

CERTIFICATE OF COMPLIANCE

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Issued to: SINPRO ELECTRONICS CO LTD
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**This is to certify that
representative samples of**

POWER SUPPLIES, INFORMATION TECHNOLOGY EQUIPMENT
INCLUDING ELECTRICAL BUSINESS EQUIPMENT

Power Supply, Models SPU45-X, SPU45E-X, IPU45-X and IPU45E-X
(X = 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 200,
201, 202, 203, 204, 209, 210, 215, 216, **235**, 300, 301, 302, 303, 304,
305, 306). PSE45-1xx, PSE45-512, PSE45-5125 where x may be any
number.

Have been investigated by UL in accordance with the
Standard(s) indicated on this Certificate.

Standard(s) for Safety: U.S. and Canadian (Bi-National) Standard for Information Technology
Equipment - Safety - Part 1: General Requirements, CAN/CSA-C22.2
No. 60950-1-07, UL 60950-1

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Bruce Mahrenholz, Director North American Certification Program
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REPORT

ON

POWER SUPPLIES, INFORMATION TECHNOLOGY EQUIPMENT,
INCLUDING ELECTRICAL BUSINESS EQUIPMENT

Sinpro Electronics Co., Ltd.
Ping Tong Hsien, Taiwan

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DESCRIPTION

PRODUCT COVERED:

USL/CNL: Power Supply, Models SPU45-X, SPU45E-X, IPU45-X and IPU45E-X (X = 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 200, 201, 202, 203, 204, 209, 210, 215, 216, 235, 300, 301, 302, 303, 304, 305, 306). PSE45-1xx, PSE45-512, PSE45-5125 where x may be any number.

ELECTRICAL RATING:

Input - 100-240 V ac, 47-63 Hz, 1.35 A maximum.
105-125 V dc, 1.35 A (for Model SPU45E-102 and IPU45E-102)

Output -

Model	V dc / A (max)	V dc / A	V dc / A	Maximum (W)
SPU45-100, SPU45E-100, IPU45-100, IPU45E-100	2-3 / 8.0			
SPU45-101, SPU45E-101, IPU45-101, IPU45E-101, PSE45-1xx	3-5 / 8.0			
SPU45-102, SPU45E-102, IPU45-102, IPU45E-102	5-6 / 8.0			40
SPU45-103, SPU45E-103, IPU45-103, IPU45E-103	6-8 / 7.0			
SPU45-104, SPU45E-104, IPU45-104, IPU45E-104	8-11 / 5.63			
SPU45-105, SPU45E-105, IPU45-105, IPU45E-105	11-13 / 4.0			
SPU45-106, SPU45E-106, IPU45-106, IPU45E-106	13-16 / 3.46			
SPU45-107, SPU45E-107, IPU45-107, IPU45E-107	16-21 / 3.12			50
SPU45-108, SPU45E-108, IPU45-108, IPU45E-108	21-27 / 2.3			
SPU45-109, SPU45E-109, IPU45-109, IPU45E-109	27-33 / 1.85			
SPU45-110, SPU45E-110, IPU45-110, IPU45E-110	33-40 / 1.51			
SPU45-111, SPU45E-111, IPU45-111, IPU45E-111	40-50 / 1.25			

Model	V dc / A (max)	V dc / A	V dc / A	Maximum (W)
SPU45-200, SPU45E-200, IPU45-200, IPU45E-200	3.3 / 5	12 / 2		40
SPU45-201, SPU45E-201, IPU45-201, IPU45E-201, PSE45-512	5 / 5	12 / 2		42
SPU45-202, SPU45E-202, IPU45-202, IPU45E-202	5 / 5	15 / 1.5		42
SPU45-203, SPU45E-203, IPU45-203, IPU45E-203	5 / 5	24 / 1		42
SPU45-204, SPU45E-204, IPU45-204, IPU45E-204	3.3 / 5	5 / 2		26.5
SPU45-209, SPU45E-209, IPU45-209, IPU45E-209	12 / 3	-12 / 1		42
SPU45-210, SPU45E-210, IPU45-210, IPU45E-210	15 / 2	-15 / 1		42
SPU45-215, SPU45E-215, IPU45-215, IPU45E-215	5 / 5	-24 / 1		42
SPU45-216, SPU45E-216, IPU45-216, IPU45E-216	5.1 / 1	7.2 / 2.6		23.82
SPU45-300, SPU45E-300, IPU45-300, IPU45E-300	3.3 / 5	12 / 2	-12 / 0.8	42
SPU45-301, SPU45E-301, IPU45-301, IPU45E-301, PSE45-5125	5 / 5	12 / 2	-5 / 0.8	42
SPU45-302, SPU45E-302, IPU45-302, IPU45E-302	5 / 5	12 / 2	-12 / 0.8	42
SPU45-303, SPU45E-303, IPU45-303, IPU45E-303	5 / 5	15 / 2	-15 / 0.8	42
SPU45-304, SPU45E-304, IPU45-304, IPU45E-304	5 / 5	24 / 1	-24 / 0.5	42
SPU45-305, SPU45E-305, IPU45-305, IPU45E-305	5 / 5	24 / 1	-12 / 0.8	42
SPU45-306, SPU45E-306, IPU45-306, IPU45E-306	3.3 / 5	12 / 2	-5 / 0.8	42
SPU45-235, SPUE45-235 IPU45-235, IPU45E-235	5 / 0.35	48 / 0.35		18.55

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

Special Considerations - The following items are considerations that were used when evaluating this product.

* USL/CNL indicates investigation to the U.S. and Canadian (Bi-National) Standard for Safety of Information Technology Equipment, Including Electrical Business Equipment, CAN/CSA-C22.2 No. 60950-1-07, 2nd Edition, dated December, 2011, UL 60950-1, 2nd Edition, including revisions through revision date December 19, 2011.

* The equipment was submitted and tested for a maximum manufacturer recommended ambient (Tma) of 40°C.

The equipment is: Movable, Class I (earthed), pluggable Type A, uses a detachable power cord, intended for use on a TN power system.

Disconnect Device - The following part is considered the equipment disconnect device: Appliance Inlet.

The output circuit of Models SPU45-303 and IPU45-303 are investigated as a limited power source (LPS).

CONSTRUCTION DETAILS:

See Section General for additional details.

Nameplate Marking - Listee's name or File No. E183744, model number and input rating provided on each unit. May be provided on more than one label. Located where tools not necessary for gaining access. Located on parts not likely to be discarded or lost. May be directly molded on to the enclosure.

Operating/Instruction/Safety Manual - Provided with each unit.

Printed Wiring Board - See Section General for details. General appearance of trace layout same as in ILL. 1 and ILL. 4 (Used for models SPU45-303 and IPU45-303 only).

Model Difference - All models are identical, except for output rating, model designation and as described in the report.

Model PSE45-1xx is identical to Model SPU45-101 except for model designation.

Model PSE45-512 is identical to Model SPU45-201 except for model designation.

Model PSE45-5125 is identical to Model SPU45-301 except for model designation.

Model IPU45-X is identical to Model SPU45-X except for model designation.

Model IPU45E-X is identical to Model SPU45E-X except for model designation.

Model SPU45-235 is identical to Model SPU45-203 except for model designation, output rating and transformer(T1).

MODEL SPU45-X - FIG. 1 (S00-03306)

General - Overall view of the subject unit. Also represent all models.

1. Enclosure - (QMFZ2) SABIC INNOVATIVE PLASTICS JAPAN L L C, Type SE100V. Rated V-1 minimum, 80 degree C. Overall 146 by 76 by 43 mm, minimum 2.4 mm thick. Consist of top enclosure and bottom enclosure. Secured together by screws.

Alternate - Same as above, except SABIC INNOVATIVE PLASTICS JAPAN L L C, Type 940A, rated 120 degree C.

Alternate - Same as above, except SABIC INNOVATIVE PLASTICS JAPAN L L C, Type 940(f1), rated 80 degree C.

Alternate - Same as above, except 'STYRON EUROPE GMBH', Type 890, or 891, rated 105 degree C.

Alternate - Same as above, except 'Teijin Chemicals Ltd.', Type LN-1250G, rated 105 degree C.

Alternate - Same as above, except SABIC INNOVATIVE PLASTICS JAPAN L L C, Type SE1.

Alternate - Same as above, except SABIC INNOVATIVE PLASTICS JAPAN L L C, Type SE1X. Rated 105 degree C

Alternate - Same as above, except NAN YA PLASTICS CORP PLASTICS 3RD DIV, Type 531P. Rated 105 degree C

2. Appliance Inlet - (AXUT2) Supercom, Type SC-9R, rated 250 V, 15 A. Secured to enclosure by physical-fit and to PWB by soldering of integral pins.

Alternate - Same as above, except Rong Feng, Type SS-7B-1.

Alternate - Listed, rated 250 V, 15 A. Secured to enclosure by physical-fit and to PWB by soldering of integral pins.

3. Strain Relief of Output Cable - Integral to Output Cable. Strain relief provided with a molded-on anti-kink bushing held in place by integral slots in top and bottom enclosure. Opening is 9 by 9 mm. See ILL. 2 for details.
4. Output Cable - AWM, Style No. 2464, VW-1, 80°C, 300 V minimum. Provided with a polarized molded on connector at one end, mechanically secured and soldered to PWB.

MODEL SPU45-X - FIG. 2 (S00-03307)

General - Internal view of the subject unit. Also represent all models.

FIG. 3 thru 4 - Internal view of unit, for models SPU45-303 and IPU45-303 only

1. Earthing - (AVLV2) Green/yellow lead, No. 18 AWG minimum; one end mechanically secured then soldered to earthing terminal of Appliance Inlet; other end mechanically secured then soldered to PWB.
2. Fuse (F1) - Listed (JDYX). Rated 250 V, 2 A. Fuse is directly soldered to PWB. Wired in hot (non-identified) side of line. Fuse rating marking provided adjacent to fuse or provided in service documentation.

Alternate - Same as above, except (JDYX2), Wickmann-Werke, Type 382.

Alternate - Same as above, except (JDYX2), Ever Island Electric Co Ltd & Walter Electric, Type 2000.

Alternate - Same as above, except (JDYX2), Bel, Type MRT.

Alternate - Same as above, except (JDYX2), Wickmann-Werke, Type 19372.

Alternate - Same as above, except (JDYX2), Cooper Industries, Type S506.

- *3. Y-Capacitors (C3, C4, C6) - Optional, (Pri. - Earth). (FOWX2), Marked with a "Y1" or "Y2". C3, C4 rated minimum 250 V, maximum 2200 pF. C6 rated minimum 250 V, maximum 4700 pF, comply with IEC 60384-14 with 21 days of Damp Heat Steady-State Test, see the table below for related Manufactures and Types. C3 and C6 provided with tubing. See Section General, Insulating Tubing/Sleeving.

Manufacturer	Type
Murata Mfg. Co. Ltd.	KX
Welson Industrial Co. Ltd.	WD
TDK-EPC Corporation	CD or CS
Success Electronics Co. Ltd.	SB, SE
Panasonic Corporation, Panasonic Corporation Of North America	NS-A or WS
Samwha Capacitor Co. Ltd.	SD
Vishay Electronic Gmbh	VY1
Hsuan Tai Electronics Co Ltd	CY
Jya-Nay Co Ltd	JN
Walsin Technology Corp.	AH, AC

4. Bleeder Resistors (R1, R2) - Rated 470 kilohm, 1/4 W.

5. X-Capacitors (C1, C2) - Optional, (Line-to-Line). (FOWX2), comply with IEC 60384-14 with 21 days of Damp Heat Steady-State Test, see the table below for related Manufactures and Types. Rated maximum 0.22 μ F, 250 V minimum.

Manufacturer	Type
Jenn Fu Electronics Corp.	MPX
Kemet Electronics Italia Srl	R.46, 1.40, 1.47
Panasonic Corporation, Panasonic Corporation Of North America	ECQUG, ECQUL, ECQ-UV
Murata Mfg. Co. Ltd.	KX
Okaya Electric Industries Co. Ltd.	PA, RE
Pilkor Electronics Co. Ltd.	PCX series
Chiefcon Electronics Co. Ltd.	CKX
Cheng Tung Industrial Co. Ltd.	CTX
Hua Jung Components Co. Ltd.	MKP
Teapo Electronic Corp.	XG-V series
Ultra Tech Xiphi Enterprise Co. Ltd.	HQX
Tai-Yao Electric Co. Ltd.	MPX
Iskra Mis D D	KNB series
Carli Electronics Co Ltd	MPX
Epcos Electronic Components S A	B3292x
Yuon Yu Electronics Co Ltd	MPX

6. Line Choke (L1) - Open-type construction. Core: Ferrite, overall 20 by 15.7 by 6 mm. Coil: Copper magnet wire-wound on three-flanged bobbin of (QMFZ2), PBT, Chang Chun, Type PBT-4130 or T375J or Sumitomo Bakelite Co Ltd, type PM-9820. Materials rated minimum 130°C.
- *7. Line Choke (L2) - Optional, Toroidal-type. Core: Ferrite, 16 mm OD by 10 mm ID by 5 mm wide. Coil of copper magnet wire-wound around the core. Secured to PWB by solder. Provided with (QMFZ2) tubing. See Section General, Insulating Tubing/Sleeving. Materials rated minimum 130°C.
8. Thermistor (TH1) - NTC. Rated minimum 3 A, minimum 5 ohms at 25°C. Mounted minimum 10 mm above PWB. Provided with tubing. See Section General, Insulating Tubing/Sleeving.
- *
11. Bridge Rectifier (DB1) - Rated minimum 2 A, 600 V. Mounted minimum 10 mm above PWB.
12. Electrolytic Capacitor (C7) - Integral pressure relief. Rated minimum 400 V, 85°C minimum, 100 μ F minimum. Provided with tubing. See Section General, Insulating Tubing/Sleeving.
13. Switching Transistor (Q1) - Rated minimum 3 A, 600 V. Secured to plastic insulation then secured to Heat Sink (HS2) by screw. See ILL. 3 for details.
14. Heat Sink (HS2) - Aluminum, overall 121 by 18 mm, 2.9 mm thick, secured to PWB by soldering of integral pins. (Heat sink is earth.) An insulation sheet, minimum 0.2 mm, provided between Q1 and HS2. Insulation Sheet: (QMFZ2), Fu-Da, Type P-100 or Six Phase Co., Ltd., Type SP-610-610.
15. Heat Sink (HS1) - Aluminum, overall 121 by 18 mm, 2.9 mm thick, secured to PWB by soldering of integral pins. (Heat sink is earthed.)
16. Bottom Chassis - Aluminum, U-shape. Overall 136 by 65 by 30 mm, 1.0 mm thick. Secured to Heat Sinks (HS1 and HS2) by screws.
17. Insulation Sheet - (QMFZ2) Fastex, Type Formex, rated minimum 94V-2, overall 136 by 62 mm, minimum 0.2 mm thick. Provided between solder side of PWB and Bottom Chassis.

18. Optical Isolators (IC2, IC3) - Optional. (FPQU2) Lite-On, Type 817. (Rated isolation 3000 V ac. Insulation thickness 0.4 mm. Compliance with reinforced insulation requirements.) IC3 not provided for Model SPU45E-X.

Alternate - Same as above, except Sharp, Type PC123 or PC 817.

Alternate - Same as above, except NEC, Type PS2501-2.

Alternate - Same as above, except Vishay, Type TCET1100 or TCET1109.

Alternate - Same as above, except for QT Optoelectronics (E90700), Type H11A817AC (Package code T).

Alternate - Same as above, except for Toshiba Corp. Semiconductor Co. Discrete Semiconductor DIV, Type TLP781. (Rated isolation min. 5000Vac.)

19. Transformer (T1) - (OBJY2), Xepex Electronic Co., Ltd., designated XPB-5, Class B insulation system. Open-type construction. Core: Ferrite, overall 28.8 by 34.2 by 11 mm. Coil: Copper magnet wire-wound on two-flanged bobbin. Bobbin: (QMFZ2), Phenolic, minimum 0.71 mm thick, rated minimum 94V-2.

Insulation:

Location	#Layers / Total Thickness (mm) / Material
Outer wrap	3 / 0.15 / Polyester film tape
Cross-over	1 / 0.05 / Polyester film tape
Pri/Sec.	3 / 0.15 / Polyester film tape
Pri/Core	1 / 0.71 / Bobbin
Sec/Core	1 / 0.71 / Bobbin

Margin tape, polyester film, minimum 3 mm wide, between windings and bobbin edge.

Exit leads provided with tubing. See Section General, Insulating Tubing/Sleeving.

Alternate Transformer (T1) - Same as above, except (OBJY2), Wenhao Electronics Co., Ltd. Class 130(B), Designated Wenhao-01, differences as described below:

Coil: (OBMW2), copper magnet wire wound on bobbin.

Bobbin: (QMFZ2), Hitachi Chemical Co., Ltd., Type CP-J-8800, phenolic, 0.71 mm thick minimum.

Insulation Tape: (QANZ2), Minnesota Mining & Mfg Co., Type No. 1350F-1, or 1350F-2, or Four pillars Enterprise Co., Ltd. Type No. MY130, polyester film tape.

Alternate - Same as above, except (OBJY2), Horng Wei Electronic Enterprise Co., Ltd., designated 130 or HIS-8A, Class 130(B).

- Alternate - Same as above, except (OBJY2), Cormex Electronics Ind. Co., Ltd., designated DV-130-1, Class 130(B).
- Alternate - Same as above, except (OBJY2), Long Sail Electronic Co., Ltd., designated DV-130-1, Class 130(B).
- * Alternate - Same as above, except (OBJY2), Agelong Technology Co. Ltd., designated GS-0001 or GS-1, Class 130(B).
- Alternate - Same as above, except (OBJY2), Newline Universal, designated HIS-8A or Viking B-2, Class 130(B).
- Alternate - Same as above, except (OBJY2), Yu Jing Technology Co. Ltd., Designated SBI4.2, Class 130(B).
20. Secondary current fuse (F2) - R/C (JDYX2), Littelfuse Inc, Type 466 series, rated 32 Vdc, F5A. (Used for models SPU45-303 and IPU45-303 only)
21. Current Sensor Resistor (R2) - Rated 0.56 ohm minimum, 1W. (Used for models SPU45-303 and IPU45-303 only)

SIGNAL TRANSFORMER MODEL SPU45-235

General - Model SPU45-235 is similar to Model SPU45-203 except for described below:

- * Transformer (T1) - Insulation System, (OBJY2), Agelong Technology Co. Ltd., designated GS-0001 or GS-1, Class 130(B), and (OBJY2), Yu Jing Technology Co. Ltd., Designated SBI4.2, Class 130(B),

Insulation and winding information see I11 1

Core: Ferrite, overall 38.0 by 31.0 by 11.3 mm, wrapped with three layers of insulation type.

Coil: type MW28 Copper magnet wires wound on bobbin.

Bobbin: (QMFZ2), two flanges, Sumitomo Bakelite Co., Ltd., Type PM-9820, rated V-0, minimum 0.71 mm thick. Leads exit directly through integral flanges in bobbin and are mechanically secured and soldered to pins that are molded into bobbin. Exit leads provided with tubing.

Layer Tape: (OANZ2), 3M Company Electrical Markets Div(EMD), Type 1350-1 or 1350F-1.

Margin Tape: (OANZ2), 3M Company Electrical Markets Div(EMD), Type 44 , minimum 4.0 mm, between windings and bobbin edge, except between N5 windings and bobbin edge minimum 8.0 mm, 130 degree C.

Tubing / Sleeving (YDPU2) - Great Holding Industrial Co., Ltd. type TFL OR TFT, Materials rated Maximum 300V, Maximum 130°C,

Tubing / Sleeving (YDPU2) - Great Holding Industrial Co., Ltd. type TFL OR TFT, Materials rated Maximum 300V, Maximum 130°C,

Tubing / Sleeving (YDPU2) (Alternate) - P Leo&Co.(B C) Ltd. type 2T-TFL , Materials rated Maximum 150V, Maximum 200°C,

Varnish - (OBOR2), John C Dolph Co, type BC-359, material rated 130 degree C.

Alternate - Same as above, except (OBOR2), Hitachi Chemical Co., Ltd, type WP-2952F-2G, material rated 130 degree C.

- * Alternate - Same as above, except (OBOR2), Elantas Electrical Insulation Elantas PDG Inc , type V1630FS, material rated 130 degree C.

*

Varistor (J1 or MOV1)- (VZCA2) (Optional), Thinking Electronic Industrial Co., Ltd., type TVR07471, rated 300Vac, 385Vdc.

Alternate (Optional) - Same as above, except (VZCA2), Thinking Electronic Industrial Co., Ltd., type TVR10471, rated 300Vac, 385Vdc.

Alternate (Optional) - Same as above, except (VZCA2), Thinking Electronic Industrial Co., Ltd., type TVR10471-D, rated 300Vac, 385Vdc.

Alternate (Optional) - Same as above, except (VZCA2), Uppermost Electronic Industrial Co Ltd., type V14K300, rated 300Vac, 385Vdc.

Alternate (Optional) - Same as above, except (VZCA2), Centra Science Corp., type CNR-14D471K, rated 300Vac, 385Vdc.

Alternate (Optional) - Same as above, except (VZCA2), Joyin Co., Ltd., type JVR14N471K, rated 300Vac, 385Vdc.

Alternate (Optional) - Same as above, except (XUTH2), Song Long, type SAS-471KD14, rated 300Vac, 385Vdc.

Alternate (Optional) - Same as above, except (VZCA2), Pan Overseas Electronic Co., Ltd., type PVR-14D471K, rated 300Vac, 385Vdc.