BCC Series Application Note

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1. Basic Installation

The BCC series of power supplies need to be mounted on a suitable flat surface which is capable of removing the dissipated heat. It should be fixed down using the ten mounting holes in the base flanges. These are designed to accommodate M4 or similar screws which should have a spring and flat washer under the head.

The BCC will accept a wide range of AC input voltages through the AMP "Mat'n'lok" style input connector. This input lead must be earthed as it is a class 1 product needing a safety earth.

M6 studs are used to connect the power supply output with suitable ring or fork terminals. Two 0.1" Molex style headers provide the signal interface for remote sense, inhibit and parallelling controls. A connector kit is available, order part BCC CONN KIT. To set the remote sense facility to monitor the output terminal studs, set the switches to 1&2 off ie towards the end of the power supply and 3&4 on ie. towards the cover.

Once powered up correctly and operating, a green LED will illuminate to indicate DCOK.

2. Output Connections

The main output is connected via two M6 captive studs for use with suitable ring terminals for the cable to be used. These ring terminals should be retained by using the supplied plain and spring washers under the nut. The nut should be torqued down to 3Nm and care should be taken to avoid damaging any surrounding components on the power supply PCB.

All auxiliary connections are on a pair of 0.1" Molex headers. These can mate with crimp or IDC style housings to provide the signal interface.

3. Thermal Considerations

BCC power supplies rely on intimate thermal contact between the bottom of the baseplate and the host surface. A method of reducing this thermal interface resistance should be used such as either heatsink paste or a suitable pad which is available, order part BCC THERM.

The mounting surface should be flat and true to within 0.25mm across the unit and 0.5mm along the length. A standard extrusion should be capable of meeting this but if there is any doubt then the surface should be milled flat.

The BCC series will start and operate to -20°C as a standard with an option to specify a -40°C if required. Between -20 and 0°C, the output ripple will be slightly higher than specified.

Providing the baseplate is kept below 83°C by conduction cooling into the host surface, the BCC units may be operated at ambient temperatures up to 70°C. The baseplate temperature needs to be measured and confirmed in the application by monitoring the temperature reached at point halfway along the baseplate on both sides. At full output power, the host chassis or heatsink will need to draw 100W away from the BCC whilst keeping the baseplate below 83°C.

4. Protection Circuits

Overvoltage Protection

If the power supply detects a voltage on its output which is higher than the specified level, then the over voltage protection (OVP) circuitry will operate. This will shut down the internal power conversion but will not crowbar the output. If an external voltage is applied to the output it may cause internal damage if it is greater than the rated value.

OVP will shut down the power supply in a way that needs the AC input removed to be reset. Disconnect the AC input and wait five minutes before reapplying the power. Check the output trim circuit has not been adjusted too high so as to put the power supply into OVP.

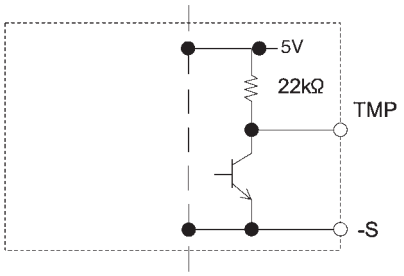
Overcurrent Protection

A overload on the output will cause the overcurrent circuit to limit the available current to a value of 105-140% (3.3 V model 130-166%) of nominal rating. This is an automatic circuit and will recover once the overload is removed. The power supply has a constant current limit irrespective of the voltage the output is trimmed to.

To reduce stresses on the power supply when in overload, the average current is reduced by pulsing the output.

Thermal Protection

An internal device monitors the baseplate temperature to give a warning of potential overheat conditions. This "temp" signal is available on the Molex header and changes from about 5V through a 22k resistor down to less than 0.5V at 5mA to indicate overheating. If overheating continues after the temp signal is asserted, the output will be shutdown to protect the power supply.



No.	Item	TMP
1	Function	Normal “H” Overheat “L”
2	Base pin	-S
3	Level Voltage “L”	0.5V max at 5mA
4	Level Voltage “H”	5V typ
5	Maximum Sink Current	10mA max
6	Maximum Applicable Voltage	35V max

It should be noted that this is a protection circuit and should not be relied on to correct a poor heatsinking arrangement. Once the thermal shutdown has operated, the AC input will need to be removed, allow the chassis to cool down and then reapply the AC supply.

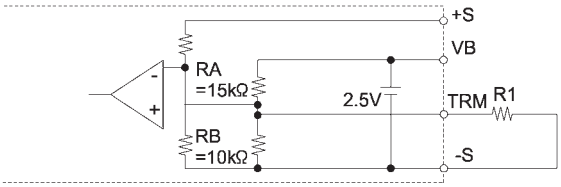
5. Adjusting the Output Voltage

The output voltage is adjusted by either a onboard potentiometer or by an external voltage. The potentiometer is marked with "VSET" and will alter the output up by 10% and down by about 60% adjustment.

It is possible to override this by applying a voltage to the trim pin on the Molex header. Nominal output is achieved with 1.0V on this pin relative to –sense and by altering this it is possible to change the output of the power supply proportionately. Note that this voltage must be stable and low noise and must not exceed 1.1V.

External Adjustment
Decreasing Output Voltage with fixed Resistors

By connecting the external resistor (R1) more than 1/10 W, output voltage becomes adjustable to decrease as shown in Fig.1.6.1.



Output voltage is calculated by the following equation

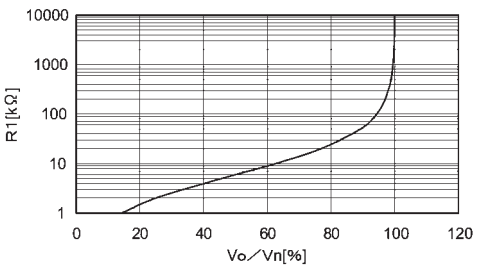
Vn: Rated output voltage
Vo: Desire output voltage

$$R1\ (k\Omega) = \frac{Vo}{Vn - Vo} \times 6.0$$

Example Vn = 5.0 (V) Vo = 4.5 (V)

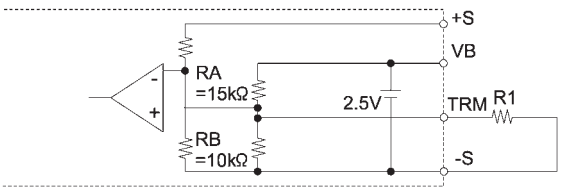
$$R1\ (k\Omega) = \frac{4.5}{5.0 - 4.5} \times 6.0$$

$$= 54\ (k\Omega)$$



Increasing Output Voltage with fixed Resistors

By connecting the external resistor (R1) more than 1/10 W, output voltage becomes adjustable to increase as shown in Fig.1.6.3.

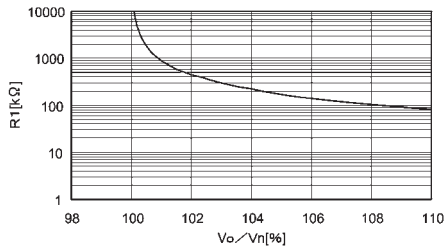


Output voltage is calculated by the following equation.

Vn: Rated output voltage Vo: Desire output voltage
Example Vn = 5.0 (V) Vo = 5.5 (V)
= 84 (kΩ)

$$R1\ (k\Omega) = \frac{2.5Vn - Vo}{Vo - Vn} \times 6.0$$

$$R1\ (k\Omega) = \frac{2.5 \times 5.0 - 5.5}{5.5 - 5.0} \times 6.0$$



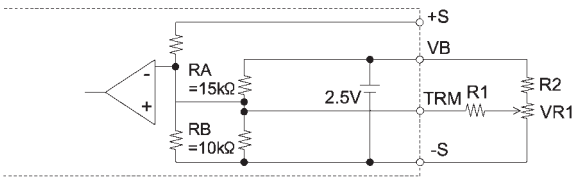
Output Voltage Adjustment Using External Potentiometer

By connecting the external potentiometer (VR1) and resistors (R1, R2) more than 1/10W, output voltage becomes adjustable, as shown in Fig.1.6.5, recommended external parts are shown in Table 1.6.1.

The wiring to the potentiometer should be as short as possible. The temperature coefficient becomes worse, depending on the type of a resistor and potentiometer. Following parts are recommended for the power supply.

Resistor — Metal film type, coefficient of less than±100ppm/°C

Potentiometer — Cerment type, coefficient less than ±300ppm/°C



No.	Adjustable Range (%)	Number of unit	External parts value (Ω)		
			VR1	R1	R2
1	±5	Single	5k	75k	1k
2		2 sets		36k	
3		3 sets		24k	
4	±10	Single	5k	36k	910
5		2 sets		18k	
6		3 sets		12k	

6. Remote Sensing

Using the remote sense connections will allow for compensation of up to 0.5V total drop in the load supply cables. The two remote connections should be done as either a twisted pair or in a shielded cable. They should be less than 1M long and must not carry any of the load current even under fault conditions.

To use the remote sense configuration, set the switches 1&2 to on ie towards the cover and then switches 3&4 to off ie towards the output stud end of the power supply. Connect the remote sense leads to the Molex header and to the load terminals. Take care to use correct polarity as a reversal of these leads could damage the power supply.

See below for instructions on remote sense used in parallel configurations.

	Remote	Local
SW1 A (1)	ON	OFF
SW1 B (2)	ON	OFF
SW1 C (3)	OFF	ON
SW1 D (4)	OFF	ON

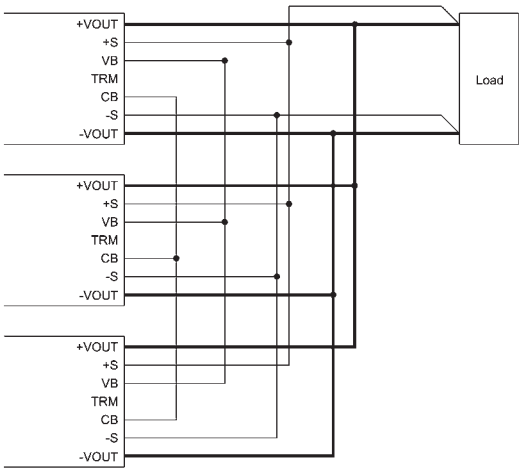
Output Inhibit

It is possible to inhibit the output voltage by shorting the "ROF" pin of the Molex connectors to the 0V output or by using a logic "0" related to the output.

7. Parallel & Redundant Configurations

Upto 3 off modules can be connected is parallel, modules sharing within 10%.

Total output power derates by 10%.

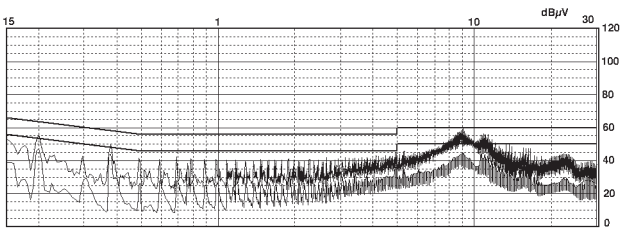


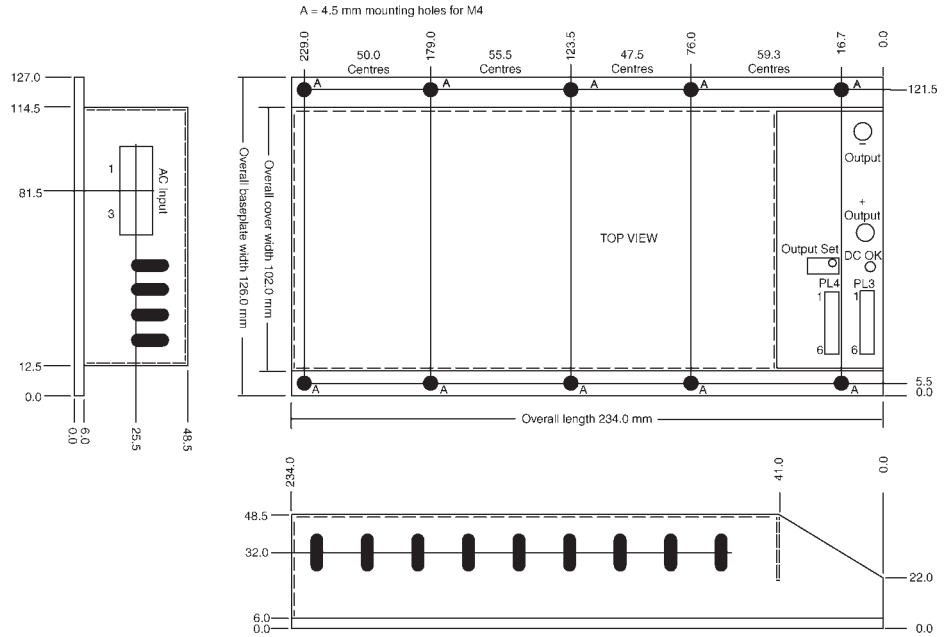
8. Mechanical Specifications

See next page.

9. EMC

EN55022 Level 'B' conducted, see BCC400PS24 trace below.





Input:

AMP Mat'n'lok 3 way.
Mating housing AMP 350766-1.
Socket crimp AMP 926893-1.
Pin 1: Live
Pin 2: Earth
Pin 3: Neutral

Output:

Power output +ve and -ve by M6 studs.
Use appropriate ring terminals and wire for the load current.
Signal connections on two 0.1" headers (PL3 & PL4).
Mating Housing: Molex 22-01-2065.
Mating Crimp: Molex 08-50-0032.

PL3 Connections	
Pin	Function
1	Current Balance
2	Voltage Balance
3	Trim
4	-Remote Sense
5	+Remote Sense
6	Remote on/off

PL4 Connections	
Pin	Function
1	Current Balance
2	Voltage Balance
3	Trim
4	-Remote Sense
5	+Remote Sense
6	Temp Warning

Accessories

1. For Input and Output Connector Kit - order part 'BCC connector kit'.
2. For Thermal Pad, order part 'BCC Therm'.