# COTEK 3000W Programmable Single Output AEK-3000 HV Oring Diode

## Features:

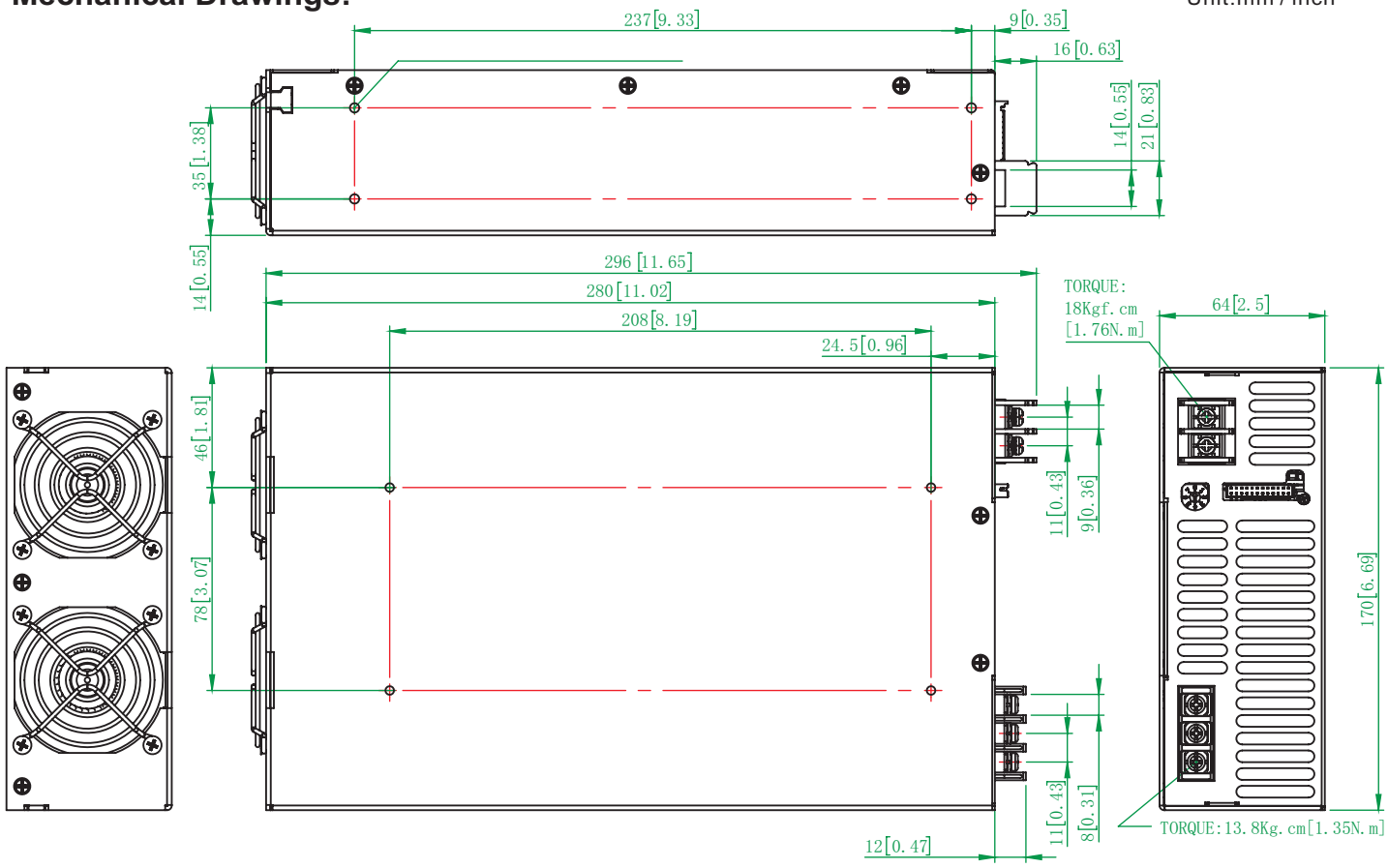
- Universal AC input / Full range
- Programmable output Voltage / Current (0% ~ 105%)
- Built-in active PFC Function & Oring Diode
  Built-in I²C and RS485 communication interface
- Constant current limit
- Forced current sharing at parallel operation (Refer to pg. 5 for connection diagram)
- Selectable +5V / 0.5A or +9V / 0.3A auxiliary output
- Global control via RS232 / RS485 protocol
- Remote setting multiple PSU via RS485 & I²C
- Power OK signal & Remote ON / OFF function
- Protection: OVP, OLP, OTP, SCP, Fan failure

IEC62368-1

| MODEL | | AEK-3000-150 Oring Diode | AEK-3000-200 Oring Diode | AEK-3000-250 Oring Diode | AEK-3000-300 Oring Diode | AEK-3000-400 Oring Diode |
|---|---|---|---|---|---|---|
| Output | DC Voltage Rated | 150V | 200V | 250V | 300V | 400V |
| | Rated Current | 20A | 15A | 12A | 10A | 7.5A |
| | Current Range | 0 ~ 20A | 0 ~ 15A | 0 ~ 12A | 0 ~ 10A | 0 ~ 7.5A |
| | Rated Power | 3000W | | | | |
| | Ripple & Noise (Max.) Note.2 | 1500mVp-p | 2000mVp-p | 2500mVp-p | 3000mVp-p | 4000mVp-p |
| | Voltage Adj. Range | ±5.0% Typical adjustment by potentiometer. (Via V-Adj from PSU front panel) | | | | |
| | Voltage Tolerance Note.3 | ±2.0% (rated output voltage of single unit) | | | | |
| | Current Tolerance | ±3.0% (rated output current of single unit) | | | | |
| | Line Regulation | ±1.0% | | | | |
| | Load Regulation | ±1.0% | | | | |
| | Setup, Rise Time | 1100ms, 350ms at full load | | | | |
| | Hold Up Time (Typ.) | 14ms / 230VAC at full load | | | | |
| Input | Voltage Range Note.4 | 90 ~ 264VAC, 127 ~ 370VDC (Refer to de-rating curve) | | | | |
| | Frequency Range | 47 ~ 63Hz | | | | |
| | Power Factor (Typ.) | 0.95 / 230VAC, 0.98 / 115VAC at full load | | | | |
| | Efficiency (Max.) | 91% | | | 92% | |
| | AC Current (Max.) | 19.7A / 115VAC (2000W), 14.5A / 230VAC (3000W) | | | | |
| | Inrush Current (Typ.) | 33A / 115VAC, 65A / 230VAC | | | | |
| | Leakage Current | < 3.5mA / 240VAC | | | | |
| Protection | Over Load | 105% rated output power | | | | |
| | | Protection type: Constant current limit | | | | |
| | Over Voltage | Variable OVP Refer to VCI VS OVP curve.(OVP Tolerance 7%) | | | | |
| | | 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 | | | | |
| 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 | | | | |
| | Communication Interface | Built-in RS485 and I²C. | | | | |
| | Communication Protocol | RS232, RS485 and I²C | | | | |
| Environment | Working Temp. | -20 ~ +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, 2G 10min. / 1cycle, period for 60min. each along X, Y, Z axes Compliance to IEC 60068-2-6, IEC 60068-2-64 | | | | |
| Safety & EMC | Safety Standards | Certified EN 62368-1; UL62368-1 | | | | |
| | 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 (25°C/70%PH) | | | | |
| | EMI Conduction Radiation | Certified EN 55032 | | | | |
| | Power Harmonic & Voltage Fluctuation and Flicker | Certified EN 61000-3-2; EN 61000-3-3 | | | | |
| | EMS Immunity | Certified EN 55024; IEC 61000-4-2,3,4,5,6,8,11 | | | | |
| Others | MTBF | 90.2K HRS Certified MIL-HDBK-217F | | | | |
| | Cooling | Load and temperature control fan | | | | |
| | Dimension (WxHxD) | 170x64x280 mm / 6.69x2.52x11.02 inch | | | | |
| | Packing | 3.3kg; 6pcs / 22.7kg / 2.48CUFT | | | | |
| Note | 1. All parameters NOT specially mentioned are measured at 230VAC input, rated load and 25°C of ambient temperature.<br>2. Ripple & noise are measured at 20MHz of bandwidth by using a 12" twisted pair-wire terminated with a 0.1uF & 47uF parallel capacitor.<br>3. Tolerance: includes setup time tolerance, line regulation and load regulation.<br>4. De-rating may apply in low input voltage. Please check the de-rating curve for more details.<br>5. In parallel connection only one unit will operate if the total output load is less than 5% of the rated power.<br>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<br>7. This test is done without enclosure: I/P-O/P 4242VDC. If with enclosure: I/P-O/P 2121VDC,I/P-FG:2121VDC, O/P-FG: 707VDC | | | | | |

## Mechanical Drawings:

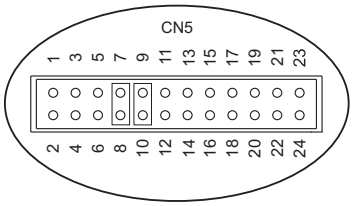
Unit:mm / inch




Note: Recommended screw length is measured from the power supply surface

AC Input Terminal Pin No. Assignment

| Pin No. | Assignment |
|---|---|
| L | ACL |
| N | ACN |
| ⏚ | ⏚ |




Control pin number assignment (CN5): JST S24B-PHDSS or equivalent

| Pin No. | Assignment | Pin No. | Assignment | Pin No. | Assignment | Mating Housing / Contact | |
|---|---|---|---|---|---|---|---|
| 1 | AUX | 9 | EN+ | 17 | NC. | JST PHDR-24VS or equivalent | JST SPHD-002T-P0.5 or equivalent |
| 2 | GND | 10 | AUX | 18 | NC. | | |
| 3 | POK | 11 | ACI | 19 | +5VC | | |
| 4 | GND | 12 | GND | 20 | GND1 | | |
| 5 | PAR | 13 | VCI | 21 | SCL | | |
| 6 | VSET | 14 | GND | 22 | SDA | | |
| 7 | EN- | 15 | AUX | 23 | DA- | | |
| 8 | GND | 16 | GND | 24 | DA+ | | |

## CN5 Function Description:

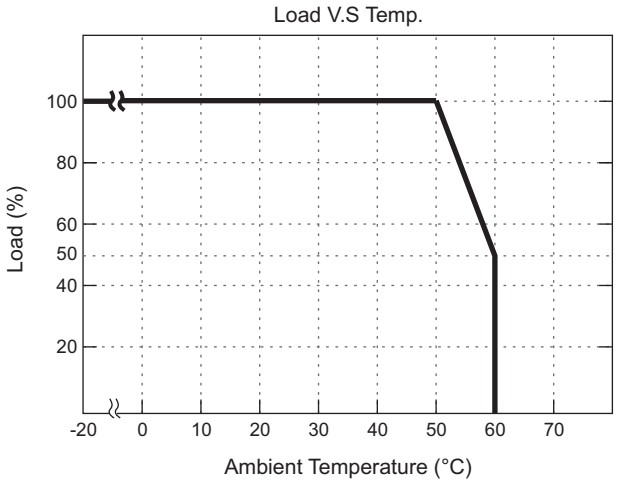
| Pin No. | Function | Description | Pin No. | Function | Description |
|---|---|---|---|---|---|
| 1 | AUX | +5V / 0.5A or +9V / 0.3A Auxiliary power | 13 | VCI | V Program |
| 2 | GND | Ground | 14 | GND | Ground |
| 3 | POK | Power OK | 15 | AUX | +5V / 0.5A or +9V / 0.3A Auxiliary power |
| 4 | GND | Ground | 16 | GND | Ground |
| 5 | PAR | Parallel operation current share | 17 | NC. | |
| 6 | VSET | Aux output setting | 18 | NC. | |
| 7 | EN- | Inhibit ON/OFF (-) | 19 | +5VC | +5V power supply ,needs to be used with GND1 |
| 8 | GND | Aux output setting | 20 | GND1 | Ground ,needs to be used with +5VC |
| 9 | EN+ | Inhibit ON/OFF (+) | 21 | SCL | Serial Clock for $I^2C$ interface |
| 10 | AUX | +5V / 0.5A or +9V / 0.3A Auxiliary power | 22 | SDA | Serial Data for $I^2C$ interface |
| 11 | ACI | I Program | 23 | DA- | For RS485 Data- Interface |
| 12 | GND | Ground | 24 | DA+ | For RS485 Data+ Interface |

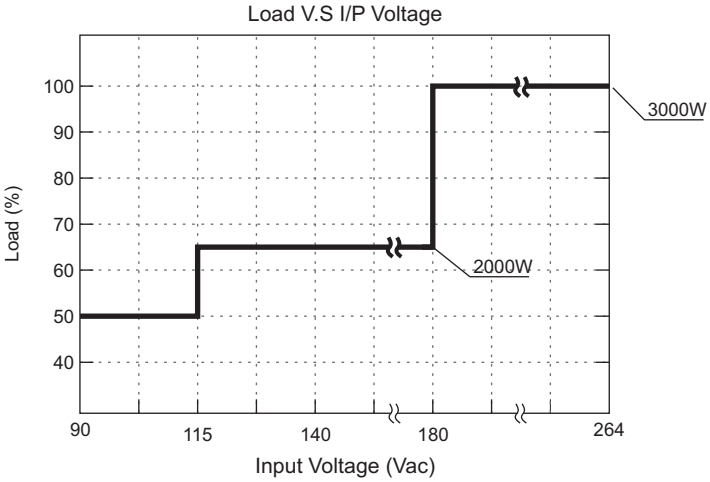
## LED Status:

| LED | LED Signal | Status |
|---|---|---|
| Solid(Green) | | Power OK (Local mode) |
| Solid(Orange) | | Power OK (Remote mode) |
| Slow Blink(Green) | | Power Standby (Local mode) |
| Slow Blink(Orange) | | Power Standby (Remote mode) |
| 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 |

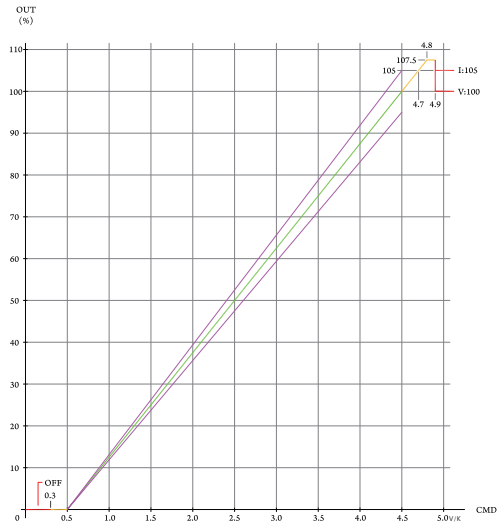
*Local mode : Use ACI/VCI to control output current and voltage.
Remote mode : Use RS-232/485 or $I^2C$ command to control output current and voltage.

## De-rating Curve:



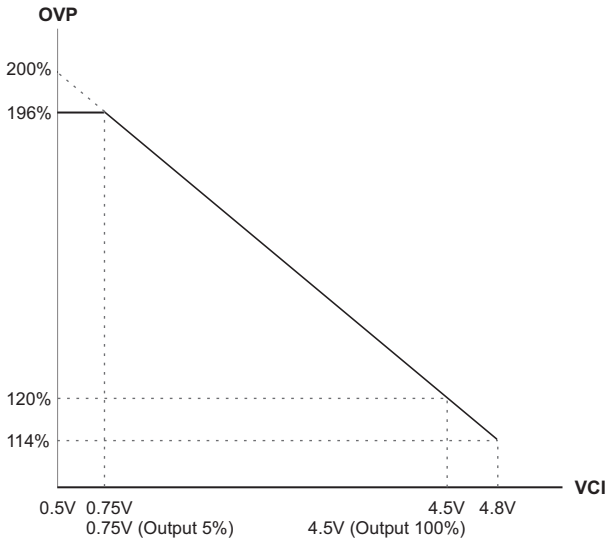



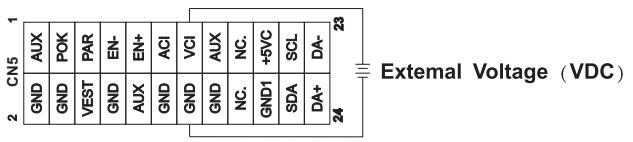

## CMD VS Output Curve:

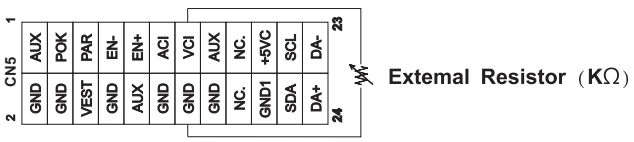


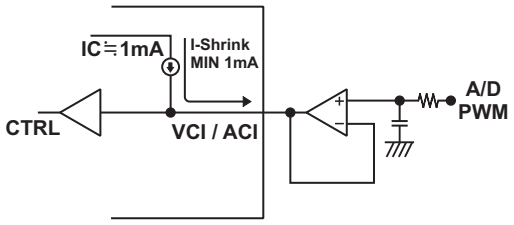

To ensure the power supply output voltage and current could be accurately adjusted, please make sure to adjust the output voltage and current > 10% vs. the rated voltage and current. (e.g. for a 300V unit, please adjust the DC output voltage above 30V to ensure accuracy; same applies to the output current)

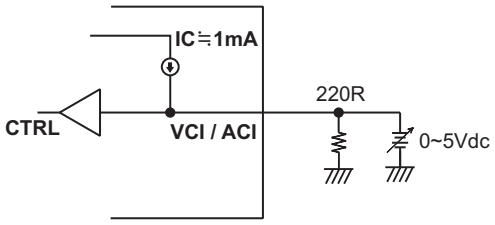
## VCI VS OVP Curve:

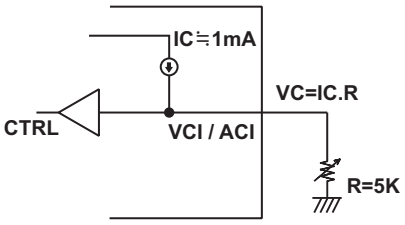


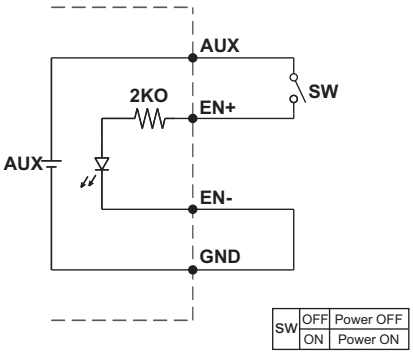



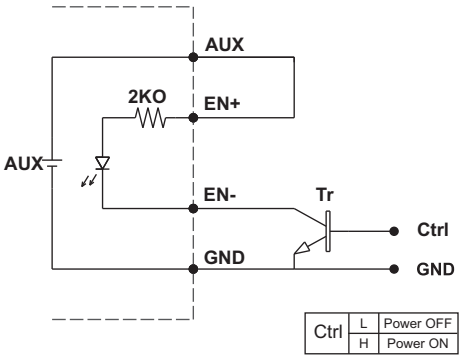
## Remote ON/OFF:

(A) Default Setting



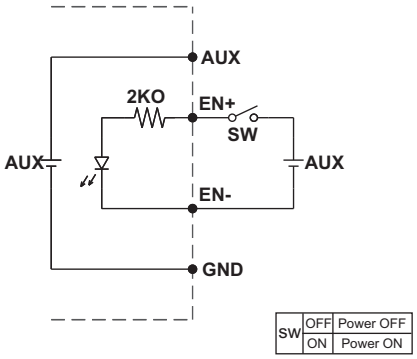

(A) Using internal 5V auxiliary source

(B)




(B) ON / OFF Control by NPN transistor

(C)



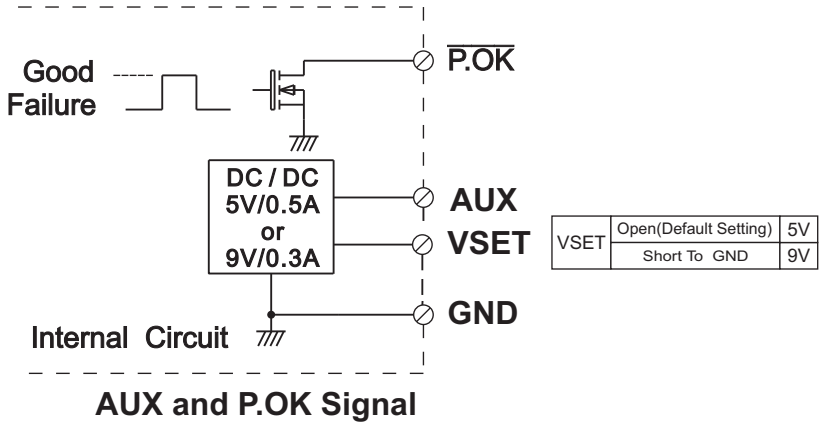

(C) Using external voltage source

*GND shown in above diagram is referring to the GND of CN5, 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.

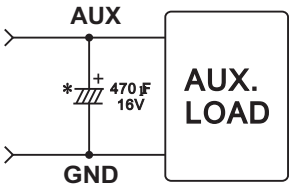
Open drain signal low when PSU turns on, Max. P.OK sink current: 20mA, Max. drain voltage: 40V.




AUX and P.OK Signal

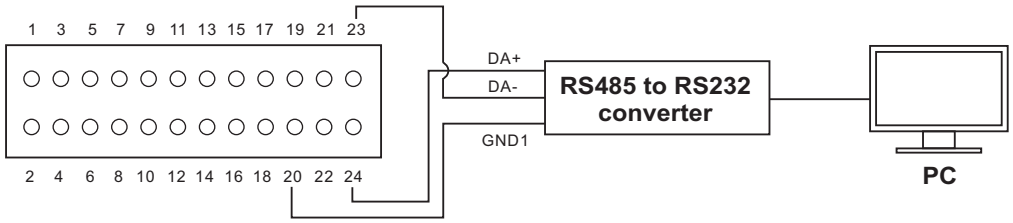
*GND shown in above diagram is referring to the GND of CN5, not the Grounding from main power(NEG-).*

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



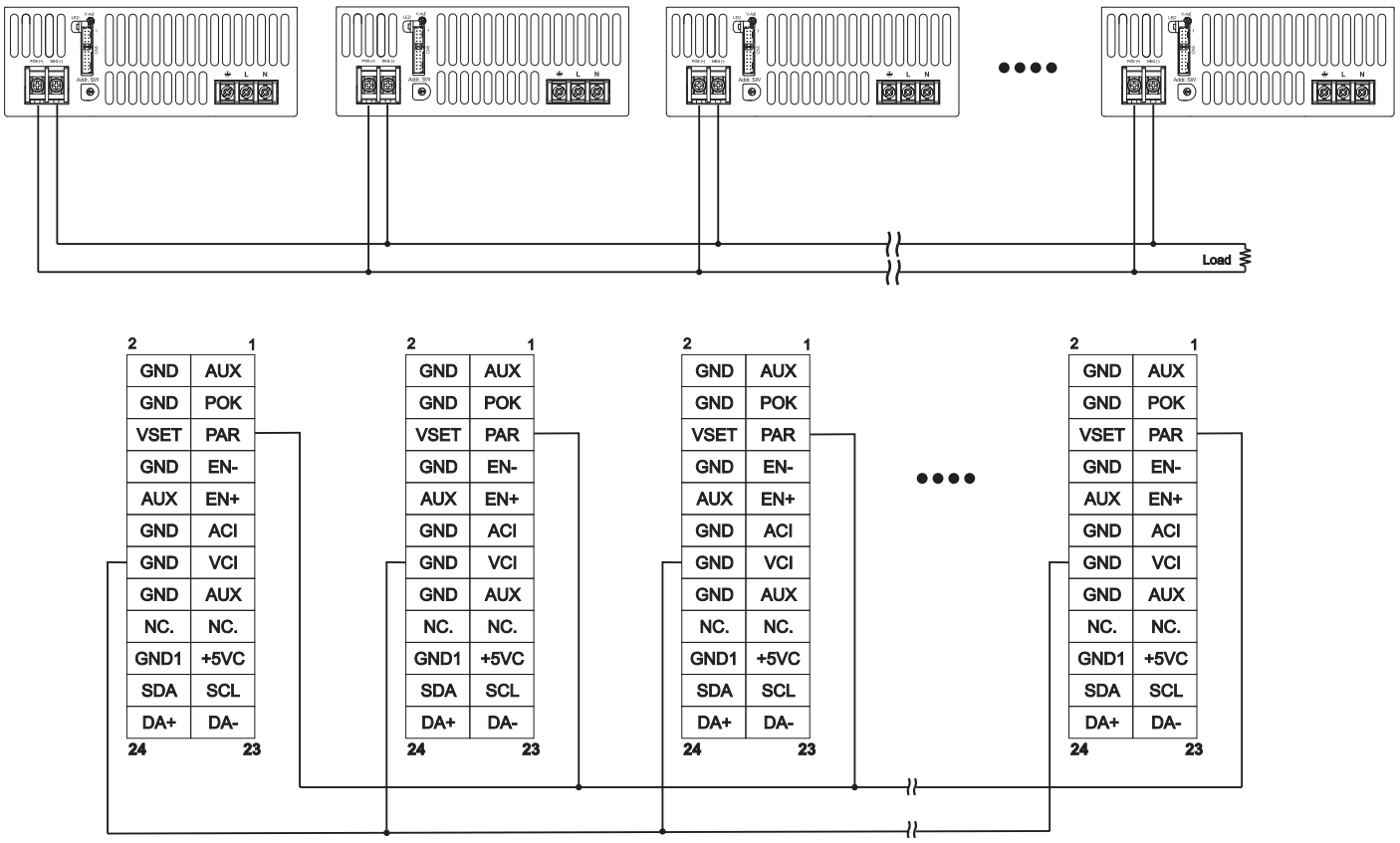

Do NOT exceed 5V/0.5A or 9V/0.3A

## RS485 communication connection diagram




Note: Make sure GND1 (pin 20) is connected to the external communication kit when using RS485 / $I^2C$

1. Current Sharing




Remarks:

1. AEK-3000-HV Oring diode has the built-in active current sharing function to support max. of 8pcs connected in parallel condition to support higher output power. When performing parallel connection, make sure to note the followings:
   a. Please connect PAR pins together for current sharing function
   b. Among the parallel connection units, output voltage difference of each PSU should be <0.2VDC (This can be set via V-adj from the PSU front panel VR)
   c. Total output current must not exceed 90% of the rated power in parallel condition
      Maximum output current at parallel condition = rated current per unit x number of unit x 0.9
   d. To ensure current share balance, output current of each unit must be >10% vs. the rated output current

2. For Series connection, please find some of the remarks as follow:
   a. Max. units for series connection is 2pcs
   b. Total output current must not exceed 90% of the rated power in series condition
      maximum output current at series condition = rated current per unit x 0.9
   c. Make sure to isolate all the signals from CN5, except $I^2C$/RS485, Pin 19, 20 and +5VC

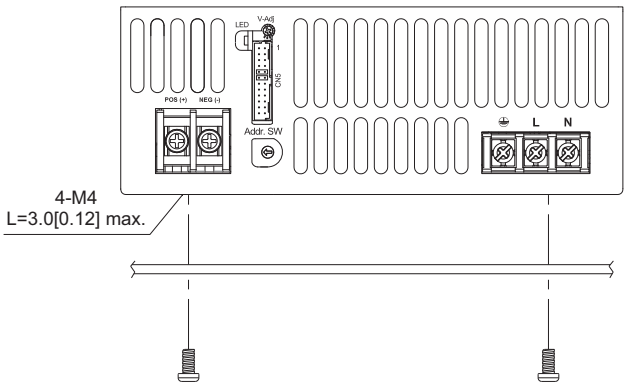
## Installation Instruction:

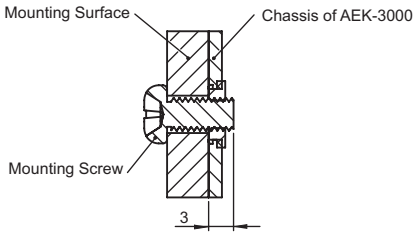
1. Mounting Directions

1-1 Recommended standard mounting methods:

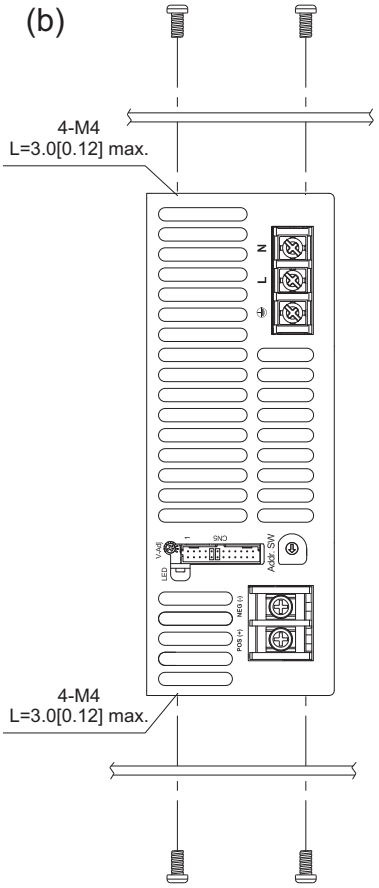
Unit: mm [inch]

(a)

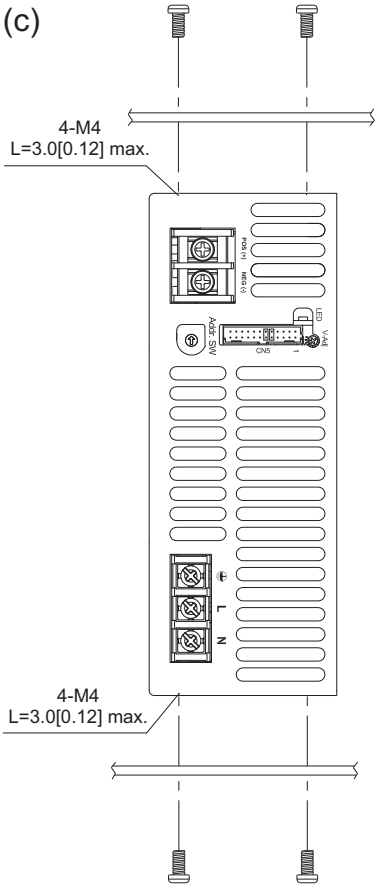



(b)




(c)




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 3mm. Incomplete threading should not be penetrated.

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