

ARTESYN LCM4000HV/LCM12K

4000 Watts Bulk Front End/12 kWatts Power Shelf
Centralized Power for LED Horticulture Lighting



Advanced Energy's Artesyn LCM4000HV series and associated LCM12K mounting shelf has been designed specifically to provide a centralized current source for medium to large scale LED lighting and horticulture applications. The unique input design allows all standard AC inputs 208 VAC to 600 VAC from single to 3 phase sources. The output of each 4 kW block provides flicker free current source from 0 to 16 A at an output voltage range between 100 VDC to 300 VDC. High nominal operating voltage provides the benefits of lower cost standard wiring and higher efficiency with minimal voltage drop over long distance.

For large systems stacking 10 shelves in a short 10U cabinet would provide 120 kW for a normal sized grow area.

SPECIAL FEATURES

- Wide input voltage range
 - High efficiency: up to 95%
 - Industrial safety
 - Five-year warranty
 - Low cost
 - Digital and analog communication
 - Scales easily (Module/Shelf/Rack)
 - Meets DLC 2.1 requirements
 - Supports Artesyn iTS and IHLC
- LCM12K:
- Accepts 3 types of input configurations (3-PH delta 4W, 3-PH wye 4W, 3-PH wye 5 W)
 - Houses three 4 kW power modules
 - 446.3 mm x 504.3 mm x 43.7 mm
- LCM4000HV:
- 4000 W output power
 - 480 mm x 140 mm x 40.3 mm
 - 24 Watts per cubic inch
 - Variable speed "Smart Fans"
 - Optional dust filter available
 - DSP controlled

AT A GLANCE

Total Power

LCM4000HV: 4000 Watts
LCM12K: 12 kWatts

Input Voltage

LCM4000HV: Single Phase
180 to 264 VAC
311 to 528 VAC

LCM12K: Three Phase
180 to 264 VAC
342 to 528 VAC
540 to 660 VAC (WYE with Neutral)

Output

LCM4000HV:
Voltage source: 100 to 300 VDC
Current source: 0 to 16 A

COMPLIANCE

- EMI Class A
- EN61000 Immunity
- RoHS 3

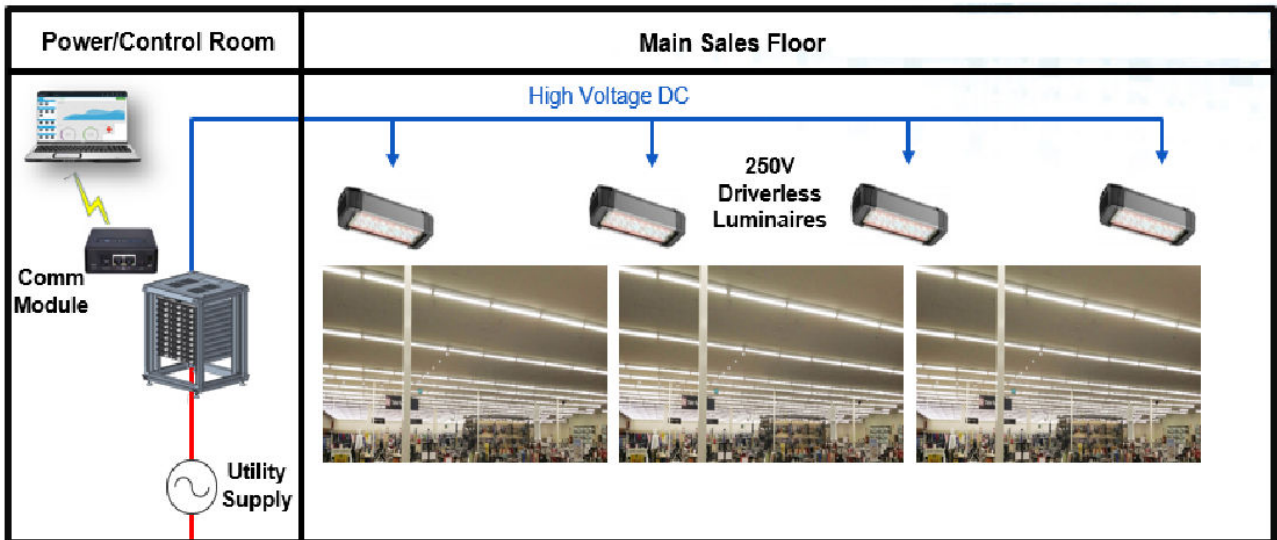
SAFETY

- UL 62368-1 Listed
- CSA 62368-1 Listed
- EN 62368-1 Listed
- IEC 62368-1 Listed
- CB Certificate and Report (IEC 62368-1/IEC 60950-1)
- CE (LVD+RoHS)
- UKCA Mark

APPLICATIONS



Retail Store LED Lighting



ELECTRICAL SPECIFICATIONS

| Input - LCM4000HV | |
|--------------------------|---|
| Input range ¹ | 180 to 264 VAC 311 to 528 VAC |
| Frequency | 47 to 63 Hz, Nominal 50/60 Hz |
| Input fusing | Both lines fused |
| Inrush current | < 60 A peak at 264 VAC, < 60 A peak at 528 VAC |
| Power factor | 0.99 at 100% load, at both 208 VAC and 480 VAC input |
| Harmonics | Meets IEC 61000-3-12 requirements |
| Input current | 25 A max at 180 VAC |
| No load power | 35 W max at 180 VAC |
| Efficiency | 95.0% typical at 480 VAC input |
| Isolation voltage | Primary to protective earth (PE) = 4000 VDC Primary to secondary = 4000 VDC Secondary to protective earth (PE) = 3200 VDC Primary to user-accessible = 6000 VDC Secondary to user-accessible = 5000 VDC |
| Input - LCM12K | |
| Input range ¹ | 180 to 229 VAC (3-PH 4W) 342 to 528 VAC (3-PH 4W. Add Neutral for 600 VAC) |
| Input current | 45 A max per phase at 180 VAC 25 A max per phase at 342 VAC |

Note 1 - Detailed input specifications please refer to ordering information section.

ELECTRICAL SPECIFICATIONS

| LCM4000HV Output - Module In Voltage Source Mode | | |
|--|---|--|
| Nominal output voltage | 250 VDC | |
| Maximum output current | 16 A | |
| Maximum output power | 4000 W | |
| Output voltage adjustability range | 100 VDC to 300 VDC | |
| Output voltage adjustment accuracy | ±0.5% of nominal output (via digital command) ±1% of nominal output (via analog command) | Ambient temperature at 23 °C ± 5 °C (with 30 minutes warm-up period) |
| Output static regulation ¹ | 0.5% of nominal output (line regulation) 0.75% of nominal output (load regulation) | Ambient temperature at 23 °C ± 5 °C (with 30 minutes warm-up period) |
| Line transient regulation ^{2,3} | ±3% of nominal output voltage | Recovery time of 1 ms at recovery value of 0.5% of nominal output voltage |
| Load transient regulation ² | ±5% of nominal output voltage | Load transient at 50 Hz to 5 kHz, duty cycle 10% to 90%, 1 A/us, 50% step load change |
| Output voltage transient regulation ^{2,4} | ±5% of nominal output voltage | Recovery time of 1 ms at recovery value of 0.5% of nominal output voltage |
| Output ripple & noise (peak to peak) | 0.5% of nominal output voltage | Measured with 0.1 µF ceramic and 10 µF tantalum capacitor on any output, 20 MHz, at 25 °C |
| Output voltage overshoot & undershoot ⁵ | ±5% of nominal output voltage ±1% of nominal output voltage | Output current equal or less than 1.6 A Output current more than 1.6 A |
| Max output capacitance | 600 µF | |
| Output voltage rise time | 80 ms maximum | Ramp of main output voltage from 0% to 100% of its final setpoint within the regulation band, under any load condition |
| Hold-up time | 10 ms minimum | Tested at nominal output voltage, maximum output current |
| Overvoltage protection (OVP) | First level: 125% of voltage set-point, Secondary level: 130% of max output voltage | Latch Latch |
| Overload protection (OCP) | First level: constant current clamp (adjustable up to 104% of maximum output current) Second level: fast latch (set at 115% of maximum output current) | Auto-recovery Latch |
| Over temperature protection (OTP) | Over temperature protected | Auto-recovery |
| Short circuit protection | Short circuit protected | |
| LCM12K Output - Module In Voltage Source Mode | | |
| Maximum output current | 48 A (16A per PSU) | |
| Maximum output power | 12 kW | |

Note 1 - Operate at steady state line and load conditions.

Note 2 - Minimum dynamic load 1.6 A, maximum test capacitance 470 µF.

Note 3 - Line transient change at ±10%.

Note 4 - Occur during an on-the-fly adjustment of output voltage set-point. Slew rate at 4 V/ms.

Note 5 - Recover within 300 ms, rise is monotonic.

ELECTRICAL SPECIFICATIONS

| LCM4000HV Output - Module In Current Source Mode | | |
|--|---|---|
| Maximum output current | 16 A | |
| Output voltage range | 100 VDC to 300 VDC | |
| Maximum output power | 4000 W | LCM4000HV |
| Output current adjustability range | 0.48 A to 16 A | Less than 0.48A will be considered as 0A or OFF |
| Output current adjustment accuracy | ±2% of max output current (via digital command) ±2.5% of max output current (via analog command) | Ambient temperature at 23 °C ± 5 °C (with 30 minutes warm-up period) |
| Output static regulation ¹ | 1% of max output current (line regulation) 2.5% of max output current (load regulation) | Ambient temperature at 23 °C ± 5 °C (with 30 minutes warm-up period) |
| Line transient regulation ^{2,3} | ±3% of max output current | Recovery time of 1 ms at recovery value of 0.5% of max output current |
| Output current transient regulation ^{2,4} | ±5% of max output current | Recovery time of 1 ms at recovery value of 0.5% of nominal output voltage |
| Output ripple & noise (RMS) | 3.5% of maximum output current | Use current probe to measure the ripple current, 20 MHz |
| Output current overshoot & undershoot ⁵ | ±1% of nominal output current | Output voltage 100V and above |
| Max output capacitance | 600 uF | |
| Output current rise time | 80 ms maximum | Ramp of main output voltage from 10% to 100% of its final setpoint within the regulation band, under any load condition |
| Hold-up time | 10 ms minimum | Tested at nominal output voltage, maximum output current |
| Overvoltage protection (OVP) | First level: constant voltage clamp (adjustable up to 120% of nominal output voltage) | Auto-recovery |
| | Second level: fast latch (set at 130% of nominal output voltage) | Latch |
| Overload protection (OCP) | First level: 115% of current set-point | Latch |
| | Secondary level: 120% of max output current | Latch |
| Over temperature protection (OTP) | Over temperature protected | Auto-recovery |
| Short circuit protection | Short circuit protected | |
| LCM12K Output - Module In Current Source Mode | | |
| Maximum output current | 48 A (16 A per PSU) | |
| Maximum output power | 12 kW | |

Note 1 - Operate at steady state line and load conditions.

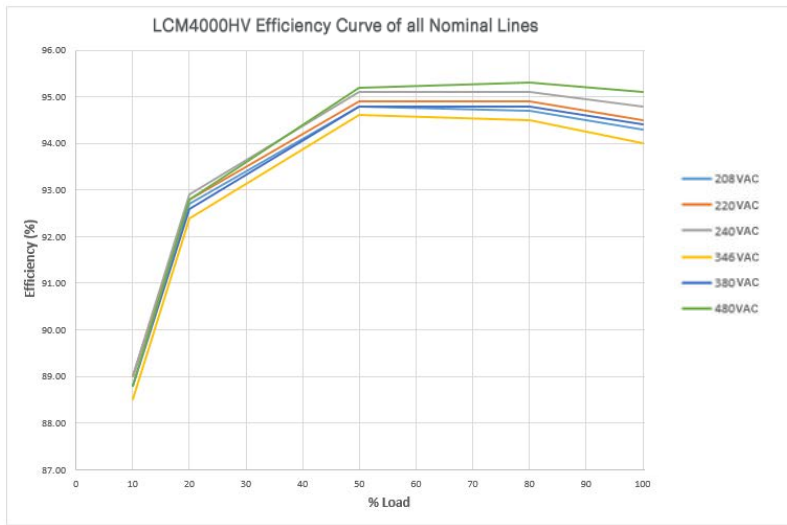
Note 2 - Minimum dynamic load is equivalent to 40% of nominal output voltage, maximum test capacitance 470 uF.

Note 3 - Line transient change at ±10%.

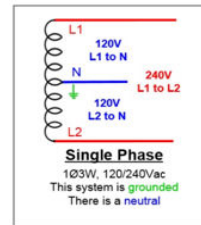
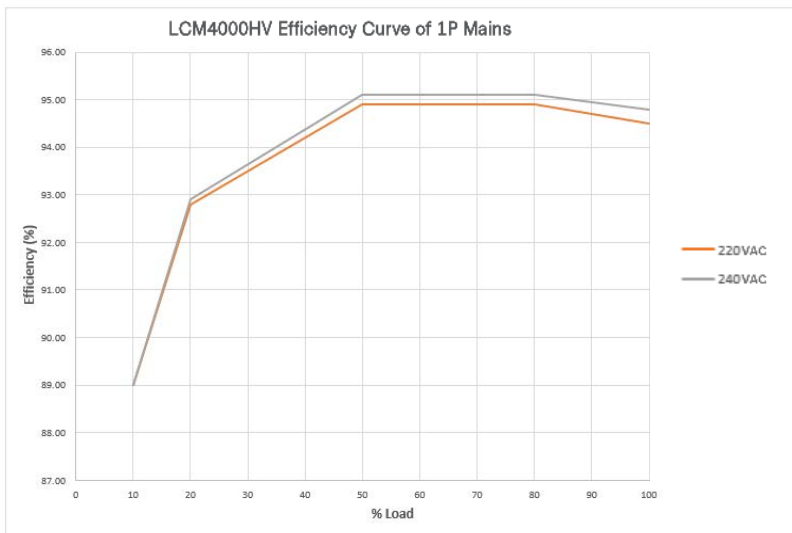
Note 4 - Occur during an on-the-fly adjustment of output current set-point. Slew rate at 4% of Iout-max per ms.

Note 5 - Recover within 300 ms, rise is monotonic.

ELECTRICAL SPECIFICATIONS

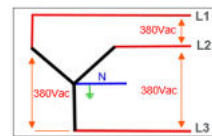
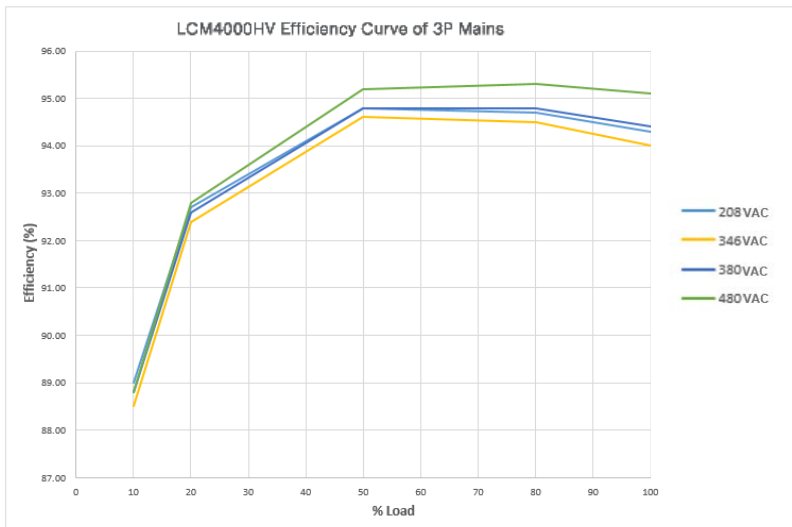


| Load % | Efficiency (%) | | | | | |
|--------|----------------|---------|---------|---------|---------|---------|
| | 208 VAC | 220 VAC | 240 VAC | 346 VAC | 380 VAC | 480 VAC |
| 10 | 89.00 | 89.00 | 89.00 | 88.50 | 88.80 | 88.80 |
| 20 | 92.70 | 92.80 | 92.90 | 92.40 | 92.60 | 92.80 |
| 50 | 94.80 | 94.90 | 95.10 | 94.60 | 94.80 | 95.20 |
| 80 | 94.70 | 94.90 | 95.10 | 94.50 | 94.80 | 95.30 |
| 100 | 94.30 | 94.50 | 94.80 | 94.00 | 94.40 | 95.10 |

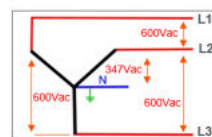


- 220 VAC (nominal)
- 240 VAC (nominal)

| Load % | Efficiency (%) | |
|--------|----------------|---------|
| | 220 VAC | 240 VAC |
| 10 | 89.00 | 89.00 |
| 20 | 92.80 | 92.90 |
| 50 | 94.90 | 95.10 |
| 80 | 94.90 | 95.10 |
| 100 | 94.50 | 94.80 |



- 208 VAC (nominal)
- 380 VAC (nominal)
- 480 VAC (nominal)



- 347 VAC (nominal)

| Load % | Efficiency (%) | | | |
|--------|----------------|---------|---------|---------|
| | 208 VAC | 346 VAC | 380 VAC | 480 VAC |
| 10 | 89.00 | 88.50 | 88.80 | 88.80 |
| 20 | 92.70 | 92.40 | 92.60 | 92.80 |
| 50 | 94.80 | 94.60 | 94.80 | 95.20 |
| 80 | 94.70 | 94.50 | 94.80 | 95.30 |
| 100 | 94.30 | 94.00 | 94.40 | 95.10 |

ENVIRONMENTAL SPECIFICATIONS

| Operating Conditions | |
|-----------------------|---|
| Operating Temperature | 0 °C to 50 °C at 100% rated load, 50 °C to 60 °C derate to 3200 W |
| Storage Temperature | -40 °C to 85 °C |
| Operating Humidity | 20% to 90% non condensing |
| Storage Humidity | 10% to 95% non condensing |
| Operating Altitude | Up to 9,842 feet above sea level (3,000 meters) |
| Storage Altitude | Up to 30,000 feet above sea level (9,144 meters) |
| Shipping and Handling | NSTA for <100 lbs; MIL-STD-2073-1 >100 lbs |
| Cooling | Internal fan with variable speed control |
| Vibration and Shock | IEC068-2 / IEC721-3 Standard & Levels |

ORDERING INFORMATION

LCM4000HV

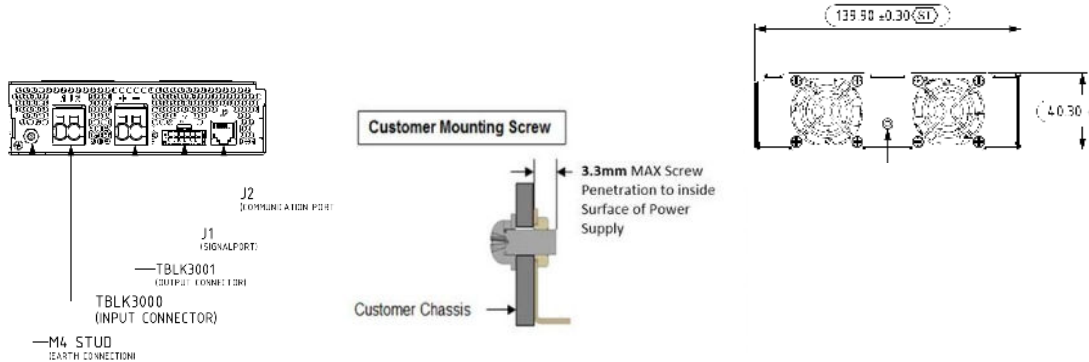
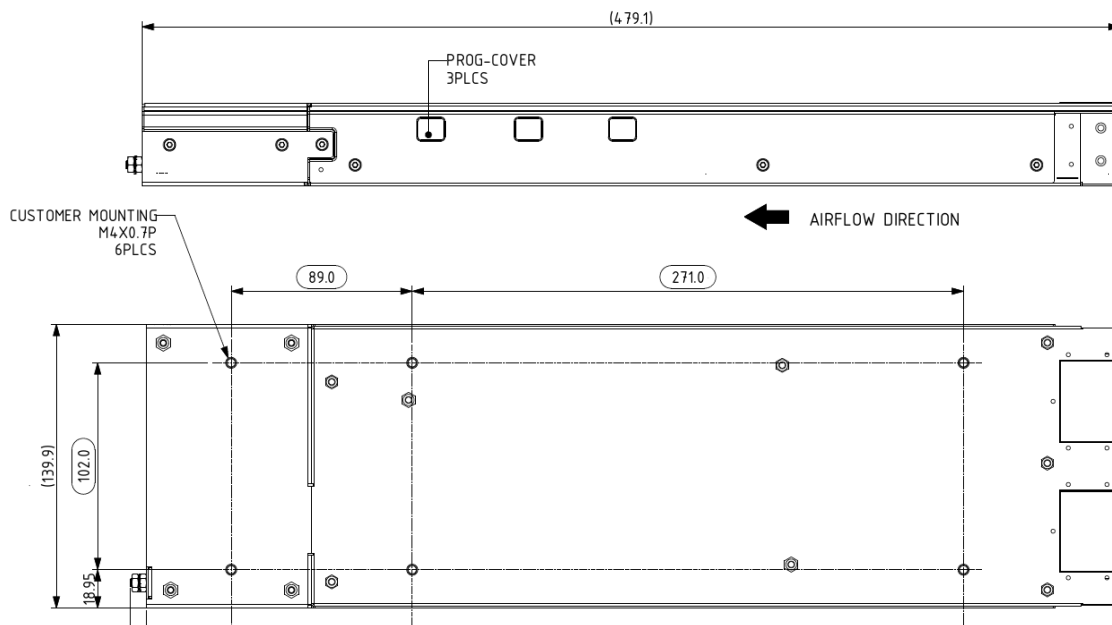
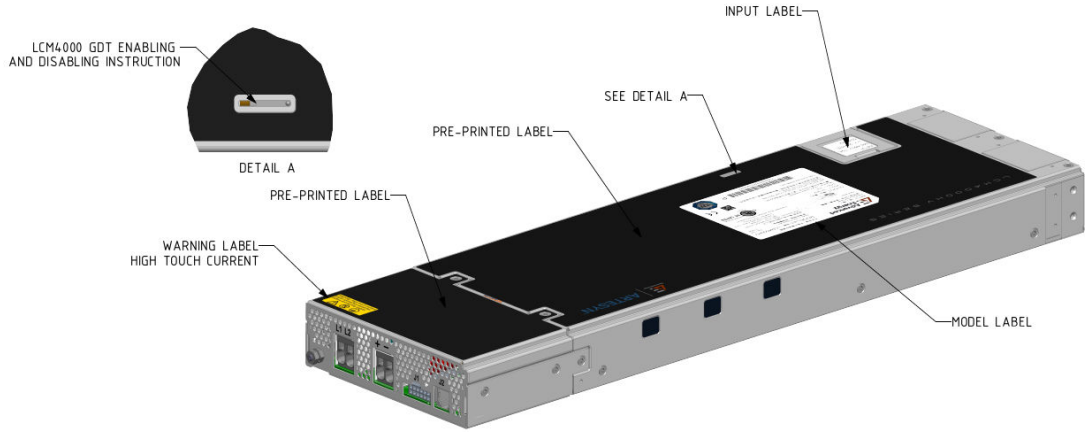
| Description | Model Number | Input Range | Default Output Setting ¹ | | |
|-------------------------------------|---------------|----------------|-------------------------------------|----------------|----------------|
| | | | Output Mode | Output Current | Output Voltage |
| Standalone 4 kW module | LCM4000HV-T-P | 180 to 264 VAC | Current Source | 0 A | 250 VDC |
| | LCM4000HV-T-S | 311 to 528 VAC | Current Source | 0 A | 250 VDC |
| Pluggable 4 kW module for shelf use | LCM4000HV-P-P | 180 to 264 VAC | Current Source | 0 A | 250 VDC |
| | LCM4000HV-P-S | 311 to 528 VAC | Current Source | 0 A | 250 VDC |

Note 1 - Output voltage and current adjustment range please refer to Electrical Specifications section.

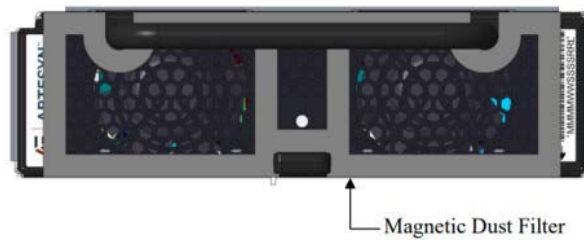
LCM12K

| Model Number | Description | Input Range |
|--------------|-----------------------|-----------------------------------|
| LCM12K-SHF-N | 12 kW 250 V 1U SHELF | HIGH LINE, 600 VAC W/NEUTRAL |
| LCM12K-SHF-P | 12 kW 250 V 1U SHELF | LOW LINE, 200/208/220/230/240 VAC |
| LCM12K-SHF-S | 12 kW 250 V 1U SHELF | HIGH LINE, 380/480 VAC |
| LCM12K-BLK | 1U BLANK FILLER PANEL | N/A |

MECHANICAL DRAWINGS - LCM4000HV-T



MECHANICAL DRAWINGS - OPTIONAL DUST FILTER



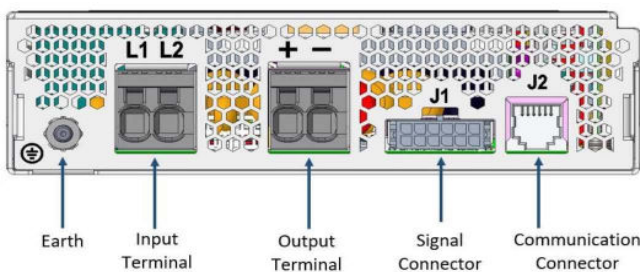
Optional dust filter part number: 73-788-014

Installation instructions:

Place the LCM4000HV dust filter over the LCM4000HV air intakes (Refer to the image above).

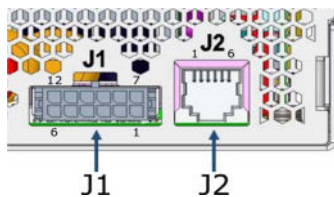
Ensure that the LCM4000HV dust filter sticks well to the LCM4000HV front panel.

PIN ASSIGNMENT - LCM4000HV-T



| Connector Details | |
|-----------------------------|---------------------------|
| Input terminal [†] | Euro style terminal block |
| Output terminal | Euro style terminal block |
| Signal connector | Molex micro-fit |
| Communication connector | RJ11 |

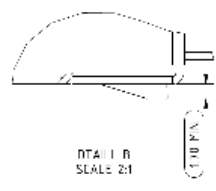
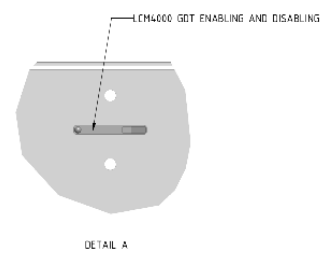
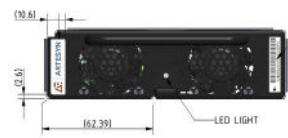
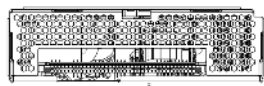
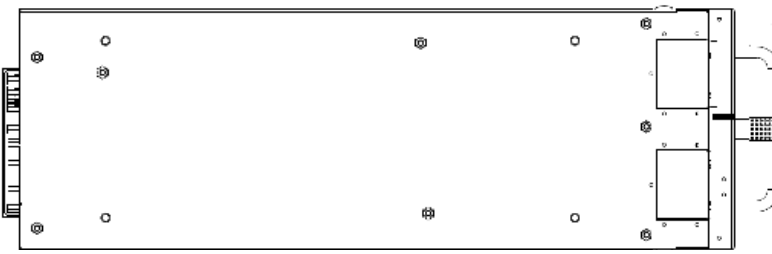
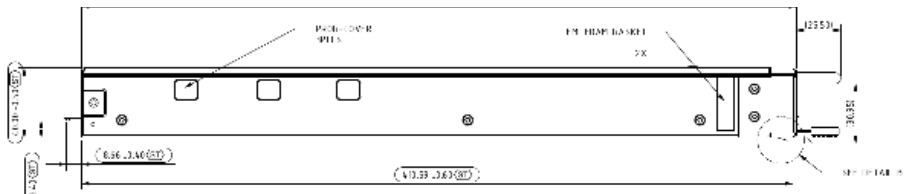
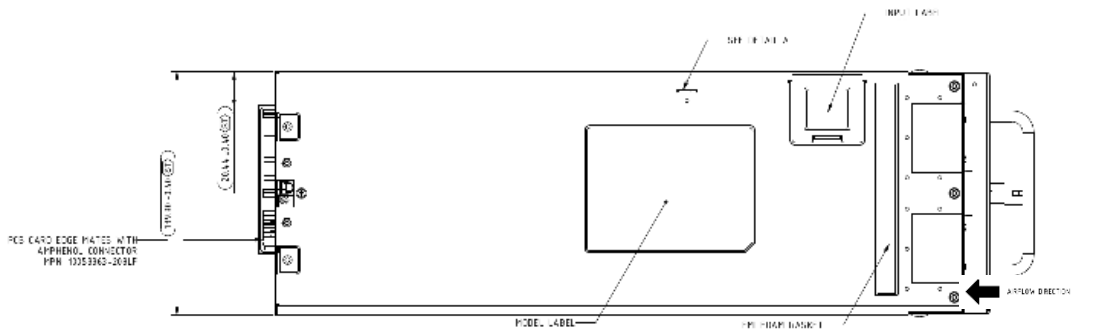
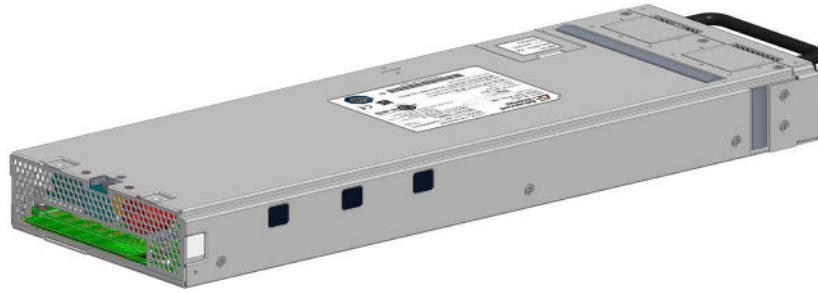
Note 1 - For single phase application, the Neutral is connected to either L1 or L2 terminal.



Signal and Communication Connector (J1 & J2)

| J1 Pin Number | Signals | Description |
|---------------|-------------|-----------------------------------|
| 1 | SPARE | SPARE |
| 2 | SPARE | SPARE |
| 3 | PSU_AC_OK# | Global AC_OK |
| 4 | PSU_DC_OK# | Global DC_OK |
| 5 | PSU_ALERT# | Alert signal |
| 6 | PSU_ON# | Output remote on/off |
| 7 | ISO_RTN | Isolated signal return |
| 8 | ISO_RTN | Isolated signal return |
| 9 | 5V_ISO | 5V_ISO standby power |
| 10 | 0-24V_PROG | 0-24V programming |
| 11 | 0-10V_PROG | 0-10V programming |
| 12 | ISO_RTN | Isolated signal return |
| J2 Pin Number | Signals | Description |
| 1 | SPARE | SPARE |
| 2 | SPARE | SPARE |
| 3 | RS485 RTN | Communication lines RTN for RS485 |
| 4 | SPARE | SPARE |
| 5 | RS485_A_EXT | Communication lines for RS485 |
| 6 | RS485_B_EXT | Communication lines for RS485 |

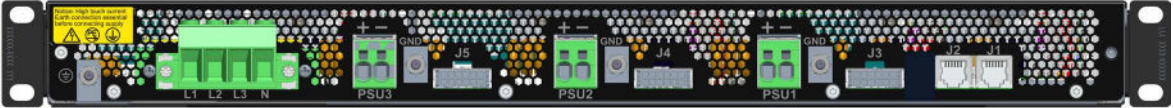
MECHANICAL DRAWINGS - LCM4000HV-P



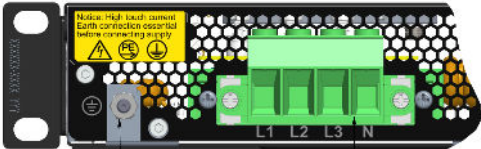
MECHANICAL DRAWINGS - LCM12K



LCM12K Shelf Front View



LCM12K Shelf Rear View

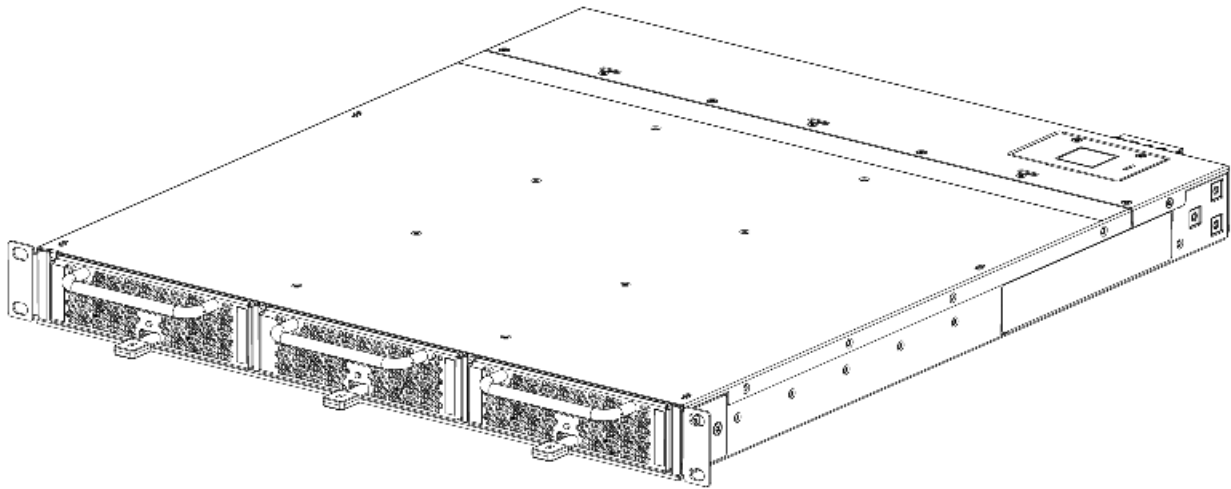


M4 STUD
(EARTH CONNECTION)
NUT TIGHTENING TORQUE
8-10 kgf-cm or
0.78-0.98 N-m

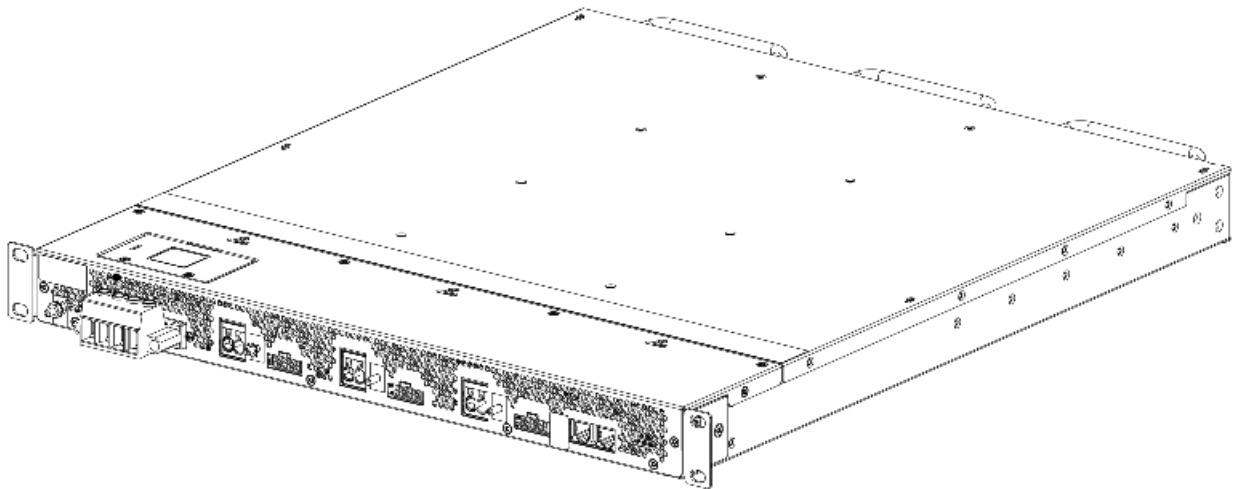
INPUT CONNECTOR
TERMINAL BLOCK
DETAIL VIEW ROTATED 90
SCALE: NTS
MFR: PHOENIX CONTACT
MPN: 1967472
CONDUCTOR RANGE
18 - 6 AWG
TIGHTENING TORQUE
1.8 N-m MAX or
18Kgf-cm MAX

MECHANICAL DRAWINGS - LCM12K

Ear Bracket Mounting Option



Option A - Ear bracket at front

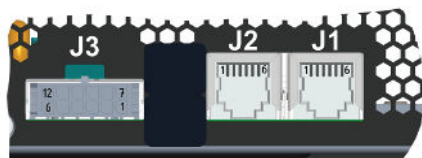
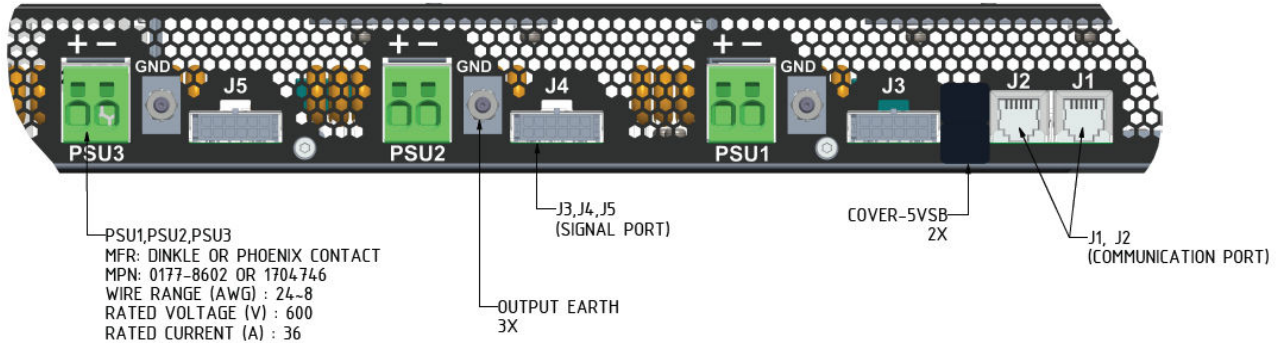


Option B - Ear bracket at rear

| Mounting Screw Information | |
|----------------------------|----------------------|
| Thread type | Metric 3.5 |
| Head type & length | Torx flat head, 8 mm |
| Torque | 12-14 kgf-cm |

PIN ASSIGNMENT - LCM12K

Output/Singal/Communication Connectors



| J1/J2 Pin Number | Signals | Description |
|------------------|-------------|-----------------------------------|
| 1 | SPARE | SPARE |
| 2 | SPARE | SPARE |
| 3 | RTN_RS485 | Communication lines RTN for RS485 |
| 4 | SPARE | SPARE |
| 5 | RS485_A_EXT | Communication lines for RS485 |
| 6 | RS485_B_EXT | Communication lines for RS485 |

| Pin Number | J3 | J4 | J5 |
|------------|---------------|---------------|---------------|
| 1 | PS_ON#1 | PS_ON#2 | PS_ON#3 |
| 2 | PSU_PRESENT#1 | PSU_PRESENT#2 | PSU_PRESENT#3 |
| 3 | ALERT#1 | ALERT#2 | ALERT#3 |
| 4 | AC_OK#1 | AC_OK#2 | AC_OK#3 |
| 5 | DC_OK#1 | DC_OK#2 | DC_OK#3 |
| 6 | 0-10V_PROG1_1 | 0-10V_PROG1_2 | 0-10V_PROG1_3 |
| 7 | ISO_PRTN | ISO_PRTN | ISO_PRTN |
| 8 | 0-24V_PROG1_1 | 0-24V_PROG1_2 | 0-24V_PROG1_3 |
| 9 | ISO_PRTN | ISO_PRTN | ISO_PRTN |
| 10 | SPARE | SPARE | SPARE |
| 11 | SPARE | SPARE | SPARE |
| 12 | SPARE | SPARE | SPARE |

MISCELLANEOUS SPECIFICATIONS

MTBF

The power supply has a minimum MTBF of 200K hours using the Telcordia specifications @ 25 °C ambient at full load, nominal line of 220V/240 VAC. With the power supply installed in a system in a 35 °C ambient environment and operating at full load, capacitor life will be 5 years minimum for ALL electrolytic capacitors contained within this power supply. The power supply will demonstrate an MTBF level of > 500,000 hours based on actual field population operational hours.

QUALITY ASSURANCE

Full QAV testing is conducted in accordance with Advanced Energy’s Artesyn Standards with reports available upon request.

WARRANTY

Advanced Energy’s Artesyn Embedded Power 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 is fully transferable to the end owner of the equipment powered by the supply.

WEIGHT

| Model | Weight | |
|-------------|------------|------------|
| LCM12K-SHF | 4728 grams | 10.40 lbs. |
| LCM4000HV-P | 2992 grams | 6.58 lbs. |
| LCM4000HV-T | 3316 grams | 7.30 lbs. |



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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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