400W AC/DC Switching Power Supply

Model: TNA0400-XX-X



FEATURES

- Universal, single phase input: 85 to 264VAC.
- Built-in active PFC function.
- 400W convection cooled.
- High efficiency up to 95%.
- High power density: 7.82W/In^3, compact size: 3.94”x7.87”x1.65”.
- Operating ambient temperature range: -40°C to +80°C.
- Output short circuit, over-current, over-voltage protection, over-temperature protection.
- Remote On/Off, Power Good/Power Fail.
- Overvoltage category: OVC II (for 5000m).
- Operating altitude up to 5000m.
- Safety according to IEC62368-1 4th.

Models & Ratings

Model No. (1)	Cooling Method	Rated Output Power (W) (2)	Output Voltage/ Current	Standby Output	Fan Output	Efficiency at 230VAC (%) Typ. (3)	External Cap. Load (μF)
TNA0400-12-X	Convection cooling	320	12V / 26.6A	5V / 1.0A	12V / 0.6A	92	10,000
TNA0400-24-X	Convection cooling	400	24V / 16.6A	5V / 1.0A	12V / 0.6A	95	5,000
TNA0400-36-X	Convection cooling	400	36V / 11.1A	5V / 1.0A	12V / 0.6A	95	4,000
TNA0400-48-X	Convection cooling	400	48V / 8.3A	5V / 1.0A	12V / 0.6A	95	2,500
TNA0400-54-X	Convection cooling	400	54V / 7.4A	5V / 1.0A	12V / 0.6A	95	2,000

Notes:

1. Model Name Description.

TNA0400-12-X
VV-O
① ②

① VV : Output Voltage
12 : 12V Output.
24 : 24V Output.
36 : 36V Output.
48 : 48V Output.
54 : 54V Output.

② O : Optional
U : With U-Shaped.
C : With Cover.

2. Under any conditions, the total power of the product should not exceed the rated power. When the output voltage is increased, the total output power cannot exceed the rated output power.

Conversely, if the output voltage is decreased, the current should not exceed the rated output current.

3. Efficiency is measured at 50% of rated main-output load, 230 VAC input, 25°C.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	AC input (Refer to power de-rating curve)		85	100-240	264	VAC
Input Frequency	-		47	50-60	63	Hz
Input Current	115VAC & Maximum load		-	-	5	Arms
	230VAC & Maximum load		-	-	2.5	
Inrush Current	115VAC	At 25°C, Cold start	-	-	30	A peak
	230VAC		-	-	60	
Power Factor	115VAC & Maximum load		0.98	-	-	-
	230VAC & Maximum load		0.95	-	-	-
Standby power consumption	230VAC/50Hz, Only 5Vsb no load		-	-	0.3	W
Touch Current	264VAC/63Hz		-	-	3.5	mA
Input Protection	T6.3AH/250V Time Lag fuse.					

Main Output Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage		See Models and Ratings table		12	-	54	VDC
Initial Set Accuracy		115VAC, 50% load		-	±1	-	%
Output Voltage Adjustment		-		-	±5	-	%
Minimum Load		-		0	-	-	A
Line Regulation		Rated load		-	±0.5	-	%
Load Regulation		Output from 0 - 100% load		-	±1	-	%
Ripple & Noise (4)		Oscilloscope Bandwidth : 20MHz	-20°C < Ta < 80°C	-	-	1	%
Transient Response		50-100% and 100-50% load step, 1A/μsec slew rate		-	±5	-	%
Sequence time	Start-up Delay	115/230VAC maximum load from input AC turn on		-	-	1	S
	Rise Time	Maximum load, 10% to 90% of output voltage		-	-	100	mS
	Hold-up Time	At 25°C, 115VAC & maximum load, 90% of output voltage		10	-	-	mS
Overshoot		Maximum load		-	-	5	%
Over-voltage Protection		Output shut down and latch off, manual reset (Re-power on or Re-remote on) 12V, 24V, 36V, 48V.		110	-	130	%
		Output shut down and latch off, manual reset (Re-power on or Re-remote on) 54V.				65	V
Over-current Protection (5)		Output shut down and auto recovery		110	-	160	%
Short Circuit Protection		Output shut down and auto recovery		-	-	-	-
Over-temperature Protection		Output shutdown and auto recovery		-	-	-	°C
Remote On/Off (6)		Output condition on	Remote on = High / floated	2.0	-	5.5	VDC
		Output condition off	Remote off = Low	0	-	0.8	
PG Signal (7)		Power good	TTL High level	2.0	-	5.5	VDC
		Delay time		100	-	1000	mS

	Output current	Main output reaches 90% of its set value	-	-	1.0	mA
	Power off/Power fail	TTL Low level	0	-	0.8	VDC
	Warning time	Main output falls to 90% of set value at Power off	1.0	-	-	mS
	Sink current		-	-	1.0	mA
Fan Output (8)	-		0	-	0.6	A

5VDC Standby Output Specifications (Option)

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage		-		-	5	-	VDC
Rated Load		-		0	-	1	A
Line Regulation		Rated load		-	±0.5	-	%
Load Regulation		Output from 0 - 100% load		-	±1	-	%
Ripple & Noise (4)		Oscilloscope Bandwidth : 20MHz	-20°C < Ta < 80°C	-	-	1	%
Transient Response		50-100% and 100-50% load step, 1A/μsec slew rate		-	±5	-	%
Sequence time	Start-up Delay	115/230VAC maximum load from input AC turn on		-	-	0.1	S
	Rise Time	Maximum load, 10% to 90% of output voltage		-	-	50	mS
	Hold-up Time	At 25°C, 115VAC & maximum load, 90% of output voltage		500	-	-	mS
Overshoot		Maximum load		-	-	5	%
Over-current Protection (5)		Output shut down and auto recovery		110	-	-	%
Short Circuit Protection		Output shut down and auto recovery		-	-	-	-

Notes:

4. Please refer to Fig. A for measurement of Vo, line & load regulation and ripple voltage, Output voltage is measured at PSU output terminals.
   Ripple and noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1μF ceramic (C1) or film capacitor and 47μF low ESR electrolytic capacitor (C2).

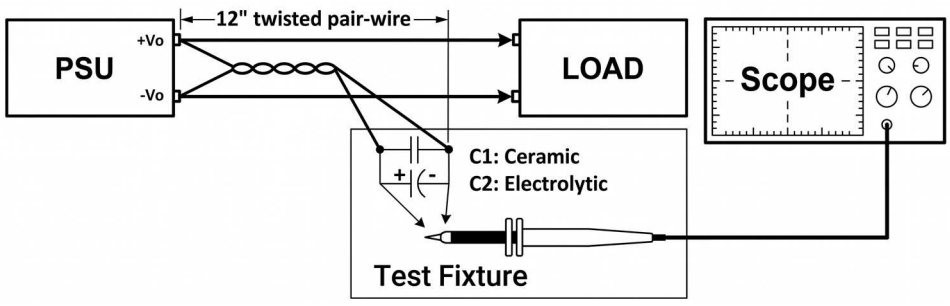


Fig. A

5. The overload current should ramp up from the maximum current at a minimum rate of 0.1A/100mS. When it detects that it is higher than 110-160 % of the maximum current, it will shut down and auto recovery.

6. Remote On/Off can be used to enable or disable only the main output. When the main output is disabled, the +5Vsb will continue to operate. This signal can be pulled up to a value greater than 2.0 volts or equal to 5 volts, or floated (no connection to the signal), in order for the main output to be enabled; and pulled down to a low level of 0.8 volts, in order to disable the main output.
   To turn output off, connect Remote On/Off, Pin 2 to Return, Pin 4 or Pin 5.
   Output is on if Remote On/Off, Pin 2 is floating or connected to 5V standby, Pin 1.

7. Power Good Signal
   Power Good is provided warning signal before loss of output voltage since AC fail through PG and SGND.
   Power Good signal shows “High” level (2.0V~5.5V) to indicate power supply operating normal, and can source maximum 1.0mA current.
   When power supply stops operating, the signal will turn to “Low” level (0V~0.8V), and the maximum sink current is 1.0mA.

8. Fan Output (Option)
   With a minimum load of 10W on the main output, the fan power supply voltage adjustment tolerance is -5% to +5%, and the maximum output current is 0.6A.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Electrical Strength Test (9)	Input - Output	Electrical strength test for 1 minute, leakage current is less than 10mA.	3000	-	-	VAC
	Input - FG		1800	-	-	
	Output - FG		2250	-	-	VDC
Insulation Resistance	Input - Output	25±5°C, 70% RH, non-condensing testing voltage 500VDC.	100	-	-	MΩ
	Input - FG		100	-	-	
	Output - FG		100	-	-	
Mean Time Between Failure	At 230VAC/50Hz maximum load 25°C, Telcordia SR332, issue4.		1,000,000	-	-	hrs.

Environmental Specifications

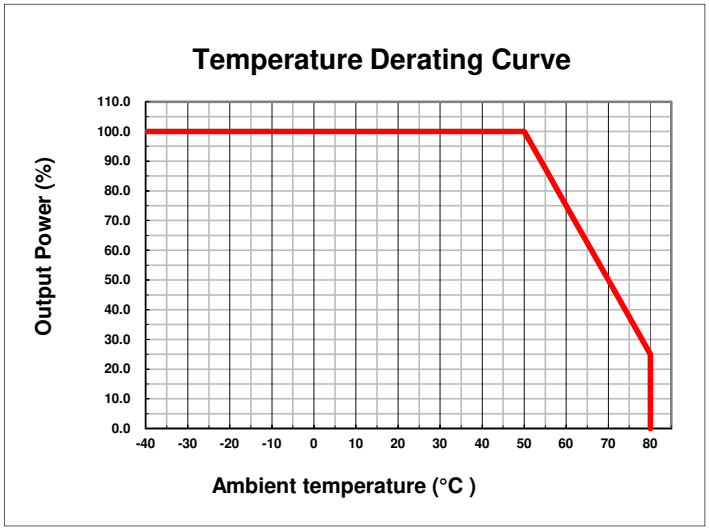
Operating Temperature	Refer to power de-rating curve		-40	-	+80	°C
Storage Temperature	Non-operation		-40	-	+85	
Operating Humidity	Non-condensing		10	-	90	%
Storage Humidity	Non-operation		5	-	95	
Power De-rating (10)	Operating Temperature	+50°C to +80°C	2.5			%/°C
	Input voltage	85VAC – 115VAC	1			%/VAC
OVER VOLTAGE CATEGORY	IEC/EN/UL 62368-1 OVC II		-	-	5000	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)					
RoHS	Directive 2011/65/EU, (EU) 2015/863 COMPLIANT.					

Notes:

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

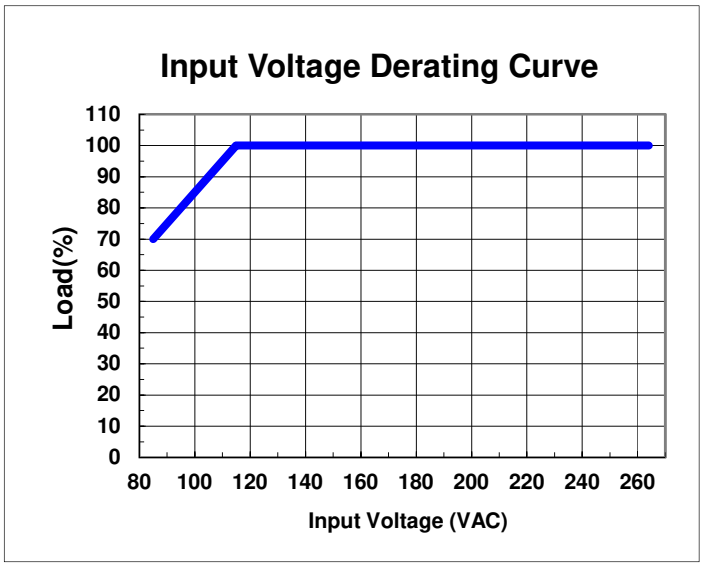
10. Temperature de-rating curves: Please refer to the de-rating specifications and curves below.

Temperature derating curve:



Ambient temperature (°C)	Average Load (%)
-40 ~ +50	100
+60	75
+70	50
+80	25

Input voltage derating curves:



Input Voltage (VAC)	Average Load (%)
115V	100
85V	70

11. Unless otherwise specified, all specifications is at 230VAC input voltage, maximum load, and after warm-up at +25°C conditions.

Safety Approvals

Safety Standard	All models	UL62368-1, 4th Edition, IEC62368-1, 4th Edition
Safety Class	-	Class I

Electromagnetic Compatibility (EMC)

Emissions (13)	CE	EN55032(CISPR32) Class B	
	RE	EN55032(CISPR32) Class B	
	Harmonic Current	EN61000-3-2 Class D	
	Flicker	EN 61000-3-3	
Immunity	ESD	EN 61000-4-2, level 4, Contact +/- 8KV; Air discharge +/-15KV	Criteria A
	RS	EN 61000-4-3, level 3, 10V/m	Criteria A
	EFT	EN 61000-4-4, level 3, +/- 2KV	Criteria A
	Surge	EN 61000-4-5, level 3, Line to Line +/-1KV; Line to Earth +/-2KV	Criteria A
	CS	EN 61000-4-6, level 3	Criteria A
	PFMF	EN 61000-4-8, level 3	Criteria A
	DIP	EN 61000-4-11	Criteria B

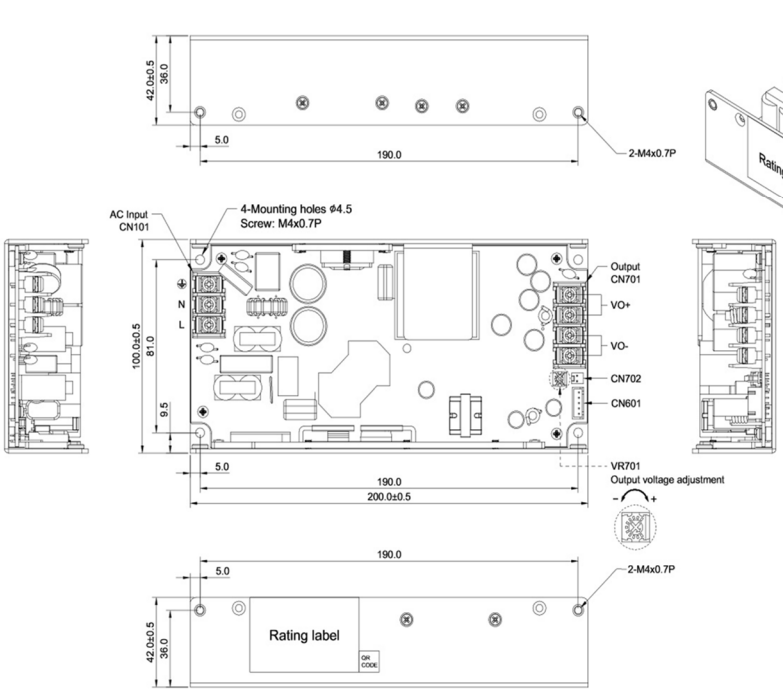
Note:
13.The power supply should be considered as a part of the components in the system. All EMC measurements have been completed on a metal plate (L x W x H, 360mm × 360mm x 1mm). The power supply must be combined with final equipment for EMC confirmation.

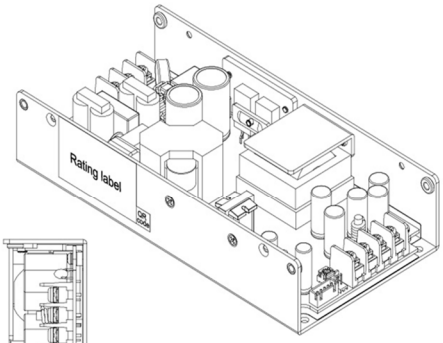
Dimensions and Recommended Layout

Item	Value	Unit
Weight (Typ.)	850	g
Size (L x W x H)	200 x 100 x 42.0 (Refer to outline drawing)	mm

Outline Drawing: (Unit: mm, Tolerance: ±0.5 mm)

TNA0400-XX-U





CN101	
Connector	Wire Size
ANYTEK YK5110303007G or equivalent	AWG 18

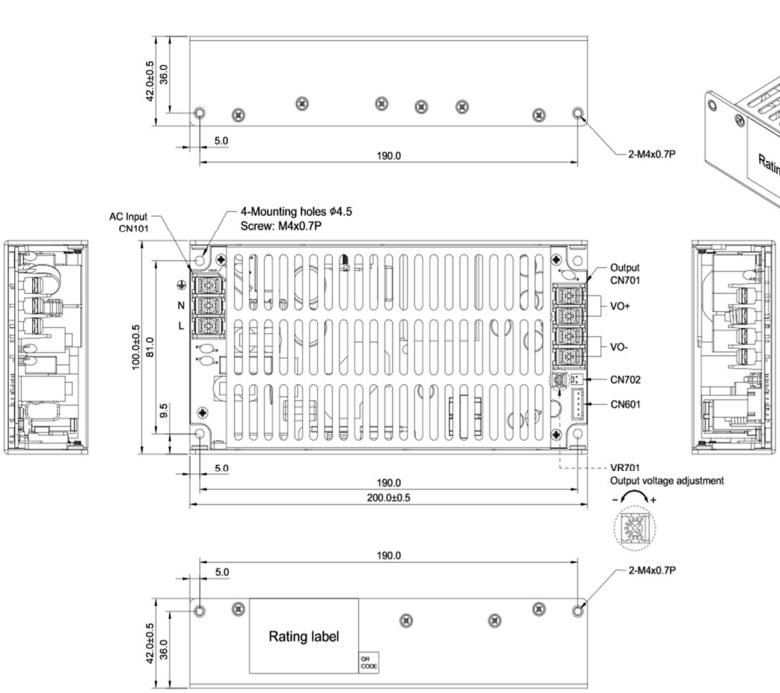
CN701		
Connector	Output Voltage	Wire Size
ANYTEK YK5110403007G or equivalent	12V	2 x14 AWG
	24V	2 x16 AWG
	36V	1 x14 AWG or 2 x18 AWG
	48V 54V	1 x16 AWG or 2 x18 AWG

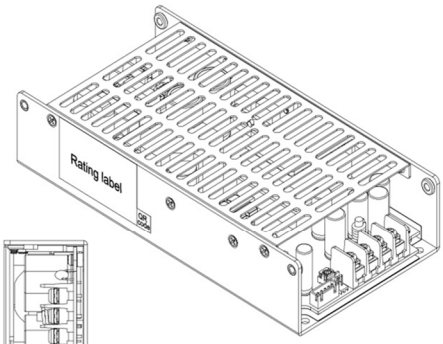
Wire size	Crimp Terminal	
	JST	NICHIFU
14 AWG	2-S3A / 2-P3.5	2Y-3.5 / R2-3.5
16 AWG	1.25-S3A / R1.25-3.5	1.25Y-3L / R1.25-3.5
18 AWG	1.25-S3A / R1.25-3.5	1.25Y-3L / R1.25-3.5

CN702	
2 1	Pin 1 Fan +
	Pin 2 Fan -
Connector	Mating Housing
JWT A2508WV0-2P	JWT A2508H00-2P
TKP 8812-02(LF)	TKP 8811-02(LF)
ALEX 8812-02-NH	ALEX 8811-02
MOLEX 2204-1021	MOELX 51191-0200

CN601	
5 1	Pin 1 +5Vsb
	Pin 2 Remote On/Off
	Pin 3 PG
	Pin 4 +5Vsb_RTN
	Pin 5 +5Vsb_RTN
Connector	Mating Housing
WST M5-I25002	WST P5-I25002
TKP 8822-05	TKP 8821-05

TNA0400-XX-C





CN101	
Connector	Wire Size
ANYTEK YK5110303007G or equivalent	AWG 18

CN701		
Connector	Output Voltage	Wire Size
ANYTEK YK5110403007G or equivalent	12V	2 x14 AWG
	24V	2 x16 AWG
	36V	1 x14 AWG or 2 x18 AWG
	48V 54V	1 x16 AWG or 2 x18 AWG

Wire size	Crimp Terminal	
	JST	NICHIFU
14 AWG	2-S3A / 2-P3.5	2Y-3.5 / R2-3.5
16 AWG	1.25-S3A / R1.25-3.5	1.25Y-3L / R1.25-3.5
18 AWG	1.25-S3A / R1.25-3.5	1.25Y-3L / R1.25-3.5

CN702		
2 1	Pin 1	Fan +
	Pin 2	Fan -
Connector	Mating Housing	
JWT A2508WV0-2P	JWT A2508H00-2P	
TKP 8812-02(LF)	TKP 8811-02(LF)	
ALEX 8812-02-NH	ALEX 8811-02	
MOLEX 2204-1021	MOELX 51191-0200	

CN601		
5 1	Pin 1	+5Vsb
	Pin 2	Remote On/Off
	Pin 3	PG
	Pin 4	+5Vsb_RTN
	Pin 5	+5Vsb_RTN
Connector	Mating Housing	
WST M5-I25002	WST P5-I25002	
TKP 8822-05	TKP 8821-05	