

### Features:

- Universal AC input / Full range
- Programmable output Voltage (30% ~ 105%)
- Programmable output Current (40% ~ 105%)
- +5V / 0.5A auxiliary output
- Forced current sharing at parallel operation
- Power OK signal
- Remote ON / OFF, Remote sense function
- Protection: OVP, OLP, OTP, SCP, Fan failure
- 3 years warranty

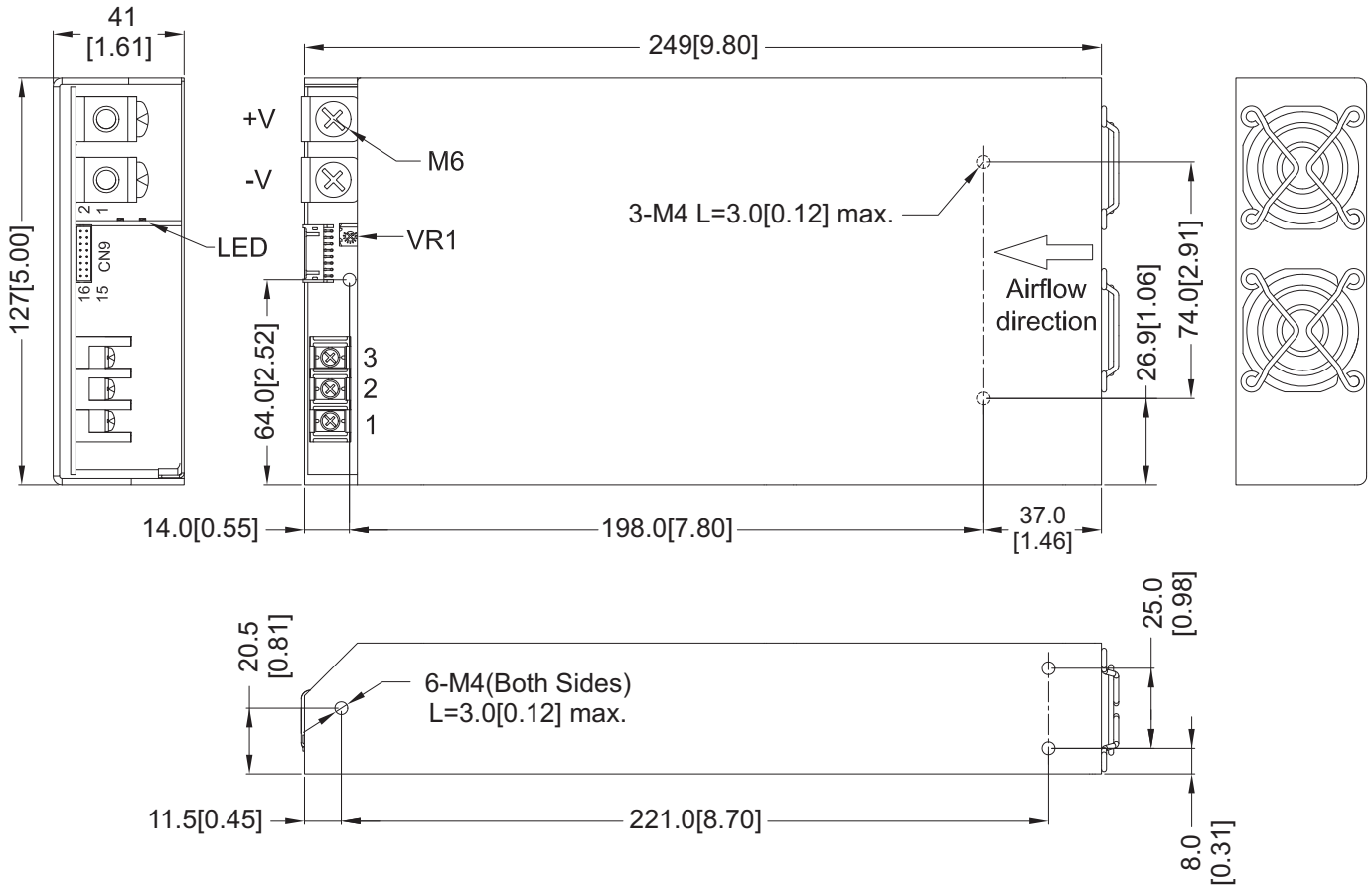


MODEL		AK-650-05	AK-650-12	AK-650-15	AK-650-24	AK-650-27	AK-650-48
Output	DC Voltage Range	5V	12V	15V	24V	27V	48V
	Rated Current	100A	50A	40A	27A	24A	13.6A
	Current Range	0 ~ 100A	0 ~ 50A	0 ~ 40A	0 ~ 27A	0 ~ 24A	0 ~ 13.6A
	Rated Power	500W	600W	600W	648W	648W	652W
	Ripple & Noise (Max.) <small>Note.2</small>	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p	150mVp-p
	Voltage Adj. Range	±5.0% Typical adjustment by potentiometer					
	Voltage Tolerance <small>Note.3</small>	±1.0%					
	Line Regulation	±0.5%					
	Load Regulation	±0.5%					
	Setup, Rise Time	800ms, 60ms at full load					
Hold Up Time (Typ.)	16ms / 230VAC at full load						
Input	Voltage Range <small>Note.4</small>	90 ~ 264VAC, 127 ~ 370VDC					
	Frequency Range	47 ~ 63Hz					
	Power Factor (Typ.)	0.98 / 230VAC, 0.99 / 115VAC at full load					
	Efficiency (Typ.)	83%	88%	88%	90%	90%	91%
	AC Current (Typ.)	7.5A / 115VAC, 3.5A / 230VAC					
	Inrush Current (Typ.)	27A / 115VAC, 54A / 230VAC					
Leakage Current	< 1.0mA / 240VAC						
Protection	Over Load	105 ~ 125% rated output power Protection type: Total Power limit, Latch-style (Recovery after reset AC power ON or inhibit)					
	Over Voltage	Variable OVP, 125 ±10% Vout. Protection type: Latch-style (Recovery after reset AC power ON or inhibit)					
	Over Temperature	By detecting primary and secondary heat sink. Protection type: Shut down o/p voltage (Recovers automatically after temperature goes down)					
Function	Auxiliary Power	5V / 0.5A (±3%)					
	Remote ON / OFF Control	External switch or NPN Transistor to turn ON / OFF					
	Power OK Signal	Open drain signal low when PSU turns on, Max. sink current: 20mA, Max. drain voltage: 40V.					
	Output Voltage Trim	Adjustment of output voltage is between 30 ~ 105% of rated output					
	Output Current Trim	Adjustment of output voltage is between 40 ~ 105% of rated output					
	Parallel (Current Sharing) <small>Note.5</small>	Please refer to Function Manual					
Environment	Working Temp.	-25 ~ +60°C (Refer to de-rating curve)					
	Working Humidity	20 ~ 90% RH non-condensing					
	Storage Temp. & Humidity	-40 ~ +85°C, 10 ~ 95% RH					
	Temp. Coefficient	±0.02% / °C (0 ~ 50°C)					
Vibration	10 ~ 500Hz, 5G 10min. / 1cycle, period for 60min. each along X, Y, Z axes Compliance to IEC 68-2-6, IEC 68-2-64						
Safety & EMC	Safety Standards	Certified UL 60950-1; EN 60950-1					
	Withstand Voltage <small>Note.7</small>	I/P-O/P: 3KVAC (4242VDC), I/P-FG: 1.5KVAC (2121VDC), O/P-FG: 0.5KVAC (707VDC), 1min					
	Isolation Resistance	I/P-O/P, I/P-FG, O/P-FG: 100M Ohms / 500VDC					
	EMI Conduction & Radiation	Certified EN 55022; EN 61000-6-3					
	Harmonic Current	Certified EN 61000-3-2; EN 61000-3-3					
	EMS Immunity <small>Note.6</small>	Certified EN 55024; EN 61204-3; EN 61000-6-1; ENV 50204; IEC 61000-4-2, 3, 4, 5, 6, 8, 11					
Others	MTBF	166.2K HRS Certified MIL-HDBK-217F					
	Cooling	Load and Temperature control fan					
	Dimension (WxHxD)	127x40.9x249 mm / 5.000x1.610x9.803 inch					
	Packing	1.68kg; 9pcs / 16.1kg / 1.86CUFT					

- Note**
1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.
  2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor.
  3. Tolerance: includes setup time tolerance, line regulation and load regulation.
  4. De-rating may apply in low input voltage. Please check the de-rating curve for more details.
  5. In parallel connection, only one unit will operate if the total output load is less than 5% of the rated load condition.
  6. The power supply is considered a component which will be installed into a final equipment. The final equipment must be re-confirmed that it still meets EMC directives.
  7. This test is done without enclosure.

### Mechanical Drawings:

Unit:mm / inch



Recommended screw length is measured from the power supply surface

AC Input Terminal  
Pin No. Assignment

Control pin number assignment (CN9) : JST S16B-PHDSS or equivalent

Pin No.	Assignment
1	ACL
2	ACN
3	⏏

Pin No.	Assignment	Pin No.	Assignment	Pin No.	Assignment	Pin No.	Assignment	Mating Housing	Terminal
1	VS+	5	AUX	9	EN-	13	VCI	PHDR-16VS	SPHD-002T-P05
2	VO+	6	AUX	10	GND	14	GND		
3	VS-	7	EN+	11	P.OK	15	PAR		
4	VO-	8	GND	12	GND	16	ACI		

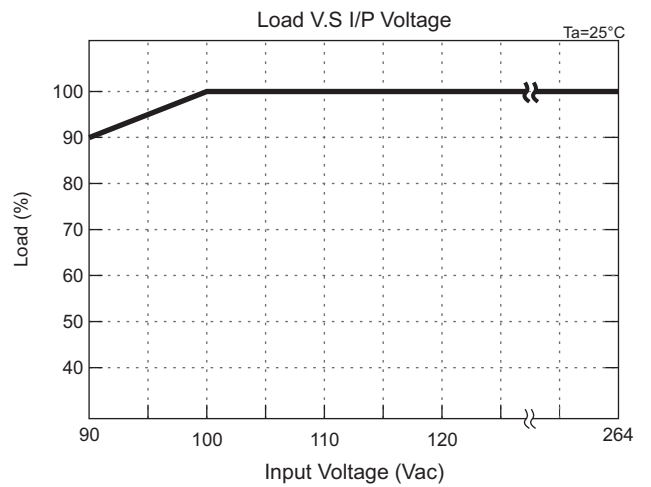
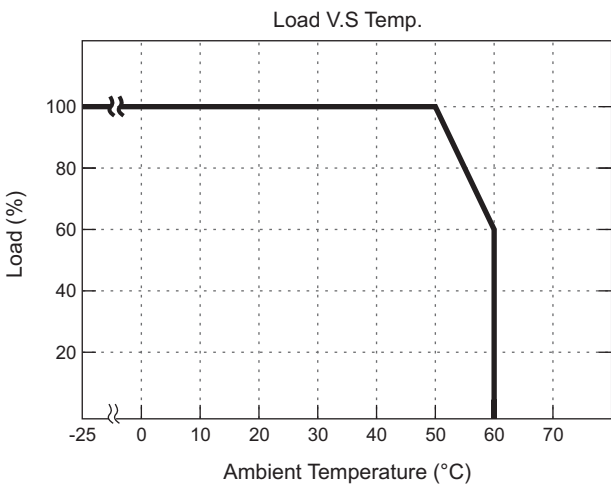
### Function Description of CN9:

Pin No.	Function	Description
1	VS+	Remote voltage sense (+)
2	VO+	Local output voltage sense (+)
3	VS-	Remote voltage sense (-)
4	VO-	Local output voltage sense (-)
5,6	AUX	+5V / 0.5A Auxiliary power
7	EN+	Remote ON/OFF (+)
8,10,12,14	GND	Ground
9	EN-	Remote ON/OFF (-)
11	P.OK	Power OK
13	VCI	V Program
15	PAR	Parallel operation current share
16	ACI	I Program

### LED Status:

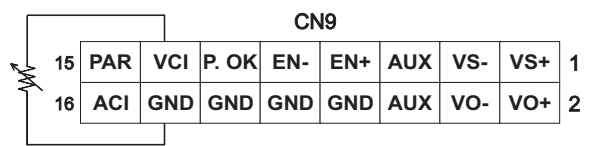
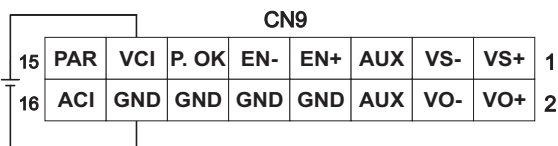
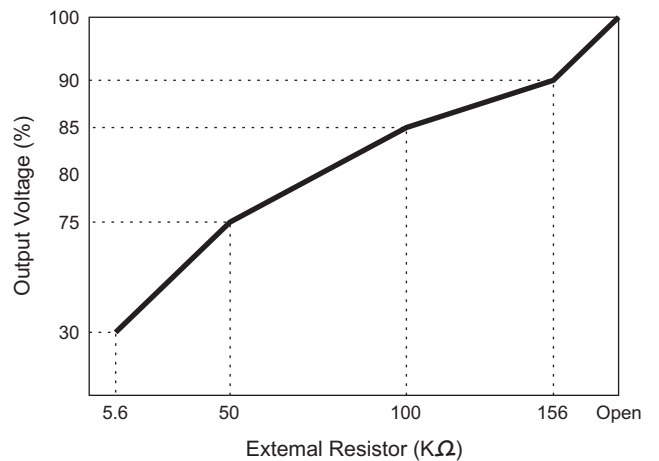
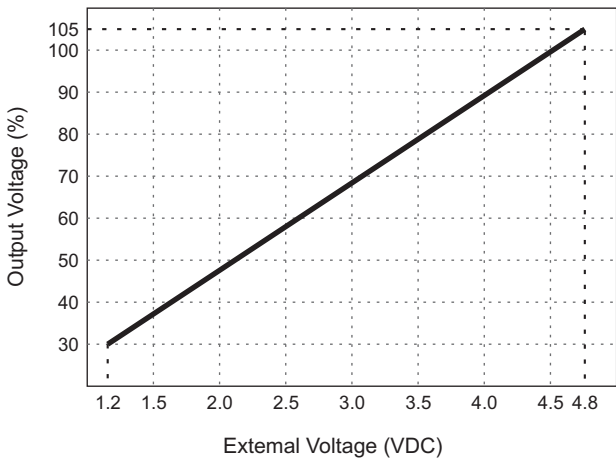
Green LED	LED Signal	Status
Solid		Power OK
Slow Blink		Power Standby
Red LED	LED Signal	Status
Fast Blink		Over Voltage Protection ( OVP )
Solid		Over Load Protection ( OLP )
		Output Short Circuit Protection ( SCP )
		Under Voltage Protection ( UVP )
Slow Blink		Over Temperature Protection ( OTP )
Intermittent Blink		Fan Failure
Interlace Blink		Power Failure

### De-rating Curve:

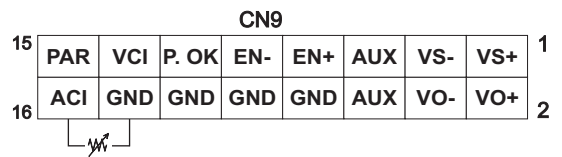
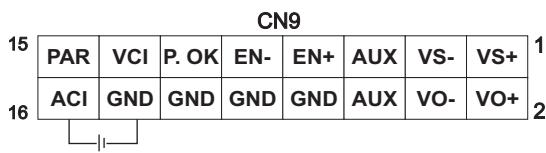
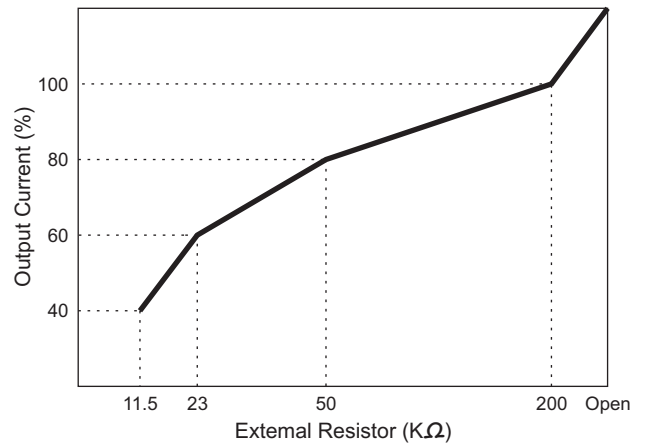
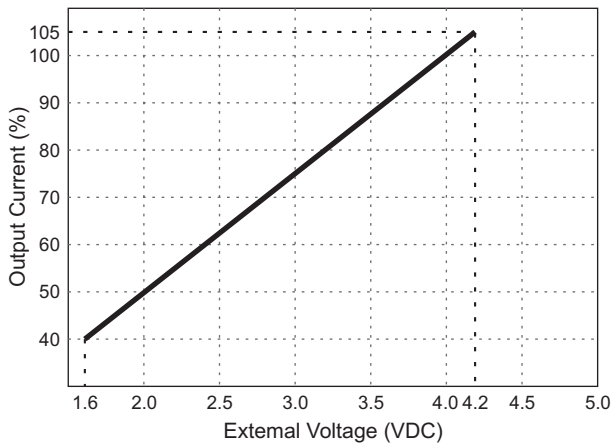


### Function Manual:

#### 1. Output Voltage Trim

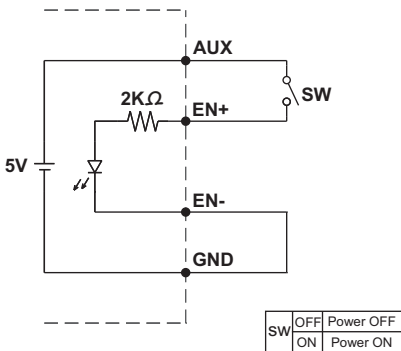


### 2. Output Current Trim (For Reference Only)



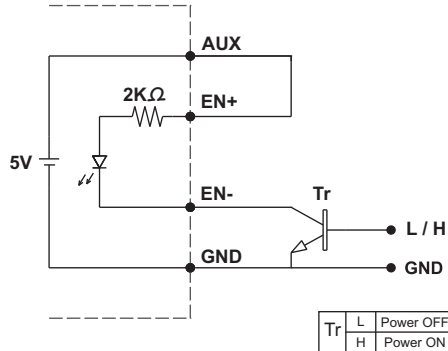
### 3. Remote ON/OFF

(A)



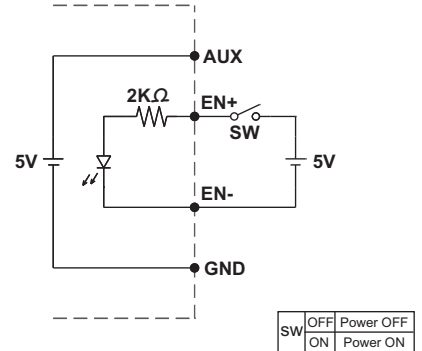
(A) Using internal 5V auxiliary source

(B)



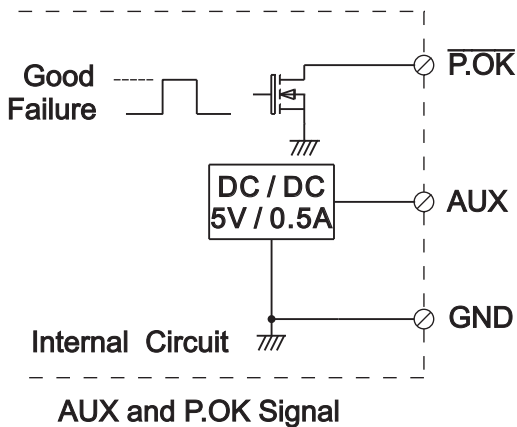
(B) ON / OFF Control by NPN transistor

(C)



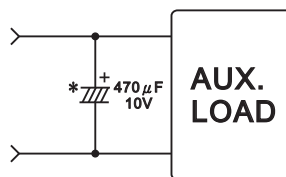
(C) Using external voltage source

### 4. Power OK Signal

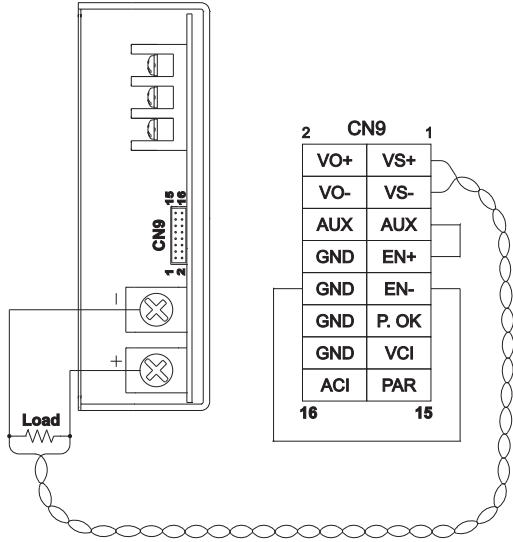


\*Place an additional capacitor to have a better performance of auxiliary power operation.

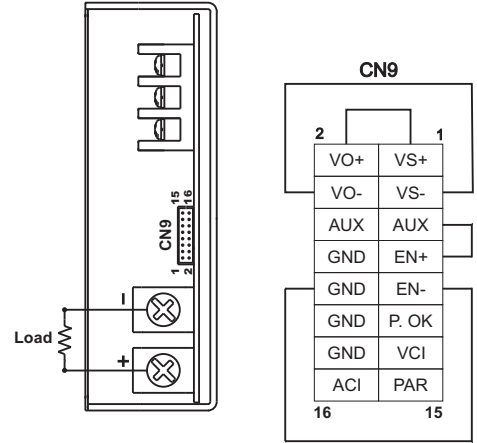
\*The grounding of "AUX" power should be connected to "GND" port. If "V-" is connected as Grounding, make sure to short the GND and V- ports.



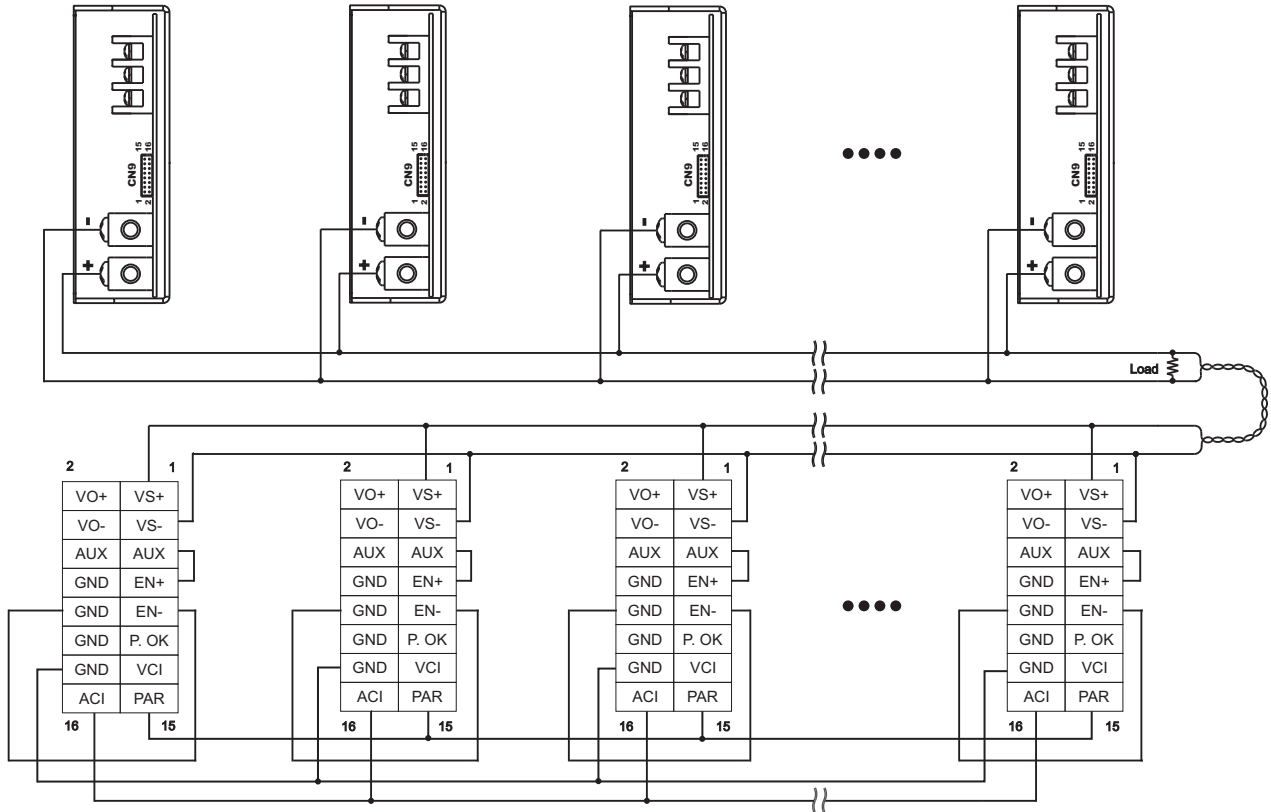
### 5. Remote Sense



### 6. Local Sense

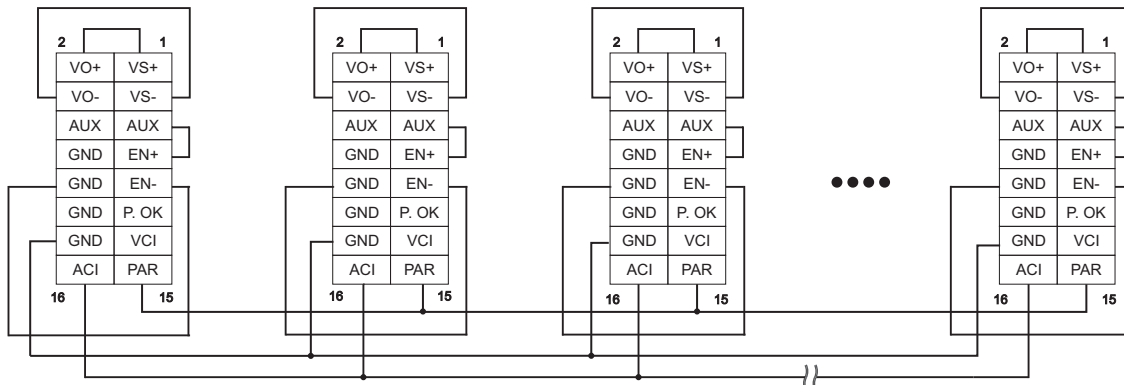


### 7. Current Sharing with Remote Sensing



Please connect PAR pins together for current sharing function

### 8. Current Sharing with Local Sensing

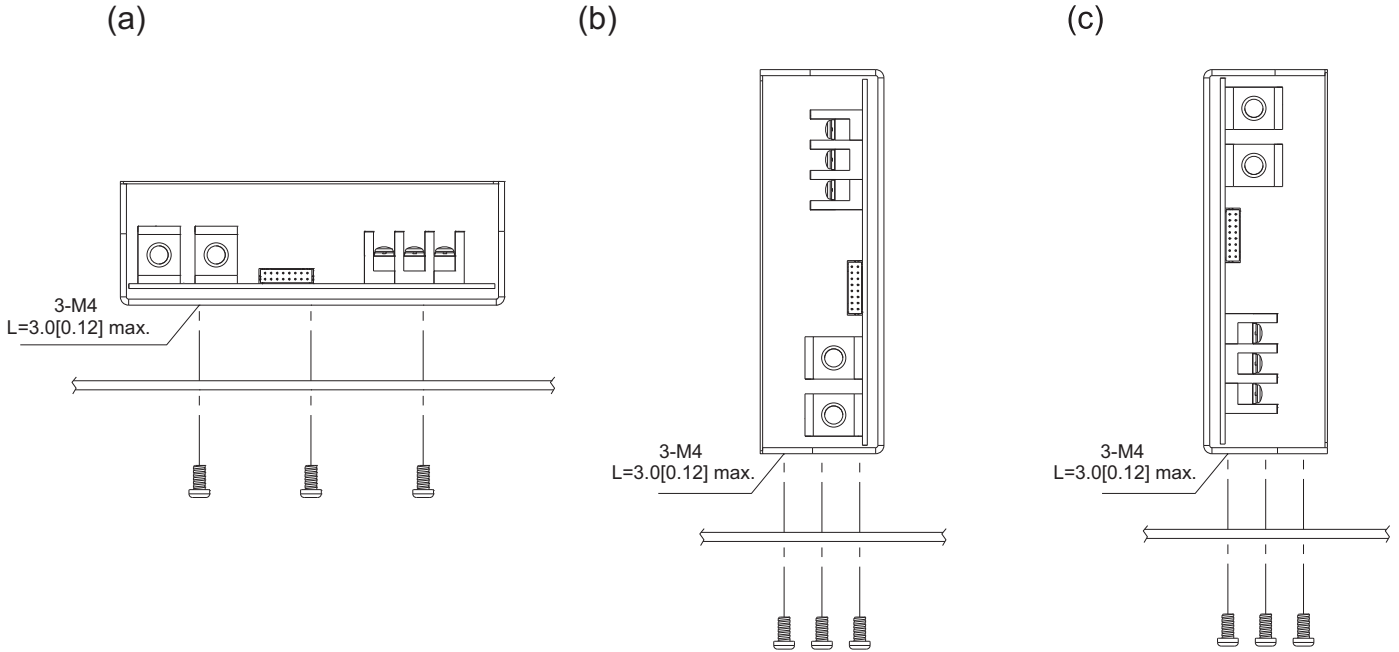


Please connect PAR pins together for current sharing function

### Installation Instruction:

#### 1. Mounting Directions

1-1 Recommended standard mounting methods:



Recommended screw length is measured from the power supply surface

#### 2. Mounting Method

2-1 There are ventilating holes on the front and back side panels, do not obstruct; allow 50mm at least for air flow.

2-2 The Maximum allowable penetration of screw is 4mm. Incomplete threading should not be penetrated.

2-3 Recommended the torque of mounting screw:  
M4 screw: 1.27N · m (13.0kgf · cm)

