

P R B X

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

Table of Contents

1.	Assembling and Installation method	1
1.1	Mounting method	1
1.2	Installation to fulfil EMC requirement.....	1
2.	Temperature operating area	2
3.	Pin assignment of connector	2
4.	Series Operation	2
5.	Functions	3
5.1	Input voltage range	3
5.2	Inrush current limiting	3
5.3	Over current protection.....	3
5.4	Over voltage protection.....	3
5.5	Thermal protection	3
5.6	Remote ON/OFF	3
5.7	Power good (PG)	4
5.8	Other functions.....	5
6.	Warranty.....	5
7.	400Hz input frequency operation	5

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.

ECDA 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.

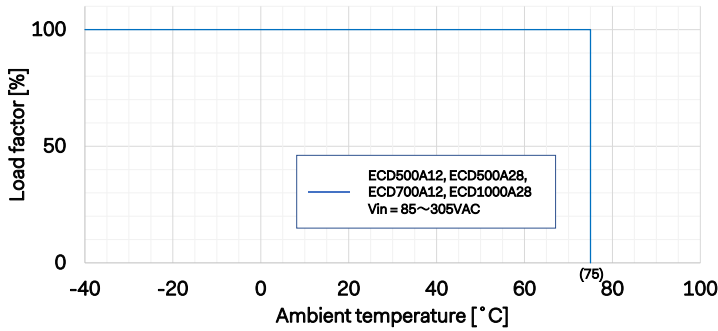


Fig. 2.1 Temperature operating area

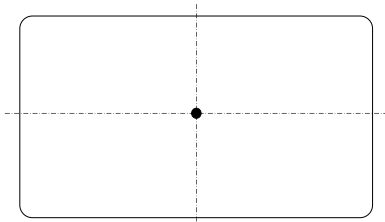
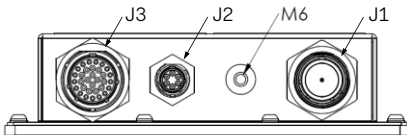


Fig. 2.2 Measurement point of baseplate (Bottom view)

3. Pin assignment of connector

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



J1: Input		J3: Output		
Mating connector: D38999/26FD5SA		Mating connector: MS3475L18-32P		
A	AC/N	A	J	+Vout
B	AC/L	B	V	
C	NC	C	W	
D	Earth	D	X	
E	NC	E	Y	
		F	Z	
		G	g	
J2: Signal		H	h	-Vout
Mating connector: MS3475L10-6P		K	U	
A	RC-A	L	a	
B	RC-B	M	b	
C	RC-C	N	c	
D	PG	P	d	
E	PGG	R	e	
F	NC	S	f	
		T	j	

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.

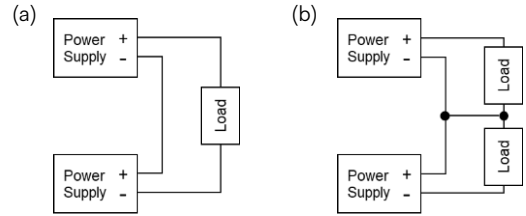


Fig. 4.1 Example of Series operation

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.

If 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 comes into effect when drawing over 105% of the rated current.

The over current protection prevents 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 circuit is built in. If the over voltage protection circuit is activated, shut down the input voltage, wait 10 seconds or more and turn on the AC input again to recover the output voltage.

Warning:

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

5.5 Thermal protection

When the baseplate temperature exceeds around 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

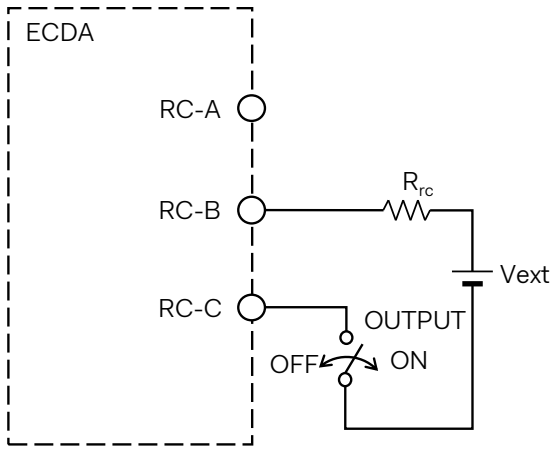
The unit has a built functionality for remote ON/OFF operations. Remote ON/OFF is operated by switch or applying a voltage to RC-A, RC-B and RC-C terminals.

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-controlling connection. The isolation between the RC circuit and any other is dependent. Details are shown in Table 5.1 and Fig. 5.2.

Table 5.1 Remote-controlling connection

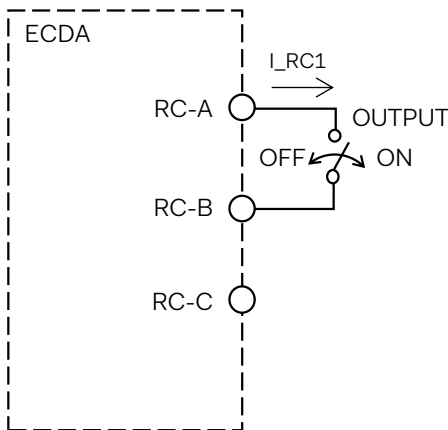
No.	Item	Connection	
1	Figure	Fig. 5.1	Fig. 5.2
2	Isolation in between	INPUT - RC	INPUT - RC
3	Reference pin	RC-C	RC-B
4	Output ON	SW OPEN (0.1mA max)	
5	Output OFF	SW SHORT (2mA min)	



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



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

Fig. 5.2 Example of connecting remote controlling 2

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.

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.

The circuit of the PG (PG, PGG) is isolated from input, output, FG, and various function terminals.

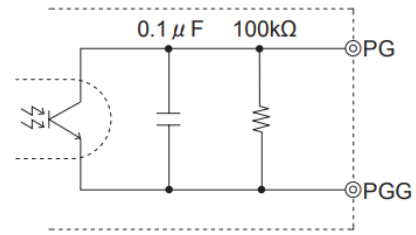


Fig. 5.3 Internal circuit of PG

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	Base 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

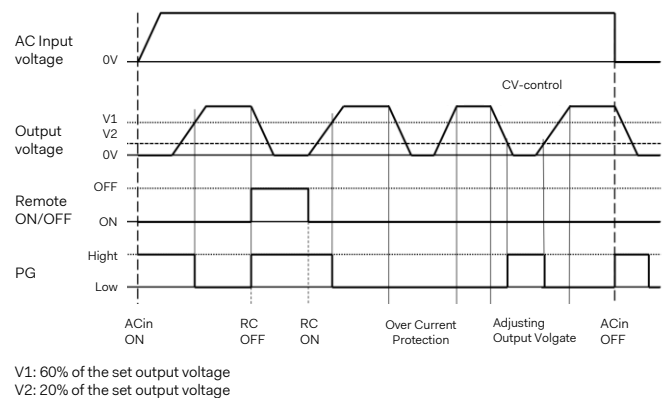


Fig. 5.4 PG signal sequence

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 limited by 400Hz input frequency.

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 under 400Hz input frequency.

(b) Maximum output power

The maximum output power for ECD1000A28 is limited by 400Hz input frequency.

Model Number	Input Frequency	Maximum Output power
ECD1000A28	50/60Hz	1008W
ECD1000A28	400Hz	896W

WARNING:

- When the output power is loaded more than 900W under 400Hz input frequency, the unit may not start especially less than 90VAC.
- The output current trigger of the over-current protection stays the same between 50/60Hz and 400Hz.