MCC Series

- 400 W Regulated Output
- Optional 200 W Non–regulated Conditioned Rail
- 1 to 4 Configurable Outputs
- MIL–STD–1275 and DEF–STAN 61–5
- MIL–STD–461 and DEF–STAN 59–411
- Low Profile
- Rugged Construction Meets MIL–STD–810F
- 3 Year Warranty

The 28 V in MCC family of power systems is a new class of configurable, modular power solutions orientated to the most demanding military applications. It incorporates active and passive filtering and congifurable outputs complying with MIL-STD-1275, MIL-STD-461, DEF-STAN 59-411 and DEF-STAN 61-5

Supplies can be specified with 1 x 400 W, 2 x 200 W, 1 x 200 W + 2 x 100 W and 4 x 100 W outputs with voltages as low as 2 VDC to as high as 48 VDC. In addition the wide trim range can provide output voltages from 500 mV to 52.8 V.

The MCC is conduction cooled and relies on the use of an external heat sink. The MCC provides a low profile and rugged mechanical construction which complies with MIL-STD-810F.

Input Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage	18.5	28	34	VDC	
Input Current	27		38	A	At 18.5 V 400 W and 600 W respectively
Inrush Current			<60	A	
UVLO			<18	VDC	
Reverse Voltage Protection					Internally provided

Output Characteristics

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	2		48	VDC	O/P 1 to 4
Output Voltage Adjustment	-60		+10	%	O/P 1 to 4, factory adjustable for trimming below 90 %, a min load of 10% is required
Auxiliary Output Voltage				V	Vin - 2 VDC minimum, 36 VDC (clamped) maximum
Auxiliary Output Power			200	W	For MCC600, 9 A max
Maximum Auxiliary Output			<36	VDC	Vout clamped
Minimum Load	No minimum load				Output ripple increases at Pout <10% Pout max
Line Regulation			<1 %		
Load Regulation			<1 %		
Output Set Tolerance		±100 mV			
Hold Up	1 ms 200 W at 28 VDC I/P 0.5 ms 400 W at 28 VDC I/P				For external hold up see calculations
Ripple and Noise	50 mV		1 %		Pk-pk, which is greater, at 20 MHz bandwidth
Temperature Coefficient		±0.05		% / ºC	
Overvoltage Protection	110		120	%	Vout nominal, recycle input to restart
Overcurrent Protection	110		120	%	I out nominal, auto recovery
Short Circuit Protection					Continuous with auto restart
Overtemperature Protection	>90			ºC	Baseplate temperature with auto restart
Remote Sense		0.5		VDC	O/P 1 and 2 only
Low Noise Output		25 45		mV	Reduction for O/P 1 and 2 Reduction for O/P 3 and 4

General Specifications

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency		75		%	
Isolation	500			VDC	Input to output, output to chassis, input to chassis
Inhibited Current			5	mA	When input inhibit is used
Input Inhibit	Global enable and disable function on Input CN1 connector, short to input ground to inhibit (see control signal section)				
Output Inhibit	Each regulated output has independent inhibit, TTL high to inhibit (see control signal section)				
DC OK Signal	Optional on output voltages ≥5 VDC Isolated opto-coupler transistor output				

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Case Temperature	-40		+90	ºC	Baseplate temperature
Extended Temperature Range	-55		+100	ºC	Baseplate temperature[1]
Storage Temperature	-55		+90	ºC	
Humidity	20		95	%	Non condensing
Shock			40	g	MIL-STD 810F, Method 516.5-1
Vibration	Minimum integrity test for military equipment				MIL-STD 810F, Method 514.5C-17

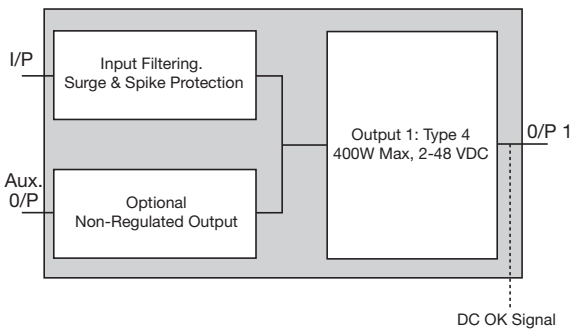
1. For -55 şC to +100 şC extended operating range, use suffix E in the part number. See model numbering system.

Electromagnetic Compatibility

	Standard	Test Level	Criteria	Notes & Conditions
Conducted Emissions	MIL-STD-461E/F	CE102		
Conducted Susceptibility	DEF-STAN 59-411	DCE01/DCE02		
	MIL-STD-461E/F	CS101, CS114 CS115, CS116		
Conducted Immunity	MIL-STD-1275A-D	Spikes, Surges, Ripple	±250 V for 100 µs, 100 V for 50 ms, 14 VAC pk-pk	Surges are with 0.5 Ω source impedance
	MIL-STD-704A	600 V Input transient	10 µs 50 Ω source impedance	
	MIL-STD-704B-F		50 V for 10 ms	
	DEF-STAN 61-5 part 6 issue 5			

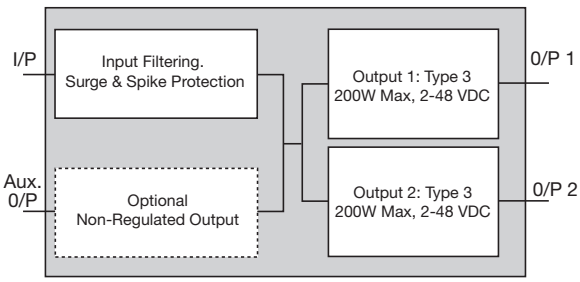
Configuration Options

SINGLE OUTPUT MODELS



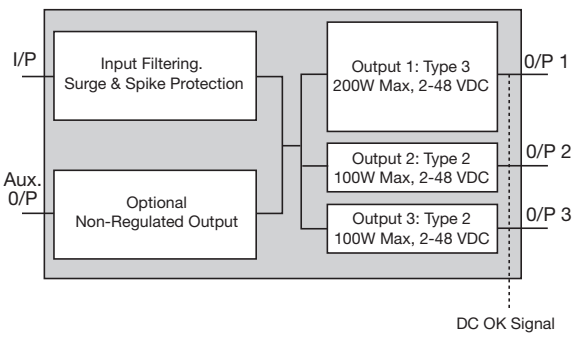
Example: 28 Vout @ 400 W, with auxiliary output and DC OK. P/n MCC6S4QSD

DUAL OUTPUT MODELS



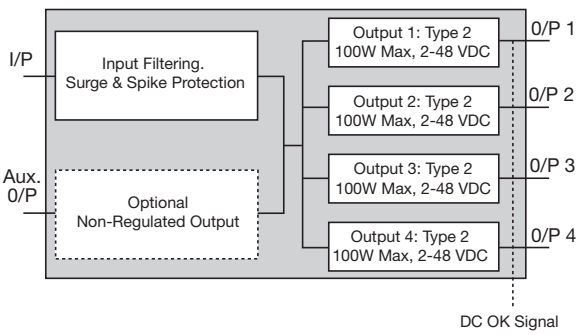
Example: ±12 Vout @ 200 W each, no auxiliary output and no DC OK. P/n MCC4D3J3JS

TRIPLE OUTPUT MODELS



Example: 5 Vout @ 200 W, ±15 Vout @ 100 W each, with auxiliary output, stress-screened components and DC OK. P/n MCC6T3D2L2LED

QUAD OUTPUT MODELS



Example: 3.3 Vout @100 W, 5 Vout @ 100 W, ±12 Vout @ 100 W each, no auxiliary output, stress-screened components and DC OK. P/n MCC4Q2C2D2J2JSD

Figure 1. Configuration Options

Model Numbering System

			1	2	3	4					
MCC	4	Q	2J	2J	2J	2J	E	X	X	X	X

Chassis Designations, Power & Sizes		
Code	Power	Slots
MCC4	400 W	4
MCC6	400 W + 200 W Aux	4

MCC400/600:
Single (S), Dual (D), Triple (T) or Quad (Q)
(4 slots max where all slots must be filled)

Modules Output Voltage / Current Rating				
V	I	W	Slots	Code
3.3	22.7 A	75 W	1	2C
3.3	45.4 A	150 W	2	3C
3.3	80.0 A	264 W	4	4C [2]
5	20.0 A	100 W	1	2D
5	40.0 A	200 W	2	3D
5	80.0 A	400 W	4	4D [2]
12	8.3 A	100 W	1	2J
12	16.6 A	200 W	2	3J
12	33.3 A	400 W	4	4J [2]
15	6.6 A	100 W	1	2L
15	13.3 A	200 W	2	3L
15	26.7 A	400 W	4	4L [2]
24	4.1 A	100 W	1	2P
24	8.3 A	200 W	2	3P
24	16.7 A	400 W	4	4P [2]
28	3.5 A	100 W	1	2Q
28	7.1 A	200 W	2	3Q
28	14.3 A	400 W	4	4Q [2]
36	2.78 A	100 W	1	2T
36	5.56 A	200 W	2	3T
36	11.11 A	400 W	4	4T
48	2.1 A	100 W	1	2W
48	4.1 A	200 W	2	3W
48	8.3 A	400 W	4	4W [2]

D - DC OK, leave blank if not required
Q - Low noise output
L - Passive filtering only [4]
P - Conformal coating

S - Standard
E- Screening option [3]
A- Auxiliary Turn Off [5]

1. Modules 1 to 4 available for MCC400/600 e.g. MCC4Q2D2J2L2PED.
2. The 4 series output modules to be used with single MCC400/600 models only.
3. DC-DC output modules are stress-screened for -55 ˚C to +100 ˚C operation.
4. Low cost option with passive EMI filtering only. No auxiliary output, EMI to EN55022 level B only.
5. Global inhibit will also turn off the auxiliary output - Option A.

Block Diagram

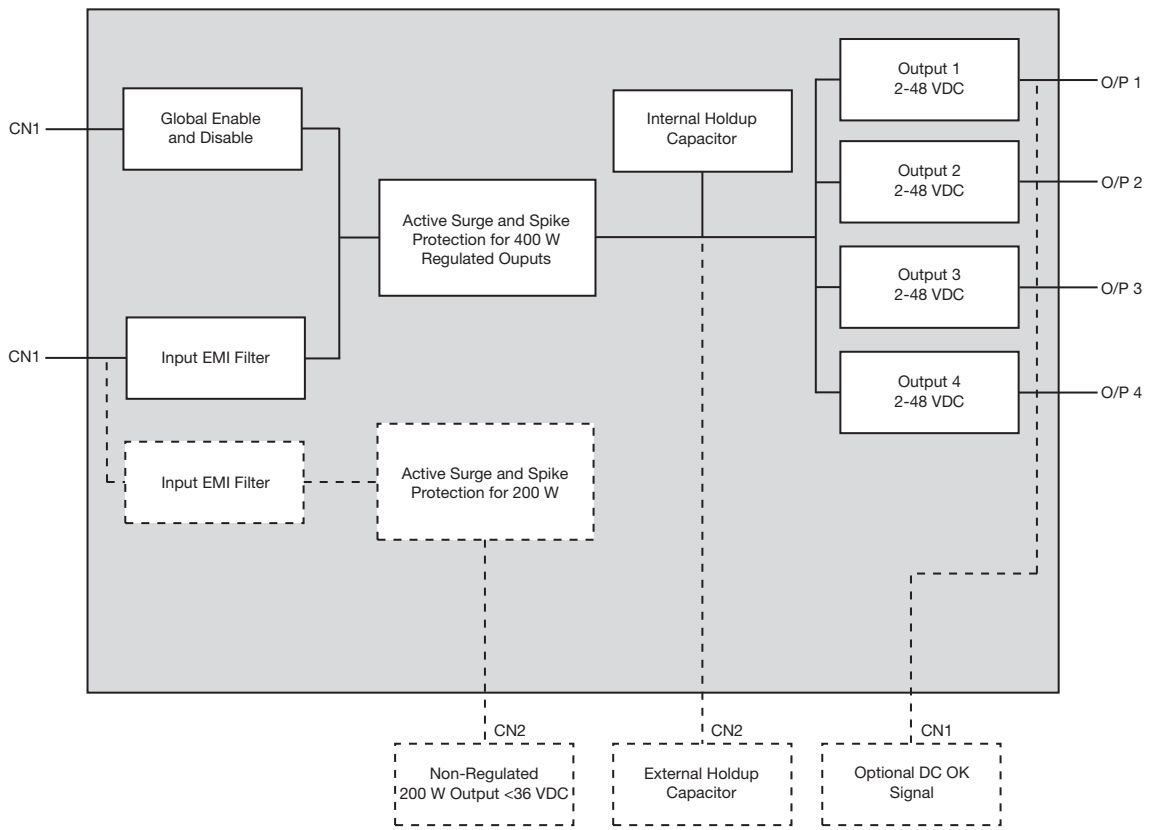


Figure 2. Block Diagram

Safe Operating Area

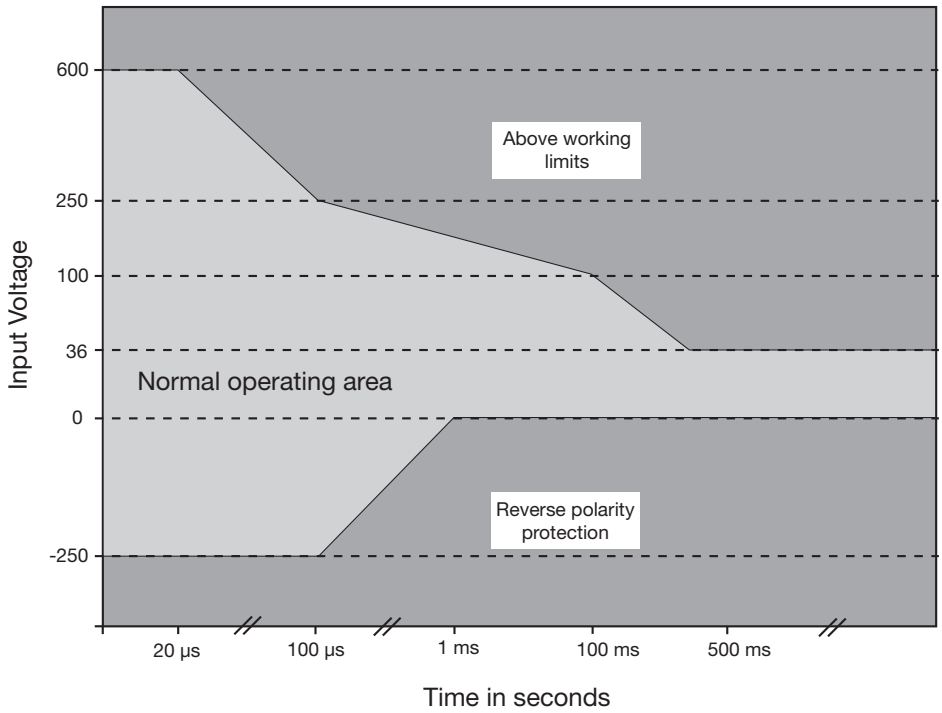


Figure 3. Safe Operating Area

Control Signals

Input/Global Inhibit

The Global Inhibited signal is available on pins 2 and 15 of the 25-pin input connector CN1. To disable the unit short to ground / return pin by switch, relay or opto-coupler (see figure 4). To enable, leave disconnected. Internal to the product the inhibit pin is connected via a resistor to the gates of the power MOSFET transistors used for the surge protection circuit. This function shuts down the input stage so no regulated output voltages are available. When in use the auxiliary output remains on and with option A will turn off.

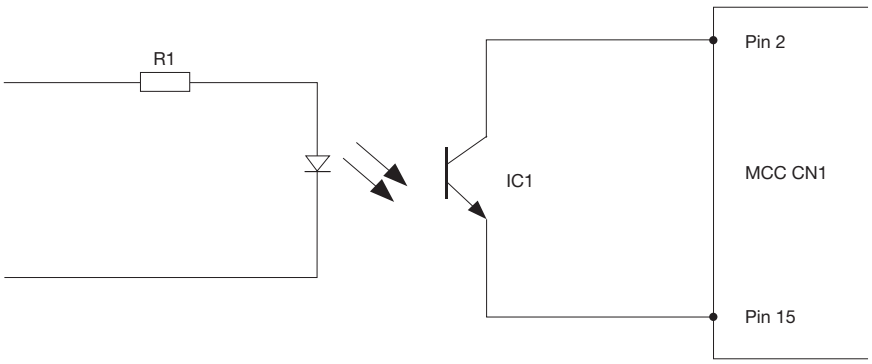


Figure 4. Disable with opto-coupler

Notes:
1. The circuit above is not MIL-STD-1275 A/D compliant and the optocoupler may require additional circuity to achieve compliance.

Output Inhibit

Every output can be inhibited individually by using the Disable function pins 1 and 5 of the output signal connector positioned next to every output. TTL high to inhibit, TTL low or not connected to enable. This gives the option to turn off an output and still have the other regulated outputs operating.

Alarm Section

Local DC OK

The alarm is available on pins 6 and 4 of the output signal connector for output voltages ≥5 VDC. It monitors the individual outputs and gives a signal which is opto isolated to indicate the status. The signal is logic high when OK and a pull up resistor limiting the current to 20mA can be connected to the output voltage. Also an LED for indication can be connected to the pins as shown below.

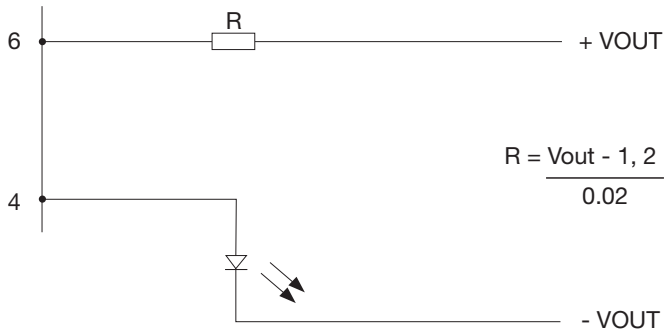


Figure 5. LED Connection for indicating DC OK status

Global DC OK

The alarm is based around the four window comparators from the local DC OK which sums them so if any output fails a failure is indicated. It is available on pins 1 (collector) and 14 (emitter) of the input connector CN1 and it is TTL high when OK. Similar to the local DC OK the signal is opto isolated and requires a pull up resistor connected to input or output voltage limiting the current to 20 mA.

External Hold Up Capacitor

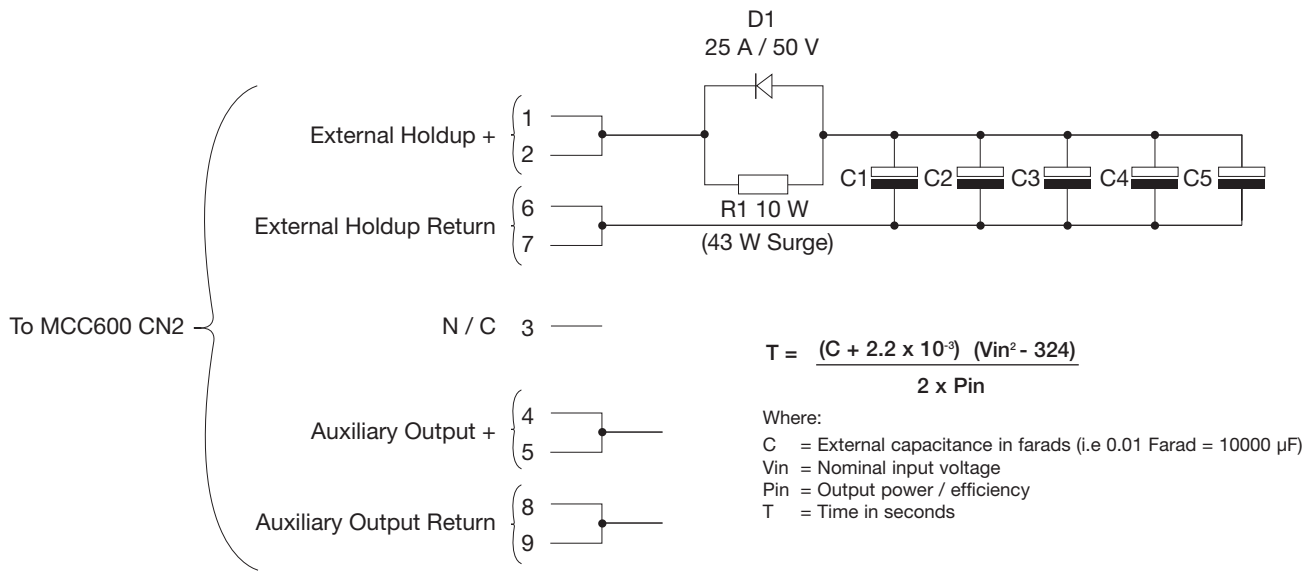


Figure 6. External hold up circuit

Remote Sense

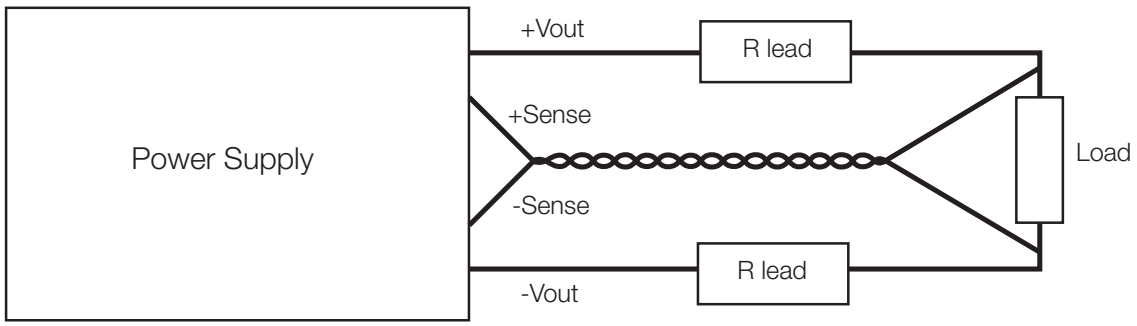


Figure 7. Remote sense connection diagram

Notes:
1. Note: 1. + Sense and – Sense are available from the output signal connector pins 2 and 3 respectively.
2. Compensates to 0.5V voltage drop on the output cables on output 1 and 2 only.
3. If not in use leave not connected.

Connecting in Series

The connection diagram below is suitable for applications that require a fixed output voltage where two or more converters can be used in series configuration. Total output voltage should not exceed the converter output to chassis isolation voltage of 500VDC.

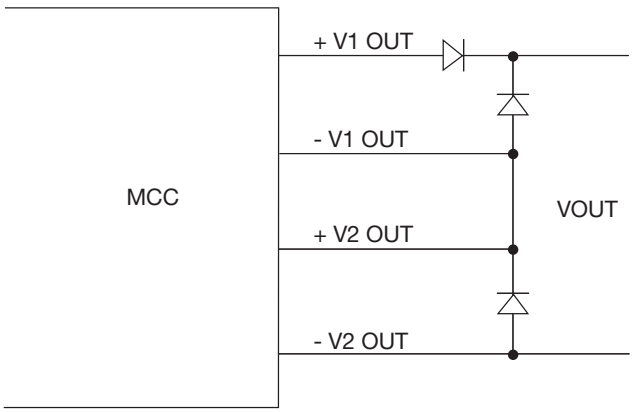
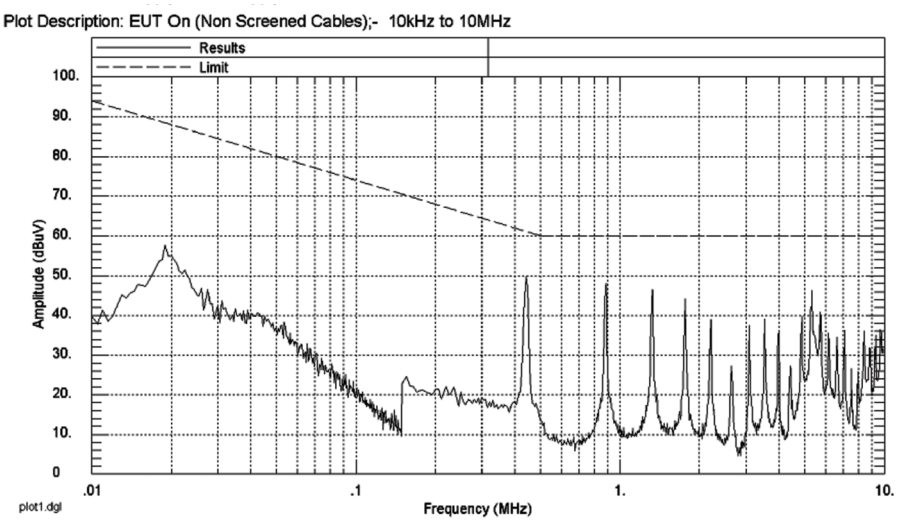


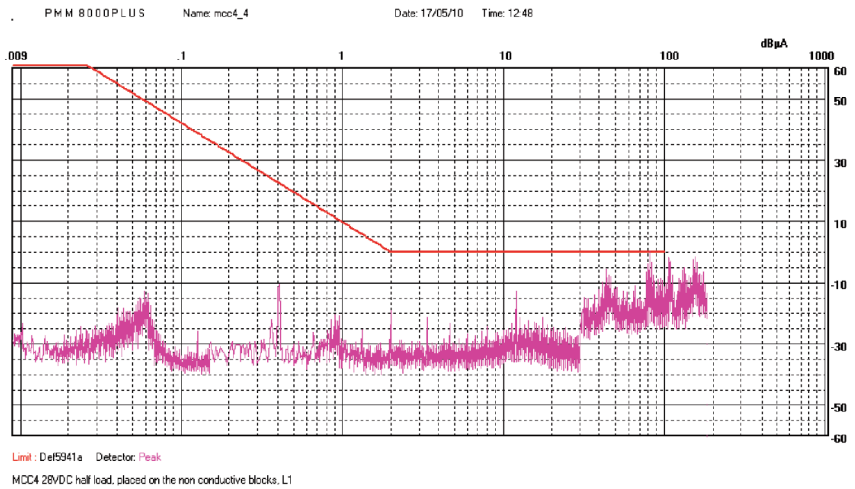
Figure 8. Series Configuration

Conducted Emissions Performance - MCC4Q2L2L2L2LSD

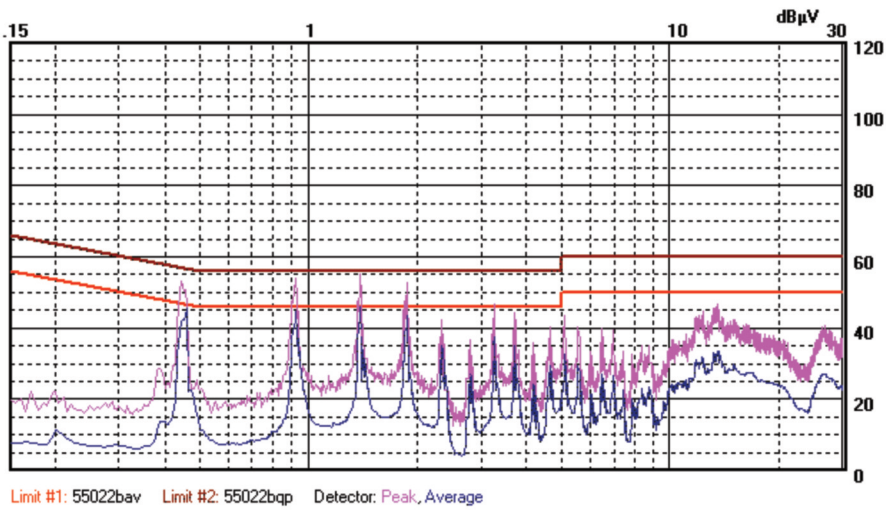
Compliance to MIL-STD 461E/F CE102.



Compliance to DEF-STAN 59-411 DCE01



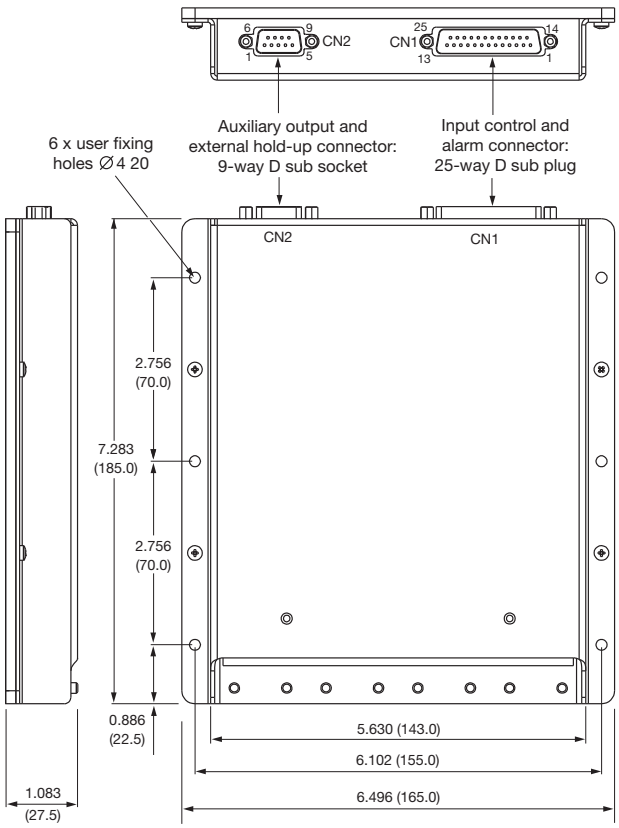
Compliance to EN55022 Level B - Passive Filtering Option - L

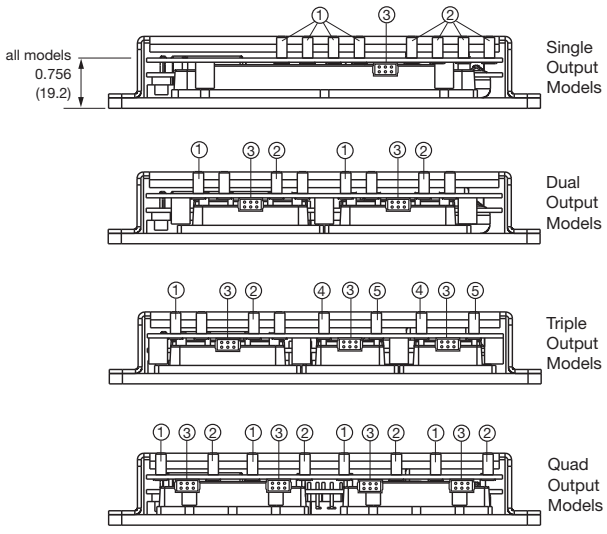


Mechanical Details

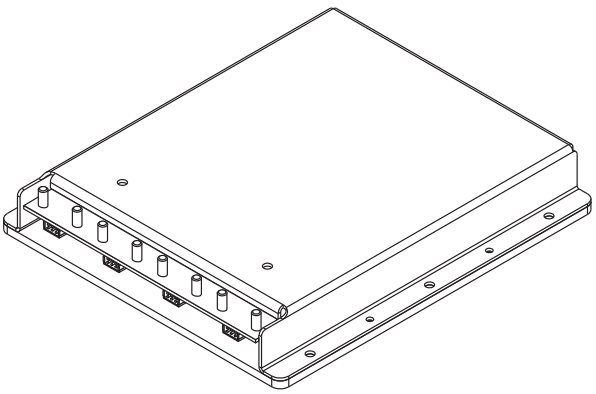
CN2 9-Pin Aux Output Connector			
Pin	Function	Pin	Function
1	External Holdup Positive	6	External Holdup Negative
2	External Holdup Positive	7	External Holdup Negative
3	N/C	8	Aux Output Negative
4	Aux Output Positive	9	Aux Output Negative
5	Aux Output Positive		

All dimensions are in inches (mm).
Maximum weight 2.31 lb (1.05kg).

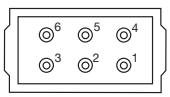




CN1 25-Pin Input Connector			
Pin	Function	Pin	Function
1	DC OK	14	DC OK RTN
2	Global Inhibit	15	Global Inhibit RTN
3	N/C	16	Negative Input
4	Negative Input	17	Negative Input
5	Negative Input	18	Negative Input
6	Negative Input	19	Negative Input
7	Negative Input	20	Negative Input
8	Negative Input	21	Positive Input
9	Positive Input	22	Positive Input
10	Positive Input	23	Positive Input
11	Positive Input	24	Positive Input
12	Positive Input	25	Positive Input
13	Positive Input		



Harwin 2mm Datamate Connector. Horizontal male.
Harwin p/n:
M80-8410642



Signals Connector	
Pin	Function
1	Disable
2	+sense
3	-sense
4	DC OK RTN
5	Disable RTN
6	DC OK

1	4 x M4 negative output studs. Max current per stud 35 A.
2	4 x M4 positive output studs. Max current per stud 35 A.
3	Signal connector. Harwin 2 mm Datamate connector. As above.

1	2 x M4 positive output studs. Max current per stud 35 A.
2	2 x M4 negative output studs. Max current per stud 35 A.
3	Signal connector. Harwin 2 mm Datamate connector. As above.

1	2 x M4 positive output studs. Max current per stud 35 A.
2	2 x M4 negative output studs. Max current per stud 35 A.
3	Signal connector. Harwin 2 mm Datamate connector. As above.
4	M4 positive output stud. Max current per stud 35 A.
5	M4 negative output stud. Max current per stud 35 A.

1	M4 negative output stud. Max current per stud 35 A.
2	M4 positive output stud. Max current per stud 35 A.
3	Signal connector. Harwin 2 mm Datamate connector. As above.

Notes:
1. All dimensions are in inches (mm).
2. Weight: MCC400/600: 2.31 lb (1.05kg) max.
3. Tolerance: ±0.008 in (±0.2 mm).
4. Max Torque: M4 studs 17.7 lbs-in (2.0 Nm)
5. For mating signal connector kit order part number MCC-SIG CON KIT

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