

P R B X

POWERBOX Defense Line
ECDA Series
Single output
AC/DC Baseplate power supply

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1. Assembling and Installation method

1.1 Mounting method

ECDA series shall be mounted to a heatsink or structure which has sufficient thermal capacity to cool the power supply.

The unit has 12 of 4.5mm diameter mounting holes, to keep uniform thermal conductivity.

A thermal interface material such as a thermal pad or thermal grease shall be used to ensure proper cooling of the unit.

1.2 Installation to fulfil EMC requirement

Input cables should be twisted and placed as close to the metal enclosure as possible.

Output cables of positive (+) and negative (-) should be twisted and shall be separated from input cables as much as possible.

When function pins are connected to a user accessible point (i.e., panel switch, indicator circuit etc.), these must be protected from electrostatic discharging.

2. Temperature operating area

For reliable and safe operation, follow the temperature operating area shown in Fig. 2.1. The measurement point of baseplate is shown in Fig. 2.2. The baseplate temperature must be kept below 75°C. The curve is set based on 3-years life expectancy.

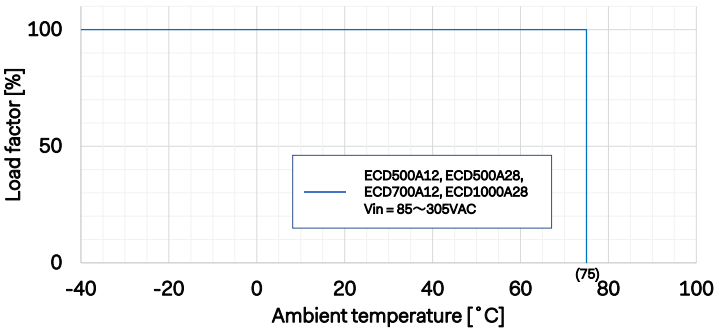


Fig. 2.1 Temperature operating area

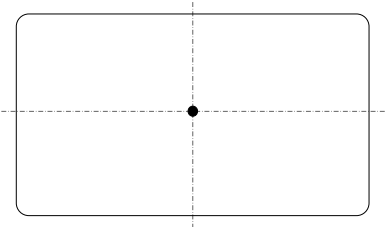


Fig. 2.2 Measurement point of baseplate (Bottom view)

3. Pin assignment of connector

The pin assignment and the mating connectors are shown in Fig.3.1.

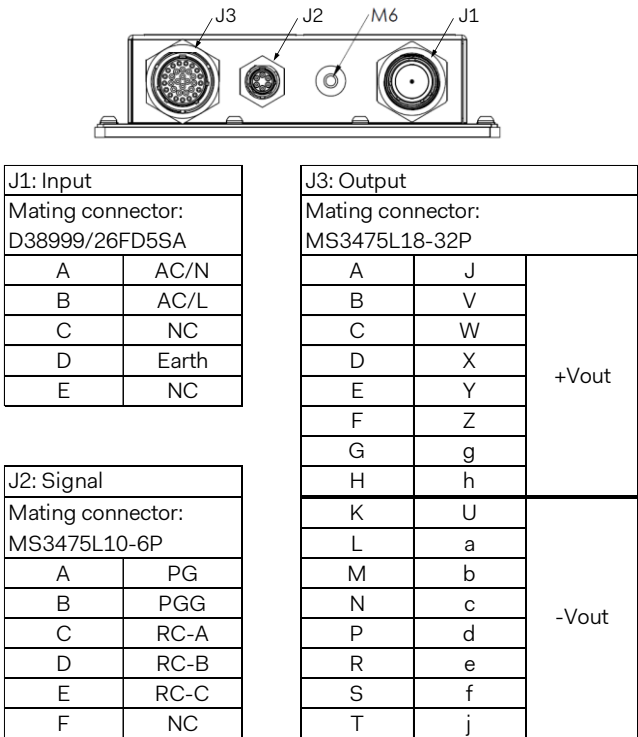


Fig.3.1 Pin assignment and the mating connectors

4. Series Operation

Series operation is possible by connecting the output of two or more power supplies as shown in Fig. 4.1.

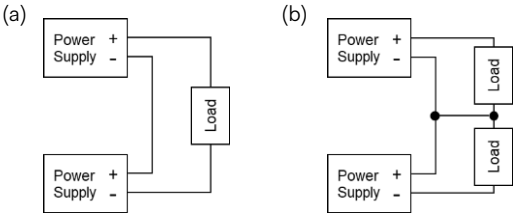


Fig. 4.1 Example of Series operation

Output current in series connection should be lower than the lowest rated current in each unit.

When one of unit's output becomes short circuit in series operation, high voltage may be applied to rest of units. To avoid further damages, consider adding a protection method that immediately stops operation.

Make sure that the combined total output voltage is less than 120VDC.

5. Functions

5.1 Input voltage range

The unit operates with an input voltage range between 85 - 305 VAC.
The voltage range for a valid safety assessment is 100 - 277 VAC (50/60Hz).

Warning:

- Be aware that use of voltages other than those listed above may result in the unit not operating according to specifications or may cause damage or dangerous situations. Avoid square waveform input voltage, commonly used in UPS and inverters.

5.2 Inrush current limiting

There is a built-in inrush current limiting circuit.

When a switch is needed on the input side, select one that can withstand the input inrush current.

The thyristor technique is used in the inrush current limiting circuit. Avoid repeatedly turning the power ON/OFF within a short period of time, operates the inrush current limiting becomes inoperative.

5.3 Over current protection

The over current protection is built in and activated when drawing over 105% of the rated current.

The over current protection protects the unit from short circuit and over current condition. The unit automatically recovers when the fault condition is cleared.

5.4 Over voltage protection

The over voltage protection is built in and activated when excess over voltage appears on the output and shuts down the output.

When the over voltage protection is activated, shut down the input voltage, wait 10 seconds or more, then turn on the AC input again to recover the output voltage.

Warning:

- Note that devices inside the unit might fail if the voltage higher than the rated output voltage is applied to the output terminal. This could happen during routine test of the over voltage performance in an application.

5.5 Thermal protection

When the baseplate temperature exceeds 100°C, thermal protection will be activated and shut down the output.

When the thermal protection is activated, turn off the input voltage and eliminate all the overheating conditions. To recover the output voltage, let the unit cool down before turning on the input voltage again.

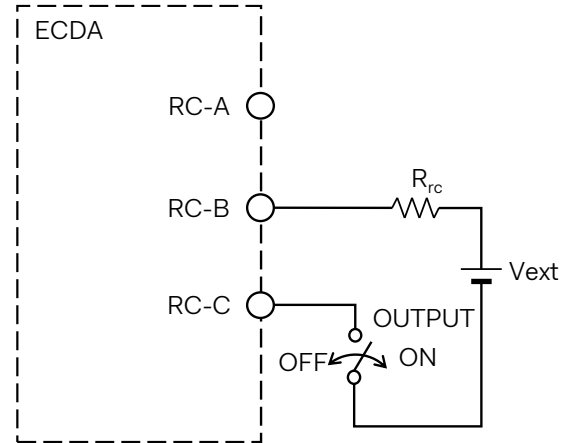
5.6 Remote ON/OFF

The unit has a built functionality for remote ON/OFF operations. Remote ON/OFF is operated by switch or applying a voltage to RC-A, RC-B and RC-C terminals.

When the output shuts off by the over voltage protection or thermal protection, it can be recovered by toggling Remote ON/OFF signal.

There are several possible configurations for the remote-control

connection. The remote control circuit is internally connected to -Vo. Fig. 5.1 and Fig. 5.2 show examples of remote control method, and Table 5.1 shows the operation of remote control function.



External resistor R_{rc} value shall be decided by following formula.

$$\frac{V_{ext}[V]-1.4}{2[mA]} - 150[\Omega] > R_{rc}[\Omega] > \frac{V_{ext}[V]-0.9}{12[mA]} - 150[\Omega]$$

Fig. 5.1 Example of connecting remote controlling 1

Warning:

- Be careful not to connect RC-B and RC-C opposite when applying voltage. It may cause a failure of unit.
- The sink current of RC-B must be kept below 12mA.

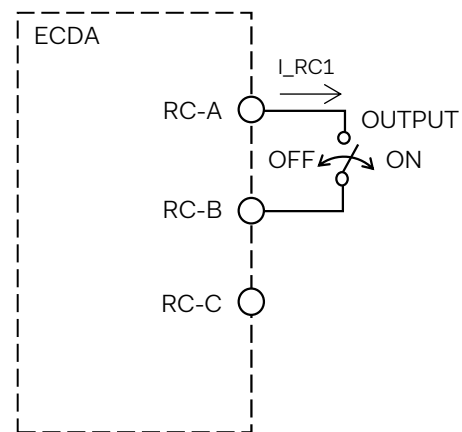


Fig. 5.2 Example of connecting remote controlling 2

In the case of this connection example, the control current (I_{RC1}) flows up to 3.5mA.

Table 5.1 Operation of remote control circuit

No.	Item	Connection	
1	Figure	Fig. 5.1	Fig. 5.2
2	Output ON	SW OPEN (0.1mA max)	
3	Output OFF	SW CLOSE (2mA min)	

5.7 Power good (PG)

By using power good signal (PG), it is possible to monitor the unit whether normal operation or abnormal operation. The PG signal is "Low" when the unit operates correctly. The signal turns to "High" when the unit stops.

The PG circuit is designed as shown in Fig. 5.3. The sink current of PG is 1mA max.

PG and PGG are isolated from input, output, FG, and RC.

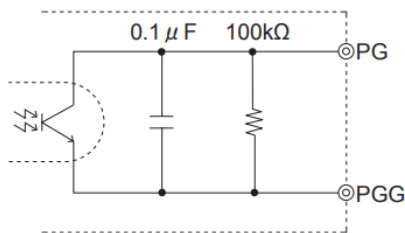


Fig. 5.3 Internal circuit of PG

The details of PG signal are shown in Table 5.2 and Fig. 5.4.

Table 5.2 Specification of PG

No.	Item	PG
1	Function	Normal operation "Low" The unit stops "High"
2	Reference pin	PGG
3	Level voltage "L"	0.5V max at 1mA
4	Level voltage "H"	Open collector
5	Maximum sink current	1mA max
6	Maximum applied voltage	50V max

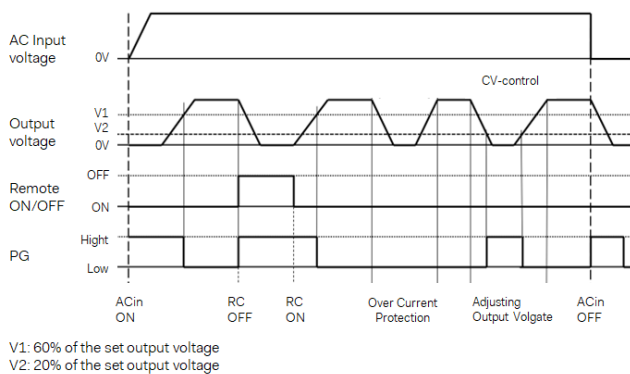


Fig. 5.4 PG signal sequence

5.8 Other functions

Optional features available on request, please contact us for more information. Following features can be made available.

- Remote sense
- Voltage adjustment
- Adjustable constant current limit
- Parallel operation

6. Warranty

Warranty term is 3 years.

7. 400Hz input frequency operation

The unit can operate under 400Hz input frequency. The differences on the specification between 50/60Hz and 400Hz are shown below.

(a) Input voltage range

The input voltage range is changed at 400Hz input frequency as shown below.

Input frequency	Input voltage range
50/60Hz	85-305VAC
400Hz	85-200VAC

WARNING:

- Internal components may be damaged when a voltage of more than 200VAC is applied at 400Hz input frequency.

(b) Maximum output power

The maximum output power is changed at 400Hz input frequency as shown below.

Part number	Input frequency	Output power
ECD1000A28	50/60Hz	1008W
ECD1000A28	400Hz	896W

WARNING:

- When the output power becomes more than 900W at 400Hz input frequency, the unit may not start especially less than 90VAC.
- The over current protection setting remains at the same value between 50/60Hz and 400Hz.