



## **300 SERIES 19" Rack Mount 3RU** **Eurocard Modular DC-DC CONVERTER**



### **DESCRIPTION**

The Benbro 300 Series converters are a range of high efficiency DC/DC Converter modules developed by Benbro for high reliability applications including communication systems, solar installations, process control, industrial electronics, railway rolling stock and mine applications. Up to 6 units (1.8kW) can be housed in a single 3RU 19" subrack enclosure.

The DC-DC Converter converts a single primary DC Voltage to the required single output Voltage.

Nominal inputs available are 110VDC, 48VDC, 24VDC or 12VDC. Nominal outputs available are 12VDC, 24VDC or 48VDC.

The input and output are fully isolated; this enables connection of input and output polarity (earthing/common) as required.

The equipment is housed in a rugged 19" 3RU rack mounting enclosure with the input and output terminals on the rear and the indicators on the front panel.

## **FEATURES**

- ✓ Rugged 19" 3RU rack mount enclosure. (6 units per rack).
- ✓ Flexible modular construction.
- ✓ Keyed to prevent insertion of incorrect Voltage module
- ✓ Input, output, over/under voltage (alarm) LED indicator.
- ✓ Under voltage/over voltage output alarm. Voltage free contacts.
- ✓ Auto resetting over voltage shutdown
- ✓ Over current and short circuit protection.
- ✓ Fully isolated input to output.
- ✓ Hot swappable.
- ✓ Output Voltage and current monitor module available.
- ✓ Distribution module available (up to 5 circuit breakers)

## **FUNCTION**



The equipment is protected against input reverse polarity by a diode across the input, which causes an internal fuse to trip.

The equipment is fitted with both common mode and differential mode input and output filter to minimise EMI emissions that are produced by switch mode operation.

The switching converter is a current mode. Push Pull configuration operating at approximately 50 kHz.

The output voltage is monitored by the supervisory circuit, which regulates the output voltage and activates converter shutdown and alarm for over voltage and activates the alarm for under voltage conditions.

The alarm outputs are Voltage free relay contacts that can be configured for normally closed (open on alarm) or normally open (close on alarm).

The primary current is monitored by a current transformer, which activates pulse by pulse current limiting in the case of an over current condition (constant current) and shuts down the converter in the case of a short circuit.

A thermistor is fitted to the heatsink which shuts down the converter if the temperature exceeds the thermal threshold. Indicators display the status of input voltage, output voltage, over/under voltage (alarm) conditions.

The output is fitted with an isolation schottky diode enabling 2 or more converters to be connected in parallels for load sharing or redundancy applications.

The system is modular and individual modules plug into a 3RU subrack frame allowing maximum flexibility. Single or dual input and single and dual output systems can be easily configured as well as polarity change between input and output.

## **OPTIONS**

### **Output monitor (Uses 1 converter space)**

Monitors and displays the output Voltage and current and provides auxiliary alarm inputs as well as 3 Voltage free alarm contact outputs and an audible alarm indication and an alarm LED.

### **Load distribution (Uses 2 converter spaces)**

Up to 5 circuit breakers with a C/B fail output for the monitor (if fitted).

### **Connector interface PCB**

Extends the alarm and I/O connectors to external screw terminals or to Krone connectors (useful for front connection applications).

### **3 way backplane PCB**

Facilitates dual input Voltage and/or dual output Voltage option eg 3x48V-24Vconverters can be fitted as well as 3x48V-12V converters within the same subrack housing saving rack space. Current shunt is included on PCB

### **4 way backplane PCB**

Useful when load distribution module is used to allow for 4 converters or 3 converters and monitor (Pictured). Current shunt is included on PCB.

### **Blanking panels**

Covers unused positions.

## SPECIFICATIONS

### ELECTRICAL

<u>Input Voltage</u>	<u>Range</u>	<u>Output Voltage</u>	<u>Range</u>	<u>Output current</u>	<u>Output Power</u>	<u>Efficiency</u>
<b>110VDC</b>	80-130VDC	<b>48VDC</b>	44-56VDC	6.25 Amps	<b>300W</b>	>85% (typ 90%)
<b>110VDC</b>	80-130VDC	<b>24VDC</b>	23-29VDC	12.5 Amps	<b>300W</b>	>85% (typ 90%)
<b>110VDC</b>	80-130VDC	<b>12VDC</b>	12-15VDC	18 Amps	<b>250W</b>	>80% (typ 85%)
<b>48VDC</b>	42-63VDC	<b>48VDC</b>	44-56VDC	6.25 Amps	<b>300W</b>	>85% (typ 90%)
<b>48VDC</b>	42-63VDC	<b>24VDC</b>	23-29VDC	12.5 Amps	<b>300W</b>	>85% (typ 90%)
<b>48VDC</b>	42-63VDC	<b>12VDC</b>	12-15VDC	18 Amps	<b>250W</b>	>80% (typ 85%)
<b>24VDC</b>	21-30VDC	<b>48VDC</b>	44-56VDC	6.25 Amps	<b>300W</b>	>85% (typ 88%)
<b>24VDC</b>	21-30VDC	<b>24VDC</b>	23-29VDC	12.5 Amps	<b>300W</b>	>85% (typ 88%)
<b>24VDC</b>	21-30VDC	<b>12VDC</b>	12-15VDC	18 Amps	<b>250W</b>	>80% (typ 85%)
<b>12VDC</b>	10.5-20VDC	<b>48VDC</b>	44-56VDC	4 Amps	<b>200W</b>	>80% (typ 85%)
<b>12VDC</b>	10.5-20VDC	<b>24VDC</b>	23-29VDC	8 Amps	<b>200W</b>	>80% (typ 85%)
<b>12VDC</b>	10.5-20VDC	<b>12VDC</b>	12-15VDC	12 Amps	<b>200W</b>	>80% (typ 85%)

Line regulation	<+/-0.02%
Load regulation	<+/-0.5%
Output ripple	<1mV RMS
Output noise	<+/-20mV
Current limit	set between 100-115% as required
Over voltage alarm/shutdown	shutdown set at 120%
Under voltage alarm	set at approx. 80%
Redundant operation	Output diode option for N+1 applications
Isolation	1kVDC (5kV available for some models)
Indicators	Input Voltage, under/over Voltage (alarm), output Voltage

### PROTECTION

Output over Voltage	over Voltage shutdown
Output short circuit	short circuit shutdown
Input over current	input fuse fitted
Input polarity	reverse voltage protection
Thermal	over temperature shutdown

### MECHANICAL

Dimensions (Converter)	H: 128mm D: 250mm W: 65.5mm (13HP)
Dimensions (Subrack frame)	H: 133mm D: 275mm W: 483mm
Construction	13HP Eurocard format.
Cooling	convection

### ENVIRONMENTAL

EMC	AS3548, CISPR 22 Class B
Operating temperature	0-55°C