

FEATURES

- Universal 90-264VAC input voltage.
- Built-in active PFC function.
- 470W with forced air cooling.
- Dual output, High efficiency up to 90%.
- High power density, compact size: 6.0"x4.0"x1.33" (above PCB).
- Operating ambient temperature range: -20°C to +70°C.
- Output short circuit, over-current, over-voltage protection, over-temperature protection.
- Operating altitude up to 5,000m.
- Safety according to IEC62368-1.

Models & Ratings

Model No.	Cooling Method (4)	Output Power (W) (1)	Output 1 Voltage/ Current	Output 2 (2) Voltage/ Current	Fan Output (2)	Efficiency (%) Typ. (3)	Capacitive Load (μF) (5)
TN16-0450-01	Forced Air Cooling	470	54V / 8.34A	12V / 8.34A	12V / 1.5A	90	1,000

Notes:

1. Under any conditions, the total power of the product should not exceed the rated power 470W.

2. +12V and Fan auxiliary power supply total output power can't exceed 110W.

3. Typical values are measured at typical load (54V / 6.9A, 12V / 8.34A) and 230Vac/50Hz input voltage at 25°C, the fan should be connected to an external power supply.

4. The test equipment uses two forced-draft cooling fans with a minimum external airflow of 22.2 CFM. These two fans are installed in the final system. Please refer to the following figure (Figure A) for details.
Disclaimer:
The force air flow and structural diagrams are for reference only of the PSU standalone safety declaration, actual requirements should be based on system configuration and measurement of component temperature rise.

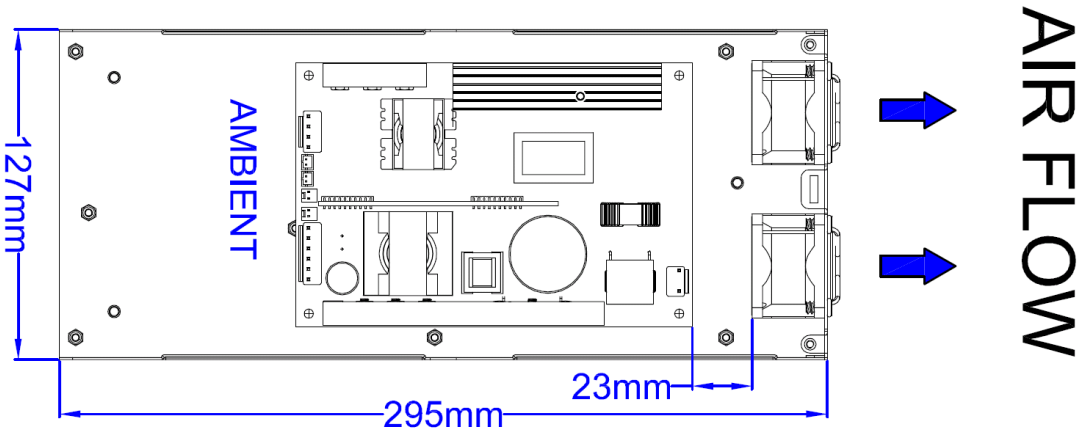


Figure A.

5. During transient response testing, an external 1,000μF capacitor shall be added at the +12V and +54V output.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Input voltage (Refer to power derating curve)		90	100-240	264	VAC
Input Frequency	-		47	50-60	63	Hz
Input Current	100/115VAC & typical load		-	-	6.0/5.0	Arms
	230VAC & typical load		-	-	2.5	
Inrush Current	115VAC	At 25°C, Cold start	-	-	60	A peak
	230VAC		-	-	120	
Power Factor	115VAC & typical load		0.98	-	-	-
	230VAC & typical load		0.95	-	-	-
Earth Leakage Current	264VAC/63Hz		-	-	3.5	mA

54V Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage (6)	-		51.3	54	56.7	VDC
Initial Set Accuracy	At output 1A		53.9	-	54.1	VDC
Output Load	-		0	6.9	8.34	A
Line Regulation	90 - 264VAC, constant load		-	±1	-	%
Load Regulation	Output from 0.1 - 100% load		-	±2	-	%
Ripple & Noise (7)	Oscilloscope Bandwidth : 20MHz	0°C < Ta < 70°C	-	-	1	%
Transient Response	50-75% and 75-50% load step, 1A/μsec slew rate		-	±5	-	%
Turn on Delay Time	115/230VAC typical load from input AC turn on		-	-	3	S
Rise Time	Typical load, 10% to 90% of output voltage		-	-	50	mS
Hold-up Time	At 25°C, 115VAC & typical load, 90% of output voltage		10	-	-	mS
Over-voltage Protection	Output shut down and latch off, manual reset (Re-power on)		-	-	63	V
Over-current Protection	Output shut down and auto recovery		9.2	-	12.5	A
Short Circuit Protection	Output shut down and auto recovery		-	-	-	-
Over-temperature Protection (8)	Output shut down and latch off, manual reset (Re-power on)		-	-	-	-
Current Share (9)	100% load tolerance		-	±10	-	%

12V Output Specifications

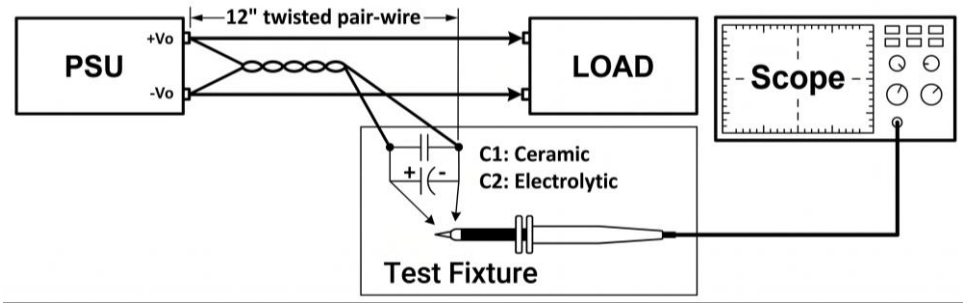
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage	-		11.4	12	12.6	VDC
Initial Set Accuracy	At output 1A		11.9	-	12.1	VDC
Output Load	-		0	8.34	8.34	A
Line Regulation	90 - 264VAC, constant load		-	±1	-	%
Load Regulation	Output from 0 - 100% load		-	±2	-	%
Ripple & Noise (7)	Oscilloscope Bandwidth : 20MHz	0°C < Ta < 70°C	-	-	1	%
Transient Response	50-75% and 75-50% load step, 1A/μsec slew rate		-	±5	-	%
Turn on Delay Time	115/230VAC typical load from input AC turn on		-	-	3	S
Rise Time	Typical load, 10% to 90% of output voltage		-	-	50	mS
Hold-up Time	At 25°C, 115VAC & typical load, 90% of output voltage		10	-	-	mS
Over-voltage Protection	Output shut down and latch off, manual reset (Re-power on)		-	-	16	V

Over-current Protection	Output shut down and auto recovery	8.7	-	15	A
Short Circuit Protection	Output shut down and auto recovery / Hiccup mode	-	-	-	-
Over-temperature Protection (8)	Output shut down and latch off, manual reset (Re-power on)	-	-	-	-
Fan Output	Optional.	0	-	1.5	A
Current Share (9)	100% load tolerance	-	±10	-	%

Notes:

6. When +54V output current is 0A, the output voltage should not be more than +58.5V.

7. The +12V output is decoupled with 47μF low ESR aluminum electrolytic (C2) and 0.1μF ceramic capacitor (C1). The +54V output is decoupled with 100μF low ESR aluminum electrolytic (C2) and 0.1μF ceramic capacitor (C1). Measurement is made with a high impedance probe connected across the decoupling capacitance. Measurements shall be made with an oscilloscope with 20 MHz bandwidth.



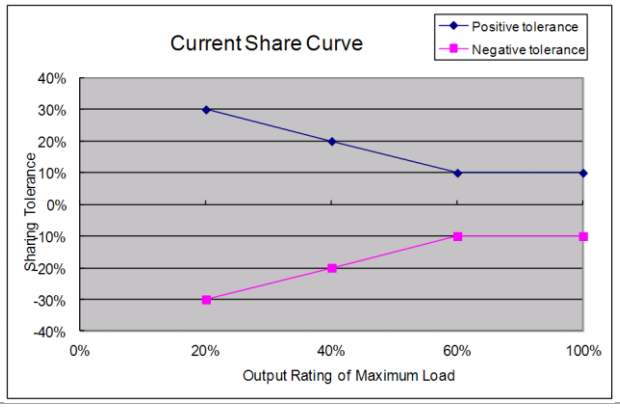
8. Over Temperature Protection (OTP)

Over temperature shut down function is provided.
When ambient or internal temperature rises abnormally, over temperature protection function operates and output will be shut down. After shut down, please wait for the temperature to return to normal and automatically resume operation or remove the input and cool it down to reset over temperature protection, and then re-input.
Over temperature protection function operates at out of the specification area.
This function may not activate or cannot avoid power supply damage depending on the situation.

9. Current Share (Optional)

Current share is achieved by means of active current sharing for max. 2 units of same type redundant application. Provision is made for a current share line for +12V or +54 V named +12VCS or +54VCS. +12VCS and +54VCS bus is independent. The current share line is referenced to the negative sense lead (+12CS_RTN and +54VCS_RTN).

Current sharing tolerance is defined since every output load more than 20% of the max. load. If there was one piece of power supply shut down at the condition of 1+1 current sharing, the max. load of system must be reduced to 2 x 90% x max. load (Amp.) until the fault was removed and turned on the power supply.



General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Electrical Strength Test (10)	Input - Output	Electrical strength test for 1 minute, leakage current is less than 10mA.	3,000	-	-	VAC
	Input - FG		1,800	-	-	
	54V Output - FG		2,250	-	-	VDC
	12V Output - FG		500			
Insulation Resistance	Input - Output	25±5°C, 70% RH, non-condensing testing voltage 500VDC.	100	-	-	MΩ
	Input - FG		100	-	-	
	54V Output - FG		100	-	-	
	12V Output - FG		100	-	-	
Mean Time Between Failure	At 230VAC/50Hz typical load 25°C, Telcordia SR332, issue4.		900,000	-	-	Hrs.

Notes:

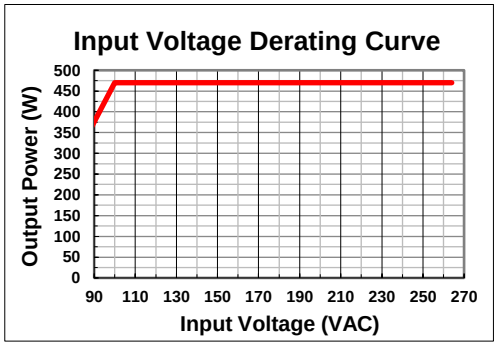
10. The electric strength test of LY production line was conducted for 3 seconds, and the leakage current was less than 10mA.

Environmental Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Operating Temperature	Refer to power de-rating curve		-20	-	+70	°C
Storage Temperature	Non-operation		-40	-	+85	
Operating Humidity	Non-condensing		10	-	90	%
Storage Humidity	Non-operation		5	-	95	
Power De-rating (11)	Operating Temperature	+50°C to +70°C	2.5	-	-	%/°C
	Input voltage	90VAC - 100VAC	1	-	-	%/VAC
Altitude	Operating altitude		-	-	5,000	meter
Vibration	Operating：0.5G, 5 - 500Hz, 10 min/cycle, 30 min each axis (X, Y, Z)					
Shock	Non-operating (package)：20G, half-sine, 11 ms, 1 shock per direction per axis (X, Y, Z)					

Notes:

11. Input voltage and temperature derating curve: Please refer to the derating specifications and curves below.
    a. Input Voltage Derating Curves: Please refer to Figure C.
    Derate linearly from 100% load at 100VAC to 80% load at 90VAC.



Input voltage (VAC)	Rated output load (%)
100 - 264	100
90	80

Figure C.

    b. Temperature Derating Curves: Please refer to Figure D.

Derate linearly from 100% load at +50 °C to 50% load at +70 °C.

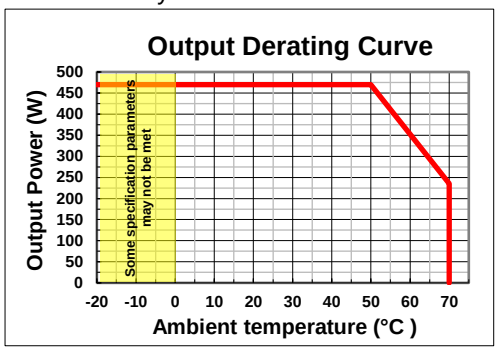


Figure D.

Ambient temperature (°C)	Rated output load (%)
-20 - +50	100
+60	75
+70	50

Other :
All specifications typical load at 230Vac, typical load 25 °C, unless otherwise noted.

Safety Approvals

Certification	Standard	Notes & conditions
UL	UL/cUL UL62368-1, 3rd Edition	-
CB report	CB IEC62368-1, 3rd Edition	-
CCC	GB4943.1-2022	
Safety Class	Class I only	-

Electromagnetic Compatibility (EMC)

EMC Emissions (12)	Standard	Test level
Conducted	EN55032(CISPR32) Class B	Class B
Radiated	EN55032(CISPR32) Class B	Class B
Harmonic Current	EN61000-3-2	Class D
Voltage Flicker	EN61000-3-3	-

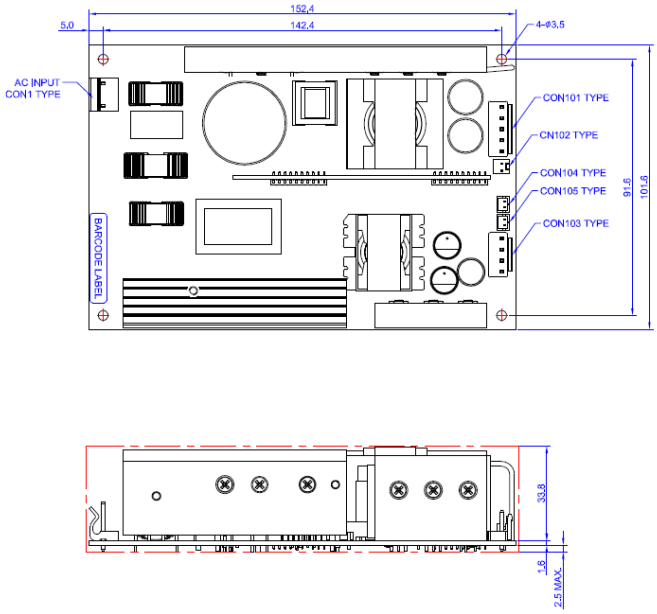
EMC Immunity	Standard	Test level	Criteria
ESD	EN61000-4-2	level 4, Contact +/- 8KV; Air discharge +/-15KV	Criteria A
RS	EN61000-4-3	level 3, 10V/m	Criteria A
EFT	EN61000-4-4	level 3, +/- 2KV	Criteria A
Surge	EN61000-4-5	level 4, Line to Line +/-2KV; Line to Earth +/-4KV	Criteria B
CS	EN61000-4-6	level 2	Criteria A
PFMF	EN61000-4-8	level 3	Criteria A
DIP	EN61000-4-11		Criteria B

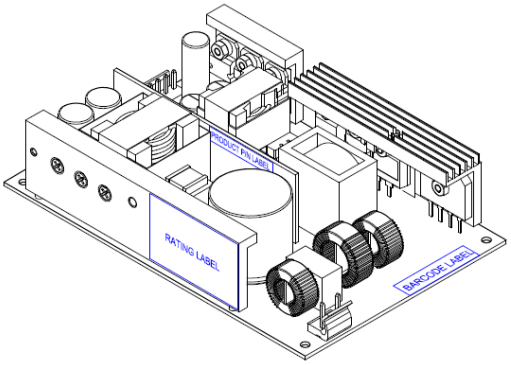
Note:
12.The power supply should be considered a part of the system component. All EMC tests conducted with the unit installed in a metal enclosure dummy system. The power supply needs to be confirmed for electromagnetic compatibility in conjunction with the terminal equipment.

Dimensions and Recommended Layout

Item	Value	Unit
Weight (Typ.)	559 (Ref.)	g
Size (L x W x H)	152.4 x 101.6 x 33.8 (above PCB, Refer to outline drawing)	mm

Outline Drawing: (Unit: mm, Tolerance: ±1.0 mm)





CON1 TYPE
AC INPUT
TKP P8800I-03N2-V0

Pin	Define
1	N
2	L

CN101 TYPE
WST M5-I39606
TKP PVHI-05
JST B5P-VH

Pin	Define
1	+54V
2	+54V
3	GND
4	GND
5	GND

CN103 TYPE
WST M4-I39606
TKP PVHI-04
JST B4P-VH

Pin	Define
1	+12V
2	+12V
3	GND
4	GND

CN102 TYPE
TKP,8812-02(LF)
MOLEX,2204-1021
ALEX,8812-02

Pin	Define
1	+54VCS_RTN
2	+54VCS

CN104 TYPE
WST M2-I20001
TKP P110I-02
JST B2B-PH-K-S(LF)(SN)

Pin	Define
1	GND
2	+12V

CN105 TYPE
WST M2-I20001
TKP P110I-02
JST B2B-PH-K-S(LF)(SN)

Pin	Define
1	GND
2	+12V