

# CoolX<sup>®</sup>1800

## 1800W Modular Power Supplies

### Patent Pending Resonant Technology



#### CoolX1800 Modular Power Supply

- Up to 1800W
- Up to 12 outputs
- All outputs isolated (1850VAC)
- Variable Fan Speed Control

#### Incredible Reliability and Efficiency

- MTBF >200000 hrs
- 93% Efficiency
- Level 4 Input Surge Protection
- Reverse Energy Protection
- 23.5W Auxiliary Power
- Safety Approved to 5000m Altitude
- 5 Year Warranty

#### Flexibility

- **Analog and Digital Management**
  - PMBus™ monitoring and control capability
- **Field Configurable**
  - Plug and Play Power
- **Series and Parallel Outputs**
  - Higher voltages/currents
- **Mounting Options**
  - Base/Side and DIN-Rail mounting

#### Certifications

- **Medical**
  - IEC60601-1 3rd Edition certified
  - IEC60601-1-2 4th Edition EMC certified
  - 2 MOPP
  - Dual Fused
  - Suitable for Type B and BF rated applications
  - ISO13485
- **Industrial**
  - IEC60950, IEC62368-1 certified
  - SEMI F47 compliant
- **Defence/Aero**
  - MIL810G certified
  - CE101, CE102 characterised

#### TYPICAL APPLICATIONS

- **Medical;** Clinical diagnostic equipment, Medical lasers, Dialysis equipment, Radiological Imaging, Clinical Chemistry
- **Industrial;** Test and Measurement, Industrial Machines, Automation equipment, Printing, Telecommunications, Audio equipment
- **Hi Rel;** Harsh Industrial Electronics, Radar (Marine, Ground Based), Communications Test & Measurement

The CoolX1800 Series is the new modular power supply from Excelsys. It provides an incredible 1800W in a compact 5 x 10.5 x 1U package, typically 50% more power than the industry standard. Delivering best in class performance in efficiency and unrivalled reliability, the CoolX 1800 offers system designers the most comprehensive feature set and specifications.

The series comprises two base models. The CX18S is certified to IEC60950 2nd edition for industrial applications as well as the upcoming IEC62368-1 standard. The CX18M carries IEC60601-1 3rd edition & IEC60601-1-2 4th edition (EMC) for medical applications. The CoolX1800 can be populated with up to 6 CoolMods, providing up to 12 isolated DC outputs ranging from 2.5V to 58.0V. Continuing the Excelsys tradition of flexibility, the CoolX1800 is completely user and field configurable. Outputs can be adjusted to the required set point voltages and can be configured in parallel or series for higher current and/or higher voltages. CoolPacs can be paralleled for higher power and N+1 Redundancy applications. There are a range of CoolMods available including medium and high power single outputs and dual modules.

Stand-out features for medical applications include suitability for type BF rated (Body Floating) applications, input dual fusing, 2 x MOPP isolation and <300uA leakage current.

The CoolX brings user flexibility to a completely new level allowing system designers to monitor and control power supply performance using either analog and Digital Communications (PMBus™).



#### CoolX CoolPac

CoolPac	Slots	Power	Medical Approval IEC60601-1 3rd edition & IEC60601-1-2 4th edition (EMC)	Industrial Approval IEC60950 2nd edition	IEC62368-1 Edition 2
CX18S	6	1800W	-	Yes	Yes
CX18M	6	1800W	Yes	-	-

#### CoolX CoolMod

Model	Vnom (V)	Set Point		Power (W)
		Adjust Range (V)	I <sub>max</sub> (A)	
CmA	5	2.5-6.0	30	150
CmB	12	6.0-15.0**	23.3	280
CmC	24	15.0-28.0	12.5	300
CmD	48	28.0-58.0	6.25	300
CmE	24	22.8-25.2	37.5	900
CmG <sup>v1</sup>	24	3.0-30.0	4.0*	120*
CmG <sup>v2</sup>	24	3.0-30.0	4.0*	120*

\*Max Power per output is 120W, Max combined output power is 200W

\*\*Full dynamic specifications may not be met at full load when output voltage is trimmed above 13V

## INPUT

Parameter	Conditions/Description	Min	Nom	Max	Units
AC Operating Input Range		85		264	VAC
Nominal Input Voltage Range	Universal Input 47- 440Hz	100		240	VAC
Extended AC Operating Range	Maximum for 5 seconds			300	VAC
DC Input voltage range		120		300	VDC
Input Current	90VAC @ 1080W			14.5	A
Inrush Current	230VAC @ 1800W			25	A
Power Factor	120VAC@ 1400W	0.98			
Undervoltage Lockout	Shutdown	65		74	VAC
Input Fuses Rating	Dual Fused (Line and Neutral) 250VAC		16		A
Efficiency	230VAC, 1800W with 6 x CmC CoolMods 230VAC, 1800W with 2 x CmF CoolMod		91 93		% %

## COOLMOD OUTPUT

Parameter	Conditions/Description	Min	Nom	Max	Unit
Power Rating	CX18: See derating curves			1800	W
Minimum Load			0		A
Line Regulation	For $\pm 10\%$ change from nominal line CmE			$\pm 0.1$ $\pm 0.5$	%
Load & Cross Regulation	For 25% to 75% load change CmE			$\pm 0.2$ $\pm 0.2$	%
Transient Response	For 25% to 75% load change 0.5A/uS: Voltage Deviation *CmE Figures in ( ) Settling Time			4 (4) 500 (1000)	% $\mu$ S
Ripple and Noise	100mV or 1.0% pk-pk. 20MHz BW			1	%
Overvoltage Protection	Tracking OVP Level (N/A in CmE, CmG) Latching OVP Level	105 125		125 160	% %
Remote Sense	Max. line drop compensation			0.5	VDC
Overshoot				1	%
Rise Time	Monotonic. CmG			10 20	ms ms
Turn-on Delay	From AC in From Global Enable From CoolMod Enable			1000 10 10	ms ms ms
Hold-up Time	For nominal output voltages at full load CmE combination at 1300W	16			ms
CoolMod Power	As per CoolMod table				
Output Adjustment Range	Manual: Multi-turn potentiometer. As per CoolMod table Vtrim: As per CoolMod table				
Overcurrent Protection	Straight line with hiccup activation @ 35% Vo nom CmE, CmG: Current limit hiccup autorecovery	110	130	150	%
Short Circuit Protection	Yes, Autorecovery				
OverTemperature Protection	Yes, Autorecovery				
Capacitive Load	CmA-CmE CmG			10 <0.47	mF mF

## AUXILIARY OUTPUT

Parameter	Conditions/Description	Min	Nom	Max	Units
Nominal Output Voltage	Aux Voltage Option A Aux Voltage Option B	11.76 4.75	12 5	12.24 5.25	V V
Load Regulation				$\pm 2$	%
Line Regulation	For $\pm 10\%$ change from nominal line			$\pm 0.5$	%
Maximum Output Current	Aux Voltage Option A Aux Voltage Option B			1.96 4.7	A A
Maximum Output Capacitive Load				1000	$\mu$ F
Output Overcurrent Protection	Hiccup	110		140	%
Short Circuit Protection	Yes, Autorecovery				

## GALVANIC ISOLATION

Parameter	Conditions/Description	Min	Nom	Max	Units
Input to Output	Reinforced (2 x MOPP)	4000			VAC
Input to Case	Basic (1 x MOPP)	1850			VAC
Output to Case	Basic (1 x MOPP)	1850			VAC
Output to Output	Basic (1 x MOPP)	1850			VAC
CmG V1 to V2	Functional	500			VDC

**RELIABILITY**

Parameter	Conditions/Description	Min	Nom	Max	Units
Reliability and MTBF	MTBF of >>3 Million Hours, Telecordia SR-332, Issue 4 CoolPac (excludes fans)		0.33		Fpmh
Warranty	5 Years				

**ENVIRONMENTAL**

Parameter	Conditions/Description	Min	Nom	Max	Units
Operating Temperature	Operates to specification below -20°C after 10 min warm-up	-40		+70	°C
Storage Temperature		-40		+85	°C
Derating	See Derating Curves				
Relative Humidity	Non-condensing	5		95	%RH
Shock & Vibration	MIL-STD810G Method 514.6				
Altitude				5000	m

**LEAKAGE CURRENTS**

Parameter	Conditions/Description	Min	Nom	Max	Units
<b>AC Leakage Current</b>	<b>Input to earth ground</b>				<b>Units</b>
Normal condition (high line)	Mains Voltage 264VAC/60Hz	244			µA
Single fault condition (high line)	Mains Voltage 264VAC/60Hz	435			µA
<b>Touch Current</b>					
Normal Condition	Mains Voltage 264VAC/60Hz	14.2			µA
Single Fault Condition	Mains Voltage 264VAC/60Hz	246			µA

**EMC**

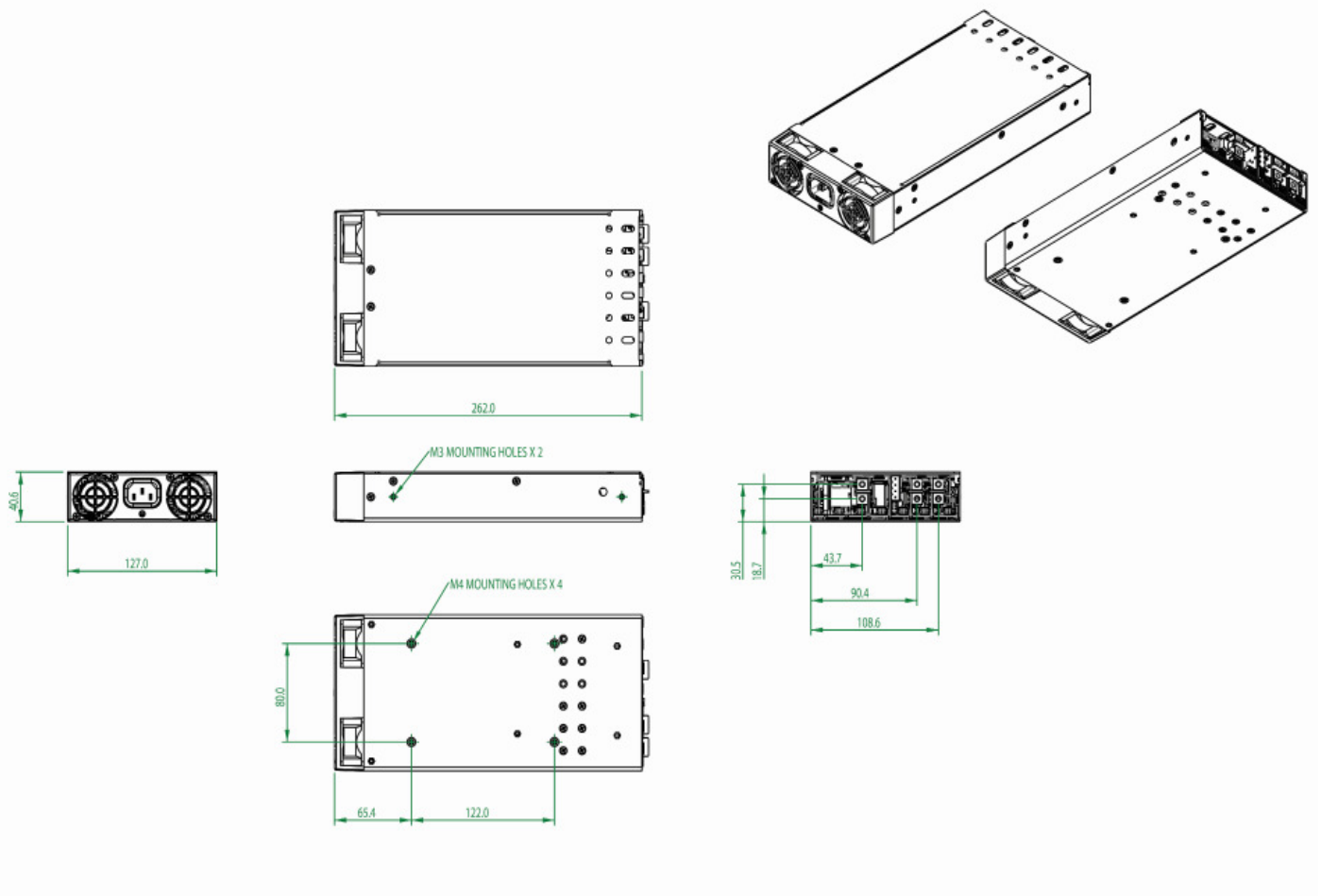
Parameter	Conditions/Description	Criteria
Radiated Emissions	EN 55011, EN 55022 and FCC, Class B	
Conducted emissions	EN 55011, EN 55022 and FCC, Class B	
Power line harmonics	EN 61000-3-2, Class A	
Voltage flicker	EN 61000-3-3	
ESD	EN 61000-4-2, level 4, 8 kV contact, 15 kV air	A
Radiated immunity	EN 61000-4-3, level 3, 10 V/m 80-2700MHz	A
Electrical fast transient	EN 61000-4-4, level 4, ±4 kV	A
Surge immunity	EN 61000-4-5, level 4, 2 kV DM, 4 kV CM	A
Conducted RF immunity	EN 61000-4-6, level 3, 10Vemf 150KHz-80MHz	A
Power frequency magnetic field	EN 61000-4-8, level 4, 30A/m	A
Voltage Dips and Interruptions	EN61000-4-11	10ms A 100ms B 500ms B

**STANDARDS & DIRECTIVES**

Parameter	Conditions/Description
Safety Agency Approvals	EN60601-1 3rd Edition, UL60601-1, CSA601, EN60950 2nd Edition, CSA C22.2 No. 60950-1,
IEC/EN 60950-1, Edition 2 and all national deviations	UL 60950-1/CSA 22.2 No 60950-1, Edition 2; 5000 m (16,400 ft) altitude, 100Vac to 240Vac ±10%
IEC/EN 60601-1, Edition 3 and all national deviations	IEC 60601-1(2005), EN60601-1(2006) ANSI/AAMI ES 60601-1(2005) CAN/CSA C22.2 No. 60601-1 (2008); 5,000 m (16,400 ft) altitude, 100Vac to 240Vac ±10%
IEC 62368 Edition 2	IEC 62368-1 (2014) Edition 2 5000 m (16,400 ft) altitude, 100Vac to 240Vac ±10%
IEC 60601-1-2 Edition 4	IEC 60601-1-2 (2014)
Protection class	Class I
ROHS	EU DIRECTIVE 2015/863 RoHS compliant
REACH-171	Compliant
Conflict Materials	Compliant with Conflict Free Sourcing Initiative

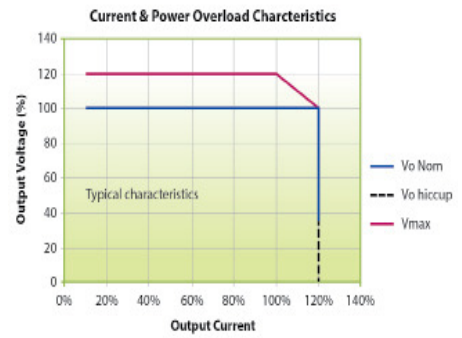
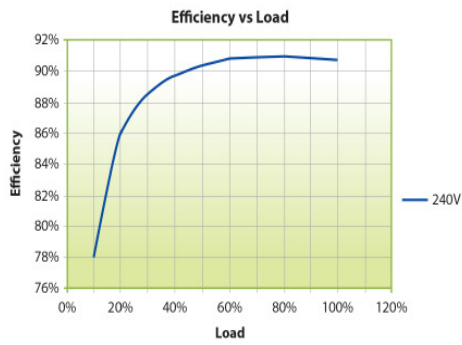
MECHANICAL DATA		
Parameter	Description	
Dimensions (L x W x H)	L x W x H	267mm x 127mm x 41mm 10.5" x 5" x 1U
Weight	Nominal Weight: CoolPac + 6 x CoolMods	1.6Kg
Connectors	Description	Mating Connectors (if applicable)
AC/DC IEC input (Option)	IEC 320 Inlet	
Main DC output terminal block (CmA-CmE)	M4 Screws	
Main DC output terminal block (CmG)	Camden - CTB9350/4A	Camden - CTB9200/4A or Würth Elektronik - 691 352 710 004
System Signal Connector J1007	Molex 87833-0831 8-way	Locking Molex 51110-0860; Non Locking Molex 51110-0850; Crimp Terminal: Molex p/n 50394 or Molex 51110-0856 which includes Locking Tab & Polarization Keying
Output Signal Connectors J1001-1006	Molex 87833-0631 6-way	Locking Molex 51110-0660; Non Locking Molex 51110-0650; Crimp Terminal: Molex p/n 50394 or Molex 51110-0656 which includes Locking Tab & Polarization Keying
Output Signal Connector (CmG)	Molex 87833-0831 8-way	Locking Molex 51110-0860; Non Locking Molex 51110-0850 Crimp Terminal: Molex p/n 50394 or Molex 51110-0856 which includes Locking Tab & Polarization Keying
Output Sense Connectors J3	JST-S2BPH-K(LF)(SN)	JST PHR2. Crimp Terminal JST BPH-002T-P.0.5S or SPH-002T-P.05S
Auxiliary Output Connector J1	Molex 1041880210 2pin	

## CoolX Mechanical Drawings

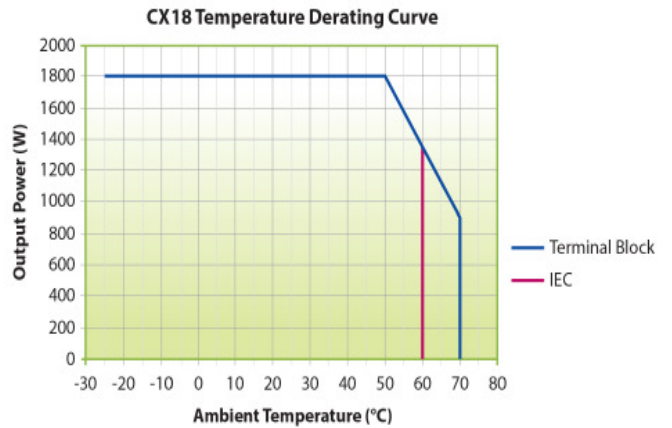
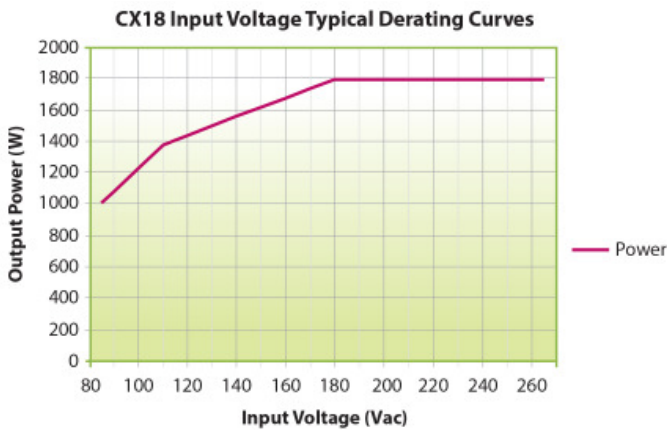


CoolX can be mounted on its base, vertically or on its side. CoolX can also be mounted on the Excelsys DIN Rail accessory (Z744).

## CoolX 1800 Efficiency, Derating and Power Limit Curves

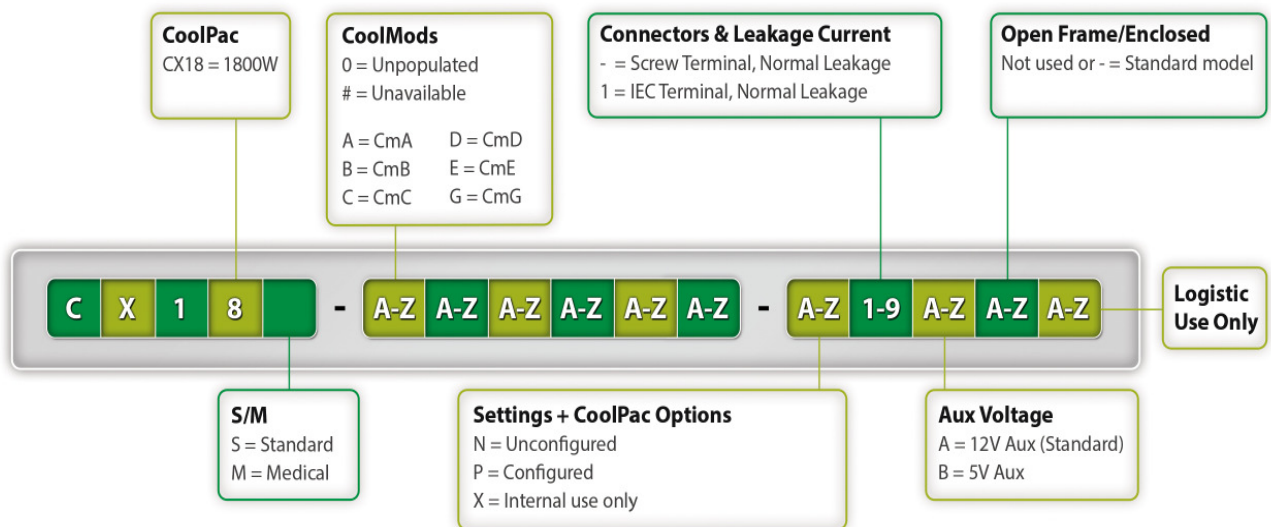


## CoolX Derating



2) Enhanced thermal performance with system fans & base plate cooling. Consult Excelsys for details.

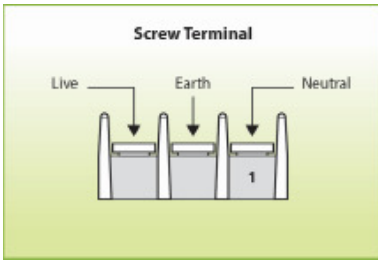
## Configuring Your CoolX



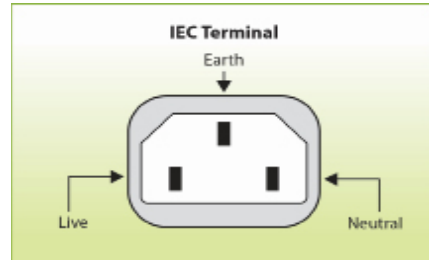
\*Consult Excelsys for Conformal Coating and Ruggedised products.

## CoolX Connectors

### Input Connectors

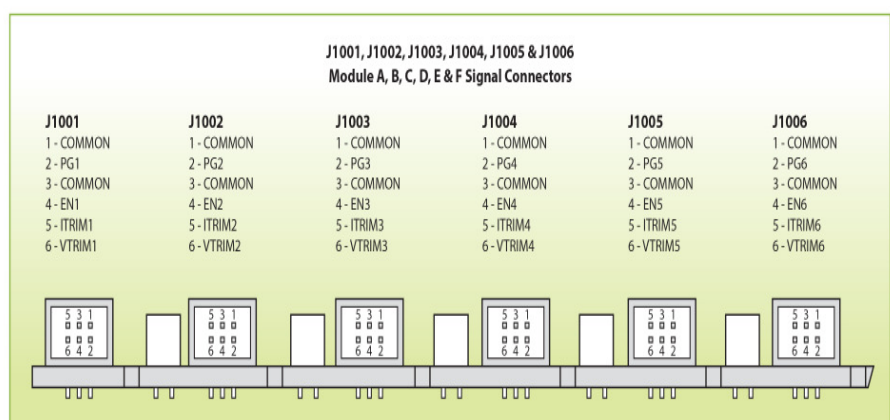
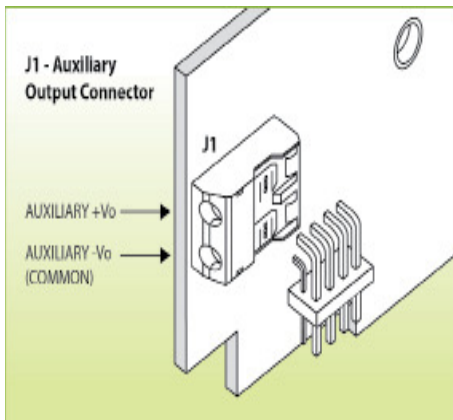
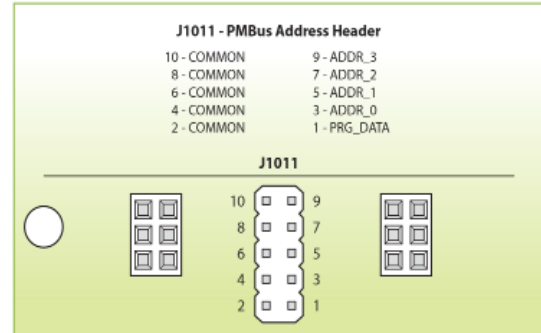
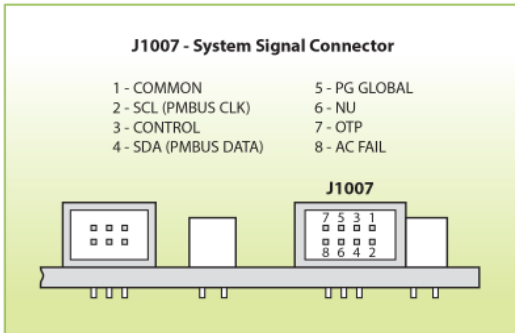


Standard (Screw Terminal)

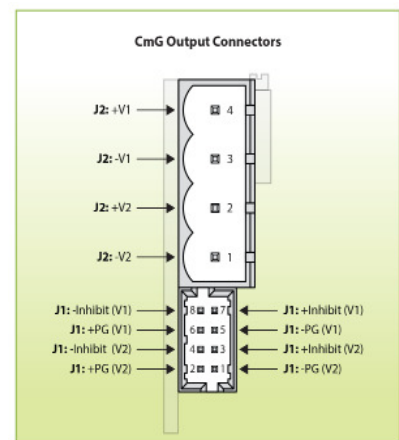
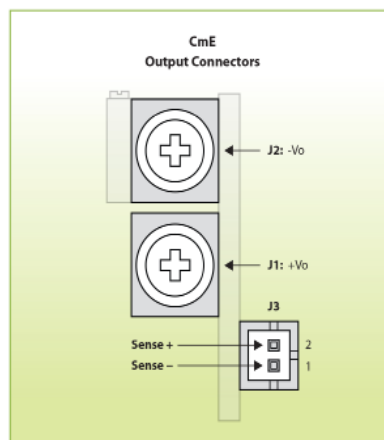
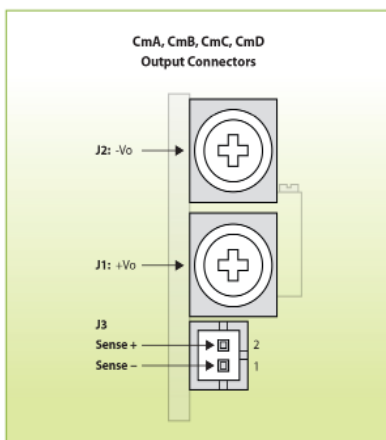


Option 1 (IEC Terminal)

### CoolPac Connectors



### CoolMod Connectors



Specifications are subject to change  
REV 3.3

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