EVERGREEN™ VENTO™ FCM30K

30,000 W Bulk Front End
Narrow Trim

Advanced Energy's FCM30K series provides for a wide range of AC-DC embedded power requirement. Featuring high build quality with robust screw terminals, long life, and typical full-load efficiency of greater than 95.5%, these units are ideal for use in industrial applications. They are backed by a comprehensive set of industrial safety approvals and certificates. Variable-speed "smart fans" draw on software controls developed by Advanced Energy to match fan speed to the unit's cooling requirement and load current. Slowing the fan not only saves power but also reduces wear, thus extending its life.

AT A GLANCE

Total Power

30,000 W

Input Voltage

187 to 528 VAC, 3 Phase 3 Wire + PE

Number of Outputs

Single

RoHS

SPECIAL FEATURES

- 30,000 W output power
- 85.2 mm H x 448 mm W x 595 mm L
- -40 to +50°C, for variants capable of operating up to 70°C (+50°C to 70°C power is derated)
- 5 V at 1 A housekeeping
- High efficiency: >95.5% typical at full load
- FCM10K modules Rev AT above support Hot Swap
- Supports Read-Only NFC Tag Application
- Semi F47 compliance
  (Tested at 480 VAC, 54.5 V 30 kW)
- Five-year warranty

COMPLIANCE

- EMI Class A, with 6 db margin
- EN61000 Immunity

SAFETY

- UL62368-1, 3rd Ed
- CAN/CSA C22.2 No. 62368-1:19, 3rd Ed
- EN/IEC 62368-1:2020/A11:2020
- IEC 62368-1: 2018 3rd Ed
- CB Certificate and Report (IEC 62368-1 3rd Ed)
- CE (LVD + RoHS), EN 62368-1 3rd Ed

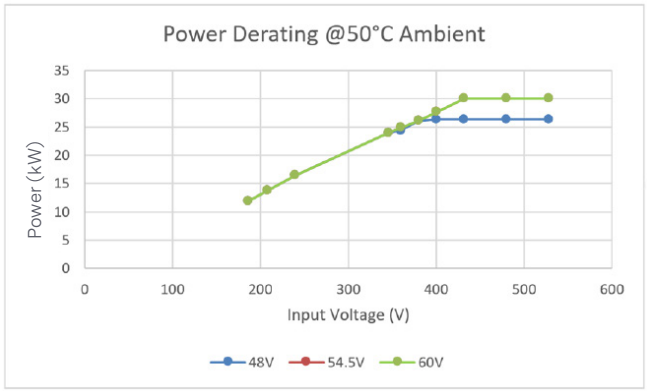
ELECTRICAL SPECIFICATIONS

Input	
Input Range	187 to 528 VAC, 3 phase input, 3 wire + PE (corner ground not supported) 480 VAC (nominal)
Frequency	47 to 63 Hz, nominal 50/60 Hz
Input Fusing	Recommend external circuit breaker with 63 A rating.
Inrush Current	≤ 180 A peak at 480 VAC
Power Factor	0.98 typical, meets EN61000-3-12
Harmonics	Meets EN61000-3-12 requirements
Input Current	45 A RMS max input current at 480 VAC
Hold Up Time	> 12 ms minimum for at 30,000 W load > 20 ms minimum for at 18,000 W load
Efficiency	> 95.5% typical at full load, 480 VAC nominal
Power Line Transient Protection	Suitable MOV after input fuse for modules with added SPD (Surge Protective Device) within the shelf.
Isolation Voltage	Meets UL62368

Output		
Output Voltage	Main output: 54.5 VDC Standby output: 5 VDC	
Output Trimming Range	48 to 60 VDC	
Output Current	Main output at 550.5 A max Standby at 1 A available for system side	
Minimum Load	Main output at 0 A Standby at 0 A	
Output Ripple / Noise (PARD)	Main output: 1% of voltage setting Standby: 100 mV	Measured with 0.1 µF ceramic and 10 µF electrolytic capacitor on any output, 20 MHz
Output Turn On Overshoot	< 5% of voltage setting	
Transient Response	±5% of nominal output voltage	Load transient change of ±25% with 5% minimum load
Current Sharing	< 5% for 50%-100% load current	Main output: support shelf to shelf current sharing. Accuracy TBD. Standby: none
Max Number of Unit in Parallel	Contact AE technical support team	
Protections	UV/OV, OCP, OVP, OTP, ACUV, etc.	
Output Isolation	Default product has main output isolated (100 VDC) from PSU chassis and meets functional isolation requirements. Product with output ground terminated to chassis is available upon request.	

ELECTRICAL SPECIFICATIONS

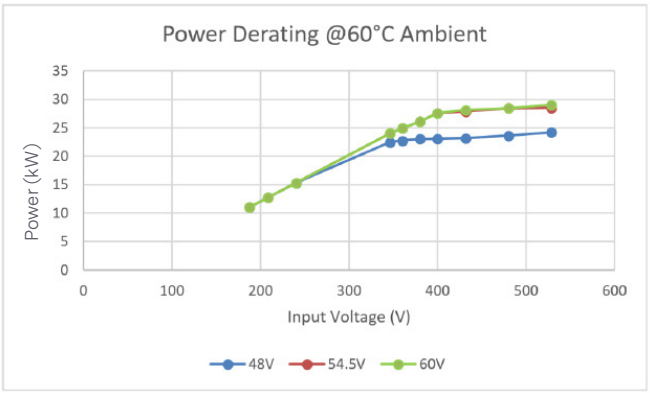
Output Power Derating vs Input Line Voltage @ 50°C			
Input Voltage	48 V	54.5 V	60 V
528 VAC	26,400 W	30,000 W	30,000 W
480 VAC	26,400 W	30,000 W	30,000 W
432 VAC	26,400 W	30,000 W	30,000 W
400 VAC	26,400 W	27,600 W	27,600 W
380 VAC	26,100 W	26,100 W	26,100 W
360 VAC	24,400 W	24,900 W	24,900 W
346 VAC	24,000 W	24,000 W	24,000 W
240 VAC	16,400 W	16,400 W	16,400 W
208 VAC	13,700 W	13,700 W	13,700 W
187 VAC	12,000 W	12,000 W	12,000 W



Output Power Derating vs Input Line Voltage @ 60°C			
Input Voltage	48 V	54.5 V	60 V
528 VAC	24,200 W	28,500 W	29,100 W
480 VAC	23,600 W	28,400 W	28,400 W
432 VAC	23,200 W	27,900 W	28,200 W
400 VAC	23,100 W	27,600 W	27,600 W
380 VAC	23,000 W	26,100 W	26,100 W
360 VAC	22,800 W	24,900 W	24,900 W
346 VAC	22,500 W	24,000 W	24,000 W
240 VAC	15,300 W	15,300 W	15,300 W
208 VAC	12,700 W	12,700 W	12,700 W
187 VAC	11,100 W	11,100 W	11,100 W

Applicable for variants without PMI.

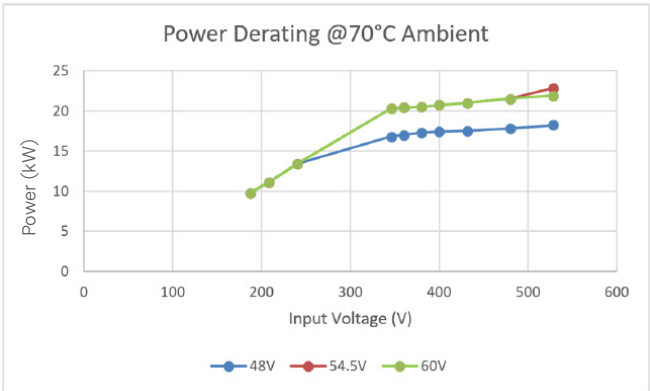
FCM30KSHNW-PRN and FCM30KSHNW-TRN



Output Power Derating vs Input Line Voltage @ 70°C			
Input Voltage	48 V	54.5 V	60 V
528 VAC	18,200 W	22,800 W	21,900 W
480 VAC	17,800 W	21,500 W	21,500 W
432 VAC	17,500 W	21,000 W	21,000 W
400 VAC	17,400 W	20,700 W	20,700 W
380 VAC	17,300 W	20,500 W	20,500 W
360 VAC	17,000 W	20,400 W	20,400 W
346 VAC	16,800 W	20,300 W	20,300 W
240 VAC	13,400 W	13,400 W	13,400 W
208 VAC	11,100 W	11,100 W	11,100 W
187 VAC	9,800 W	9,800 W	9,800 W

Applicable for variants without PMI.

FCM30KSHNW-PRN and FCM30KSHNW-TRN

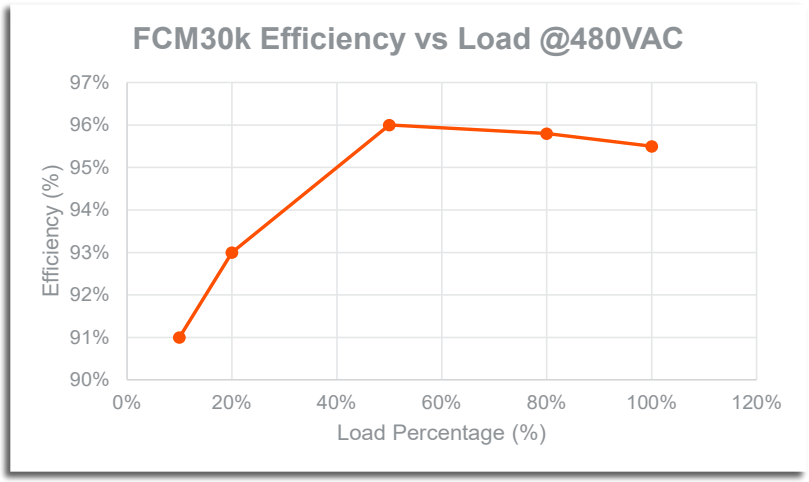


ELECTRICAL SPECIFICATIONS

Variant	Operating Temperature
FCM30KSHNW-PRM	-40°C to 50°C
FCM30KSHNW-TRM	-40°C to 50°C
FCM30KSHNW-PRN	-40°C to 70°C. Above 50°C, power is derated.
FCM30KSHNW-TRN	-40°C to 70°C. Above 50°C, power is derated.

For variants without PMI (Power Metering Interface), FCM30KSHNW-PRN and FCM30KSHNW-TRN, the shelf can operate at temperatures up to 70°C (+50°C to 70°C with power derated).

FCM30K Efficiency @ 70°C	
Load	Efficiency
10%	91.00%
20%	93.00%
50%	96.00%
80%	95.80%
100%	95.50%



ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-40°C to +50°C; Start at -40°C requires a 5 minutes operating warm-up. For variants capable of operating up to 70°C, +50°C to 70°C power is derated. Refer to ELECTRICAL SPECIFICATIONS section for power derating.
Storage Temperature	-40 to +85°C
Humidity	10% to 90% non-condensing, operating
Acoustic Noise	< 83 dBA at 30°C
Altitude	3000 m for 100% load
Shock	Operating Shock: 4 G, 22 msec, half-sine pulse, 3 shocks for each of the three axes. Non-operating (empty): 12 G, 11 msec, half-sine pulse, 10 shocks on each of the six faces
Vibration	Operating Sinusoidal Vibration: 0.5 G acceleration, 1.5 mm amplitude, 5 to 500 Hz, 10 sweeps at 1 octave/min for each of the 3 axes (1 sweep is 5 to 500 Hz). Non-operating Sinusoidal Vibration: 1 G acceleration, 3.0 mm amplitude, 5 to 500 Hz, 10 sweeps at 1 octave/min for each of the 3 axes (1 sweep is 5 to 500 Hz). Package: MIL-STD-810G, Method 514.6 Procedure I, Cat 7, Table 514.6C-VII, General Purpose

SAFETY & EMC

Conducted/Radiated Emission	EN55032/CISPR32 Class A, 6 dB Margin
Surge	2KV DM; 4KV CM
Voltage Dips and Interruptions	EN61000-4-34
ESD	6 kV contact/8 kV air
Safety	UL/IEC/62368-1
Compliance Reports	UL 62368-1, Demko CB Report for IEC 62368-1, CE LVD + RoHS

ORDERING INFORMATION

New Model Number	Nominal Output Voltage	Trim Range	Max Current	Standby Output	Efficiency	Description / Remarks	Max Operating Ambient Temp
FCM30KSHNW-PRM	54.5 VDC	48 to 60 VDC	550.5 A	5 V at 1 A	95.5%	Narrow Trim Shelf, Pluggable AC input version, MODBUS RTU with PMI	50 degC Max
FCM30KSHNW-TRM	54.5 VDC	48 to 60 VDC	550.5 A	5 V at 1 A	95.5%	Narrow Trim Shelf, Terminal Block AC input version, MODBUS RTU with PMI	50 degC Max
FCM30KSHNW-PRN	54.5 VDC	48 to 60 VDC	550.5 A	5 V at 1 A	95.5%	Narrow Trim Shelf, Pluggable AC input version, MODBUS RTU without PMI	70 degC Max, Power is derated from 50 degC to 70 degC
FCM30KSHNW-TRN	54.5 VDC	48 to 60 VDC	550.5 A	5 V at 1 A	95.5%	Narrow Trim Shelf, Terminal Block AC input version, MODBUS RTU without PMI	70 degC Max, Power is derated from 50 degC to 70 degC

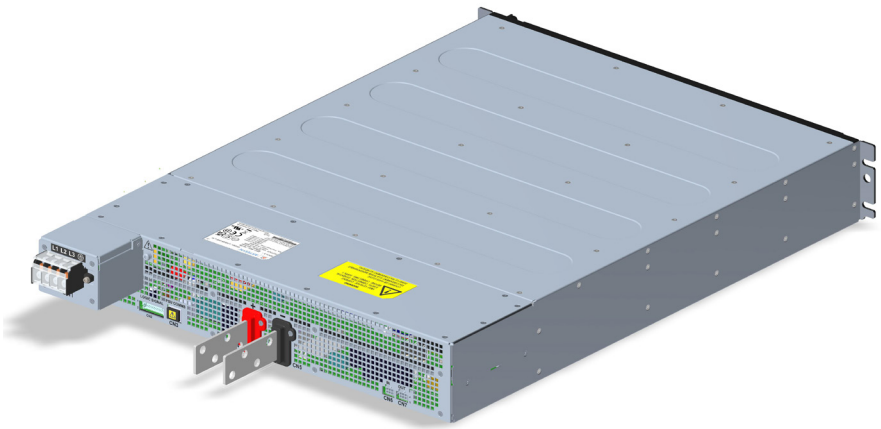
FCM30K SHELF MODEL NUMBER SCHEME							
FCM30KSHYX		-	**A**	**B**	**C**	**D**	**4XX**
Shelf Size (mm)			Input Connector Option	Interface Type	Input Option Codes	Option Codes	Hardware Code
30000 W = 85.2 x 448 x 595			T = Input Terminal Block	R = MODBUS RTU	M = PMI Added	Blank = No Option	4XX = Mod Codes
			P = Input Connection Plug (pluggable module)		N = PMI Removed	1 = Conformal Coating	
						2 = Future Option	
Module Trim Range Y =							
Code	**Volts**						
N	**Narrow/Std Trim**						
Module Output Code X =							
Code	**Volts**						
W	**54.5 V**						

Example:
FCM30KSHNW-TRN = 30K Shelf, Narrow/Standard Trim Range, W = 54.5 V, Input Terminal Block, MODBUS RTU, PMI Removed

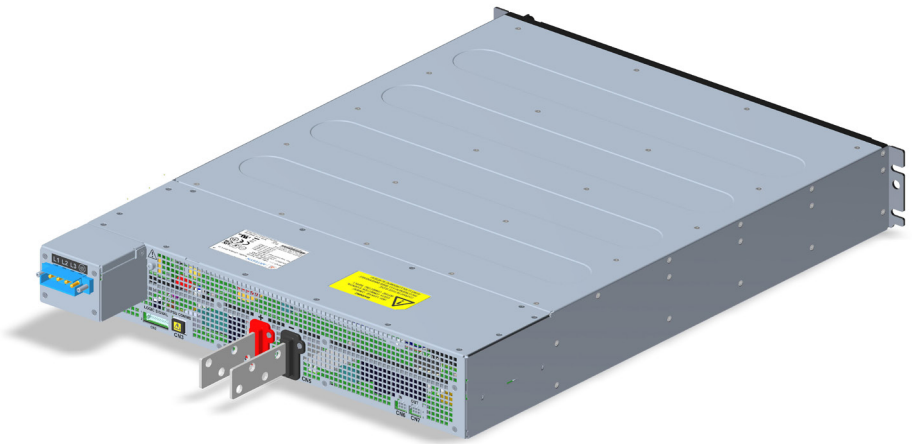
MECHANICAL DRAWINGS

FRONT 3D VIEW

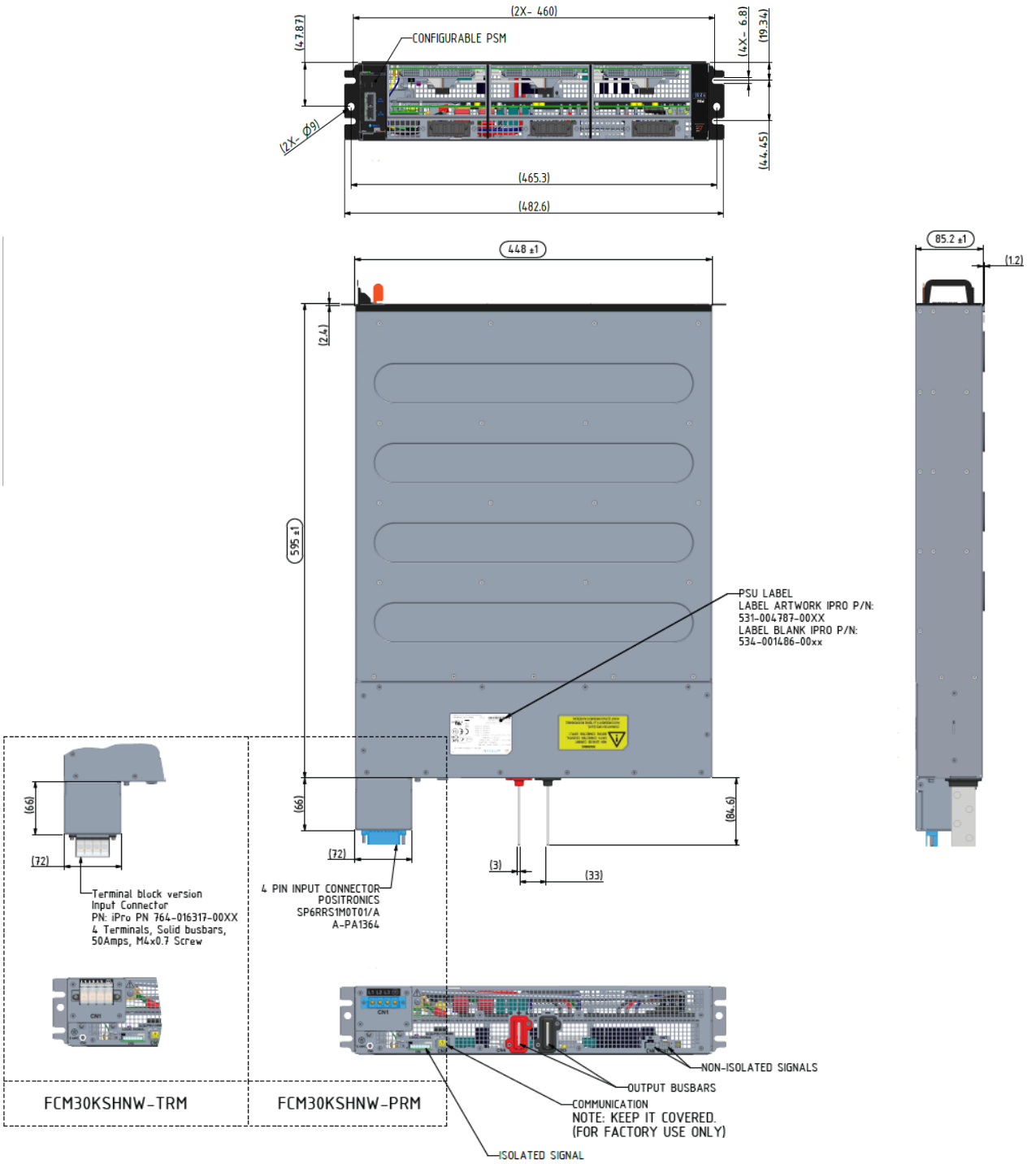
Input Terminal Block Version REAR 3D VIEW



Input Pluggable Version REAR 3D VIEW

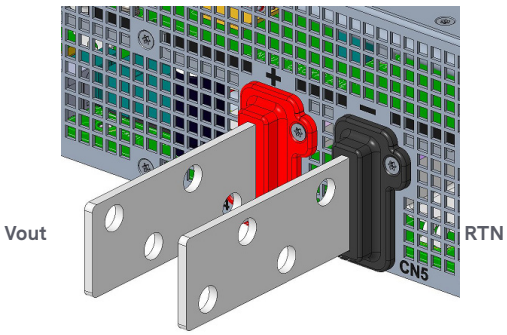


MECHANICAL DRAWINGS



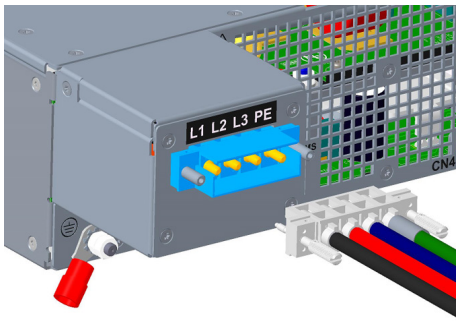
MECHANICAL DRAWINGS

DC Output Busbar



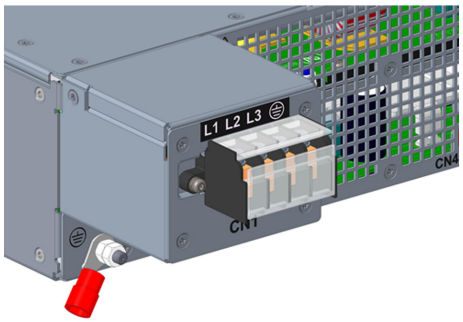
Material: 3.0 mm COPPER PLATE
Tin-Nickel Plated
Fit with Ring Terminal, M10 Stud
Vendor P/N: CT50-10 (RS)
Note: Contact AE customer support for CN5 busbar weight bearing capacity.

AC Input Connectors



Fixed Earth Connection
Ring Terminal AWG8
Vendor P/N: 19067-0008

Pluggable version details:
MFR: Positronics MPN: SP6RRS1M0T01/AA-PA1364
Scorpion Series, 4 Pins, 50Amps, w/ FMLB
Wiring colors will depend on country of use.

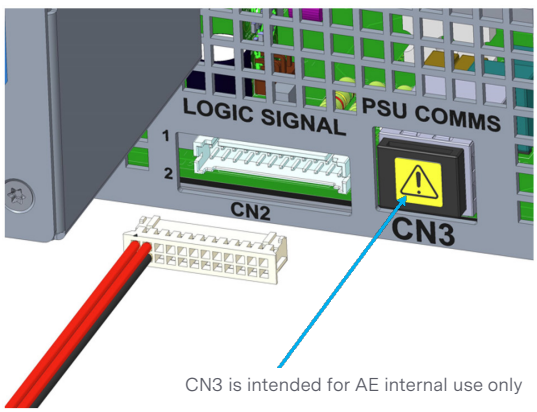


Terminal block version details: 4 Terminals, Solid busbars, 50Amps, M4x0.7 Screw

M4 terminal block screw torque requirement: 8.0Kgf-cm (min) - 10.0Kgf-cm (max)

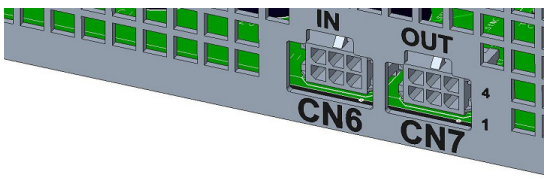
L1, L2, L3, and PE are AWG 8. Protective Earth (PE) wire (green or striped green and yellow) must always be terminated to the corresponding system Earth connection.

Signal Mating Connectors



CN3 is intended for AE internal use only

Landwin Mfg P/N: 2052P2400T-01



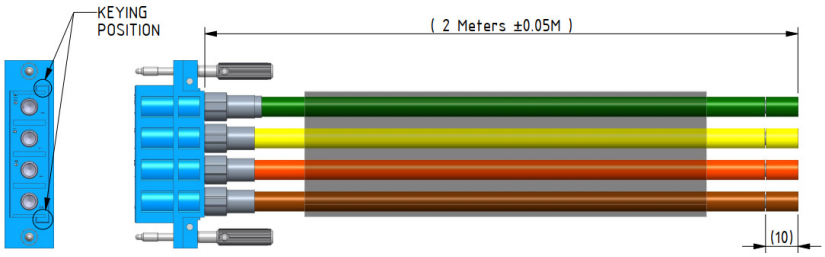
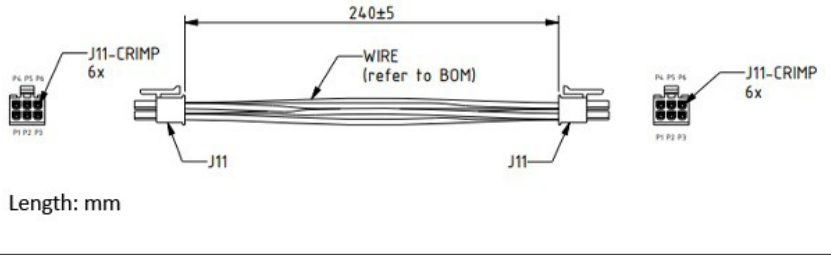
Signal Mating Connector
Molex Mfg P/N: 43025-0600

Note: CN6 and CN7 are used for parallel connection of shelves. Connect CN7 of 1 shelf to CN6 of next shelf using 750-011955-0000 (Non-isolated Signal Mating)

Note: PSU COMMS pin CN3 is intended only for AE internal debugging inside the shelf and for Factory use only. For Modbus communication, use the RJ45 at the front side located at the PSM (Power shelf Monitoring).

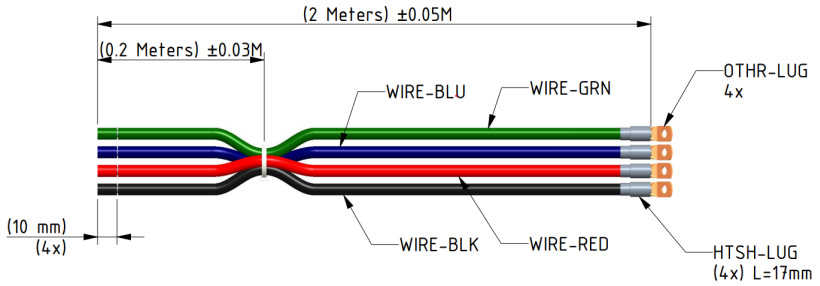
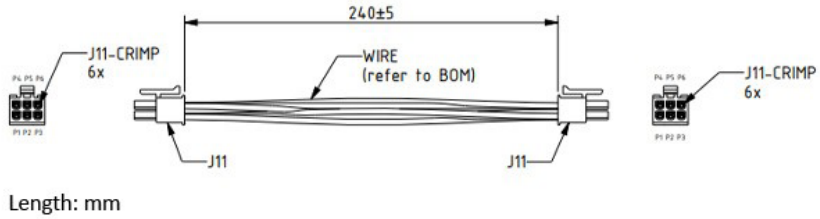
Accessories

Pluggable Version Order Test Kit number 83-788-004P

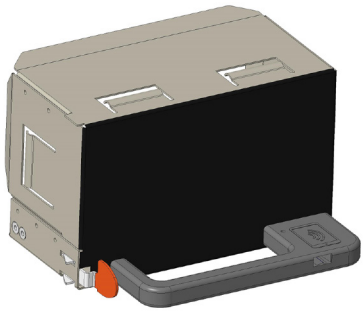
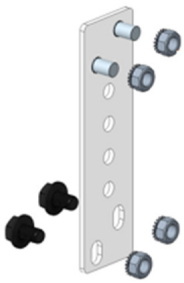
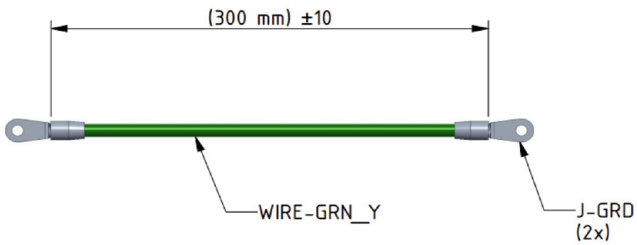
Description	Diagram
Input Mating Connector (Pluggable version)	
Isolated Signal Mating	
Non-isolated Signal Mating	

Accessories

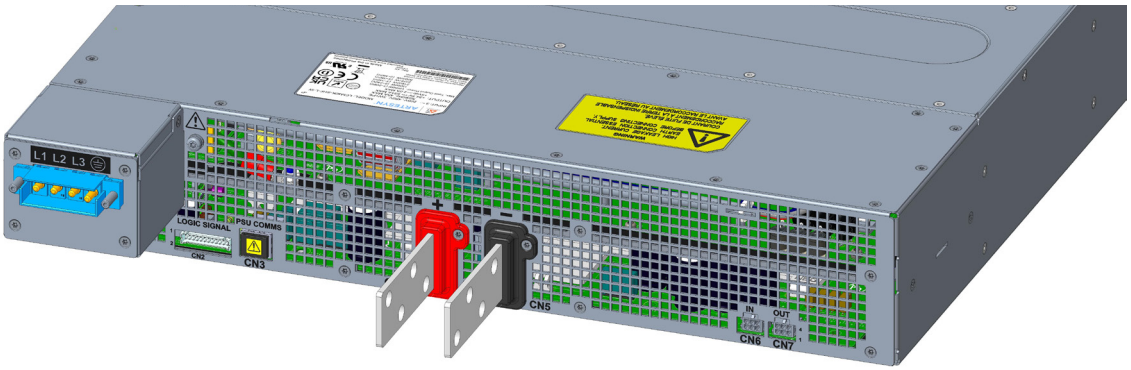
Terminal Block Version Order Test Kit number 83-788-004T

Description	Diagram
Input Mating Connector (Terminal Block version)	
Isolated Signal Mating	
Non-isolated Signal Mating	

Accessories

Description	Diagram
FCM30K Shelf Filler 83-788-007	
FCM30K 2U Parallel Bus Bar Kit 83-788-008	
Ground Connector Wire Assy 83-788-009	

PIN ASSIGNMENT

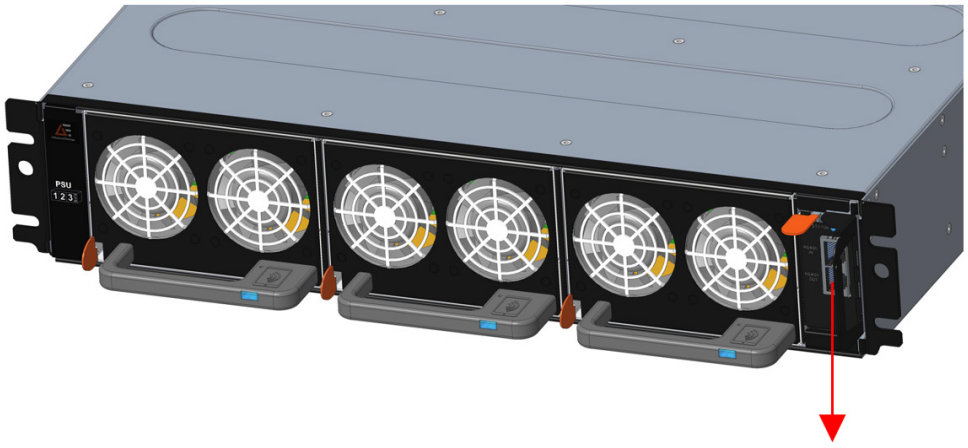


CN2		
Signal Name	Pin #	Wire Color
5VSB	1	Red
5VSB_GND_SHLF	2	Black
5VSB	3	Red
5VSB_GND_SHLF	4	Black

CN6	
Pin #	Signal Name
1	SYS_GND_SHLF
2	
3	ISHARE_SHLF_RTN
4	ISHARE_SHLF_IO
5	
6	PSU_SYNC_IO

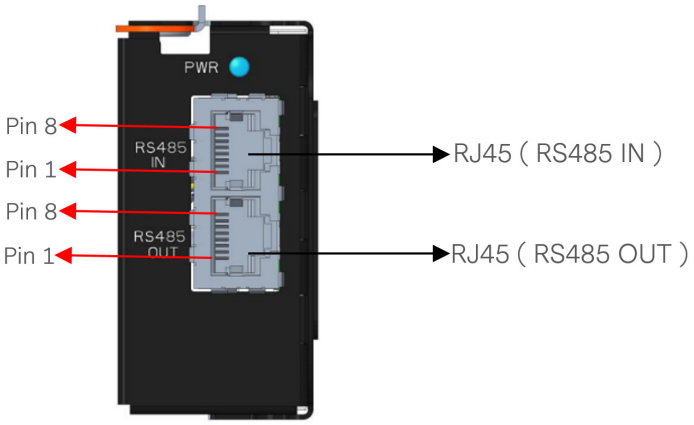
CN7	
Pin #	Signal Name
1	
2	
3	ISHARE_SHLF_RTN
4	ISHARE_SHLF_IO
5	
6	PSU_SYNC_IO

PIN ASSIGNMENT



RJ45 (RS485 IN)	
Supports Modbus RTU	
Pin#	Signal Name
1	RS485_A_SHLF
2	RS485_B_SHLF
3	N/A
4	N/A
5	N/A
6	N/A
7	5VSB
8	5VSB_GND

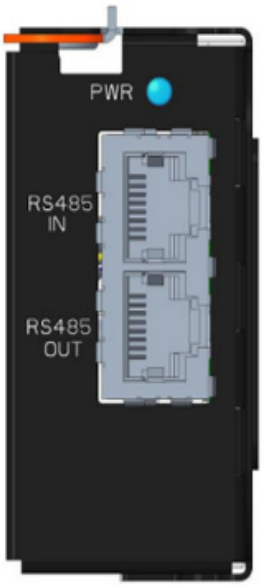
RJ45 (RS485 OUT)	
Supports Modbus/RS485	
Pin#	Signal Name
1	RS485_A_SHLF
2	RS485_B_SHLF
3	N/A
4	N/A
5	N/A
6	N/A
7	N/A
8	N/A



Note: The PSM is not hot swappable and must remain within the shelf whenever the shelf is turned on. The PSM can be replaced while the shelf is off.

LED Indicator

Condition	LED Status
Normal operation (AC present, standby output ON, main output ON)	Solid blue
Standby mode (main output OFF)	Blinking blue (1 s ON; 1 s OFF)
Fault	Solid amber
Wrong AC input connection sequence (L1 L2 L3)	Blinking amber (1 s ON; 1 s OFF)
AC input under voltage/over voltage	Blinking amber (3 s ON; 3 s OFF)
Module firmware update in progress	Fast blinking blue (0.5 s ON; 0.5 s OFF)



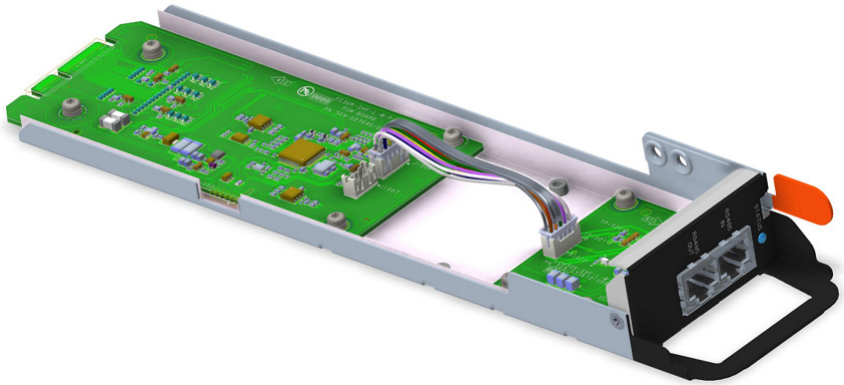
Condition	LED Status
Normal operation (INT_SUPPLY state is ON 3V3_INT_SUPPLY is ON)	Solid blue
Module firmware update in progress	Blinking blue (500 ms ON, 500 ms OFF)
Module config error*	Solid amber
Shelf internal comm error	Fast amber (200 ms ON, 200 ms OFF)
Shelf OTP	Slow amber (500 ms ON, 500 ms OFF)
No AC input power	OFF

*Default Config is 3 PSU present.

PSM FEATURES

Power System Manager (PSM)

Power System Manager (PSM) is a pluggable type AEI's PMC-Lite assembly that controls and oversees the PMI and Modules operations. FCM30K shelf and any modules inserted within the shelf will go into standby mode after removing the PSM.



Power Metering (Optional)

The power-metering interface is able to report via UART communication through PSM the following electrical input information:

Parameter	Load	Accuracy
AC input voltage	0 - 100%	±1%
AC input current	<15%	±0.5 A
	15% - 30%	±2%
	>30% - 100%	±1%
AC input active power	15% - 20%	±5%
	>20% - 100%	±3%
Power factor (error difference not in %)	15% - 30%	±0.05
	>30% - 100%	±0.01

Note: For applications beyond 50°C ambient, use the shelf variants without PMI .
For the variant without PMI. Follow the stated accuracy below:

Parameter	Load	Accuracy
AC input voltage	0 - 100%	±1%
AC input current	<20%	Fixed ±7% of rated max input current
	20% - 30%	±15%
	>30% - 100%	±10%
AC input active power	<20%	Fixed ±7% of rated max input power
	20% - 30%	±15%
	>30% - 100%	±10%
Power factor		

Variant	Operating Temperature
FCM30KSHNW-PRM	-40°C to 50°C
FCM30KSHNW-TRM	-40°C to 50°C
FCM30KSHNW-PRN	-40°C to 70°C. Above 50°C to 70°C, power is derated.
FCM30KSHNW-TRN	-40°C to 70°C. Above 50°C to 70°C, power is derated.

MECHANICAL SPECIFICATION

Parameter	Detail
Shelf metal finish	Chromate-free hot dip galvanized steel (GI steel) conforming to JIS G3302 SGCC, Z08
Shelf net weight	FCM10K module 6 kg FCM30K shelf 12 kg FCM30K shelf with three modules 30 kg
Shelf mechanical dimensions	595 mm (D) x 448 mm (W) x 85.2 mm (H)

MISCELLANEOUS SPECIFICATIONS

BURN-IN

Refer to module for burn-in condition.

MTBF

The power supply module has a minimum MTBF of 200,000 hours using the Telcordia 2 Method, with specifications at 25°C, ambient, at full load. With the power supply installed in a system in a 35°C ambient environment and operating at full load, capacitor life shall be five (5) years, minimum for ALL electrolytic capacitors contained within this power supply.

QUALITY ASSURANCE

Full QAV testing shall be conducted in accordance with Advanced Energy standards.

WARRANTY

Advanced Energy shall warrant the power supply to be free of defects in materials and workmanship for a minimum period of five (5) years from the date of shipment, when operated within specifications. The warranty shall be fully transferable to the end owner of the equipment powered by the supply.

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than four decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

PRECISION | POWER | PERFORMANCE | TRUST

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