AC/DC 600W Switching Power Supply

Model: TNA0600-XX-X



FEATURES

- Universal, single phase input: 85 to 264VAC.
- Built-in active Interleaved PFC function.
- 800W Peak Power in 10 Sec, 600W natural convection cooling.
- High efficiency up to 96%.
- High power density: 9.07W/In^3, compact size: 8"x5"x1.65".
- Hold-up Time up to 16mS, no-load power consumption < 0.3W.
- Operating ambient temperature range: -30°C to +80°C.
- Output short circuit, overcurrent, overvoltage protection, Over-temperature protection.
- Optional functions: Remote on/off, Power Good/Power Fail.
- Overvoltage category: OVC II (for 5000m) & OVC III (for 2000m).
- Safety according to IEC62368-1, IEC60601-1, IEC61558-1, IEC60335-1.

Models & Ratings

Model No. (1)	Peak Output Power (W) (7)	Rated Output Power (W) (2)	Output Voltage/ Current	Standby Output (4)	Fan Output (4)	Efficiency (3)	Capacitive Load (μF)
TNA0600-12-X	700	500	12V / 41.6A	5V / 1.0A	12V / 0.6A	93	10,000
TNA0600-24-X	800	600	24V / 25.0A	5V / 1.0A	12V / 0.6A	95	5,000
TNA0600-36-X	800	600	36V / 16.6A	5V / 1.0A	12V / 0.6A	95	4,000
TNA0600-48-X	800	600	48V / 12.5A	5V / 1.0A	12V / 0.6A	95.5	2,500
TNA0600-54-X	800	600	54V / 11.1A	5V / 1.0A	12V / 0.6A	96	2,000

Notes:

1. Model Name Description.

TNA0600-12-U

VV-X

① ②

① VV : Output Voltage (Single output)
- 12 : 12V Output.
- 24 : 24V Output.
- 36 : 36V Output.
- 48 : 48V Output.
- 54 : 54V Output.

② X : 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.

3. When measuring Maximum-load efficiency (typical values are measured at 230VAC input and 600W load), the fan should be connected to an external power supply. Standby power consumption and fan losses are not included in the input power.

4. 5Vsb standby output and fan output are optional configurations.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Input voltage (Refer to power derating curve)		85	100 - 240	264	VAC
Input Frequency	-		47	50 - 60	63	Hz
Input Current	115VAC & Maximum load		-	-	6.0	Arms
	230VAC & Maximum load		-	-	3.0	
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	-	-	-
No Load Power Consumption	230VAC, Remote off and no load on 5Vsb		-	-	0.3	W
Earth Leakage Current	264VAC/63Hz(max)		-	-	500	μA
Touch Current	264VAC/63Hz(max)		-	-	100	μA
Input Protection	T10AH/250V Time Lag fuse (Internal fuse fitted in line and neutral).					

Main Output Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage		See Models and Ratings table		12	-	54	VDC
Initial Set Accuracy (5)		115/230VAC, 50% load		-	±1	-	%
Output Voltage Adjustment		-		-	±5	-	%
Minimum Load		-		0	-	-	A
Line Regulation		90 - 264VAC, constant load		-	±0.5	-	%
Load Regulation		Output from 0 - 100% load		-	±1	-	%
Ripple & Noise (6)		Oscilloscope Bandwidth : 20MHz	0°C < Ta < 80°C	-	-	1	%
			-20°C < Ta < 0°C	-	-	1	%
Transient Response		50-75% and 75-50% load step, 1A/μsec slew rate		-	±5	-	%
Peak Power Response (7)		Peak power duration is 10 seconds. See "Peak Output Conditions" for details.			±10		%
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		-	-	50	mS
	Hold-up Time	At 25°C, 115VAC & Maximum load, 90% of output voltage		16	-	-	mS
Over/undershoot		Maximum load		-	-	5	%
Over-voltage Protection		Output shut down and latch off, manual reset (Re-power on or Re-remote on)		110	-	130	% Vnom
Over-current Protection (8)		Output shut down and auto recovery		110	-	160	% Inom
Short Circuit Protection		Output shut down and auto recovery / Hiccup mode		-	-	-	-
Over-temperature Protection (9)		Measured internally, auto recovery		-	-	-	°C
Remote On/Off (10)		Output condition on	Remote on = High / floated	2.0	-	5.5	VDC
		Output condition off	Remote off = Low	0	-	0.8	
PG Signal (11)		Power good	TTL High level	2.0	-	5.5	VDC
		Delay time	Main output reaches 90% of its set value	100	-	1000	mS
		Output current		-	-	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 (12)	When the minimum load of the main output is 10W, the 12V voltage regulation tolerance is ±5%.	-	-	0.6	A

5Vsb Standby Output Specifications

Item		Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage		-		-	5	-	VDC
Output Accuracy		115/230VAC, 50% load, on-board, not adjustable		-	±5	-	%
Rated Load		-		0	-	1	A
Line Regulation		90 - 264VAC, constant load		-	±0.5	-	%
Load Regulation		Output from 0 - 100% load		-	±2	-	%
Ripple & Noise (6)		Oscilloscope Bandwidth : 20MHz	0°C < Ta < 80°C	-	-	1	%
			-20°C < Ta < 0°C	-	-	1.5	%
Transient Response		50-75% and 75-50% load step, 1A/μsec slew rate		-	±5	-	%
Sequence time	Start-up Delay	115/230VAC Maximum load from input AC turn on		-	-	0.5	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
Over/undershoot		Maximum load		-	-	5	%
Over-current Protection (8)		Output shut down and auto recovery		110	-	-	% Inom
Short Circuit Protection		Output shut down and auto recovery / Hiccup mode		-	-	-	-

Notes:

5. The voltage range for Power over Ethernet (PoE) varies by standard. In standards, the Power Supply Equipment (PSE) typically provides 44V to 57V, while the Powered Device (PD) receives 37V to 57V (802.3af) or 42.5V to 57V (802.3at/bt) to ensure safe and stable operation. 48V is usually the primary power supply reference voltage.
   Safety: PoE voltages (44-57V) are classified as Safety Extra Low Voltage (SELV), making them safe for network infrastructure. If the user needs to adjust the power supply output voltage, we do not recommend adjusting it above 57V.

6. Please refer to Figure A to measure Vo, line regulation, load regulation, and ripple voltage. The output voltage is measured at the power supply output terminal.
   Ripple and noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a C1: 0.1μF ceramic or film capacitor and C2: 47μF low ESR electrolytic capacitor parallel, After 20 min warm up.
   Ripple & Noise measurement circuit

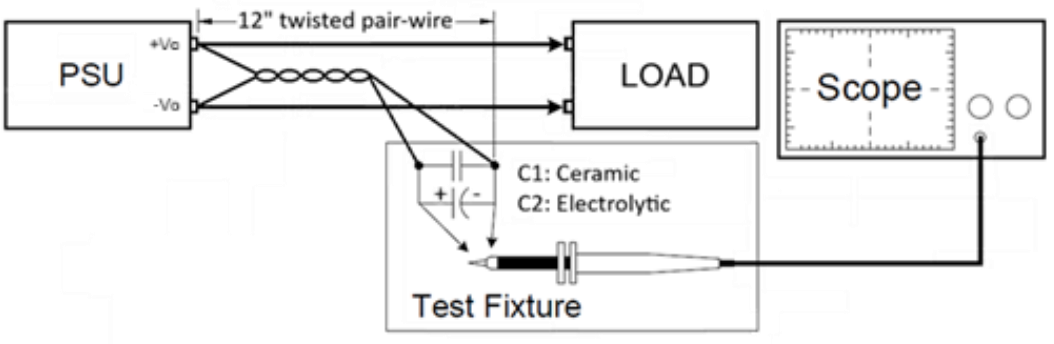


Figure A

7. Peak output power operation time is less than 10 seconds, See "Peak Output Conditions" for details Please refer to Figure B.

Average power not to exceed maximum power ratings. Exceeding these limits may damage the product or trigger the internal over-temperature protection circuit to shut down the power supply.

When using pulse load, a noise may be heard from power supply unit. Please evaluate and check before using.

Peak Power Conditions

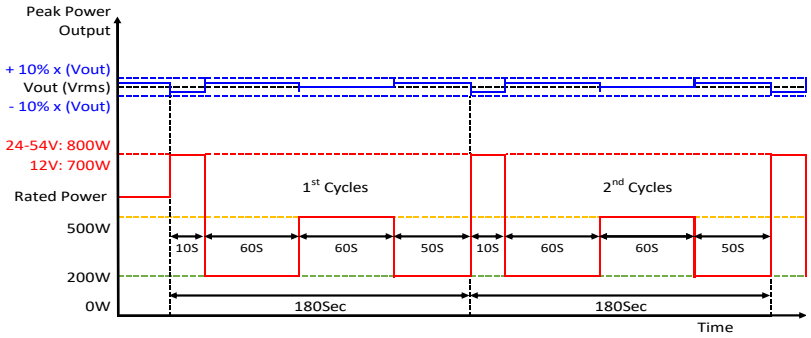


Figure B

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

9. 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.

10. 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, in order to disable the main output.

To turn off the output, connect the remote on/off pin 2 of CON601 to the return pin 4 or pin 5, Please refer to Figure D. The output is on if the remote on/off pin 2 of CON601 is left floating or connected to the 5V standby pin 1.

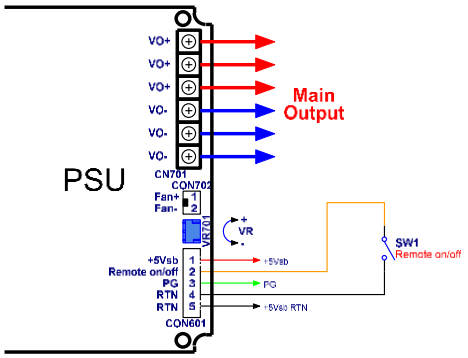


Figure D

11. Power Good Signal

Power Good is provided warning signal before loss of output voltage since AC fail through PG and SGND.
Power Good signal is a TTL signal which goes high after main output reaches 90% of its set value. The delay is 100ms to 1000ms, shows “High” level (2.0V~5.5V) to indicate power supply operating normal, and can source maximum 1mA current.
The same signal goes low at least 1ms before main output falls to 90% of set value at AC Power off or Remote off, When power supply stops operating, the signal will turn to “Low” level (0V~0.8V), and the maximum sink current is 1mA.

12. Fan Output (Optional)

CON702 fan output connector: With a minimum load of 10W on the main output, the fan power supply voltage regulation tolerance is ±5%, and the maximum output current is 0.6A.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Efficiency	230VAC, Maximum load, at 25°C		93	-	-	%
Power density	Compact size: 8"x5"x1.65"		-	-	9.07	W/In^3
Electrical Strength Test (14)	Input - Output	Electrical strength test for 1 minute, leakage current is less than 10mA.	4000	-	-	VAC
	Input - FG		2000	-	-	
	Output - FG		1500	-	-	
Insulation Resistance	Input - Output	25±5°C, 70% RH, non-condensing testing voltage 500VDC.	100	-	-	MΩ
	Input - FG		100	-	-	
	Output - FG		100	-	-	
Isolation level	Primary to Secondary		-	2 x	-	MOPP
	Primary to Earth		-	1 x	-	MOPP
	Secondary to Earth		-	1 x	-	MOPP
Mean Time Between Failure	At 100VAC/60Hz Maximum load 25°C, Telcordia SR332, issue4.		1,000,000	-	-	Hrs.

Notes:

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

Environmental Specifications

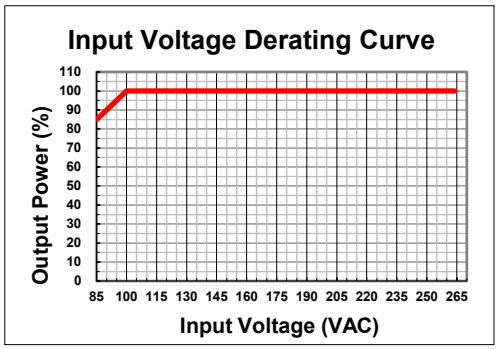
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Operating Temperature (15)	Refer to power de-rating curve		-30	-	+80	°C
Storage Temperature	Non-operation		-40	-	+85	
Operating Humidity	Non-condensing		10	-	90	%
Storage Humidity	Non-operation		5	-	95	
Power De-rating (15)	Operating Temperature	+50°C to +80°C	2.5	-	-	%/°C
	Input voltage	85VAC - 100VAC	1	-	-	%/VAC
OVER VOLTAGE CATEGORY	IEC/EN/UL 62368-1 (OVC II)		-	-	5,000	meter
	IEC/EN 61558-1/-2-16 (OVC III)		-	-	2,000	
	IEC/EN 60601-1 (OVC II)		-	-	3,000	
Vibration	Operating：0.5G, 5 - 500Hz, 10 min/cycle, 30 min each axis (X, Y, Z).					
Shock	Non-operating (package)：20G, 11 ms, 1 shock per direction per axis (X, Y, Z).					
RoHS	Directive 2011/65/EU, (EU) 2015/863 COMPLIANT.					

Notes:

15. Input voltage and temperature derating curve: Please refer to the derating specifications and curves below.

a. Input voltage derating curve: Please refer to Figure E.

Derate linearly from 100% load at 100VAC to 85% load at 85VAC, Peak power does not have the derating.

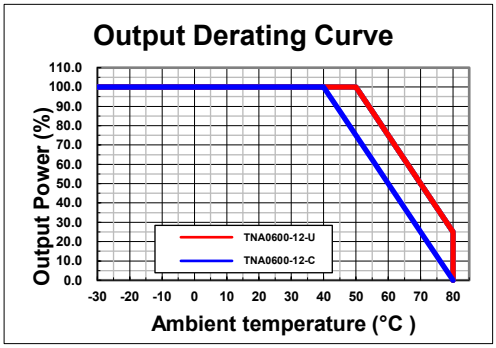


Input voltage (VAC)	Rated output load (%)
100 - 264	100
90	90
85	85

Figure E

b. Temperature derating curve for 12V rated output load of 500W: Please refer to Figure F.

TNA0600-12-U: Derate linearly from 100% load at +50 °C to 25% load at +80 °C,
TNA0600-12-C: Derate linearly from 100% load at +40 °C to 0% load at +80 °C.

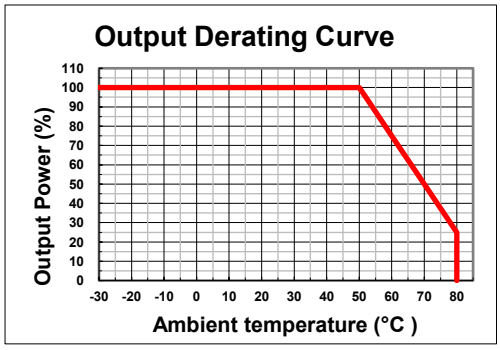


Ambient temperature (°C)	TNA0600-12-U Rated output load (%)	TNA0600-12-C Rated output load (%)
-30 - +40	100	100
+50	100	75
+60	75	50
+70	50	25
+80	25	0

Figure F

c. Temperature derating curve for 24-54V rated output load of 600W: Please refer to Figure G.

TNA0600-XX-U & TNA0600-XX-C: Derate linearly from 100% load at +50 °C to 25% load at +80 °C.



Ambient temperature (°C)	Rated output load (%)
-30 - +50	100
+60	75
+70	50
+80	25

Figure G

Safety Approvals

Certification	Standard	Notes & conditions
UL	UL/cUL UL62368-1, 4th Edition	-
CB report	CB IEC62368-1, 4th Edition	-
Other	Meet IEC60601-1; IEC61558-1; IEC60335-1	-
Safety Class	Class I only	-

Electromagnetic Compatibility (EMC)

EMC Emissions (16)	Standard	Test level
CE	EN55011, EN55014, EN55032(CISPR32)	Class B
RE	EN55011, EN55014, EN55032(CISPR32)	Class B
Harmonic Current	EN61000-3-2	Class A
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, Com. mode: 4KV, 12 ohm; Diff. mode: 2KV, 2 ohm	Criteria A
CS	EN61000-4-6	level 3, 10V/m	Criteria A
PFMF	EN61000-4-8	level 3	Criteria A
DIP	EN61000-4-11	-	Criteria B

Note:

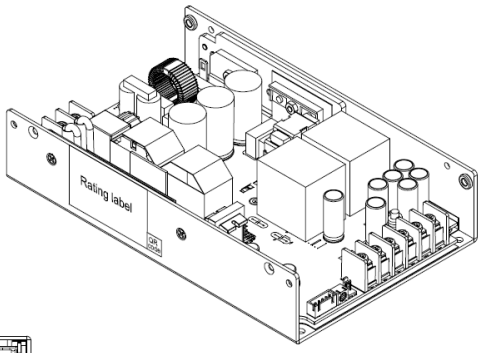
16. The power supply should be considered as a part of the components in the system. All EMC measurements have been completed on a metal plate (L x W x H, 360mm × 360mm x 1mm). The power supply must be combined with final equipment for EMC confirmation.

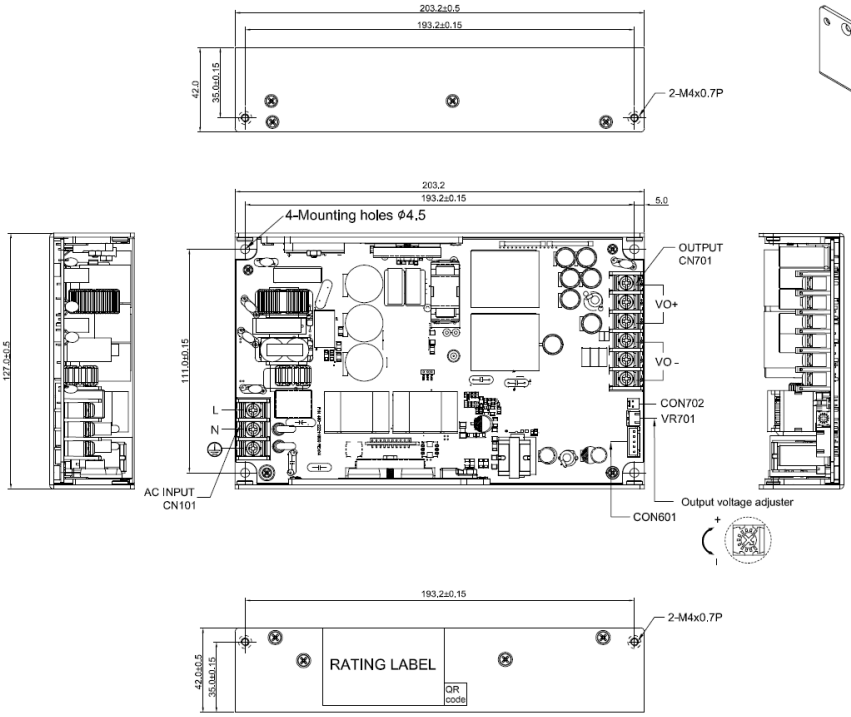
Dimensions and Recommended Layout

Item	Models	Value	Unit
Weight (Typ.)	TNA0600-XX-U	991 (Ref.)	g
	TNA0600-XX-C	1094 (Ref.)	
Size (L x W x H)	All Models	203.2 x 127.0 x 42.0 (Refer to outline drawing)	mm

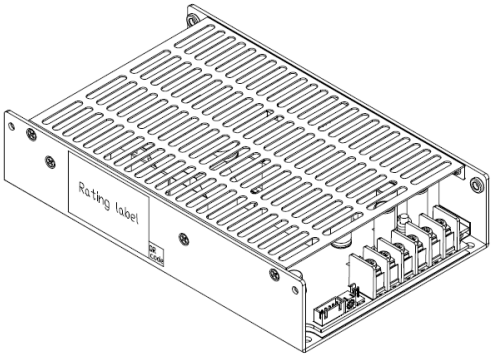
Outline Drawing:

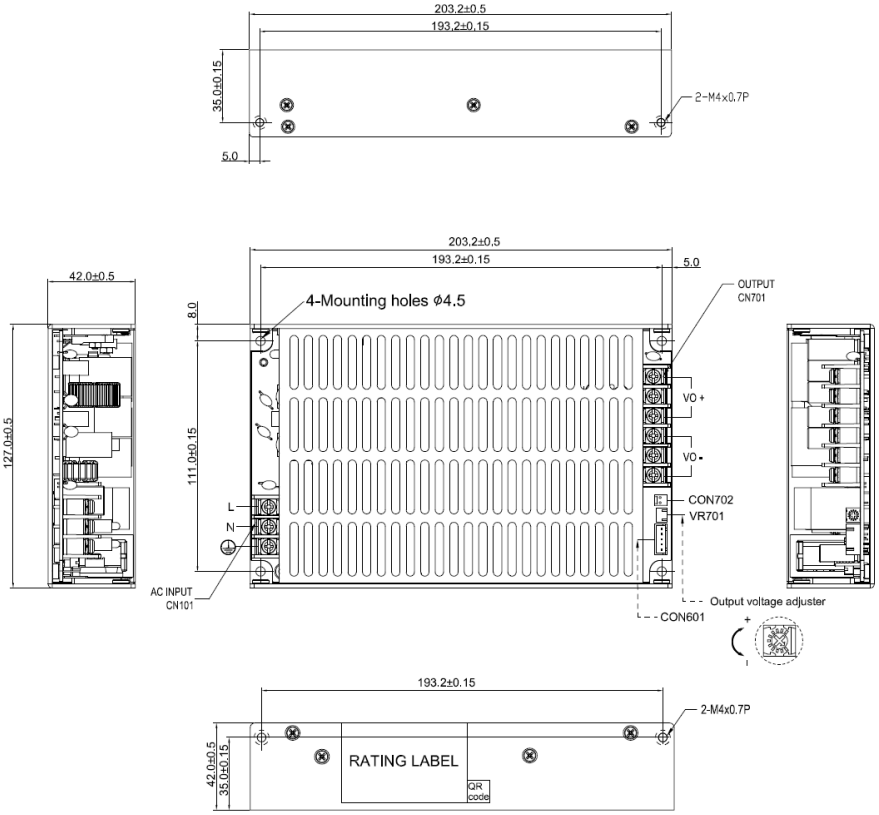
TNA0600-XX-U





TNA0600-XX-C





Terminal Pin No. Assignment

CN701		
Connector	Output Voltage	Wire size
ANYTEK YK5110603009G DECA T34-BM1106	12V	3Px14AWG
	24V	2Px14AWG OR 3Px16AWG
	36V	2Px14AWG OR 2Px16AWG
	48V	1Px14AWG OR 2Px18AWG
	54V	1Px14AWG OR 2Px18AWG

CN101	
Connector	Wire size
ANYTEK YK5110303000G	AWG 16
DECA T34-BM1103	

CON702		
2 1	Pin 1	Fan +
	Pin 2	Fan -
Connector	Mates Housing	
JWT A2508WV0-2P	JWT A2508H00-2P	
TKP 8812-02(LF)	TKP 8811-02(LF)	
ALEX 8812-02-NH	ALEX 2502-2	

CON601		
5 1	Pin 1	+5Vsb
	Pin 2	Remote on/off
	Pin 3	PG
	Pin 4	+5Vsb_RTN
	Pin 5	+5Vsb_RTN
Connector	Mates Housing	
WST M5-I25002	WST P5-I25002	
TKP 8822-05	TKP 8821-05	

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