Coil to contact clearance	4			mm
Coil to Contact creepage	5			mm
Normally Open Contacts Clearance	1.5			mm
Normally Open Contacts Energize Time (1st touch), at coil voltage20V			14.0	ms
Normally Open Contacts Energize Time (1st touch), at coil voltage24V			12	ms
Normally Open Contacts Energize Time (1st touch), at coil voltage28V			9.0	ms
Bounce beyond first touch, energize NO		4		ms
Normally Open Contacts Deenergize Break Time(note 3), 26V zener across coil.		1.5	4.1	ms
Normally open Contacts Deenergize Break Time (note 4), 86V zener across coil.			2.5	ms
Bounce beyond first touch, deenergize NC		4.5		ms
Contact Weld Test (Normally Open Contact)(2)	500			Cycles

- (1) Per safety agency test report.
- (2) Voltage 350V, Capacitance=1300 μ F, Resistance=5 Ω , 75A peak pulse.
- (3) At deenergize the coil reverse voltage is limited to 26V plus diode drop.
- (4) A deenergize time is also specified at 86V zener voltage plus diode drop for those applications where a faster time is required.

1.5mm contact GAP each pole. Creepage between electrical points connected to the pins must be a minimum of 5.0mm when used on pc board with 1.1mm slot midway between pins and 3.0mm minimum spacing between pads OR EQUIVALENT CTI per reinforced requirements of IEC60950 for 230VAC. Complete system must be reviewed by regulatory engineer.

Must have temperature class "F" insulation components.

Must be approved by a European Notified Body to IEC 255 and must comply with IEC 950 for an application that uses one set of contacts in each line of a 230 VAC supply and has the coil driven by a SELV circuit.

Notice of Deviation:

(Description of deviation from current release of drawings.)

Special Instructions:

APC Part Number 450-2151A -- Production Rev. 2

Shipping Packaging:

Method and materials:

Egg crate - sufficient to prevent shipping and handling damage.
Enter any other shipping packaging info here:

Inbound Shipping Package Marking requirements:

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

Part Markings:

Date Code or Lot Code, Agency Marks (VDE, UL), Manufacturer Identification and Part Number.

Special Qualifying Instructions / Drawings:

Approved Manufacturer List:

Commodity Type is : Electromechanical

If you can't find a manuf name listed this might be the reason why. **

[illegible]

Vendors Removed from Approved Vendors List:

Part Spec Reviewers Section:

[illegible]

PADS\ViewLogic Section:

Symbol Section

FTP the symbol to the librarian by using the button below or if a generic symbol is used state which symbol to use, i.e. RES.1 or CAP.1 here

FTP Schematic Symbol to Librarian

Select here to upload file to the FTP server.

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. FTP the database to the librarian by using the button below or if a generic decal is to be used, i.e. R1/4W or C1206 then state what decal to use here.

FTP PADS Decal to Librarian

Select here to upload file to the FTP server.

NOTE: After you have Ftp'd your parts to the server you MUST press the submit for CAD Librarian approval button below

Submit for CAD Library Approval

Librarian approval requested on 05/17/2001 08:56:18 AM 05/17/2001 08:56:18 AM

PADS/ViewLogic Administrator Section

New PADS-ViewLogic Part has been Approved 05/14/2001 10:04:35 PM
Library Verified by: Peter Finn on: 05/14/2001

Yes

THE SOLIDWORKS TAB IS ONLY FOR MODELS THAT ARE TO BE PLACED IN THE CORP SOLIDWORKS LIBRARY. USE THE DETAILED TAB FOR FTP'ING THE COMPLETE SET OF FILES THAT WILL DEFINE THE PART. THE SOLIDWORKS MODEL FILE SHOULD BE IN THE SET OF FILES DEFINING THE PART ON THE DETAILED TAB AND THE SOLIDWORKS MODEL FILE SHOULD BE FTP'D ON THE LIBRARY TAB IF THERE IS A LIKELIHOOD OF REUSE FOR THE PART.

FTP Solidworks part to Librarian ?

Select here to upload file to the FTP server.

Reason for SolidWorks file not FTP'd:

Solid Works Administrator Section

(Only last 35 changes kept)



VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 9

VDE File: 19244-3335-0020/
Appendix 9, Page 1 of 22

APC Smart-UPS® On-Line

1000VA und 2000VA

220/230/240 Turmeinheit/Rackmount, 19 Zoll-Einbau

Unterbrechungsfreie Stromversorgung (USV)

Benutzerhandbuch

Deutsch

1: SICHERHEITSINFORMATIONEN

American Power Conversion Corporation (APC) ist der führende nationale und internationale Hersteller von hochentwickelten unterbrechungsfreien Stromversorgungen, redundanten Schaltern, Energieüberwachungssoftware und ähnlichen Produkten. APC Produkte beschützen 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.



Änderungen oder Modifizierungen an diesem Gerät, die nicht ausdrücklich von der für den standardgemäßen Betrieb des Geräts verantwortlichen Stelle genehmigt wurden, können das Erlöschen des Garantieanspruchs zur Folge haben.

SICHERE HANDHABUNG

Aufgrund ihres Gewichts, werden für die Installation der USV zwei Personen benötigt. Um die USV leichter zu machen, können Sie die Batterie während des Positionierens entfernen.



<18 kg



32–55 kg



18–32 kg



>55 kg



Dieses Gerät ist für die Installation in einem temperaturkontrollierten Raum, frei von leitfähigen, verunreinigenden Substanzen bestimmt. Spezifizierungen zum Temperaturbereich finden Sie auf der APC Web-Seite.

ELEKTRISCHE SICHERHEIT

- Um die Feuergefahr zu reduzieren, darf das Anschließen nur an einen Schaltkreis erfolgen, der einen maximal 30 Amp Verzweigungsleitungs-Überstromschutz gemäß der Richtlinien des National Electrical Code ANSI/NFPA aufweist.
- Arbeiten Sie unter gefährlichen Bedingungen nicht allein.
- Vergewissern Sie sich, dass sich Stromeingangskabel, Stecker und Steckdosen in guter Kondition befinden.
- Um das Stromschlagrisiko beim Erden zu reduzieren, entfernen Sie die Geräte vom Wechselstromanschluss, bevor Sie sie installieren oder an andere Geräte anschließen. Schließen Sie das Stromeingangskabel erst wieder an, wenn alle Verbindungen hergestellt sind.

- Benutzen Sie zum Verbinden oder Entfernen von Signalkabeln nach Möglichkeit eine Hand, um Stromschläge durch das Anfassen zweier Oberflächen mit unterschiedlichen elektrischen Erdungen zu Verhindern.
- Schließen Sie Geräte an einen Dreifachanschluss (zwei Pole und Erde) an. Die Steckerbuchse muss an eine entsprechende Verzweigungsleitung/Netzstromsicherung (Sicherung oder Schaltkreis-Sicherung) angeschlossen sein. Das Anschließen an eine andere Art von Steckerbuchse kann Stromschlaggefahr zur Folge haben.
- Gemäß der EMC-Bestimmungen, dürfen die an der USV angeschlossenen Ausgabekabel nicht länger als 10 m sein.

ABSCHALTSICHERHEIT

- Wenn das Gerät eine interne Energiequelle (Batterie) hat, kann die Ausgabe eingeschaltet werden, wenn die Einheit nicht an einen Wechselstromanschluss angeschlossen ist.
- Um steckbare Geräte abzuschalten, halten Sie den AUS-Schalter  länger als eine Sekunde gedrückt. Entfernen Sie alle Geräte vom Stromnetz. Ziehen Sie den Batterieanschluss heraus. Drücken Sie den -Schalter, um die Kapazitäten abzuschalten.
- Geräte mit Steckern enthalten einen Erdungsleiter, der den Kriechstrom vom Ladegerät (Computergerät) trägt. Der Gesamtkriechstrom darf nicht größer als 3.5 mA sein.
- Die Benutzung dieses Geräts in Verbindung mit lebenserhaltenden Apparaten wird nicht empfohlen, wenn ein Versagen des Produkts ein Versagen des lebenserhaltenden Apparats zur Folge hat, oder dessen Sicherheit oder Effektivität einschränken könnte.

BATTERIESICHERHEIT

- Dieses Gerät weist gefährliche Stromspannung auf. Bitte die Einheit nicht auseinanderbauen. Der Batterieaustausch mit Hilfe des unten aufgeführten Verfahrens ist erlaubt. Außer der Batterie enthält diese Einheit keine vom Benutzer auszutauschenden Teile. Reparaturen dürfen nur von ausgebildetem Servicepersonal vorgenommen werden.
- Batterien dürfen nicht verbrannt werden; Explosionsgefahr.
- Batterien dürfen nicht geöffnet oder zerstört werden, da sie ein Elektrolyt enthalten, das schädlich für Haut und Augen ist.
- Die Terminals einer Batterie oder eines Batteriepacks dürfen nicht mit einem Draht oder anderen elektrisch leitenden Objekten verbunden werden.
- Um die Verletzungsgefahr zu verringern, entfernen Sie erst Armbanduhren und Schmuck, z.B. Ringe, bevor Sie Batterien austauschen. Benutzen Sie nur Werkzeug mit isolierten Griffen.
- Tauschen Sie Batterien mit derselben Anzahl und demselben Batterietyp oder Batteriepack aus, die original im Gerät installiert waren.

BATTERIEAUSTAUSCH UND RECYCLING

Informationen zum Austausch von Batteriebausätzen und Batterierecycling erhalten Sie von Ihrem Händler oder auf der APC Web-Seite, www.apc.com/support/



Bitte senden Sie alte Batterien an APC zum Recycling zurück. Sie können dafür das Verpackungsmaterial der neuen Batterie benutzen.

2:

INSTALLATION

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 (mit nicht angeschlossenen Batterien); die Frontblende (separat verpackt), Montierfüße (für die Turmkonfiguration) und ein Informationspaket mit einer CD, einem seriellen Kabel, Stromkabeln, Schrauben für die Montierfüße und Produktdokumentation.



Die USV wird mit nicht angeschlossener Batterie und nicht installierter Frontblende geliefert. Während des Installationsverfahrens werden Sie später die Batterie anschließen und die Frontblende installieren (wie unten beschrieben).

DIE USV PLAZIEREN

Plazieren Sie die USV dort wo sie benutzt werden soll. **Die USV ist sehr schwer.** Aufgrund ihres Gewichtes werden für die Installation zwei Personen benötigt. Um die USV leichter zu machen, können Sie während des Positionierens der USV die Batterie entfernen. Anweisungen dazu finden Sie im Abschnitt *Das Batteriepack entfernen*. Wählen Sie einen Installationsort, der das Gewicht aushält.

Beachten Sie, dass Sie die USV in einem geschützten Bereich installieren sollten, der relativ frei von Staub und gut durchlüftet ist. Versichern Sie sich, dass die Luftlöcher vorne und hinten in der USV nicht blockiert sind. Lassen Sie auf beiden Seiten mindestens 2,5 cm Zwischenraum.

Nehmen Sie die USV nicht in Betrieb, wenn Temperatur und Luftfeuchtigkeit außerhalb der spezifizierten Grenzen liegen. Die Grenzwerte finden Sie auf der APC Web-Seite (www.apc.com).

Plazierung

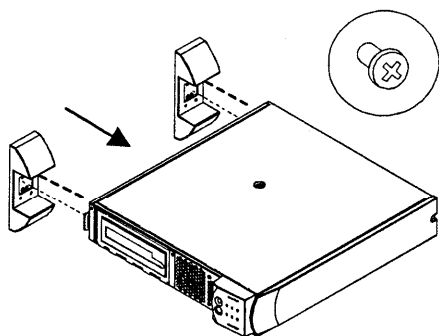


INSTALLATION

1. DIE STÜTZFÜSSE MONTIEREN

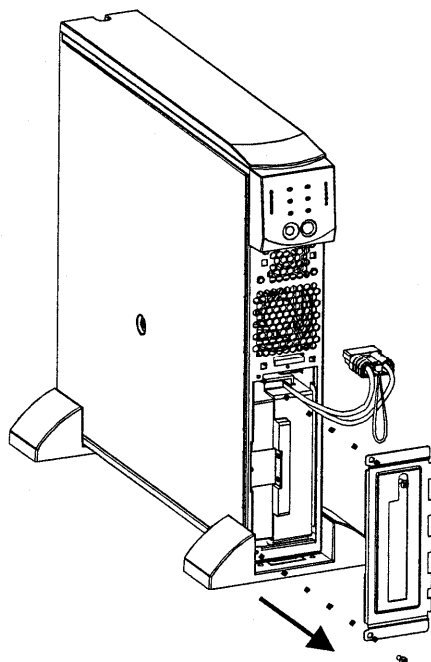


Wird die USV in Turmkonfiguration benutzt, müssen die Stützfüße zur Stabilisierung montiert werden.



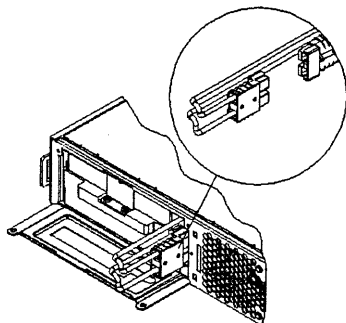
1. Sie benötigen die zwei Stützfüße und die vier in Plastik verpackten Schrauben, die mit der USV geliefert wurden.
2. Legen Sie die USV vorsichtig auf die Seite.
3. Benutzen Sie die Schrauben, um die Stützfüße fest an die Unterseite der USV zu montieren.
4. Stellen Sie die USV vorsichtig auf die Füße.

2. DIE BATTERIETÜR ENTFERNEN



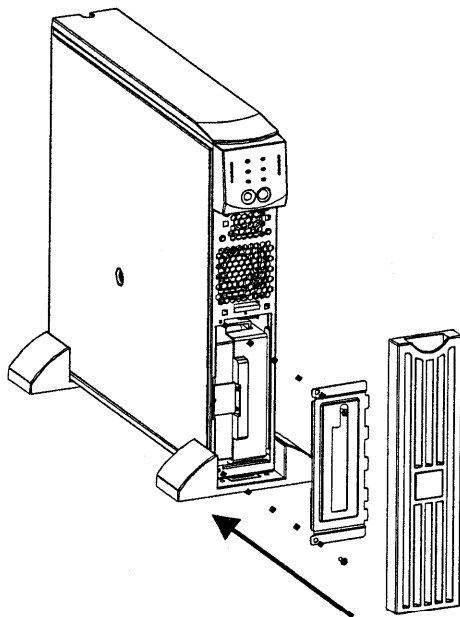
1. Suchen Sie an der Vorderseite der USV das Batteriefach. Der Batterieanschluss befindet sich an Kabeln, die durch eine Öffnung in der Batterietür in das Batteriefach führen.
2. Entfernen Sie mit einem Schraubenzieher die zwei Batterietürschrauben, die sich an den linken Ecken der Batterietür befinden. Bewahren Sie die Schrauben gut auf, da Sie sie später wieder anbringen werden.
3. Entfernen Sie die Batterietür, indem Sie sie entlang der Kabel mit dem Batterieanschluss ziehen (der Anschluss passt durch die Öffnung in der Batterietür). Legen Sie die Batterietür zur Seite.

3. DIE BATTERIE ANSCHLIESSEN



1. Um die Batterie anzuschließen, schieben Sie den Anschluss in die Buchse im Batteriefach. Drücken Sie kräftig, um eine feste Verbindung herzustellen. Sie hören den Anschlussstecker einrasten, wenn er sich in der richtigen Position befindet.
2. Schieben Sie das Batteriekabel und das weiße Band in das Fach mit dem Batterieanschluss.

4. DIE BATTERIETÜR UND DIE FRONTBLENDE BEFESTIGEN




1. Benutzen Sie die zwei Batterietürschrauben, um die Batterietür wieder an der USV zu befestigen. Die Batterietür verdeckt die Batteriekabel und das weiße Band.
2. Die USV wird getrennt von der Frontblende verschickt (im selben Paket, jedoch separat verpackt). Packen Sie die Blende aus und halten Sie sie mit dem ausgeschnittenen Bereich nach oben gerichtet. Schieben Sie das hervorstehende Stück unten an der Blende in den Schlitz unten an der USV. Lassen Sie die Frontblende vorsichtig einrasten. Die Blende kann jederzeit entfernt werden, indem Sie das obere Ende vorsichtig ausrasten lassen und die Blende nach oben hin aus dem Schlitz unten an der USV herausziehen.

5. GERÄTE AN DIE USV ANSCHLIESSEN UND DIE USV AN DAS STROMNETZ ANSCHLIESSEN

1. Stecken Sie an der Rückseite den Buchsenstecker des Stromeingangskabels in die Steckerbuchse. Schließen Sie danach den Stiftstecker an eine zwei-polige, drei-drahtige, geerdete Steckerbuchse an. Vermeiden Sie den Gebrauch von Verlängerungskabeln und Adaptersteckern.
2. Schließen Sie die gewünschten Geräte mit Hilfe der mitgelieferten Stromkabel an die USV an.
3. Schalten Sie alle angeschlossenen Geräte ein. Um die USV als Hauptschalter zum Ein- und Ausschalten zu benutzen, vergewissern Sie sich, dass alle angeschlossenen Geräte eingeschaltet sind. Die Geräte erhalten keinen Strom, bis die USV eingeschaltet wird.

6. SCHALTEN SIE DIE USV EIN

Vergewissern Sie sich, dass die Batterie angeschlossen ist, bevor Sie die USV einschalten!

Drücken Sie den  -Schalter vorne an der USV, um sie einzuschalten. Alle angeschlossenen Geräte, die eingeschaltet sind, werden nun mit Strom versorgt.



Die USV lädt ihre Batterie auf, wenn sie an das Stromnetz angeschlossen ist. Die Batterie wird während der ersten normalen vierundzwanzig Betriebsstunden vollständig aufgeladen. Während des ersten Ladezeitraums können Sie KEINE volle Laufzeit erwarten.

Die Einheit vollzieht automatisch einen Selbsttest, wenn sie eingeschaltet wird und alle zwei Wochen danach (Standard). Informationen zum Ändern des Standardintervalls finden Sie im Abschnitt **Benutzerkonfiguration** in diesem Handbuch.

Informationen zum Einschalten der USV, wenn kein Netzstrom vorhanden ist, finden Sie unter Kaltstart im Abschnitt **Betrieb** in diesem Handbuch.

7. ZUBEHÖR (OPTIONAL)

Die USV ist mit einem Smartslot für Zubehör ausgestattet. Informationen über verfügbares Zubehör finden Sie auf der APC Web-Seite, www.apc.com.

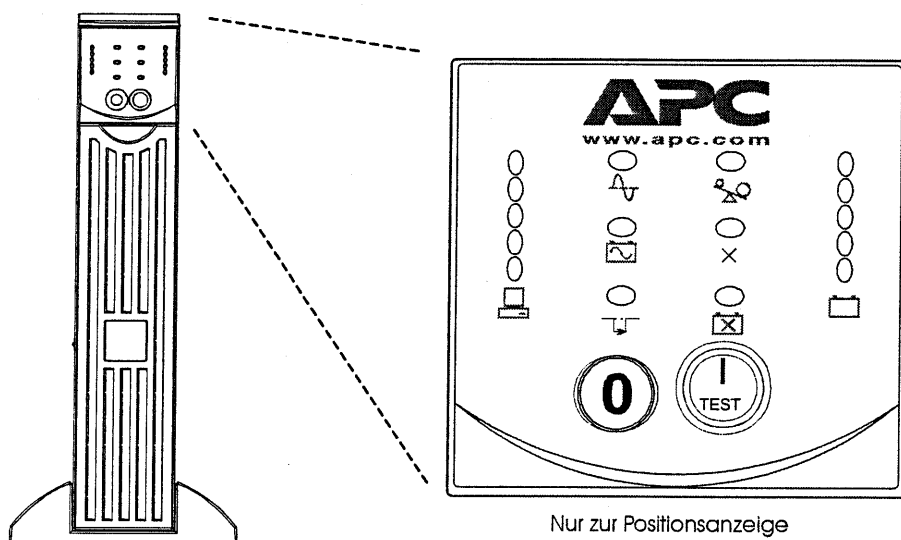
Zur weiterreichenden Computersystemsicherheit können Sie die PowerChutePlus® Smart-UPS Überwachungssoftware installieren. Sie gewährleistet automatisches, unbeaufsichtigtes Herunterfahren der meisten, großen Netzwerkbetriebssysteme. PowerChute **Plus**® und die dazugehörige Dokumentation befinden sich auf der der USV beiliegenden CD.




3: BETRIEB

ANZEIGEN UND STEUERUNG

An der USV befinden sich die Steuerung und die Betriebsindikatoren an der Vorderseite. An der Rückseite der USV befinden sich die Eingangs- und Ausgangsanschlüsse.

VORDERSEITE




Die EIN- und AUS--Schalter werden zum Ein- und Ausschalten der USV, sowie als Hauptsteuerung für die, an der USV angeschlossenen Geräte benutzt. (Vergewissern Sie sich, dass alle angeschlossenen Geräte eingeschaltet sind) Die USV bleibt eingeschaltet, solange sie an Strom angeschlossen ist und der -Schalter nicht gedrückt wird.

BETRIEB


Einschalten



Drücken Sie kurz den -Schalter, um die USV und die angeschlossenen Geräte mit Strom zu versorgen.

Kaltstart

Ist die USV ausgeschaltet und besteht kein Netzstrom, können Sie die Kaltstartfunktion benutzen, um die angeschlossenen Geräte mit Batteriestrom der USV zu versorgen. Ein Kaltstart ist kein standardmäßiges Verfahren. Um


einen Kaltstart durchzuführen, drücken und halten Sie den -Schalter gedrückt. Die USV gibt erst einen kurzen und dann einen langen Piepton von sich. Lassen Sie den Schalter während des langen Pieptons los, und der Kaltstart wird durchgeführt.



Das Ladegerät behält das Aufladen der Batterie bei, wenn die USV an Netzstrom angeschlossen wird und Stromspannung vorhanden ist.

Ausschalten



Drücken Sie kurz den -Schalter, um die USV und alle daran angeschlossenen Geräte auszuschalten.

Auslastung

○ 85%
○ 68%
○ 51%
○ 34%
○ 17%




Die fünf LED-Anzeigen vorne links zeigen die Prozentzahl des verfügbaren Stroms an, die von den an der USV angeschlossenen Geräten benutzt wird. Wenn z.B. drei LEDs aufleuchten, benutzen die angeschlossenen Geräte zwischen 51% und 68% der USV-Kapazität. Leuchten alle LEDs, benutzen die angeschlossenen Geräte zwischen 85% und 100% der Kapazität. Testen Sie Ihr System sorgfältig, um sicherzustellen, dass die USV nicht überlastet wird. In der Grafik links ist der Kapazitätsbereich jeweils neben der LED angegeben (Kapazitätsbereiche werden an der eigentlichen USV nicht aufgeführt).

SELBSTTEST

Automatischer Selbsttest


Die USV führt automatisch einen Selbsttest durch, wenn sie zuerst eingestellt wird, und danach alle weiteren zwei Wochen (Standard). Informationen zum Ändern des Standardintervalls finden Sie in der Tabelle **Benutzerkonfigurationen** in diesem Handbuch.

Der automatische Selbsttest erleichtert die Wartung, da periodische manuelle Selbsttests nicht notwendig sind. Während des Selbsttests laufen angeschlossene Geräte für kurze Zeit auf Batterie. Besteht die USV den Selbsttest, wird der On-Line-Betrieb wiederhergestellt. 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 bestandenem Test nicht beeinflusst. Um das Testresultat zu bestätigen, 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.

Manueller Selbst-test



Halten Sie den -Schalter gedrückt, bis die USV zwei Pieptöne von sich gibt, um den Selbsttest zu initiieren.

EINGANGSSPANNUNG

Während des normalen Betriebs überwacht die USV die Eingangsspannung und gibt Strom an die angeschlossenen Geräte weiter. Erfährt Ihr System über eine lange Zeit zu hohe oder zu niedrige Spannung, sollten Sie Ihre Eingangsspannung von einem Elektriker überprüfen lassen. Wenden Sie sich im Falle von weiteren Problemen an Ihren Stromversorger.

On-Line



Die On-Line-Anzeige leuchtet auf, wenn die USV Netzstrom benutzt und Doppelkonversion durchführt, um angeschlossene Geräte mit Strom zu versorgen.

Stromzufuhr

0 266

0 248

0 229


0 210

0 192



Die USV verfügt über eine Diagnosefunktion, die die Stromeingangsspannung anzeigt. Schließen Sie die USV an das normale Stromnetz an.



Halten Sie den -Schalter gedrückt, um die Anzeige für die Stromeingangsspannung 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).



Die USV startet für dieses Verfahren einen Selbsttest, der die Spannungsanzeige jedoch nicht beeinflusst.

Die Anzeige indiziert, dass sich die Spannung zwischen dem angezeigten Wert und dem nächst höheren Wert befindet. Wenn z.B. drei LEDs aufleuchten, liegt die Eingangs-spannung zwischen 229 und 248VAC.

Leuchten keine LEDs auf, obwohl die USV an einen Stromkreis angeschlossen ist, ist die Leitungsspannung extrem niedrig.

Leuchten alle 5 LEDs auf, ist die Leitungsspannung extrem hoch und sollte von einem Elektriker überprüft werden.

Bypass



Diese LED zeigt an, dass sich die USV im Bypassmodus befindet. Batterienotstromversorgung ist in diesem Modus nicht verfügbar. Netzstrom wird direkt an die angeschlossenen Geräte gegeben. Die USV geht aufgrund eines Befehls vom seriellen Port oder nach einem internen USV-Fehler auf diesen Modus über.

Fehler



Diese LED zeigt an, dass die USV einen internen Fehler entdeckt hat. Weitere Informationen hierzu finden Sie im Abschnitt Fehlersuche (Troubleshooting).

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). Der Alarm stoppt, wenn die USV zum On-Line-Betrieb zurückkehrt.

Batteriestrom Leuchtet die Batteriestrom-Anzeige auf, versorgt die USV die an ihr angeschlossenen Geräte mit Batteriestrom.



Batterie- aufladung

○ 96%
○ 72%
○ 48%
○ 24%
○ 0%



Die fünf LEDs vorne rechts zeigen die aktuelle Aufladung der Batterie als Prozentsatz der Batteriekapazität an. Leuchten alle fünf LEDs auf, ist die Batterie vollständig aufgeladen. Die LEDs werden nach und nach von oben nach unten ausgeblendet, wenn die Batteriekapazität sinkt. Zum Ablesen der Grenzwerte für die Batteriekapazität, siehe Abbildung links (Werte sind auf der eigentlichen USV nicht angegeben).


Als Batteriewarnung leuchten die LEDs für die entsprechende Kapazität auf, und die USV piept. Die Standardeinstellung für die Batteriewarnung kann im Terminalmodus oder mit Hilfe der optionalen PowerChute Software geändert werden. Hinweise dazu finden Sie unter **Benutzerkonfiguration** in diesem Handbuch. Die Laufzeiten für Ihr USV-Modell in Minuten, finden Sie in der Laufzeit-Tabelle auf der APC Web-Seite.

Überlastet



Die USV gibt einen durchgehenden Ton von sich und die LED leuchtet auf, wenn ein Überlasten vorliegt (wenn die angeschlossenen Geräte die auf der APC Web-Seite spezifizierten, maximale Last überschreiten).

Die USV wechselt bei einem Überlasten möglicherweise in den Bypassmodus über. In diesem Fall kann die USV zum On-Line-Modus gewechselt werden,

indem Sie den -Schalter drücken. Entfernen Sie unnötige Geräte von der USV, um die Überlastung zu beseitigen.

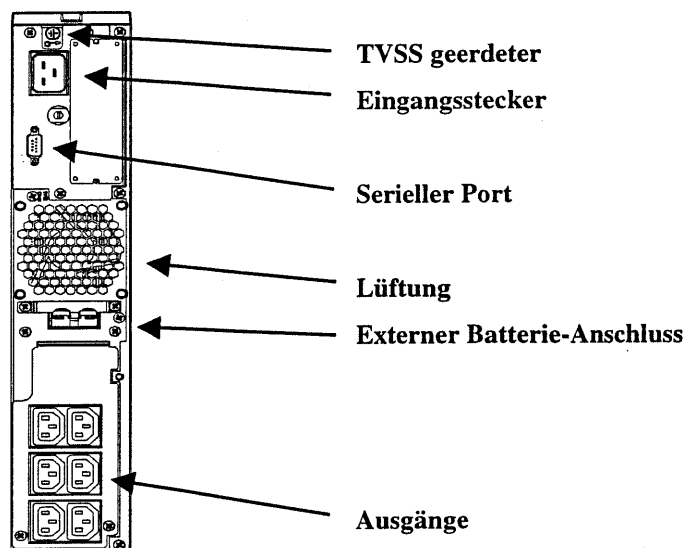
Batterie ersetzen



Wird ein Batterie-Selbsttest nicht bestanden, gibt die USV für eine Minute kurze Pieptöne von sich und die LED *Batterie ersetzen* leuchtet auf. Das Aufleuchten der LED zeigt, dass die Batterie nicht angeschlossen ist. Die USV wiederholt den Alarm alle fünf Stunden. Vergewissern Sie sich, dass das Batteriepack korrekt angeschlossen ist. Ist dies der Fall, führen Sie den Selbsttest durch, nachdem sich die Batterie 24 Stunden aufgeladen hat, um die Statusmeldung der LED zu bestätigen. Der Alarm stoppt, wenn die Batterie den Selbsttest besteht.

ABSCHALTMODUS

Im Abschaltmodus stoppt die USV die Stromabgabe an die angeschlossenen Geräten und wartet auf das Ende des Stromausfalls. Ist keine Eingangsspannung vorhanden, können externe Geräte, wie z.B. ein Server, die an dem seriellen Port oder dem Smartslotzubehör angeschlossen sind, veranlassen, dass sich die USV abschaltet. Dies wird normalerweise durchgeführt, um Batteriekapazität zu sparen, nachdem geschützte Server ausgeschaltet sind. Im Abschaltmodus lässt die USV die LEDs an der Vorderseite sequentiell aufleuchten.



GRUNDANSCHLÜSSE

Serieller Port



Stromverwaltungssoftware und Schnittstellenkits können mit der USV benutzt werden. **Benutzen Sie jedoch nur solche Schnittstellenkits, die von APC anerkannt sind.** Verbinden Sie das Schnittstellenkabel mit dem 9-poligen seriellen Port. Befestigen Sie die Verbindungsschrauben.

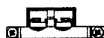


Benutzen Sie ein von APC geliefertes Kabel, um den seriellen Port anzuschließen. Benutzen Sie KEIN standardmäßiges, seriellles Schnittstellenkabel, da es mit dem USV-Port nicht kompatibel ist.

TVSS Schraube

Die USV verfügt über eine Schraube zur vorübergehenden Spannungsstoss-unterdrückung (TVSS), für den Anschluss von Erdungskabeln verwendeter Spannungsableitgeräte, wie z.B. Telefon- und Netzwerkleitungsschutzeinrichtungen.

Externer Batterie-Anschluss



Externe Batteriepacks können an die USV angeschlossen werden, um bei Stromausfällen längere Laufzeit zu erzielen. Entfernen Sie dafür die Schutzabdeckung vom Anschluss-Port und schließen Sie das mit dem Batteriepack mitgelieferte Kabel an. Mehrere Batteriepacks können aneinander angeschlossen werden, um die gewünschte Laufzeit zu erzielen.



Eingangsschaltkreis

Anweisungen zum Anschließen optionaler, externer Batteriepacks an die USV finden Sie im *Smart-UPS On-Line Batteriepack Benutzerhandbuch*. Diese Smart-UPS On-Line XL kann maximal zehn externe Batteriepacks unterstützen.

Springt die Sicherung heraus, müssen Sie die an der USV angeschlossenen Geräte reduzieren und den Austrittsarm wieder hereindrücken.

BATTERIEBETRIEB

Die Smart-UPS wechselt bei einem Stromausfall automatisch auf Batteriebetrieb über. Während des Batteriebetriebs ertönt ein interner Alarm (periodisches Piepen). Drücken Sie den EIN-Schalter (Vorderseite), um den USV-Alarm abzustellen (gilt nur für den gegenwärtigen Alarm). Wenn Sie die PowerChute Software benutzen, können Sie den Alarm ändern. Wird die Eingangsspannung nicht wiederhergestellt, versorgt die USV die angeschlossenen Geräte mit Strom, bis die Batterie leer ist. Die USV beginnt durchgehend zu piepen, wenn Strom nur noch für etwa zwei Minuten zur Verfügung steht. Wenn Sie einen Computer benutzen, müssen Sie Ihre Dateien manuell speichern und ihn herunterfahren, bevor sich die USV abschaltet. Dies gilt nicht, wenn Sie die PowerChute Überwachungssoftware benutzen, weil diese ein automatisches, unbeaufsichtigtes Herunterfahren durchführt.



Die USV-Batterielaufzeit hängt vom Gebrauch und der Umgebung ab. Wir empfehlen, dass Sie die Batterien alle drei Jahre ersetzen. Informationen über die etwaigen Laufzeiten finden Sie in der Laufzeit-Tabelle für die Smart-UPS On-Line auf der APC Web-Seite.

BENUTZERKONFIGURATION

HINWEIS: ZUM EINSTELLEN DIESER OPTIONEN BENÖTIGEN SIE DIE ENTSPRECHENDE SOFTWARE, OPTIONALE HARDWARE ODER DIE KONFIGURATION IM TERMINALMODUS.			
FUNKTION	STANDARD-EINSTELLUNG	BENUTZER-OPTIONEN	BESCHREIBUNG
Automatischer Selbsttest	Alle 14 Tage (336 Stunden)	Alle 7 Tage (168 Stunden), nur beim Starten, ohne Selbsttest	Diese Funktion bestimmt den Intervall, 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 definieren.	Benutzen Sie dieses Feld, um die USV für Netzwerkverwaltungszwecke zu kennzeichnen.
Datum des letzten Batterieaustauschs	Herstellungsdatum	Datum für den Batterieaustausch	Tragen Sie dieses Datum neu ein, wenn Sie die Batterie ersetzen.
Minimale Kapazität vor Wiedereinschalten	0 Prozent	15, 25, 35, 50, 60, 75, 90 Prozent	Die USV lädt ihre Batterien bis zum angegebenen Prozentsatz auf, bevor sie sich nach dem Herunterfahren wieder hochfährt.

HINWEIS: ZUM EINSTELLEN DIESER OPTIONEN BENÖTIGEN SIE DIE ENTSPRECHENDE SOFTWARE, OPTIONALE HARDWARE ODER DIE KONFIGURATION IM TERMINALMODUS.			
FUNKTION	STANDARD-EINSTELLUNG	BENUTZER-OPTIONEN	BESCHREIBUNG
Dauer der Batteriewarnung	2 Minuten	5, 7, 10, 12, 15, 18, 20 Minuten	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.
Alarmverzögerung nach Stromausfall	5 Sekunden Verzögerung	30 Sekunden Verzögerung, bei schwacher Batterie kein Alarm	Stellen Sie die Alarmverzögerung ein, um Alarm aufgrund unbedeutender Stromstörungen zu vermeiden
Abschaltverzögerung	20 Sekunden	0, 60, 120, 240, 480, 720, 960 Sekunden	Diese Funktion bestimmt, wann das eigentliche Herunterfahren durchgeführt wird, nachdem die USV den Befehl zum Herunterfahren erhalten hat.
Synchronisierte Einschaltverzögerung	0 Sekunden	20, 60, 120, 240, 480, 720, 960 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).
Einstellung der Ausgangsspannung	230 VAC	240, 220, 225 VAC	Nominale Einstellung der Ausgangsspannung.
Hoher Transferpunkt	+ 10% der Ausgangsspannungseinstellung	+5%, +15%, +20%	Maximale Spannung, die die USV während des internen Bypass an angeschlossene Geräte weitergibt.
Niedriger Transferpunkt	-15% der Ausgangsspannungseinstellung	-20%, -25%, -30%	Minimale Spannung, die die USV während des internen Bypass an angeschlossene Geräte weitergibt.
Ausgangsfrequenz	Automatisch	50 ± 3 Hz, 50 ± 0.1 Hz, 60 ± 3 Hz, 60 ± 0.1 Hz	Stellt die mögliche Ausgangsfrequenz der USV ein. Wenn möglich, verfolgt die Ausgangsfrequenz die Eingangsfrequenz. Die automatische Einstellung ermöglicht 50 +/-3 oder 60 +/-3 Hz, entsprechend der Eingangsfrequenz.
Einheitposition	Turmeinheit	Rackmount, 19 Zoll-Einbau	Die Betriebskonfiguration der USV. Der optionale Schienenbausatz SUOLRK wird benötigt, um die USV zur Rackmount-Konfiguration zu konvertieren.

HINWEIS: ZUM EINSTELLEN DIESER OPTIONEN BENÖTIGEN SIE DIE ENTSPRECHENDE SOFTWARE, OPTIONALE HARDWARE ODER DIE KONFIGURATION IM TERMINALMODUS.			
<i>FUNKTION</i>	<i>STANDARD-EINSTELLUNG</i>	<i>BENUTZER-OPTIONEN</i>	<i>BESCHREIBUNG</i>
Anzahl der externen Batteriepacks	0	Anzahl der angeschlossenen Batteriepacks	Definiert die Anzahl der angeschlossenen, externen Batteriepacks zur Kalkulierung der korrekten Laufzeit. Fügen Sie zu dieser Zahl nicht die internen Batteriepacks hinzu.

TERMINALMODUS

Der Terminalmodus ist eine menügesteuerte Schnittstelle, die eine erweiterte Konfiguration der USV ermöglicht. Auf diese Schnittstelle kann mit einem Computer und einer standardmäßigen seriellen Kommunikationsanwendung, wie z.B. Hyperterminal, zugegriffen werden. Um den Terminalmodus zu benutzen und aufzurufen:

1. Schließen Sie einen Computer mit den mitgelieferten Kabeln an die USV an.
2. Rufen Sie eine serielle Kommunikationsanwendung, wie z.B. Hyperterminal, auf.
3. Spezifizieren Sie den Kommunikations-Port an den Sie angeschlossen sind.
4. Definieren Sie die folgenden Einstellungen: 2400 Baud, 8 Datenbits, keine Parität, ein Stopbit und kein Protokoll.
5. Drücken Sie die Eingabetaste.
6. Folgen Sie den Anweisungen auf dem Bildschirm, um im Terminalmodus fortzufahren.

4: TRANSPORT, INSTANDHALTUNG UND FEHLERSUCHE

DIE USV TRANSPORTIEREN



Vergewissern Sie sich, dass die Batterie NICHT an die USV angeschlossen ist, bevor Sie die USV transportieren, um mögliche Schäden zu verhindern. (Versandrichtlinien können *erfordern*, dass Batterien während des Transports nicht angeschlossen sind.) Die Batterie kann jedoch in der USV verbleiben, sie muss nicht entfernt werden.

Diese Regel gilt, wenn die USV transportiert oder in ein 19 Zoll-Rack oder -system installiert wird.

Folgen Sie diesen Schritten, um die USV für den Transport vorzubereiten.



Aufgrund ihres Gewichts, sind zwei Personen notwendig, um die USV aus dem 19 Zoll-Rack zu entfernen.

1. Schalten Sie alle Geräte aus, die an die USV angeschlossen sind.
2. Trennen Sie die USV von der Stromversorgung.
3. Befindet sich Ihre USV in Turmkonfiguration, übergehen Sie diesen Schritt und fahren Sie mit Schritt 4 fort. Um die Einheit aus einem 19 Zoll-Schrank zu entfernen, führen Sie die Installationsschritte für die USV in den 19 Zoll-Schrank in umgedrehter Reihenfolge durch. Informationen dazu finden Sie in den *Rackmount, 19 Zoll-Einbau Installationsanweisungen*, die dem *Schienenbausatz* beiliegen.
4. Entfernen Sie die Frontblende. Wenn Sie die originale USV-Verpackung benutzen, müssen Sie die Frontblende von der USV getrennt verpacken. Führen Sie nun die Schritte zum Anbringen der Frontblende in umgedrehter Reihenfolge durch (siehe Abschnitt *Installation* in diesem Handbuch).
5. Entfernen Sie den Batterieanschluss. Führen Sie dazu die Schritte zum Anschließen der Batterie in umgedrehter Reihenfolge durch (siehe Abschnitt *Installation* in diesem Handbuch).
6. Befindet sich Ihre USV in Turmkonfiguration, entfernen Sie die Füße, indem Sie die Schritte zum Anschließen der Stützfüße in umgedrehter Reihenfolge durchführen (siehe Abschnitt *Installation* in diesem Handbuch).
7. Sie können die USV nun in der originalen Verpackung für den Transport verpacken.

LAGERUNG

LAGERBEDINGUNGEN:

Lagern Sie die USV an einem kühlen, trockenen Ort, mit voll aufgeladenen Batterien. Entfernen Sie alle Kabel, die an den seriellen Port angeschlossen sind, um unnötiges Entladen der Batterien zu verhindern.

LÄNGERE LAGERUNG:

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

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

DAS BATTERIEMODUL AUSTAUSCHEN

Die USV hat ein einfach zu ersetzendes, schnell austauschbares Batteriepack. Das Austauschen 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 Batteriepacks erhalten Sie bei Ihrem Händler oder direkt bei APC. Dieses Verfahren wird sowohl für die Turmonfiguration, als auch die Rackmount-Konfiguration benutzt.



Durch das Entfernen der Batterie sind die Geräte nicht mehr vor Stromausfällen geschützt.

DAS BATTERIEPACK ENTFERNEN UND WIEDER INSTALLIEREN

Seien Sie beim Entfernen und Installieren des Batteriepacks vorsichtig; es ist sehr schwer.

Die Batterie entfernen

1. Entfernen Sie die Frontblende und die Batterietür, falls diese montiert sind (Anweisungen hierzu finden Sie im Abschnitt **Installation** in diesem Handbuch).
2. Ist die Batterie angeschlossen, entfernen Sie den Anschlussstecker, indem Sie fest daran ziehen.
3. Halten Sie das Batteriepack fest und ziehen Sie es aus der Einheit heraus. Wenn es fast ganz aus der USV heraus ist, lässt es sich nicht weiterziehen. Heben Sie das Batteriepack nun vorsichtig über die Stopkante und ziehen Sie es vollständig heraus. Die Kabel sind mit dem Batteriefach verbunden. Ziehen Sie NICHT an den Batteriekabeln oder dem weißen Band, während Sie die Batterie entfernen.

Die Batterie installieren

1. Stützen Sie das Batteriepack von unten ab, richten Sie es mit der Öffnung aus und schieben Sie es in das Batteriefach.
2. Schließen Sie die Batterie wieder an die USV an. Befestigen Sie die Batterietür und die Frontblende (Anweisungen hierzu finden Sie im Abschnitt **Installation** in diesem Handbuch).

Senden Sie alte Batteriepacks an APC zum Recycling zurück.

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	
Der EIN-Schalter wurde nicht gedrückt.	Drücken Sie einmal den EIN-Schalter, um die USV und die Geräte zu starten.
Die USV ist nicht an das Stromnetz angeschlossen.	Vergewissern Sie sich, dass das Stromeingangskabel von der USV zum Stromnetz richtig angeschlossen ist.
Der USV-Sicherungsautomat ist herausgesprungen.	Reduzieren Sie die Geräte der USV, indem Sie Geräteanschlüsse entfernen und den Sicherungsautomat (hinten an der USV) wieder neu setzen (den Austrittsarm wieder hereindrücken).
Sehr niedrige oder keine Stromspannung.	Prüfen Sie den Stromfluss zur USV, indem Sie eine Tischlampe o.ä. anschließen. Ist das Licht sehr gedämpft, lassen Sie die Stromspannung überprüfen.
Batterie ist nicht korrekt angeschlossen.	Vergewissern Sie sich, dass der Batterieanschluss voll belegt ist.
DER USV-BETRIEB ERFOLGT AUF BATTERIE, OBWOHL NORMALE STROMSPANNUNG BESTEHT	
Der USV-Sicherungsautomat ist herausgesprungen.	Reduzieren Sie die Geräte der USV, indem Sie Geräteanschlüsse entfernen und den Sicherungsautomat (hinten an der USV) wieder neu setzen (den Austrittsarm wieder hereindrücken).
Sehr hohe, niedrige oder verzerrte Stromspannung. Preiswerte, kraftstoffbetriebene Generatoren können die Spannung verzerren.	Schließen Sie die USV an ein anderes Stromnetz oder an einen anderen Stromkreis an. Testen Sie die Eingangsspannung mit der Stromspannungsanzeige.
DIE LEDS UMGEHUNG, ÜBERLASTET UND FEHLER LEUCHTEN AUF	
Es sind zu viele Geräte an die USV angeschlossen.	Entfernen Sie unnötige Geräte. Drücken Sie den EIN-Schalter, um die Stromversorgung wiederherzustellen.
Externe Überlastung.	Warten Sie bis die Überlastung vorüber ist. Es kann sein, dass Sie den EIN-Schalter drücken müssen, um die USV wieder rückzustellen.
DIE LEDS FEHLER UND ÜBERLASTET LEUCHTEN AUF; DIE LED UMGEHUNG LEUCHTET NICHT AUF	
Die USV ist überlastet.	Entfernen Sie unnötige Geräte. Drücken Sie erst den AUS-Schalter und dann den EIN-Schalter, um die Stromversorgung wiederherzustellen.
DIE LED FEHLER LEUCHTET AUF; DIE LED ÜBERLASTET LEUCHTET NICHT AUF	
Interner USV-Fehler.	Benutzen Sie die USV nicht. Schalten Sie sie aus und wenden Sie sich an den Kundenservice.
DIE LED BATTERIE AUSTAUSCHEN LEUCHTET AUF	
Schwache Batterie.	Warten Sie mindestens vierundzwanzig 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.
Die Batterie ist nicht richtig angeschlossen.	Vergewissern Sie sich, dass der Batterieanschluss voll belegt ist.
DIE USV PIEPT HIN UND WIEDER	
Normaler USV-Betrieb.	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.

PROBLEM UND MÖGLICHE URSACHE	LÖSUNG
<i>DIE LEDS AN DER VORDERSEITE BLINKEN SEQUENTIELL</i>	
Die USV wurde nicht manuell, sondern durch eine Software oder eine optionale Zubehörkarte ausgeschaltet.	Keine. Die USV startet automatisch, wenn die Eingangsspannung wiederhergestellt ist.

5: KONTAKT-, REGULATIONS- UND GARANTIEINFORMATIONEN

APC KONTAKTIEREN

Informationen hierzu finden auf der APC Internet-Seite:

<http://www.apcc.com/support/contact>

PRÜFUNGSSTELLEN-GENEHMIGUNGEN



ÜBEREINSTIMMUNGSERKLÄRUNG (DECLARATION OF CONFORMITY)



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

Application of Council Directives:

73/23/EEC, 93/68/EEC
89/336/EEC, 92/31/EEC, 93/68/EEC, 91/157/EEC

Type of Equipment:

Uninterruptible Power Supply
SUOL1000XLI, SUOL2000XLI

Model Numbers:

Manufacturer's Name and Address:

American Power Conversion
132 Fairgrounds Road
West Kingston, Rhode Island, 02892, USA

-or-

American Power Conversion (A. P. C.) b. v.
Ballybritt Business Park
Galway, Ireland

-or-

American Power Conversion
Main Avenue, Peza
Rosario, Cavite, Philippines

-or-

American Power Conversion
2nd Street, Peza, Cavite Economic Zone
Rosario, Cavite Philippines

-or-

American Power Conversion
Lot 32 Phase 1 Carmelray Industrial Park
Canlubang, Calamba, Laguna Philippines

-or-

APC (Suzhou) UPS Co., Ltd
No. 189 Suhong Road, China-Singapore
Suzhou Industrial Park
Suzhou 215021, Jiangsu, P.R.C

Importer's Name and Address:

American Power Conversion (A. P. C.) b. v.
Ballybritt Business Park
Galway, Ireland

Place: N. Billerica, MA U.S.

Richard J. Everett 15 Apr 01
Richard J. Everett, Sr. Regulatory Compliance Engineer

Place: Galway, Ireland

Ray S. Ballard 15 Apr 01
Ray S. Ballard, Managing Director, Europe
Phone: 353 917 02000 Fax: 353 9175 6909

BESCHRÄNKTE GARANTIE

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VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 10

VDE File: 19244-3335-0020
Appendix 10, Page 1 of 3

Certificate of Conformity

issued by Curtis-Straus

Company: APC Corporation BNS Group
Product Tested: SUOL2000XL1 and SUOL1000XL1
Testing Date: May 9, 10, 18, 23, 24, June 12 and 24, 2001
Report No.: EB0513-1

A sample of the product as configured in the accompanying test report has been found to comply with the following standards:

EMC Emissions:

- EN 55022:1998 Class A ITE emissions requirements (EU)
- EN61000-3-2:1995/A14:2000 Limits for harmonic current emissions (equipment input current up to and including 16A per phase)
- EN61000-3-3:1995 Limitation of voltage fluctuations and flicker in low-voltage supply systems for equipment with rated current up to and including 16 A

EMC Emissions and Immunity:

- EN 50091-2: 1995 EMC requirements for UPS

EMC Immunity:

• EN 55024:1998 Information technology equipment - immunity characteristics for the following standards:

- EN 61000-4-2:1999 Electrostatic Discharge
- EN 61000-4-3:1998 Radiated RF Immunity
- EN 61000-4-4:1995 Electrical fast transient/burst immunity
- EN 61000-4-5:1995 Lightning Strike (Surge)
- EN 61000-4-6:1996 Immunity to conducted disturbances, induce by radio-frequency fields
- EN 61000-4-8:1994 50Hz Power frequency, magnetic field immunity
- EN 61000-4-11:1994 Voltage dips, short interruptions and voltage variations immunity

Attested to by the hands and seals:

For Curtis-Straus

For the Manufacturer or Importer

M Hussain 8/9/01

Test Engineer

Date

Date

Michael Buchholz 9 Aug 01

EMC Manager

Date

For original signatures see hard copy of the report.

To: **Stephen Lee**, APC Corporation BNS Group

From: Mairaj Hussain, Curtis-Straus LLC.

Re: Testing of the SUOL2000XL1 and SUOL1000XL1

Date: 6 August, 2001

Form Final Report REV 19-Jan-2001 (DW)

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VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 11

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	Manuf. & Model	Type	Serial #	Cal. date	Cal Due
Calibrate					
191	Bell - CG100D	Current Probe/Amp	NONE	06/06/01	06/01/2002
196	Universal enterprise - DVWI	Digital Multimeter	0	5/21/01	05/01/2002
222	Valhalla - 2101	Watt Meter	3-7450	08/22/96	08/01/97
224	Fluke - 8012A	Digital Multimeter	3660509		
227	Stanford Research - SR630	Thermometer	17134	7/01/98	12/01/2000
228	Stanford Research - SR630	Thermometer	17149	9/21/00	08/01/2001
229	Voltech - PM3000; 3 Channel	Watt Meter	3570	9/21/98	09/01/99
231	Fluke - 52	Thermometer	5120320	11/08/00	10/01/2001
232	Fluke - 51	Thermometer	4910076		
233	Fluke - 70	Digital Multimeter	53200782	5/21/01	05/01/2002
234	Fluke - 73	Digital Multimeter	50601221	11/22/99	11/01/2000
234	Fluke - 73	Digital Multimeter	50601221	12/13/00	12/01/2001
[Replication or Save Conflict]					
235	Associated Research - 4040A	HyPot Tester	1802	11/08/00	10/01/2001
236	Associated Research - 5014A	HyPot Tester	688	5/22/01	05/01/2002
251	Associated Research - 4025A	HyPot Tester	4918	11/17/98	11/01/99
258	Tektronix - P6046	Oscilloscope Accessory	WL12326	3/24/98	03/01/99
346	Circuitmate - CM20	Component Tester	41219077	11/08/00	11/01/2001
411	Fluke - 31/33	Current Probe/Amp	5655170	01/15/01	01/01/2002
464	Triplet - 30	Current Probe/Amp	00		
464	Triplet - Triplet 30 Clamp-Meter	Digital Multimeter	0	1/09/01	01/01/2002
470	Fluke - 87	Digital Multimeter	956030123	04/26/01	04/01/2002
480	Fluke - 87	Digital Multimeter	57311721	5/1/01	05/01/2002
487	Valhalla Scientific - 2101	Watt Meter	3-7620	08.03.00	08/01/2001
489	Tektronix - TDS320	Oscilloscope	B010255		
512	Commercial Scale Co. Inc - DFI-100	Other	19339	12/19/00	12/01/2001
520	Fluke - 87	Digital Multimeter	57790000	05/04/01	05/01/2002
523	Voltech - PM3000; 3 Channel	Watt Meter	5590	5/4/01	05/01/2002
526	Stanford Research - SR630	Thermometer	17378	1/8/98	01/01/99
550	Technical Engineering Service - SET-50	Other	550	07/18/00	07/01/2001
564	Fluke - 87	Digital Multimeter	58940798	5/20/99	05/01/2000
630	Fluke - 33	Current Probe/Amp	5900166	5/16/01	05/01/2002
639	Bell - C600	Current Probe/Amp	93060136	04/15/97	04/01/98
640	Fluke - 51	Thermometer	5955753	5/20/99	05/01/2000
657	Stanford Research - SR630	Thermometer	17515	11/17/98	11/01/99
658	Stanford Research - SR630	Thermometer	17516	11/5/99	11/01/2000
664	Voltech - PM3000A; 3 Channel	Watt Meter	6632	07/18/00	07/01/2001
668	Valhalla Scientific - 4150ATC	Digital Multimeter	8-3682	9/19/00	08/01/2001
676	ED&D - LT-30HC053	Other	A02250053	5/4/01	05/01/2002
698	Stanford Research - SR630	Thermometer	17541	1/25/01	01/01/2002
721	Valhalla - 2101	Watt Meter	3-7970	06/06/01	06/01/2002
730	Voltech - PM3000A; 3 Channel	Watt Meter	6848	12/15/98	12/01/99
731	Stanford Research - SR630	Thermometer	17559	03/13/01	03/01/2002
736	Stanford Research - SR630	Thermometer	17574	07/18/00	07/01/2001
752	Stanford Research - SR630	Thermometer	17581	06/06/01	06/01/2002
755	Valhalla - 2101	Watt Meter	3-7923	06/06/01	06/01/2002
756	Valhalla - 2101	Watt Meter	3-7933	06/06/01	06/01/2002
759	Valhalla - 2101	Watt Meter	3-8004	9/21/00	09/01/2001
815	Associated Research - 403AI	HyPot Tester	175	3/30/00	03/01/2001
841	Associated Research - 403AI	HyPot Tester	261	5/4/01	05/01/2002
842	Voltech - PM3000A; 3 Channel	Watt Meter	7236	07/06/00	07/01/2001
977	Tektronix - TDS420A	Oscilloscope	B010296	10/24/97	10/01/98
982	Tektronix - TDS320	Oscilloscope	B033346	5/3/01	05/01/2002
1209	Chatillon - DFIS200	Other	25605	01/09/01	01/01/2002
1211	Fluke - 45	Digital Multimeter	6608022	5-22-00	05/01/2001
1260	FLUKE - 87	Digital Multimeter	65770053	9/17/98	09/01/99
1261	FLUKE - 87	Digital Multimeter	65900208	9/17/98	09/01/99
1266	Tektronics - TDS420A-13	Oscilloscope	BO22778	12/13/00	12/01/2001
1353	Stanford Research - SR630	Thermometer	34148	12/13/0	12/01/2001

	Manuf. & Model	Type	Serial #	Cal. date	Cal Due
1355	Voltech - SER9392	Current Probe/Amp	9392	10/09/96	10/01/97
1369	Stanford Research Systems - SR630	Thermometer	34076	08/19/99	08/01/2000
1435	Fluke - 36	Digital Multimeter	67159188	12-30-99	12/01/2000
1448	Valhalla - 2101	Watt Meter	3-8718	7/21/98	07/01/99
1450	Valhalla - 2101	Watt Meter	3-8726	4/6/99	04/01/2000
1507	Transistor Devices - DLVP	Electronic Load	8343-188		
1523	Fluke - 76	Digital Multimeter	67640571	8/18/00	07/01/2001
1650	Stanford Research Systems - SR630	Thermometer	34296	11/25/97	11/01/98
1651	Stanford Research Systems - SR630	Thermometer	34286	11/25/97	11/01/98
1657	Stanford Research Systems - SR630	Thermometer	17993	04/30/01	04/01/2002
1781	TEKTRONIK - P5205	Oscilloscope Accessory	BO12571	8/18/98	08/01/99
1783	Tektronix - P5100	Oscilloscope Accessory	none	11/03/00	11/01/2001
1784	Tektronix - P5100	Oscilloscope Accessory	none	11/03/00	11/01/2001
1787	Pearson Electronics Inc. - 101	Oscilloscope Accessory	86169	11/07/00	11/01/2001
1788	Tektronix - TDS520C	Oscilloscope	B010530	11/03/00	11/01/2001
1808	Fluke - 45	Digital Multimeter	6836027	10/18/99	10/01/2000
1819	Tektronix - P6015A	Oscilloscope Accessory	B036710	11/03/00	11/01/2001
1820	Tektronix - P6015A	Oscilloscope Accessory	B036711	11/03/00	11/01/2001
1846	Standford Research - SR 630	Thermometer	34348	5/22/01	05/01/2002
1847	Stanford Research Systems - SR630	Thermometer	34345	7/26/00	07/01/2001
1856	Fluke - 76	Digital Multimeter	68672144	11/22/99	11/01/2000
1864	Yokogawa - WT130	Watt Meter	27BW0085-H	8/03/00	07/01/2001
1901	Fluke - 26III	Digital Multimeter	69920990		
1930	Valhalla Scientific - 2300	Watt Meter	40-2441	8/19/99	08/01/2000
1939	Fowler - Max-Cal	Other	374781	06/06/01	06/01/2002
1941	Fluke 123-423 - 52	Thermometer	6926065	09/24/99	09/01/2000
1943	Fluke - 26 III	Digital Multimeter	69401578	5/22/00	05/01/2001
1945	Hipotronics Inc. - HD106-A	HyPot Tester	M9711317	11/17/99	11/01/2000
1946	Test Equity - SR720	Component Tester	44180	10/05/99	10/01/2000
1950	Tektronix - TDS210	Oscilloscope	B037855	11/17/98	11/01/99
1951	Voltech - PM3000A	Watt Meter	AU31/2748	8/23/99	08/01/2000
1961	Fluke - 76	Digital Multimeter	63320053	04/26/01	04/01/2002
2045	Fluke - 87 III	Digital Multimeter	70080663	05/15/00	05/01/2001
2048	Tektronix - P5200	Oscilloscope Accessory	B015174	12/14/00	12/01/2001
2049	Tektronix - P5200	Oscilloscope Accessory	B015103	12/14/00	12/01/2001
2053	Tektronix - DTM920	Thermometer	112609	5-22-00	05/01/2001
2132	Fluke - 79-3	Digital Multimeter	70310220	06/06/01	06/01/2002
2161	Valhalla Scientific - 4150ATC	Digital Multimeter	8-4185	08.08.00	08/01/2001
2163	Tektronix - TDS4208	Oscilloscope	B061238	10/24/97	10/01/98
2191	Tektronix - DTM920	Thermometer	113157	05/21/01	05/01/2002
2204	Voltech - CL100	Current Probe/Amp	3143	01/15/01	01/01/2002
2205	Voltech - CL100	Current Probe/Amp	3245	01/15/01	01/01/2002
2206	Voltech - CL100	Current Probe/Amp	3247	07/18/00	07/01/2001
2207	Voltech - CL103	Current Probe/Amp	2385	01/15/01	01/01/2002
2266	Stanford Research Systems - 630	Thermometer	34592	11/08/00	10/01/2001
2267	Stanford Research Systems - 630	Thermometer	34583	11/08/00	10/01/2001
2312	Textronix - TDS420A	Oscilloscope	B060248	06/06/01	06/01/2002
2321	Yokogawa Corp. - CL 612	Current Probe/Amp	75504	5-22-00	05/01/2001
2335	Hypatia - 309	Environmental Test	0435	8/15/00	08/01/2001
2397	Chatillon - 80D	Other	LCAD-1	01/09/01	01/01/2002
2411	Associated Research - 3030D	HyPot Tester	A140024	11/23/00	11/01/2001
2412	Hypotronics - 111111	HyPot Tester	00000	11/08/00	10/01/2001
2427	Valhalla Scientific - 2101	Watt Meter	3-9291	12/4/98	12/01/99
2428	Yokogawa Corp. - WT130	Watt Meter	2535GA407	11/08/00	10/01/2001
2475	Fluke - 76	Digital Multimeter	63320056	06/06/01	06/01/2002
2529	Voltech - PM3000A	Watt Meter	7419	1/5/01	01/01/2002
2542	Fluke - OOO	Other	6425061	02/06/99	02/01/2000
2543	Fluke - DPS-SR	Other	6425062	02/06/99	02/01/2000
2548	Fluke - 87 III	Digital Multimeter	72650067	05/04/01	05/01/2002
2582	EXTECH Instruments - 4465CF	Thermometer	991002799	12/13/00	12/01/2001

	Manuf. & Model	Type	Serial #	Cal. date	Cal Due
2607	ED&D - LT-952HC	Other	H04300122	5/4/01	05/01/2002
2623	Voltech - PM300A	Lab Power Supply	AU26/2010		
2639	NH Research - 4600 Part #1108188 Rev E	Lab Power Supply	49049-1		
2642	A&D Engineering Inc. - FG-60KB	Other	H3803186	12/1/00	12/01/2001
2653	Technical Engineering - SET50	Other	n/a	5-1-99	05/01/2000
2689	Contact East - 122-689	Watt Meter	7314019		
2738	Chatillon - DFIS 200	Other	B34826	12/6/00	12/01/2001
2751	Mitutoyo - 1"/6"	Other	N/A	6/21/01	06/01/2002
2753	Starrett - 721	Other	98340960	6/21/01	06/01/2002
2847	Simpson - 229-2	Other	none	12.26.00	12/01/2001
2939	Textronix - TDS430A	Oscilloscope	B062324	12/13/00	12/01/2001
2940	Textronix - P5200	Current Probe/Amp	B017885	12/19/00	12/01/2001
2950	Tektronix - A6303	Current Probe/Amp	BO30012		
2963	Tektronix - TDS 3040	Oscilloscope	B013759		
3043	Fluke - 45-05	Digital Multimeter	7568019		
3045	Yokosawa - 253502	Digital Multimeter	12w728182		
3064	Tektronix - ps280	Computer Power Supply	tw60145		
3072	Fluke - 87 III	Digital Multimeter	76520450		09/01/2001
3088	Fluke - 52II	Thermometer	76880107		09/01/2001
3108	Fluke - 77-3	Digital Multimeter	76210987	06/06/01	06/01/2002
3133	Fluke - 87 III	Digital Multimeter	76530286	08.02.00	08/01/2001
3157	Associated Research - 03570D	HyPot Tester	10743	8-9-00	08/01/2001
3158	Agilent Technologies Inc. - 34970A	Thermometer	US37036117	8-9-00	08/01/2001
3182	Textronix - TDS3014	Oscilloscope	B015804	08/18/01	08/01/2001
3183	Textronix - TCP202	Current Probe/Amp	B020304	10.13.00	10/01/2001
3212	Agilent technologies - 34970A	Other	us37036764	8/30/00	07/01/2001
3213	Agilent Technologies - 34970A	Other	us37037469	9/18/00	08/01/2001
3371	Stanford Research Systems - SR630	Thermometer	17536		

Non-Calibrated

140	Acer - 386 33	Computer - Workstation	A1133006362-M		
217	Kepeco - RAX	Computer Power Supply	1Y800423		
225	Transistor Devices - DLP	Electronic Load	7936-58		
240	Transistor Devices - SPS	Electronic Load	8337-29		
241	Dayton - vv	Other	K55HXKRN-3467		
243	Transistor Devices - SPS	Electronic Load	8444-53	11/22/99	11/01/2001
359	Kepeco - RAX	Computer Power Supply	9800306		
428	Rapid - Special	Lab Power Supply	587018		
466	Ingersoll-Rand - ES100P	Other			
477	Mitutoyo - CD-6"P	Other	7208510		
518	Champion -	Other	533943		
531	IEC - 101	Other			
551	Helix - 12112	Other			
558	Empire - #36 Magnetic	Other	123		
646	American Reliance - PPS-1302A	Lab Power Supply	13220138		
647	Kepeco - RBX	Computer Power Supply	39X03505	05/01/96	06/01/97
702	American Reliance - PPS-1302A	Lab Power Supply	13220138		
703	American Reliance - PPS-1302A	Lab Power Supply	13220009		
768	American Reliance - PPS-1302A	Lab Power Supply	13220180		
833	Pacific Power - 140J-BT	Environmental Test	1709		
834	Avtvon - K571	Electronic Load	124		
917	Modica Precision Tools - Ball Pressure Ap	Other	N/A		
1079	American Reliance - PPS-1302	Lab Power Supply	392479		
1164	Voltech - PM100	Watt Meter	AA05/8651	4/23/99	04/01/99
1200	Biddle - 21259	Other	18354	7/11/97	07/01/98
1248	Contact East - Unknown	Other	Unknown		
1249	Contact East - ?	Other	?		
1312	HP - Desk Jet 682C	Other	US7651G1DX		
1530	- 1032 IEC Probe B	Other	N/A		
1640	Stanford Research Systems - SR630	Thermometer	34294	3/31/99	03/01/2000
1779	Dasco Pro Inc. - Angle Finder	Other	N/A		

	Manuf. & Model	Type	Serial #	Cal. date	Cal Due
1786	Contact East - 117-408	Other	none		
1878	Pacific Power Source - NONE	Lab Power Supply	NONE		
1879	Pacific Power Source - NONE	Lab Power Supply	NONE		
1900	Peacock - vm-150	Other	C818632		
2050	Tektronix - P6138A	Current Probe/Amp	none	12/14/00	12/01/2001
2051	Tektronix - P6138A	Current Probe/Amp	none		
2052	MAKITA - 6019D	Other	169751		
2092	QSI Corporation - T632	Other	81116504		
2192	Pace - MBT101A	Soldering Iron	10-08847		
2269	Transistor Devices - dlp 50-150-3000	Electronic Load	8034215		
2270	Transistor Devices - 50-150-3000	Electronic Load	8034225		
2271	Kepco - RAX-24-65K	Electronic Load	82401632		
2272	Kepco - RAX-24-65K	Electronic Load	82401674		
2273	Kepco - RAX-24-65K	Electronic Load	82401664		
2274	Kepco - RAX-24-65K	Electronic Load	82401640		
2275	Kepco - RAX-24-65K	Electronic Load	82401672		
2276	Kepco - RAX-24-65K	Electronic Load	82401638		
2438	IBM - 1	Computer - Monitor	1		
2491	Fluke - DMM79	Digital Multimeter	71701024		
2530	Mitutoyo - Solar-Powered	Other	0007465		
2538	Fluke - 87 III	Digital Multimeter	72350429		
2591	Stanford Research - SR727	Other	47278		
2626	Cosel - P1500	Electronic Load	n/a		
2627	Cosel - P1500	Electronic Load	xxxxxx		
2628	Cosel - P1500	Electronic Load	xxxxxx		
2629	Cosel - P1500	Electronic Load	xxxxxx		
2630	Cosel - P1500	Electronic Load	xxxxxx		
2631	Cosel - P1500	Electronic Load	xxxxxx		
2663	Avtron - K490	Electronic Load	328		
2667	Contact East - 7851024	Watt Meter	7314019		
2736	Starrett - GPS-85059J	Other	964063		
2740	Starrette - 568A	Other	n/a		
2741	PiJ - 39001 L	Other	n/a		
2744	Brown & Sharpe - 007.90042	Other	7P-016-02		
2745	Brown & Sharpe - E36	Other	W7		
2747	J&L - SV-612	Other	n/a		
2748	Starrett - 445	Other	N/A		
2750	Brown & Sharp - 7029-3	Other	7D12316		
2752	Starrett - 220	Other	N/A		
2755	Vermont Gage - B/Minus27504	Other			
2756	ERN - 00342 L	Other	SA0090605		
2760	Keytek - E-103	Environmental Test	9407195	07/22/99	07/01/2000
2761	Keytek - E-501B	Environmental Test	9907202	07/22/99	07/01/2000
2762	Keytek - E-504A	Environmental Test	9907203	07/22/99	07/01/2000
2763	Keytek - E-503	Environmental Test	9612444	07/22/99	07/01/2000
2764	Keytek - E-4554	Environmental Test	9907204	07/22/99	07/01/2000
2775	Fischer Custom Communications - F-61	Current Probe/Amp	n/a		
2776	Mitutoyo - 0" to 6" set	Other	n/a		
3046	Kikusui - pcr-500I	AC Source	cb003348		
3047	Kikisui - pl2303W	Electronic Load	eg002000		
3109	Pace - MBT201A	Soldering Iron	04-03-0288		
3314	Fluke - 83 III	Digital Multimeter	77270661		
3317	Avtron - K490	Electronic Load	380		



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VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 12

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Appendix 12, Page 2 of 7

SPECIFICATION FOR APPROVAL



CUSTOMER :

DESCRIPTION : DC BRUSHLESS FAN

DIMENSIONS : 80X80X25 mm

MODEL : KDE2408PTB3-6

APPROVED NO :

APPROVED BY :
(AUTHORIZED)

DAWN.	7/4	CHKD.		APPD.		SPEC. NO.	086408300
						ISSUE DATE	01.04.1996
						EDITION	0
						REVISE DATE	

EME Fan & Motor
13805 Alton Parkway, Suite B
Irvine, CA 92718

SUNON

DC BRUSHLESS FAN**MODEL: KDE2408PTB3-6****CHARACTERISTICS**

1. Input power, Current & Speed : Measured after continuous 30 minutes operation at rated voltage in clean air at ambient temperature of 25 degrees C.
2. Noise Level : Measured in an semi-anechoic chamber with background noise level below 15 dBA. The fan is running in free air with microphone at a distance of one meter from the fan intake.
3. Dielectric Strength : Applied AC 500V for one minute or AC 600V for 2 seconds between housing and lead wire(+)
4. Motor Design : Patented single-coil DC brushless 6 poles motor design.
5. Insulation Resistance : More than 500M ohm between internal stator and lead wire(+) measured by DC 500V.
6. Tolerances : $\pm 15\%$ on rated power and current
7. Motor Protection : Polarity protected & Locked rotor protected.
8. Air Performance : Measured by a double chamber. The value are recorded when the fan speed is stabilized at rated voltage.



建準電機工業股份有限公司
SUNONWEALTH ELECTRIC

SPEC. NO.	086408300	REVISE DATE	
ISSUE DATE	01. 04. 1996	EDITION	0

SPECIFICATIONS

MODEL: KDE2408PTB3-6

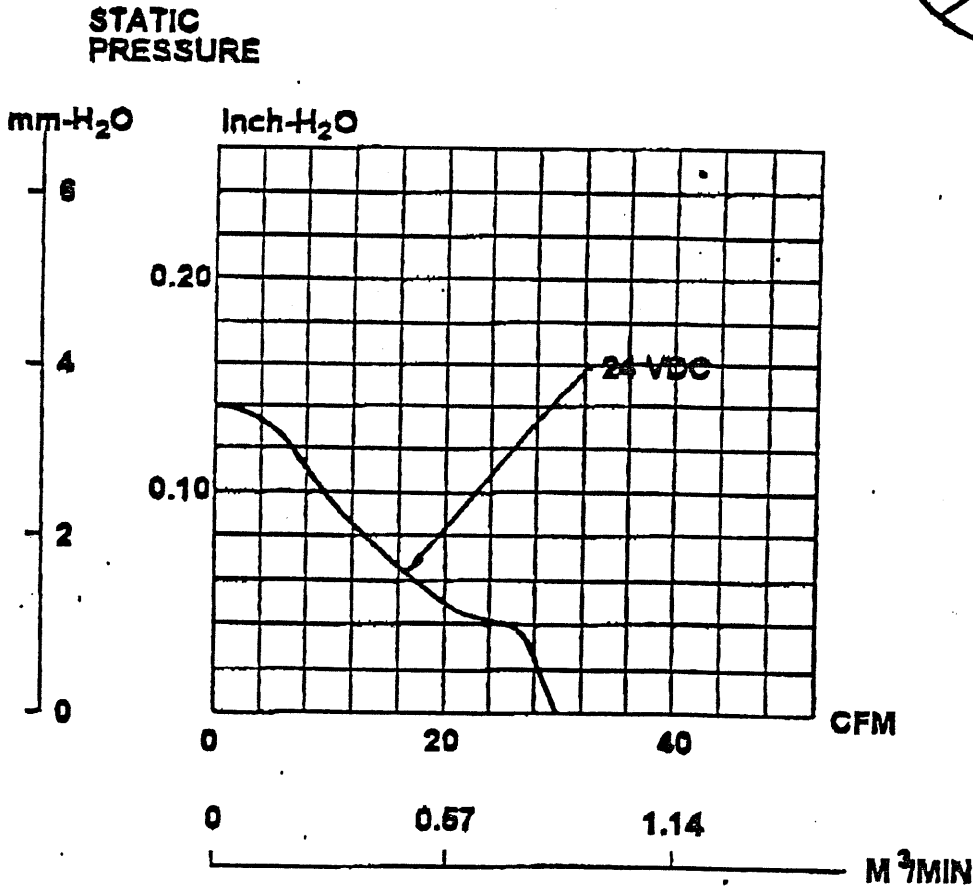


- 1-1. Rated Voltage : 24 VDC
- 1-2. Operating Voltage Range : 20.4-27.6 VDC
- 1-3. Starting Voltage : 16 VDC
- 1-4. Rated Speed : 2500 RPM \pm 300 RPM
- 1-5. Air Delivery : 30 CFM
- 1-6. Static Pressure : 0.14 Inch-H₂O
- 1-7. Rated Current : 0.10 AMP
- 1-8. Rated Power : 2.4 WATTS
- 1-9. Noise Level : 28.5 dB(A)
- 1-10. Direction of Rotation : Clockwise viewed from front face
- 1-11. Operating Temperature : -20 to +80 Deg.C
- 1-12. Storage Temperature : -40 to +80 Deg.C
- 1-13. Bearing System : Precise ball bearing system
- 1-14. Weight : 120g
- 1-15. Safety : UL/CUR Approvals

建準電機工業股份有限公司 SUNONWEALTH ELECTRIC MACHINE INDUSTRY CO., LTD.	SPEC. NO.	086408300	REVISE DATE	
	ISSUE DATE	01.04.1996	EDITION	0
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MODEL: KDE2408PTB3-6

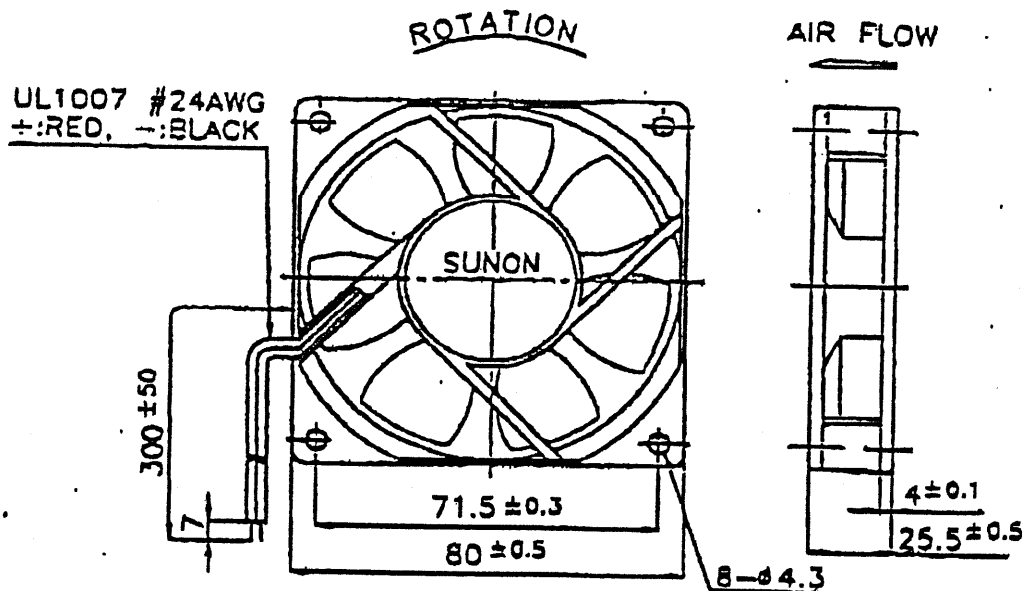
PERFORMANCE CURVES



建準電機工業股份有限公司 SUNONWEALTH ELECTRIC MACHINE INDUSTRY CO., LTD	SPEC. NO.	086408300	REVISE DATE	
	ISSUE DATE	01.04.1996	EDITION	0
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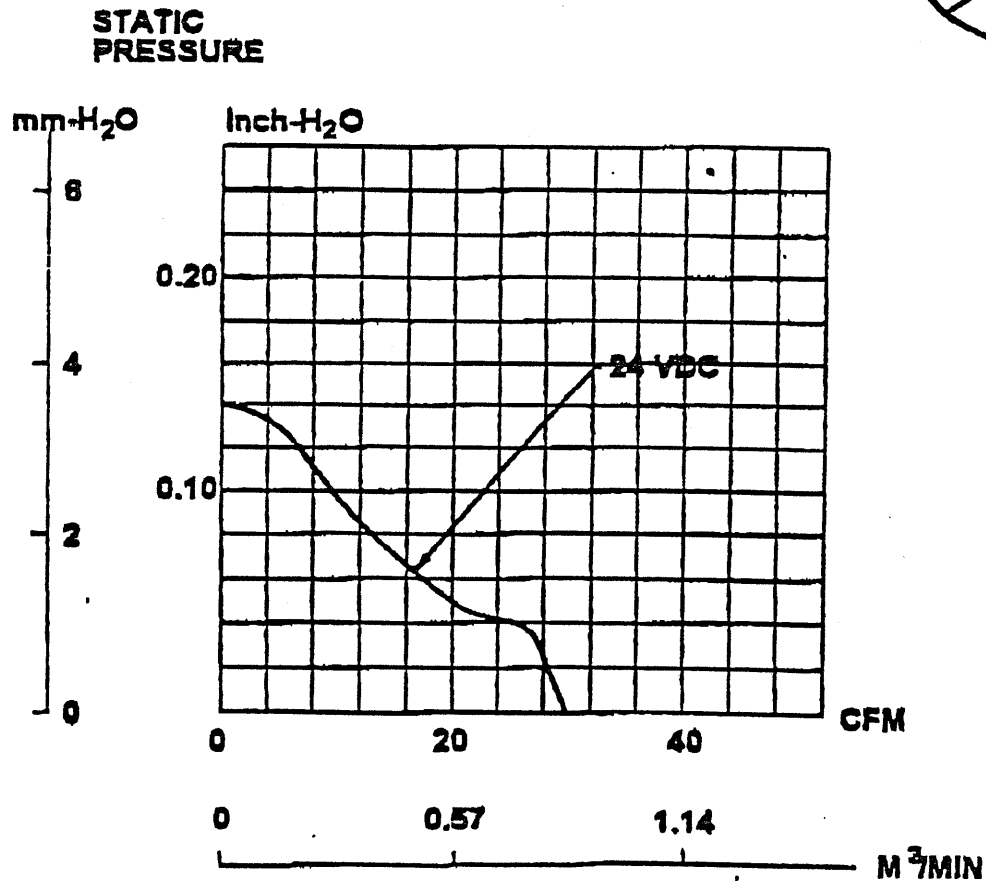
MATERIAL

- 2-1. Frame : Thermoplastic PBT of UL 94V-0
 2-2. Impeller : Thermoplastic PBT of UL 94V-0
 2-3. Bobbin : Thermoplastic PBT of UL 94V-0
 2-4. Lead Wire : UL1007, 24AWG, +:RED ; -:BLACK

DIMENSIONS

UNIT : mm

建準電機工業股份有限公司 SUNONWEALTH ELECTRIC MACHINE INDUSTRY CO., LTD.	SPEC. NO.	086408300	REVISE DATE	
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MODEL: KDE2408PTB3-6**PERFORMANCE CURVES**

建準電機工業股份有限公司
SUNONWEALTH ELECTRIC
MACHINE INDUSTRY CO., LTD.

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Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 13

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APCC Proprietary



Part Specification Cover Sheet

APC Part Number:

349-0100

OPTO 125%CTR UL 817X SOIC4

Production:

X-Reference Part Number:

Status of Specification:

Approved

Production Revision History:

Rev.	Date	By:	ECO #	Alpha Letter	Description of change
1	11/15/99	NWP			Initial Release
2	5/8/2000	J AFC			Add VDE requirement
3	2/1/2001	PMD			Add Mfr to AML per PQR no. MY360

Detailed Specification

APC Part Number: 349-0100 -- Production Rev. 2

Description:

Expanded description

**OPTOCOUPLER, 4-PIN SURFACE MOUNT, LED INPUT, TRANSISTOR OUTPUT,
125% CURRENT TRANSFER RATIO MIN., 5300 VOLT A.C. ISOLATION, UL,
CSA + VDE RECOGNIZED**

Primary Application (Business Unit)

DPS

Project (End Item Part Number(s))



APC Standards:

Applicable APC standards

Applicable industry standards

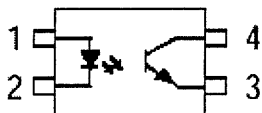
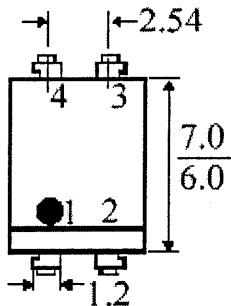
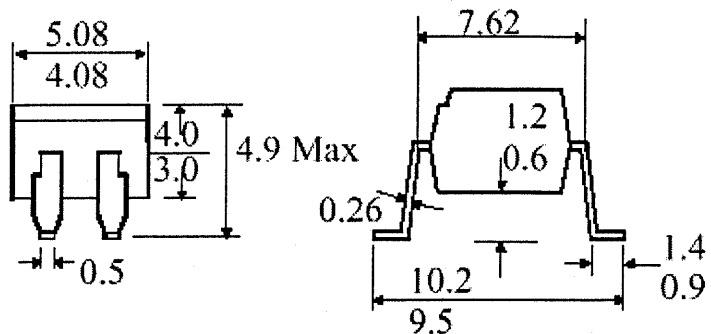
EIA 481-A Taping of Surface Mount Components for Automatic Placement

Specs Directory

Drawing File attachments	Drawing Revision (revision number of current attachment.)
 db92275.pdf	Isocom Data Sheet - Dated 7/30/97,
 datasheet.pdf	Infineon Data Sheet - Dated 02/01/2001,

Drawing Image:

Drawing Images not to exceed 5" x 3" otherwise attach Acrobat (.PDF) file



Schematic and pin out

Notice of Deviation:

Be advised that the Infineon Current Transfer Ratio is 160%-320%

Special InstructionsAPC Part Number **349-0100** -- Production Rev. 2**Shipping Packaging:****Method and materials:**

Tape & Reels - Sufficient to prevent shipping and handling damage. The tape width shall be 16mm, the pitch shall be 8mm and the orientation shall be pins 1 & 2 towards the sprocket holes.

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

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:

Date Code or Lot Code, Manufacture Identification.

Special Qualifying Instructions / Drawings:

Electrical Parameters: [Unless otherwise specified $T_a=25^{\circ}\text{C}$, all voltage and current are DC rated.]

Maximum Ratings	Symbol	Value	Units
Led Reverse Voltage	V_R	6	Volts
Led Forward Current - continuous	I_F	0.050	AMP
Led Power Dissipation	PD	0.070	Watts
Transistor Power Dissipation	PD	0.150	Watts
Transistor Collector to Emitter Voltage	V_{CEO}	35	Volts
Transistor Emitter to Collector Voltage	V_{ECO}	6	Volts
Isolation Test Voltage (Led to Transistor)	V_{ISO}	5,300	Vrms
Total Device Power Dissipation	PD	0.200	Watts

Led Parameters	Symbol	Min.	Max.	Units
Forward Voltage ($I_F=20\text{mA}$)	V_F		1.4	Volts
Reverse Leakage Current ($V_R=6.0\text{V}$)	I_R		10	μA

Transistor Parameters	Symbol	Min.	Max.	Units
Collector to Emitter Breakdown Voltage ($I_C=1\text{mA}$)	V_{BRCEO}	35		Volts
Emitter to Collector Breakdown Voltage ($I_E=100\mu\text{A}$)	V_{BRECO}	6		Volts

Collector to Emitter Dark Current ($V_{CE}=20V$)	I_{CEO}	100	nA
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Coupled Parameters	Symbol	Min.	Max.	Units
Current Transfer Ratio ($I_F=5mA$, $V_{CE}=5V$)	$I_{C(CTR)}$	125	300	%
Collector to Emitter Saturation Voltage ($I_F=20mA$, $I_C=1mA$)	V_{CEsat}		0.2	Volts
Isolation Voltage ($f=60Hz$, $t=1sec.$)	V_{ISO}	5300		Vrms
Isolation Resistance ($V=500V$)	R_{ISO}	50G (TYP)		Ohms
Output Rise Time ($V_{CE}=2V$, $I_C=2mA$, $R_L=100ohm$)	t_r	4 (typ)	18	μs
Output Fall Time ($V_{CE}=2V$, $I_C=2mA$, $R_L=100ohm$)	t_f	3 (typ)	18	μs

Other Requirements:

Waterproof construction is required suitable for use with pure water cleaning process.

Must be UL recognized, CSA approved, and VDE approved.

Approved Manufacturer List

< Link to Manufacturer's Qual. database (Sorted by Name)

< Link to Component Qualifications dB. (Sorted P/N)

PADS/VIEWLOGIC SECTION:

Server:	Comment History
APC - BILLERICA	<p>02/13/2001 08:39 AM EST, Revision # 2, Status Approved , Annette D'elia</p> <p>02/13/2001 08:39 AM EST, Revision # 2, Status Approved , Annette D'elia</p> <p>02/12/2001 11:33 AM EST, Revision # 2, Status Submitted for Approval , Robert Thibodeau</p> <p>02/01/2001 08:42 AM EST, Revision # 2, Status Submitted for Approval , Kim Racca</p> <p>02/01/2001 01:42 PM EST, Revision # 2, Status Submitted for Approval , Robert Thibodeau</p> <p>05/11/2000 04:43 PM EDT, Revision # 2, Status Approved , Pamela Savoie</p> <p>05/11/2000 02:40 PM EDT, Revision # 1, Status Submitted for Approval , Steve Williams</p> <p>05/09/2000 01:23 PM EDT, Revision # 1, Status Submitted for Approval , Robert Thibodeau</p> <p>05/08/2000 02:39 PM EDT, Revision # 1, Status Draft , Jeff Curtis</p>

ISP817X, ISP827X, ISP847X
ISP817, ISP827, ISP847



HIGH DENSITY MOUNTING PHOTOTRANSISTOR OPTICALLY COUPLED ISOLATORS

APPROVALS

- UL recognised, File No. E91231

'X' SPECIFICATION APPROVALS

- VDE 0884 in 3 available lead form : -
- STD
- G form
- SMD approved to CECC 00802
- Certified to EN60950 by the following
Test Bodies :-
Nemko - Certificate No. P96102022
Fimko - Registration No. 192313-01..25
Semko - Reference No. 9639052 01
Demko - Reference No. 305969

DESCRIPTION

The ISP817, ISP827, ISP847 series of optically coupled isolators consist of infrared light emitting diodes and NPN silicon photo transistors in space efficient dual in line plastic packages.

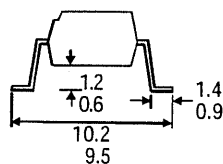
FEATURES

- Options :-
10mm lead spread - add G after part no.
Surface mount - add SM after part no.
Tape&reel - add SMT&R after part no.
- High Current Transfer Ratio (50% min)
- High Isolation Voltage (5.3kV_{RMS}, 7.5kV_{PK})
- High BV_{CEO} (35Vmin)
- All electrical parameters 100% tested
- Custom electrical selections available

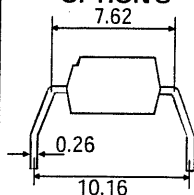
APPLICATIONS

- Computer terminals
- Industrial systems controllers
- Measuring instruments
- Signal transmission between systems of different potentials and impedances

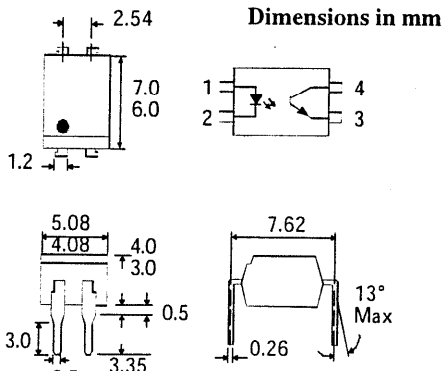
OPTIONSM SURFACEMOUNT



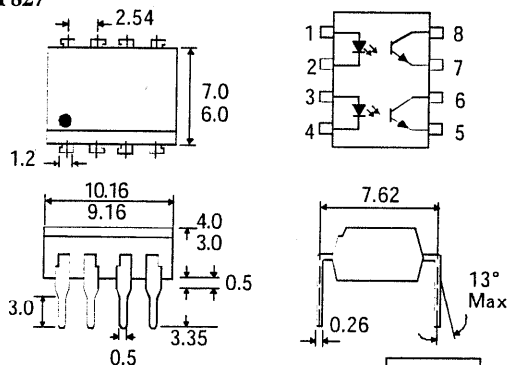
OPTIONG



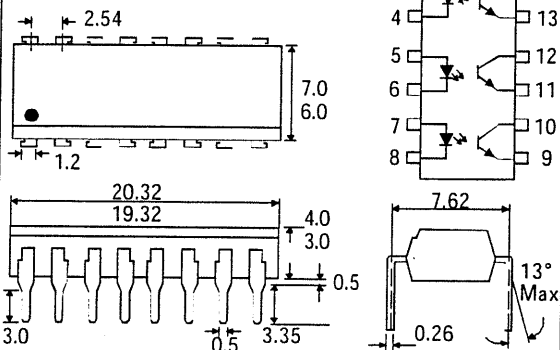
ISP817X ISP817



ISP827X ISP827



ISP847X ISP847



ISOCOM COMPONENTS LTD

Unit 25B, Park View Road West,
Park View Industrial Estate, Brenda Road
Hartlepool, Cleveland, TS25 1YD
Tel: (01429) 863609 Fax: (01429) 863581

ISOCOM INC

720 E., Park Boulevard, Suite 104,
Plano, TX 75074 USA
Tel: (972) 423-5521
Fax: (972) 422-4549

ABSOLUTE MAXIMUM RATINGS
(25°C unless otherwise specified)

Storage Temperature	_____	-55°C to + 125°C
Operating Temperature	_____	-55°C to + 100°C
Lead Soldering Temperature	_____	260°C
(1/16 inch (1.6mm) from case for 10 secs)		

INPUT DIODE

Forward Current	_____	50mA
Reverse Voltage	_____	6V
Power Dissipation	_____	70mW

OUTPUT TRANSISTOR

Collector-emitter Voltage BV_{CEO}	_____	35V
Emitter-collector Voltage BV_{ECO}	_____	6V
Power Dissipation	_____	150mW

POWER DISSIPATION

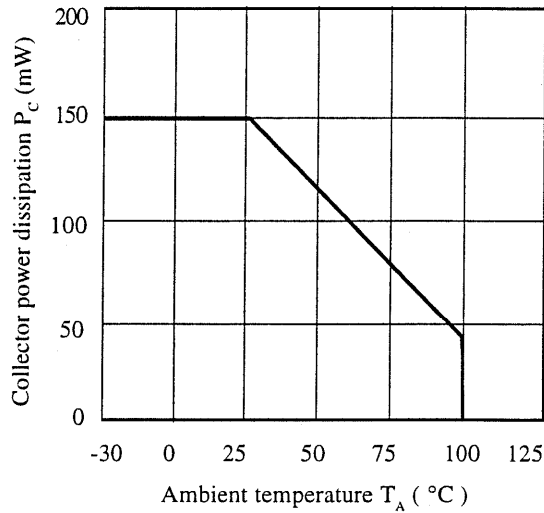
Total Power Dissipation	_____	200mW
(derate linearly 2.67mW/°C above 25°C)		

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

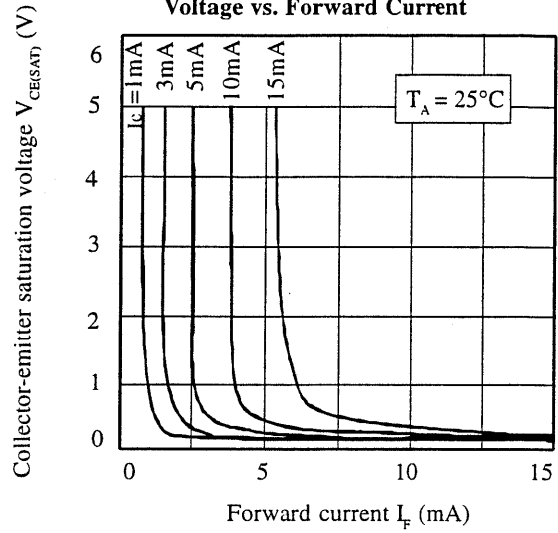
PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITION
Input	Forward Voltage (V_F)		1.2	1.4	V	$I_F = 20\text{mA}$
	Reverse Voltage (V_R)	6			V	$I_R = 10\mu\text{A}$
	Reverse Current (I_R)			10	μA	$V_R = 6\text{V}$
Output	Collector-emitter Breakdown (BV_{CEO}) (Note 2)	35			V	$I_C = 1\text{mA}$
	Emitter-collector Breakdown (BV_{ECO})	6			V	$I_E = 100\mu\text{A}$
	Collector-emitter Dark Current (I_{CEO})			100	nA	$V_{CE} = 20\text{V}$
Coupled	Current Transfer Ratio (CTR) (Note 2) ISP817, ISP827, ISP847	50		600	%	5mA I_F , 5V V_{CE}
	ISP817GB, ISP827GB, ISP847GB	100		600	%	5mA I_F , 5V V_{CE}
	ISP817BL, ISP827BL, ISP847BL	200		600	%	5mA I_F , 5V V_{CE}
	Collector-emitter Saturation Voltage $V_{CE(SAT)}$			0.2	V	20mA I_F , 1mA I_C
	Input to Output Isolation Voltage V_{ISO}	5300 7500			V_{RMS} V_{PK}	See note 1 See note 1
	Input-output Isolation Resistance R_{ISO}	5×10^{10}			Ω	$V_{IO} = 500\text{V}$ (note 1)
	Output Rise Time t_r		4	18	μs	$V_{CE} = 2\text{V}$, $I_C = 2\text{mA}$, $R_L = 100\Omega$
	Output Fall Time t_f		3	18	μs	

- Note 1 Measured with input leads shorted together and output leads shorted together.
Note 2 Special Selections are available on request. Please consult the factory.

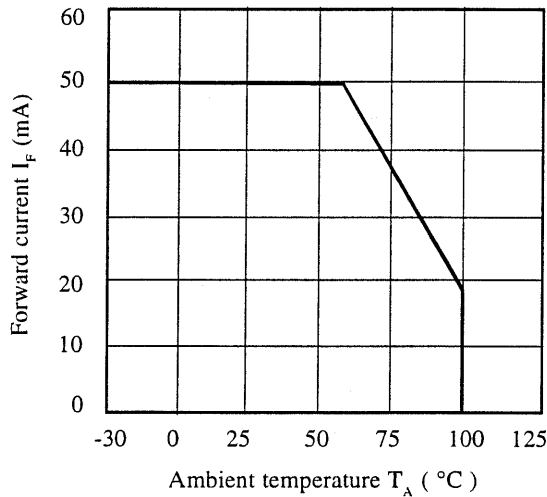
Collector Power Dissipation vs. Ambient Temperature



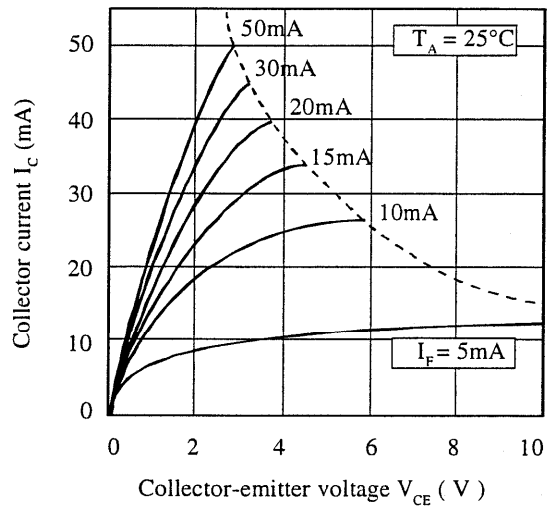
Collector-emitter Saturation Voltage vs. Forward Current



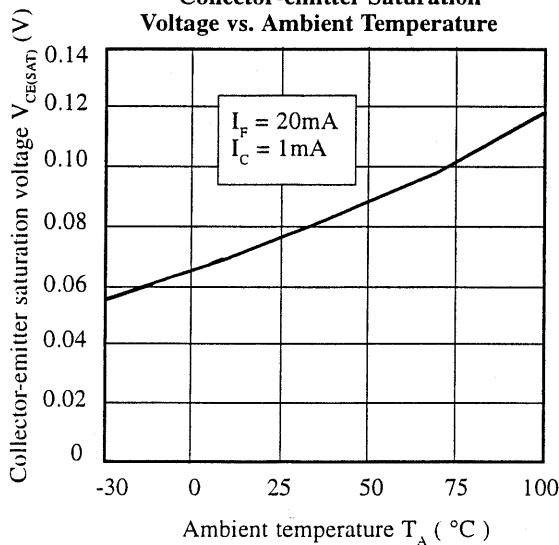
Forward Current vs. Ambient Temperature



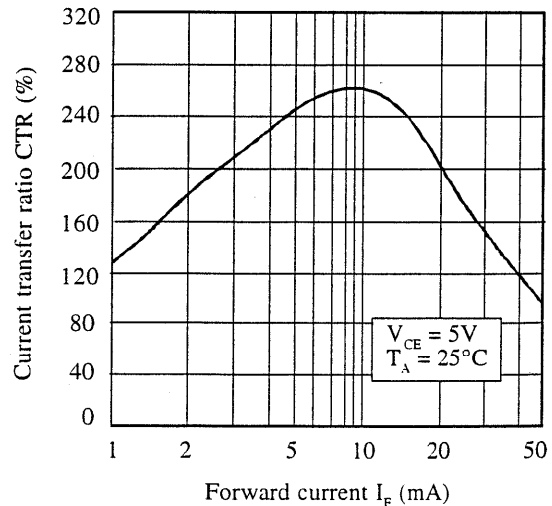
Collector Current vs. Collector-emitter Voltage



Collector-emitter Saturation Voltage vs. Ambient Temperature



Current Transfer Ratio vs. Forward Current





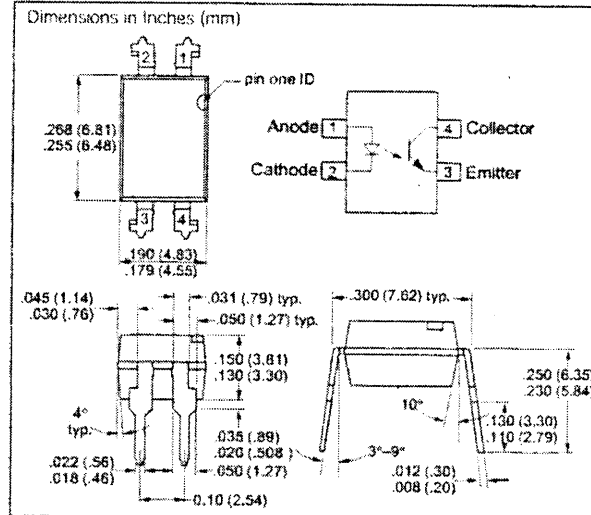
SFH615A

5.3 kV TRIOS® Optocoupler High Reliability

FEATURES

- Variety of Current Transfer Ratios at $I_F=10\text{mA}$
 - SFH615A-1, 40–80%
 - SFH615A-2, 63–125%
 - SFH615A-3, 100–200%
 - SFH615A-4, 160–320%
 - SFH615A-12, 40–125%
 - SFH615A-23, 63–200%
 - SFH615A-34, 100–320%
 - SFH615A-13, 40–200%
 - SFH615A-24, 63–320%
 - SFH615A-14, 40–320%
- Low CTR Degradation
- Good CTR Linearity Depending on Forward Current
- Withstand Test Voltage, 5300 V_{RMS}
- High Collector-Emitter Voltage, $V_{CEO}=70\text{ V}$
- Low Saturation Voltage
- Fast Switching Times
- Field-Effect Stable by TRIOS (TRansparent IOn Shield)
- Temperature Stable
- Low Coupling Capacitance
- End-Stackable, .100" (2.54 mm) Spacing
- High Common-Mode Interference Immunity (Unconnected Base)
- Underwriters Lab File #52744
- VDE 0884 Available with Option 1

$$\frac{I_C}{I_{LED}} = CTR$$



Maximum Ratings

Emitter

Reverse Voltage	6.0 V
DC Forward Current	60 mA
Surge Forward Current ($t_p \leq 10\text{ }\mu\text{s}$)	2.5 A
Total Power Dissipation	100 mW

Detector

Collector-Emitter Voltage	70 V
Emitter-Collector Voltage	7.0 V
Collector Current	50 mA
Collector Current ($t_p \leq 1\text{ ms}$)	100 mA
Total Power Dissipation	150 mW

Package

Isolation Test Voltage between Emitter and (LED to +REPHYSISTOR)	
Detector, refer to Climate DIN 40046,	
part 2, Nov. 74, $t=1\text{ s}$	5300 V_{RMS}
Creepage	27.0 mm
Clearance	27.0 mm
Insulation Thickness between Emitter and Detector	20.4 mm
Comparative Tracking Index	
per DIN IEC 112/VDE 0303, part 1	≥175
Isolation Resistance	
$V_{IO}=500\text{ V}$, $T_A=25^\circ\text{C}$	≥10 ¹² W
$V_{IO}=500\text{ V}$, $T_A=100^\circ\text{C}$	≥10 ¹¹ W
Storage Temperature Range	55 to +150°C
Ambient Temperature Range	55 to +100°C
Junction Temperature	100°C
Soldering Temperature (max. 10 s. Dip Soldering)	
Distance to Seating Plane ≥1.5 mm)	260°C

DESCRIPTION

The SFH615A features a large variety of transfer ratio, low coupling capacitance and high isolation voltage. These couplers have a GaAs infrared emitting diode emitter, which is optically coupled to a silicon planar phototransistor detector, and is incorporated in a plastic DIP-4 package.

The coupling devices are designed for signal transmission between two electrically separated circuits.

The couplers are end-stackable with 2.54 mm spacing.

Creepage and clearance distances of >8.0 mm are achieved with option 6. This version complies with IEC 950 (DIN VDE 0805) for reinforced insulation up to an operation voltage of 400 V_{RMS} or DC.

Specifications subject to change.

Characteristics (T_A=25°C)

Parameter	Sym.	Value	Unit	Condition
Emitter (IR GaAs)				
Forward Voltage	V _F	1.25(±1.65)	V	I _F =60 mA
Reverse Current	I _R	0.01(±10)	μA	V _R =6.0 V
Capacitance	C ₀	13	pF	V _R =0 V, f=1.0 MHz
Thermal Resistance	R _{thJA}	750	K/W	—
Detector (Si Phototransistor)				
Capacitance	C _{CE}	5.2	pF	V _{CE} =5.0 V, f=1.0 MHz
Thermal Resistance	R _{thJA}	500	K/W	—
Package				
Collector-Emitter Saturation Voltage	V _{CESAT}	0.25(±0.4)	V	I _F =10 mA, I _C =2.5 mA
Coupling Capacitance	C _C	0.4	pF	—

Current Transfer Ratio (I_C/I_F at V_{CE}=5.0 V) and Collector-Emitter Leakage Current

Parameter	-1	-2	-3	-4	-12	-23	-34	-13	-24	-14	Unit
I _C /I _F (I _F =10 mA)	40-80	63-125	100-200	160-320	40-125	63-200	100-320	40-200	63-320	40-320	%
I _C /I _F (I _F =1.0 mA)	30(>13)	45(>22)	70(>34)	90(>56)	30(>13)	45(>22)	70(>34)	30(>13)	45(>22)	30(>13)	
Collector-Emitter Leakage Current, I _{CE0} , V _{CE} =10 V	2.0(±50)	2.0(±50)	5.0(±100)	5.0(±100)	2.0(±50)	5.0(±100)	5.0(±100)	5.0(±100)	5.0(±100)	5.0(±100)	nA

Table 1. I_F=10mA, V_{CC}=5 V, T_A=25°C, without Saturation

Parameter	Sym.	Value	Unit
Load Resistance	R _L	75	Ω
Turn-on Time	t _{ON}	3.0	μs
Rise Time	t _R	2.0	
Turn-off Time	t _{OFF}	2.3	
Fall Time	t _F	2.0	
Cut-off Frequency	F _{CD}	250	kHz

Figure 1. Switching Times (Typical) Linear Operation (without saturation)

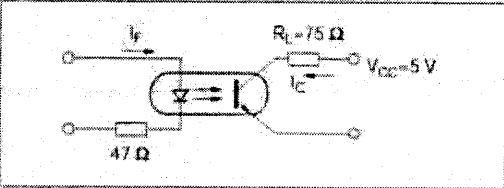
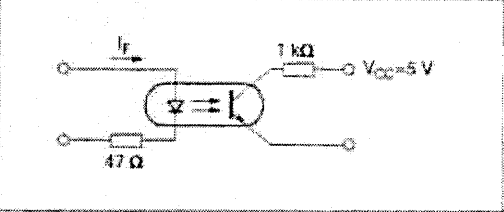


Table 2. V_{CC}=5 V, T_A=25°C, with Saturation

Parameter	Sym.	Switching Time by Dash Numbers			Unit
		-1, -12, -13 I _F =20 mA	-2, -3, -23 I _F =10 mA	-4, -34, -24 I _F =5.0 mA	
Load Resistance	R _L	1000	1000	1000	Ω
Turn-on Time	t _{ON}	3.0	4.2	6.0	μs
Rise Time	t _R	2.0	3.0	4.6	
Turn-off Time	t _{OFF}	18	23	25	
Fall Time	t _F	11	14	15	

Figure 2. Switching Operation (with saturation)



VL

Figure 3. Current transfer ratio (typical) vs. temperature
 $I_F=10\text{ mA}$, $V_{CE}=5.0\text{ V}$

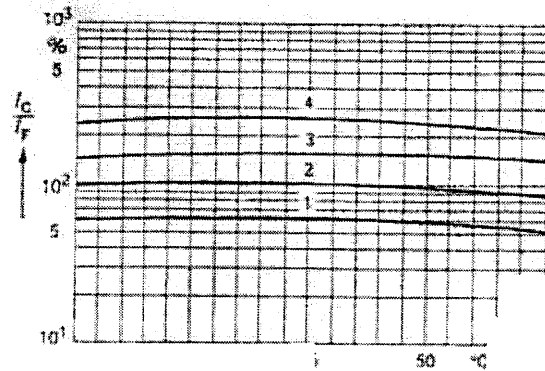


Figure 6. Transistor capacitance (typical) vs. collector-emitter voltage $T_A=25^\circ\text{C}$, $f=1.0\text{ MHz}$

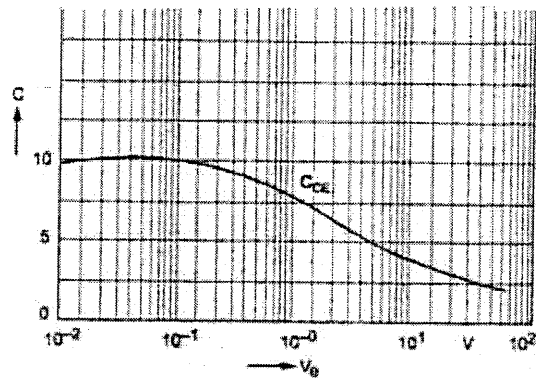


Figure 4. Output characteristics (typical) Collector current vs. collector-emitter voltage $T_A=25^\circ\text{C}$

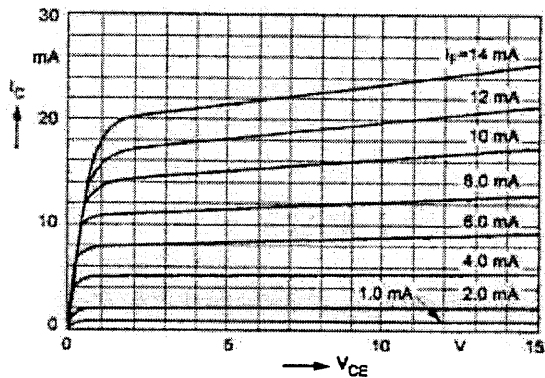


Figure 7. Permissible pulse handling capability, Forward current vs. pulse width Pulse cycle D=parameter, $T_A=25^\circ\text{C}$

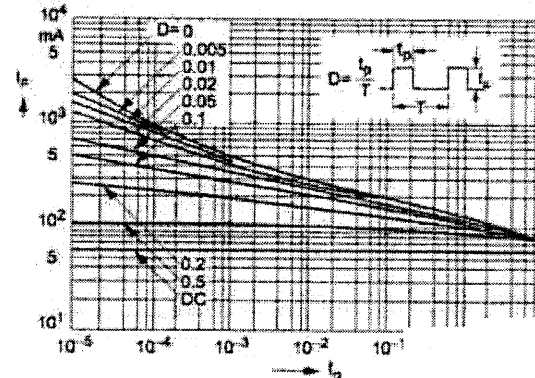


Figure 5. Diode forward voltage (typical) vs. forward current

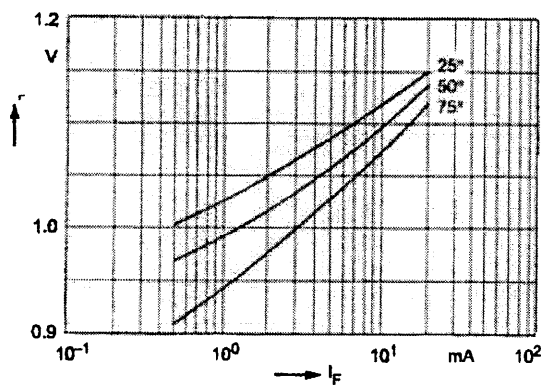
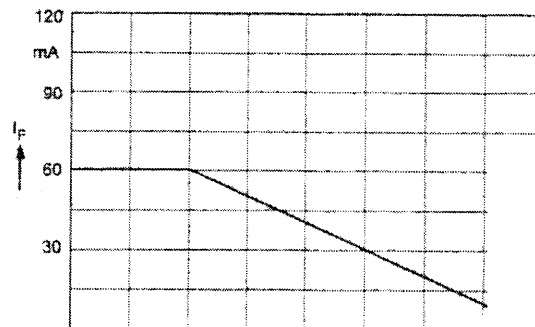


Figure 8. Permissible power dissipation vs. ambient temperature



u

SIEMENS

SFH6106
SFH6116
SFH6156
SFH6186
SFH6206
SFH6286

5.3 kV TRIOS® High Reliability Optocouplers

FEATURES

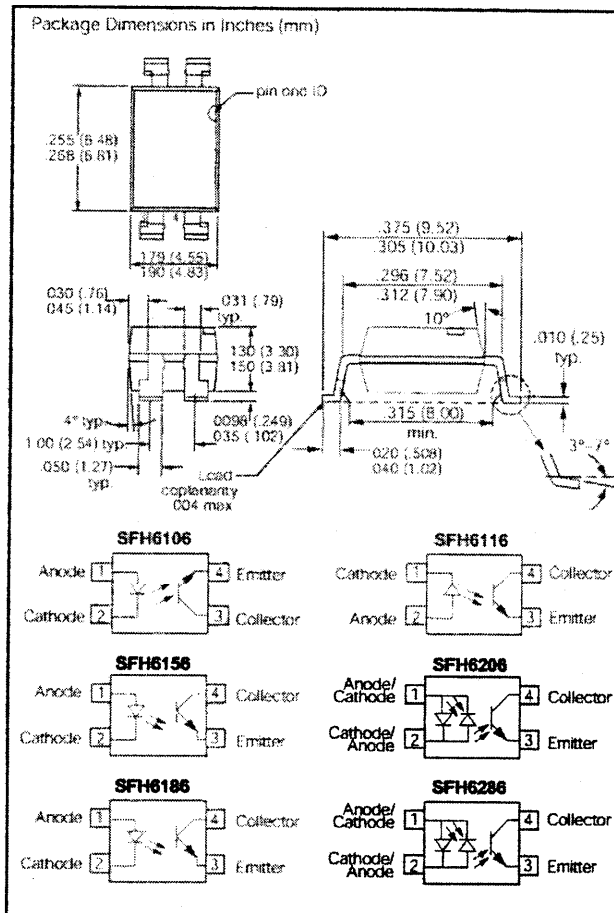
- **SMD Versions of SFH610, 611, 615, 618, 620, 628**
- **Available on Tape and Reel**
—To Order Use Suffix "T"
- **TRIOS — Transparent I/O on Shield**

DESCRIPTION

The SFH6106, 6116, 6156, 6186, 6206, 6286 families of optocouplers are lead bent for SMD applications. They are electrically equivalent to the SFH610, 611, 615, 618, 620, and 628 families of optocouplers.

CROSS REFERENCE

SMD	Thru-hole	
	New Designs	Not for New Design
SFH6106-1	SFH610A-1	SFH610-1
SFH6106-2	SFH610A-2	SFH610-2
SFH6106-3	SFH610A-3	SFH610-3
SFH6106-4	SFH610A-4	SFH610-4
SFH6116-1	SFH611A-1	SFH611-1
SFH6116-2	SFH611A-2	SFH611-2
SFH6116-3	SFH611A-3	SFH611-3
SFH6116-4	SFH611A-4	SFH611-4
SFH6156-1	SFH615A-1	SFH615-1
SFH6156-2	SFH615A-2	SFH615-2
SFH6156-3	SFH615A-3	SFH615-3
SFH6156-4	SFH615A-4	SFH615-4
SFH6186-2	SFH618A-2	SFH618-2
SFH6186-3	SFH618A-3	SFH618-3
SFH6186-4	SFH618A-4	SFH618-4
SFH6186-5	SFH618A-5	SFH618-5
SFH6206-1	SFH620A-1	SFH620-1
SFH6206-2	SFH620A-2	SFH620-2
SFH6206-3	SFH620A-3	SFH620-3
SFH6286-2	SFH628A-2	SFH628-2
SFH6286-3	SFH628A-3	SFH628-3
SFH6286-4	SFH628A-4	SFH628-4





Optocoupler Option 1

Option 1 Optocouplers for Safe Electrical Insulation per DIN VDE 0884*

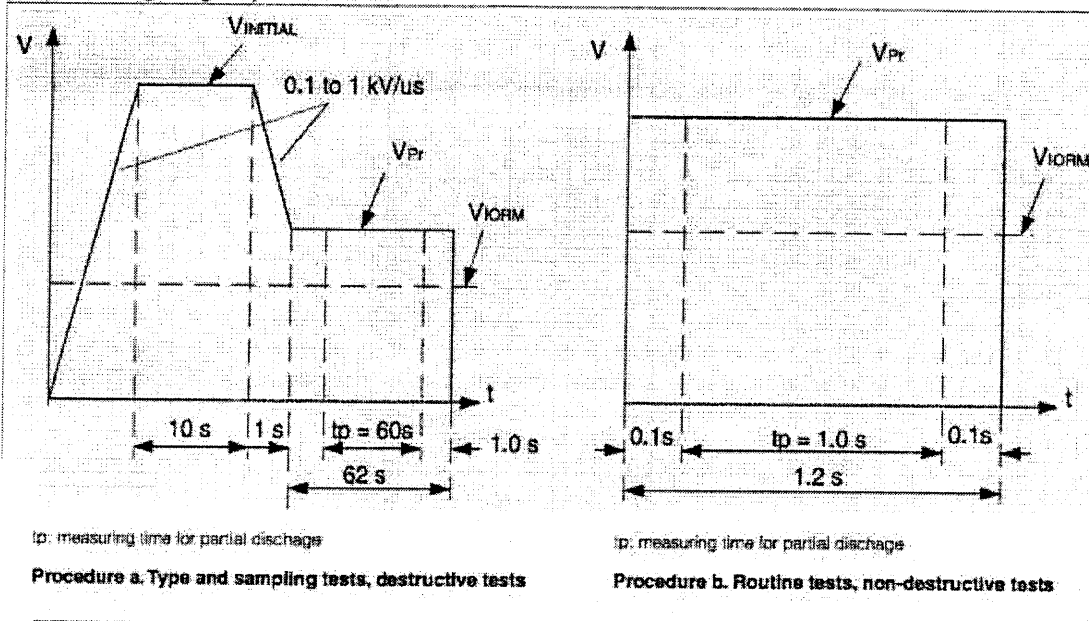
These optocouplers are suitable for safe electrical insulation only within the safety maximum ratings. Compliance with the safety maximum ratings must be ensured by protective circuits.

The partial discharge measurement ensures that no partial discharge occurs during operation at maximum permissible operating insulation voltage (V_{ORM}). Permanent partial discharge affects the insulating materials and can result in a high voltage breakdown.

It is recommended that tests with the insulation test voltage (V_{ISOL}) should not be made, otherwise partial discharge may occur impairing the insulation characteristics. Thus partial discharges also may occur at the maximum permissible operating insulation voltage.

The insulation test per DIN VDE 0884 is carried out after all the other tests.

Time-Test Voltage Diagram per DIN VDE 0884*



* DIN VDE 0884, edition June 1992

APCC Proprietary

APC

Part Specification Cover Sheet

APC Part Number:
349-0321**OPTO 80V 200%CTR VDE4P SMD**

Production

X-Reference Part Number:

Status of Specification:
Approved**Production Revision History:**

Rev.	Date	By:	ECO #	Alpha Letter	Description of change
1	3/15/01	jil			Release

Detailed Specification

APC Part Number: 349-0321 -- Production Rev. 1

Description:

Expanded description

**OPTOCOUPLER, 4-PIN SURFACE MOUNT, LED INPUT, TRANSISTOR OUTPUT,
80V 200% CURRENT TRANSFER RATIO MIN., 5300 VOLT A.C. ISOLATION, UL,
CSA + VDE RECOGNIZED**Primary Application (Business Unit)
NPS


Project (End Item Part Number(s))

APC Standards:

Applicable APC standards

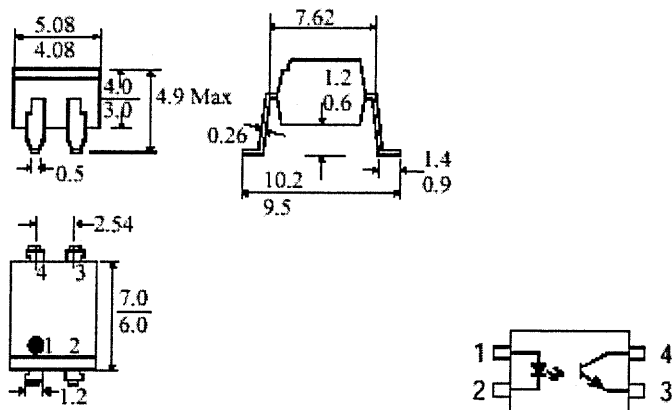
Applicable industry standards

Specs Directory

Drawing File attachments	Drawing Revision (revision number of current attachment.)
 iscocom321.pdf	Isocom Spec. 10/20/00

Drawing Image:

Drawing Images not to exceed 5" x 3" otherwise attach Acrobat (.PDF) file



Notice of Deviation:

Special InstructionsAPC Part Number **349-0321** -- Production Rev. 1**Shipping Packaging:****Method and materials:**

Ammo packs or Reels - Sufficient to prevent shipping and handling damage.

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.

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:

Part Number, and Manufacture Identification.

Special Qualifying Instructions / Drawings:**Approved Manufacturer List**

< Link to Manufacturer's Qual. database (Sorted by Name)

< Link to Component Qualifications dB. (Sorted P/N)

PADS/VIEWLOGIC SECTION:

Library Verified by: Peter Finn on: 02/16/2001

Server:	Comment History
APC - BILLERICA	03/20/2001 11:46 AM EST, Revision # 1, Status Approved , Annette D'elia

	03/20/2001 11:46 AM EST, Revision # 1, Status Approved , Annette D'elia

	03/20/2001 09:07 AM EST, Revision # 0, Status Submitted for Approval , Robert Thibodeau

	03/19/2001 08:33 AM EST, Revision # 0, Status Submitted for Approval , Robert Thibodeau

	03/16/2001 01:19 PM EST, Revision # 0, Status Submitted for Approval , Robert Thibodeau

	03/15/2001 04:36 PM EST, Revision # 0, Status Draft , Janice Lund

	02/16/2001 02:02 PM EST, Revision # 0, Status Draft , Peter Finn

	02/16/2001 01:56 PM EST, Revision # 0, Status Draft , Brooke Eklund

	02/16/2001 12:39 PM EST, Revision # 0, Status Draft , Janice Lund

	02/16/2001 12:39 PM EST, Revision # 0, Status Draft , Janice Lund

	02/16/2001 12:39 PM EST, Revision # 0, Status Draft , Janice Lund

	02/16/2001 12:37 PM EST, Revision # 0, Status Draft , Janice Lund

	02/16/2001 12:37 PM EST, Revision # 0, Status Controlled Release - Revision Pending , Janice Lund

	12/11/2000 04:37 PM EST, Revision # 0, Status Controlled Release , Sandra Buker

ISP321-1X, ISP321-2X, ISP321-4X
ISP321-1, ISP321-2, ISP321-4



HIGH DENSITY MOUNTING PHOTOTRANSISTOR OPTICALLY COUPLED ISOLATORS

APPROVALS

- UL recognised, File No. E91231
- 'X' SPECIFICATION APPROVALS
 - VDE 0884 in 3 available lead form : -
 - STD
 - G form
 - SMD approved to CECC 00802
- Certified to EN60950 by the following Test Bodies :-
 - Nemko - Certificate No. P96102022
 - Fimko - Registration No. 192313-01..25
 - Semko - Reference No. 9639052 01
 - Demko - Reference No. 305969

DESCRIPTION

The ISP321-1, ISP321-2, ISP321-4 series of optically coupled isolators consist of infrared light emitting diodes and NPN silicon photo transistors in space efficient dual in line plastic packages.

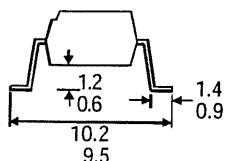
FEATURES

- Options :-
 - 10mm lead spread - add G after part no.
 - Surface mount - add SM after part no.
 - Tape&reel - add SMT&R after part no.
- High Current Transfer Ratio (50% min)
- High Isolation Voltage (5.3kV_{RMS}, 7.5kV_{PK})
- High BV_{CEO} (80Vmin)
- All electrical parameters 100% tested
- Custom electrical selections available

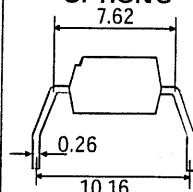
APPLICATIONS

- Computer terminals
- Industrial systems controllers
- Measuring instruments
- Signal transmission between systems of different potentials and impedances

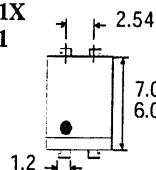
OPTIONSM SURFACEMOUNT



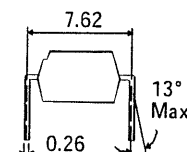
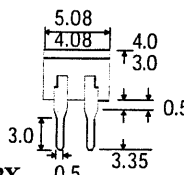
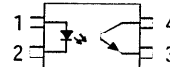
OPTIONG



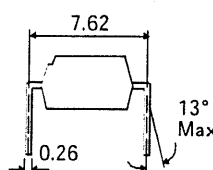
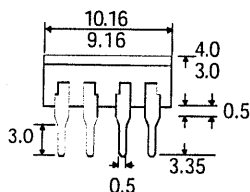
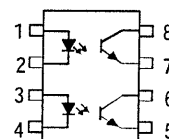
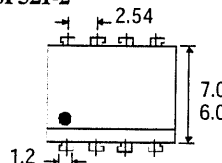
ISP321-1X ISP321-1



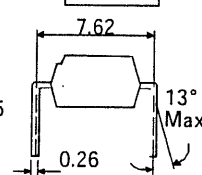
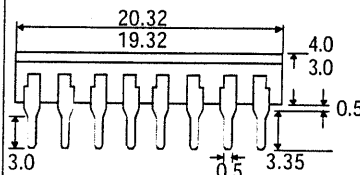
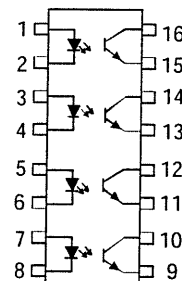
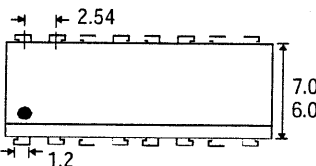
Dimensions in mm



ISP321-2X ISP321-2



ISP321-4X ISP321-4



ISOCOM COMPONENTS LTD

Unit 25B, Park View Road West,
Park View Industrial Estate, Brenda Road
Hartlepool, Cleveland, TS25 1YD
Tel: (01429) 863609 Fax : (01429) 863581

ISOCOM INC

720 E., Park Boulevard, Suite 104,
Plano, TX 75074 USA
Tel: (972) 423-5521
Fax: (972) 422-4549

ABSOLUTE MAXIMUM RATINGS
(25°C unless otherwise specified)

Storage Temperature	-55°C to + 125°C
Operating Temperature	-55°C to + 100°C
Lead Soldering Temperature	
(1/16 inch (1.6mm) from case for 10 secs)	260°C

INPUT DIODE

Forward Current	50mA
Reverse Voltage	6V
Power Dissipation	70mW

OUTPUT TRANSISTOR

Collector-emitter Voltage BV_{CEO}	80V
Emitter-collector Voltage BV_{ECO}	6V
Power Dissipation	150mW

POWER DISSIPATION

Total Power Dissipation	200mW
(derate linearly 2.67mW/°C above 25°C)	

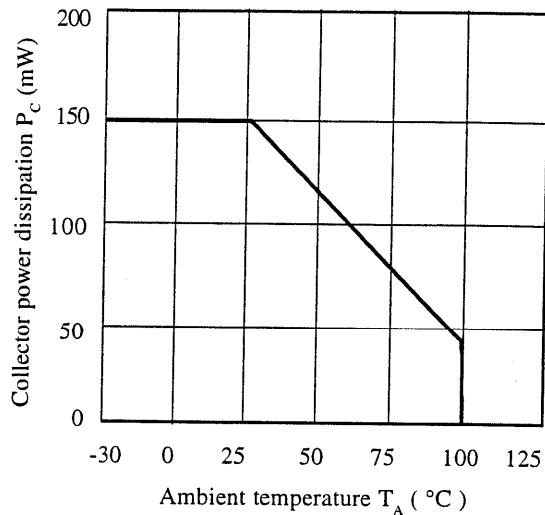
ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ Unless otherwise noted)

PARAMETER		MIN	TYP	MAX	UNITS	TEST CONDITION
Input	Forward Voltage (V_F)	1.0	1.15	1.3	V	$I_F = 10\text{mA}$
	Reverse Voltage (V_R)	5			V	$I_R = 10\mu\text{A}$
	Reverse Current (I_R)			10	μA	$V_R = 5\text{V}$
Output	Collector-emitter Breakdown (BV_{CEO}) (Note 2)	80			V	$I_C = 0.5\text{mA}$
	Emitter-collector Breakdown (BV_{ECO})	6			V	$I_E = 100\mu\text{A}$
	Collector-emitter Dark Current (I_{CEO})			100	nA	$V_{CE} = 48\text{V}$
Coupled	Current Transfer Ratio (CTR) (Note 2)					
	ISP321-1, ISP321-2, ISP321-4	50		600	%	$5\text{mA } I_F, 5\text{V } V_{CE}$
	CTR selection available GB	100		600	%	
	BL	200		600	%	
	GB	30			%	$1\text{mA } I_F, 0.4\text{V } V_{CE}$
	Collector-emitter Saturation Voltage $V_{CE(SAT)}$			0.4	V	$8\text{mA } I_F, 2.4\text{mA } I_C$
	GB			0.4	V	$1\text{mA } I_F, 0.2\text{mA } I_C$
	Input to Output Isolation Voltage V_{ISO}	5300			V_{RMS}	See note 1
		7500			V_{PK}	
	Input-output Isolation Resistance R_{ISO}	5×10^{10}			Ω	$V_{IO} = 500\text{V}$ (note 1)
	Rise Time tr		2		μs	$V_{CC} = 10\text{V}$
	Fall Time tf		3		μs	$I_C = 2\text{mA}, R_L = 100\Omega$
	Turn-on Time ton		3		μs	
	Turn-off Time toff		3		μs	

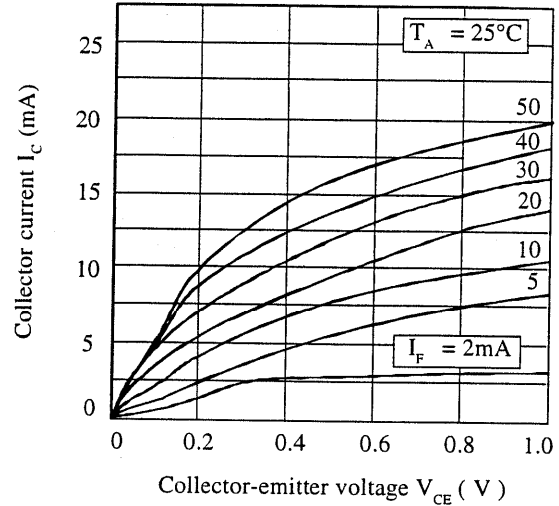
Note 1 Measured with input leads shorted together and output leads shorted together.

Note 2 Special Selections are available on request. Please consult the factory.

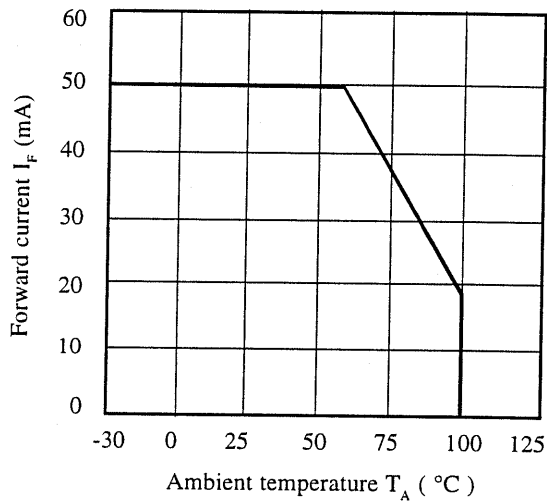
Collector Power Dissipation vs. Ambient Temperature



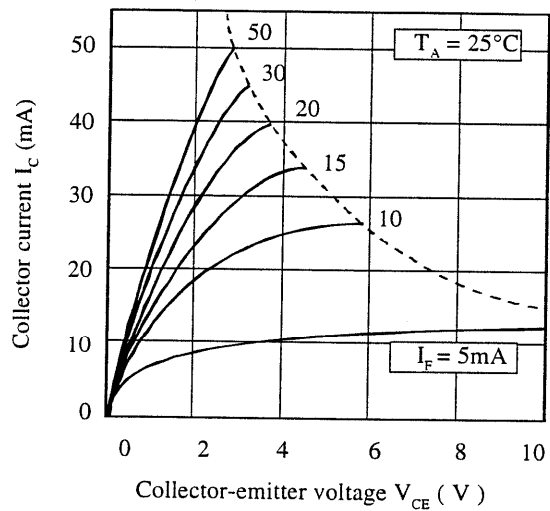
Collector Current vs. Low Collector-emitter Voltage



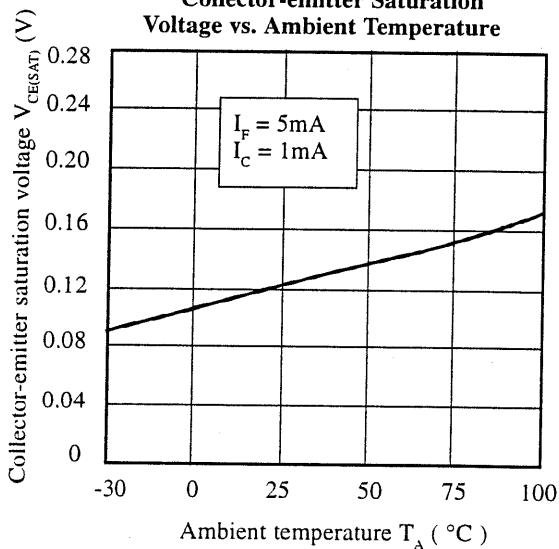
Forward Current vs. Ambient Temperature



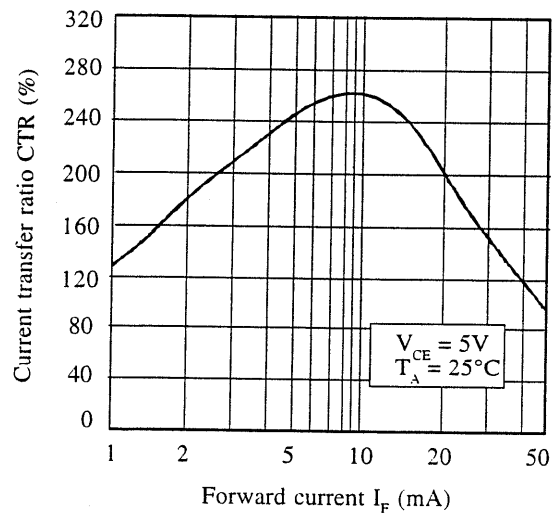
Collector Current vs. Collector-emitter Voltage



Collector-emitter Saturation Voltage vs. Ambient Temperature



Current Transfer Ratio vs. Forward Current





VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 14

VDE File: 19244-3335-0020
Appendix 14, Page 1 of 5

)UPSCOLT D

+00865127611660

T-964 P.01/03 F-455

HAMBURG INDUSTRIES CO., LTD.

漢保實業股份有限公司

TEL (02)6: 28862 (REP)
 FAX (02)6: 27201-2

DATE: Table

YDFU2 November 22, 1985
 Component - Extruded Tubing, Electrical

SUMITOMO ELECTRIC INDUSTRIES LTD

E48762 (S)
 (A1-cont. from A card)

Irradiated polyvinyl chloride (PVC).					
806	300	105	=	+	=
807	800	105	=	+	=
Heat shrinkable polyvinyl chloride (PVC).					
818	300	105	1	Clear	=
819	800	105	1	CL	=
823	300	105	1	CL	=

Yes

Yes

Yes

Yes

Yes

Report: November 23, 1971; November 23, 1971; January 9, 1978; January 9, 1978; January 9, 1978.

Replaces E48762A1 dated August 27, 1984.

83263011

N3228

Underwriters Laboratories Inc.*

(Cont on B card)

01V0090390

YDFU2 May 12, 1989
 Component - Extruded Tubing, Electrical

SUMITOMO ELECTRIC INDUSTRIES LTD

E48762 (S)
 (D-cont. from C card)

All colors except clear.

*Tubing is considered to comply with the optional oil resistant requirements only if it is so marked.

*Tubing is considered to comply with the optional VW-1 flammability requirements only if it is so marked.

Marking: Company name or "TRAX" or "SUMITUBE" or "SUMIPAL" and temperature printed on tubing. Company identification may include suffix K or KM. Catalog designation appears on tubing, package, tag or spool.

See General Information Preceding These Recognitions.

For use only in equipment where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Replaces E48762D dated September 16, 1985.

6136630(1)

Underwriters Laboratories Inc.*

01V0089472

08665123452327

SUZBOU HAMBURG CO., LTD.

1720294210000 VWZ 02-01 TNY 00-00

VDE File: 19244-3335-0020,
Appendix 14, Page 3 of 5

標準サイズ
Cat. No. 818

呼称サイズ (inch)	収縮前サイズ(mm)		収縮後サイズ(mm)		長さ(m)
	径(最小値)	肉厚	内径(最大値)	肉厚(最小値)	
3/64	1.2	0.10	0.6	0.26	100
1/16	1.6	0.10	0.8	0.33	100
3/32	2.4	0.12	1.2	0.33	100
1/8	3.2	0.12	1.6	0.33	100
3/16	4.8	0.12	2.4	0.33	100
1/4	6.4	0.15	3.2	0.44	50
5/8	9.6	0.15	4.8	0.44	50
1/2	12.7	0.19	6.3	0.56	50
3/4	19.1	0.23	9.5	0.69	50
1	25.4	0.25	12.7	0.77	50

Cat. No. 823

呼称サイズ (mm)	収縮前サイズ(mm)		収縮後サイズ(mm)		長さ(m)
	径(最小値)	肉厚	内径(最大値)	肉厚(最小値)	
2×0.15	2.0	0.15	1.0	0.33	100
2.5×0.15	2.5	0.15	1.25	0.33	100
3×0.15	3.0	0.15	1.5	0.33	100
3.5×0.15	3.5	0.15	1.75	0.33	100
4×0.15	4.0	0.15	2.0	0.33	100
5×0.15	5.0	0.15	2.5	0.44	50
6×0.15	6.0	0.15	3.0	0.44	50
7×0.15	7.0	0.15	3.5	0.44	50
8×0.15	8.0	0.15	4.0	0.44	50
9×0.20	9.0	0.20	4.5	0.56	50
10×0.20	10.0	0.20	5.0	0.56	50
11×0.20	11.0	0.20	5.5	0.56	50
12×0.20	12.0	0.20	6.0	0.56	50
13×0.25	13.0	0.25	6.5	0.69	50
14×0.25	14.0	0.25	7.0	0.69	50
15×0.25	15.0	0.25	7.5	0.69	50
16×0.25	16.0	0.25	8.0	0.69	50
18×0.25	18.0	0.25	9.0	0.77	50
20×0.25	20.0	0.25	10.0	0.77	50
22×0.25	22.0	0.25	11.0	0.77	50
25×0.25	25.0	0.25	12.5	0.77	50



Cat. No. 818, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

スミチューブV (UL-224規格品)

Cat. No. 818.823

■ 適用規格

UL-224

認定番号 (File No.) E48762 105°C、300V、VW-1

カタログNo. 813、823

■ 用途

- (1) 電子機器内配線の絶縁。
- (2) 電線接続端子の絶縁保護。

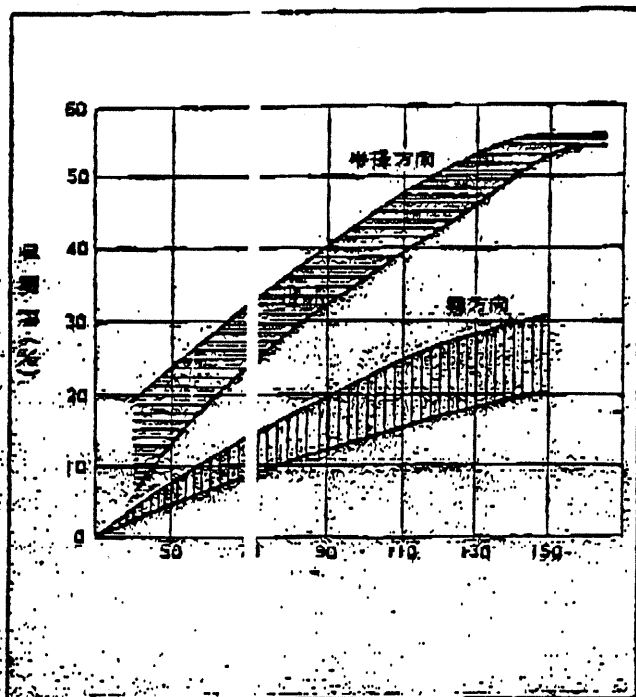
■ 特長

- (1) 難燃性です。
- (2) 透明です。
- (3) 耐薬品性 良好
- (4) 収縮率

半径方向 : 0%以下

軸方向 : 0%以下

■ 収縮特性



■ マーキング

スミチューブVの表面には、

SUMITOMO SUMITUBE V 105°C CAT

××××の文字が印刷されています。

××××にはカタログNo.の数字が入ります。

■ 特性 (UL-224規格)

特 性	項 目	特 性 値
物理的特性	引張り強さ (老化前)	1.05kg/mm以上
	引張り強さ (老化後)	残率70%以上
	伸 び (老化前)	100%以上
	伸 び (老化後)	残率70%以上
	柔軟 性	老化後クラックなし
	熱 変 形 性	121℃1時間で50%以下
	ヒートショック	121℃1時間でクラックなし
	低温屈曲性	-10℃1時間でクラックなし
電気的特性	耐 電 圧 (老化前)	AC2.5KV60秒で破壊なし
	耐 電 圧 (老化後)	AC2.5KV60秒で破壊なし
	破壊電圧 (老化前)	AC2.5KV以上
	破壊電圧 (老化後)	老化前の50%以上かつ 2.5KV以上
	体積固有抵抗	10 ¹⁴ Ω-cm以上
化学的特性	導 体 腐 食 性	老化後腐食なし
	耐 安 定 性	湿度95%、温度23℃で24時間後、老化し、伸び残率70%以上
	燃 焼 性	VW-1取得

* 老化条件 : 135°C、7日

30.MAR.2001 13:43

APC (SUZHOU) UPS CO., LTD.

NO.936

P.2

To: Bill Bungrayao

001-718-610-517

HAMBURG INDUSTRIES CO., LTD.

漢保實業股份有限公司

Fr: William Shen

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VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

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APPENDIX 15

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Appendix 15, Page 1 of 104

Note: * *

Explanation of method for reduced spacings

IEC 60950 3RD Edition

69050 IEC:1999 Page 451

R2 Reduced clearances (see 2.10.3)

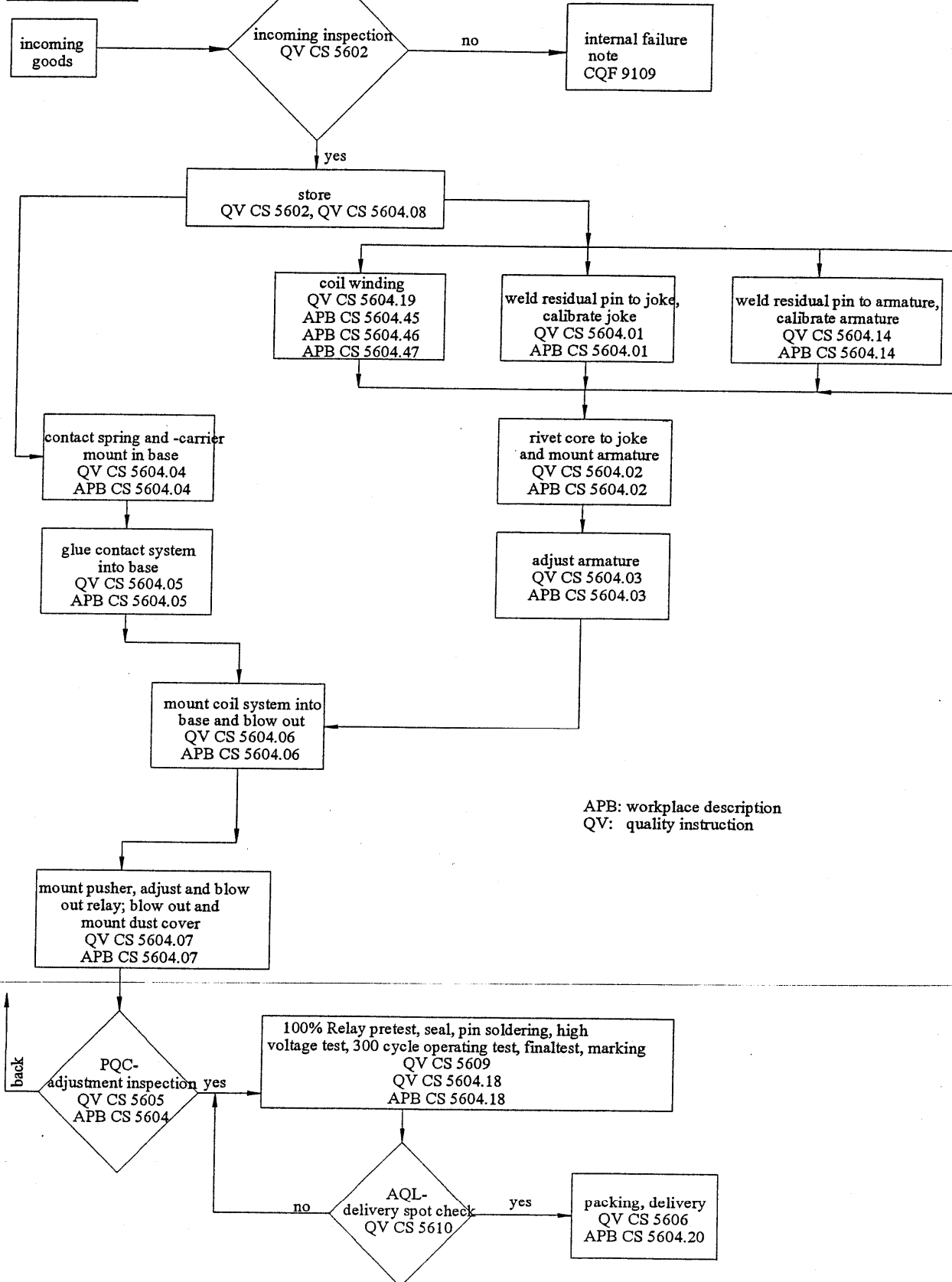
A manufacturer wishing to use reduced CLEARANCES permitted by 2.10.3, tables 2H, 2J and 2K, shall implement a quality control programme for those features of the construction listed in table R.2. This programme shall include specific quality controls for the tools and materials which affect CLEARANCES.

60950 IEC:1999 Page 453

The manufacturer shall also identify and plan the protection and, where applicable, installation processes which directly affect quality and shall ensure that these processes are carried out under controlled conditions. Controlled conditions shall include the following:

- documented work instructions defining process, equipment, environment and manner of production where the absence of such instructions would adversely affect quality, suitable working environment, compliance with reference standards or specifications and quality plans;
- monitoring and control of suitable processes and product characteristics during production and installation in the equipment;
- criteria for workmanship stipulated to the extent necessary in written specifications or by means of representative samples;
- records maintained for qualified processes, equipment and personnel as appropriate.

Table R.2 provides the sampling plan for attributes and tests necessary to conform to the requirements of 2.10.3. The number of samples of production parts or assemblies shall be based on IEC 60410 or ISO 2859-1 or equivalent national standards.

c) procedure

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Qualitätssicherungsplan

RP BG II/2

QV CS 5600

☒ **Arbeitsexemplar**

**unterliegt dem Änderungsdienst inklusive
Nachträge**

☐ **Informationsexemplar**

unterliegt nicht dem Änderungsdienst

*gültig ab 12.03.1996 Ernst
Birkmann*

Verteiler:

[Signature]

QUALITÄTSSICHERUNGSVORSCHRIFT ÜBERSICHT RP BG II/2

- QV CS 5600**
- a) Zweck
 - b) Geltungsbereich
 - c) Inhalt

Beck

Um den hohen Qualitätsstandard im Wettbewerb gerecht werden zu können, muß sichergestellt werden, daß sowohl die verwendeten Einzelteile in einer Art und Weise ablaufen, daß eine genügend hohe Prozeßsicherheit zur Erreichung der gestellten Anforderungen gewährleistet wird.

Geltungsbereich

Diese Vorschrift ist für die Justage von Printrelais RP 2/2 anzuwenden, wenn die Baugruppen an einem anderen Ort als Dimling justiert werden und die Relais als Baugruppe zur Ablieferung gelangen.

Inhalt

QV CS5600	QV - Übersicht
QV CS5601	QV - Prozeßdiagramm
QV CS5602	QV - Wareneingangskontrolle
QV CS5603	QV - Process Quality Control (PQC)
QV CS5604	QV - Arbeitsplatzkontrolle (APK)
QV CS5605	QV - PQC/Justagestichprobe
QV CS5606	QV - Verpackung
QV CS5607	QV - Behandlung fehlerhafter LOSE
QV CS5608	QV - Mitgeltende Unterlagen
QV CS5609	QV - Endfertigung von Relais
QV CS5610	QV - Ablieferprüfung

Erstellt: PQC / Bittermann 1999-01-27/ *110 751/1*
Freigegeben: Q / Becker, 1999-01-28/ *Beck*

Geprüft: Q / Becker, 1999-01-28/ *Beck*
Version 02: gültig ab 1999-01-28

PROZESSDIAGRAMM

- CQV CS 5601
- a) Zweck
 - b) Geltungsbereich
 - c) Ablauf
 - d) Ablauf WS-Relais

a) Zweck

Das Prozeßdiagramm dient dem Zweck, Abläufe einfach darzustellen und die Zusammenhänge deutlich zu machen. Fehler in den Abläufen werden dadurch reduziert und die Rückverfolgbarkeit sichergestellt.

b) Geltungsbereich

Die vorliegende Vorschrift hat für die Bereiche

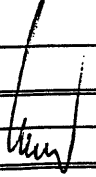
- Wareneingang und Lagerung
- Montage
- Justage
- Verpackung

Gültigkeit.

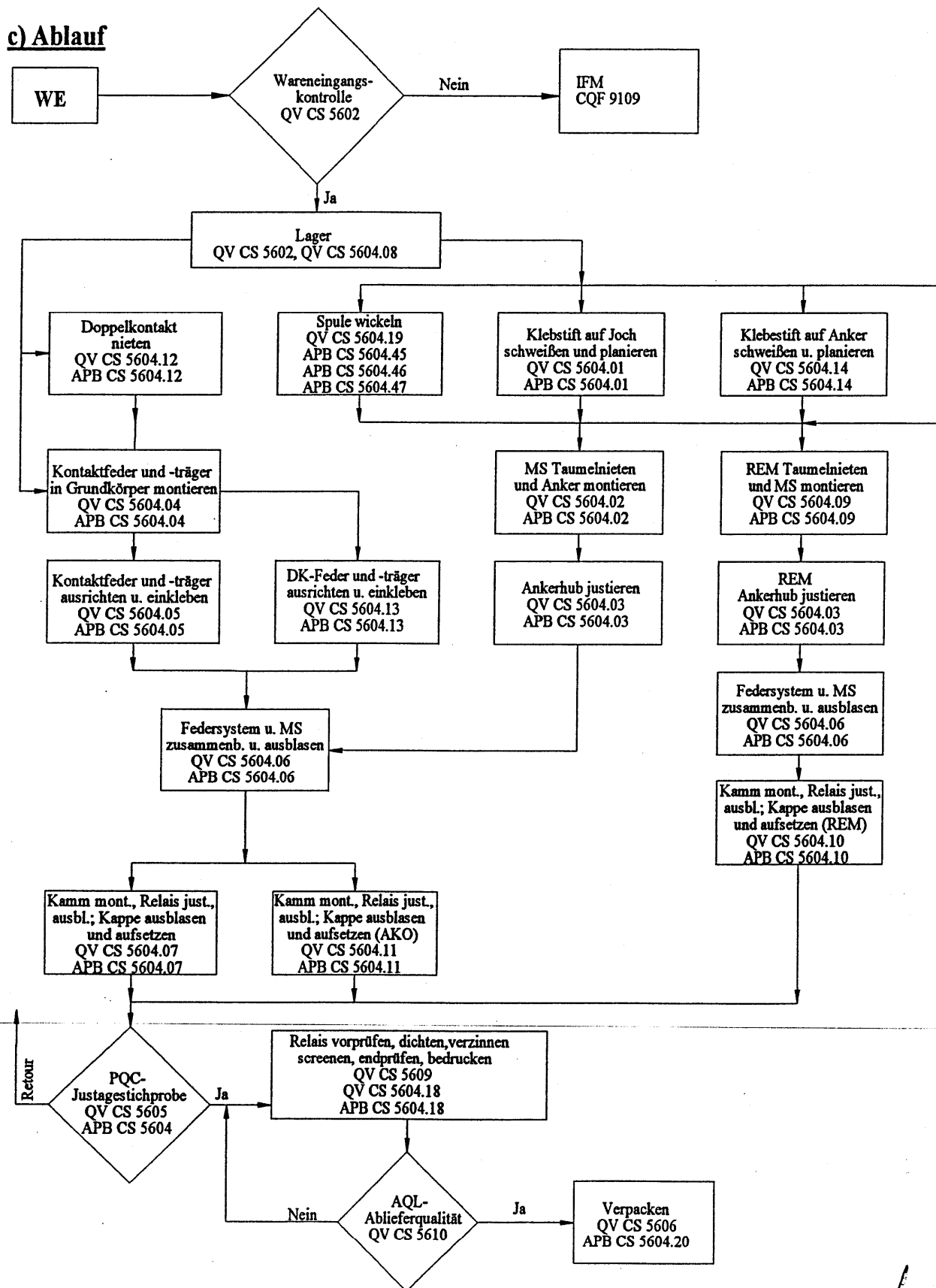
Erstellt: Q / Bittermann 1999-04-07 / 

Freigegeben: Q / Becker, 1999-04-07 / 

Geprüft: Q / Becker, 1999-04-08 / 

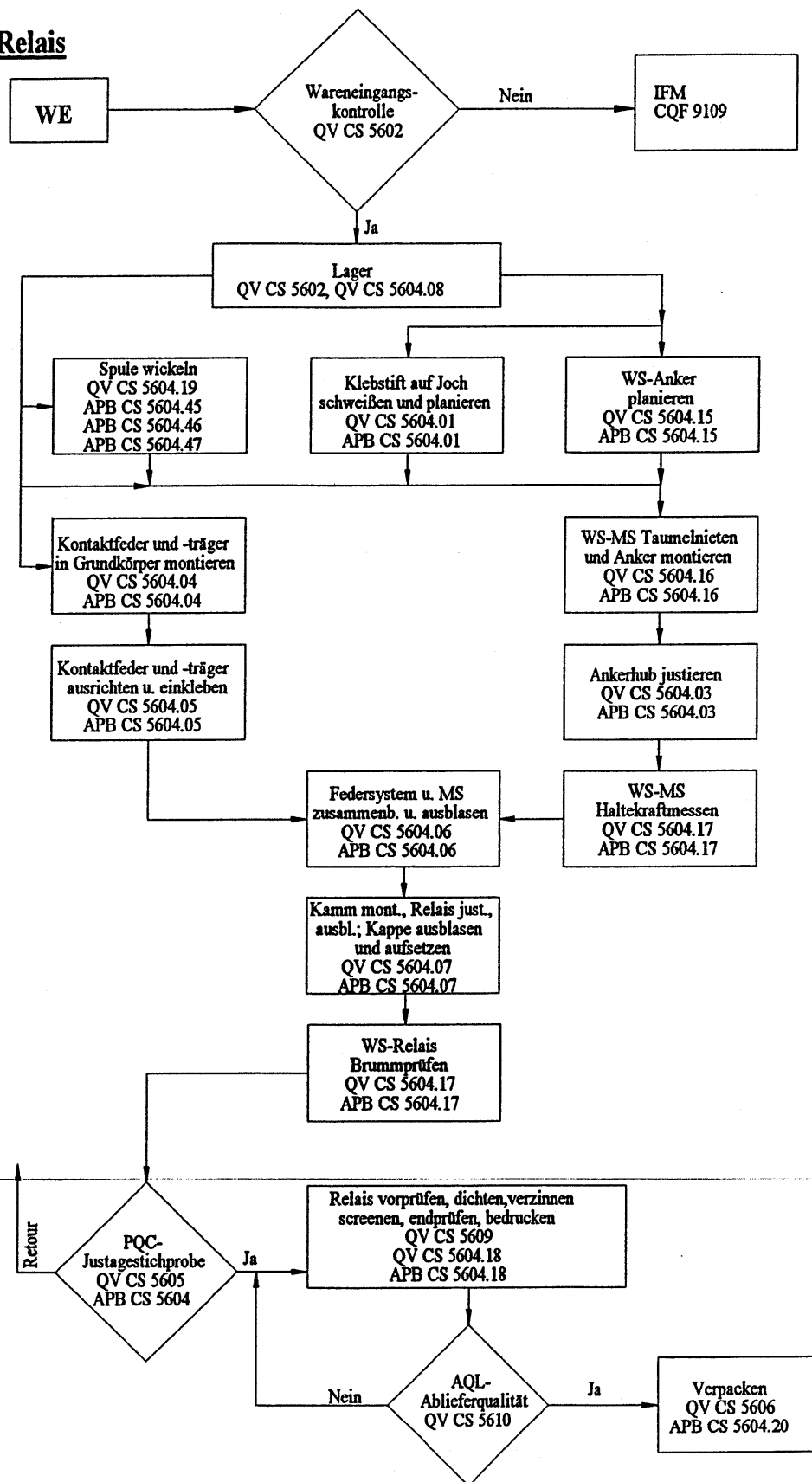
Version 03: gültig ab 1999-04-08 

c) Ablauf



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d) Ablauf WS-Relais



VDE File: 19244-3335-0020
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WARENEINGANGSKONTROLLE (WEK)

- QV CS 5602**
- a) Zweck
 - b) Geltungsbereich
 - c) Ablauf

a) Zweck

Die Wareneingangskontrolle dient dem Zweck, falsches Material bzw. abweichende Stückzahlen zu erkennen.

b) Geltungsbereich

Diese Vorschrift hat für Relaiseinzelteile und Baugruppen Gültigkeit, wenn sie aus dem Werk Waidhofen stammen und zum Zweck des Zusammenbaus und der Justage an einen anderen Ort geliefert wurden.

c) Ablauf

Jede angelieferte Ware muß auf folgende Inhalte geprüft werden (Identprüfung):

- c1) Identität zwischen Bestellung und Lieferschein
- c2) Prüfbzettel: - Produktionsdatum
- Sachnummer
- Stückzahl
- Unterschrift des Prüfers
- c3) Der Prüfbzettel muß bei der Ware bis zum Verbrauch verbleiben
- c4) Kontrolle kann bei jeder Kommission bei Übernahme in Waidhofen und Bestätigung am Gegensein erfolgen.
- c5) Die Dokumentation erfolgt je Sachnummer in einer fortlaufenden Übersicht. CWL1 (Produktionsprogramm).
- c6) Abweichungen müssen in Waidhofen innerhalb von 24 h nach Übernahme vorgelegt werden, Abweichungen, die zu einem späteren Zeitpunkt festgestellt werden, müssen mittels interner Fehlermeldung (CQF 9109) abgehandelt werden.
- c7) Die Lagerung von Wareneingängen darf nur in den angelieferten Behältnissen an dafür vorgesehenen Räumlichkeiten oder Flächen gelagert werden, wobei eine eindeutige Statuskennzeichnung mittels CQF 9101/9102 sicherzustellen ist.
- c8) First in First out: Die Rückverfolgbarkeit von Produktständen und die Aufrechterhaltung einer funktionierenden Regelschleife zwischen den Standorten erfordert die strikte Einhaltung des First in First out Systems. Um dies zu gewährleisten ist es notwendig, die ältesten Bauzustände laut Freigabeschein CQF 9101 zuerst zu verbauen. Baugruppen, die länger gelagert werden als in QV CS5604.08 definiert, können nur mit einer Freigabe seitens CWQ verbaut werden.
- c9) Lagerklima: Die Betauung von Waren ist nicht zulässig.

PROCESS QUALITY CONTROL (PQC)
(Selbstprüfung)

- QV CS 5603**
- a) Zweck
 - b) Geltungsbereich
 - c) Ablauf

a) Zweck

Die PQC dient als kurze Regelschleife zur Optimierung aller Einzelschritte im Fertigungsbereich.

b) Geltungsbereich

Der Geltungsbereich dieser Vorschrift umfaßt alle Arbeitsplätze in der Produktionsphase, wenn sie manuell, maschinell oder automatisch durchgeführt werden.

c) Ablauf

An jedem Arbeitsplatz ist eine 100%ige Prüfung der verwendeten Einzelteile und Baugruppen durchzuführen. (SELBSTPRÜFUNG). Als Basis gelten Vergleichs- und Belegmuster.

- c1) Wird Material mit unzulässigen Abweichungen gefunden, so muß es am Arbeitsplatz in dafür vorgesehenen Behältern gesammelt werden.
- c2) Der Inhalt der Behälter muß mindestens einmal je Schicht analysiert, stratifiziert und ausgewertet werden.
- c3) Die Auswertung muß in Fehlerstück (I) erfolgen.
- c4) Die Dokumentation erfolgt laufend in den PQC Wochenblättern (CQF9126). Monatlich (CQF9124) werden die Ergebnisse verdichtet und im Management verteilt.
- c5) Aufgrund der laufenden PQC Ergebnisse sind permanent qualitätsverbessernde Maßnahmen einzuleiten und zu dokumentieren. (CQF 9103)
 - P - Problem erfassen Datensammeln
 - U - Ursachen analysieren was, wer, wann, ...?
 - L - Lösungen finden Freigabe
- c6) Das Lager und Produktionsklima soll zwischen 20 und 25°C sowie 40 - 75 % Luftfeuchtigkeit liegen. Dokumentation in CQF 9139 und CQF 9140.

ARBEITSPLATZKONTROLLE (APK)

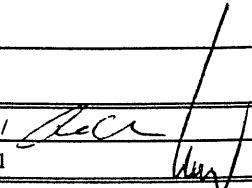
- CQV CS 5604** a) Zweck
b) Geltungsbereich
c) Ablauf

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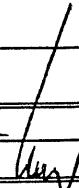
Inhalt:

- CQV CS 5604.01 SPC/Klebestift auf Joch schweißen und planieren
- CQV CS 5604.02 SPC/Magnetsystem Taumelnieten (monost. Relais)
- CQV CS 5604.03 SPC/Ankerhub justieren
- CQV CS 5604.04 SPC/Kontaktfedern und Kontaktträger in Grundkörper montieren
- CQV CS 5604.05 SPC/Kontaktfedern und Kontaktträger ausrichten und in Grundkörper einkleben
- CQV CS 5604.06 SPC/Magnetsystem und Federsystem zusammenbauen
- CQV CS 5604.07 SPC/Relais justieren, ausblasen sowie Kappe ausblasen und aufsetzen
- CQV CS 5604.08 SPC/Lagerüberprüfung in Vormontage zwecks "first in/first out"
- CQV CS 5604.09 SPC/Magnetsystem Taumelnieten (bistabile Relais)
- CQV CS 5604.10 SPC/REM Relais justieren und Kappe aufsetzen
- CQV CS 5604.11 SPC/AKO Relais justieren und Kappe aufsetzen
- CQV CS 5604.12 SPC/Doppelkontakt nieten
- CQV CS 5604.13 SPC/Kontaktfedern und Kontaktträger ausrichten und in Grundkörper einkleben >> Doppelkontakt
- CQV CS 5604.14 SPC/Klebestift auf Anker schweißen und planieren
- CQV CS 5604.15 SPC/WS-Anker planieren
- CQV CS 5604.16 SPC/WS-Magnetsystem Zusammenbau (Nieten und Montage)
- CQV CS 5604.17 SPC/WS-Relais brummprüfen und Haltekraft messen
- CQV CS 5604.18 SPC/Endfertigung von Relais
- CQV CS 5604.19 SPC/Spule wickeln und ausfertigen
- CQV CS 5604.20 SPC/Relais zum Versand verpacken

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Version 04: gültig ab 1999-06-21 

a) Zweck

Die Arbeitsplatzkontrolle dient als Instrument zur Überprüfung der vorgeschriebenen Tätigkeiten und deren Qualitätsmerkmale aller Einzelschritte im Fertigungsbereich.

Übersetzungen in eine andere Sprache müssen bei allen Fertigungsunterlagen (SPC, APB, ...) mit dem Abgabedatum der Originalunterlage, der Unterschrift des Übersetzers und des Prüfers (der Übersetzung) versehen sein.

b) Geltungsbereich

Der Geltungsbereich dieser Vorschrift umfaßt alle Arbeitsplätze in der Produktionsphase, wenn sie manuell, maschinell oder automatisch durchgeführt werden.

c) Ablauf

An jedem Arbeitsplatz ist gemäß Kontrollstammkarte eine entsprechende Stichprobenprüfung durchzuführen.

Wird bei der Stichprobe ein Fehler gefunden, so ist vom PQC-Verantwortlichen sofort die entsprechende Ursache zu ermitteln und entsprechende Maßnahmen zur Korrektur des Fehlers einzuleiten. Die Ergebnisse der Arbeitsplatzkontrolle sind in das dafür vorgesehene Formblatt CQF 9127 einzutragen. Die getroffenen Maßnahmen zur Abstellung des Fehlers sind ebenfalls im gleichen Formblatt auf der Rückseite zu dokumentieren.

CQV CS 5604.01 SPC/Klebestift auf Joch schweißen und planieren

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.01
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Klebestift auf Joch schweißen und		
STICHPROBENGROSSE: 5		planieren		
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Anker-Schweiß und Planierautomat (MKE)		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Der Klebestift darf mit der Pinzette nicht ablösbar sein und der Schweißpunkt muß, nach dem Entfernen mit der Zange, sichtbar sein.		Lupe, Pinzette, Zange	
02	Der Schweißdraht muß 0,8 mm (+/- 0,012 mm) im Durchmesser und ca. 3-4 mm lang sein.		Schiebelehre	
03	Die Klebestiftmitte muß zwischen 17,0 und 17,5 mm von der Ankerlagerstelle entfernt sein.		Schiebelehre	
04	Die Klebestifthöhe soll zwischen 2,19 - 2,33 mm planiert sein (inkl. Jochdicke messen).		Mikrometer	
05	Beschädigungen der Ni-Oberfläche von Joch und Lagerstelle unzulässig (Kratzer, lose Späne, Verschmutzung).		Lupe	
06	Die Prägung zur Magnetsystemfixierung muß im Bereich der GK-Einspannstelle 2,14 +/- 0,02 mm hoch sein.		Schiebelehre	
07	Verfahrensparameter a) Schweißstrom 2,5A +/- 0,5A b) Schweißkraft 1bar +/- 0,5bar c) Planierkraft APB - Aufstellung		visuell	
08	Die Nullstellung des Meßtasters ist zu überprüfen.		Maschinensteuerung	
09				
10				

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Version 04: gültig ab 1999-06-21

CQV CS 5604.02 SPC/Magnetsystem Taumelnieten (monostabile Relais)

<i>SCHRACK</i> COMPONENTS		SPC	PRODUKT: RP II/2Relais	NUMMER CQV CS 5604.02
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Magnetsystem Taumelnieten		
STICHPROBENGROSSE: 5		(monostabile Relais)		
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Magnetsystem, Taumelnietmaschine		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Der Spulenkern muß so fest vernietet sein, daß er sich mit der Justierzange nicht bewegen läßt.		visuell mit Justierzange	
02	Die Kern-Joch Stufe muß so ausgeführt sein, daß der Kern um 0,00 bis 0,09 mm niedriger als das Joch ist.		Meßuhr	
03	Die Gesamthöhe des vernieteten Kernes muß zw. 20,6 mm bis 20,75 mm hoch sein.		Schiebelehre	
04	Es dürfen keine Grate im Bereich der Ankerlagerstelle und auf der Polfläche des Kernes sein.		visuell	
05	Die Spule darf keine Druckstellen, Abschürfungen und Verschmutzungen aufweisen (Ni-Späne, Kratzer, ...).		visuell, Lupe	
06	Bei der Bearbeitung des Magnetsystems sind Fingerlinge zu verwenden.		visuell	
07	Die Anker müssen vollständig in der Lagerstelle eingesetzt werden und dürfen nicht beschädigt sein.		visuell	
08	Verfahrensparameter: Taumelnietdruck 2,5 bar +/- 0,5 bar		visuell	
09	Überprüfung der Schlechteileselektion durch einlegen eines unterbrochenen Prüfmusters 1 x am Tag.		visuell Prüfmuster	
10				

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Erstellt: Q / Bittermann 1999-06-18/

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Version 04: gültig ab 1999-06-21

CQV CS 5604.03

SPC/Ankerhub justieren

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.03
KST: PL-RPII	DATUM: 92-09-14		ARBEITSPLATZ: Ankerhub justieren	
STICHPROBENGROSSE: 5				
KONTROLLHÄUFIGKEIT: 4xSchicht		BETRIEBSMITTEL: Ankerhubjustiergerät, DMM und Referenzmaß		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Die Ankerendstellung wird, je nach Toleranzlage der Einzelteile von der Hauptmontage vorgegeben.		Hubjustiergerät, DMM	
02	Die Messegengenauigkeit wird mit Prüfling mit einer Höhe von 0,00 mm und 2,00 mm überprüft.		Referenzmaß	
03	Beschädigungen der Metallteile und der Spule sind unzulässig.		visuell, Lupe	
04	Zum Handling der Magnetsysteme sind Fingerlinge zu verwenden.		visuell	
05				
06				
07				
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Erstellt: Q / Bittermann 1999-06-18/

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Version 04: gültig ab 1999-06-21

CQV CS 5604.04 SPC/Kontaktfedern und Kontaktträger in Grundkörper montieren

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2-Relais	NUMMER CQV CS 5604.04
KST: PL-RPII	DATUM: 92-09-14		ARBEITSPLATZ: Kontaktfedern und Kontaktträger in	
STICHPROBENGROSSE: 5		Grundkörper montieren		
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: 10fach Aufnahme		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Alle Teile müssen vollständig in den Grundkörper eingezogen sein. Fehlende Teile sind unzulässig.		visuell	
02	Alle Kontaktfedern und Kontaktträger müssen mit dem gleichen Kontaktmaterial benietet sein.		visuell	
03	Beschädigungen des Grundkörpers und der Kontaktfedern sowie Kontaktträger sind unzulässig (besonders zu beachten sind Haarrisse an der Unterseite des Grundkörpers, Abscherungen usw.).		Lupe	
04	Materialverschmutzungen und Fingerabdrücke auf den Kontaktfedern sowie Kontaktträgern sind unzulässig.		Lupe	
05	Die Kontaktfedern und Kontaktträger müssen in die Lagerstelle gedrückt sein.		visuell, Justierzange	
06	Verbogene Anschlußpins sind unzulässig.		Rastermaß	
07	Beim Bestücken sind Fingerlinge zu verwenden.		visuell	
08				
09				
10				

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CQV CS 5604.05

SPC/Kontaktfedern und Kontaktträger ausrichten und in Grundkörper einkleben

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.05
KST: PL-RPII	DATUM: 92-09-14		ARBEITSPLATZ: Kontaktfedern und Kontaktträger	
STICHPROBENGROSSE: 5		ausrichten und in GK einkleben		
KONTROLLHÄUFIGKEIT: 2xSchicht.		BETRIEBSMITTEL: Kniehebelpresse, Dosiergerät		
CODE	PRÜFMERKMAL	PRÜFMITTEL		
01	Beschädigungen des Grundkörpers und der Kontaktfedern sowie Kontaktträger sind unzulässig (besonders zu beachten sind Haarrisse an der Unterseite des Grundkörpers, Abscherungen usw.).	Lupe		
02	Der Seitenabstand der Umschaltfedern zum Grundkörper bzw. der Kappeninnenseite muß mind. 0,4 mm betragen.	Drahtspion		
03	Die Ruhekontakt- bzw. Arbeitskontaktträger müssen einen Seitenabstand größer 0,2 mm haben.	Drahtspion, Kappe		
04	Die ausgerichtetn Kontaktfedern und Kontaktträger dürfen über die Grundkörperkante nicht hinausragen.	visuell		
05	Sämtliche Kontaktfedern und Kontaktträger müssen im Grundkörper eingeklebt sein.	visuell		
06	Kleberreste außerhalb der Kleberkammern sind unzulässig.	visuell		
07	Der Kleber muß im Ofen vollständig ausgehärtet sein.	visuell, Pinzette		
08	Der Kontaktversatz darf 0,3 mm nicht überschreiten.	visuell		
09	Beim Handling mit den fertig bestückten Federsystemen sind Fingerlinge zu verwenden.	visuell		
10	Nach dem Ausrichten des Federsystems und dem Aufsetzen einer Kappe auf den GK, müssen sich die Federpins leicht durch die vorgegebenen Löcher der Rastermaßelehre (Pinning 5 mm) schieben lassen.	Rastermaß		
11	Ofentemperatur lt. APB, Ablaufdatum des Klebers darf nicht überschritten werden.	visuell		

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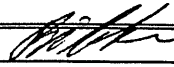
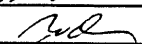
CQV CS 5604.06 SPC/Magnetsystem und Federsystem zusammenbauen

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2-Relais	NUMMER CQV CS 5604.06
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Magnetsystem und Federsystem		
STICHPROBENGROSSE: 5		zusammenbauen		
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Pinzette		
CODE	PRÜFMERKMAL	PRÜFMITTEL		
01	Die Rastnasen des Spulenkörpers müssen beidseitig im GK eingerastet sein.	visuell		
02	Die Spulenanschlußpins dürfen beim Montieren nicht durch den Spulenkörper gedrückt werden.	visuell		
03	Die Feder- und Magnetsysteme dürfen bei der Bestückung nicht beschädigt werden.	Lupe		
04	Bei den montierten Federsystemen sind verbogene Anschlußpins sowie Kontaktfedern unzulässig.	visuell		
05	Beim Handling mit den fertig bestückten Relais und Federsystemen sind Fingerlinge zu verwenden.	visuell		
06	Die Ablage der montierten Relais darf nur in sauberen Klarsichttassen erfolgen.	visuell		
07	Die Druckluftwartungseinrichtung ist täglich 1x zu überprüfen (saubere Luft beim Ausblasen des Federsystems).	visuell mit Reinigungspapier		
08	Identität, Type,: richtige Spule und Federsystem lt. Stückliste	visuell		
09				
10				

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CQV CS 5604.07 SPC/Relais justieren, ausblasen sowie Kappe ausblasen und aufsetzen

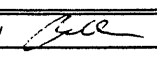
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KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Relais justieren und Kappe aufsetzen		
STICHPROBENGROSSE: 5				
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Justieraufnahme, -zange, Federwaage, Drahtspion, Netzgerät		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Beschädigungen des GK bzw. der Kontaktfedern und Kontaktträger sind unzulässig.		Lupe	
02	Der Seitenabstand der Umschaltefedern zum Grundkörper bzw. der Kappeninnenseite muß mind. 0,4 mm betragen.		Drahtspion	
03	Die Ruhekontakt- bzw. Arbeitskontaktträger müssen einen Seitenabstand > 0,2 mm haben.		Drahtspion	
04	Die ausgerichteten Kontaktfedern und Kontaktträger dürfen über die Grundkörperkante nicht hinausragen.		visuell	
05	Sämtliche Hilfswerkzeuge dürfen keine Verschmutzungen aufweisen.		visuell	
06	Die Greifbehälter und Relaiskappen dürfen keine Verunreinigungen aufweisen (lose Kunststoffteilchen).		visuell	
07	Die Justierspannung muß laut Justiervorschrift eingestellt werden.		visuell, DMM	
08	Beim Handling der Relais ohne Kappen sind Fingerlinge zu verwenden.		visuell	
09	Die Düsen der Ausblasrichtung müssen sich drehen, Kappen vor dem Aufsetzen müssen ausgeblasen und abgesaugt werden.		visuell	
10				

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Appendix 15, Page 19 of 104Erstellt: Q / Bittermann 1999-06-18/ Geprüft: Q / Becker, 1999-06-21/ Freigegeben: Q / Becker, 1999-06-21/ Version 04: gültig ab 1999-06-21 

CQV CS 5604.08 SPC/Lagerüberprüfung in Vormontage zwecks "first in/first out"

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.08
KST: PL-RPII	DATUM: 92-09-14		ARBEITSPLATZ: Lagerüberprüfung in Vormontage zwecks	
STICHPROBENGROSSE: 5		"first in/first out"		
KONTROLLHÄUFIGKEIT: 1xwöchent		BETRIEBSMITTEL:		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Die ältesten auf Lager befindlichen Baugruppen oder montierten Relais dürfen max. 1 Jahr alt sein; Lt. CQF 9101 "first in/first out"-Überprüfung.		visuell	
02				
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Erstellt: Q / Bittermann 1999-06-18/ 	Geprüft: Q / Becker, 1999-06-21/ 
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CQV CS 5604.09

SPC/Magnetsystem Taumelnieten (bistabile Relais)

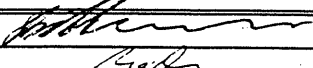
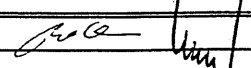
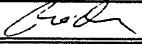
<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.09
KST: PL-RPII	DATUM: 93-05-11		ARBEITSPLATZ: Magnetsystem Taumelnieten	
STICHPROBENGROSSE: 5		(bistabile Relais)		
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Taumelnietvorrichtung		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Der Spulenanker muß so fest vernietet sein, daß er sich mit der Justierzange nicht bewegen läßt.		visuell mit Justierzange	
02	Die Kern-Joch Stufe muß so ausgeführt sein, daß der Kern um 0,20 bis 0,25 mm höher als das Joch ist.		Meßuhr	
03	Es dürfen keine Grate im Bereich der Ankerlagerstelle und auf der Polfläche des Kernes sein.		visuell, Lupe	
04	Die Spule darf keine Druckstellen, Abschürfungen und Verschmutzungen aufweisen (Ni-Späne, Kratzer, ...).		visuell, Lupe	
05	Zur Bearbeitung des Magnetsystems sind Fingerlinge zu verwenden.		visuell	
06	Die Anker müssen vollständig in der Lagerstelle eingesetzt werden und dürfen nicht beschädigt sein.		visuell	
07				
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CQV CS 5604.10 SPC/REM Relais justieren und Kappe aufsetzen

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT : RP II/2 Relais	NUMMER CQV CS 5604.10
KST: PL-RPII	DATUM : 93-05-11		ARBEITSPLATZ : REM Relais justieren und Kappe	
STICHPROBENGROSSE : 5		aufsetzen		
KONTROLLHÄUFIGKEIT : 2xSchicht		BETRIEBSMITTEL : Justieraufnahme, -zange, Federwaage, Drahtspion, Netzgeräte		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Beschädigungen des GK bzw. der Kontaktfeder und Kontaktträger sind unzulässig.		Lupe	
02	Der Seitenabstand der Umschaltfedern zum Grundkörper bzw. der Kappeninnenseite muß mind. 0,4 mm betragen.		Drahtspion	
03	Die Ruhekontakt- bzw. Arbeitskontaktträger müssen einen Seitenabstand > 0,2 mm haben.		Drahtspion	
04	Die Haltekraft muß in Kammebene gemessen werden.		visuell	
05	Sämtliche Hilfswerkzeuge dürfen keine Verschmutzungen aufweisen.		visuell	
06	Die Greifbehälter und Relaiskappen dürfen keine Verunreinigungen aufweisen (lose Kunststoffteilchen).		visuell	
07	Die Justierspannungen müssen laut Justiervorschrift eingestellt sein.		visuell, DMM	
08	Beim Handling der Relais ohne Kappen sind Fingerlinge zu verwenden.		visuell, DMM	
09				
10				

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CQV CS 5604.11 SPC/Relais justieren und Kappe aufsetzen

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.11
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Relais justieren und Kappe aufsetzen		
STICHPROBENGROSSE: 5				
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Justieraufnahme,-zange, Federwaage, Drahtspion, Netzgeräte		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Beschädigungen des GK bzw. der Kontaktfeder und Kontaktträger sind unzulässig.		Lupe	
02	Der Seitenabstand der Umschaltfedern zum Grundkörper bzw. der Kappeninnenseite muß mind. 0,4 mm betragen.		Drahtspion	
03	Die Ruhekontakt- bzw. Arbeitskontaktträger müssen einen Seitenabstand > 0,2 mm haben.		Drahtspion	
04	Die ausgerichteten Kontaktfedern und Kontaktträger dürfen über die Grundkörperkante nicht hinausragen.		visuell	
05	Sämtliche Hilfswerkzeuge dürfen keine Verschmutzungen aufweisen.		visuell	
06	Die Greifbehälter und Relaiskappen dürfen keine Verunreinigungen aufweisen (lose Kunststoffteilchen).		visuell	
07	Die Justierspannungen müssen laut Justiervorschrift eingestellt sein.		visuell, DMM	
08	Beim Handling der Relais ohne Kappen sind Fingerlinge zu verwenden.		visuell	
09	Sonderjustage: Justagespannung 75 % von Unenn RK-Druck ≥ 13 cN (12 cN) Überhub $\geq 0,12$ mm ($\geq 0,12$ mm) AK-Auflagedruck ≥ 13 cN (≥ 12 cN)		visuell	

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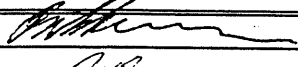
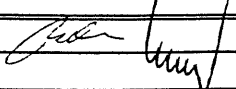
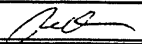
Freigegeben: Q / Becker, 1999-06-21/

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CQV CS 5804.12 SPC/Doppelkontakt nieten

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.12
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Doppelkontakt nieten		
STICHPROBENGROSSE: 5				
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Kniehebelpresse		
CODE	PRÜFMERKMAL	PRÜFMITTEL		
01	Die vorgestanzten Kontaktträger und US Federn müssen gratfrei und nach der Reinigungsanlage frei von Ölrückständen sein.	visuell mit Lupe		
02	Gesamthöhe des Kontaktes a) bei US-Feder 1,45 +0,048/-0,008 mm b) bei AK-Träger 1,03 - 1,04 mm c) bei RK-Träger 1,11 - 1,13 mm	Mikrometerschraube		
03	Der Kontakt muß so fest vernietet sein, daß kein Luftspalt zwischen Kontakt und Feder vorhanden ist.	Lupe		
04	Eine Verformung der US-Federn und Kontaktträger durch die Vernietung ist unzulässig.	visuell, Lupe		
05	Eingepreßter Schmutz am Kontakt oder der Kontaktfeder ist unzulässig.	visuell, Lupe		
06	Risse in Kontakt, Kontaktfeder bzw. verschlagene Kontakte sind unzulässig.	visuell, Lupe		
07	Beim Kontaktnieten sind Fingerlinge zu verwenden.	visuell		
08	Federlappengleichlauf: max. zulässige Abweichung: 1/2 Federdicke im Kontaktbereich.	visuell, Lupe		
09				
10				

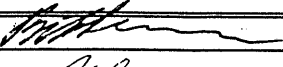
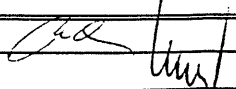
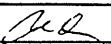
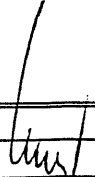
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CQV CS 5604.13 SPC/Kontaktfedern und Kontaktträger ausrichten und in Grundkörper einkleben >> Doppelkontakt

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT : RP II/2 Relais	NUMMER CQV CS 5604.13
KST: PL-RPII	DATUM : 92-09-14	ARBEITSPLATZ : Kontaktfedern und Kontaktträger		
STICHPROBENGROSSE : 5		ausrichten und in GK einkleben >> Doppelkontakt		
KONTROLLHÄUFIGKEIT : 2xSchicht.		BETRIEBSMITTEL : Kniehebelpresse, Dosiergerät, Leuchtlupe, Pinzette		
CODE	PRÜFMERKMAL	PRÜFMITTEL		
01	Beschädigungen des Grundkörpers und der Kontaktfedern sowie Kontaktträger sind unzulässig (besonders zu beachten sind Haarrisse an der Unterseite des Grundkörpers, Abscherungen usw.).	Lupe		
02	Der Seitenabstand der Umschaltfedern zum Grundkörper bzw. der Kappeninnenseite muß mind. 0,4 mm betragen.	Drahtspion		
03	Die Ruhekontakt- bzw. Arbeitskontaktträger müssen einen Seitenabstand größer 0,2 mm zum Grundkörper und Kappe haben.	Drahtspion, Kappe		
04	Die ausgerichteten Kontaktfedern und Kontaktträger dürfen über die Grundkörperkante nicht hinausragen.	visuell		
05	Sämtliche Kontaktfedern und Kontaktträger müssen im Grundkörper eingeklebt sein.	visuell		
06	Kleberreste außerhalb der Kleberkammern sind unzulässig.	visuell		
07	Der Kleber muß im Ofen vollständig ausgehärtet sein.	visuell, Pinzette		
08	Der Kontaktversatz darf max. 1/3 des Kontaktdurchmessers betragen.	visuell		
09	Beim Handling der fertigen Federsysteme sind Fingerlinge zu verwenden.	visuell		
10	Nach dem Ausrichten des Federsystems und dem Aufsetzen einer Kappe auf den GK, müssen sich die Federpins leicht durch die vorgegebenen Löcher der Rastermaßlehre (Pinning 5 mm) schieben lassen.	Rastermaß		

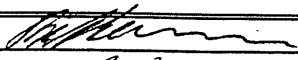
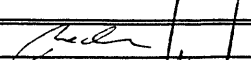

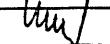
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CQV CS 5604.14 SPC/Klebestift auf Anker schweißen und planieren

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.14
KST: PL-RPII	DATUM: 92-09-14		ARBEITSPLATZ: Klebestift auf Anker schweißen und planieren	
STICHPROBENGROSSE: 5				
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Anker-Schweiß und Planierautomat (MKE)		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Der Klebestift darf mit der Pinzette nicht ablösbar sein und der Schweißpunkt muß, nach dem Entfernen mit der Zange, sichtbar sein. Bei Anker für REM Relais wird kein Klebestift aufgeschweißt.		Lupe, Pinzette, Zange	
02	Der Schweißdraht muß 0,5 mm (+/- 0,005 mm) im Durchmesser und ca. 3-4 mm lang sein.		Schiebelehre	
03	Der Klebestift muß 8,5 bis 9 mm von der Jochlagerkante entfernt aufgeschweißt werden. (die Klebestiftposition wird nach dem Planieren bis zur Mitte des Klebestifts gemessen).		Schiebelehre	
04	Der Klebestift soll 0,02 bis 0,08 mm hoch sein; REM Anker werden nur planiert		Mikrometer	
05	Der Anker muß symmetrisch zu seiner Mittelachse planiert sein und muß von Kernmitte bis Ende aufliegen. Der Anker darf max. 20,4 mm lang sein.		visuell mit Magnetsystem	
06	Beschädigungen der Ni-Oberfläche von Joch und Lagerstelle unzulässig (Kratzer, lose Späne, Verschmutzung).		Lupe	
07	Der Anker darf im Bereich der Jochlagerstelle max. 8,35 mm breit sein.		Schiebelehre	
08	Die Nullstellung des Meßtasters ist zu überprüfen.		Kalibrierlei.	
09	Verfahrensparameter a) Schweißstrom 2,5A +/- 0,5A b) Schweißkraft 1bar +/- 0,5bar c) Planierkraft APB - Aufstellung		visuell am Bildschirm	

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CQV CS 5604.15 SPC/WS-Anker planieren

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.15
KST: PL-RPII	DATUM: 92-09-14		ARBEITSPLATZ: WS-Anker planieren	
STICHPROBENGROSSE: 5				
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Ankerplanierautomat (MKE)		
CODE	PRÜFMERKMAL	PRÜFMITTEL		
01	Die Auflageflächen des Ankers werden auf eine Planität von 0 bis 0,005 mm planiert.	visuell mit Magnetsystem		
02	Der Anker muß symmetrisch zu seiner Mittelachse planiert sein und darf max. 20,4 mm lang sein.	visuell mit Magnet-system, Prüflehre		
03	Beschädigungen der Oberfläche des Ankers und abspringende Ni-Späne sind unzulässig.	Lupe		
04	Verunreinigungen der Planieranlage und des Ankers sind unzulässig.	visuell		
05	Der Anker darf im Bereich der Lochlagerstelle max. 8,35 mm breit sein.	Schiebelehre		
06				
07				
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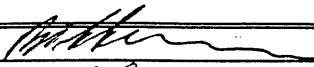
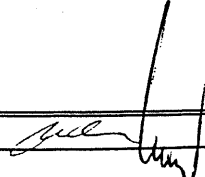
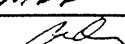
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CQV CS 5604.16 SPC/WS-Magnetsystem Zusammenbau

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.16
KST: PL-RPII	DATUM: 92-09-14		ARBEITSPLATZ: WS-Magnetsystem	
STICHPROBENGROSSE: 5		Zusammenbau		
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: WS-Magnetsystemplanieranlage Pinzette		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Die Auflageflächen für den Anker müssen auf eine Planität von 0 bis 0,005 mm planiert werden.		visuell mit Anker	
02	Der Arbeitsluftspalt am Kern muß 0,005 + 0,015 mm - 0,00 mm groß sein.		visuell mit Anker	
03	Beschädigungen der Oberfläche des Joches und Kernes sowie abspringende Ni-Späne sind unzulässig.		Lupe	
04	Abscherungen beim Bestücken der Spule des Kurzschlußrings sind unzulässig.		visuell	
05	Der Kurzschlußring muß mit dem Stanzgrat nach unten in den Spulenkörper eingezogen werden.		visuell	
06	Die Ankerrückstellfeder darf beim Bestücken des Ankers nicht beschädigt sein.		visuell	
07	Beim Handling mit den Spulen bzw. Magnetsystemen sind Fingerlinge zu verwenden.		visuell	
08				
09				
10				

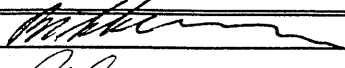
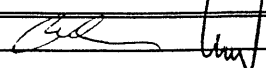

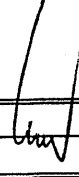
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CQV CS 5604.17 SPC/WS-Relais brummprüfen und Haltekraft messen

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.17
KST: PL-RPII	DATUM: 92-09-14		ARBEITSPLATZ: WS-Relais brummprüfen und	
STICHPROBENGROSSE: 5		Haltekraft messen		
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Prüfaufnahme, Regeltrafos		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Die Relais müssen bei 75 % und 110 % der Nennspannung brummfrei halten, ein kurzes Ansprechbrummen ist zulässig.		Prüfaufnahme Gehör	
02	Der Lärmpegel der Umgebung darf nicht zu hoch sein.		Gehör u. Lärmschutzhaube	
03	Reparaturen müssen in blaue Tiefziehtassen abgelegt werden.		visuell	
04	Beim Handling der Relais ohne Kappe sind Fingerlinge zu verwenden.		visuell	
05	Die Haltekraft des Magnetsystems wird 8 mm von der Lagerkante gemessen und muß größer 180cN sein.		Prüfaufnahme Federwaage	
06	Bei der Haltekraftmessung wird die Spule mit 75 % der Nennspannung erregt.		Voltmeter	
07				
08				
09				
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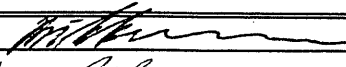

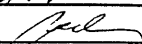
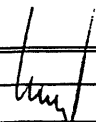
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CQV CS 5604.18 SPC/Endfertigung von Relais

<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.18
KST: PL-RPII	DATUM: 96-07-01	ARBEITSPLATZ: Vorprüfen, Dichten, Verzinnen, Screenen,		
STICHPROBENGROSSE: 5		Endprüfen und Bedrucken		
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Dicht und Endprüfstrecke		
CODE	PRÜFMERKMAL	PRÜFMITTEL		
01	Einstellung der Anlage entsprechend Type und Verfahrensparameter Vorprüfrechner, HV-Prüfung, Endprüfrechner, Screeningtestgerät, Dichtheitsprüfung lt. VA5806.136	visuell		
02	Spulenpin quetschen lt. Sondertypenliste und Zeichnung.	Schiebelehre, Zeichnung		
03	Relaisabdichtung: Kleberauftrag ausreichend und gleichmäßig; Kleber über Aufstandsebene bzw. im Relais und Verunreinigungen der Pins und Kappe sind unzulässig; der Kleber muß vollständig ausgehärtet sein; bei lötstraßenfesten Relais Typen muß der Spulenpin vollständig mit Kl. umschlossen sein	visuell Pinzette		
04	Flußmittel am Gk und im Relais ist unzulässig.	visuell		
05	Die Verzinnung muß glatt und porenfrei sein und bis 0,3 mm an die Aufstandsebene heranreichen. Zinnspritzer > 0,2 mm sind unzulässig.	visuell		
06	Das Ausgasloch muß nach dem Warmverprägen vollständig geschlossen sein. Beschädigungen der Kappe (Fäden, Löcher, etc.) sind unzulässig.	visuell Lupe		
07	Ausgasloch mit UV-Kleber abdichten: Die Klebermenge muß ausreichend sein; der Kleber muß vollständig ausgehärtet sein; Kleberverschmutzungen sind unzulässig	visuell Pinzette		
08	RELAIS KOMPLETT: Der Kappendruck muß richtig positioniert, lesbar und vollständig sein.	visuell		
09	Div. Beschädigungen und Verunreinigungen der Relais sind unzulässig.	visuell		
10	Abmessungen: a) Länge: max. 29 mm, b) Breite: max. 12,6 mm c) Höhe: max. 25,5 mm	Schiebelehre		
11	Das Rastermaß ist mit einer entsprechenden Rastermaßlehre zu überprüfen.	Rastermaßlehre		

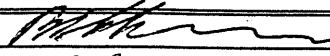
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CQV CS 5604.19 SPC/Spule wickeln und ausfertigen


SCHRACK COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.1
KST: PL-RPII	DATUM: 1998-08-18		ARBEITSPLATZ: Spule wickeln und ausfertigen	
STICHPROBENGROSSE: 5				
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: MLS, LWA, Sipro		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Lose Windungen an Spule sowie Drahtreste an Anwickelpins sind unzulässig		visuell	
02	Der Wicklungsdurchmesser darf die Spulenkörperkontur nicht überragen		visuell	
03	3 Windungen der Spulenanschlußdrähte müssen vollständig verlötet und die Kontur erkennbar sein. Die Anwickelstifte müssen mind. bis 1,0 mm an den Spulenkörperflansch heran verzinnt sein.		visuell	
04	Die umgelegten Anwickelstifte dürfen die Spulenkörperkontur nicht überragen, die Spulenanschlußpins müssen im rechten Winkel zur Spulenkörperaufstandsebene stehen.		visuell	
05	Die umgelegten Anschlußstifte müssen einen Abstand von mind. 0,5 mm zur Wicklung haben. Eventuell wegstehende Zinnfahnen (wegen Drahtreste) dürfen diesen Abstand nicht verkleinern und auch nicht über die Spulenkörperkontur hinausragen. Weiters sollen die Zinnfahnen eine Länge von 0,6 mm nicht überschreiten.		visuell, Drahtlehre	
06	Bei Spulen mit einer Nennspannung > 60 V muß der Spulenanfang gegen Ende mit UV-Kleber isoliert werden. Die Aushärtung erfolgt mit einem Blue-Point mit einer mind. Lichtintensität von 20 mW/cm ² .		visuell, Meßgerät	
07	Flußmittel und Zinnrückstände (Zinnspr. > 0,2 mm) auf Spule und Spulenkörperflansch sind unzulässig.		visuell	
08	Die Anschlußstifte müssen so fest sitzen, daß sie sich bei leichtem Druck nicht bewegen lassen.		visuell	
09	Die Ohmwertprüfung wird durch Unterbrechung bzw. Überbrückung der Kontaktierung kontrolliert.		visuell	
10	Abnahme der manuell ausgefertigten Spulen nach AQL 0,65 N = 1200 - 3200 Stk >> n/c = 125/2		visuell	
11	Verfahrensparameter: Zinnbadtemperatur = 380 °C +/- 10 °C UV-Kleber-Isolierung >> 1 bar +/- 0,5 bar Kleberdruck Dosierkopfheizung = 80 °C +/- 10 °C		Thermometer, visuell	
12	Anwickeldraht außer Wickelraum ist unzulässig		visuell	
13	Beschädigungen an Wickeldraht, Anschlußpins und Spulenkörper sind unzulässig. Speziell Druckstellen am unverzinnnten Draht der Anwickelpins.		visuell, Mikroskop	
14	Der Spulenwiderstand muß lt. Stückliste bzw. PVE innerhalb der zulässigen Grenzen liegen. Bei Einstellung der Toleranzgr. ist die Umgebungstemp. lt. CQR9122 zu berücksichtigen.		Multimeter	

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Erstellt: Q / Bittermann 1999-06-18/ 

Geprüft: Q / Becker, 1999-06-21/ 

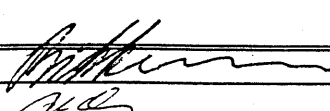
Freigegeben: Q / Becker, 1999-06-21/ 

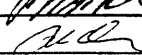
Version 04: gültig ab 1999-06-21 

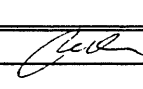
CQV CS 5604.20 SPC/Relais zum Versand verpacken

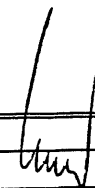
<u>SCHRACK</u> COMPONENTS		SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.20
KST: PL-RPII	DATUM: 1999-04-01		ARBEITSPLATZ: Verpacktisch	
STICHPROBENGROSSE: 5				
KONTROLLHÄUFIGKEIT: 2xSchicht		BETRIEBSMITTEL: Verpacktisch		
CODE	PRÜFMERKMAL		PRÜFMITTEL	
01	Identität Relaisdruck - Barcodeetiketten		visuell	
02	Verpackung lt. SNVV283 oder SNVV222		visuell	
03	Beschädigungen an Relais, Kartonlaschen und Überkarton sind unzulässig.		visuell	
04	Kennzeichnung der nicht vollständigen Verpackungseinheiten.		visuell	
05	Lage der Verpackungseinheiten in PAL-Box mit Barcodeetikette oben.		visuell	
06				
07				
08				
09				
10				

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Erstellt: Q / Bittermann 1999-06-18/ 

Freigegeben: Q / Becker, 1999-06-21/ 

Geprüft: Q / Becker, 1999-06-21/ 

Version 04: gültig ab 1999-06-21 

JUSTAGESTICHPROBE

- QV CS 5605**
- a) Zweck
 - b) Geltungsbereich
 - c) Inhalt

a) Zweck

Die Justagestichprobe dient dem Zweck, eingestellte Prozesse zu überwachen und große Abweichungen vom eingestellten Prozeß mit hinreichender Genauigkeit zu erkennen.

b) Geltungsbereich

Zusätzlich zur PQC wird die Justagestichprobe zur Überwachung der Justierplätze arbeitsplatzbezogen eingesetzt (CQF 9115).

c) Inhalt

c1) Jede Prozeßänderung muß während eines Vorlaufes beurteilt und freigegeben werden, wenn Material, Methoden oder Werkzeuge verändert wurden. Dokumentation mit Hilfe einer Verfahrens- und Prozeßfreigabe.

c2) Der Prozeß ist freizugeben, wenn eine variable Beurteilung $n \geq 100$ Stück durchgeführt wurde und die Toleranzgrenzen mindestens $xq - 3s$ entfernt sind.

c3A) Prozeßkontrolle - Justage
Stückzahlenentnahme und Rückweisegrenzen

Von jedem Arbeitsplatz werden Lose von max. 150 Stk. zur Justagestichprobe angeliefert und daraus eine Stichprobe ($n-c=10/0$) von $n=10$ Stk. Relais entnommen und laut Aufstellung geprüft. Wird ein Hauptfehler oder 3 Nebenfehler festgestellt, so muß das Los an den entsprechenden Arbeitsplatz zurückgewiesen werden. Das nachgearbeitete Los wird dann wieder zur Justagestichprobe angeliefert.

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c4) Folgende Parameter werden überprüft:

	<i>UK/Stand.</i>	<i>AKO</i>	<i>AK</i>	<i>RK</i>
<i>Ruhekontaktdruck [cN]</i>	≥ 8 (7)	≥ 12	--	≥ 8 (7)
<i>Kontaktabstand [mm]</i>	0,35-0,50 0,32-0,50	0,35-0,50 0,32-0,50	0,35-0,50 0,32-0,50	0,35-0,5 0,32-0,50
<i>AK-Auflagedruck [cN]</i>	≥ 10	≥ 12	≥ 10	--
<i>Kontaktversatz [mm]</i>	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3
<i>Überhub [mm]</i>	≥ 0,12	≥ 0,13	≥ 0,1	--
<i>Kammluft [mm]</i>	0,3-0,5	0,3-0,5	0,3-0,5	--

	<i>WS-Relais</i>	<i>Doppelkonta.</i>	<i>Miele</i>
<i>Ruhekontaktdruck [cN]</i>	≥ 12 (11)	≥ 8	≥ 12 (11)
<i>Kontaktabstand [mm]</i>	0,35-0,50 0,32-0,50	0,35-0,50 0,32-0,50	0,35-0,50 0,32-0,50
<i>AK-Auflagedruck [cN]</i>	≥ 12	≥ 9 (8)	≥ 10 (9)
<i>Kontaktversatz [mm]</i>	≤ 0,3	≤ 1/3d	< 0,3
<i>Überhub [mm]</i>	≥ 0,12	≥ 0,13	≥ 0,11 (0,10)
<i>Kammluft [mm]</i>	0,3-0,5	0,3-0,5	0,3-0,5

c5) Lose, deren Stichprobenergebnisse die Annahmekriterien überschreiten, müssen arbeitsplatzbezogen zurückgewiesen werden.

Durchführung der Stichprobe AKO:

N = 150, n = 50, wird bei 10 Stichproben die Rückweisegrenze nicht überschritten, dann darf auf n = 32 Stk. reduziert werden (es gilt n/c = 13/0), wird bei weiteren 10 Stichproben kein Hauptfehler festgestellt, darf auf n = 13 Stk. reduziert werden (es gilt n/c = 13/0). Wird bei einem Arbeitsplatz die Rückweisegrenze überschritten, so wird die Stichprobenmenge sofort wieder auf n = 50 erhöht. Zur Reduzierung der Stichprobenmenge gilt wieder die gleiche Vorgangsweise wie vorher.

c6) Alle Lose müssen einen Chargenbegleitbeleg mit folgendem Inhalt mitführen:

- Losgröße
- Justierplatz
- Produktionsdatum
- Sachnummer
- Dokumentation von RK, AK, KA
- Prüfer

c7) Die Dokumentation muß chargenweise in CQF 9115 erfolgen.

c8) Attributive Stichprobenergebnisse müssen zu Kommission chargenweise dokumentiert werden und in einer Monatsübersicht grafisch dargestellt sein. (CQF 9125)

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c9) Fehlerkatalog

Hauptfehler

	Standard	AKO	Miele	
RK Druck [cN]	< 7	< 12	< 10	Kontaktausfall
AK-Auflagedruck [cN]	< 9	< 12	< 9	Anzugsspannung zu hoch
Kontaktabstand [mm]	< 0,3	< 0,3	< 0,3	keine Ankerrückstellung
Überhub [mm]	< 0,10	< 0,11	< 0,10	Identität
Kammluft [mm]	< 0,3	< 0,3	< 0,3	Beschädigte Teile
Remanenz Haltekraft	< 100			Spule unterbrochen
				Verunreinigung innen

Nebenfehler

	Standard	AKO	Miele
RK-Druck [cN]	< 8 > 7	< 13 ≥ 12	< 12 ≥ 11
AK-Auflagedruck [cN]	< 10 > 9	< 13 ≥ 12	< 10 ≥ 9
Kontaktabstand [mm]	< 0,32 > 0,30	< 0,32 > 0,30	< 0,32 > 0,30
Überhub [mm]	< 0,11 > 0,10	< 0,11 > 0,12	< 0,11 ≥ 0,10
Überhub [mm]	> 0,15	0,18	
Verunreinigung außen			
Kontaktlage			
Beschädigte Teile (nicht funktionsstörend)			
Kleber auf Pin			
Spulendraht außer Wickelraum			
Verzinnung mangelhaft (Anschlußspule)			
Verunreinigung Magnetsystem			

VERPACKUNG

CQV CS 5606 a) Zweck
b) Geltungsbereich
c) Ablauf

a) Zweck

Die Verpackung dient dem Schutz vor Beschädigung und Verunreinigung der Produkte während der Lagerung und dem Transport.

b) Geltungsbereich

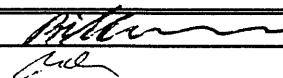
Diese Vorschrift hat für fertige Relais zur Auslieferung an Kunden Gültigkeit.

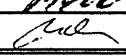
c) Ablauf

Die Relais sind gemäß der Verpackungsvorschrift SNVV283 oder SNVV222 lt. APB u. Sondertypenliste zu verpacken.

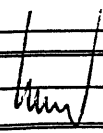
Jeder Verpackungseinheit (PAL-Box) ist die entsprechende zuordbare Koli-Liste (Inhalt) beizulegen.

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Erstellt: Q / Bittermann 1999-04-07 / 

Freigegeben: Q / Becker, 1999-04-07 / 

Geprüft: Q / Becker, 1999-04-08 / 

Version 02: gültig ab 1999-04-08 

BEHANDLUNG FEHLERHAFTER LOSE

QV CS 5607 a) Zweck
 b) Geltungsbereich
 c) Ablauf

a) Zweck

Zweck der Vorschrift ist die systematische Behandlung von fehlerhaften LOSEN zu definieren und Verwechslungen zu vermeiden.

b) Geltungsbereich

Die Vorschrift erstreckt sich auf den gesamten Bereich von Wareneingang bis zur Ablieferung der Ware.

c) Ablauf

Fehlerhafte LOSE müssen in eigens dafür bestimmte und gekennzeichnete Behälter bzw. Räumlichkeiten aufbewahrt sein.

- Die Überarbeitung erfolgt jeweils an dem Arbeitsplatz/Justierplatz, der am Chargenbegleitzettel angegeben ist.
- Lose bzw. Chargen, die überarbeitet werden, müssen von allen Chargenzetteln begleitet werden.
- Die Dokumentation von fehlerhaften LOSEN erfolgt in der bestehenden Dokumentation und wird mit einem "R" gekennzeichnet.

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MITGELTENDE UNTERLAGEN

CQV CS 5608

APB CS 5604.01 bis 20	Arbeitsplatzbeschreibungen
APB CS 5604.45 bis 47	Arbeitsplatzbeschreibungen Wickeln
CMF 9101	Prüfstatus "Ware frei"
CMF 9536	FQ Monatsbericht
CMF 9538 Version 02	Produktionsaufzeichnung Wickeln
CMR 0911 Version 03	Qualitäts-Sondermaßnahmen
CQF 9102	Prüfstatus "Ware gesperrt"
CQF 9109	Interne Fehlermeldung
CQF 9115	Chargenbegleitbeleg
CQF 9121	Justage-Jahresbericht
CQF 9124	PQC-Monatsbericht
CQF 9125	Justage-Monatsbericht
CQF 9126	PQC-Wochenbericht
CQF 9127	"SPC"
CQF 9128 Vers.2	SPC-Dokumentationskarte
CQF 9131 Version 02	AQL-Tagesbericht
CQF 9132-CAQ	AQL-Monatsbericht
CQF 9138-CAQ	AQL-Wochenbericht
CQR-9122	Relativer Spulenwiderstand i. A. der Umgebungstemperatur
CWL 1	Produktionsprogramm
Vergleichs- und Belegmuster	
Ausbildung	
PZV	Prüfzeichenverzeichnis
RP...-A/65	Prüfvorschrift für RP
RP...	Zeichnungen (Bauplan)
SNVV222	Verpackungsvorschrift Tasse, Kunststoffstange
SNVV283	Verpackungsvorschrift Kartonstange
STZ	Sondertypenliste

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Erstellt: Q / Bittermann, 1999-04-07 /

Freigegeben: Q / Becker, 1999-04-07 /

Geprüft: Q / Becker, 1999-04-08/

Version 06: gültig ab 1999-04-08

ENDFERTIGUNG VON RELAIS

- QV CS 5609
- a) Zweck
 - b) Geltungsbereich
 - c) Inhalt

a) Zweck

Die QS-Vorschrift Endfertigung von Relais dient dem Zweck, eingestellte Parameter zu überwachen, zu dokumentieren und Abweichungen vom eingestellten Prozeß zu erkennen.

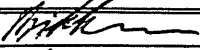
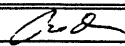
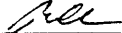
b) Geltungsbereich

Der Geltungsbereich erstreckt sich auf Endfertigungsanlagen, die nicht im Werk Waidhofen betreut werden und an einem anderen Fertigungsort stehen.

c) Inhalt

- c1) Prüfparameter Vorprüfen monostabile Standardrelais
- c2) Prüfparameter Vorprüfen bistabile Standardrelais REM1
- c3) Prüfparameter Endprüfen monostabile Standardrelais
- c4) Prüfparameter Endprüfen bistabile Standardrelais REM11
- c5) Zusätzliche Endprüfungen (außerelekt. Endprüfung, Sondertypen, Bedruckung, Dichtheit, Zuverlässigkeit)

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Erstellt: PL-Q / Bittermann, 2001-05-18 	Geprüft: Q / Naglmeier, 2001-05-18 	Seite 1 / 8
Freigegeben: Q / Becker, 2001-05-18 	Version 02: gültig ab 2001-05-21	

c1) Nachfolgende Parameter müssen durch eine 100 %ige Rechnerprüfung geprüft werden. Zuvor werden die Kontakte mit 24V / 0,8 A (bei AgCdO-Kont.) od. 24 V / 0,4 A (bei AgNi-Kont.) lichtbogengereinigt.

PRÜFSYSTEM: Fa. Schrack - Spezifikationen
der Prüfsysteme in WT erhältlich

FERTIGUNGSVORPRÜFUNG:

Die Anzahl der notwendigen Interventionen werden durch den Reparateur fehlerzugeordnet in die PQC eingetragen und als Rep.-Kosten ausgewiesen.

RELAISPARAMETER	
Spulenwiderstand	$\pm 10 \% / \pm 15 \%$
Ruhekontaktwiderstand	
Arbeitskontaktwiderstand	
AgCdO-10 6000mV / 10mA / 1kHz	$\leq 300 \text{ mOhm}$
AgNi 0,15 HV 6000mV / 10mA / 1kHz	$\leq 25 \text{ mOhm}$
AgNi 0,15 HTV 20mV / 1mA / 1kHz	$\leq 25 \text{ mOhm}$
Ansprechspannung xUn	45 - 70 % v. Un
Abfallspannung xUn	10 - 34 % v. Un
Ansprechzeit incl. Prellzeit	4 - 14 msek
Ansprechflugzeit	0,2 - 7 msek
RK - An - Prellzeit	0 - 7 msek
AK - An - Prellzeit	0 - 5 msek
Abfallzeit incl. Prellzeit	0,1 - 12 msek
Abfallflugzeit	0,2 - 7 msek
AK - Ab - Prellzeit	0 - 5 msek
RK - Ab - Prellzeit	0 - 7 msek

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Erstellt: PL-Q / Bittermann, 2001-05-18	Geprüft: Q / Naglmeier, 2001-05-18	Seite 2 / 8
Freigegeben: Q / Becker, 2001-05-18	Version 02: gültig ab 2001-05-21	

c2) Grenzwerte bei bistabilen Relais mit einer Wicklung REMI

PRÜFSYSTEM: Fa. Schrack - Spezifikationen
der Prüfsysteme in WT erhältlich

FERTIGUNGSVORPRÜFUNG:

Die Anzahl der notwendigen Interventionen werden durch den Reparateur fehlerzugeordnet in die PQC eingetragen und als Rep.-Kosten ausgewiesen.

RELAISPARAMETER	
Spulenwiderstand	$\pm 10 \% / \pm 15 \%$
Ruhekontaktwiderstand	
Arbeitskontaktwiderstand	
AgCdO-10 6000mV / 10mA / 1kHz	$\leq 300 \text{ mOhm}$
AgNi 0,15 HV 6000mV / 10mA / 1kHz	$\leq 25 \text{ mOhm}$
AgNi 0,15HTV 20mV / 1mA / 1kHz	$\leq 25 \text{ mOhm}$
Ansprechspannung xUn	50 - 75 % v. Un
Abfallspannung xUn	8 - 25 % v. Un
Ansprechzeit incl. Prellzeit	4 - 14 msek
Ansprechflugzeit	0,2 - 7 msek
RK - An - Prellzeit	0 - 7 msek
AK - An - Prellzeit	0 - 5 msek
Abfallzeit incl. Prellzeit	0,1 - 14 msek
Abfallflugzeit	0,2 - 7 msek
AK - Ab - Prellzeit	0 - 5 msek
RK - Ab - Prellzeit	0 - 8 msek

Die Impulsdauer für die einzelnen Messungen beträgt 30 ms.

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Erstellt: PL-Q / Bittermann, 2001-05-18	Geprüft: Q / Naglmeier, 2001-05-18	
Freigegeben: Q / Becker, 2001-05-18	Version 02: gültig ab 2001-05-21	Seite 3 / 8

c3) Nachfolgende Parameter müssen bei monostabilen Relais durch eine 100 % Rechnerprüfung sichergestellt werden. Zuvor werden die Kontakte mit 24 V / 0,8A (bei AgCdO-Kont.) oder 24 V / 0,4A (bei AgNi-Kont.) lichtbogengereinigt.

PRÜFSYSTEM: Fa. Schrack - Spezifikationen
der Prüfsysteme in WT erhältlich

FERTIGUNGSENDPRÜFUNG:

Die Anzahl der notwendigen Interventionen werden durch den Reparateur fehlerzugeordnet in die PQC eingetragen und als FOR ausgewiesen.

RELAISPARAMETER	
Spulenwiderstand *	$\pm 10 \% / \pm 15 \%$
Ruhekontaktwiderstand	
Arbeitskontaktwiderstand	
AgCdO-10 6000mV / 10mA / 1kHz	$\leq 300 \text{ mOhm}$
AgNi 0,15 HV 6000mV / 10mA / 1kHz	$\leq 25 \text{ mOhm}$
AgNi 0,15HTV 20mV / 1mA / 1kHz	$\leq 25 \text{ mOhm}$
Ansprechspannung xUn *)	45 - 72 % v. Un
Abfallspannung xUn	10 - 34 % v. Un
Ansprechzeit incl. Prellzeit	4 - 14 msec
Ansprechflugzeit	0,2 - 7 msec
RK - An - Prellzeit	0 - 7 msec
AK - An - Prellzeit	0 - 5 msec
Abfallzeit incl. Prellzeit	0,1 - 12 msec
Abfallflugzeit	0,2 - 7 msec
AK - Ab - Prellzeit	0 - 5 msec
RK - Ab - Prellzeit	0 - 7 msec

*) Wegen der Relaiserwärmung im UV-Tunnel wird beim nachfolgenden Endprüfen Uan max. um einen um + 2 % höheren PV-Wert geprüft und der Spulenwiderstand mit + 5,9 % größeren Toleranzbereich geprüft.

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Erstellt: PL-Q / Bittermann, 2001-05-18	Geprüft: Q / Naglmeier, 2001-05-18	
Freigegeben: Q / Becker, 2001-05-18	Version 02: gültig ab 2001-05-21	Seite 4 / 8

Die Hochspannungsfestigkeit ist durch eine 100 % Prüfung sicherzustellen.

Standardparameter:

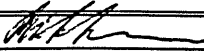
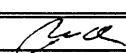

offene Polstrecke: 1 kV / 1min (1,1 kV / 1sek)
 Spule Kontaktsystem: 4 kV / 1min (4,4 kV / 1sek)
 Polstrecke-Polstrecke: 2,5 kV / 1min (2,75 kV / 1sek)

Parameter für die Sondertypen RP920123 und RP920124:

offene Polstrecke: 3 kV / 1sek
 Spule Kontaktsystem: 4,4 kV / 1sek
 Polstrecke-Polstrecke: 3 kV / 1sek

Die Ausfälle der Hochspannungsprüfung sind in die PQC einzutragen.

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Erstellt: PL-Q / Bittermann, 2001-05-18		Geprüft: Q / Naglmeier, 2001-05-18	
Freigegeben: Q / Becker, 2001-05-18		Version 02: gültig ab 2001-05-21	Seite 5 / 8

c4) Nachfolgende Parameter müssen bei bistabilen Relais REM II durch eine 100 % Rechnerprüfung sichergestellt werden.

PRÜFSYSTEM: Fa. Schrack - Spezifikationen
der Prüfsysteme in WT erhältlich

FERTIGUNGSENDPRÜFUNG:

Die Anzahl der notwendigen Interventionen werden durch den Reparateur fehlerzugeordnet in die PQC eingetragen und als FOR ausgewiesen.

RELAISPARAMETER	
Spulenwiderstand *	$\pm 10 \% / \pm 15 \%$
Ruhekontaktwiderstand	
Arbeitskontaktwiderstand	
AgCdO-10 6000mV / 10mA / 1kHz	$\leq 300 \text{ mOhm}$
AgNi 0,15 HV 6000mV / 10mA / 1kHz	$\leq 25 \text{ mOhm}$
AgNi 0,15HTV 20mV / 1mA / 1kHz	$\leq 25 \text{ mOhm}$
Ansprechspannung xUn *	50 - 75 % v. Un
Abfallspannung xUn	8 - 25 % v. Un
Ansprechzeit incl. Prellzeit	4 - 14 msek
Ansprechflugzeit	0,2 - 7 msek
RK - An - Prellzeit	0 - 7 msek
AK - An - Prellzeit	0 - 5 msek
Abfallzeit incl. Prellzeit	0,1 - 14 msek
Abfallflugzeit	0,2 - 7 msek
AK - Ab - Prellzeit	0 - 5 msek
RK - Ab - Prellzeit	0 - 8 msek

Die Impulsdauer für die einzelnen Messungen beträgt 30 ms.

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Erstellt: PL-Q / Bittermann, 2001-05-18	Geprüft: Q / Naglmeier, 2001-05-18	Seite 6 / 8
Freigegeben: Q / Becker, 2001-05-18	Version 02: gültig ab 2001-05-21	

* Wegen der Relais erwärmung im UV-Tunnel wird beim Endprüfen Uan max. um einen + 2 % höheren PV-Wert geprüft und der Spulenwiderstand mit + 5,9 % höheren Toleranzbereich geprüft.

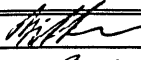
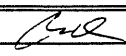

Die Hochspannungsfestigkeit ist durch eine 100 % Prüfung sicherzustellen.

Parameter:

offene Polstrecke:	1 kV / 1min (1,1 kV / 1sek)
Spule Kontaktsystem:	4 kV / 1min (4,4 kV / 1sek)
Polstrecke-Polstrecke:	2,5 kV / 1min (2,75 kV / 1sek)

Die Ausfälle der Hochspannungsprüfung sind in die PQC einzutragen.

VDE File: 19244-3335-0020
Appendix 15, Page 45 of 104

Erstellt: PL-Q / Bittermann, 2001-05-18 	Geprüft: Q / Naglmeier, 2001-05-18 
Freigegeben: Q / Becker, 2001-05-18 	Version 02: gültig ab 2001-05-21 Seite 7 / 8

c5)

1) Sondertypen:

Die gültigen Rechnergrenzwerte bei Sondertypen sind im Sondertypenkatalog festgehalten und auf einer dafür vorbereiteten Rechnerdiskette abgespeichert. Von dieser Diskette können dann die erforderlichen Prüfprogramme abgerufen werden. Die Verwaltung aller Parameterdiskette wird durch ECRN Q Whf durchgeführt.

Eigenständige Änderungen der Prüfparameter sind unzulässig.

2) Bei allen Relais wird das Ausgasloch auf der Kappe warmverprägt und zusätzlich mit UV-Kleber abgedichtet. Anschließend wird der Kleber unter einem Blue Point ausgehärtet.

3) Bedruckung der Relais:

Die Bedruckung der Relais wird mit zwei Tampoprintanlagen durchgeführt. Nach den Endprüfungen werden die Relaisausfälle automatisch entnommen und extra verpackt.

Die guten Relais werden dann zuerst mit dem Bezeichnungsdruck und anschließend mit dem Datumdruck versehen.

Der Datumdruck enthält die Lohnwoche und das Jahr, in welchem das Relais produziert wird.

Z.B.: 196 ist LW19 und Jahr 1996

4) Dichtheitsprüfung bei waschdichten Relais

Das Überdrucksystem wird mittels stichprobenartiger Überprüfung von Relais durch einen QC2-Test in Wasser überwacht mit einem Überdrucksystem durch das offene Ausgasloch geprüft.

Prüfbedingungen: Prüfmedium Wasser

Prüftemperatur 80 - 85 °C

Prüfdauer 30 Sekunden

5) Kontaktzuverlässigkeitsprüfung bei Sondertypen: (Screening-Test)

Bei allen Relais werden auf der Anlage ein Screening-Test durchgeführt.

Testbedingungen: 300 Schaltungen

24 V 10 mA Kontaktlast

Ausfallkriterium am AK-od. RK KW \geq 600 Ohm

6) Bei Wechselstromrelais wird die Ansprechspannung durch eine 100 %ige Brummprüfung bei 75 % - 110 % der Nennspannung (Brummfrees halten) sichergestellt.

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Erstellt: PL-Q / Bittermann, 2001-05-18	Geprüft: Q / Naglmeier, 2001-05-18
Freigegeben: Q / Becker, 2001-05-18	Version 02: gültig ab 2001-05-21
	Seite 8 / 8

ABLIEFERQUALITÄT

QV CS 5610

a) Zweck.....	1
b) Geltungsbereich	1
c) AQL-Stichprobe Inhalt	1
c) 1. Merkmale für Qualitätsprüfung	2
c) 2. Fehlerkatalog.....	2
c) 3. Dokumentation	3

a) Zweck

Stichprobenanweisung und Feststellung der Ablieferqualität

b) Geltungsbereich

RP11/2 wenn diese an einem anderen Standort als Waidhofen geprüft und verpackt werden.

c) AQL-Stichprobe Inhalt

Für die Sicherstellung der Ablieferqualität sind in erster Linie die einzelnen Prozeßschritte und seine wirksame Regelschleife (PQC) verantwortlich.

Als Performance Indikator (Pi) dienen die Werte der SPC, PQC und FOR.

Zur Feststellung der Ablieferqualität werden durch die Q-Sicherung Stichproben entsprechend der Stichprobenanweisung durchgeführt:

STICHPROBE ISO 2859 INSP LEVEL II NORMAL AQL HF 0,25 NF 0,65
Prüfung von allen Produktionslosen

N	n	c	d
		HF/NF	HF/NF
0 - 1200	50	0/0	1/1
1201 - 10000	200	1/3	2/4
10001 - 35000	315	2/5	3/6
35001 - 150000	500	3/7	4/8

N = Losgröße
n = Stichprobenmenge
c = Annahmehzahl
d = RückweizezahlVDE File: 19244-3335-0020.
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c) 1. Merkmale für Qualitätsprüfung

(Werte aus gültiger Prüfvorschrift entnehmen)

- Sichtprüfung

- * Typenidentität Beschriftung, Prüfzeichen, Verpackung
- * Fertigungsdatum
- * Beschädigung Kappe, Pins, Grundplatte
- * Lesbarkeit Beschriftung, Vollständigkeit Prüfz. etc.
- * Verschmutzung, Zinnspritzer, Flußmittel, Kleber
- * Pinverzinnung
- * Kleberhöhe - Aufstandsebene, Klebermenge, optisch dicht
- * UV-Klebung Ausgasöffnung
- * Relaisabmessungen
- * Rastermaß, Pinausrichtung rechth. zur Aufstandsebene

- Dichtheitsprüfung

- * 80°C - 85°C/ 30 sec (Wasser)

- elektrische Prüfung

- | | |
|--------------------------------|------------------------------|
| * Spulenwiderstand | * RK an Prellzeit |
| * RK Widerstand | * AK an Prellzeit |
| * AK Widerstand | * Abfallzeit inkl. Prellzeit |
| * Uan | * Abfallflugzeit |
| * Uab | * AK ab Prellzeit |
| * Ansprechzeit inkl. Prellzeit | * RK ab Prellzeit |
| * Ansprechflugzeit | * Brumm (AC) |

- Kontaktzuverlässigkeitsprüfung

- * 24 V 10 mA 500 Schaltungen/10 Hz Ausfallkriterium: > 600 Ohm

c) 2. Fehlerkatalog

Fehlerart	Nebenfehler	Hauptfehler
Spulenwiderstand		>Toleranz
Kontaktwiderstand AK		
Kontaktwiderstand RK		
AgCdO, AgSnO:	300-500 mOhm	> 500 mOhm
AgNi 0,15 HV, HTV	25-50 mOhm	> 50 mOhm
Ansprechspannung		X
Abfallspannung		X

 VDE File: 19244-3335-0020
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Fehlerart	Nebenfehler	Hauptfehler
Ansprechzeit inkl. Prellzeit	X	
Ansprechflugzeit	X	
RK an Prellzeit	X	
AK an Prellzeit	X	
Abfallzeit inkl. Prellzeit	X	
Abfallflugzeit	X	
AK ab Prellzeit	X	
RK ab Prellzeit	X	
Uan-Brumm		X
110%-Brumm		X
Screeningausfall Rk		X
Screeningausfall Ak		X
Totalausfall		X
Rastermaß		X
Kleber am Pin	X	X
Kleber im Relais	X	
Flußmittel im Relais	X	
Kleber über Aufstandsebene	> 0,5mm	
Kleberrückst. (Grundk., Kappe)	X	
Pinverzinnung	X	
Verzinnhöhe	> 0,5 mm	
Zinnspritzer	< 0,2 mm	> > 0,2 mm
Relais undicht	lötstraßenfest	waschdicht
Beschädigte Teile	nicht funktionsstörend	funktionsstörend
Fremdkörper im Relais	im Magnetsystember.	im Kontaktbereich
Beschriftung	X	
Verunreinigung	X	
Abmessungen	X	
Pinlänge	X	
UV-Klebung Ausgasloch	X	
Wickelfehler	X	
Oxydierte Metallteile	X	X
Identität Relais		X
Identität Verpackung - Relais		X
Verpackung visuell	X	

c) 3. Dokumentation

CQF9131 AQL Tagesbericht (muß täglich der betreffenden Lieferung beigelegt werden)

VDE File: 19244-3335-0020
Appendix 15, Page 49 of 104

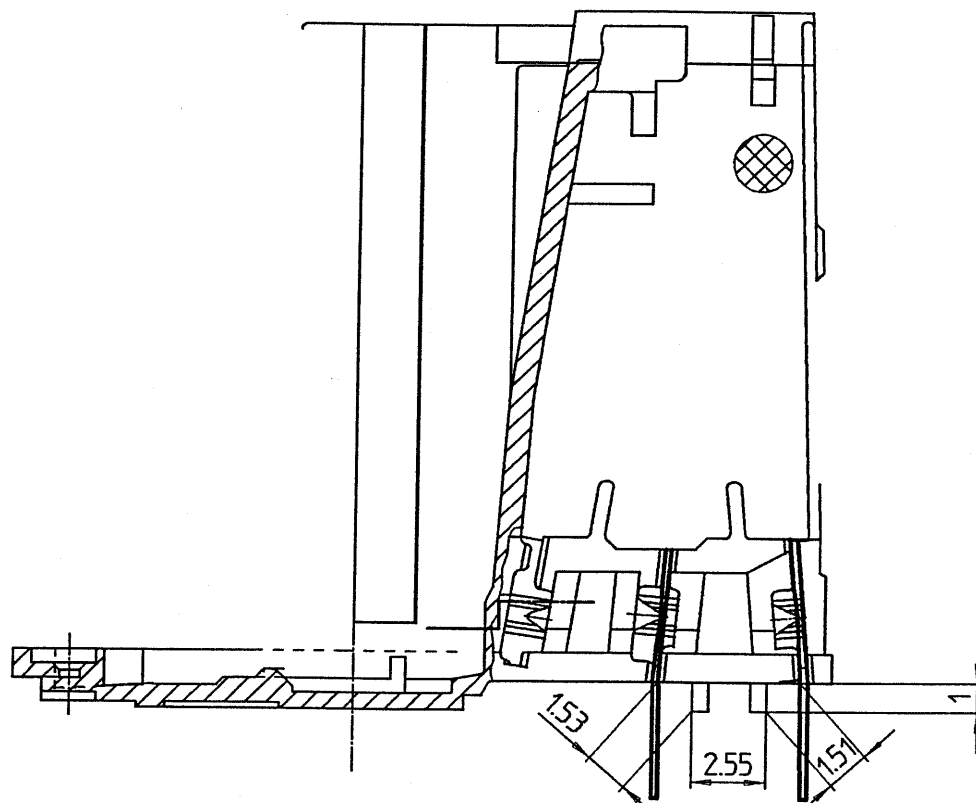
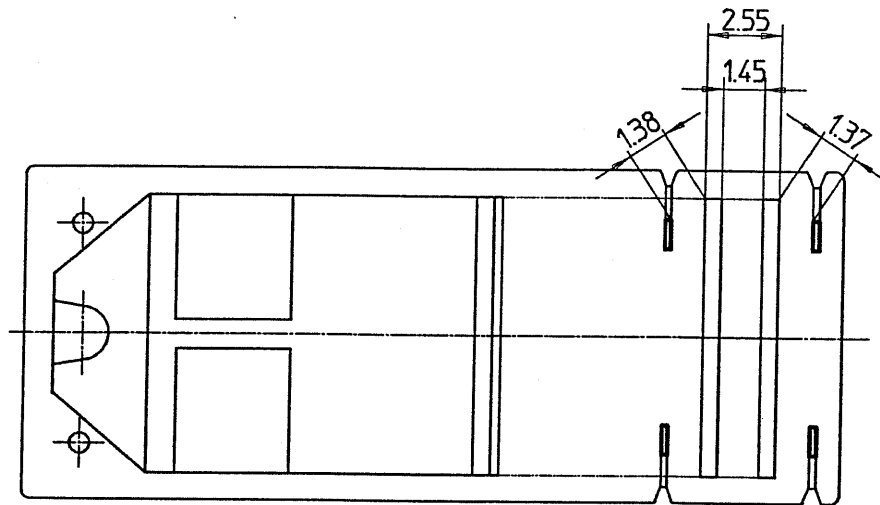
Datum: 97-02-05

Version 01 freigegeben ab: 07.01.97/Bittermann

Blatt 3 von 3

design of the base with 2 ribs for a higher creepage distance for APC

$1,37+1,38+2,55=5,3\text{mm}$ creepage distance



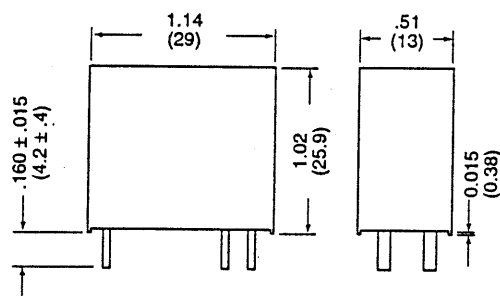
$1,53+1,51+2,55=5,59\text{ mm}$ creepage distance

AZ733W

RELAY ORDERING DATA

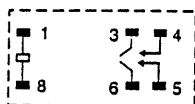
COIL SPECIFICATIONS				ORDER NUMBER	
Nominal Coil VDC	Must Operate VDC	Max. Continuous VDC	Coil Resistance	Unsealed	Sealed
3	2.25	5.0	11.3 $\pm 10\%$	AZ733W-2A-3D	AZ733W-2A-3DE
5	3.8	8.4	31 $\pm 10\%$	AZ733W-2A-5D	AZ733W-2A-5DE
6	4.5	10.1	45 $\pm 10\%$	AZ733W-2A-6D	AZ733W-2A-6DE
9	6.8	15.5	101 $\pm 10\%$	AZ733W-2A-9D	AZ733W-2A-9DE
12	9.0	20.3	180 $\pm 10\%$	AZ733W-2A-12D	AZ733W-2A-12DE
18	13.5	31.2	405 $\pm 10\%$	AZ733W-2A-18D	AZ733W-2A-18DE
24	18.0	40.6	720 $\pm 15\%$	AZ733W-2A-24D	AZ733W-2A-24DE
48	36.0	79.1	2,880 $\pm 15\%$	AZ733W-2A-48D	AZ733W-2A-48DE
60	45.0	102.0	4,500 $\pm 15\%$	AZ733W-2A-60D	AZ733W-2A-60DE

MECHANICAL DATA

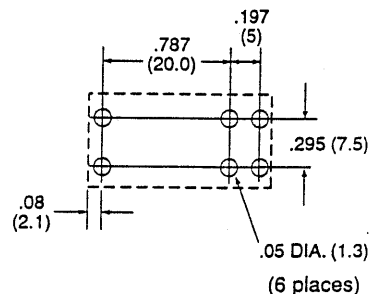


Terminal No.	Dimensions Tol.: ± 0.005 (0.13)
1,4,5,8	0.018 (0.457) x 0.038 (0.965)
3,6	0.011 (0.279) x 0.038 (0.965)

WIRING DIAGRAM (Bottom View)



PC BOARD LAYOUT (Bottom View)



Dimensions in inches with metric equivalents in parentheses. Tolerance: $\pm .010$ "

VDE File: 19244-3335-0020
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AMERICAN ZETTLER, INC.

www.azettler.com

75 COLUMBIA • ALISO VIEJO, CA 92656 • PHONE: (949) 831-5000 • FAX: (949) 831-8642 • E-MAIL: SALES@AZETTLER.COM

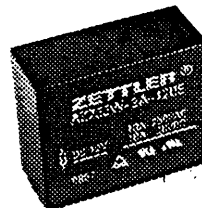
2/28/01W

AZ733W

DPST MINIATURE POWER RELAY

FEATURES

Dielectric strength 5000 Vrms
1.5 mm contact gap
Epoxy sealed version available
10 Amp switching — double pole contacts
Isolation spacing greater than 8 mm
UL Class B insulation system
UL, CUR file E43203
TUV file R9659062



CONTACTS

Arrangement	DPST (2 Form A)
Load Ratings	Resistive load: Max. switched power: 240 W or 2500 VA Max. switched current: 10 A Max. switched voltage: 150 VDC* or 400 VAC *Note: If switching voltage is greater than 30 VDC, special precautions must be taken. Please contact the factory.
Rated Load UL, CUR TUV	10 A at 250 VAC general use 8 A at 30 VDC resistive 10 A at 30 VDC, 250 VAC resistive
Contact Material	Silver cadmium oxide
Contact Resistance	< 50 milliohms initially (24 V, 1 A voltage drop method)

COIL

Coil Power	450 mW
At Pickup Voltage (typical)	
Max. Continuous Dissipation	2.3 W at 20°C (68°F) ambient 1.9 W at 40°C (104°F) ambient
Temperature Rise	51°C (65°F) at nominal coil voltage
Operating Temperature	Max. 130°C (266°F)

NOTES

All values at 20°C (68°F).
Relay may pull in with less than "Must Operate" value.
Specifications subject to change without notice.

GENERAL DATA

Life Expectancy Mechanical Electrical	Minimum operations 5 x 10 ⁵ 1 x 10 ⁵ at 10 A 240 VAC Res.
Operate Time (max.)	10 ms at nominal coil voltage
Release Time (max.)	4 ms at nominal coil voltage (with no coil suppression)
Dielectric Strength (at sea level for 1 min.)	5000 Vrms contact to coil 3000 Vrms between open contacts 3000 Vrms between contact sets
Insulation Resistance	1000 megohms min. at 20°C, 500 VDC, 50% RH
Dropout	Greater than 10% of nominal coil voltage
Ambient Temperature Operating Storage	at nominal coil voltage -40°C (-40°F) to 70°C (158°F) -40°C (-40°F) to 130°C (266°F)
Vibration	0.062" DA at 10–55 Hz
Shock	10 g
Enclosure	P.B.T. polyester
Terminals	Tinned copper alloy, P.C.
Max. Solder Temp.	270°C (518°F)
Max. Solder Time	5 seconds
Max. Solvent Temp.	80°C (176°F)
Max. Immersion Time	30 seconds
Weight	18 grams

VDE File: 19244-3335-0020
Appendix 15, Page 52 of 104



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2/28/01W

VDE File: 19244-3335-0020
Appendix 15, Page 53 of 104

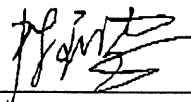
Certificate of Compliance

Dear Sir,

This is certify that the materials of plastic and epoxy used in the samples of AZ733W-2A-24DE(207) meet the requirement of PTI greater than 400. The details are:

	Plastic	Epoxy
AZ733W-2A-24DE(207) white base	SPS-EA513	ZM
AZ733W-2A-24DE(207) black base	PBT-LW9330FR	ZM

Authorized signature



Xiamen Hongfa Electroacoustic Co., Ltd.



QMFZ2 Component - Plastics

Thursday, April 05, 2001

E161817

THE DOW CHEMICAL CO

QUESTRA CRYSTALLINE POLYMERS 2040 DOW CENTER MIDLAND MI 48674

Material Designation: **QUESTRA EA 513**

Product Description: Polystyrene (PS), ignition resistant crystalline polymer, designated "QUESTRA" furnished as pellets.

Color	Min. Thick. (mm)	Flame Class	HWI	HAI	RTI Elec	RTI Imp	RTI Str	IEC GWIT	IEC GWFI
ALL	0.75	V-0	3	0	130	120	130	-	-
	1.5	V-0	2	0	130	120	130	-	-
	3.0	V-0	0	0	130	120	130	-	-

CTI: 1**HVTR: 3****D495: 6****IEC BP: -**

Report Date: 04/01/1996

Underwriters Laboratories Inc®

629502041

UL94 small-scale test data does not pertain to building materials, furnishings and related contents. UL 94 small-scale test data is intended solely for determining the flammability of plastic materials used in components and parts of end-product devices and appliances, where the acceptability of the combination is determined by ULI.

VDE File: 19244-3335-0020

Appendix 15, Page 54 of 104

TÜV Rheinland
Product Safety
GmbH
Am Grauen Stein
D-51105 Köln

Gen.-Ausw.-Nr.

R 9659062

Aktenzeichen:

00943- XL/yy- E9566170Z02

Anlage Nr.:

1.1

(von der Prüfstelle auszufüllen)(to be filled in by PfG)
 in 2-facher Ausfertigung einzureichen! / Please submit in duplicate



Aufbau-Übersicht für Elektrische Relais **Constructional Data Form for All-or-nothing Electrical Relays**

Prüfgrundlage:

DIN VDE 0435

Test Requirement:

Blatt 1 / Sheet 1

1.1 Antragsteller:
 Licenceholder

American Zettler, Inc.
 75 Columbia, Aliso Viejo California 92656, USA

1.2 Fertigungstätte:
 Factory

Xiamen Hongfa Electroacoustic Co., Ltd.
 Hongfa Bldg, Huarong Rd.,
 Huli District, Xiamen, P.R. China
 A. ZETTLER

1.3 Ursprungszeichen:
 Mark of Origin

1.4 Geräteart:
 Product category

Miniature Power Relay

1.5 Typenbezeichnung:
 Type Designation

AZ733W-2A...

1.6 Schutzart nach DIN 50040:
 Protection degree

IP00

1.7 Isolationsklasse nach IEC 85:
 Insulation class acc. to IEC 85

B

1.8 Umgebungstemperatur
 Ambient temperature

-40°C -- +70°C

1.9 Anbringungsart
 Kind of installation

P.C. Board

1.10 Werkstoff des Trägereils:
 Material of parts which support
 the current carrying parts

PBT-451

1.11 Werkstoff der Abdeckung:
 Material of cover

PC & PBT

1.12 Werkstoff der Kontakte:
 Material of contact

AgCdO₁₂

Post-it® Fax Note

7671

Date

4-3-00

of

pages

3

To

Bob Rietzel

From

Amber Filbeck

Co./Dept.

APC

Co.

American Zettler

Phone #

Request per Bill

Phone #

949-831-5000

Fax #

Boucher

Fax #

949-831-5000

Berkshire Electronics

To be continued on page 2

Köln, den

02.01.98.

XIAMEN, P.R. CHINA

12/30/97

(Datum)/ Date

(Grt) / Place

CHEN ZHI CHAO

(Stempel und Unterschrift des Antragstellers/ stamp and signature of applicant)

TÜV Rheinland
 Product Safety GmbH

TÜV Rheinland
Product Safety
GmbH
Am Grauen Stein
D-51105 Köln

Gen.-Ausw.-Nr.

R9659062

Aktenzeichen:

00943- XL/yy- E9566170Z02 1.1

Anlage Nr.:

(von der Prüfstelle auszufüllen)(to be filled in by PfG)
in 2-facher Ausfertigung einzureichen!// Please submit in duplicate



Aufbau-Übersicht für Elektrische Relais Constructional Data Form for All-or Nothing Electrical Relays

Blatt 2 / Sheet 2

2 Nennwerte der Erregerstromkreise nach DIN VDE 0435 Teil 201 Ratings of energizing circuits according to IEC 255-0-20

2.1 Erregerspannung: AC DC
Energizing quantity N/A DC3V-DC 60V

2.2 minimale Nennstrom: 0.1A
min. rated current

2.3 Bemessungsverbrauch: 0.8W
Rated Burden

2.4 Ansprechklasse: A
Pick-up class

2.5 Arbeitsbereich: 80%-110% (Class I)
Operative range

2.6 Mechanische Lebensdauer
Schaltspiele pro Stunde: 1×10^7 times
mechanical life/cycles per hour 18000 times/h

3 Isolationskoordination nach DIN VDE 0110/01.89 Insulation coordination according to IEC 664 (1980)/1664A (1991)

3.1 Verschmutzungsgrad: 2
Pollution degree

3.2 Bemessungsstoßspannung: I
Rated transient voltage

3.3 Bemessungsspannung: 250VAC
Rated voltage

3.4 Kriechstromfestigkeit: IIIa
CTI value

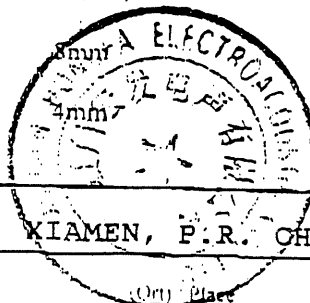
Strecke zwischen (Distance between)

geöffneten Kontakten (open contacts):

Spule und Kontakten (Coil and contacts):

Kontakten verschiedener Polarität:
Contacts of different polarity

1.5mm



To be continued on page 3

Köln, den 02. 01. 98

XIAMEN, P. R. CHINA

12/30/97

Kiao Ling

TÜV Rheinland
Product Safety GmbH

陈志超

CHEN ZHI CHAO

(Stempel und Unterschrift des Antragstellers stamp and signature of applicant)

TÜV Rheinland
Product Safety
GmbH
Am Grauen
Stein
D-51105 Köln

Gen.-Ausw.-Nr.

R 9659062

Aktenzeichen:

00943- XL/yy- E9566170Z02

Anlage Nr.:

1.1

(von der Prüfstelle auszufüllen)(to be filled in by PfG)
in 2-facher Ausfertigung einzureichen! / Please submit in duplicate



Aufbau-Übersicht für Elektrische Relais

Constructional Data Form for All-or Nothing Electrical Relays

4 **Nennwerte der Kontaktstromkreise nach DIN VDE 0435 Teil 120**
Rating of contact circuits according to IEC 255-1-00

Blatt 3 / Sheet 3

4.1 **Anzahl der Pole:**
Number of Poles

2

4.2 **Nennspannung**
Rated voltage

AC: 250VAC
DC: 30VDC

4.3 **Einschaltvermögen**
Making capacity

AC/cos phi: 10A, cos Ø=1
DC/ms:

4.4 **Ausschaltvermögen**
Breaking capacity

AC/cos phi: 10A, cos Ø=1
DC/ms:

4.5 **Kombiniertes Ein- und Ausschaltvermögen**
cyclic capacity

AC/cos phi: N/A
DC/ms:

4.6 **Dauerstrom**
continuous capacity

AC/cos phi: 10A, cos Ø=1
DC/ms:

4.7 **Kurzzeitstrom**
short time capacity

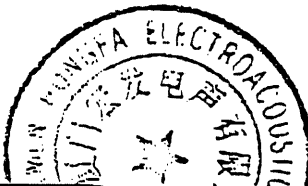
AC/cos phi: 10A, cos Ø=1
DC/ms:

Zeitdauer

wenn keine Angabe 1s:
Duration (if not 1s)

8 **Kontaktklasse:**
contact class

III



Köln, den

02.01.98

XIAMEN, P.R. CHINA

12/30/98

(Ort) / Place

(Datum) / Date

TÜV Rheinland
Product Safety GmbH

CHEN ZHI CHAO

(Stempel und Unterschrift des Antragstellers/ stamp and signature of applicant)

APC-
 ASO
 2150

Prüfbericht - Nr.: E 9566170Z02
 Test Report No.

Seite 1 von 24
 Page 1 of 24

Auftraggeber: American Zettler, Inc.
Client: 75 Columbia, Aliso Viejo, California 92656, U.S.A

Gegenstand der Prüfung: Miniature Power Relay



Gesehen/Reviewed
 Shanghai 0-01-2000
 TÜV Product Safety GmbH

Bezeichnung: AZ733W-2A...
Identification:

Serien-Nr.: Engineering Sample
Serial No.:

Wareneingangs-Nr.: N/A
Receipt No.:

Eingangsdatum: 15.06.1997
Date of receipt:

Prüfort: Shanghai No.4 Laboratory
Testing location:

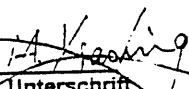
Prüfgrundlage: DIN VDE 0435 Teil 120/10.81
Test specification: DIN VDE 0435 Teil 201/05.83+A1

Prüfergebnis: Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage.

Test Result The a. m. test item passed.
geprüft/tested by: kontrolliert/reviewed by:


24.12.97
 Datum
 Date

Jiang Wei
 Name
 Name


 Unterschrift
 Signature

24.12.97
 Datum
 Date

W. WANG
 Name
 Name


 Unterschrift
 Signature

Sonstiges/Other Aspects:

Different from type AZ733, the type AZ733W changes the distance between the contacts, resistance of the coil is also changed, test results are indicated in the test report.

Abkürzungen:

OK, Pass = entspricht Prüfgrundlage
 Fail = entspricht nicht Prüfgrundlage
 N/A = nicht anwendbar

Abbreviations:

OK, Pass = passed
 Fail = failed
 N/A = not applicable

Dieser Prüfbericht bezieht sich nur auf den o.g. Prüfgegenstand und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Prüfbericht berechtigt nicht zur Verwendung eines Prüfzeichens.
 This test report relates to the a. m. test item. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark on this or similar products.

TÜV Rheinland Zertifizierungs-
und Prüfstelle für Gerätesicherheit



TÜV Rheinland

Nr./No.: E 9566170202

Seite/page 1

ELEKTRISCHE RELAIS
SCHALTRELAIS
ALL-OR-NOTHING ELECTRICAL RELAYS

Prüfbericht Nr. : E 9566170202 Seite 1 von 22
Test Report No. page 1 of 22

Auftraggeber : American Zettler Prüfort : Shanghai No.4 Laboratory
Applicant Place of Testing

Typenbezeichnung : AZ 733W-2A...
Type designation

Prüfergebnis	Test Result
Das vorstehend beschriebene Bauteil wurde geprüft und entspricht/ entspricht nicht der oben genannten Prüfgrundlage	The described component was tested and found to be in compliance/ not in compliance with the above mentioned standard

Hinweis

Dieser Prüfbericht enthält das Ergebnis einer einmaligen Untersuchung an dem zur Prüfung vorgestellten Erzeugnis. Er berechtigt nicht allein zur Führung des Bauartzeichens. Ebenso ist jede Erwähnung des TÜV Rheinland im Zusammenhang mit dem Vertrieb oder der Verwendung der geprüften Erzeugnisse nur mit vorheriger Zustimmung des TÜV Rheinland zulässig.

Remark

This test report documents the findings of an examination conducted on a single component. This report does not entitle the applicant to carry any safety mark on this or similar products. Further, for sales or other similar purposes of the tested products any reference to TÜV Rheinland is only valid with prior written consent of TÜV Rheinland.

Bestandteil der Dokumentation

Geprüft

VDE File: 19244-3335-0020
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24.12.97

J. J. Krawitz

Bestandteil der Dokumentation

Bestandteil der Dokumentation

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Einteilung des Relais (Division of Relay type)

a) Allgemeine Einteilung (General division)

Bezeichnung
Type designation

A2733W

Schutzart
Protection degree

IP-00

Umgebungstemperatur
Ambient temperature

-40 - 70 °C

Anbringungsart
Kind of installation

P.C. Board

b) Einteilung der Erregerstromkreise (Division of the energizing circuits)

Erregersspannung
Energizing quantity

AC 1 - 1 V

DC 3 - 60 V

Bemessungsverbrauch
Rated burden

AC 1 W

DC 0.8 W

Ansprechklasse
Pick-up class

1
A

Arbeitsbereich
Operative range

A Class 1

Class 1

Mechanische Lebensdauer/
Schaltspiele pro Stunde
mechanical lifecycles per hour

1
1

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c) Einteilung der Kontaktstromkreise (Division of the contact circuits)

Nennspannung
Rated voltage

AC 210 V / DC 30 V AC / V / DC / V AC / V / DC / V

Anzahl der Pole
Number of Poles

2 / /

kombiniertes Ein/
Aussschaltvermögen/
Leistungsfaktor
Switching capacity/
Power factor

cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms

Elektrische Lebensdauer/
Schaltspiele/Stunde
Electrical life/
Cycles per hour

6000 / 1800 / / /

Dauerstrom/
Leistungsfaktor
continues/
Power factor

cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms

Elektrische Lebensdauer/
Schaltspiele/Stunde
Electrical life/
Cycles per hour

6000 / 1800 / / /

Kurzzeitstrom/
Leistungsfaktor/
Zeit
(wenn keine Angabe 1s)
Short time capacity/
Power factor/duration

cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms
cosphi / / ms cosphi / / ms cosphi / / ms

(default 1s)

1000 / / /

Elektrische Lebensdauer/
Schaltspiele/Stunde
Electrical life/
Cycles per hour

6000 / 1800 / / /

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Prüfungen Test

Aufschriften nach DIN VDE 0435/Teil 201/05.90 Abschnitt 11
Data and marking acc. to DIN VDE 0435/Teil 201/05.90

Name des Herstellers, Fabrikanten-Kurzzeichen oder Handelsmarke
(Manufactures name identification code or trade mark)

ZETTLER

Typbezeichnung, Seriennummer oder Nummer des Bauartblattes
(Type designation, serial number or detail sheet number)

A2733W2A-12D

Bemessungswerte der Erregungsgröße(n) (siehe Abschnitt 3.1.3.1.1)
(Rated value of the energizing quantity(ies) (see 3.1.3.1.1)

0.k. 12V

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Prüfung des Ansprechverhaltens nach
DIN VDE 0435/Teil 201/05.90 Abschnitte 3.1.4 und 10.2.1
(Evaluation of Pick-up class acc. to DIN VDE 0435/Teil 201/05.90)

2 Prüflinge von jeder Spulenausführung
2 Samples of each coil construction

OK.

Ansprechklasse
Pick-up class

A

max. Umgebungstemperatur
max. ambient temperature

70 °C

Prüfraumtemperatur
Temperature of Test chamber

70 °C

Anzahl der Schaltspiele für $U = 0.8 \times U_n$ (min.10)
Number of Test cycles

10 times.

OK.

Anzahl der Schaltspiele für $U = 1.1 \times U_n$ (min.10)
Number of Test cycles

10 times.

OK.

Spulenausführung DC 12V.

	1	2	3	4	5	6	7	8	9	10
Sample 1	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.

Sample 2	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.
----------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Spulenausführung DC 12V.

	1	2	3	4	5	6	7	8	9	10
Sample 1	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.

Sample 2	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.	OK.
----------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

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Prüfung des Rückfallverhaltens nach
DIN VDE 0435/Teil 201/05.90 Abschnitte 3.1.5 und 10.2.2
(Evaluation of Drop-out class acc. to DIN VDE 0435/Teil 201/05.90)

2 Prüflinge von jeder Spulenausführung
2 Samples of each coil construction

OK.

Abfallen
Drop-out

OK.

min. Umgebungstemperatur
min. ambient temperature

-40 °C

Prüfraumtemperatur
Temperature of Test chamber

-40 °C

Anzahl der Schaltspiele für AC
Number of Test cycles

$U = 0,15 \times U_n$ (min.10)

N/A.

Anzahl der Schaltspiele für DC
Number of Test cycles

$U = 0,05 \times U_n$ (min.10)

OK.

10 times.

Spulenausführung

1 2 3 4 5 6 7 8 9 10

Sample 1

Sample 2

Spulenausführung

DC 12V.

Sample 1

Sample 2

OK OK OK OK OK OK OK OK OK OK

OK OK OK OK OK OK OK OK OK OK

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Prüfung der Spannungsfestigkeit und des Isolationswiderstandes nach
DIN VDE 0435/Teil 201/05.90 Abschnitte 10.3 und Anhang C
(Evaluation of dielectric strength and insulation resistance acc. to
DIN VDE 0435/Teil 201/05.90)

OK. refer to E 9566170201

Prüfung an neuen Relais
Test with new Relays

3 Prüflinge von jeder Bauausführung
3 Samples of each construction

Vorbehandlung (Pre-conditioning)

Feuchte Wärme konstant (Wet-heat constant)

Temperatur der Klimakammer (25±5)°C
Temperature of the test-chamber _____°C

relative Luftfeuchte der Klimakammer (93±2)%
rel. humidity of the test-chamber r.h. _____%

Prüfstrecke Creepage-clearance distances to be tested	Prüfspannung Test voltage	Isolationswiderstand Insulation resistance
1) Spule und Spulenkern Coil and Core	AC _____ V	_____ MΩ
2) Spule und Kontaktstromkreisen Coil and contacts	AC _____ V	_____ MΩ
3) Kontakten verschiedener Polarität Contacts of different Polarity	AC _____ V	_____ MΩ
4) geöffneten Kontakten open contacts	AC _____ V	_____ MΩ
5) _____	AC _____ V	_____ MΩ



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OK. Refer to 9566170 Z01.

Ausführung

1) 2) 3) 4) 5) 6)

Sample 1

Sample 2

Sample 3

Ausführung

1) 2) 3) 4) 5) 6)

Sample 1

Sample 2

Sample 3

Ausführung

1) 2) 3) 4) 5) 6)

Sample 1

Sample 2

Sample 3

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Mechanische Lebensdauer nach DIN VDE 0435/Teil 201/05.90 Abschnitte 6 und 10.7
(Mechanical life test acc. to Clause 10.7)

5 Prüflinge nach Herstellerangaben
5 Samples acc. to Manufacturers specification

Spulenspannung $U_n =$ 12 V

Kontakte unbelastet
Contacts with no load

OK.

max. Anzahl der Schaltspiele nach Herstellerangaben
number of cycles acc. to manufacturers specification

10⁷

Schaltspiele pro Stunde
cycles per hour

18000

anschließend :
thereafter

Ansprechen gemäß der Ansprechklasse
Pick-up acc. to Pick-up class

Prüfraumtemperatur (Raumtemperatur)
Temperature of Test chamber (ambient temperature)

70 °C

Anzahl der Schaltspiele für $U =$ 0.8 $\times U_n$ (min.10)
Number of Test cycles

10 times.

OK.

Anzahl der Schaltspiele für $U =$ 1.1 $\times U_n$ (min.10)
Number of Test cycles

10 times.

OK.

Abfallen
drop-out

Prüfraumtemperatur (Raumtemperatur)
Temperature of Test chamber (ambient temperature)

-40

Anzahl der Schaltspiele für AC $U =$ 0.15 $\times U_n$ (min.10)
Number of Test cycles

10 times.

OK.

Anzahl der Schaltspiele für DC $U =$ 0.05 $\times U_n$ (min.10)
Number of Test cycles

10 times.

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Spannungsfestigkeit und Isolationswiderstand
Dielectric strength and insulation resistance

Die Prüfung wird bei Raumtemperatur ohne Feuchtevorbehandlung durchgeführt.

This will be conducted at ambient temperature without humidity treatment

Prüfspannungen ^{75%} 70% der Werte nach der Feuchteprüfung
Testvoltages 70% of the values after humidity treatment

Prüfstrecke Creepage-clearance distances to be tested	Prüfspannung Test voltage	Isolationswiderstand Insulation resistance
1) Spule und Spulenkern Coil and Core	AC <u>375</u> V	<u>1000</u> MΩ
2) Spule und Kontaktstromkreisen Coil and contacts	AC <u>3000</u> V	<u>1000</u> MΩ
3) Kontakten verschiedener Polarität Contacts of different Polarity	AC <u>2250</u> V	<u>1000</u> MΩ
4) geöffneten Kontakten open contacts	AC <u>750</u> V	<u>1000</u> MΩ
5) <u>enclosure and contacts</u>	AC <u>3000</u> V	<u>1000</u> MΩ
6) <u>/</u>	AC <u>/</u> V	<u>/</u> MΩ

	Schaltspiele life cycles	Sichtprüfung visual check	Durchgangs- widerstand contact- resistance	Spannungs- festigkeit dielectric- strength	Isolations- widerstand insulation- resistance
Sample 1	<u>10⁷</u>	<u>OK</u>	<u>8.0 mΩ</u>	<u>OK</u>	<u>OK</u>
Sample 2	<u>10⁷</u>	<u>OK</u>	<u>8.6 mΩ</u>	<u>OK</u>	<u>OK</u>
Sample 3	<u>10⁷</u>	<u>OK</u>	<u>9.2 mΩ</u>	<u>OK</u>	<u>OK</u>
Sample 4	<u>10⁷</u>	<u>OK</u>	<u>8.7 mΩ</u>	<u>OK</u>	<u>OK</u>
Sample 5	<u>10⁷</u>	<u>OK</u>	<u>8.2 mΩ</u>	<u>OK</u>	<u>OK</u>
Contact resist.					

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Bemessungsverbrauch nach DIN VDE 0435/Teil 201/05.90 Abschnitt 10.9
Rated burden acc. to Clause 10.9

Bedingungen (conditions)

Relais kalt und ohne Eigen- oder Fremderwärmung
(Relay being cold without self- or extraneous heating) OK.

Bezugsbedingungen für die Einflußgrößen
(The influence quantities and factors under their
reference conditions) OK.

Der zu prüfende Kreis ist mit dem Bemessungswert erregt
und die übrigen Kreise sind, wenn nicht anderes angegeben
nicht erregt.

(The given circuit being energized at its rated value
all other circuits being unenergized, unless otherwise
stated) OK

DC 12V. 0.792m. rated burden is 0.8W.

Erwärmung der Eingangskreise nach Abschnitt 10.5
Temperature rise of the energizing circuits acc. to Clause 10.5

5 Prüflinge mit der Spulenspannung mit dem höchsten Bemessungsverbrauch
5 Samples of the coil voltage with highest rated burden

0.8W.

Die Relais so eng eingebaut sein, wie es das Datenblatt zuläßt.
The Relays should be installed as close as the Data-sheet specify it OK.

Bedingungen (Conditions)

Umgebungstemperatur
(muß die maximale Umgebungstemperatur sein)
ambient temperature
(must be the max. ambient temperature) 70

Alle Kontakte an Nennstrom (All contacts with rated current) OK.

Die Temperatur darf die maximale Temperatur, die vorgegeben ist durch die
Klasse des Isolationsmaterial nicht überschreiten (IEC 85).
The temperature should not exceed the limits specified by the class of its
winding insulation (IEC 85).

Coil Voltage: 1-1X12 = 12.2V. load current = 0.8

Sample

max. Temperature

70.11

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Bewertung des Kontaktverhaltens nach DIN VDE 0435 Teil 120
(Evaluation of the contact performance acc. to DIN VDE 435 Teil 120)

Einschaltvermögen nach Abschnitt 5.1.1
(Making capacity acc. to 5.1.1)

5 Prüflinge nach Herstellerangaben
5 Samples acc. to Manufacturers specification

OK.

Alle Kontakte belastet sofern möglich
All contacts on load if possible

10A OK.

Anzahl der Schaltspiele nach Herstellerangabe
number of cycles acc. to manufacturers specification

6000

Anzahl der Schaltspiele pro Stunde nach Herstellerangaben
number of cycles per hour acc. to manufacturers specification

1800.

Typ	1	2	3	4
Bezeichnung	<u>A2733W.</u>			

Spulenspannung (Coil voltage) U_n/V DC 12V.

Eingangsstrom (Input current) 61mA.

Leistungsfaktor (Power factor) $\cos \phi = 1$.

anschließend :
thereafter

Sichtprüfung (visual check)

Die Isolierstoffe dürfen nicht beschädigt noch verformt sein
The insulation material should neither be damaged or molded

OK.

Während der oben beschriebenen Messung ist festzustellen, ob die Kontakte sicher schalten.

During the above mentioned test it has to be observed, that the contacts operate correctly. OK.

Kommentar (Comment) : No deformation can be seen.

The largest contact resistance is 12-7mΩ, the contacts still work as intended.

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Spannungsfestigkeit und Isolationswiderstand
Dielectric strength and insulation resistance

Die Prüfung wird bei Raumtemperatur ohne Feuchtevorbehandlung durchgeführt.

This will be conducted at ambient temperature without humidity treatment OK.

Prüfspannungen ^{75%} 70% der Werte nach der Feuchteprüfung
Testvoltages 70% of the values after humidity treatment

Prüfstrecke Creepage-clearance distances to be tested	Prüfspannung Test voltage	Isolationswiderstand Insulation resistance
1) Spule und Spulenkern Coil and Core	AC <u>375</u> V	<u>1000</u> MΩ
2) Spule und Kontaktstromkreisen Coil and contacts	AC <u>3000</u> V	<u>1000</u> MΩ
3) Kontakten verschiedener Polarität Contacts of different Polarity	AC <u>2500</u> V	<u>1000</u> MΩ
4) geöffneten Kontakten open contacts	AC <u>750</u> V	<u>1000</u> MΩ
5) <u>Enclosure and contacts</u>	AC <u>3000</u> V	<u>1000</u> MΩ
6) <u>/</u>	AC <u>/</u> V	<u>/</u> MΩ

	Schaltspiele life cycles	Sichtprüfung visual check	Durchgangs- widerstand contact- resistance	Spannungs- festigkeit dielectric- strength	Isolations- widerstand insulation resistance
Sample 1	<u>6000</u>	OK.	<u>8.1 MΩ</u>	OK.	OK.
Sample 2	<u>6000</u>	OK.	<u>12.7 MΩ</u>	OK.	OK.
Sample 3	<u>6000</u>	OK.	<u>8.1 MΩ</u>	OK.	OK.
Sample 4	<u>6000</u>	OK.	<u>8.1 MΩ</u>	OK.	OK.
Sample 5	<u>6000</u>	OK.	<u>8.1 MΩ</u>	OK.	OK.

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Ausschaltvermögen nach Abschnitt 5.1.2
(Breaking capacity acc. to 5.1.2)

5 Prüflinge nach Herstellerangaben
5 Samples acc. to Manufacturers specification

Alle Kontakte belastet sofern möglich
All contacts on load if possible

10A o.k.

Anzahl der Schaltspiele nach Herstellerangabe
number of cycles acc. to manufacturers specification

6000

Anzahl der Schaltspiele pro Stunde nach Herstellerangaben
number of cycles per hour acc. to manufacturers specification

1800

Typ	1	2	3	4
Bezeichnung	<u>AZ733W</u>			
Spulenspannung (Coil voltage) U_n/V	<u>DC12V</u>			
Eingangsstrom (Input current)	<u>16mA</u>			
Leistungsfaktor (Power factor)	<u>$\cos\phi = 1.0$</u>			
anschließend thereafter				

Sichtprüfung (visual check)

Die Isolierstoffe dürfen nicht beschädigt noch verformt sein
The insulation material should neither be damaged or molded o.k.

Während der oben beschriebenen Messung ist festzustellen, ob die Kontakte sicher schalten.
During the above mentioned test it has to be observed, that the contacts operate correctly. o.k.

Kommentar (Comment): No deformation can be seen

the contacts can still work as intended.

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Spannungsfestigkeit und Isolationswiderstand
Dielectric strength and insulation resistance

Die Prüfung wird bei Raumtemperatur ohne Feuchtevorbehandlung durchgeführt.

This will be conducted at ambient temperature without humidity treatment o.k.

Prüfspannungen 70% der Werte nach der Feuchteprüfung
Testvoltages 70% of the values after humidity treatment

Prüfstrecke Creepage-clearance distances to be tested	Prüfspannung Test voltage	Isolationswiderstand Insulation resistance
1) Spule und Spulenkern Coil and Core	AC <u>375</u> V	<u>1000</u> MΩ
2) Spule und Kontaktstromkreisen Coil and contacts	AC <u>3000</u> V	<u>1000</u> MΩ
3) Kontakten verschiedener Polarität Contacts of different Polarity	AC <u>2250</u> V	<u>1000</u> MΩ
4) geöffneten Kontakten open contacts	AC <u>750</u> V	<u>1000</u> MΩ
5) <u>Enclosure and contacts</u>	AC <u>3000</u> V	<u>1000</u> MΩ
6) <u>✓</u>	AC <u>✓</u> V	<u>✓</u> MΩ

	Schaltspiele life cycles	Sichtprüfung visual check	Durchgangs- widerstand contact- resistance	Spannungs- festigkeit dielectric- strength	Isolations- widerstand insulation- resistance
Sample 1	<u>6000</u>	<u>o.k.</u>	<u>18.3 mΩ</u>	<u>o.k.</u>	<u>ok.</u>
Sample 2	<u>6000</u>	<u>o.k.</u>	<u>16.7 mΩ</u>	<u>ok</u>	<u>ok</u>
Sample 3	<u>6000</u>	<u>ok</u>	<u>20.2 mΩ</u>	<u>ok</u>	<u>ok</u>
Sample 4	<u>6000</u>	<u>ok.</u>	<u>12.4 mΩ</u>	<u>ok.</u>	<u>ok</u>
Sample 5	<u>6000</u>	<u>ok.</u>	<u>20.7 mΩ</u>	<u>ok. -</u>	<u>ok</u>

contact resistance condition: DC fair

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Spannungsfestigkeit und Isolationswiderstand
Dielectric strength and insulation resistance

NIA

Die Prüfung wird bei Raumtemperatur ohne Feuchtevorbehandlung durchgeführt.
This will be conducted at ambient temperature without humidity treatment

Prüfspannungen 70% der Werte nach der Feuchteprüfung
Testvoltages 70% of the values after humidity treatment

Prüfstrecke Creepage-clearance distances to be tested	Prüfspannung Test voltage	Isolationswiderstand Insulation resistance
1) Spule und Spulenkern Coil and Core	AC _____ V	_____ MΩ
2) Spule und Kontaktstromkreise Coil and contacts	AC _____ V	_____ MΩ
3) Kontakten verschiedener Polarität Contacts of different Polarity	AC _____ V	_____ MΩ
4) geöffneten Kontakten open contacts	AC _____ V	_____ MΩ
5) _____	AC _____ V	_____ MΩ
6) _____	AC _____ V	_____ MΩ

	Schaltspiele life cycles	Sichtprüfung visual check	Durchgangs- widerstand contact- resistance	Spannungs- festigkeit dielectric- strength	Isolations- widerstand insulation resistance
Sample 1	_____	_____	_____	_____	_____
Sample 2	_____	_____	_____	_____	_____
Sample 3	_____	_____	_____	_____	_____
Sample 4	_____	_____	_____	_____	_____
Sample 5	_____	_____	_____	_____	_____

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Kombiniertes Ein- und Ausschaltvermögen nach Abschnitt 5.1.3
(Cyclic capacity acc. to 5.1.3)

*N/A. resistance load only
refer to short-time
Capacity.*

5 Prüflinge nach Herstellerangaben
5 Samples acc. to Manufacturers specification

Alle Kontakte belastet sofern möglich
All contacts on load if possible

Anzahl der Schaltspiele nach Herstellerangabe
number of cycles acc. to manufacturers specification

Anzahl der Schaltspiele pro Stunde nach Herstellerangaben
number of cycles per hour acc. to manufacturers specification

Typ	1	2	3	4
Bezeichnung				
Spulenspannung (Coil voltage) U_n/V				
Eingangsstrom (Input current)				
Leistungsfaktor (Power factor)				

anschließend :
thereafter

Sichtprüfung (visual check)

Die Isolierstoffe dürfen nicht beschädigt noch verformt sein
The insulation material should neither be damaged or molded

Während der oben beschriebenen Messung ist festzustellen, ob die Kontakte
sicher schalten.
During the above mentioned test it has to be observed, that contacts
operate correctly.

Kommentar (Comment) : _____

TÜV Rheinland Zertifizierungs-
und Prüfstelle für Gerätesicherheit



Nr./No.: E 9566170202

Seite/page 18

Dauerstrom nach Abschnitt 5.1.4
(Continues capacity acc. to 5.1.4)

NIA

5 Prüflinge nach Herstellerangaben
5 Samples acc. to Manufacturers specification

Alle Kontakte belastet sofern möglich
All contacts on load if possible

Anzahl der Schaltspiele nach Herstellerangabe
number of cycles acc. to manufacturers specification

Anzahl der Schaltspiele pro Stunde nach Herstellerangaben
number of cycles per hour acc. to manufacturers specification

	Typ	1	2	3	4
Bezeichnung					
Spulenspannung (Coil voltage) U_n/V					
Eingangsstrom (Input current)					
Leistungsfaktor (Power factor)					
anschließend : thereafter					

Sichtprüfung (visual check)

Die Isolierstoffe dürfen nicht beschädigt noch verformt sein
The insulation material should neither be damaged or molded

Während der oben beschriebenen Messung ist festzustellen, ob die Kontakte sicher schalten.
During the above mentioned test it has to be observed, that the contacts operate correctly.

Kommentar:

TÜV Rheinland Zertifizierungs-
und Prüfstelle für Gerätesicherheit



Nr./No.: E 9166170202

Seite/page 19

Spannungsfestigkeit und Isolationswiderstand
Dielectric strength and insulation resistance

Die Prüfung wird bei Raumtemperatur ohne Feuchtevorbehandlung durchgeführt.
This will be conducted at ambient temperature without humidity treatment

Prüfspannungen 70% der Werte nach der Feuchteprüfung
Testvoltages 70% of the values after humidity treatment

N/A

Prüfstrecke
Creepage-clearance
distances to be tested

Prüfspannung
Test voltage

Isolationswiderstand
Insulation resistance

1) Spule und Spulenkern Coil and Core	AC _____ V	_____ MΩ
2) Spule und Kontaktstromkreisen Coil and contacts	AC _____ V	_____ MΩ
3) Kontakten verschiedener Polarität Contacts of different Polarity	AC _____ V	_____ MΩ
4) geöffneten Kontakten open contacts	AC _____ V	_____ MΩ
5) _____	AC _____ V	_____ MΩ
6) _____	AC _____ V	_____ MΩ

Schaltspiele life cycles	Sichtprüfung visual check	Durchgangs- widerstand contact- resistance	Spannungs- festigkeit dielectric- strength	Isolations- widerstand insulation resistance
-----------------------------	------------------------------	---	---	---

Sample 1	_____	_____	_____	_____
Sample 2	_____	_____	_____	_____
Sample 3	_____	_____	_____	_____
Sample 4	_____	_____	_____	_____
Sample 5	_____	_____	_____	_____

TÜV Rheinland Zertifizierungs-
und Prüfstelle für Gerätesicherheit



Nr./No.: E 9566170202

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Kurzzeitstrom nach Abschnitt 5.1.5
(Short-time current-capacity acc. to 5.1.5)

5 Prüflinge nach Herstellerangaben
5 Samples acc. to Manufacturers specification

Alle Kontakte belastet sofern möglich
All contacts on load if possible

Anzahl der Schaltspiele nach Herstellerangabe
number of cycles acc. to manufacturers specification

Anzahl der Schaltspiele pro Stunde nach Herstellerangaben
number of cycles per hour acc. to manufacturers specification

Dauer (wenn keine Angabe 1s)
Duration, when non information default is 1s

10A OK

6000

1800

1000 ms

Typ	1	2	3	4
Bezeichnung	<u>AZ733W</u>			
Spulenspannung (Coil voltage) U_n/V	<u>DC 12V</u>			
Eingangsstrom (Input current)	<u>66mA</u>			
Leistungsfaktor (Power factor)	<u>cos ϕ = 1.0</u>			

Bezeichnung

Spulenspannung (Coil voltage) U_n/V

Eingangsstrom (Input current)

Leistungsfaktor (Power factor)

anschließend
thereafter

Sichtprüfung (visual check)

Die Isolierstoffe dürfen nicht beschädigt noch verformt sein
The insulation material should neither be damaged or molded

OK

Während der oben beschriebenen Messung ist festzustellen, ob die Kontakte sicher schalten.
During the above mentioned test it has to be observed, that the contacts operate correctly.

OK

Kommentar (Comment): No deformation can be seen.
the contacts can still work as intended.

TÜV Rheinland Zertifizierungs-
und Prüfstelle für Gerätesicherheit



TÜV Rheinland

NR./No.: E 9566170202.

Seite/page 21

Spannungsfestigkeit und Isolationswiderstand
Dielectric strength and insulation resistance

Die Prüfung wird bei Raumtemperatur ohne Feuchtevorbehandlung durchgeführt.
This will be conducted at ambient temperature without humidity treatment

Prüfspannungen ⁷⁵ 70% der Werte nach der Feuchteprüfung
Testvoltages 70% of the values after humidity treatment

OK

Prüfstrecke

Creepage-clearance
distances to be tested

Prüfspannung
Test voltage

Isolationen widerstand
Insulation resistance

- | | | | |
|----|---|------------------|----------------|
| 1) | Spule und Spulenkern
Coil and Core | AC <u>275</u> V | <u>1000</u> MΩ |
| 2) | Spule und Kontaktstromkreisen
Coil and contacts | AC <u>3000</u> V | <u>1000</u> MΩ |
| 3) | Kontakten verschiedener Polarität
Contacts of different Polarity | AC <u>250</u> V | <u>1000</u> MΩ |
| 4) | geöffneten Kontakten
open contacts | AC <u>750</u> V | <u>1000</u> MΩ |
| 5) | <u>Enclosure and contacts.</u> | AC <u>3000</u> V | <u>1000</u> MΩ |
| 6) | <u>/</u> | AC <u>/</u> V | <u>/</u> MΩ |

Schaltspiele Sichtprüfung
life cycles visual check

Durchgangs-
widerstand
contact-
resistance

Spannungs-
festigkeit
dielectric
strength

Isolation:
widerstand
insulation
resistance

Sample	Resistance	Strength	Insulation Resistance
Sample 1	6000	OK.	15.2 mΩ
Sample 2	6000	OK.	14.6 mΩ
Sample 3	6000	OK.	12.1 mΩ
Sample 4	6000	OK.	28.2 mΩ
Sample 5	6000	OK.	11.1 mΩ

TÜV Rheinland Zertifizierungs-
und Prüfstelle für Gerätesicherheit



Nr./No.: E 9566170202.

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Kriech- und Luftstrecken nach DIN VDE 0110/01.89
(Creepage and clearance distances acc. to DIN VDE 0110/01.89)

Verschmutzungsgrad
(auch im inneren des Relais min. 2, da
Ablagerungen durch Abnutzung der Kontakte
auftreten)
Pollution degree
(should be at least 2 also inside of the relay
due to contact wear out)

2

Überspannungskategorie, (Overvoltage category)

I.

Kriechstromfestigkeit
(oberhalb von 630V wird mindestens Isolierstoff
IIIa empfohlen)
CTI value
(in case the voltage exceeds 630V the standard
recommends at least IIIa)

III a.

Bemessungsspannung
(muß >= der Nennspannung sein)
Rated voltage
(must be >= of rated voltage)

OK. 250V~.

Strecke (Distance)

Spule und Kontakten
(Coil and contacts)

2A: { K. Pol(e) 8.1 mm
L. Pol 8.5 mm

Geöffneten Kontakten (Open contacts)

Kontakten verschiedener Polarität
(Contacts of different polarity)

K

4.0 mm

L

4.0 mm

VDE Prüf- und Zertifizierungsinstitut

GUTACHTEN MIT FERTIGUNGSÜBERWACHUNG CERTIFICATE OF CONFORMITY WITH FACTORY SURVEILLANCE

O/E/N INDIA Ltd.
P.E.No. 1952 Vyttila
682 019 COCHIN KERALA
India

ist berechtigt, für ihr Produkt /
is authorized to use for their product

Schaltrelais
All-or-nothing electrical relays
Series 68 Relay

die hier abgebildeten markenrechtlich geschützten Zeichen für die
ab Blatt 2 aufgeführten Typen zu benutzen /
the legally protected Marks as shown below for the types referred to on page 2 ff.



Reg.-Nr. 134570

oder
or



oder
or

VDE-Reg.-Nr. 134570

Gepflicht und zertifiziert nach /
Tested and certified according to

DIN EN 61810-1 (VDE 0435 Teil 201):1998-04 EN 61810-1:1998
DIN EN 60255-23 (VDE 0435 Teil 120):1997-03 EN 60255-23:1996

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Zertifizierungsstelle
Certification

Aktenzeichen: 23967-4940-0002 / 32AD1 F33 / KS

File ref.:

Ausweis-Nr.: 134570 UG

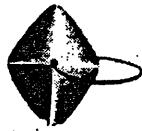
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Weitere Bedingungen siehe Rückseite und Folgenblätter /
further conditions see overleaf and following pages

Offenbach, 2001-03-05

Blatt 1
page 1





O/E/N India Limited

REGD. OFFICE: VYTTILA P. B. NO. 1952, COCHIN-682 019, KERALA, INDIA
PHONE : (0484) 301132, 303709 & 302483 CABLE : OAKELIND
FAX : (0484) 302287, 302211

E-Mail : sales@oenindia.com Website: www.oenindia.com

FACTORY : ELECTROGIRI, P. B. No. 1, MULANTHURUTHY - 682 314, VIA COCHIN, INDIA.
PHONE : (0484) 711321 TO 711328 FAX : (0484) 711891, CABLE : OAKELIND
E-Mail : oenindia@vsnl.com Website: www.oenindia.com

OUR REF : DEV/468

YOUR REF :

14th May 2001

M/s American Power Conversion Pvt. Ltd.
9 Executive Park Drive,
North Billerica,
MA 01862
USA

Kind attn: Mr. Stephen Lee - Compliance Engineer.

Dear Sirs,

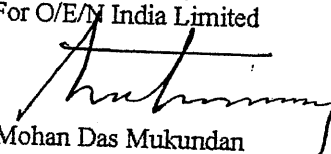
We are despatching today by courier, 50 nos. of 450-2151 relays to our Part No: 68 - 24 - 2AE for your evaluation. We are attaching the following documents.

Qualification Plan - prepared based on the specification of 2150 provided by you.

Observed values of the 50 relays.

Thank you.

Yours faithfully,
For O/E/N India Limited


* Mohan Das Mukundan
CGM - Engg. Resources.

cc: Mr. Muralidharan - Manager (Purchase)
APC India Ltd.,
Bangalore.

VDE File: 19244-3335-0020,
Appendix 15, Page 83 of 104

VDE Prüf- und Zertifizierungsinstitut

GUTACHTEN MIT FERTIGUNGSÜBERWACHUNG CERTIFICATE OF CONFORMITY WITH FACTORY SURVEILLANCE

O/E/N INDIA Ltd.
P.B.No. 1952 Vyttila
682 019 COCHIN KERALA
India

ist berechtigt, für ihr Produkt /
is authorized to use for their product

Schaltrelais
All-or-nothing electrical relays
Series 68 Relay

die hier abgebildeten markenrechtlich geschützten Zeichen für die
ab Blatt 2 aufgeführten Typen zu benutzen /
the legally protected Marks as shown below for the types referred to on page 2 ff.



Reg.-Nr. 134570

oder
or



oder
or

VDE-Reg.-Nr. 134570

Gepflicht und zertifiziert nach /
Tested and certified according to

DIN EN 51810-1 (VDE 0435 Teil 201):1993-04 EN 51810-1:1998
DIN EN 60255-23 (VDE 0435 Teil 120):1997-03 EN 60255-23:1996

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Zertifizierungsstelle
Certification

Handwritten signature

Aktenzeichen: 23967-4940-0002 / 32AD1-F33 / KS

File ref.

Ausweis-Nr.: 134570 OG

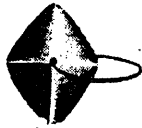
Licence No.

Blatt 1
page

Weitere Bedingungen siehe Rückseite und Folgebblätter /
further conditions see overleaf and following pages

Offenbach, 2001-03-05





O/E/N India Limited

REGD. OFFICE: VYTTILA P. B. NO. 1952, COCHIN-682 019, KERALA, INDIA
PHONE : (0484) 301132, 303709 & 302483 CABLE : OAKELIND
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E-Mail : oenindia@vsnl.com Website: www.oenindia.com

OUR REF : DEV/468

YOUR REF :

14th May 2001

M/s American Power Conversion Pvt. Ltd.
9 Executive Park Drive,
North Billerica,
MA 01862
USA

Kind attn: Mr. Stephen Lee – Compliance Engineer.

Dear Sirs,

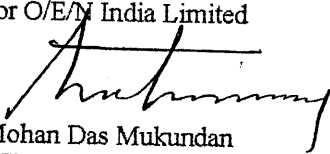
We are despatching today by courier, 50 nos. of 450-2151 relays to our Part No: 68 - 24 – 2AE for your evaluation. We are attaching the following documents.

Qualification Plan – prepared based on the specification of 2150 provided by you.

Observed values of the 50 relays.

Thank you.

Yours faithfully,
For O/E/N India Limited


✗ Mohan Das Mukundan
CGM – Engg. Resources.

cc: Mr. Muralidharan – Manager (Purchase)
APC India Ltd.,
Bangalore.

VDE File: 19244-3335-0020
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QUALIFICATION PLAN

Title: Relay

DOCUMENTATION							
Characteristics	Required For Qual Yes, No or N/A	Evaluation Technique	Special Tolerance	Result	Result Comply ? (Yes/No)	Comments	
APC P/N and Rev	Yes		450-2151		yes		
Manufacturer P/N Rev.No	Yes		68-24-2AE		yes		
Coil Voltage Rating-Nominal	Yes		24VDC	24VDC	yes		
Coil Voltage Rating-Range	No						
Coil Resistance range	Yes	100%check	700+/-10%	700 +/- 10%	yes		
Contact Voltage Rating Nominal	Yes	Sampling	240 VAC	240 VAC	yes		
Contact Voltage Rating Range	No						
Contact Current Rating Max.	Yes	Sampling	8 Amps	8 Amps	yes		
Contact Arrangement	Yes	Design	DPST	DPST	yes		
Contact Material	N/A	Design		AgCdO	yes		
Operating Temperature-Max	Yes	Sampling	+70°C	+70°C	yes		
Temperature Rating Range	Yes	Sampling		-40 to +70°C	yes		
Initial Contact Resistance Rating	No	Sampling	<50 m ohms	<50 m ohms max	yes		
Pull in Voltage Rating	Yes	100%check	20 VDC max	18 VDC max	yes		
Drop out Voltage rating	Yes	100%check		4 VDC max	yes		
Mechanical Life Cycle	Yes	Sampling	1000000	1000000	yes		
Normally Open Contact Pull-in Time (1st touch at 28VDC)	Yes	Sampling	9ms max	7ms max	yes		
Bounce beyond 1st touch	Yes	Sampling	4 ms nom.	4 max.	yes		
Normally Open Contact Release Time -Break time	Yes	Sampling	2.5 max	2max	yes		
Bounce at Rated Voltage	NA						
Fully Sealed	NA	design		yes (wash proof)	yes		
UL Recognition File#	Yes			E209843	yes		
CSA or CUL File#	Yes			E209843	yes		
VDE License#	Yes		Reg.Nr. 134570 for 12V coil				
TUV License#	NA			NA			
Case Material	NA			PBTP			
ELECTRICAL							
Coil Resistance	yes	100%	700 ohms+/- 10%	700+/- 10%	yes		
* Pull in Voltage Min	yes	100%	20vdc max.	18 VDC max	yes		

* Drop Out voltage Max	yes	100%	10vdc max.	6 VDC max	yes		
Bounce at Max. Voltage	no						
Bounce at Min. Voltage	no						
Animal Test Min. Cycle	yes	Sampling	500	600 min	yes		
Dielectric Withstand	no	Sampling		4000 V AC rms	yes		
PART MARKINGS							
APC P/N and Rev	yes	100%	450-2151 ?	450-2151			
Date Code	yes	100%		0118	yes		
Mfr's ID	yes	100%		O/E/N	yes		
Mfr's Type/Part Number	yes	100%		68-24-2AE	yes		
UL Recognition	yes	100%		E209843	yes		
CSA or CUL	yes	100%		E209843			
VDE	yes	100%	Reg.Nr. 134570 for 12V coil		not marked		
TUV	no						
Contact Voltage Rating	yes	100%		250V AC	yes		
Contact Current Rating	yes	100%		8A	yes		
Coil Voltage Rating	no						
Hypot Functional		sampling	3000 V AC rms	3000 V AC rms	yes		

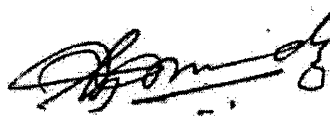
VDE File: 19244-3335-0020
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O/E/N Series 68-24-2AE (APC 450-2151) Relays - 50 Samples														
		Contact resistance			TeNO1		TeNO2		Tebnce		TdNO		Coil	
Sl. No	P/u	D/o	NOL	NOR	L	R	L	R	L	R	L	R	Res.	
	VDC	milli ohms			milli seconds								ohms	
1	2	3	4	5	10	11	12	13	14	15	16	17	24	
Spec. Values	20 max.	10	50 max.		9 max. at 28V		?		4 max.		2.5 max.		700 +/- 10%	
1	15.9	3.3	8.4	5.7	5.6	5.8	7.8	7.2	2.2	1.4	1.6	1.6	661	
2	16.3	4.3	6.0	5.5	5.4	5.6	6.0	6.6	0.6	1.0	1.2	1.1	664	
3	15.3	4.5	5.7	6.2	5.6	5.6	6.4	6.4	0.8	0.8	1.1	1.1	665	
4	13.8	3.6	8.0	7.6	5.2	5.1	8.4	8.0	3.2	2.9	1.6	1.4	654	
5	16.1	3.1	10.3	8.3	5.6	5.8	6.3	6.4	0.7	0.6	1.4	1.4	654	
6	16.4	3.1	5.4	7.0	5.8	5.8	6.6	6.5	0.8	0.7	1.5	1.5	673	
7	15.6	4.2	5.6	6.6	5.5	5.6	6.2	6.2	0.7	0.6	1.2	1.3	671	
8	16.2	3.8	6.8	6.0	5.6	5.6	6.2	6.0	0.6	0.4	1.4	1.4	674	
9	15.6	3.3	7.2	7.8	5.7	5.8	7.0	7.0	1.3	1.2	1.5	1.6	655	
10	16.0	3.5	15.5	13.5	6.0	6.0	7.8	8.0	1.8	2.0	1.4	1.4	672	
11	15.9	3.3	8.1	6.6	5.8	5.6	7.8	7.0	2.0	1.4	1.5	1.5	653	
12	15.0	3.2	7.8	9.0	5.4	5.5	6.4	6.6	1.0	1.1	1.4	1.5	652	
13	16.0	3.1	5.9	5.7	5.2	5.2	6.2	6.4	1.0	1.2	1.6	1.5	671	
14	14.2	2.6	7.8	9.4	5.0	5.0	6.4	6.2	1.4	1.2	1.8	1.7	655	
15	15.2	3.3	5.8	7.1	5.0	5.0	6.0	6.0	1.0	1.0	1.7	1.6	661	
16	14.9	4.4	7.8	6.9	5.0	5.0	6.0	6.2	1.0	1.2	1.3	1.4	659	
17	15.8	4.2	8.5	6.8	5.6	5.6	6.0	6.2	0.4	0.6	1.0	1.4	666	
18	15.0	4.1	9.1	6.6	5.6	5.6	6.4	6.5	0.8	0.9	1.3	1.3	667	
19	16.3	3.7	9.5	6.0	5.4	5.6	6.0	6.4	0.6	0.8	1.0	1.2	656	
20	16.1	4.0	8.0	6.8	5.6	5.6	7.0	5.8	1.4	0.2	1.4	1.4	654	
21	16.5	3.4	5.6	5.3	5.6	5.6	6.6	6.7	1.0	1.1	1.5	1.5	675	
22	16.0	4.9	6.0	5.5	5.5	5.6	6.2	6.4	0.7	0.8	1.2	1.2	657	
23	16.1	3.5	8.5	10.5	5.4	5.6	6.4	6.2	1.0	0.6	1.3	1.3	672	
24	15.9	3.2	12.1	7.2	5.8	6.0	6.8	7.2	1.0	1.2	1.4	1.4	654	
25	14.9	4.2	6.5	8.2	5.2	5.2	6.2	6.3	1.0	1.1	1.3	1.3	674	
26	16.6	2.6	10.4	15.2	6.0	6.0	8.0	7.4	2.0	1.4	1.5	1.6	663	
27	14.7	3.3	10.5	6.2	5.6	5.6	6.6	6.0	1.0	0.4	1.5	1.4	666	
28	15.0	3.2	5.3	6.4	6.0	5.8	7.0	7.0	1.0	1.2	1.4	1.6	659	
29	16.6	3.2	7.7	21.0	5.6	5.6	7.0	6.4	1.4	0.8	1.6	1.5	657	
30	15.5	3.3	6.1	8.2	5.6	5.7	6.6	7.0	1.0	1.3	1.6	1.7	673	
31	16.1	3.3	5.2	8.6	5.0	5.4	6.4	6.4	1.4	1.0	1.4	1.5	665	
32	15.0	3.3	10.1	7.9	6.4	6.6	7.2	7.4	0.8	0.8	1.5	1.6	667	
33	16.5	4.2	5.5	5.9	5.7	5.8	6.2	6.4	0.5	0.6	1.4	1.4	668	
34	16.7	3.3	7.3	5.6	5.4	5.4	6.6	6.6	1.2	1.2	1.6	1.6	664	
35	14.1	3.2	15.0	5.8	5.6	5.6	6.4	6.2	0.8	0.6	1.4	1.4	672	
36	16.6	4.2	5.9	5.9	5.4	5.2	7.0	6.6	1.6	1.4	1.6	1.6	664	
37	14.7	2.6	14.0	12.2	5.6	5.8	6.2	6.2	0.6	0.4	1.6	1.5	665	
38	16.5	3.1	5.5	6.9	5.4	5.4	6.2	6.4	0.8	1.0	1.2	1.2	667	
39	15.4	4.0	9.1	5.8	5.6	5.6	7.0	6.2	1.4	0.6	1.5	1.6	657	
40	15.5	3.3	8.5	5.6	5.4	5.4	6.8	6.4	1.4	1.0	1.6	1.5	668	
41	15.3	3.2	16.3	7.1	5.8	5.8	6.6	6.4	0.8	0.6	1.3	1.2	666	
42	15.9	5.2	8.6	13.4	5.6	5.8	7.4	7.0	1.8	1.2	1.5	1.6	672	
43	15.9	3.6	6.6	11.2	5.6	5.8	6.8	7.0	1.2	1.2	1.4	1.4	665	
44	15.9	3.8	5.9	6.4	5.4	5.0	6.4	6.0	1.0	1.0	1.5	1.4	675	
45	14.4	3.8	8.1	9.2	6.0	6.0	7.0	7.2	1.0	1.2	1.4	1.4	656	
46	16.2	3.8	6.6	10.6	5.8	5.8	6.8	7.0	1.0	1.2	1.5	1.5	674	
47	16.7	3.5	8.0	6.8	5.4	5.4	6.6	6.4	1.2	1.0	1.4	1.4	675	
48	15.6	4.2	7.1	5.8	5.8	5.8	6.6	6.4	0.8	0.6	1.3	1.3	675	
49	16.4	3.8	7.7	6.8	5.2	5.4	6.2	7.0	1.0	1.6	1.0	1.2	659	
50	15.4	4.3	10.2	8.3	5.6	5.6	6.2	6.4	0.6	0.8	1.4	1.4	665	
Max	16.7	5.2	16.3	21.0	6.4	6.6	8.4	8.0	3.2	2.9	1.8	1.7	675.0	
Min	13.8	2.6	5.2	5.3	5.0	5.0	6.0	5.8	0.4	0.2	1.0	1.1	652.0	
Mean	15.7	3.6	8.1	7.9	5.6	5.6	6.7	6.6	1.1	1.0	1.4	1.4	664.5	

- A Equipments used : High Voltage Tester (Laxtronics make HV-100B) Test Probe
- B Bill of Materials : Relays after sealing and tinning
- C Procedure

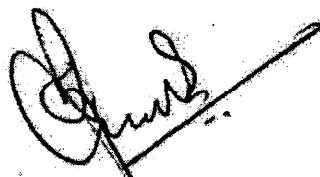
1. Switch on the High Voltage Tester.
2. Set the voltage to 3000 Vrms.
3. Check the lot size by counting the trays. Hand pick random sample size quantity of relays as per IEC 60410 General Inspection Level G II single Sampling Plan for normal inspection, AQL 0.1- ie. 125nos if the lot size is 1201 to 3200, 200nos. if the lot size is 3201 to 10000 etc. (Ref. IEC-60410 Table I and Table IIA)
4. Pick one relay from the sample lot.
5. Apply the probes of the high voltage tester to the first set of open contact terminals.
6. Repeat for the second set of open contact terminals..
7. Accept the relay if the hooter does not sound.
8. Reject the relay if the hooter sounds indicating break down.
9. Repeat steps 4 to 9 on all relays of the sample lot.
10. If no one relay is defective accept the whole lot and pass on to packing.
11. If any one relay is rejected, reject the whole lot.
12. If rejected, inspect each one of the relay of the whole lot one by one repeating steps 4 to 8.
13. Place the rejected relays in the tray marked 'REJECTIONS' after bending the terminals for identification..
14. Remove the rejected relays to the scrap yard for distroyal.
15. Pass on the accepted relays for packing.

Prepared:
by:



GODFREY MENDEZ
R&D

Approved :
by:



MOHAN DAS MUKUNDAN
Supt. Head - R&D

O/E/N INDIA LIMITED	OPERATING INSTRUCTION BREAKDOWN TESTER LAXTRONICS	NO. : WI-QAO-EQ-021A DATE : 15/11/1995 PAGE : 1 of 1
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MODEL : HV-100B

1. Switch 'ON' the mains of the Breakdown Tester.
2. Operate the selector switch to AC/DC mode as required.
3. Ensure that the 'Current Limit' potentiometer is positioned at least at 0.5 mA.
4. Operate the toggle switch to 'Set Limit' position.
5. Set the 'Current Limit' potentiometer to the required current value.
6. Set the 'Minutes' potentiometer to the required time or to 'OFF' position.
7. Operate the toggle switch to 'Operate' position.
8. Press the 'Start' switch.
9. Press and hold the switch on the probe and then set the required test voltage by varying the 'Set Voltage' potentiometer.
10. Apply the probes to the appropriate points of the specimen. If there is failure, hooter hoots and the voltage drops which is indicated by the Voltmeter.
11. In case of failure, press 'Reset' switch and bring the 'Set Voltage' potentiometer to extreme left position.
12. Repeat steps 8,9&10 above.
13. On completion of the test, operate the 'Set Voltage' potentiometer to extreme left position.
14. Operate the selector switch to 'OFF' position.
15. Switch 'OFF' the mains of the Breakdown Tester.

ISO 2859-1

Table II B

Table I - Sample size

Lot or batch size			Special Inspection levels			General Inspection levels		
			S-1	S-2	S-4	I	II	III
2	to	8	A	A	A	A	A	B
9	to	15	A	A	A	A	B	C
16	to	25	A	A	B	B	C	D
26	to	50	A	B	B	C	D	E
51	to	90	B	B	C	C	E	F
91	to	150	B	B	C	D	F	G
151	to	280	B	C	D	E	G	H
281	to	500	B	C	D	F	H	J
501	to	1200	C	C	E	G	J	K
1201	to	3200	C	D	E	H	K	L
3201	to	10000	C	D	F	J	L	M
10001	to	35000	C	D	F	K	M	N
35001	to	150000	D	E	G	L	N	P
150001	to	500000	D	E	G	M	P	Q
500001	and	over	D	E	H	N	Q	R

O/E/N
INDIA
LIMITED

WORK INSTRUCTION - 68 RELAY
PRESEAL INSPECTION

NO : WI-PRA-68-022A
DATE 02/04/2001
PAGE : 1 of 1

- A. Equipments Used : Test Console consisting of Preset Power Supply, Test Socket
Gram Gauge 15-0-15, Gap Gauge 1.5 mm & Feeler Gauge 0.005"
- B. Bill of Materials : Relay Assembly 2C/2A
Cover

C. Procedure

1. Switch on the Power Supply. Operate the toggle switch to Preset position.
2. Insert the relay in the socket.
3. If the pick up is OK, the LED indicators provided for the NO contacts will glow. Press the Push button switch. If the drop out is OK, the LED indicators provided for NC contacts will glow in case of 2C relays and no LED will be glowing in case of 2A relays.
4. Check the contact gap by inserting the gap gauge between Transfer contact and NO contact. If the contact gap is less, the LED indicator provided for NO contact will glow and the relay is defective.
5. Insert the feeler gauge between armature and core head and operate the relay. If the over travel is less, the LED indicators provided for NO contacts will not glow and the relay is defective.
6. Check the NC pressure using the gram gauge with its lever tip just above the moving contact. Note the reading at which the NC contact breaks. (LED) If the contact pressure is above 7.5 gms., the relay is acceptable. Assemble the cover on the relay and pass on for further processing.
7. Return the defective relays, if any, to the calibrator, for readjustment and resubmission.
8. On resubmission of the rectified relays, repeat steps 2 to 7.

Prepared By Godfrey Mendez
R&D

Approved Mohan Das Mukundan
Dept. Head -R&D

s for tightened inspection (Master table)

Sample size code letter	Sample size	Acceptance quality levels									
		0.01	0.015	0.025	0.04	0.065	0.1	0.15	0.25	0.4	0.65
		Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
A	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
B	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
C	5	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
D	8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
E	13	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
F	20	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
G	32	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
H	50	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
J	80	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
K	125	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
L	200	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
M	315	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
N	500	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
P	800	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
Q	1250	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
R	2000	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓
S	3150	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓



Use first sampling plan below arrow.



Use first sampling plan above arrow.

Ac

Acceptance number

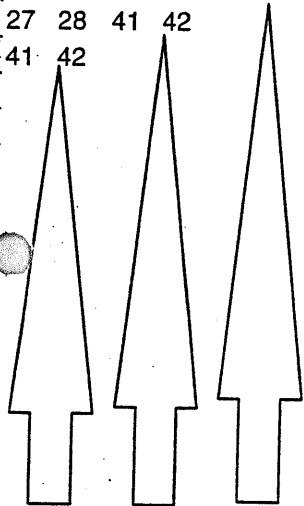
Rc

Rejection number

[illegible]

400 650 1000

Ac	Re	Ac	Re'	Ac	Re'
12	13	18	19	27	28
18	19	27	28	41	42
27	28	41	42		
41	42				



Gruner AG

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Gruner AG • Postfach 1149 • D-78560 Wehingen

American Power Conversion Corporation
9 Executive Park Dr.
North Billerica, MA 01862

Attn: Stephen Lee

26 March 2001

Relais
Magnete
Stellantriebe
Relays
Solenoids
Servomotors
Relais
Aimants
Servomoteurs

280D-R2A-G180-010 (old part number: D280A-R200A-G0013E; APC part: #450-2151)

Gentlemen:

The relay type 280D-R2A-G180-010 is a special version with contact gap 1.5mm. For this type of relay Gruner will implement a quality control program in accordance with Annex R of IEC60950. Gruner is ISO 9001 certified. Therefore by definition, documented work instructions, monitoring and control of suitable processes and product characteristics are in place, criteria for workmanship is stipulated in written specifications or by representative samples and records are properly maintained.

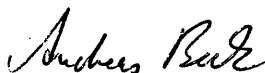
Specifically to meet Annex R.2 the program shall monitor clearance for reinforced insulation with a S2 AQL 4 sampling plan. The number of samples of production parts shall be based on IEC410. There will be also a 100% testing of dielectric strength between open contacts of 3000Vrms. A random sample will be taken and the 1.5mm contact gap will be measured before the relays are sealed. If the lot passes AQL 4, it will then be sealed. If it fails AQL 4, a 100% inspection of the contact gap follows.

Kind regards

Gruner AG


Eduard Spreitzer

CEO



Andreas Beck

Project Engineer

VDE File: 19244-3335-0020
Appendix 15, Page 96 of 104

Gruner AG
Bürglestr. 15 - 17
D-78564 Wehingen
Telefon (+49) 74 26 / 948-0

Sitz der AG : Wehingen
Handelsregister
AG Tuttlingen, HRB 699 Sp

process inspection sheet		part number: 280D-F12A-G740-036 Relais	process: mechanical inspection
inspection frequency AQL4	test equipment: pin gauge	technical standard: contact gap : 1.5mm	

[illegible][illegible]

Gruner AG will use DIN ISO 2859-1:1993, as the sampling plan equivalent to IEC 60410 as dictated from IEC 60950 annex R.2. DIN ISO 2859-1:1993 is identical with ISO 2859-1:1989 (Sampling procedures for inspection by attributes; Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection), which corresponds objectively to IEC 60410:1973.

testing	280D-F2A-G470-xxx Relais
-assembling:	contact gap (< 1.5) AQL 4
-sealing	attribute feature
-voltage (= 3 kV _{rms})	100%

E	280-ABKP-075-A-. Abdeckkappe
-inject. mold	attribute features
testing	

E	280-ABKP-074-A-. Abdeckkappe
-inject. mold	attribute features
testing	

E	280-ANHD-002-A-. Ankerhaletfeder
-stamping	attribute features 0,425 ±0,025
testing	

E	280-ANKR-002-A-. Anker
-stamping	attribute features 0,05 ±0,005
testing	

B	ANTR-280-?xxx-? ANTR, kpl.
-assembling	
testing	

E	280-BTGR-007-C-. Betätiger
-inject. mold	attribute features
testing	

B	SPUL-280-G0013E-AA SPUL, kpl.
-assembling	Durchgang
testing	

E	280-KERN-001-A-. Kern
-purchasing	FK: WE-Prüfung ≤ 0,84/cm
-annealing	FK: Galvanik
-plating	
testing	

E	CLDR-710-00700.12E Wickeldraht
-purchasing	identification
testing	

E	280-SPKR-006-A-. Spulenkörper
-inject. mold	attribute features
testing	

E	KSTK-B3005-14SA-01 Kontaktst.	identification
testing	-purchasing	

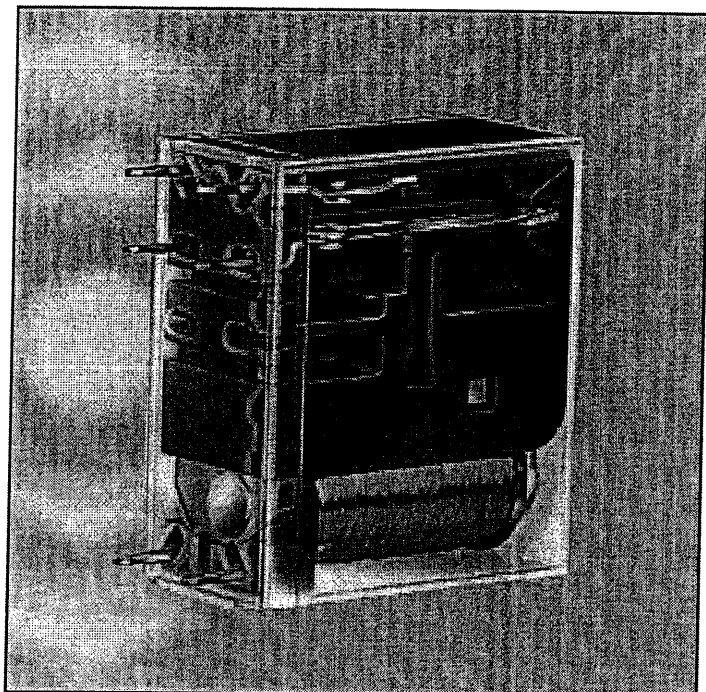
E	280-KSTT-004-A. Kontaktstücktr.	attribute features
testing	-stamping	0,975 ±0,025

E	KSTK-B3005-14SA-01 Kontaktst.	identification
testing	-purchasing	

B	280-KSTT-xxA104-A KSTT, kpl.	-contact rivet
testing	0,3 ±0,05	

A	- modification
PAL	- Pareto - analysis meth
PRK	- process inspection she
SPC	- production monitoring
WEP	- incoming inspection

Typ 280



CE

Leiterplatten-Relais Typ 280
Kontaktabstand $2 \times 1.5 \text{ mm} \approx 3 \text{ mm}$

6 A, 2 c / 8 A, 2 a

P.C.B. Relay Type 280
contact gap $2 \times 1.5 \text{ mm} \approx 3 \text{ mm}$

6 A, 2 c / 8 A, 2 a

Relais pour circuit Modèle 280
écartement du contact $2 \times 1.5 \text{ mm} \approx 3 \text{ mm}$

6 A, 2 c / 8 A, 2 a

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Änderungen in Technik und Design vorbehalten
Technical changes are reserved
Sous réserve de modifications techniques

GRUNER G

Schalten und Bewegen

**Leiterplatten-Relais
für Gleichstrom****P.C.B. Relay for DC****Relais pour circuit
imprimé C.C.**

Die Relais entsprechen in Konstruktion und Herstellung der harmonisierten Norm DIN IEC 255, Teil 1-00/VDE 0435, Teil 201 gemäß den Bestimmungen der Niederspannungsrichtlinien.

The relays are designed and manufactured in accordance to the Standards of DIN IEC 255, Part 1-00/VDE 0435, Part 201, which are also in accordance to the Low Voltage Standards.

De par leurs conception et réalisation, ces relais correspondent aux Normes harmonisées, DIN CEI 255 partie 1-00/VDE 0435 partie 201, conformément aux directives pour appareils à basse tension.

Eine Luftstrecke von 3 mm wird durch Reihenschaltung der beiden Kontaktsätze mit je 1,5 mm Kontaktabstand erreicht. Diese wird bei der sicheren Trennung vom Versorgungsstromkreis sowie als Mindestluftstrecke zur Isolierung von Primärstromkreisen und zwischen Primär- und Sekundärstromkreisen nach DIN EN 60950 (VDE 0805) gefordert.

Two contact sets each with 1,5 mm contact gap in series achieve a clearance of 3 mm. Both for safe disconnection and as minimum clearance to insulate primary circuits of primary circuits to secondary circuits, this clearance is required in accordance to EN 60950 (VDE 0805).

Nous obtenons une ligne de fuite de 3 mm par une connexion en série de deux groupes de contacts de 1,5 mm d'écartement, conforme à la norme EN 60950 (VDE 0805) en accordance sur les distances d'isolation entre primaire et secondaire et ligne de fuite (pour isolation des circuits).

29 x 12,5 x 26 mm (LxBxH)

	Technische Daten Spulendaten	Technical Data Coil Data	Caractéristiques techniques Données Bobine
6 - 60 VDC	Nennspannung	rated voltage	tension nominale
0,5 ... 0,8 W	Nennleistung	rated power	puissance nominale
0,27 ... 0,35 W	Ansprechleistung	operating power to set	puissance de collage
~ 10 ms	Ansprechzeit bei U _N	pull-in-time at rated voltage	temps de collage en tension nom.
~ 5 ms	Abfallzeit bei U _N	drop-out time at rated voltage	temps de retombée en tens. nom.
2 c 2 a	Kontaktaten	Contact Data	Données Contacts
	Max. Kontaktbestückung	max. contact arrangement	max. configuration de contacts
AgSnO	Kontaktwerkstoff	contact material	matériau de contact
2 a: 2.000 VA; 2 c: 1.500 VA	Max. Schaltleistung	max. switching power	max. pouvoir de coupure
250 VAC	Max. Schaltspannung	max. switching voltage	max. tension de commutation
2 a: 8 A; 2 c: 6 A	Max. Schaltstrom	max. switching current	max. courant de commutation
10 ⁷	Mechan. Lebensdauer	mechanical life	durée de vie mécanique
	Isolation	Insulation	Isolation
8 mm	Luft- und Kriechstrecke Spule-Kontakt	creepage and clearance distance coil-contact	ligne de fuite superficielle et aérienne bobine-contact
4.000 V eff.	Prüfspannung Spule-Kontakt	test voltage coil-contact	rigidité diélectrique bobine-contact
4.000 V eff.	Prüfspannung Kontakt-Kontakt	test voltage contact-contact	rigidité diélectrique contact-contact
3.500 V eff.	Prüfspannung Offene Kontakte	test voltage open contact	rigidité diélectrique contacts ouverts
12 kV / 1,2 / 50µs	Stoßspannung Spule-Kontakt	dielectric strength coil-contact	tension de choc électrique bobine-contact
	Sonstige Daten	General Data	Caractéristiques générales
-25... +70 °C	Umgebungstemperatur	ambient temperature	température ambiante
20 g	Gewicht	weight	poids
VDE, UL, CSA SEV, SEMKO	Konformität	conform to	conforme à

VDE File: 19244-3335-0020
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Wicklungsdaten - Standard windings - Caractéristiques des bobines

Normwicklung Standard winding Bobine	Spulen- nennspannung Nominal coil voltage Tension nominale de la bobine	Spulen-Betriebssp. Operating voltage of the coil Tension de fonct. de la bobine T 20 °C	Spulenwiderstand Coil resistance Résistance de la bobine Nennwert Nominal value Valeur nominale	Toleranz Tolerance Tolérance
Nr. No.	(VDC)	U1 - U2	(Ohm)	(± %)
2 a				
054	6	5,3 - 9,5	54	10
100	9	7,2 - 13,6	100	10
180	12	9,6 - 17,0	180	10
270	15	12,0 - 20,8	270	10
740	24	19,2 - 33,8	740	10
2 c				
040	6	5,3 - 8,0	40	10
070	9	7,2 - 10,4	70	10
120	12	9,6 - 13,6	120	10
180	15	12,0 - 17,0	180	10
470	24	19,2 - 28,0	470	10

U1 = Wert bei kalter Spule / value at cold coil / valeur pour bobine froide

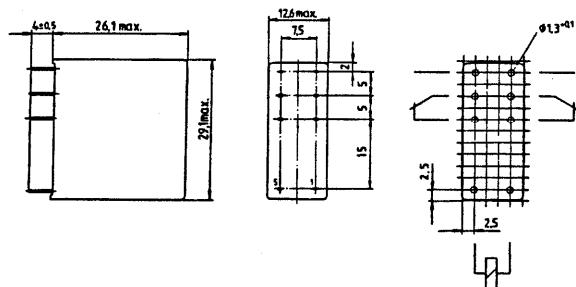
- Betriebsspannung bei erhöhter Umgebungstemperatur
- Operating voltage at higher ambient temperature
- Tension de travail à température ambiante plus forte

T	K1	K2
20 °C	1,00	1,00
30 °C	1,04	0,95
40 °C	1,08	0,89
50 °C	1,13	0,82
60 °C	1,17	0,75
70 °C	1,21	0,67

U1 x K1

U2 x K2

Abmessungen - Dimensions



Sicht auf Anschlusspins
terminal side view
vu sur les pins

Bezeichnungsschlüssel Identification Code Code de Référence

Relaistyp	Type	Modèle
Variante	Version	Version
- A = staubgeschützt	- A = dust cover	- A = contre la poussière
- D = waschdicht	- D = sealed	- D = étanche au lavage
- F = fluxmitteldicht	- F = flux-tight	- F = étanche au flux
Kontaktwerkstoff	Contact material	Matériau de contact
- R = AgSnO ₂	- R = AgSnO ₂	- R = AgSnO ₂
Anzahl Kontakte	Contact arrangement	Emplage de contacts
- 2 S = 2 Schließer	- 2 S = 2 normally open (NO)	- 2 S = 2 travail (T)
- 2 W = 2 Wechsler	- 2 W = 2 change over (CO)	- 2 W = 2 inverseur (RT)
Antriebsart	Drive	Mode d'excitation
- G = Gleichstrom	- G = DC	- G = CC
Spulen-Nr.	Coil-No.	No. de la bobine
- siehe Spulentabelle	- see coil table	- voir tableau

280 A - R 2W - G 470

Beispiel
example
exemple

Techn. Änderungen vorbehalten
Techn. changes are reserved
Sous réserve de modifications techniques



VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 16

VDE File: 19244-3335-0020
Appendix 16, Page 1 of 9

To: 陳朝光, (先生)
From: 王保子 1/12

DATE: /
Fax: 8253623

File E56070 Vol. 7C Sec. I *Page 7 Issued: 6-20-94
and Report Revised: 10-20-95

Acrylonitrile Butadiene Styrene (ABS) (Cont'd)

Sample Group	No. per Group	Grade Designation of Material	Thickness of Samples for Flammability Test (mm)	Color to be Selected	Flammability Classification
V	8/yz	PA-764	(1.57)	Any	94V-0
			(2.54)	Any	94-5VA
		PA-765+	(1.57)	Any	94V-0
			(3.17)	Any	94-5VA
		PA-765A	(2.12)	Any	94V-0
			(2.54)	Any	94-5VA
			(1.57)	Any	94V-1
		PA-766	(2.12)	Any	94V-0
			(2.54)	Any	94-5VA
		PA-769	(3.17)	Any	94V-0
			(1.57)	Any	94HB
		PA-776B	(1.57)	Any	94HB
			(1.57)	Any	94HB
		PA-777A	(1.57)	Any	94HB
			(1.57)	Any	94HB
		PA-777B	(1.57)	Any	94HB
			(1.57)	Any	94HB
		PA-777C	(1.57)	Any	94HB
			(1.57)	Any	94HB
		PA-777D	(1.57)	Any	94HB
			(1.57)	Any	94HB
		PA-765B+	(1.57)	Any	94V-1
			(2.54)	Any	94V-0
			(2.54)	Any	94-5VB
			(3.17)	Any	94-5VA
		PA-726+	(1.57)	Any	94HB
			(1.57)	Any	94HB
		PA-747R	(1.57)	Any	94HB
			(1.57)	Any	94HB
		PA-745H	(1.61)	Any	94HB
			(1.56)	Any	94HB
		PA-746Y	(1.56)	Any	94HB
			(1.56)	Any	94HB

HEAT SINK SHROUD
ALSO FAN BAFFLE

→ APC# 870-1269

FFEL APC# 870-6861

PR/MC:mb
SCDL3

File E56070

Vol. 7C

Sec. 1 *Page 6
and Report

Issued: 6-20-94
Revised: 8-7-96

Acrylonitrile Butadiene Styrene (ABS)

Sample Group	No. per Group	Grade Designation of Material	Thickness of Samples for Flammability Test (mm)	Color to be Selected	Flammability Classification
V	9/yr	PA-706	1.57	Any	94HB
		PA-707	1.57	Any	94HB
		PA-709	1.57	Any	94HB
		PA-709P	1.57	Any	94HB
		PA-709S	1.57	Any	94HB
		PA-716+	1.57	Any	94HB
		PA-717C+	1.57	Any	94HB
		PA-727	1.57	Any	94HB
		PA-737	1.57	Any	94HB
		PA-746+	1.57	Any	94HB
		PA-747+	1.57	Any	94HB
		PA-747A	1.57	Any	94HB
		PA-747P	1.57	Any	94HB
		PA-747S	1.57	Any	94HB
		PA-749	1.57	Any	94HB
		PA-756+	1.57	Any	94HB
		PA-756H	1.57	Any	94HB
		PA-756K	1.57	Any	94HB
		PA-757+	1.57	Any	94HB

FRONT BEZEL, DISPLAY
BEZEL, TOP PANEL
COVER (POWER MODE)

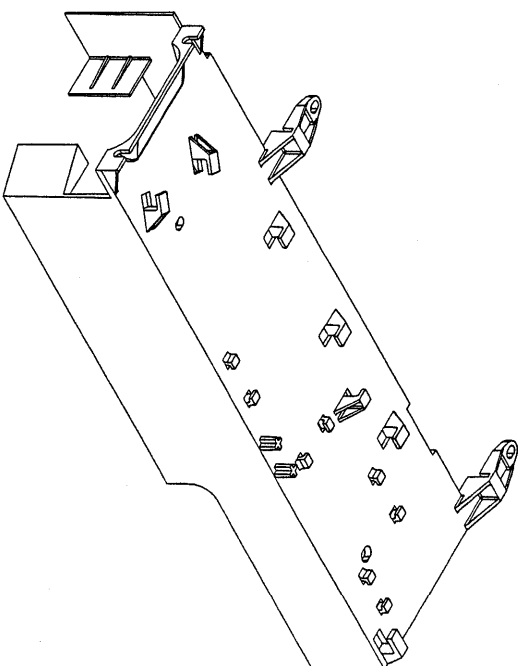
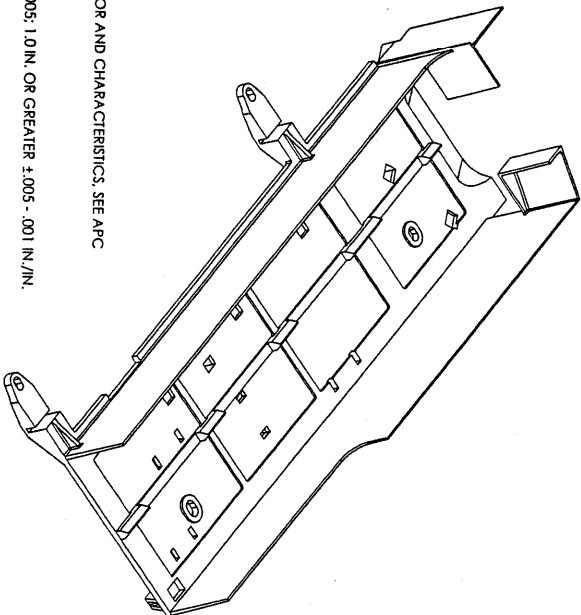
APC # 870-6860

APC # 870-6858

APC # 870-6859

THIS DRAWING IS THE PROPERTY OF APC. IT IS TO BE USED ONLY FOR THE PROJECT AND QUANTITY SPECIFIED. IT IS NOT TO BE REPRODUCED OR COPIED IN ANY MANNER WITHOUT THE WRITTEN PERMISSION OF APC. ANY VIOLATION OF THIS NOTICE WILL BE CONSIDERED A VIOLATION OF THE APPLICABLE LAWS AND REGULATIONS. APC ASSUMES NO LIABILITY FOR ANY DAMAGE OR INJURY RESULTING FROM THE USE OF THIS DRAWING.

REVISIONS		DATE	APP
1	RELEASE TO MANUFACTURING	06/01/01	BS
2	MODIFY PART	06/01/01	BS
3	CHANGE MATERIAL	06/01/01	BS



NOTES: (UNLESS OTHERWISE SPECIFIED)

1. MATERIAL: CHL MEI POLYLAC ABS-PA-777B. FOR COLOR AND CHARACTERISTICS, SEE APC PART SPECIFICATION.

2. TOLERANCE:
DIMENSIONS: $\pm .005$
ANGLES: ± 0.25

3. DRAFT ANGLE TO BE 1.0° UNLESS OTHERWISE SPECIFIED.

4. PART SHALL BE CLEAN AND FREE OF ALL FOREIGN MATTER. ALL EXTERIOR (CAVITY SIDE) SURFACES TO BE FREE OF VISIBLE COSMETIC DEFECTS, INCLUDING, BUT NOT LIMITED TO, SINK MARKS, SPRAY, BURR MARKS, INCLUDING FOREIGN PARTICLES, GATE MARKS, EJECTOR PIN MARKS, AND OTHER SIMILAR VISUAL IMPERFECTIONS. SPECIAL ATTENTION REQUIRED IN ALL VISIBLE SURFACES. GATE BURR AND OUTLET SINK IS UNACCEPTABLE. GATE BLUSH AND KENT LINES AROUND OUTLETS MUST BE MINIMIZED.

5. ALL EJECTOR PIN LOCATIONS, GATES, GATE REMOVAL, AND PARTING LINE TO BE APPROVED BY APC PRIOR TO TOOL DESIGN.

6. PART TO BE FREE OF FLASH.

7. ALL PARTING LINE SHUTOFFS TO HAVE A MIN. MISMATCH OF $\pm .003$. WHEN MISMATCH EXCEEDS TOLERANCE OF $\pm .005$ TOOL IS TO BE RETIRED TO ACHIEVE MIN. MISMATCH.

8. NOMINAL WALL THICKNESS: N/A

9. GATE REMNANT TO BE FLUSH OR HAVE A MAX. RECESS OF $.002$.

10. PART VOLUME: 7.10 CUBIC INCHES.

11. FINISH: SP-1 SPE 3 OR BETTER. PRIOR TO TEXTURE.

12. FEATURES NOT DIMENSIONED ARE REPRESENTED TO SCALE IN THE PART DATABASE. COPY OF THE DATABASE IS AVAILABLE ON REQUEST FROM APC.

13. IDENTIFICATION: MARK PART IN APPROPRIATE AREA SHOWN USING $.08 - .12$ IN. HIGH CHARACTERS 0.1 IN. ABOVE SURFACE AS FOLLOWS:

REVISION LEVEL - REMOVABLE INSERT

DATE/DIAL - MONTH/YEAR

MATERIAL IDENTIFIER - REMOVABLE INSERT

14. MOLDER TO PROVIDE CERTIFICATE OF COMPLIANCE FOR MATERIAL MANUFACTURERS UPON REQUEST.

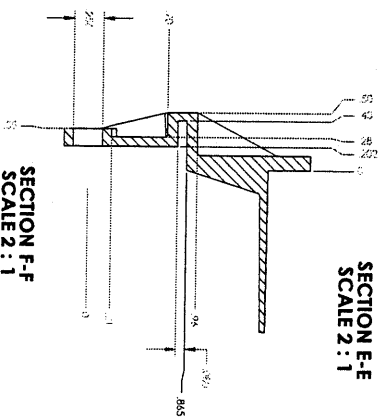
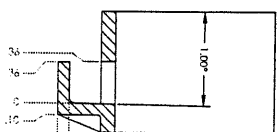
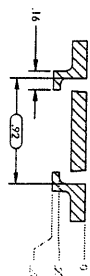
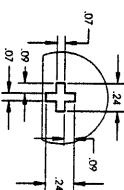
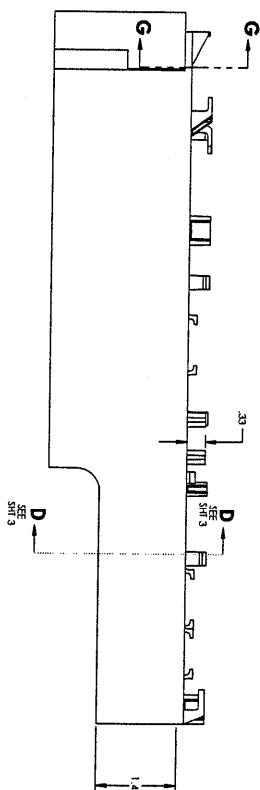
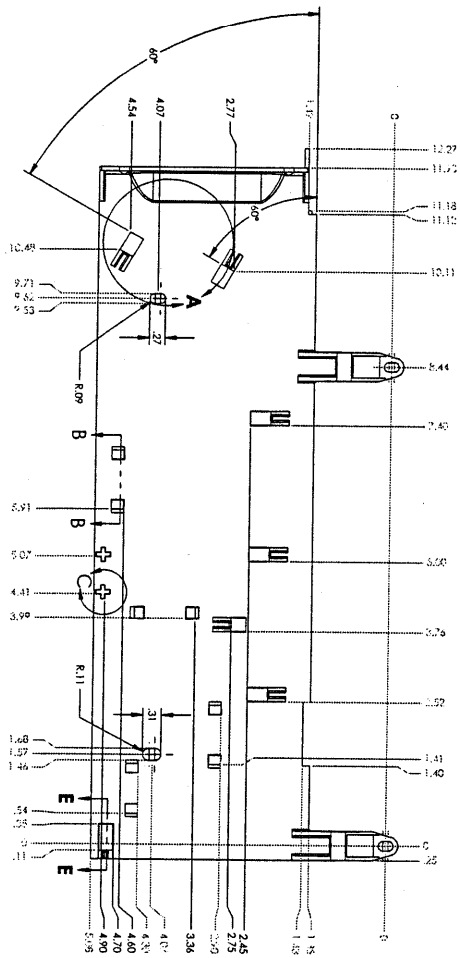
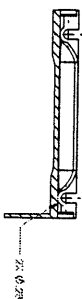
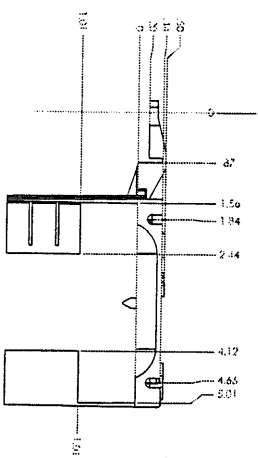
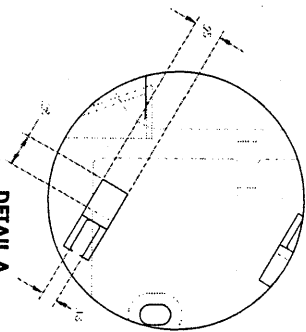
REVISIONS		DATE	APP
1	RELEASE TO MANUFACTURING	06/01/01	BS
2	MODIFY PART	06/01/01	BS
3	CHANGE MATERIAL	06/01/01	BS

ITEM NO.	APC	PART NUMBER	VENDOR	DESCRIPTION/MATERIAL SPECIFICATION	QTY.
1	APC	870-1269	APC	SHROUD HEAT SINKS ON LINE 2U	3

DATE: 01/23/01	DESIGNED BY: J. WET	DATE: 05/01/01	DESIGNED BY: J. WET
DATE: 05/01/01	DESIGNED BY: J. WET	DATE: 05/01/01	DESIGNED BY: J. WET
DATE: 05/01/01	DESIGNED BY: J. WET	DATE: 05/01/01	DESIGNED BY: J. WET

MATERIAL: SEE NOTES	FINISH: SEE NOTES	SCALE: 1:1	SCALE: 1:1
DO NOT SCALE DRAWING	DO NOT SCALE DRAWING	DO NOT SCALE DRAWING	DO NOT SCALE DRAWING

APC	AMERICAN POWER CONVERSION	870-1269	3
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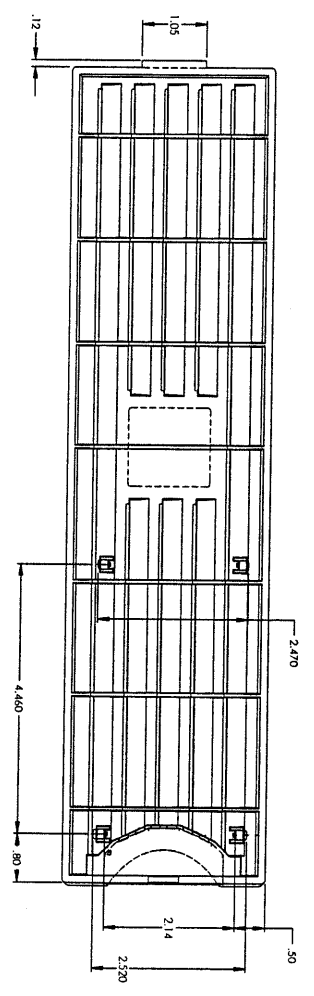


1	1	REVISIONS
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¹. MATERIAL, CHEMIE POLYTAC. ABS-TA-1/C OR GE GPM 5500. FOR COLOR AND CHARACTERISTICS, SEE APC PART SPECIFICATION.

- [illegible]



1. MATERIAL: CHM EPI POLYIAC ABS-PA-717C OR GE GPM 5500. FOR COLOR AND CHARACTERISTICS SEE APC PART SPECIFICATION.

2. TOLERANCE: TOOLING: ±.005 MOLDING: 0.01 IN. - 0.5 IN. ±.003; 0.5 IN. - 1.0 IN. ±.005; 1.0 IN. OR GREATER ±.005 - .001 IN./IN. ANGLES: ±0.25°

3. DRAFT ANGLE TO BE 1°.

4. PART SHALL BE CLEAN AND FREE OF ALL FOREIGN MATTER. ALL EXTERIOR (CAVITY SIDE) SURFACES TO BE FREE OF VISIBLE COSMETIC DEFECTS, INCLUDING, BUT NOT LIMITED TO, CRACKS, SPRAIS, BURIN MARKS, INCLUDING FOREIGN PARTICLES, GATE MARKS, EJECTOR MARKS, AND OTHER VISIBLE IMPERFECTIONS. SPECIAL ATTENTION REQUIRED IN VALVE GATE AND KNIT LINE AREAS. GATE AND KNIT LINE COUNTER SINK IS UNACCEPTABLE. GATE BLUSH AND KNIT LINE AROUND OUTLETS MUST BE MINIMIZED.

5. ALL EJECTOR PIN LOCATIONS, GATES, GATE REMOVAL, AND PARTING LINE TO BE APPROVED BY APC PRIOR TO TOOL DESIGN.

6. PART TO BE FREE OF FLASH.

7. ALL PARTING LINE SHUTOFFS TO HAVE A MIN. MISMATCH OF ±.003. WHEN MISMATCH EXCEEDS TOLERANCE OF ±.005 TOOL IS TO BE REFINED TO ACHIEVE MIN. MISMATCH.

8. NOMINAL WALL THICKNESS: N/A

9. GATE REMOVAL TO BE FLUSH OR HAVE A MAX. RECESS OF .002.

10. PART VOLUME: 2.80 CUBIC INCHES.

11. FINISH: SPI - SPI 3 OR BETTER, PRIOR TO TEXTURE.

12. FEATURES NOT DIMENSIONED ARE REPRESENTED TO SCALE IN THE PART DATABASE. COPY OF THE DATABASE IS AVAILABLE ON REQUEST FROM APC.

13. IDENTIFICATION: MARK PART IN APPROPRIATE AREA SHOWN USING .08 - .12 IN. HIGH CHARACTERS 01 IN. ABOVE SURFACE AS FOLLOWS:

14. MOLD TO PROVIDE CERTIFICATE OF COMPLIANCE FOR MATERIAL MANUFACTURERS UPON REQUEST.

DATE: 01/25/01
REVISED TO MANUFACTURING: 03/21/01
MOORE PART

REV. 1
DATE: 01/25/01
APPR: EK

REV. 2
DATE: 03/21/01
APPR: EK

REV. 3
DATE: 03/21/01
APPR: EK

REV. 4
DATE: 03/21/01
APPR: EK

REV. 5
DATE: 03/21/01
APPR: EK

REV. 6
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REV. 7
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REV. 8
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REV. 9
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REV. 10
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REV. 14
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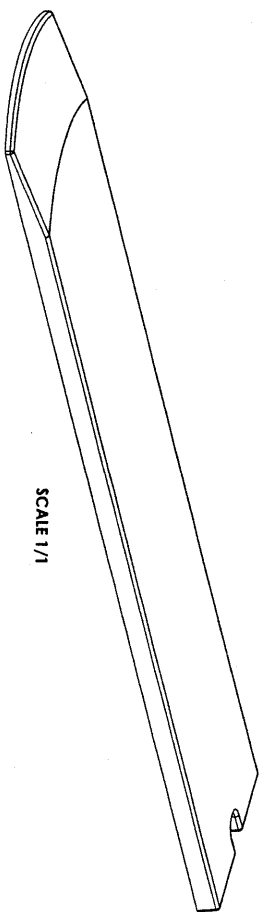
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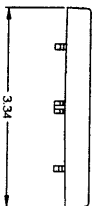
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best into a decade of "contaminants" on the landscape. "I had to get some help and add my own skills," says Williams, who says he has been in the field for 10 years. "I had to learn to work with the best of the best," he says. "I had to learn to work with the best of the best."



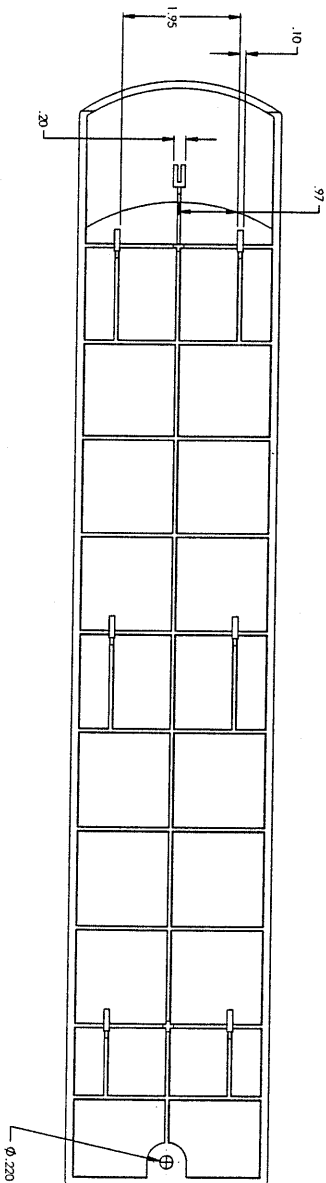
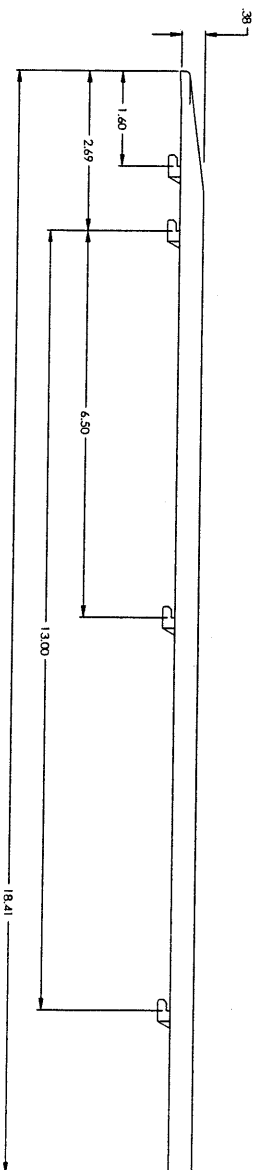
SCALE 1/1



NOTES: (UNLESS OTHERWISE SPECIFIED)

1. MATERIAL: CH/HE POLY(AC ABS-PA-717C OR GE GPM 5500 FOR COLOR AND CHARACTERISTICS SEE APC PART SPECIFICATION)
2. TOLERANCE:
- TOOLING: $\pm .005$
- MOLDING: $0.1N - 0.5 IN. \pm .003$; $0.5 IN. - 1.0 IN. \pm .005$; $1.0 IN. OR GREATER \pm .005 - .001 IN./IN.$
- ANGLES: $\pm .025^\circ$

3. DRAFT ANGLE TO BE 1°.
4. PART SHALL BE CLEAN AND FREE OF ALL FOREIGN MATTER. ALL EXTERIOR (CAVITY SIDE) SURFACES TO BE FREE OF VISIBLE COSMETIC DEFECTS, INCLUDING, BUT NOT LIMITED TO, STREAKS, SPRAY, BURR MARKS, INCLUDING FOREIGN PARTICLES, GATE MARKS, EJECTOR MARKS, AND OTHER SIMILAR VISUAL IMPERFECTIONS. SPECIAL ATTENTION REQUIRED IN YAWLE GATE AREA. GATE MARKS, SCOT BURN, AND OUTLET SINK IS UNACCEPTABLE. GATE BLUSH AND KINK LINES AROUND OUTLETS MUST BE MINIMIZED.
5. ALL EJECTOR PIN LOCATIONS, GATES, GATE REMOVAL, AND PARTING LINE TO BE APPROVED BY APC PRIOR TO TOOL DESIGN.
6. PART TO BE FREE OF FLASH.
7. ALL PARTING LINE SHIFTS OF HAVE A MIN. MISMATCH OF ±.002. WHEN MISMATCH EXCEEDS TOLERANCE OF ±.005 TOOL IS TO BE REFITTED TO ACHIEVE MIN. MISMATCH.
8. NOMINAL WALL THICKNESS: N/A
9. GATE REMNANT TO BE FLUSH OR HAVE A MAX. RECESS OF .002.
10. PART VOLUME: 9.40 CUBIC INCHES.
11. FINISH: SP1 - SPE 3 OR BETTER PRIOR TO TEXTURE.
12. FEATURES NOT DIMENSIONED ARE REPRESENTED TO SCALE IN THE PART DATABASE. CONT. OF THE DATABASE IS AVAILABLE ON REQUEST FROM APC.
13. IDENTIFICATION MARK PART IN APPROPRIATE AREA SHOWN USING .08" - .12 IN. HIGH CHARACTERS .01 IN. ABOVE SURFACE AS FOLLOWS:
PART NUMBER
PART NUMBER LEVEL - REMOVABLE INSERT
DATE DIAL - MONTH/YEAR
MOLDERS ID CODE AND SYMBOL - REMOVABLE INSERT
MATERIAL IDENTIFIER - REMOVABLE INSERT
14. MOLDER TO PROVIDE CERTIFICATE OF COMPLIANCE FOR MATERIAL MANUFACTURES COMPOUND NUMBER AND BATCH NUMBER WITH EACH FIRST ARTICLE SHIPMENT AND UPON REQUEST.



REVISIONS			
REV	DESCRIPTION	DATE	APPR
1	RELEASED TO MANUFACTURING	12/28/00	EK

ITEM NO.	ARC	VERSION	DESCRIPTION/MATERIAL/SPECIFICATION		QTY.
	PART NUMBER	PART NUMBER			
PARTS LIST					
<p> APPC AMERICAN POWER CONVESSION 18700 W. 10TH AVE. SUITE 100 DENVER, CO 80202-1118 TEL: 303.440.1118 FAX: 303.440.1119 WWW.APPC.COM </p>					
<p> ORDERING INFORMATION: ENGINEER NAME 1/24/2006 INVOICE NO. C-16240 DATE 3/1/16 TO 300.000 UNIT 1/17 QTY 3000 </p>					
<p> ITEM PANEL TOP, TOWER ON-LINE 2U PRODUCT LYNK </p>					
<p> MATERIAL SEE NOTES FINISH SEE DRAWING DO NOT SCALE DRAWING </p>					
<p> REMARKS 90°/45/0°/15°/0° MINIMUM ANGLE PROJECTION </p>					
<p> SCALE 1" = 1'-0" UNIT INCHES DATE 3/1/16 </p>					



VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 17

VDE File: 19244-3335-0020,
Appendix 17, Page 1 of 33

Data Sheet:
INPUT - 10

Page ____ of ____

Test E5: CSA 107.1, Clause 11.3.1; UL 1778, Section 44; EN 60950, Clause 1.6.1.

Model **SUOL2000XLI** was connected to a variable source of supply and operated at the voltages listed in the table below. The input current was measured using a true RMS ammeter while operating at maximum load for each of the voltages. Measured input current exceeding the rated input current by more than 110% is a failure.

INPUT				OUTPUT						Test
Voltage	FREQ	Current	Power	Voltage	Current	Power	VA	Power		Test
(VAC)	HZ	AMPS	WATTS	VAC	AMPS	WATTS	WATTS	Factor		CONDITION
230VAC										230VAC MODE
206.3	50	9.86	1660	229.2	8.8	1420	2020	0.702		CHARGE
N/A	N/A	N/A	N/A	229.3	8.85	1430	2030	0.705		DISCHARGE
205.9	50	10.11	1680	228.1	8.78	1380	2000	0.691		RECHARGE
NORMAL										NORMAL MODE
229	50	9	1660	228.3	8.61	1360	1970	0.69		CHARGE
N/A	N/A	N/A	N/A	228.7	8.76	1400	2000	0.701		DISCHARGE
229.1	50	9.1	1700	227	8.83	1400	2000	0.701		RECHARGE
230VAC										230VAC MODE
242.2	50	8.1	1610	229	8.83	1400	2020	0.692		CHARGE
N/A	N/A	N/A	N/A	230.6	8.67	1400	2000	0.7		DISCHARGE
242.2	50	8.45	1680	227.1	8.83	1400	2010	0.696		RECHARGE

The product's input ratings are: **230Vac 50/60Hz 2000VA**

The product's output ratings are: **196-253 Vac 50/60 Hz 1400 Watts**

Comments:

Test Equipment I **523**

Tested by: **Stephen Lee**

Date: **4/23/01**

Compliance Engineer Review [P][F]:

Rev 1 (02/13/95)

i. A. J. Lee

Boost

Data Sheet:
HEATING (TEMPERATURE RISE)

Page ____ of ____

ok

Test E4: CSA 107.1, Clause 11.3.1; UL 1778, Section 45; EN 60950, Clause 5.1.

Model **SUOL2000XLI** was connected to a **206.3 VAC, 1 Phase**
50 Hz source and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperatures (Degrees C)

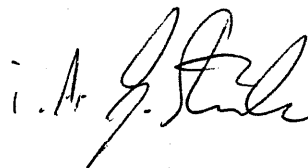
Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode	Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode
1	RMAMB	28.338		27.372	17	T5	57.42		57.808
2	BTBATT1	29.475		29.637	18	HSBOTT	93.559		94.524
3	TPBATT1	29.901		29.999	19	HSBOTT	87.669		86.072
4	BTBATT2	32.214		32.422	20	Q7	31.099		31.187
5	TPBATT2	30.884		30.937	21	Q15	29.586		29.473
6	BTBATT3	32.537		32.834	22	T5CORE	59.045		59.242
7	T6	33.476		33.195	23	C25	29.458		29.326
8	CORE	31.331		31.414	24	CT2	57.38		61.715
9	SEC1-2	30.671		30.831	25	L4TOP	108.299		116.592
10	SEC3-7	31.7		31.865	26	L4BOTT	101.629		101.875
11	PRI8-5	31.026		31.262	27	CT4	38.739		38.717
12	Q4	87.676		88.099	28	C17	53.59		53.429
13	T4CORE	59.818		59.498	29	RY3	51.75		51.885
14	T4SIDE	26.003		26.685	30	L5	95.72		95.883
15	T4SIDE2	67.415		64.843	31	INTAMB	36.212		34.473
16	T3	48.776		49.107	32	D22	65.839		66.41
Runtime		Normal	Discharge	Recharge			Normal	Discharge	Recharge
Hr:Min:S									

Comments: Output XFMR (430-7203) by FALCO Class H
Battery 12V 9Ah by Panasonic 8 FETS by INTERSIL provided, model 7645D

Test Equipment ID: # 37256, # 3212

Tested by: STEPHEN LEE Date: 4/23/01

Compliance Engineer Review [P][F]: Rev. 1 1 (4/3/95)



Boost

Data Sheet:
HEATING (TEMPERATURE RISE)

ok

Page ____ of ____

Test E4: CSA 107.1, Clause 11.3.1; UL 1778, Section 45; EN 60950, Clause 5.1.

Model **SUOL2000XLI** was connected to a **206.3 VAC, 1 Phase**
50 Hz source and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperatures (Degrees C)

Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode	Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode
1	RMAMB		29.816		17	T5		44.112	
2	AMSTFAN		48.976		18	HSBOTR85		55.69	
3	TPBATT1		30.856		19	HSTOPQ13		51.434	
4	Q8HS		43.986		20	Q7		50.774	
5	Q16HS		60.652		21	TH2		53.379	
6	BTBATT3		31.849		22	PROCESS		45.635	
7	C12		48.317		23	C25		38.016	
8	T1CORE		67.389		24	CT2		52.938	
9	T1SEC1-2		65.086		25	L4TOP		100.051	
10	T1SEC3-7		69.065		26	L4BOTT		86.296	
11	T1PRI8-5		72.273		27	CT1		43.834	
12	Q4		48.63		28	Q10		55.873	
13	T4CORE		42.586		29	RY3		42.231	
14	T4SIDE1		46.217		30	L5		48.243	
15	T4SIDE2		45.486		31	INTAMB		43.249	
16	T3		46.77		32	D22		51.114	
Runtime		Normal	Discharge	Recharge			Normal	Discharge	Recharge
Hr:Min:S									

Comments: Output XFMR (430-7203) by FALCO Class H
Battery 12V 9Ah by Panasonic 8 FETS by INTERSIL provided, model 7645D

Test Equipment ID: # 37256, # 3212

Tested by: STEPHEN LEE Date: 4/23/01

Compliance Engineer Review [P][F]: _____ Rev. 1 1 (4/3/95)

A. J. Lee

Normal

Data Sheet:
HEATING (TEMPERATURE RISE)

Page ____ of ____

ok

Test E4: CSA 107.1, Clause 11.3.1; UL 1778, Section 45; EN 60950, Clause 5.1.

Model **SUOL2000XLI** was connected to a **229 VAC, 1 Phase**
50 Hz source and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperatures (Degrees C)

Thermocouple		Normal	Discharge	Recharge	Thermocouple		Normal	Discharge	Recharge
#	Location	Mode	Mode	Mode	#	Location	Mode	Mode	Mode
1	RMAMB	25.117	25.398	28.794	17	T5	49.648	45.376	57.637
2	BTBATT1	27.199	30.234	30.319	18	HSBOTT	83.381	53.799	93.391
3	TPBATT1	27.017	30.305	30.719	19	HSTOP	75.007	49.235	91.423
4	BTBATT2	31.969	32.394	32.738	20	Q7	27.401	45.81	31.738
5	TPBATT2	30.504	31.455	31.678	21	Q15	27.008	55.485	29.817
6	BTBATT3	29.869	32.599	32.926	22	T5CORE	51.442	46.85	59.447
7	T6	30.593	37.047	33.538	23	C25	27.205	42.017	29.725
8	CORE	28.456	64.481	31.627	24	CT2	57.726	53.95	60.583
9	SEC1-2	27.96	63.085	30.903	25	L4TOP	104.174	93.863	115.486
10	SEC3-7	28.631	74.701	32.042	26	L4BOTT	90.248	79.387	100.01
11	PRI8-5	28.166	70.363	31.348	27	CT4	35.023	39.952	38.887
12	Q4	66.894	45.447	87.687	28	C17	47.375	46.774	52.84
13	T4CORE	42.918	41.734	62.291	29	RY3	47.375	42.82	51.205
14	T4SIDE	25.562	26.141	26.074	30	L5	75.072	44.185	86.562
15	T4SIDE2	45.789	41.949	69.74	31	INTAMB	31.871	38.706	36.089
16	T3	45.369	45.396	48.484	32	D22	58.087	46.255	65.393
Runtime		Normal	Discharge	Recharge			Normal	Discharge	Recharge
Hr:Min:S									

Comments: Output XFMR (430-7203) by FALCO Class H
Battery 12V 9Ah by Panasonic 8 FETS by INTERSIL provided, model 75645D

Test Equipment ID: # 37256, # 3212

Tested by: STEPHEN LEE

Date: 4/24/01

Compliance Engineer Review [P][F]:

Rev. 1 1 (4/3/95)

i. A. J. Hule

Data Sheet:
HEATING (TEMPERATURE RISE)

Page ____ of ____

ok

Test E4: CSA 107.1, Clause 11.3.1; UL 1778, Section 45; EN 60950, Clause 5.1.

Model **SUOL2000XLI** was connected to a **242.2 VAC, 1Phase**
50 Hz source and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperatures (Degrees C)

Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode	Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode
1	RMAMB	28.084	25.094	27.259	17	T5	55.988	33.152	56.095
2	BTBATT1	29.609	30.615	28.605	18	HSBOTT	55.988	32.501	90.767
3	TPBATT1	29.916	30.525	29.105	19	HSBOTT	81.058	32.514	81.512
4	BTBATT2	31.969	32.395	31.236	20	Q7	31.099	31.814	30.452
5	TPBATT2	30.504	31.332	29.551	21	Q15	29.317	30.654	28.571
6	BTBATT3	30.504	32.754	31.564	22	T5CORE	56.68	33.391	56.973
7	T6	33.208	31.266	32.061	23	C25	29.108	36.181	28.275
8	CORE	30.874	31.266	30.179	24	CT2	57.38	39.344	58.739
9	SEC1-2	30.545	43.037	29.74	25	L4TOP	108.299	53.227	109.85
10	SEC3-7	31.452	43.764	30.852	26	L4BOTT	94.003	47.832	95.452
11	PRI8-5	30.914	45.374	30.304	27	CT4	38.021	31.574	37.511
12	Q4	30.914	34.137	85.866	28	C17	50.502	40.08	51.357
13	T4CORE	30.914	36.108	58.499	29	RY3	48.557	37.562	48.868
14	T4SIDE	28.284	27.265	58.499	30	L5	78.214	40.856	78.824
15	T4SIDE2	60.755	36.408	63.108	31	INTAMB	34.875	34.091	34.473
16	T3	46.825	33.725	46.597	32	D22	64.194	32.547	64.004
Runtime		Normal	Discharge	Recharge			Normal	Discharge	Recharge
Hr:Min:S									

Comments: Output XFMR (430-7203) by FALCO Class H

Battery 12V 9Ah by Panasonic

8 FETS by INTERSIL provided, model 75645D

Test Equipment ID: # 37256, #3212

Tested by: STEPHEN LEE

Date: 4/26/01

Compliance Engineer Review [P][F]:

Rev. 1 1 (4/3/95)



EARTH LEAKAGE CURRENT - 10

Page ____ of ____

Test E6I: EN 60950, EN 50091, Clause 5.2, Annex D and Annex G.

Model SUOL2000XLI was connected to the high line voltage and frequencies listed in the table below. The unit was then isolated from earth ground by [opening the Protective Earth conductor] [the use of an isolation transformer]. Leakage current was [measured with the ED&D, LT-30HC Leakage Current Tester] [calculated by measuring the voltage drop across the resistive/capacitive network of Annex D and dividing the voltage drop by 500].

Measurements were made first from the phase conductor to chassis and then from the neutral conductor to chassis. Data was recorded with the product's power switch in both the ON and OFF positions.

Maximum Leakage Current (mA)

Voltage (VAC)	Freq (Hz)	Power Switch ON		Power Switch OFF		Mode of Operation
		Ø-Chass	N-Chass	Ø-Chass	N-Chass	
230	50	1.539	.471	1.551	.017	Normal
230	50	1.562	.478			Discharge
230	50	1.562	.472			Recharge
						Bypass
						Normal
						Discharge
						Recharge
						Bypass

Pass/Fail Criteria:

- Leakage current of Pluggable Type A equipment shall not exceed 3.5 mA.
- Leakage current of Permanently Connected or Pluggable Type B equipment shall not exceed either: 3.5 mA; or 5% of the measured input current with the following label applied to the product (in multiple languages):
HIGH LEAKAGE CURRENT - Earth connection essential before connecting supply".
- Leakage current of hand-held equipment shall not exceed 0.75 mA.

Comments: _____

Equipment ID & Range: ED+D LT-30HC ID# 45501 5/4/01-02

Tested by: Stephen Lee Date Tested: 5/24/01 Report#: _____

Reviewed by: [P][F]: _____

Data Sheet Rev 2 (7/21/98)

[Signature]

PROTECTIVE EARTHING

Data Sheet:

PROTECTIVE EARTHING RESISTANCE

Page ____ of ____

ok

Test M11: CSA 0.4, Section 4 (CSA 107.1, Clause 4.23.1);
UL 1778, Paragraph 55; EN 60950, Clause 2.5.11.

A current of 25 A, derived from a low voltage[DC] source was passed between the points listed in the table below for model SUOL2000XLI The voltage drop was measured one minute after the current was applied, and the resistance of the grounding paths were calculated. The resistance of the protective earthing conductor of the power supply cord [was] included in the resistance measurements. The resistance[~~did not~~] exceed 0.1 Ohm (100 mOhm).

To satisfy the added requirement of CSA, the test was repeated with a 60 Hz current source that was twice the rating of the product's power supply cord plugcap, but not less than 30 A, with the test sample at normal operating temperature. The duration of the test was dependant upon the value of the branch circuit protector, that is: 2 minutes for a 0-30 A protector; 4 minutes for a 31-60 A protector; 6 minutes for a 61-100 A protector; 8 minutes for a 101-200 A protector; and 10 minutes for a protector rated >200 A. The VOLTAGE DROP cannot exceed 4 volts; and there shall be no melting of any metal in the bond, and no heating or burning, which is likely to create a fire hazard.

For hard-wired products (terminal box in place of a power cord), the test current is twice the rating of the branch circuit protector, but not more than 500 A. The branch circuit protector is determined by the ampacity of the conductors in the product's powercord as listed in the Canadian Electrical Code under Tables 12 & 13.

Test Point from	Test Point to	Current (A)	Voltage Drop(mv)	Time Minutes	Resistance (mohms)
Plug grd	Front left corner	25	403	2	16.12
Plug grd	Front left corner	30	516	2	17.2
Right rear panel	Front left corner	30	392	2	13.1
Right rear panel	Front left corner	25	290	2	11.6

Comments:

Test Equipment ID:

ID#41256

Tested by:

Stephen Lee

Date:

4/24/01

Compliance Engineer Review [P][F]:

Rev 3 (3/20/97)

LINE CORD DISCHARGE

Data Sheet:
LINE CORD DISCHARGE

Page ____ of ____

ok

Test E2: CSA 107.1, Clause 6.20; UL 1778, Clause 48.2; EN 60950, Clause 2.1.10.

Model **SUOL2200XLI** was connected to **230** Vrms, 60 Hz, and operated in a steady state condition. The unit was then disconnected from the supply source and the voltage across the powercord's pins were measured within **1** second(s) of disconnection using a storage oscilloscope with probes each having a minimum input impedance of 10 megohms. [Data was recorded on the positive half and negative half of the sine wave.][It was clearly visible that a bleeder resistor, or sense transformer acting as a bleeder resistor, acted under both polarities of the sine wave.] [The test was performed with the ON/OFF switch in both positions.]

The peak measured voltage at the time of disconnection (V_o), the voltage measured after [1][second(s) (V_t), and the time for the voltage to decay to 37% V_o (actual time constant "T.C.") are to be recorded.

[The test was not performed between phase and ground, nor between neutral and ground since the total capacitance between those points was less than 0.1 μ F.]

Location	Switch	Sine	Vin	Vo	37%Vo	Vt	T.C
	Position	Polarity	(Vrms)	(Vpeak)	(Volts)	(Volts)	(ms)
Phase	on	Positive	230	300	111	0	10
Phase	on	Negative	230	300	111	0	14
Phase	off	Positive	230	300	111	0	10
Phase	off	Negative	230	300	111	0	14

Pass/Fail Criteria:

EN 60950 - Time constant must not exceed: **1** second for type A pluggable equipment; or **10** seconds for permanently connected and type B pluggable equipment.

UL 1778 - Maximum voltage across the capacitor (V_t) after five seconds is based on the capacitance. For example: 1184V if 0.5 μ F, 729V if 1 μ F, 449V if 2 μ F, 367V if 13.9 μ F, 284V if 20 μ F, 150V if 50 μ F, etc. Refer to Table 8.2 for all values.

CSA 107.1 - Refer to Test E1 (Electric Shock & Energy Hazards).

Must be less than 42.4 Vpk or 60 Vdc and 20 Joules after two seconds.

Comments:

Test Equipment ID:

982

Tested by Stephen Lee

Date: 3/15/01

Compliance Engineer Review [P][F]:

[Signature]

Tek stop: single seq. 5.00kS/s

A vertical dotted line with a solid arrow pointing up and a solid arrow pointing down. At the bottom, there are two horizontal brackets: one on the left and one on the right, both pointing towards the center of the line.



READINGS TAKEN WITH

A 10-1 TRANSFORMER

2008

LIN E CORD DISCHARGE NEGATIVE SINE WAVE

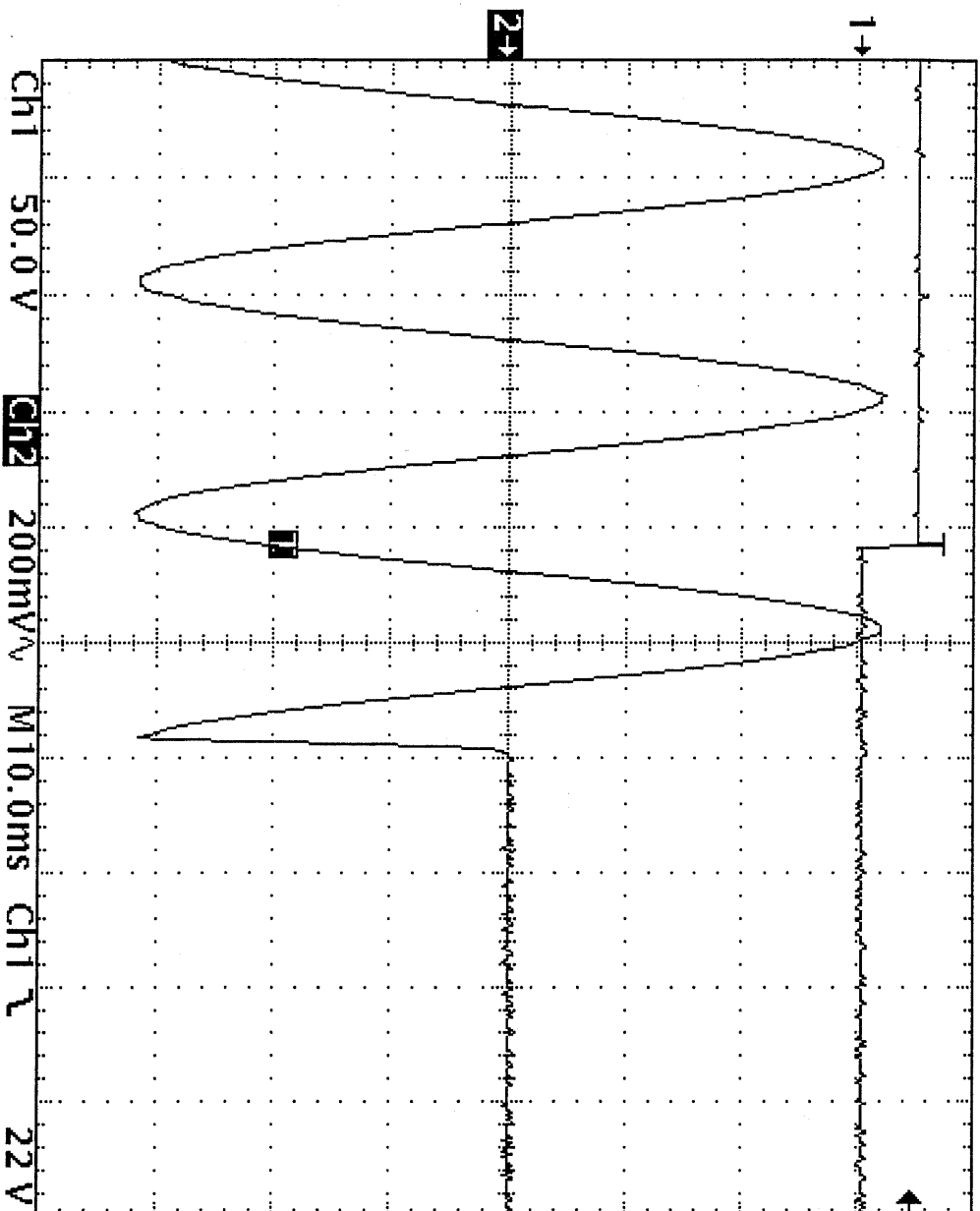
Tek **STOP** Single Seq 5.00KS/s

[T]

VDE File: 19244-3335-0020
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C2 RMS
432.8mV

REARINGS TAKEN WITH A
10-1 TRANSFORMER



17:06:52

OL 9.8.8

Limited Current Test

Test E17 : CSA 950, UL 1950, EN 60950, Clause 2.4.1

Model SUOL2000XLI was connected to a 230 V, 50 A, 50 Hz supply, and was operating at rated load (230 V, 8.6 A, 1400 W). This test is performed to determine that the current limit of a limited current circuit is not exceeded under normal operating conditions and in the event of a breakdown of Basic Insulation or a single component failure.

A 2000 ohm resistor is placed between any two parts of the limited current circuit or between one part and ground. The current flowing through the 2000 ohm resistor is to be measured. The test is to be performed with any necessary faults applied or with the simulation of the loss of Basic Insulation.

Pass/Fail Criteria: For frequencies not exceeding 1 kHz, the current through the 2000 ohm resistor shall not exceed 0.7 mA peak AC or 2ma DC. For frequencies above 1KHZ, the limit of 0.7 mA is multiplied by the value of the frequency in kilohertz but shall not exceed 70 mA peak.

Test Point	Frequency (Hz)	V Measured (mV)	Current V/2000	Condition
<u>ACROSS 2K + GND</u>	<u>50</u>	<u>623mV</u>	<u>.301mA</u>	<u>R14 SHORT</u>

L. J. Hulse

Comments: _____

Equipment ID & Range: # 3072

Tested by: Stephen Lee Date Tested: 7/1 Report#: _____

Reviewed by: [P][F]: _____

Data Sheet Rev. 1 (3/18/99)

ABNORMAL FAULT

Boost

VDE File: 19244-3335-0020.
Appendix 17, Page 13 of 33

Data Sheet:

HEATING (TEMPERATURE RISE)

Page ____ of ____

Blocked Vent

Test E4: CSA 107.1, Clause 11.3.1; UL 1778, Section 45; EN 60950, Clause 5.1.

Model **SUOL2000XLI** was conected to a **206.3 VAC, 1 Phase**
50 Hz source and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured mea by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperatures (Degrees C)

Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode	Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode
1	RMAMB	28.025	29.68	27.282	17	T5	69.312	44.125	71.566
2	AMSTFAN	31.785	48.68	76.877	18	HSBOTR8	99.813	55.698	105.659
3	TPBATT1	32.108	30.69	38.114	19	HSTOPQ1	112.346	51.442	85.838
4	Q8HS	39.208	43.66	34.463	20	Q7	34.844	50.741	34.75
5	Q16HS	33.652	60.21	33.197	21	TH2	34.397	53.391	33.301
6	BTBATT3	38.225	31.95	45.372	22	PROCESS	71.325	45.655	71.731
7	C12	40.28	48.78	46.537	23	C25	33.176	38.069	41.387
8	T1CORE	34.027	67.91	48.712	24	CT2	65.824	52.985	58.882
9	T1SEC1-2	34.606	65.63	44.898	25	L4TOP	99.447	100.017	98.371
10	T1SEC3-7	35.287	69.55	47.728	26	L4BOTT	89.532	86.265	88.024
11	T1PRI8-5	34.701	72.38	51.484	27	CT1	52.923	43.847	46.126
12	Q4	96.734	48.632	85.127	28	Q10	56.348	55.831	115.714
13	T4CORE	54.936	42.644	51.936	29	RY3	77.327	42.218	56.027
14	T4SIDE1	27.062	46.73	58.224	30	L5	80.907	48.231	96.441
15	T4SIDE2	58.845	45.463	60.04	31	INTAMB	51.029	43.29	44.849
16	T3	65.807	46.773	68.223	32	D22	83.347	51.146	78.474
Runtime		Normal	Discharge	Recharge			Normal	Discharge	Recharge
Hr:Min:S		163.67	218.54	129.37			163.67	218.54	129.37

Comments: Output XFMR (430-7203) by FALCO Class H
Battery 12V 9Ah by Panasonic 8 FETS by INTERSIL provided, model 7645D

Test Equipment ID: # 37256, # 3212

Tested by: STEPHEN LEE Date:

Compliance Engineer Review [P][F]: Rev. 1 1 (4/3/95)

ok. S

ABNORMAL FAULT

Boost

VDE File: 19244-3335-0020
Appendix 17, Page 14 of 33

Data Sheet:

HEATING (TEMPERATURE RISE)

Page ____ of ____

ok

STALLED ROTOR

Test E4: CSA 107.1, Clause 11.3.1; UL 1778, Section 45; EN 60950, Clause 5.1.

Model **SUOL2000XLI** was connected to a **206.3 VAC, 1 Phase**
50 Hz source and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperatures (Degrees C)

Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode	Thermocouple #	Location	Normal Mode	Discharge Mode	Recharge Mode
1	RMAMB	45.426	28.075	27.282	17	T5	71.792	75.188	72.566
2	AMSTFAN	75.426	59.034	76.877	18	HSBOTR8	105.976	100.839	106.659
3	TPBATT1	32.154	38.754	38.114	19	HSTOPQ1	86.402	80.113	86.838
4	Q8HS	31.398	54.313	34.463	20	Q7	31.446	57.775	34.75
5	Q16HS	30.889	70.274	33.197	21	TH2	31.937	66.117	34.301
6	BTBATT3	34.802	47.036	45.372	22	PROCESS	72.36	75.892	72.731
7	C12	34.433	58.04	46.537	23	C25	37.841	48.168	40.387
8	T1CORE	29.942	78.11	48.712	24	CT2	51.116	66.545	59.882
9	T1SEC1-2	30.07	79.494	44.898	25	L4TOP	85.139	123.704	99.371
10	T1SEC3-7	30.371	80.118	47.728	26	L4BOTT	75.932	107.57	89.024
11	T1PRI8-5	29.821	83.377	51.484	27	CT1	34.646	52.61	45.126
12	Q4	84.868	69.846	85.127	28	Q10	113.818	110.831	114.714
13	T4CORE	44.09	58.112	51.936	29	RY3	45.357	51.011	54.027
14	T4SIDE1	51.579	57.099	58.224	30	L5	90.473	59.68	94.441
15	T4SIDE2	53.459	59.364	60.04	31	INTAMB	37.649	58.017	43.849
16	T3	61.286	67.498	68.223	32	D22	76.914	73.431	77.474
Runtime		Normal	Discharge	Recharge			Normal	Discharge	Recharge
Hr:Min:S		125.25	220.13	131.29			125.25	220.13	131.29

Comments: Output XFMR (430-7203) by FALCO Class H

Battery 12V 9Ah by Panasonic

8 FETS by INTERSIL provided, model 7645D

The fan was stalled with a probe stick during the test, when the unit shut down via the micro processor

Test Equipment ID: # 37256, # 3212

Tested by: STEPHEN LEE

Date:

Compliance Engineer Review [P][F]:

Rev. 1

1 (4/3/95)

ok

ABNORMAL SHORT

VDE File: 19244-3335-0020.
Appendix 17, Page 15 of 33

ABNORMAL OPERATING AND FAULT CONDITIONS

Page ____ of ____

Test A15: EN 60950, EN 50091, Clause 5.4.

Test# - SHORT MV1 with an input of 230 V, 50 Hz.

Model SL60L2000XLI was connected to a 50 A supply (125% of the product's mains rating), and was operating in its NORMAL MODE mode, before the fault was inserted. [The unit was placed on a white tissue-paper covered surface, and a single layer of cheesecloth was loosely draped over it to determine if flaming particles escaped the enclosure.] At the completion of the test -- after the unit had cooled to room temperature -- the unit was subjected to electric strength testing to determine if insulation had been damaged.

Input before fault: 230 V, 9.86 A, 1860 (W) (VA)

Output before fault: 230 V, 8.81 A, 1420 (W) (VA)

Input after fault: 0 V, 0 A, 0 W (VA)

Output after fault: 0 V, 0 A, 0 W (VA)

Each test was continued until further change as a result of the fault was not likely. This test was terminated in INSTANTLY hr:min:sec when:

- a. input circuit breaker tripped.
- (b) circuit was interrupted due to failure of components: MV1, MV2
- c. unit shut down (current limiting mode).
To ensure an ultimate result, unit must operate for at least 1 hour with fault applied. In addition, temperatures of magnetic components must have stabilized.
- d. temperatures of magnetic components stabilized. See Abnormal Heating, next page.
- e. low battery cutout.
- f. other: UNIT SHUT DOWN INSTANTLY AFTER SHORT WAS APPLIED

Emission of flaming or glowing material or molten metal?	[Yes] <input checked="" type="radio"/> [No] <input checked="" type="radio"/>
Enclosure deformed as to permit access to a hazard?	[Yes] <input checked="" type="radio"/> [No] <input checked="" type="radio"/>
Open transformer winding?	[Yes] <input checked="" type="radio"/> [No] <input checked="" type="radio"/>
Rupturing of battery case or venting of a battery?	[Yes] <input checked="" type="radio"/> [No] <input checked="" type="radio"/> [N/A]
Was Vout > Vin + 10% or < Vin - 10% for more than 1 second?	[Yes] <input checked="" type="radio"/> [No] <input checked="" type="radio"/> [N/A]
1500 Vrms [2121 Vdc] AC Input to Chassis Hipot:	<input checked="" type="radio"/> Pass <input checked="" type="radio"/> Fail <input checked="" type="radio"/> [N/A]
1500 Vrms [2121 Vdc] AC Output to Chassis Hipot:	<input checked="" type="radio"/> Pass <input checked="" type="radio"/> Fail <input checked="" type="radio"/> [N/A]
1500 Vrms [3000 Vrms] [4243 Vdc] Primary to Secondary Hipot:	<input checked="" type="radio"/> Pass <input checked="" type="radio"/> Fail <input checked="" type="radio"/> [N/A]
1500 Vrms Hazardous Voltage Battery to Chassis hipot:	<input checked="" type="radio"/> Pass <input checked="" type="radio"/> Fail <input checked="" type="radio"/> [N/A]

Comments: _____

Equipment ID & Range: # 37256, # 3212

Tested by: Stephen Lee Date Tested: 7/1 Report#: _____

Reviewed by: [P][F]: _____ Data Sheet Rev 6 (4/12/00)

ok s

ABNORMAL SHORT

ABNORMAL OPERATING AND FAULT CONDITIONS

Page ____ of ____

Test A15: EN 60950, EN 50091, Clause 5.4.

Test# ____ - SHORT Q8 INVERTER FET with an input of 230 V, 50 Hz.

Model SUOL2000XLI was connected to a 50 A supply (125% of the product's mains rating), and was operating in its _____ mode, before the fault was inserted. [The unit was placed on a white tissue-paper covered surface, and a single layer of cheesecloth was loosely draped over it to determine if flaming particles escaped the enclosure.] At the completion of the test -- after the unit had cooled to room temperature -- the unit was subjected to electric strength testing to determine if insulation had been damaged.

Input before fault: 230 V, 9.80 A, 1654 W (VA)

Output before fault: 230 V, 8.7 A, 1415 W (VA)

Input after fault: 0 V, 0 A, 0 W (VA)

Output after fault: 0 V, 0 A, 0 W (VA)

Each test was continued until further change as a result of the fault was not likely. This test was terminated in INSTANTLY hr:min:sec when:

- input circuit breaker tripped.
- circuit was interrupted due to failure of components: Q8, Q7, Q6, Q5, D16
- unit shut down (current limiting mode).
To ensure an ultimate result, unit must operate for at least 1 hour with fault applied. In addition, temperatures of magnetic components must have stabilized.
- temperatures of magnetic components stabilized. See Abnormal Heating, next page.
- low battery cutout.
- other: _____

Emission of flaming or glowing material or molten metal?	[Yes]	[No]	
Enclosure deformed as to permit access to a hazard?	[Yes]	[No]	
Open transformer winding?	[Yes]	[No]	
Rupturing of battery case or venting of a battery?	[Yes]	[No]	[N/A]
Was Vout > Vin + 10% or < Vin - 10% for more than 1 second?	[Yes]	[No]	[N/A]
1500 Vrms [2121 Vdc] AC Input to Chassis Hipot:	[Pass]	[Fail]	[N/A]
1500 Vrms [2121 Vdc] AC Output to Chassis Hipot:	[Pass]	[Fail]	[N/A]
1500 Vrms [3000 Vrms] [4243 Vdc] Primary to Secondary Hipot:	[Pass]	[Fail]	[N/A]
1500 Vrms Hazardous Voltage Battery to Chassis hipot:	[Pass]	[Fail]	[N/A]

Comments: FETS BLEW THEN UNIT SHUTDOWN
WITHIN 1 SECOND OF SHORT APPLICATION

Equipment ID & Range: # 37256, #3212

Tested by: Stephen Lee Date Tested: 11/11 Report#: _____

Reviewed by: [P][F]: _____

Data Sheet Rev 6 (4/12/00)

ols

ABNORMAL SHORT

VDE File: 19244-3335-0020.
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ABNORMAL OPERATING AND FAULT CONDITIONS

Page ____ of ____

Test A15: EN 60950, EN 50091, Clause 5.4.

Test# ____ - SHORT Q2 IGBT with an input of 230 V, 50 Hz.

Model SL6042000XLI was connected to a 50 A supply (125% of the product's mains rating), and was operating in its NORMAL mode, before the fault was inserted. [The unit was placed on a white tissue-paper covered surface, and a single layer of cheesecloth was loosely draped over it to determine if flaming particles escaped the enclosure.] At the completion of the test -- after the unit had cooled to room temperature -- the unit was subjected to electric strength testing to determine if insulation had been damaged.

Input before fault: 230 V, 9.83 A, 1658 W (VA)

Output before fault: 230 V, 8.78 A, 1417 W (VA)

Input after fault: 0 V, 0 A, 0 W (VA)

Output after fault: 0 V, 0 A, 0 W (VA)

Each test was continued until further change as a result of the fault was not likely. This test was terminated in 8 hr:min sec when:

- a. input circuit breaker tripped.
- (b) circuit was interrupted due to failure of components: Q2, Q10, D21, D22, D23
- c. unit shut down (current limiting mode).
To ensure an ultimate result, unit must operate for at least 1 hour with fault applied. In addition, temperatures of magnetic components must have stabilized.
- d. temperatures of magnetic components stabilized. See Abnormal Heating, next page.
- e. low battery cutout.
- f. other: _____

Emission of flaming or glowing material or molten metal?

[Yes] (No)

Enclosure deformed as to permit access to a hazard?

[Yes] (No)

Open transformer winding?

[Yes] (No)

Rupturing of battery case or venting of a battery?

[Yes] (No) [N/A]

Was Vout > Vin + 10% or < Vin - 10% for more than 1 second?

[Yes] (No) [N/A]

1500 Vrms [2121 Vdc] AC Input to Chassis Hipot:

(Pass) [Fail] [N/A]

1500 Vrms [2121 Vdc] AC Output to Chassis Hipot:

(Pass) [Fail] [N/A]

1500 Vrms [3000 Vrms] [4243 Vdc] Primary to Secondary Hipot:

[Pass] [Fail] [N/A]

1500 Vrms Hazardous Voltage Battery to Chassis hipot:

[Pass] [Fail] [N/A]

Comments: UNIT BLINKED ON AND OFF FOR ABOUT 7 TO
8 SECONDS THEN COMPONENTS DESCRIBED ABOVE
BLEW, THEN AN INSTANT SHUT DOWN AFTER THAT.

Equipment ID & Range: #37256, #3212

Tested by: Stephen Lee Date Tested: 7/1/01 Report#: _____

Reviewed by: [P][F]: _____

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065

ABNORMAL SHORT

Component Short

VDE File: 19244-3335-0020
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Data Sheet:

COMPONENT SHORT- AND OPEN-CIRCUIT TEST

Page ____ of ____ ok

Test A9: CSA 107.1, Clause 6.6.7; UL 1778, Paragraph 52.10.

Test SHORT IC 37 PIN 13 TO GND with an input of 230 VAC, 50 Hz

Model SUOL2200XLI was connected to a 50 A supply circuit, and was operating normally [in its Normal mode], before the fault was inserted. The unit was placed on a white tissue-paper covered surface, and a single layer of cheesecloth was loosely draped over it to determine if flaming particles escaped the enclosure. The unit's protective earthing conductor was connected to earth ground through a 3 A nontime delay fuse to detect a primary to ground fault. Immediately following the test, the unit was subjected to hipot testing to determine if insulation had been damaged.

Input before fault:

Output before fault:

Input after fault:

Output after fault:

230	8.9	1689
229	8.85	1410
230	0	0
0	0	0

Test was terminated in

2 SECONDS

- a. input circuit breaker tripped.
- b. circuit was interrupted due to failure of components:
- c. unit shut down (current limiting mode).
- d. temperatures of magnetic components stabilized.
- e. low battery shutdown.
- f. other:

Emission of flaming or glowing material or molten metal?

No

Enclosure deformed as to permit access to a hazard?

No

Rupturing of battery case or venting of a battery?

No

Open transformer winding?

No

Hazardous Backfeed Potential at the powercord pins?

No

Open wires or etch in primary circuit?

No

1500 Vrms AC Input to Chassis Hipot:

Pass

1500 Vrms AC Output to Chassis Hipot:

Pass

1500 Vrms Pri-Sec Hipot across Output XFMR:

Pass

1500 Vrms Pri-Sec Hipot across Sense XFMR:

1500 Vrms Pri-Sec Hipot across Charger XFMR:

1500 Vrms Hazardous Voltage Battery to Chassis Hipot:

Condition of 3 Amp ground fuse:

Comments: IC 37 is the backfeed relay driver. The unit went in to overload instantly and went into shut down mode within 2 seconds.

Test Equipment ID: 500,664, 240,657 658,659 664

Tested by: Stephen Lee

Date: 5/24/01

Compliance Engineer Review [P][F]:

Rev 3 (9/27/96)

ok

ABNORMAL OVERLOAD

VDE File: 19244-3335-0020
Appendix 17, Page 19 of 33

Output overload

Data Sheet:

OUTPUT OVERLOAD ABNORMAL TEST

Page ___ of ___

ok

Test A3: CSA107.1, Clause 6.6.1; UL1778, ¶ 52.4; EN60950/EN50091, Clause 5.4.

SUOL2200XLI - Model was placed on a white tissue-paper covered surface, and a single layer of cheesecloth was loosely draped over it to determine if flaming particles escaped the enclosure. [The unit's protective earthing conductor was connected to earth ground through a 3 A nontime delay fuse to detect a primary to ground fault.] Immediately following the test, the unit was subjected to hipot testing to determine if insulation had been damaged.

The unit was connected to a 208 Vac 60 Hz 50Amp supply, and was operating in its Normal mode, delivering maximum rated output AC power into an adjustable load. After thermal stabilization was reached, the load was increased in 10% increments and held for 1/2 hour.

Maximum loading was the point just before the input overcurrent protector opened. The unit operated with maximum loading [for a period of 7 hours] [until temperatures of magnetic components stabilized]. [A fuse opened during this test, therefore, the output was loaded to 135% of the fuse's rating - with the fuse bypassed - for a period of 7 hours.]

The test was then repeated with the unit operating on inverter. After the test above, the load was returned to its normal value, and a power failure was simulated. While operating on inverter, the load was adjusted for maximum VA. This test was continued until low battery shutdown.

Input with maximum output power (Normal Mode):

Output with maximum output power (Normal Mode):

Output with maximum output power (Inverter Mode):

Inverter Mode Runtime: 92 SEC.

Volts	Amps	Watts
229.1	8.97	1690
229	8.87	1400

Emission of flaming or glowing material or molten metal?

Enclosure deformed as to permit access to a hazard?

Rupturing of battery case, or venting of a battery?

Open transformer winding?

Hazardous Backfeed Potential at the powercord pins?

1500 Vrms AC Input to Chassis Hipot:

1500 Vrms AC Output to Chassis Hipot:

500 Vrms Pri-Sec Hipot across Output XFMR:

1500 Vrms Pri-Sec Hipot across Sense XFMR:

1500 Vrms Pri-Sec Hipot across Charger XFMR:

1500 Vrms Hazardous Voltage Battery to Chassis Hipot:

Condition of 3 Amp ground fuse:

No
No
No
No

Pass
Pass
Pass
Pass

Comments: Lynx is an on line UPS, which means it is always on inverter, even when plugged to the wall. Its test was terminated in 92 seconds at 10% above normal rated load.

Test Equipment ID: 523, 235

Tested by Stephen Lee

Date: _____

Rev 1 (10/21/96)

Compliance Engineer Review [P][F]: _____

045

ABNORMAL OUTPUT SHORT

VDE File: 19244-3335-0020,
Appendix 17, Page 20 of 33

Output Short Circuit

Data Sheet:

(OUTPUT) SHORT CIRCUIT ABNORMAL TEST

Page ____ of ____

Test A4: CSA107.1, Clause 6.6.1; UL1778, ¶ 52.5; EN60950, EN50091, Clause 5.4.

Model SUOL2000XLI was connected to a 230 VAC 1Phase 50 Hz 30 Amp supply and was operating at rated load 230 Volts 8.87 Amps 1400 Watts

The unit was placed on a white tissue-paper covered surface, and a single layer of cheesecloth was loosely draped over it to determine if flaming particles escaped the enclosure.] [The unit's protective earthing conductor was connected to earth ground through a 3 A nontime delay fuse to detect a primary to ground fault.] Immediately following the test, the unit was subjected to hipot testing to determine if insulation had been damaged.

1. The unit was operating in its Normal mode when the AC Output was short circuited.

The test was terminated in 0.00.02 hr:min:sec when

- | | |
|--|-----|
| a. the branch circuit breaker opened. | No |
| b. the UPS's supplementary protector opened and was reset ten times. | Yes |
| c. the UPS's UL489/CSA#5 circuit breaker opened and was reset three times. | No |
| d. the automatic reset protector functioned so the test continued for 7 hours. | No |
| e. circuit was interrupted due to failure of components _____ | No |
| f. unit shut down (current limiting mode). | No |
| g. temperature of transformer stabilized at _____ oC. | No |
| h. low battery shutdown. | No |

2. The unit was operating in its Inverter mode, with fully charged batteries, when the AC Output was shorted. The test was terminated in 2 Sec. hr:min:sec when

- | | |
|--|-----|
| a. the branch circuit breaker opened. | No |
| b. the UPS's supplementary protector opened and was reset ten times. | Yes |
| c. the UPS's UL489/CSA#5 circuit breaker opened and was reset three times. | No |
| d. the automatic reset protector functioned so the test continued for 7 hours. | No |
| e. circuit was interrupted due to failure of components: _____ | No |
| f. unit shut down (current limiting mode). | No |
| g. temperature of transformer stabilized at _____ oC. | No |
| h. low battery shutdown. | No |

3. The test was repeated with the unit operating in its Inverter mode, with fully charged batteries, when the DC battery circuit was short circuited at a point immediately after the battery's fuse. This test was terminated [instantaneously] in hr:min:sec 2 Sec. when C.B. Opened

- | | |
|--|------|
| Emission of flaming or glowing material or molten metal? | No |
| Enclosure deformed as to permit access to a hazard? | No |
| Rupturing of battery case or venting of a battery? | No |
| Open transformer winding? | No |
| Hazardous Backfeed Potential at the powercord pins? | No |
| 1500 Vrms AC Input to Chassis Hipot: | Pass |
| 1500 Vrms AC Output to Chassis Hipot: | Pass |
| 1500 Vrms Pri-Sec Hipot across Output XFMR: | Pass |
| 1500 Vrms [3000 Vrms] Pri-Sec Hipot across Sense XFMR: | N/A |
| 1500 Vrms [3000 Vrms] Pri-Sec Hipot across Charger XFMR: | N/A |
| 1500 Vrms Hazardous Voltage Battery to Chassis Hipot: | N/A |

Condition of 3 Amp ground fuse:

Comments: _____

Test Equipment ID: 523 236

Tested by Stephen Lee

Date: _____

Compliance Engineer Review [P][F]: _____

Rev 3 (10/21/96)

065

Test A16: EN 50091, Annex L, and EN 60950, Clause 5.2.

Model **SUOL2000XLI** was connected to a 230 V, 50 Hz source, and was operating in its normal mode with no load connected to the UPS's output. The input powercord was disconnected from the branch circuit to simulate a power outage, causing the unit to operate in its battery mode. Leakage current was measured between all pins of the powercord using [the ED&D, model LT-30HC Leakage Current Tester] [a Voltmeter and 1500 ohm/0.15µF network].

The tests were then repeated with the UPS supplying maximum power to a resistive load with 22 nF capacitors connected from phase to ground and neutral to ground.

All testing was then repeated with a single fault applied after the unit was set to its battery mode. Hazardous voltage must be less than 42.4 Vpeak, 60 Vdc within 1 second. Leakage current must be less than 3.5 mA within 5 seconds of the powercord's disconnection or application of a fault.

NOTE: Please attach oscilloscope photographs of the following voltage waveforms: Transfer Time, Retransfer Time, Backfeed Protection Time(s).

Leakage Current (mA)			Load	Test Condition	Backfeed Voltage	
Ø - N	Ø - Gnd	N - Gnd			Voltage @ 1 Second	Time to 60Vdc, 42.4Vpk(ms)
.052__	.032	_.032ma	None	No Fault	___0___	___2ms___
_____	_____	_____	_____ W with 22 nF caps		_____	_____
_____	_____	_____	None		_____	_____
_____	_____	_____	_____ W with 22 nF caps		_____	_____

Comments: _____

Equipment ID & Range: 2607 ,982

Tested by: Stephen Lee Date Tested: _____

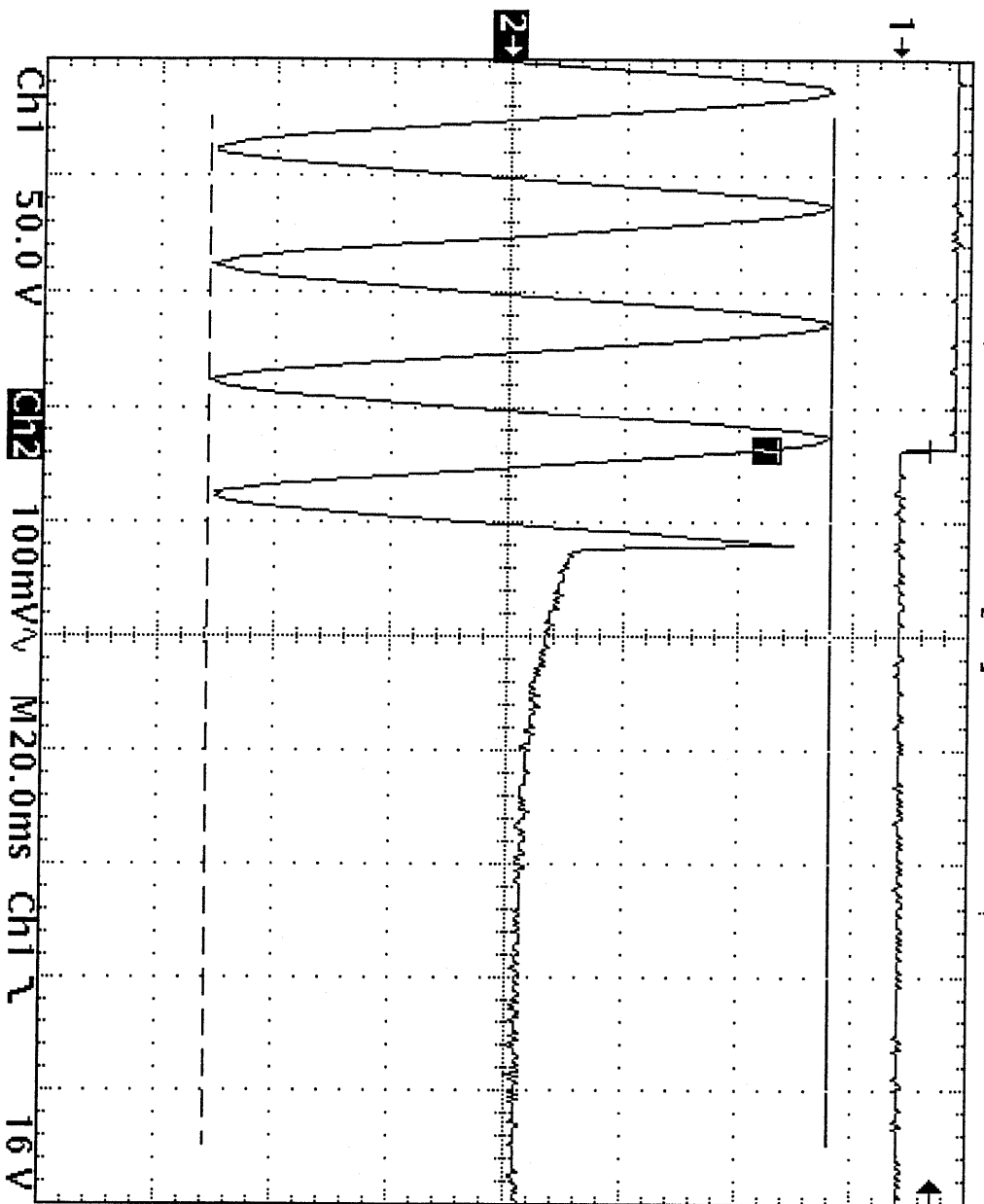
Report#: _____

Reviewed by: [P][F]: _____ Data Sheet Rev 2 (11/14/96)

OK_s

DO NOT BACKFIRE SUOL 2000 KLI

Tek Stop Single Seq 2.50Ks/s



Δ: 540mV
@: 280mV

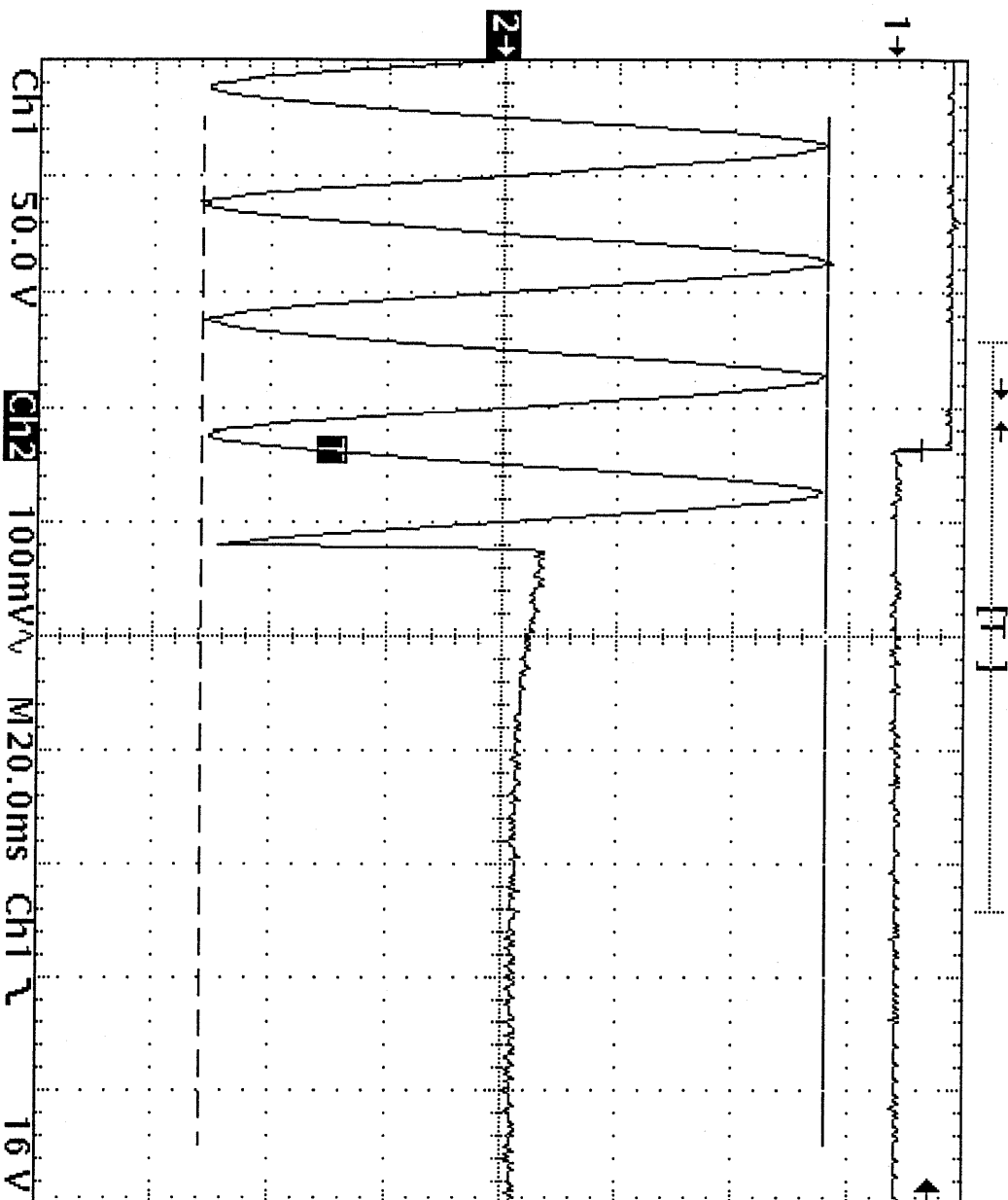
C2 RMS
180.8mV

READINGS TAKEN
WITH A 10-1 TRANSDUCER

17 Mar 2001
20:57:45

Ø 10 GND BACKFEED SUGAR 2000 XLI

Tek Stop Single Seq 2.50KS/s



Δ: 540mV
@: 280mV

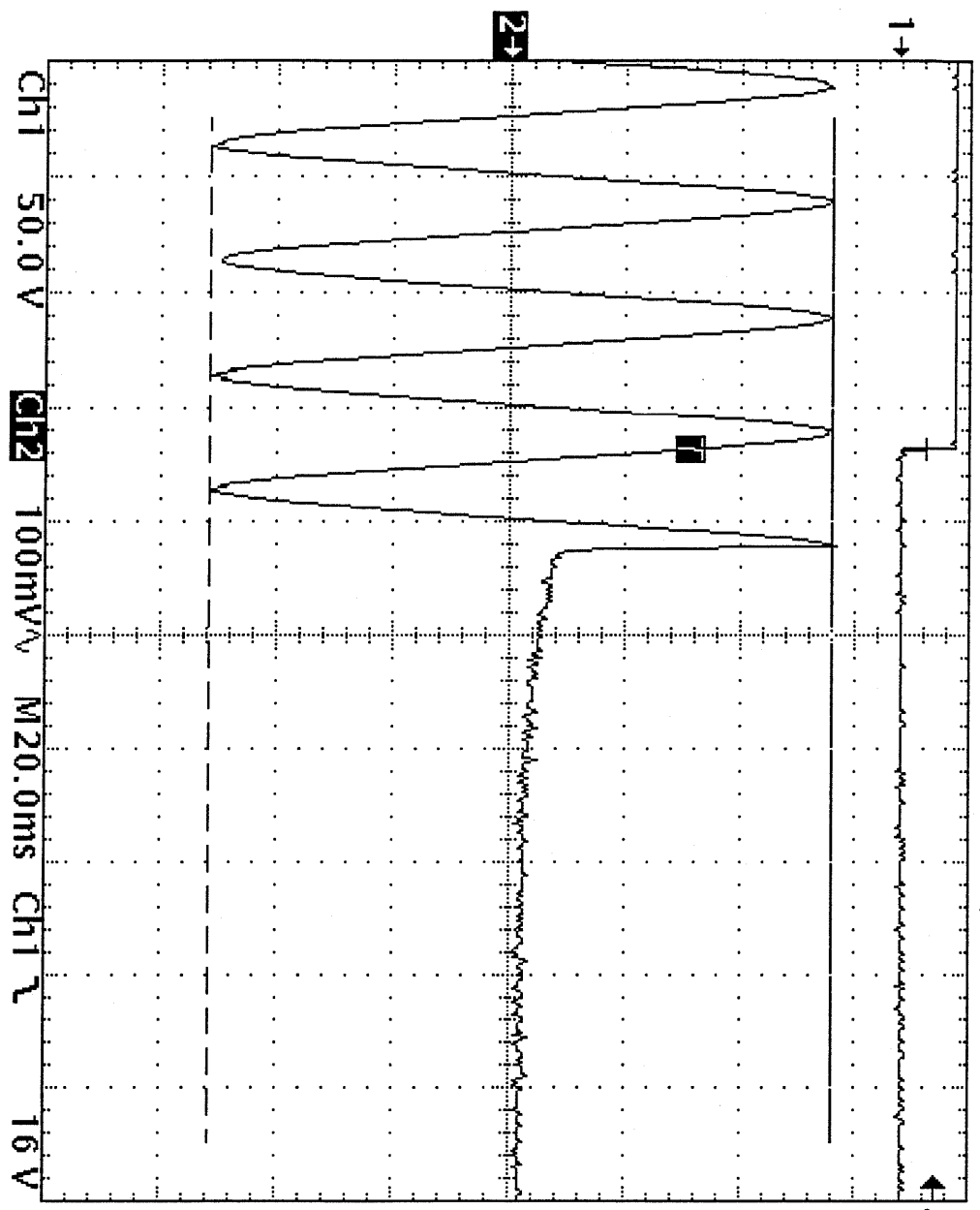
C2 RMS
182.4mV

READINGS TAKEN WITH
A 10-1 TRANSFER RULER

17 Mar 2001
20:54:51

N TO GND BACKFEED SUGAR 2000XLI

Tek Stop Single Seq 2.50KS/s



A: 540mV
@: 280mV

C2 RMS
182.0mV

590

READINGS TAKEN WITH A
10-1 TRANSFORMER

17 Mar 2001
21:01:38

Page ____ of ____ ok

After model **SUOL2000XLI** was in a well-heated condition, a potential was applied between the locations noted below. Starting at zero, the potential was gradually increased to the value indicated and maintained at that value for 1 minute.

[In order to simulate the effects of the Heating Test, the XFMRs/capacitors were placed in an oven of ____°C (max. temp. measured during Heating Test) for 8 hours.]

- | |
|------|
| Pass |
| Pass |
| Pass |
| Pass |

ohs

a. 1000 VAC between Secondary windings and Core (VGB Required)
 b. 1250 VAC @ 1750 VDC between Primary and Secondary windings
 c. 10000 VAC @ 4240 VDC between Primary and SELV circuit
 d. _____ VAC @ _____ VDC between Hazardous Voltage Secondary and SELV
 1750 VDC across Live-to-Live and Live-to-Ground (Leakage)
 VAC capacitors well cleared

[illegible]

Test Equipment ID: 235

Tested by: Stephen Lee

Date: _____

Compliance Engineer Review [P][F]: _____ Rev 2 (8/21/96)

Data Sheet:

MECHANICAL STRENGTH OF ENCLOSURES: BALL IMPACT

Page ____ of ____

Test M7: CSA 107.1, Section 6.13; UL 1778, Section 65; EN 60950, Clause 4.2.4.

This test is applicable to external surfaces of enclosures and guards, the failure of which would give access to hazardous parts. Darken each test

performed on model SUOL2000XLI Gray out the term that does not describe the test or result.

a. A smooth steel sphere, with a diameter of 50.8 mm (2 inches) and a mass of 535 grams (1.18 lb) was [allowed to fall freely from rest] [suspended by a cord and swung as a pendulum to apply a horizontal impact] through a vertical distance of 1290 mm (51 inches) onto the sample to subject the surface to an impact of 6.8 Joules (5 ft-lbs). The sample was supported in its normal position, unless otherwise noted below.

[illegible]

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The *Agrobacterium* strains were grown in the YEA medium for 24 h and then adjusted to the OD₆₀₀ of 0.1. The *Agrobacterium* strains were then grown in the YEA medium with the concentration of 0.1, 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8, 0.9, 1.0, 1.5, 2.0, 3.0, 4.0, 5.0, 6.0, 7.0, 8.0, 9.0, 10.0, 15.0, 20.0, 30.0, 40.0, 50.0, 60.0, 70.0, 80.0, 90.0, 100.0, 150.0, 200.0, 300.0, 400.0, 500.0, 600.0, 700.0, 800.0, 900.0, 1000.0, 1500.0, 2000.0, 3000.0, 4000.0, 5000.0, 6000.0, 7000.0, 8000.0, 9000.0, 10000.0, 15000.0, 20000.0, 30000.0, 40000.0, 50000.0, 60000.0, 70000.0, 80000.0, 90000.0, 100000.0, 150000.0, 200000.0, 300000.0, 400000.0, 500000.0, 600000.0, 700000.0, 800000.0, 900000.0, 1000000.0, 1500000.0, 2000000.0, 3000000.0, 4000000.0, 5000000.0, 6000000.0, 7000000.0, 8000000.0, 9000000.0, 10000000.0, 15000000.0, 20000000.0, 30000000.0, 40000000.0, 50000000.0, 60000000.0, 70000000.0, 80000000.0, 90000000.0, 100000000.0, 150000000.0, 200000000.0, 300000000.0, 400000000.0, 500000000.0, 600000000.0, 700000000.0, 800000000.0, 900000000.0, 1000000000.0, 1500000000.0, 2000000000.0, 3000000000.0, 4000000000.0, 5000000000.0, 6000000000.0, 7000000000.0, 8000000000.0, 9000000000.0, 10000000000.0, 15000000000.0, 20000000000.0, 30000000000.0, 40000000000.0, 50000000000.0, 60000000000.0, 70000000000.0, 80000000000.0, 90000000000.0, 100000000000.0, 150000000000.0, 200000000000.0, 300000000000.0, 400000000000.0, 500000000000.0, 600000000000.0, 700000000000.0, 800000000000.0, 900000000000.0, 1000000000000.0, 1500000000000.0, 2000000000000.0, 3000000000000.0, 4000000000000.0, 5000000000000.0, 6000000000000.0, 7000000000000.0, 8000000000000.0, 9000000000000.0, 10000000000000.0, 15000000000000.0, 20000000000000.0, 30000000000000.0, 40000000000000.0, 50000000000000.0, 60000000000000.0, 70000000000000.0, 80000000000000.0, 90000000000000.0, 100000000000000.0, 150000000000000.0, 200000000000000.0, 300000000000000.0, 400000000000000.0, 500000000000000.0, 600000000000000.0, 700000000000000.0, 800000000000000.0, 900000000000000.0, 1000000000000000.0, 1500000000000000.0, 2000000000000000.0, 3000000000000000.0, 4000000000000000.0, 5000000000000000.0, 6000000000000000.0, 7000000000000000.0, 8000000000000000.0, 9000000000000000.0, 10000000000000000.0, 15000000000000000.0, 20000000000000000.0, 30000000000000000.0, 40000000000000000.0, 50000000000000000.0, 60000000000000000.0, 70000000000000000.0, 80000000000000000.0, 90000000000000000.0, 100000000000000000.0, 150000000000000000.0, 200000000000000000.0, 300000000000000000.0, 400000000000000000.0, 500000000000000000.0, 600000000000000000.0, 700000000000000000.0, 800000000000000000.0, 900000000000000000.0, 1000000000000000000.0, 1500000000000000000.0, 2000000000000000000.0, 3000000000000000000.0, 4000000000000000000.0, 5000000000000000000.0, 6000000000000000000.0, 7000000000000000000.0, 8000000000000000000.0, 9000000000000000000.0, 10000000000000000000.0, 15000000000000000000.0, 20000000000000000000.0, 30000000000000000000.0, 40000000000000000000.0, 50000000000000000000.0, 60000000000000000000.0, 70000000000000000000.0, 80000000000000000000.0, 90000000000000000000.0, 100000000000000000000.0, 150000000000000000000.0, 200000000000000000000.0, 300000000000000000000.0, 400000000000000000000.0, 500000000000000000000.0, 600000000000000000000.0, 700000000000000000000.0, 800000000000000000000.0, 900000000000000000000.0, 1000000000000000000000.0, 1500000000000000000000.0, 2000000000000000000000.0, 3000000000000000000000.0, 4000000000000000000000.0, 5000000000000000000000.0, 6000000000000000000000.0, 7000000000000000000000.0, 8000000000000000000000.0, 9000000000000000000000.0, 10000000000000000000000.0, 15000000000000000000000.0, 20000000000000000000000.0, 30000000000000000000000.0, 40000000000000000000000.0, 50000000000000000000000.0, 60000000000000000000000.0, 70000000000000000000000.0, 80000000000000000000000.0, 90000000000000000000000.0, 100000000000000000000000.0, 150000000000000000000000.0, 200000000000000000000000.0, 300000000000000000000000.0, 400000000000000000000000.0, 500000000000000000000000.0, 600000000000000000000000.0, 700000000000000000000000.0, 800000000000000000000000.0, 90000000

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The locations on the enclosure subjected to impact during this test were:

Directly above L5

1. Were there resulting cracks or openings that would allow the test finger or test pin to access hazardous voltages, energy hazards, bare parts at ELV or hazardous moving parts?

2. Was there permanent distortion of the enclosure that would reduce the electrical spacings below minimum allowable values?

3. Was there visible signs of interference with the operation of safety features such as thermal cutouts, overcurrent protection devices or interlocks?

4. Were there visible signs of damage to the strain relief or power cord?

5. Was there appreciable strain on the powercord at the strain relief?

Comments: _____

Test Equipment ID: _____

Tested by: Stephen Lee

Date: _____

Compliance Engineer Review [P][F]: _____ Rev 1 (3/9/95)

Data Sheet:

STRENGTH OF MOUNTING MEANS

Page ____ of ____

Test M6: EN 60950, Clause 4.1.5.

Model SUOL2000XLI which is intended for mounting on a surface other than on top of a horizontal surface - was installed in its intended manner. The unit weighed 45 LBS

Highlight each test performed and grey out the term that does not describe the result.

a. A force equal to three times the weight of the product _____ Newtons
180 LBS was applied downward, for one minute, at the top of the unit, at a point most likely to result in malfunction of the mounting surface or mounting means. *ok*

b. Since the unit is likely to be used as a horizontal working surface, an 800 Newton force was applied downward, for one minute, at the top of the unit, at a point most likely to result in malfunction of the mounting surface or mounting means.

c. The chassis slide-mounted unit was extended to the service position, and a force of 400 Newtons (40 Kg, 88.2 lb) was applied to the most unfavorable location of the extended unit.

d. The chassis slide-mounted unit was then extended to the operator position and a force of 800 N (80 Kg, 176.4 lb) was applied to the most unfavorable location of the extended unit.

Description of Mounting Means: _____

Was there was an adverse effect to the mounting surface or mounting means that increased the risk of fire, electric shock, hazardous energy level, or injury to persons?

No

Did the chassis slides pass the force tests without dropping the unit, or sustaining any permanent damage or deformation?

NA

Comments: _____

Test Equipment ID: _____

Tested by: Stephen Lee

Date: _____

Compliance Engineer Review [P][F]: _____

Rev 1 (4/3/95)

Page ____ of ____

ok

The sharp edge tester was positioned so that it exerted a 6.7 N (1.5 lb) force along all operator accessible edges of model **SUOL2000RMLXI** including enclosure openings, the frame, guards, knobs and handles. To guarantee the 6.7 N force, the steel arm of the tester was kept at its mid-point (the small hole in the plastic enclosure). The tester was moved 2 inches (50.8 mm) along the edges and back 2 inches (50.8 mm) without losing contact with the edges.

This test was performed on the following locations: Along the top cover, front and rear, and sides

Were the two outer layers of sensing tape on the sharp edge tester cut through, so that the black layer was exposed?

No

Comments No sharp edges were found

Test Equipment ID: 550

Tested by: Stephen Lee

Date: . . .

Compliance Engineer Review [P][F]: Rev 2 (3/20/97)

PHYSICAL STABILITY (STEP)

VDE File: 19244-3335-0020
Appendix 17, Page 29 of 33

Data Sheet:

PHYSICAL STABILITY (STEP) - 800 Newton (176 lb)

Page ____ of ____

Test M3: EN 60950, EN50091, Clause 4.1.1.

Model SUOL2000XLI

This test only applies to floor-standing units.

A constant downward force of 800 N (176 lb) was applied at the point of maximum moment to any horizontal working surface or surface offering an obvious foothold at a height not exceeding 1 meter (39.37 inches) from the floor. Doors, products mounted on chassis slides, etc. were closed during this test.

Results:

Location	Height	With/Without		Did unit
	Inches (cm)	Batteries		tip over?
TOP FRONT	17	WITH		NO
TOP CENTER	17	WITH		NO
TOP REAR	17	WITH		NO

ok s

Comments:

Test Equipment ID:

Tested by:

Stephen Lee

Date:

Compliance Engineer Review [P][F]:

Rev 3 (3/20/97)

STABILITY

Data Sheet:

PHYSICAL STABILITY - 10° Tilt

Page ____ of ____

ok

Test M2: UL 1778, Section 63; EN 60950, EN 50091, Clause 4.1.1.

This test was performed with and without the batteries installed.

Model SUOL2000XLI was tilted at an angle 10° from its normal, upright position in all four directions with all doors, drawers, etc. in place and closed.

Results:

Did the unit **remain stable** and show no signs of overturning? **Yes**

<u>Direction of Force</u>	<u>Angle of Instability</u>	<u>With/Without Batteries</u>
<u>Left Side</u>	<u>75*</u>	<u>With</u>
<u>Left Side</u>	<u>75*</u>	<u>Without</u>
<u>Right Side</u>	<u>75*</u>	<u>With</u>
<u>Right Side</u>	<u>75*</u>	<u>Without</u>
<u>Front</u>	<u>75*</u>	<u>With</u>
<u>Front</u>	<u>75*</u>	<u>Without</u>
<u>Rear</u>	<u>75*</u>	<u>With</u>
<u>Rear</u>	<u>75*</u>	<u>Without</u>

oks

Comments:

Test Equipment ID: 558

Tested by: Stephen Lee Date: 2008.08.01

Compliance Engineer Review [P][F]: _____ Rev 2 (3/20/97)

To: pi.f13-3@vde.com
cc:
From: Stephen Lee on 08/17/2001 10:31 AM
Subject: Attention Frank Richter LYNX Answers to open Item list

This is a formal response to the 4 items waiting for resolution

APC

9 Executive Park Drive
North Billerica, Ma 01862

Subject: Commitment for VDE, from Stephen Lee in the NPS compliance Dept. of American Power Conversion to have the following issues resolved.

1.) Increase spacing on Lynx PCB to 1.01 mm.

APC had Prototech (PCB Manuf.) increase the spacing to 1.2 mm.

2.) Increase creepage on the Lynx transformer 430-7206, between Pri. & Sec. to 9.4 mm.

APC changed the part number from 430-7206 to 430-7207, had Falco and JML both make changes to meet 10 mm creepage between Pir. & Sec.

3.) Increase creepage on the Lynx transformer 430-7203, between Pri. & Sec. to 9.4 mm.

APC had Falco and JML both make changes to meet 10 mm creepage between Pir. & Sec.

4.) With 460Vrms present, we must have 9.4 mm creepage on the PCB from Pri. to Sec..

APC had Prototech (PCB Manuf.) increase the creepage spacing on the PCB, between Pri. & Sec. to 10 mm.

Sincerely



Stephen Lee
Sr. Compliance Eng.
NPS Dept. APC

	L-IN	N-IN	NEU	PFC-IN	LINE(OUT)	PDC	NDC	INV(OUT)	PFC1	PFC2	PFC3	DSCHG1	DSCHG2	CHGPR1	CHGPR2
L-IN		230Vac 100mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils
N-IN			230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils
NEU				230Vac 100mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils	400Vdc 158mils
PFC-IN				460Vac 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils
LINE(OUT)					460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils
PDC						800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils
NDC								800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils	800Vdc 315mils
INV(OUT)															
(pdc&ndc)															
PFC1															
(pdc&ndc)															
PFC2															
(pdc&ndc)															
PFC3															
(neu&pdc)															
DSCHG1															
(pdc&ndc)															
DSCHG2															
(pdc&ndc)															
CHGPR1															
(pdc&ndc)															
CHGPR2															
(pdc&ndc)															
CHGSEC1															
(pdc+ndc)*n															
XEMR1	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils
XEMR2	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils
P48V	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils
(batt pos)	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils
N48V	230Vac 100mils	230Vac 100mils	230Vac 100mils	230Vac 100mils	230Vac 100mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils
(batt neg)	230Vac 100mils	230Vac 100mils	230Vac 100mils	230Vac 100mils	230Vac 100mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils	460Vrms 186mils
SGND	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils
(safety)	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils
+BATT	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	230Vac 200mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils

FBATT (bias, etc.)	230VAC 200mils	230VAC 200mils	230VAC 200mils	230VAC 200mils	230VAC 200mils	230VAC 200mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils	460Vrms 371mils
-----------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	--------------------	--------------------	--------------------	--------------------	--------------------	--------------------	--------------------	--------------------	--------------------	--------------------

Calculations:

= reinforced insulation

CHGSEC1 =

160 Vrms

280 Vrms

488 Vrms

461 Vrms

HVDC =



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VDE Testing and Certification Institute

VDE

Clause	Requirement and Test	Result - Remark	Verdict
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APPENDIX 1-18

VDE File: 19244-3335-0020,
Appendix 18, Page 1 of 3



Verband Der Elektrotechnik Elektronik Informationstechnik e.V

Merianstraße 28
63069 Offenbach (Main)

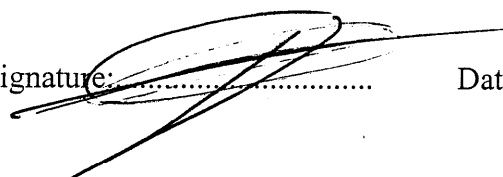
TEST REPORT Thermal Cycling Test

Approved by: Frank Richter	File No.: Date: 08/01/2001
Applicant: APC	
Manufacturing Place: see test report	
Construction: multi layer board	Type: 640-0781BREV2
Markings: APC	Creepage Distances and Clearances exist: --
Potting Compound: Prepreg	Thickness through insulation exist: >0,4 mm
Adhesive test: pass	
Insulation class: test with 150°C	

Cycles at U= AC 500 V	68 h/ 150 °C	1 h/ 25 °C.	2 h/ 0 °C	1 h/ 25 °C.
1. Cycle from 08.01.01 – 11.01.01	Alle unter 100uA			
2. Cycle from 12.01.01 – 15.01.01	Alle unter 100uA			
3. Cycle from 15.01.01 – 18.01.01	Alle unter 100uA			
4. Cycle from 19.01.01 – 22.01.01	Alle unter 100uA			
5. Cycle from 22.01.01 – 25.01.01	Alle unter 100uA			
6. Cycle from 26.01.01 – 29.01.01	Alle unter 100uA			
7. Cycle from 29.01.01 – 01.02.01	10 μ A → 10:30	7 μ A → 11:30	6,5 μ A → 13:30	7 μ A → 14:30
8. Cycle from 02.02.01 – 05.02.01	10 μ A → 11:30	6 μ A → 12:30	7 μ A → 14:30	7,5 μ A → 15:30
9. Cycle from 05.02.01 08.02.01	10 μ A	7 μ A	7 μ A	7,5 μ A
10. Cycle from 12.02.01 – 09.02.01 02.02.01 – 12.02.01	10 μ A	7 μ A	7 μ A	7,5 μ A

48 hours humidity : Pass

Requirements:	Test voltage	Results
Basic Insulation 1500 V	---	---
Additional Insulation 4600 V	---	---
Reinforced Insulation 4800 V	AC 4600 V	pass

Signature: 

Date: 19.2.01

 F142A.02.09.08	VDE Prüf- und Zertifizierungsinstitut VDE Testing and Certification Institute Merianstrasse 28 · D-63069 Offenbach Tel. (+49) (069) 8306-0 · Fax (+49) (069) 8306-582 · e-mail: pi.customer-servicef1@vde.com		Copyright VDE
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Aufbau-Übersicht / Constructional data		Seite 1 von 4 / Page 1 of 4	Form AUe F142A
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1.1 Hersteller : Falco Electronics
Manufacturer

1.2 Fertigungsstätte(n) : Mexico/China
Manufacturing site(s)

2.1 Produktbezeichnung : Transformatoren zum Einbau in Geräte/Built in transformers for equipment
Product designation
nach
according to DIN EN 60950 (VDE 0805)

2.2 Typenbezeichnung : TRANSFORMER
Type designation

3.1 Ursprungszeichen : N/A
Trade Mark

3.2 Sonstige Aufschriften : 430-0358-01, Date Code, Falco, CL-H
Other markings

4.1 Bauart (Trenn-, Isoliertransformator usw.) : DC-DC TRANSFORMER
Type of construction (Isolating transformer etc.)


5.1 Schutzklasse : --
Protection against electric shock

5.2 Höchste Nenn-Umgebungstemperatur : ta = N/A °C
Maximum rated ambient temperature

5.3 Isolationsklasse nach IEC 60085 *) : H / 180 °C
*Insulation class according to IEC 60085 *)*
Bitte VDE-Form AUeF162A beifügen!
Please attach VDE-Form AUeF162A!

6. Elektrische Daten <i>Electrical values</i>		Eingang (Primär) <i>Input (primary)</i>	Ausgang (Sekundär) <i>Output (secondary)</i>
6.1 Bemessungsspitzenspannung [V] <i>Rated peak voltage</i>	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
6.2 Bemessungsspannung (effektiv) [V] <i>Rated voltage (rms)</i>	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
6.3 Bemessungsfrequenz [Hz] <i>Rated frequency</i>	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
6.3 Bemessungsstrom [A] <i>Rated current</i>	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
6.4 Bemessungsleistung [VA] <i>Rated power</i>	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
7. Wicklungen <i>Windings</i>			
7.1 Anzahl Wicklungen <i>Number of Windings</i>	:	1	2
7.2 Windungsanzahl <i>Number of turn</i>	:	7 (W2)	60 (W1) / 60 (W3)
7.3 Drahtdurchmesser [mm] <i>Diameter of wire</i>	:	0.25THICK. X 35MM Width (Copper Foil)	0.57MM
7.4 Kaltwiderstand in Ω bei 25 °C <i>Cold resistance in Ω at 25 °C</i>	:	0.002826 (W2)	0.2145 (W1) / 0.3049 (W3)

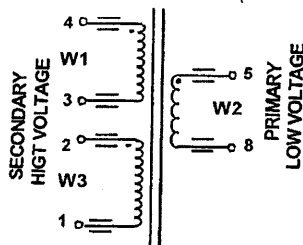
J:\FORMULARE\AUe (PROBETRIEB FÜR F1)AUe F142A BUILT IN TRANSFORMERS FOR EQUIPMENT.DOC

 F142A.02.09.08	Genehmigungsausweis Nr.: Marks Licence No.: Raum für Vermerke des VDE-Instituts / Space reserved for notes of the VDE Institute	Aktenzeichen: File reference: Anlage: Appendix No.:	Seite Page 2 / 4	Copyright VDE
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8. Isolation
Insulation
- 8.1 Spulenkörpermaterial (Hersteller, Typ) : PAPER NOMEX410 BY DUPONT DE NEMOURS
Bobbin material (Manufacturer, type)
- 8.1.1 Entflammbarkeitskategorie Spulenkörper : 94V-0
Flammability category bobbin
- 8.2 Material der Drahtisolation (Hersteller, Typ) : SOFT COLD ROLL ANNEALED COPPER (PRI)/ HEAVY
Material of wire insulation (Manufacturer, type) MW35 or 73 (SEC)
- 8.2.1 Lacktyp der Drahtisolation : POLYESTER-AMIDE-IMIDE
Type of varnish for wire insulation
- 8.2.2 Lackisolation nach IEC 60317 : --
Varnish for insulation in acc. to IEC 60317
- 8.3 Lagenisolationmaterial (Hersteller, Typ) : PAPER NOMEX410 BY DUPONT DE NEMOURS
Material of layer insulation (Manufacturer, type)
- 8.4 Leitungen (Isolationsmaterial) : N/A
Lead insulation material
- 8.5 Wicklungsschema-Schaltbild (mit Klemmenbezeichnung, Farben der Anschlußenden usw.) :
Circuit diagram (which terminal markings, color of wires etc.)

SCHEMATIC

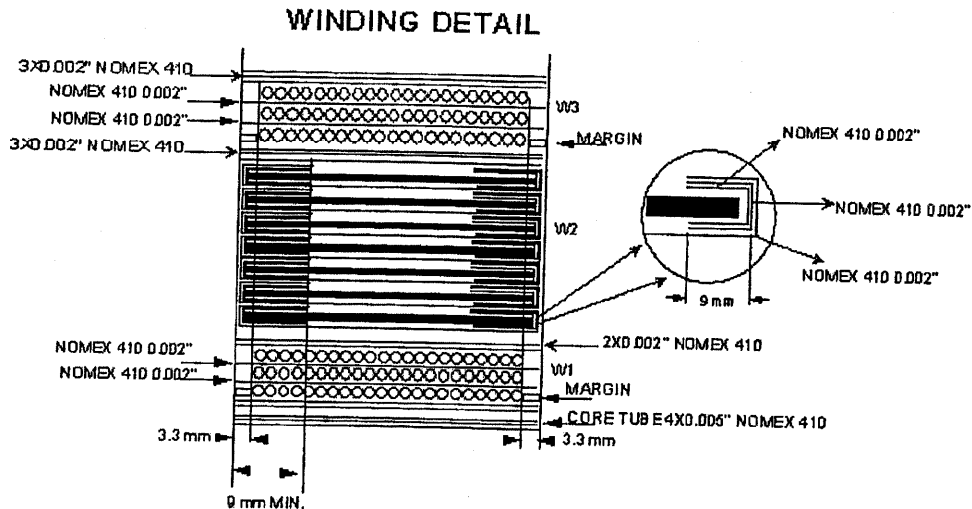
All sleeves are Kapton
Tape (3 Layers)



9. Eisenkern / Iron core
- 9.1 Blech, Materialsorte / Sheet metall, material : Soft Ferrite: Mn-Zn
- 9.2 Hauptabmessungen / Main dimensions : 55mm X 27.8mm X 25mm
- 9.3 Schnittskizze / Cross-sectional drawing

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9.3 Schnittskizze / Cross-sectional drawing




10. Aufbau / Construction

10.1 Konstruktionsmerkmale Construction details	:	—	Getränkt / Impregnated
10.2 Tränkungsmedium (Hersteller, Typ) Impregnating substances (Manufacturer, Type)	:	PD GEORGE 50VT POLYESTER RESIN	
10.3 Tränkungsverfahren Impregnation procedure	:	<input checked="" type="checkbox"/> Unterdruck Underpressure	<input type="checkbox"/> Überdruck Overpressure
10.4 Vergußmasse (Hersteller, Typ) Potting material (Manufacturer, Type)	:	N/A	bei 25 °C at
10.5 Entflammbarkeitskategorie Vergußmasse Flammability category potting material	:	N/A	
10.6 Baustoff der Abdeckung Material of the cover	:	N/A	
10.7 Entflammbarkeitskategorie der Abdeckung Flammability category of cover	:	N/A	
10.8 Baustoff des Gehäuses Material of the enclosure	:	N/A	
10.9 Entflammbarkeitskategorie des Gehäuses Flammability category of enclosure	:	N/A	

11. Im Transformator eingebaute Einzelteile (Schutzeinrichtungen, Kabel, Stecker, Schalter usw.): Components built in the transformer (Protective means, cables, plugs, switches etc.):

Einzelteil Component	Hersteller Manufacturer	Typ Type	Referenz/Tech. Daten*) Reference / techn. Data	Prüfzeichen *) Certification mark

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11. Im Transformator eingebaute Einzelteile (Schutzeinrichtungen, Kabel, Stecker, Schalter usw.):
Components built in the transformer (Protective means, cables, plugs, switches etc.):

Einzelteil Component	Hersteller Manufacturer	Typ Type	Referenz/Tech. Daten*) Reference / techn. Data	Prüfzeichen *) Certification mark

*) Bitte weitere technische Informationen, Zertifikate, Prüfberichte u. a. beifügen.
Please provide further technical information, Certificates, Testreports etc. if applicable

12. Sonstiges (Besondere konstruktive Merkmale usw.) :
Other data (special constructional feature etc.)
N/A

Offenbach <i>19.10.04</i> VDE Prüf- und Zertifizierungsinstitut VDE Testing and Certification Institute Fachgebiet F13 / Section F13 i. A. <i>[Signature]</i>	Ort / Place: Merida, Yucatan Mexico Datum / Date: 09/22/2004 Verantwortlich für die Angaben Responsible for the details Alejandro Palma QUALITY ASSURANCE MANAGER. Name <i>[Signature]</i>
--	--

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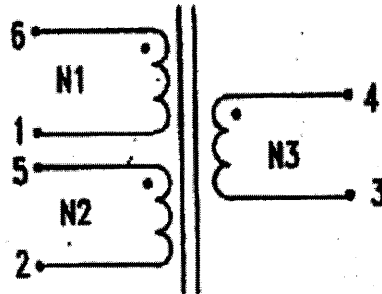
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Aufbau-Übersicht / Constructional data		Seite 1 von 3 / Page 1 of 3	Form AUe F142A
1.1	Hersteller Manufacturer	Leader Electronics Inc	
1.2	Fertigungsstätte(n) Manufacturing site(s)	Zhangxiang, Guyang Town, Dantu county, Zhenjiang City, Jiangsu Province, CHINA	
2.1	Produktbezeichnung Product designation	Transformatoren zum Einbau in Geräte/Built in transformers for equipment	
		nach according to	DIN EN 60065 (VDE 0860)
2.2	Typenbezeichnung Type designation	LS-A9782-ST1	
3.1	Ursprungszeichen Trade Mark	LEI	
3.2	Sonstige Aufschriften Other markings		
4.1	Bauart (Trenn-, Isoliertransformator usw.) Type of construction (isolating transformer etc.)	Gate drive transformer	
5.1	Schutzklasse Protection against electric shock	II Schutzisolierung/Protective isolation	
5.2	Höchste Nenn-Umgebungstemperatur Maximum rated ambient temperature	ta = 40 °C	
5.3	Isolationsklasse nach IEC 60085 *) Insulation class according to IEC 60085 *)	B / 130 °C	
		Bitte VDE-Form AUeF162A beifügen! Please attach VDE-Form AUeF162A!	
6.	Elektrische Daten Electrical values	Eingang (Primär) Input (primary)	Ausgang (Sekundär) Output (secondary)
6.1	Bemessungsspitzenspannung [V] Rated peak voltage		
6.2	Bemessungsspannung (effektiv) [V] Rated voltage (rms)		
6.3	Bemessungsfrequenz [Hz] Rated frequency		
6.3	Bemessungsstrom [A] Rated current		
6.4	Bemessungsleistung [VA] Rated power		
7.	Wicklungen Windings		
7.1	Anzahl Wicklungen Number of Windings	2(N1, N2)	1(N3)
7.2	Windungsanzahl Number of turn	N1: 45 turns, N2:45 turns	N3:36 turns
7.3	Drahtdurchmesser [mm] Diameter of wire	N1: 0.2, N2:0.2	N3:0.2
7.4	Kaltwiderstand in Ω bei 20 °C Cold resistance in Ω at 20 °C		

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8. Isolation
Insulation

- 8.1 Spulenkörpermaterial (Hersteller, Typ) : Rynite FR-530
Bobbin material (Manufacturer, type)
- 8.1.1 Entflammbarkeitskategorie Spulenkörper :
Flammability category bobbin
- 8.2 Material der Drahtisolation (Hersteller, Typ) : TEX-E
Material of wire insulation (Manufacturer, type)
- 8.2.1 Lacktyp der Drahtisolation : CKE-700A/B
Type of varnish for wire insulation
- 8.2.2 Lackisolation nach IEC 60317 : -
Varnish for insulation in acc. to IEC 60317
- 8.3 Lagenisolationmaterial (Hersteller, Typ) :
Material of layer insulation (Manufacturer, type)
- 8.4 Leitungen (Isolationsmaterial) :
Lead insulation material
- 8.5 Wicklungsschema-Schaltbild (mit Klemmenbezeichnung, Farben der Anschlußenden usw.) :
Circuit diagram (which terminal markings, color of wires etc.)



9. Eisenkern / Iron core

- 9.1 Blech, Materialsorte / Sheet metall, material : T12.7*7.92*7C
- 9.2 Hauptabmessungen / Main dimensions :
- 9.3 Schnittskizze / Cross-sectional drawing

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10. Aufbau / Construction

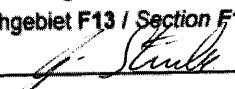

- 10.1 Konstruktionsmerkmale : Offen / Open , Getränkt / Impregnated
Construction details
- 10.2 Tränkungsmitel (Hersteller, Typ) :
Impregnating substances (Manufacturer, Type)
- 10.3 Tränkungsverfahren : ☐ Unterdruck ☐ Überdruck bei 25 °C
Impregnation procedure Underpressure Overpressure at
- 10.4 Vergußmasse (Hersteller, Typ) : CKE-700A/B
Potting material (Manufacturer, Type)
- 10.5 Entflammbarkeitskategorie Vergußmasse :
Flammability category potting material
- 10.6 Baustoff der Abdeckung :
Material of the cover
- 10.7 Entflammbarkeitskategorie der Abdeckung :
Flammability category of cover
- 10.8 Baustoff des Gehäuses :
Material of the enclosure
- 10.9 Entflammbarkeitskategorie des Gehäuses :
Flammability category of enclosure

11. Im Transformator eingebaute Einzelteile (Schutzeinrichtungen, Kabel, Stecker, Schalter usw.):
Components built in the transformer (Protective means, cables, plugs, switches etc.):

Einzelteil Component	Hersteller Manufacturer	Typ Type	Referenz/Tech. Daten*) Reference / techn. Data	Prüfzeichen *) Certification mark
Base	EI DUPONT	18000018 VTM600-6PIN	150 Degree C 94V-0	E41938
Triple insulation wire	FURUKAWA	TEX-E	105 degree C	VDE-RE G-NR. 6735

*) Bitte weitere technische Informationen, Zertifikate, Prüfberichte u. a. beifügen.
Please provide further technical information, Certificates, Testreports etc. if applicable

12. Sonstiges (Besondere konstruktive Merkmale usw.) :
Other data (special constructional feature etc.)

Offenbach 19.10.04 VDE Prüf- und Zertifizierungsinstitut VDE Testing and Certification Institute Fachgebiet F13 / Section F13 i. A. 	Ort / Place: ZhenJiang City, CHINA Verantwortlich für die Angaben Responsible for the details  Name	Datum / Date: 2004-09-16
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Aufbau-Übersicht / Constructional data		Seite 1 von 4 / Page 1 of 4	Form AUe F142A
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1.1 Hersteller : Falco Electronics
Manufacturer

1.2 Fertigungsstätte(n) : Mexico / China
Manufacturing site(s)

2.1 Produktbezeichnung : Transformatoren zum Einbau in Geräte/Built in transformers for equipment
Product designation
nach DIN EN 60950 (VDE 0805)
according to

2.2 Typenbezeichnung : TRANSFORMER
Type designation

3.1 Ursprungszeichen : N/A
Trade Mark

3.2 Sonstige Aufschriften : 430-0357-1, Date Code, Falco, CL-B
Other markings

4.1 Bauart (Trenn-, Isoliertransformator usw.) : GATE DRIVE TRANSFORMER
Type of construction (isolating transformer etc.)

5.1 Schutzklasse : --
Protection against electric shock


5.2 Höchste Nenn-Umgebungstemperatur : ta = N/A °C
Maximum rated ambient temperature

5.3 Isolationsklasse nach IEC 60085 *) : B / 130 °C
Insulation class according to IEC 60085 *)
Bitte VDE-Form AUeF162A beifügen!
Please attach VDE-Form AUe162A!

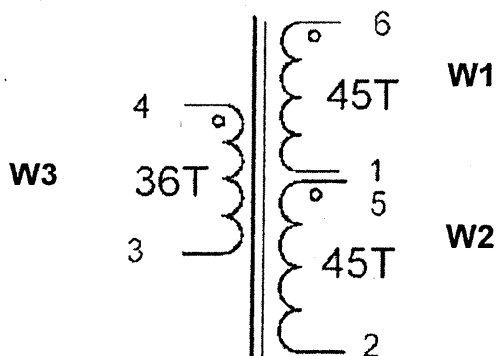
6. Elektrische Daten Electrical values		Eingang (Primär) Input (primary)	Ausgang (Sekundär) Output (secondary)
6.1 Bemessungsspitzenspannung [V] Rated peak voltage	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
6.2 Bemessungsspannung (effektiv) [V] Rated voltage (rms)	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
6.3 Bemessungsfrequenz [Hz] Rated frequency	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
6.3 Bemessungsstrom [A] Rated current	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT
6.4 Bemessungsleistung [VA] Rated power	:	COSTUMER WILL PROVIDED IT	COSTUMER WILL PROVIDED IT

7. Wicklungen Windings		
7.1 Anzahl Wicklungen Number of Windings	:	1 2
7.2 Windungsanzahl Number of turn	:	36 (W2) 45 (W1) / 45 (W3)
7.3 Drahtdurchmesser [mm] Diameter of wire	:	0.20mm 0.20mm
7.4 Kaltwiderstand in Ω bei 25 °C Cold resistance in Ω at 25 °C	:	1 (W3) 1.5 (W1) / 1.5 (W2)


J:\FORMULARE\AUe F142A BUILT IN TRANSFORMERS FOR EQUIPMENT.DOC

	Genehmigungsausweis Nr.: Marks Licence No.:	Aktenzeichen: File reference:	Anlage: Appendix No.:	Seite Page 2 / 4	Copyright VDE
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8. Isolation
Insulation
- 8.1 Spulenkörpermaterial (Hersteller, Typ) : Base-PET FR-530 BY DUPONT DE NEMOURS
Bobbin material (Manufacturer, type)
- 8.1.1 Entflammbarkeitskategorie Spulenkörper : 94-V0
Flammability category bobbin
- 8.2 Material der Drahtisolation (Hersteller, Typ) : TEX-E (FURUKAWA)
Material of wire insulation (Manufacturer, type)
- 8.2.1 Lacktyp der Drahtisolation : MODIFIED POLYESTER THERMAL-RESISTANT RESIN
Type of varnish for wire insulation POLYAMID RESIN
- 8.2.2 Lackisolation nach IEC 60317 : --
Varnish for insulation in acc. to IEC 60317
- 8.3 Lagenisolationmaterial (Hersteller, Typ) : FURUKAWA, TEX-E modified polyester, thermal resistant
Material of layer insulation (Manufacturer, type)
- 8.4 Leitungen (Isolationsmaterial) : N/A
Lead insulation material
- 8.5 Wicklungsschema-Schaltbild (mit Klemmenbezeichnung, Farben der Anschlußenden usw.) :
Circuit diagram (which terminal markings, color of wires etc.)



9. Eisenkern / Iron core
- 9.1 Blech, Materialsorte / Sheet metall, material : Soft Ferrite Core
- 9.2 Hauptabmessungen / Main dimensions : 12mm X 7.92mm X 6.35
- 9.3 Schnittskizze / Cross-sectional drawing : N/A

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9.3 Schnittskizze / Cross-sectional drawing N/A

10. Aufbau / Construction

- | | | | |
|--|---|--|------------------------|
| 10.1 Konstruktionsmerkmale
<i>Construction details</i> | : | -- , | Getränkt / Impregnated |
| 10.2 Tränkungsmitel (Hersteller, Typ)
<i>Impregnating substances (Manufacturer, Type)</i> | : | PD GEORGE, AIR DRYING VARNISH PDG434 | |
| 10.3 Tränkungsverfahren
<i>Impregnation procedure</i> | : | <input checked="" type="checkbox"/> Unterdruck <input type="checkbox"/> Überdruck bei 25 °C
<i>Underpressure Overpressure at</i> | |
| 10.4 Vergußmasse (Hersteller, Typ)
<i>Potting material (Manufacturer, Type)</i> | : | USED AS GLUE TSE3331 BY GE TOSHIBA SILICONES | |
| 10.5 Entflammbarkeitskategorie Vergußmasse
<i>Flammability category potting material</i> | : | 94V-0 | |
| 10.6 Baustoff der Abdeckung
<i>Material of the cover</i> | : | N/A | |
| 10.7 Entflammbarkeitskategorie der Abdeckung
<i>Flammability category of cover</i> | : | N/A | |
| 10.8 Baustoff des Gehäuses
<i>Material of the enclosure</i> | : | N/A | |
| 10.9 Entflammbarkeitskategorie des Gehäuses
<i>Flammability category of enclosure</i> | : | N/A | |

11. Im Transformator eingebaute Einzelteile (Schutzeinrichtungen, Kabel, Stecker, Schalter usw.): *Components built in the transformer (Protective means, cables, plugs, switches etc.):*

Einzelteil <i>Component</i>	Hersteller <i>Manufacturer</i>	Typ <i>Type</i>	Referenz/Tech. Daten*) <i>Reference / techn. Data</i>	Prüfzeichen *) <i>Certification mark</i>

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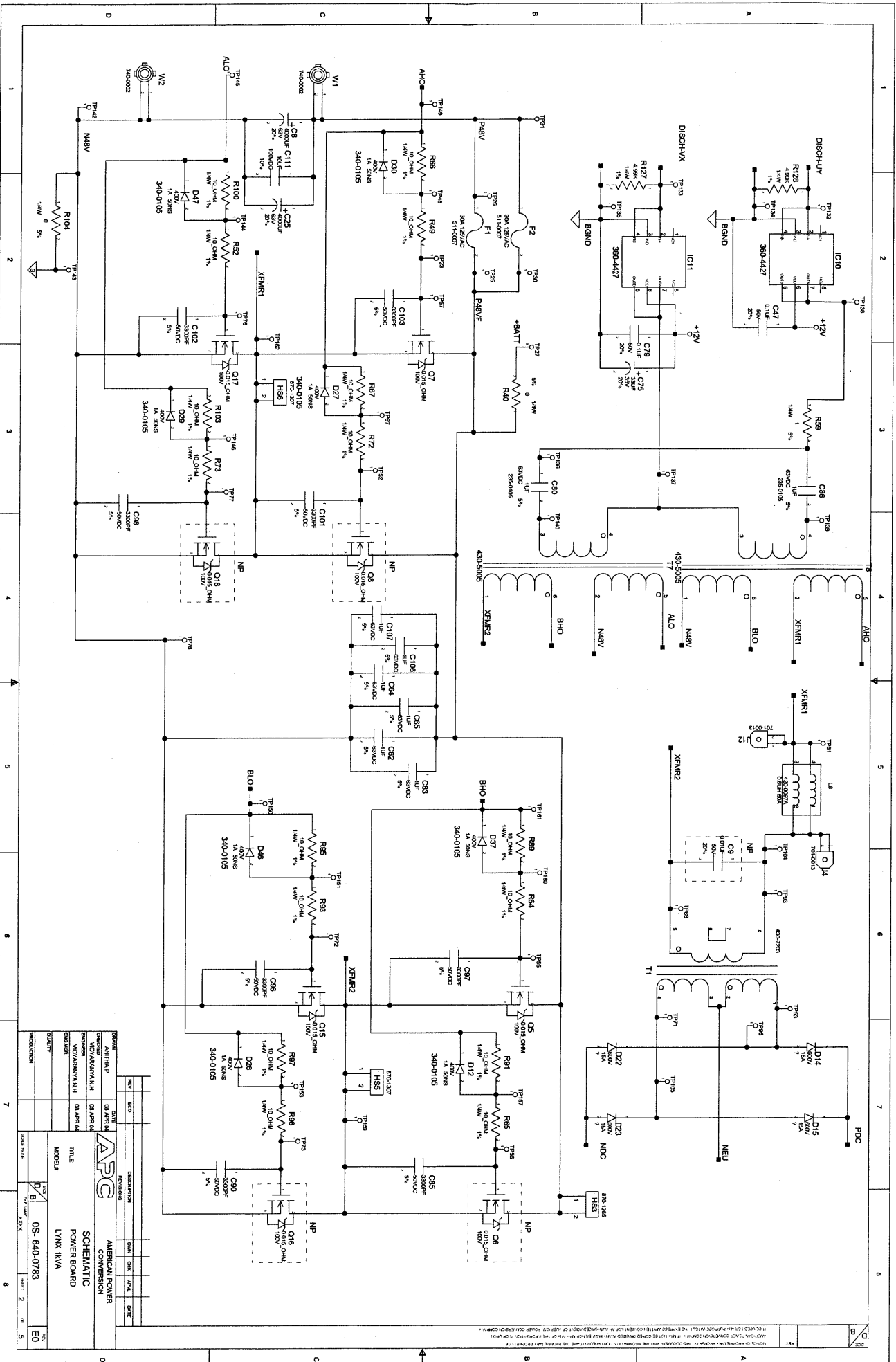
11. Im Transformator eingebaute Einzelteile (Schutzeinrichtungen, Kabel, Stecker, Schalter usw.):
Components built in the transformer (Protective means, cables, plugs, switches etc.):

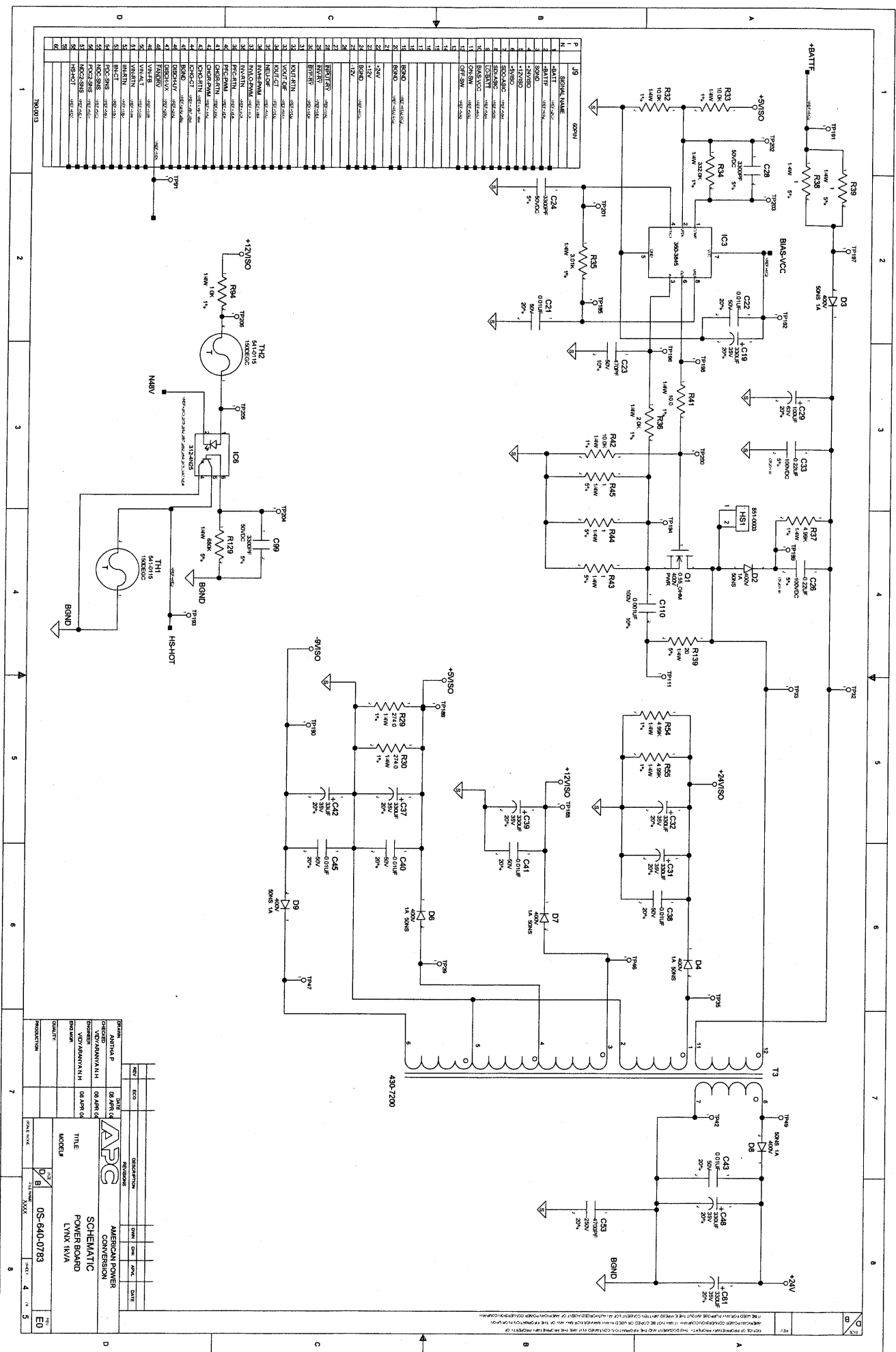
Einzelteil Component	Hersteller Manufacturer	Typ Type	Referenz/Tech. Daten*) Reference / techn. Data	Prüfzeichen *) Certification mark

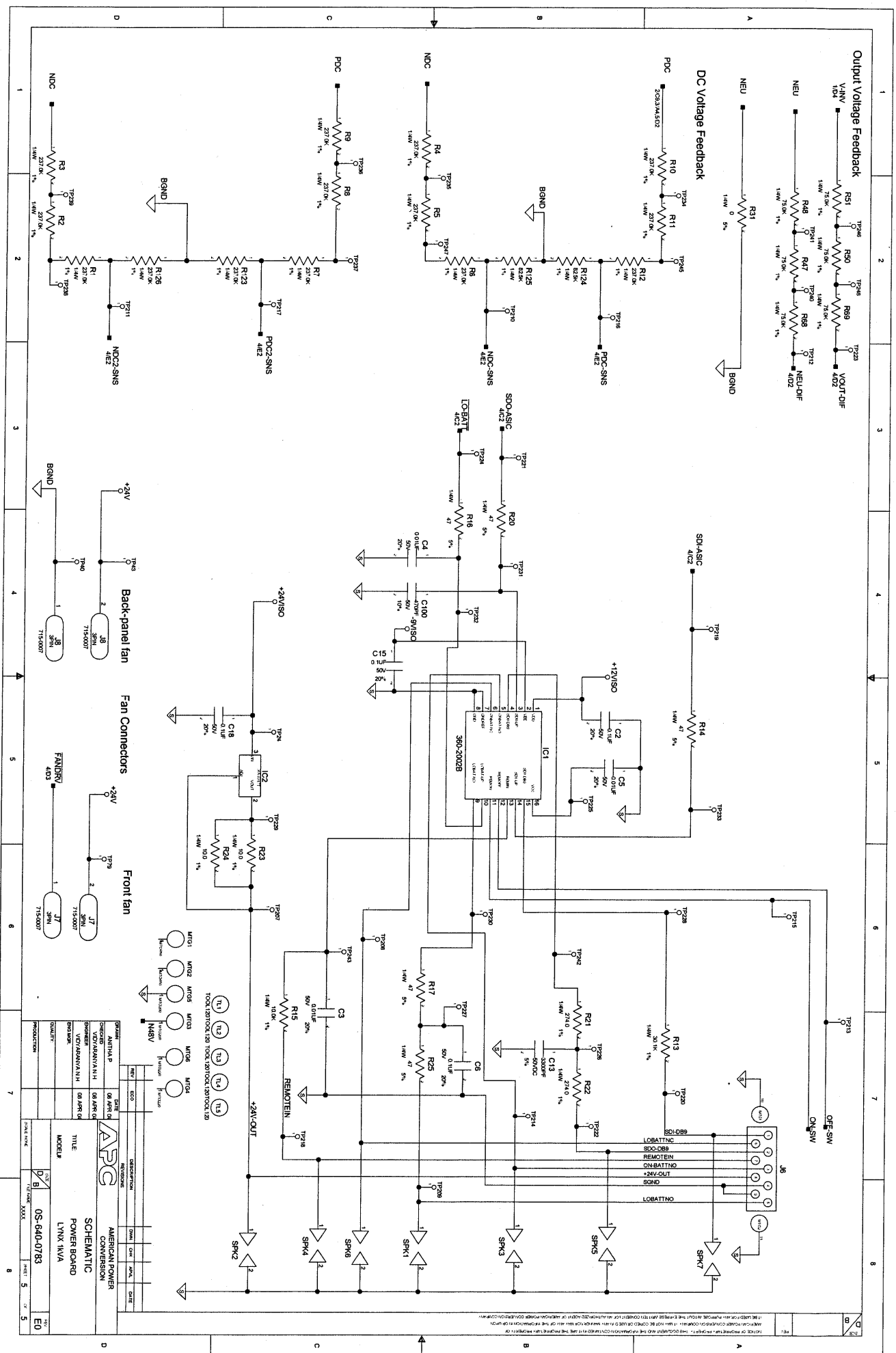
*) Bitte weitere technische Informationen, Zertifikate, Prüfberichte u. a. beifügen.
Please provide further technical information, Certificates, Testreports etc. if applicable

12. Sonstiges (Besondere konstruktive Merkmale usw.) :
Other data (special constructional feature etc.)
N/A

Offenbach <i>19.10.04</i> VDE Prüf- und Zertifizierungsinstitut VDE Testing and Certification Institute Fachgebiet E13 / Section F13 i. A. <i>[Signature]</i>	Ort / Place: Merida, Yucatan Mexico Datum / Date: 09/22/2004 Verantwortlich für die Angaben Responsible for the details Alejandro Palma QUALITY ASSURANCE MANAGER. Name
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HEATING (TEMPERATURE RISE)

Page 1 of 3

Test E4: EN 60950 , Clause 5.1. UL/CSA/EN60950 3rd edition 60950-1 Clause 4.5.1

Model SURT1000XLI * was connected to a 230 V, 1 \emptyset , 50 Hz source of supply and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperature Rise (°C)

Thermocouple # and Location	Normal Mode	Discharge Mode	Recharge Mode
1. Ambient	24.1	21.7	20.7
2. Transformer T1a	4.5	23.0	21.1
3. Transformer T1b	2.6	14.9	13.1
4. Transformer T8	1.0	1.0	0.8
5. Inductor L4	54.6	52.8	54.0
6. Inductor L6	30.5	25.3	30.1
7. Relay RY2	13.3	11.6	13.4
9.			
10.			
11.			
12.			

Runtime (hr:min:sec)

Pass/Fail Criteria (excluding abnormal results):

- XFMR & inductor insulation of products with a specified ambient of 40°C shall be limited to the following temperature rises (measured temp - measured ambient):
Class A(105), 50°C; Class B(130), 70°C; Class F(155), 90°C; Class H(180), 115°C; Class N(200), 125°C; Class R(220), 140°C.
- Components such as caps & PC Boards are limited to the component's specified rating minus the difference between the UUT's specified ambient and room ambient.
- External surfaces are limited to the following temperature rises:
 - Carrying handles or knobs: 25 if metal; 35 if non-metallic.
 - Handles or knobs that are contacted but do not involve lifting or carrying: 35 if metal; 45 if glass or porcelain; 60 if plastic or rubber.
 - External surfaces which may be touched: 45 if metal; 55 if glass or porcelain; 70 if plastic or rubber.

Comments: Transformers - (Reinforced insulation) T1 (430-7203); T7,T8 (430-0357)

*- represents SURT1000XLI, SURT1000UXI, SURT1000XLICH, SURT1000UXICH

Equipment ID: Power Analyzer #523 (due 10/28/04), Acquisition 3328 (due 10/01/04)Tested by: Steve Lee Date Tested: 23 August 04 Report#: _____Reviewed by: [P] [F]: *Rich Everett* Data Sheet Rev 3 (5/27/03)*IF*

HEATING (TEMPERATURE RISE)

Page 2 of 3

Test E4: EN 60950 , Clause 5.1. UL/CSA/EN60950 3rd edition 60950-1 Clause 4.5.1

Model SURT1000XLI * was connected to a 254 V, 1 \emptyset , 50 Hz source of supply and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperature Rise (°C)

Thermocouple # and Location	Normal Mode	Discharge Mode	Recharge Mode
1. Ambient	22.0	21.6	21.1
2. Transformer T1a	0.7	23.1	24.1
3. Transformer T1b	0.5	15.3	15.9
4. Transformer T8	0.2	0.6	1.1
5. Inductor L4	51.1	51.6	53.4
6. Inductor L6	24.6	21.5	26.2
7. Relay RY2	11.4	11.2	12.7
8.			
9.			
10.			
11.			
12.			

Runtime (hr:min:sec)

Pass/Fail Criteria (excluding abnormal results):

- XFMR & inductor insulation of products with a specified ambient of 40°C shall be limited to the following temperature rises (measured temp - measured ambient):
Class A(105), 50°C; Class B(130), 70°C; Class F(155), 90°C; Class H(180), 115°C; Class N(200), 125°C; Class R(220), 140°C.
- Components such as caps & PC Boards are limited to the component's specified rating minus the difference between the UUT's specified ambient and room ambient.
- External surfaces are limited to the following temperature rises:
 - Carrying handles or knobs: 25 if metal; 35 if non-metallic.
 - Handles or knobs that are contacted but do not involve lifting or carrying: 35 if metal; 45 if glass or porcelain; 60 if plastic or rubber.
 - External surfaces which may be touched: 45 if metal; 55 if glass or porcelain; 70 if plastic or rubber.

Comments: Transformers - (Reinforced insulation) T1 (430-7203); T7,T8 (430-0357)

*- represents SURT1000XLI, SURT1000UXI, SURT1000XLICH, SURT1000UXICH

Equipment ID: Power Analyzer #523 (due 10/28/04), Acquisition 3328 (due 10/01/04)Tested by: Steve Lee Date Tested: 24 August 04 Report#: _____Reviewed by: [P] [F]: *Dick Everett*

Data Sheet Rev 3 (5/27/03)



VDE-Technische Universität
Südwestfalen

Test E4: EN 60950 , Clause 5.1. UL/CSA/EN60950 3rd edition 60950-1 Clause 4.5.1

Model SURT1000XLI * was connected to a 207 V, 1 \emptyset , 50 Hz source of supply and operated in the modes stated in the table below. Temperatures were monitored until thermal equilibrium. Maximum temperatures obtained during the test were measured by means of 30 AWG, Type K (chromel-alumel) thermocouples placed on the components.

Maximum Measured Temperature Rise (°C)

Thermocouple # and Location	Normal Mode	Discharge Mode	Recharge Mode
1. Ambient	22.0	22.0	23.7
2. Transformer T1a	0.7	29.1	7.8
3. Transformer T1b	0.5	16.8	6.7
4. Transformer T8	0.2	0.8	0.9
5. Inductor L4	48.8	50.4	54.4
6. Inductor L6	28.3	28.5	37.2
7. Relay RY2	11.6	11.6	13.4
8.			
9.			
10.			
11.			
12.			

Runtime (hr:min:sec)

Pass/Fail Criteria (excluding abnormal results):

1. XFMR & inductor insulation of products with a specified ambient of 40°C shall be limited to the following temperature rises (measured temp - measured ambient):
Class A(105), 50°C; Class B(130), 70°C; Class F(155), 90°C; Class H(180), 115°C; Class N(200), 125°C; Class R(220), 140°C.
2. Components such as caps & PC Boards are limited to the component's specified rating minus the difference between the UUT's specified ambient and room ambient.
3. External surfaces are limited to the following temperature rises:
 - Carrying handles or knobs: 25 if metal; 35 if non-metallic.
 - Handles or knobs that are contacted but do not involve lifting or carrying: 35 if metal; 45 if glass or porcelain; 60 if plastic or rubber.
 - External surfaces which may be touched: 45 if metal; 55 if glass or porcelain; 70 if plastic or rubber.

Comments: Transformers - (Reinforced insulation) T1 (430-7203); T7,T8 (430-0357)

*- represents SURT1000XLI, SURT1000UXI, SURT1000XLICH, SURT1000UXICH

Equipment ID: Power Analyzer #523 (due 10/28/04), Acquisition 3328 (due 10/01/04)

Tested by: Steve Lee Date Tested: 24 August 04 Report#:

Reviewed by: [P] [F]: Mike Everett

Data Sheet Rev 3 (5/27/03)

Hidden fields from previous dE design

Test E6I: EN 60950, EN 50091, Clause 5.2, Annex D and Annex G.

Model SURT1000XLI * was connected to the high line voltage and frequencies listed in the table below. The unit was then isolated from earth ground by opening the Protective Earth conductor.

Leakage current was measured with the ED&D, LT-30HC Leakage Current Tester.

Measurements were made first from the phase conductor to chassis and then from the neutral conductor to chassis. Data was recorded with the product's power switch in both the ON and OFF positions.

		Maximum Leakage Current (mA)				
Voltage (VAC)	Freq (Hz)	Power Switch ON		Power Switch OFF		Mode of Operation
		Ø-Chass	N-Chass	Ø-Chass	N-Chass	
<u>230</u>	<u>50</u>	<u>0.404</u>	<u>0.405</u>	<u>0.708</u>	<u>0.710</u>	Normal
<u>-</u>	<u>50</u>	<u>0.011</u>	<u>0.011</u>			Discharge
<u>230</u>	<u>50</u>	<u>0.395</u>	<u>0.396</u>			Recharge
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	Normal
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	Discharge
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	Recharge
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

Pass/Fail Criteria:

- Leakage current of Pluggable Type A equipment shall not exceed 3.5 mA.
- Leakage current of Permanently Connected or Pluggable Type B equipment shall not exceed either: 3.5 mA; or 5% of the measured input current with the following label applied to the product (in multiple languages):
HIGH LEAKAGE CURRENT - Earth connection essential before connecting supply".
- Leakage current of hand-held equipment shall not exceed 0.75 mA.

Comments: _____

*- represents SURT1000XLI, SURT1000UXI, SURT1000XLICH, SURT1000UXICH

Equipment ID & Range: Leakage Tester #676 (due 01/18/04), Pacific Source #1879

Tested by: Steve Lee Date Tested: 13 August 04 Report#: _____

Reviewed by: [P] ~~[F]~~: *Rich E...* Data Sheet Rev 2 (7/21/98)

Hidden files from previous dS design:

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Test E7: CSA 107.1, Clause 6.5; UL 1778, Sections 47.3 & 47.4; EN 60950, Clause 5.3.
UL/CSA/EN60950 3rd ed, 60950-1 Clause 5.2

After Model SURT1000XLI * was in a well-heated condition, a potential was applied between the locations noted below. Starting at zero, the potential was gradually increased to the value indicated and maintained at that value for 1 minute.

Underline the letter of each test performed. Cross out the voltage not used for testing and cross out the term that does not describe the result. Be sure to include the model designation and vendor of each transformer (XFMR) tested. The table is to be used for situations such as: testing numerous XFMRs or capacitors; testing metal-coated plastics; and investigating production-line hipot failures.

- | | |
|---|--------------------------|
| a. 1500 VAC between AC Input Circuits and Ground
(Phase & Neutral pins to ground pin of power supply cord). | [Pass] [Fail] |
| b. 2121 VDC between AC Output Circuits and Ground
(Phase and Neutral pins to ground pin of outlet receptacles). | [Pass] [Fail] |
| c. 4243 VDC between Primary and SELV circuits. | [Pass] [Fail] |
| d. 3000 VAC between Primary windings and Core
(1500 VAC required by VDE, but varnish could cause poor ground). | [Pass] [Fail] |
| e. 1500 VAC between Secondary windings and Core. (VDE Required) | [Pass] [Fail] |
| f. 1250 VAC between Hazardous Voltage Battery and Ground | [Pass] [Fail] |
| g. [1250 VAC] [1768 VDC] between Primary and Secondary circuits. | [Pass] [Fail] |
| h. _____ VAC (_____ VDC) between Hazardous Voltage Secondary and SELV. | [Pass] [Fail] |
| i. 1768 VDC across Line to Line and Line to Ground Capacitors,
with capacitors well heated. | [Pass] [Fail] |

Pass/Fail Criteria: There shall be no insulation breakdown. Insulation breakdown is considered to have occurred when the current which flows as a result of the application of the test voltage rapidly increases in an uncontrolled manner, i.e. the insulation does not restrict the flow of the current. Corona discharge or a single momentary flashover is not regarded as insulation breakdown.

Comments: *- represents SURT1000XLI, SURT1000UXI, SURT1000XLICH, SURT1000UXICH

Equipment ID & Range: HiPot Tester #2412 (due 3-11-05)

Tested by: Steve Lee Date Tested: 18 August 04 Report#: _____

Reviewed by: [P] ~~[F]~~: *Dick Everett* Data Sheet Rev 2 (7/21/98)

ELECTRIC STRENGTH

Page 2 of 2

Test E7: CSA 107.1, Clause 6.5; UL 1778, Sections 47.3 & 47.4; EN 60950, Clause 5.3.
UL/CSA/EN60950 3rd ed, 60950-1 Clause 5.2

After model Transformers - * was in a well-heated condition, a potential was applied between the locations noted below. Starting at zero, the potential was gradually increased to the value indicated and maintained at that value for 1 minute.

Underline the letter of each test performed. Cross out the voltage not used for testing and cross out the term that does not describe the result. Be sure to include the model designation and vendor of each transformer (XFMR) tested. The table is to be used for situations such as: testing numerous XFMRs or capacitors; testing metal-coated plastics; and investigating production-line hipot failures.

- | | |
|---|---------------|
| a. [1500 VAC] [2121 VDC] between AC Input Circuits and Ground
(Phase & Neutral pins to ground pin of power supply cord). | [Pass] [Fail] |
| b. [1500 VAC] [2121 VDC] between AC Output Circuits and Ground
(Phase and Neutral pins to ground pin of outlet receptacles). | [Pass] [Fail] |
| c. 3000 VAC between Primary and SELV windings. | [Pass] [Fail] |
| d. 3000 VAC between Primary windings and Core
(1500 VAC required by VDE, but varnish could cause poor ground). | [Pass] [Fail] |
| e. 1500 VAC between Secondary windings and Core. (VDE Required) | [Pass] [Fail] |
| f. 1250 VAC between Hazardous Voltage Battery and Ground | [Pass] [Fail] |
| g. [1250 VAC] [1768 VDC] between Primary and Secondary circuits. | [Pass] [Fail] |
| h. _____ VAC (_____ VDC) between Hazardous Voltage Secondary and SELV. | [Pass] [Fail] |
| i. 1768 VDC across Line to Line and Line to Ground Capacitors,
with capacitors well heated. | [Pass] [Fail] |

Pass/Fail Criteria: There shall be no insulation breakdown. Insulation breakdown is considered to have occurred when the current which flows as a result of the application of the test voltage rapidly increases in an uncontrolled manner, i.e. the insulation does not restrict the flow of the current. Corona discharge or a single momentary flashover is not regarded as insulation breakdown.

Comments: * T1 (APC 430-7203), T7,T8 (APC 430-0357)

Equipment ID & Range: HiPot Tester #2412 (due 3-11-05)

Tested by: Steve Lee Date Tested: 18 August 04 Report#: _____

Reviewed by: [P] [F]: Pick Everett Data Sheet Rev 2 (7/21/98)

Hidden filers from previous dB design:

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VDE Testing and Co.
Jensen

Test A16: EN 50091, Annex L, and EN 60950, Clause 5.2.
UL 1778 3rd ed, CSA 107.3 Clause 2.1.102 and Annex FF

Model SURT1000XLI * was connected to a 254 V, 50 Hz source and was operating in its normal mode with no load connected to the UPS's output. The input powercord was disconnected from the branch circuit to simulate a power outage, causing the unit to operate in its battery mode. Leakage current was measured between all pins of the powercord using the ED&D, model LT-30HC Leakage Current Tester.

The tests were then repeated with the UPS supplying maximum power to a resistive load with 22 nF capacitors connected from phase to ground and neutral to ground.

All testing was then repeated with a single fault applied after the unit was set to its battery mode.

Leakage Current (mA)			Load	Test Condition
Ø - N	Ø - Gnd	N - Gnd		
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	None	Normal
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	Full load with 22 nF caps	Normal
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	None	Fault ¹
<u>n/a</u>	<u>n/a</u>	<u>n/a</u>	Full load with 22 nF caps	Fault ¹

Pass/Fail Criteria:

For pluggable equipment, leakage current must be less than 3.5 mA within one second of the powercord's disconnection or application of a fault.

Comments: *- represents SURT1000XLI, SURT1000UXI, SURT1000XLICH, SURT1000UXICH

Note 1: Fault = Control Board IC40 - Short pin 8 to pin 13

Leakage Current measurements were not required. In all tests the measured output voltage was well below 30 Vrms within one second of disconnection from AC mains.

Equipment ID: Oscilloscope #2939 (due 2-5-05), Diff. Probe #3382 (due 7-26-05)

Tested by: Steve Lee Date Tested: 17,18 August 04 Report#:

Reviewed by: [P] [F]: *Paul Everett*

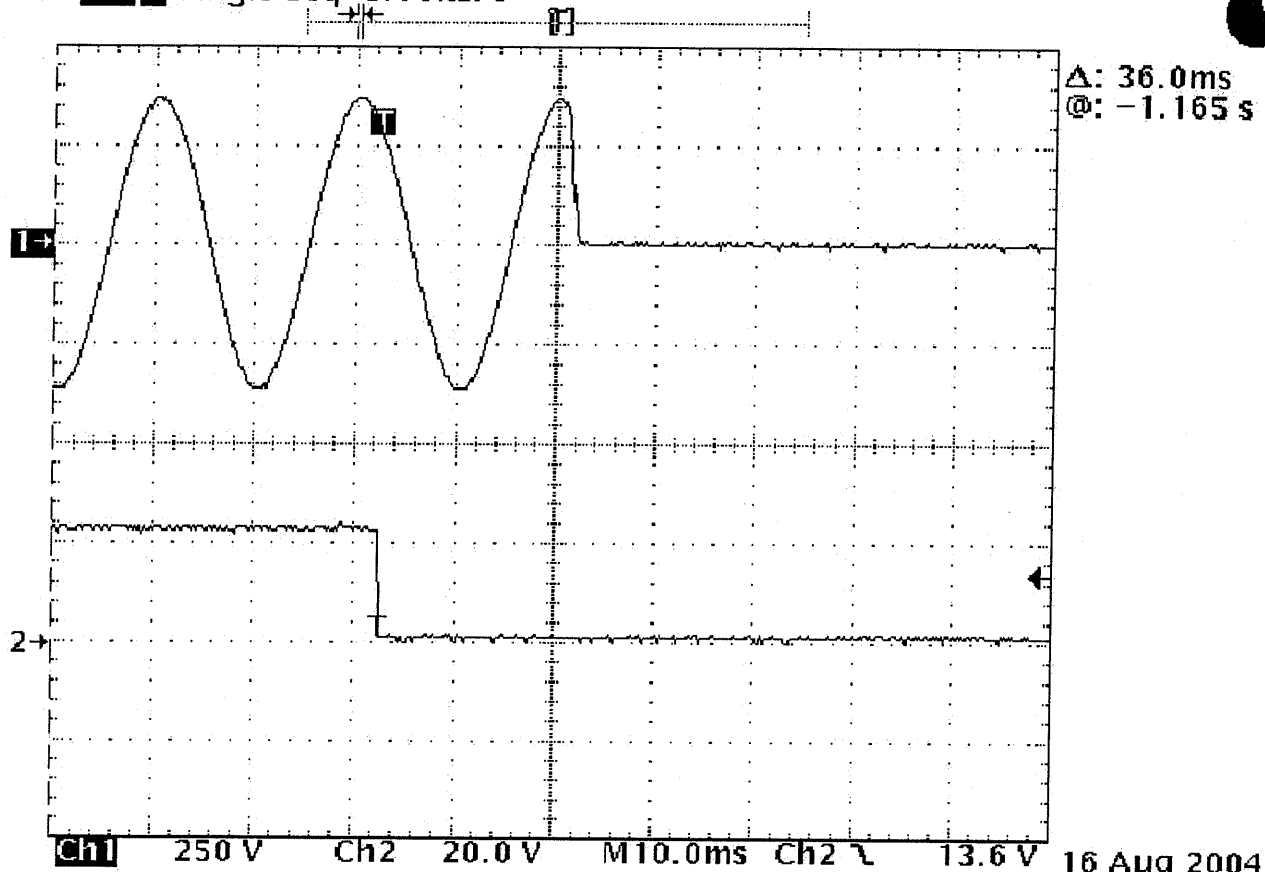
Data Sheet Rev 2 (7/21/98)

[Signature]
VDE File:1924400-3335-0020
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Backfeed Protection Test

Model SURT1000XLI

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



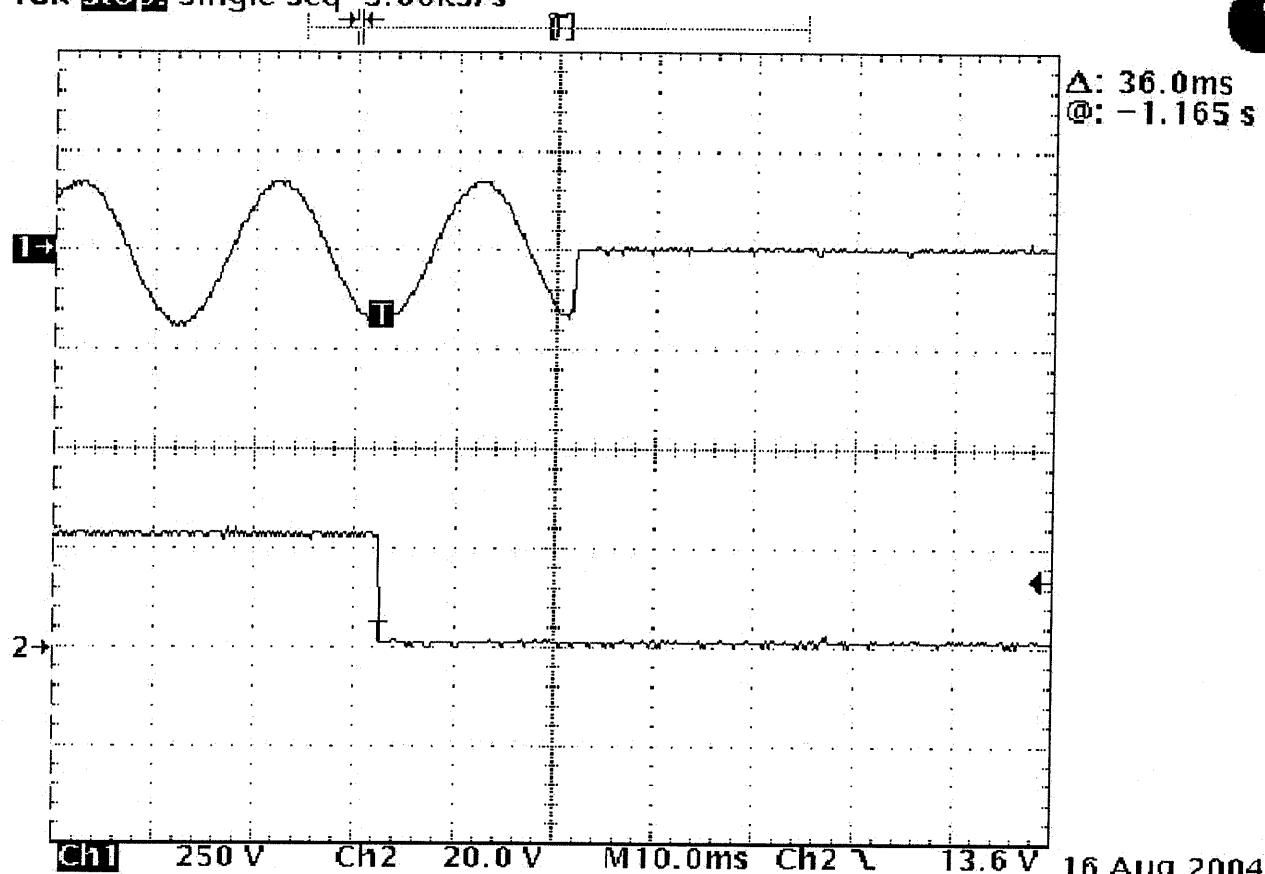
16 Aug 2004
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Backfeed Protection Test
SURT1000XLI (cost)
Normal – No Load
Phase to Neutral

Backfeed Protection Test

Model SURT1000XLI

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



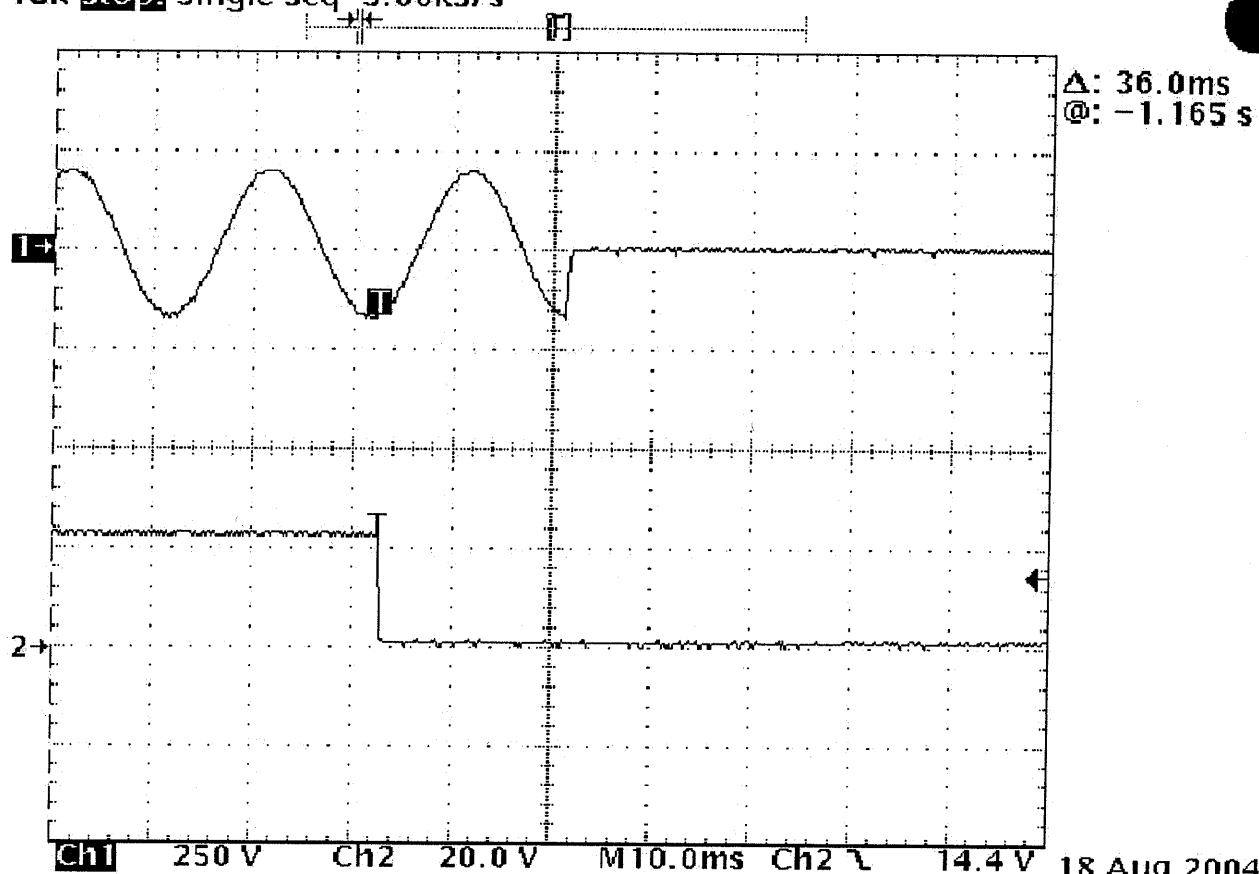
16 Aug 2004
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Backfeed Protection Test
SURT1000XLI (cost)
Normal - No Load
Phase to Ground

Backfeed Protection Test

Model SURT1000XLI

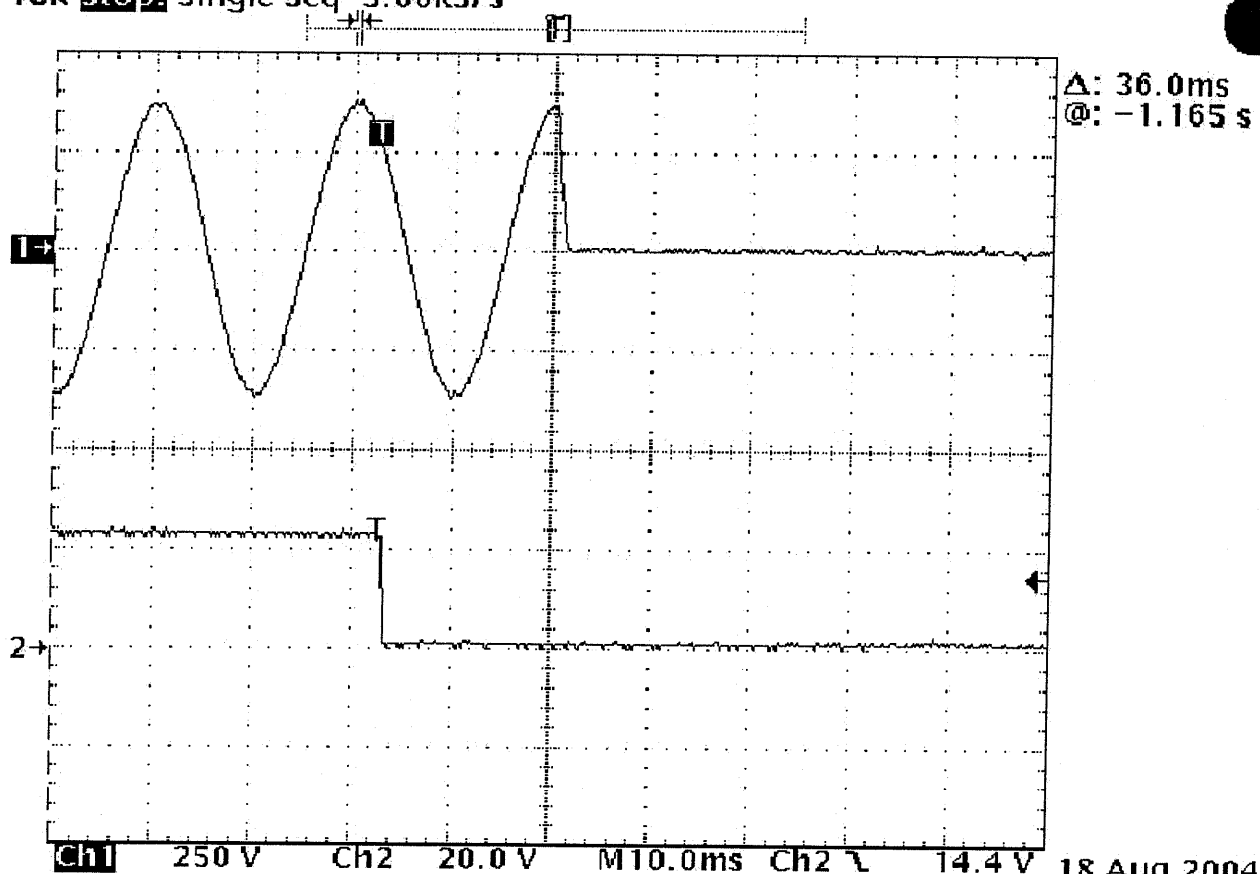
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18 Aug 2004
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Backfeed Protection Test
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Normal – No Load
Neutral to Ground

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



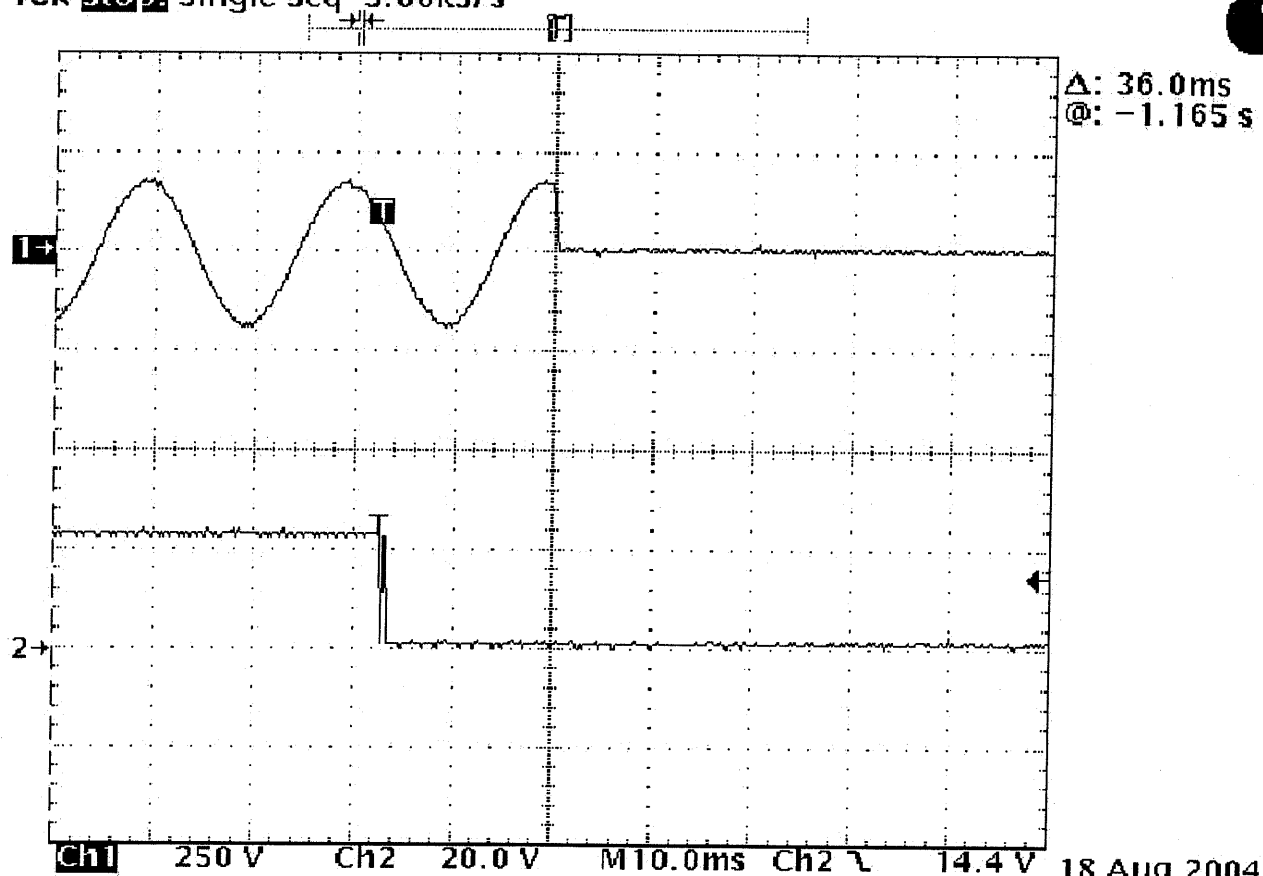
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Backfeed Protection Test
SURT1000XLI (cost)
Normal - Full Load
Phase to Neutral

Backfeed Protection Test

Model SURT1000XLI

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



18 Aug 2004
08:03:52

Backfeed Protection Test
SURT1000XLI (cost)
Normal - Full Load
Phase to Ground

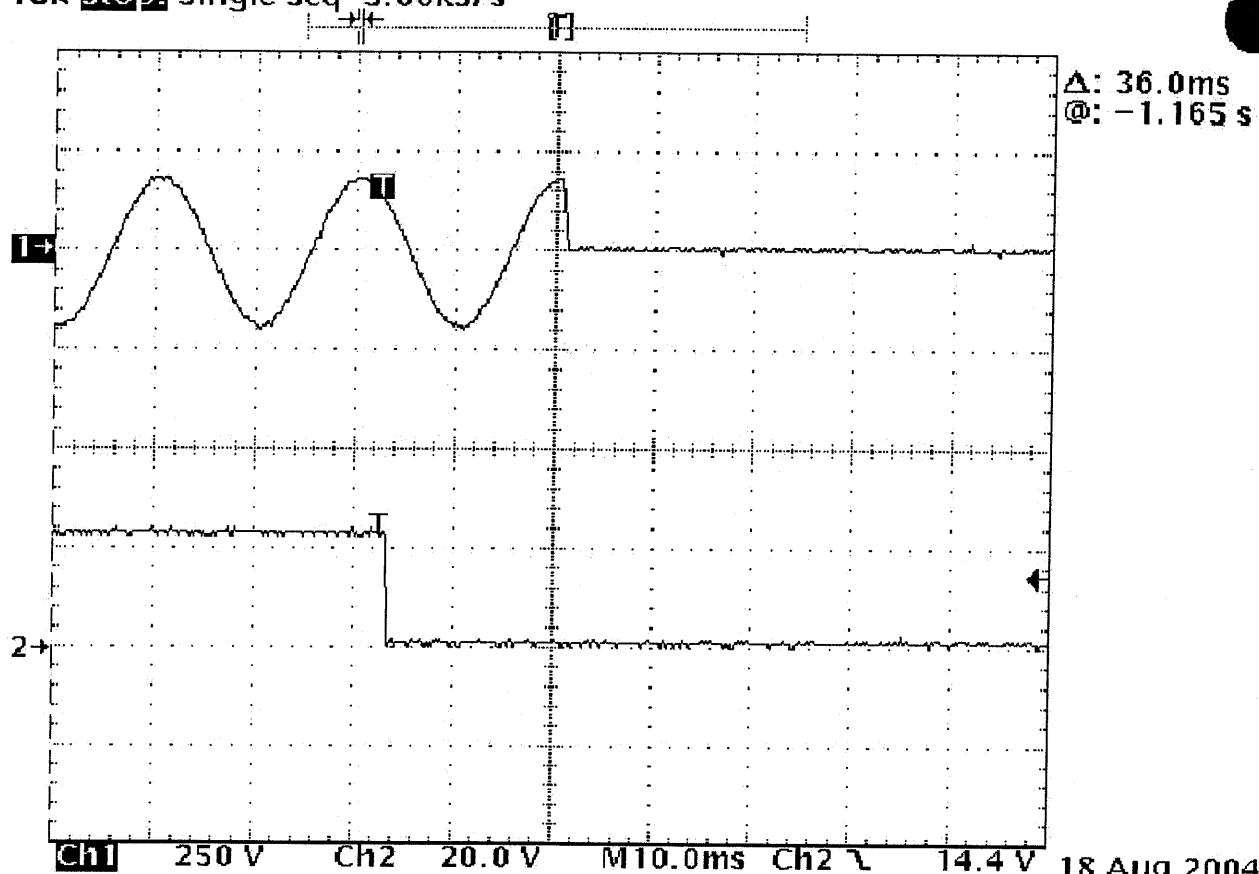
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VDE File:1924400-3335-0020
G. Stulze

Backfeed Protection Test

Model SURT1000XLI

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



18 Aug 2004
08:06:01

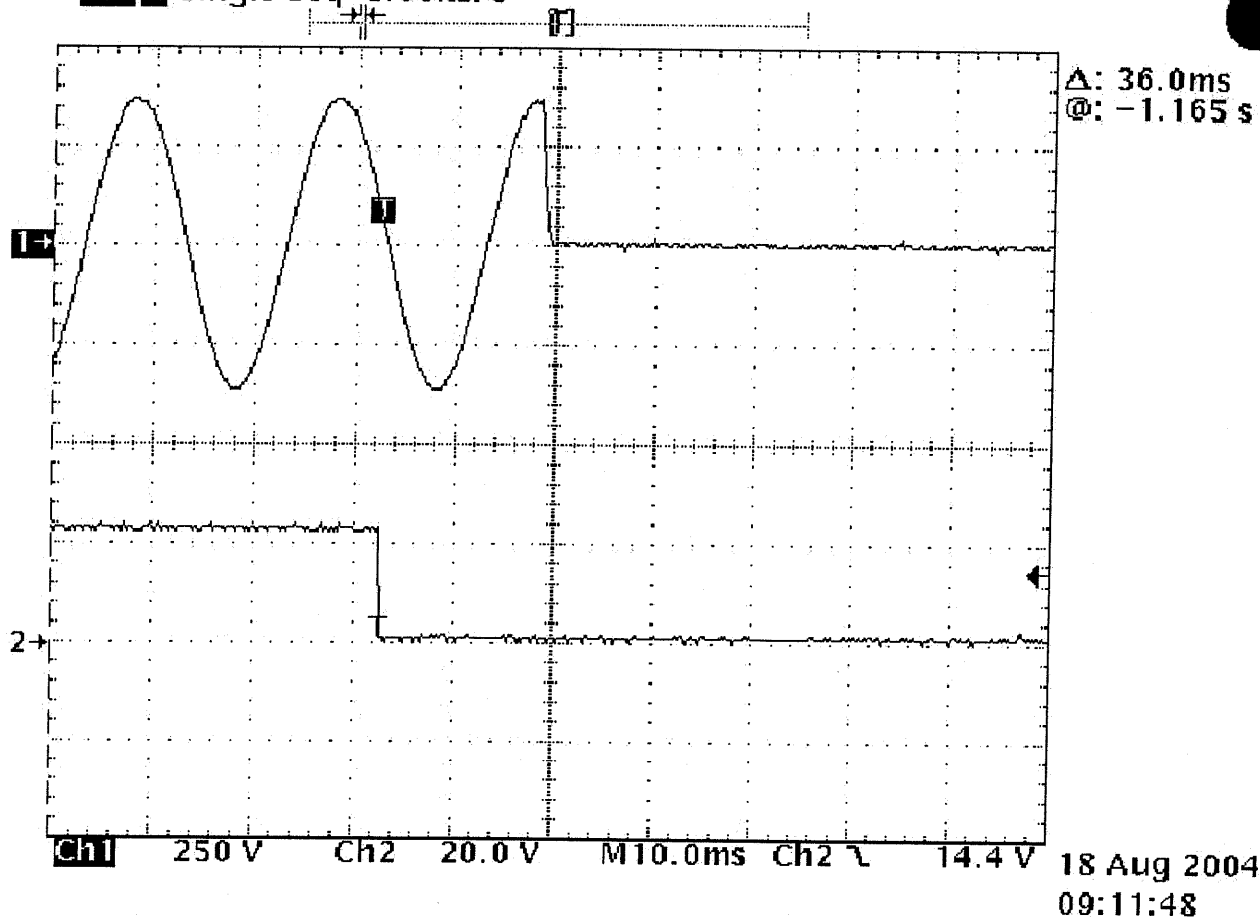
Backfeed Protection Test
SURT1000XLI (cost)
Normal - Full Load
Neutral to Ground

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Appendix 21, Page 13 of 21

Backfeed Protection Test

Model SURT1000XLI

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



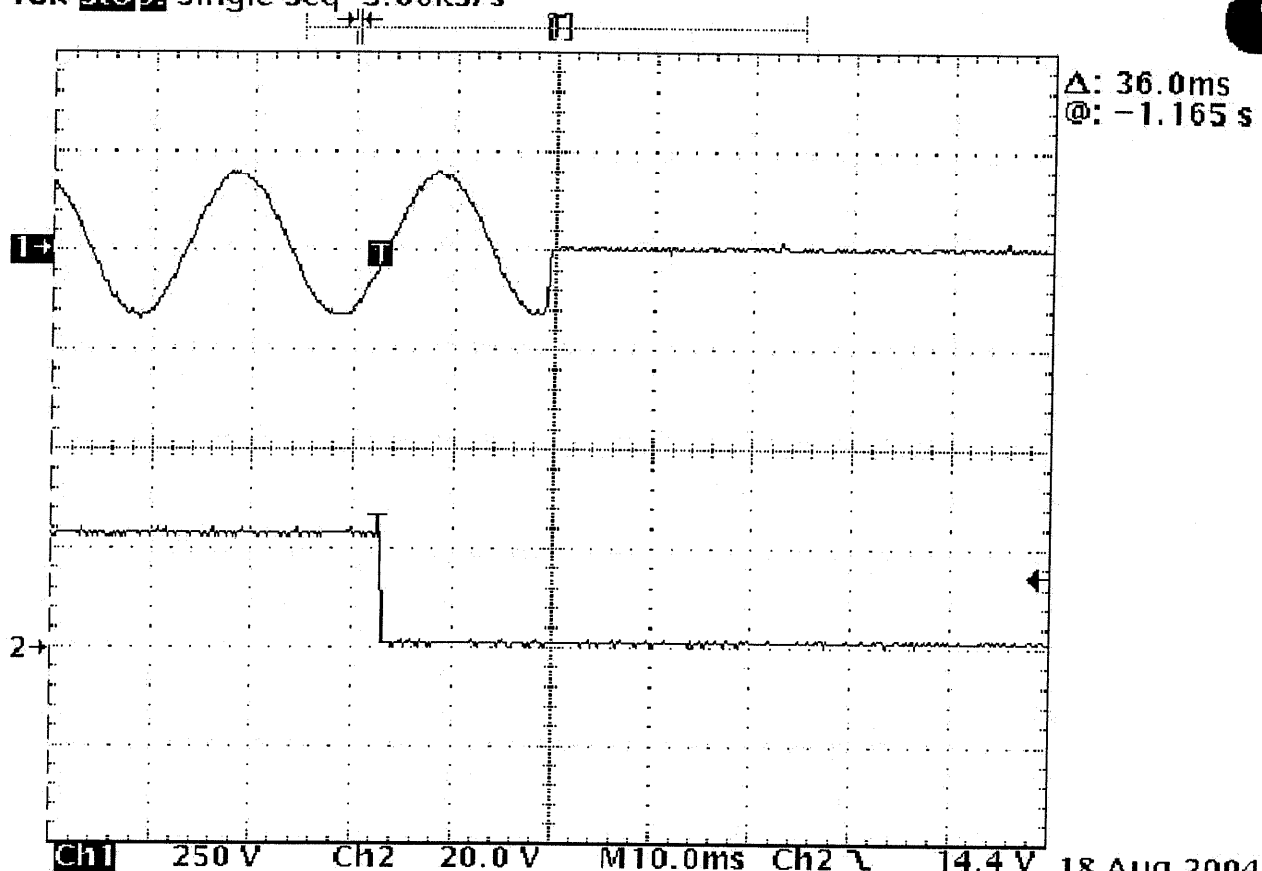
Backfeed Protection Test
SURT1000XLI (cost)
Fault - No Load
Phase to Neutral

Handwritten signature
VDE File:1924400-3335-0020
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Backfeed Protection Test

Model SURT1000XLI

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



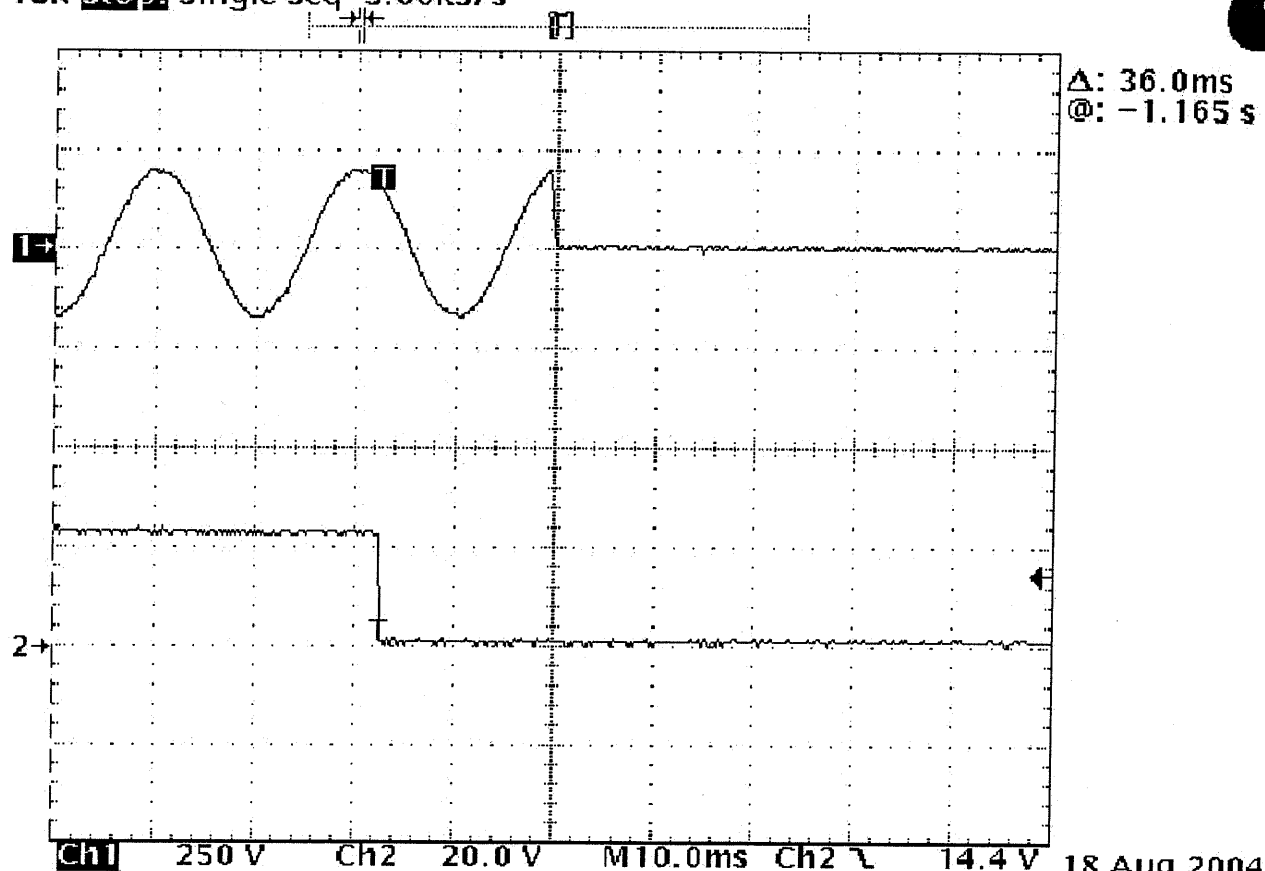
18 Aug 2004
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Backfeed Protection Test
SURT1000XLI (cost)
Fault - No Load
Phase to Ground

Backfeed Protection Test

Model SURT1000XLI

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



18 Aug 2004
09:22:34

Backfeed Protection Test
SURT1000XLI (cost)
Fault - No Load
Neutral to Ground

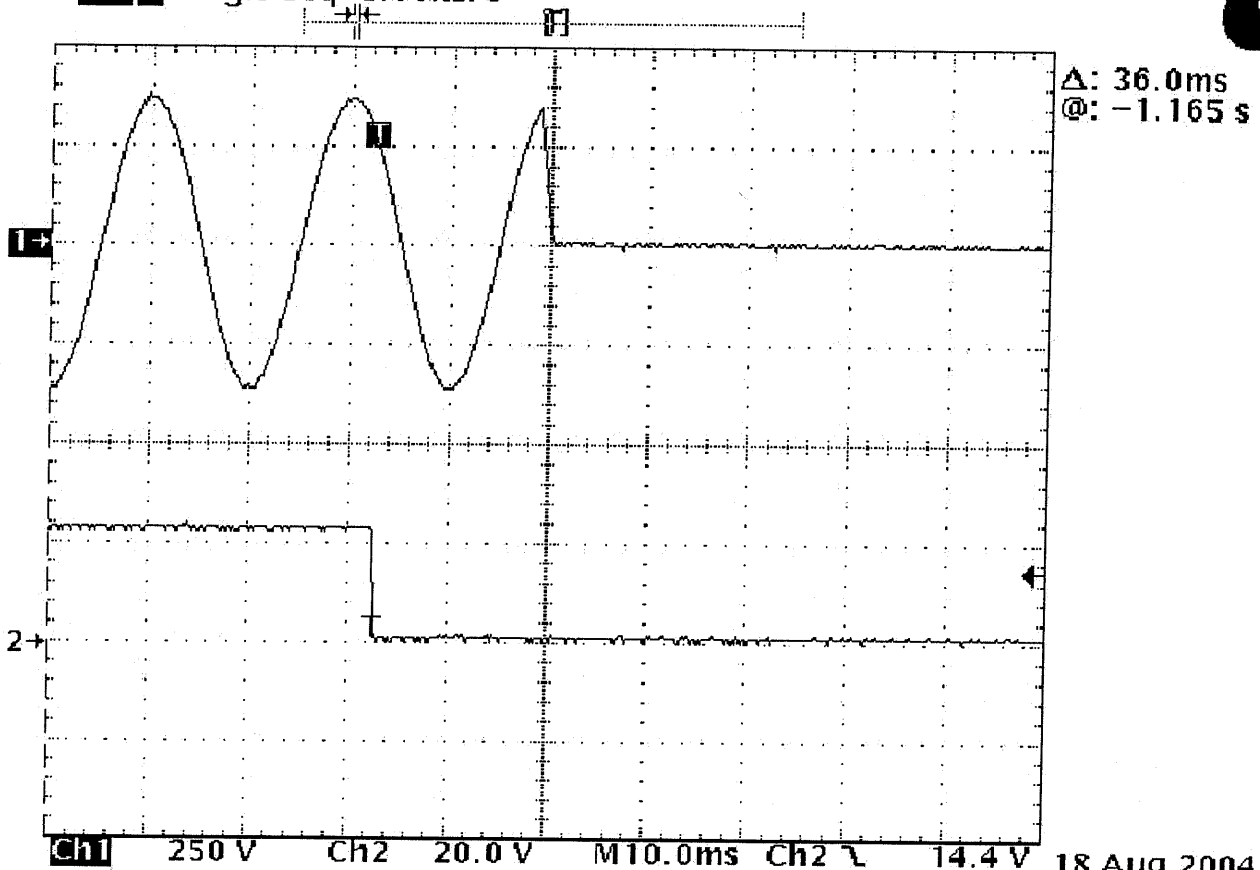
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VDE Technology Application Institute
J. K. Kline

Backfeed Protection Test

Model SURT1000XLI

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



18 Aug 2004
09:24:54

Backfeed Protection Test
SURT1000XLI (cost)
Fault - Full Load
Phase to Neutral

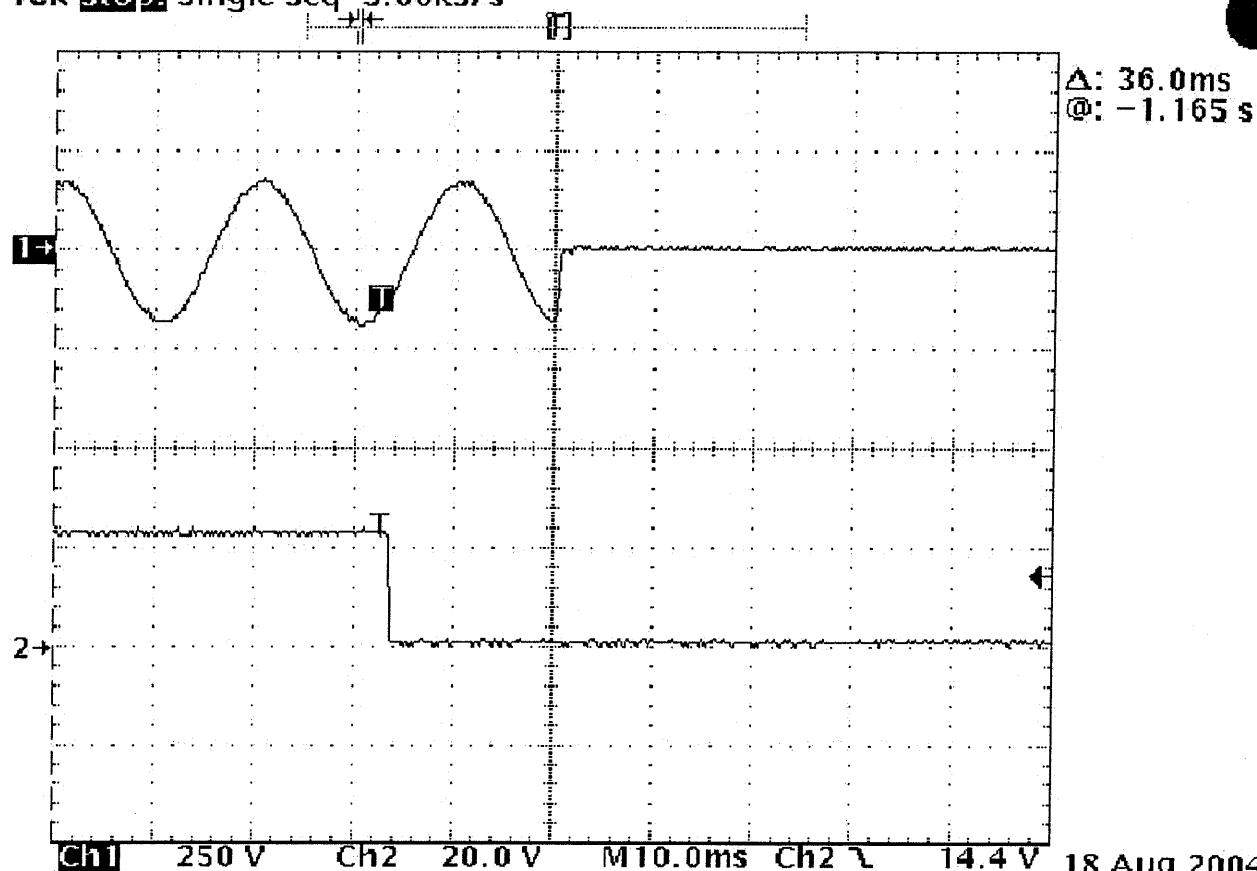
VDE File:1924400-3335-0020
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VDE Certification
[Signature]
C. 13

Backfeed Protection Test

Model SURT1000XLI

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



18 Aug 2004
09:26:54

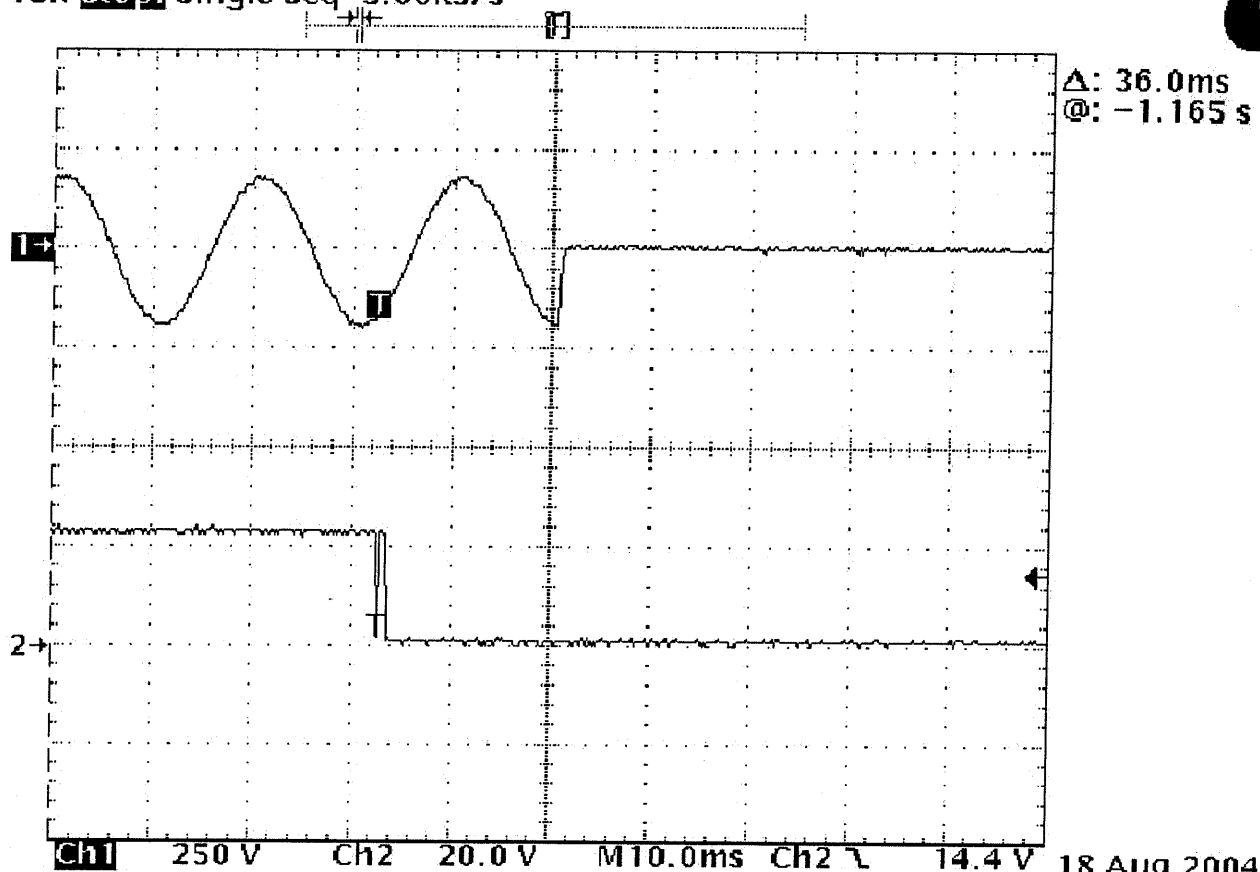
Backfeed Protection Test
SURT1000XLI (cost)
Fault - Full Load
Phase to Ground

VDE File:1924400-3335-0020
G. F. L. K. S. 18 Aug 2004
09:26:54

Backfeed Protection Test

Model SURT1000XLI

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



18 Aug 2004
09:28:35

Backfeed Protection Test
SURT1000XLI (cost)
Fault - Full Load
Neutral to Ground

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[Signature]

COMPONENT SHORT- AND OPEN-CIRCUIT TEST

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Test A9: CSA 107.1, Clause 6.6.7; UL 1778, Paragraph 52.10.
UL/csa/en 60950 3rd ed 60950-1

Transformer T1 (430-0358) Secondary Short Circuit Test

Model SURT1000XLI was connected to a 50 A source and was operating in its Battery mode, before the fault was inserted. The unit was placed on a white tissue-paper covered surface, and a single layer of cheesecloth was loosely draped over it to determine if flaming particles escaped the enclosure. Immediately following the test, the unit was subjected to hipot testing to determine if insulation had been damaged.

Each test was conducted until further change as a result of the fault was not likely. This test was terminated in 1 second when:

- a. the branch circuit breaker opened.
- b. the UPS's supplementary protector opened and was reset ten times.
- c. the UPS's UL489/CSA#5 circuit breaker opened and was reset three times.
- d. the automatic reset protector functioned so the test continued for 7 hours.
- e. circuit was interrupted due to failure of component(s): Q5
- f. unit shut down (current limiting mode).
- g. temperatures of magnetic components stabilized. See Abnormal Heating, next page.
- h. low battery shutdown.
- i. other: _____

Pass/Fail Criteria:

Emission of flaming or glowing material or molten metal?	[Yes] [No]
Enclosure deformed as to permit access to a hazard?	[Yes] [No]
Rupturing of battery case, or venting of a battery?	[Yes] [No]
Open transformer winding?	[Yes] [No]
1500 Vac AC Input to Chassis Hipot:	[Pass] [Fail]
2121 Vdc AC Output to Chassis Hipot:	[Pass] [Fail]

Comments: _____

Equipment ID: Power Analyzer #523 (due 10/28/04), Acquisition 3328 (due 10/01/04)

Tested by: Rodney Wright Date Tested: 02 Sept. 04 Report#: _____

Reviewed by: [P] ~~[F]~~: *Rich Everett* Data Sheet Rev 3 (5/27/03)

Hidden files from previous dB design:

VDE File:1924400-3335-0020
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VDE Testing *G. Lube* Institution

COMPONENT SHORT- AND OPEN-CIRCUIT TEST

Page 1 of 2

Test A9: CSA 107.1, Clause 6.6.7; UL 1778, Paragraph 52.10.
UL/csa/en 60950 3rd ed 60950-1

Transformer T1 (430-0358) Secondary Short Circuit Test

Model SURT1000XLI was connected to a 50 A source and was operating in its Normal mode, before the fault was inserted. The unit was placed on a white tissue-paper covered surface, and a single layer of cheesecloth was loosely draped over it to determine if flaming particles escaped the enclosure. Immediately following the test, the unit was subjected to hipot testing to determine if insulation had been damaged.

Each test was conducted until further change as a result of the fault was not likely. This test was terminated in 1 hour when:

- a. the branch circuit breaker opened.
- b. the UPS's supplementary protector opened and was reset ten times.
- c. the UPS's UL489/CSA#5 circuit breaker opened and was reset three times.
- d. the automatic reset protector functioned so the test continued for 7 hours.
- e. circuit was interrupted due to failure of components: _____
- f. unit shut down (current limiting mode).
- g. temperatures of magnetic components stabilized. See Abnormal Heating, next page.
- h. low battery shutdown.
- i. other: No affect on the unit, test terminated in 1 Hour. *

Pass/Fail Criteria:

Emission of flaming or glowing material or molten metal?	[Yes] [No]
Enclosure deformed as to permit access to a hazard?	[Yes] [No]
Rupturing of battery case, or venting of a battery?	[Yes] [No]
Open transformer winding?	[Yes] [No]
1500 Vac AC Input to Chassis Hipot:	[Pass] [Fail]
2121 Vdc AC Output to Chassis Hipot:	[Pass] [Fail]

Comments: * The transformer is used to step-up the battery voltage to be
equal to the DC buss voltage.

Equipment ID: Power Analyzer #523 (due 10/28/04), Acquisition 3328 (due 10/01/04)

Tested by: Rodney Wright Date Tested: 02 Sept. 04 Report#: _____

Reviewed by: [P] {F}: *Dick Everett* Data Sheet Rev 3 (5/27/03)

J. F. L...
Certification