VDE Prüf- und Zertifizierungsinstitut

VDE

VDE Prüf- und Zertifizierungsinstitut · Merianstraße 28 · D-63069 Offenbach

American Power Conversion Corp.
85 Rangeway Road
Building #2
NORTH BILLERICA MA 01862
USA

Offenbach, 2002-05-27

Ihr Zeichen *Your ref.*	Ihr Schreiben *Your letter* 2002-04-16	Unser Zeichen - bitte angeben *Our ref. - please indicate* 1924400-3335-0025 Auftrag Nr. *Order No.* 15855	Bearbeiter(in) techn.: *Contact (tech.):* Frank Richter Tel: +49(0)698306-435 Fax: -402 Bearbeiter(in) kaufm.: *Contact (order d.):* Erwin Biehl Tel: +49(0)698306-352 Fax: -582

Zeichengenehmigung Nr. 40000164
Marks Licence No.

Sehr geehrte Damen und Herren,

wir übersenden Ihnen den Zeichengenehmigungsausweises Nr. 40000164 zum Benutzen des auf Blatt 1 angegebenen Zeichens und bitten Sie, die auf der Rückseite abgedruckten Hinweise sorgfältig zu beachten. Wegen weiterer Einzelheiten verweisen wir auf unsere Prüf- und Zertifizierungsordnung PM 102.

Ladies and Gentlemen.

Please find enclosed the Marks Licence No. 40000164 for the use of the certification mark as shown on page 1. Please observe carefully the instructions printed on the reverse side. For further details, see the Testing and Certification Procedure PM 102.

Mit freundlichen Grüßen
Yours sincerely

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

VDE VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.

VDE Prüf- und Zertifizierungsinstitut
Testing and Certification Institute
Institut d'Essais et de Certification
Merianstrasse 28
D-63069 Offenbach
http//www.vde-institut.com

Telefon
+49 (0) 69 83 06-0
Telefax
+49 (0) 69 83 06-555
e-mail
vde-institut@vde.com

Nach dem Gerätesicherheitsgesetz (GSG) "zugelassene Stelle" für technische Arbeitsmittel.
Nach dem EMV-Gesetz "zuständige Stelle" für elektromagn. Verträglichkeit EMV von Geräten.
Vom Bundesminister für Verteidigung anerkannte Prüfstelle für Bauelemente der Elektronik.
Von Akkreditierungsstellen im DAR nach DIN EN 45001, 45011 und 45012 akkreditiert.
Akkreditiert durch: IEC - Internationale Elektrotechnische Kommission - IECEE/CB, IECQ und CENELEC - Europ. Komitee für elektrotech. Normung - CCA, HAR, ENEC, EMEDCA, CECC.

VDE Prüf- und Zertifizierungsinstitut

ZEICHENGENEHMIGUNG
MARKS LICENCE

American Power Conversion Corp.
85 Rangeway Road
NORTH BILLERICA 01862
USA

ist berechtigt, für ihr Produkt /
is authorized to use for their product

Unterbrechungsfreie Stromversorgung
Uninterruptible power supply

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.

oder/*or*

oder/*or*

Geprüft und zertifiziert nach /
Tested and certified according to

DIN EN 60950 (VDE 0805):2001-12; EN 60950:2000
IEC 60950:1999 + corr. 2000 modif.
DIN EN 50091-1-1 (VDE 0558 Teil 511):1997-07; EN 50091-1-1:1996
IEC 146-4:1986

Die Anforderungen des Gerätesicherheitsgesetzes (GSG) §3 werden eingehalten.
The requirements of the Appliance Safety Law §3 are met.

Aktenzeichen: 1924400-3335-0025 / 15855
File ref.:
Ausweis-Nr. 40000164 Blatt 1
Licence No. *Page*
Weitere Bedingungen siehe Rückseite und Folgeblätter /
further conditions see overleaf and following pages
Offenbach, 2002-02-06

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Zertifizierungsstelle
Certification

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ELEKTRONIK INFORMATIONSTECHNIK e.V.

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

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American Power Conversion Corp., 85 Rangeway Road, Building #2, NORTH BILLERICA MA 01862, USA

Aktenzeichen / *File ref.*
1924400-3335-0025 / 15855 / F131 / RC

Datum / *Date*
2002-02-06

Dieses Blatt gilt nur in Verbindung mit Blatt 1 des Zeichengenehmigungsausweises Nr. 40000164.
This supplement is only valid in conjunction with page 1 of the Licence No. 40000164.

Jahresgebühren-Einheiten /
Annual fee units

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

VDE Prüf- und Zertifizierungsinstitut
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	Jahresgebühren-Einheiten / *Annual fee units*
Unterbrechungsfreie Stromversorgung ***Uninterruptible power supply***	26.00

Typ(en) / *Type(s)*:

BP650SI	2.00
BP420SI	2.00
BP280SI	2.00
SU620INET	2.00
SU420INET	2.00

Nennspannung *Rated voltage*	AC 220-240 V, 50 - 60 Hz
Nennstrom *Nominal Current*	5.3 A
Schutzklasse *Class*	I
Ausgangsspannungen und -ströme *output voltage and current*	AC 220 - 240 V, 3.0 A, 50 - 60 Hz, 650 VA AC 220 - 240 V, 2.8 A, 50 - 60 Hz, 620 VA AC 220 - 240 V, 1.9 A, 50 - 60 Hz, 420 VA AC 220 - 240 V, 1.3 A, 50 - 60 Hz, 280 VA
Schutzmaßnahme *Protection against electric shock*	abgedeckte Ausführung *covered version*
Weitere Angaben *Further information*	siehe Anlagen 1 - 8 *see appendix 1 - 8*

Summe der Jahresgebühren-Einheiten / *Sum of annual fee units* 36.00

Fortsetzung siehe Blatt 3 /
continued on page 3

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Ausweis-Nr. / Licence No. 40000164 | Beiblatt / Supplement

Name und Sitz des Genehmigungs-Inhabers / *Name and registered seat of the Licence holder*
American Power Conversion Corp., 85 Rangeway Road, Building #2, NORTH BILLERICA MA 01862, USA

Aktenzeichen / *File ref.*
1924400-3335-0025 / 15855 / F131 / RC

letzte Änderung / *updated* 2002-05-28

Datum / *Date* 2002-02-06

Dieses Beiblatt ist Bestandteil des Zeichengenehmigungsausweises Nr. 40000164.
This supplement is part of the Licence No. 40000164.

Unterbrechungsfreie Stromversorgung
Uninterruptible power supply

Fertigungsstätte(n)
Place(s) of manufacture

American Power Conversion
Plant 1
2nd Street Epza Cavite
Econoic Zone
ROSARIO CAVITE
PHILIPPINEN

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

VDE Prüf- und Zertifizierungsinstitut

VDE

VDE Prüf- und Zertifizierungsinstitut · Merianstraße 28 · D-63069 Offenbach

American Power Conversion Corp.
85 Rangeway Road
Building #2
NORTH BILLERICA MA 01862
USA

Offenbach, 2002-05-15

Ihr Zeichen *Your ref.*	Ihr Schreiben *Your letter* 2002-04-16	Unser Zeichen - bitte angeben *Our ref. - please indicate* 1924400-3335-0025 Auftrag Nr. *Order No.* 15328	Bearbeiter(in) techn.: *Contact (tech.):* Frank Richter Tel: +49(0)698306-435 Fax: -402 Bearbeiter(in) kaufm.: *Contact (order d.):* Erwin Biehl Tel: +49(0)698306-352 Fax: -582

Zeichengenehmigung Nr. 40000164
Marks Licence No.

Sehr geehrte Damen und Herren,

Sie erhalten heute eine Neuausfertigung des Zeichengenehmigungsausweises Nr. 40000164. Diese Neuausfertigung ersetzt zum 2002-05-15 den derzeit gültigen Zeichengenehmigungsausweis, welcher dann von Ihnen unverzüglich zu vernichten ist. Wir weisen darauf hin, dass die Herstellung von Produkten mit einem VDE-Zeichen nur dann gestattet ist, wenn eine gültige Zeichengenehmigung für diese Produkte besteht. Zuwiderhandlungen stellen einen Verstoß gegen die Prüf- und Zertifizierungsordnung (PM 102) dar.

Ladies and Gentlemen,

Please find enclosed a new version of the Marks Licence No. 40000164. This version replaces the currently valid licence as of 2002-05-15, which has to be destroyed by you immediately. We would like to inform you that the manufacturing of products with a VDE Mark is only permitted, if a valid licence has been issued for these products. Infringements to this are in violation of the Testing and Certification Procedure (PM 102).

Mit freundlichen Grüßen
Yours sincerely

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

i.A. Jakubki-Weikl

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ELEKTRONIK INFORMATIONSTECHNIK e.V.

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VDE Form 111 03/02

VDE Prüf- und Zertifizierungsinstitut

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American Power Conversion Corp.
85 Rangeway Road
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Aktenzeichen: 1924400-3335-0025 / 15328
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Ausweis-Nr. 40000164 Blatt 1
Licence No. *Page*
Weitere Bedingungen siehe Rückseite und Folgeblätter /
further conditions see overleaf and following pages

Offenbach, 2002-02-06
(letzte Änderung/updated 2002-05-15)

VDE Prüf- und Zertifizierungsinstitut
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Zertifizierungsstelle
Certification

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VDE Prüf- und Zertifizierungsinstitut
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1924400-3335-0025 / 15328 / F131 / RC

letzte Änderung / *updated* 2002-05-15

Datum / *Date* 2002-02-06

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	Jahresgebühren-Einheiten / *Annual fee units*
Unterbrechungsfreie Stromversorgung ***Uninterruptible power supply***	26.00

Typ(en) / *Type(s)*:

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BP420SI	2.00
BP280SI	2.00
SU620INET	2.00
SU420INET	2.00

Nennspannung *Rated voltage*	AC 220-240 V, 50 - 60 Hz
Nennstrom *Nominal Current*	5.3 A
Schutzklasse *Class*	I
Ausgangsspannungen und -ströme *output voltage and current*	AC 220 - 240 V, 3.0 A, 50 - 60 Hz, 650 VA AC 220 - 240 V, 2.8 A, 50 - 60 Hz, 620 VA AC 220 - 240 V, 1.9 A, 50 - 60 Hz, 420 VA AC 220 - 240 V, 1.3 A, 50 - 60 Hz, 280 VA
Schutzmaßnahme *Protection against electric shock*	abgedeckte Ausführung *covered version*
Weitere Angaben *Further information*	siehe Anlagen 1 - 8 *see appendix 1 - 8*

Summe der Jahresgebühren-Einheiten / *Sum of annual fee units* 36.00

Fortsetzung siehe Blatt 3 /
continued on page 3

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Zeichengenehmigung

Ausweis-Nr. / Licence No. 40000164 | Blatt / page 3

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Jahresgebühren-Einheiten / *Annual fee units*

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

i.A. Jakubski-Weikl

i.A.

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Ausweis-Nr. / Licence No. 40000164 | Beiblatt / Supplement

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Datum / *Date* 2002-02-06

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This supplement is part of the Licence No. 40000164.

Unterbrechungsfreie Stromversorgung
Uninterruptible power supply

Fertigungsstätte(n)
Place(s) of manufacture

American Power Conversion (APC)
Plant 2
Lot 32 Phase I Carmelray Ind. PK
Canlubang Calamba
LAGUNA, PHILIPPINES
PHILIPPINEN

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

i. A. Jakubki-Weikl

i. A.

VDE Pruf-und Zertifizierungsinstitut
VDE Testing and Certification institute
MenanstraBe28.D-63069 Offenbach. Tel.(+491(69) 83 06-0. Fax(+49)(69) 83 06-555

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

Constructional date for isolating transformers and safety isolating transformers to ED 60742 DIN VDE 0551 | Form 42E

-Transiation of the VDE Testing and Certification Documents-

1.1 Manufacturer: PROS TRANSFORMER, INC.
1.2 Place of manufacture: Blk 19, Phase 3, Lot 2-11, PEZA, Rosario, Cavite, 4106 PHILIPPINES
1.3 Reference of type: PS - A1006PT
1.4 Trade Mark: PTI
1.5 Other markings:
1.6 Reference number: 430-2052A

2.1 Protection against electric shock: CLASS 2
2.2 Class of protection to IEC 539: IP20
2.3 Type of construction(Isolating transformer for toys……): Isolating Transformer
2.4 Transformer, stationary - portable.): Stationary

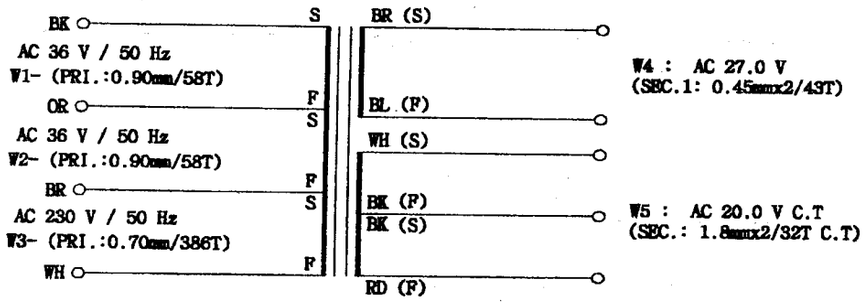
2.5 Protection against short- circuit according to sub clause 6.2.):
inherently short-circuit proof.
non-inherently short-circuit proof.
non short-circuit proof.
fail safe:
(rated current of the cutout: A)
2.6 Rated maximum abient temperature: ta ℃
2.7 Class: F insulation : Delclaration of Insulation see VDE- Form 187
(according to IEC 85)
2.8 CTI- Value (according to IEC 112. Method A):

3. Electrical values	input	output(AC:DC)
3.1 Rated voltage (s)	V:Pri.W1(BK-OR)36Vac,W2(OR-BR)36Vac,W3(BR-WH)230Vac	Sec.W4(BR-BL)27Vac, W5(WH-BK-RD)20VacC.T
3.2 Rated frequency	Hz: 50Hz	
3.3 Rated current	A:	
3.4 Rated output	VA:	
3.5 Rated power factor cos phi:		

4 Windings

4.1 Coil base,	number FR.530 material:(FR.530) Polyethylene terephthalate(PET) 94V-O	
4.2 Material of layer insulation:	Polyester Film Tape, Nomex Paper	
4.3 Windings, material: Polyurethane enameled (CB UEW/NY UEW)	number:ANSI MW28 or MW79	
4.4 Taps.	Number:	
4.5 Diameter of wire (mm):	Pri.W1(BK-OR)0.9Φ,W2(OR-BR)0.9Φ,W3(BR-WH)0.7Φ	Sec.W4(BR-BL)0.45Φx2, W5(WH-BK-RD)1.8Φx2
4.6 Windings insulation.	Materials: Polyester, Nomex	
4.7 Cord insulation material	internal: external:	
4.8 Cold resistance in Ω at 25 ℃	Pri.W1(BK-OR)0.311,W2(OR-BR)0.312,W3(BR-WH)3.65	Sec.W4(BR-BL)0.615, W5(WH-BK-RD)0.015C.T

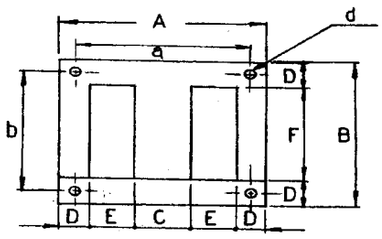
4.9 Circuit diagram (witch terminal markings.color of wires etc.):



5 Iron core

5.1 Sheet metall, material: Lamination steel
main demension:

5.2 Cross-sectional drawing:



A	B	C	D	E	F
105.0	77.5	35	17.5	17.5	52.5
a	b	d			
87.0	70.0	6.0			

6 Type of construction

6.1 Open-covered -in case protection.) Open

6.2 Impregnated-undrowned-drowned.) Drowned

6.3 Soaking (liquor):

6.4 Underpressure - Overpressure - Soaking at ℃.)

6.5 Drownmaterial : Varnish TSHP (Hanval Inc.)

6.6 Material of the cover:
of the case:
of the socket(support): EGI 2.0T

6.7 Fiammability class for insulation material:

7.1 Other date (special constional feature. Etc.):

8.1 Compenents built - in the transformer: (switches,plugs.thermal cut off, cable.. Etc.):

Type	Manufacturer	Details about type. Current.power or similar	VDE - Marx No - Yes

Offenbach. 14.OT.02

VDE Testing and Certification institut
Department

i.A.

Place : Date:
PEZA, CAVITE / FEBRUARY28 , 2002

(Stamp and signature of the manufacturer)

VDE Pruf-und Zertifizierungsinstitut
VDE-Prufstelle
MerianstraBe28

Aktenzsichen / file ref.

D-63069 Offenbach

ISOLATIONSERKLARUNG

DECLARATION OF INSULATION

Betriebsmittel(Bauteii): 430-2052A
Equipment (Component)

Typenbezeichnung: PS - A1006PT
Type designation

Hersteller:
Manufacturer

PROS TRANSFORMER INC.

Hiermit wird bestatigt daB die im o.g.elektrischen Betriebsmittel (Bauteii) verwendeten und wie aut der Ruckseite beschriebenen Isolierstoffe der jewei's dazu angegebenen IEC-Norm und dem daraus entnommenen IEC-Typ entsprechen.

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

Das o.g. elektrische Betriebsmittel (Bauteii) entspricht der Thermischen Klasse _____ gemaB IEC-Publkation 85.

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

LOT. 2, 4-9, 11 Blk. 19, Phase 3 / FEBRUARY28,2002
PEZA, ROSARIO CAVITE
Ort und Datum / Place and date

Untersanrift des Herstellers / Manutacuers sigrtaruer

Spulenkurper Uber Isolierstoffe/Specification of Insulation materiols

Isollerstoff insulation	Hersteller monufacturer	Handelsname(Typ) Tradename	Chemische ezeichnung Chemical Name	Nach IEC-Norm IEC-Typ siehe Aolage Nr.des Isolierstoffherstellers acc. To IEC-Norm IEC-Type see encl.No.of the insulation manufacturer	Temperotur-Index Temperature-Index
Isolierung zwisclien Wlckungen (Insulation between windings)	3M E.I Du Pont	1350/1298 #410	Polyester Film Tape. Nomex Paper.		130℃(TAPE) 220℃(NX PAPER)
Spulenkurper-Isulierung (Coil base insulation)	E.I Du Pont	PET(FR-530)94V-O	Polyethylene terephthalate.		150℃
Lagenls olierung (Layer insulation)	3M E.I Du Pont	1350/1298 #410	Polyester Film Tape. Nomex Paper.		130℃(TAPE) 220℃(NX PAPER)
Tranlamittle (Impregnation substances)	Hanval Inc.	TSHP	Varnish		200℃
VerguBmasse (Drown material)					
Drohtisolierung (Winding insulation)	LG DAESAN	NY-UEW CB-UEW	Polyurethane enameled wire		NY-UEW(130 C) CB-UEW(155 C)
Leilungsisolierung (Cord insulation)					

APPENDIX 2

PRODUCT SPECIFICATION

CATEGORY : POWER / MAINS TRANSFORMER

PART NO. : 430-2052A

P/N MARKED :

CUSTOMER : AMERICAN POWER CONVERSION CORP.

1. Scope

This specification cover the power / mains tranformer, part number(P/N) 430-2052A delivered to (customer) AMERICAN POWER CONVERSION CORP for use in UNINERRUPTIBLE POWER SYSTEM.

2. Application safety standard

☐ KS ☒ UL 1446 ☐ CSA ☐ VDE ☐ BS

☒ IEC 950 ☐ OTHER

3. General Appearance

3.1 The general appearance of the transformer shall be accptable without deformation, cracks or corrosion.

3.2 The shape, dimensions and marking of the transformer shall be as specified in the assembly drawing.

4. Mechanical Performance

4.1 Terminal Strength Each terminal of the transformer shall be capable of withstanding an axial pull of 3.0 Kg applied gradually and maintained for 30 ± 5 seconds, without loosening, breaking or other damage.

5. Electrical Performance

5.1 Rated primary voltage : Pri.(W1) : AC 36 V (BK-OR)
Pri.(W2) : AC 36 V (OR-BR) V
Pri.(W3) : AC 230 V (BR-WH)

5.2 Rated frequency : 50 Hz

5.3 Rated output capacity : 650 VA

5.4 Secondary voltage tolerances and regulations :

Winding	Terminals	Rated Voltage (Ref.)	Tolerance	Rated Current	Voltage Regulation	No-load Voltage (Ref.)	Remarks
SEC.1 (W4)	BR - BL	AC 27.0 V	± V		% max.	AC 27.0 V	
SEC.2 (W5)	YL-VIO-WH	AC20.0C.TV	± V		% max.	AC20.0 C.TV	

* Leakage Inductance.

Voltage	Frequency	Winding	Min.	Max.	Limit
.1	1K	Red - Black With Black Shorted to White and Primary White & Black left open.	na	<2.0	uH

5.5 Voltage unbalance. The voltage unbalance of any winding having a center a tap shall not exceed 2%.

5.6 No-load current : The no-load current shall not exceed 300 mA when a test voltage of 230 V, 50 Hz applied across the 230 V primary input terminals.

5.7 No-load loss. The no-load loss shall not exceed 10.7 W when a test voltage of 230 V, 50 Hz is ap across the 230 V primary input termals.

5.8 Dielectric withstand test. The transformer shall be capable of withstanding the following dielectric with-stand test voltage applied between parts stated without breakdown. The setting of dielectric test leak current shall be 3 mA.

Test Voltage Applied Between	Type Test		Production Test	
	Test Voltage	Time	Test Voltage	Time
Primary and Secondary windings	3.0 KV (RMS)	1 min	3.6 KV (Rms)	1 s
Primary winding(s) and core	3.0 KV (RMS)	1 min	3.6 KV (Rms)	1 s
Primary windings	KV (RMS)	1 min	KV (Rms)	1 s
Secondary windings	KV (RMS)	1 min	KV (Rms)	1 s
Secondary winding(s) and core	1.5 KV (RMS)	1 min	1.8 KV (Rms)	1 s

5.9 Induced voltage dielectric test. The transformer shall be capable of withstanding without breakdc application of test voltage 400 Hz, 460 V for 18 seconds across the 230 V primary input terms with all the secondary windings open and the normally grounded terminals connected to the core (c metal piece).

5.10 Insulation resistance. The insulation resistance between the winding and between the winding and (case, metal piece) shall be not less than 100 megohms when measured at 500 V DC and under unlo cold condition.

5.11 Temperature rise. The temeperature rise on each winding and the core shall be not more than ___ d a temperature cquilibrium is reached on the transformer which has been energized with 230 V appl across the 230 V primary input termals. The load conditions shall be _____

_____ ..

The winding temperature shall be determined by the resistance method, and the core temperature s be determined by the thermometer method.

5.12 Abnormal operation test.The transformer shall satisfy the requirements of the applicable safety [X] As transformer alone. [ ] As part of final product.

5.13 DC resistance. The DC resistance of each winding, measured at a reference ambient temperature of shall be as follows :

W1: PRI. (BK - OR) 0.313 Ω MAX.

W2: PRI. (OR - BR) 0.313 Ω MAX.

W3 : PRI. (BR - WH) 3.65 Ω MAX.

W4 : SEC.1 (BR - BL) 0.616 Ω MAX.

W5 each half:SEC.2(WH-BK-RD) 0.017 Ω MAX.

6. Environmental

6.1 Operating temperature range. The operating temperature range of the transformer shall be from- 10 to + 80 ° C

6.2 Resistance to heat.When tested within 10 minutes after the transformer has been placed in a test maintained at 110 ± 3 ° C for 6 hours, the transformer shall comply with the requirements of 5.8, Dielectric withstand test, shall have insulation resistance not less than stated below as at 500V DC : 10 megohms minimum between the primary winding(s) and the secondary winding(s) and core together; 10 megohms minimum between a secondary winding and the other secondary winding(s) and core together.

6.3 Resistance to moisture. The transformer shall be placed in a test chamber maintained at 40 ± 2 ° C and 90 - 95 % relative humidity for 6 hours. Then, when tested within 10 minutes after the transfo is taken out from the test chamber and wiped dry, the transformer shall comply with the requirement

5.8 Dielectric withstand test, and shall have insulation resistance not less than stated below as mea at 500 V DC:

5 megohms minmum between the primary winding(s) and the secondary winding(s) and core together;
5 megohms minmum between a secondary winding and the other secondary winding(s) and core together;

7. Inspection

7.1 100% inspection items. The items of 100% inspection shall be: no-load current; no-load voltage; diel withstand test ; and general appearance.

7.2 The sampling inspection items. The item of sampling inspection shall in addition to the 100% inspect items, include : DC resistance ; insulation resistance ; and audible sound check.

7.3 The sampling inspection data according to 7.2 and 100% dielctric withstand test data shall be submit for each lot. (n=5)

8. Other

8.1 Audible sound check. The transformer shall not produce any audible buzz when a test voltage of 230 V 50 Hz is applied across its 230 V primary input terminals. In case of doubt, a limit sample shall be used.

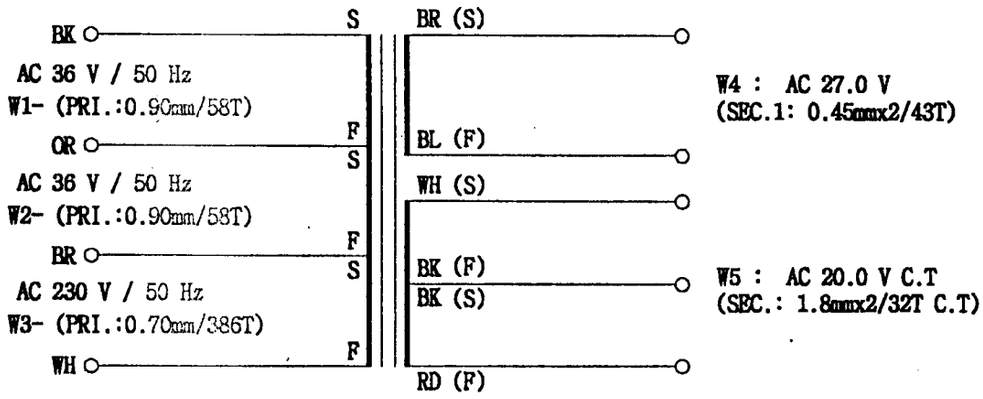
8.2 Class of insulation. The class of insulation of the transformer shall be class "F"

8.3 Type of protective device. ☐ Yes _____ [X] No.

8.4 Connection diagram. The connection diagram of the transformer shall be shown in the assembly drawing

8.5 Incidental matters. Any change in design,process or materials shall be subject to the customer's ap before such a change is actually incorporated. In case of a doubt on items not specifically covered specification, it shall be clarified or settled through discussion with the customer.

9. Circuit Diagram



PROS TRANSFORMER INS.
Research and Development Department

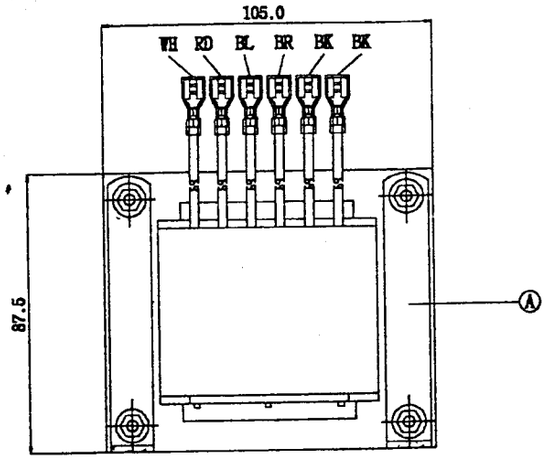
Approved by : _____ Checked by : _____ Prepared by : _____

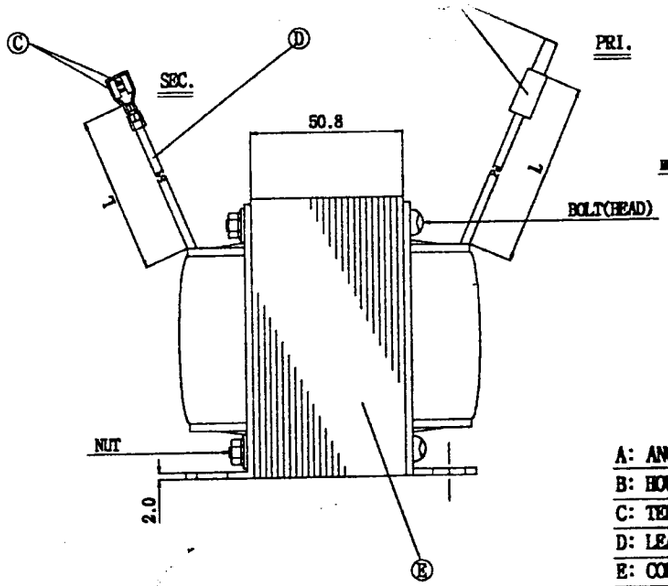
POWER/MAINS TRANSFORMER MATERIALS LIST

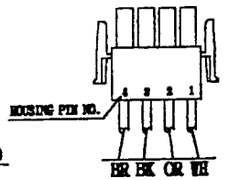
* Transformer Part Number : 430-2052A *

	DISCRIPTION	MATERIAL	MANUFACTURE	FILE NO
	Core	Lamination Silicon steel. Type : EI-105mm (PS-14A)	[X] Po Hang Iron & Steel Co.,Ltd.	
	Bobbin (0.71 mm Min.)	[X] PET Rynite FR-530 94V-0	[X] E.I Dupont Du Nemours & Co.	E41938
	Pri. winding (W1 & W2 & W3)	[X] NY-UEW(MW-28),CB-UEW(MW-79) (W1:ø0.90,W2:ø0.90,W3:ø0.70)	[X] LG Cable & Mechinery Ltd. [X] Daesan Co.,Ltd. or Other Equivalent Manufacturer	E84441 E174361
	Sec. winding (W4 & W5)	[X] NY-UEW(MW-28),CB-UEW(MW-79) (W4: ø0.45 , W5: ø1.80)	as item 3.	
	Insulation butween Pri. & Sec. winding	[X] Polyester film tape 0.09mm * 4 Layer	[X] 3M Electrical Tape. or Other Equivalent Manufacturer	E17385
	Insulation butween Sec. & Sec. winding	Polyester film tape 0.09mm * 1 Layer	as item 5.	
	Insulation butween Pri./Sec. connections & Sec. winding	[X] Polyester film tape 0.09mm * 2 Layers [X] Nomex paper 0.25mm * 1 Sheet	[X] 3M Electrical Tape. or Other Equivalent Manufacturer [X] E.I Dupont Du Nemours & Co.	E17385 E34739
	Outer wrap	Polyester film tape 0.09mm * 2 Layers Nomex paper 0.25mm * 1 Sheet	as item 7.	
	Integral leads (Pri./Sec.)	[X] Pri/Sec.-AWG # 18-3173 AWG # 10-3173	[X] LG Cable & Mechinery Ltd. or Other Equivalent Manufacturer	E52853
	Crossover	Polyester film tape 0.09mm * 4 Sheets.	as item 5.	
11	Creepage	Polyester film tape 0.09mm * 3 Sheets.	as item 5.	
12	Lead Ancho Board	PVC or Fiber or KP	Option	
13	Mounting frame	[X] SECC	as item 1.	
14	Screw	[X] SWRCH10A	as item 1.	
15	Varnish	[X] TSHP	[X] Hanval Inc.	E101220

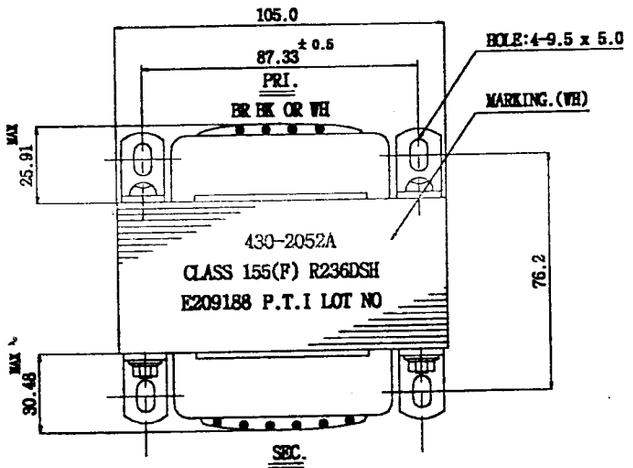
TRANSFORMER (Phils.)INC.







A: ANGLE EGI 2.0t
B: HOUSING & TERMINAL
C: TERMINAL & SLEEVE
D: LEAD WIRE
E: CORE



NO	VOLT	LEAD WIRE	COLOR	LENGTH(L)	DISCRIMINATE	HOUSING	TERMINAL	SLEEVE
10	AC 10.0 V	UL#10 - 3173	RD	101.6 ± 6.4	W5		(AMP) 520974-2or EQUIVALENT	250 SLEEVE
9	0 V	"	BK	"				
8	0 V	"	BK	"				
7	AC 10.0 V	"	WH	"				
6	AC 27.0 V	UL#18 - 3173	BL	"	W4		(AMP) 2-520407-2or EQUIVALENT	
5	0 V	"	BR	"				
4	AC 230 V	UL#18 - 3173	WH	114.3 ± 6.4	W3	(AMP) 1-480702-0or EQUIVALENT	(AMP) 350537-3or EQUIVALENT	
3	AC 36.0 V	"	BR	"	W2			
2	AC 36.0 V	"	OR	"	W1			
1	0 V	"	BK	"				

PROJECTION	SCALE	MEASURE	MATERIAL	PART NO	430-2052A
	N / S	mm	-		
DATE	DRAWNED BY	CHECKED BY	APPROVED BY	DRAWING NO	430-2052A-DWG
2002.01.17				CUSTOMER	A.P.C

PROS TRANSFORMER (Phils.)INC.

P.T.I

PROS TRANSFORMER (Phils.) INC.
LOT NO. 2, 4-9, 11, BLK.19, PHASE3,
PHILIPPINE ECONOMIC ZONE AUTHORITY
ROSARIO, CAVITE, PHILIPPINES.4106
TEL NO. : (046) 437-2341
FAX NO. : (046) 437-2343

Power Transformer Test Report

Date : 2002. 01 .

Cust. : A. P. C

Part No. : 430-2052A

Engr. : JAE WEON HWANG

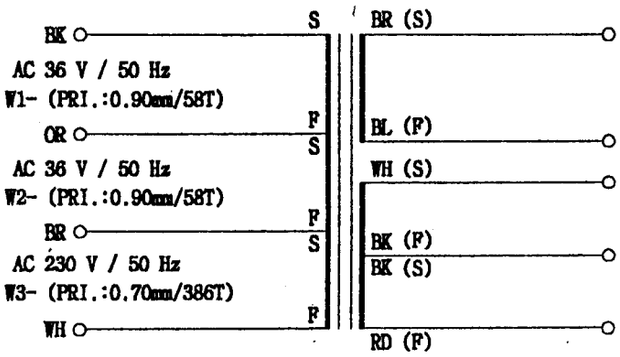
Tested by : CHUNG GEUN MA

REPORT BY : CHIN-A YOUN

ing	Lead No. or Colors	Circuit Description	Volts (Ref.)	Amps	Open Ckt Volts(Ref.)		Open Ckt Amps	
					SEC.1(W4)	SEC.2(W5)	SEC.1(W4)	SEC.2(W5)
(W1)	BK - OR	AC 36 V / 50 Hz	·	·	AC V	AC V	0A	0A
(W2)	OR - BR	AC 36 V / 50 Hz	·	·	AC V	AC V	0A	0A
(W3)	BR - WH	AC 230 V / 50 Hz	·	·	AC V	AC V	0A	0A
(W4)	BR - BL	AC 27.0 V	AC 27.0 V	·	AC V	AC V	0A	0A
(W5)	WH - RD	AC 20.0 V C.T	AC 20.0 V C.T	·				

le No.		1	2	3	4	5	6	7	8	Remarks
e Loss WATT										10.7 W MAX.
lting Cur. mA										300 mA MAX.
Res. (Ω) PRI.(W1)										0.313 Ω
Res. (Ω) PRI.(W2)										0.313 Ω
Res. (Ω) PRI.(W3)										3.65 Ω
Res. (Ω) SEC.1(W4)										0.616 Ω
Res. (Ω) SEC.2(W5)										0.017Ω each half
LECTRIC	P - S	OK	OK	OK						3.0 KV / 1 min
STAND	P - E	OK	OK	OK						3.0 KV / 1 min
T.	S - E	OK	OK	OK						1.5 KV / 1 min
age Inductance(mH)										2.0 uH MAX.

te :



Approved by:

Checked by :

Drawn by :

Appendix No. 8
to Marks Licence No. 40000164
file ref. 1924400-3335-0025/15328

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:Chuan Shun Electric Industrial Co.,Ltd.
1.2 Place of manufacture:ChangKeng Village GuanLan Town ShenZhen City BaoAn Zone China
1.3 Reference of type:430-2052A
1.4 Trade Mark: CSC
1.5 Other markings:
1.6 Reference number:
2.1 Protection against electric shock: An isolated transformer Class F
2.2 Class of protection to IEC 539: IP.....20
2.3 Type of construction (Isolating transformer for toys.....):According to VDE 0551 and EN 60742
2.4 Transformer, stationary - portable *):UPS
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 abient temperature: ta =25~30 °C
2.7 Class:F Insulation; Declaration of Insulation see VDE-Form 187
(according to IEC 85)
2.8 CTI - Value (according to IEC 112, Method A):

3	**Electrical values**		**Input**	**Output (AC/DC)**
3.1	Rated voltage(s)	V:	P3:230V	P1:34.6V , P2:34.6V
3.2	Rated frequency	Hz:	50Hz	S1:25.6V,S2:19V
3.3	Rated current	A:		
3.4	Rated output	VA:		650VA
3.5	Rated power factor cos phi:			
4	**Windings**			
4.1	Coil base	number:		
		material:	FR530	EI Dupont De Nemours & Co Inc.
4.2	Material of layer insulation	material:	Polyester tape	
4.3	Windings	number:		
		material:		
4.4	Taps	number:		
4.5	Diameter of wire	mm:	P3:0.724Φ	P1,P2:0.9Φ S1:0.45Φ,S2:1.8Φ
4.6	Winding of insulation	material:	Polyurethane Enamelled Wire(MW79,MW5)	
4.7	Cord insulation material			
		innere:		
		äußere:		
4.8	Cold resistance in Ω at:25	°C =	P3:3.65Ω(Max)	P1,P2:313mΩ(Max)S1:616mΩ (Max) S2:34mΩ(Max)

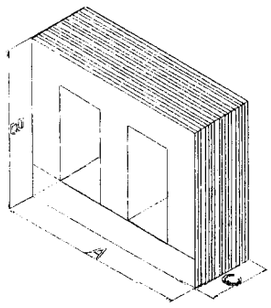
*) Delete if not applicable
J:\VDE-Form\42E.0697/EDV

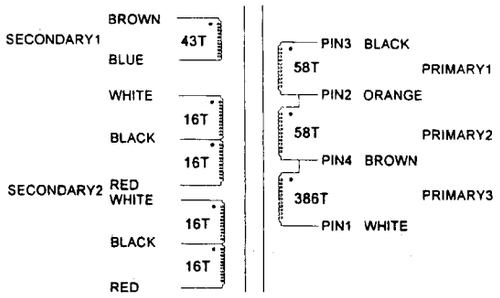
4.9 Circuit diagram (which terminal markings, color of wires etc.):

5 Iron core

5.1 Sheet metal, material:Silicon steel strip 50H400
main dimensions:A:105.0±1.0mm B:87.5±1.0mm C:50.8±0.5mm

5.2 Cross-sectional drawing:





6 Type of construction

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

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

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
N/A	N/A	N/A	N/A

Offenbach, 14.5.02

VDE Testing and Certification Institute
Department

Place: Chang keng Village Guanlan Date:Feb.19.2002
Town Shenzhen City Baoan Zone China

For and on behalf of
CHUAN SHUN ELECTRIC INDUSTRIAL COMPANY LTD
串順電機有限公司

Authorized Signature(s)

(Stamp and signature of the manufacturer)

Please return 2 copies

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*) Delete if not applicable
J:\VDE-Form\42E.0697/EDV

VDE Prüf- und Zertifizierungsinstitut ..... Az:
VDE-Prüfstelle
Merianstraße 28
D-6050 Offenbach

ISOLATIONSERKLÄRUNG DECLARATION OFINSULATION

Gegenstand/Component: **430-2052A** .....

Typenbezeichnung/Type designation **CLASS F CSC-F2** .....

Hersteller/Manufacturer: **Chuan Shun Electria Industrial Co.,Ltd** .....

.....

Hiermit wird bestätigt, daß die im o.g. elektrischen Betriebsmittel (Bauteil) verwendeten und wie auf der Rückseite beschriebenen Isolierstoffe der jeweils dazu angegebenen IEC-Norm and dem dar-aus entnommenen IEC-Typ entsprechen
Das o.g. elektrische Betriebsmittel (Bauteil) entspricht der Thermischen Klasse.....gemäß IEC-Publikation 85.

It is hereby declared that in the above mentioned electrical equipment (component) used and on the rear specified insulation materials 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.F.....according to IEC-Publication 85.

Place:ChangKeng Village GuanLan Town
ShenZhen City BaoAn Zone China
Date:Feb.19.2002

For and on behalf of
CHUAN SHUN ELECTRIC INDUSTRIAL COMPANY LIMITED
川順電機有限公司

Unterschrift des Herstellers/Manufacturers signature:

VDE-Form 187.0191/07941105 Please return 2 copies

Spezifikation Über Isolierstoffe / Specification of Insulation materials

Isolierstoff Insulation	Hersteller Manufacturer	Handelsname (Typ) Tradename	Chemische Bezeichnung Chemical Name	Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffherstellers acc. to IEC-Norm IEC-Type see encl. No. of the insulation manufacturer	Temperatur-Index Temperature Index
Isolierung zwischen Wicklungen Insulation between windings	1.3M Co.,Ltd 2.El Dupont De Nemous & Co.,Inc	1.3M TAPE No.1318 2.Nomex No.410	1.Polyester tape 2.Aramid paper		1.130℃ 2.94V-0
Spulenkörper- Isolierung Coil base insulation	1.El Dupont De Nemous & Co.,Inc	1.Rynite FR530	1.FR530		1.94V-0
Lagenisolierung Layer insulation	1.3M Co.,Ltd	1.3M tape No.1318	1.Polyester tape		1.130℃
Tränkmittel Impregnation substances	1.STERLING GROUP	1.Y-210	1.Varnish		1.155℃
Vergußmasse Drown material	N/A	N/A	N/A		N/A
Drahtisolienrung Windings insulation	1.Pacific Electric Wire & Cable Co.,Ltd	1.Magnet Wire	1.Polyurethane Enamelled wire(ANSI MW5)		1.155℃
Leitungsisolierung Cord insulation	N/A	N/A	N/A		N/A

Please return 2 copies

APPENDIX 1

承　認　書

SPECIFICATION FOR APPROVAL

客　戶
CUSTOMER: AMERICAN POWER CONVERSION CORP

品　名
DESCRIPTION: TRANSFORMER

料　號
PART NO: 430-2052A

日　期
DATE: 2001/10/12

APPROVED SIGNATURES	
	CHUAN SHUN ELECTRIC INDUSTRIAL CO.,LTD 12 OCT 2001 APPROVED

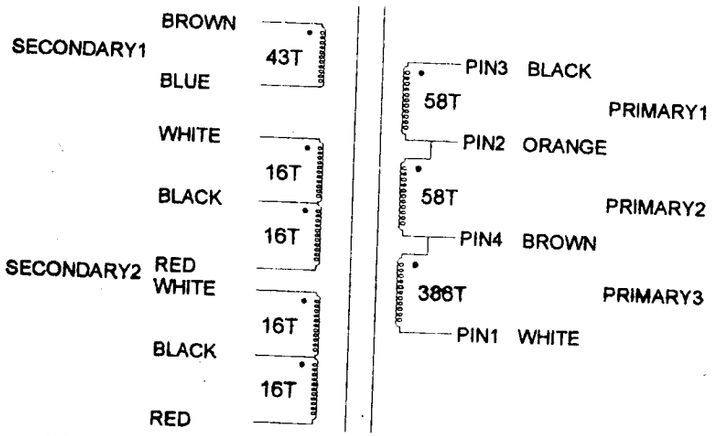
專順電機(深圳)有限公司

深圳市寶安區觀瀾鎮樟坑徑長坑村
CHUAN SHUN ELECTRIC INDUSTRIAL(SHENZHEN)CO.,LTD.
ADDRESS: ZHANG KENG JING CHANG KENG VILLAGE,
GUAN LAN, BAO AN , SHEN ZHEN, CHINA
TEL: 0755 7976055～9
FAX: 0755 7976030
http://www.csccn.com Email: csc@csccn.com

MODEL: 650VA 230VAC REV "2"

PART NO: 430-2052A

1.CIRCUIT DIAGRAM:



2.WINDING SPECIFICATION

TERMINAL NO	PRIMARY			SECONDARY	
	PRIMARY1	PRIMARY2	PRIMARY3	SECONDARY1	SECONDARY2
WIRE GAUGE	0.95Ø	0.95Ø	0.75Ø	2*0.45Ø	(2*1.8Ø)x2
WINDING TURNS	58T	58T	386	43	(2x16)x2
WINDING ORDER	1	2	3	4	5

3. LEAD WIRE SPECIFICATION

TERMINAL NO	PRIMARY				SECONDARY				
COLOR	BLACK	ORANGE	BROWN	WHITE	BROWN	BLUE	WHITE	BLACK*2	RED
LENGTH(±5mm)	114.0				101.5		101.5		
TERMINAL	AMP #350537-3				F-250		F-250		
HOUSING	AMP #1-480702-0								
LEAD WIRE CLASS	UL 3173 18AWG				UL 3173 18AWG		UL 3173 10AWG		

4.EI-105*50.8

5.CLASS F 155℃ (CSC-F2)

Designer	01.10.12
Checked	01.10.12
Approved	01.10.12

CHUAN SHUN ELECTRIC INDUSTRIAL CO.,LTD

FILENAME:EDD234A0

PART NO: 430-2052A

6.Validation Tests

Test 1: Nominal Winding Voltage
Test Condition: Apply 230V AC 50Hz across PRIMARY3 PIN1 AND PIN4

Test 1 Results:

Winding	Measurement Winding	Nominal Voltage (Vrms ±0.5V)
PRIMARY	PRI1(PIN3-PIN2)	34.6 Voits
	PRI2(PIN2-PIN4)	34.6 Voits
SECONDARY	SEC1(BRN-BLU)	25.6 Voits
	SEC2(WHT-BLK)	9.5 Voits
	SEC2(BLK-RED)	9.5 Voits

Electrical Parameters:

Test	Voltage	Frequency	Winding	Min.	Max.	Limit
Resistance @ 25°C			PRI1(PIN3-PIN2)		0.313	Ohms
			PRI2(PIN2-PIN4)		0.313	Ohms
			PRI3(PIN4-PIN1)		3.65	Ohms
			SEC1(BWN-BLU)		0.616	Ohms
			SEC2 (each half)		0.017	Ohms
Core Loss	230V	50Hz	PRI3 (PIN4-PIN1)		10.7	Watts
Core Loss						
Magnetizing Current	230V	50Hz	PRI3 (PIN4-PIN1)		0.30	Amps RMS
Leakage Inductance	0.1V	1KHz	SEC RED TO BLK(WITH BLK SHORTED TO WHT)		2	μ H
Dielectric Withatand	3000V	50-60Hz	Primary to Secondary		3	mAmps
	1500V	50-60Hz	Primary to Core			
	1500V	50-60Hz	Secondary to Core			

Designer	01.10.12
Checked	01.10.12
Approved	01.10.12

ITEM DESCRIPTION	MATERIAL	SOURCE
1.BOBBIN	105x50.8 RYNITE FR530	E I DUPONT DE NEMOUS CO.,LTD E69578(M)
2.CORE (E I 105 H14-0.5A)	SILICON STEEL STRIP(50H400)	NIPPON STEEL CORPORATION
3.PRIMARY WINDING	MAGNET WIRE ANSI MW5 P1,P2:0.95∅ PEW P3:0.75∅ PEW	PACIFIC ELECTRIC WIRE & CABLE CO.,LTD E84081(S)
4.SECONDARY WINDING	S1:0.45∅ PEW S2:1.8∅ PEW	
5.CREEPAGE INSULATION	POLYESTER FILM NO.1318 TAPE 0.05mmx3Layer	MINNESOTA MINING & MFG CO.,LTD E17385
6.CROSS OVER INSULATION(Pri)	PLOYESTER FILM NO.1318 0.05mmx4Layer	MINNESOTA MINING & MFG CO.,LTD E17385
CROSS OVER INSULATION(Sec)	PLOYESTER FILM NO.1318 0.05mmx3Layer	MINNESOTA MINING & MFG CO.,LTD E17385
7.PRIMARY TO PRIMARY INSULATION	POLTESTER FILM NO.1318 TAPE 0.05mmx1T	MINNESOTA MINING & MFG CO.,LTD E17385
8.PRIMARY TO SECONDARY INSULATION	POLYESTER FILM NO.1318 TAPE 0.09mmx4T	MINNESOTA MINING & MFG CO.,LTD E17385
9.SECONDARY TO SECONDARY INSULATION	POLTESTER FILM NO.1318 TAPE 0.05mmx1T	MINNESOTA MINING & MFG CO.,LTD E17385
10.END COVER	POLYESTER FILM NO.1318 TAPE 0.05mmx1T	MINNESOTA MINING & MFG CO.,LTD E17385
PRI TO SEC LEAD WIRE CONNECT SPLICE PAD	NOMEX PAPER NO.410 0.13mmx3Layer	E I DUPONT DE NEMOUS CO.,LTD E34739(R)
SEC TO SEC LEAD WIRE CONNECT SPLICE PAD	NOMEX PAPER NO.410 0.25mmx1Layer	E I DUPONT DE NEMOUS CO.,LTD E34739(R)
11.PRI AND SEC LEAD WIRE	P.V.C(UL 3173 125℃ 600V 18AWG , 10AWG)	HANNSTAR ELECTRONICS CORP E52534
12.CONNECTION INSUNATION	NOMEX PAPER NO.410 0.25mmx1Layer	E I DUPONT DE NEMOUS CO.,LTD E34739(R)
13.COIL OUTER INSULATION	POLYESTER FILM NO.1318 TAPE 0.09mmx2T	MINNESOTA MINING & MFG CO.,LTD E17385
14.BRACKET	ELECTROPLATE Zn	WING LEE METAL MANU FACTORY
15.SCREWS	ELECTROPLATE COLOR	
16.WASHER	4∅ NY66	E I DUPONT DE NEMOUS CO.,LTD E41938(M)
17.IMPREGNATION	VARNISH(Y-210)	STERLING GROUP E103575(M)

PART NO: 430-2052A

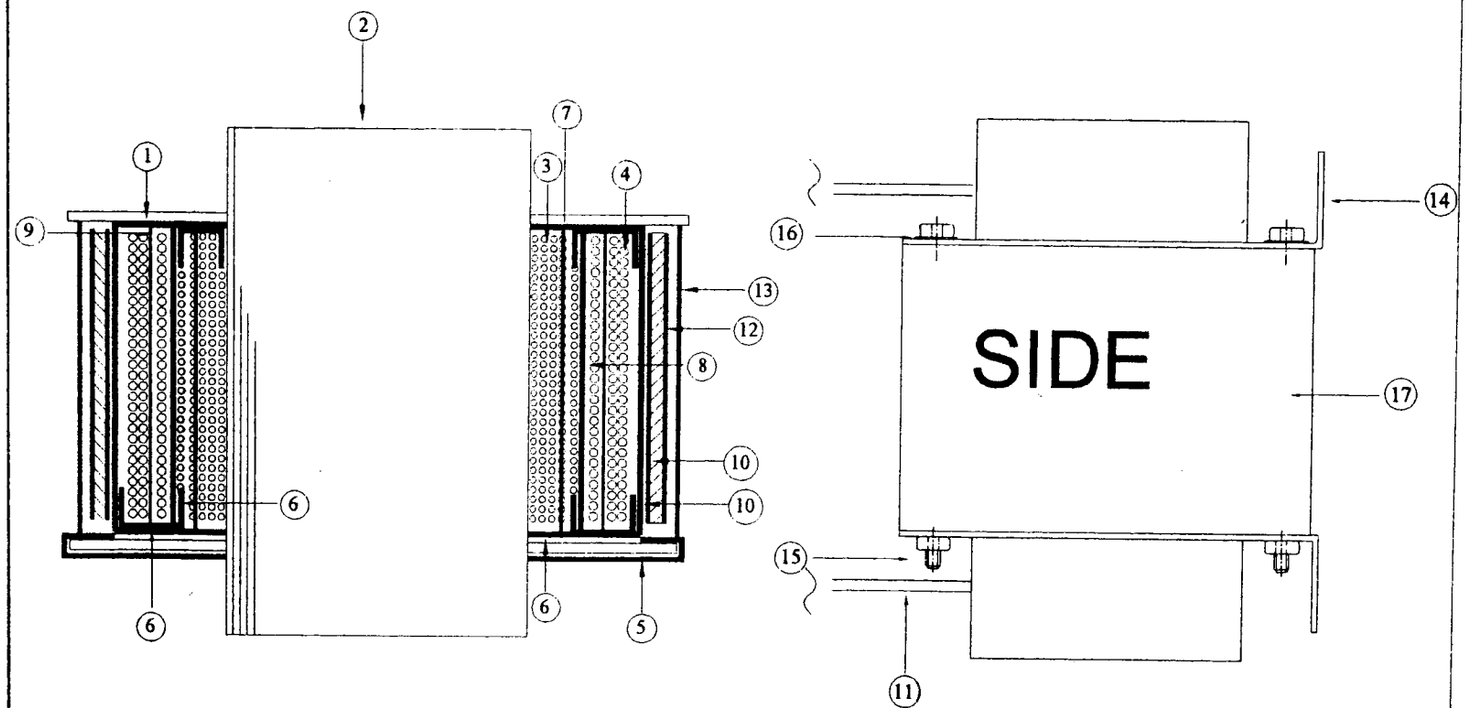
Designer	01. 10. 12
Checked	01. 10. 12
Approved	01 10. 12

CHUAN SHUN ELECTRIC INDUSTRIAL CO.,LTD

FILENAME:EDD234A0

3.CONSTRUCTION DRAWING

PART NO:
430-2052A



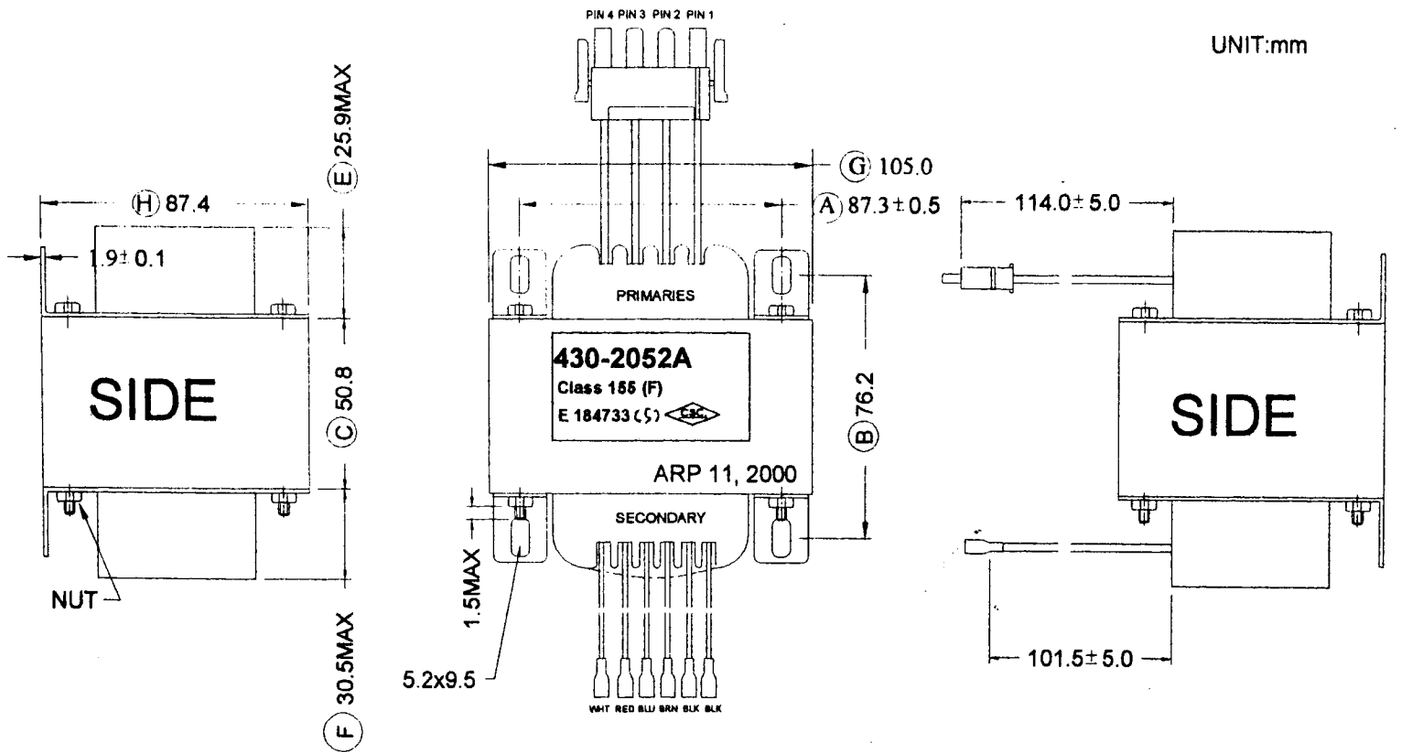
Designer	01.10.12
Checked	01.10.12
Approved	01.10.12

CHUAN SHUN ELECTRIC INDUSTRIAL CO.,LTD

FILENAME:EDD234A0

PART NO:
430-2052A

UNIT:mm



NOTES:

1. Lead Wire must inside install.
2. secondary 2 bifilar winding.
3. Lead Wire length as drawing.
4. Stamp transformer type date on product top.
5. There has no label size to terance ±0.5mm.

Designer	01.10.12
Checked	01.10.12
Approved	01.10.12

CHUAN SHUN ELECTRIC INDUSTRIAL CO.,LTD

FILENAME:EDD234A0

VDE Prüf- und Zertifizierungsinstitut

ZEICHENGENEHMIGUNG
MARKS LICENCE

American Power Conversion Corp.
85 Rangeway Road
NORTH BILLERICA 01862
USA

ist berechtigt, für ihr Produkt /
is authorized to use for their product

Unterbrechungsfreie Stromversorgung
Uninterruptible power supply

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.

oder/*or*

oder/*or*

Geprüft und zertifiziert nach /
Tested and certified according to

DIN EN 60950 (VDE 0805):2001-12; EN 60950:2000
IEC 60950 :1999 + corr. 2000 modif.
DIN EN 50091-1-1 (VDE 0558 Teil 511):1997-07; EN 50091-1-1:1996
IEC 146-4 :1986

Die Anforderungen des Gerätesicherheitsgesetzes (GSG) §3 werden eingehalten.
The requirements of the Appliance Safety Law §3 are met.

Aktenzeichen: 1924400-3335-0025 / A404ZE
File ref.:
Ausweis-Nr. 40000164 Blatt 1
Licence No. *Page*
Weitere Bedingungen siehe Rückseite und Folgeblätter /
further conditions see overleaf and following pages
Offenbach, 2002-02-06

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Zertifizierungsstelle
Certification

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Name und Sitz des Genehmigungs-Inhabers / *Name and registered seat of the Licence holder*
American Power Conversion Corp., 85 Rangeway Road, Building #2, NORTH BILLERICA MA 01862, USA

Aktenzeichen / *File ref.*
1924400-3335-0025 / A404ZE / F131 / RC

Datum / *Date*
2002-02-06

Dieses Blatt gilt nur in Verbindung mit Blatt 1 des Zeichengenehmigungsausweises Nr. 40000164.
This supplement is only valid in conjunction with page 1 of the Licence No. 40000164.

Jahresgebühren-Einheiten / *Annual fee units*

Unterbrechungsfreie Stromversorgung
Uninterruptible power supply 26.00

Typ(en) / *Type(s)*:

BP650SI	2.00
BP420SI	2.00
BP280SI	2.00
SU620INET	2.00
SU420INET	2.00

Nennspannung *Rated voltage*	AC 220-240 V, 50 - 60 Hz
Nennstrom *Nominal Current*	5.3 A
Schutzklasse *Class of protection*	I
Ausgangsspannungen und -ströme *output voltage and current*	AC 220 - 240 V, 3.0 A, 50 - 60 Hz, 650 VA AC 220 - 240 V, 2.8 A, 50 - 60 Hz, 620 VA AC 220 - 240 V, 1.9 A, 50 - 60 Hz, 420 VA AC 220 - 240 V, 1.3 A, 50 - 60 Hz, 280 VA
Schutzmaßnahme *Protection against electric shock*	abgedeckte Ausführung *covered version*
Weitere Angaben *Further informations*	siehe Anlage Nr. 1-5 *see appendix no. 1-5*

Summe der Jahresgebühren-Einheiten / *Sum of annual fee units* 36.00

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Ausweis-Nr. / Licence No. 40000164 | Blatt / page 3

Name und Sitz des Genehmigungs-Inhabers / *Name and registered seat of the Licence holder*
American Power Conversion Corp., 85 Rangeway Road, Building #2, NORTH BILLERICA MA 01862, USA

Aktenzeichen / *File ref.*
1924400-3335-0025 / A404ZE / F131 / RC

Datum / *Date*
2002-02-06

Dieses Blatt gilt nur in Verbindung mit Blatt 1 des Zeichengenehmigungsausweises Nr. 40000164.
This supplement is only valid in conjunction with page 1 of the Licence No. 40000164.

Jahresgebühren-Einheiten / *Annual fee units*

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Ausweis-Nr. / Licence No. 40000164

Beiblatt / Supplement

Name und Sitz des Genehmigungs-Inhabers / *Name and registered seat of the Licence holder*
American Power Conversion Corp., 85 Rangeway Road, Building #2, NORTH BILLERICA MA 01862, USA

Aktenzeichen / *File ref.*
1924400-3335-0025 / A404ZE / F131 / RC

Datum / *Date*
2002-02-06

Dieses Beiblatt ist Bestandteil des Zeichengenehmigungsausweises Nr. 40000164.
This supplement is part of the Licence No. 40000164.

Unterbrechungsfreie Stromversorgung
Uninterruptible power supply

Fertigungsstätte(n)
Place(s) of manufacture

American Power Conversion (APC)
Plant 2
Lot 32 Phase I Carmelray Ind. PK
Canlubang Calamba
LAGUNA, PHILIPPINES
PHILIPPINEN

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Merianstraße 28 · D-63069 Offenbach · Tel.(+49) (69) 83 06-0 · Fax (+49) (69) 83 06-555

Appendix No. 1
to Marks Licence No. 40000164
file ref. 1924400-3335-0025/A404ZE

Anlage / *Appendix No.:* Genehmigungsausweis Nr. / *Marks licence No.:* Aktenzeichen / *file ref.:*

(vom Institut auszufüllen / *filled in by the Institute*)

Aufbau-Übersicht / Liste der im Gerät eingebauten Einzelteile
Constructional data / List of components built-in equipment

Form 203(E)

1.1 **Hersteller**:
Manufacturer American Power Conversion

1.2 **Produkt/Gerät**: *Product/device Uninteruptible Power Supply*

1.3 **Typenbezeichnung**: *Type reference BP650SI,BP420SI ,BP280SI, SU620INET, SU420INET*

2.1 **Nennspannung**: *Rated voltage 220-240 VAC*

2.2 **Nennstrom**: *Rated current 5,3A*

2.3 **Nennfrequenz**: *Rated frequency 50-60 HZ*

2.4 **Nennleistung**: *Rated input power*

2.5 **Ausgangsdaten *)**:
Output rates 1. Full Time accesory: 220-240 VAC, 50-60HZ,2,3A
2. Battery Only: 220-240 VAC, 50-60 HZ, 3A, 410W, 650VA(BP650SI); 2,8A,390W, 620VA (SU620INET);1,9A, 260W, 420VA (BP420SI,SU420INET); 1,3A, 180W,280VA (BP280SI)

3.1 **Schutzklasse** *Protection against electric shock*:
(X) Schutzleiteranschluß (I) *Protective earth contact (I)*
( ) Schutzisolierung (II) *Protective isolation (II)*
( ) SELV Kreise (III) *SELV circuits (III)*

3.2 **Schutzart** *Protection against moisture*:
(X) abgedeckt *covered* ( ) tropfwassergeschützt *drip proof* ( ) spritzwassergeschützt *splash proof* ( ) wasserdicht *watertight*

3.3 **IP-Schutzart:** *IP-protection class Not Rated*

4.1 **Umgebungstemperatur:** *Max ambient temperatur 40 C*

5.1 **Anschlußmittel** *Supply connection*:
( ) feste Anschlußleitung *Non detachable cord*
( ) fester Anschluß *Permanent connection*
(X) Gerätesteckvorrichtung *Appliance coupler*

6.1 **Betrieb** *Operation*:
( ) Handgerät *hand-held* ( ) ortsfest *stationary* ( ) Einbau *built-in* (X) ortsveränderlich *portable* ( ) festangebracht *fixed installation*

(X) Dauerbetrieb *continuous* ( ) Kurzzeit *) *short time* ( ) Aussetz *) *intermittent* ( ) Nennbetriebszeit: *rated working time* Std. *h* Min. *min*

7.1 **Verfügt die Fertigungsstätte über ein Qualitätssicherungssystem?** *Is there a quality management system in place at factory?* (X) Ja *Yes* ( ) zertifiziert *) *certified system*

7.2 Falls ja, nach welcher(n) Norm(en): *If yes, against what Standard(s) ISO 9001*

7.3 (X) Fertigungsüberwachung durch VDE *Factory inspection by VDE*

Weitere Angaben für spezielle Geräte und Teile *Further Information for special devices and components*

8.1 **Isolationsklasse von Transformatoren, Motoren und Drosselspulen nach IEC 85 *):**
Insulation class of transformers, motors and inductors according to IEC 85
Class B for T1 and transformer in 280/420 units. Class F in 650/620 Units

8.2 **Klassifikation nach Richtlinie für Medizinprodukte:** *Classification according to Medical Device Directive None*

8.3 **Laserklasse *):** *Laserclass None*

Raum für zusätzliche Vermerke *Place for additional remarks*:

*) Bitte weitere Technische Informationen, Zertifikate, Prüfberichte u. a. beifügen.
Please provide further technical information, Certificates, Testreports etc. if applicable

9.1 **Im Gerät eingebaute Einzelteile, die die Sicherheit beeinflussen können**, wie Schalter - Temperaturregler - Leitungen - Kondensatoren - Ventilatoren - Motore - Transformatoren - Druckbehälter - Heizelemente - Sicherungshalter - etc. sind aufzuführen und in Anlagen ggf genau zu beschreiben.

All safety relevant components built in like switches, thermostats, wiring material, capacitors, fans, motors, transformers, pressure vessels, heating elements, fuse holders, etc. have to be listed and described in detail.

Einzelteil *Component*	**Hersteller** *Manufacturer*	**Typ** *Type*	**Prüfzeichen *)** *Certification mark*	**Referenz *)** *Reference*
	See Next Sheet			

Liste ggf. auf zusätzlichem Blatt fortsetzen *Please continue on further pages if necessary*

10.1 **Informationen zu Kombinationsmöglichkeiten, Zubehör, etc. *):**
Information about possible combinations, accessories, etc.
None

*) Bitte weitere technische Informationen, Zertifikate, Prüfberichte u. a. beifügen.
Please provide further technical information, Certificates, Testreports etc. if applicable

Wir erklären, daß das beschriebene Erzeugnis nur mit den aufgeführten Komponenten gefertigt wird.
We declare that the product described is manufactured only with the components listed above

Für Rückfragen stehen wir Ihnen jederzeit gerne zur Verfügung: Tel: (+49) (69) 8306 - 705
If you have any question, please feel free to call in: Fax: (+49) (69) 8306 - 666

Offenbach, 4.2.2

VDE Prüf- und Zertifizierungsinstitut
Abteilung / *Department TD*

Ort / *Place:* Datum / *Date:* 11/27/09

(Stempel und Unterschrift des Herstellers / Stamp and signature of the manufacturer)

VDE-Form 203 (E). 0296/EDV

American Power Conversion Corporation
132 Fairgrounds Road, West Kingston, Rhode Island, U.S.A.
Uninterruptible Power Supplies
Model BP650SI, BP420SI, BP280SI, SU620INET, SU420INET
Vin = 220-240 V~, 50-60 Hz Input =5,3 A
Output: Full time surge 220-240 V~, 50-60 Hz 2,3A
Battery: 220-240 V~, 50-60 Hz, 3A, 410W, 650VA(BP650SI)
2,8A, 390W, 620VA(SU620INET)
1,9A, 260W, 420VA (BP420SI SU420INET)
1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

Appliance Inlet		10 A, 250 V	
(APC 770-0036)	Power Dynamics	420R02-3212-150-D3	VDE
	Panel Components	8301312	VDE
	Globtek	PX0575/15/63	VDE
	Qualtek Electronics	701W-15/31	VDE
AC Outlet		10 A, 250 V	
(APC 770-0036)	QUALTEK	742W-18/70B	VDE
	SINGAPORE RESOURCE	SRM-045-4	VDE
	Well Shin	770-0062	VDE
Relays			
RIY1 (transfer)		8 A, 250 VAC, 12 VDC, SELV Isolation	
(APC 450-2150A)	Grunner	D280A-R200A-G002A/01	VDE
	Schrack	RP 920123DC12V	VDE
	American Zettler	AZ733W-2A-12DE(209)	TUV
	OEN	68-12-2AE	VDE
RIY 2,3,4		10A, 250 VAC, 12 VDC, SELV Isolation	
(APC 450-0026)	Omron	G2R-14-T130-DC12	VDE
C53		1uF, 250 VAC, X2	
(APC 232-0105)	VISHAY/ROEDERSTEIN	F1772-510-2000	VDE
	PANASONIC INDUSTRIAL	ECQU2A105MV	VDE
	EVOX-RIFA	PHE830MF7100M	VDE
	TECATE	MPX-275/105M27	VDE
	NISSEI ARCOTRONICS	R40105M275BS or R46105M275BRS	VDE
	ISKRA	KNB1530 1u 275V	SEV
	OKAYA ELECTRIC	PA105 or RE105L	VDE
	CAMEL	MPX105K275VAC or MPX105K5KUP0P	VDE
C55		0.022uF, 250 VAC, X2	
(APC 232-0223)	ISKRA	KNB1530.022M250V	VDE
	EVOX-RIFA	PHE830MB5220M	VDE
	NISSEI ARCOTRONICS	R46223-275MBS	VDE
	CAMEL ELECTRONICS	MPEX 223M 250V	VDE
	EPCOS	B81130-B1223-M189	VDE

American Power Conversion Corporation
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Output: Full time surge 220-240 V~, 50-60 Hz 2,3A
Battery: 220-240 V~, 50-60 Hz, 3A, 410W, 650VA(BP650SI)
2,8A, 390W, 620VA(SU620INET)
1,9A, 260W, 420VA (BP420SI SU420INET)
1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

C56,C58		4700pF, 250VAC, Y2	
(APC 221-0502)	VISHAY/ROEDERSTEIN	WY0472MCMCRBK	VDE
	PANASONIC	ECKNTS472MF	VDE
	MURATA ERIE	DE2E3KH472MN3A or DE1307-486E472M-KH	VDE
	MURATA ELECTRONICS	DE1307-640E	VDE
	FARNELL ELECTRONIC	106-764	VDE
Resistors(R27,28,31,32,50,51,53,54,101-104)) Any		332 Kohms, 1/4W,	
(APC 130-3323)			
Opto(U7)		7500 V isolation	
(APC 312-0003)	Motorola	4N25	VDE, FIMKO
	ISOCOM	IS201X	VDE, FIMKO
	Siemens	4N25-X001 or IL202-x001	VDE, FIMKO
MV4		300 V, 160 J, 20 mm	
(APC 380-0001)	Harris	V320LA40BX10	VDE
	Panasonic	ERZV20D471	VDE
	Maida	D6544ZOV301RA150	VDE
		D6344ZOV301RA150	VDE
	Siemens	S18K300S5M4.8 or S20K300S5M4.8	VDE
MV1		360V, 160 J, 5 mm	
(APC 380-0009)	Maida	D65ZOV361RA160	VDE
Circuit Breaker BP650SI, SU620INET		10A, 250VAC	
(APC 530-0034)	Mechanical Products	1600-254-100	VDE
	Rocom	B110S	VDE
	Snap Action	MB1-10-S	VDE
Circuit Breaker BP420/280SI, SU420INET		7A, 250VAC	
(APC 530-0009)	Mechanical Products	1600-254-070	VDE
	Snap Action, Inc.	MB1-7-S	VDE
	Rocom	B107S	VDE

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Battery: 220-240 V~, 50-60 Hz, 3A, 410W, 650VA(BP650SI)
2,8A, 390W, 620VA(SU620INET)
1,9A, 260W, 420VA (BP420SI SU420INET)
1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

Inductor L1		500uH, 2A
(APC 420-0032)	FALCO ELECTRONICS, LTD	E12024
	EASTAR	420-0032
	Videocon	420-0032
Inductor L2,L3		25uH, 3A
(APC 420-0003)	Falco	420-0003
	Eastar	420-0003
	BPL	420-0003
Transformer T1		
(APC 460-0008)	Falco	460-0008
Transformer BP650SI/SU620INET		
(APC 430-2052A)	Leader	430-2152A
	Sino American	430-2152A
Transformer BP420SI/SU420INET		
(APC 430-2051)	Leader	430-2151

American Power Conversion Corporation
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Uninterruptible Power Supplies
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Battery: 220-240 V~, 50-60 Hz, 3A, 410W, 650VA(BP650SI)
2,8A, 390W, 620VA(SU620INET)
1,9A, 260W, 420VA (BP420SI SU420INET)
1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

Battery Fuse BP650SI, SU620INET (F2, F3)		40 A, 32 VDC	
(APC 517-0040)	Bussmann	ATC-40	UL
	Littelfuse	M257040	UL
Battery Fuse BP420/280SI, SU420INET (F1,F2)		30A, 32VDC	
(APC 517-0030)	Bussmann	ATC-30	UL
	Littelfuse	M257030	UL
Battery BP650SI, SU620INET		12 V, 11 or 12 Ah	
(APC 910-8020)	CSB	GP12110F2 or GP12120F2	UL
	YUASA	NP12-12	UL
	PANASONIC	LC-RA1212P1	UL
	B & B BATTERY	BP1212	UL
Battery BP420/280SI, SU420INET		12 V, 7 or 7.2 Ah	
(APC 910-8011)	CSB	GP1270F2 #438A	UL
	Panasonic	LC-R127R2P1	UL
	B & B Battery	BP7-12	UL
	Exide	EP 7-12	UL
Battery Terminal Hood (APC 870-3219)	Polycarbonate	rated V-2	UL
Accessibility shield 420 and 280 units only (APC 850-0007)		PVC	
Printed Circuit Board (640-0232)		rated V-1 or V-0, 130°C	UL
Bezel	GE	Type GPM5500, HB minimum	UL

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Battery: 220-240 V~, 50-60 Hz, 3A, 410W, 650VA(BP650SI)
2,8A, 390W, 620VA(SU620INET)
1,9A, 260W, 420VA (BP420SI SU420INET)
1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

Telco components			
MOV Q201		175V,14mm	
(APC 380-1752)	SIEMENS	S14K175E2G3R5	VDE
Gas Tube S201		470V	
(APC 38100471)	CP Claire	CG2-470	
	Lumex	GT-CM470	
	Meguro	CM-470L	
PTC1, PTC2		600V,0,375A,15 Ohms	
(APC 160-R376)	Raychem	PSR-23382-2	UL
Telco connectors(J201,J202)		8 position	
(APC 750-0009)	AMP INC.	555164-1	UL
	AMPHENOL	G93AV080814	UL
	Allsun Corporation	C031-8-F-3-.250	UL
	SUNJUN ELECTRONICS, INC	9633-8812	UL

Appendix No. 2
to Marks Licence No. 40000164
file ref. 1924400-3335-0025/A40

BP650SI

VDE Pruf-und Zertifizierungsinstitut - VDE-Prufstelle
VDE Testing and Certification Institute
Merianstra β e 28 D-63069 Offenbach a. M. Tel.(+49) (69) 8306-0 FAX (+49) (69) 8306-555

Appendix No. 26
to Marks Licence No. 86657 G
file ref. 19244-3335-0001/300LT

file ref.
(filled in by the institute)

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

-Translation of the VDE Testing and Certification Documents-

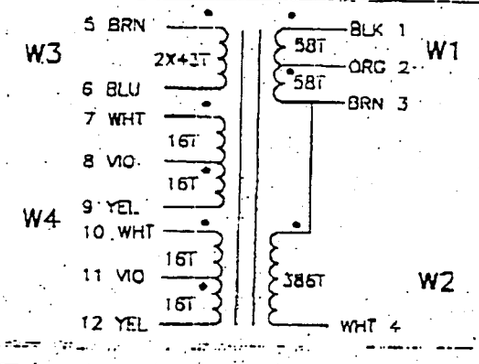
1.1 Manufacture: LEI INTERNATIONAL LTD.
1.2 Place of Manufacture: No.1 Industrial Area Tangxia Town,Dongguan City,Guangdong Province,CHINA
1.3 Reference of type: Power Transformer,Isolating
1.4 Trade Mark: LEI
1.5 Other markings: Date code, Class 155 (F)
1.6 Reference number: LS-A2819-PT

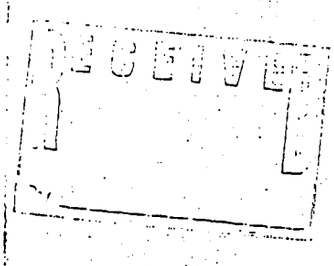
2.1 Protection against electric shock: Reinforced
2.2 Class of protection to IEC 539: IP 20
2.3 Type of construction (isolating transformer for toys.....): Isolating Transformer
2.4 Transformer,Stationary – Portable*): Portable

2.5 Protection against short-circuit according to Sub-clause 6.2*)
inherently short-circuit proof:
non-inherently short-circuit proof: Non-inherently short-circuit proof
non short-circuit proof:
fail safe:
(rated current of the cutout: 280MA)
2.6 Rated maximum ambient temperature t_a= 40 . °C
2.7 Class: B Insulation;Declaration of insulation see VDE-Form 187
(according to IEC 85)

		Input	Output(AC/DC)
3.0	**Electrical value**		
3.1	Rated voltage(s)	V: Pri.3-4:230 Vac,Pri. 1-3 :69.11Vac.	Sec 8-9:25.62VAC, Sec 5-7:19.06VAC
3.2	Rated frequency	HZ: 50	
3.3	Rated current	N/A	N/A
3.4	Rated output	N/A	N/A
3.5	Rated power factor cos phi:	N/A	N/A

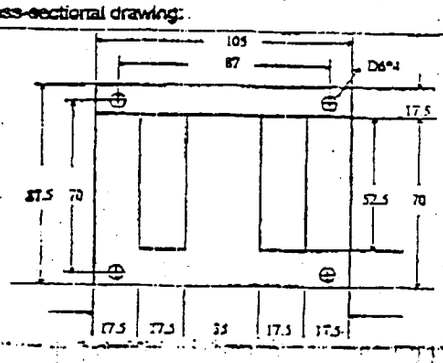
4.0 **Windings**
4.1 Coil base, number:
material: ZYTEL 101 POLYNIDE NY66
4.2 Material of layer insulation: POLYESTER FILM TAPE
4.3 Windings number: Pri: 3-4 :386T,Pri.1-3 2X58T Sec 8-9:2X 43T, Sec 5-7: 2x32T
material: Copper Wire
4.4 Tape, number:
4.5 Diameter of wire(mm) Pri 3-4:0.75; Pri 1-3:0.90 Sec 8-9:0.45 Sec 5-7:1.80
4.6 Windings insulation, material: Polyester tape
4.7 Cord insulation material N/A
internal:
external:
4.8 Cold resistance in Ω :at 25°C Pri.3-4: 3.50, Pri.1-3 :1.0 Sec 8-9: 0.80 , Sec 5-7: 0.04
4.9 Circuit diagramm(with terminal markings,color of wires etc.):





*)Please insert what is applicable

5.0 Iron core
5.1 Sheet metall,material: H14A50
main dimensions: 105 mm x 87.4 mm x 50.80 mm
5.2 Cross-sectional drawing:



6.0 Type of construction
6.1 Open-covered -in case protection*) Open
6.2 Impregnated-undrowned-drowned*) Drowned
6.3 Soaking(liquor):
6.4 Underpressure-Overpressure-Soaking at °C)
6.5 Drown material: Varnish, John C. Dolph Co.,Type BC-346A
6.6 Material of the cover:
of the case:
of the socket(support)
6.7 Flammability class for insulation material:

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

N / A

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

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

*) Delete if not applicable. (continue on separate sheet if necessary)

Offenbach, 21.8.97

VDE Testing and Certification Institute
Department

Place: N/A Date: 14/Aug/1997

(Stamp and signature of the manufacturer)

VDE Pruf-und Zertifizierungsinstitut
VDE-Prufstelle
Merianstra ße 28
D-63069 Offenbach

Aktenzeichen / file ref.

ISOLATIONSERKLARUNG

DECLARATION OF INSULATION

Gegenstand/Component: 430-2052

Typenbezeichnung/Type designation: Power Transformer, Isolating LS-A2819-PT

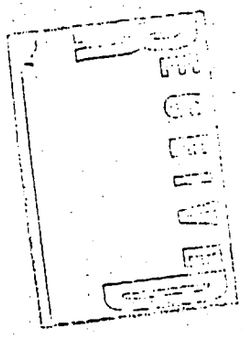
Hersteller/Manufacturer: LEI INTERNATIONAL LTD.

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

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.

Das o.g. elektrische Betriebsmittel (Bauteil) entspricht der Thermischen Klasse_____gema ß IEC-Publikation 85.

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



No.1 Industrial Area Tangxia Town,Dongguan City,GuangdongProvince,CHINA

Ort und Datum/Place and date.

Unterschrift des herstellers/Manufacturers signature:

Spezifikation über Isolierstoffe/Specification of insulation materials

Isolierstoff Insulation	Hersteller manufacturer	Handelsname (Typ) Tradename	Chemische Bezeichnung Chemical Name	Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffherstellers acc. to IEC-Norm IEC-Type see encl.No.of the insulation manufacturer	Temperatur-Index Temperature-Index
Isolierung zwischen Wicklungen Insulation between windings	DU PONT 3M	NOMEX 410 1350	NOMEX PAPER WEB REINFORCED POLYESTER FILM TAPE POLYESTER FILM TAPE		220 °C 130 °C 130 °C
Spulenkörper-Isolierung Coil base insulation	DU PONT	FR530	PET+30% GLASS FIBER		140 °C
Lagenisolierung Layer insulation					
Tränkmittel Impregnation substances	JOHN C.DOLPH HITACHI	BC-340A HP-2952F-2HY	VARNISH VARNISH		200 °C
Vergußmasse Crown material					
Drahtisolierung Windings insulation	1.PACIFIC 2.TAI-I	AIEIW-200 ETW.H	POLYESTER-IMIDE COPPER WIRE	NW35-C	200 °C
Leitungsisolierung Cord insulation					

AUG 14 '97 05:18PM ISM RI 401 435 7901

430-2052A(4-5) (1224x1729x2 tiff)

BP6505I

VDE Prüf- und Zertifizierungsinstitut
Merianstrasse 28

D-63069 Offenbach

Aktenzeichen / *file ref.*

ISOLATIONSERKLÄRUNG ***DECLARATION OF INSULATION***

Betriebsmittel (Bauteil)/
Equipment (Component): **Transformer 430- 2052A**

Typenbezeichnung/
Type designation: **Class F SAF-1 Table XII**

Hersteller/
Manufacturer: **Sino American Electronic (Shenzhen)Co., Ltd**

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

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

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

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

District 18, Bao An New City ShenZhen GuangDong Province, China, March 22, 2001

Ort und Datum / *Place and date*

SINO-AMERICAN ELECTRONICS (SHE... CO., LTD. 華美電子(深圳)有限公司

S.Tai

Unterschrift des Herstellers / *Manufacturers signature*

Spezifikation über Isolierstoffe / *Specification of insulation materials*

Isolierstoff *Insulation*	**Hersteller** *Manufacturer*	**Handelsname (Typ)** *Tradename*	**Chemische Bezeichnung** *Chemical Name*	**Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffher-stellers** *Acc. to IEC Norm IEC Type see encl. No. of the insulation manufacturer*	**Temperatur-Index** *Temperature index*
Isolierung zwischen Wicklungen *Insulation between windings*	1. Windsor-Stevens Inc. 2. Nitto Denko Corp. 3. 3M Co.	1. Kraft Paper 2. Nitto tape 31C 3. 3M tape 1350	 2. Polyester 3. Polyester		1. 94V-0 2.130 ℃ 3.130 ℃
Spulenkörper-Isolierung *Coil base insulation*	E.I. Dupont De Nemoure	Bobbin - Rynite FR-530	PET		1.180 ℃
Lagenisolation *Layer insulation*	1. Nitto Denko Corp. 2. 3M Co.	1. Nitto tape 31C 2. 3M tape 1350	1. Polyester 2. Polyester		1.130 ℃ 2.130 ℃
Tränkmittel *Impregnation substances*	Viking Products, Inc.	V1630FS			1.180 ℃
Vergußmasse *Drown material*	N/A	N/A	N/A		N/A
Drahtisolierung *Windings insulation*	1. Tai-I Electric Wire & Cable Co., Ltd. 2. Ta Ya Electric Wire & Cable Co., Ltd.	Magnet Wire	PEW		1.155 ℃
Leitungsisolierung *Cord insulation*	N/A	N/A	N/A		N/A

430-2052A(5-5) (1224x1729x2 tiff)

Appendix No. 3
to Marks Licence No. 40000164
file ref. 1924400-3335-0025/A40

430-2052A(1-5) (1224x1729x2 tiff)

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 e-mail vde-info@vde-institut.com

VDE

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

(filled in by the Institute)

Constructional data for transformers acc : DIN EN 61558 VDE 0570 | **Form 43E**

- Translation of the VDE Testing and Certification Documents -

1.1 Manufacturer: SINO-AMERICAN Electronic CO.,LTD.
1.2 Place of manufacture: District 18 Bao-An Shen Zhen City Guang Dong Province China
1.3 Reference of type: 430-2052A REV 2
1.4 Trade Mark:
1.5 Other markings:
1.6 Reference number: A2014162-0

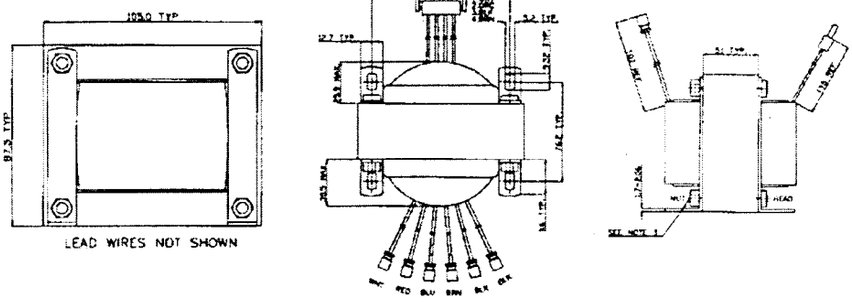
2.1 Protection against electric shock: An isolated transformer.class F
2.2 Class of protection to IEC 539: IP..... 20
2.3 Type of construction (Isolating transformer for toys.....): According to VDE 0570 and EN61558
2.3.1 Applicable part(s) 2 of EN 61558
2.4 Transformer, stationary - portable *): UPS
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 ablent temperature: ta = 25~30 °C
2.7 Class: F 155℃ Insulation; Declaration of insulation see VDE-Form 187
(according to IEC 85)
2.8 CTI - Value (according to IEC 112, Method A):

3	Electrical values			Input	Output (AC/DC)
3.1	Rated voltage(s)		V:	230V	27V 20V
3.2	Rated frequency		Hz:	50Hz	
3.3	Rated current		A:		
3.4	Rated output		VA:	650VA	
3.5	Rated power factor cos phi:				
4	**Windings**				
4.1	Coil base		number:	1	
			material:	PET	
4.2	Material of layer insulation		material:	Polyester Tape	
4.3	Windings		number:	1	
			material:	Copper	
4.4	Taps		number:	5	
4.5	Diameter of wire		mm:	0.9Φ 0.9Φ 0.75Φ	0.45Φ 1.8Φ
4.6	Winding of insulation		material:	Polyester Tape or Nomex	
4.7	Cord insulation material				
			innere:		
			äußere:		
4.8	Cold resistance in Ω at:	25	°C =	0.313Ω max 0.313Ω max 3.65Ω Max	0.616Ω Max 17mΩ Max

5 Iron core

5.1 Sheet metall, material:H14 50A
main dimensions:EI 105*50

5.2 Cross-sectional drawing:



6 Type of construction

6.1 Open - covered - in case protection *)

6.2 Impregnated - undrowned - drowned *)

6.3 Soaking (liquor):

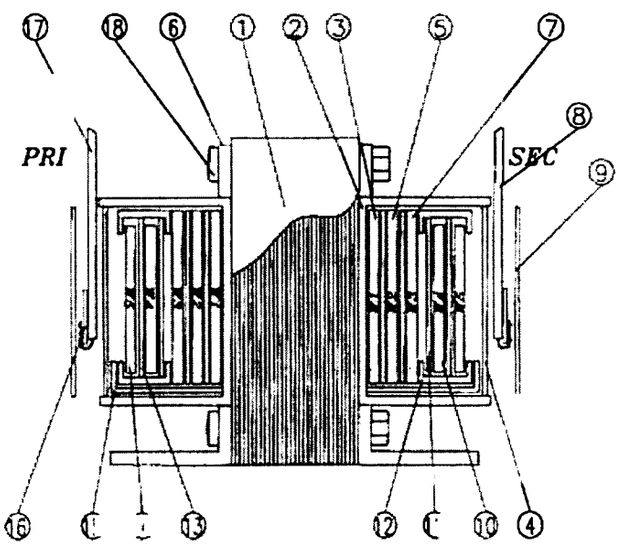
6.4 Underpressure - Overpressure - Soaking at °C *)

6.5 Drown material:

6.6 Material of the cover:
of the case:
of the socket (support):

6.7 Flammability class for insulation material: 94V-0

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



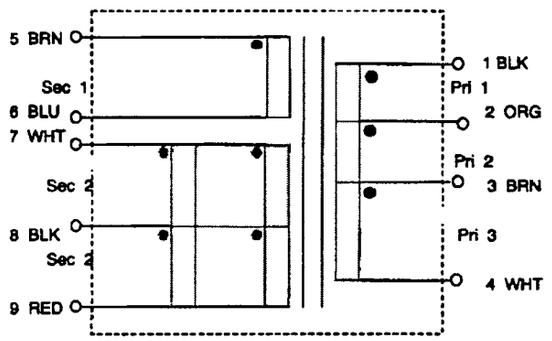
430-2052A(3-5) (1224x1729x2 tiff)

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

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

CIRCUIT DIAGRAM:



Offenbach, 2.2.02

VDE Testing and Certification Institute
Department

Place: District 18 Bao An Date: Mar.18.2001
Shen Zhen City Guang Dong Province China

(Stamp and signature of the manufacturer)

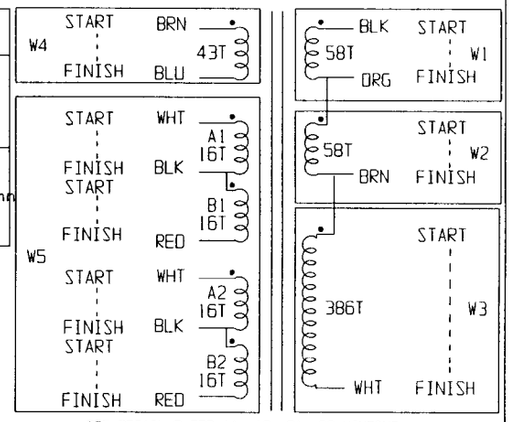
Copyright - all rights reserved. In any case the German version shall prevail

NOTES

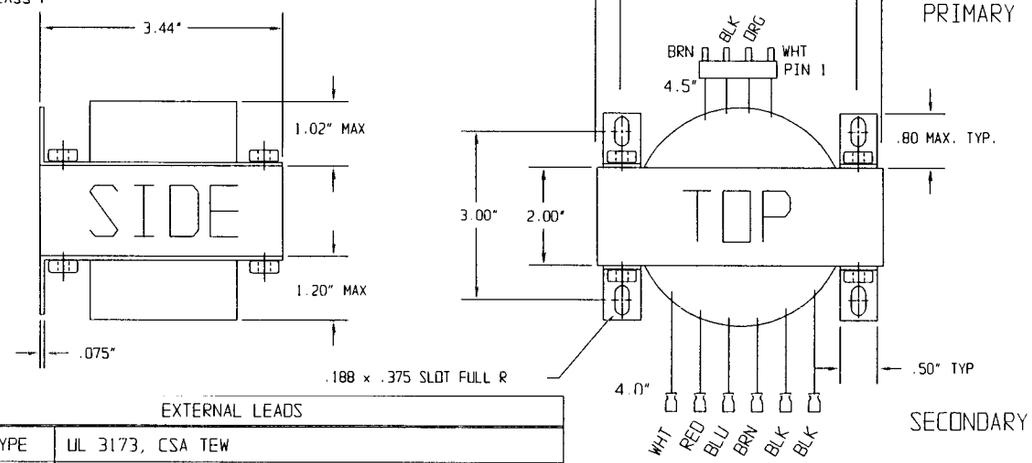
1) LAMINATION TYPE EI 1 3/8, M19, 26GA, STACK 2"
1a) LAMINATION TYPE EI 105x35, H14A50, STACK 51mm
2) INTERLEAVED 1x1.
3) HORIZONTAL MOUNT L-BRACKETS TO BE #14 GA (.067" - .081").
4) LEAD LENGTHS MEASURED FROM POINT OF EXIT FROM WINDINGS BEFORE TERMINALS ARE APPLIED (TOLERANCE ± .25")
5) NOTE POLARITIES
6) TO TEST WINDING COUNTS APPLY 230VAC (W3) TO PRIMARY (W3) (USE RMS OR AVERAGING METER TO VERIFY). EACH SECONDARY
MUST READ: 230V x $\left(\frac{\text{SEC. TURNS}}{\text{PRIM. TURNS}}\right)$ ± 1% *
* USING THE SAME METER.
7) LEAKAGE INDUCTANCE FROM RED TO BLACK <2uH @ 1KH z & 0.1V MEASURED WITH BLACK SHORTED TO WHITE AND PRIMARY WHITE & BLACK LEFT OPEN.
8) WIND W1, W2, W3, W4 THEN W5 IN THAT ORDER.
W1-W2-W3 INSULATION NOT REQUIRED.
W4-W5 INSULATION NOT REQUIRED.
9) CLASS F

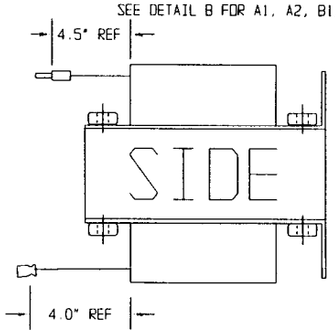
REV #	DATE	REVISION
1	7/96	

WINDINGS
PRIMARY WINDING W1: 58T OF 19 AWG OR 0.912mm WINDING W2: 58T OF 19 AWG OR 0.912mm WINDING W3: 386T OF 21 AWG OR 0.724mm
SECONDARY WINDING W4: 43T OF 2 X 25 AWG OR 2x0.45mm WINDING W5: 64T TOT OF 13 AWG OR 1.80mm



SEE DETAIL B FOR A1, A2, B1, B2 WINDING



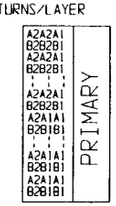


EXTERNAL LEADS		
W1, W2, W3	TYPE	UL 3173, CSA TEW
	AWG	18
	TERM	TERMINATION: UNIVERSAL MATE-N-LOK SOCKET TERMINAL, AMP #350537-3 OR APC APPVD EQUIVALENT, INSERTED IN HOUSING, AMP #1-480702-0 OR APC APPVD EQUIVALENT. PINOUT AS SHOWN IN SCHEMATIC ABOVE.
W4	TYPE	UL 3173, CSA TEW
	AWG	18
	TERM	AMP 2-520407-2 OR KS FDFD1-250 .25x.032 FASTON
W5	TYPE	UL 3173, CSA TEW
	AWG	10
	TERM	AMP 520974-2 OR KS FDFD5-250 .25x.032 FASTON

SECONDARY WINDING DETAIL
3 LAYERS TOTAL
22 TURNS/LAYER

BIFILAR IS CRITICAL MIDDLE LAYER IS SPLIT

DETAIL B



AMERICAN POWER CONVERSION CORP

ITEM: OUTPUT TRANSFORMER

PRODUCT: BP650I DBL8ST 230V

APC PART #: 430-2052A

DATE	BY	SCALE	DWG #	REV #
7/26/97	MGC	.52	43020521	2

BP4D05I

Appendix No. 4
to Marks Licence No. 40000164
file ref. 1924400-3335-0025/A404ZE

VDE Prüf-und Zertifizierungsinstitut- VDE-Prüfstelle
VDE Testing and Certification Institute
Merianstra β e 28 D-63069 Offenbach a. M. Tel.(+49) (69) 8306-0 FAX (+49) (69) ——

Appendix No. 27
to Marks Licence No. 86657 G
file ref. 19244-3335-0001/300LT

file ref:

(filled in by the institute)

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

-Translation of the VDE Testing and Certification Documents-

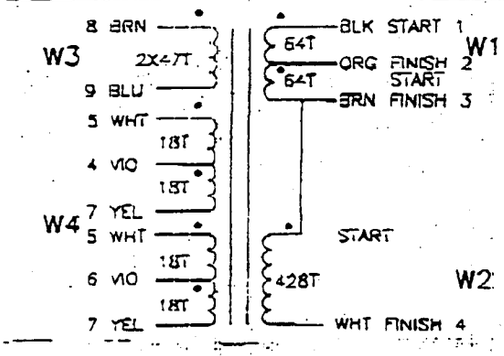
1.1	Manufacture:	LEI INTERNATIONAL LTD.
1.2	Place of Manufacture:	No.1 Industrial Area Tangxia Town,Dongguan City,Guangdong Province,CHINA
1.3	Reference of type:	Power Transformer,Isolating
1.4	Trade Mark:	LEI
1.5	Other markings:	Date code, Class 130 (B)
1.6	Reference number:	LS-A2816-PT

2.1 Protection against electric shock: Reinforced
2.2 Class of protection to IEC 539: IP 20
2.3 Type of construction (isolating transformer for toys ——): Isolating Transformer
2.4 Transformer,Stationary – Portable*): Portable

2.5 Protection against short-circuit according to Sub-clause 6.2*)
inherently short-circuit proof:
non-inherently short-circuit proof: Non-inherently short-circuit proof
non short-circuit proof:
fail safe:
(rated current of the cutout: 280MA)
2.6 Rated maximum ambient temperature:ta= 40 °C
2.7 Class: B Insulation;Declaration of Insulation see VDE-Form 187
(according to IEC 85)

		Input	Output(AC/DC)
3.0	Electrical value		
3.1	Rated voltage(s)	V: Pri. 1-3 :68.88 Vac Pri. 3-4 230 Vac	Sec. 8-9 :25.26VAC ,Sec 5-7:19.34VAC
3.2	Rated frequency	Hz 50	
3.3	Rated current	N/A	N/A
3.4	Rated output	N/A	N/A
3.5	Rated power factor cos phi:	N/A	N/A

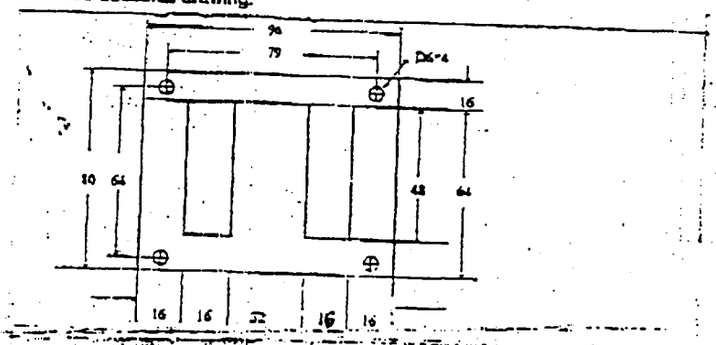
4.0 Windings
4.1 Coil base, number:
material: ZYTEL 101 POLYNIDE NY66
4.2 Material of layer insulation: POLYESTER FILM TAPE
4.3 Windings number: Pri:1-3 2X64T ,Pri.3-4 : 428T Sec: 8-9 2X47T, 5-7: 38X2T
material: Polyurethane and polyester copper wire (UEW PEW)
4.4 Taps, number:
4.5 Diameter of wire(mm) Pri; 1-3 : 0.80, Pri. 3-4: 0.65 ; Sec: 8-9: 0.4 ; Sec 5-7 :1.50
4.6 Windings insulation, material: Polyester- tape
4.7 Cord insulation material: N/A
internal:
external:
4.8 Cold resistance in Ω at 25°C Pri.1-3: 1,034 ,Pri.3-4 5.1; Sec.5-7: 0.0517, Sec .8-9: 0.0836.
4.9 Circuit diagramm(witch terminal markings,color of wires etc.):



*)Please insert what is applicable

7/13

5.0 Iron core
5.1 Sheet metall,material: H14A50
main dimensions: 95 mm x 79 mm x 50.80 mm
5.2 Cross-sectional drawing:



6.0 Type of construction
6.1 Open-covered -in case protection*) Open
6.2 Impregnated-undrowned-drowned*) Drowned
6.3 Soaking(liquor):
6.4 Underpressure-Overpressure-Soaking at °C)
6.5 Drown material: Varnish, John C. Dolph Co., Type BC-346A
6.6 Material of the cover:
of the case:
of the socket(support)
6.7 Flammability class for insulation material:

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

N / A

RECEIVED

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

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

*) Delete if not applicable (continue on separate sheet if necessary)

Offenbach, 21.8.97

VDE Testing and Certification Institute
Department ZTD

Place: N/A Date: 14/Aug/1997

(Stamp and signature of the manufacturer)

8/13

VDE Prüf-und Zertifizierungsinstitut
VDE-Prüfstelle
Merianstra ße 28
D-63069 Offenbach

Aktenzeichen / file ref.

ISOLATIONSERKLÄRUNG

DECLARATION OF INSULATION

Gegenstand/Component: 430-2051

Typenbezeichnung/Type designation: Power Transformer, Isolating LS-A2816-PT

Hersteller/Manufacturer: LEI INTERNATIONAL LTD.

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

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.

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

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

No.1 Industrial Area Tangxia Town,Dongguan City,GuangdongProvince,CHINA

Ort und Datum/Place and date:

14 Aug

Unterschrift des Herstellers/Manufacturers signature:

RECEIVED

9/13

Spezifikati[illegible] über Isolier[illegible]re/Specification of Insulation materials

Isolierstoff Insulation	Hersteller manufacturer	Handelsname (Typ) Tradename	Chemische ezeichnung Chemical Name	Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffherstellers acc. to IEC-Norm IEC-Type see encl.No.of the insulation manufacturer	Temperatur-Index Temperature-Index
Isolierung zwischen Wicklungen Insulation between windings	3M NITTO	1350 310	WEB REINFORCED POLYESTER FILM TAPE		130 ℃
Spulenkörper-Isolierung Coil base insulation	DU PONT	NYLON	POLYAMINE		125 ℃
Lagenisolierung Layer insulation					
Tränkmittel Impregnation substances	JOHN C.DOLPH HITACHI	BC-346A WP-2952F-2GY	VARNISH VARNISH		200 ℃
Vergußmasse Drawn material					
Drahtisolierung Windings insulation	1.TOTOKU 2.TAI-1	UEW UEW PEW	POLYEURETHANE COPPER WIRE POLYESTER COPPER WIRE	NW75-C	135 ℃ 155 ℃
Leitungsisolierung Cord insulation					

NOTES

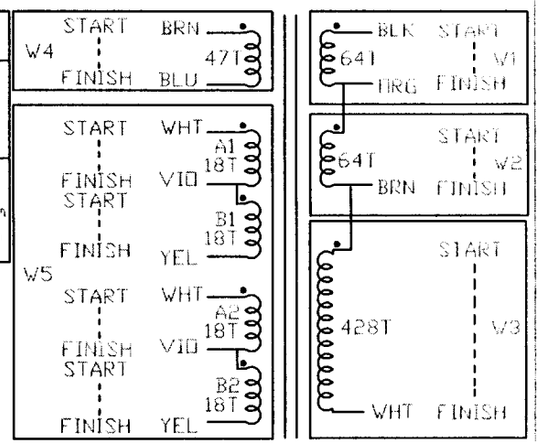
1) LAMINATION TYPE EI 1 1/4, M19, 26GA, STACK 2.00"
1a) LAMINATION TYPE EI 96x32, H14A5a, STACK 51mm
2) INTERLEAVED 1x1.
3) HORIZONTAL MOUNT L-BRACKETS TO BE #14 GA (.067" - .081").
4) LEAD LENGTHS MEASURED FROM POINT OF EXIT FROM WINDINGS BEFORE TERMINALS ARE APPLIED (TOLERANCE ± .25")
5) NOTE POLARITIES
6) TO TEST WINDING COUNTS APPLY 230VAC (W3) TO PRIMARY (W3) (USE RMS OR AVERAGING METER TO VERIFY). EACH SECONDARY MUST READ: $230V \times \left(\frac{\text{SEC. TURNS}}{\text{PRIM. TURNS}}\right) \pm 1\%$*

* USING THE SAME METER.

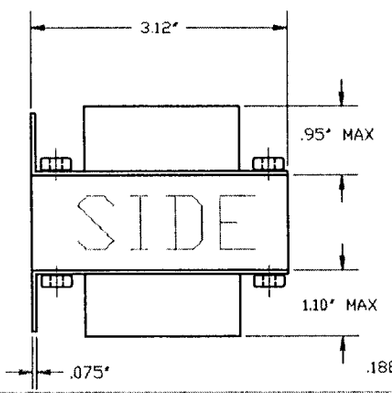
7) LEAKAGE INDUCTANCE FROM YELLOW TO VIOLET (2uH @ 1KHz & 0.1V MEASURED WITH VIOLET SHORTED TO WHITE AND PRIMARY WHITE & BLACK LEFT OPEN.
8) WIND W1, W2, W3, W4 THEN W5 IN THAT ORDER.
W1-W2-W3 INSULATION NOT REQUIRED.
W4-W5 INSULATION NOT REQUIRED.
9) CLASS B

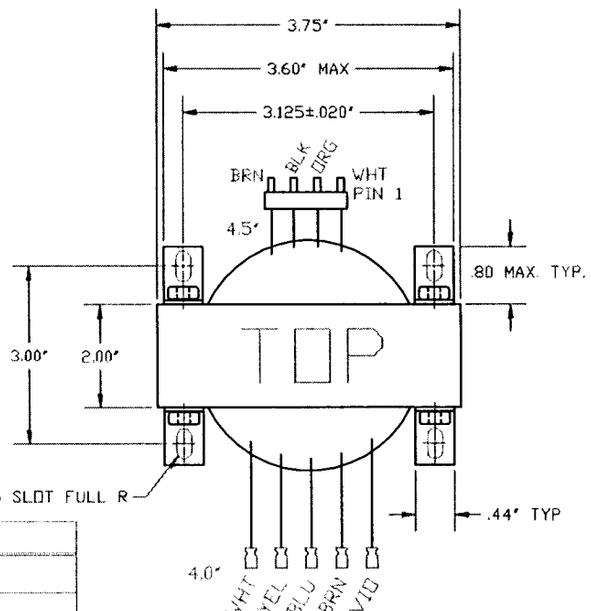
REV. #	DATE	REVISION
1	7/97	

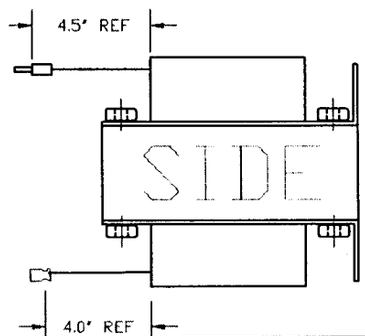
WINDINGS
PRIMARY WINDING W1: 64T OF 20 AWG OR 0.813mm WINDING W2: 64T OF 20 AWG OR 0.813mm WINDING W3: 428T OF 22 AWG OR 0.643mm
SECONDARY WINDING W4: 47T OF 2x26 AWG OR 2x0.40mm WINDING W5: 72T TOT OF 15 AWG OR 1.50mm



SEE DETAIL B FOR A1, A2, B1, B2 WINDING







EXTERNAL LEADS		
W1, W2, W3	TYPE	UL 1015, CSA TEW
	AWG	18
	TERM	TERMINATION: UNIVERSAL MATE-N-LOK SOCKET TERMINAL, AMP #350537-3 OR APC APPVD EQUIVALENT, INSERTED IN HOUSING, AMP #1-480702-0 OR APC APPVD EQUIVALENT. PINOUT AS SHOWN IN SCHEMATIC ABOVE.
W4	TYPE	UL 1015, CSA TEW
	AWG	18
	TERM	AMP 2-520407-2 OR KS FDFD1-250 .25x.032 FASTON
W5	TYPE	UL 1015, CSA TEW
	AWG	14
	TERM	AMP 3-520408-2 OR KS FDFD2-250 .25x.032 FASTON

SECONDARY WINDING DETAIL
3 LAYERS TOTAL
24 TURNS/LAYER

BIFILAR IS CRITICAL
MIDDLE LAYER IS SPLIT

DETAIL B

AMERICAN POWER CONVERSION CORP.

ITEM: OUTPUT TRANSFORMER

PROJECT: BP420I DBLBST 230V

APC# PART #: 430-2051

DATE	BY	SCALE	DWG #	REV #
7/26/97	MGC		4302051.DWG	1

Appendix No. 5
to Marks Licence No. 40000164
file ref. 1924400-3335-0025/A404ZE

file ref.:

ATTN: M. CALVANESE 5

(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 DE MEXICO
1.2 Place of manufacture: MERIDA, YUCATAN, MEXICO
1.3 Reference of type: CURRENT SENSOR
1.4 Trade Mark: NONE
1.5 Other markings:
1.6 Reference number: → 460-____, FALCO, DATE CODE
→ L120D1 (FALCO PART NO)

2.1 Protection against electric shock: YES
2.2 Class of protection to IEC 536: IP..... CREEPAGE & CLEARANCE
2.3 Type of construction (isolating transformer for toys.....): CREEPAGE AND TRIPLE INSULATION
2.4 Transformer, stationary – portable *): STATIONARY.

2.5 Protection against short-circuit according to sub clause 6.2 *):
inherently short-circuit proof: YES
non-inherently short-circuit proof: NO
non short-circuit proof: NO
fail safe: YES
(rated current of the cutout: A) .8 mA MAX
2.6 Rated maximum ambient temperature: t_a = °C 130°C
2.7 Class: B 130°C Insulation; Declaration of insulation see VDE-Form 187 (according to IEC 85)
2.8 CTI – Value (according to IEC 112, Method A):

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	N/A	6VAC
3.2 Rated frequency	Hz:	60Hz	
3.3 Rated current	A:	8AMPS MAX.	.8AMPS MAX.
3.4 Rated output	VA:		
3.5 Rated power factor cos phi:			

4 Windings
4.1 Coil base, BOBBIN number: 3000-460F
material: RYNITE FR-530
4.2 Material of layer insulation:
4.3 Windings, PRIMARY * 6T number: TEX-E .65 mm TRIPLE INSULATED
material: 3 INSULATION LAYERS OF MODIFIED POLYESTER
4.4 Tape: SECONDARY 200T number: THERMAL-RESISTANT AND POLYAMID RESIN.
4.5 Diameter of wire (mm): .078 BARE COPPER [.081mm-.094mm OVER INSULATION]
4.6 Windings insulation, materials:-MYLAR TAPE P-256, PERMACEL 130°C
4.7 Cord insulation material
internal:) N/A
external:
4.8 Cold resistance in Ω 273Ω ± 25Ω at: 25 °C
4.9 Circuit diagram (witch terminal markings, color of wires etc.):

* TEX-E TRIPLE INSULATED .65mm WIRE, MANUFACTURED BY FURUKAWA
APPROVALS NEMKO, IEC950. A3. A4/ANNEX U) TEMP. IND 120°C.
EN 60950, A3. A4/ANNEX U.)

*) Delete if not applicable

UL 1950-2e.) UL File # E157568(S)
1411-4e)

please turn over

1/4

460-[illegible]

09/24/1997 13:23 3055676377 FALCO USA PAGE 01

main dimensions:

5.2 Cross-sectional drawing:

6 Type of construction

6.1 Open – covered – in case protection *) OPEN CONSTRUCTION

6.2 Impregnated – undrowned – drowned *) DROWNED

6.3 Soaking (liquor): NO

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

6.5 Drown material: PD GEORGE 439 AIR DRY VARNISH

6.6 Material of the cover: N/A

of the case:

of the socket (support): UL94-V0

6.7 Flammability class for insulation material:

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

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

Type	Manufacturer	Details about type, current, power or similar	VDE-Mark No – Yes
		N/A	

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

Offenbach, 5.11.97

Place: Date:

VDE Testing and Certification Institut
Department

(Stamp and signature of the manufacturer)

2/4

09/24/1997 13:23 3055676377 FALCO USA PAGE 02

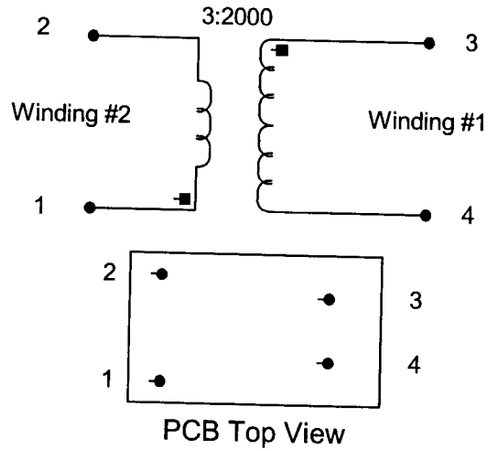
Spezifikation über Isolierstoffe / Specification of insulation materials

Isolierstoff (Insulation)	Hersteller (Manufacturer)	Handelsname (Typ) (Tradename)	Chemische Bezeichnung (Chemical Name)	Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffherstellers (acc. to IEC-Norm IEC-Type see encl. No. of the insulation manufacturer)	Temperatur-Index (Temperature index)
Isolierung zwischen Wicklungen (Insulation between windings)	COIL BASE (BOBBIN) COSMO + CREEPAGE.	RYNITE FR-530 DUPONT		UL-E69578M	CLASS-H 180°C
Spulenkörper-Isolierung (Coil base insulation)	COIL BASE (BOBBIN) COSMO	RYNITE FR-530 DUPONT		UL-E69578M	CLASS-H 180°C
Lagenisolierung (Layer insulation)	N/A				
Tränkmittel* (Impregnation substances)	N/A				
Vergußmasse (Drowe material)	PD GEORGE	#434 AIR DRY VARNISH		UL-E87039 RECOGNIZED COMP. (OBOA2)	130°C
Drahtisolierung (Windings insulation)	PERMACEL TAPE, MYLAR	MYLAR P-256			130°C.
Leitungsisolierung (Cord insulation)	N/A				

DESAHT SEITEN 05

460-0595

3/4


3:2000
2
3
Winding #2
Winding #1
1
4
2
3
1
4
PCB Top View

VDE Prüf- und Zertifizierungsinstitut

VDE

VDE Prüf- und Zertifizierungsinstitut · Merianstraße 28 · D-63069 Offenbach

American Power Conversion Corp.
85 Rangeway Road
Building #2
NORTH BILLERICA MA 01862
USA

Offenbach, 2002-03-15

Ihr Zeichen *Your ref.*	Ihr Schreiben *Your letter*	Unser Zeichen - bitte angeben *Our ref. - please indicate*	Bearbeiter(in) techn.: *Contact (tech.):*
Mr. B.Lucido	2001-10-29	1924400-3335-0025	Frank Richter Tel: +49(0)698306-435 Fax: -402
		Auftrag Nr. *Order No.* 12512	Bearbeiter(in) kaufm.: *Contact (order d.):* Erwin Biehl Tel: +49(0)698306-352 Fax: -582

Zeichengenehmigung Nr. 40000164
Marks Licence No.

Sehr geehrte Damen und Herren,

wir übersenden Ihnen den Zeichengenehmigungsausweis Nr. 40000164 zum Benutzen des auf Blatt 1 angegebenen Zeichens und bitten Sie, die auf der Rückseite abgedruckten Hinweise sorgfältig zu beachten. Wegen weiterer Einzelheiten verweisen wir auf unsere Prüf- und Zertifizierungsordnung PM 102.

Ladies and Gentlemen.

Please find enclosed the Marks Licence No. 40000164 for the use of the certification mark as shown on page 1. Please observe carefully the instructions printed on the reverse side. For further details, see the Testing and Certification Procedure PM 102.

Mit freundlichen Grüßen
Yours sincerely

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

VDE VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.

VDE Prüf- und Zertifizierungsinstitut
Testing and Certification Institute
Institut d'Essais et de Certification
Merianstrasse 28
D-63069 Offenbach
http//www.vde-institut.com

Telefon
+49 (0) 69 83 06-0
Telefax
+49 (0) 69 83 06-555
e-mail
vde-institut@vde.com

Nach dem Gerätesicherheitsgesetz (GSG) "zugelassene Stelle" für technische Arbeitsmittel.
Nach dem EMV-Gesetz "zuständige Stelle" für elektromagn. Verträglichkeit EMV von Geräten.
Vom Bundesminister für Verteidigung anerkannte Prüfstelle für Bauelemente der Elektronik.
Von Akkreditierungsstellen im DAR nach DIN EN 45001, 45011 und 45012 akkreditiert.
Akkreditiert durch: IEC - Internationale Elektrotechnische Kommission - IECEE/CB, IECQ und CENELEC - Europ. Komitee für elektrotech. Normung - CCA, HAR, ENEC, EMEDCA, CECC.

VDE Prüf- und Zertifizierungsinstitut

ZEICHENGENEHMIGUNG
MARKS LICENCE

American Power Conversion Corp.
85 Rangeway Road
NORTH BILLERICA 01862
USA

ist berechtigt, für ihr Produkt /
is authorized to use for their product

Unterbrechungsfreie Stromversorgung
Uninterruptible power supply

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.

oder/*or*

oder/*or*

Geprüft und zertifiziert nach /
Tested and certified according to

DIN EN 60950 (VDE 0805):2001-12; EN 60950:2000
IEC 60950:1999 + corr. 2000 modif.
DIN EN 50091-1-1 (VDE 0558 Teil 511):1997-07; EN 50091-1-1:1996
IEC 146-4:1986

Die Anforderungen des Gerätesicherheitsgesetzes (GSG) §3 werden eingehalten.
The requirements of the Appliance Safety Law §3 are met.

Aktenzeichen: 1924400-3335-0025 / 12512
File ref.:
Ausweis-Nr. 40000164 Blatt 1
Licence No. *Page*
Weitere Bedingungen siehe Rückseite und Folgeblätter /
further conditions see overleaf and following pages
Offenbach, 2002-02-06

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Zertifizierungsstelle
Certification

VDE VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Name und Sitz des Genehmigungs-Inhabers / *Name and registered seat of the Licence holder*
American Power Conversion Corp., 85 Rangeway Road, Building #2, NORTH BILLERICA MA 01862, USA

Aktenzeichen / *File ref.*
1924400-3335-0025 / 12512 / F131 / RC

Datum / *Date*
2002-02-06

Dieses Blatt gilt nur in Verbindung mit Blatt 1 des Zeichengenehmigungsausweises Nr. 40000164.
This supplement is only valid in conjunction with page 1 of the Licence No. 40000164.

	Jahresgebühren-Einheiten / *Annual fee units*
Unterbrechungsfreie Stromversorgung ***Uninterruptible power supply***	26.00

Typ(en) / *Type(s)*:

BP650SI	2.00
BP420SI	2.00
BP280SI	2.00
SU620INET	2.00
SU420INET	2.00

Nennspannung *Rated voltage*	AC 220-240 V, 50 - 60 Hz
Nennstrom *Nominal Current*	5.3 A
Schutzklasse *Class*	I
Ausgangsspannungen und -ströme *output voltage and current*	AC 220 - 240 V, 3.0 A, 50 - 60 Hz, 650 VA AC 220 - 240 V, 2.8 A, 50 - 60 Hz, 620 VA AC 220 - 240 V, 1.9 A, 50 - 60 Hz, 420 VA AC 220 - 240 V, 1.3 A, 50 - 60 Hz, 280 VA
Schutzmassnahme *Protection against electric shock*	abgedeckte Ausführung *covered version*
Weitere Angaben *Further information*	siehe Anlagen 1 - 6 *see appendix 1 - 6*

Summe der Jahresgebühren-Einheiten / *Sum of annual fee units* 36.00

Fortsetzung siehe Blatt 3 /
continued on page 3

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Name und Sitz des Genehmigungs-Inhabers / *Name and registered seat of the Licence holder*
American Power Conversion Corp., 85 Rangeway Road, Building #2, NORTH BILLERICA MA 01862, USA

Aktenzeichen / *File ref.*
1924400-3335-0025 / 12512 / F131 / RC

Datum / *Date*
2002-02-06

Dieses Blatt gilt nur in Verbindung mit Blatt 1 des Zeichengenehmigungsausweises Nr. 40000164.
This supplement is only valid in conjunction with page 1 of the Licence No. 40000164.

Jahresgebühren-Einheiten / *Annual fee units*

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131

Merianstrasse 28, D-63069 Offenbach
Telefon +49 (0) 69 83 06-0
Telefax +49 (0) 69 83 06-555

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Ausweis-Nr. / Licence No. 40000164

Beiblatt / Supplement

Name und Sitz des Genehmigungs-Inhabers / *Name and registered seat of the Licence holder*
American Power Conversion Corp., 85 Rangeway Road, Building #2, NORTH BILLERICA MA 01862, USA

Aktenzeichen / *File ref.*
1924400-3335-0025 / 12512 / F131 / RC

Datum / *Date*
2002-02-06

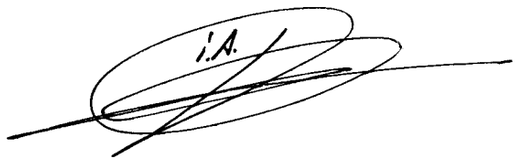
Dieses Beiblatt ist Bestandteil des Zeichengenehmigungsausweises Nr. 40000164.
This supplement is part of the Licence No. 40000164.

Unterbrechungsfreie Stromversorgung
Uninterruptible power supply

Fertigungsstätte(n)
Place(s) of manufacture

American Power Conversion (APC)
Plant 2
Lot 32 Phase I Carmelray Ind. PK
Canlubang Calamba
LAGUNA, PHILIPPINES
PHILIPPINEN

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131



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

A file ref.:

Appendix No. 6
to Marks Licence No. 40000164
file ref. 1924400-3335-0025/1251

(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:Chuan Shun Electric Industrial Co.,Ltd.
1.2 Place of manufacture:ChangKeng Village GuanLan Town ShenZhen City BaoAn Zone China
1.3 Reference of type:430-2051
1.4 Trade Mark: CSC
1.5 Other markings:
1.6 Reference number:
2.1 Protection against electric shock: An isolated transformer.class B
2.2 Class of protection to IEC 539: IP.....20
2.3 Type of construction (Isolating transformer for toys.....):According to VDE 0551 and EN 60742
2.4 Transformer, stationary - portable *):UPS
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 abient temperature: ta =25~30 °C
2.7 Class:B Insulation; Declaration of Insulation see VDE-Form 187
(according to IEC 85)
2.8 CTI - Value (according to IEC 112, Method A):

3	**Electrical values**		**Input**	**Output (AC/DC)**
3.1	Rated voltage(s)	V:	P3:230V	P1:34.3V , P2:34.3V
3.2	Rated frequency	Hz:	50Hz	S1:25.3V,S2:19.4V
3.3	Rated current	A:		
3.4	Rated output	VA:		420VA
3.5	Rated power factor cos phi:			
4	**Windings**			
4.1	Coil base	number:		
		material:	Rynite	EI Dupont De Nemours & Co Inc.
4.2	Material of layer insulation	material:	Polyester tape	
4.3	Windings	number:		
		material:		
4.4	Taps	number:		
4.5	Diameter of wire	mm:	P3:0.65Φ	P1,P2:0.8Φ S1:0.4Φ,S2:1.5Φ
4.6	Winding of insulation	material:	Polyurethane Enamelled Wire(ANSI MW28)	
4.7	Cord insulation material			
		innere:		
		äußere:		
4.8	Cold resistance in Ω at:25	°C =	P3:4.587Ω(Max)	P1,P2:495mΩ(Max)S1:770mΩ (Max) S2:52.6mΩ(Max)

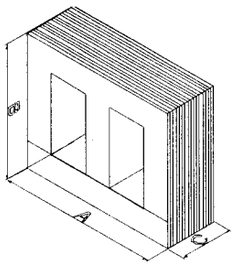
*) Delete if not applicable

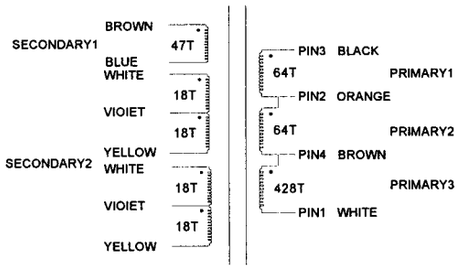
4.9 Circuit diagram (which terminal markings, color of wires etc.):

5 Iron core

5.1 Sheet metal, material:Silicon steel strip 50H400
main dimensions:A:96.0±1.0mm B:80.0±1.0mm C:50.8±0.5mm

5.2 Cross-sectional drawing:





6 Type of construction

6.1 Open - covered - in case protection *)

6.2 Impregnated - undrowned - drowned *)

6.3 Soaking (liquor): varnish

6.4 Underpressure - Overpressure - Soaking at °C *)

6.5 Drown material:

6.6 Material of the cover:
of the case:
of the socket (support):

6.7 Flammability class for insulation material:

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

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
N/A	N/A	N/A	N/A

Offenbach, 12.03.02

VDE Testing and Certification Institute
Department

Place: Chang keng Village Guanlan Date:Apr.11.2001

For and on behalf of
Town Shenzhen City Baoan Zone China

Authorized Signature(s)

(Stamp and signature of the manufacturer)

Please return 2 copies

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

*) Delete if not applicable

VDE Prüf- und Zertifizierungsinstitut
Merianstrasse 28

D-63069 Offenbach

Aktenzeichen / *file ref.*

ISOLATIONSERKLÄRUNG

DECLARATION OF INSULATION

Betriebsmittel (Bauteil)/
Equipment (Component): **430-2051**

Typenbezeichnung/
Type designation: **CLASS B CSC-B1**

Hersteller/
Manufacturer: **Chuan Shun Electric Industrial Co.,Ltd**

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

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

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

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

Place:ChangKeng Village GuanLan Town ShenZhen City BaoAn Zone China ,
Apr.11.2001

Ort und Datum / *Place and date*

For and on behalf of
CHUAN SHUN ELECTRIC INDUSTRIAL COMPANY LIMITED
川順電機有限公司

CHU TSAN HUI

Authorized Signature(s)

Unterschrift des Herstellers / *Manufacturers signature*

Spezifikation über Isolierstoffe / *Specification of insulation materials*

Isolierstoff *Insulation*	**Hersteller** *Manufacturer*	**Handelsname** (Typ) *Tradename*	**Chemische Bezeichnung** *Chemical Name*	**Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffher-stellers** *Acc. to IEC Norm IEC Type see encl. No. of the insulation manufacturer*	**Temperatur-Index** *Temperature index*
Isolierung zwischen Wicklungen *Insulation between windings*	1.Four Pillars 2.3M Co.,Ltd 3.El Dupont De Nemours & Co.,Inc	1.Four Pillars No.35660 2.3M tape No.1318 3.Nomex No.410	1.Polyester tape 2.Polyester tape 3.Aramid paper		1.130℃ 2.130℃ 3.94V-0
Spulenkörper-Isolierung *Coil base insulation*	1.El Dupont De Nemours & Co.,Inc	1.Bobbin Zytel 70G101L	1.NY66+30%GF		1.94V-2
Lagenisolation *Layer insulation*	1.Four Pillars 2.3M Co.,Ltd	1.Four Pillars No.35660 2.3M tape No.1318	1.Polyester tape 2.Polyester tape		1.130℃ 2.130℃
Tränkmittel *Impregnation substances*	1.Ripley Resin Engineering Co.,Inc	1.468-2,-2-7,-2FC "DASH 2 H-1"	1.Varnish		1.180℃
Vergußmasse *Drown material*	N/A	N/A	N/A		N/A
Drahtisolierung *Windings insulation*	1.Pacific Electric Wire & Cable Co.,Ltd 2.Ta Ya Electric Wire & Cable Co.,Ltd	Magnet Wire	PolyurethaneEnamelled Wire(ANSI MW28)		1.130℃ 2.130℃
Leitungsisolierung *Cord insulation*	N/A	N/A	N/A		N/A

VDE Prüf- und Zertifizierungsinstitut

VDE

VDE Prüf- und Zertifizierungsinstitut · Merianstraße 28 · D-63069 Offenbach

American Power Conversion Corp.
85 Rangeway Road
Building #2
NORTH BILLERICA MA 01862
USA

Offenbach, 2002-02-07

Ihr Zeichen *Your ref.*	Ihr Schreiben *Your letter*	Unser Zeichen - bitte angeben *Our ref. - please indicate*	Bearbeiter(in) techn.: *Contact (tech.):*
Mr. Williams	2001-10-29	1924400-3335-0025	Frank Richter Tel: +49(0)698306-435 Fax: -402
		Auftrag Nr. *Order No.* A404ZE	Bearbeiter(in) kaufm.: *Contact (order d.):* Erwin Biehl Tel: +49(0)698306-352 Fax: -582

Zeichengenehmigung Nr. 40000164
Marks Licence No.

Sehr geehrte Damen und Herren,

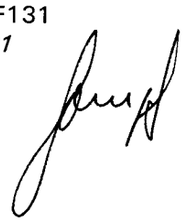
wir übersenden Ihnen den Zeichengenehmigungsausweis Nr. 40000164 zum Benutzen des auf Blatt 1 angegebenen Zeichens und bitten Sie, die auf der Rückseite abgedruckten Hinweise sorgfältig zu beachten. Wegen weiterer Einzelheiten verweisen wir auf unsere Prüf- und Zertifizierungsordnung PM 102.

Ladies and Gentlemen.

Please find enclosed the Marks Licence No. 40000164 for the use of the certification mark as shown on page 1. Please observe carefully the instructions printed on the reverse side. For further details, see the Testing and Certification Procedure PM 102.

Mit freundlichen Grüßen
Yours sincerely

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Fachgebiet F131
Section F131



VDE VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.

VDE Prüf- und Zertifizierungsinstitut
Testing and Certification Institute
Institut d'Essais et de Certification
Merianstrasse 28
D-63069 Offenbach
http//www.vde-institut.com

Telefon
+49 (0) 69 83 06-0
Telefax
+49 (0) 69 83 06-555
e-mail
vde-institut@vde.com

Nach dem Gerätesicherheitsgesetz (GSG) "zugelassene Stelle" für technische Arbeitsmittel.
Nach dem EMV-Gesetz "zuständige Stelle" für elektromagn. Verträglichkeit EMV von Geräten.
Vom Bundesminister für Verteidigung anerkannte Prüfstelle für Bauelemente der Elektronik.
Von Akkreditierungsstellen im DAR nach DIN EN 45001, 45011 und 45012 akkreditiert.
Akkreditiert durch: IEC - Internationale Elektrotechnische Kommission - IECEE/CB, IECQ und CENELEC - Europ. Komitee für elektrotech. Normung - CCA, HAR, ENEC, EMEDCA, CECC.

VDE

VDE Prüf- und Zertifizierungsinstitut

American Power Conversion Corp.
85 Rangeway Road
Building #2
NORTH BILLERICA MA 01862
USA

Offenbach, 2002-02-07

Your ref.	Your letter	Our ref. - please indicate	Contact
Stephen G. Williams	29.10.2001	1924400-3335-0025/404ZE F13/rc-bw	Mr. Richter

Tel (+49) (69) 83 06-435
Fax (+49) (69) 83 06-402
e-mail pi.f13-3@vde.com

Mitteilung von Prüfergebnissen im Rahmen des CB-Verfahrens

Sehr geehrte Damen und Herren,

anbei erhalten Sie das gewünschte CB-Zertifikat mit einer Kopie des Prüfberichtes. Diese Dokumente können Sie jeder anderen für diese Kategorie am CB-Verfahren teilnehmenden Zertifizierungsstelle vorlegen, mit dem Ziel, weitere nationale Prüfzeichen in einem vereinfachten Verfahren zu erlangen.

In der Regel ist den Stellen neben dem Antrag und den oben genannten Dokumenten auch ein Prüfmuster vorzustellen, zur Beurteilung der Übereinstimmung des vorgelegten Prüfmusters mit dem Prüfbericht und zur Beurteilung, ob alle nationalen Anforderungen, die an das zertifizierte Produkt gestellt werden, eingehalten sind.

Sollten Sie bei der Abwicklung des Antrages unsere Unterstützung benötigen sind wir Ihnen gerne behilflich.

Notification of Test Results according to the CB scheme

Dear Sirs,

we have the pleasure to enclose the requested CB Certificate along with the Test Results Report. With these documents you might apply to any other Certification Body participating in the scheme for the category in question for further national safety marks.

In general the Certification Bodies require a sample of the product together with the application to check compliance of the product with the Test Results Report and if all national requirements are satisfied.

If you need our assistance please feel free to ask.

Mit freundlichen Grüßen
VDE Prüf- und Zertifizierungsinstitut
Fachbereich F1

gez. Manfred Disser

Anlagen:/ Attachment:
Prüfbericht / Testreport

INTERNATIONAL ELECTROTECHNICAL COMMISSION (IEC)
COMMISSION ELECTROTECHNIQUE INTERNATIONALE (CEI)

Ref. Certif. No.
DE 1 – 12330-000

IEC SYSTEM FOR CONFORMITY TESTING AND CERTIFICATION OF ELECTRICAL EQUIPMENT (IECEE)
CB SCHEME

SYSTÈME CEI D'ESSAIS DE CONFORMITÉ ET DE CERTIFICATION DES EQUIPEMENTS ELECTRIQUES (IECEE)
METHODE OC

CB TEST CERTIFICATE
CERTIFICAT D'ESSAI OC

Product
Produit

Uninterruptible power supply

Name and address of the applicant
Nom et adresse du demandeur

American Power Conversion Corp.
85 Rangeway Road, US - 01862 NORTH BILLERICA

Name and address of the manufacturer
Nom et adresse du fabricant

American Power Conversion Corp.
85 Rangeway Road, US - 01862 NORTH BILLERICA

Name and address of the factory
Nom et adresse de l'usine

American Power Conversion (APC) Plant 2
Lot 32 Phase I Carmelray Ind. PK, PH - LAGUNA, PHILIPPINES

Rating and principal characteristics
Valeurs nominales et caractéristiques principales

Input: AC 220-240 V, 6.0A, 50-60 Hz
Output: AC 220-240 V, 3.0A, 650VA, 50-60 Hz
AC 220-240 V, 2.8A, 620VA, 50-60 Hz
AC 220-240 V, 1.9A, 420VA. 50-60 Hz
AC 220-240 V, 1.3A, 280VA, 50-60 Hz

Trade mark (if any)
Marque de fabrique (si elle existe)

APC

Model/type Ref.
Ref. de type

BP650SI, BP420SI, BP280SI, SU620INET, SU420INET

Additional information (if necessary)
Information complémentaire (si nécessaire)

TMP, Class I

A sample of the product was tested and found to be in conformity with
Un échantillon de ce produit a été essayé et a été considéré conforme à la

IEC **PUBLICATION** 60950 **EDITION** 3:1999

IEC 60950:1999 – corr. 2000 modif.
IEC 146-4 (1986) Edition 1

as shown in the Test Report Ref. No. which form part of this certificate
comme indiqué dans le Rapport d'essais numéro de référence qui constitue une partie de ce certificat

DE 1 – 12330-00 by VDE Institute
1924400-3335-0025/404ZE

This CB Test Certificate is issued by the National Certification Body
Ce Certificat d'essai OC est établi par l'Organisme National de Certification

VDE VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.
VDE Prüf- und Zertifizierungsinstitut
VDE *Testing and Certification Institute*
Zertifizierungsstelle / *Certification*

Date 2002-02-07

Signature

TEST REPORT

IEC 60 950

Safety of information technology equipment

Report

Report reference No. ..... : 19244-3335-0025

Tested by ..... : Frank Richter

Name in block letters and title Signature

Approved by ..... : Juergen Barwinkle

Name in block letters and title Signature

Date of issue ..... : November 27, 2001

Contents ..... : 53 pages

..... :

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

Testing laboratory

Name ..... : VDE Testing and Certification Institute

Address ..... : Merianstraße 28, D-63069 Offenbach

Testing location ..... : American Power Conversion Corp.
85 Rangeway Road Bldg. #3, N. Billerica, MA USA
TMP (TDAP File No. 19244-9501-0001)

Applicant/Client

Name ..... : American Power Conversion Corporation

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

Manufacturer

Name ..... : American Power Conversion Corporation

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

Factory

Name ..... : American Power Conversion (APC)

Address ..... : Lot 32, Phase 1,Carmelray Industrial Park
Canlubang, Calamba, Laguna
Philippines

Test specification

Standard ..... : IEC 60 950, 3rd Edition (1999)

Test procedure ..... : CB-scheme

Procedure deviation ..... :

Non-standard test method ..... :

Test Report Form

Test Report Form No. ..... : I950___F

TRF originator ..... : FIMKO

Master TRF ..... : Dated 99-02

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Test item

Description ..... : Uninteruptible Power Supply

Trademark ..... : APC

Model and/or type reference ..... : BP650SI, BP420SI, BP280SI, SU620INET, SU420INET

Rating(s) ..... : Input:AC 220-240V, 50-60HZ, 5,3A

Output:

Surge Only : AC 220-240V, 50-60HZ, 2,3A

UPS: AC 220-240V, 50-60HZ,

650: 650VA, 410W, 3A

620: 620VA, 390W, 2,8A

420: 420VA, 260W, 1,9A

280: 280VA. 180W, 1,3A

Particulars: test item vs. test requirements

Equipment mobility ..... : movable

Operating condition ..... : continuous

Mains supply tolerance (%) ..... : -10, +6

Tested for IT power systems ..... : No

IT testing, phase-phase voltage (V) : N/A

Class of equipment ..... : Class I

Mass of equipment (kg) ..... : < 18kg

Protection against ingress of water . : IP Not rated

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)

Standard is amended per deviations OK

Testing

Date of receipt of test item ..... : September 12, 2001

Date(s) of performance of test ..... : September 12, 2001-November 26, 2001

General remarks

"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.

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

Copy of marking plate and summary of test results (information/comments):

See Appendix 1 for Marking plate:

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

- Operating Condition:
1) Unit intended for continuous operation while charging

2) Unit designed for short-time operation while operating on inverter (battery power) . See IEC 146-4 test report for runtimes.

Model differences: All of the models use the same enclosure. The Power rating (VA) is in the Model Number. All of the models use the same Printed Circuit board, however the number of power FETs changes based upon the output power rating. Also, the power transformer is different for the 280, 420 and 650 units.

The SU INET units are identical to the BPSI units except for a change in the bezel appearance and some additional LEDs. SU620INET is identical electrically to BP650SI and SU420INET is identical electrically to BP420SI.

Appendix 1	Markings	Page 1
Appendix 2	Manual	Page 1-2
Appendix 3	Critical Components list	Page 1-5
Appendix 4	EN 50091-1-1 Test report	Page 1-37
Appendix 5	IEC 146-4 Test Report	Page 1-62
Appendix 6	Transformer Information	Page 1-19
Appendix 7	Schematics	Page 1-5
Appendix 8	Photos	Page 1-6
Appendix 9	PCB Artworks	Page 1-3
Appendix 10	Relay Information	Page 1-94
Appendix 11	LED Info	Page 1-10
Appendix 12	EMC Test Report	Page 1-95
Appendix 13	Test Equipment List	Page 1

IEC 60 950			
Clause	Requirement - Test	Result	Verdict
1	**GENERAL**		P
1.5	COMPONENTS		P
1.5.1	Comply with IEC 950 or relevant component standard	(see appended table 1.5.1)	P
1.5.2	Evaluation and testing of components	Certified Components are used in accordance with their raitings, and they comply with applicable parts of this standard. Components not certified are use in accordence with their raitings and they comply with applicable parts of IEC950 and the relevant component standard. Components for which no relevant IEC-standards exists, have been tested under the conditions, occurring in the equipment using applicable parts of IEC950	P
	Dimensions (mm) of mains plug for direct plug-in .....:	Not direct plug in equipment	N/A
	Torque and pull test of mains plug for direct plug-in; torque (Nm); pull (N).....:		N/A
1.5.3	Thermal controls		N/A
1.5.4	Transformers	see annex C	P
1.5.5	Interconnecting cables	no interconnecting cables employed	N/A
1.5.6	Capacitors in primary circuits .....:	certified to IEC 384-14:1981, receptable capacitors and inductors mounted on main - PCB`s	P
1.5.7	Double or reinforced insulation bridged by components	Reinforced insulation is bridged by transformers , optos, resistors and Relays	P
1.5.7.1	Bridging capacitors		N/A
1.5.7.2	Bridging resistors	3 x in series 333kohms in each line	P
1.5.7.3	Accessible parts	0,51 mA	P
1.5.8	Components in equipment for IT power systems		N/A

1.6	POWER INTERFACE		P
1.6.1	AC power distribution systems	not for use in IT-systems	P
1.6.2	Input current	(see appended table 1.6.2)	P
1.6.3	Voltage limit of hand-held equipment		N/A
1.6.4	Neutral conductor	neutral and phase is insulated from earth with basic insulation	P

1.7	MARKING AND INSTRUCTIONS		P
1.7.1	Power rating	See nameplate in Appendix 1	P
	Rated voltage(s) or voltage range(s) (V) .....:	AC 220-240V	P
	Symbol for nature of supply for d.c. .....:		N/A
	Rated frequency or frequency range (Hz) .....:	50-60Hz	P
	Rated current (A) .....:	5,3A	P
	Manufacturer's name/Trademark .....:	APC	P
	Type/model .....:	BP650SI,BP420SI,BP280SI, SU620INET, SU420INET.	P
	Symbol of Class II .....:		N/A
	Other symbols .....:		N/A
	Certification marks .....:	VDE	P
1.7.2	Safety instructions	In English and German	P
1.7.3	Short duty cycles	See IEC 146-4 test report for run times (Appendix 5)	P
1.7.4	Supply voltage adjustment .....:		N/A
1.7.5	Power outlets on the equipment .....:	See Appendix 1	P
1.7.6	Fuse identification .....:	All fuses are marked with ratings or F1,F2,F3,F4	P
1.7.7	Wiring terminals		P
1.7.7.1	Protective earthing and bonding terminals		P
1.7.7.2	Terminal for a.c. mains supply conductors	Appliance Inlet	N/A
1.7.8	Controls and indicators	.	P

1.7.8.1	Identification, location and marking .....:	Power switch marking On/OFF conditions are achieved with one push button switch, Press once and the UPS turns on. Press once again and the UPS turns off. The switch is provided with the international symbol for standby; the number 1 protruding from the number 0, with the number 0 open at the top to permit the number 1 to protrude from it. The nature of UPS´s are such that the batteries will continue to charge even when the power switch has been set to the off position, therefore it is not a total power off condition. For this reason, the standby symbol is used instead of off.	P
1.7.8.2	Colours .....:		P
1.7.8.3	Symbols according to IEC 60417.....:		P
1.7.8.4	Markings using figures .....:	See clause 1.7.8.1	P
1.7.9	Isolation of multiple power sources .....:		N/A
1.7.10	IT power system		N/A
1.7.11	Thermostats and other regulating devices		N/A
1.7.12	Language .....:	German and English	—
1.7.13	Durability		P
1.7.14	Removable parts		N/A
1.7.15	Replaceable batteries	Replaceable Lead Acid Battery. See Appendix 2	N/A
	Language .....:	German and English	—
1.7.16	Operator access with a tool .....:	No hazards accessible	P
1.7.17	Equipment for restricted access locations .....:		N/A

2	**PROTECTION FROM HAZARDS**		P
2.1	PROTECTION FROM ELECTRIC SHOCK AND ENERGY HAZARDS		P
2.1.1	Protection in OPERATOR access areas	Access to SELV only	P
2.1.1.1	Access to energized parts		P
	Test by inspection .....:		P
	Test with test finger .....:		P
	Test with test pin .....:		P
	Test with test probe .....:		P
2.1.1.2	Battery compartments.....:	No TNV Batteries	N/A
2.1.1.3	Access to ELV wiring		N/A
	Working voltage (V); distance (mm) through insulation	(see appended table 2.10.5)	—
2.1.1.4	Access to hazardous voltage circuit wiring		N/A
2.1.1.5	Energy hazards .....:	Battery terminals are protected	P
2.1.1.6	Manual controls		N/A
2.1.1.7	Discharge of capacitors in the primary circuit		P
	Time-constant (s); measured voltage (V) .....:	See data below	—
2.1.2	Protection in service access areas		N/A
2.1.3	Protection in restricted access locations		N/A

BP650SI

Location	Switch Position	Vin (Vrms)	Vin (Vpeak)	37% Vin (Volts)	Vt (Volts)	T.C. (seconds)
Phase to Neutral	off	254	360	133,2	0	7,4
Phase to Neutral	on	254	360	133,2	76	94,2
Phase to ground	off	254	360	133,2	0	3,6
Phase to Ground	On	254	360	133,2	44	3,8
Neutral to ground	Off	254	360	133,2	0	0
Neutral to Ground	on	254	360	133,2	26,7	20,7

2.2	SELV CIRCUITS		P
2.2.1	General requirements	SELV levels are maintained after single fault condition	P
2.2.2	Voltages under normal conditions (V) ..... :	less than 42.2 V peak and 60 V DC classified as SELV	P
2.2.3	Voltages under fault conditions (V) ..... :	less than 42.2 V peak and 60 V DC, all specified limits are not exceeded in the event of a single fault condition, refer to subclause 5.3	P
2.2.3.1	Separation by double or reinforced insulation (method 1)	SELV levels are maintained after single fault condition	P
2.2.3.2	Separation by earthed screen (method 2)	method 1	N/A
2.2.3.3	Protection by earthing of the SELV circuit (method 3)	method 1	N/A
2.2.4	Connection of SELV circuits to other circuits ..... :		P

2.3	TNV CIRCUITS		P
2.3.1	Limits	Telco protection circuit only. Does not generate any voltages	P
	Type of TNV circuits ..... :	TNV-3	—
2.3.2	Separation from other circuits and from accessible parts	Basic	P
	Insulation employed ..... :		—
2.3.3	Separation from hazardous voltages		P
	Insulation employed ..... :	Reinforced	—
2.3.4	Connection of TNV circuits to other circuits	TNV to SELV	P
	Insulation employed ..... :	Reinforced Method 2	—
2.3.5	Test for operating voltages generated externally	Basic Insulation	N/A

2.4	LIMITED CURRENT CIRCUITS		P
2.4.1	General requirements		P
2.4.2	Limit values		P
	Frequency (Hz) ..... :	50	—
	Measured current (mA) ..... :	1,026	—
	Measured voltage (V) ..... :		—
	Measured capacitance (µF) ..... :		—
2.4.3	Connection of limited current circuits to other circuits		P

2.5	LIMITED POWER SOURCES		N/A
	Inherently limited output	No Limited Power Sources	N/A

2.6	PROVISIONS FOR EARTHING AND BONDING		P
2.6.1	Protective earthing		P
2.6.2	Functional earthing		N/A
2.6.3	Protective earthing and protective bonding conductors		P
2.6.3.1	Size of protective earthing conductors		P
	Rated current (A), cross-sectional area (mm^2), AWG ..... :	0,75	—
2.6.3.2	Size of protective bonding conductors		N/A
	Rated current (A), cross-sectional area (mm^2), AWG ..... :		—
2.6.3.3	Rated current (A), type and nominal thread diameter (mm) ..... :		N/A
	Resistance (Ω) of earthing conductors and their terminations, test current (A)..... :	25A for 1 minute. See results below	P
2.6.3.4	Colour of insulation ..... :	Green/yellow	P
2.6.4	Terminals	Appliance Inlet	P
2.6.4.1	Protective earthing and bonding terminals		N/A
	Rated current (A), type and nominal thread diameter (mm) ..... :		—
2.6.4.2	Separation of the protective earthing conductor from protective bonding conductors		N/A
2.6.5	Integrity of protective earthing		P
2.6.5.1	Interconnection of equipment		N/A
2.6.5.2	Components in protective earthing conductors and protective bonding conductors	No switches or fuses in earth	P
2.6.5.3	Disconnection of protective earth	Appliance Inlet	P
2.6.5.4	Parts that can be removed by an operator	Appliance inlet	P
2.6.5.5	Parts removed during servicing		N/A
2.6.5.6	Corrosion resistance		P
2.6.5.7	Screws for protective bonding		N/A
2.6.5.8	Reliance on telecommunication network		N/A

Test Point (from)	Test Point (to)	Current (A)	Time (minutes)	Resistance (Ohms
Line Cord Gnd.	UPS Outlet Ground	26	1	0.043
Line Cord Gnd.	Surge Outlet Ground	26	1	0.045
Line Cord Gnd.	Enclosure	26	1	0,044
TNV Ground screw	Ground lead of S201	2,0	1	0,009

2.7	OVERCURRENT AND EARTH FAULT PROTECTION IN PRIMARY CIRCUITS		P
2.7.1	Basic requirements	VDE approved circuit breaker is used for overcurrent and earth fault protection. See Appendix 3	P
	Instructions when protection relies on building installation		N/A
2.7.2	Faults not covered in 5.3		P
2.7.3	Short-circuit backup protection		P
2.7.4	Number and location of protective devices .....:	One in Line or Neutral	P
2.7.5	Protection by several devices		N/A
2.7.6	Warning to service personnel .....:		N/A

2.8	SAFETY INTERLOCKS		N/A
2.8.1	General principles	No Safety Interlocks	N/A

2.9	**ELECTRICAL INSULATION**		P
2.9.1	Properties of insulating materials	not hygroscopic, rubber or asbestos materials	P
2.9.2	Humidity conditioning	95% by 25°C	P
2.9.3	Requirements for insulation	see subclause 2.10	P
2.9.4	Insulation parameters	max. value of rated voltage is used	P
2.9.5	Categories of insulation	all requirements for basic, supplementary and reinforced insulation are issued	P

2.10	CLEARANCES, CREEPAGE DISTANCES AND DISTANCES THROUGH INSULATION		—
2.10.1	General		P
2.10.2	Determination of working voltage	determined in accordance with 2.10.1	P
2.10.3	Clearances	Provided by transformers and relays	P
2.10.3.1	General		P
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 levels	Max Voltage on main transformer is 250VRMS	N/A
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	P
	Number of layers (pcs) .....:	3 minimum. See Annex C	—
	Electric strength test	(see appended table 5.2)	—
2.10.5.3	Printed boards		N/A
	Distance through insulation		N/A
	Electric strength test for thin sheet insulating material	(see appended table 5.2)	—
	Number of layers (pcs) .....:		N/A
2.10.5.4	Wound components	T1	P
	Number of layers (pcs) .....:	3 layers see Annex U	P
	Two wires in contact inside component; angle between 45° and 90°	Flange of bobbin is in between triple insulated wire and SELV	P
2.10.6	Coated printed boards		N/A
2.10.6.1	General		N/A
2.10.6.2	Sample preparation and preliminary inspection		N/A
2.10.6.3	Thermal cycling		N/A
2.10.6.4	Thermal ageing (°C) .....:		N/A
2.10.6.5	Electric strength test	(see appended table 5.2)	—
2.10.6.6	Abrasion resistance test		N/A
	Electric strength test	(see appended table 5.2)	—
2.10.7	Enclosed and sealed parts .....:		N/A
	Temperature $T_1=T_2 = T_{mra} - T_{amb} +10K$ (°C).....:		N/A
2.10.8	Spacings filled by insulating compound.....:		N/A
	Electric strength test	(see appended table 5.2)	—
2.10.9	Component external terminations		N/A
2.10.10	Insulation with varying dimensions		N/A

3	**WIRING, CONNECTIONS AND SUPPLY**		P
3.1	GENERAL		—
3.1.1	Current rating and overcurrent protection	all internal wiring used in the distribution of primary power protected agains overcurrent and short circuit by suitably rated protective devices	P
3.1.2	Protection against mechanical damage	wires are routed away fron sharp edges and parts which could damage insulation.	P
3.1.3	Securing of internal wiring	wires are positioned in such a manner that prevents excessive stain, loosening of terminal connections and damage of conductor insulation	P
3.1.4	Insulation of conductors	(see appended table 5.2)	P
3.1.5	Beads and ceramic insulators	no beads/insulation provided in the P/S	N/A
3.1.6	Screws for electrical contact pressure	all electical screw connections are by metal screw with more than 2 threads into a metal plate	N/A
3.1.7	Non-metallic materials in electrical connections	the equipment does not have any electrical connectors that rely on insulation material for adequite contact pressure	N/A
3.1.8	Self-tapping and spaced thread screws	thread cutting or space thread screws are not used for ele. connections, machine screws only	N/A
3.1.9	Termination of conductors		
	10 N pull test		
3.1.10	Sleeving on wiring	Shrink wrap type	P

3.2	CONNECTION TO A.C. MAINS SUPPLIES		P
3.2.1	Means of connection .....:	Appliance Inlet	P
3.2.2	Multiple supply connections		N/A
3.2.3	Permanently connected equipment		N/A
	Number of conductors, diameter (mm) of cable and conduits .....:		—
3.2.4	Appliance inlets	Appliance Inlet located at rear of unit	P
3.2.5	Power supply cords		
	Type .....:		—
	Rated current (A), cross-sectional area (mm^2), AWG .....:		—
3.2.6	Cord anchorages and strain relief		N/A
	Mass of equipment (kg), pull (N) .....:		—

	Longitudinal displacement (mm) .....:		—
3.2.7	Protection against mechanical damage		N/A
3.2.8	Cord guards		N/A
	D (mm); test mass (g) .....:		—
	Radius of curvature of cord (mm) .....:		—
3.2.9	Supply wiring space		N/A

3.3	WIRING TERMINALS FOR CONNECTION OF EXTERNAL CONDUCTORS		N/A
3.3.1	Wiring terminals	Appliance Inlet	N/A
3.3.2	Connection of non-detachable power supply cords		N/A
3.3.3	Screw terminals		N/A
3.3.4	Rated current (A), cord/cable type, cross-sectional area (mm^2).....:		N/A
3.3.5	Rated current (A), type and nominal thread diameter (mm) .....:		N/A
3.3.6	Wiring terminals design		N/A
3.3.7	Grouping of wiring terminals		N/A
3.3.8	Stranded wire		N/A

3.4	DISCONNECTION FROM THE A.C. MAINS SUPPLY		P
3.4.1	General requirement		P
3.4.2	Disconnect devices	Appliance Coupler, see statement in manuals Appendix 2	P
3.4.3	Permanently connected equipment		N/A
3.4.4	Parts which remain energized		N/A
3.4.5	Switches in flexible cords		P
3.4.6	Single-phase equipment		P
3.4.7	Three-phase equipment		N/A
3.4.8	Switches as disconnect devices		N/A
3.4.9	Plugs as disconnect devices		N/A
3.4.10	Interconnected equipment		N/A
3.4.11	Multiple power sources		N/A

3.5	INTERCONNECTION OF EQUIPMENT		N/A
3.5.1	General requirements		N/A
3.5.2	Types of interconnection circuits.....:		N/A
3.5.3	ELV circuits as interconnection circuits		N/A

4	**PHYSICAL REQUIREMENTS**		P
4.1	STABILITY		P
	Angle of 10°		P
	Test: force (N) ..... :		N/A
4.2	MECHANICAL STRENGTH		P
4.2.1	General		P
4.2.2	Steady force test, 10 N		P
4.2.3	Steady force test, 30 N		P
4.2.4	Steady force test, 250 N		P
4.2.5	Impact test		P

4.2.6	Drop test		N/A
4.2.7	Stress relief	On front bezel, 70C	P
4.2.8	Cathode ray tubes	No CRT Provided	N/A
	Picture tube separately certified ..... :	(See separate test report or attached certificate)	N/A
4.2.9	High pressure lamps	No Lamps Provided	N/A
4.2.10	Wall or ceiling mounted equipment; force (N) ... :		N/A

4.3	DESIGN AND CONSTRUCTION		—
4.3.1	Edges and corners		P
4.3.2	Handles and manual controls; force (N) ..... :		N/A
4.3.3	Adjustable controls		N/A
4.3.4	Securing of parts		P
4.3.5	Connection of plugs and sockets	All outlets are IEC approved	P
4.3.6	Direct plug-in equipment		N/A
	Torque (Nm) ..... :		—
4.3.7	Heating elements in earthed equipment		N/A
4.3.8	Batteries	See IEC 146 report (Annex 5)	P
4.3.9	Oil and grease		N/A
4.3.10	Dust, powders, liquids and gases	equipment does not generate ionizing radiation or contain flammable liquids or gases	N/A
4.3.11	Containers for liquids or gases		N/A
4.3.12	Flammable liquids ..... :		N/A
	Quantity of liquid (l) ..... :		N/A
	Flash point (°C) ..... :		N/A
4.3.13	Radiation; type of radiation ..... :	LEDs see appendix 11	N/A
	Equipment using lasers	(See separate test report of IEC 60825-1)LEDs only	N/A

4.4	PROTECTION AGAINST HAZARDOUS MOVING PARTS		N/A
4.4.1	General		N/A
4.4.2	Protection in operator access areas		N/A
4.4.3	Protection in restricted access locations		N/A
4.4.4	Protection in service access areas		N/A

4.5	THERMAL REQUIREMENTS		P
4.5.1	Temperature rises		P
	Normal load condition per Annex L.....:	One cycle consists of 12 hour charge, full discharge and 24 hour recharge. Max temp measured	P
4.5.2	Resistance to abnormal heat	Transformers	P

4.6	OPENINGS IN ENCLOSURES		P
4.6.1	Top and side openings	Side openings only	P
	Dimensions (mm) .....:	182 per side, each opening is 1,27 mm dia.	P
4.6.2	Bottoms of fire enclosures	No openings	P
	Construction of the bottom.....:		—
4.6.3	Doors or covers in fire enclosures	Battery door is hinged and can't be easily detached from the unit	P
4.6.4	Openings in transportable equipment		N/A
4.6.5	Adhesives for constructional purposes		N/A
	Conditioning temperature/time.....:		—

4.7	RESISTANCE TO FIRE		P
4.7.1	Reducing the risk of ignition and spread of flame	All internal materials are V-1 minimum	P
4.7.2	Conditions for a fire enclosure	Metal enclosure	P
4.7.2.1	Parts requiring a fire enclosure	Metal enclosure	P
4.7.2.2	Parts not requiring a fire enclosure	Front bezel	P
4.7.3	Materials		P
4.7.3.1	General	Metal enclosure	P
4.7.3.2	Materials for fire enclosures	Metal enclosure	P
4.7.3.3	Materials for components and other parts outside fire enclosures	Front Bezel HB (decorative only)	P
4.7.3.4	Materials for components and other parts inside fire enclosures	See 4.7.1	P
4.7.3.5	Materials for air filter assemblies		N/A
4.7.3.6	Materials used in high-voltage components		N/A

5	**ELECTRICAL REQUIREMENTS AND SIMULATED ABNORMAL CONDITIONS**		—
5.1	TOUCH CURRENT AND PROTECTIVE CONDUCTOR CURRENT		—
5.1.1	General		P
5.1.2	Equipment under test (EUT)		P
5.1.3	Test circuit	Fig. 5A	P
5.1.4	Application of measuring instrument	D1	P
5.1.5	Test procedure		P
5.1.6	Test measurements	U2/500	P
	Test voltage (V) .....:	254	—
	Measured current (mA) .....:	0,1856 worst case	—
	Max. allowed current (mA) .....:	3,5	—
5.1.7	Equipment with touch current exceeding 3.5 mA .....:		N/A
5.1.8	Touch currents to and from telecommunication networks	No Active TNV components	N/A
5.1.8.1	Limitation of the touch current to a telecommunication network		N/A
	Test voltage (V) .....:		—
	Measured current (mA) .....:		—
	Max. allowed current (mA) .....:		—
5.1.8.2	Summation of touch currents from telecommunication networks.....:		N/A

5.2	ELECTRIC STRENGTH		P
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		P
5.3.1	Protection against overload and abnormal operation	(see appended table 5.3)	P
5.3.2	Motors	(see appended Annex B)	N/A
5.3.3	Transformers	(see appended Annex C)	P
5.3.4	Functional insulation .....:	See abnormals	P
5.3.5	Electromechanical components		P
5.3.6	Simulation of faults		P
5.3.7	Unattended equipment		N/A
5.3.8	Compliance criteria for abnormal operating and fault conditions		P

6	**CONNECTION TO TELECOMMUNICATION NETWORKS**		P
6.1	PROTECTION OF TELECOMMUNICATION NETWORK SERVICE PERSONNEL, AND USERS OF OTHER EQUIPMENT CONNECTED TO THE NETWORK, FROM HAZARDS IN THE EQUIPMENT		—
6.1.1	Protection from hazardous voltages		P
6.1.2	Separation of the telecommunication network from earth		P
6.1.2.1	Requirements Basic	(see appended table 5.2)	P
	Test voltage (V)	1,5 kV	—
	Current in the test circuit (mA)	0,04 mA	—
6.1.2.2	Exclusions.....		N/A

6.2	PROTECTION OF EQUIPMENT USERS FROM OVERVOLTAGES ON TELECOMMUNICATION NETWORKS		P
6.2.1	Separation requirements		P
6.2.2	Electric strength test procedure		P
6.2.2.1	Impulse test	(see appended table 5.2)	N/A
6.2.2.2	Steady-state test	(see appended table 5.2)	P
6.2.2.3	Compliance criteria		P

6.3	PROTECTION OF TELECOMMUNICATION WIRING SYSTEM FROM OVERHEATING		N/A
	Max. output current (A) .....:	0 no wiring	—
	Current limiting method .....:	N/A	—

A	**ANNEX A, TESTS FOR RESISTANCE TO HEAT AND FIRE**	N/A

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

C	ANNEX C, TRANSFORMERS (SEE 1.5.4 AND 5.3.3)		P
	Position ..... :	Main Transformer	—
	Manufacturer ..... :	Leader or Sino	—
	Type ..... :	430-2052A	—
	Rated values ..... :	See Appendix 6 for details	—
	Method of protection..... :	Main Circuit Breaker	—
C.1	Overload test	(see appended table 5.3)	
C.2	Insulation	(see appended table 5.2)	
	Protection from displacement of windings ..... :	See Appendix 6 for details	

C	ANNEX C, TRANSFORMERS (SEE 1.5.4 AND 5.3.3)		P
	Position ..... :	Main Transformer	—
	Manufacturer ..... :	Leader	—
	Type ..... :	430-2051	—
	Rated values ..... :	See Appendix 6 for details	—
	Method of protection..... :	Main Circuit Breaker	—
C.1	Overload test	(see appended table 5.3)	
C.2	Insulation	(see appended table 5.2)	
	Protection from displacement of windings ..... :	See Appendix 6 for details	

C	ANNEX C, TRANSFORMERS (SEE 1.5.4 AND 5.3.3)		P
	Position ..... :	Main Transformer	—
	Manufacturer ..... :	Falco	—
	Type ..... :	460-0008	—
	Rated values ..... :	See Appendix 6 for details	—
	Method of protection..... :	Main Circuit Breaker	—
C.1	Overload test	(see appended table 5.3)	
C.2	Insulation	(see appended table 5.2)	
	Protection from displacement of windings ..... :	See Appendix 6 for details	

G	**ANNEX G, ALTERNATIVE METHOD FOR DETERMINING MINIMUM CLEARANCES**		N/A
G.1	Summary of the procedure for determining minimum clearances		N/A
G.2	Determination of mains transient voltage (V)..... :		N/A
G.3	Determination of telecommunication network transient voltage (V)..... :		N/A
G.4	Determination of required withstand voltage (V) :		N/A
G.5	Measurement of transient levels (V)..... :		N/A
G.6	Determination of minimum clearances ..... :		N/A

H	**ANNEX H, IONIZING RADIATION (SEE 4.3.13)**		N/A
	Ionizing radiation		N/A
	Measured radiation (mR/h) ..... :		—
	Measured high-voltage (kV) ..... :		—
	Measured focus voltage (kV) ..... :		—
	CRT markings ..... :		—

J	**ANNEX J, TABLE OF ELECTROCHEMICAL POTENTIALS (SEE 2.6.5.6)**		N/A
	Metal used ..... :		—

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

M	**ANNEX M, CRITERIA FOR TELEPHONE RINGING SIGNALS (SEE 2.3.1)**		N/A

U	**ANNEX U, INSULATED WINDING WIRES FOR USE WITHOUT INTERLEAVED INSULATION (SEE 2.10.5.4)**		P
	Separate test report	Wire Type is Furukawa Type TEX-X, VDE approved (6735)	P

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

1.6.2	TABLE: electrical data (in normal conditions)					
fuse #	Irated (A)	U (V)	P (W)	I (mA)	Ifuse (mA)	condition/status
BP650SI	5.3	220	663	5,1		Recharging
BP650SI	5,3	230	677	4,99		Recharging
BP650SI	5,3	240	680	4,86		Recharging
BP420SI	5,3	220	498	4,24		Recharging
BP420SI	5,3	230	511	4		Recharging
BP420SI	5,3	240	534	3,83		Recharging
BP280SI	5,3	220	3,5	399		Recharging
BP280SI	5,3	230	3,4	413		Recharging
BP280SI	5,3	240	3,3	438		Recharging

Loaded as follows: Battery output loaded to rated VA value, surge outlet loaded to 2,3A. Power factor was 0,63

2.10.3 and 2.10.4	TABLE: clearance and creepage distance measurements					
clearance cl and creepage distance dcr at/of:	Up (V)	U r.m.s. (V)	required cl (mm)	cl (mm)	required dcr (mm)	dcr (mm)
PWB: Primary to Ground	360	254	2,0	2,0	2,5	2,5
PWB: Primary to SELV [1]	360	254	4,0	5,0	5,0	5,0
T1: Primary to Ground	360	254	2,0	>2,0	2,5	>2,5
T1 Primary to SELV	360	254	4,0	>4,0	5,0	>>5,0
Main Transformer: Pri to Gnd	360	254	2,0	2,0	2,5	2,5
Main Transformer: Pri to SELV	360	254	4,0	5,0	5,0	5,0
Relay RLY1: Pri to SELV	360	254	4,0	>5,0	5,0	>5,0
PWB Backfeed Relay:Hazardous Secondary to user accessible [2]	360	254	2,8	>5,0	5,0	>5,0
Backfeed relay Internal Contact to contact [3]	360	254	0,4	1,4	5,0	>5,0
Backfeed relay base: Hazardous Secondary to user accessible [4]	360	254	2,8	>5,0	5,0	5,3
Backfeed relay base: Hazardous Secondary to user accessible [5]	360	254	2,8	4,5	3,6	4,5
TNV to Ground	340	240	2,0	2,5	2,5	2,5
TNV to SELV	340	240	2,0	>>2,0	2,5	>>2,5
TNV to Primary	340	240	4,0	>>5,0	5,0	>>5,0

1. Slots are used (min. 1 mm wide) under C33 and RLY 1 to increase creepage path
2. Slots under RLY1 used to increase creepage path needed for Reinforced insulation due to backfeed.
3. Clearnce values are reduced based upon Annex R of standard. See appendix 10 for relay quality testing
4. Ribs are used on certain relay bases to increase creepage. See appendix 10
5. American Zettler has a CTI of 400 on base and epoxy hence reduced creepage values. See Appendix 10.

2.10.5	TABLE: distance through insulation measurements				
distance through insulation di at/of:		U r.m.s. (V)	test voltage (V)	required di (mm)	di (mm)
Main Transformer: Pri to SELV		250	3000	3 layers tape	3 layers tape used. 2 layers tested with 3000VAC
Opto Pri to SELV		250	5000	0,4	>0,4
Shrink tubing on Pri wires		250	3000	0,4	0,4

BP650SI

4.5	**TABLE: temperature rise measurements**					
	test voltage (V)	198	207	230	254	—
	t1 (°C)	25	25	25	25	—
	t2 (°C)	25	25	25	25	—
rise dT of part/at:		dT (K)				allowed dT (K)
L3		35,4	38,9	32,2	26,7	75
L2		41,3	45,5	38	32,1	75
C53		28,4	28,9	27,1	23,6	45
RYL1		35,4	35,6	34,4	32,1	75
T1 core		36,1	35,7	36,6	32,2	75
T1 coil		36,6	36,5	36,7	32,6	75
C55		30,6	29,9	31,4	27,6	45
L1 coil		55,1	54	57,7	53,9	75
L1 core		54,1	52,9	56,1	52,6	75
Between C15 and C42		50,8	50,2	56,3	51,4	90
C44		67,3	67,9	73,3	68,3	90
Battery		11,4	12,7	19,1	14,5	30
Top Cover		13	11,2	14,8	12,1	45

Transformer Vendor: Leader Primary winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	allowed dT (K)	insulation class
198V	3,924	4,930	66,53	100	F
207V	3,924	4,93	66,53	100	F
230V	3,924	5	71,16	100	F
254V	3,924	4,75	54,62	100	F

Transformer Vendor: Leader Secondary winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	DT (K)	allowed dT (K)	insulation class
198V	0,02815	0,03665	78,36	100	F
207V	0,02815	0,03669	78,73	100	F
230V	0,02815	0,03507	63,79	100	F
254V	0,02815	0,03557	68,4	100	F

Transformer Vendor: Leader Clamp winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	DT (K)	allowed dT (K)	insulation class
198V	0,5547	0,72	77,33	100	F
207V	0,5547	0,73	82	100	F
230V	0,5547	0,69	63,3	100	F
254V	0,5547	0,7	67,97	100	F

Transformer Vendor: Sino American Primary winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	allowed dT (K)	insulation class
198V	3,3170	4,3493	81,52	100	F
254V	3,3170	4,2922	76,83	100	F

Transformer Vendor: Sino American AVR1 winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	allowed dT (K)	insulation class
198V	0,3245	0,4094	68,54	100	F
254V	0,3245	0.4065	66	100	F

Transformer Vendor: Sino American AVR2 winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	allowed dT (K)	insulation class
198V	0,3351	0,4278	72,45	100	F
254V	0,3351	0,4235	68,92	100	F

Transformer Vendor: Sino American Secondary winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	allowed dT (K)	insulation class
198V	0,03351	0,04574	73,39	100	F
254V	0,03351	0,04676	80,69	100	F

Transformer Vendor: Sino American Clamp winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	allowed dT (K)	insulation class
198V	0,5741	0,7595	84,6	100	F
254V	0,5741	0,7495	79,86	100	F

BP420SI

4.5	TABLE: temperature rise measurements					
	test voltage (V)	198	207	230	254	—
	t1 (°C)	25	25	25	25	—
	t2 (°C)	25	25	25	25	—
rise dT of part/at:		dT (K)				allowed dT (K)
L1 Coil		37,6	36,5	36,3	34	75
L1 Core		37,6	37,3	38,4	35,5	75
RLY1		39	42,2	39,8	40,4	75
T1 Core		42,4	24,6	24,8	21,5	75
T1 Coil		25,5	24,9	25,1	21,8	75
C53		25,5	19,5	19,5	16,9	45
C44		20,2	40,5	39,8	34	90
L2		39,6	26,5	25,5	21,3	75
L3		24,7	23,8	22,9	19,3	75
C55		20,6	20,2	20,8	18,6	45
Between C15 and C42		25,5	23,9	27,2	22,4	90
Battery		11,4	11,7	17,7	10,4	30
Top Cover		9,1	7,5	10,2	7,8	45

Transformer Vendor: Leader Primary winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	dT (K)	allowed dT (K)	insulation class
198V	5,510	6,58	50,4	80	B
207V	5,510	6,5	46,62	80	B
230V	5,510	6,13	29,2	80	B
254V	5,510	6,34	39,09	80	B

Transformer Vendor: Leader Secondary winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	DT (K)	allowed dT (K)	insulation class
198V	0,7597	0,94	61,59	80	B
207V	0,7597	0,92	54,75	80	B
230V	0,7597	0,87	37,68	80	B
254V	0,7597	0,9	47,92	80	B

Transformer Vendor: Leader Clamp winding

temperature rise dT of winding:	R_1 (Ω)	R_2 (Ω)	DT (K)	allowed dT (K)	insulation class
198V	0,04489	0.05535	60,47	80	B
207V	0,04489	0,05463	56,3	80	B
230V	0,04489	0.05135	37,34	80	B
254V	0,04489	0,05309	47,4	80	B

BP280SI

4.5	TABLE: temperature rise measurements					
	test voltage (V)	198	207	230	254	—
	t1 (°C)	25	25	25	25	—
	t2 (°C)	25	25	25	25	—
rise dT of part/at:		dT (K)				allowed dT (K)
L3		14,6	16	11,7	11,6	75
L2		17,6	21,3	15,4	14,7	75
C53		15,6	18,1	15,3	14,7	45
RYL1		32	34,1	29,3	29,3	75
T1 core		21,8	27,3	21,5	20,4	75
T1 coil		21,4	27	21,3	20,1	75
C55		19,2	24,3	19,5	18,5	45
L1 coil		28,4	34,4	30	28,1	75
L1 core		28,6	34,6	30,3	28,5	75
Between C15 and C42		30,2	36,6	32,5	30,1	90
C44		39,9	46	41,4	39,5	90
Battery		13,5	17,1	14,6	14,2	30
Top Cover		11,7	14,9	13,6	11,7	45

4.5.2	TABLE: ball pressure test of thermoplastic parts		
	allowed impression diameter (mm) .....:	≤ 2 mm	—
part		test temperature (°C)	impression diameter (mm)
430-2052A by leader bobbin		125	<2,0
430-2052A by Sino bobbin		125	<2,0
430-2051 by leader bobbin		125	<2,0

5.2	TABLE: electric strength tests and impulse tests	
test voltage applied between:	test voltage (V)	breakdown Yes / No
Primary to ground*	2121VDC	No
Primary to Selv*	4242VDC	No
Transformer 430-2051 by Leader Pri-SELV	3000VAC	No
Transformer 430-2052 by Leader Pri-SELV	3000VAC	No
Transformer 430-2052 by Sino Pri-SELV	3000VAC	No
Primary to TNV*	4242VDC	No
TNV to SELV*	2121VDC	No
TNV to Earth*	2121VDC	No
T1 Primary to SELV	3000VAC	No
supplementary information		
Test voltage a.c. / d.c.		

* Testing on BP650SI represents all units

5.3	TABLE: fault condition tests						
	ambient temperature (°C) ..... :				25		—
	model/type of power supply ..... :				BP650SI		—
	manufacturer of power supply ..... :				APC		—
	rated markings of power supply ..... :				650VA		—
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result	
Output*	Overload	254	1 hour	CB1	10	Max temp 73,9	
Output*	Overload	0	15 sec	N/A	2,66	Loaded to 125%. No hazard	
Output*	Short	254	1 sec	CB1	>>10A	Unit shuts down instantly	
Output*	Short	0	1 sec	N/A	>>10A	Unit shuts down instantly, RLY1 needs to be replaced	
Main Transform (Clamp)*	Overload	254	1 hour	N/A	7A	Loaded to 7A (any more and unit shuts down). Max Temp 111,5	
Main Transform (Clamp)*	Short	254	1 sec	N/A		Unit shuts down instantly	
Main Transform (Clamp)*	Short	0	1 sec	N/A		Unit shuts down instantly	
Output+	Overload	254	1 hour	CB1	8,3A	CB1 trips, no hazard	
Output+	Overload	0	15 sec	N/A	2,66	Loaded to 125%. No hazard	
Output+	Short	254	1 sec	CB1	>>10A	Unit shuts down instantly	
Output+	Short	0	1 sec	N/A	>>10A	Unit shuts down instantly, RLY1 needs to be replaced	
Main Transform (Clamp)+	Overload	254	1 hour	N/A	7A	Loaded to 7A (any more and unit shuts down). Max Temp 111,5	
Main Transform (Clamp)+	Short	254	1 sec	N/A		Unit shuts down instantly	
Main Transform (Clamp)+	Short	0	1 sec	N/A		Unit shuts down instantly	
Enclosure*	Blocked Vents	254/0	5 hours	N/A		Run until temps stabalized, then a discharge. No hazards	
Enclosure +	Blocked vents	254/0	5 hours	N/A		Run until temps stabalized, then a discharge. No hazards	
Q19 1-3	Short	254	1 hour	N/A		No impact on operation of unit	

5.3	TABLE: fault condition tests						
	ambient temperature (°C) ..... :				25		—
	model/type of power supply ..... :				BP650SI		—
	manufacturer of power supply ..... :				APC		—
	rated markings of power supply ..... :				650VA		—
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result	
Q19 1-2	Short	254	5 sec	N/A		Q19 and Q20 have to be replaced	
Q19 2-3	Short	254	1 Sec	F2,3	>40A	F2 and F3 open	
Q19 1-3	Short	0	1 Sec	F2,3	>40A	F2 and F3 open	
Q19 1-2	Short	0	1 Sec	N/A		Q19 and Q20 have to be replaced	
Q19 2-3	Short	0	1 Sec	F2,3	>40A	F2 and F3 open	
U8 4-3	Short	254	1 hour	N/A		No impact on unit	
U8 4-2	Short	254	1 hour	N/A		No impact on unit	
U8 2-3	Short	0	4 min, 8 sec	N/A		Low battery shutdown	
U7 5-4	Short	254	1 hour	N/A		No impact on unit	
T1	Short	254	1 hour	N/A		Max temp 53,7	
LED 1#	Short	254	1 hour	N/A		No change in operation	
LED 2#	Short	254	1 hour	N/A		No change in operation	
LED 4#	Short	254	1 hour	N/A		No change in operation	
LED 5#	Short	254	1 hour	N/A		No change in operation	
C1#	Short	254	1 hour	N/A		No change in operation	
C2#	Short	254	1 hour	N/A		No change in operation	
C3#	Short	254	1 hour	N/A		No change in operation	
C4#	Short	254	1 hour	N/A		No change in operation	
Q23 2-3	Short	0	1 sec	N/A		Backfeed test, see Appendix 4	
Q23 2	Open	0	1 sec	N/A		Backfeed test, see Appendix 4	
supplementary information							
* means tranformer vendor is Leader, + denotes Sino, # done to verify suitability of HB bezel							

BP420SI

5.3	TABLE: fault condition tests						
	ambient temperature (°C) ..... :				25		—
	model/type of power supply ..... :				BP420SI		—
	manufacturer of power supply ..... :				APC		—
	rated markings of power supply ..... :				420VA		—
component No.	fault	test voltage (V)	test time	fuse No.	fuse current (A)	result	
Output	Overload	254	7 Hours	CB1	7A	Just below trip point of CB1. No hazard	
Output	Overload	0	25 Sec	N/A	N/A	125% of rated load. Max temp 82,7	
Output	Short	254	1 sec	CB1	>7A	Unit shuts down	
Output	Short	0	1 sec	N/A	>7A	Unit shuts down	
T1(Clamp)	Overload	254	85 min.	N/A		Loaded winding to 7A (max load before unit shuts down). Max temp was 143	
T1(Clamp)	Short	254	1 sec	N/A		Unit shuts down	
T1(Clamp)	Short	0	1 sec	N/A		Unit shuts down	
Enclosure	Blocked vents	254/0	5 hours	N/A		Run until temps stabalized, then a discharge. No hazards	
supplementary information							

A.6.5	TABLE: flammability test for classifying materials V-0, V-1 or V-2	
sample No. / ref.	afterflame time (s) t_1 or t_2	afterflame + afterglow (s) after 2nd flame application $t_2 + t_3$
1/A		
2/A		
3/A		
4/A		
5/A		
6/B		
7/B		
8/B		
9/B		
10/B		
supplementary information:		
Total afterflame time (s) for any condition set $t_1 + t_2$ for five (5) specimens:		
Conditioning "A" designates 7 days at 70 °C ± 1 °C followed by 4 h minimum in calcium chloride desiccator.		
Conditioning "B" designates 48 h at 23 °C ± 2 °C and relative humidity between 45 % and 55 %.		

A.6.6	TABLE: flammability re-test for classifying materials V-0, V-1 or V-2	
sample No.	afterflame time (s) t_1 or t_2	afterflame + afterglow (s) after 2nd flame application $t_2 + t_3$
11		
12		
13		
14		
15		
supplementary information:		
Total afterflame time (s) for any condition set $t_1 + t_2$ for five (5) specimens:		

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			
sample No. / ref.	flame time (s)	glow time (s)	flaming/glowing distance from the end (mm)	comment (for A.7.7 burning rate mm/min)
1/A				
2/A				
3/A				
4/A				
5/A				
6/B				
7/B				
8/B				
9/B				
10/B				
supplementary information:				
Conditioning "A" designates 7 days at 70 °C ± 1 °C followed by 4 h minimum in calcium chloride desiccator.				
Conditioning "B" designates 48 h at 23 °C ± 2 °C and relative humidity between 45 % and 55 %.				

A.7.8	TABLE: flammability re-test for classifying foam materials HF-1 or HF-2			
sample No.	flame time (s)	glow time (s)	flaming/glowing distance from the end (mm)	comment
11				
12				
13				
14				
15				
supplementary information:				

A.7.9	TABLE: flammability re-test for classifying foam materials HBF			
sample No.	flame time (s)	glow time (s)	flaming/glowing distance from the end (mm)	comment (for A.7.7 burning rate mm/min)
11				
12				
13				
14				
15				
supplementary information:				

A.8.5	TABLE: flammability test for classifying materials HB	
sample No.	flaming/glowing rate mm/min	flaming/glowing distance from reference mark (mm)
1		
2		
3		
supplementary information:		

A.8.6	TABLE: flammability re-test for classifying materials HB	
sample No.	flaming/glowing rate mm/min	flaming/glowing distance from reference mark (mm)
4		
5		
6		
supplementary information:		

Remarks:

A.9.6	TABLE: flammability test for classifying materials 5V				
sample No./ref.	test bars		test plaques		
	flaming + glowing time (s)	burning distance (mm)	position	flaming + glowing time (s)	burning distance (mm)
1/A			A		
2/A			B		
3/A			C		
4/A			D		
5/A			—	—	—
6/B			A		
7/B			B		
8/B			C		
9/B			D		
10/B			—	—	—
supplementary information:					
Conditioning "A" designates 7 days at 70 °C ± 1 °C followed by 4 h minimum in calcium chloride desiccator.					
Conditioning "B" designates 48 h at 23 °C ± 2 °C and relative humidity between 45 % and 55 %.					

A.9.7	TABLE: flammability re-test for classifying materials 5V				
sample No.	test bars		test plaques		
	flaming + glowing time (s)	burning distance (mm)	position	flaming + glowing time (s)	burning distance (mm)
11			A		
12			B		
13			C		
14			D		
15			—	—	—
supplementary information:					

IEC 60950, 3rd edition (1999)
Information technology equipment including electrical business equipment
Issuance and recognition: At the date of the issue, CB Test Certificates for equipment in accordance with the standard concerned are issued and recognized by the National Certification Bodies (NCBs) of the following countries. The letter "R" adjacent to the name of the country indicates that the National Certification Body is only a Recognizing NCB for the standard in question.
Country Remark Group differ. National differ. National standard
- AT Austria Yes
– CH Switzerland Yes - pr EN 60950
CZ Czech Republic Yes
-DE Germany –
-DK Denmark –
-FI Finalnd Yes Yes EN 60950
- FR France
- GB United Kingdom –
- HU Hungary Yes - MSZ EN 60950
- The Netherlands –
- NO Norway Yes Yes NEK EN 60950
- SE Sweden Yes Yes SS EN 60950, 6 th ed
- SI Slovenia Yes
-SG Singapore –
-US United States of America Yes - UL 1950 (April 2000)
- ZA South Africa - - SABS IEC 60950

NATIONAL DIFFERENCES

Finnland FI

2.3.3	The exclusions are applicable for permanently connected equipment and pluggable equipment type B only.		N/A

Norway (NO)

1.5.8	In Norway, due to the IT power system used (see annex V, figure V.7), capacitors are required to be rated for the applicable phase-to- phase voltage (230 V).		P
1.7.2	In Norway, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a communication network shall, K safety relies on connection to protective earth, require a marking stating that. the equipment must be connected to an earthed mains socket-outlet. In Sweden, if the separation between the mains and SELV terminal relies upon connection to the safety earth, the apparatus shall have a marking stating that it must be connected to an earthed mains socket-outlet The marking text shall be in Swedish and as follows: "Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk."		N/A
2.2.4	In Norway, requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply.		OK
2.3.2	In Norway, requirements according to this annex, sub-clause 6.1.2.1 apply.		OK
2.3.3	In Norway, requirements according to this annex, sub-clause 6.1.2.1 apply.		OK
2.3.4	In Norway, requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply.		OK
2.10.3.1	In Norway, due to the IT power distribution system used (see annex V, figure V.7), tire A.C. MAINS SUPPLY Voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault.		P
6.1.2.1	In Norway and Sweden, add the following text between the first and second		OK

	paragraph: If this insulation is solid, including Insulation forming part of a component, it shall at least consist of either - 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. If this insulation forms part of a semiconductor component e.g. an optocoupler, there is no distance through insulation requirement for the insulation consigns 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: - 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 W. It Is permitted to bridge this insulation With a capacitor complying with EN 132400:1994, subclass Y2.		
6.1.2.2	In Norway and Sweden, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE- EQUIPMENT TYPE B only.		N/A
Annex G.2	In Norway, due to the IT power distribution system used (see annex V, figure V.7), the A.C. MAINS SUPPLY voltage Is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault.		P

Schweden (SE)

1.5.1	Add the following: NOTE: In Sweden, switches containing mercury such as thermostats, relays and level controllers are not allowed.		P
1.7.2	In Sweden, if the separation between the mains and SELV terminal relies upon connection to the safety earth, the apparatus shall have a marking stating that it must be connected to an earthed mains socket-outlet. The marking shall be in Swedish and as follows: "Apparaten skall anslutas till j ordat uttag ndr den ansluts till ett ndtverk.		N/A
6.1.2.1	In Sweden, add the following text between the first and the second paragraph: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either: - 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. 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: - passes the tests and inspection criteria of 2.10.8 with an electric strength		N/A

	test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.7 shall be performed using 1,5 kV); and - is subjected to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1,5 kV. It is permitted to bridge this insulation with a capacitor complying with EN 132400:1994, subclass Y2.		
6.1.2.2	In Sweden, the exclusions are applicable to PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B only.		N/A

GROUP DIFFERENCES

2.7.1	Replace the subclause as follows: Basic requirements To protect against excessive current, short Circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b), and c) a) Except as detailed in b) and c), protective devices necessary to comply with the requirements of subclause 6.3 shall be Included as parts of the equipment 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 instruction. If reliance is placed on protection in the building installation. the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building Installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.		P

2.7.2	This subclause has been declared 'void'.		OK
3.2.3	Delete NOTE 1, and in table 3A delete the conduit sizes in parentheses.		OK
3.2.5	Replace “60245 IEC 530” by "HO5 RR-F" “60227 IEC 52” by 'HO3 W-F or H03 WH2-F” “60227 IEC 53" by “HOS W-F or H05 WH2-F2” In table 38, 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, delete the second sentence. 3.3.4 In table 30, 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.		OK
4.3.13	Replace the second compliance paragraph by:		P

	For equipment using LEDs or lasers, compliance is checked according to EN 60825- 1. NOTE 1 - if equipment falling within the scope of EN 60950 Is inherently a class 1 laser product, i.e. it contains no embedded laser or LD of a higher class number, then a laser warning label or other laser warning statement is not required (see 1.1 of EN 60825-1). Renumber the NOTE below the third compliance paragraph 2S NOTE 2.		
Annex H	Replace the last paragraph of this annex by: At any point 10 cm from the surface of the OPERATOR ACCESS AREA. the dose rate shall not exceed ıSv/h (0,1 mR/h) (see note). Account is taken of the background level. Replace the NOTE as follows: NOTE - These values appear in directive 96/29/Euratorm.		N/A
Annex P	Replace the text of this annex by: See annex ZA.		OK
Annex Q	Add the following notes for the standards indicated: IEC 60127 series NOTE. Harmonized as EN 60127 series (not modified) IEC 60529 NOTE: Harmonized as EN 60629:1 991 (not modified) IEC 61032 NOTE: Harmonized as EN 61032:1998 (not modified)		OK

ANNEX FOR TEST REPORT EN 60950 3rd EDITION (2000)
DEVIATIONS FOR EUROPE

Explanations for abbreviations:
C = CENELEC Common Modification, **S** = Special National Condition, **A** = National Deviation (A-deviation), **F** = Other information, **AT** = Austria, **CH** = Switzerland, **DE** = Germany, **DK** = Denmark, **ES** = Spain, **FI** = Finland, **GB** = Great Britain, **IE** = Ireland, **NO** = Norway, **SE** = Sweden, **All** = All countries

Sub-cl.		Deviation	Result
—	C	Delete all the "country" notes that appear on the following pages of the reference document (IEC 60950:1999): 85, 91, 99, 103, 117, 119, 123, 125, 149, 171, 213, 215, 219, 251, 283, 325, 327, 331, 333 and 407. **CENELEC**	OK
1.2.4.1	S	Certain types of Class I appliances (see subclause 3.2.1) may be provided with a plug not establishing earthing continuity when inserted into Danish socket-outlets. **DK**	N/A
1.5.1	A	Add the following: NOTE: Switches containing mercury such as thermostats, relays and level controllers are not allowed. **CH, SE**	P
1.5.8	S	Due to the IT power system used (see annex V, figure V.7), capacitors are required to be rated for the applicable phase-to phase voltage (230 V). **NO**	P

Sub-cl.		Deviation	Result
1.7.2	S	Class I pluggable equipment type A intended for connection to other equipment or a communication network shall, if safety relies on connection to protective earth, require a marking stating that the equipment must be connected to an earthed mains socket outlet. **NO**	P
	S	If the separation between the mains and SELV terminal relies upon connection to the safety earth, the apparatus shall have a marking stating that it must be connected to an earthed mains socket-outlet. The marking text shall be in Swedish and as follows: "Apparaten skall anslutas till jordat uttag när den ansluts till ett nätverk." **SE**	N/A
	A	Supply cords of Class I equipment, which are delivered without a plug must be provided with a visible tag with the following text: "Vigtigt! Lederen med grøn/gul isolation må kun tilsluttes en klemme mærket eller (IEC 417, No. 5019 eller IEC 417, No. 5017)." If essential for the safety of the equipment, the tag must in addition be provided with a diagram, which shows the connection of the other conductors, or be provided with the following text: "For tilslutning af de øvrige ledere, se medfølgende installationsvejledning." **DK**	N/A
1.7.5	S	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. **DK**	N/A
	A	Class II equipment shall not be fitted with socket-outlets for providing power to other equipment. **DK**	N/A
1.7.12	A	(Gesetz über techische 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. **DE**	P
1.7.15	A	(Ordinance on environmentally hazardous substances SR 814.013) Annex 4.10 of SR 814.013 applies for batteries. **CH**	P
	D	Warning texts for lithium batteries. **All**	N/A
		Languages..... :	—
2.2.4	S	Requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply. **NO**	OK
2.3.2	S	Requirements according to this annex, sub-clause 6.1.2.1 apply. **NO**	OK
2.3.3	S	Requirements according to this annex, sub-clause 6.1.2.1 apply. **NO**	OK
2.3.4	S	Requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply. **NO**	OK

Sub-cl.		Deviation	Result
2.7.1	C	Replace the subclause as follows: Basic requirements To protect against excessive current, short circuits and earth faults in primary circuits, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b), and c): a) Except as detailed in b) and c), protective devices necessary to comply with the requirements of 5.3 shall be included as integral parts of the equipment. 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 instruction. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for pluggable equipment type A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet. **CENELEC**	P
2.7.2	C	This subclause has been declared 'void'. **CENELEC**	OK
2.10.3.1	S	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. **NO**	P
3.2.1	S	Supply cords of equipment having a rated current not exceeding 10 A shall be provided with a plug complying with SEV 1011 or IEC 884-1 and one of the following dimensions sheets: - 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 In general, EN 60 309 applies for plugs for currents exceeding 10 A. However, a 16 A plug and socket-outlet system is being introduced in Switzerland, the plugs of which are according to the following dimension sheets, published in February 1998: - 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 **CH**	P
	S	Supply cords of single-phase equipment having a rated current not exceeding 10 A shall be provided with a plug according to the Heavy Current Regulations Section 107-2-D1. 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. If poly-phase equipment and single-phase equipment having a rated current exceeding 10 A is provided with a supply cord with a plug, this plug shall be in accordance with the Heavy Current Regulations Section 107-D1 or EN 60309-2. **DK**	P

Sub-cl.		Deviation	Result
	S	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. 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. Class I equipment provided with socket-outlets with earth contacts, or which are intended to be used locations where protection against indirect contact is required according to the wiring rules, shall be provided with a plug in accordance with standard UNE 20315:1994. If poly-phase equipment is provided with a supply cord with a plug, this plug shall be in accordance with UNE-EN 60309-2. **ES**	P
	S	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. NOTE: "Standard plug" is defined in SI 1768:1994 and essentially means an approved plug conforming to BS 1363 or an approved conversion plug. **GB**	N/A
	S	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. **IE**	N/A
3.2.3	C	Delete note 1, and in table 3A delete the conduit sizes in parentheses. **CENELEC**	OK
3.2.5	C	Replace "60245 IEC 53" by "H05 RR-F", "60227 IEC 52" by "H03 VV-F or H03 VVH2-F" and "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, delete the second sentence **CENELEC**	OK
	S	A power supply cord with conductor of 1,25 mm² is allowed for equipment with rated current over 10 A and up to and including 13 A. **GB**	N/A
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 161.5 to 2,5 1,5 to 4" Delete the fifth line – conductor sizes for 13 to 16 A. **CENELEC**	OK
	S	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 **GB**	N/A
4.3.6	S	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. **GB**	N/A

Sub-cl.		Deviation	Result
	S	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. **IE**	N/A
4.3.13	C	Replace the second compliance paragraph by: For equipment using LEDs or lasers, compliance is checked according to EN 60825-1. NOTE 1 – If equipment falling within the scope of EN 60950 is inherently a class 1 laser product, i.e. it contains no embedded laser or LED of a higher class number, then a laser warning label or other laser warning statement is not required (see 1.1 of EN 60825-1). Renumber the NOTE below the third compliance paragraph as NOTE 2. **CENELEC**	P
6.1.2.1	S	Add the following text between the first and second paragraph: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either - 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. 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: - passes the tests and inspection criteria of 2.10.8 with an electric strength test of 1,5 kV multiplied by 1,6 (the electric strength test of 2.10.7 shall be performed using 1,5 kV); and - is subjected to routine testing for electric strength during manufacturing, using a test voltage of 1,5 kV. It is permitted to bridge this insulation with a capacitor complying with EN 132400:1994, subclass Y2. **NO, SE**	N/A
6.1.2.2	S	The exclusions are applicable for permanently connected equipment and pluggable equipment type B only. **FI, NO, SE**	N/A
G.2	S	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. **NO**	P
Annex HC		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 exceecd 1 µSv/h (0,1 mR/h) (see note). Account is taken of the background level. **CENELEC**	N/A
	C	Replace the NOTE as follows: NOTE – These values appear in Directive 96/29/Euratom. **CENELEC**	OK

Sub-cl.	Deviation	Result
Annex H A	(Regulation on protection against hazards by X-ray, of 8th January 1987, Article 5 [Operation of X-ray emission source], clauses 1 to 4) a) A licence is required by those who operate an X-ray emission source. b) A licence in accordance with Cl. 1 is not required by those who operate an X-ray emission source on which the electron acceleration voltage does not exceed 20 kV if 1) the local dose rate at a distance of 0,1 m from the surface does not exceed 1 μSv/h and 2) it is adequately indicated on the X-ray emission source that i) X-rays are generated and ii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer. c) A licence in accordance with Cl. 1 is also not required by persons who operate an X-ray emission source on which the electron acceleration voltage exceeds 20 kV if 1) the X-ray emission source has been granted a type approval and 2) it is adequately indicated on the X-ray emission source that 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 and iii) the electron acceleration voltage must not exceed the maximum value stipulated by the manufacturer or importer. d) Furthermore, a licence in accordance with Cl. 1 is also not required by persons who operate X-ray emission sources on which the electron acceleration voltage does not exceed 30 kV if 1) the X-rays are generated only by intrinsically safe CRTs complying with Enclosure III, No. 6, 2) the values stipulated in accordance with Enclosure III, No. 6.2 are limited by technical measures and specified in the device and 3) it is adequately indicated on the X-ray emission source that the X-rays generated are adequately screened by the intrinsically safe CRT. **DE**	N/A
Annex PC	Replace the text of this annex by: See Annex ZA. **CENELEC**	OK
Annex QC	Add the following notes for the standards indicated: IEC 60127 series NOTE: Harmonized as EN 60127 series (not modified) IEC 60269-2-1 NOTE: Harmonized as HD 630.2.1 S2:1997 (modified) IEC 60529 NOTE: Harmonized as EN 60529:1991 (not modified) IEC 61032 NOTE: Harmonized as EN 61032:1998 (not modified) **CENELEC**	OK
Annex ZA C	This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate palces in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies. NOTE: When an international publication has been modivied by common modifications, indicated by (mod), the relevant EN/HD applies. — IEC 60050-151:1978	OK

IEC 60950, 3rd edition (1999)
Information technology equipment including electrical business equipment

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

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

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

NATIONAL DIFFERENCES

Canada (CA)

GENERAL

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

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

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

SPECIAL NATIONAL CONDITIONS

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

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

1.1.1	All equipment design and installations are required to be in accordance with the Canadian Electrical Code (CEC), Part 1, CAN/CSA C22.1, and with National Electrical Code (NEC), ANSI/NFPA 70, and, unless marked or otherwise identified, the Standard for the Protection of Electronic Computer/Data-Processing Equipment, ANSI/NFPA 75.		OK
1.5.5	For lengths exceeding 3.05 m, external interconnecting flexible cord and cable assemblies are required to be a suitable cable type (e.g. DP, CL2) specified in the CEC/NEC. For lengths 3.05 m or less, external interconnecting flexible cord and cable assemblies which are not types specified in the CEC/NEC are required to have special construction features and identification markings.		N/A
1.7.1	Equipment for use on a.c. mains supply systems with a neutral and more than one phase conductor (e.g. 120/240 V, 3-wire) require a special marking format for electrical ratings. A voltage rating that exceeds an attachment plug cap rating is only permitted if it does not exceed the extreme operating conditions in Table 2 of CAN/CSA C22.2 No. 235, and if it is part of a range that extends into the Table 2 „Normal Operating Conditions". Likewise, a voltage rating shall not be lower than the specified „Normal Operating Conditions", unless it is part of a range that extends into the „Normal Operating Conditions".		N/A
2.5	Where a fuse is used to provide Class 2, Limited Power Source, or TNV current limiting, it shall not be operator-accessible unless it is not interchangeable.		N/A
2.7.1	Suitable CEC/NEC branch circuit protection is required for all standard supply outlets, receptacles and medium-base or smaller lampholders if the supply branch circuit protection is not suitable. Power distribution transformers distributing power at 100 volts or more, and rated 10 kVA or more, require transformer overcurrent protection.		N/A
3.2	Wiring methods (terminals, leads, etc.) used for the connection of the equipment to the mains shall be in accordance with the CEC/NEC.		P
3.2.1	Power supply cords are required to have attachment plugs rated not less than 125 percent of the rated current of the equipment.		P
3.2.3	Permanent connection of equipment to the mains supply by a power supply cord is not permitted, except for certain equipment, such as ATMs.		N/A
3.2.5	Power supply cords are required to be no longer than 4.5 m in length. Flexible power supply cords are required to be compatible with Tables 11 & 12 of the CEC, and Article 400 of the NEC.		P
3.2.9	Permanently connected equipment is required to have a suitable wiring compartment and wire bending space.		N/A
3.3	Wiring terminals and associated spacings for field wiring connections shall comply with CAN/CSA C22.2 No. 0.		N/A
3.3.3	Wire binding screws are not permitted to attach conductors larger than 10 AWG (5.3 mm²).		N/A
3.3.4	Terminals for permanent wiring, including protective earthing terminals are required to be suitable for Canadian/U.S. wire gauge sizes, rated 125 percent of the equipment rating, and specially marked when specified (1.7.7).		N/A
3.4.2	Motor control devices are required for cord-connected equipment with a motor if the equipment is rated more than 12 A, or if the motor has a nominal voltage rating greater than 120 V or is rated more than 1/3 hp (locked rotor current over 43 A).		N/A
3.4.8	Vertically-mounted disconnect switches and circuit breakers are required to have the "on" position indicated by the handle in the up position.		N/A
3.4.10	For computer room applications, equipment with battery systems capable of supplying 750 VA for five minutes are required to have a battery disconnect means that may be connected to the computer room remote power-off circuit.		N/A
4.3.12	The maximum quantity of flammable liquid stored in equipment is required to comply with NFPA 30.		N/A

4.3.13	Equipment with lasers is required to meet Code of Federal Regulations 21CFR 1040 and/or Canadian Radiation Emitting Devices Act, REDR C1370, as applicable.		N/A
4.7.1	For computer room applications, automated information storage systems with combustible media greater than 27 cubic feet are required to have a provision for connection of either automatic sprinklers or a gaseous agent extinguishing system with an extended discharge.		N/A
4.7.3.1	For computer room applications, enclosures with combustible material measuring greater than 0.9 m^2 or a single dimension greater than 1.8 m, are required to have a flame spread rating of 50 or less. For other applications, enclosures with the same dimensions require a flame spread rating of 200 or less.		N/A
Annex H	Equipment that produces ionizing radiation is required to comply with Code of Federal Regulations, 21 CFR 1020 and/or Canadian Radiation Emitting Devices Act, REDR C1370, as applicable.		N/A

OTHER DIFFERENCES

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

1.5.2	Components of equipment must be suitable for the application, and must comply with the requirements of the equipment standard and the applicable national (Canadian and/or U.S.) component or material standards, as far as they may apply. The acceptance will be based on the following: E) A component Certified by a Canadian or U.S. National Certification Body (NCB) to a Canadian or U.S. component standard will be checked for correct application and use in accordance with its specified rating. Where necessary, it will also be subject to the applicable tests of the equipment standard. F) A component, which has a CB Test Certificate for compliance with a relevant IEC component standard, will be checked for correct application and use in accordance with its specified ratings. Where necessary, it will also be subject to the applicable tests of the equipment standard, and to the applicable tests of the Canadian and/or U.S. component or material standard, under the conditions occurring in the equipment. G) A component, which has no approval as in A) or B) above or which is used not in accordance with its specified ratings, will be subject to the applicable tests of the equipment standard, and to the applicable tests of the Canadian and/or U.S. component or material standard, under the conditions occurring in the equipment. H) Some components may require annual re-testing, which may be carried out by the manufacturer, CSA International or another laboratory.		N/A
2.3.1	For TNV-2 and TNV-3 circuits with other than ringing signals and with voltages exceeding 42.4 Vp or 60 Vd.c., the maximum acceptable current through a 2000 ohm resistor (or greater) connected across the voltage source with other loads disconnected is 7.1 mA peak or 30 ma d.c. under normal operating conditions.		N/A
2.6.3.3	When subject to impedance testing, protective earthing and bonding are required to be tested to the additional test conditions that originate in CAN/CSA C22.2 No. 0.4.		N/A
4.2.8.1	Enclosures around CRTs having a diagonal dimension of 160 mm or more are required to reduce the risk of injury due to the implosion of the CRT.		N/A
4.3.2	Equipment with handles is required to comply with special loading tests.		N/A
5.1.8.1.1	Equipment intended to receive telecommunication ringing signals is required to comply with a special touch current measurement test.		N/A
6.2.1	Enamel coating on winding wire is not considered electrical separation unless subject to special investigation.		N/A
6.4	Equipment intended for connection to telecommunication network outside plant cable is required to be protected against overvoltage from power line crosses in accordance with 6.4 and Annex NAC.		N/A

6.5	Equipment connected to a telecommunications network and supplied with an earphone intended to be held against or in the ear is required to comply with special acoustic pressure tests.		N/A
Annex M.2	Continuous ringing signals up to 16 mA only are permitted if the equipment is subject to special installation and performance restrictions.		N/A
Annex NAB	Equipment connected to centralized d.c. power systems is required to comply with special earthing, wiring, marking and insulation requirements in accordance with Annex NAB and 3.6.1.		N/A

Finland (FI)

6.1.2.2	In Finland, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B only.		N/A

Norway (NO)

1.5.8	In Norway, due to the IT power system used (see annex V, figure V.7), capacitors are required to be rated for the applicable phase-to-phase voltage (230 V).		P
1.7.2	In Norway, CLASS I PLUGGABLE EQUIPMENT TYPE A intended for connection to other equipment or a communication network shall, if safety relies on connection to protective earth, require a marking stating that the equipment must be connected to an earthed mains socket-outlet.		N/A
2.2.4	In Norway, requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply.		OK
2.3.2	In Norway, requirements according to this annex, sub-clause 6.1.2.1 apply.		OK
2.3.3	In Norway, requirements according to this annex, sub-clause 6.1.2.1 apply.		OK
2.3.4	In Norway, requirements according to this annex, sub-clauses 1.7.2 and 6.1.2.1 apply.		OK
2.10.3.1	In Norway, due to the IT power distribution system used (see annex V, figure V.7), the A.C. MAINS SUPPLY voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault.		P
6.1.2.1	In Norway, add the following text between the first and second paragraph: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either - 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. If this insulation forms part of a semiconductor component e.g. an optocoupler, there is no distance through insulation requirement for the insulation consigns 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 accord-ance with the compliance clause below and in addition: - 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		N/A

	- is subjected to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1.5 kV. It is permitted to bridge this insulation with a capacitor complying with EN 132400: 1994, subclass Y2.		
6.1.2.2	In Norway, the exclusions are applicable for PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B only.		N/A
Annex G.2	In Norway, due to the IT power distribution system used (see annex V, figure V.7), the A.C. MAINS SUPPLY voltage is considered to be equal to the line-to-line voltage, and will remain at 230 V in case of a single earth fault.		P

Sweden (SE)

1.5.1	Add the following: NOTE: In Sweden, switches containing mercury such as thermostats, relays and level controllers are not allowed.		P
1.7.2	In Sweden, if the separation between the mains and SELV terminal relies upon connection to the safety earth, the apparatus shall have a marking stating that it must be connected to an earthed mains socket-outlet. The marking shall be in Swedish and as follows: „Apparaten skall anslutas till j ordat uttag när den ansluts till ett nätverk."		N/A
6.1.2.1	In Sweden, add the following text between the first and the second paragraph: If this insulation is solid, including insulation forming part of a component, it shall at least consist of either: - 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. 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 accord-ance with the compliance clause below and in addition: - passes the tests and inspection criteria of 2.10.8 with an electric strength test of 1.5 kV multiplied by 1.6 (the electric strength test of 2.10.7 shall be performed using 1.5 kV), and - is subjected to ROUTINE TESTING for electric strength during manufacturing, using a test voltage of 1.5 kV. It is permitted to bridge this insulation with a capacitor complying with EN 132400: 1994, subclass Y2.		N/A
6.1.2.2	In Sweden, the exclusions are applicable to PERMANENTLY CONNECTED EQUIPMENT and PLUGGABLE EQUIPMENT TYPE B only.		N/A

GROUP DIFFERENCES

2.7.1	Replace the subclause as follows: Basic requirements To protect against excessive current, short circuits and earth faults in PRIMARY CIRCUITS, protective devices shall be included either as integral parts of the equipment or as parts of the building installation, subject to the following, a), b), and c) a) Except as detailed in b) and c), protective devices necessary to comply with the requirements of subclause 6.3 shall be included as parts of the equipment. 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 instruction. If reliance is placed on protection in the building installation, the installation instructions shall so state, except that for PLUGGABLE EQUIPMENT TYPE A the building installation shall be regarded as providing protection in accordance with the rating of the wall socket outlet.		P
2.7.2	This subclause has been declared ‚**void**'.		OK
3.2.3	Delete NOTE 1, and in table 3A delete the conduit sizes in parentheses.		OK
3.2.5	Replace „60245 IEC 53" by „HO5RR-F" „60227 IEC 52" by „HO3VV-F or H03VVH2-F" „60227 IEC 53" by „HO5VV-F or H05VVH2-F2" In table 3B, replace the first four lines by the following: I Up to and including 6 I 0.75 1) I I Over 6 up to and including 10 I (0.75) 2) 1.0 I I Over 10 up to and including 16 I (1.0)3) 1.5 I In the conditions applicable to table 3B delete the words „in some countries" in condition 1) In NOTE 1, delete the second sentence.		OK
3.3.4	In table 3D, delete the fourth line - conductor sizes for 10 to 13 A, and replace with the following: I Over 10 up to and including 16 I 1.5 to 2.5 I 1.5 to 4 I Delete the fifth line - conductor sizes for 13 to 16 A.		OK
4.3.13	Replace the second compliance paragraph by: For equipment using LEDs or lasers, compliance is checked according to EN 60825-1. NOTE 1 - if equipment falling within the scope of EN 60950 is inherently a class 1 laser product, i.e. it contains no embedded laser or LED of a higher class number, then a laser warning label or other laser warning statement is not required (see 1.1 of EN 60825-1). Renumber the NOTE below the third compliance paragraph as NOTE 2.		P

Annex H	Replace the last paragraph of this annex by: At any point 10 cm from the surface of the OPERATOR ACCESS AREA the dose rate shall not exceed 1 µSv/h (0.1 mR/h) (see note). Account is taken of the background level. Replace the NOTE as follows: NOTE - These values appear in directive 96/29/Euratom.		OK
Annex P	Replace the text of this annex by: See annex ZA.		OK
Annex Q	Add the following notes for the standards indicated: IEC 60127 (series) NOTE: Harmonized as series EN 60127 (not modified) IEC 60269-2-1 NOTE: Harmonized as HD 630.2.1 S2:1997 (modified) IEC 60529 NOTE: Harmonized as EN 60629:1991 (not modified) IEC 61032 NOTE: Harmonized as EN 61032:1998 (not modified)		OK

Applicable Drawing

Part # 0A-229
Rev. 2

SPECIFICATION ATTACHMENT
THIS DRAWING DOES NOT REPRESENT
A COMPLETE SPECIFICATION

MODEL #
SERIAL #

0B229
Rev. 2

FULL-TIME
SURGE PROTECTION
220-240V~, 2.3 A
50/60 Hz

SURGE PROTECTION
AND BATTERY BACKUP
220-240 V~
50/60 Hz
MODEL 650VA: 410W, 3.0A
MODEL 620VA: 390W, 2.8A
MODEL 420VA: 260W, 1.9A
MODEL 280VA: 180W, 1.3A

220-240 V~
5.3 A
50-60 Hz

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 1, Page 1 of 1

0A-229-2CDR

WICHTIGE SICHERHEITSANWEISUNGEN – UNBEDINGT AUFBEWAHREN

Diese Sicherheitsrichtlinien enthalten wichtige Anweisungen bezüglich der Installation und Wartung von APC-Geräten und –Batterien. Sie wurden für APC-Kunden zusammengestellt, die Geräte von APC aufstellen, installieren, umstellen oder warten.

Sichere Handhabung

- Vorsicht! Niemals ohne Hilfe schwere Lasten heben.

⇒ <18 kg

⇒ 18-32 kg

⇒ 32-55 kg

⇒ >55 kg

- Geräte mit Rollen sind für glatte Oberflächen ohne Hindernisse gedacht.
- Niemals Rampen benutzen, die eine Neigung von 10° überschreiten.
- Diese Geräte sind zur Installation in Innenräumen mit geregelter Temperatur vorgesehen (siehe Gebrauchsanleitung zu genauer Temperaturspanne), die frei von leitenden Verschmutzungen sind.

Sicherheit beim Arbeiten mit Strom

- Niemals alleine unter gefährlichen Bedingungen arbeiten.
- Hoher Kurzschlußstrom durch leitende Materialien kann ernsthafte Verbrennungen verursachen.
- Die Installation von fest und permanent angeschlossenen Geräten muß durch einen Elektriker vorgenommen werden.
- Stromkabel, Stecker und Steckdosen müssen in gutem Zustand sein.
- Kann nicht überprüft werden, ob das Gerät geerdet ist, muß das Gerät von der Wechselstromquelle entfernt werden, bevor andere Geräte bzw. Ausrüstung installiert oder angeschlossen werden, um so einem elektrischen Schlag vorzubeugen. Das Stromkabel darf erst wieder eingesteckt werden, nachdem alle Anschlüsse vorgenommen wurden.
- Niemals Verbindungsstücke aus Metall anfassen, bevor das Gerät von der Stromquelle entfernt ist.
- Wenn möglich, Signalkabel immer mit nur einer Hand ein- bzw. ausstecken, um einen möglichen Schlag durch das Berühren zweier Oberflächen mit verschiedenen Erdungen zu vermeiden.
- Geräte immer an einen geerdeten Wechselstromanschluß anschließen. Die Steckverbindung muß an den entsprechenden Schutz des Stromkreises angeschlossen sein (Sicherung oder Schutzschalter). Wird das Gerät an andere Steckverbindungen angeschlossen, die diese Bedingungen nicht erfüllen, so kann es zu elektrischen Schlägen kommen.
- Bitte beachten Sie, daß am Ausgang des Gerätes keine Kabel mit mehr als 10 m Länge angeschlossen werden dürfen!

⚠ VORSICHT! Sicherheit beim Entregen

- Verfügt das Gerät über eine interne Energiequelle (Batterie), kann die Ausgabe stromführend sein wenn das Gerät nicht an eine Wechselstromquelle angeschlossen ist.
- Entregen von **Geräten mit Steckverbindung:** zuerst den Knopf „Aus" über eine Sekunde lang drücken, um das Gerät auszuschalten. Anschließend das Gerät von der Wechselstromquelle trennen. Dann den Batterieanschluß trennen.
- Entregen von **festverdrahteten Geräten:** den Stromschalter auf Bereitschaft einstellen ⏻. Dann den Wechselstromschutzschalter auf Bereitschaft einstellen ⏻. Nun den Batterieanschluß trennen (einschließlich aller Erweiterungseinheiten). Und schließlich den Wechselstrom von der Stromversorgung des Gebäudes trennen.
- Geräte mit Steckverbindungen beinhalten geerdete Schutzleiter die Leckstrom von den angeschlossenen Geräten (Computerausrüstung) führen. Der Gesamtleckstrom darf 3,5 mA nicht überschreiten.
- Von der Benutzung dieser Geräte in Ausrüstungen, die bei lebenserhaltenden Maßnahmen zur Anwendung kommt, wo ein Versagen der Geräte sehr wahrscheinlich das Versagen dieser lebenserhaltenden Ausrüstung verursacht bzw. Die Sicherheit oder Wirksamkeit dieser Ausrüstung stark beeinträchtigt, wird abgeraten.

⚠ ACHTUNG! Batteriesicherheit

- **Bei dieser Ausrüstung besteht Hochspannungsgefahr.** Das Gerät darf nicht auseinandergebaut werden. Ausnahmen sind Geräte mit Batterie. Batterien dürfen unter Einhaltung des nachfolgenden Verfahrens ausgewechselt werden. Außer der Batterie enthält das Gerät keine weiteren, durch den Benutzer instandzuhaltenden Teile. Reparaturen dürfen nur durch ausgebildete Fachkräfte des Herstellers ausgeführt werden.

Batterien müssen wiederverwertet werden. Die alten Batterien vorschriftsgemäß einer Recyclingstelle zuführen oder im Verpackungsmaterial der neuen Batterie an den Händler zurücksenden. Mehr dazu in den Anleitungen zu neuen Batterien.

- Batterien niemals durch Verbrennen entsorgen. Es besteht Explosionsgefahr.
- Batterien niemals öffnen oder beschädigen. Sie enthalten giftige Lauge, die Haut- und Augenreizungen hervorrufen können.
- Um Verletzungen durch Energie vorzubeugen, Armbanduhren und Schmuck, wie z.B. Ringe, vor dem Auswechseln von Batterien ablegen. Werkzeug mit isolierten Griffen verwenden.
- Immer die gleiche Anzahl und den gleichen Batterietyp auswechseln, wie ursprünglich im Gerät installiert.

Batteriewechsel und Recycling

Informationen zu Batteriekits und Recycling sind entweder im ***Benutzerhandbuch*** zu finden oder über den Händler zu erhalten.

IMPORTANT SAFETY INSTRUCTIONS - SAVE THIS GUIDE

This Safety Guide contains important instructions that should be followed during installation and maintenance of the APC equipment and batteries. It is intended for APC customers who setup, install, relocate, or maintain APC equipment.

Handling Safety

- Be careful. Do not lift heavy loads without assistance.

⇒ <18 kg (<40 lb.)

⇒ 18-32 kg (40-70 lb.)

⇒ 32-55 kg (70-120 lb.)

⇒ >55 kg (>120 lb.)

- Equipment with casters is built to move on a smooth surface without any obstacles.
- Do not use a ramp inclined at more than 10°.
- This equipment is intended for installation in a temperature-controlled indoor area (see the ***User's Manual*** for exact temperature range), free of conductive contaminants.

Electrical Safety

- Do not work alone under hazardous conditions.
- High short circuit current through conductive materials could cause severe burns.
- A licensed electrician is required to install permanently wired equipment.
- Check that the power cord(s), plug(s), and sockets are in good condition.
- To reduce the risk of electric shock when grounding cannot be verified, disconnect the equipment from the AC power outlet before installing or connecting to other equipment. Reconnect the power cord only after all connections are made.
- Do not handle any kind of metallic connector before the power has been removed.
- Use one hand, whenever possible, to connect or disconnect signal cables to avoid a possible shock from touching two surfaces with different electrical grounds.
- Connect the equipment to a three wire AC outlet (two poles plus ground). The receptacle must be connected to appropriate branch circuit/mains protection (fuse or circuit breaker). Connection to any other type of receptacle may result in a shock hazard.
- In order to maintain compliance with the EMC directive, output cords attached to the UPS should not exceed 10 meters in length.

⚠ CAUTION! Deenergizing Safety

- If the equipment has an internal energy source (the battery), the output may be energized when the unit is not connected to an AC power outlet.
- To deenergize **pluggable equipment**: first press the Off button for more than one second to switch the equipment off. Next disconnect the equipment from the AC power outlet. Finally, disconnect the battery.
- To deenergize **permanently wired** equipment: set the power switch to standby ⏻. Next set the AC circuit breaker to standby ⏻. Then disconnect the batteries (including any expansion units). Finally, disconnect the AC power from the building power supply.
- Pluggable equipment includes a protective earth conductor which carries the leakage current from the load devices (computer equipment). Total leakage current must not exceed 3.5 mA.
- Use of this equipment in life support applications where failure of this equipment can reasonably be expected to cause the failure of the life support equipment or to significantly effect its safety or effectiveness is not recommended.

⚠ WARNING! Battery Safety

- **This equipment contains potentially hazardous voltages**. Do not attempt to disassemble the unit. The **only exception** is for equipment containing batteries. Battery replacement using the procedures below is permissible. Except for the battery, the unit contains no user serviceable parts. Repairs are performed only by factory trained service personnel.

Batteries must be recycled. Deliver the battery to an appropriate recycling facility or ship it to the supplier in the new battery's packing material. See the new battery instructions for more information.

- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or mutilate batteries. They contain an electrolyte which is toxic and harmful to the skin and eyes.
- To avoid personal injury due to energy hazard, remove wrist watches and jewelry such as rings when replacing the batteries. Use tools with insulated handles.
- Replace batteries with the same number and type of batteries as originally installed in the equipment.

Replacement and Recycling of Batteries

See your dealer or the ***User Manual*** for information on replacement battery kits and battery recycling.

American Power Conversion Corporation
132 Fairgrounds Road, West Kingston, Rhode Island, U.S.A.
Uninterruptible Power Supplies
Model BP650SI, BP420SI, BP280SI, SU620INET, SU420INET
Vin = 220-240 V~, 50-60 Hz Input =5,3 A
Output: Full time surge 220-240 V~, 50-60 Hz 2,3A
Battery: 220-240 V~, 50-60 Hz, 3A, 410W, 650VA(BP650SI)
2,8A, 390W, 620VA(SU620INET)
1,9A, 260W, 420VA (BP420SI SU420INET)
1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

Appliance Inlet		10 A, 250 V	
(APC 770-0036)	Power Dynamics	420R02-3212-150-D3	VDE
	Panel Components	8301312	VDE
	Globtek	PX0575/15/63	VDE
	Qualtek Electronics	701W-15/31	VDE
AC Outlet		10 A, 250 V	
(APC 770-0036)	QUALTEK	742W-18/70B	VDE
	SINGAPORE RESOURCE	SRM-045-4	VDE
	Well Shin	770-0062	VDE
Relays			
RIY1 (transfer)		8 A, 250 VAC, 12 VDC, SELV Isolation	
(APC 450-2150A)	Grunner	D280A-R200A-G002A/01	VDE
	Schrack	RP 920123DC12V	VDE
	American Zettler	AZ733W-2A-12DE(209)	TUV
	OEN	68-12-2AE	VDE
RIY 2,3,4		10A, 250 VAC, 12 VDC, SELV Isolation	
(APC 450-0026)	Omron	G2R-14-T130-DC12	VDE
C53		1uF, 250 VAC, X2	
(APC 232-0105)	VISHAY/ROEDERSTEIN	F1772-510-2000	VDE
	PANASONIC INDUSTRIAL	ECQU2A105MV	VDE
	EVOX-RIFA	PHE830MF7100M	VDE
	TECATE	MPX-275/105M27	VDE
	NISSEI ARCOTRONICS	R40105M275BS or R46105M275BRS	VDE
	ISKRA	KNB1530 1u 275V	SEV
	OKAYA ELECTRIC	PA105 or RE105L	VDE
	CAMEL	MPX105K275VAC or MPX105K5KUP0P	VDE
C55		0.022uF, 250 VAC, X2	
(APC 232-0223)	ISKRA	KNB1530.022M250V	VDE
	EVOX-RIFA	PHE830MB5220M	VDE
	NISSEI ARCOTRONICS	R46223-275MBS	VDE
	CAMEL ELECTRONICS	MPEX 223M 250V	VDE
	EPCOS	B81130-B1223-M189	VDE

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1,9A, 260W, 420VA (BP420SI SU420INET)
1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

Battery Fuse BP650SI, SU620INET (F2, F3)		40 A, 32 VDC	
(APC 517-0040)	Bussmann	ATC-40	UL
	Littelfuse	M257040	UL
Battery Fuse BP420/280SI, SU420INET (F1,F2)		30A, 32VDC	
(APC 517-0030)	Bussmann	ATC-30	UL
	Littelfuse	M257030	UL
Battery BP650SI, SU620INET		12 V, 11 or 12 Ah	
(APC 910-8020)	CSB	GP12110F2 or GP12120F2	UL
	YUASA	NP12-12	UL
	PANASONIC	LC-RA1212P1	UL
	B & B BATTERY	BP1212	UL
Battery BP420/280SI, SU420INET		12 V, 7 or 7.2 Ah	
(APC 910-8011)	CSB	GP1270F2 #438A	UL
	Panasonic	LC-R127R2P1	UL
	B & B Battery	BP7-12	UL
	Exide	EP 7-12	UL
Battery Terminal Hood (APC 870-3219)	Polycarbonate	rated V-2	UL
Accessibility shield 420 and 280 units only (APC 850-0007)		PVC	
Printed Circuit Board (640-0232)		rated V-1 or V-0, 130°C	UL
Bezel	GE	Type GPM5500, HB minimum	UL

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1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

Inductor L1		500uH, 2A
(APC 420-0032)	FALCO ELECTRONICS, LTD	E12024
	EASTAR	420-0032
	Videocon	420-0032
Inductor L2,L3		25uH, 3A
(APC 420-0003)	Falco	420-0003
	Eastar	420-0003
	BPL	420-0003
Transformer T1		
(APC 460-0008)	Falco	460-0008
Transformer BP650SI/SU620INET		
(APC 430-2052A)	Leader	430-2152A
	Sino American	430-2152A
Transformer BP420SI/SU420INET		
(APC 430-2051)	Leader	430-2151

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1,9A, 260W, 420VA (BP420SI SU420INET)
1,3A, 180W, 280VA (BP280SI)

Rated Ambient = 0 - 40°C

Telco components			
MOV Q201		175V,14mm	
(APC 380-1752)	SIEMENS	S14K175E2G3R5	VDE
Gas Tube S201		470V	
(APC 38100471)	CP Claire	CG2-470	
	Lumex	GT-CM470	
	Meguro	CM-470L	
PTC1, PTC2		600V,0,375A,15 Ohms	
(APC 160-R376)	Raychem	PSR-23382-2	UL
Telco connectors(J201,J202)		8 position	
(APC 750-0009)	AMP INC.	555164-1	UL
	AMPHENOL	G93AV080814	UL
	Allsun Corporation	C031-8-F-3-.250	UL
	SUNJUN ELECTRONICS, INC	9633-8812	UL

TEST REPORT
EN 50091-1 (1993)

Product Uninterruptible Power Supply

Model/type BP280SI,BP420SI,BP650SI,SU420INET,SU650INET

Trade mark APC

Serial no

Name and address of the applicant American Power Conversion (APC)
85 Rangeway Road, #2, N.Billerica, MA, 01862

Name and address of the manufacturer American Power Conversion (APC)
Lot 32, Phase 1, Carmelray Industrial Park
Canlubang, Calamba, Laguna
Philippines

	RESULTS			
	PASS	FAIL	N/A	ENCL.
The equipment complies with the publication	[X]	[]	[]	[]
National deviations	[]	[]	[X]	[]
Other requirements	[]	[]	[X]	[]

Name and address of the testing laboratory VDE Testing and Certification Institute
Merianstr. 28, 63069 Offenbach

Tested by _____ 20.11.01
signature date
Frank Richter
name in block letter

Approved by _____ 6.1.02
signature date
Jurgen Barwinkel
name in block letters

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

April 1998

MANUFACTURER NAME AND ADDRESS:	
1.	American Power Conversion (APC) Lot 32, Phase 1,Carmelray Industrial Park Canlubang, Calamba, Laguna Philippines
2.	

Equipment mobility		movable stationary fixed permanent connection for building-in	[X] [] [] [] []
1.3.3 Class of equipment		Class I Class II	[X] []
Mass of equipment	9 kg		
Tested for IT power system? YES [] __ V phase-phase		NO [X]	[]
Copy of the marking plate: See IEC 950 Test report			

SUMMARY OF TESTING

Clause	Information/Comments

1.5.1 LIST OF CRITICAL COMPONENTS

Part No	Component	Manufacturer, type, ratings	Tested by/ Publication
		see IEC 950 Test report	

1.6 COMPONENTS
1.7 POWER INTERFACE

		RESULTS			
		PASS	FAIL	N/A	ENCL.
1.6.1	Comply with IEC 950 or relevant component standard	[X]	[]	[]	[]
1.6.2	Correct application	[X]	[]	[]	[]
1.6.3	Transformers	[X]	[]	[]	[]
1.6.4	Flammability class of high- voltage components	[]	[]	[X]	[]
1.7.1	Neutral conductors insulated from earth and the body	[X]	[]	[]	[]
1.7.4	Components connected between phase and earth in equipment intended for IT power system	[]	[]	[X]	[]
1.7.5	Rated supply tolerance _____	[X]	[]	[]	[]

Comments:

1.6.1 - 1.6.4 see 1.5.1 - 1.5.4 RD (IEC 950 Testreport)

1.7.4 - 1.7.5 see 1.6.4 - 1.6.5 RD (IEC 950 Testreport)

1.7.5 - -10 % = 207 V and +10% = 254 V ok

1.8 MARKING AND INSTRUCTIONS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
1.8.1	Rated voltage _	[X]	[]	[]	[]
	Symbol of nature of supply _	[X]	[]	[]	[]
	Rated frequency _	[X]	[]	[]	[]
	Rated current	[X]	[]	[]	[]
	Number of phases _	[X]	[]	[]	[]
	Output rated active power _	[X]	[]	[]	[]
	Output rated apparent power _	[X]	[]	[]	[]
	Maximum ambient operating temperature range	[]	[]	[X]	[]
	Stored energy time _	[]	[]	[X]	[]
	Manufacturer _	[X]	[]	[]	[]
	Trade mark _	[X]	[]	[]	[]
	Type/model	[X]	[]	[]	[]
	Symbol of Class II	[]	[]	[X]	[]
	Supply ratings given in installation instructions for units with additional separate automatic by-pass/maintenance by-pass/additional input ac supply/external batteries	[]	[]	[X]	[]
	Text referring to installation instructions on/near point of connection	[]	[]	[X]	[]
	Certification marks	[]	[]	[X]	[]
1.8.2	Operating instructions	[X]	[]	[]	[]
	Installation instructions	[X]	[]	[]	[]
1.8.3	Marking for voltage/frequency setting	[X]	[]	[]	[]
1.8.4	Marking at outlets _	[X]	[]	[]	[]
1.8.5	Marking at fuseholders _	[X]	[]	[]	[]
1.8.6	Wiring terminals _	[]	[]	[X]	[]

1.7 MARKING AND INSTRUCTIONS (continued)

		RESULTS			
		PASS	FAIL	N/A	ENCL.
1.8.7	Battery terminal	[X]	[]	[]	[]
1.8.8.1	Clear indication of switches and other controls	[X]	[]	[]	[]
1.8.8.2	Colours of controls and indicators	[X]	[]	[]	[]
1.8.8.3	Symbols according to IEC 417 __	[X]	[]	[]	[]
1.8.8.4	Figures used for indicating positions of controls	[X]	[]	[]	[]
1.8.8.5	Location of markings and indications for switches and controls __	[X]	[]	[]	[]
1.8.9	Isolation of multiple power sources	[]	[]	[X]	[]
1.8.10	Instructions for installation to IT power system	[]	[]	[X]	[]
1.8.11	Protection in building installation	[]	[]	[X]	[]
1.8.12	Marking when leakage current is more than 3.5 mA	[]	[]	[X]	[]
1.8.12.1	Installation manual for pluggable type A equipment: Permitted level of earth leakage current	[X]	[]	[]	[]
1.8.12.2	Connection method to primary power source for pluggable type B equipment /equipment for fixed installation.	[]	[]	[X]	[]
1.8.13	Marking at thermostats	[]	[]	[X]	[]
1.8.14	Language of safety markings/instruction	[X]	[]	[]	[]
	Language _				
1.8.15	Durability and legibility	[X]	[]	[]	[]
1.8.16	Removable parts	[X]	[]	[]	[]
1.8.17	Warning text for replaceable lithium batteries	[]	[]	[X]	[]
	Language English and German				

1.7 MARKING AND INSTRUCTIONS (continued)

Comments:
1.8.1 see 1.7.1 RD and Rating Label in IEC 950 Testreport
1.8.2 provided with each unit see also IEC 950 Testreport
1.8.3 see 1.7.4 RD (IEC 950 Testreport)
1.8.4 see 1.7.5 RD (IEC 950 Testreport)
1.8.5 see 1.7.6 RD (IEC 950 Testreport)
1.8.7 Batteries are provided with a keyed connector
1.8.8 see 1.7.8 RD (IEC 950 Test report)
1.8.12.1 see 5.2.2 RD and Installation Instructions
1.8.14 see 1.7.14 RD (IEC 950 Testreport)
1.8.15 see 1.7.15 RD (IEC 950 Testreport)
1.8.16 see 1.7.16 RD (IEC 950 Testreport)
1.8.18 see 1.7.18 RD (IEC 950 Testreport)

1.7 MARKING AND INSTRUCTIONS (continued)

		RESULTS			
		PASS	FAIL	N/A	ENCL.
1.8.18	Operator access with a tool	[X]	[]	[]	[]
1.8.19	Battery type	[X]	[]	[]	[]
	Nominal voltage of total battery string	[X]	[]	[]	[]
	Nominal capacity of total battery string	[X]	[]	[]	[]
	Warning label	[X]	[]	[]	[]
	Label outside of the unit	[]	[]	[X]	[]
	Instructions for internally mounted battery	[X]	[]	[]	[]
	Instructions for externally mounted battery	[]	[]	[X]	[]
	Instructions for external battery cabinets	[]	[]	[X]	[]
1.8.20	Information on signalling circuits	[]	[]	[X]	[]
1.8.21	Information on internal circuit configuration	[]	[]	[X]	[]

Comments:

1.8.20 see Installation Instruction

1.8.21 see Installation Instruction

1.8.19 see attached Battery Label.

2.1 PROTECTION AGAINST ELECTRIC SHOCK AND ENERGY HAZARDS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
2.1.1	Access to energized parts	[X]	[]	[]	[]
	Protection against electric shock	[X]	[]	[]	[]
2.1.2	Insulation of internal wiring in an ELV circuit accessible to operator	[]	[]	[X]	[]
2.1.3	Risk of electric shock from stored charge on capacitors of external circuit				
	Time-constant s	[X]	[]	[]	[]
	Measured voltage v	[X]	[]	[]	[]
2.1.4	Backfeed protection	[X]	[]	[]	[]
	Service access area	[X]	[]	[]	[]
2.1.5	Protection acting within 1 s	[X]	[]	[]	[]
	Energy hazard	[X]	[]	[]	[]
2.1.6	Emergency power off	[]	[]	[X]	[]

Comments:

2.1.1 see 2.1 RD (IEC 950 Testreport)

2.1.3.1 see 2.1 RD (IEC 950 Testreport)

2.1.3 see 2.1.10 RD (IEC 950 Testreport)

2.1.4 / 2.1.5 See annex L

2.2 INSULATION

	RESULTS			
	PASS	FAIL	N/A	ENCL.
2.2.1 General rules for working voltages	[X]	[]	[]	[]
Comments:				
see also 2.2.1 - 2.2.6 RD (IEC 950 Testreport)				

2.3 SELV CIRCUITS

	RESULTS			
	PASS	FAIL	N/A	ENCL.
2.3.1 Construction of equipment	[X]	[]	[]	[]
Comments:				
see also 2.3.1 - 2.3.5 RD (IEC 950 Testreport)				

2.4 LIMITED CURRENT CIRCUITS

	RESULTS			
	PASS	FAIL	N/A	ENCL.
2.4 Test voltage __V	[x]	[]	[ ]	[]
2.4.2 Measured current __mA	[x]	[]	[]	[]
2.4.3 Measured capacitance __mF	[]	[]	[X]	[]
2.4.4 Measured charge __mC	[]	[]	[X]	[]
2.4.5 Measured energy __mJ	[]	[]	[X]	[]
Comments:				
See IEC 950 test report for results				

2.5 PROVISIONS FOR PROTECTIVE EARTHING

		RESULTS			
		PASS	FAIL	N/A	ENCL.
2.5.1	Reliable connection	[X]	[]	[]	[]
2.5.2	Earthing of System Configurations	[X]	[]	[]	[]

Comments:

see also 2.5.2 - 2.5.11 RD (IEC 950 Test report)

2.6 AC AND DC POWER ISOLATION

		RESULTS			
		PASS	FAIL	N/A	ENCL.
2.6.1	Disconnect device	[X]	[]	[]	[]
2.6.2	Disconnection of all phase conductors of supply in three-phase equipment	[]	[]	[X]	[]
2.6.3	Marking of disconnect device	[]	[]	[X]	[]
2.6.4	Protection	[]	[]	[X]	[]
	Marking at each disconnect device	[]	[]	[X]	[]
2.6.5	Openings of all ungrounded conductors of battery(s)	[X]	[]	[]	[]
	Placing of isolating switch	[]	[]	[X]	[]

Comments:

2.6.1 see 2.6.2 RD (IEC 950 Testreport)

2.6.2 single phase unit

see also 2.6.2 - 2.6.12 RD (IEC 950 Testreport)

2.7 OVERCURRENT AND EARTH FAULT PROTECTION

		RESULTS			
		PASS	FAIL	N/A	ENCL.
2.7.1	Type of protective device _	[X]	[]	[]	[]
	Adequate breaking capacity __	[X]	[]	[]	[]
	Protection by several devices	[X]	[]	[]	[]
2.7.1	a) Protective devices included as integral parts of equipment	[X]	[]	[]	[]
	b) Protective devices for components in series with mains input	[X]	[]	[]	[]
	c) Reliance based on protection in building installation, installation instructions	[]	[]	[X]	[]
	d) Available fault current specified by manufacturer __	[]	[]	[X]	[]
	Current limiting action during fault conditions	[]	[]	[X]	[]
	Maximum output voltage during short-circuit or overload	[]	[]	[X]	[]
2.7.3	Location of protective device for battery supply circuit inside equip.	[X]	[]	[]	[]
2.7.4	Location of protective device for batteries outside equipment	[]	[]	[X]	[]
	Number of protective devices _	[]	[]	[X]	[]
2.7.5	Rating of overcurrent protective device located internally	[X]	[]	[]	[]
	Rating of protective device for separate battery supply	[]	[]	[X]	[]
2.7.6	Warning to service personnel	[]	[]	[X]	[]

Comments:

2.7.1 See IEC 950 Test Report

2.7.3 Battery has two 40A fuses in parallel in positive circuit

2.7.5 See IEC 950 Test Report

2.8 PROTECTION OF SERVICE PERSONNEL - SAFETY INTERLOCKS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
2.8	Safety interlocks	[]	[]	[X]	[]
2.8.2	Removing and replacing of covers	[]	[]	[X]	[]
	Design	[]	[]	[X]	[]
2.8.3	Reducing the likelihood of unintentional contact	[]	[]	[X]	[]
	Protection against inadvertent reactivation	[]	[]	[X]	[]
2.8.4	Parts on the rear side of a door	[]	[]	[X]	[]
	Reliability	[]	[]	[X]	[]
2.8.5	Electrical service functions	[]	[]	[X]	[]
	Override system	[]	[]	[X]	[]
2.8.6	Adjustment with a screwdriver	[]	[]	[X]	[]
	Contact gap	[]	[]	[X]	[]
2.8.7	Location/protection of moving parts	[]	[]	[X]	[]
	Protection against overstress	[]	[]	[X]	[]
2.8.8	Discharging of capacitor banks	[]	[]	[X]	[]
	Need of warning label	[]	[]	[X]	[]
2.8.9	Location of internal batteries	[]	[]	[X]	[]

Comments:

No Interlocks

2.9 CLEARANCES, CREEPAGE DISTANCES AND DISTANCES THROUGH INSULATION

		RESULTS			
	Test voltage __ V	PASS	FAIL	N/A	ENCL.
2.9.2	Clearances	[x]	[]	[]	[]
2.9.3	Creepage distances CTI test: __	[x]	[]	[]	[]
2.9.4	Distances through insulation	[x]	[]	[]	[]
2.9.5	Distances on coated printed boards	[]	[]	[x]	[]
2.9.6	Internal creepage distances in hermetically sealed components	[]	[]	[x]	[]
2.9.7	Internal distances in potted comp.	[]	[]	[x]	[]
2.9.8	Spacings between external terminations of components	[]	[]	[x]	[]

Comments:

See IEC 950 Test report

2.9 CLEARANCES, CREEPAGE DISTANCES AND DISTANCES THROUGH INSULATION (continued)

2.9.2, 2.9.3 Location/ insulation	Up/V	Urms/V	Clearance		Creepage dist.	
			Req/mm	Meas/mm	Req/mm	Meas/mm

2.9.4 Insulation	Urms/V	Test Voltage/V	Dist thr insulat	
			Req/mm	Meas/mm

Req = Requirement, Meas = Measured,
Dist thr insulat = Distance through insulation

2.9 CLEARANCES, CREEPAGE DISTANCES AND DISTANCES THROUGH INSULATION (continued)

Comments:
See IEC 950 Test report

2.10 CONNECTION TO OTHER EQUIPMENT and
2.11 LIMITED POWER SOURCE and
2.12 PROTECTION OF THE APPLIED LOAD

		RESULTS			
		PASS	FAIL	N/A	ENCL.
2.10	Connection of SELV and TNV circuits __	[]	[]	[X]	[]
	Separation between mains and external signalling circuit relied on connection to safety earth	[]	[]	[X]	[]
2.11	Use of limited power source __	[]	[]	[X]	[]
2.12	Prevention of possibility of excessive AC/DC voltages applied to load	[X]	[]	[]	[]
	Static output voltage variations _	[X]	[]	[]	[]

Comments:

3.1 WIRING, CONNECTIONS AND SUPPLY

		RESULTS			
		PASS	FAIL	N/A	ENCL.
3.1.1	Cross-sectional area and protection	[x]	[]	[]	[]
3.1.2	Wireways	[x]	[]	[]	[]
3.1.3	Fixing of internal wiring	[x]	[]	[]	[]
3.1.4	Fixing of uninsulated conductors	[x]	[]	[]	[]
3.1.5	Suitable insulation __	[x]	[]	[]	[]
3.1.6	Wires coloured green/yellow (only for protective earth connection)	[x]	[]	[]	[]
3.1.7	Fixing of beads and similar insulators	[x]	[]	[]	[]
3.1.8	Required electrical contact pressure	[x]	[]	[]	[]
3.1.9	Reliable electrical connections	[x]	[]	[]	[]
3.1.10	End of stranded conductor	[x]	[]	[]	[]
3.1.11	Use of spaced thread screws	[x]	[]	[]	[]

Comments:

See IEC 950 Test report

3.2 CONNECTION TO POWER

		RESULTS			
		PASS	FAIL	N/A	ENCL.
3.2.1	Type of connection detacheable cord	[X]	[]	[]	[]
	More than one supply connection	[]	[]	[X]	[]
3.2.2	Provision for permanent connection —	[]	[]	[X]	[]
3.2.3	Appliance inlet	[X]	[]	[]	[]
3.2.4	Type and cross-sectional area of power supply cord __	[]	[]	[X]	[]
3.2.5	Cord anchorage	[]	[]	[X]	[]
	Test at 25 x 100 N/1 second				
	Longitudinal displacement £ 2 mm				
3.2.6	Protection of power supply cord	[]	[]	[X]	[]
3.2.7	Cord guard	[]	[]	[X]	[]
	D = __ mm				
	Test with mass of __ g				
	r of curvature of the cord £ 1.5 D				
3.2.8	Supply wiring space	[]	[]	[X]	[]

Comments:

See IEC 950 Test Report

3.3 WIRING TERMINALS FOR EXTERNAL POWER CONDUCTORS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
3.3.1	Terminals	[]	[]	[x]	[]
3.3.2	Special non-detachable cord	[]	[]	[x]	[]
	Type of connection __				
	Pull test at 5 N				
3.3.3	Screws and nuts	[]	[]	[x]	[]
3.3.4	Fixing of conductors	[]	[]	[x]	[]
3.3.5	Connection of conductors	[]	[]	[x]	[]
3.3.6	Size of terminals	[]	[]	[x]	[]
	Nominal thread diameter __ mm				
3.3.7	Protection against damage of conductors	[]	[]	[x]	[]
3.3.8	Terminal location	[]	[]	[x]	[]
3.3.9	Test with 8 mm stranded wire	[]	[]	[x]	[]

Comments:

See IEC 950 test report

4 PHYSICAL REQUIREMENTS and 4.1 STABILITY AND MECHANICAL HAZARDS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
4	Frame/chassis shall not carry current	[x]	[]	[]	[]
	Individual modules of modular unit				
	with enclosure	[]	[]	[x]	[]
	without enclosure	[]	[]	[x]	[]
	partial enclosure	[]	[]	[x]	[]
4.1.1	Stability tests				
	Angle of 10°	[x]	[]	[]	[]
	Test at force of 250__ N	[x]	[]	[]	[]
4.1.2	Protection against personal injury	[x]	[]	[]	[]
4.1.3	Warning and means provided for stopping the moving part	[]	[]	[x]	[]
	—				
4.1.4	Edges and corners	[x]	[]	[]	[]
4.1.5	Enclosure of a high pressure lamp	[]	[]	[x]	[]

Comments:

See IEC 950 Test Report

4.2 MECHANICAL STRENGTH AND STRESS RELIEF

		RESULTS			
		PASS	FAIL	N/A	ENCL.
4.2.2	Internal enclosures 30 N ± 3 N/5 s	[x]	[]	[]	[]
4.2.3	External enclosures 250 N ± 10 N/5 s	[x]	[]	[]	[]
4.2.4	Steel sphere tests				
	Fall test	[x]	[]	[]	[]
	Swung test	[x]	[]	[]	[]
4.2.5	Drop test	[]	[]	[x]	[]
4.2.6	Heat test T = 70 °C/7 h	[x]	[]	[]	[]

Comments:

See IEC 950 Test Report

4.3 CONSTRUCTION DETAILS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
4.3.1	Openings in the top of enclosure Dimensions: _	[X]	[]	[]	[]
	Changing of setting for different power supply voltages	[]	[]	[X]	[]
4.3.2	Openings in the sides of enclosure Dimensions: _	[X]	[]	[]	[]
	Adjustment of accessible control devices	[]	[]	[X]	[]
4.3.3	Safeguards against risk of dangerous gas concentration and spillings	[x]	[]	[]	[]
	Prevention of penetration or split liquid	[x]	[]	[]	[]
4.3.4	Castors	[]	[]	[x]	[]
4.3.5	Fixing of knobs, grips, handles, levers	[x]	[]	[]	[]
	Test at 50 N				
4.3.6	Driving belts/couplings shall not ensure electrical insulation	[]	[]	[x]	[]
4.3.7	Retaining of sleeves	[x]	[]	[]	[]
4.3.8	Gaps in supplementary and basic insulation	[x]	[]	[]	[]
4.3.9	Protection of loosening parts	[x]	[]	[]	[]
4.3.10	Protection of supplementary and r-GRnforced insulation	[x]	[]	[]	[]
4.3.11	Resistance to oil and grease	[]	[]	[x]	[]
4.3.13	Securing of screwed connections	[x]	[]	[]	[]
4.3.17	Interchangeable plugs and sockets	[x]	[]	[]	[]
4.3.21	Protection of lithium batteries Construction of protection circuit _	[]	[]	[x]	[]

4.4 RESISTANCE TO FIRE and 4.5 BATTERY LOCATION

		RESULTS			
		PASS	FAIL	N/A	ENCL.
4.4.2	Minimizing the risk of ignition	[x]	[]	[]	[]
4.4.3.2	Flammability of materials and components	[x]	[]	[]	[]
4.4.3.4	Wiring harnessed	[x]	[]	[]	[]
4.4.3.5	Cord anchorage bushings	[]	[]	[X]	[]
4.4.3.6	Air filter assemblies	[]	[]	[x]	[]
4.4.4	Flammability of outer enclosures and decorative parts	[x]	[]	[]	[]
4.4.5.1	Components which require fire enclosure	[x]	[]	[]	[]
4.4.6	Fire enclosure construction	[x]	[]	[]	[]
4.4.7	Doors and covers	[x]	[]	[]	[]
4.4.8	Protection against spreading of flammable liquids	[]	[]	[x]	[]
4.5.1	Accessibility and maintainability	[x]	[]	[]	[]
	Protection degree IP20	[]	[]	[x]	[]
	Temperature range	[x]	[]	[]	[]
	Vibrations	[]	[]	[x]	[]
	Distance	[]	[]	[x]	[]
	Insulation	[x]	[]	[]	[]
	Wiring	[x]	[]	[]	[]
	Electrolyte spillage	[x]	[]	[]	[]
	Ventilation	[x]	[]	[]	[]
	Charging voltages	[x]	[]	[]	[]

Comments:

4.5.1 Only one battery provided. Does not contain NiCd batteries. Battery modules are provided with a sold bottom enclosure. In addition, the batteries are "starved electrolyte" so there is no electrolyte spill. Batteries shall be protected against excessive charging voltage under any single fault condition

5.1 HEATING

t_1=__°C

t_2=__°C

RESULTS

PASS	FAIL	N/A	ENCL.
[x]	[]	[]	[]

Winding	R1/W	R2W	dt measured	dt allowed	Insulation class

other measured parts	dt measured	dt allowed

Comments:

See IEC 950 Test Report

5.2 EARTH LEAKAGE CURRENT

		RESULTS			
		PASS	FAIL	N/A	ENCL.
5.2.1	Sum of leakage currents from UPS and connected load in UPS protective earth conductor, see IEC 364-7-707	[x]	[]	[]	[]
5.2.2	Non-detachable power supply cord in pluggable type B equipment	[]	[]	[x]	[]
	Leakage current				
	Test voltage __ V				
	Measured current __ mA				
	Max. allowed current __ mA	[]	[]	[x]	[]
5.2.5	Equipment with earth leakage current exceeding 3.5mA	[]	[]	[x]	[]

Comments:

See IEC 950 Test Report. See installation instruction. 3,5 mA max.

5.3 ELECTRIC STRENGTH

	RESULTS			
	PASS	FAIL	N/A	ENCL.
	[x]	[]	[]	[]

Location	Test voltage	Result

Comments:

See IEC 950 Test Report

5.4 ABNORMAL OPERATING AND FAULT CONDITIONS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
5.4.1	Fault conditions not covered by clauses 5.4.2/RD, 5.4.3/RD, 5.4.5/RD				
5.4.2	Test in any expected normal use and foreseeable misuse	[x]	[]	[]	[]
	Motors	[]	[]	[x]	[]
5.4.3	Transformers	[x]	[]	[]	[]
5.4.4	Compliance of operational insulation	[x]	[]	[]	[]
	Used method __				
5.4.5	Electromechanical components in secondary circuits	[]	[]	[x]	[]
5.4.8	Unattended use of equipment having thermostats, temperature limiters etc	[]	[]	[x]	[]
5.4.9	Compliance	[x]	[]	[]	[]
5.4.10	Ball-pressure test of thermoplastics	[]	[]	[x]	[]

Test part	t/°C	Impress	Requir.	Result
			≤ 2 mm	
			≤ 2 mm	
			≤ 2 mm	
			≤ 2 mm	
			≤ 2 mm	

Comment:

See IEC 950 Test report

Impress. = Impression, Requir. = Requirement

FAULT CONDITION TESTS

Ambient temperature __ °C

F No	Comp. No	Fault	Test V	Test time	Fuse No	Current through fuse	Mains power/temperatures/results

F No = Fault Number, S-c = Short-circuit, Dis = Disconnection

FAULT CONDITION TESTS

(continued)

F No	Comp. No	Fault	Test V	Test time	Fuse No	Current through fuse	Mains power/temperatures/results

F No = Fault Number, S-c = Short-circuit, Dis = Disconnection

ELECTRICAL DATA (in normal conditions)

Fuse No	I rated	U in V	P in W	I in mA	I thr fuse/mA	Conditions/status

Comments:

See IEC 950 Test report

I thr fuse = Current through fuse

April 1998

ANNEX A
TESTS FOR RESISTANCE TO HEAT AND FIRE
[ ] A1 [ ] A2

Preconditioning at __°C for 7 days (168 h)

Mounting of samples during test _____

Wall thickness _____

Sample	Burning time	Comments
1		
2		
3		

Material complies with the requirement YES [] NO []

INFORMATION ABOUT TESTED MATERIAL

Manufacturer _____

Type _____

Additional information _____

See IEC 950 Test Report

ANNEX B
MOTOR TESTS UNDER ABNORMAL CONDITIONS

	RESULTS			
	PASS	FAIL	N/A	ENCL.
Position _____				
Manufacturer _____				
Type _____				
Rated voltage/current _____				
B.2 Temperatures See table for fault conditions				[]
B.4 Running overload test	[]	[]	[x]	[]
B.5 Locked-rotor overload test	[]	[]	[x]	[]
Duration of test __days				
Electric strength test at __ V				
B.6 Running overload test for DC motor in secondary circuits	[]	[]	[x]	[]
B.7 Locked-rotor overload test for DC motor in secondary circuits				
B.7.2 Test time __ h	[]	[]	[x]	[]
B.7.3 Test time __ h	[]	[]	[x]	[]
B.8 Test for motors with capacitors	[]	[]	[x]	[]
B.9 Test for three-phase motors	[]	[]	[x]	[]
B.10 Test for series motors	[]	[]	[x]	[]
Comments:				
No Motors				

ANNEX C
TRANSFORMERS

	RESULTS			
	PASS [x]	FAIL []	N/A []	ENCL. []
Position _____				
Manufacturer _____				
Type _____				
Rated values _____				
Temperatures See table for fault conditions				[]
C.1 Overload test	[x]	[]	[]	[]
Type of transformer coventional	[x]	[]	[]	[]
safety isolating	[]	[]	[x]	[]
ferro-resonant	[]	[]	[x]	[]
Type of thermal cut-out __				
C.2 Safety isolating tranformers				
Precautions	[]	[]	[x]	[]
_____				
Retaining of end truns of all windings	[]	[]	[x]	[]
Earth test at 25 A	[]	[]	[x]	[]
C.3 Electric strength test See table in clause 5.3	[x]	[]	[]	[]

Comments:

See IEC 950 Test report

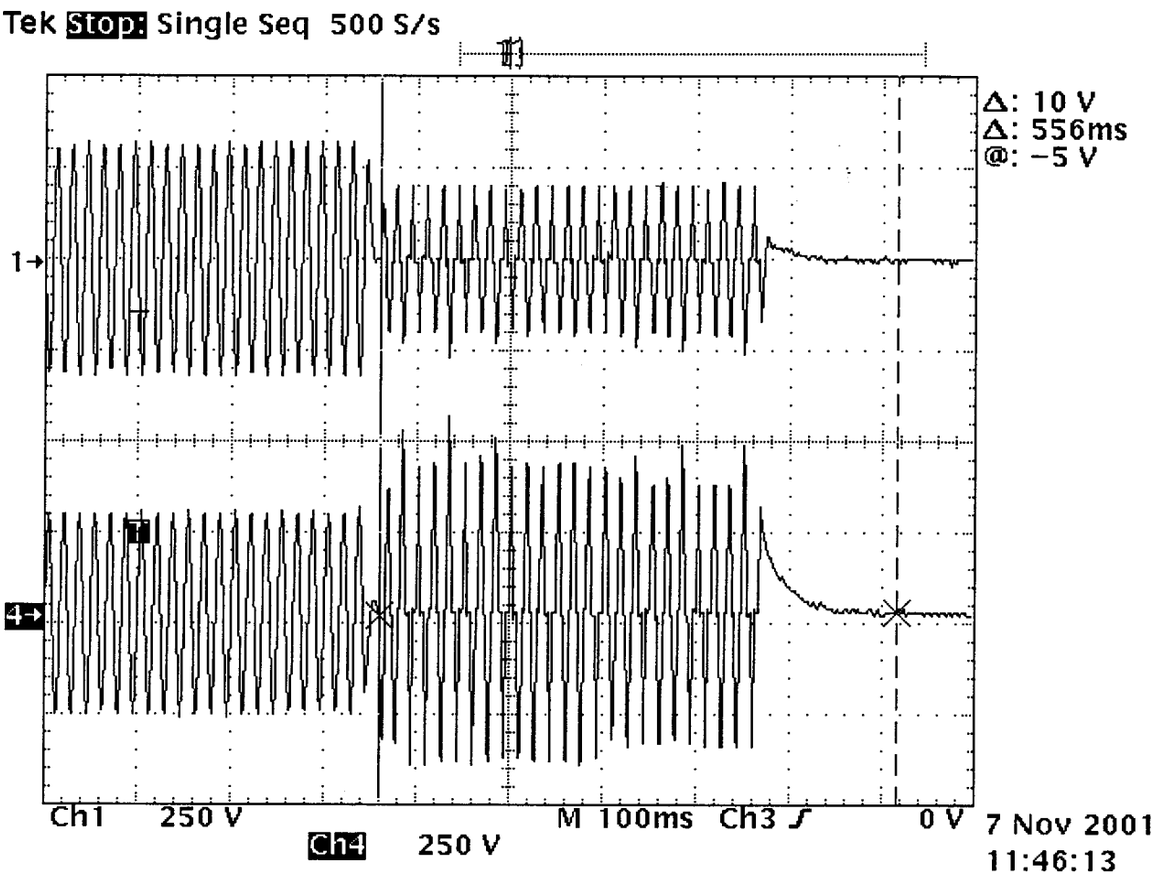
APPENDIX L
BACKFEED PROTECTION TEST

		RESULTS			
		PASS	FAIL	N/A	ENCL.
Test L1 for pluggable type A or B equipment					
1)	Current between any two user accessible input terminals				
	Measured current mA	[X]	[]	[]	[]
2)	Operation time of internal protection				
	Measured current 0 mA	[X]	[]	[]	[]
Test L2 for permanently connected equipment					
1)	Current between any two user accessible input terminals				
	Measured current _____ mA	[]	[]	[x]	[]
2)	Operation time of internal protection				
	Measured current _____ mA	[]	[]	[x]	[]

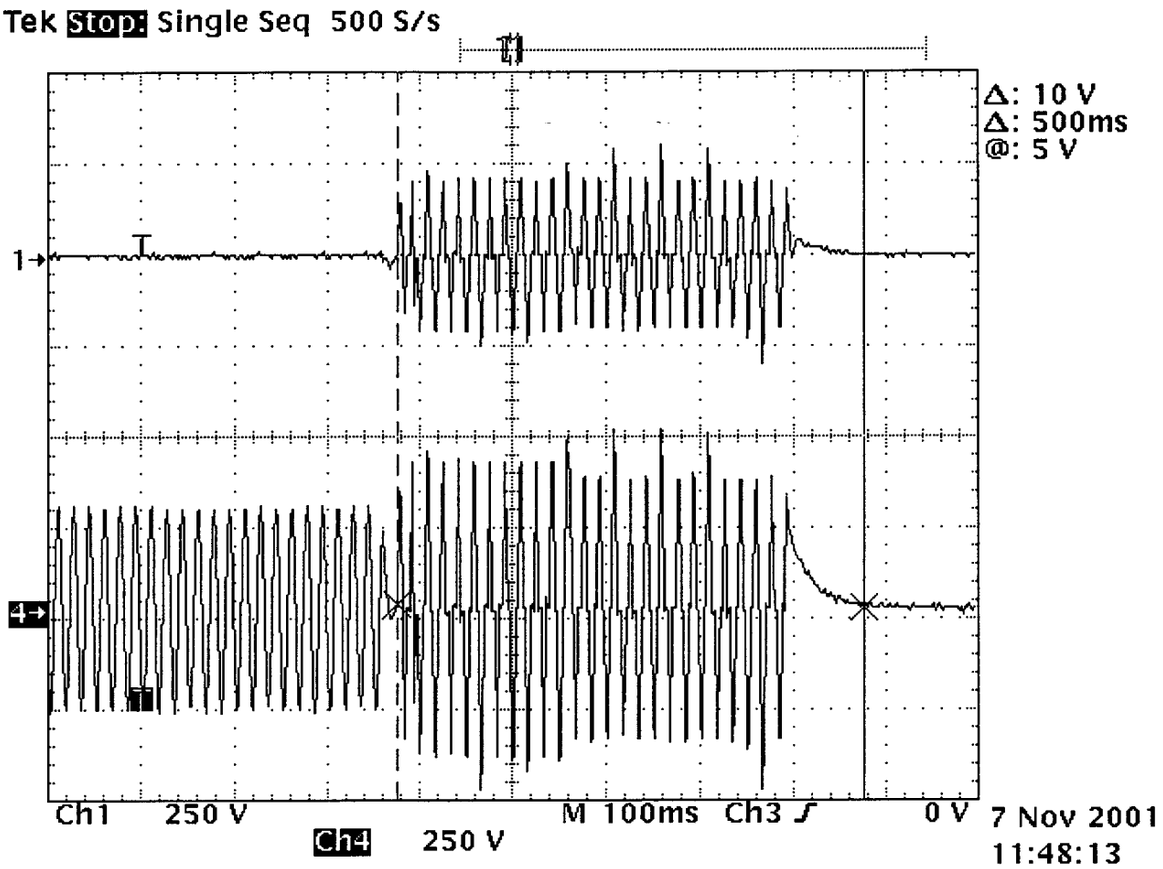
Comments:

L1 **After 1 second no current present. Fault was to short gate to source of drive transistor(Q23). This resulted in relays opening and inverter turns off. Opening the gate causes the unit to shut down instantly**

Channel 1 is Line to Ground with fault applied
Channel 4 is Line to Neutral with fault applied



Channel 1 is Neutral to Ground with fault applied
Channel 4 is Line to Neutral with fault applied



COMMENTS

April 1998

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

Product name:	Uninterruptible Power Supply (UPS)
Model/Type:	BP650Si,BP420SI,BP280SI,SU620INET,SU420INET
Trademark:	APC
Serial no.:	---
Name and address of the Applicant:	see IEC 950 Testreport
Name and address of the Responsible Organization:	see IEC 950 Testreport
Name and address of the Factory:	see IEC 950 Testreport

	RESULTS			
	PASS	FAIL	N/A	ENCL.
The equipment complies with the publication	[X]	[ ]	[ ]	[ ]
National deviations:	[ ]	[ ]	[X]	[ ]
Other requirements:	[ ]	[ ]	[X]	[ ]

Name and address of the testing laboratory: VDE Testing and Certification Institute
APC, 85 Rangeway Road, Bldg # 2,N. Billerica,MA
USA
TMP(TDAP under File #19244-9501-0002)

Tested by: _____ date 30.11.01
signature
Frank Richter

Approved by: _____ date
signature
Jurgen Barwinkel

January 1995

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

FACTORY LOCATIONS

1. American Power Conversion Lot 32, Phase 1 Carmelray Industrial Park Canlubang, Calamba, Laguna, Philippines
3.
4.

7. TESTS FOR UPS

		RESULTS			
		PASS	FAIL	N/A	ENCL.
7.4	Test Specifications	[X]	[ ]	[ ]	[ ]
7.4.1	Interconnection Cable Check	[X]	[ ]	[ ]	[ ]
7.4.2	Light Load Test	[X]	[ ]	[ ]	[ ]
7.4.3	Checking of Auxiliary Devices	[ ]	[ ]	[X]	[ ]
7.4.4	Synchronization Tests	[ ]	[ ]	[X]	[ ]
7.4.5	AC Input Failure Test	[X]	[ ]	[ ]	[ ]
7.4.6	AC Input Return Test	[X]	[ ]	[ ]	[ ]
7.4.7	Simulation of Parallel Redundant UPS Fault	[ ]	[ ]	[X]	[ ]
7.4.8	Transfer Test	[ ]	[ ]	[X]	[ ]
7.4.9	Full Load Test	[X]	[ ]	[ ]	[ ]
7.4.10	UPS Efficiency	[X]	[ ]	[ ]	[ ]

Comments:

7.4	Equipment tested per manufacturer's instructions
7.4.2	Functional test done. No problems
7.4.5/7.4.6	See EN50091 Test Report for photos of output
7.4.9	See EN50091 Test Report Heating Test

7. TESTS FOR UPS (con't)

		RESULTS			
		PASS	FAIL	N/A	ENCL.
7.4.11	Unbalanced Load Test	[ ]	[ ]	[X]	[ ]
7.4.12	Output Voltage Unbalance	[ ]	[ ]	[X]	[ ]
7.4.13	Actual Load Test	[X]	[ ]	[ ]	[ ]
7.4.14	Current Division in Parallel UPS	[ ]	[ ]	[X]	[ ]
7.4.15	Rated Stored Energy Time (Battery Test)	[X]	[ ]	[ ]	[ ]
7.4.16	Rated Restored Energy Time	[X]	[ ]	[ ]	[ ]
7.4.17	Battery Ripple Current	[ ]	[ ]	[X]	[ ]
7.4.18	On-Site Ventilation Test	[ ]	[ ]	[X]	[ ]
7.4.19	Overload Capability Test	[X]	[ ]	[ ]	[ ]
7.4.20	Short-Circuit Current Capability	[ ]	[ ]	[X]	[ ]

Comments:

7.4.15 See EN50091 Heating Test and attached Performance Test Data

7.4.19 Tested at +/- 10% rated Voltage

7.4.20 Not Specified

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 11/03/1997 12:27 PM

Tester: Jon Becker

Title: Transfer Characterisitcs

Detailed Title: Black out response

Laboratory: APC

Platform: **Duet**

Models: BP650SI

F/W Version: Rev 0

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

LAB-BLKO1.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

Blackouts vs Phase Angle
APC Laboratory Report

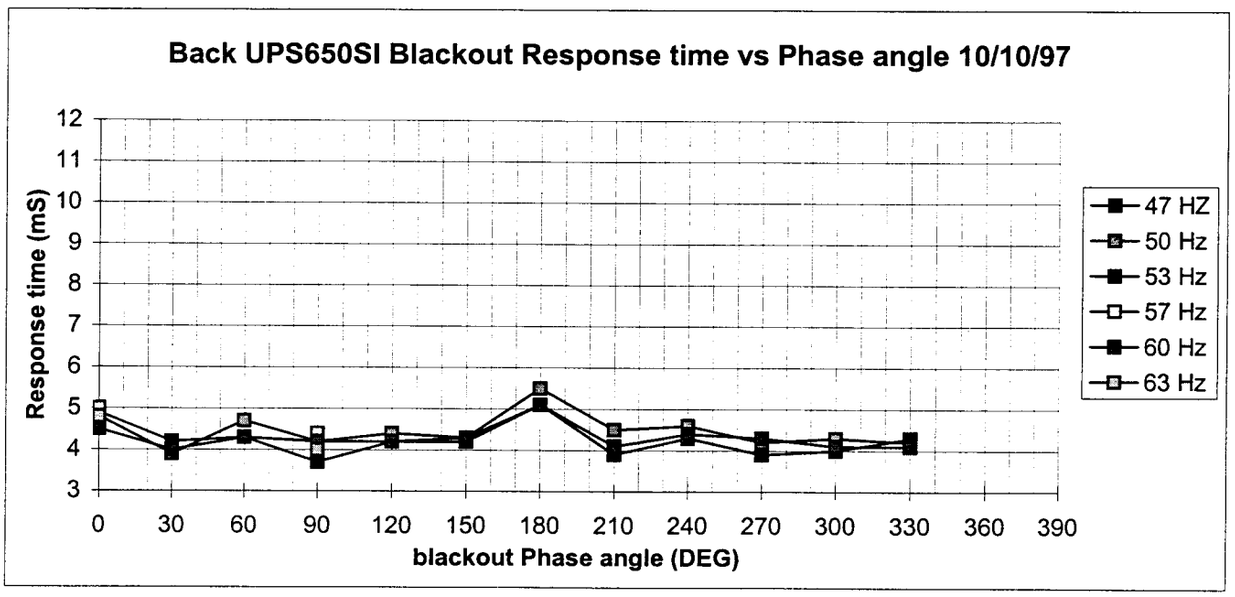
product: Back UPS 650 SI
serial number: Prototype
date: ########
data taken by: Dick T
Test Section/page: 4.2 1 of 2

Test equipment: Kikusui AC Power Source, Oscilloscope
Test Procedure Set output Load to full load resistive.
Create an AC blackout (Vac = 0 volts) such that the unit goes to inverter. Repeat tests at different phase angles and AC line frequency. Using the oscilloscope, measure the blackout response time. Capture nominal frequency waveforms at 0' and 90 '.

data subdirectory i:\dvt
Temperature 25
load information full load resistive unless otherwise specified
Sensitivity if applicable

Blackout Response time (ms)

Phase	47 HZ	50 Hz	53 Hz	57 Hz	60 Hz	63 Hz	Boost	Trim
0		4.8	4.9	5	4.5	4.8	4.9	5.3
30		3.9	4.2		4			
60		4.7	4.3		4.3			
90		4.2	3.7	4.4	4.2	4	4	4
120		4.4	4.2		4.2			
150		4.3	4.3		4.2			
180		5.5	5.1		5.1			
210		4.5	3.9		4.1			
240		4.6	4.3		4.4			
270		4.2	3.9		4.3			
300		4.3	4		4.1			
330		4.2	4.3		4.1			
360								



Blackouts vs Phase Angle
APC Laboratory Report

product: Back UPS 650 SI

serial number: Prototype

date: ########

data taken by: Dick T

page 4.2 2 of 2

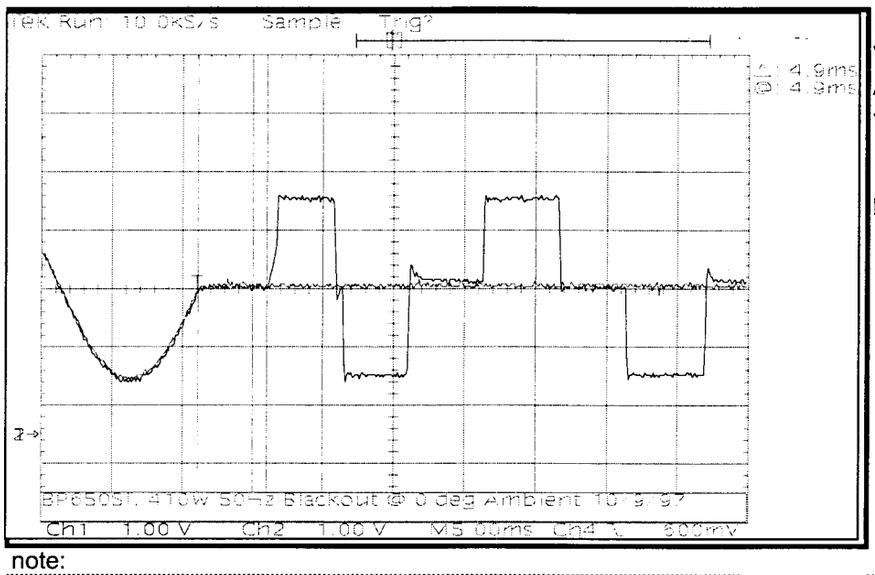


Photo #	1	
Volt/div		
Amps/div		
time/div	5 mS/div	

Blackout Response at 0 Deg.

note:

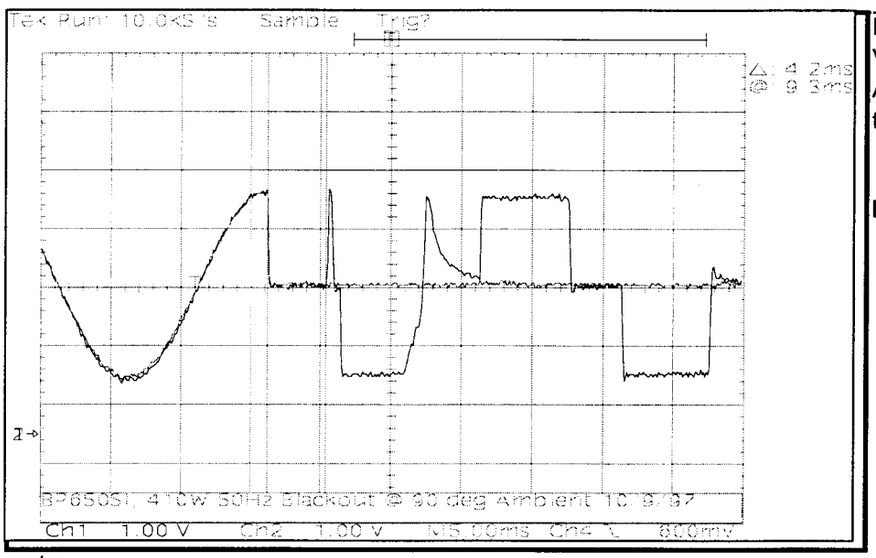


Photo #	2	
Volt/div		
Amps/div		
time/div	5mS/DIV	

Blackout Response at 90 Deg

note:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 11/03/1997 12:26 PM

Tester: Jon Becker

Title: Transfer Characterisitcs

Detailed Title: Brown out response

Laboratory: APC

Platform: **Duet**

Models: BP650SI

F/W Version: Rev 0

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

LAB-BRNO.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

Brownout and High Line Test
APC Laboratory Report

product: Back UPS 650SI

serial number: Prototype

date: 10/25/1997

data taken by: Becker

page 4.2 1 of 2

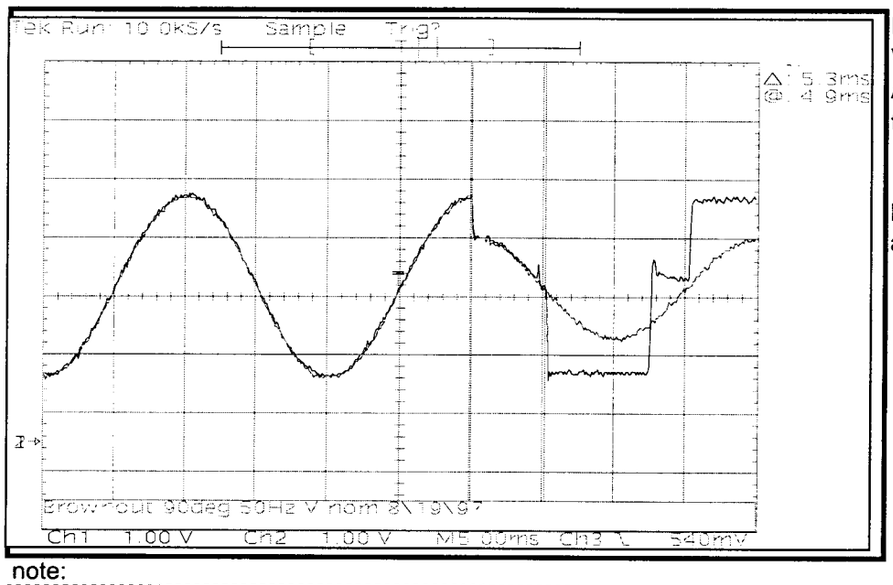


Photo #	1
Volt/div	
Amps/div	
time/div	

Brownout Response
at 90 Deg.

note:

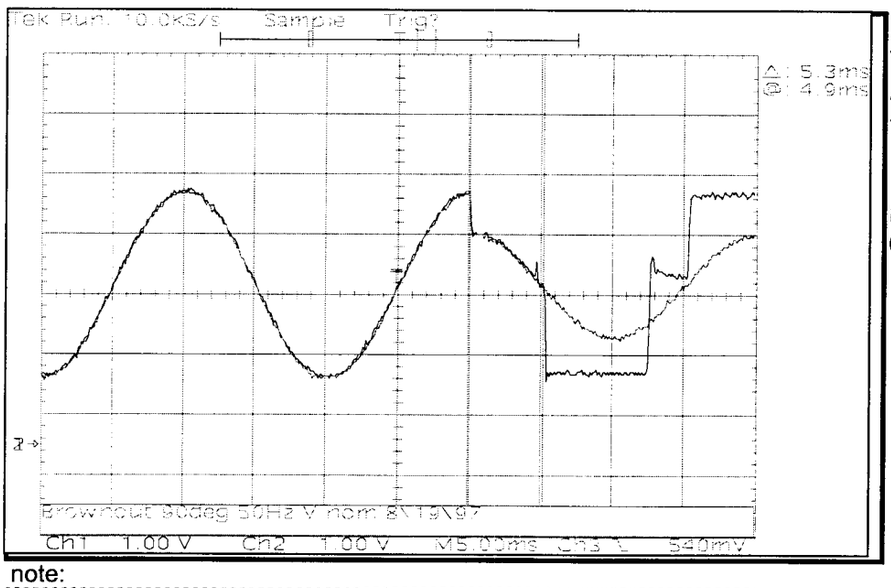


Photo #	2
Volt/div	
Amps/div	
time/div	

High Line Response
0 Deg.

note:

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 5, Page 10 of 62

Form: LAB-BRNO.xls

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Richard Tucker
Date: 11/07/1997 02:08 PM

Tester: J Becker

Title: Output Characterisitcs - On-battery

Detailed Title: Efficiency of Inverter vs Load

Laboratory: APC

Platform: Duet

Models: BP650SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-Battery

Results:

LAB-EFFI.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Efficiency Test
APC Laboratory Report

product: Back UPS6

serial number: Prototype

date: 11/8/1997

data taken by: Dick T

Test Section/page: 4.4.6 1 of

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Step the output load (in watts) from full load to no load. Record electrical parameters including battery voltage and current.

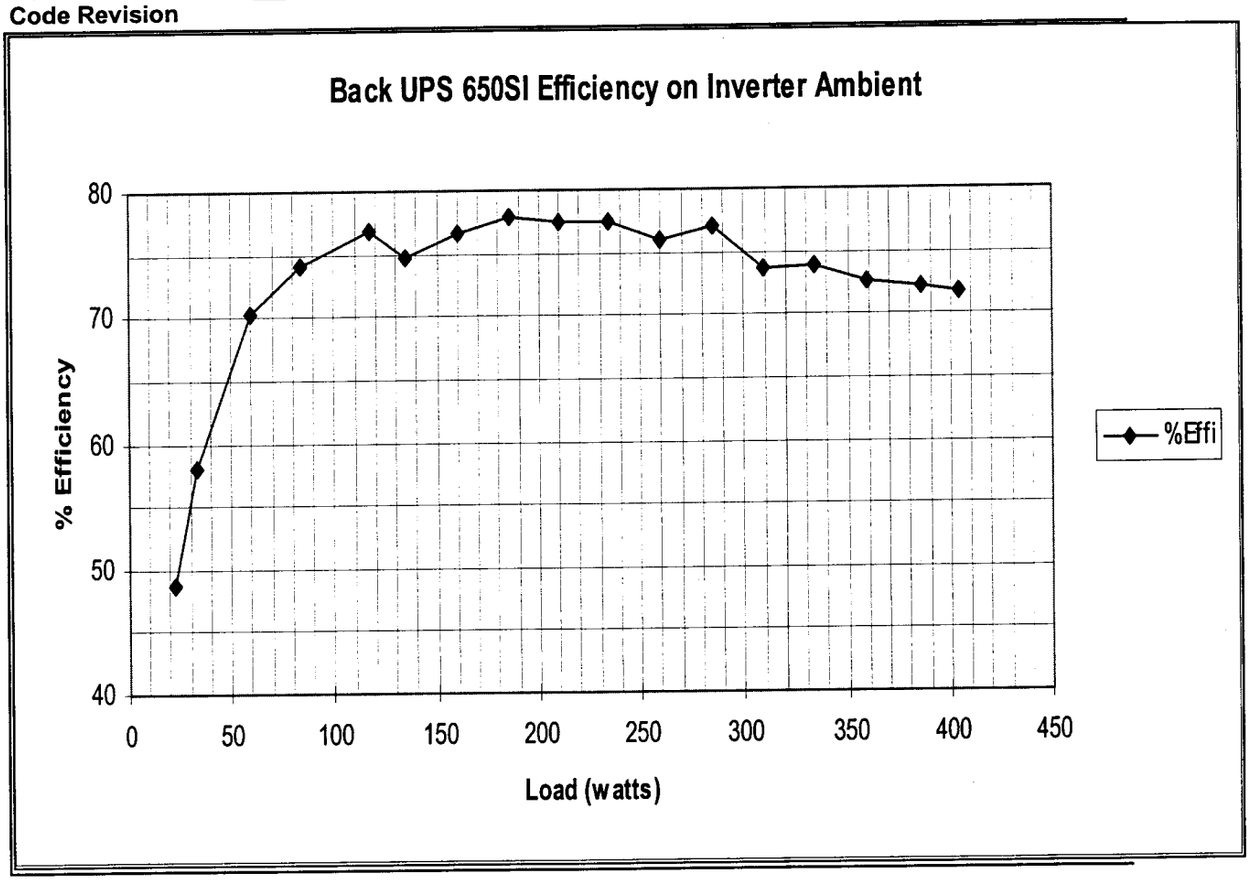
data subdirectory I:\dvt\

Temperature 25

AC input voltage on inverter

Input Frequency

Code Revision



note:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 11/03/1997 10:30 AM

Tester: Dick Tucker

Title: Output Characterisitcs - On-line

Detailed Title: Efficiency vs line, load

Laboratory: APC

Platform: Duet

Models: BP650SI

F/W Version: Rev 1

Target Performance:
Applicable Standards:

==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

LAB-EFF%.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

Comments:

Efficiency Test
APC Laboratory Report

product: Back UPS (

serial number: Prototype

date: ########

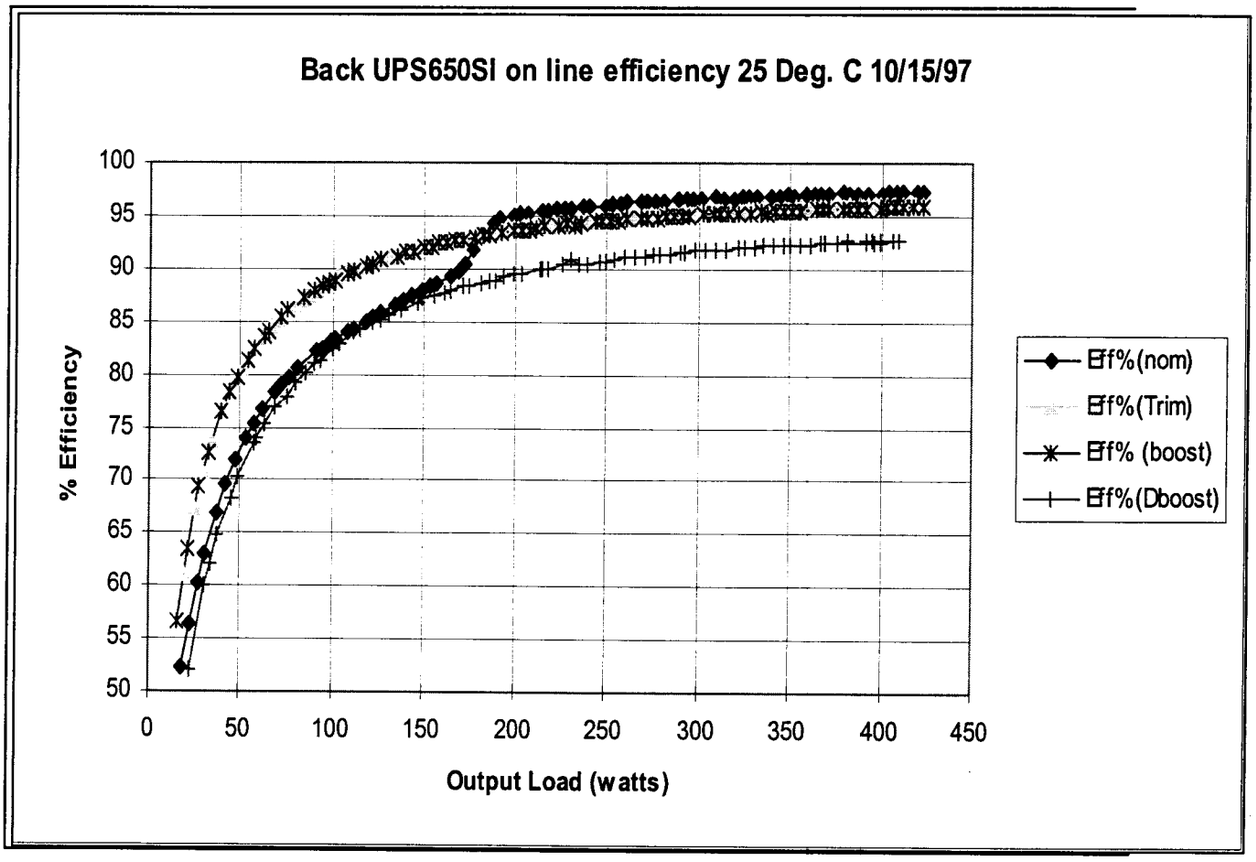
data taken by: Dick T

Test Section/page: 4.3.4 1 of

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Step the output load (in watts) from 0 watts to 150% of full load. Record electrical parameters. Repeat at different voltages frequencies, and ambient temperatures. On-line, test both fully charged and and recharging battery. Also sweep load with unit on inverter.

data subdirectory	i:\dvt\
Temperature	25
AC input voltage	Nominal
Input Frequency	50 HZ
Code Revision	



note:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 11/03/1997 12:31 PM

Tester: J Becker

Title: Output Characterisitcs - On-battery

Detailed Title: Frequency regulation

Laboratory: APC

Platform: Duet

Models: BP650SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

LAB-FREG.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Frequency Regulation Test
APC Laboratory Report

product: Back UPS 650SI

serial number: Prototype

date: #########

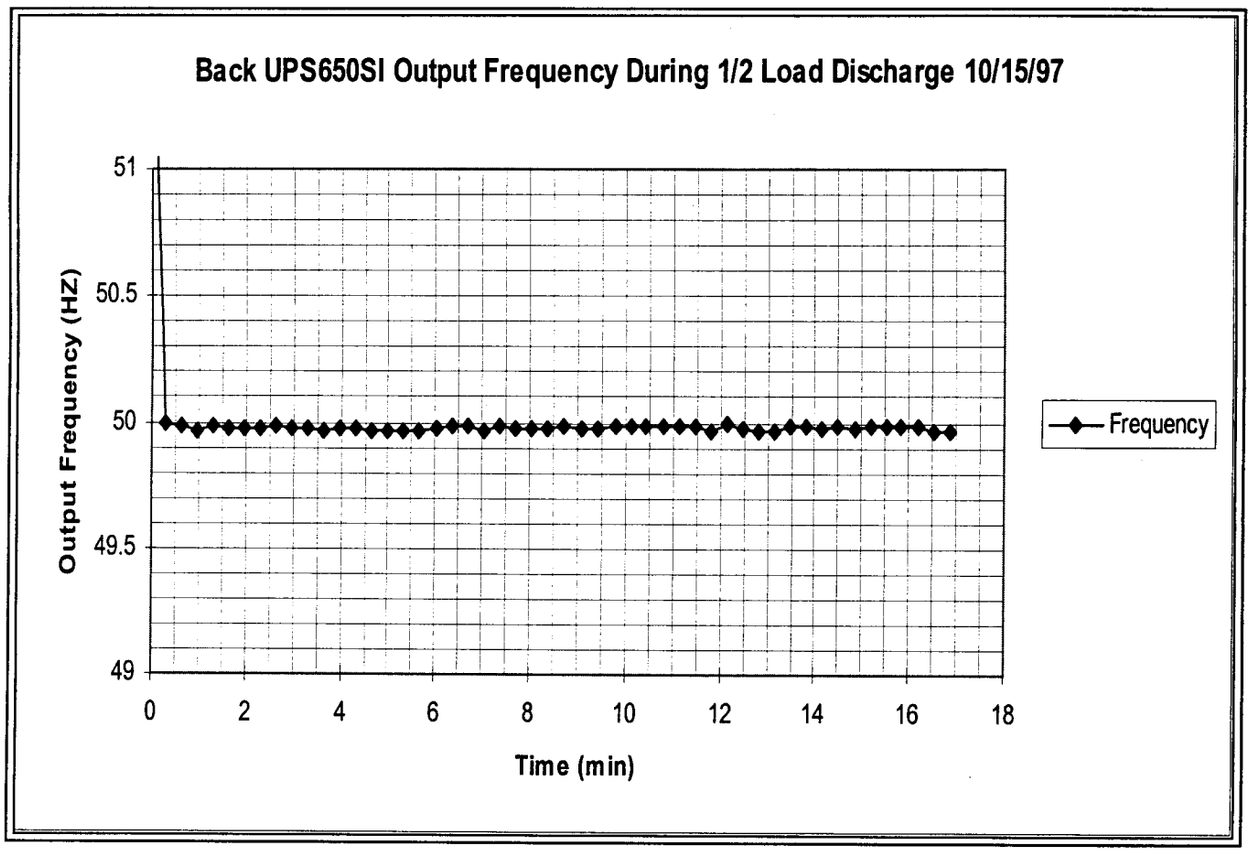
data taken by: Dick T

Test Section/page: 4.4.4 1 of 1

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Set the output load (in watts) to 1/2 Load.
Remove AC power from unit , allow to discharge while recording electrical parameters.
Repeat Test at full load , and environmental extremes.

data subdirectory	i:\dvt\
Temperature	25
AC input voltage	On Battery
Input Frequency	
Code Revision	



note:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 11/06/1997 05:40 PM

Tester: Jon Becker

Title: Output Characterisitcs - On-battery

Detailed Title: Overload capability on-battery

Laboratory: APC

Platform: Duet

Models: BP650SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-Battery

Results:

LAB-OVLD.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Overload Capability Test
APC Laboratory Report

product: Back-Ups 650SI

serial number: Prototype

date: 11/4/1997

data taken by: J Becker

Test section/page: 4.3.6 1 of 2

Test equipment: Kikusui AC power source, oscilloscope, PM3000, output load.

Test procedure: Verify that UPS is capable of supporting 150% of rated computer load for 1 second at 20% of battery capacity.

Data subdirectory	i:\dvt\bck0420b
Temperature	25
Load information	computer load on inverter 0 to 150% load
CODE revision	

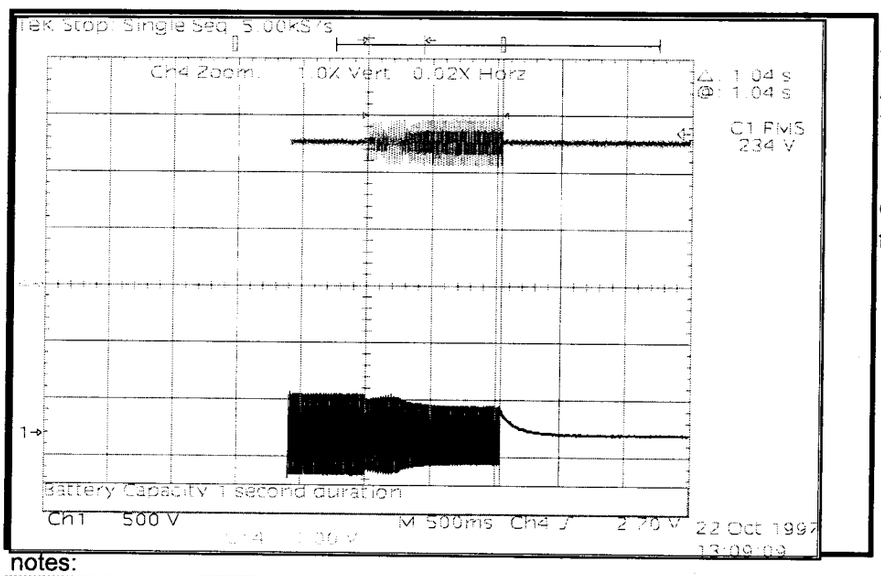


Photo #	1	
Volt/div	200	volts
Amps/div	4	
time/div	500 mS	

Output voltage step response from 0% to 150% load

notes:

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 5, Page 19 of 62

Form: ~4891994.xls

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Richard Tucker
Date: 11/06/1997 10:04 AM

Tester: J Becker

Title: Output Characterisitcs - On-line

Detailed Title: Overload capability on Line

Laboratory: APC

Platform: Duet

Models: BP650SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

LAB-OVLD.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Overload Capability Test
APC Laboratory Report

product: Back-Ups 650SI

serial number: Prototype

date: 11/4/1997

data taken by: J Becker

Test section/page: 4.3.6 1 of 2

Test equipment: Kikusui AC power source, oscilloscope, PM3000, output load.

Test procedure: Verify that UPS is capable of supporting 150% of rated computer load for 1 second at 20% of battery capacity.

Data subdirectory	i:\dvt\bck0420b
Temperature	25
Load information	computer load On Line 0 to 150% load
CODE revision	

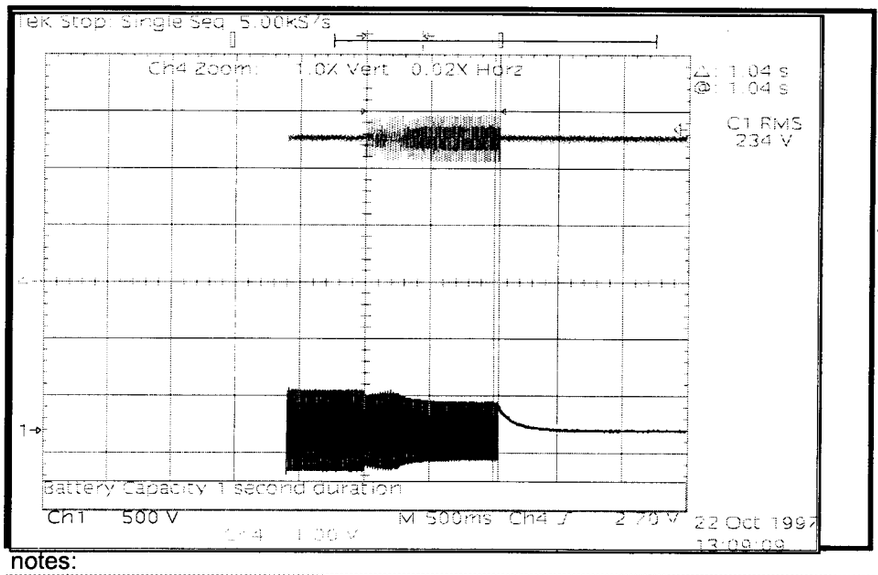


Photo #	1	
Volt/div	200	volts
Amps/div	4	
time/div	500 mS	

Output voltage step response from 0% to 150% load

notes:

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 5, Page 21 of 62

Form: ~5754944.xls

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Richard Tucker
Date: 11/06/1997 10:01 AM

Tester: J Becker

Title: Input Characterisitcs

Detailed Title: Quiescent input current

Laboratory: APC

Platform: Duet

Models: BP650SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

QUIe.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

Quiescent Input Current Test
APC Laboratory Report

product: Back-UPS (

serial number: Prototype

date: 11/4/1997

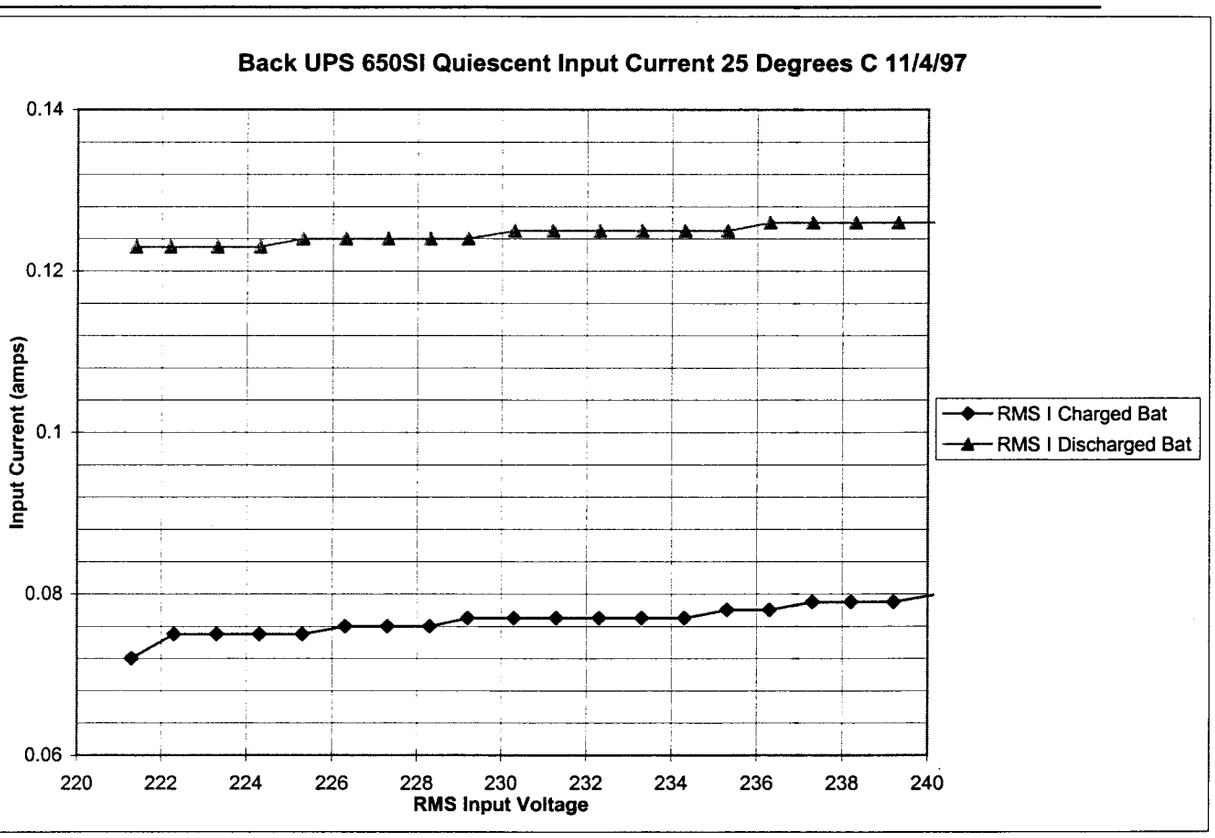
data taken by: Becker

Test Section/page: 4.1.4 1 (

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency to their nominal values. Set the output load for 0 watts, with discharged battery allow battery to recharge while recording electrical parameters.

data subdirectory	i:\dvt\
Temperature	25
AC input voltage	
Input Frequency	
Code Revision	



note:

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 5, Page 23 of 62

Form: QUIe.xls

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 11/03/1997 10:32 AM

Tester: John Becker

Title: Run Time

Detailed Title: Run-time vs. load

Laboratory: APC

Platform: Duet

Models: BP650SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

LAB-RUNT.xls

LAB-RUNT.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Comments:

Runtime Table
APC Laboratory Report

product: Back UPS 650SI

serial number: Prototype

date: 9/30/1997

data taken by: Dick T

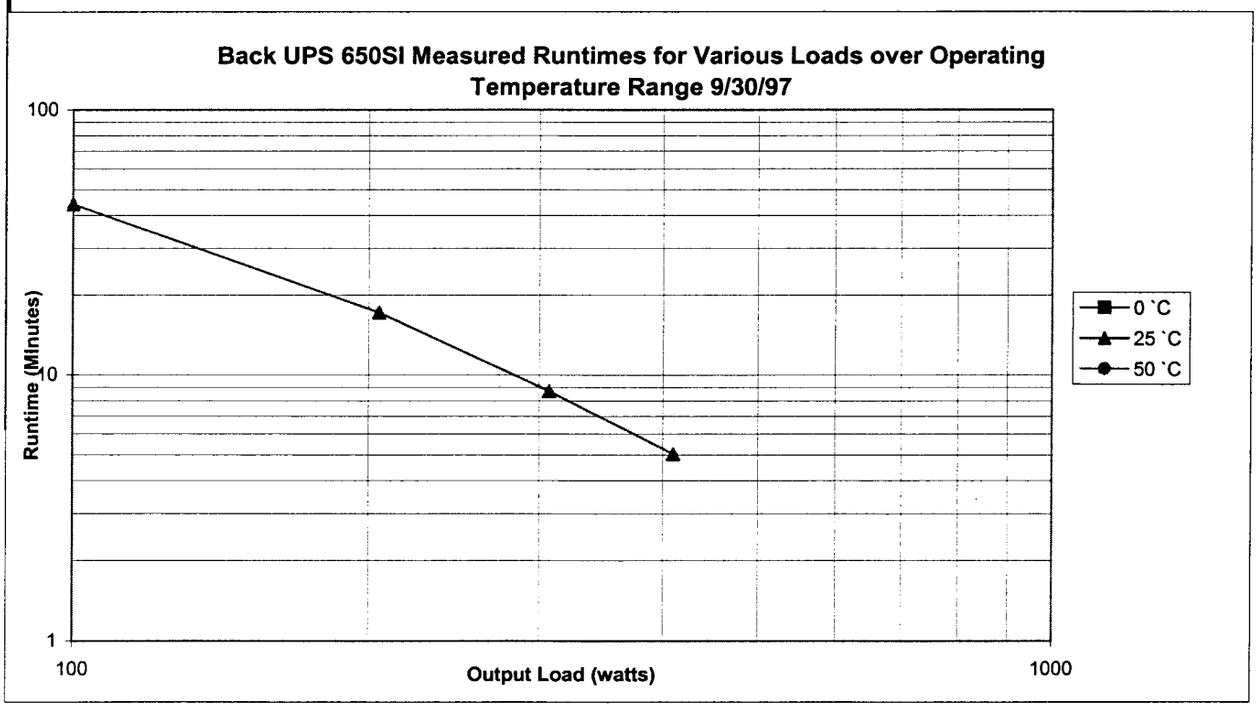
Test Section/page: 1 of 1

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Set the output load (watts and VA) at nominal Vac. Remove AC power from unit , allow to discharge while recording electrical parameters. Repeat Test at various load and environmental extremes.

data subdirectory	I:\DVT
Temperature	
AC input voltage	On Battery
Input Frequency	
Code Revision	

Load (%)	3.75	25	50	75	100
Load (Watts)		100	205	307	410
Ambient `C					
0 `C					
25 `C		43.97	17.21	8.7	5.03
50 `C					



NOTES:

Form: ~5576299.xls

Runtime Table
APC Laboratory Report

product: Back UPS 650SI

serial number: Prototype

date: 9/30/1997

data taken by: Dick T

Test Section/page: 1 of 1

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Set the output load (watts and VA) at nominal Vac. Remove AC power from unit , allow to discharge while recording electrical parameters. Repeat Test at various load and environmental extremes.

data subdirectory I:\DVT

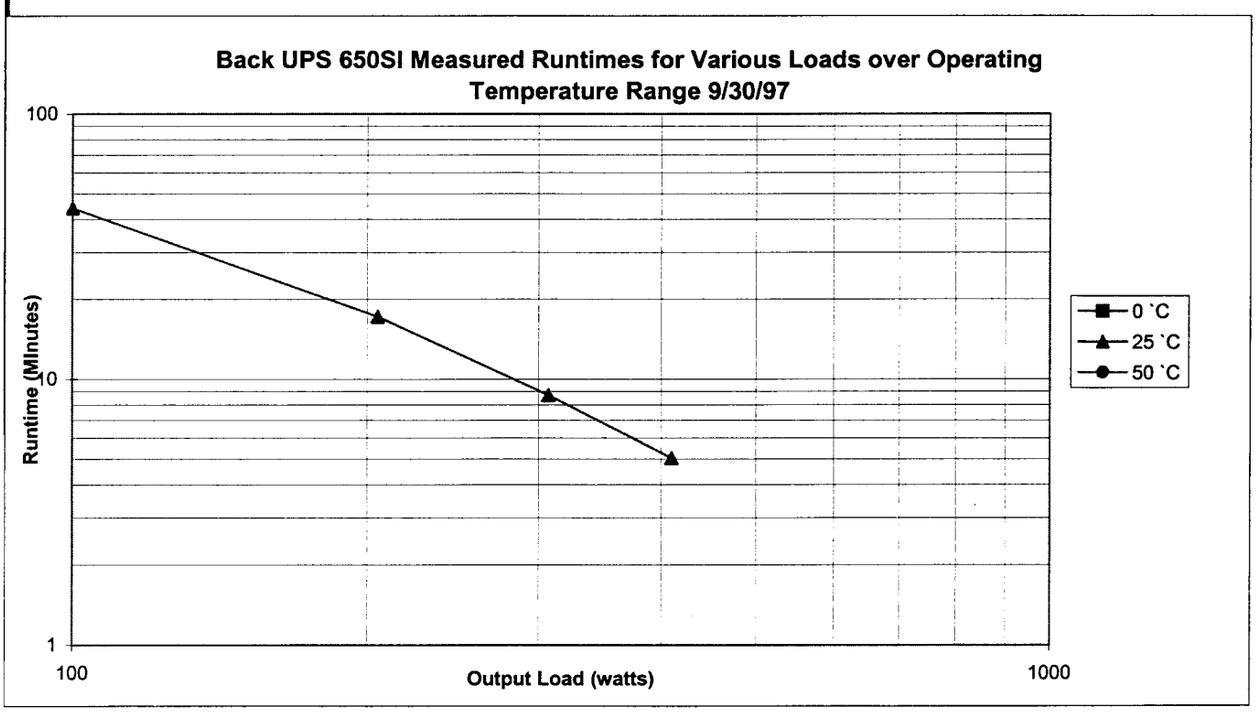
Temperature

AC input voltage On Battery

Input Frequency

Code Revision

Load (%)	3.75	25	50	75	100
Load (Watts)		100	205	307	410
Ambient `C					
0 `C					
25 `C		43.97	17.21	8.7	5.03
50 `C					



NOTES:

Form: ~6712753.xls

VDE File: 19244-3335-0025
CB/DE1-11884

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/25/1998 07:51 AM

Tester: Jon Becker

Title: Transfer Characterisitcs

Detailed Title: Blackout Tests

Laboratory: APC

Platform: Duet

Models: BP420SI

F/W Version: Rev 2

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
Measure UPS's response time to AC Blackouts (Vac=0 volts) and brownouts at different phase angles and AC line frequencies.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

LAB-BLKO420si.xls

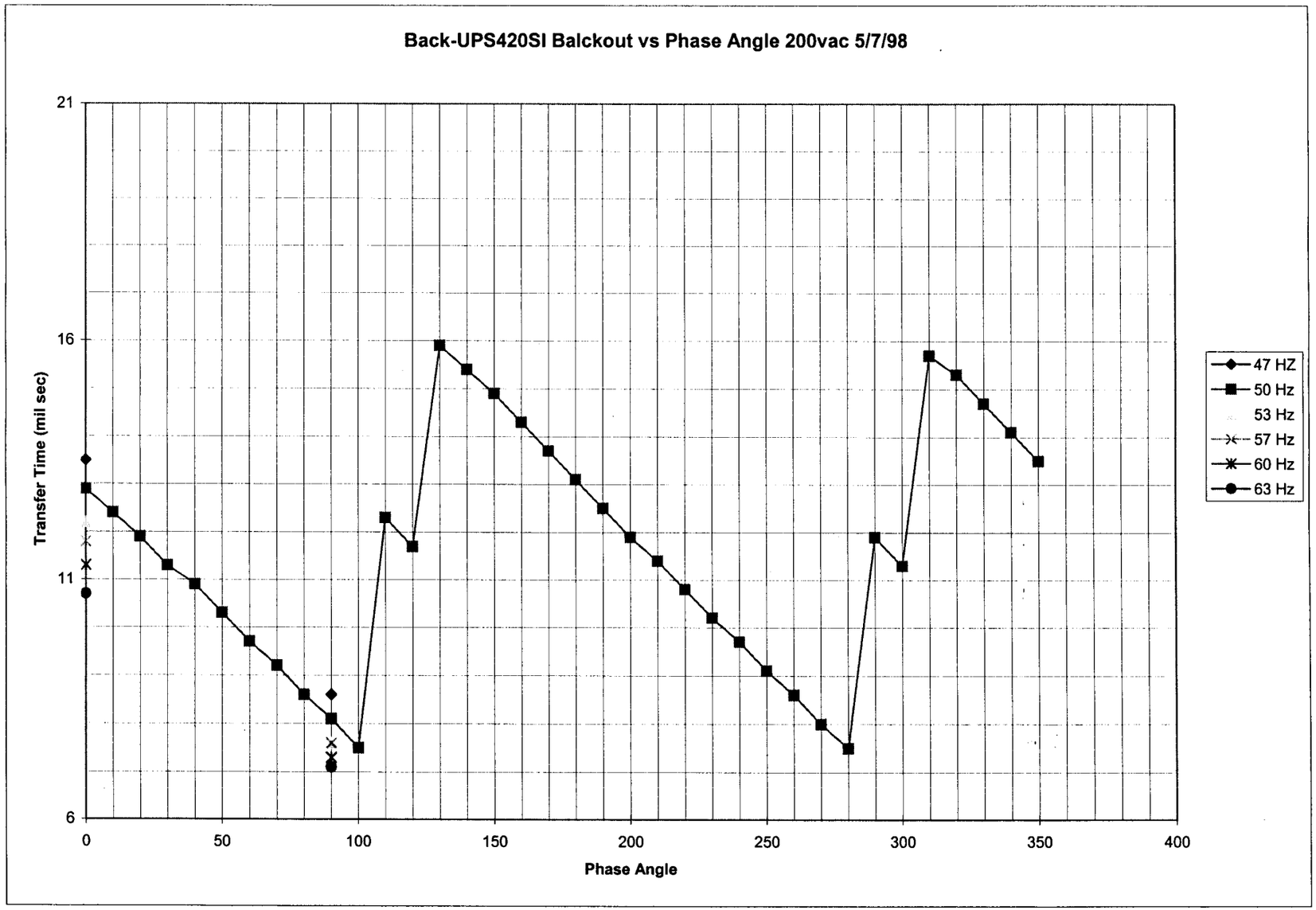
Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Comments:


Back-UPS420SI Balckout vs Phase Angle 200vac 5/7/98
Transfer Time (mil sec)
21
16
11
6
0
50
100
150
200
250
300
350
400
Phase Angle
47 HZ
50 Hz
53 Hz
57 Hz
60 Hz
63 Hz

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/05/1998 11:33 AM

Tester: Jon Becker

Title: Output Characterisitcs - On-battery

Detailed Title: Dynamic regulation, 10% to 90%, 90% to 10%

Laboratory: APC

Platform: Duet

Models: BP420SI

F/W Version: Rev 2

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
Determine dynamic output voltage load regulation for 10-90% and 90-10% loads steps at 20% of battery capacity.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line, On-Battery

Results:

Dreg1090.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Dynamic Load Regulation Test
APC Laboratory Report

product: BP420SI

serial number: Prototype
date: 5/5/1998
data taken by: J. Becker
Test Section/page: 4.4.2 1 of 2

Test equipment: Kikusui AC Power Source, Oscilloscope, resistive load
Test Procedure Determine dynamic output voltage load regulation for 10-90% and 90-10% loads steps at 20% of battery capacity.

data subdirectory i:\dvt\
Temperature 25
load information resistive load unless otherwise specified
CODE revision Revision 2

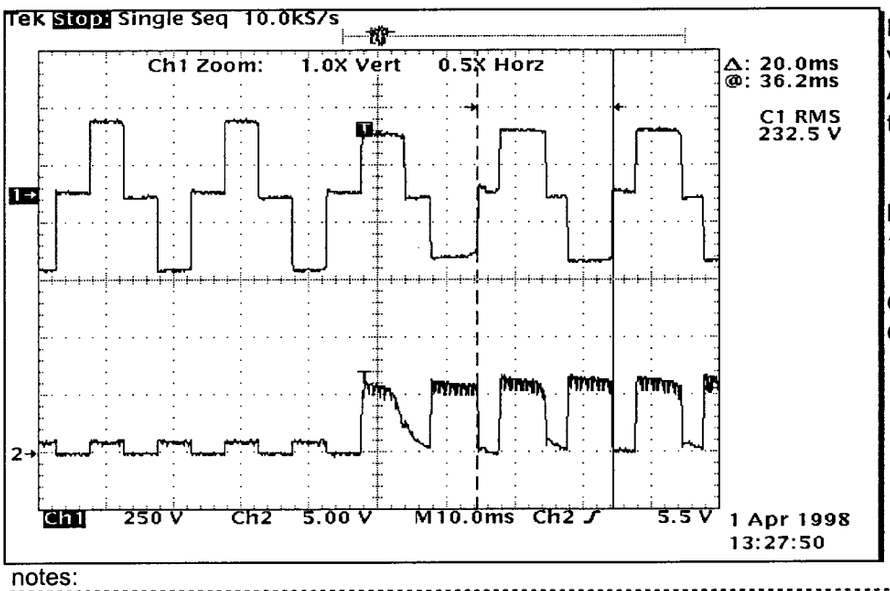


Photo #	1	
Volt/div	250 Vrms	
Amps/div		
time/div	10 mS/div	

Dynamic load change
10 to 90%

CH1 = Output voltage of UPS
CH2 = Battery current

notes:

Dynamic Load Regulation Test
APC Laboratory Report

product: BP420SI

serial number: Prototype
date: 5/5/1998
data taken by: J. Becker
page 2 of 2

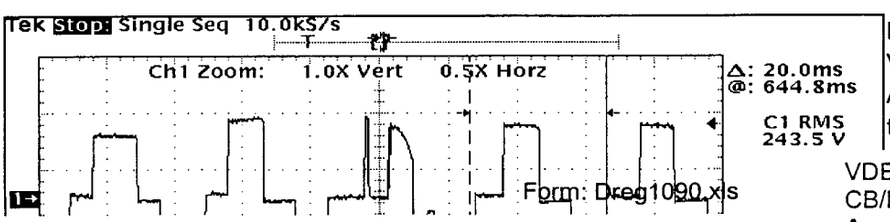
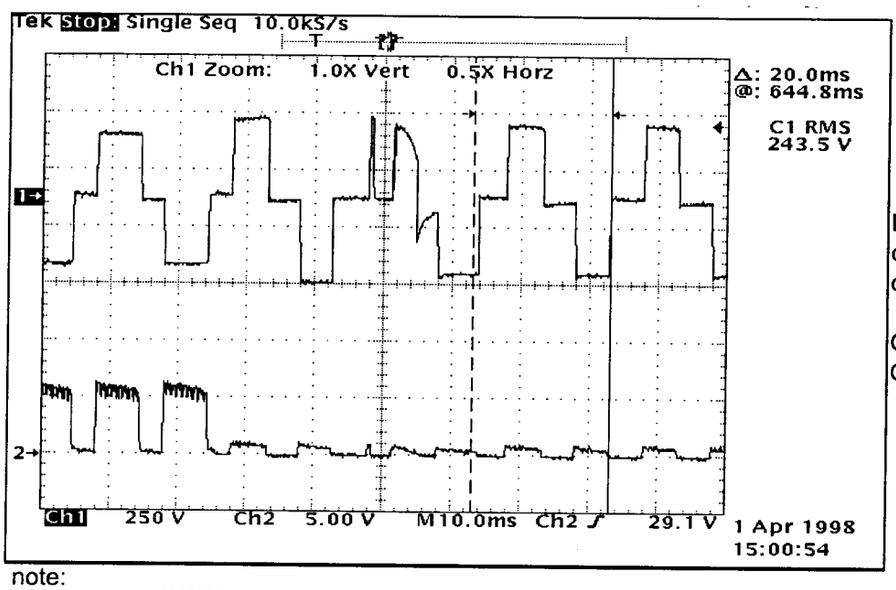


Photo #	2	
Volt/div	250	
Amps/div	4	
time/div	10 mS/div	

Form: Dreg1090.xls



Dynamic load
change from 90% to 10%
of full load

CH1 = Output voltage of UPS
CH2 = Battery current

note:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Jon Becker
Date: 06/26/1998 02:29 PM

Tester: Jon Becker

Title: Output Characterisitcs - On-line

Detailed Title: Efficiency Test

Laboratory: APC

Platform: Duet

Models: BP420SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

Lab-eff%.xls Lab-eff1.xls Lab-eff2.xls Lab-eff3.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

Efficiency Test
APC Laboratory Report

product: Back-UPS

serial number: Prototype

date: 4/20/1998

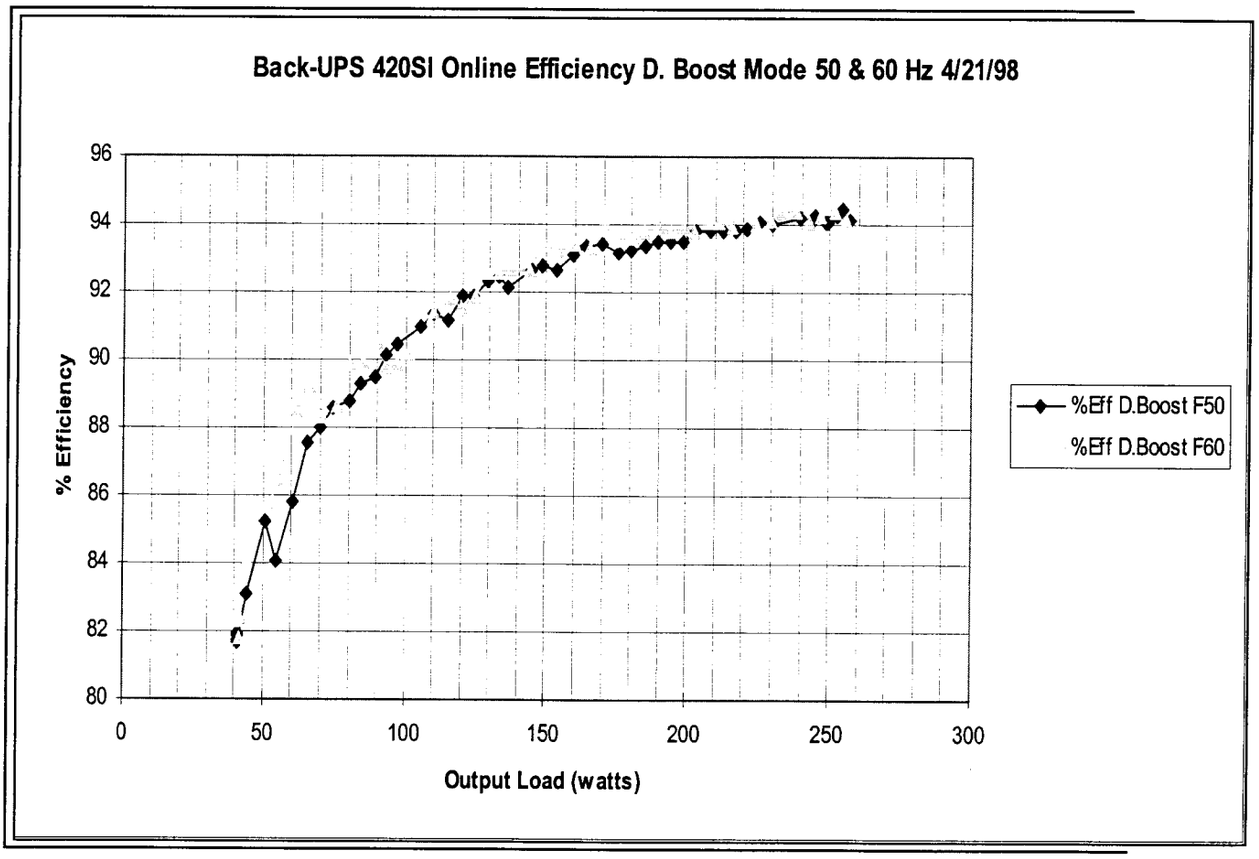
data taken by: J.Becker

Test Section/page: 4.3.4 1 of

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Step the output load (in watts) from 0 watts to 150% of full load. Record electrical parameters. Repeat at different voltages frequencies, and ambient temperatures. On-line, test both fully charged and and recharging battery. Also sweep load with unit on inverter.

data subdirectory	i:\dvt\
Temperature	25
AC input voltage	Double Boost mode
Input Frequency	50 & 60 HZ
Code Revision	



note:

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 5, Page 35 of 62

Form: Lab-eff%.xls

Efficiency Test
APC Laboratory Report

product: Back-UPS

serial number: Prototype

date: 4/21/1998

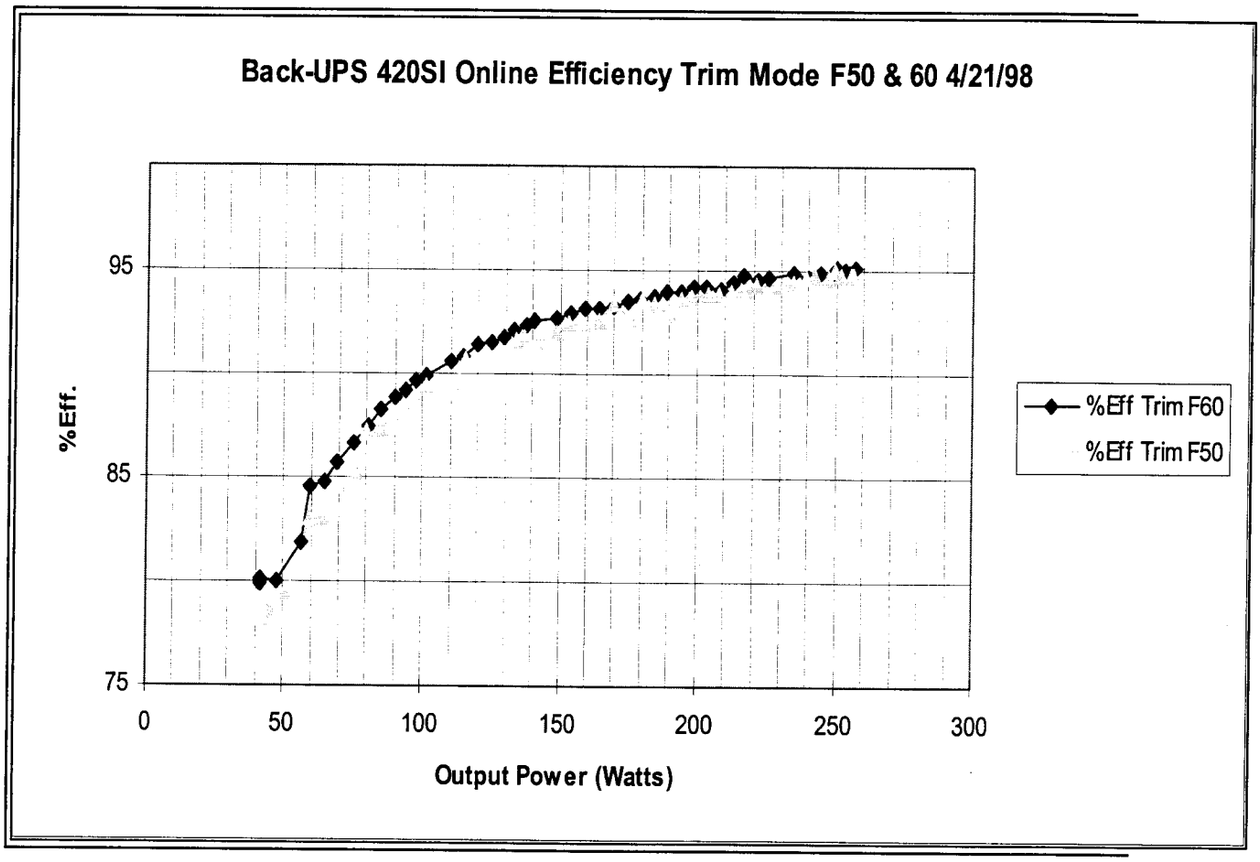
data taken by: J. Becker

Test Section/page: 4.3.4 1 of

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Step the output load (in watts) from 0 watts to 150% of full load. Record electrical parameters. Repeat at different voltages frequencies, and ambient temperatures. On-line, test both fully charged and and recharging battery. Also sweep load with unit on inverter.

data subdirectory	i:\dvt\
Temperature	25
AC input voltage	Trim Mode
Input Frequency	50 & 60 HZ
Code Revision	



note:

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 5, Page 36 of 62

Form: Lab-eff1.xls

Efficiency Test
APC Laboratory Report

product: _____

serial number: _____

date: _____

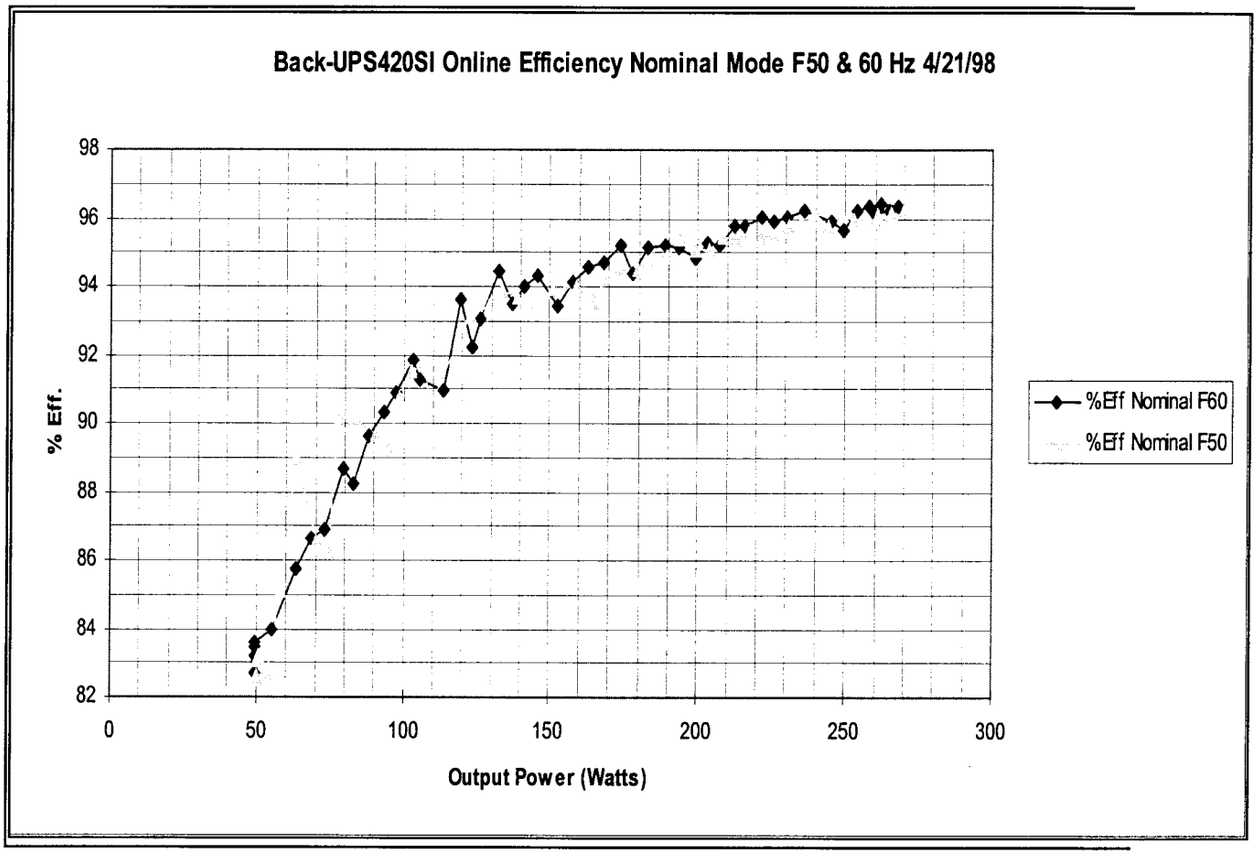
data taken by: _____

Test Section/page: 4.3.4 1 of

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Step the output load (in watts) from 0 watts to 150% of full load. Record electrical parameters. Repeat at different voltages frequencies, and ambient temperatures. On-line, test both fully charged and and recharging battery. Also sweep load with unit on inverter.

data subdirectory	i:\dvt\
Temperature	25
AC input voltage	Nominal
Input Frequency	60 HZ
Code Revision	



note: ----------

Efficiency Test
APC Laboratory Report

product: Back-UPS4

serial number: Prototype

date: 4/22/1998

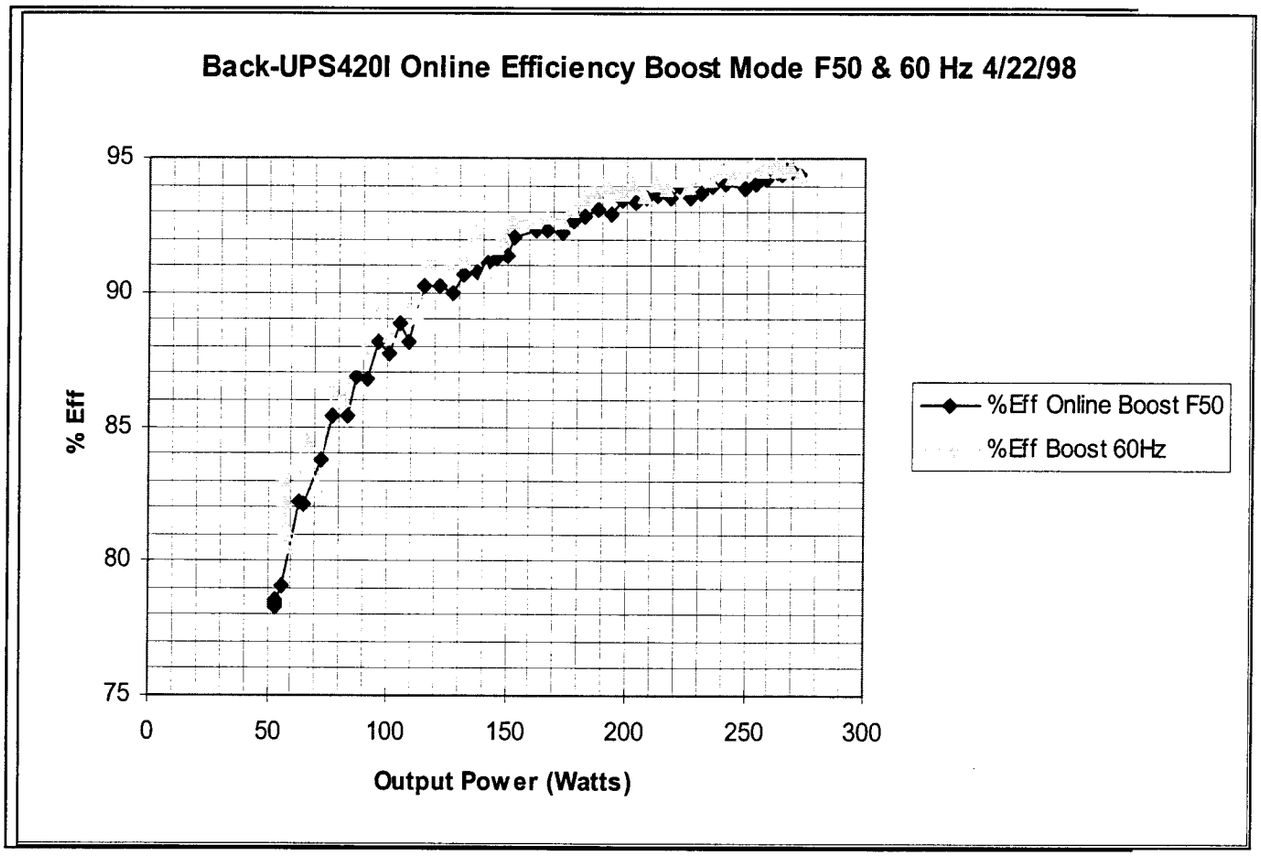
data taken by: J Becker

Test Section/page: 4.3.4 1 of

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Step the output load (in watts) from 0 watts to 150% of full load. Record electrical parameters. Repeat at different voltages frequencies, and ambient temperatures. On-line, test both fully charged and and recharging battery. Also sweep load with unit on inverter.

data subdirectory	i:\dvt\
Temperature	25
AC input voltage	Boost Mode
Input Frequency	50 & 60 HZ
Code Revision	



note:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/04/1998 06:56 PM

Tester: Jon Becker

Title: Input Characterisitcs

Detailed Title: Input Frequency Inverter Synchronization

Laboratory: APC

Platform: Duet

Models: BP420SI

F/W Version: Rev 2

Target Performance:
Applicable Standards:
==========

Purpose:
To determine the amount of time it takes the UPS to sink up to the AC line at its different operating line frequencies.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
Determine inverter frequency synchronization over input frequency range.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line, On-Battery

Results:

Input frequency (Hz)	Inverter Synchronization (seconds) Maximum readings taken from 12 iterations
47	3.78
50	2.1
53	2.39
57	2.00
60	1.85
63	2.62

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Comments:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Jon Becker
Date: 06/26/1998 01:31 PM

Tester: Jon Becker

Title: Run Time

Detailed Title: Runtime Tests

Laboratory: APC

Platform: **Duet**

Models: BP420SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
Runtime Test.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

Lab-runt.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

Comments: Lab-runt shows runtimes for 25, 50 75 and 100% of full load

Runtime Table
APC Laboratory Report

product: Back-UPS 420SI

serial number: Prototype

date: 4/20/1998

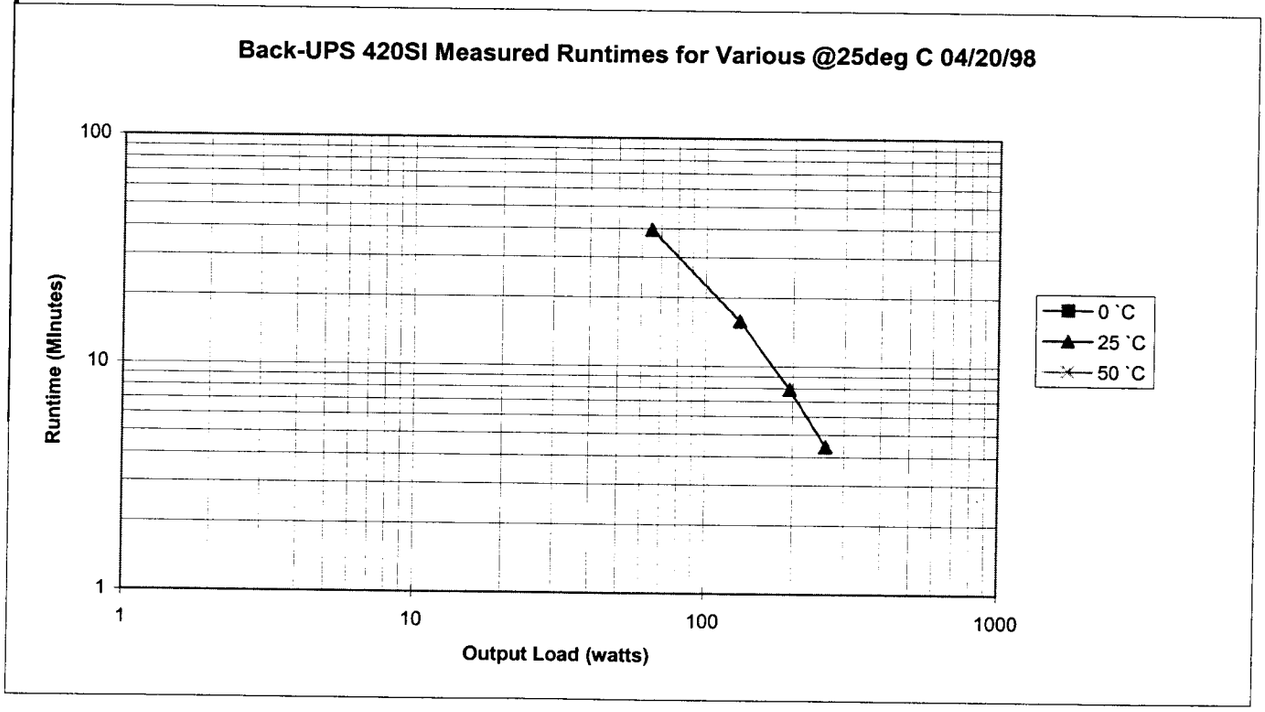
data taken by: J Becker

Test Section/page: 1 of 1

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Set the output load (watts and VA) at nominal Vac. Remove AC power from unit , allow to discharge while recording electrical parameters. Repeat Test at various load and environmental extremes.

data subdirectory	I:\DVT				
Temperature					
AC input voltage	On Battery				
Input Frequency					
Code Revision					
Load (%)	3.75	12.5	25	50	100
Load (Watts)		65	131	195	260
Ambient `C					
0 `C					
25 `C		39.53	15.77	7.91	4.43
50 `C					



NOTES:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/05/1998 12:30 PM

Tester: Jon Becker

Title: Input Characterisitcs

Detailed Title: Transfer with high impedance line

Laboratory: APC

Platform: Duet

Models: BP420SI

F/W Version: Rev 1

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
This test determines the maximum amount of input line impedance that the UPS can tolerate. For a given load, increase the input impedance until the unit continuously switches between on-line and inverter. Repeat using different source voltages and output loads.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:
An input resistance of greater than 8.63 ohms will cause the unit to continuously transfer from on-line to on-battery.

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/05/1998 10:37 AM

Tester: Jon Becker

Title: Transfer Characterisitcs

Detailed Title: Transfer/Retransfer frequency (AC jitter test)

Laboratory: APC

Platform: Duet

Models: BP420SI

F/W Version: Rev 2

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
This test is a figure of merit for the UPS Phase lock loop. Using the Kikusui source, modulate the input frequency to determine the maximum amount of AC jitter (frequency modulation) the UPS can tolerate and still retransfer to line.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line, On-Battery

Results:

acjitter.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

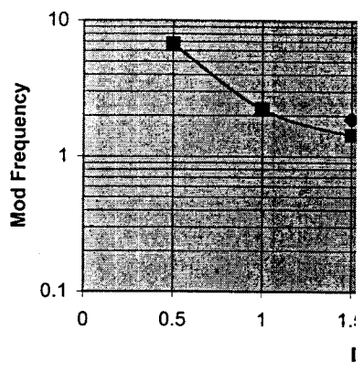
DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

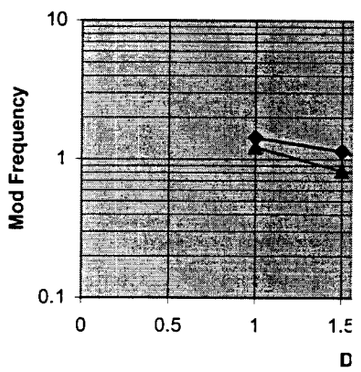
Comments:

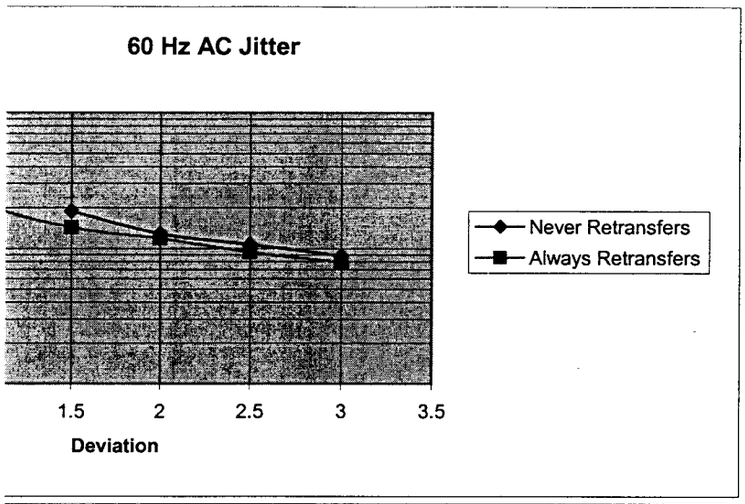
AC Jitter Test

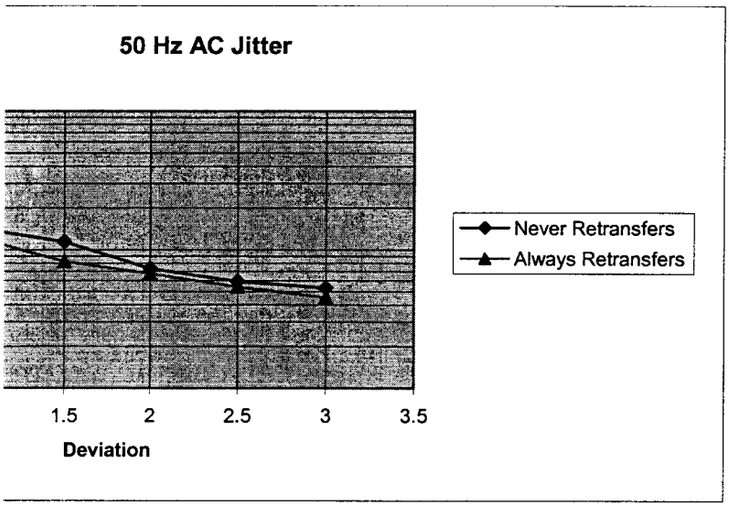
Center Freq	Deviation	Modulation Frequency Never Retransfers	Modulation Frequency Always Retransfers
60	0.5		6.67
60	1		2.22
60	1.5	1.87	1.43
60	2	1.28	1.18
60	2.5	1.07	0.94
60	3	0.88	0.79



Center Freq	Deviation	Modulation Frequency Never Retransfers	Modulation Frequency Always Retransfers
50	0.5		
50	1	1.43	1.22
50	1.5	1.14	0.82
50	2	0.73	0.67
50	2.5	0.59	0.54
50	3	0.53	0.45




60 Hz AC Jitter
Never Retransfers
Always Retransfers
1.5
2
2.5
3
3.5
Deviation


50 Hz AC Jitter
Never Retransfers
Always Retransfers
1.5
2
2.5
3
3.5
Deviation

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/05/1998 10:52 AM

Tester: Jon Becker

Title: Transfer Characterisitcs

Detailed Title: Transfer/Retransfer voltages and times

Laboratory: APC

Platform: Duet

Models: BP420SI

F/W Version: Rev 2

Target Performance:
Applicable Standards:
==========
Purpose:

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
Set output Load to full load resistive. With the UPS on inverter, turn the AC back on and capture the voltage waveforms when the unit retransfers. Repeat test with different line frequencies and AC voltages.

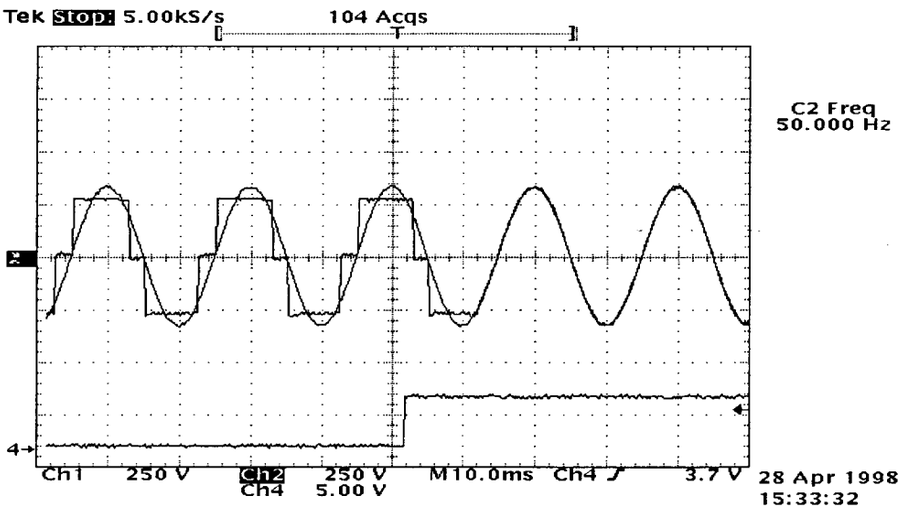
Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

		Frequencies																	
		47			50			53			57			60			63		
Sensitivity		H	M	L	H	M	L	H	M	L	H	M	L	H	M	L	H	M	L
VAC	175	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	200	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	230	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
	264	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P

P represents a pass. UPS synchronized to the AC line.



Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ Pass (Accepted) ○ Fail (Rejected)

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Comments:

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Jon Becker
Date: 06/26/1998 03:22 PM

Tester: Jon Becker

Title: Output Characterisitcs - On-battery

Detailed Title: Inverter Efficiency

Laboratory: APC

Platform: Duet

Models: BP280SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

Lab-effi.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

Efficiency Test
APC Laboratory Report

product: Back-Ups2

serial number: Prototype

date: 5/6/1998

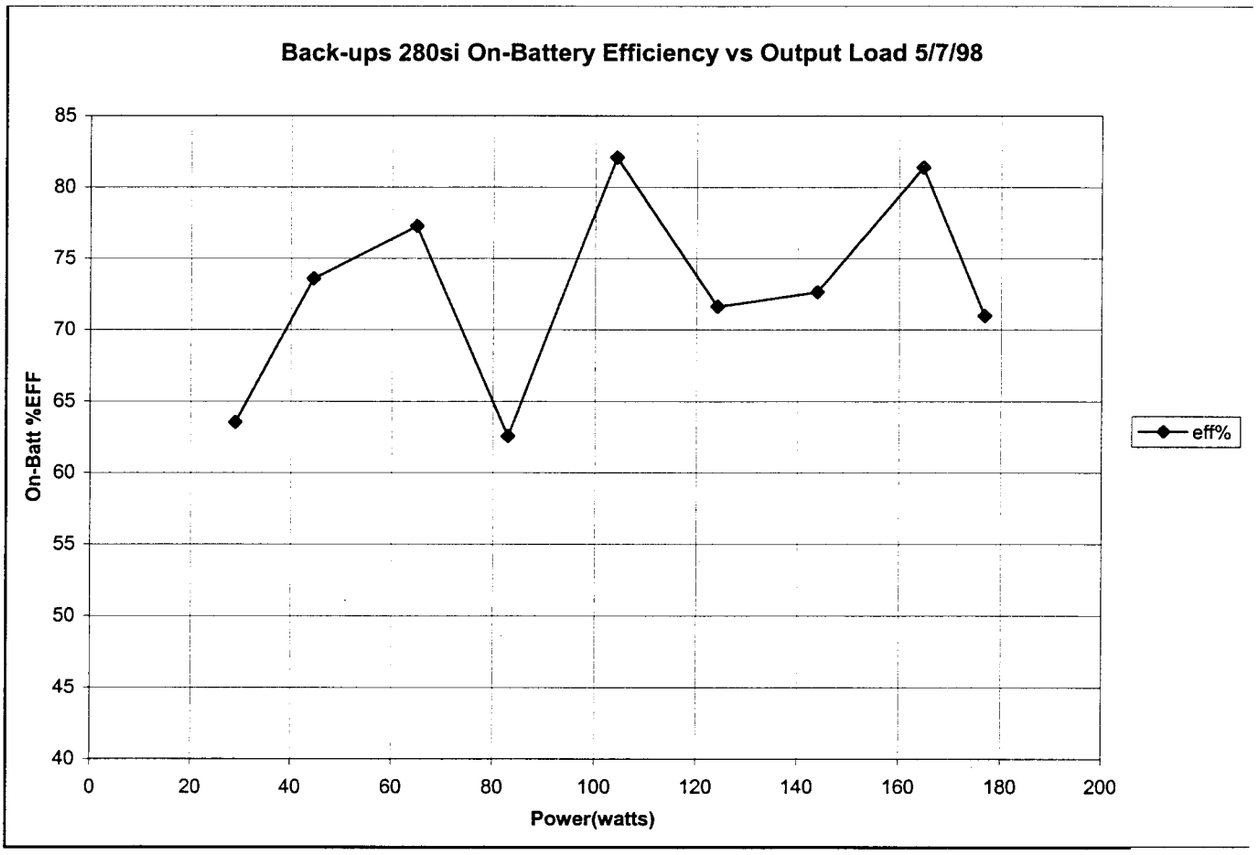
data taken by: Rommel

Test Section/page: 4.4.6

Test equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

Test Procedure Set AC voltage and frequency. Step the output load (in watts) from full load to no load. Record electrical parameters including battery voltage and current.

data subdirectory	I:\dvt\
Temperature	25
AC input voltage	on inverter
Input Frequency	
Code Revision	



note:

VDE File: 19244-3335-0025
CB/DE1-11884
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Form: Lab-effi.xls

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Jon Becker
Date: 06/26/1998 04:07 PM

Tester: Jon Becker

Title: Input Characterisitcs

Detailed Title: Maximum Input Current

Laboratory: APC

Platform: Duet

Models: BP280SI

F/W Version:

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
See attached report.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

Lab-maxi.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**

Hardcopy report file location: No hardcopy report

r put Current Test
APC Laboratory Report

product: BP280SI

serial number: 11

date: ########

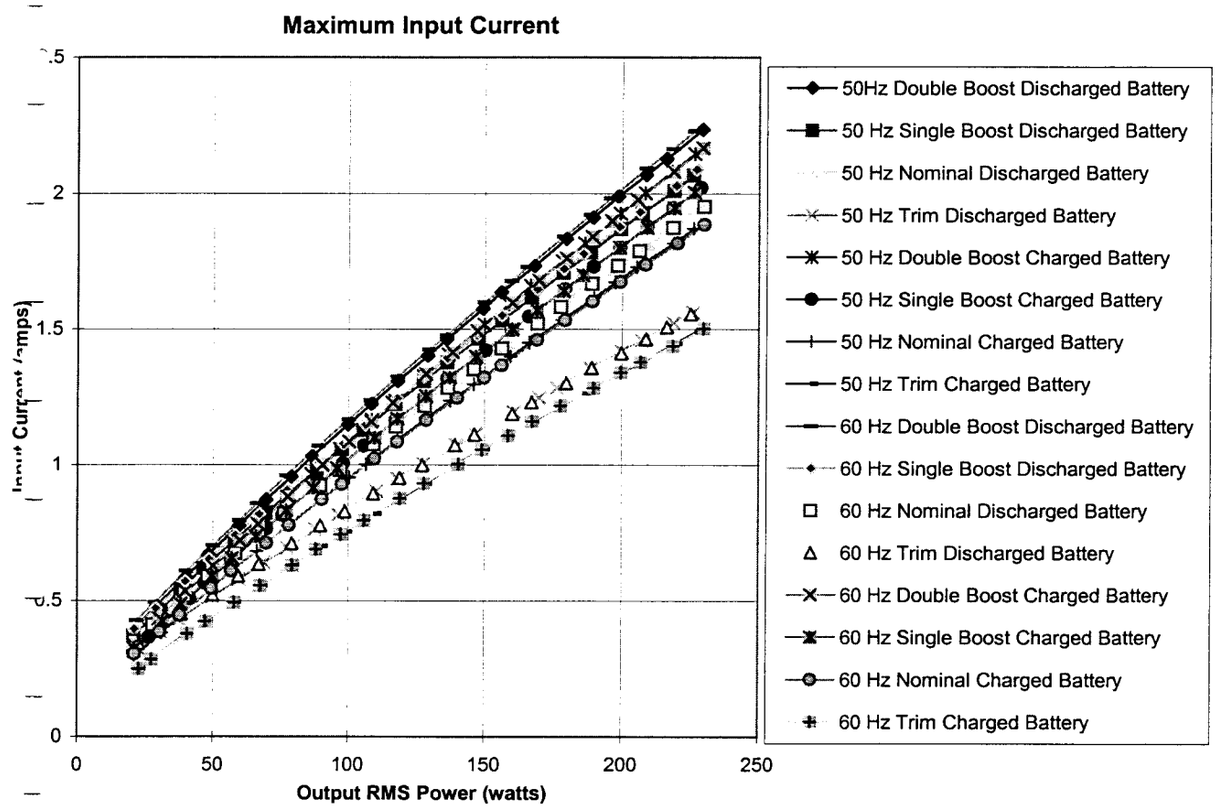
data taken by: Becker

Test Section/page: 4.1.5 1 of 1

e equipment: Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load

e Procedure Set AC voltage and frequency. Step the output load (in watts) from 0 watts to 150% of full load. Record electrical parameters. Repeat at different voltages frequencies, and ambient temperatures. On-line, test both fully charged and and recharging battery.

a subdirectory	i:\dvt\
e perature	25
AC input voltage	175, 200, 230 285
nput Frequency	50 Hz, 60 Hz
Co e Revision	1



Overload Capability Test Online
APC Laboratory Report

product: Back-Ups 280SI
serial number: Prototype
date: 5/5/1998
data taken by: J Becker
Test section/page: 4.3.6 1 of 2

Test equipment: Kikusui AC power source, oscilloscope, PM3000, output load.
Test procedure: Verify that UPS is capable of supporting 150% of rated resistive load for 1 second at 20% of battery capacity.

Data subdirectory
Temperature 25
Load information resistive load On Line 0 to 150% load
CODE revision

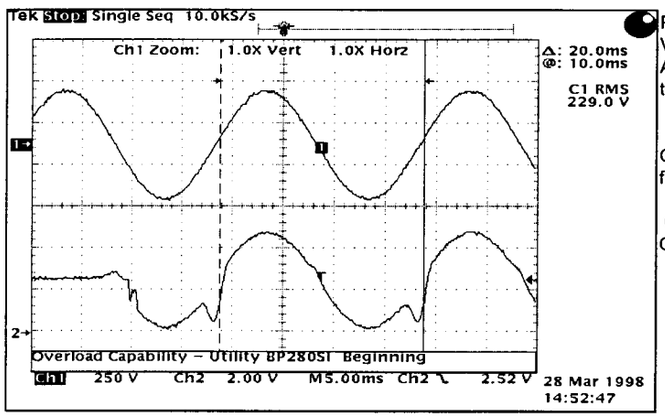
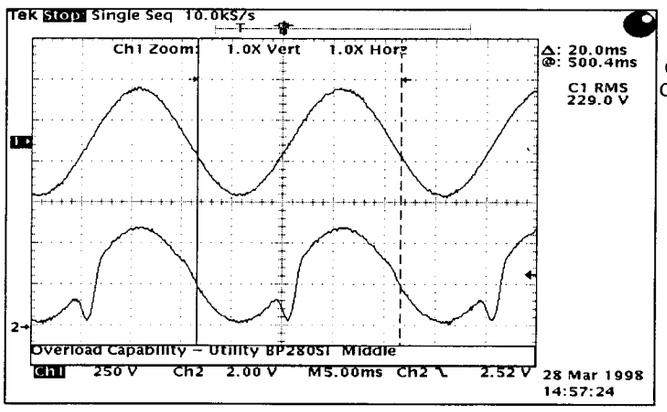


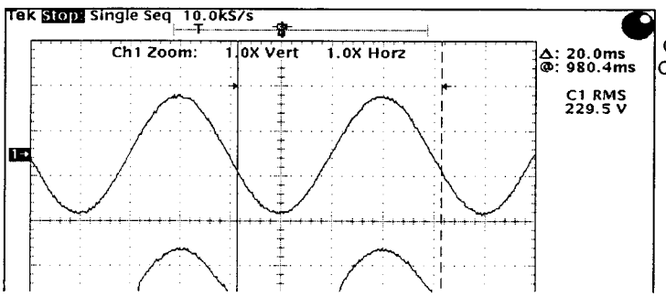
Photo #	1	
Volt/div	250	volts
Amps/div		
time/div	5 mS	

Output voltage step response from 0% to 150% load

Ch1= Input AC voltage
Ch2 = Output current



Ch1= Input AC voltage
Ch2 = Output current



Ch1= Input AC voltage
Ch2 = Output current

Form: ovldonline.xls

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/05/1998 04:22 PM

Tester: Jon Becker

Title: Output Characterisitcs - On-line

Detailed Title: Overload Capability - On-line

Laboratory: APC

Platform: Duet

Models: BP280SI

F/W Version: Rev 2

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
Verify that UPS is capable of supporting 150% of rated resistive load when online.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

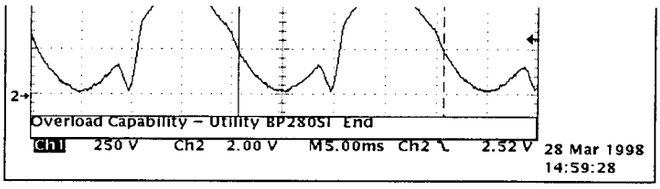
ovldonline.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: Complete

Hardcopy report file location: No hardcopy report



notes: The anomaly in the output current waveform is due to the variac on the output of the UPS. The Kikisui has a DC offset which causes the output current waveform to be distorted. Using a variac and a cone to model a resistive load allows the unit to behave strangely. It is better to use light bulbs to model a resisitve load.

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/05/1998 04:01 PM

Tester: Jon Becker

Title: Output Characterisitcs - On-battery

Detailed Title: Overload Capability - on battery

Laboratory: APC

Platform: Duet

Models: BP280SI

F/W Version: Rev 2

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
Verify that UPS is capable of supporting 150% of rated resistive load for 1 second at 20% of battery capacity.

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

Results:

ovldbatt.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: Complete

Hardcopy report file location: No hardcopy report

Overload Capability Test
APC Laboratory Report

product: Back-Ups 280SI

serial number: Prototype

date: 5/5/1998

data taken by: J Becker

Test section/page: 4.3.6 1 of 2

Test equipment: Kikusui AC power source, oscilloscope, PM3000, output load.

Test procedure: Verify that UPS is capable of supporting 150% of rated resistive load for 1 second at 20% of battery capacity.

Data subdirectory	i:\dvt\bck0420b
Temperature	25
Load information	resistive load On Line 0 to 150% load
CODE revision	

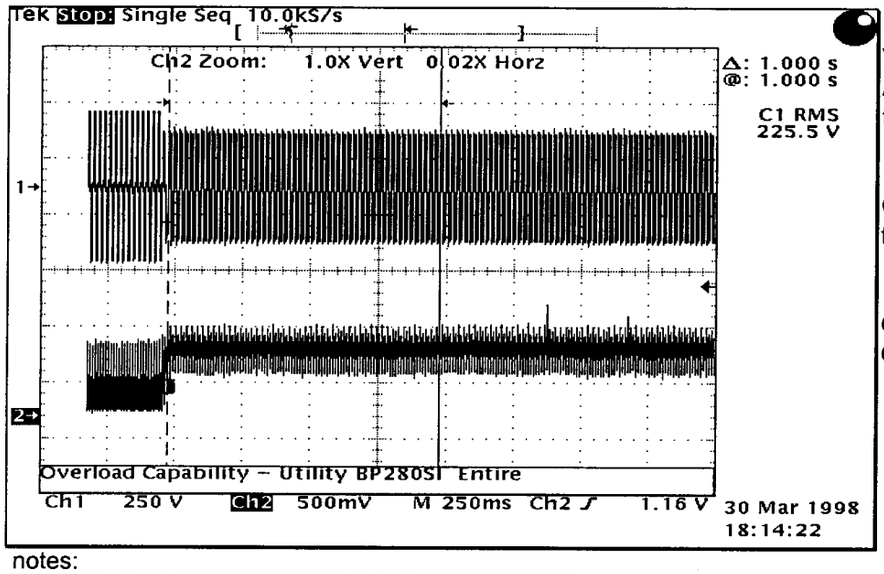


Photo #	1	
Volt/div	250	volts
Amps/div		
time/div	250ms	

Output voltage step response from 0% to 150% load

Ch1: Output voltage
Ch2:Output current

notes:

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 5, Page 59 of 62

Form: ovldbatt.xls

Back-UPS DVT

Report type: UPS Electrical Performance
Author: Mark Calvanese
Date: 05/25/1998 05:01 PM

Tester: Jon Becker

Title: Run Time

Detailed Title: Run time vs load

Laboratory: APC

Platform: **Duet**

Models: BP280SI

F/W Version: Rev 2

Target Performance:
Applicable Standards:
==========

Purpose:
See attached report.

Test Equipment:
Kikusui AC Power Source, Voltech PM3000 Power Analyzer, Computer Load (Kepco)

Procedure:
Run Time Verification

Automated Test Program:

Temperature: Room ambient
Humidity (%RH): Room ambient
Operating modes tested: On-line

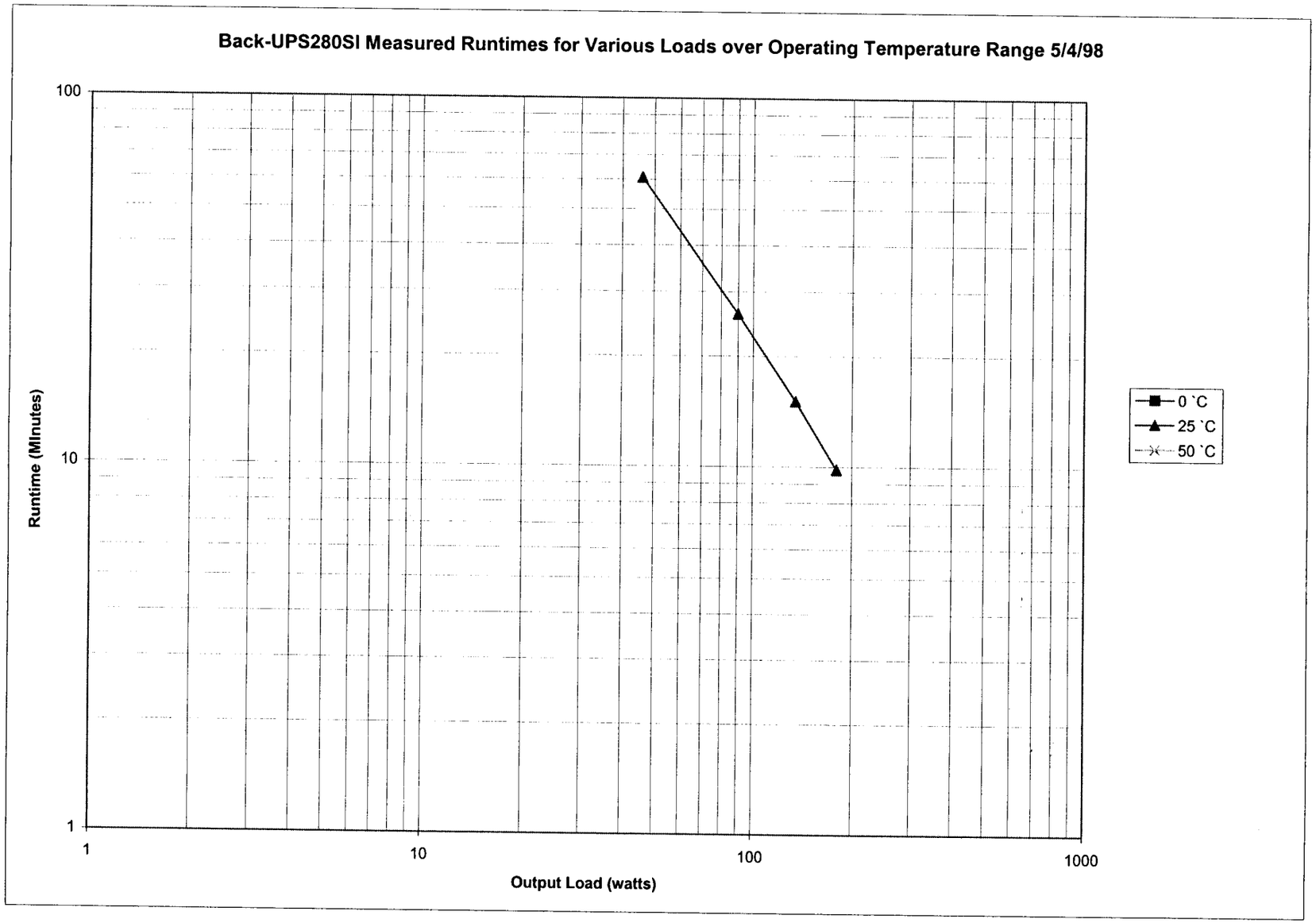
Results:

Lab-runt.xls

Data (Raw or Processed):
Attach raw/processed data or link here.

Performance Results: ○ **Pass (Accepted)** ○ **Fail (Rejected)**

DVT Status: **Complete**


Back-UPS280SI Measured Runtimes for Various Loads over Operating Temperature Range 5/4/98
Runtime (Minutes)
100
10
1
1
10
100
1000
Output Load (watts)
0 `C
25 `C
50 `C

Hardcopy report file location: No hardcopy report

Comments:

10/13

BP650SI

VDE Prüf-und Zertifizierungsinstitut-VDE-Prüfstelle
VDE Testing and Certification Institute
Merianstra β e 28 D-63069 Offenbach a. M. Tel.(+49) (69) 8306-0 FAX (+49) (69) 8306-555

file ref.

(filled in by the institute)

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

-Translation of the VDE Testing and Certification Documents-

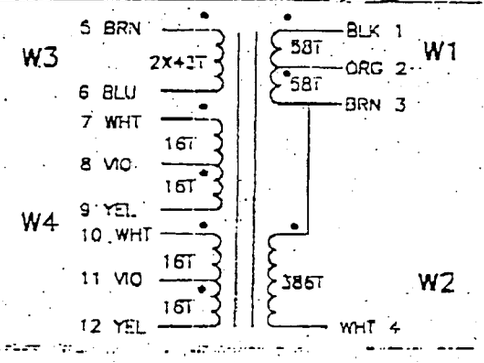
1.1 Manufacture: LEI INTERNATIONAL LTD.
1.2 Place of Manufacture: No.1 Industrial Area Tangxia Town,Dongguan City,Guangdong Province,CHINA
1.3 Reference of type: Power Transformer,Isolating
1.4 Trade Mark: LEI
1.5 Other markings: Date code, Class 155 (F)
1.6 Reference number: LS-A2619-PT

2.1 Protection against electric shock: Reinforced
2.2 Class of protection to IEC 539: IP 20
2.3 Type of construction (isolating transformer for toys.....): Isolating Transformer
2.4 Transformer,Stationary – Portable*): Portable

2.5 Protection against short-circuit according to Sub-clause 6.2*)
inherently short-circuit proof:
non-inherently short-circuit proof: Non-inherently short-circuit proof
non short-circuit proof:
fail safe:
(rated current of the output: 200MA)
2.6 Rated maximum ambient temperature ta= 40 °C
2.7 Class: B Insulation;Declaration of insulation see VDE-Form 187
(according to IEC 85)

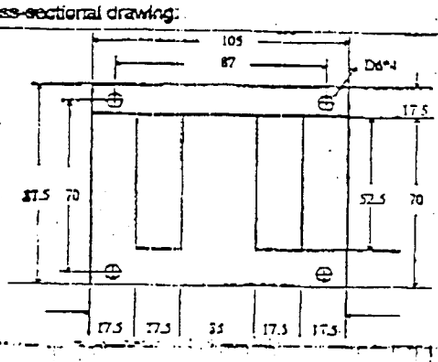
		Input	Output(AC/DC)
3.0	**Electrical value**		
3.1	Rated voltage(s)	V: Pri.3-4:230 Vac,Pri. 1-3 :69.11Vac.	Sec 8-9:25.62VAC, Sec 5-7:19.06VAC
3.2	Rated frequency	HZ: 50	
3.3	Rated current	N/A	N/A
3.4	Rated output	N/A	N/A
3.5	Rated power factor cos phi:	N/A	N/A

4.0 **Windings**
4.1 Coil base, number:
material: ZYTEL 101 POLYNIDE NY66
4.2 Material of layer insulation: POLYESTER FILM TAPE
4.3 Windings number: Pri: 3-4 :386T,Pri.1-3 2X58T Sec 8-9:2X 43T, Sec 5-7: 2x32T
material: Copper Wire
4.4 Taps, number:
4.5 Diameter of wire(mm) Pri 3-4:0.75, Pri 1-3:0.90 Sec 8-9:0.45 Sec 5-7:1.80
4.6 Windings insulation, material: Polyester tape
4.7 Cord insulation material N/A
internal:
external:
4.8 Cold resistance in Ω at 25°C Pri.3-4: 3.50, Pri.1-3 :1.0 Sec 8-9: 0.80 , Sec 5-7: 0.04
4.9 Circuit diagramm(with terminal markings,color of wires etc.):



*)Please insert what is applicable

5.0 Iron core
5.1 Sheet metall,material: H1.4A50
main dimensions: 105 mm x 87.4 mm x 50.80 mm
5.2 Cross-sectional drawing:



6.0 Type of construction
6.1 Open-covered -in case protection*) Open
6.2 Impregnated-undrowned-drowned*) Drowned
6.3 Soaking(liquor):
6.4 Underpressure-Overpressure-Soaking at °C)
6.5 Drown material: Varnish, John C. Delph Co.,Type BC-346A
6.6 Material of the cover:
of the case:
of the sockult(support)
6.7 Flammability class for insulation material:

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

N / A

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

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

*) Delete if not applicable. (continue on separate sheet if necessary)

Offenbach, 2.AP.97

VDE Testing and Certification Institute
Department

Place: N/A

Date: 14/Aug/1997

(Stamp and signature of the manufacturer)

VDE Pruf-und Zertifizierungsinstitut
VDE-Prufstelle
Merianstra βe 28
D-63069 Offenbach

Aktenzeichen / file ref.

ISOLATIONSERKLARUNG

DECLARATION OF INSULATION

Gegenstand/Component: 430-2052

Typenbezeichnung/Type designation: Power Transformer, Isolating LS-A2819-PT

Hersteller/Manufacturer: LEI INTERNATIONAL LTD.

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

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.

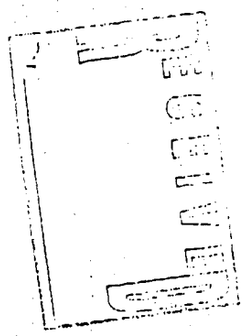
Das o.g. elektrische Betriebsmittel (Bauteil) entspricht der Thermischen Klasse_____gema β IEC-Publikation 85.

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

No.1 Industrial Area Tangxia Town,Dongguan City,GuangdongProvince,CHINA

Ort und Datum/Place and date.

Unterschrift des herstellers/Manufacturers signature:



Spezifikation über Isolierst[illegible]/Specification of ins[illegible]tion materials

Isolierstoff Insulation	Hersteller manufacturer	Handelsname (Typ) Tradename	Chemische ezeichnung Chemical Name	Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffherstellers acc. to IEC-Norm IEC-Type see encl.No.of the insulation manufacturer	Temperatur-Index Temperature-Index
Isolierung zwischen Wicklungen Insulation between windings	DU PONT 3M	NOMEX 410 1350	NOMEX PAPER WEB REINFORCED POLYESTER FILM TAPE POLYESTER FILM TAPE		220 ℃ 130 ℃ 130 ℃
Spulenkorper-Isolierung Coil base insulation	DU PONT	FR530	PET+30% GLASS FIBER		140 ℃
Lagenisolierung Layer insulation					
Tranlamittel Impregnation substances	JOHN C.DOLPH HITACHI	BC-340A WP-2052F-2GY	VARNISH VARNISH		200 ℃
Vergußmasse Drawn material					
Drahtisolierung Windings insulation	1.PACIFIC 2.TAI-I	AIEIW-200 ETW.II	POLYESTER-IMIDE COPPER WIRE	NW35-C	200 ℃
Leitungsisolierung Cord insulation					

P.13/13
13/13

430-2052A(4-5) (1224x1729x2 tiff)

BP 6505 I

VDE Prüf- und Zertifizierungsinstitut
Merianstrasse 28

D-63069 Offenbach

Aktenzeichen / file ref.

ISOLATIONSERKLÄRUNG ***DECLARATION OF INSULATION***

Betriebsmittel (Bauteil)/
Equipment (Component): **Transformer 430- 2052A**

Typenbezeichnung/
Type designation: **Class F SAF-1 Table XII**

Hersteller/
Manufacturer: **Sino American Electronic (Shenzhen)Co., Ltd**

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

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

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

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

District 18, Bao An New City ShenZhen GuangDong Province, China, March 22, 2001

Ort und Datum / Place and date

SINO-AMERICAN ELECTRONICS (SHEN...) CO., LTD. 華美電子(深圳)有限公司

G. Tai

Unterschrift des Herstellers / Manufacturers signature

J:\QM\VDE-Form\Kunde\187 (0697(E)/EDV)

Seite 1/2

430-2052A(5-5) (1224x1729x2 tiff)

Spezifikation über Isolierstoffe / *Specification of insulation materials*

Isolierstoff *Insulation*	**Hersteller** *Manufacturer*	**Handelsname (Typ)** *Tradename*	**Chemische Bezeichnung** *Chemical Name*	**Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffher-stellers** *Acc. to IEC Norm IEC Type see encl. No. of the insulation manufacturer*	**Temperatur-Index** *Temperature index*
Isolierung zwischen Wicklungen *Insulation between windings*	1. Windsor-Stevens Inc. 2. Nitto Denko Corp. 3. 3M Co.	1. Kraft Paper 2. Nitto tape 31C 3. 3M tape 1350	2. Polyester 3. Polyester		1. 94V-0 2.130 ℃ 3.130 ℃
Spulenkörper-Isolierung *Coil base insulation*	E.I. Dupont De Nemours	Bobbin - Rynite FR-530	PET		1.180 ℃
Lagenisolation *Layer insulation*	1. Nitto Denko Corp. 2. 3M Co.	1. Nitto tape 31C 2. 3M tape 1350	1. Polyester 2. Polyester		1.130 ℃ 2.130 ℃
Tränkmittel *Impregnation substances*	Viking Products, Inc.	V1630FS			1.180 ℃
Vergußmasse *Drown material*	N/A	N/A	N/A		N/A
Drahtisolierung *Windings insulation*	1. Tai-I Electric Wire & Cable Co., Ltd. 2. Ta Ya Electric Wire & Cable Co., Ltd.	Magnet Wire	PEW		1.155 ℃
Leitungsisolierung *Cord insulation*	N/A	N/A	N/A		N/A

430-2052A(1-5) (1224x1729x2 tiff)

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 e-mail vde-info@vde-institut.com

VDE

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

(filled in by the institute)

Constructional data for transformers acc : DIN EN 61558 VDE 0570 | **Form 43E**

- Translation of the VDE Testing and Certification Documents -

1.1 Manufacturer: SINO-AMERICAN Electronic CO.,LTD.
1.2 Place of manufacture: District 18 Bao-An Shen Zhen City Guang Dong Province China
1.3 Reference of type: 430-2052A REV 2
1.4 Trade Mark: SAE
1.5 Other markings:
1.6 Reference number: A2014162-0

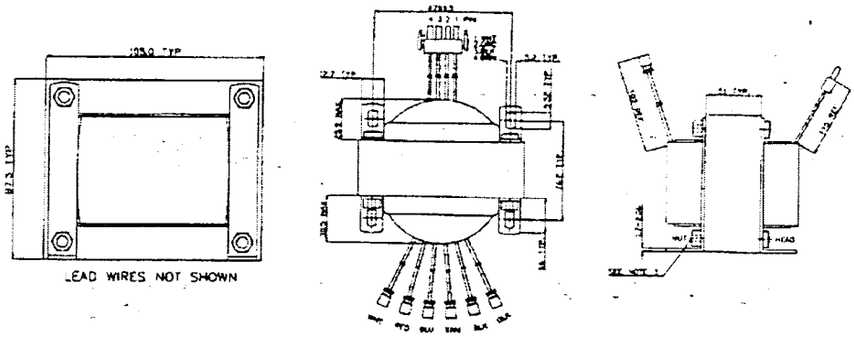
2.1 Protection against electric shock: An isolated transformer.class Ⅱ
2.2 Class of protection to IEC 539: IP..... 20
2.3 Type of construction (Isolating transformer for toys.....): According to VDE 0570 and EN61558
2.3.1 Applicable part(s) 2 of EN 61558
2.4 Transformer, stationary - portable *): UPS
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 ablent temperature: ta = 25~30 °C
2.7 Class: F 155℃ Insulation; Declaration of Insulation see VDE-Form 187
(according to IEC 85)
2.8 CTI - Value (according to IEC 112, Method A):

3	Electrical values			Input	Output (AC/DC)
3.1	Rated voltage(s)		V:	230V	27V 20V
3.2	Rated frequency		Hz:	50Hz	
3.3	Rated current		A:		
3.4	Rated output		VA:	650VA	
3.5	Rated power factor cos phi:				
4	**Windings**				
4.1	Coil base		number:	1	
			material:	PET	
4.2	Material of layer insulation		material:	Polyester Tape	
4.3	Windings		number:	1	
			material:	Copper	
4.4	Taps		number:	5	
4.5	Diameter of wire		mm:	0.9Φ 0.9Φ 0.75Φ	0.45Φ 1.8Φ
4.6	Winding of Insulation		material:	Polyester Tape or Nomex	
4.7	Cord insulation material				
			innere:		
			äußere:		
4.8	Cold resistance in Ω at:	25	°C =	0.313Ωmax 0.313Ωmax 3.65ΩMax	0.616ΩMax 17mΩMax

5 Iron core

5.1 Sheet metall, material:H14 50A
main dimensions:EI 105*50

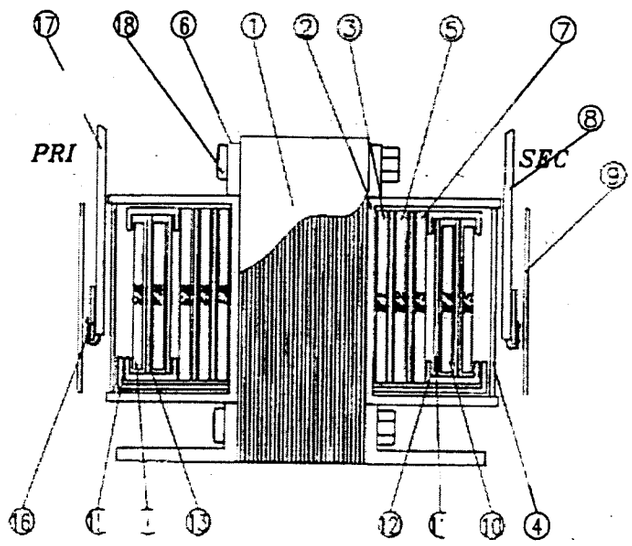
5.2 Cross-sectional drawing:



6 Type of construction

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

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



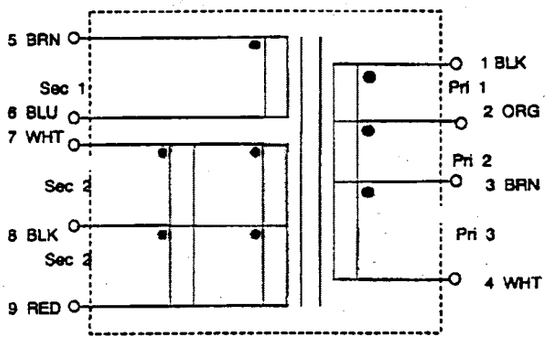
430-2052A(3-5) (1224x1729x2 tiff)

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

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

CIRCUIT DIAGRAM:



Offenbach,

VDE Testing and Certification Institute
Department

Place: District 18 Bao-An Date: Mar.18.2001
Shen Zhen City Guang Dong Province China

(Stamp and signature of the manufacturer)

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

NOTES

1) LAMINATION TYPE EI 1 3/8, M19, 26GA, STACK 2"
1a) LAMINATION TYPE EI 105x35, H14A50, STACK 51mm
2) INTERLEAVED 1x1.
3) HORIZONTAL MOUNT L-BRACKETS TO BE #14 GA (.067" - .081").
4) LEAD LENGTHS MEASURED FROM POINT OF EXIT FROM WINDINGS BEFORE TERMINALS ARE APPLIED (TOLERANCE ± .25")
5) NOTE POLARITIES
6) TO TEST WINDING COUNTS APPLY 230VAC (W3) TO PRIMARY (W3) (USE RMS OR AVERAGING METER TO VERIFY). EACH SECONDARY

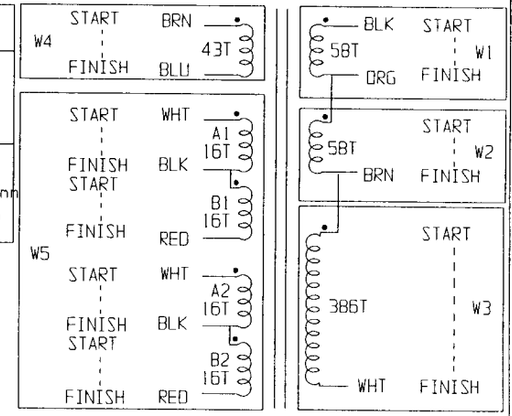
MUST READ: 230V x $\left(\frac{\text{SEC. TURNS}}{\text{PRIM. TURNS}}\right)$ ± 1% *

* USING THE SAME METER.

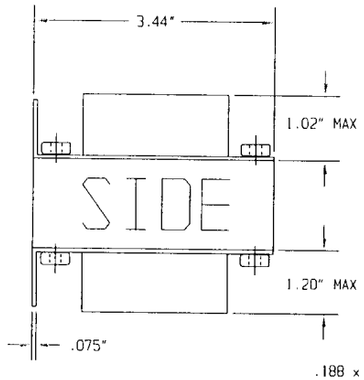
7) LEAKAGE INDUCTANCE FROM RED TO BLACK <2uH @ 1KH z & 0.1V MEASURED WITH BLACK SHORTED TO WHITE AND PRIMARY WHITE & BLACK LEFT OPEN.
8) WIND W1, W2, W3, W4 THEN W5 IN THAT ORDER.
W1-W2-W3 INSULATION NOT REQUIRED.
W4-W5 INSULATION NOT REQUIRED.
9) CLASS F

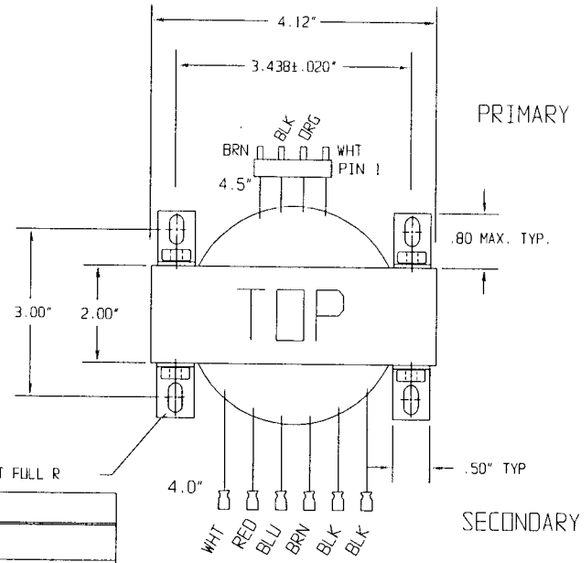
REV #	DATE	REVISION
1	7/96	

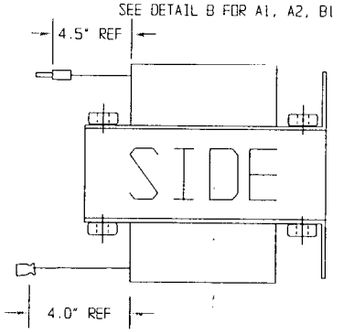
WINDINGS
PRIMARY WINDING W1: 58T OF 19 AWG OR 0.912mm WINDING W2: 58T OF 19 AWG OR 0.912mm WINDING W3: 386T OF 21 AWG OR 0.724mm
SECONDARY WINDING W4: 43T OF 2 X 25 AWG OR 2x0.45mm WINDING W5: 64T TOT OF 13 AWG OR 1.80mm



SEE DETAIL B FOR A1, A2, B1, B2 WINDING

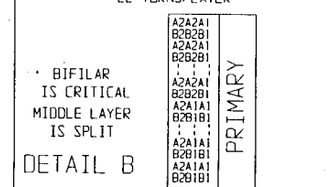






EXTERNAL LEADS		
W1, W2, W3	TYPE	UL 3173, CSA TEW
	AWG	18
	TERM	TERMINATION: UNIVERSAL MATE-N-LOK SOCKET TERMINAL, AMP #350537-3 OR APC APPVD EQUIVALENT, INSERTED IN HOUSING, AMP #1-480702-0 OR APC APPVD EQUIVALENT. PINOUT AS SHOWN IN SCHEMATIC ABOVE.
W4	TYPE	UL 3173, CSA TEW
	AWG	18
	TERM	AMP 2-520407-2 OR KS FDFD1-250 .25x.032 FASTON
W5	TYPE	UL 3173, CSA TEW
	AWG	10
	TERM	AMP 520974-2 OR KS FDFD5-250 .25x.032 FASTON

SECONDARY WINDING DETAIL
3 LAYERS TOTAL
22 TURNS/LAYER



* BIFILAR IS CRITICAL MIDDLE LAYER IS SPLIT

DETAIL B

AMERICAN POWER CONVERSION CORP			
ITEM: OUTPUT TRANSFORMER			
PRODUCT: BP650I DBLBST 230V		APC PART #: 430-2052A	
DATE: 7/26/97	BY: MGC	SCALE: .52	DWG #: 43020521 REV #: 2

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 6, Page 10 of 19

GP420SI

6/13

VDE Pruf-und Zertifizierungsinstitut- VDE-Prufstelle
VDE Testing and Certification Institute
Merianstra β e 28 D-63069 Offenbach a. M. Tel.(+49) (69) 8306-0 FAX (+49) (69) 8306-555

file ref:

(filled in by the institute)

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

-Translation of the VDE Testing and Certification Documents-

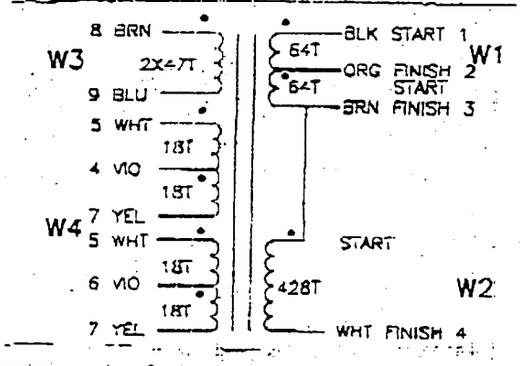
1.1 Manufacture: LEI INTERNATIONAL LTD.
1.2 Place of Manufacture: No.1 Industrial Area Tangxia Town,Dongguan City,Guangdong Province,CHINA
1.3 Reference of type: Power Transformer,Isolating
1.4 Trade Mark: LEI
1.5 Other markings: Date code, Class 130 (B)
1.6 Reference number: LS-A2816-PT

2.1 Protection against electric shock: Reinforced
2.2 Class of protection to IEC 536: IP 20
2.3 Type of construction (isolating transformer for toys ___): Isolating Transformer
2.4 Transformer,Stationary – Portable*): Portable

2.5 Protection against short-circuit according to Sub-clause 6.2*)
inherently short-circuit proof:
non-inherently short-circuit proof: Non-inherently short-circuit proof
non short-circuit proof:
fail safe:
(rated current of the output: 280MA)
2.6 Rated maximum ambient temperature ta= 40 °C
2.7 Class: B Insulation;Declaration of insulation see VDE-Form 187
(according to IEC 85)

		Input	Output(AC/DC)
3.0	Electrical value		
3.1	Rated voltage(s)	V: Pri. 1-3 :88.88 Vac Pri. 3-4 230 Vac	Sec. 8-9 :25.26VAC ,Sec 5-7:19.34VAC
3.2	Rated frequency	Hz: 50	
3.3	Rated current	N/A	N/A
3.4	Rated output	N/A	N/A
3.5	Rated power factor cos phi:	N/A	N/A

4.0 Windings
4.1 Coil base, number:
material: ZYTEL 101 POLYNIDE NY66
4.2 Material of layer insulation: POLYESTER FILM TAPE
4.3 Windings number: Pri:1-3 2X64T ,Pri.3-4 : 428T Sec: 8-9 :2X47T, 5-7: 36X2T
material: Polyurethane and polyester copper wire (UEW PEW)
4.4 Taps, number:
4.5 Diameter of wire(mm) Pri: 1-3 : 0.80, Pri. 3-4: 0.65 ; Sec: 8-9: 0.4 ; Sec 5-7 :1.50
4.6 Windings insulation, material: Polyester tape
4.7 Cord insulation material: N/A
internal:
external:
4.8 Cold resistance in Ω at 25°C Pri.1-3: 1,034 ,Pri.3-4 5.1; Sec.5-7: 0.0517, Sec .8-9: 0.0836.
4.9 Circuit diagramm(with terminal markings,color of wires etc.):



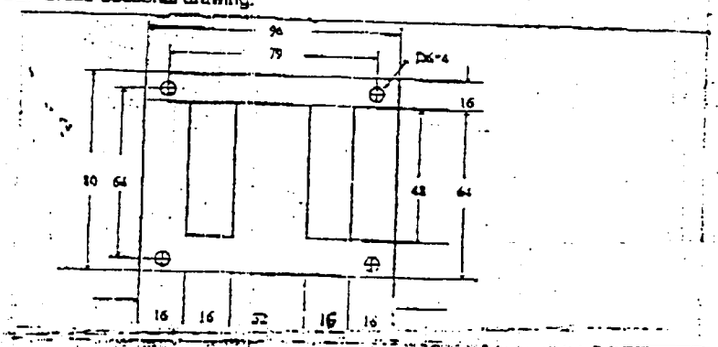
*)Please insert what is applicable

RECEIVED

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 6, Page 11 of 19

7/13

5.0 Iron core
5.1 Sheet metall,material: H14A50
main dimensions: 95 mm x 79 mm x 50.80 mm
5.2 Cross-sectional drawing:



6.0 Type of construction
6.1 Open-covered -in case protection*) Open
6.2 Impregnated-undrowned-drowned*) Drowned
6.3 Soaking(liquor):
6.4 Underpressure-Overpressure-Soaking at °C)
6.5 Drown material: Varnish, John C. Dolph Co., Type BC-346A
6.6 Material of the cover:
of the case:
of the socket(support)
6.7 Flammability class for insulation material:

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

N / A

RECEIVED

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

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

*) Delete if not applicable (continue on separate sheet if necessary)

Offenbach, 21.8.97

VDE Testing and Certification Institute
Department FTZ

Place: N/A Date: 14/Aug/1997

(Stamp and signature of the manufacturer)

8/13

VDE Prüf-und Zertifizierungsinstitut
VDE-Prüfstelle
Merianstra ß e 28
D-63069 Offenbach

Aktenzeichen / file ref.

ISOLATIONSERKLÄRUNG

DECLARATION OF INSULATION

Gegenstand/Component: 430-2051

Typenbezeichnung/Type designation: Power Transformer, Isolating LS-A2816-PT

Hersteller/Manufacturer: LEI INTERNATIONAL LTD.

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

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.

Das o.g. elektrische Betriebsmittel (Bauteil) entspricht der Thermischen Klasse_____gemä ß IEC-Publikation 85.

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

No.1 Industrial Area Tangxia Town,Dongguan City,GuangdongProvince,CHINA

Ort und Datum/Place and date:

14 Aug

Unterschrift des Herstellers/Manufacturers signature:

RECEIVED

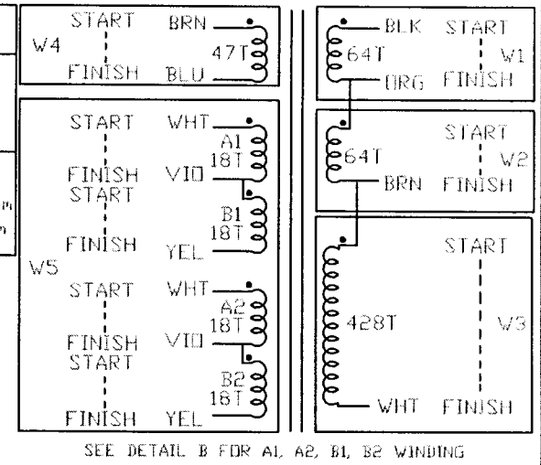
9/13

Spezifikatio über Isolier...re/Specification of Insulation materials

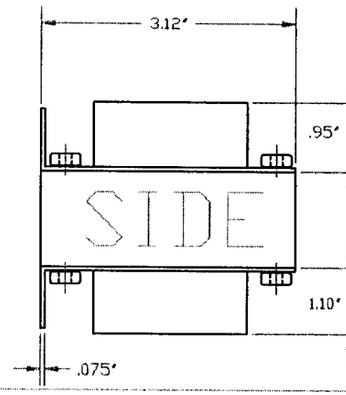
Isollerstoff Insulation	Hersteller manufacturer	Handelsname (Typ) Tradename	Chemische ezeichnung Chemical Name	Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffherstellers acc. to IEC-Norm IEC-Type see encl.No.of the insulation manufacturer	Temperatur-Index Temperature-Index
Isolierung zwischen Wicklungen Insulation between windings	3M NITTO	1350 310	WEB REINFORCED POLYESTER FILM TAPE		130 ℃
Spulenkörper-Isolierung Coil base insulation	DU PONT	NYLON	POLYAMINE		125 ℃
Lagenisolierung Layer insulation					
Trankmittel Impregnation substances	JOHN C.DOLPH HITACHI	BC-346A WP-2952F-20Y	VARNISH VARNISH		200 ℃
Vergußmasse Drown material					
Drahtisolierung Windings insulation	1.TOTOKU 2.TAI-I	UEW UEW PEW	POLYEURETHANE COPPER WIRE POLYESTER COPPER WIRE	NW75-C	135 ℃ 155 ℃
Leitungsisolierung Cord insulation					

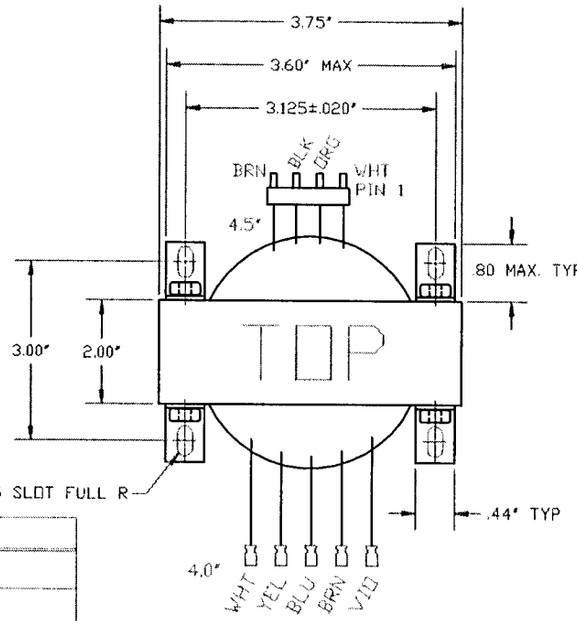
1) LAMINATION TYPE EI 1 1/4, M19, 26GA, STACK 2.00"
1a) LAMINATION TYPE EI 96x32, H14A50, STACK 51mm
2) INTERLEAVED 1x1.
3) HORIZONTAL MOUNT L-BRACKETS TO BE #14 GA (.067" - .081").
4) LEAD LENGTHS MEASURED FROM POINT OF EXIT FROM WINDINGS BEFORE TERMINALS ARE APPLIED (TOLERANCE ± .25")
5) NOTE POLARITIES
6) TO TEST WINDING COUNTS APPLY 230VAC (W3) TO PRIMARY (W3) (USE RMS OR AVERAGING METER TO VERIFY). EACH SECONDARY MUST READ: $230V \times \left(\frac{\text{SEC. TURNS}}{\text{PRIM. TURNS}}\right) \pm 1\%$*
* USING THE SAME METER.
7) LEAKAGE INDUCTANCE FROM YELLOW TO VIOLET <2uH @ 1KHz & 0.1V MEASURED WITH VIOLET SHORTED TO WHITE AND PRIMARY WHITE & BLACK LEFT OPEN.
8) WIND W1, W2, W3, W4 THEN W5 IN THAT ORDER.
W1-W2-W3 INSULATION NOT REQUIRED.
W4-W5 INSULATION NOT REQUIRED.
9) CLASS B

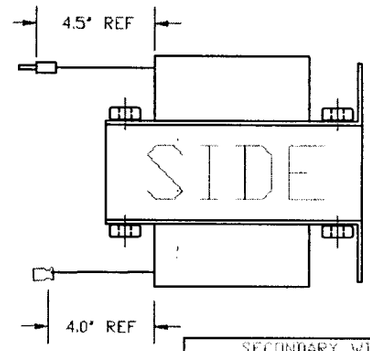
WINDINGS
PRIMARY WINDING W1: 64T OF 20 AWG OR 0.813mm WINDING W2: 64T OF 20 AWG OR 0.813mm WINDING W3: 428T OF 22 AWG OR 0.643mm
SECONDARY WINDING W4: 47T OF 2x26 AWG OR 2x0.40mm WINDING W5: 72T TOT OF 15 AWG OR 1.50mm



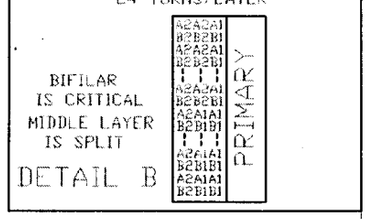
SEE DETAIL B FOR A1, A2, B1, B2 WINDING







EXTERNAL LEADS		
W1, W2, W3	TYPE	UL 1015, CSA TEW
	AWG	18
	TERM	TERMINATION: UNIVERSAL MATE-N-LOK SOCKET TERMINAL, AMP #350537-3 OR APC APPVD EQUIVALENT, INSERTED IN HOUSING, AMP #1-480702-0 OR APC APPVD EQUIVALENT. PINOUT AS SHOWN IN SCHEMATIC ABOVE.
W4	TYPE	UL 1015, CSA TEW
	AWG	18
	TERM	AMP 2-520407-2 OR KS FDFD1-250 .25x.032 FASTON
W5	TYPE	UL 1015, CSA TEW
	AWG	14
	TERM	AMP 3-520408-2 OR KS FDFD2-250 .25x.032 FASTON



VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 6, Page 15 of 19

AMERICAN POWER CONVERSION CORP			
ITEM: OUTPUT TRANSFORMER			
PRODUCT: BP420I DBLBST 230V	APC® PART #: 430-2051		
DATE: 7/26/97	BY: MGC	SCALE	DWG #: 430205I1.DWG / REV #: 1

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

Mathe lineare No.: file ref.:

ATTN: M. CALVANESE

(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 DE MEXICO
1.2 Place of manufacture: MERIDA, YUCATAN, MEXICO
1.3 Reference of type: CURRENT SENSOR.
1.4 Trade Mark: NONE
1.5 Other markings: → 460-----, FALCO, DATE CODE
1.6 Reference number: → L120D1 (FALCO PART NO)

2.1 Protection against electric shock: YES
2.2 Class of protection to IEC 539: IP..... CREEPAGE & CLEARANCE
2.3 Type of construction (isolating transformer for toys.....): CREEPAGE AND TRIPLE INSULATION
2.4 Transformer, stationary – portable *): STATIONARY.

2.5 Protection against short-circuit according to sub clause 6.2 *):
inherently short-circuit proof: YES
non-inherently short-circuit proof: NO
non short-circuit proof: NO
fail safe: YES
(rated current of the cutout: A) .8 mA MAX
2.6 Rated maximum ablent temperature: ta = °C 130°C
2.7 Class: B 130°C Insulation; Declaration of insulation see VDE-Form 167 (according to IEC 65)
2.8 CTI – Value (according to IEC 112, Method A):

3 Electrical values		Input	Output (AC/DC)
3.1 Rated voltage(s)	V:	N/A	6VAC
3.2 Rated frequency	Hz:	60Hz	
3.3 Rated current	A:	8 Amps max.	.8 Amps max.
3.4 Rated output	VA:		
3.5 Rated power factor cos phi:			

4 Windings
4.1 Coil base, BOBBIN number: 3000-460F
material: RYNITE FR-530
4.2 Material of layer insulation:
4.3 Windings, PRIMARY * 6T number: TEX-E .65 mm TRIPLE INSULATED
material: 3 INSULATION LAYERS OF MODIFIED POLYESTER
4.4 Taps: SECONDARY 2000T number: THERMAL-RESISTANT AND POLYAMID RESIN.
4.5 Diameter of wire (mm): .078 BARE COPPER [.081mm – .099mm OVER INSULATION]
4.6 Windings insulation, materials: MYLAR TAPE P-256, PERMACEL 130°C
4.7 Cord insulaton material
internal:) N/A
external:)
4.8 Cold resistance in Ω 273Ω ± 25Ω at: 25 °C
4.9 Circuit diagram (witch terminal markings, color of wires etc.):

* TEX-E TRIPLE INSULATED .65mm WIRE, MANUFACTURED BY FURUKAWA
APPROVALS NEMKO, IEC 950. A3. A4/Annex U) TEMP. IN
EN 60950, A3. A4/Annex U.) 120°C.

*) Delete if not applicable

UL 1950-2e.) UL File # E157568(S)
1411-4e

please turn over

1/4

460-

4 3/0 NICKEL 29 gage (.014 ink.)

5.1 Sheet metal, material:
main dimensions:

5.2 Cross-sectional drawing:

6 Type of construction

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

6.2 Impregnated - undrowned - drowned *) DROWNED

6.3 Soaking (liquor): NO

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

6.5 Drawn material: PD GEORGE 434 AIR DRY VARNISH

6.6 Material of the cover:
of the case:
of the socket (support): N/A

6.7 Flammability class for insulation material: UL94-V0

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
		N/A	

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

Offenbach, 5.11.97

VDE Testing and Certification Institut
Department

Place: Date:

(Stamp and signature of the manufacturer)

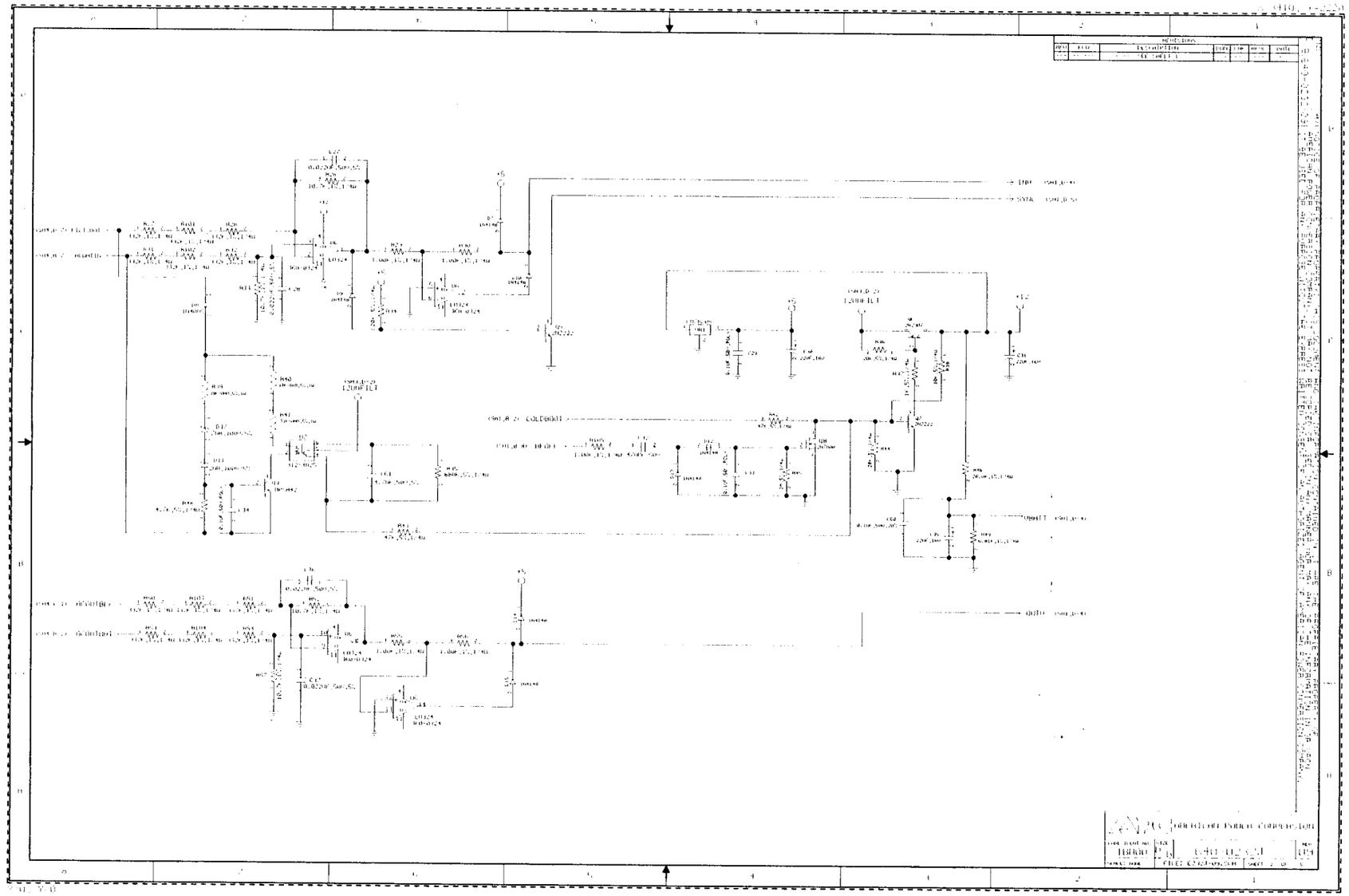
(2/4)

Specifikation über Isolierstoffe / Specification of insulation materials

Isolierstoff (Insulation)	Hersteller (Manufacturer)	Handelsname (Typ) (Tradename)	Chemische Bezeichnung (Chemical Name)	Nach IEC-Norm IEC-Typ siehe Anlage Nr. des Isolierstoffherstellers (acc. to IEC-Norm IEC-Type see encl. No. of the insulation manufacturer)	Temperatur-Index (Temperature index)
Isolierung zwischen Wicklungen (Insulation between windings)	COIL BASE (BOBBIN) COSMO + CREEPAGE	RYNITE FR-530 DUPONT		UL-E69578M	CLASS-H 180°C
Spulenkörper-Isolierung (Coil base insulation)	COIL BASE (BOBBIN) COSMO	RYNITE FR-530 DUPONT		UL-E69578M	CLASS-H 180°C
Lagenisolierung (Layer insulation)	N/A	—	—	—	—
Tränkmittel[1] (Impregnation substances)	N/A	—	—	—	—
Vergußmasse (Drowe material)	PD GEORGE	#434 AIR DRY VARNISH		UL-E87039 RECOGNIZED COMP. (OBOR2)	130°C
Drahtisolierung (Windings insulation)	PERMACEL TAPE, MYLAR	MYLAR P-256			130°C.
Leitungsisolierung (Cord insulation)	N/A	—	—	—	—

DESAMT SEITEN 05

2
1
Winding #2
3:2000
4
3
Winding #1
PCB Top View
1
2
4
3



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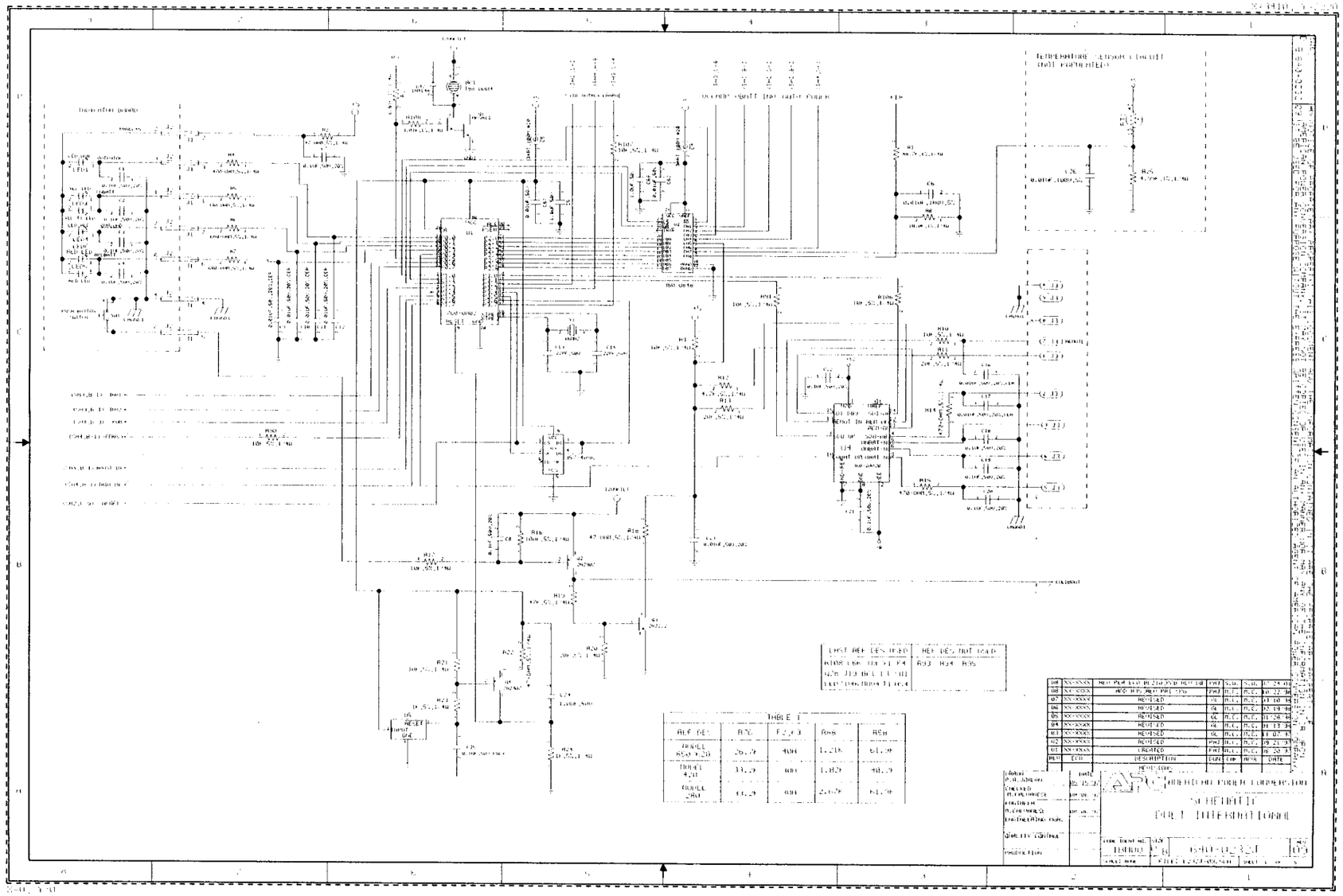
Appendix 7, Page 1 of 5



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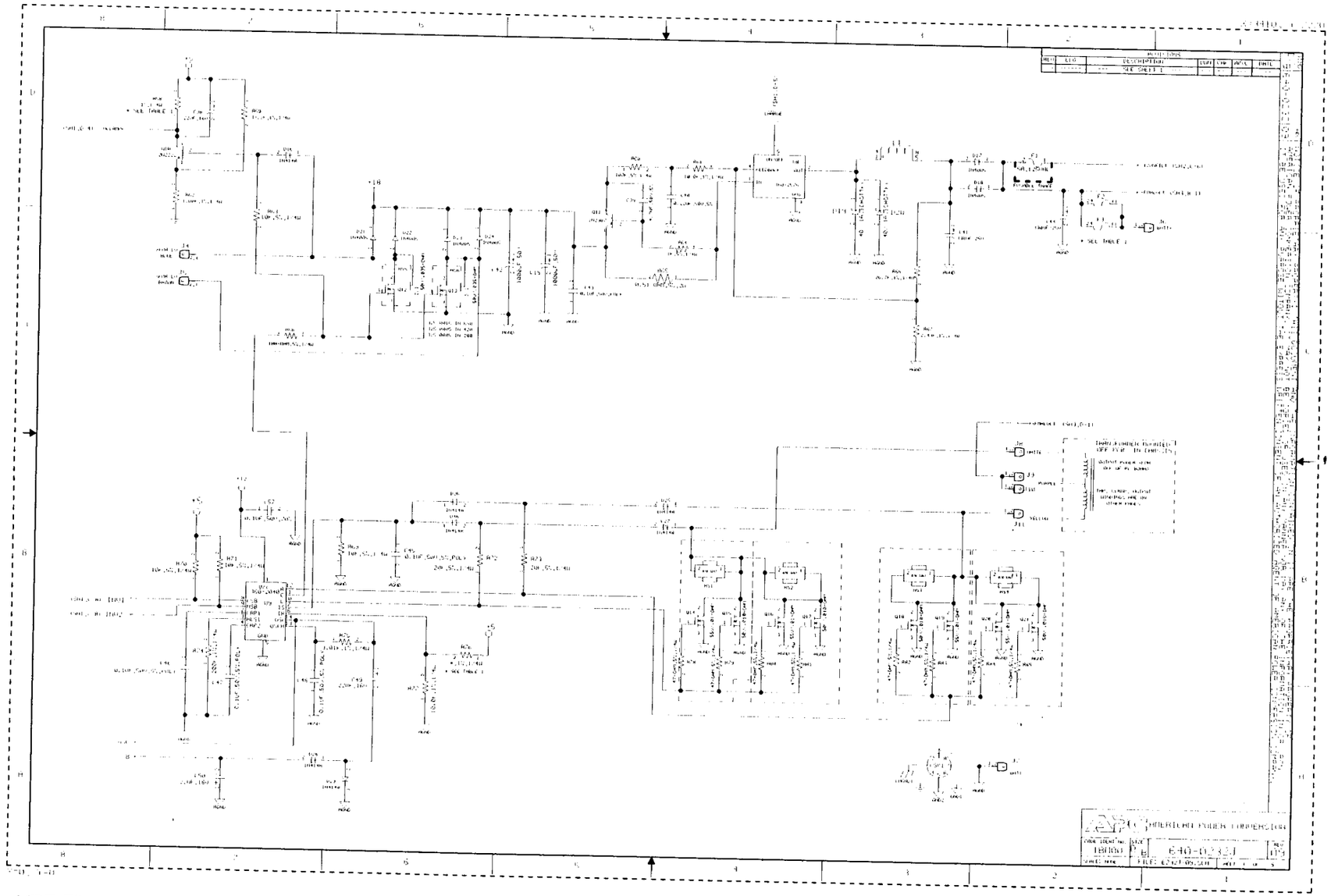
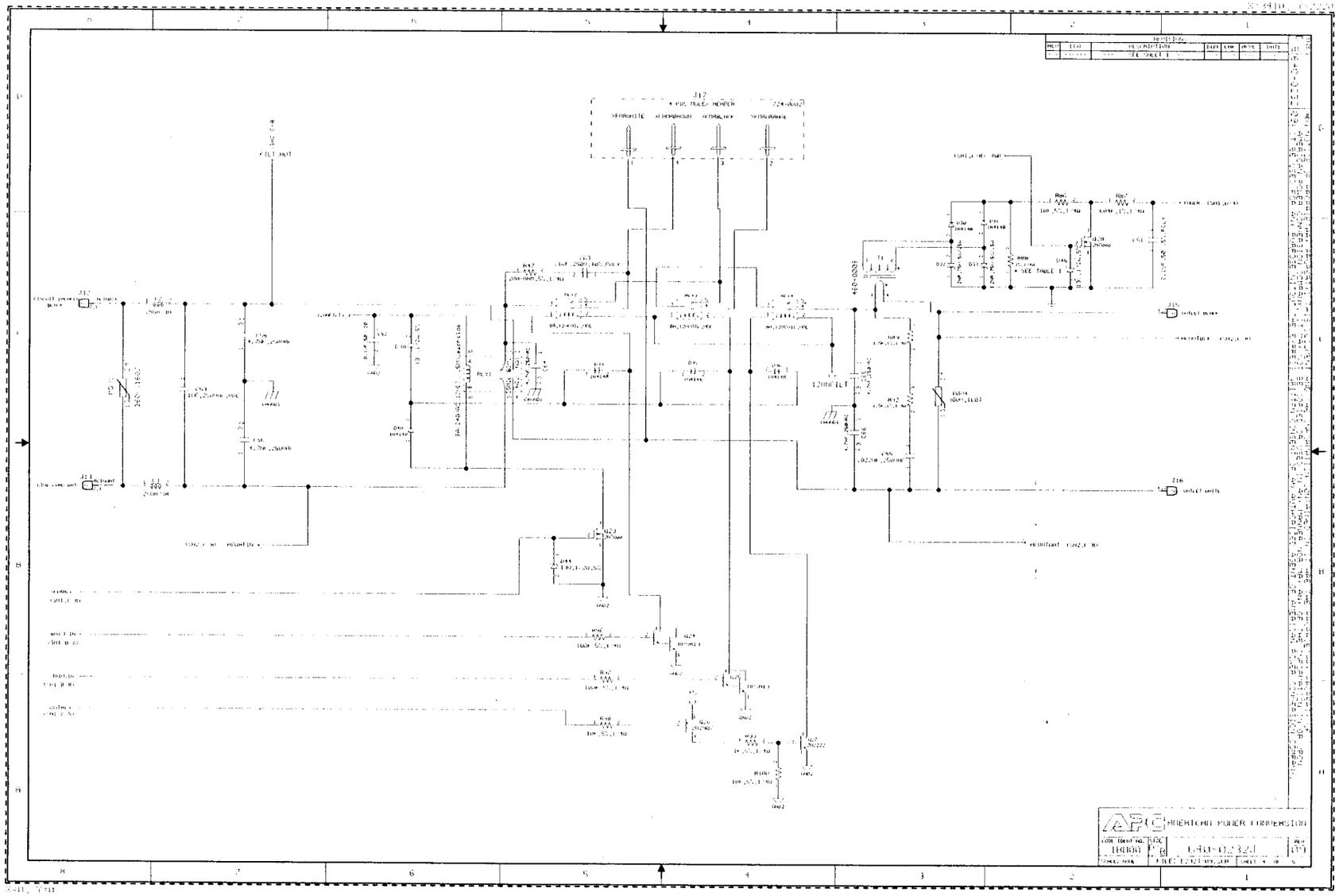
Appendix 7, Page 2 of 5



VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 7, Page 3 of 5



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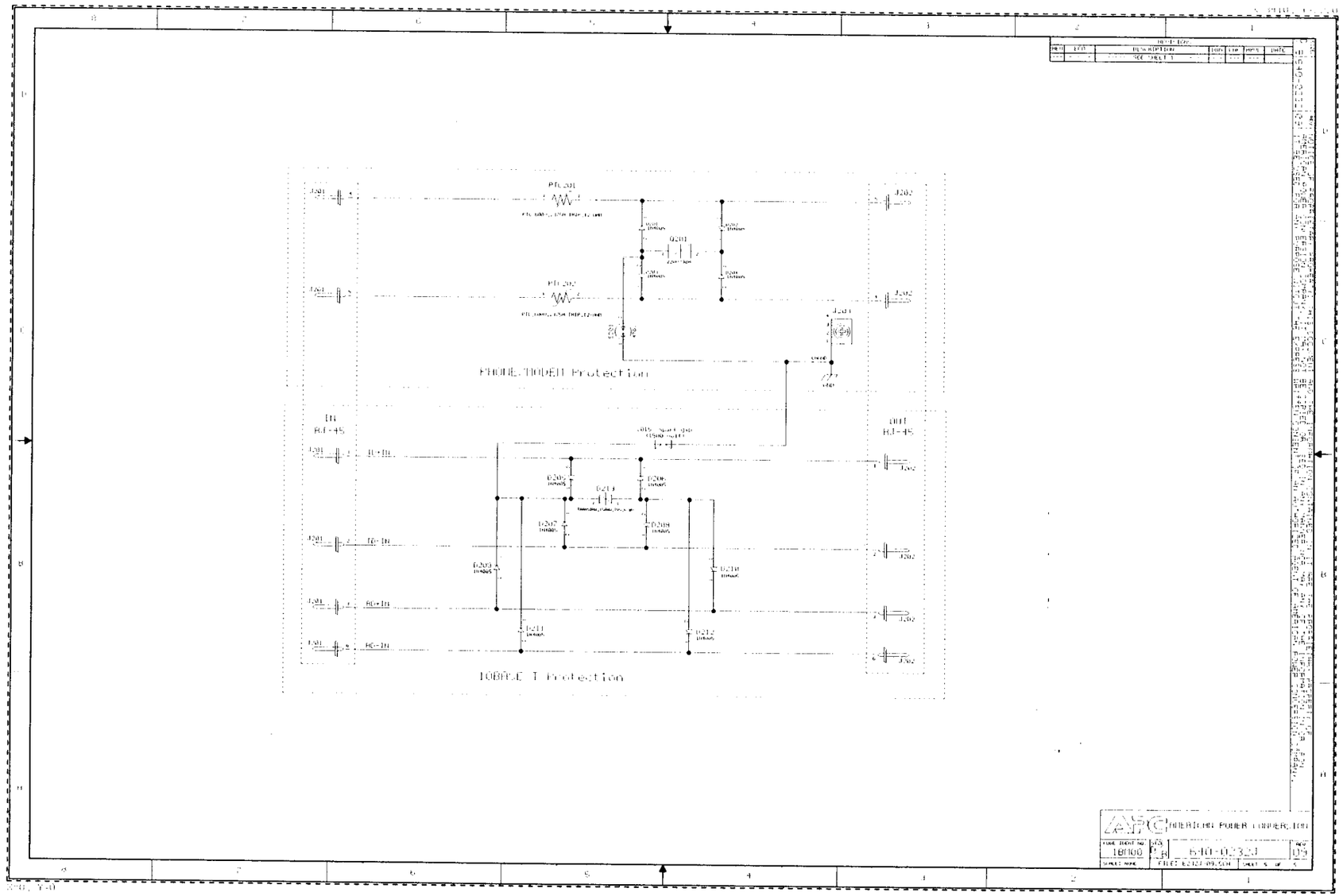
CB/DE1-11884
Appendix 7, Page 4 of 5



VDE File: 19244-3335-0025
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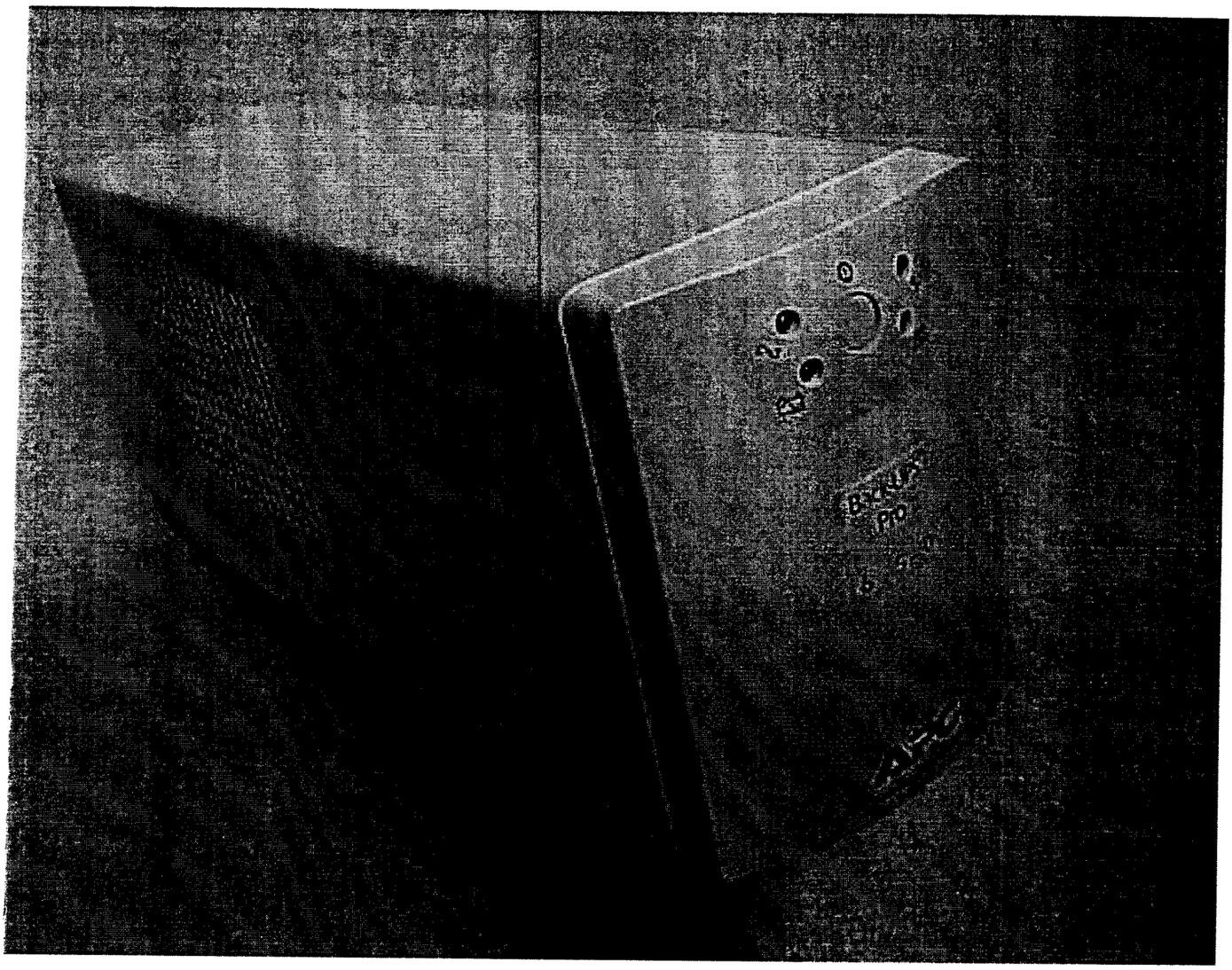
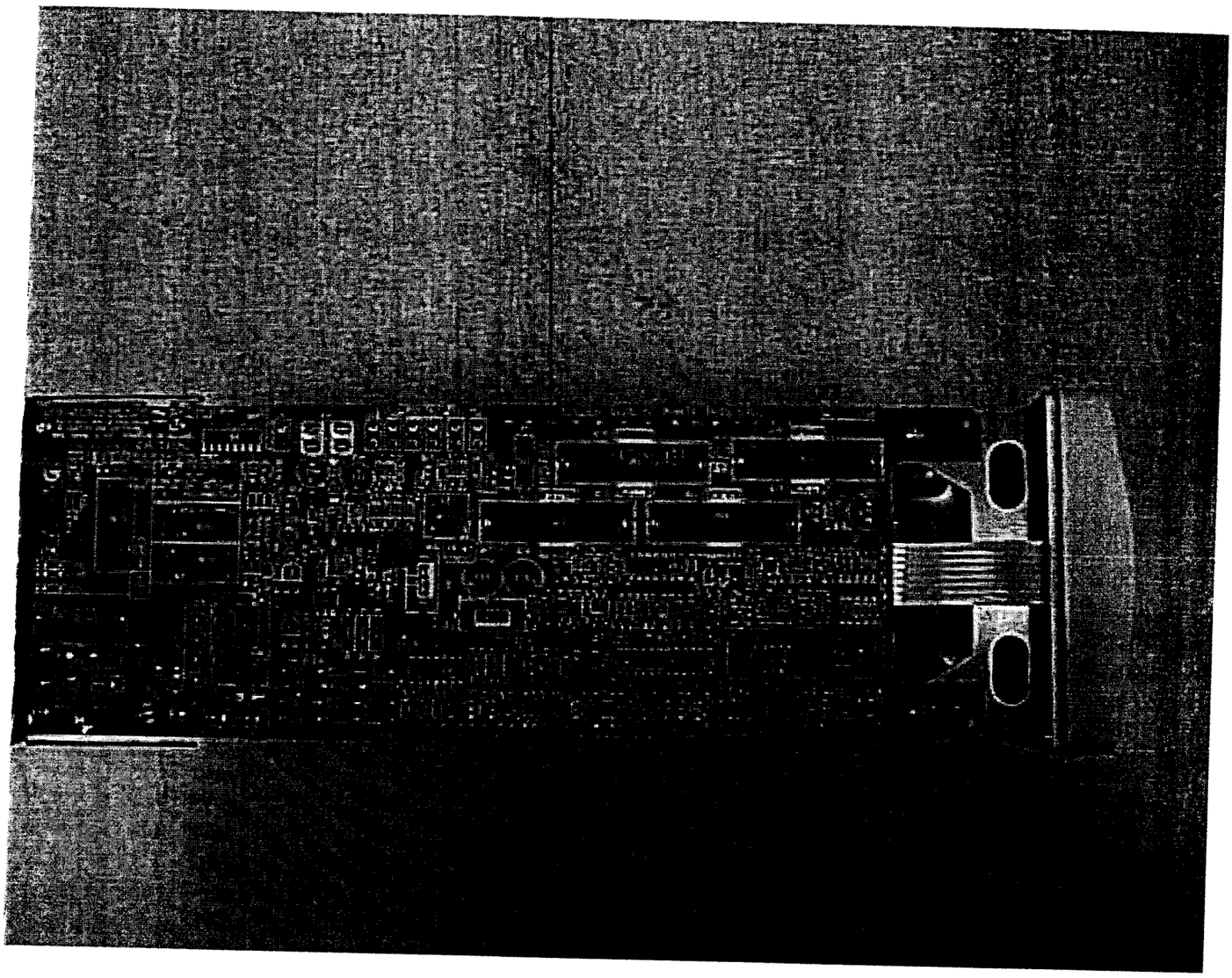
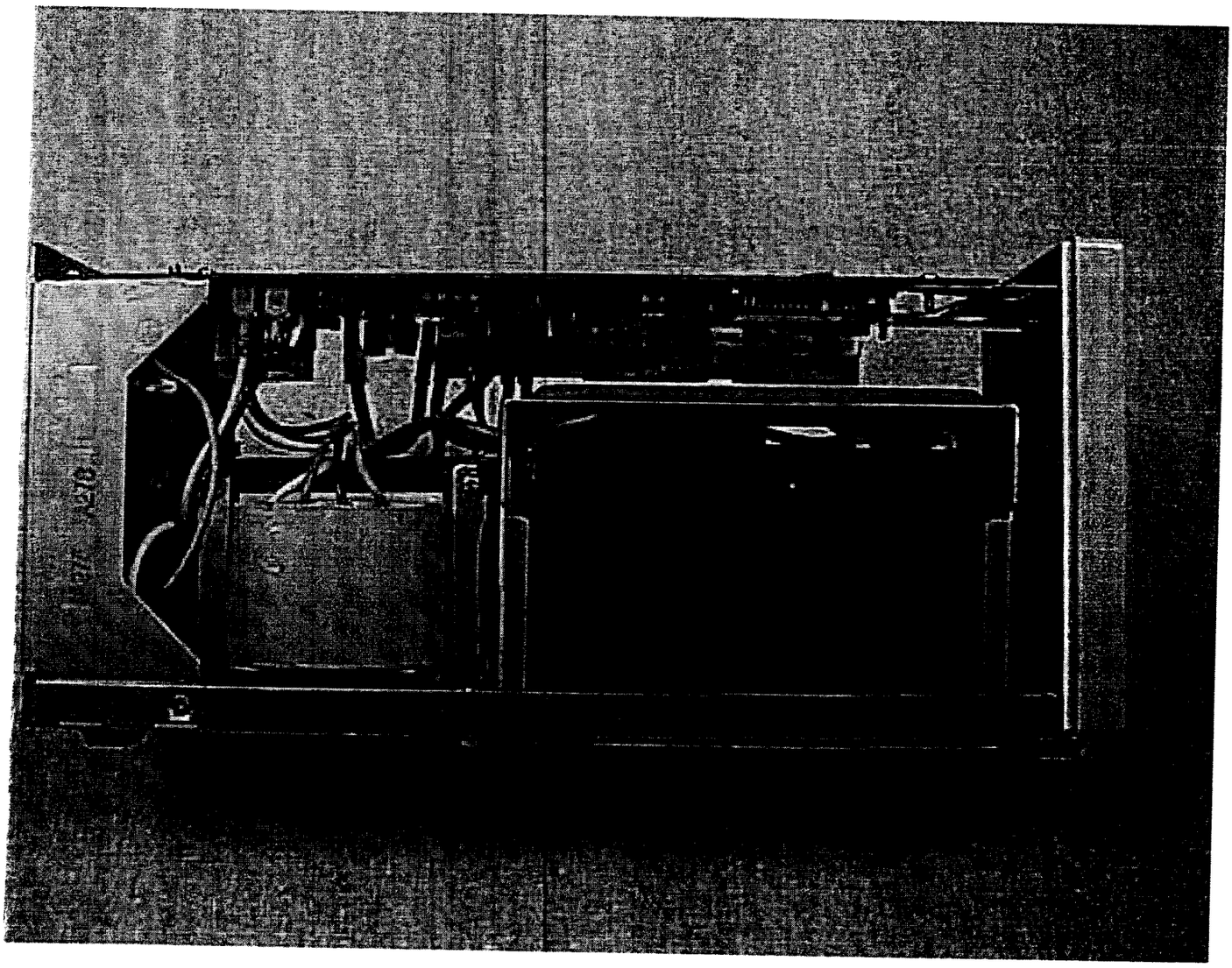
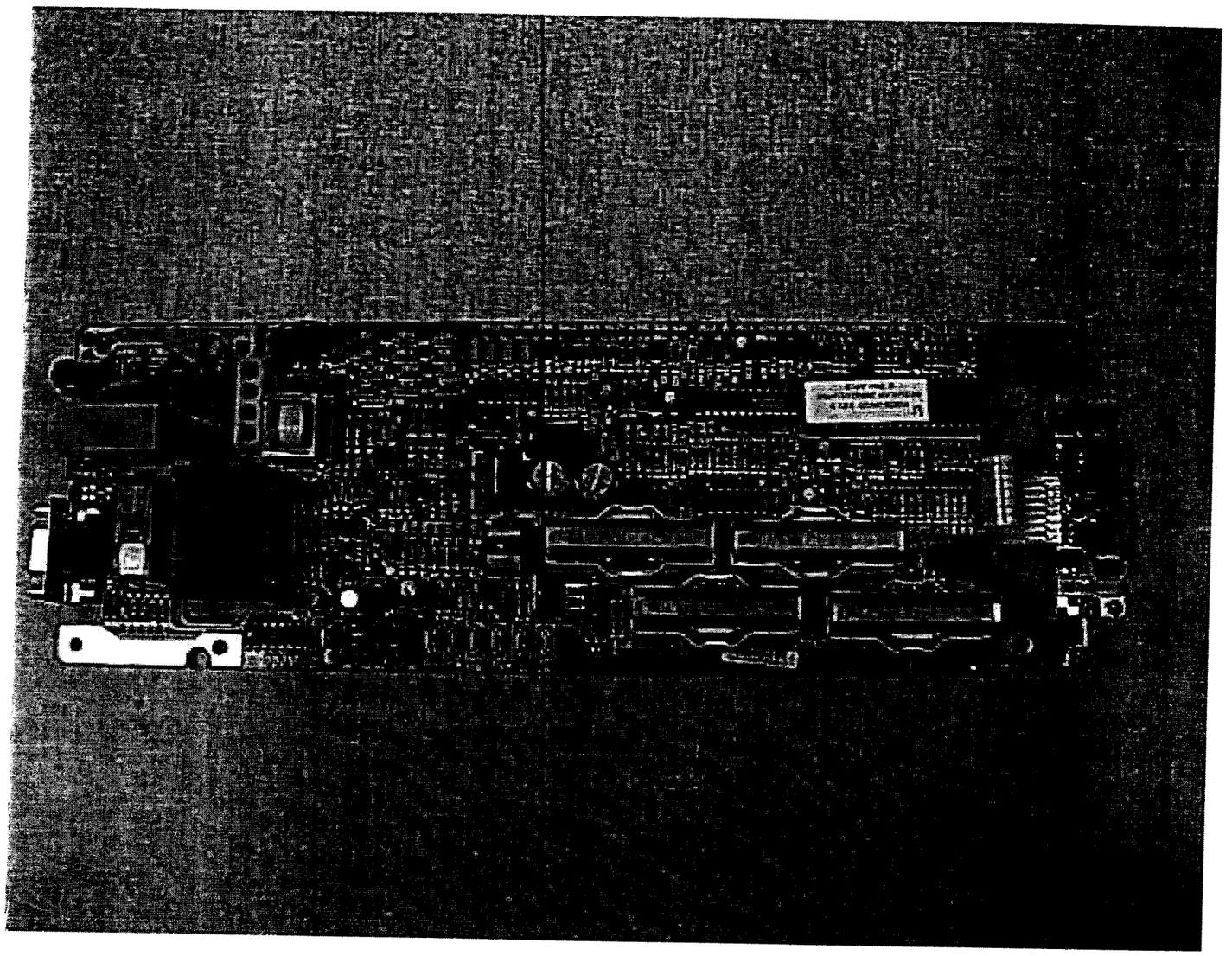
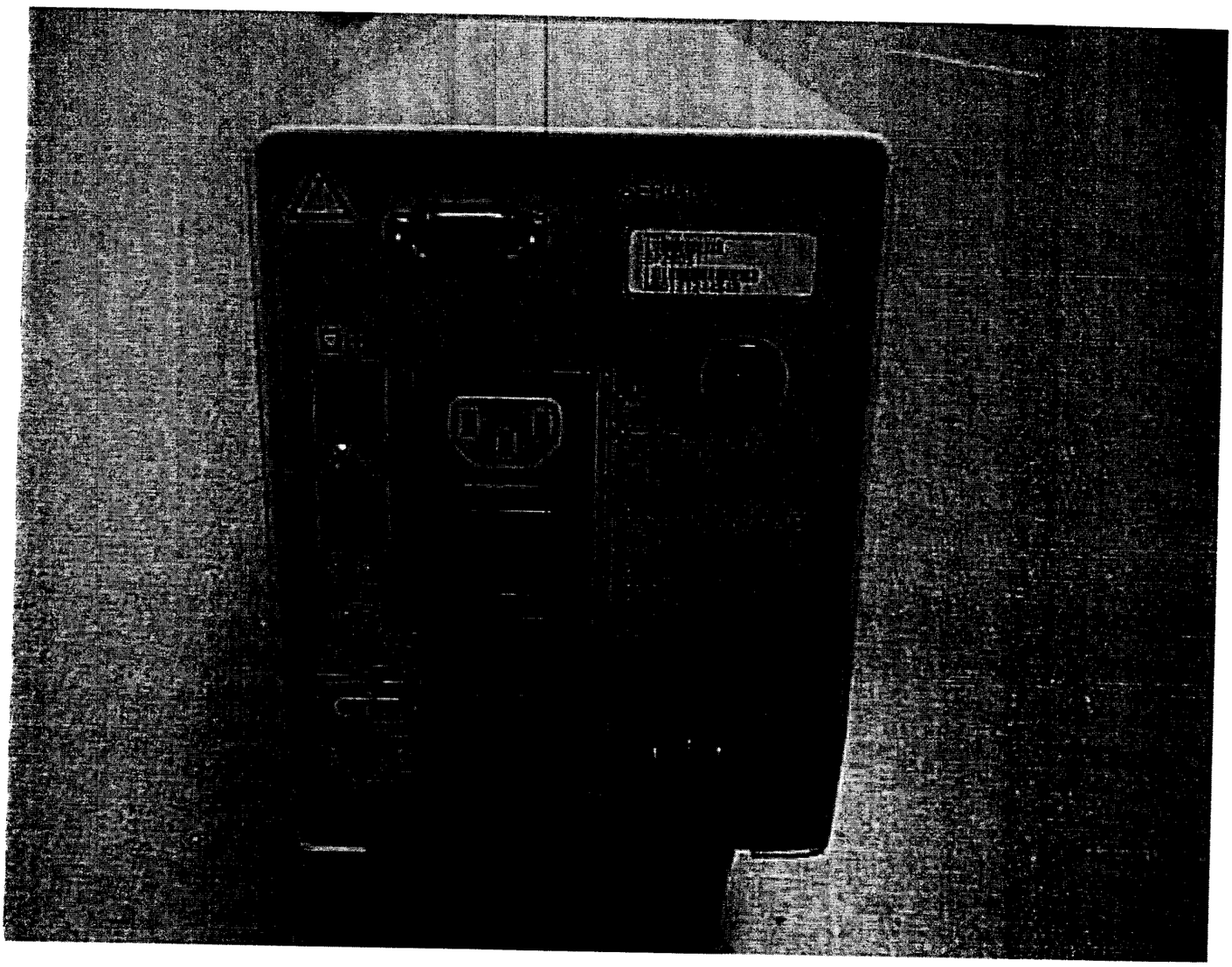
Appendix 7, Page 5 of 5

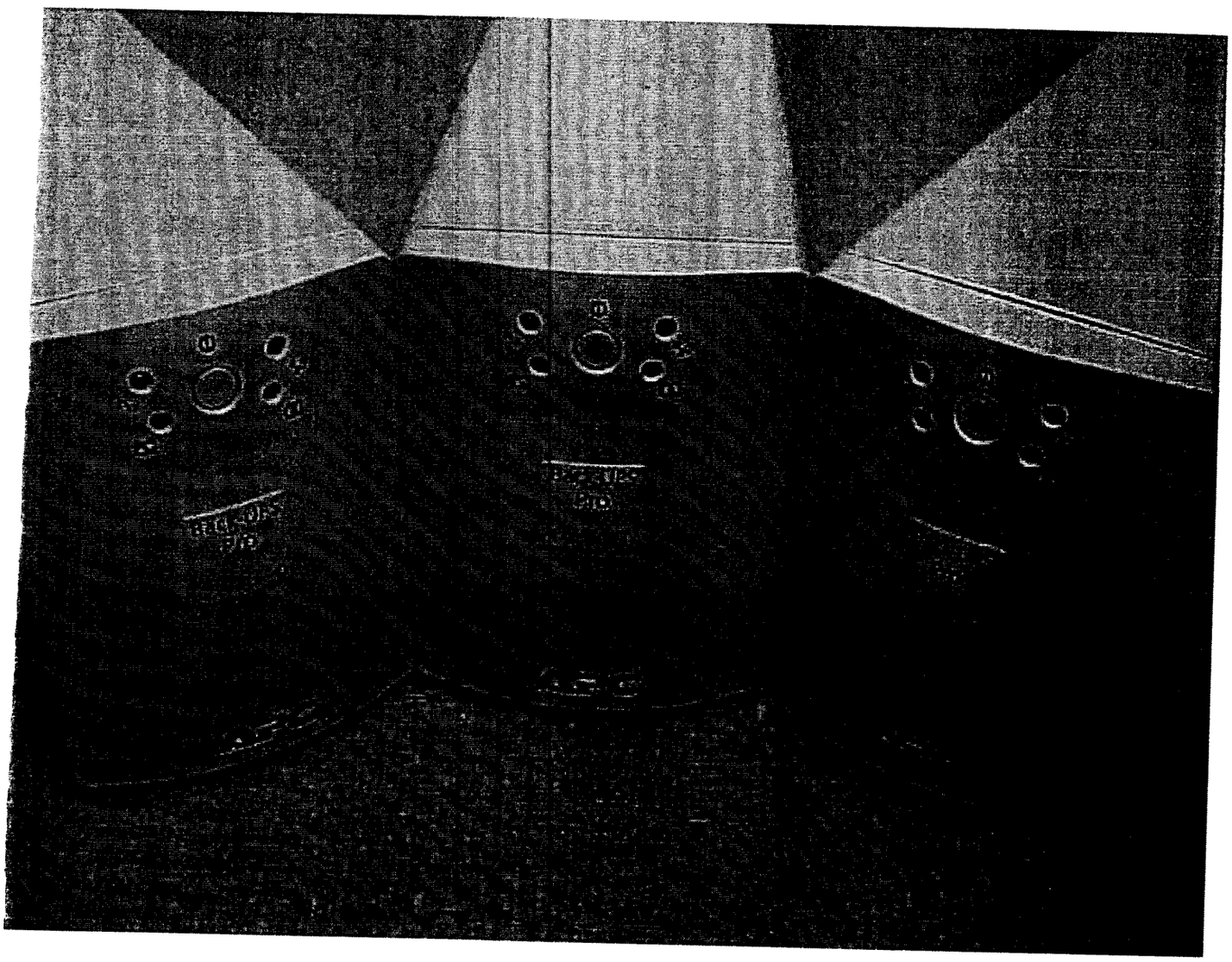


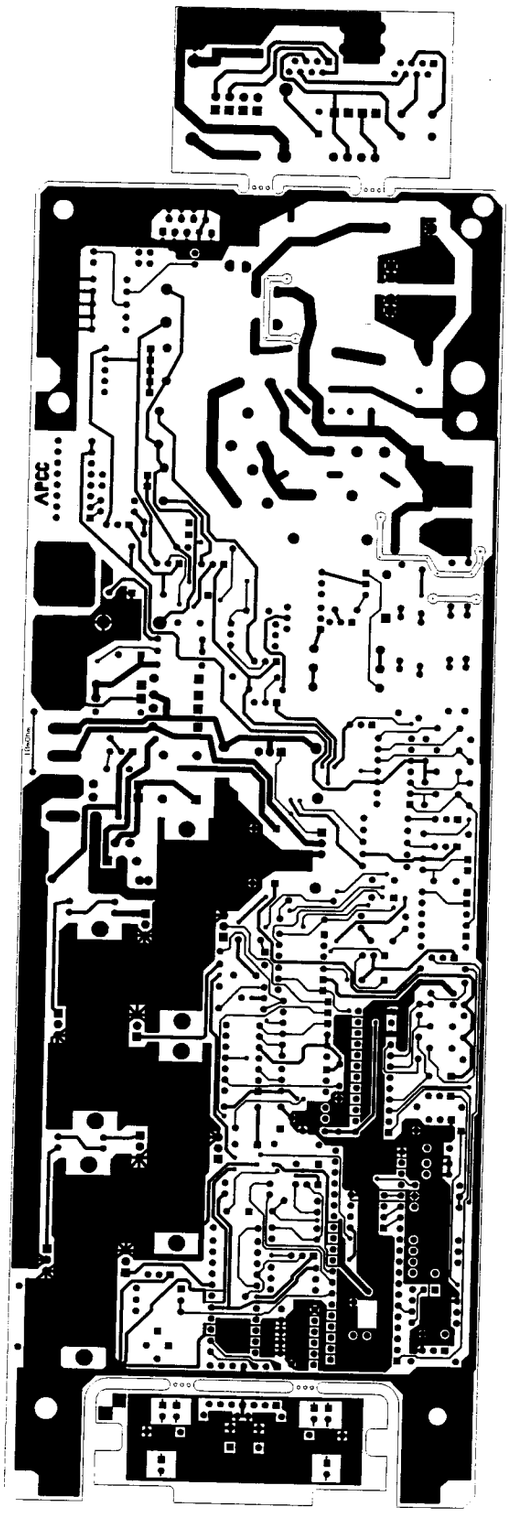




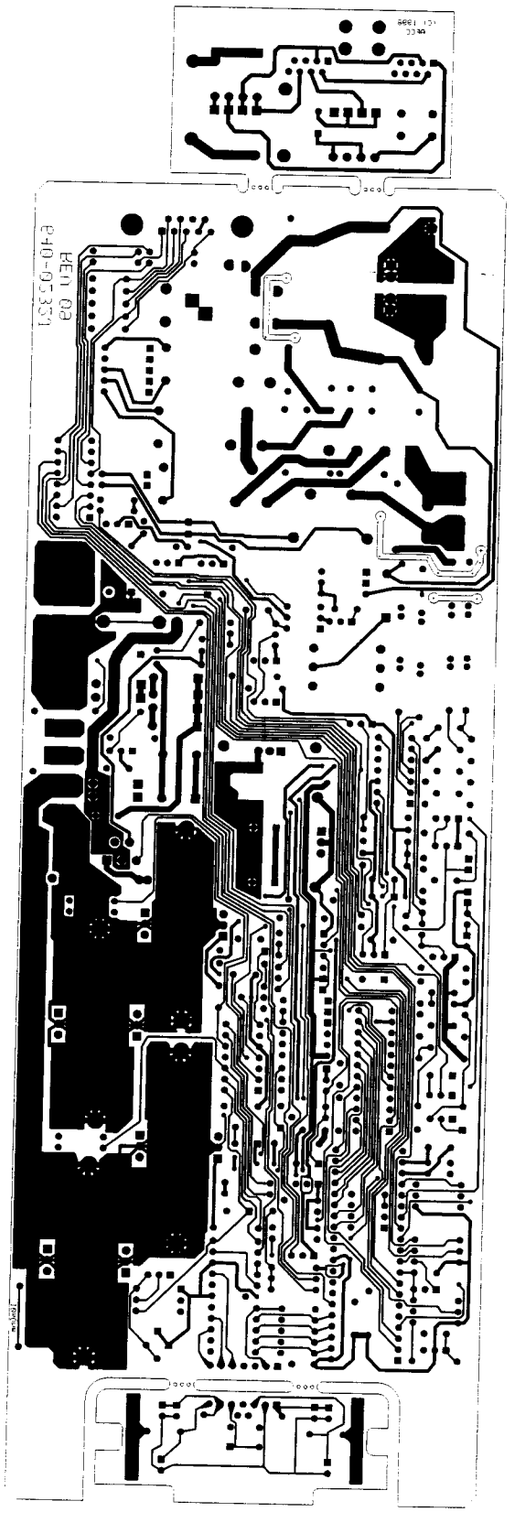








COMPONENT SIDE



SOLDER SIDE

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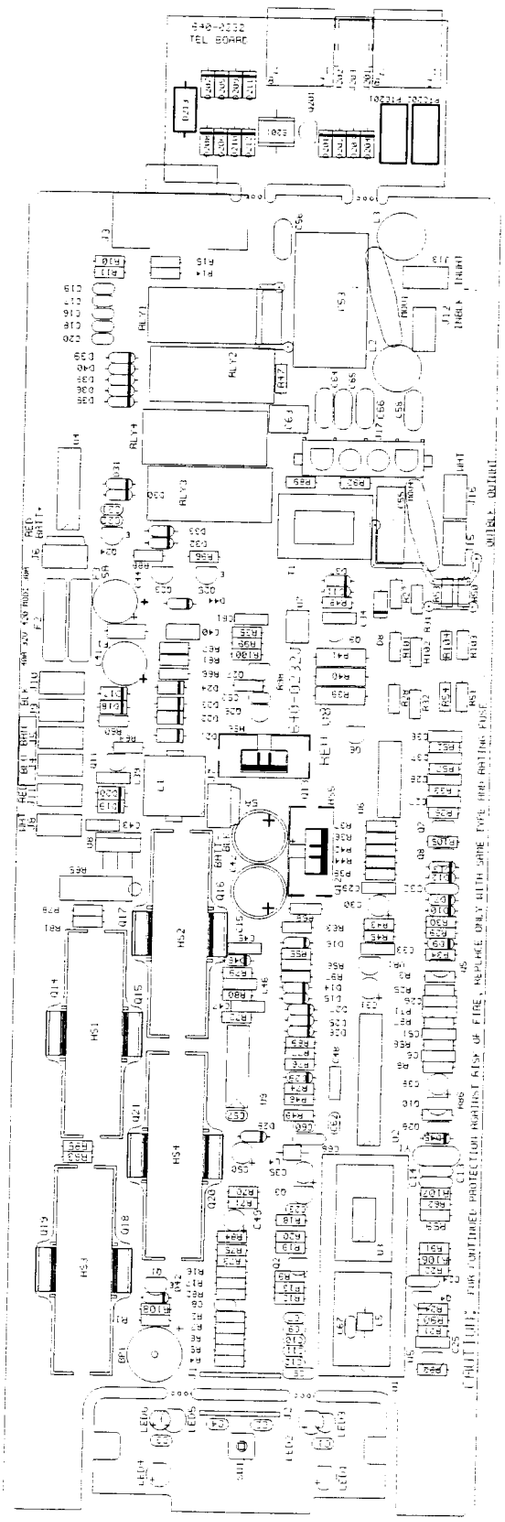
6440-A032
TEL BOARD
SILK SCREEN COMP

Explanation of reduced spacing for backfeed relays:

IEC 60950-3rd. edition requires the backfeed protection to be 2,8mm clearance and 5 mm creepage. In this application, American Power Conversion is using Annex R of IEC 60950 which allows relay clearances to be reduced to as low as 0,4 mm provided that the relay manufacturer performs a quality check per Annex R and performs 100% dielectric withstand testing. We are using a relay with 1,5 mm clearance. Attached are copies of the manufacturers quality plans which state that Dielectric testing at AC3000V will be performed on the contacts and that the spacing of the contacts will be measured.

Creepage will be obtained by one of two methods:

Method 1: The relay base will have 1 mm high ribs on them that will increase the creepage path pin to pin to achieve 5mm creepage.

Method 2: In this case the CTI of the relay base and epoxy has a value of 400 assigned to it. This allows the creepage to be reduced to 3,6mm. In the relays that use this the creepage is 4,5mm and thus acceptable.

AMERICAN ZETTLER, INC.
75 Columbia, Aliso Viejo, California 92656 • Telephone: (949) 831-5000 • FAX: (949) 831-8642

September 14, 2001

American Power Conversion Corporation
9 Executive Park Dr.
North Billerica, MA 01862

Attention: Steve Williams

Subject: AZ733W-2A-12DE (209) (APC 450-2150 A) Relay
AZ733W-2C-12DE (210) (APC 450-2152 A) Relay
– spacing between open contacts

Gentlemen:

The AZ733W relays (referenced above) made by American Zettler, Inc., have a specified air-gap between open contacts of 1.5 mm. In order to meet the APC requirement of 1.5 mm minimum contact gap between open contacts with a high degree of confidence, American Zettler will implement a quality control program in accordance with Annex R of IEC60950.

Specifically the program shall be implemented to meet Annex R.2 and shall monitor clearance (Reinforced Insulation), with 100% inspection of the contact gap and 100% dielectric strength testing of the open contact gap at 3000 VRMS for 500 to 1000 ms duration.

The Quality Plan, procedures and test log sheets are enclosed with this letter. Due to the complexity of the spreadsheet used for writing the Quality Plan, the text is quite small. I have printed the entire spreadsheet and have also printed out in larger type, the two key areas of "Mechanical Inspection" (1) and "Electrical Test" (2).

Test procedures and test logs are also included for the "Mechanical Inspection" and "Electrical Test".

I will send to you via e-mail the Excel spreadsheet for your reference.

Please call immediately if you have any questions.

Sincerely,

AMERICAN ZETTLER, INC.

Nate Benedict
VP, Engineering

American Zettler, Inc. will use IEC 60410 as the sampling plan dictated by IEC 60950 annex R 2. The following plan was taken directly from the IEC 60410 standard with the following exceptions: Sample size: 100% of production lot. Accept/Reject: 0/1

American Zettler, Inc. AZ733W-2A and AZ733W-2C Quality Plan [2]

Compiled: Derek Lee — 12/3/01

Approved: Steve Hesselberg, VP Engr. — 12/3/01

Nate Burquist

Inspection Sequence	Drawing No.	Item No.	Critical dimensions	MIL-STD	MIL-STD		Technical requirement	SPC requirement: Inspection frequency	Records	Recording method	Equipment	Calibration record	Process name	Acceptable value	Equipment	Test type	Technical standard	Process sequence	Inspection frequency	Records	SPC requirement: Recording method	Equipment	Calibration record
													Inventory Assembly	42									
													Continuous cycling test operation	43	[illegible]								
													Relay assembly	44									
													Terminal and/or terminated and aging of leads to epoxy plate	45, 46	Dimensions								
													manually inspection	47									
													Clean contact	48									
													Adjustment	49	calibration								
												1	Mechanical inspection	50	calibration			Quality inspection per [illegible]					
			Critical dimensions meet drawing and revised	Appearance limited by dimensions in 4.4.3b	Technical requirement	recording sheet for appearance of coil	digital caliper	visual gage	mark on the cover	51	manufacturing process										
													clean the cover and then put cover on the relay	52	special equipment								
													Tin dipping on the terminal	53	special equipment								
													electrical test, coil to contacts	54	computer burn-in test station								
													adjust the terminal	55		adjusting jig							
													Packing	56	special equipment								
													inspection change product	57		inspector							
													weld coil leads	58	special equipment								
													lead aging test	59	heating machine								
												2	Electrical Test	60	special equipment (automatic testing)			Quality inspection per [illegible]					
													inspect appearance and package	61, 62		adjusting jig							

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[2] The plans exceed the level of accuracy in the example given in IEC 60410 clause R 2 (100% testing for clearance and 100% testing for dielectric strength).

1	Mechanical Inspection	20	voltmeter	adjusting jig gram gauge pin gauge shim	relay should meet the following mechanical spec Mov spring pressure 0.03N Contact gap≥1.5mm Overtravel≥0.19mm	Quality inspection point 100%test	Spec/2h 100%	Technical supervisor Operator	finished product inspection sheet Self-inspection sheet	gram gauge voltmeter pin gauge shim	one year one day

2	Electrical Test	30	special equipment (automatic tester)		contact resistance, electrical spec dielectric strength and insulation meet requirement test conditions on the dielectric strength between open contacts 3000V ac(max leak current 0.5mA) Test time 500~1000ms	Quality inspection point 100% test	n/a	Operator	Self-inspection sheet	Automatic Tester	one year

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.

Prüfmuster *Specimen*				DIN EN 60695-2-1/1 (VDE 0471 Teil 2-1/1):1997-04 Glühdrahtprüfung [60 sec] *Glow-wire test [60 sec]* Flamme - *Flame*						DIN IEC 60112 (VDE 0303 Teil 1):1984-06 Kriechstromprüfung *Tracking test* Erosionstiefe/*Erosion depth [mm]*				DIN IEC 89(sec)82 (VDE 0471 Teil 2-5):1993-11 Kugeldruckprüfung *Ball-pressure test*				DIN EN 60695-2-2 (VDE 0471 Teil 2-2):1998-09 Nadelflammprüfung *Needle-flame test* Flamme - *Flame*				
Teil / Bezeichnung *Part / Designation*	Material / Handelsname *Material / Trade name*	Materialdicke *Material-thickness* mm	Farbe *Colour*	°C	Start *Start* sec	Ende *End* sec	Höhe *Height* mm	Entzünden Seidenpapier *Ignition of tissue paper*	Ergebnis *Result*	PTI Prüflösung *Test-solution* [A]	CTI	PTI Prüflösung *Test-solution* [B]	Ergebnis *Result*	°C	Gemessen *Measured* mm	Gefordert *Required* mm	Ergebnis *Result*	Brenndauer *Burning-duration* sec	Start *Start* sec	Ende *End* sec	Entzünden Seidenpapier *Ignition of tissue paper*	Erge *Re*
ecimen plates for SE and COVER	DuPont Rynite FR-530	2.8	black	850	0	0	0	no flame	passed	175	—	—	passed	—	—	—	—	—	—	—	—	-
ecimen plates for OBBIN	DuPont Rynite FR-530	2.8	natural	850	0	0	0	no flame	passed	175	—	—	passed	—	—	—	—	—	—	—	—	-
ecimen plates for EALING COMPOUND oxy resin)	ZM	various	black	—	—	—	—	—	—	400	—	—	passed	—	—	—	—	—	—	—	—	-
ecimen plates for EALING COMPOUND oxy resin)	AH3052K	various	black	—	—	—	—	—	—	400	—	—	passed	—	—	—	—	—	—	—	—	-

ält das Ergebnis einer einmaligen Untersuchung an dem zur Prüfung vorgelegten Erzeugnis. Ein Muster dieses Erzeugnisses wurde geprüft und die Übereinstimmung mit den nachfolgend aufgeführten Normen bzw. Teilen von Normen festgestellt. D
nicht zur Benutzung eines Prüfzeichens des VDE und des Zeichens GS=Geprüfte Sicherheit und erstreckt sich nicht auf alle für das geprüfte Erzeugnis geltenden VDE-Bestimmungen. Dieser Prüfbericht darf Dritten nur in vollem Wortlaut einschließl
und unter Angabe des Ausstellungsdatums zur Kenntnis gegeben werden. Jede Veröffentlichung und Vervielfältigung bedarf der vorherigen schriftlichen Genehmigung des VDE Prüf- und Zertifizierungsinstituts.
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oduction requires the prior written approval of the VDE Testing and Certification Institute.

	17525-4940-0006 / 32WGG	Anlage Nr.: *Appendix No.:*	2	Genehmigungsausweis Nr.: *Marks Licence No.:*	132710 ÜG	**PRÜFBERICHT** ***TEST-REPORT***
	American Zettler Inc.	© VDE	Name: *Name:*	Datum: *Date:*	Unterschrift: *Signature:*	**Fachgebiet F33** ***Section F33***
ita security :	C:\My Documents\E-mail attachments\Anlage 2-2.doc	Geprüft von: *Tested by:*	Nate Benedict	01. Juni 2001		Seite: *Page:* 1 von *of* 1

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: 19244-3335-0025
CB/DE1-11884
Appendix 10, Page 9 of 103

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Merianstraße 28 · D-63069 Offenbach · Tel. (+49) (069) 8306 - 0 · Fax (+49) (069) 8306 - 716

VDE
VDE-Form 33A3 0101

Prüfmuster *Specimen*				DIN EN 60695-2-1/1 (VDE 0471 Teil 2-1/1):1997-04 Glühdrahtprüfung [60 sec] *Glow-wire test [60 sec]* Flamme - *Flame*						DIN IEC 60112 (VDE 0303 Teil 1):1984-06 Kriechstromprüfung *Tracking test* Erosionstiefe/*Erosion depth (mm)*				DIN IEC 89(sec)82 (VDE 0471 Teil 2-5):1993-11 Kugeldruckprüfung *Ball-pressure test*				DIN EN 60695-2-2 (VDE 0471 Teil 2-2):1998-09 Nadelflammprüfung *Needle-flame test* Flamme - *Flame*				
Teil / Bezeichnung *Part / Designation*	Material / Handelsname *Material / Trade name*	Materialdicke *Material thickness* mm	Farbe *Colour*	°C	Start *Start* sec	Ende *End* sec	Höhe *Height* mm	Entzünden Seidenpapier *Ignition of tissue paper*	Ergebnis *Result*	PTI Prüflösung *Test-solution* [A]	CTI	PTI Prüflösung *Test-solution* [B]	Ergebnis *Result*	°C	Gemessen *Measured* mm	Gefordert *Required* mm	Ergebnis *Result*	Brenndauer *Burning-duration* sec	Start *Start* sec	Ende *End* sec	Entzünden Seidenpapier *Ignition of tissue paper*	Ergebnis *Result*
Specimen plates for BASE and COVER	*DuPont Rynite FR-530*	*2.8*	*black*	*850*	*0*	*0*	*0*	*no flame*	*passed*	*175*	—	—	*passed*	—	—	—	—	—	—	—	—	—
Specimen plates for BOBBIN	*DuPont Rynite FR-530*	*2.8*	*natural*	*850*	*0*	*0*	*0*	*no flame*	*passed*	*175*	—	—	*passed*	—	—	—	—	—	—	—	—	—
Specimen plates for SEALING COMPOUND (Epoxy resin)	ZM	*various*	*black*	—	—	—	—	—	—	400	—	—	*passed*	—	—	—	—	—	—	—	—	—
Specimen plates for SEALING COMPOUND	AH3052K	*various*	*black*	—	—	—	—	—	—	400	—	—	*passed*	—	—	—	—	—	—	—	—	—

Dieses Ergebnis einer einmaligen Untersuchung an dem zur Prüfung vorgelegten Erzeugnis. Ein Muster dieses Erzeugnisses wurde geprüft und die Übereinstimmung mit den nachfolgend aufgeführten Normen bzw. Teilen von Normen festgestellt. Der Bericht darf Benutzung eines Prüfzeichens des VDE und des Zeichens GS=Geprüfte Sicherheit und erstreckt sich nicht auf alle für das geprüfte Erzeugnis geltenden VDE-Bestimmungen. Dieser Prüfbericht darf Dritten nur in vollem Wortlaut und ohne Angabe des Ausstellungsdatums zur Kenntnis gegeben werden. Jede Veröffentlichung und Vervielfältigung bedarf der vorherigen schriftlichen Genehmigung des VDE Prüf- und Zertifizierungsinstitute.
This is the results of a single investigation carried out on the product submitted. A sample of this product was tested and found in accordance with the thereafter listed standards resp. parts of standards. This test report does not entitle to use a VDE test mark. GS = geprüfte Sicherheit (tested safety)" and does not refer to all VDE special actions applicable for the tested product. This test report may only be passed to a third party in its complete wording including this preamble and the date of issue. It requires the prior written approval of the VDE Testing and Certification Institute.

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 10, Page 10 of 103

17525-4940 0006 / 32WGG	Anlage Nr.: *Appendix No*	2	Genehmigungsausweis Nr.: *Marks Licence No.:*	132710 ÜG	**PRÜFBERICHT** ***TEST-REPORT***	
American Zettler Inc	© VDE	Name: *Name:*	Datum: *Date:*	Unterschrift: *Signature:*	**Fachgebiet F33** ***Section F33***	
C:\My Documents\E-mail attachments\Anlage 2-2.doc	Geprüft von: *Tested by:*	Nate Benedict	01. Juni 2001		Seite: *Page* 1 von *of* 1	

Prüfmuster / Specimen				DIN EN 60695-2-1/1 (VDE 0471 Teil 2-1/1):1997-04 Glühdrahtprüfung [60 sec] / Glow-wire test [60 sec] Flamme - Flame						DIN IEC 60112 (VDE 0303 Teil 1):1984-08 Kriechstromprüfung / Tracking test Erosionstiefe / Erosion depth [mm]				DIN IEC 89(sec)82 (VDE 0471 Teil 2-5):1993-11 Kugeldruckprüfung / Ball-pressure test				DIN EN 60695-2-2 (VDE 0471 Teil 2-2):1996-09 Nadelflammprüfung / Needle-flame test Flamme - Flame				
Teil / Bezeichnung / Part / Designation	Material / Handelsname / Material / Trade name	Materialdicke / Material-thickness	Farbe / Colour	°C	Start / Start	Ende / End	Höhe / Height	Entzünden Seidenpapier / Ignition of tissue paper	Ergebnis / Result	PTI Prüflösung / Test-solution [A]	CTI	PTI Prüflösung / Test-solution [B]	Ergebnis / Result	°C	Gemessen / Measured	Gefordert / Required	Ergebnis / Result	Brenndauer / Burning-duration	Start / Start	Ende / End	Entzünden Seidenpapier / Ignition of tissue paper	Erget / Res
					sec	sec	mm								mm	mm		sec	sec	sec		
Specimen plates for BASE and COVER	DuPont Rynite FR-530	2 B	black	850	0	0	0	no flame	passed	175			passed									
Specimen plates for BOBBIN	DuPont Rynite FR-530	2 B	natural	850	0	0	0	no flame	passed	175	--	--	passed	--	--	--	--	--	--	--	--	--
Specimen plates for SEALING COMPOUND (Epoxy resin)	ZM	various	black	--	--	--		--	--	400	--	--	passed	-								
Specimen plates for SEALING COMPOUND (Epoxy resin)	AH3052K	various	black	--	--	--		--	--	400		--	passed	--	--	--	--	--	--	--	--	--

VDE File: 19244-3335-0025
CB/DE1-11884
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enthält das Ergebnis einer einmaligen Untersuchung an dem zur Prüfung vorgelegten Erzeugnis. Ein Muster dieses Erzeugnisses wurde geprüft und die Übereinstimmung mit den nachfolgend aufgeführten Normen bzw. Teilen von Normen festgestellt. D
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ng und unter Angabe des Ausstellungsdatums zur Kenntnis gegeben werden. Jede Veröffentlichung und Vervielfältigung bedarf der vorherigen schriftlichen Genehmigung des VDE Prüf- und Zertifizierungsinstituts.

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eproduction requires the prior written approval of the VDE Testing and Certification Institute.

Ak / Re	er.:	17525-4940-0006 / 32WGG	Anlage Nr.: / Appendix No.:	2	Genehmigungsausweis Nr.: / Marks Licence No.:	132710 UG	PRÜFBERICHT / TEST-REPORT
Au / Cu		American Zettler Inc.	© VDE	Name: / Name:	Datum: / Date:	Unterschrift: / Signature:	Fachgebiet F33 / Section F33
Da / Da	:	J:_KUNDEN\17000\17525\4940\0006\Anlage 2-2.doc	Geprüft von: / Tested by:	VDE-Prüfinstitut	31. Mai 2001		Seite / Page 1 von / of 1

TÜV Rheinland Product Safety GmbH Am Grauen Stein D-51105 Köln	Gen.-Ausw.-Nr.	Aktenzeichen:	Anlage Nr.:	TÜV Rheinland
	R 9659062	00943- XL/yy- E9566170Z02	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
1.3 **Ursprungszeichen:** Mark of Origin	A. ZETTLER
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 Trägerteils:** 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	$AgCdO_{12}$

Post-it® Fax Note 7671 | Date 4-3-00 | # of pages 3
To Bob Rietzel | From Amber Filbeck
Co./Dept. AFC | Co. American Zettler
Phone # Request per Bill Bouchard | Phone # 949-831-5000
Fax # | Fax # Berkshire Electronics

To be continued on page 2

Köln, den 02.01.98

Xiao Ling

TÜV Rheinland
Product Safety GmbH

XIAMEN, P.R. CHINA (Ort) / Place — 12/30/97 (Datum)/ Date

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.	Aktenzeichen:	Anlage Nr.:	TÜV Rheinland
	R9659062	00943- XL/yy- E9566170Z02	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

2 **Nennwerte der Erregerstromkreise nach DIN VDE 0435 Teil 201**
Ratings of energizing circuits according to IEC 255-0-20

		AC	DC
2.1	**Erregerspannung:** Energizing quantity	N/A	DC3V-DC 60V
2.2	**minimale Nennstrom:** min. rated current	0.1A	
2.3	**Bemessungsverbrauch:** Rated Burden	0.8W	
2.4	**Ansprechklasse:** Pick-up class	A	
2.5	**Arbeitsbereich:** Operative range	80%-110% (Class 1)	
2.6	**Mechanische Lebensdauer** **Schaltspiele pro Stunde:** mechanical life/cycles per hour	1×10^7 times 18000 times/h	

3 **Isolationskoordination nach DIN VDE 0110/01.89**
Insulation coordination according to IEC 664 (1980)/1664A (1991)

3.1	**Verschmutzungsgrad:** Pollution degree	2	
3.2	**Bemessungsstoßspannung:** Rated transient voltage	I	
3.3	**Bemessungsspannung:** Rated voltage	250VAC	
3.4	**Kriechstromfestigkeit:** CTI value	IIIa	

Strecke zwischen (Distance between)

geöffneten Kontakten (open contacts): 1.5mm

~~Spule und Kontakten (Coil and contacts):~~ 8mm

Kontakten verschiedener Polarität:
Contacts of different polarity 4mm

To be continued on page 3

Köln, den 02.01.98

Xiao Ling

TÜV Rheinland
Product Safety GmbH

XIAMEN, P.R. CHINA (Ort) Place

12/30/97 (Datum) Date

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.	Aktenzeichen:	Anlage Nr.:	TÜV Rheinland
	R 9659062	00943- XL/yy- E9566170Z02	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

4.1	**Anzahl der Pole:** Number of Poles		2
4.2	**Nennspannung** Rated voltage	AC: DC:	250VAC 30VDC
4.3	**Einschaltvermögen** Making capacity	AC/cos phi: DC/ms:	10A, cos ∅=1
4.4	**Ausschaltvermögen** Breaking capacity	AC/cos phi: DC/ms:	10A, cos ∅=1
4.5	**Kombiniertes Ein- und Ausschaltvermögen** cyclic capacity	AC/cos phi: DC/ms:	N/A
4.6	**Dauerstrom** continuous capacity	AC/cos phi: DC/ms:	10A, cos ∅=1
4.7	**Kurzzeitstrom** short time capacity	AC/cos phi: DC/ms:	10A, cos ∅=1
	Zeitdauer wenn keine Angabe 1s: Duration (if not 1s)		
4.8	**Kontaktklasse:** contact class		III

Köln, den 02.01.98

TÜV Rheinland
Product Safety GmbH

XIAMEN, P.R. CHINA 12/30/98

(Ort) / Place (Datum)/ Date

CHEN ZHI CHAO

(Stempel und Unterschrift des Antragstellers/ stamp and signature of applicant)

APC-150/150

TÜV Rheinland
Product Safety GmbH
Am Grauen Stein D - 51105 Köln

TÜV Rheinland

Prüfbericht - Nr.: E 9566170Z02
Test Report No.

Auftraggeber: *Client:*	American Zettler, Inc. 75 Columbia, Aliso Viejo, California 92656, U.S.A
Gegenstand der Prüfung:	Miniature Power Relay
Bezeichnung: *Identification:*	AZ733W-2A...
Serien-Nr.: *Serial No.*	Engineering Sample.
Wareneingangs-Nr.: *Receipt No.:*	N/A.
Eingangsdatum: *Date of receipt:*	15.06.1997.
Prüfort: *Testing location:*	Shanghai No.4 Laboratary
Prüfgrundlage: *Test specification:*	DIN VDE 0435 Teil 120/10.81 DIN VDE 0435 Teil 201/05.83+A1

Gesehen/Reviewed
Shanghai 10-01-2000
TÜV Product Safety GmbH

Prüfergebnis: *Test Result*	**Der vorstehend beschriebene Prüfgegenstand wurde geprüft und entspricht oben genannter Prüfgrundlage.** The a. m. test item passed.

geprüft/*tested by:*

24.12.97	Jiang Wei	J. Wei
Datum *Date*	Name *Name*	Unterschrift *Signature*

kontrolliert/*reviewed by:*

24.12.97	LI, WANYU	L. Y.
Datum *Date*	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:		Abbreviations:	
OK. Pass	= entspricht Prüfgrundlage	OK. Pass	= passed
Fail	= entspricht nicht Prüfgrundlage	Fail	= failed
N/A	= nicht anwendbar	N/A	= not applicable

Dieser Prüfbericht bezieht sich nur auf den o.g. Prüfgegenstand. Ohne Genehmigung des Prüflabors darf dieser Prüfbericht nicht auszugsweise vervielfältigt werden. Dieser Prüfbericht berechtigt nicht zum Führen eines Prüfzeichens.
This test report relates to the a. m. test item. Without permission of the test laboratory this test report may not be reproduced in extracts. This test report does not entitle to carry any test mark.

Blatt 2

试验设备清单

试验编号：E 956617o Z 07

生产厂名：American Zettler. Inc.

样品型号规格：AZ733W - 2A-.

序号	型号	设备名称	编号	下次计量日期	使用情况
1	8520A	数字多用表 Digital Multi-fuaction meter	9-17	98/10/18	
2	4329A	高阻仪 High resistance meter	14-8	98/ 9/ 2	
3	TOS8750	耐压仪 High voltage Tester	50-55	98/ 8/ 3	
4	DH1715	双路稳压稳流电源 Constant Voltage and current power supply	7-107	98/ 9/ 9	
5	DR020	数字温度巡回检测仪 Digital Temp. recorder	50-308	98/11/ 9	
6	MC-81	高低温箱 High and low temp. chamber	62-03	98/11/ 3	
7	6520A	记忆示波器 OSCilloscope	31-03	98/ 5/ 8	
8	MF35	万用表 Multimeter	50-247	98/ 6/19	
9		继电器寿命台 Endurance tester for relay	66-08	98/ 9/17	
10					
11					
12					

o.k. Xiaoling

上海市电子仪表标准计量测试所元器件室

TÜV Rheinland Zertifizierungs-
und Prüfstelle für Gerätesicherheit

TÜV Rheinland

Nr./No.: E 9566170Z02.

Seite/page 1

ELEKTRISCHE RELAIS
SCHALTRELAIS
ALL-OR-NOTHING ELECTRICAL RELAYS

Prüfbericht Nr. : E 9566170Z02
Test Report No.

Seite 1 von 22
page 1 of 22

Auftraggeber : American Zettler
Applicant

Prüfort
Place of Testing Shanghai No.4 Laboratory

Typenbezeichnung : AZ 733W-2A...
Type designation

Prüfergebnis

Das vorstehend beschriebene Bauteil wurde geprüft und entspricht/~~entspricht nicht~~ der oben genannten Prüfgrundlage

Test Result

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 to this or similar products. Further, for sales or other application purposes of the tested products any reference to TÜV Rheinland is only [illegible] written consent of TÜV Rheinland.

Der Sachverständige

Geprüft

24.12.97 [illegible]

Datum, Unterschrift

Datum, Unterschrift

VDE File: 19244-3335-0025
CB/DE1-11884
Appendix 10, Page 17 of 103

Einteilung des Relais (Division of Relay type)

a) Allgemeine Einteilung *(General division)*

Bezeichnung *Type designation*	AZ733W-
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	/ - / V
	DC	3 - 60 V
Bemessungsverbrauch *Rated burden*	AC	/ W
	DC	0.8 W
Ansprechklasse *Pick-up class*		/ - - A
Arbeitsbereich *Operative range*	A	Class /
		Class I
Mechanische Lebensdauer/ Schaltspiele pro Stunde *mechanical lifecycles per hour*		/

c) Einteilung der Kontaktstromkreise (Division of the contact circuits)

Nennspannung *Rated voltage*	AC 230 V / DC 30 V	AC / V / DC / V	AC / V / DC / V
Anzahl der Pole *Number of Poles*	2	/	/
kombiniertes Ein/ Aussschaltvermögen/ Leistungfaktor *Switching capacity/ Power factor*	cosphi 1 / / ms	cosphi / / / ms	cosphi / / / ms
	cosphi / / / ms	cosphi / / / ms	cosphi / / / ms
	cosphi / / / ms	cosphi / / / ms	cosphi / / / ms
	cosphi / / / ms	cosphi / / / ms	cosphi / / / ms
Elektrische Lebendauer/ Schaltspiele/Stunde *Electrical life/ Cycles per hour*	6000 / 1800	/ /	/ /
Dauerstrom/ Leistungfaktor *continues/ Power factor*	cosphi 1 / / ms	cosphi / / / ms	cosphi / / / ms
	cosphi / / / ms	cosphi / / / ms	cosphi / / / ms
	cosphi / / / ms	cosphi / / / ms	cosphi / / / ms
	cosphi / / / ms	cosphi / / / ms	cosphi / / / ms
Elektrische Lebendauer/ Schaltspiele/Stunde *Electrical life/ Cycles per hour*	6000 / 1800	/ /	/ /
Kurzzeitstrom/ Leistungsfaktor/ Zeit (wenn keine Angabe 1s) *Short time capacity/ Power factor/duration*	cosphi 1 / / 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 ms		
Elektrische Lebendauer/ Schaltspiele/Stunde *Electrical life/ Cycles per hour*	6000 / 1800	/ /	/ /

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) AZ733W-2A-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) o.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 x U_n (min.10)
Number of Test cycles — 10 times. — ok.

Anzahl der Schaltspiele für U = 1.1 x 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

Sample 3	ok.	ok.	ok.	ok.	ok.	ok.	ok.	ok.	ok.	ok.
Sample 4	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 — $U = \cancel{0{,}15\%} \times U_n$ (min.10) — N/A.
Number of Test cycles

Anzahl der Schaltspiele für DC — $U = \cancel{0{,}5\%}$ 0.05 $\times U_n$ (min.10) — OK.
Number of Test cycles — 10 times.

Spulenausführung /

	1	2	3	4	5	6	7	8	9	10
Sample 1						/				
Sample 2						/				

Spulenausführung DC 12V.

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	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

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 E9t66170201

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_____	
4) geöffneten Kontakten *open contacts*	AC_____	
5) _____	AC_____	

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OK. refer to E956617-E01.

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 _____

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 10^7.

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 = 0.9 x U_n (min.10)
Number of Test cycles 10 times. OK.

Anzahl der Schaltspiele für U = 1.1 x U_n (min.10)
Number of Test cycles 10 times. OK.

Abfallen
drop-out

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Prüfraumtemperatur (Raumtemperatur)
Temperature of Test chamber (ambient temperature) -40

Anzahl der Schaltspiele für AC U = ~~0.15~~ x U_n (min.10)
Number of Test cycles 10 times. - OK

Anzahl der Schaltspiele für DC U = 0.95 x U_n (min.10

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% der Werte nach der Feuchteprüfung
Testvoltages 75% 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 375 V	1000 MΩ
2) Spule und Kontaktstromkreisen *Coil and contacts*	AC 3000 V	1000 MΩ
3) Kontakten verschiedener Polarität *Contacts of different Polarity*	AC 2250 V	1000 MΩ
4) geöffneten Kontakten *open contacts*	AC 750 V	1000 MΩ
5) enclosure and contacts	AC 3000 V	1000 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	10^7	OK.	8.0 mΩ.	OK.	OK.
Sample 2	10^7	OK.	8.6 mΩ.	OK.	OK.
Sample 3	10^7	OK.	9.1 mΩ.	OK.	OK.
Sample 4	10^7	OK.	8.7 mΩ.	OK.	OK.
Sample 5	10^7	OK.	8.2		

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 Bemessungverbrauch
5 Samples of the coilvoltage 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)*

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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: 1-1X

Sample

max. Temperatur ...

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			A≥733W.	
Spulenspannnng *(Coil voltage)* U_n/V			DC12V.	
Eingangsstrom *(Input current)*			61mA.	
Leistungfaktor *(Power factor)*			cos φ = 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.

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% der Werte nach der Feuchteprüfung
Testvoltages 75% 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 375 V	1000 MΩ
2)	Spule und Kontaktstromkreisen *Coil and contacts*	AC 3000 V	1000 MΩ
3)	Kontakten verschiedener Polarität *Contacts of different Polarity*	AC 2250 V	1000 MΩ
4)	geöffneten Kontakten *open contacts*	AC 750 V	1000 MΩ
5)	Enclosure and contacts.	AC 3000 V	1000 MΩ
6)	/	AC	/

	Schaltspiele *life cycles*	Sichtprüfung *visual check*	Durchgangs-widerstand *contact-resistance*	Spannungs-festigkeit *dielectric-strength*	Isolations-widerstand *insulation resistance*
Sample 1	6000	OK.	8.1 mΩ	OK.	OK.
Sample 2	6000	OK.	12.7 mΩ	OK.	OK.
Sample 3	6000	OK.	8.3 mΩ	OK.	OK.
Sample 4	6000	OK.	8.1 mΩ	OK.	OK.
Sample 5	6000	OK.	8.3 mΩ	OK.	OK.

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		AZ733W		
Spulenspannung *(Coil voltage)* U_n/V		DC12V		
Eingangsstrom *(Input current)*		16mA		
Leistungfaktor *(Power factor)*		Cosφ = 1.0		

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.

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 375 V	1000 MΩ
2) Spule und Kontaktstromkreisen *Coil and contacts*	AC 3000 V	1000 MΩ
3) Kontakten verschiedener Polarität *Contacts of different Polarity*	AC 2250 V	1000 MΩ
4) geöffneten Kontakten *open contacts*	AC 750 V	1000 MΩ
5) Enclosure and contacts	AC 3000 V	1000 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	6000	o.k	18.3 mΩ	ok.	ok.
Sample 2	6000	o.k	16.7 mΩ	ok	ok
Sample 3	6000	ok	20.2 mΩ	ok	ok
Sample 4	6000	ok.	12.4 mΩ	ok.	ok
Sample 5	6000	ok.	20.7 mΩ	ok. -	ok

contact resistan

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)*				
Leistungfaktor *(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 *(Comment)* :

N/A.

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

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					

N/A

Dauerstrom nach Abschnitt 5.1.4
(Continues capacity acc. to 5.1.4)

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)*				
Leistungfaktor *(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 safely.

Kommentar *(Comment)* : _____

N/A

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

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					

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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 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

Dauer (wenn keine Angabe 1s)
Duration, when non information default is 1s 1000 ms

Typ	1	2	3	4
Bezeichnung	AZ733W.			
Spulenspannung *(Coil voltage)* U_n/V	DC12V.			
Eingangsstrom *(Input current)*	66mA.			
Leistungfaktor *(Power factor)*	cos φ = 1.0.			

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
the contacts can still work

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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 der Werte nach der Feuchteprüfung
Testvoltages 75 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 375 V	1000 MΩ
2) Spule und Kontaktstromkreisen *Coil and contacts*	AC 3000 V	1000 MΩ
3) Kontakten verschiedener Polarität *Contacts of different Polarity*	AC 2250 V	1000 MΩ
4) geöffneten Kontakten *open contacts*	AC 750 V	1000 MΩ
5) Enclosure and contacts.	AC 3000 V	1000 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	6000	ok.	15.2 mΩ	ok.	ok.
Sample 2	6000	ok.	14.6 mΩ.	ok.	ok.
Sample 3	6000	ok.	12.1 mΩ.	ok.	ok.
Sample 4	6000	ok.	28.2 m	ok.	ok.
Sample 5	6000	ok.	11.1 m	ok.	ok.

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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) IIIa.

Bemessungsspannung
(muß >= der Nennspannung sein)
Rated voltage
(must be >= of rated voltage ok. 250V~.

Strecke *(Distance)*

Spule und Kontakten
(Coil and contacts)

2A: K Feld 8.5 mm
L Feld 8.5 mm
Feld ___ mm

Geöffneten Kontakten *(Open contacts)* ___ mm

Kontakten verschiedener Polarität
(Contacts of different polarity)

K 4.0 mm
L. 4.0 mm
___ mm

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.

VDE Reg.-Nr. 134570 oder *or* VDE VDE-Reg.-Nr. 134570

Geprüft 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

Aktenzeichen: 23967-4940-0002 / 32AD1 F33 / KS
File ref.:

VDE Prüf- und Zertifizierungsinstitut
VDE Testing and Certification Institute
Zertifizierungsstelle
Certification body

Ausweis-Nr.: 134570 ÜG
Licence No.:

Blatt 1
page

Weitere Bedingungen siehe Rückseite und Folgeblätter /
further conditions see overleaf and following pages

Offenbach, 2001-03-05

VDE VERBAND DER ELEKTROTECHNIK
ELEKTRONIK INFORMATIONSTECHNIK e.V.

O/E/N INDIA LIMITED	WORK INSTRUCTION – 68 RELAY DIELECTRIC STRENGTH (HIPOT) CHECKING	NO. : WI-PRA-68-023 DATE : 23/03/2001 PAGE : 1 of 1

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
Dept. 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

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.

Prepared by	Resha Joseph Quality Assurance	Approved by	Isaac Palathinkal Dept.head-QA

O/E/N INDIA LIMITED

WORK INSTRUCTION - 68 RELAY PRESEAL INSPECTION

NO : WI-PRA-68-022A
DATE 02/04/2001

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

ISO 2859-1
Table II B **ıle I - Sample size**

Lot or batch size			ial 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

s for tightened inspection (Master table)

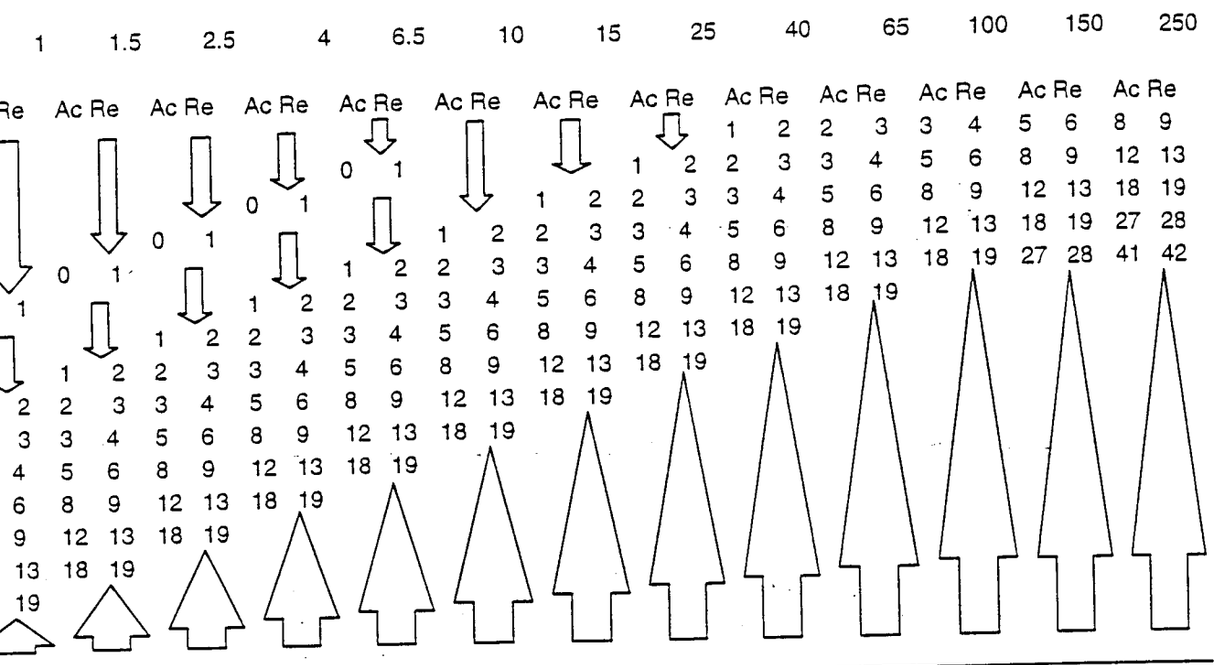
Sample size code letter	Sample size	:ceptab quality levels ightene									
		0.01	0.015	0.025	0.04	0.065	0.1	0.15	0.25	0.4	0.65
		Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re	Ac Re
A	2	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
B	3	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
C	5	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
D	8	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
E	13	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
F	20	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩
G	32	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	0 1
H	50	⇩	⇩	⇩	⇩	⇩	⇩	⇩	⇩	0 1	⇩
J	80	⇩	⇩	⇩	⇩	⇩	⇩	⇩	0 1	⇩	⇩
K	125	⇩	⇩	⇩	⇩	⇩	⇩	0 1	⇩	⇩	1 2
L	200	⇩	⇩	⇩	⇩	⇩	0 1	⇩	⇩	1 2	2 3
M	315	⇩	⇩	⇩	⇩	0 1	⇩	⇩	1 2	2 3	3 4
N	500	⇩	⇩	⇩	0 1	⇩	⇩	1 2	2 3	3 4	5 6
P	800	⇩	⇩	0 1	⇩	⇩	1 2	2 3	3 4	5 6	8 9
Q	1250	⇩	0 1	⇩	⇩	1 2	2 3	3 4	5 6	8 9	12 13
R	2000	0 1	⇧	⇩	1 2	2 3	3 4	5 6	8 9	12 13	18 19
S	3150	⇧	⇧	1 2	⇧	⇧	⇧	⇧	⇧	⇧	⇧

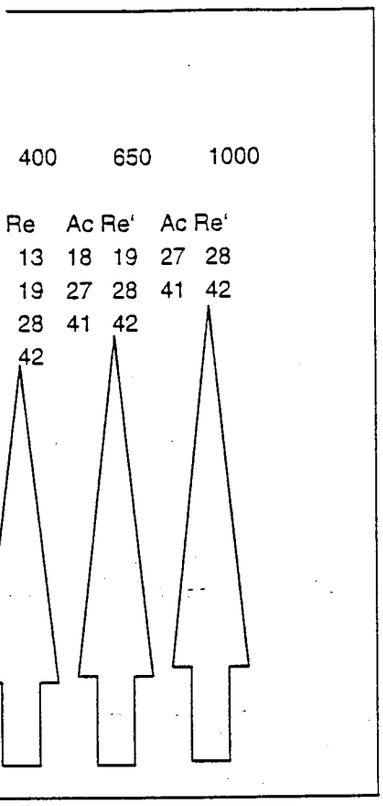
⇩ Use first sampling plan below arrow.

⇧ Use first sampling plan above arrow.

Ac Acceptance number

Rc Rejection number


1 1.5 2.5 4 6.5 10 15 25 40 65 100 150 250
Ac Re


400
650
1000
Re
Ac Re'
Ac Re'
13 18 19 27 28
19 27 28 41 42
28 41 42
42

Gruner AG
Telefon: +49 7426 948-0 Bürglestraße 15-17 D-78564 Wehingen
Telefax: +49 7426 948-200 Postfach 11 49 D-78560 Wehingen
Email: vk@gruner.de
http://www.gruner.de

American Power Conversion Corporation
85 Rangeway Road
Building #2
North Billerica, MA 01862

Attn: Steve Williams

28 November 2001

280D-R2A-G740-036 (APC part: #450-2151A)
280D-R2A-G180-037 (APC part: #450-2150A)
280D-R2U-G180-038 (APC part: #450-2152A)

Gentlemen:

The relay type 280D-R2A-G740-036, 280D-R2A-G180-037 and 280D-R2U-G180-038 are special versions 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	Andreas Beck
CEO	Project Engineer

: Prüf- und Zertifizierungsinstitut
chengenehmigung

Ausweis-Nr. / Licence No. 10055 ÖG — Blatt / Sheet 7

Gruner GmbH Relaisfabrik, Bürglestraße 17, 78564 Wehingen

Eingegangen 18. DEZ. 1997

Hersteller/Place of manufacture
A– W. Gruner GmbH Relaisfabrik, Bürglestraße 17, 78564 Wehingen

Prüfer/Bearbeiter: D. Klammer/23.10.1997 — Aktenzeichen/File: 4377–4940–0012/301S6 TI5/rip–mim–na — Datum/Date: 1997–12–15

VDE –Reg.–Nr. 10055 oder or VDE oder or VDE–Reg.–Nr. 10055

Bedingungen zum Benutzen des Zeichens sind auf Blatt 1 von 1992–05–04 genannt.
conditions to use the mark are referred to on page 1 of 1992–05–04.

Übertrag / *transfer*: 45,0

Geprüft nach
DIN EN 60255–1–00 (VDE 0435 Teil 201):1997–09 — EN 60255–1–00:1997
DIN EN 60255–23 (VDE 0435 Teil 120):1997–03 — EN 60255–23:1996

Schaltrelais		
Bezeichnung:	280 . (A; D; F) – R2U – G . . .	
Weitere Bezeichnung:	. (S; D; F) 280 . (A; D) – R 002 A – G . . .	
Spule		
Nennspannung:	DC 6 V; 9 V; 12 V; 24 V	
Spulen–Nr.:	045; 100; 180; 740	
Weitere Spulen–Nr.:	26B; 01A; 20 A; 13E	
Klasse des Arbeitsbereiches:	1	
Ansprechklasse:	b	
Kontakte		
Nennspannung:	AC 250 V	3,0
Nennstrom:	a) 6,4 A cos phi 1 b) 3 A cos phi 0,4	3,0
Kontaktart:	2–poliger Wechsler	
Kontaktklasse:	III	
Kontaktmaterial:	Ag Sn O2 12	
Elektrische Lebensdauer:	a) 10 000 Schaltspiele b) 30 000 Schaltspiele	
Mechanische Lebensdauer:	1.000.000 Schaltspiele	
Allgemeines		
Anschlußart:	Lötanschluß	
Anbringungsart:	Einbau	
Einbaulage:	Beliebig	
Isolationsgruppe nach DIN VDE 0110	B	
Nennisolationsspannung:	AC 250 V	
Kriechstromfestigkeit:	PTI 100M	
Umgebungstemperatur:	max. 70°C	
Weitere Angaben:	Anlage Nr. 3	

Summe der Jahresgebühren–Einheiten / *Total annual fee units*: 51,0

VDE Prüf– und Zertifizierungsinstitut
Abteilung TI

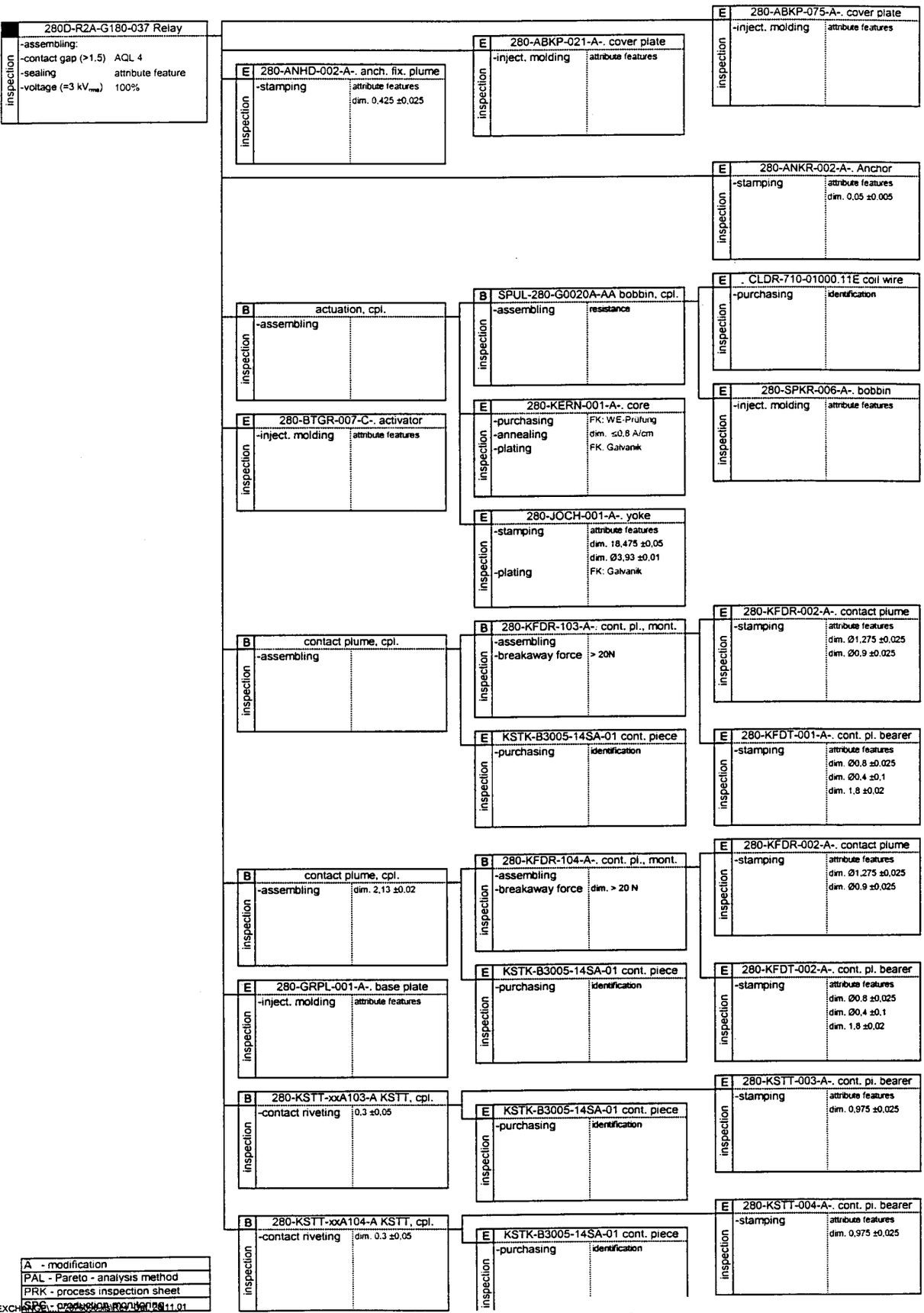
i. A.

VDE Testing and Certification Institute · Institut VDE d'Essais et de Certification

30138 VDE Verband Deutscher Elektrotechniker e.V.
VDE Association of German Electrical Engineers
Merianstraße 28 · D–63069 Offenbach

Telefon national (069) 8306–0 · Telefax (069) 8306–555
Telefon international (+49 69 8306–0

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.



process inspection sheet	part number: 280 Relais	process: mechanical inspection
inspection frequency AQL4	test equipment: pin gauge	technical standard: contact gap: 1.5mm

Lot quantity																											
sample size (n)																											
acceptance (c)																											
rejection (d)																											
Date																											
Operator																											
Nr.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
failed																											

Nr.:	fault source:	measure:

process inspection sheet	part number: 280 Relais	process: electrical test
inspection frequency 100%	test equipment: special equipment	technical standard: dielectric strength between open contacts: $3kV_{RMS}$, 50Hz, (max. leak current: 3mA), Test time: 0.5-

Lot quantity																											
Date																											
Operator																											
Nr.:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
failed																											

Nr.:	fault source:	measure:

Kontaktabstand: 2x1,5 = 3mm **contact gap: 2x1,5 = 3 mm** **écartement de contact: 2x1,5 = 3 mm**

Leiterplatten-Relais für Gleichstrom

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.

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.

P.C.B. Relay for DC

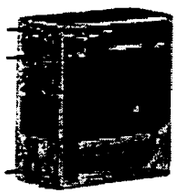
The relays are designed and manufactured in accordance to the Standards of DIN IEC 255, Part 1-00/VDE 0435, Part 201, which are also in accordance to the Low Voltage Standards.

Two contact sets each with 1,5 mm contact gap in series achieve a clearence 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).

Relais pour circuit imprimé C.C.

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.

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.
	Kontaktdaten	**Contact Data**	**Données Contacts**
2 c 8 a	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 c 8 A, 2 c 6 A	Max. Schaltstrom	max. switching current	max. courant de commutation
10	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

GRUNER

Schalten und Bewegen

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

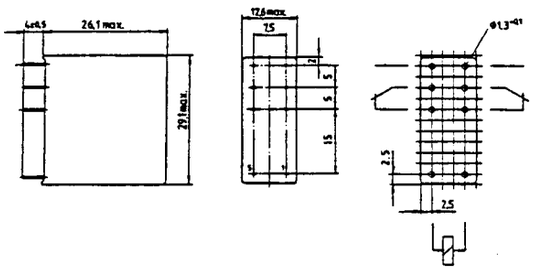
U1 = Wert bei kalter Spule / value at cold coil / valeur pour bobine froide

- 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 - A = staubgeschützt - D = waschdicht - F = fluxmitteldicht	Version - A = dust cover - D = sealed - F = flux-tight	Version - A = contre la poussière - D = étanche au lavage - F = étanche au flux
Kontaktwerkstoff - R = $AgSnO_2$	Contact material - R = $AgSnO_2$	Matériau de contact - R = $AgSnO_2$
Anzahl Kontakte - 2 S = 2 Schließer - 2 W = 2 Wechsler	Contact arrangement - 2 S = 2 normally open (NO) - 2 W = 2 change over (CO)	Empilage de contacts - 2 S = 2 travail (T) - 2 W = 2 inverseur (RT)
Antriebsart - G = Gleichstrom	Drive - G = DC	Mode d'excitation - G = CC
Spulen-Nr. - siehe Spulentabelle	Coil-No. - see coil table	No. de la bobine - voir tableau

280 A - R 2W - G 470

Beispiel
example
exemple

Techn. Änderungen vorbehalten
Techn. changes are reserved
Sous réserve de modifications techniques

10:

VDE Prüf- und Zertifizierungsinstitut
Zeichengenehmigung

Lizenz-Nr. / Licence No.	Blatt / Sheet
3734 ÜG	13

Name und Sitz des Zeichengenehmigungs-Inhabers/Name and registered seat of the mark's licence holder

EH-Schrack Components AG, Seybelgasse 13, A-1235 Wien

Fertigungsstätte/Place of manufacture

-AA- A-3830 Waidhofen

Statistik/Statistics		Aktenzeichen/File	Datum/Date
1	Gattinger/Man/B95042/11.10.95	4570-4940-1008 TI3/ham-na	22.11.95

VDE-Reg.-Nr.
Es ist das umseitig unter Nummer 4.0 aufgeführte Zeichen zu benutzen.
An der mit xxxx markierten Stelle wird der Zusatz 2453 eingetragen.
Die Bedingungen zum Benutzen des Zeichens sind auf Blatt 1 vom 29.01.1990 genannt.

Übertrag: 99,0

Geprüft nach DIN IEC 255 Teil 1-00/DIN VDE 0435 Teil 201/05.83
DIN IEC 255 Teil 0-20/DIN VDE 0435 Teil 120/10.81
DIN VDE 0435 Teil 201 A1/05.90

Schaltrelais

Bezeichnung:	Typ: RP 920 123		3,0
Spule			0,5
Nennspannung:	DC 12 V		
Klasse des Arbeitsbereiches:	2		
Ansprechklasse:	b		
Kontakte			
Nennspannung:	AC 250 V	AC 250 V	
Nennstrom:	3 A cos phi 1	8 A cos phi 1	
Kontaktart:	2-pol. Schließer		
Kontaktklasse:	III		
Kontaktmaterial:	AgCdO		
Elektrische Lebensdauer:	100 000 Schaltspiele (3 A)		9,0
	10 000 Schaltspiele (8 A)		
Mechanische Lebensdauer:	10 000 000 Schaltspiele		

Allgemeines

Anbringungsart:	Einbau in gedruckten Schaltungen
Einbaulage:	beliebig
Isolationsgruppe nach DIN VDE 0110	C
Nennisolationsspannung:	250 V
Umgebungstemperatur:	max. +55°C
Weitere Angaben:	Anlage Nr. 7 und 8

Dieses Gutachten mit Fertigungsüberwachung bildet die Grundlage für die EG-Konformitätserklärung und CE-Kennzeichnung durch den Hersteller oder dessen Bevollmächtigten und bescheinigt die Konformität mit den genannten Normen im Sinne der EG-Niederspannungsrichtlinie 73/23/EWG mit ihren Änderungen.

VDE Prüf- und Zertifizierungsinstitut
Abteilung TI

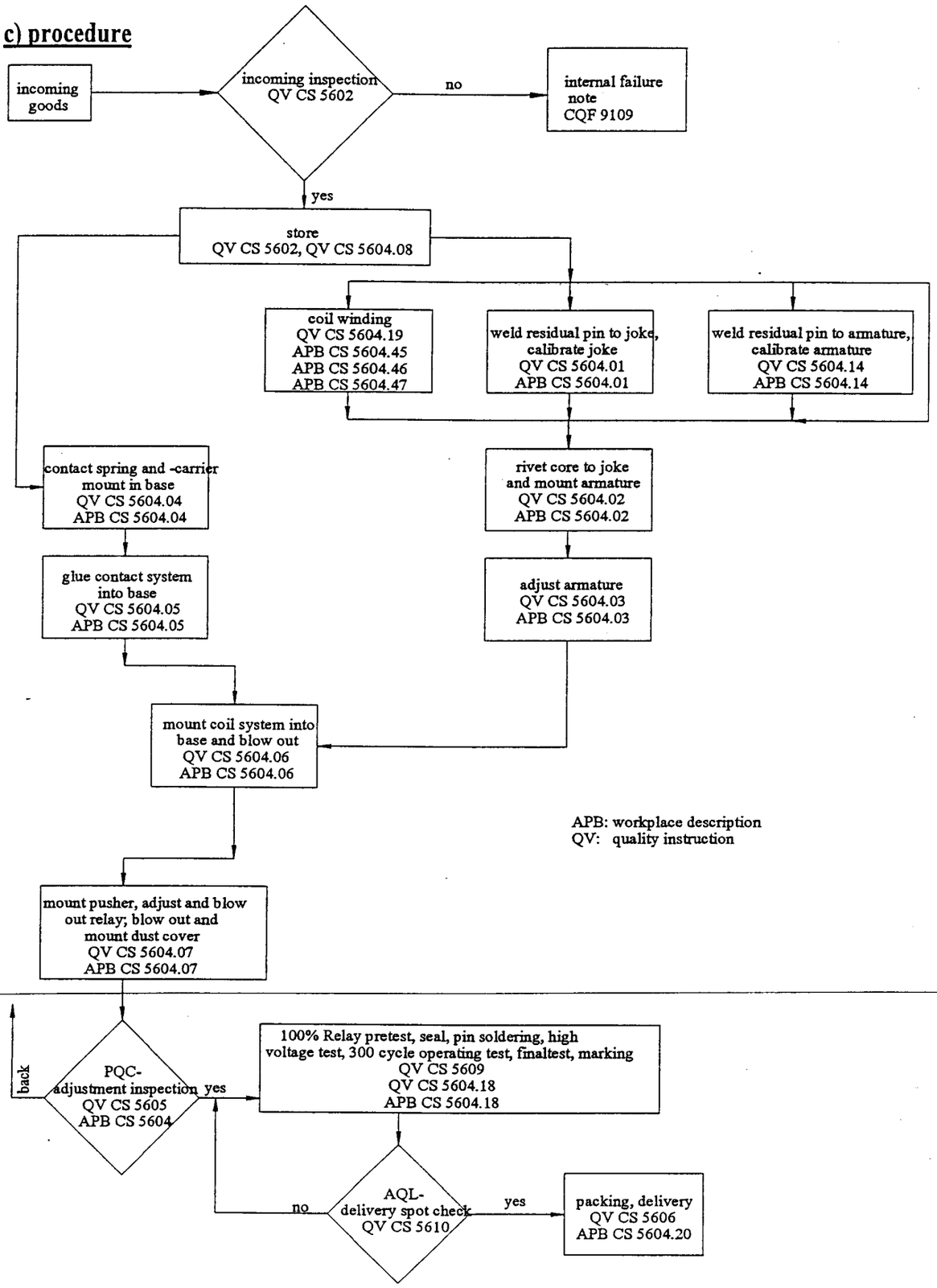
i. A. Haupt

Summe der Jahresgebühren-Einheiten 111,5

VDE Testing and Certification Institute · Institut VDE d'Essais et de Certification

VDE Verband Deutscher Elektrotechniker e.V.
VDE Association of German Electrical Engineers
Merkurstraße 25 · D-63069 Offenbach
Telefon national (0 69) 83 06-0 · Telex 4 162 796 vdep d
Telefon international (+49) (69) 83 06-0 · Telefax (0 69) 83 06-6 55

c) procedure



author: Q / Bittermann 1999-04-07 /	checked: Q / Becker, 1999-04-08 /
approved: Q / Becker, 1999-04-07 /	version 03: a:

Qualitätssicherungsplan

RP BG II/2

QV CS 5600

[X] Arbeitsexemplar — **unterliegt dem Änderungsdienst inklusive Nachträge**

[ ] Informationsexemplar — unterliegt nicht dem Änderungsdienst

gültig ab 12.03.1996 Ernst Bökermann

Verteiler:

QUALITÄTSSICHERUNGSVORSCHRIFT ÜBERSICHT RP BG II/2

QV CS 5600 **a) Zweck**
b) Geltungsbereich
c) Inhalt

a) Zweck

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.

b) 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.

c) 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/	Geprüft: Q / Becker, 1999-01-28/
Freigegeben: Q / Becker, 1999-01-28/	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.

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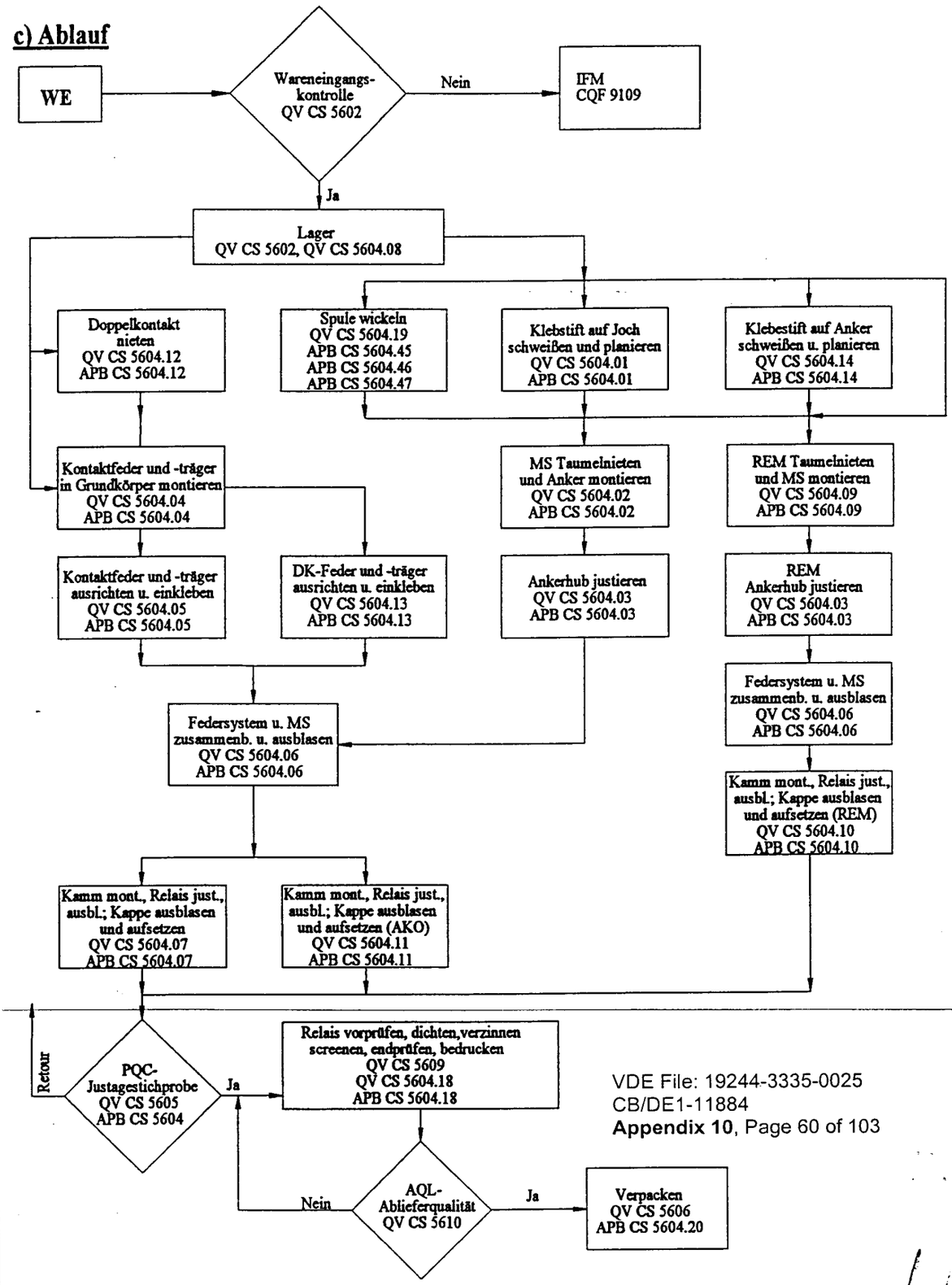
c) Ablauf



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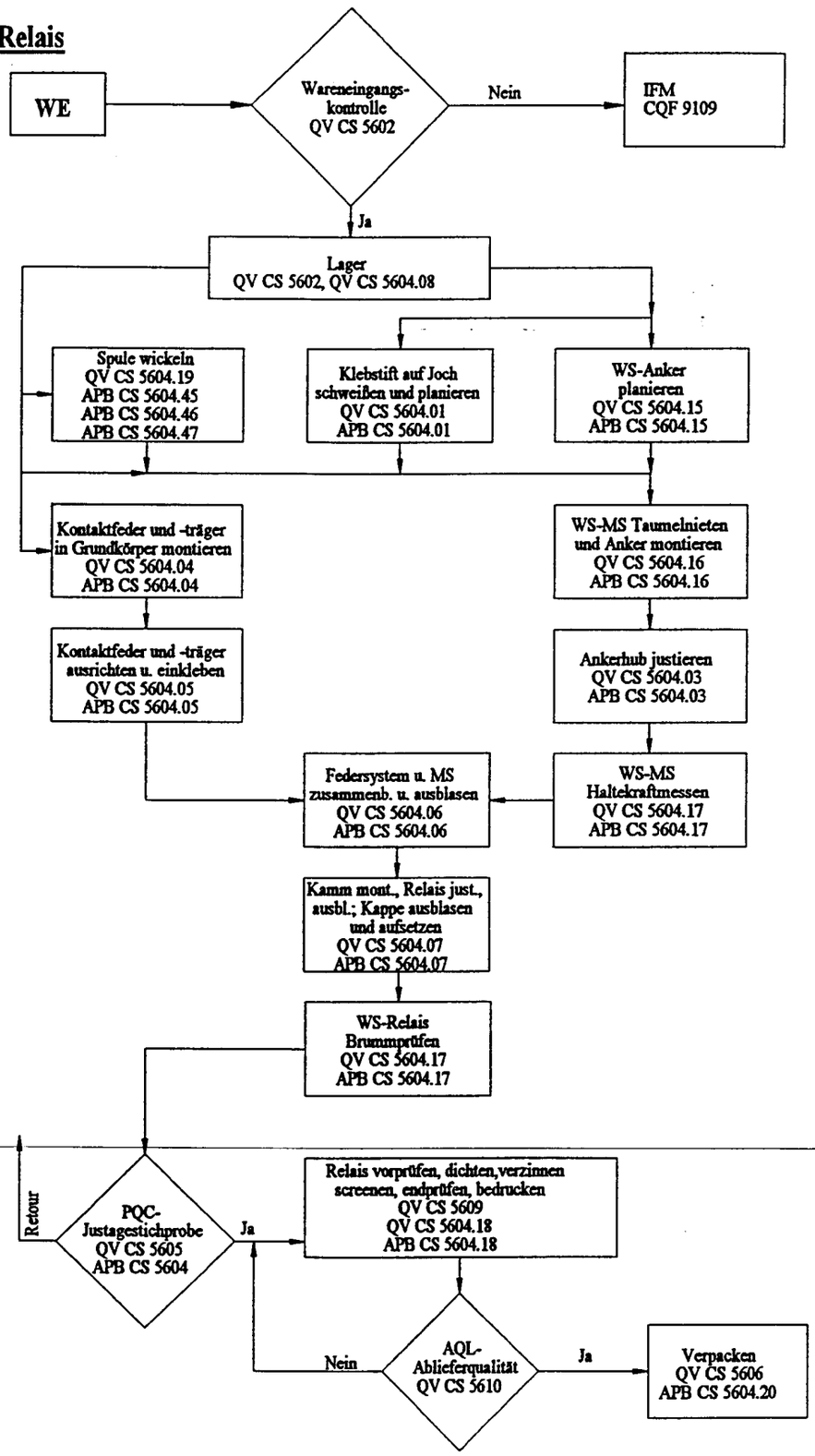
d) Ablauf WS-Relais



Erstellt: Q / Bittermann 1999-04-07 /	Geprüft: Q / Becker, 1999-04-08 /
Freigegeben: Q / Becker, 1999-04-07 /	Version 03: gültig ab 1999-04-08

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 Zusammenbauens 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) Prüfzettel:
- Produktionsdatum
- Sachnummer
- Stückzahl
- Unterschrift des Prüfers

c3) Der Prüfzettel muß bei der Ware bis zum Verbrauch verbleiben

c4) Kontrolle kann bei jeder Komission bei Übernahme in Waidhofen und Bestätigung am Gegenschein 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

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

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

SCHRACK 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 planieren
STICHPROBENGRÖSSE: 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.	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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CQV CS 5604.02 SPC/Magnetsystem Taumelnieten (monostabile Relais)

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2Relais	NUMMER CQV CS 5604.02
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Magnetsystem Taumelnieten (monostabile Relais)	
STICHPROBENGRÖSSE: 5			
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 Schlechtteileselektion durch einlegen eines unterbrochenen Prüfmusters 1 x am Tag.	visuell Prüfmuster
10		

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 5604.03 SPC/Ankerhub justieren

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.03
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Ankerhub justieren	
STICHPROBENGRÖSSE: 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 Messegenauigkeit 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		
08		
09		
10		

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 5604.04 SPC/Kontaktfedern und Kontaktträger in Grundkörper montieren

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2-Relais	NUMMER CQV CS 5604.04
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Kontaktfedern und Kontaktträger in Grundkörper montieren	
STICHPROBENGRÖSSE: 5			
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		

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 5604.05 SPC/Kontaktfedern und Kontaktträger ausrichten und in Grundkörper einkleben

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.05

KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Kontaktfedern und Kontaktträger ausrichten und in GK einkleben
STICHPROBENGRÖSSE: 5		
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 Umschaltefedern 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 Rastermaßlehre (Pinning 5 mm) schieben lassen.	Rastermaß
11	Ofentemperatur lt. APB, Ablaufdatum des Klebers darf nicht überschritten werden.	visuell

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 5604.06 SPC/Magnetsystem und Federsystem zusammenbauen

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2-Relais	NUMMER CQV CS 5604.06

KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Magnetsystem und Federsystem zusammenbauen
STICHPROBENGRÖSSE: 5		
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		

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 5604.07 SPC/Relais justieren, ausblasen sowie Kappe ausblasen und aufsetzen

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2- Relais	NUMMER CQV CS 5604.07
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Relais justieren und Kappe aufsetzen	
STICHPROBENGRÖSSE: 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		

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 5604.08 SPC/Lagerüberprüfung in Vormontage zwecks "first in/first out"

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.08

KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Lagerüberprüfung in Vormontage zwecks "first in/first out"
STICHPROBENGRÖSSE: 5		
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
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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 5604.09 SPC/Magnetsystem Taumelnieten (bistabile Relais)

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.09

KST: PL-RPII	DATUM: 93-05-11	ARBEITSPLATZ: Magnetsystem Taumelnieten (bistabile Relais)
STICHPROBENGRÖSSE: 5		
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
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Erstellt: Q / Bittermann 1999-06-18/	Geprüft: Q / Becker, 1999-06-21/
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CQV CS 5604.10 SPC/REM Relais justieren und Kappe aufsetzen

SCHRACK 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 aufsetzen	
STICHPROBENGRÖSSE: 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 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 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
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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 5604.11 SPC/Relais justieren und Kappe aufsetzen

SCHRACK 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	
STICHPROBENGRÖSSE: 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 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 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 ≥ 0,12 mm (≥ 0,12 mm) AK-Auflagedruck ≥ 13 cN (≥ 12 cN)	visuell

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 5804.12 SPC/Doppelkontakt nieten

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.12
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Doppelkontakt nieten	
STICHPROBENGRÖSSE: 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
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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 5604.13 SPC/Kontaktfedern und Kontaktträger ausrichten und in Grundkörper einkleben >> Doppelkontakt

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.13
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: Kontaktfedern und Kontaktträger ausrichten und in GK einkleben >> Doppelkontakt	
STICHPROBENGRÖSSE: 5			
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 Umschaltefedern 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

SCHRACK 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	
STICHPROBENGRÖSSE: 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

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 5604.15 SPC/WS-Anker planieren

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.15
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: WS-Anker planieren	
STICHPROBENGRÖSSE: 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
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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 5604.16 SPC/WS-Magnetsystem Zusammenbau

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.16
KST: PL-RPII	DATUM: 92-09-14	ARBEITSPLATZ: WS-Magnetsystem Zusammenbau	
STICHPROBENGRÖSSE: 5			
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
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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 5604.17 SPC/WS-Relais brummprüfen und Haltekraft messen

SCHRACK COMPONENTS	SPC	PRODUKT : RP II/2 Relais	NUMMER CQV CS 5604.17
KST: PL-RPII	DATUM : 92-09-14	ARBEITSPLATZ : WS-Relais brummprüfen und Haltekraft messen	
STICHPROBENGRÖSSE : 5			
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
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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 5604.18 SPC/Endfertigung von Relais

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.18

KST: PL-RPII	DATUM: 96-07-01	ARBEITSPLATZ: Vorprüfen, Dichten, Verzinnen, Screenen, Endprüfen und Bedrucken
STICHPROBENGRÖSSE: 5		
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 Relaistypen 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

Erstellt: Q / Bittermann 1999-06-18/	Geprüft: Q / Becker, 1999-06-21/
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CQV CS 5604.19 SPC/Spule wickeln und ausfertigen

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.19
KST: PL-RPII	DATUM: 1998-08-18	ARBEITSPLATZ: Spule wickeln und ausfertigen	
STICHPROBENGRÖSSE: 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 Spulenkörberflansch 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 sitzten, 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 unverzinnten 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

CQV CS 5604.20 SPC/Relais zum Versand verpacken

SCHRACK COMPONENTS	SPC	PRODUKT: RP II/2 Relais	NUMMER CQV CS 5604.20
KST: PL-RPII	DATUM: 1999-04-01	ARBEITSPLATZ: Verpacktisch	
STICHPROBENGRÖSSE: 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
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Erstellt: Q / Bittermann 1999-06-18/	Geprüft: Q / Becker, 1999-06-21/
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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.

c4) Folgende Parameter werden überprüft:

	UK/Stand.	*AKO*	*AK*	*RK*
Ruhekontaktdruck [cN]	≥ 8 (7)	≥ 12	–	≥ 8 (7)
Kontaktabstand [mm]	0,35-0,50	0,35-0,50	0,35-0,50	0,35-0,5
	0,32-0,50	0,32-0,50	0,32-0,50	0,32-0,50
AK-Auflagedruck [cN]	≥ 10	≥ 12	≥ 10	–
Kontaktversatz [mm]	≤ 0,3	≤ 0,3	≤ 0,3	≤ 0,3
Überhub [mm]	≥ 0,12	≥ 0,13	≥ 0,1	–
Kammluft [mm]	0,3-0,5	0,3-0,5	0,3-0,5	–

	WS-Relais	*Doppelkonta.*	*Miele*
Ruhekontaktdruck [cN]	≥ 12 (11)	≥ 8	≥ 12 (11)
Kontaktabstand [mm]	0,35-0,50	0,35-0,50	0,35-0,50
	0,32-0,50	0,32-0,50	0,32-0,50
AK-Auflagedruck [cN]	≥ 12	≥ 9 (8)	≥ 10 (9)
Kontaktversatz [mm]	≤ 0,3	≤ 1/3d	< 0,3
Überhub [mm]	≥ 0,12	≥ 0,13	≥ 0,11 (0,10)
Kammluft [mm]	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

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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)

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.

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.

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

Erstellt: Q / Bittermann, 1999-04-07 /	Geprüft: Q / Becker, 1999-04-08/
Freigegeben: Q / Becker, 1999-04-07 /	Version 06: gültig ab 1999-04-08

MITGELTENDE UNTERLAGEN

CQV CS 5608

APB CS 5604.01 bis 20	Arbeitsplatzbeschreibungen
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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
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STZ	Sondertypenliste

Erstellt: Q / Bittermann, 1999-04-07 /	Geprüft: Q / Becker, 1999-04-08/
Freigegeben: Q / Becker, 1999-04-07 /	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 REM1

c5) Zusätzliche Endprüfungen (außerelektr. Endprüfung, Sondertypen, Bedruckung, Dichtheit, Zuverlässigkeit)

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	± 10 % / ± 15 %
Ruhekontaktwiderstand	
Arbeitskontaktwiderstand	
AgCdO-10 6000mV / 10mA / 1kHz	≤ 300 mOhm
AgNi 0,15 HV 6000mV / 10mA / 1kHz	≤ 25 mOhm
-AgNi 0,15 HTV 20mV / 1mA / 1kHz	≤ 25 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

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	± 10 % / ± 15 %
Ruhekontaktwiderstand	
Arbeitskontaktwiderstand	
AgCdO-10 6000mV / 10mA / 1kHz	≤ 300 mOhm
AgNi 0,15 HV 6000mV / 10mA / 1kHz	≤ 25 mOhm
AgNi 0,15HTV 20mV / 1mA / 1kHz	≤ 25 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.

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 *	± 10 % / ± 15 %
Ruhekontaktwiderstand	
Arbeitskontaktwiderstand	
AgCdO-10 6000mV / 10mA / 1kHz	≤ 300 mOhm
AgNi 0,15 HV 6000mV / 10mA / 1kHz	≤ 25 mOhm
AgNi 0,15HTV 20mV / 1mA / 1kHz	≤ 25 mOhm
Ansprechspannung xUn *)	45 - 72 % 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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*) 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.

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.

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 *	± 10 % / ± 15 %
Ruhekontaktwiderstand	
Arbeitskontaktwiderstand	
AgCdO-10 6000mV / 10mA / 1kHz	≤ 300 mOhm
AgNi 0,15 HV 6000mV / 10mA / 1kHz	≤ 25 mOhm
AgNi 0,15HTV 20mV / 1mA / 1kHz	≤ 25 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.

* Wegen der Relaiserwärmung 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.

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 Tampooprintanlagen 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 ≥ 600 Ohm

6) Bei Wechselstromrelais wird die Ansprechspannung druch eine 100 %ige Brummprüfung bei 75 % - 110 % der Nennspannung (Brummfreies halten) sichergestellt.

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

RPII/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 = Annahmezahl
d = Rückweisezahl

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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 Ausgasöffung
* Relaisabmessungen
* Rastermaß, Pinausrichtung rechtw. zur Aufstandsebene

- Dichtheitsprüfung
* 80°C - 85°C/ 30 sec (Wasser)

- elektrische Prüfung
* Spulenwiderstand
* RK Widerstand
* AK Widerstand
* Uan
* Uab
* Ansprechzeit inkl. Prellzeit
* Ansprechflugzeit
* RK an Prellzeit
* AK an Prellzeit
* Abfallzeit inkl. Prellzeit
* Abfallflugzeit
* AK ab Prellzeit
* RK ab Prellzeit
* 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

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)

APCC Proprietary | APC | Part Specification Cover Sheet

APC Part Number:
370-0028
X-Reference Part Number:

LED RED T1 3/4 95MCD20MA .1

Productio

Status of Specification:
Approved

Production Revision History:

Rev.	Date	By:	ECO #	Description of change
1	11/7/94	JK		Release
2	12/29/98	KK		Convert DWG file to PDF and create the ZIP file
3	9/25/01	XS		The specs' description conflict with the parameter of current part, so update the specs, More details pls refer PQR#BL543, I add a new version on it

Detailed Specification

APC Part Number: **370-0028** -- Production Rev. **3**

Description:

Expanded description

Primary Application (Business Unit)

Project (End Item Part Number(s))

APC Standards:

Applicable APC standards

Applicable industry standards
N/A

Specs Directory

Drawing File attachments	**Drawing Revision** (revision number of current attachment.)
37000281.pdf	37000281.PDF Revision 1

Drawing Image:

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

Notice of Deviation:

Special Instructions

APC Part Number **370-0028** -- Production Rev. **3**

Shipping Packaging:

Method and materials:
Tape mounted, on reel or in ammo pack.

Package Marking requirements:
Note: the packing list is not considered as package marking

Part Markings:

Special Qualifying Instructions / Drawings:

Other Notes:

Version 1:
95+/-5mcd at If=20mA Vf=1.8Vmax; Ir=10uA Vr=5Vmin; Wave length=660nm+/-20nm at If=20mA; 60 degree view angle.

Version 2
Luminous Intensity @ 20mA 80mcd (Type); Vf=2.0 (type) 2.6(max), Vr=5V; Wave length=635at If=20mA; 30 degree view angle

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	10/03/2001 02:42 PM EDT, Revision # 3, Status Approved , Annette D'elia --- 10/03/2001 02:41 PM EDT, Revision # 3, Status Approved , Annette D'elia --- 10/03/2001 02:08 PM EDT, Revision # 2, Status Submitted for Approval , Robert Thibodeau --- 07/20/2001 04:04 PM EDT, Revision # 2, Status Approved , Ken Steeves --- 01/06/99 01:01 PM EST, Revision # 2, Status Approved , Kimberley Goodwin --- 01/05/99 03:18 PM EST, Revision # 1, Status Submitted for Approval , Robert Thibodeau --- 12/29/98 02:39 PM EST, Revision # 1, Status Draft , Kin Keat --- 12/29/98 02:35 PM EST, Revision # 1, Kin Keat --- On 02/27/96 08:59 AM, Joy Kulesza updated the document --- On 08/11/95 11:52 AM, Anita Lagasse updated the document --- On 08/10/95 11:21 AM, Anita Lagasse updated the document --- On 08/10/95 09:37 AM, Anita Lagasse updated the document --- On 08/10/95 08:59 AM, Anita Lagasse composed the document ---
Tivoli	
Catfish	
Barracuda	
Manning	
Taihu	

APCC Proprietary | APC | Part Specification Cover Sheet

APC Part Number:
370-0030
X-Reference Part Number:

LED GRN T1 3/4 50MCD20MA 1" TR

Productio

Status of Specification:
Approved

Production Revision History:

Rev.	Date	By:	ECO #	Description of change
1	11/7/94	JK		Release
2	12/29/98	KK		Convert DWG file to PDF and create the ZIP file
3	04/19/01	JB		Add supplier to AML as per PQR#AA192

Detailed Specification

APC Part Number: **370-0030** -- Production Rev. **3**

Description:

Expanded description

LED GREEN T1-3/4 50MCD 20MA TAPE & REEL

Primary Application (Business Unit)

Project (End Item Part Number(s))

APC Standards:

Applicable APC standards

Applicable industry standards
N/A

Specs Directory

Drawing File attachments	Drawing Revision (revision number of current attachment.)
37000301.pdf	37000301.PDF Revision 1

Drawing Image:

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

Notice of Deviation:

VDE File: 1924400-3335-0025
CB/DE1 - 11884
Appendix 11, Page 3 of 10

Special Instructions

APC Part Number **370-0030** -- Production Rev. **3**

Shipping Packaging:

Method and materials:
Tape mounted, on reel or in Ammo Pack.

Package Marking requirements:
Note: the packing list is not considered as package marking

Part Markings:

Special Qualifying Instructions / Drawings:

Other Notes:

Luninous Intensity	40 to 85 mcd at If = 20mA Vf = 2.6Vmax
Reverse Current	Ir = 10uA Vr = 5Vmin
Wave length	565nm +/-30nm at If = 20nmA
view angle	40 degree

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	08/10/2001 04:47 PM EDT, Revision # 3, Status Approved , Sandra Buker --- 08/10/2001 04:47 PM EDT, Revision # 3, Status Approved , Sandra Buker --- 08/10/2001 01:40 PM EDT, Revision # 2, Status Submitted for Approval , Robert Thibodeau --- 01/06/99 01:06 PM EST, Revision # 2, Status Approved , Kimberley Goodwin --- 01/05/99 03:41 PM EST, Revision # 1, Status Submitted for Approval , Robert Thibodeau --- 12/29/98 02:58 PM EST, Revision # 1, Status Draft , Kin Keat --- 12/29/98 02:51 PM EST, Revision # 1, Kin Keat --- On 02/27/96 09:05 AM, Joy Kulesza updated the document --- On 08/11/95 11:41 AM, Anita Lagasse updated the document --- On 08/10/95 11:22 AM, Anita Lagasse updated the document --- On 08/10/95 09:39 AM, Anita Lagasse updated the document --- On 08/10/95 09:30 AM, Anita Lagasse composed the document ---
Tivoli	
Catfish	
Barracuda	
Manning	

APCC Proprietary | APC | Part Specification Cover Sheet

APC Part Number:
370-0040

LED,T1-3/4,RED,TALL,

Productio

X-Reference Part Number:

Status of Specification:
Approved

Production Revision History:

Rev.	Date	By:	ECO #	Description of change
1	6/4/96	BO		Initial Release
2	12/29/98	KK		Remove DWG file attachment as not needed and create the ZIP file

Detailed Specification

APC Part Number: **370-0040** -- Production Rev. **2**

Description:

Expanded description

Red high efficiency GaAsP/GaP LED with red diffused lens which is flush mounted to a pc board, but is 0.10" taller than standard T1 3/4. (370-0022), tape ammo box preferred, or tape & reel acceptable.

Primary Application (Business Unit)
DPS

Project (End Item Part Number(s))

APC Standards:

Applicable APC standards
0S-TP-RDL

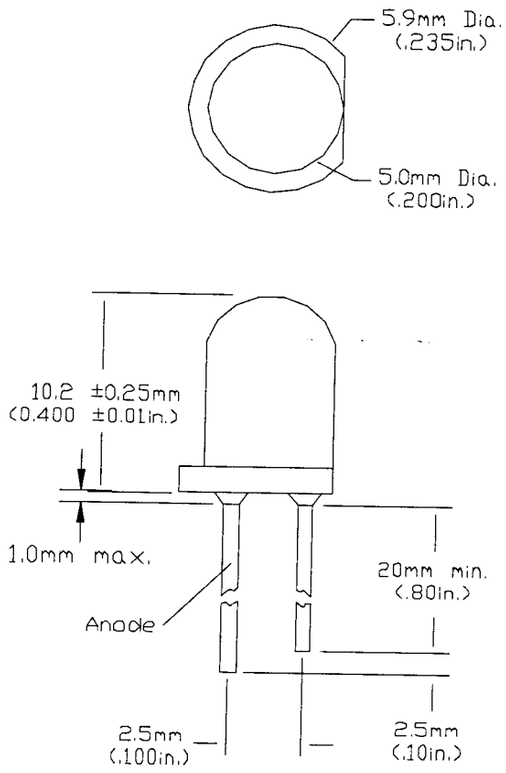
Applicable industry standards
N/A

Specs Directory

Drawing Image:

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

VDE File: 1924400-3335-0025
CB/DE1 - 11884



Notice of Deviation:

Special Instructions

APC Part Number **370-0040** -- Production Rev. **2**

Shipping Packaging:

Method and materials:
Tape Ammo Box Perfer, Tape & Reel Acceptable.

Package Marking requirements:
Note: the packing list is not considered as package marking
APCC Part Number, Revision, Date Code or Lot Code, Quantity, APCC Purchase Order Number and Manufacture Identification.

Part Markings:

None.

Special Qualifying Instructions / Drawings:

ELECTRICAL CHARACTERISTICS:

Absolute Maximum Ratings: Unless otherwise specified T_A=25°C.

Parameter	Symbol	Min.	Typ.	Max.	Units
Reverse Breakdown Voltage (I_R= 100µA)	V_R			5	Volts
Maximum DC Forward Current	I_F			30	mA
Maximum Forward Current (Peak), pw < 10 µs	I_F			150	mA
Peak Wavlength (I_F=20mA)	$\lambda_{(peak)}$			625	nm
Spectraline Half-Width (I_F=20mA)	$\Delta\lambda$			45	nm
Luminous Intensity (I_F=10 mA)	I_V	12.5		32	mcd
Reverse Current at Rated DC Blocking Voltage	I_R			10	µA
Luminous Intesity Points (View Angle)			60		Degree
Maximum Power Dissipation	P_D			105	mW
Operating & Storage Temperature Range	T_{OPT}	-40		+85	°C

NOTES: Part must be able to be flush mounted to a pcb.

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	07/20/2001 04:13 PM EDT, Revision # 2, Status Approved , Ken Steeves --- 01/06/99 01:11 PM EST, Revision # 2, Status Approved , Kimberley Goodwin --- 01/05/99 03:45 PM EST, Revision # 1, Status Submitted for Approval , Robert Thibodeau --- 12/29/98 03:49 PM EST, Revision # 1, Status Draft , Kin Keat

APCC Proprietary | APC | Part Specification Cover Sheet

APC Part Number:
370-0041
X-Reference Part Number:

LED,T1-3/4,YEL,TALL,

Productio

Status of Specification:
Approved

Production Revision History:

Rev.	Date	By:	ECO #	Description of change
1	6/5/96	BO		Initial Release
2	12/30/98	KK		Remove DWG file attachment as not needed and create the ZIP file

Detailed Specification

APC Part Number: **370-0041** -- Production Rev. **2**

Description:

Expanded description

Yellow high efficiency GaAsP/GaP LED with yellow diffused lens which is flush mounted to a pc board, but is 0.10" taller than standard T1 3/4. (370-0020), tape ammo box perfer, tape & reel acceptable.

Primary Application (Business Unit)
DPS

Project (End Item Part Number(s))

APC Standards:

Applicable APC standards
0S-TP-AMO, 0S-TP-RDL

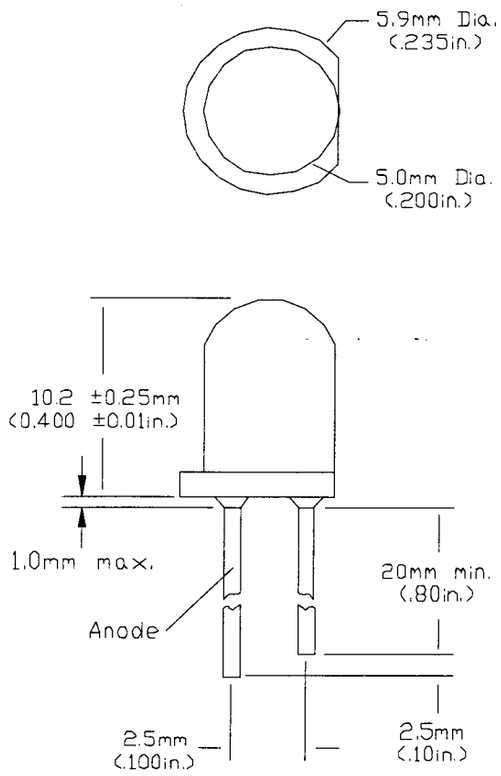
Applicable industry standards
N/A

Specs Directory

Drawing Image:

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

VDE File: 1924400-3335-0025
CB/DE1 - 11884
Appendix 11, Page 8 of 10



Notice of Deviation:

Special Instructions

APC Part Number **370-0041** -- Production Rev. **2**

Shipping Packaging:

Method and materials:
Tape Ammo Box Perfer, Tape & Reel Acceptable.

Package Marking requirements:
Note: the packing list is not considered as package marking
APCC Part Number, Revision, Date Code or Lot Code, Quantity, APCC Purchase Order Number and Manufacture Identification.

Part Markings:

None

Special Qualifying Instructions / Drawings:

ELECTRICAL CHARACTERISTICS:

Technical Data: Unless otherwise specified T_A=25°C.

Parameter	Symbol	Min.	Typ.	Max.	Units
Reverse Breakdown Voltage (I_R= 100µA)	V_R			5	Volts
Maximum DC Forward Current	I_F			30	mA
Maximum Forward Current (Peak), pw < 10 µs	I_F			150	mA
Peak Wavlength (I_F=20mA)	$\lambda_{(peak)}$		590		nm
Spectraline Half-Width (I_F=20mA)	$\Delta\lambda$		35		nm
Luminous Intensity (I_F= 10 mA)	I_V	5		20	mcd
Reverse Current at Rated DC Blocking Voltage	I_R			10	µA
Luminous Intesity Points (View Angle)			60		Degree
Maximum Power Dissipation	P_D			105	mW
Operating & Storage Temperature Range	T_{OPT}	-40		+85	°C

NOTES: Part must be able to be flush mounted to a pcb.

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	01/06/99 01:12 PM EST, Revision # 2, Status Approved , Kimberley Goodwin --- 01/05/99 04:09 PM EST, Revision # 1, Status Submitted for Approval , Robert Thibodeau --- 12/30/98 08:57 AM EST, Revision # 1, Status Draft , Kin Keat ---

EMV Test Report

Technical File for Model BP650SI

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Declaration of Conformity	Annex A

Explanation Page

The products covered by this Technical File are Uninterruptible Power Supplies (UPS). Currently, the EMC standards that apply to a UPS are:
EN50091-2
EN61000-3-2
EN61000-3-3

EN50091-2 consists of the following standards for these UPS

IEC 801-2 (ESD)
IEC 801-3 (RFI)
IEC 801-4 (EFT)
IEC 1000-2-2 (Low Frequency Disturbances)
EN55022 Class B (Emissions)

When these products were first released, there was not a UPS specific EMC standard in place so the Generic Immunity standard (EN50082-2 1992) was used.

EN50082-1 consisted of the following standards
IEC 801-2 (ESD)
IEC 801-3 (RFI)
IEC 801-4 (EFT)

APC originally had these products tested to EN50082-1. As a result, we have updated our Technical File by running only the new standards that weren't in EN50082-2. As a result, this file has the following sections

Part I Emissions

A. EN55022 Class B Test Report
B. EN61000-3-2 (Harmonics) Test Report
C. EN61000-3-3 (Flicker) Test Report

Part II Immunity

A. EN50082-1 Test Report
B. IEC1000-2-2 Test Report

Model List:

The Models covered by this Technical File Are:

BP650SI,BP420SI,BP280SI, SU420INET,SU620INET
The 280/420 and 650 are all the same except for enclosure size, output transformer and circuit breaker. The SU INETs are just re=packaged versions and sold under a different division within APC.

Explanation:
When the products were first tested the model names were BP280/420/650 IS not SI. There is no difference as Marketing changed the suffix to be consistent with North American model numbers. Finally, the family of these products is commonly referred to as the Back UPS Pro (BP).

Part I
Emissions

EN55022 Class B Test Report

Integrity
Design & Test
Services, Inc.

Standard(s): EN55022:1994 Class B

Model(s): BP 280 SI, BP 280 INET,
BP 420 SI, BP 420 INET,
BP 650 SI, & the BP 650 INET

Prepared for: American Power Conversion
755 Middlesex Turnpike
Billerica, MA 01821-3945

Date of Issue: October 20, 1997

Prepared by:

James L. Goyette, Compliance Engineer

Reviewed by:

Michael C. Boucher, EMI Section Manager

Report No. 61936.e1

37-7 Ayer Road *Littleton, MA 01460*
Tel: (508) 486-0432 *Fax: (508) 486-0592*

Integrity
Design & Test
Services, Inc.

Certificate of Compliance

The following product was found to comply with the requirement stated below when tested in accordance with the test procedures described in the accompanying test/measurement report. Reference report number 61936.e1

Manufacturer:	American Power Conversion 755 Middlesex Turnpike Billerica, MA 01821-3945
Model Number:	BP 280 SI, BP 280 INET, BP 420 SI, BP 420 INET, BP 650 SI, BP 650 INET (The SU 420INET, & the SU 620INET are same as above models except that the SU series is representative of the Smart UPS division)
Requirement:	EN55022 Class B
Applicable Directive:	89/336/EEC

Approved By:

Robert D. Goyette NVLAP Signatory	
Date:	7/23/98

Remarks: *Testing is performed using calibrated equipment traceable to the National Institute of Standards and Technology (NIST).*

This certificate is valid for products tested as described in the accompanying test report. Specific modifications necessary to meet the above requirement, recommended by Integrity Design & Test Services, Inc. are described therein.

Integrity Design & Test Services, Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for Electromagnetic Emissions Testing.

Integrity
Design & Test
Services, Inc.

Certificate of Compliance

The following product was found to comply with the requirement stated below when tested in accordance with the test procedures described in the accompanying test/measurement report.

Manufacturer: American Power Conversion
755 Middlesex Turnpike
Billerica, MA 01821-3945

Model Number: BP 280 SI, BP 280 INET,
BP 420 SI, BP 420 INET,
BP 650 SI, & the BP 650 INET

Requirement: EN55022 Class B

Applicable Directive: 89/336/EEC

Approved By:

Michael C. Boucher NVLAP Signatory	Michael C. Boucher
Date	10/20/97

Remarks: *Testing is performed using calibrated equipment traceable to the National Institute of Standards and Technology (NIST).*

This certificate is valid for products tested as described in the accompanying test report. Specific modifications necessary to meet the above requirement, recommended by Integrity Design & Test Services, Inc. are described therein.

Integrity Design & Test Services, Inc. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) for Electromagnetic Emissions Testing.

This report may not be reproduced in parts without the written consent of Integrity Design & Test Services, Inc. This report must not be used to claim product endorsement by NVLAP or any agency of the United States government.

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1.2 CONTENT 1
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1. Executive Summary

1.1 Scope

This document describes electromagnetic emissions testing performed on the BP 280 SI, BP 420 SI, and the BP 650 SI on August 5, August 10, and September 22, 1997, pursuant to EN55022 requirements.

1.2 Content

Contained herein are the technical descriptions of the equipment under test (EUT) as well as the test methods used to verify compliance with the EN55022 emissions requirements for Information Technology Equipment (ITE).

1.3 Reporting of Results

Radiated and conducted emissions data are presented in tabular form in the appendix of this document. Summaries of results as well as modifications required for compliance are given in the Test Descriptions & Results section. The summary of results of the complete testing is also provided in Table 1.3-1 on the following page.

1.4 Conclusions

The BP 280 SI, BP 420 SI, and the BP 650 SI met the EN55022 Class B requirements when tested as received. (Refer to Test Descriptions & Results in section 3 for a detailed description).

2. Test Environment

2.1 EUT Description

M/N: BP 280 SI S/N: N/A
M/N: BP 420 SI S/N: N/A
M/N: BP 650 SI S/N: N/A

The BP 280 SI is a 280 VA uninterruptable power supply. This model also represents the SU 280 INET, the only difference being the plastic front bezel.

The BP 420 SI is a 420 VA uninterruptable power supply. This model also represents the SU 420 INET, the only difference being the plastic front bezel.

The BP 650 SI is a 650 VA uninterruptable power supply. This model also represents the SU 650 INET, the only difference being the plastic front bezel.

2.1.1 System Operation

Each of the units under test were tested separately, and configured as part of a typical tabletop personal computer system. The EUT provided power to the PC, monitor throughout the testing. Emissions were measured while the unit operated under AC power as well as battery backup power.

2.1.2 Support Equipment:

Description	Manufacturer	Model Number	Serial Number	FCC ID
Monitor	Korea Data Systems	KD-1500N	244A023917	EVOKD-1500N
Keyboard	Packard Bell	Force III	Not Labeled	Not Labeled
Computer	Packard Bell	Force III	90275176	FODFORCE-III12
Mouse	Hewlett Packard	M-S34	LCA53825459	DZL210582

Cables

Quantity	Description
4	AC power (2m, unshielded)
2	RJ 11 (1m, unshielded)
1	DB9 Serial cable (2m, shielded)

2.2 Test Facility Description

The test facility is located on the premises of Integrity Design & Test Services, Inc. at 37-7 Ayer Road, Littleton, MA 01460. All testing is performed in an Open Area Test Site conforming to the site attenuation characteristics defined by CISPR Publication 16. Test methods and facilities have been audited and accredited by the National Voluntary Lab Accreditation Program (NVLAP).

2.3 Test Equipment

All equipment used in the testing process have up to date calibrations traceable to the National Institute of Standards and Technology (NIST). Refer to Table 2.3-1 for a complete list of equipment used during the testing.

2.4 Product Disposition

All items received for testing undergo an inspection to ensure proper working condition upon reception and before return shipment. The unit under test passed the incoming inspection when received for testing on August 5, 1997. The unit was returned to the client's facility at the completion of testing after passing the final inspection.

Table 1.3-1: Test Equipment

Description	Model Number	Serial Number	Last Calibration	Due Calibration
Spectrum Analyzer	HP 8591E	3346A02258	12-17-96	12-17-97
Preamplifier	HP 447D	2443A04077	11-1-96	11-1-97
Log Periodic Antenna 180 MHz to1000MHz	IDTS LG1000	00126	4-18-97	4-18-98
Biconical Antenna 30 MHz to 1000MHz	IDTS BC200	0036	4-18-97	4-18-98
LISN: 50Ω/50µH (Device Under Test)	Solar 9252-50-R-24-BNC	941724	3-12-97	3-12-98
LISN: 50Ω /50µH (Peripheral Devices)	Solar 9252-50-R-24-BNC	941725	05-12-97	05-12-98
Chase Ultra Broad Band Antenna 30 MHz to 2GHz	CBL6112A	2173	12-19-96	12-19-97

All equipment used for testing has been calibrated according to methods and procedures defined by the National Institute of Standards and Technology (NIST).

3. Test Description/Results

3.1 Radiated Emissions

3.1.1 Object

The purpose of this test is to measure the radiated electromagnetic emissions generated by the equipment under test (EUT), pursuant to EN55022 Class B requirements. (See Table 3.1.1-1 for the Class B radiated limits).

3.1.2 Procedure

Testing is performed in an Open Area Test Site. The EUT is placed on a wooden turntable 80 cm in height. The EUT is centered laterally on the turntable and flush with the rear of the table. Peripheral equipment are placed on either side of the EUT with a minimum of 10 cm spacing. (When testing a personal computer system, monitors shall be placed on top of the PC, and the keyboard and mouse shall be placed in front of the PC towards the front edge of the turntable.) Excess interface cables are draped over the back edge of the table no closer than 40 cm to the ground plane.

The EUT shall be set into operation such that all parts of the system are exercised. This may require the use of test software designed to exercise the various parts of the system.
With the EUT set into operation, the turntable is rotated over 360 degrees and interface cables are manipulated to maximize the emissions. The peripherals are not moved during the test. The receiving antenna is placed at a test distance of 3 or 10 meters from the closest point on the EUT. The antenna height is varied from 1 to 4 meters, and the polarity of the antenna is switched between vertical and horizontal such that the received signal is maximized.

3.1.3 Deviations from Test Method

None

3.1.4 Measurement Uncertainty

A minimum of a 2 dB margin of compliance is required for radiated emissions data to verify passing results. This is required to compensate for the measurement uncertainties involved.

3.1.5 Results

The BP 280 SI, BP 420 SI, and the BP 650 SI met the EN55022 Class B radiated emissions requirements when tested as described below. (See Appendix A for a complete listing of data points).

Modifications	EN55022 Class B Radiated Emissions
See Note (1)	Passed: - 8.5 dB at 160.0 MHz (BP 650 SI, on line)
See Note (1)	Passed: - 13.5 dB at 160.0 MHz (BP 650 SI, inverter on)
See Note (1)	Passed: - 12.0 dB at 144.0 MHz (BP 280 SI, on line)
See Note (1)	Passed: - 11.5 dB at 224.0 MHz (BP 280 SI, inverter on)
See Note (1)	Passed: - 10.0 dB at 176.0 MHz (BP420 IS, on line)
See Note (1)	Passed: - 11.0 dB at 113.3 MHz (BP 420 SI, inverter on)

Notes

(1) Initial scan. No modifications installed.

The above results pertain only to the specific item submitted for testing, identified by the product's model and serial numbers.

3.1.6 Radiated Emissions Terms and Calculation

The following is a description of terms and a sample calculation, as appears in the radiated emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading: This is the reading obtained on the spectrum analyzer in dBμV. Any external preamplifiers used are taken into account through internal analyzer settings.

A.F.: This is the antenna factor for the receiving antenna. It is a conversion factor which converts electric fields strengths to voltages which can be measured directly on the spectrum analyzer. It is treated as a loss in dB. Cable losses have been included with the A.F. to simplify the calculations. The antenna factor is used in calculations as follows:

Reading on Analyzer(dBμV) + A.F. (dB) = Net field strength (dBμV/m)

Net: This is the net field strength measurement (as shown above).

Limit: This is the EN55022 Class B radiated emission limit (in units of dBμV/m).

Margin: This is the margin of compliance below the EN55022 limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example for an emission measuring 18.5 dBμV on the spectrum analyzer at 592 MHz, assuming a 3 meter test distance:
(Note: This shows a passing result (i.e. a negative margin))

Example only:

Reading		A.F.	Net Reading		Net Reading		limit		Margin
18.5dBμV	+	25 dB	= 43.5 dBμV/m	:	43.5 dBμV/m	-	47.5 dBμV/m	=	-4.0 dB

3.2 *Conducted Emissions*

3.2.1 Object

The purpose of this test is to measure the conducted electromagnetic emissions on the AC power lines, pursuant to EN55022 Class B requirements. (See Table 3.2.1-1 for the Class B conducted limits).

3.2.2 Procedure

Testing is performed in an Open Area Test Site. Equipment is arranged on the turntable as described in section 3.1.2. Each individual current-carrying power lead shall be individually connected through a 50Ω/50μH Line Impedance Stabilization Network(LISN). A 2 meter x 2 meter vertical coupling plane is placed 40 cm to the rear of the EUT. The EUT is set into operation such that all parts of the system are exercised, while the RF voltages across the 50 Ω measuring port of the LISN are recorded. The test is repeated for each current-carrying power line of the EUT.

3.2.3 Deviations from Test Method

None

3.2.4 Measurement Uncertainty

A minimum of a 1 dB margin of compliance is required for conducted emissions data to verify passing results. This is required to compensate for the measurement uncertainties involved.

3.2.5 Results

The BP 280 SI, BP 420 SI, and the BP 650 SI met the EN55022 Class B conducted emissions requirements when tested as described below. (See Appendix A for a complete listing of data points).

Modifications	EN55022 Class B Conducted Emissions
See Note (1)	Passed: - 7.4 dB at .175 MHz (BP 650 SI, on line)
See Note (1)	Passed: - 10.2 dB at 9.4 MHz (BP 650 SI, inverter on)
See Note (1)	Passed: - 18.3 dB at .611 MHz (BP 280 SI, on line)
See Note (1)	Passed: - 20.8 dB at .325 MHz (BP 280 SI, inverter on)
See Note (1)	Passed: - 8.0 dB at .175 MHz (BP420 IS, on line)
See Note (1)	Passed: - 10.1 dB at 9.4 MHz (BP 420 SI, inverter on)

Notes

(1) Initial scan. No modifications installed.

The above results pertain only to the specific item submitted for testing, identified by the product's model and serial numbers.

3.2.6 Conducted Emissions Terms and Calculation

The following is a description of terms and a sample calculation, as appears in the conducted emissions data table. The numbers used in the calculation are for example only. There is no direct correlation to the specific data taken for the product described in this document:

Reading: This is the reading obtained on the spectrum analyzer in dBμV. Any external attenuators used are taken into account through internal analyzer settings.

Limit: This is the EN55022 Class B conducted emission limit (in units of dBμV).

Margin: This is the margin of compliance below the EN55022 limit. The units are given in dB. A negative margin indicates the emission was below the limit. A positive margin indicates that the emission exceeds the limit.

Example for an emission measuring 55 dBμV on the spectrum analyzer at 5.4 MHz. (Note: This shows a passing result (i.e. a negative margin))

Example only:

Reading		Average limit		Margin
55 dBμV	-	60 dBμV	=	-5 dB

Table 2.1.1-1: EN55022 Class B Radiated Emissions Limit

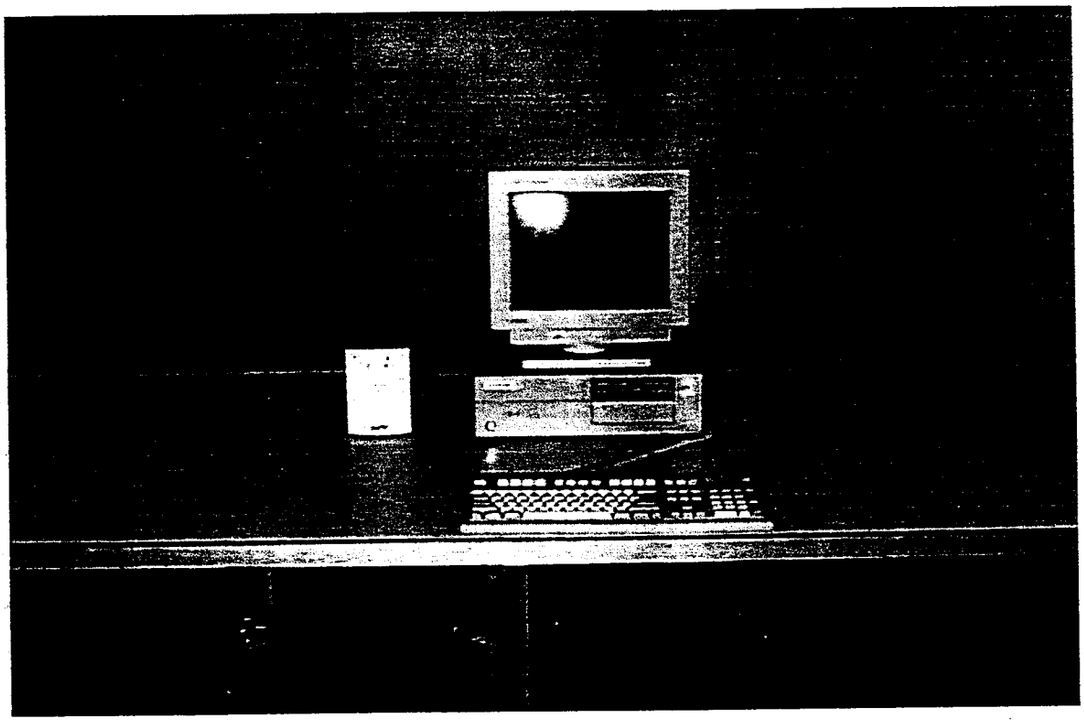
Frequency	Quasi-Peak Limit @ 3 Meters	Quasi-Peak Limit @ 10 Meters
30 MHz to 230 MHz	40 dBμV/m	30 dBμV/m
230 MHz to 1000 MHz	47 dBμV/m	37 dBμV/m

Table 3.2.1-1: EN55022 Class B Conducted Emissions Limit

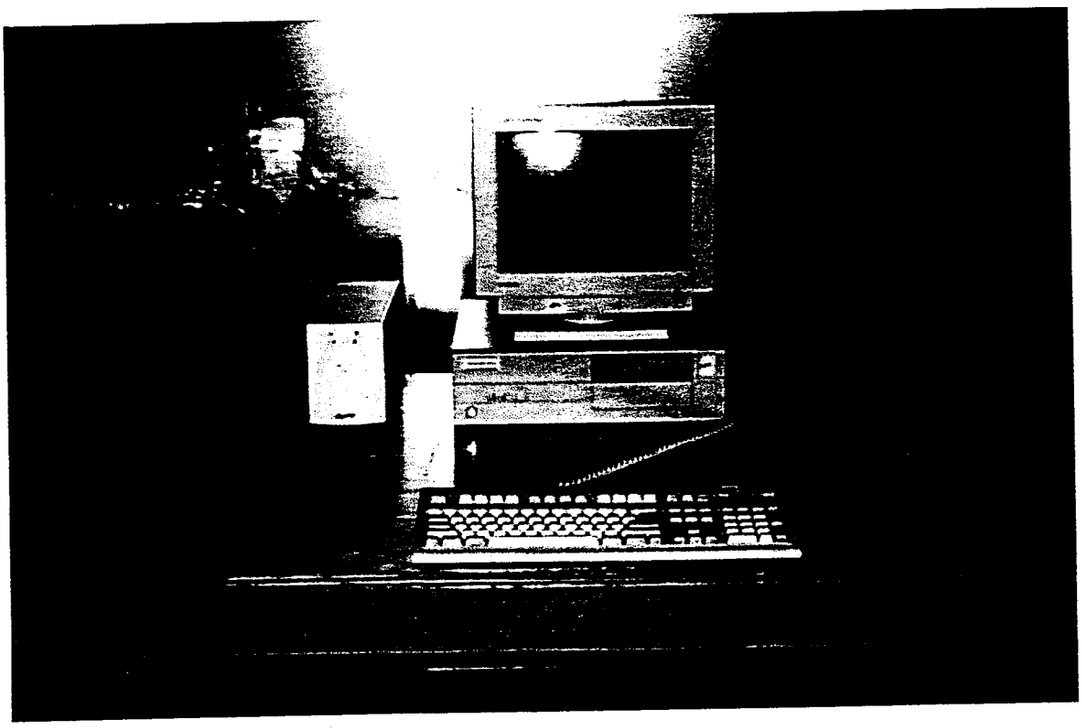
Frequency	Average Limit	Quasi-Peak Limit
.15 MHz to .5 MHz	56 dBμV to 46 dBμV	66 dBμV to 56 dBμV
.5 MHz to .5 MHz	46 dBμV	56 dBμV
5 MHz to 30 MHz	50 dBμV	60 dBμV

Configuration Photographs

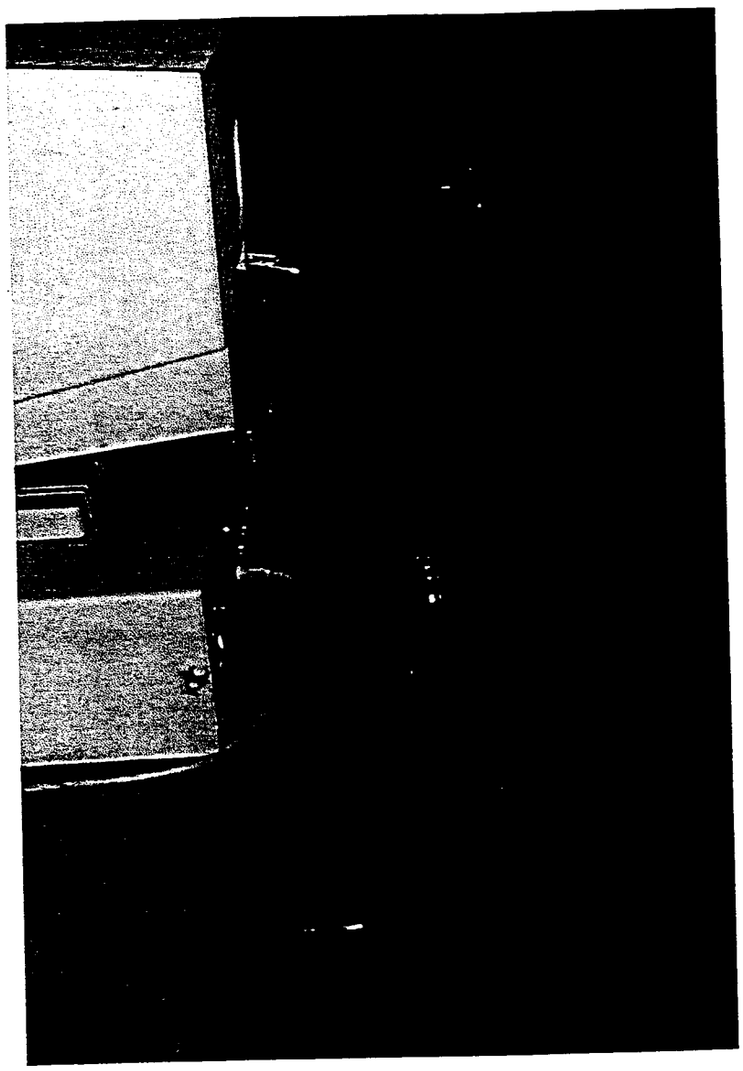
Configuration Photograph



Configuration Photograph



Configuration Photograph



Appendix A

Test Data

Table A1: EN55022 Class B Radiated Emissions

Company: American Power Conversion
Model: BP 650

Test Date: August 5, 1997
Engineer: Jim Goyette
OATS: #2

Test Config:Initial Scan (on line)

Polarity (V or H)	Frequency (MHz)	Q.P. Reading (dBuV)	A.F. (dB)	Net (dBuV/m)	EN55022 Class B Limit @3m (dBuV/m)	EN55022 Margin (dB)
V	80.4	8	10	18	40	-22
V	83.8	7.5	10	17.5	40	-22.5
V	86.4	10	11	21	40	-19
V	112.9	6	14.5	20.5	40	-19.5
V	120.4	8.5	14.5	23	40	-17
V	124.2	7	14.5	21.5	40	-18.5
V	160	18	13.5	31.5	40	-8.5
V	168	12	13	25	40	-15
V	248	14	18	32	47	-15

Table A2: EN55022 Class B Radiated Emissions

Company: American Power Conversion
Model: BP 650

Test Date: August 5, 1997
Engineer: Jim Goyette
OATS: #2

Test Config:Initial Scan (inverter on)

Polarity (V or H)	Frequency (MHz)	Q.P. Reading (dBuV)	A.F. (dB)	Net (dBuV/m)	EN55022 Class B Limit @3m (dBuV/m)	EN55022 Margin (dB)
V	80.4	7	10	17	40	-23
V	82.7	6	10	16	40	-24
V	86.4	7.5	11	18.5	40	-21.5
V	113.1	5.5	14.5	20	40	-20
V	119.3	7	14.5	21.5	40	-18.5
V	125.6	5	13.5	18.5	40	-21.5
V	160	13	13.5	26.5	40	-13.5
V	168	10.5	13	23.5	40	-16.5
V	248	12.5	18	30.5	47	-16.5

Table A3: EN55022 Class B Conducted Emissions

npany: American Power Conversion
del: BP 650

st Config: Initial Scan (on line)

requency (MHz)	Phase Quasi-Peak Reading (dBuV)	Phase Average Reading (dBuV)	EN55022 Class B Quasi-Peak Limit (dBuV)	EN55022 Class B Average Limit (dBuV)	Margin (dB)
0.159	40.3	39.4	65.6	55.6	-16.2
0.175	53.3	46.5	64.8	54.8	-8.3
0.275	49.5	42.5	61.0	51.0	-8.5
6.3	39.7	34.6	60.0	50.0	-15.4
9.4	43.2	39	60.0	50.0	-11.0
12.6	39	34.2	60.0	50.0	-15.8
Frequency (MHz)	**Neutral Quasi-Peak Reading (dBuV)**	**Neutral Average Reading (dBuV)**	**EN55022 Class B Quasi-Peak Limit (dBuV)**	**EN55022 Class B Average Limit (dBuV)**	**Margin (dB)**
0.152	49.9	40.1	65.9	55.9	-15.8
0.175	53.8	47.4	64.8	54.8	-7.4
0.275	50.7	42.4	61.0	51.0	-8.6
6.3	39.1	34.2	60.0	50.0	-15.8
9.4	43.1	39.1	60.0	50.0	-10.9
12.6	38.9	34.1	60.0	50.0	-15.9

Test Date: August 5, 1997
Test Engineer: Jim Goyette

Table A4: EN55022 Class B Conducted Emissions

mpany: American Power Conversion
)del: BP 650

st Config: Initial Scan (inverter on)

Frequency (MHz)	Phase Quasi-Peak Reading (dBuV)	Phase Average Reading (dBuV)	EN55022 Class B Quasi-Peak Limit (dBuV)	EN55022 Class B Average Limit (dBuV)	Margin (dB)
0.334	48.5	27.4	59.4	49.4	-10.9
0.44	45.9	25.7	57.1	47.1	-11.2
6.3	38.6	34.4	60.0	50.0	-15.6
9.4	43.6	39.6	60.0	50.0	-10.4
11.5	31.5	29.7	60.0	50.0	-20.3
16	35.1	34.1	60.0	50.0	-15.9
Frequency (MHz)	**Neutral Quasi-Peak Reading (dBuV)**	**Neutral Average Reading (dBuV)**	**EN55022 Class B Quasi-Peak Limit (dBuV)**	**EN55022 Class B Average Limit (dBuV)**	**Margin (dB)**
0.31	42.5	28.3	60.0	50.0	-17.5
1.3	40.3	23.3	56.0	46.0	-15.7
6.3	38.1	35.8	60.0	50.0	-14.2
9.4	43.4	39.8	60.0	50.0	-10.2
12	38.7	33.3	60.0	50.0	-16.7
16	36.9	34.7	60.0	50.0	-15.3

Test Date: August 5, 1997
Test Engineer: Jim Goyette

Table A5: EN55022 Class B Radiated Emissions

Company: American Power Conversion
Model: BP 280 IS

Test Date: August 10, 1997
Engineer: Jim Goyette
OATS: #2

Test Config:Initial Scan (on line)

Polarity (V or H)	Frequency (MHz)	Q.P. Reading (dBuV)	A.F. (dB)	Net (dBuV/m)	EN55022 Class B Limit @3m (dBuV/m)	EN55022 Margin (dB)
V	136	12	13.5	25.5	40	-14.5
V	144	14.5	13.5	28	40	-12
V	152	8	13.5	21.5	40	-18.5
V	160	14	13.5	27.5	40	-12.5
V	224	12	14	26	40	-14
V	240	12	15	27	47	-20

Table A6: EN55022 Class B Radiated Emissions

Company: American Power Conversion
Model: BP 280 IS

Test Date: August 10, 1997
Engineer: Jim Goyette
OATS: #2

Test Config:Initial Scan (inverter on)

Polarity (V or H)	Frequency (MHz)	Q.P. Reading (dBuV)	A.F. (dB)	Net (dBuV/m)	EN55022 Class B Limit @3m (dBuV/m)	EN55022 Margin (dB)
V	136	1.5	13.5	15	40	-25
V	144	14	13.5	27.5	40	-12.5
V	152	7	13.5	20.5	40	-19.5
V	160	9	13.5	22.5	40	-17.5
V	224	14.5	14	28.5	40	-11.5
V	240	12.5	15	27.5	47	-19.5

Table A7: EN55022 Class B Conducted Emissions

ompany: American Power Conversion
odel: BP 280 IS

st Config: Initial Scan (on line)

Frequency (MHz)	Phase Quasi-Peak Reading (dBuV)	Phase Average Reading (dBuV)	EN55022 Class B Quasi-Peak Limit (dBuV)	EN55022 Class B Average Limit (dBuV)	Margin (dB)
0.223	37.3	29.6	62.7	52.7	-23.1
0.347	35.6	30.4	59.1	49.1	-18.7
0.611	31	27.7	56.0	46.0	-18.3
10.5	30.5	30.1	60.0	50.0	-19.9
11	31.5	30.9	60.0	50.0	-19.1
15.5	32.3	30.1	60.0	50.0	-19.9
Frequency (MHz)	**Neutral Quasi-Peak Reading (dBuV)**	**Neutral Average Reading (dBuV)**	**EN55022 Class B Quasi-Peak Limit (dBuV)**	**EN55022 Class B Average Limit (dBuV)**	**Margin (dB)**
11	33.3	29.8	60.0	50.0	-20.2
11.4	33.9	28.7	60.0	50.0	-21.3
14.4	34.1	21.7	60.0	50.0	-25.9
18.6	35	19.5	60.0	50.0	-25.0

Test Date: August 10, 1997
Test Engineer: Jim Goyette

Table A8: EN55022 Class B Conducted Emissions

ompany: American Power Conversion
lodel: BP 280 IS

est Config: Initial Scan (inverter on)

Frequency (MHz)	Phase Quasi-Peak Reading (dBuV)	Phase Average Reading (dBuV)	EN55022 Class B Quasi-Peak Limit (dBuV)	EN55022 Class B Average Limit (dBuV)	Margin (dB)
0.325	34	28.8	59.6	49.6	-20.8
0.633	31.2	24.8	56.0	46.0	-21.2
1.4	29.5	23.3	56.0	46.0	-22.7
7.1	31.1	19	60.0	50.0	-28.9
24	30.5	18.1	60.0	50.0	-29.5
Frequency (MHz)	**Neutral Quasi-Peak Reading (dBuV)**	**Neutral Average Reading (dBuV)**	**EN55022 Class B Quasi-Peak Limit (dBuV)**	**EN55022 Class B Average Limit (dBuV)**	**Margin (dB)**
0.325	33.2	28.1	59.6	49.6	-21.5
0:633	31.1	23.2	56.0	46.0	-22.8
1.4	29.6	23.2	56.0	46.0	-22.8
7.1	31	19.1	60.0	50.0	-29.0
24	30.1	18	60.0	50.0	-29.9

Test Date: August 10, 1997
Test Engineer: Jim Goyette

Table A9: EN55022 Class B Radiated Emissions

Company: American Power Conversion
Model: BP 420 IS

Test Date: September 22, 1997
Engineer: Robert Goyette
OATS: #1

Test Config:Initial Scan (on line)

Polarity (V or H)	Frequency (MHz)	Q.P. Reading (dBuV)	A.F. (dB)	Net (dBuV/m)	EN55022 Class B Limit @3m (dBuV/m)	EN55022 Margin (dB)
V	80.5	12	9	21	40	-19
V	83.1	14	9	23	40	-17
V	85	15.5	9	24.5	40	-15.5
V	113.3	14	13.5	27.5	40	-12.5
V	119.6	14	13.5	27.5	40	-12.5
V	125.69	12.5	12.5	25	40	-15
H	163.7	16	10.5	26.5	40	-13.5
H	176	19.5	10.5	30	40	-10
H	248	11.5	14	25.5	47	-21.5
H	300	13	15.5	28.5	47	-18.5

Table A10: EN55022 Class B Radiated Emissions

Company: American Power Conversion
Model: BP 420 IS

Test Date:September 22, 1997
Engineer: Robert Goyette
OATS: # 1

Test Config:Initial Scan (inverter on)

Polarity (V or H)	Frequency (MHz)	Q.P. Reading (dBuV)	A.F. (dB)	Net (dBuV/m)	EN55022 Class B Limit @3m (dBuV/m)	EN55022 Margin (dB)
V	80.3	11	9	20	40	-20
V	82.9	10	9	19	40	-21
V	85	14	9	23	40	-17
V	113.3	15.5	13.5	29	40	-11
V	119.6	14	13.5	27.5	40	-12.5
V	125.9	13.5	12.5	26	40	-14
H	163.7	14	10.5	24.5	40	-15.5
H	176	16	10.5	26.5	40	-13.5
H	248	12	14	26	47	-21
H	300	14.5	15.5	30	47	-17

Table A11: EN55022 Class B Conducted Emissions

ompany: American Power Conversion
odel: BP 420 IS

est Config: Initial Scan (on line)

Frequency (MHz)	Phase Quasi-Peak Reading (dBuV)	Phase Average Reading (dBuV)	EN55022 Class B Quasi-Peak Limit (dBuV)	EN55022 Class B Average Limit (dBuV)	Margin (dB)
0.175	53.9	46.2	64.8	54.8	-8.6
0.275	47.1	39.4	61.0	51.0	-11.6
2.3	39.5	29.7	56.0	46.0	-16.3
6.3	38.6	33.3	60.0	50.0	-16.7
9.4	41.4	36.6	60.0	50.0	-13.4
12.6	37.9	32.8	60.0	50.0	-17.2
Frequency (MHz)	**Neutral Quasi-Peak Reading (dBuV)**	**Neutral Average Reading (dBuV)**	**EN55022 Class B Quasi-Peak Limit (dBuV)**	**EN55022 Class B Average Limit (dBuV)**	**Margin (dB)**
0.175	48.1	46.8	64.8	54.8	-8.0
0.275	49.3	42.3	61.0	51.0	-8.7
2.3	38.4	29.3	56.0	46.0	-16.7
6.3	38.2	32.1	60.0	50.0	-17.9
9.4	41.4	37.8	60.0	50.0	-12.2
12.6	38.1	32.9	60.0	50.0	-17.1

Test Date: August 5, 1997
Test Engineer: Jim Goyette

EN61000-3-2 Test Report

Response

Response Topic: BP280SI

Author: Steve Williams
Date: 12/29/2000 03:15 PM

Date: 12/29/00

Product: BP280SI

S/N: NB9938350023

Tester: Ken Alves

Reviewer: Steve Williams

Parameters: 100% resistive load, fully discharged battery

Equipment: PM3000 asset #2829

Comments: Battery was fully discharged prior to testing to bring in the charging circuit and create a "worst case" scenario.

Results:

Frequency	Input Current Harmonic	THD Limits	n	Pass/Fail	Margin
0	0.0000		0		
50	0.7692		1		
100	0.0121	1.08	2	Pass	1.068
150	0.0657	2.30	3	Pass	2.234
200	0.0047	0.43	4	Pass	0.425
250	0.0386	1.14	5	Pass	1.101
300	0.0008	0.30	6	Pass	0.299
350	0.0190	0.77	7	Pass	0.751
400	0.0004	0.23	8	Pass	0.230
450	0.0028	0.40	9	Pass	0.397
500	0.0004	0.23	10	Pass	0.230
550	0.0054	0.33	11	Pass	0.325
600	0.0002	0.23	12	Pass	0.230
650	0.0056	0.21	13	Pass	0.204
700	0.0001	0.23	14	Pass	0.230
750	0.0020	0.15	15	Pass	0.148
800	0.0001	0.23	16	Pass	0.230
850	0.0013	0.15	17	Pass	0.149
900	0.0001	0.23	18	Pass	0.230
950	0.0022	0.15	19	Pass	0.148
1000	0.0000	0.23	20	Pass	0.230
1050	0.0013	0.15	21	Pass	0.149
1100	0.0001	0.23	22	Pass	0.230

1150	0.0003	0.15	23	Pass	0.150
1200	0.0000	0.23	24	Pass	0.230
1250	0.0010	0.15	25	Pass	0.149
1300	0.0001	0.23	26	Pass	0.230
1350	0.0010	0.15	27	Pass	0.149
1400	0.0000	0.23	28	Pass	0.230
1450	0.0001	0.15	29	Pass	0.150
1500	0.0001	0.23	30	Pass	0.230
1550	0.0007	0.15	31	Pass	0.149
1600	0.0001	0.23	32	Pass	0.230
1650	0.0006	0.15	33	Pass	0.149
1700	0.0001	0.23	34	Pass	0.230
1750	0.0002	0.15	35	Pass	0.150
1800	0.0001	0.23	36	Pass	0.230
1850	0.0005	0.15	37	Pass	0.150
1900	0.0001	0.23	38	Pass	0.230
1950	0.0003	0.15	39	Pass	0.150
2000	0.0000	0.23	40	Pass	0.230

Rev. A 1-04-01 KA

Response

Response Topic: BP420SI

Author: Ken Alves
Date: 01/04 10:32 AM

Date: 12/29/00

Product: BP420SI

S/N: GB9815465624

Tester: Ken Alves

Reviewer: Steve Williams

Parameters: 100% resistive load, fully discharged battery

Equipment: PM3000 asset #2829

Comments: Battery was fully discharged prior to testing to bring in the charging circuit and create a "worst case" scenario.

Results:

Frequency	Input Current Harmonic	THD Limits	n	Pass/Fail	Margin
0	0.0000		0		
50	1.1730		1		
100	0.0415	1.08	2	Pass	1.039
150	0.0410	2.30	3	Pass	2.259
200	0.0145	0.43	4	Pass	0.416
250	0.0197	1.14	5	Pass	1.120
300	0.0036	0.30	6	Pass	0.296
350	0.0159	0.77	7	Pass	0.754
400	0.0022	0.23	8	Pass	0.228
450	0.0075	0.40	9	Pass	0.393
500	0.0005	0.23	10	Pass	0.230
550	0.0047	0.33	11	Pass	0.325
600	0.0000	0.23	12	Pass	0.230
650	0.0010	0.21	13	Pass	0.209
700	0.0006	0.23	14	Pass	0.229
750	0.0011	0.15	15	Pass	0.149
800	0.0004	0.23	16	Pass	0.230
850	0.0021	0.15	17	Pass	0.148
900	0.0002	0.23	18	Pass	0.230
950	0.0015	0.15	19	Pass	0.149
1000	0.0003	0.23	20	Pass	0.230
1050	0.0010	0.15	21	Pass	0.149
1100	0.0002	0.23	22	Pass	0.230
1150	0.0004	0.15	23	Pass	0.150

1200	0.0003	0.23	24	Pass	0.230
1250	0.0006	0.15	25	Pass	0.149
1300	0.0003	0.23	26	Pass	0.230
1350	0.0009	0.15	27	Pass	0.149
1400	0.0003	0.23	28	Pass	0.230
1450	0.0004	0.15	29	Pass	0.150
1500	0.0003	0.23	30	Pass	0.230
1550	0.0003	0.15	31	Pass	0.150
1600	0.0003	0.23	32	Pass	0.230
1650	0.0003	0.15	33	Pass	0.150
1700	0.0002	0.23	34	Pass	0.230
1750	0.0003	0.15	35	Pass	0.150
1800	0.0002	0.23	36	Pass	0.230
1850	0.0004	0.15	37	Pass	0.150
1900	0.0004	0.23	38	Pass	0.230
1950	0.0003	0.15	39	Pass	0.150
2000	0.0003	0.23	40	Pass	0.230

Rev. A 1-04-01 KA

Response

Response Topic: BP650SI

Author: Ken Alves
Date: 01/04 10:54 AM

Date: 12/29/00

Product: BP650SI

S/N: NB0003251057

Tester: Ken Alves

Reviewer: Steve Williams

Parameters: 100% resistive load, fully discharged battery

Equipment: PM3000 asset #2829

Comments: Battery was fully discharged prior to testing to bring in the charging circuit and create a "worst case" scenario.

Results:

Frequency	Input Current Harmonic	THD Limits	n	Pass/Fail	Margin
0	0.0000		0		
50	1.7780		1		
100	0.0557	1.08	2	Pass	1.024
150	0.0486	2.30	3	Pass	2.251
200	0.0187	0.43	4	Pass	0.411
250	0.0223	1.14	5	Pass	1.118
300	0.0059	0.30	6	Pass	0.294
350	0.0199	0.77	7	Pass	0.750
400	0.0037	0.23	8	Pass	0.226
450	0.0093	0.40	9	Pass	0.391
500	0.0011	0.23	10	Pass	0.229
550	0.0071	0.33	11	Pass	0.323
600	0.0003	0.23	12	Pass	0.230
650	0.0018	0.21	13	Pass	0.208
700	0.0006	0.23	14	Pass	0.229
750	0.0002	0.15	15	Pass	0.150
800	0.0003	0.23	16	Pass	0.230
850	0.0022	0.15	17	Pass	0.148
900	0.0001	0.23	18	Pass	0.230
950	0.0018	0.15	19	Pass	0.148
1000	0.0002	0.23	20	Pass	0.230
1050	0.0016	0.15	21	Pass	0.148
1100	0.0001	0.23	22	Pass	0.230
1150	0.0006	0.15	23	Pass	0.149

1200	0.0002	0.23	24	Pass	0.230
1250	0.0001	0.15	25	Pass	0.150
1300	0.0000	0.23	26	Pass	0.230
1350	0.0009	0.15	27	Pass	0.149
1400	0.0001	0.23	28	Pass	0.230
1450	0.0006	0.15	29	Pass	0.149
1500	0.0002	0.23	30	Pass	0.230
1550	0.0008	0.15	31	Pass	0.149
1600	0.0002	0.23	32	Pass	0.230
1650	0.0005	0.15	33	Pass	0.150
1700	0.0002	0.23	34	Pass	0.230
1750	0.0004	0.15	35	Pass	0.150
1800	0.0002	0.23	36	Pass	0.230
1850	0.0003	0.15	37	Pass	0.150
1900	0.0000	0.23	38	Pass	0.230
1950	0.0007	0.15	39	Pass	0.149
2000	0.0001	0.23	40	Pass	0.230

Rev. A 1-04-01 KA

EN61000-3-3 Test Report

Model: BP280SI
S/N: NB9938350023

Test per IEC1000-3-3

Tested by: Ken Alves
Date: January 3, 2001
Location: APC Safety Lab
85 Rangeway Road, Bldg #2,
North Billerica, MA 01862, USA

Notes: Testing that has been done on this unit also represents the BP420SI and the BP650SI as they use the same "online" electronic circuitry.

IEC 1000-3-3/EN 61000-3-3 Voltage Fluctuation and Flicker Test
Date Performed: 01/03/01

Test Executed By: Ken Alves
Company Name: APC
Test Description: Online, no load
Device Under Test ID: BP280SI
Test ID: NB9938350023

Approved by: *Stephen G. Williams*

Signature: _____ Date: January 3, 2001

Final Test Result: **PASS**

Settings and Test Conditions Compliant to the Standard: **Yes**

Test Equipment Used:
HP 6813B Harmonic/Flicker Test System with serial number: US38390336
HFTS Software Version: A.05.02
Date Last Calibrated:

Test Equipment Settings:

Line Voltage: 230.00 V	Pst Integration Time: 10 minutes
Line Frequency: 50 Hz	Pst Integration Periods: 12
Measurement Delay: 10.0 seconds	Test Duration: 02:00:00
RMS Current Limit: 13.1 A	Peak Current Limit: 80.8 A

Overrides:
Pst/Plt Test Limit Overrides: NONE
RMS Test Limit Overrides: NONE

Equipment Under Test Pre-test Results:

RMS Voltage: 230.0 V	RMS Current: 0.1 A	Real Power: 24.0 W
Frequency: 50.0 Hz	Peak Current: 0.3 A	Apparent Power: 33.4 VA
Voltage THD: 0.02%	Current THD: 59.17%	Power Factor: 0.717

Total Number of Failures:

Pst: 0	Dc: 0
Plt: 0	Dmax: 0
	Dt: 0

Total Number of Errors:
None

Final Test Summary:

Dmax: 0.0	Pst: 0.07	P_0.1: 0.01
Dc: 0.0	Plt: 0.07	P_1s: 0.01
Dt: 0.00	Plt Threshold: 0.65	P_3s: 0.01
		P_10s: 0.01
		P_50s: 0.01

Final Test Data by Integration Period:

Number of Integration Periods: 12

Integration Periods	Pst (P.U.)	P_0.1 (P.U.)	P_1.0s (P.U.)	P_3.0s (P.U.)	P_10s (P.U.)	P_50s (P.U.)	Dc (%)	Dmax (%)	Dt (sec)	Pass(P) Fail(F)
1	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
2	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
3	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
4	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
5	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
6	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
7	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
8	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
9	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
10	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
11	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A
12	0.07	0.01	0.01	0.01	0.01	0.01	-----	-----	--------	N/A

Part II
Immunity

Electromagnetic Compatibility
Product Safety

Integrity
Design & Test
Services, Inc.

Competent Body Affiliation
NVLAP

International Regulatory Compliance Testing

September 10, 1997

Mr. Bill Burks
American Power Conversion
755 Middlesex Turnpike
Billerica, MA 01821-3945

Dear Bill,

Enclosed are the EN50082-1:1992 test reports for testing performed on August 6 through August 8, 1997 on the UPS Backup Pro BP280IS and BP650IS and the UPS Backup Pro BP420IS. Please feel free to call if you have any questions concerning the testing or the reports.

Sincerely,

Michael A. McGuire P. E.
Immunity Section Manager

MAM/tl
Enclosure

37-7 Ayer Road • Littleton, Massachusetts 01460 • Tel: (508) 486-0432 • Fax: (508) 486-0592

Test Report No. 61936.c1 from Integrity Design & Test Services, Inc. is Representative of the units listed below:

SU 420INET, SU 620INET

Reviewed and Approved by:

Bill Burks
Senior Staff Regulatory Compliance Engineer

Integrity
Design & Test
Services, Inc.

Certificate of Compliance

The following product was found to comply with the requirement stated below when tested in accordance with the test procedures described in the accompanying test/measurement report.

Manufacturer: American Power Conversion
755 Middlesex Turnpike
Billerica, MA 01821-3945

Model Number: UPS Backup Pro BP280IS and BP650IS
Note: (The SU 420INET & the SU 620INET are same as above models except that the SU series is representative of the Smart UPS division)

Requirement: EN 50082-1:1992

Applicable Directive: 89/336/EEC

Approved By:

Christopher P. Burch. Immunity Section Manager	Christopher P. Burch
Date	7/23/98

Remarks: *Testing is performed using calibrated equipment traceable to the National Institute of Standards and Technology (NIST).*

This certificate is valid for products tested as described in the accompanying test report. Specific modifications necessary to meet the above requirement, recommended by Integrity Design & Test Services, Inc. are described therein.

Integrity
Design & Test
Services, Inc.

Standard: EN 50082-1:1992

Model: UPS Backup Pro BP280IS and BP650IS

Prepared for: American Power Conversion
755 Middlesex Turnpike
Billerica, MA 01821-3945

Date of Issue: August 14, 1997

Prepared by: Steven M. Burgess

Steven M. Burgess
Compliance Engineer

Reviewed by: Michael A McGuire

Michael A. McGuire, P.E.
Immunity Section Manager

Report No. 61936.c1

37-7 Ayer Road *Littleton, MA 01460* *Tel: (508) 486-0432* *Fax: (508) 486-0592*

Integrity
Design & Test
Services, Inc.

Certificate of Compliance

The following product was found to comply with the requirement stated below when tested in accordance with the test procedures described in the accompanying test/measurement report.

Manufacturer: American Power Conversion
755 Middlesex Turnpike
Billerica, MA 01821-3945

Model Number: UPS Backup Pro BP280IS and BP650IS

Requirement: EN50082-1:1992

Applicable Directive: 89/336/EEC

Approved By:

Michael A. McGuire P.E. Immunity Section Manager	
Date	9/19/97

Remarks: *Testing is performed using calibrated equipment traceable to the National Institute of Standards and Technology (NIST).*

This certificate is valid for products tested as described in the accompanying test report. Specific modifications necessary to meet the above requirement, recommended by Integrity Design & Test Services, Inc. are described therein.

This report may not be reproduced in parts without the written consent of Integrity Design & Test Services, Inc. This report must not be used to claim product endorsement by Integrity Design & Test Services, Inc. or affiliated accreditation agencies.

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1. Executive Summary

1.1 Scope

This report describes electromagnetic immunity testing performed on August 6 and 7, 1997 on the UPS Backup Pro BP280IS and BP650IS, submitted by American Power Conversion. Testing was performed pursuant to EN 50082-1:1992, a generic standard for electrical and electronic equipment intended for residential, commercial and light industrial environments. Technical descriptions of the equipment under test, support equipment, test equipment, test procedures and results are presented in the following sections.

1.2 Purpose

The purpose of the testing was to determine if the unit was susceptible to electrostatic discharge (ESD), radio frequency interference (RFI), and electrical fast transients (EFT) pursuant to EN 50082-1:1992 performance requirements.

1.3 Conclusions

The UPS Backup Pro BP280IS and BP650IS met the EN 50082-1:1992 performance requirements when tested as received. See Table 1.3-1 for a summary of test results.

Table 1.3-1: Summary of Test Requirements and Results

Requirements	Results
IEC 801-2:1991 ± 8 kV through air discharges ± 4 kV direct contact discharges Performance Criterion B pursuant to EN50082-1:1992	Passed
IEC 801-3:1984 10 V/m from 27 MHz to 1000 MHz, with 80% am at KHz Performance Criterion A pursuant to EN50082-1:1992	Passed
IEC 801-4:1988 ± 1 kV coupled to AC power lines ± 0.5 kV coupled to signal and I/O lines Performance Criterion B pursuant to EN50082-1:1992	Passed

1.4 Performance Criteria

Requirements for Performance Criterion A:
The EUT shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the EUT is used as intended.

Requirements for Performance Criterion B:
The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the EUT is used as intended. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed.

Customer Specified Performance Criteria:
The client has specified that failures are considered to include if the EUT's stop providing power to the variable transformer and light stand load, or if the EUT switches to a battery power mode. The EUT can not lose power and shut off, nor can the front panel leds change state.

2. Test Environment

2.1 EUT Description

M/N: BP280IS & BP650IS S/N: Not Labeled

The Equipment Under Test (EUT) are uninterruptable power supplies, designated as the UPS Backup Pro BP280IS and BP650IS. During testing, the EUT was powered at 230V / 50Hz. The EUT was operated in the online pass through mode. Support equipment was connected to act as a load. A light bulb was used to monitor the proper operation condition of the EUT.

The client has declared that due to similarities between the product families, compliance for both the Backup Pro and Smartups is obtained simultaneously during this testing. The client has stated that by testing the BP 650-IS that compliance is also obtained for the SU620INET. Testing was performed twice, once on the BP280IS and then again on the BP650IS.

EUT Configuration

Description	Manufacturer	Model Number	Serial Number
UPS Backup Pro	APC	280	N/A
UPS Backup Pro	APC	650	N/A

2.1.1 Support Equipment:

Description	Manufacturer	Model Number	Serial Number
Variable Transformer	Staco	9612	N/A
Light Stand 175 Watts	ITDS	P1010	N/A

Cables:

Quantity	Description
2	AC Power Cords, unshielded, (1.5m)
2	RJ45, unshielded, (3m)

2.2 Test Facility Description

The test facility is located on the premises of Integrity Design & Test Services, Inc. at 37-7 Ayer Road, Littleton, MA, 01460. Testing is performed in one or more of the following chambers:

(A) anechoic chamber 11 feet high x 15 feet wide x 22 feet long
(B) anechoic chamber 16 feet high x 16 feet wide x 28 feet long
(C) shielded room 9 feet high x 8 feet wide x 14 feet long.

2.3 Test Equipment

See Table 2.3-1 for a complete list of equipment used during the testing.

2.4 Product Disposition

All items received for testing undergo an inspection to ensure proper working condition upon receipt and before return shipment. The UPS Backup Pro BP280IS and BP650IS passed the incoming inspection when received for testing on August 6, 1997. The UPS Backup Pro BP280IS and BP650IS was returned to the customer at the completion of testing.

Table 2.3-1: Test Equipment

Item	Description	Model #	Serial #	Last Calibr.	Calibr. Due
1	Monitor	ZEC ZEN1492-1	051RE0024 ROA	N/A	N/A
2	Computer	Trademark	149E369314	N/A	N/A
3	Keyboard	Gateway 2000	92221059	N/A	N/A
4	Amplifier (75 W)	Amplifier Research 75A250	19281	N/A	N/A
5	Signal Generator	Fluke 6071A	3625005	4-23-97	4-23-98
6	Amplifier (10W)	Amplifier Research 10W1000A	14885	N/A	N/A
7	Audio Generator	Leader LAG-27	2032144	N/A	N/A
8	Signal Generator	Fluke 6071A	2850014	7-17-97	7-17-98
9	Leveling Pre-amp	Amplifier Research 888	15607	N/A	N/A
10	Isotropic Field Monitor	Amplifier Research FM2000	14932	N/A	N/A
10A	Field Probe	Amplifier Research FP2000	14005	N/A	N/A
11	Amplifier (50W)	Amplifier Research 50W1000A	18991	N/A	N/A
12	Fast Transient Burst Generator	Schaffner NSG 1025	3360	1-17-97	1-17-98
13	Fast Transient Burst Generator	Schaffner NSG 1025	3289	5-23-97	5-23-98
14	ESD Simulator	Schaffner 402-579/D	228	9-9-96	9-9-97
37A	Antenna, Log Periodic (A)	IDTS LG1000	00125	N/A	N/A
37B	Antenna, Log Periodic (B)	IDTS LG1000	00413	N/A	N/A

All equipment used for testing has been calibrated according to methods and procedures defined by the National Institute of Standards and Technology (NIST).

3. Test Descriptions and Results

3.1 Electrostatic Discharge Pursuant to IEC 801-2:1991

3.1.1 Object

The purpose of this test is to evaluate the performance of the EUT when subjected to electrostatic discharges of ± 4 kV using the direct contact method, and/or ± 8 kV using the through air method.

3.1.2 Procedure

Testing is performed on a reference ground plane. The EUT and its interface cables are isolated from the ground plane by a distance of 0.5 millimeters (see Figure 3.1-1). Discharges are made to all surfaces of the EUT which are normally accessible to the operator. The voltage level is set initially at 2 kV, and increased to a maximum level of 4 kV for contact discharges and 8 kV for air discharges. Approximately 200 single discharges are made to each surface with a minimum time interval of 1 second between discharges.

Direct contact injection is the preferred method of discharge. This method is performed on all metallic surfaces. If an electrostatic discharge event is unattainable by using the direct contact method, then the though air method of discharge is employed.

Additional discharges are made in close proximity to the EUT to simulate charged objects near the EUT. These discharges are made to a vertical coupling plate around all sides of the EUT and its interface cables. Approximately 200 single discharges are made to the ground plane, with a minimum time interval of 1 second between discharges.

Testing of the EUT was performed in Room C (see Section 2.2). Support equipment was located inside the testing room.

3.1.3 Test Equipment

The following test equipment was used for this test (refer to Table 2.3-1): Items No. 14.

3.1.4 Climatic Conditions

The climatic conditions must comply with certain requirements during testing and were measured as follows:

	Requirement	Measured
Ambient temperature	15° C to 35° C	26°C
Humidity	30% to 60%	51%
Pressure	86 kPa to 106 kPa	102.1 kPa

3.1.5 Confidence of Results and Deviations from Test Method

Confidence of results is obtained by exceeding the requirement for minimum number of discharge locations and by increasing the test voltage level to 105% of specification.

3.1.6 Results

The UPS Backup Pro BP280IS and BP650IS met the Performance Criterion B requirements of EN 50082-1:1991 when subjected to ESD events of up to and including ± 8 kV using the through air discharge method and up to and including ± 4 kV using the direct contact discharge method, when tested as received.

The above results pertain only to the specific item submitted for testing, identified by the product's model and serial numbers.

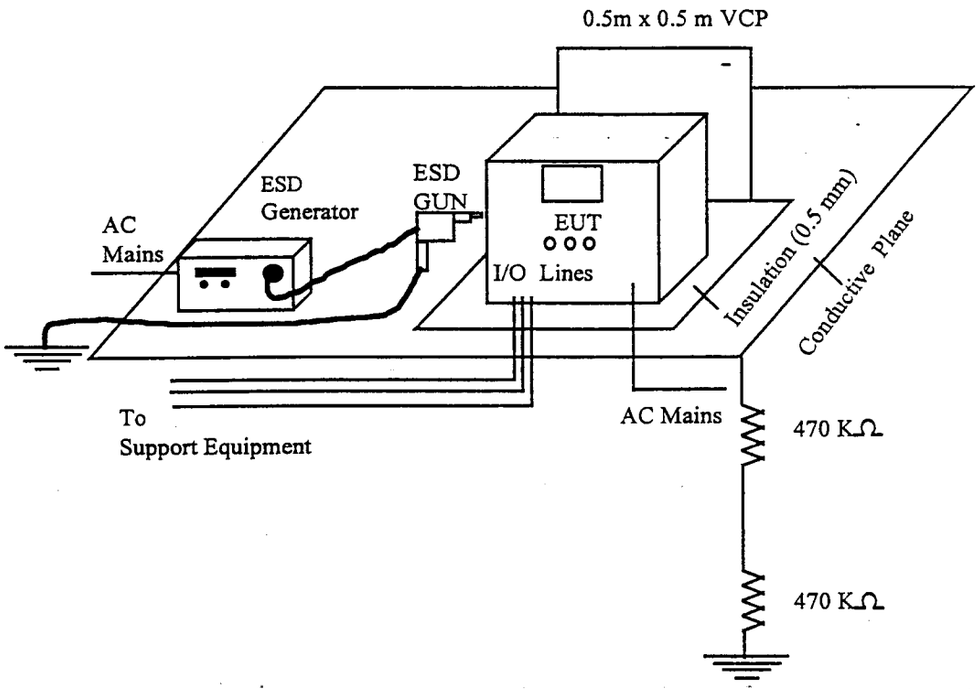

Figure 3.1-1: IEC 801-2:1991 Test Setup

3.2 Radiated Susceptibility Pursuant to IEC 801-3:1984

3.2.1 Object

The purpose of this test is to evaluate the performance of the EUT when subjected to an electric field of 3 V/m from 27 MHz to 500 MHz, unmodulated.

3.2.2 Procedure

Testing is performed in a shielded anechoic enclosure. The EUT is placed in the center of the enclosure (on a wooden table if tabletop equipment), while a broadband transmitting antenna is placed 3 meters away (see Figure 3.2-1). An isotropic field strength probe is placed adjacent to the EUT and connected to the field strength monitor over a fiber optic cable. The signal source, field strength monitor and EUT support equipment are placed outside of the shielded enclosure. Cable connections from inside to outside of the enclosure are made through feedthrough connectors. EUT connections to its support equipment were made through an access hole in the shielded enclosure.

The frequency is then swept across the entire range of interest at the required field strength while monitoring the EUT for performance. The sweep is repeated for both horizontal and vertical polarizations of the antenna.

Testing of the EUT was performed in Room A (see Section 2.2). Support equipment was located inside the testing room.

3.2.3 Test Equipment

The following test equipment was used for this test (refer to Table 2.3-1): Items No. 1, 2, 3, 5, 6, and 37A.

3.2.4 Climatic Conditions

The climatic conditions must comply with certain requirements during testing and were measured as follows:

	Requirement	Measured
Ambient temperature	none specified in standard	26°C
Humidity	none specified in standard	49%
Pressure	none specified in standard	101.9 kPa

3.2.5 Confidence of Results and Deviations from Test Method

Confidence of results is obtained by ensuring the frequency sweep rate is slow/fast enough to detect a product failure and by increasing the test voltage level to 105% of specification. As per request from the client the test level was increased from 3 V/m to 10 V/m, the frequency range was extended from 500 MHz to 1000 MHz, and 80% amplitude modulation at 1 KHz was applied.

3.2.6 Results

The UPS Backup Pro BP280IS and BP650IS met the Performance Criterion A requirements of EN 50082-1:1992 at 10 V/m from 27 MHz to 1000 MHz, with 80% am at 1 KHz, when tested as received.

The above results pertain only to the specific item submitted for testing, identified by the product's model and serial numbers.

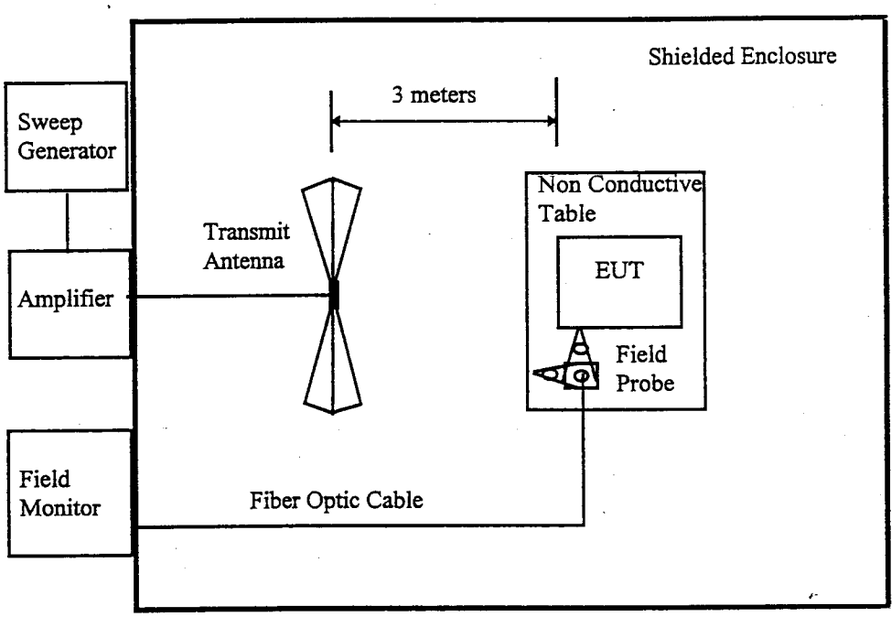

Figure 3.2-1: IEC 801-3:1984 Test Setup

3.3 Electrical Fast Transient Pursuant to IEC 801-4:1988

3.3.1 Object

The purpose of this test is to evaluate the performance of the EUT when subjected to electrical fast transients of ± 1.0 kV on the power lines and ± 0.5 kV on the signal lines and I/O lines.

3.3.2 Procedure

Testing is performed on a reference ground plane. The EUT and its interface cables are isolated from the ground plane by a distance of 0.1 meters (see Figure 3.3-1). The interference signal is coupled to the power lines through an internal capacitive coupling network in the interference generator. The transients are applied to the power lines at ± 1.0 kV in several coupling configurations including L1 to Ground, L2 to Ground and L1/L2 to Ground, while monitoring the EUT for performance. Transients are applied for a minimum of one minute for each test configuration.

In addition to the power lines, the signal is also applied to all signal lines greater than 3 meters in length. This is done with the use of a capacitive coupling clamp (see Figure 3.3-1). The interference signal is applied directly to the clamp while the signal cables under test are placed in the clamp. This provides a means of capacitively coupling the interference signal to the cables without a direct electrical connection. The interference level is set at ± 0.5 kV, while monitoring the EUT for performance.

Testing of the EUT was performed in Room C (see Section 2.2). Support equipment was located inside the testing room.

3.3.3 Test Equipment

The following test equipment was used for this test (refer to Table 2.3-1): Items No. 13, and 39.

3.3.4 Climatic Conditions

The climatic conditions must comply with certain requirements during testing and were measured as follows:

	Requirement	Measured
Ambient temperature	15° C to 35° C	26°C
Humidity	45% to 75%	49%
Pressure	68 kPa to 106 kPa	101.9 kPa

3.3.5 Confidence of Results and Deviations from Test Method

Confidence of results is obtained by extending test duration from one (1) minute per configuration to a minimum of three (3) minutes per configuration.

3.3.6 Results

The UPS Backup Pro BP280IS and BP650IS met the Performance Criterion B requirement of EN 50082-1:1992 at ± 1 kV applied to the AC power lines and ± 0.5 kV capacitively coupled to the signal and I/O lines, when tested as received.

The above results pertain only to the specific item submitted for testing, identified by the product's model and serial numbers.

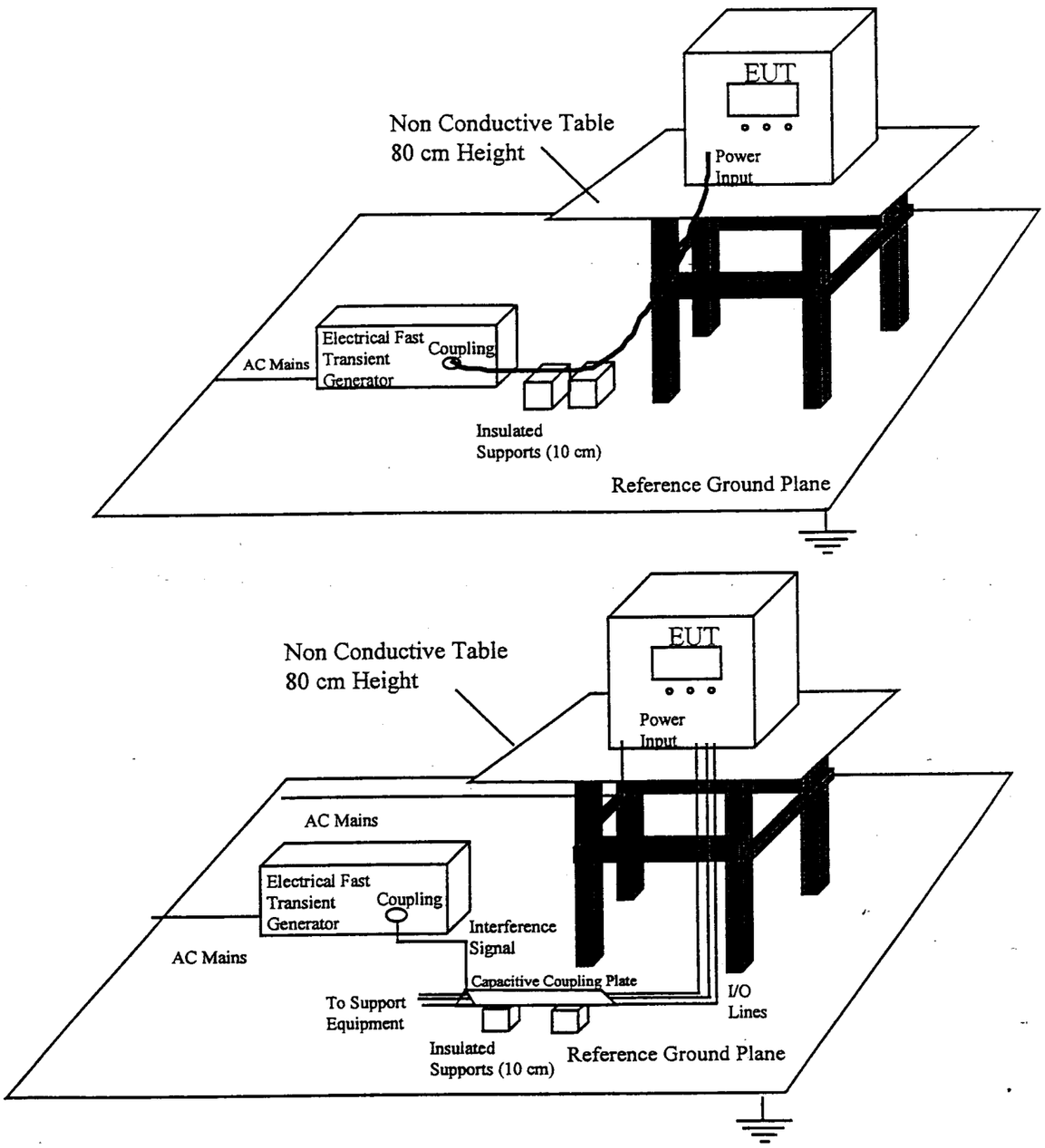

Figure 3.3-1: IEC 801-4:1988 Test Setup

APPENDIX A

CONFIGURATION PHOTOGRAPHS

APPENDIX A

CONFIGURATION PHOTOGRAPHS

IEC1000-2-2
Test Report

VDE File: 1924400-3335-0025
CB/DE1-11884
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International Regulatory Compliance Testing

Electromagnetic Compatibility
Product Safety
Product Certification
Field Evaluation

Competent Body Affiliation
NVLAP
CE Marking Assistance
CB Scheme

January 30, 2001

Mr. Steve Williams
American Power Conversion
755 Middlesex Turnpike
Billerica, MA 01821-3945

Dear Steve:

Enclosed are the amended IEC 1000-2-2: 1990 reports for the BK500MI; BK650MI; Back Up Pro. Please feel free to call if you have any questions regarding this matter.

Sincerely,

Steven M. Burgess
Immunity Section Manager

SMB/lm

37-7 Ayer Road • Littleton, Massachusetts 01460 • Tel: (978) 486-0432 • Fax: (978) 486-0592 • www.idts.com
Grand Rapids • Detroit • Littleton, MA • Taiwan • Hong Kong • Toronto

Integrity
Design & Test Services, Inc.

Standard: **IEC 1000-2-2:1990**

Model: **BK650MI; BK500MI; Back up Pro**

Prepared for: **American Power Conversion**
755 Middlesex Turnpike
Billerica, MA 01821-3945

Date of Issue: **January 26, 2001**

Prepared by:

Robert J. Mitchell
Compliance Engineer

Reviewed by:

Steven M. Burgess
Immunity Section Manager

Report No. 66436.c1

37Ayer Road, #7 *Littleton, MA 01460*
Tel: (978) 486-0432 *Fax: (978) 486-0592* *E-mail: Integrity@idts.com*

Integrity
Design & Test
Services
An Entela, Inc. Company

Certificate of Compliance

The following product was found to comply with the requirement stated below when tested in accordance with the test procedures described in the accompanying test/measurement report. Reference report numbers 66436.c1

Manufacturer:	American Power Conversion 755 Middlesex Turnpike Billerica, MA 01821-3945
Model:	BK500MI; BK650MI; Pack Up Pro
Requirement:	IEC 1000-2-2: 1990
Applicable Directive:	89/336/EEC

Approved By:

Steven M. Burgess Immunity Section Manager	Steven M. Burgess
Date	2/1/01

Remarks: *Testing is performed using calibrated equipment traceable to the National Institute of Standards and Technology (NIST).*

This certificate is valid for products tested as described in the accompanying test report. Specific modifications necessary to meet the above requirement, recommended by Integrity Design & Test Services, Inc. are described therein.

This report may not be reproduced in parts without the written consent of Integrity Design & Test Services, Inc. This report must not be used to claim product endorsement by Integrity Design & Test Services, Inc. or affiliated accreditation agencies.

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1. Executive Summary

1.1 Scope

This report describes electromagnetic immunity testing performed on January 9, 2001 through January 12, 2001 on the BK650MI; BK500MI; Back up Pro, submitted by American Power Conversion. Testing was performed pursuant to IEC 1000-2-2:1990, a product specific standard for Uninterruptible power systems (UPS). The standard applies to single UPS units or UPS systems comprising a number of interconnected UPS and associated control/switch gear forming a single power system, intended to be installed in any operator accessible area or in separated electrical locations, connected to either industrial or public low voltage supply networks. Technical descriptions of the equipment under test, support equipment, test equipment, test procedures and results are presented in the following sections.

1.2 Purpose

The purpose of the testing was to determine if the unit was susceptible to electrostatic discharge (ESD), radio frequency interference (RFI), electrical fast transients (EFT), and low frequency conducted disturbances pursuant to IEC 1000-2-2:1990 requirements.

1.3 Conclusions

The BK650MI; BK500MI; Back up Pro met the IEC 1000-2-2:1990 performance requirements when tested as received. See Table 1.3-1 for a summary of the test results.

Table 1.3-1: Summary of Test Requirements and Results

IEC 1000-2-2:1990 $10V_{r.m.s.}$ from 140 Hz to 360 Hz Performance Criterion A	Passed

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CB/DE1-11884
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Integrity Design & Test Services, Inc.

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1.4 Performance Criteria

Requirements for Performance Criterion A:
The EUT shall continue to operate as intended. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the EUT is used as intended.

Requirements for Performance Criterion B:
The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the EUT is used as intended. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed.

Requirements for Performance Criterion C:
Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls.

Customer Specified Performance Criteria:
The client has specified that failures are considered to include if at anytime the EUT lost power or was unable to support the load. Failures were also considered if the EUT went to an "off" state due to the applied stimulus.

2. Test Environment

2.1 EUT Description

M/N: BK650MI; BK500MI; Back up Pro S/N: PB9919121 434

The Equipment Under Test (EUT) is a Uniteruptable Power Supply, designated as the BK650MI; BK500MI; Back uppro. During testing, the EUT was running with a 300-watt load. The EUT was tested under battery power and also was tested under normal conditions. Operation verification was achieved by ensuring the load was supplied with continuous power.

EUT Configuration

Description	Manufacturer	Model Number	Serial Number
UPS	APC	BK500MI	PB9919121 434
UPS	APC	BK650MI	NB9815045006
UPS	APC	BP420 SI	GB9815465624

2.1.1 Support Equipment:

Description	Manufacturer	Model Number	Serial Number
300 watt load			

Cables:

Quantity	Description
1	AC Power Cord, unshielded, 1.5 meter

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2.2 Test Facility Description

The test facility is located on the premises of Integrity Design & Test Services, Inc. at 37 Ayer Road, #7, Littleton, MA, 01460. Testing is performed in one or more of the following chambers:

(A) anechoic chamber 10 feet high x 17 feet wide x 22 feet long
(B) anechoic chamber 16 feet high x 18 feet wide x 28 feet long
(C) shielded room 9 feet high x 8 feet wide x 12 feet long
(D) workstation ground plane 7 feet wide x 8 feet long with a copper ground reference table 32" x 64".
(E) workstation ground plane 7 ½ feet wide x 8 feet long with a copper ground reference table 32" x 64"

2.3 Test Equipment

See Table 2.3-1 for a complete list of equipment used during the testing.

2.4 Product Disposition

All items received for testing undergo an inspection to ensure proper working condition upon receipt and before return shipment. The BK650MI; BK500MI; Back up Pro passed the incoming inspection when received for testing January 9, 2001. The BK650MI; BK500MI; Back up Pro was returned to the customer after completion of testing.

Table 2.3-1: Test Equipment

Item	Description	Model #	Serial #	Last Calibr.	Calibr. Due
2	Computer	Trademark	149E369314	N/A	N/A
3	Frequency Counter	Tektronix CMC 250	CMC-250TW11721	N/A	N/A
4	Amplifier (75W)	Amplifier Research 75A250	19281	N/A	N/A
5	Signal Generator	Fluke 6071A	3625035	12-08-99	12-08-00
6	Amplifier (10W)	Amplifier Research 10W1000A	14885	N/A	N/A
7	Audio Generator	Leader LAG-27	2032144	N/A	N/A
8	Signal Generator	Fluke 6071A	2850014	7-02-99	7-02-00
9	Leveling Pre-amp	Amplifier Research 888	15607	N/A	N/A
10	Isotropic Field Monitor	Amplifier Research FM2000	14932	N/A	N/A
10A	Field Probe	Amplifier Research FP2000	14055	2-29-00	2-28-01
11	Amplifier (50W)	Amplifier Research 50W1000A	18991	N/A	N/A
12	Fast Transient Burst Generator	Schaffner NSG 1025	3360	9-16-99	9-16-00
13	Fast Transient Burst Generator	Schaffner NSG 1025	3289	6-18-99	6-18-00
14	ESD Simulator	Schaffner 402-579/D	228	9-10-99	9-10-00
16	Transmitting Horn Antenna	Com-Power AH-118	10077	N/A	N/A
17	Antenna High Power Transmitting Log Periodic	Allied Instruments, LOG-1	00138	N/A	N/A
18	High Energy Pulse Generator	Schaffner NSG650	1089044	3-30-99	3-30-00

Item	Description	Model #	Serial #	Last Calibr.	Calibr. Due
19	Surge Pulse Coupling Network	Schaffner CDN 110	2389347	3-30-99	3-30-00
20	Amp 40 Watt	Realistic 12-1957	003228	N/A	N/A
23	IBM Laptop Thinkpad	Laptop	78-A2038	N/A	N/A
24	Computer	Packard Bell Force (1)	90275176	N/A	N/A
25	Impedance Network	Voltech	1B079034	N/A	N/A
26	Power Analyzer	VoltecPM 3000A	AI099349	1-18-00	1-18-01
27	E Field Generator	Amplifier Research AT3000	25919	N/A	N/A
28	Coupling/Decoupling Network	FCC FCC-801-M3-25	97-03	1-05-00	1-05-01
29	Coupling/Decoupling Network	FCC FCC-801-M3-25	97-02	12-31-99	12-31-00
30	Coupling/Decoupling Network	FCC FCC-801-M2-25	97-01	1-05-00	1-05-01
31	Current Injection Clamp	Solar Electronics 9144-1N	956610	1-05-00	1-05-01
32	EM Injection Clamp	FCC F-2031	264	1-06-00	1-06-01
33	Loop Antenna	Solar Electronics 7334-1	945207	1-12-00	1-12-01
34	Oscilloscope	Tektronix TDS350	B040735	9-14-99	9-14-00
35A	Helmholtz Coil	Loop One IDTS PT202	00415	N/A	N/A
35B	Helmholtz Coil	Loop Two IDTS PT202	00415	N/A	N/A
36	Variable Autotransformer	Staco Energy 3PN1520B	147-036	N/A	N/A

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Item	Description	Model #	Serial #	Last Calibr.	Calibr. Due
37A	Antenna, Log Periodic (A)	IDTS LG1000	00125	N/A	N/A
37B	Antenna, Log Periodic (B)	IDTS LG1000	00126	N/A	N/A
38	AC Power Source	Hewlett Packard 6813A	3524A-00302	12-08-99	12-08-00
39	I/O and Signal Line Clamp	Amplifier Research	20343	N/A	N/A
40	I/O and Signal Line Clamp	IDTS	00414	N/A	N/A
41	Computer	IBM 433DX/D	23-5T10L	N/A	N/A
42A	10.0 MFD R.F Capacitor	Solar Electronics 6512-106R	N/L	N/A	N/A
42B	10.0 MFD R.F Capacitor	Solar Electronics 6512-106R	N/L	N/A	N/A
45	CE Master	Keytek	9802223	2-23-99	2-23-00
46	3ϕ CDN, Coupling Decoupling Network	IDTS	Not Labeled	N/A	N/A
47	Function Generator	LG Precision FG-8002	8071121	N/A	N/A
49	Computer	CRS Mini Tower	Not Labeled	N/A	N/A
50	Laptop	IBM Think Pad	78-TV260	N/A	N/A
52	Signal Generator	Fluke 6060B	5830205	1-18-00	1-18-01
53	CM-ESD Gun	Keytek Simulator Probe	9802329	2-23-99	2-23-00
54	Helmholtz Coil	Keytek	Not Labeled	N/A	NA
55	True RMS AC/DC Clamp Meter	Extech Instruments 380920	9800181	N/A	N/A
56A	Surge Control Center	Keytek E-Class Series 100	9907197	7-20-99	7-20-00

Item	Description	Model #	Serial #	Last Calibr.	Calibr. Due
56B	Surge Network	Keytek E509A	9907200	7-20-99	7-20-00
57	EM Radiation Meter	Wandel & Goltermann EMR-200	L-0016	6-10-99	6-10-01
58	Signal Generator	Hewlett Packard 83260B	3722A00552	2-10-00	2-10-01
59	Amplifier (10 W)	Hughes 1177H06F000	314	N/A	N/A
60	DC Supply	HP 6472C	2614A-00469	N/A	N/A
61	1 to 4 GHz 30 Watt Amplifier	Milmega KM0104-30R	990772	N/A	N/A
62	DC Supply	Xantrex XFR 60-46	45325	N/A	N/A
63	ESD Simulator	Allied Instruments HBM-2	19822	10-22-99	10-22-00
64	Room A	IDTS	001	N/A	N/A
65	Room B	LectroMagnetics, Inc. 1636 12 3472	Not Labeled	N/A	N/A
66	DMM	Fluke 79III	74621167	N/A	N/A

All equipment used for testing has been calibrated according to methods and procedures defined by the National Institute of Standards and Technology (NIST).

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3.1 Low Frequency Signals Pursuant to IEC 1000-2-2:1990

3.4.1 Object

The purpose of this test is to evaluate the performance of the EUT when subjected to $10V_{r.m.s.}$ from 140Hz through 360Hz.

3.4.2 Procedure

The EUT is connected to an audio generator, amplifier, and transformer. The $10V_{r.m.s.}$ disturbance is applied across the AC power lines and the audio generator is then swept across the entire range of interest at the required field strength while monitoring the EUT for performance.

Testing of the EUT was performed in room C (see Section 2.2). Support equipment was located inside the testing room.

3.4.3 Test Equipment

The following test equipment was used for this test (refer to Table 2.3-1); Items No: variable transformer; audio amplifier; transformer; function generator; digital Multimeter.

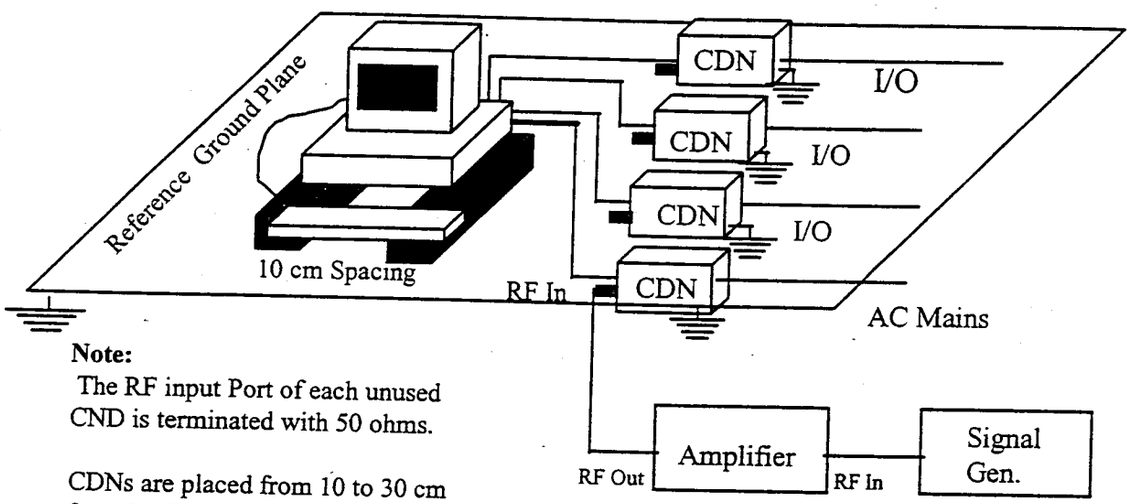

Figure 3.4-1: IEC 1000-2-2:1990 Test Setup

APPENDIX A

CONFIGURATION PHOTOGRAPHS

Annex A

Declaration of Conformity

Application of Council Directives:	89/336/EEC,73/23/EEC,92/31/EC, 98/13/EC,91/157/EEC
Standards to Which Conformity Declared:	EN50091-1, EN50091-2, EN50116, EN60950, EN55022, EN61000-3-2, EN61000-3-3
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 Phillipines Second Street Cavite EPZA Roserio, Cavite Phillipines
Importer's Name and Address:	American Power Conversion (A. P. C.) b. v. Ballybritt Business Park Galway, Ireland
Type of Equipment:	Uninterruptible Power Supply
Model Numbers:	BP280SI, BP420SI, BP650SI, SU 420INET, SU 620INET
Serial Numbers:	XB0101 000 000 – XB0152 999 999 XB0201 000 000 – VB0252 999 999
Years of Manufacture:	2001,2002
Note:	Where X = B, O, W, N, P or D

We, the undersigned, hereby declare that the equipment specified above conforms to the above directives.

Billerica, MA	1/1/01	Stephen G. Williams Regulatory Compliance Engineer
Place	Date	
Galway, Ireland	1/1/01	Ray Ballard Managing Director, Europe
Place	Date	

Safety Equipment List

Date: 11/27/2001

Equipment Type	APC ID	SN	Manufacturer	Model	Last cal date	Cal Due date	Cal Status
Current Clamp	191	191	Bell	CG100D	6/1/2001	6/1/2002	Valid
Data logger	698	17541	Stanford research	SR630	1/25/2001	1/1/2002	Valid
Data logger	697	17902	Stanford research	SR630	6/19/2001	6/1/2002	Valid
Data logger	3371	17536	Stanford research	SR630	6/6/2001	6/1/2002	Valid
Data logger	752	17581	Stanford research	SR630	6/6/2001	6/1/2002	Valid
Data logger	1657	17993	Stanford research	SR630	4/30/2001	4/1/2002	Valid
Data logger	3365	34858	Stanford research	SR630	9/11/2001	9/1/2002	Valid
DVM	520	57790000	Fluke	87	5/4/2001	5/1/2002	Valid
DVM	2548	72650067	Fluke	87-III	5/4/2001	5/1/2002	Valid
DVM	3108	76210987	Fluke	77-III	6/6/2001	6/1/2002	Valid
DVM	3133	76530286	Fluke	87-III	8/9/2001	8/1/2002	Valid
Hipot	1945	M9711317	Hipotronics	HD106-A	11/20/2001	11/20/2002	Valid
Scale	2642	H3803186	A&D Engineering	FG-60KB	12/1/2000	12/1/2001	Valid
Calipers	2753	98340960	Starrett	721	6/21/2001	6/1/2002	Valid
Leakage current	2847		Simpson	229-2	12/26/2000	12/1/2001	Valid
Power	2529	7419	Voltech	PM3000A	1/5/2001	1/1/2002	Valid
Power	842	7236	Voltech	PM3000A	7/23/2001	7/23/2002	Valid
Power	721	37970	Valhalla	2101	6/6/2001	6/1/2002	Valid
Power	755	37293	Valhalla	2101	6/6/2001	6/1/2002	Valid
Power	2298	38952	Valhalla	2101	12/28/2000	12/1/2001	Valid
Power	756	37933	Valhalla	2101	6/6/2001	6/1/2002	Valid
Temperature	2191	113157	Tektronix	DTM920	5/21/2001	5/1/2002	Valid
Temperature and RH	2582	991002799	Extech	4465CF	12/13/2000	12/1/2001	Valid
Milli Ohm	2161	8-4185	Valhalla	4150ATC	8/21/2001	8/1/2002	Valid
Force Gauge	1157	41487	Wagner	FDK20	12/6/2000	12/1/2001	Valid
Oscilloscope	1788	B010530	Tektronix	TDS520C	11/9/2001	11/9/2002	Valid
Oscilloscope Probe	1819	B036710	Tektronix	P6015A	11/9/2001	11/9/2002	Valid
Oscilloscope Probe	1820	B036711	Tektronix	P6015A	11/9/2001	11/9/2002	Valid
Oscilloscope	2312	B060248	Tektronix	TDS420	6/6/2001	6/1/2002	Valid