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REPORT

ON

COMPONENT - POWER SUPPLIES, INFORMATION TECHNOLOGY
EQUIPMENT INCLUDING ELECTRICAL BUSINESS EQUIPMENT

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Metro Manila, Philippines

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DESCRIPTION

PRODUCT COVERED:

USR, CNR Component - Switching Power Supply, Model LPQ172 for use in Information Technology Equipment, Including Electrical Business Equipment..

ELECTRICAL RATINGS:

MODEL	INPUT	OUTPUT
LPQ172	AC 100 - 250 V	FORCED AIR
	4.0 A	V1: DC +3.3 to +5.7 V, 30.0 A MAX
	50 / 60 Hz	V2: DC + 12.0 V, 8.0 A MAX
	OR	V3: DC -12.0 to -15.0 V, 3.0 A MAX
	DC 120Vmin - 300Vmax	V4: DC 3.3 to 25.0 V, 5.0 A MAX
		DC + 5 VSB, 0.2 A MAX
	4.0 A	CONVECTION COOLING
		V1: DC +3.3 to +5.7 V, 15.0 A MAX
		V2: DC + 12.0 V, 6.0 A MAX
		V3: DC -12.0 to -15.0 V, 1.5 A MAX
		V4: DC 3.3 to 25.0 V, 2.0 A MAX
		DC + 5 VSB, 0.2 A MAX

Maximum continuous output powers is 175 W with or without cover at min. 30 CFM forced.

Maximum continuous output powers is 110 W without cover at min. 30 CFM forced.

ENGINEERING CONSIDERATIONS (NOT FOR FIELD REPRESENTATIVE'S USE):

General - The unit is for use in product where the acceptability of the combination is determined by Underwriters Laboratories Inc.

Both USR and CNR indicate investigation to the Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment, UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition.

Conditions of Acceptability - When installed in the end-use equipment, the following are the considerations to be made:

1. This component has been judged on the basis of the required creepages and clearances in the Third Edition of the Standard for Safety of Information Technology Equipment Including Electrical Business Equipment, UL 60950 and CAN/CSA C22.2 No. 60950-00, Sub-clause 2.10, which covers the end-use product for which the component was designed. The operational insulation have been evaluated by conducting Component Failure Tests per sub-clause 5.3.4 (c) of UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition.

2. This power supply has only been evaluated for use in Pollution Degree 2 environment.
3. This power supply was evaluated with the assumption that the power source is a TN-S system as defined by UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition.
4. A suitable enclosure shall be provided by end use equipment.
5. The secondary outputs of the power supply are unearthed non-energy hazard SELV. Sub-clause 2.2.3.1 per UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition were used to maintain the insulation of SELV from primary circuits.
6. This power supply has been evaluated for use in Class I equipment as defined in UL 60950 and CAN/CSA C22.2 No. 60950-00, Third Edition and shall be properly earthed or bonded to earth in the end-use. An additional evaluation shall be made if the power supply is intended for use in other than Class I equipment.
7. This power supply has been evaluated for use in 25°C and 50°C ambient.
8. Transformers T201, T202, T203 and L801 employs Class F electrical insulation system, while T701 employs Class B electrical insulation system.
9. The secondary DC output connector and input connector have not been evaluated for field connections.
10. This power supply is classified as Level 3 as defined by CAN/CSA C22.2 No. 60950-00, Third Edition.
11. This power supply has not been evaluated for end system mounting. Creepage and clearance requirements between primary parts of power supply and system chassis shall be considered in the end system.
12. This power supply has only been evaluated under a specific ventilation set-up. See ILL. 3 for details.
13. The reliability of protective bonding conductor in U-Base shall be evaluated per clause 2.6 of UL 60950 Third Edition in the end system.

CONSTRUCTION DETAILS:

Spacing - the following spacings are maintained in the power supply, Model LPQ172.

1. Minimum 6.4 mm creepage and 4.4 mm clearance between primary and secondary pins and traces for power transformer (T201).
2. Minimum 8.2 mm creepage and 4.4 mm clearance between primary and secondary pins and traces for auxiliary transformer (T701).
3. Minimum 5.8 mm creepage and 4.2 mm clearance between primary and secondary pins and traces for gate drive transformers (T202,T203).
4. Minimum 7.6 mm creepage and 4.0 mm clearance between primary and secondary pins and traces for current transformer (L801).
5. Minimum 5.0 mm creepage distance and minimum 4.0 mm clearance between primary and secondary traces other than items 1 to 4.
6. Minimum 2.5 mm creepage and 2.0 mm clearance between Live and Neutral phase before the fuse.
7. Minimum 2.5 mm creepage and 2.0 mm clearance between primary traces and Protective Earth traces.

See ILL. 1 and 2 for details.

Section General - The following construction items are described in the Section general.

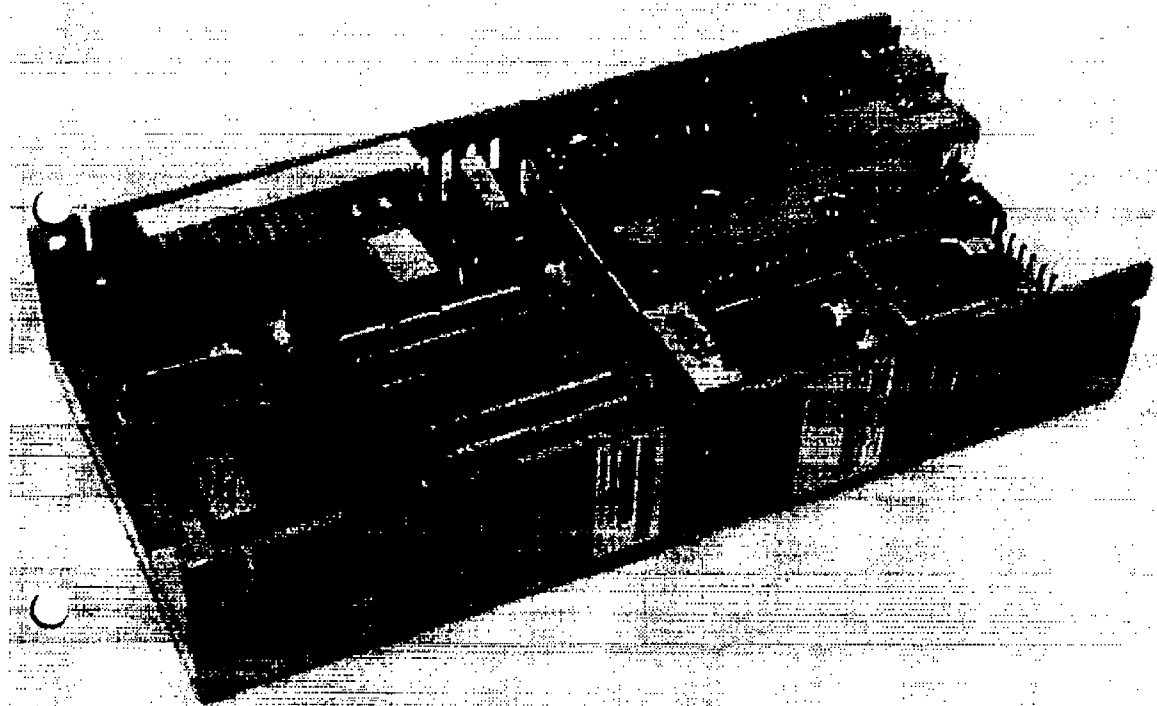
Factory Location and Identification
Abbreviations
Corrosion Protection
Segregation
Marking Methods
Internal Polymeric Materials
Wire Connections
Earthing/Bonding
Earthing Symbol
Tolerances

C-UL Requirements
Internal Wiring
Wire Positioning Devices
Markings
Printed Wiring Boards
Connectors and Receptacles
Mechanical Assembly
Insulating Tubing / Sleeving
Capacitors
Optocouplers

ILLUSTRATIONS:

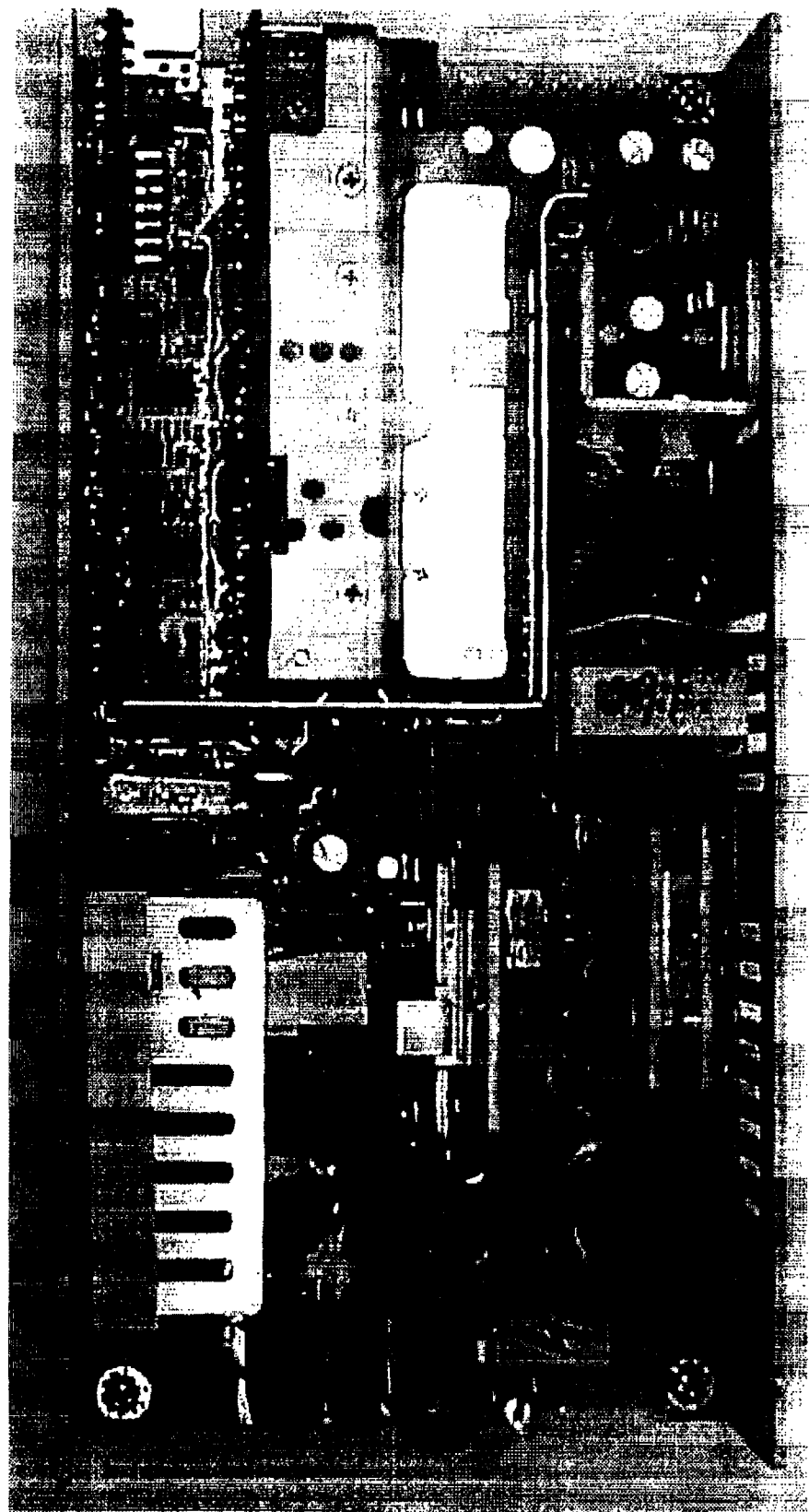
- ILL. 1 - Main PWB Trace Layout (Component Side)
ILL. 2 - Main PWB Trace Layout (Solder Side)
ILL. 3 - Ventilation Condition

General - The general design, shape and arrangement shall be as illustrated, in the following figures, except where variations are specifically described.



MODEL LPQ172 - FIG. 1

1. U-Base - Metal. Overall dimension 216.15 by 108.15 by 38.24 mm, 2 mm thick. Provided with 48 oval-shaped ventilation slots on both sides, 13 of them each measures 25 by 3 mm, 8 of them measures 24 by 3 mm, 9 of them measures 11.2 by 3 mm, 4 of them measures 37.9 by 3, 9 of them measures 17.8 by 3 mm and the other 5, each measures 41.8 by 3 mm.
2. Main Printed Wiring Board (PWB) - (ZPMV2), Refer to Section General for details. Measures 213.4 by 103.1 mm, 1.8 mm thick. Secured to metal studs of U-Base, Item 1, by three screws.
3. Cover - Not Shown. Optional. Aluminum metal, Overall dimension 216.15 by 108.15 mm, 1.0 mm thick. Provided with 429 circular-shaped ventilation slots, each measures 3 mm diameter.



MODEL LPQ172 - FIG. 2

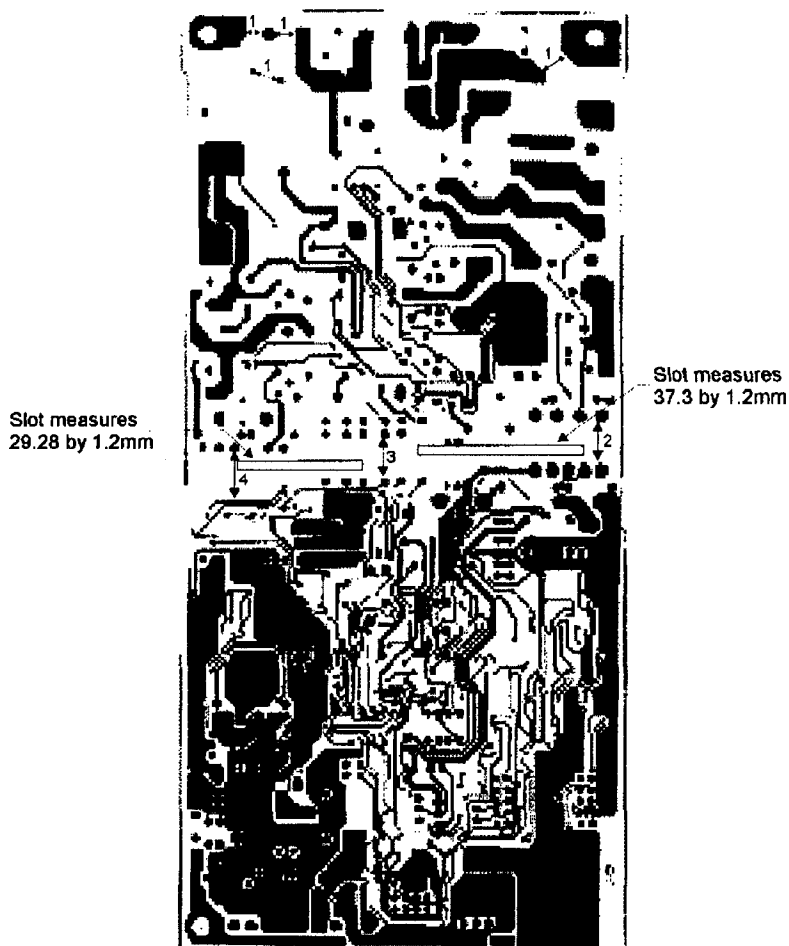
1. Input Connector (SK4) - (ECBT2), Cvilux Corp., Type CI51, rated 7 A, 250 V ac. Secured to Main PWB by soldering.

Alternate - Same as above, except Landwin, Type 3061P.
Alternate - Same as above, except Alex Connector, Type 8673.
2. Fuse (F1) - (JDYX2), Cooper Industries Inc., Bussmann Div., Type GDA-V/S501, rated 4 A, 250 V ac. Wrapped with heat-shrinkable tube and a Teflon tube on longer lead-out used to isolate both ends of the fuse. Soldered to Main PWB. Fuse rating is permanently marked on the Main PWB, adjacent to the fuse.

Alternate - Same as above, except Wickmann, Type 19194.
Alternate - Same as above, except Littelfuse, Type 226004.
3. Capacitor (C1) - (Across-the-Line). See Section General for manufacturer and catalog number. Rated maximum 0.33uF, minimum 250 V ac.
4. Discharge Resistors (R1, R2, R3) - Each rated maximum 330 K ohms, minimum 1/4 watts.
5. Capacitors (C2, C3) - (Line-to-Protective Earth). See Section General for manufacturer and catalog number. Each rated maximum 1000 pF, minimum 250 V ac.
6. Capacitor (C4) - (Across-the-Line). See Section General for manufacturer and catalog number. Rated maximum 0.22 uF, minimum 250 V ac.
7. Common Mode Choke (L1) - Astec P/N: 852-66006070.
8. Differential Chokes (L2, L3) - Astec P/N: 852-66006060.
9. Common Mode Choke (L4) - Astec P/N: 852-66006100.
10. Bridge Rectifier (D2) - Rated minimum 15 A, min. 600 V.
11. PFC Choke (L101) - Astec P/N: 852-66006390.
12. PFC Transistor (Q103) - Rated minimum 20 A, minimum 500 V.
13. Bulk Capacitor (C105) - With integral pressure relief, rated minimum 220 uF, minimum 420 V.
14. Capacitor (C106) - (Line-to-Protective Earth). See Section General for manufacturer and catalog number. Each rated maximum 10000 pF, minimum 250 V ac.

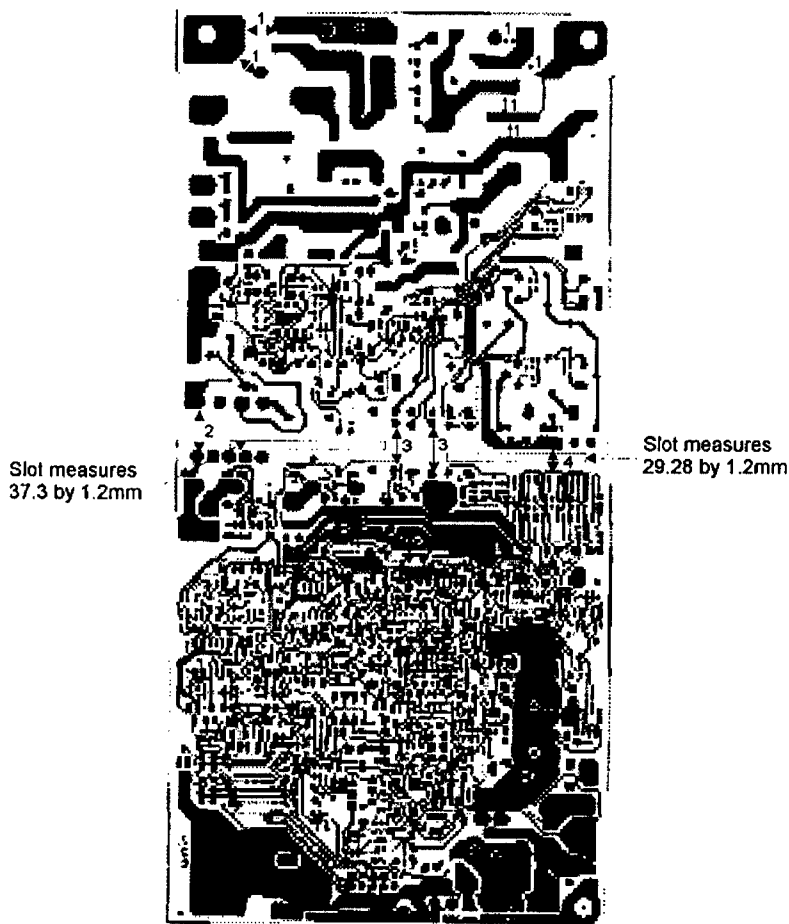
15. Gate Drive Transformers (T202,T203) - Astec P/N: 852-66006140. Provided with (OBJY2), Astec International Ltd., Class 155 (F), insulation system, designated 155-10B.
16. Current Transformer (L801) - Astec P/N: 852-66006080. Provided with (OBJY2), Astec International Ltd., Class 155 (F), insulation system, designated 155-10B.
17. Power Transistors (Q201,Q202,Q203,Q204) - Rated minimum 8 A, minimum 500 V.
18. Snubber Choke (L201) - Astec P/N: 852-66006130.
19. Power Transformer (T201) - Astec P/N: 852-66006120. Provided with (OBJY2), Astec International Ltd., Class 155 (F), insulation system, designated 155-10B.
20. Auxiliary Transformer (T701) - Astec P/N: 852-66006090. Provided with (OBJY2), Astec International Ltd., Class 130 (B), insulation system, designated 130-10B.
21. Optocouplers (IC702) - See Section General for manufacturer and catalog number. Each rated minimum 3000 V ac isolation test voltage.
22. Output Chokes (L401,L402) - Astec P/N: 852-66006040.
23. Output Choke (L403) - Astec P/N: 852-20101360.
24. Output Chokes (L251, L252) - Astec P/N: 852-66006050.
25. Output Choke (L612) - Astec P/N: 852-66008050.
26. Output Choke (L613) - Astec P/N: 852-66006790.
27. Output Choke (L603) - Astec P/N: 852-66006020.
28. Output Chokes (L604,L516) - Astec P/N: 852-20101260.
29. Boost Choke (L514) - Astec P/N: 852-66006110.
30. Control Transformer (T601) - Astec P/N: 852-66006780.
31. Insulator between primary traces/components and chassis - (QMFZ2), General Electric Co., Valox, Type FR1, rated 94VTM-0. Measures 215 by 102 mm, minimum 0.51 mm thick.
32. Insulator on D2 heatsink - (QMFZ2), General Electric Co., Valox, Type FR1, rated 94VTM-0. Measures 63 by 48.9 mm, minimum 0.25 mm thick.
33. Insulator on cover opposite of primary heatsink - (QMFZ2), General Electric Co., Valox, Type FR1, rated 94VTM-0. Measures 105 by 35 mm, minimum 0.25 mm thick.

ILL. 1 - MAIN PWB TRACE LAYOUT
(COMPONENT SIDE)



- LOCATION 1 : Minimum 2.5mm creepage and 2.0mm clearance
LOCATION 2 : Minimum 8.2mm creepage and 4.4mm clearance
LOCATION 3 : Minimum 5.8mm creepage and 4.2mm clearance
LOCATION 4 : Minimum 5.0mm creepage and 4.0mm clearance

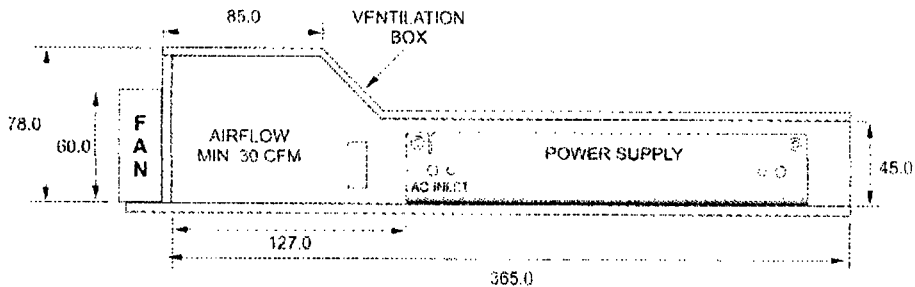
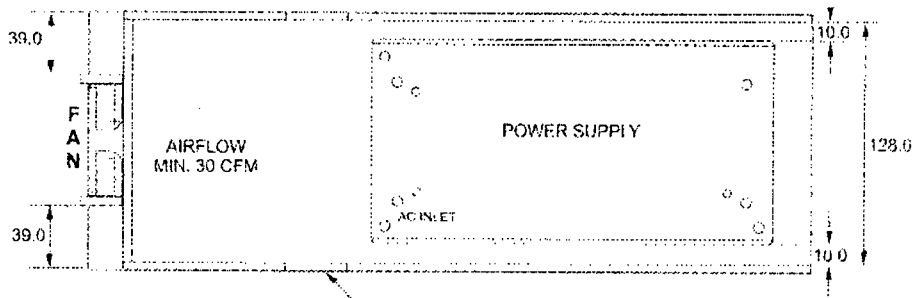
ILL. 2 - MAIN PWB TRACE LAYOUT (SOLDER SIDE)



- LOCATION 1 : Minimum 2.5mm creepage and 2.0mm clearance
- LOCATION 2 : Minimum 8.2mm creepage and 4.4mm clearance
- LOCATION 3 : Minimum 5.8mm creepage and 4.2mm clearance
- LOCATION 4 : Minimum 5.0mm creepage and 4.0mm clearance

ILL.3 - VENTILATION SET-UP

TOP VIEW



SIDE VIEW

TEST RECORD NO. 1

GENERAL

The test results reported relate only to the items tested.

SAMPLES:

Samples of Model LPQ172 were submitted for review and testing under the TCP.

The following tests were conducted in accordance with U.S. and Canadian (Bi-National) Standard for Safety of Information Technology Equipment, CSA C22.2, No. 60950 / UL 60950, Third Edition, including revisions through revision date March 15, 2002.

The following tests were conducted:

<u>Ref. Clause No.</u>	<u>Test Title</u>	<u>Test Ref. No.</u>
1.) 1.2.8.4	Hazardous Voltage	TR-CS02001-01
2.) 1.2.8.8	Output Power Limitation	TR-CS02001-02
3.) 1.6.2	Input Test	TR-CS02001-03
4.) 1.7.13	Marking Permanency	TR-CS02001-04
5.) 2.1.1.7	Energy Discharge Test	TR-CS02001-05
6.) 2.6.3.3	Protective Earthing Test	TR-CS02001-06
7.) 2.9.2, 5.2	Humidity and Electric Strength Test for Power Supply	TR-CS02001-07
8.) 2.9.2, 5.2	Humidity and Electric Strength Test for Power Transformer	TR-CS02001-08
9.) 2.9.2, 5.2	Humidity and Electric Strength Test for Auxiliary Transformer	TR-CS02001-09
10.) 2.9.2, 5.2	Humidity and Electric Strength Test for Current Transformer	TR-CS02001-10
11.) 2.9.2, 5.2	Humidity and Electric Strength Test for Gate Drive Transformer	TR-CS02001-11
12.) 2.9.2, 5.2	Humidity and Electric Strength Test for Insulator	TR-CS02001-12
13.) 2.10	Croepage and Clearance Distance	TR-CS02001-13
14.) 2.10.2	Working Voltage Measurement	TR-CS02001-14
15.) 4.2.3, 4.2.4	Enclosure Deflection Test	TR-CS02001-15
16.) 4.5	Heating Test	TR-CS02001-16
17.) 4.5.2	Ball Pressure Test	TR-CS02001-17
18.) 5.1	Touch Current Test	TR-CS02001-18
19.) 5.3.1	Output Short Circuit Test	TR-CS02001-19
20.) 5.3.1	Output Overload Test	TR-CS02001-20
21.) 5.3	Abnormal Operating and Fault Conditions	TR-CS02001-21
22.) 5.3.3	Fan Malfunction Test	TR-CS02001-22
23.) 5.3.1	Transformer Overload Test	TR-CS02001-23

The test methods and results of the above tests have been reviewed and found in accordance with the requirement in the standard mentioned above.