



## APPLICATION NOTE

### COTEK MODELS

**AE-800**

**AE-1500**

**AE-3000**

**AEK-3000**

**AE-3000HV**

**NOTE:** The following application notes are for the Cotek models distributed by Kepco, Inc. that are listed above.

1. RS 232 Communication is only possible using the CT Series adapters listed below. (Pins 23 and 24 of CN2 are not connected and do not function.) See CT Series User Guide (free download) for details.

[www.kepcopower.com/support/opmanls.htm#ae](http://www.kepcopower.com/support/opmanls.htm#ae)

2. Computer control is also possible using the I<sup>2</sup>C interface. Refer to the Cotek I<sup>2</sup>C and RS 232/RS 485 Communication Protocol Manual (free download) for details.

[www.kepcopower.com/support/opmanls.htm#ae](http://www.kepcopower.com/support/opmanls.htm#ae)

**CT-201** - Used to control a single power supply from a PC via RS 232. Includes one (1) CT Series cable (Cotek P/N 47-0124-0001) to connect CT-201 to power supply and one 5-pin connector (ECH350R-05P) used for remote sense connections. Requires RS 232 cable to connect CT-201 DB-9F connector to computer RS 232 port (not supplied). See CT Series User Guide for details.

**CT-204** - Used to control up to four (4) power supplies configured in series from a PC via RS 232; maximum output voltage: <500V d-c. Includes four (4) CT Series cables (Cotek P/N 47-0124-0001) to connect CT-201 to power supplies. Optional 5-pin connector(s) (Dinkle P/N ECH350R-05P) used for remote sense connections are not supplied. Requires RS 232 cable to connect CT-201 DB-9F connector to computer RS 232 port (not supplied). See CT Series User Guide for details.

**NOTE:** More than four (4) power supplies may be connected in series and controlled via RS 232 by the use of multiple CT-204 modules and the optional CT-204 to CT-204 series cable (Cotek P/N 47-0103-0028); <500V d-c max still applies.

**CT-251** - Used to provide parallel control of multiple power supplies. Connecting a total of (N) power supplies in parallel requires (N-1) CT-251 modules plus one (1) CT-551 module which provides the RS 232/PC communication path. Each CT-251 and CT-551 module requires a CT series cable to connect to the associated power supply (supplied). See CT Series User Guide for details.

**CT-551** - Used to provide parallel control of multiple power supplies. Connecting a total of (N) power supplies in parallel requires (N-1) CT-251 modules plus one (1) CT-551 module which provides the RS 232/PC communication path. Each CT-251 and CT-551 module requires a CT series cable to connect to the associated power supply (supplied). See CT Series User Guide for details.

## Features:

- Universal AC input / Full range
- Programmable output Voltage (0% ~ 105%)
- Programmable output Current (0% ~ 105%)
- Forced current sharing at parallel operation
- Constant current limit
- Selectable +5V / 0.5A or +9V / 0.3A auxiliary output
- Global control via RS232
- Remote setting multiple PSU via RS232, RS485 & I<sup>2</sup>C
- Power OK signal
- Remote ON / OFF, Remote sense function
- Protection: OVP, OLP, OTP, Fan failure
- 3 years warranty



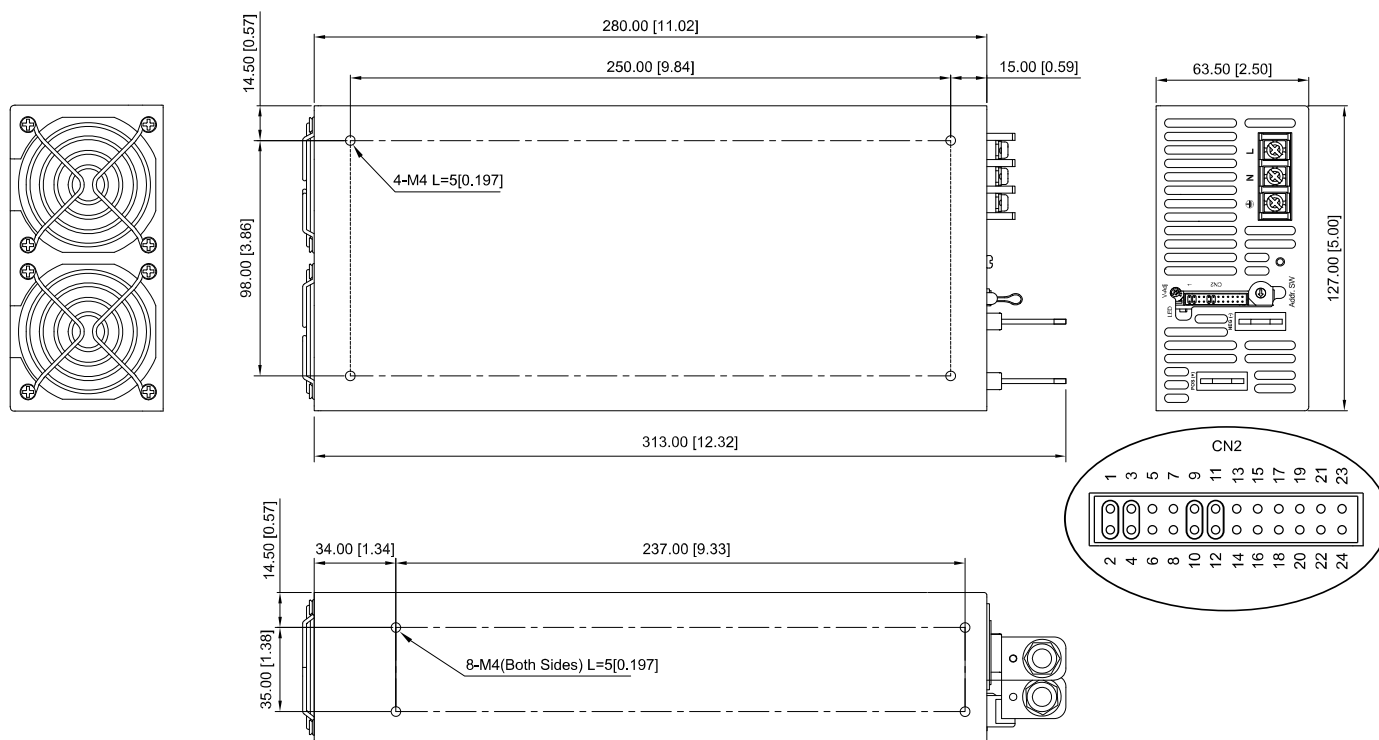
MODEL		AE-1500-12	AE-1500-15	AE-1500-24	AE-1500-30	AE-1500-36	AE-1500-48	AE-1500-60	
Output	DC Voltage Range	12V	15V	24V	30V	36V	48V	60V	
	Rated Current	125A	100A	62.5A	50A	41.7A	31.3A	25A	
	Current Range	0 ~ 125A	0 ~ 100A	0 ~ 62.5A	0 ~ 50A	0 ~ 41.7A	0 ~ 31.3A	0 ~ 25A	
	Rated Power	1500W	1500W	1500W	1500W	1501W	1502W	1500W	
	Ripple & Noise (Max.)	Note.2 150mVp-p	150mVp-p	240mVp-p	300mVp-p	360mVp-p	480mVp-p	600mVp-p	
	Voltage Adj. Range	±5.0% Typical adjustment by potentiometer. (VR1)							
	Voltage Tolerance	Note.3 ±2.0%							
	Line Regulation	±1.0%							
	Load Regulation	±1.0%							
	Setup, Rise Time	800ms, 100ms at full load							
Hold Up Time (Typ.)	14ms / 230VAC at full load								
Input	Voltage Range	Note.4 90 ~ 264VAC, 127 ~ 370VDC							
	Frequency Range	47 ~ 63Hz							
	Power Factor (Typ.)	0.95 / 230VAC, 0.99 / 115VAC at full load							
	Efficiency (Typ.)	89%	90%	92%	92%	92%	92%	93%	
	AC Current (Typ.)	18A / 115VAC, 9A / 230VAC							
	Inrush Current (Typ.)	30A / 115VAC, 45A / 230VAC							
	Leakage Current	< 2.5mA / 240VAC							
Protection	Over Load	105% rated output power Protection type: Constant current limit							
	Over Voltage	Variable OVP, 120 ± 7% Vout. Refer to VCI VS OVP curve. Protection type: Latch-style (Recovery after reset AC power ON or inhibit)							
	Over Temperature	85 ±5°C detect on NTC, Protection type: Auto recovery after temperature goes down Protection type: Auto recovery after temperature goes down							
	Function	Auxiliary Power	Selectable +5V / 0.5A or +9V / 0.3A auxiliary output						
		Remote ON / OFF Control	By external switch						
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 0 ~ 105% of rated output							
Output Current Trim		Adjustment of output current is between 0 ~ 105% of rated output							
Parallel (Current Sharing)	Note.5 Please refer to page 5								
Environment	Working Temp.	-25 ~ +60°C (Refer to load 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, 2G 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	Note.7 I/P-O/P: 3KVAC (4242VDC), I/P-FG: 1.5KVAC (2121VDC), O/P-FG: 0.5KVAC (707VDC)							
	Isolation Resistance	I/P-O/P, I/P-FG, O/P-FG: 100M Ohms / 500VDC							
	EMI Conduction & Radiation	Certified EN 55022; EN 61204-3; EN 61000-6-3							
	Harmonic Current	Certified EN 61000-3-2; EN 61000-3-3							
Note.6	EMS Immunity	Certified EN 55024; EN6 1204-3; EN6 1000-6-1; IEC 61000-4-2, 3, 4, 5, 6, 8, 11							
Others	Cooling	Load and temperature control fan							
	Dimension (WxHxD)	127x63.5x280 mm / 5.000x2.500x11.024 inch							
	Packing	2.6kg; 6pcs / 16.6kg / 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 power.
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



AC Input Terminal Pin No. Assignment

Pin No.	Assignment
1	L
2	N
3	⏏

### CN2 Function Description:

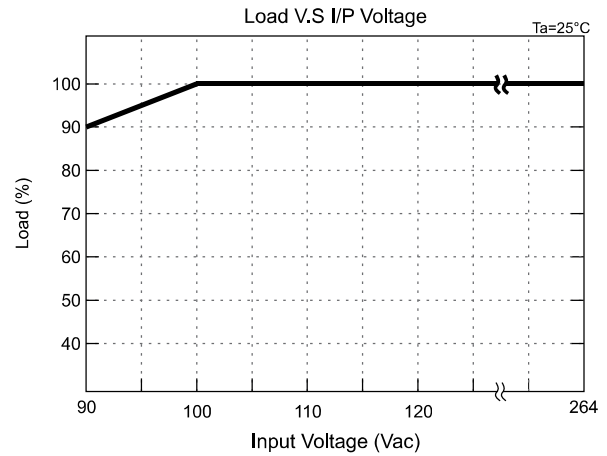
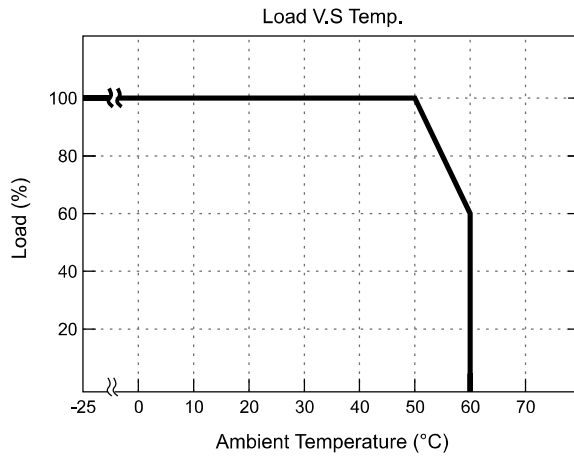
Pin No.	Function	Description	Pin No.	Function	Description	Mating Housing / Contact	
1	VS+	Remote sense (+)	13	ACI	I Program	JST PHDR-24VS or equivalent	JST SPHD-002T-P0.5 or equivalent
2	VO+	Positive output voltage	14	GND	Ground		
3	VS-	Remote sense (-)	15	VCI	V Program		
4	VO-	Negative output voltage	16	GND	Ground		
5	POK	Power OK	17	AUX	+5V / 0.5A or +9V / 0.3A Auxiliary power		
6	GND	Ground	18	GND	Ground		
7	PAR	Parallel operation current share	19	SCL	Serial Clock used in the I <sup>2</sup> C interface		
8	VSET	Aux output setting	20	SDA	Serial Data used in the I <sup>2</sup> C interface		
9	EN-	Inhibit ON/OFF (-)	21	AUX	+5V / 0.5A or +9V / 0.3A Auxiliary power		
10	GND	Ground	22	GND	Ground		
11	EN+	Inhibit ON/OFF (+)	23	NC.	For RS232 Receiver function		
12	AUX	+5V / 0.5A or +9V / 0.3A Auxiliary power	24	NC.	For RS232 Transmission function		

### LED Status:

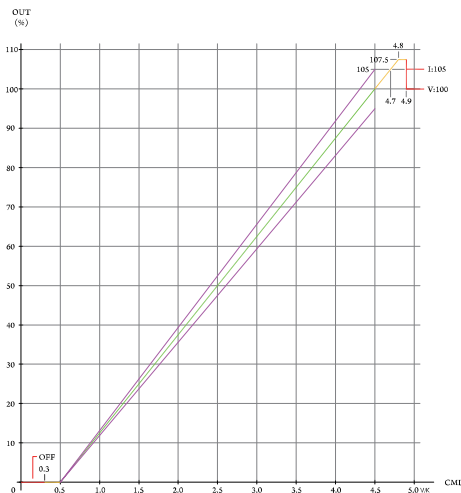
LED	LED Signal	Status
Solid(Green)		Power OK (Local mode)
Solid(Orange)		Power OK (Remote mode)
Slow Blink(Green)		Power Standby
Fast Blink(Red)		Over Voltage Protection ( OVP )
Solid(Red)		Over Load Protection ( OLP )
Slow Blink(Red)		Over Temperature Protection ( OTP )
Intermittent Blink(Red)		Fan Failure
Interlace Blink(Red)		Power Failure

\*Local mode : Use ACI/VCI to control output current and voltage.  
Remote mode : Use RS-232 or I<sup>2</sup>C command to control output current and voltage.

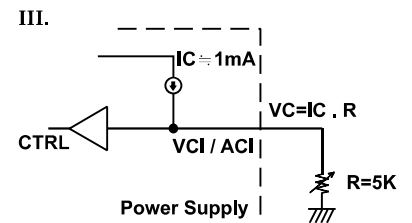
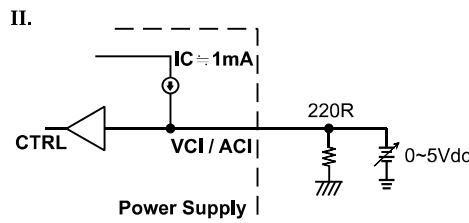
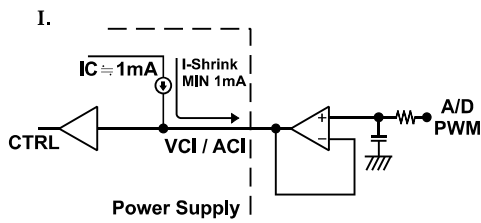
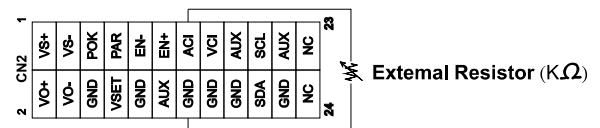
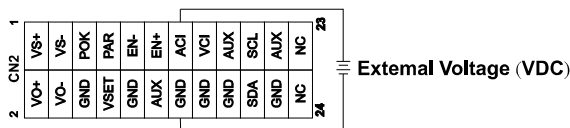
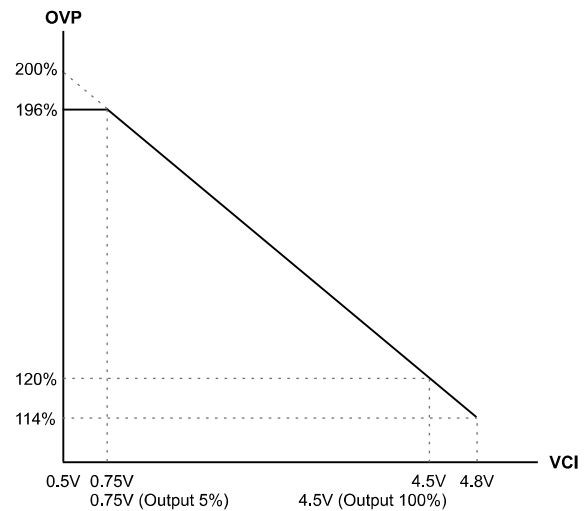
### De-rating Curve:



### CMD VS Output Curve:

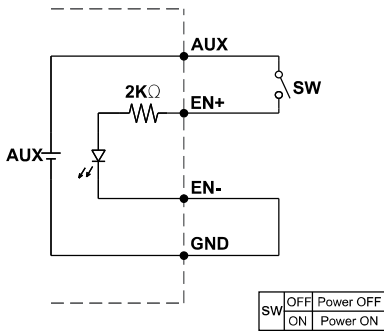


### VCI VS OVP Curve:



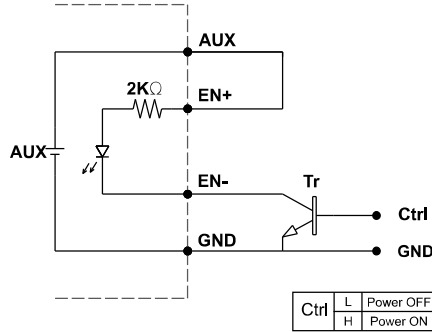
### Remote ON/OFF:

(A) Default Setting



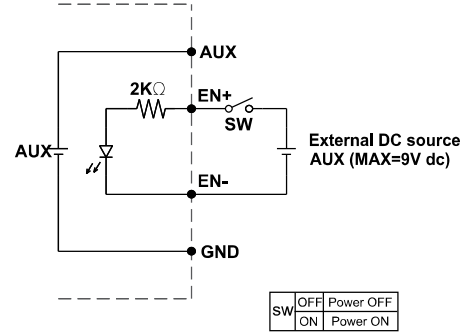
(A) Using internal 5V auxiliary source

(B)



(B) ON / OFF Control by NPN transistor

(C)



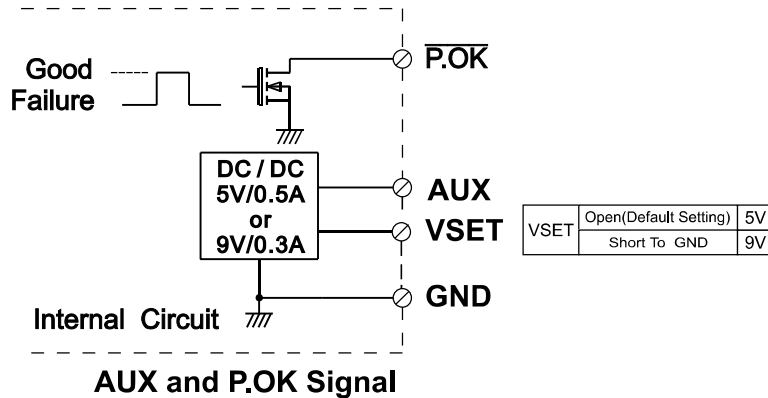
(C) Using external voltage source

\*GND shown in above diagram is referring to the GND of CN2, not the Grounding from main power(NEG-).\*

### Power OK Signal & Auxiliary Power Setting:

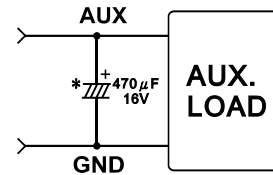
\*The grounding of "AUX" power and P.OK signal should be connected to "GND" port. If "VO-" is connected as Grounding, make sure to short the GND and VO- ports.

Open drain signal low when PSU turns on, Max.  
P.OK sink current: 20mA, Max, drain voltage: 40V.



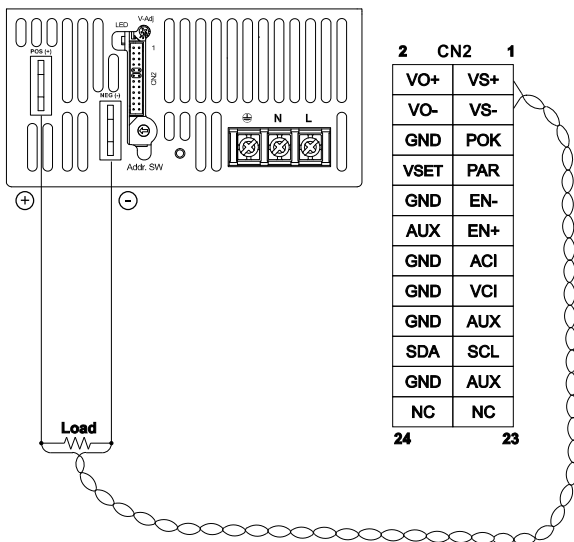
\*GND shown in above diagram is referring to the GND of CN2, not the Grounding from main power(NEG-).\*

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

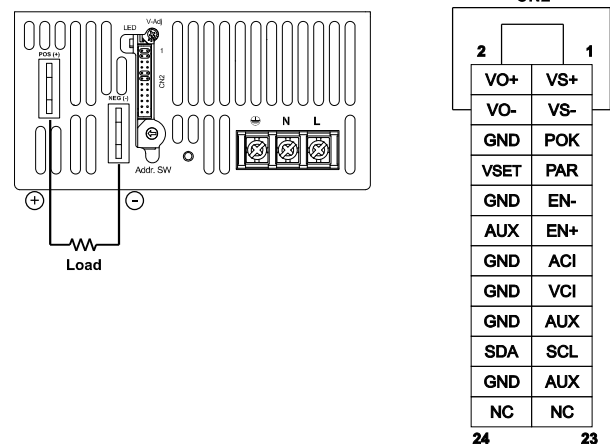


Do NOT exceed 5V/0.5A or 9V/0.3A

1. Remote Sense

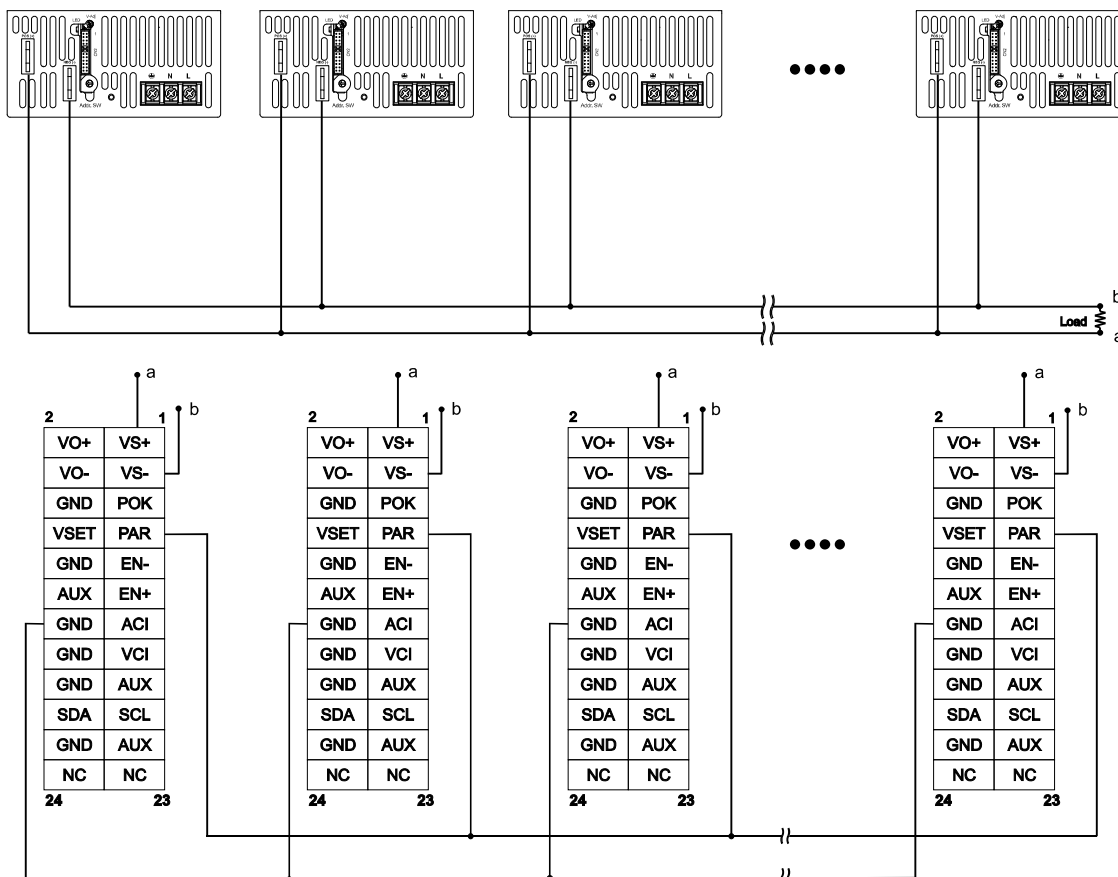


2. Local Sense (Default setting)

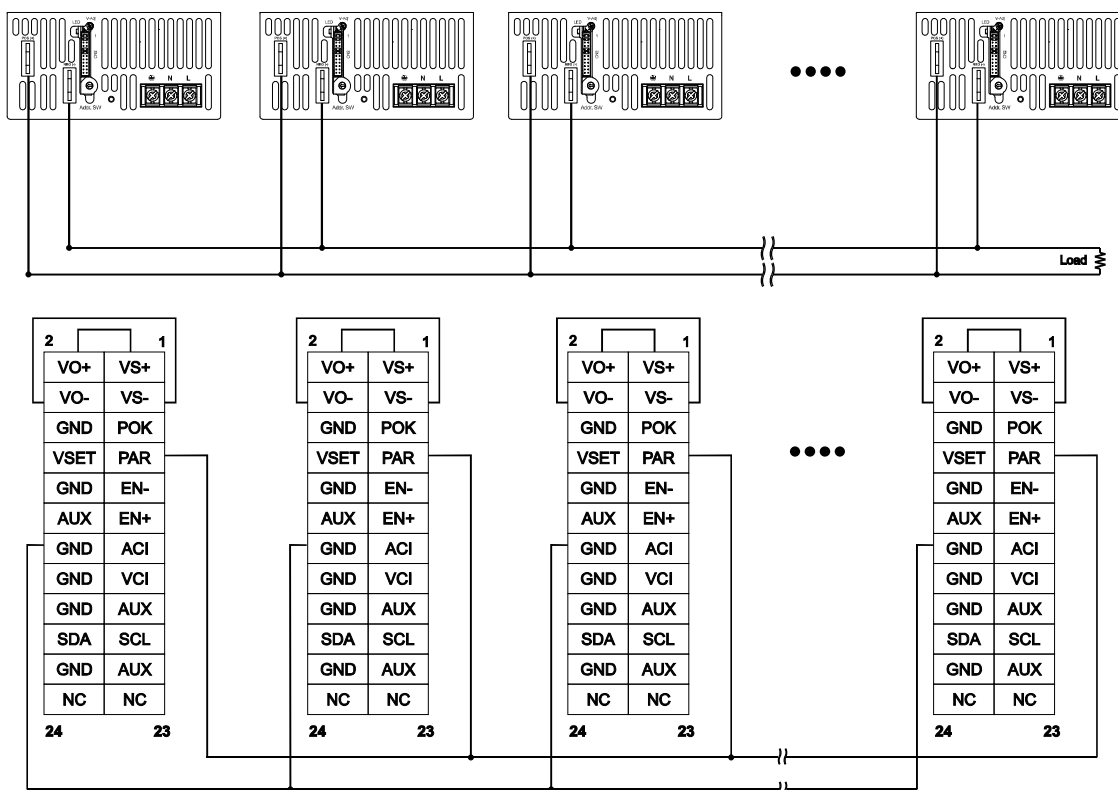


VS-,VS+ Compensation Voltage < 0.5V

### 3. Current Sharing with Remote Sensing(Parallel Connection)



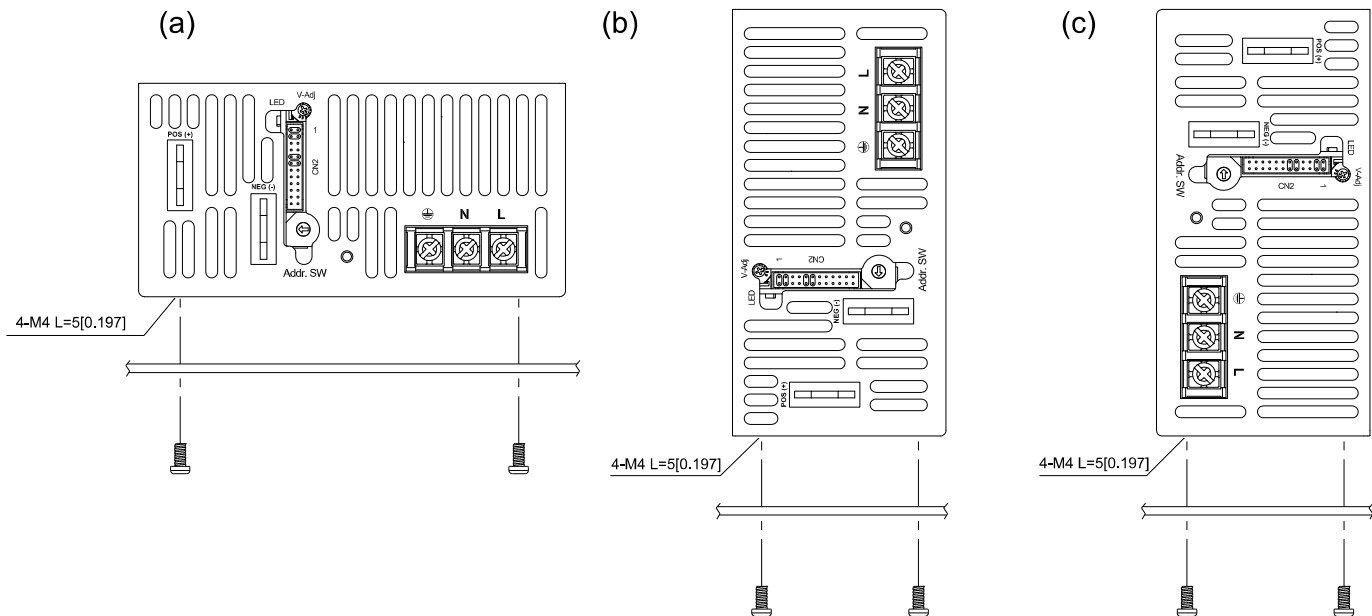
### 4. Current Sharing with Local Sensing



### Installation Instruction:

#### 1. Mounting Directions

1-1 Recommended standard mounting methods:



#### 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 Recommended the torque of mounting screw:  
M4 screw: 1.27N • m (13.0kgf • cm)

