LCM1500

1500 W Bulk Front End



Advanced Energy's LCM1500 series provide for a very 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 89 percent, these units are ideal for use in industrial and medical applications. They are backed by a comprehensive set of industrial and medical 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

1500 W

of Outputs

Single

Outputs

12 to 48 VDC
Optional 5 VDC standby

SPECIAL FEATURES

- 1500 W output power
- Low cost
- 2.5" x 5.2" x 10.0"
- 12 Watts per cubic inch
- Industrial/Medical safety
- -40°C to 70°C with derating
- Optional 5 VDC @ 2 A housekeeping
- High efficiency: 89% typical
- Variable speed "Smart Fans"
- DSP controlled
- Conformal coat option
- ± 10% adjustment range
- Margin programming
- OR-ing FET
- Semi F47 compliance at high line

COMPLIANCE

- EMI Class A
- EN61000 Immunity
- RoHS3

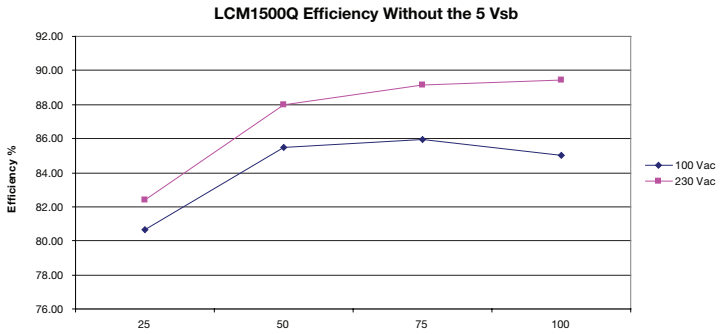
SAFETY

- UL/cUL Recognized ITE (UL/CSA62368-1)
- UL/cUL Recognized Medical (ANSI/AAMI ES60601-1)
- TUV-SuD ITE + Medical (EN62368-1 and EN60601-1)
- CE LVD (EN62368-1 + RoHS)
- BSMI
- CB Report
- CE and UKCA Mark
  - · through Demko for IEC60950-1
  - · through TUV-SuD for IEC60601-1

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ELECTRICAL SPECIFICATIONS

Input	
Input Range	90 to 264 VAC (Operating) 115/230 VAC (Nominal) Terminal Block
Frequency	47 to 440 Hz, Nominal 50/60
Input Fusing	Internal 30 A fuses, both lines fused
Inrush Current	≤ 25 A peak
Power Factor	0.99 typical, meets EN61000-3-2
Harmonics	Meets IEC 1000-3-2 requirements
Input Current	18 A RMS max input current, at 100 VAC
Hold Up Time	14 ms minimum for main O/P, at full rated load
Efficiency	> 89% typical at full load / 230 VAC nominal
Leakage Current	< 400 µA @ 240 VAC for UL test method
Isolation Voltage	PRI-Chassis 2087 VAC Basic PRI-SEC 4000 VAC Reinforced 2xMOPP SEC-Chassis 500 VDC



ELECTRICAL SPECIFICATIONS

Output		
Output Rating	See Ordering Information Table	
Factory Set Point	± 0.5%	230 VAC @ half load
Total Regulation	Main Output: ± 2.0% 5 Vsb: ± 5%	Combined line/load/temperature change, warm-up drift when measured at output terminal
Rated Load	1500 W maximum	Derate linear to 50% from 50 °C to 70 °C
Minimum Load	Main Output @ 0A 5 Vsb @ 0A	No loss of regulation
Output Ripple	Main Output: 1% max p-p 5 Vsb: 50 mV max p-p	Measured with 0.1 µF Ceramic and 10 µF Tantalum Capacitor on any output, 20 MHz
Output Voltage Overshoot		No overshoot/undershoot outside the regulation band during on or off cycle
Transient Response	Peak Deviation: ± 4% Setting time < 300 µS	50% load step @ 1 A/µs Step load valid between 10% to 100% of output rating Recovery time to within 1% of set point at onset of transient
Max Units in Parallel	Up to 4	
Remote Sense		Compensation up to 500 mV
Short Circuit Protection (SCP)	Protected, no damage to occur	Bounce mode
Overcurrent Protection (OCP)	105% to 125% 120% to 170%	Main output (Bounce mode) 5 Vsb output (Bounce mode)
Overvoltage Protection (OVP)	125% to 145% 110% to 125%	Main output (Latch mode) 5 Vsb output (Latch mode)
Overtemperature Protection (OTP)	55 to 65 °C ambient temperature	Shut down and auto-recover

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature range	-40 to +70 °C linear derating to 50% from 50°C to 70°C. For "L" version linear derating starts at 45°C
Storage Temperature	-40 to +85 °C
Humidity	10% to 95% Non-operating. 20-90% operating. Conformal coat option available
Altitude	Operating - 16,404 feet (5000 m) Storage - 30,000 feet (9144 m)
Shock	MIL-STD-810F 516.5 Procedure I, VI Storage
Vibration	MIL-STD-810F 514.5 Cat. 4, 10 Storage
Fan Noise	< 45 dBA, 80% load at 30°C. For the "L" version, the noise is < 61dBA at 80% load at 25°C

ORDERING INFORMATION TABLE 1

Model Number	Output	Nominal Output Voltage Set Point	Set Point Tolerance	Adjustment Range	Current		Output Ripple P/P (0-50 ˚C)	Max Continuous Power	Combined Line/ Load Regulation
					Min	Max			
LCM1500L	12 V	12 V	±0.5%	10.8 - 13.2 V	0 A	133 A	120 mV	1500 W	2%
LCM1500N	15 V	15 V	±0.5%	13.5 - 16.5 V	0 A	100 A	150 mV	1500 W	2%
LCM1500Q	24 V	24 V	±0.5%	21.6 - 26.4 V	0 A	67 A	240 mV	1500 W	2%
LCM1500R	28 V	28 V	±0.5%	25.2 - 30.8 V	0 A	53 A	280 mV	1500 W	2%
LCM1500U	36 V	36 V	±0.5%	32.4 - 39.6 V	0 A	43 A	360 mV	1500 W	2%
LCM1500W	48 V	48 V	±0.5%	43.2 - 52.8 V	0 A	33 A	480 mV	1500 W	2%

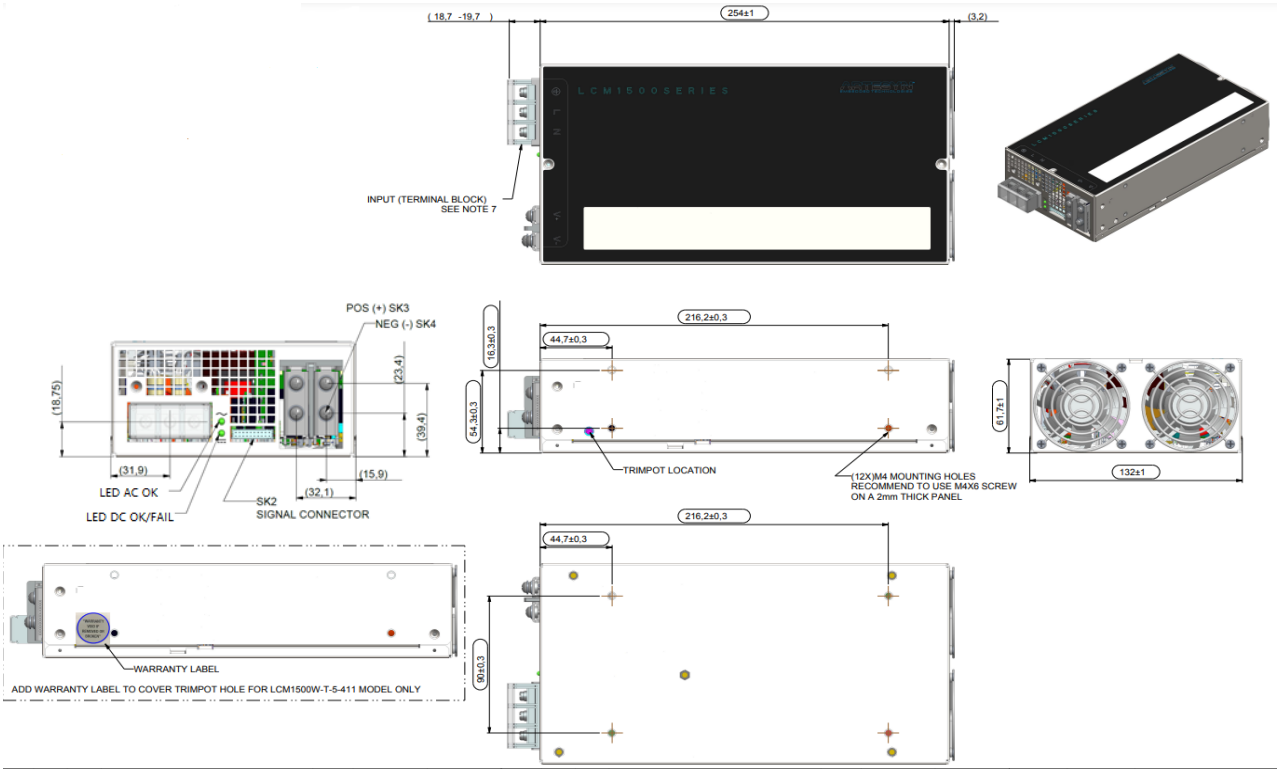
Note: LCM1500Q is 80 PLUS® certified

ORDERING INFORMATION TABLE 2

LCMXXXXY		-	A	-	B	-	C	-	###
Case Size			Input Termination		Acoustic Noise		Option Codes*		Hardware Code
1-Phase input where XXXX =									
1500 = 2.5” x 5.2” x 10.0”, 1500W					Blank = Standard		Blank = No Options		Factory Assigned for Modiefied Standards
			T = Terminal Block				1 = Conformal Coat		
Voltage Code Y =							2 = Reverse Air		
Code							3 = Opt 1 + 2		
L	12						4 = 5V Standby		
N	15						5 = Opt 1 + 4		
Q	24						6 = Opt 2 + 4		
R	28						7 = Opt 1 + 2 + 4		
U	36						8 = Constant Current		
W	48						9 = Opt 1 + 8		
							B = Opt 2 + 8		
							C = Opt 1 + 2 + 8		
							D = Opt 4 + 8		
							E = Opt 1 + 4 + 8		
							F = Opt 2 + 4 + 8		
							G = Opt 1 + 2 + 4 + 8		

*Note: Some option code combinations may not be configured yet and will require extra leadtime the first time they are requested.

MECHANICAL DRAWINGS (LCM1500Q-T, LCM1500R-T,LCM1500U-T and LCM1500W-T)



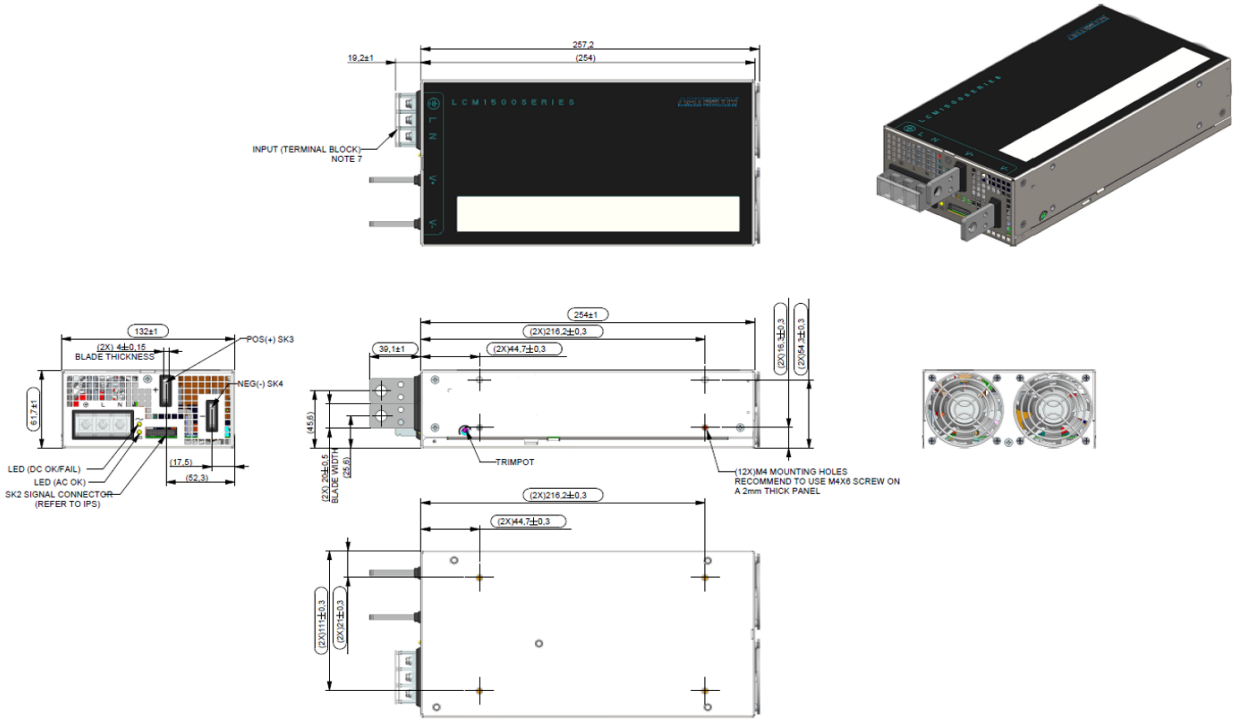
Notes:
MOUNTING LOCATIONS SCREW
PENETRATION DEPTH IS 4.6 mm MAX.
RECOMMENDED SCREW TORQUE:
M3.5 x 0.6P = 6 - 8kgf-cm
M4.0 x 0.7P = 8 - 10kgf-cm



Bus bar adapter (option)

P/N 500-006848-0000

MECHANICAL DRAWINGS (LCM1500L-T and LCM1500N-T)



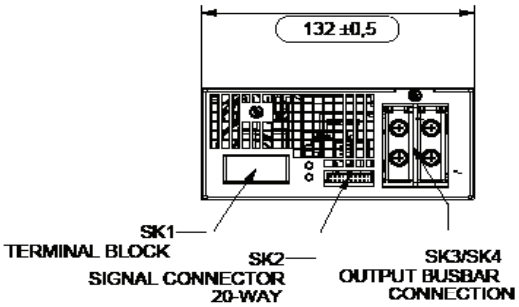
Notes:

1. Parts must be completely assembled.
2. Quality controlled dimensions. These dimensions to be included in the mechanical CPK of 1.33
3. Casing parts used must have matching color. In order to ensure color matching of parts, it is required that the raw material that will be processed by the fabricator will come from the same supplier and the sheetmetal fabricator for all matching parts must be the same. To avoid color variations on the same lot delivered, all parts with matching color requirement should be delivered as a set by the fabricator.
5. Sheared edges visible to the customer should have no rust formation. If rust formation is present then a concealing layer of silver ink or some other substitute should be applied on the rusted area.
6. Mounting locations screw penetration depth is 4.6mm max.
7. Recommended screw torque:
   M3.5X0.6P = 6-8kgf-cm
   M4.0X0.7P = 8-10kgf-cm
8. Input: terminal block type. M4 screw torque value of 16kgf-cm using wire gauge 18-10 (13mm centers)

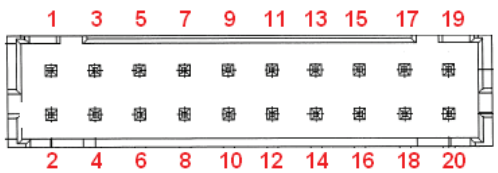
PIN ASSIGNMENT

SIGNALS	DESCRIPTION	PIN #
+Vout	Power Rail	SK3
GND	Power Ground	SK4
SIGNALS	**DESCRIPTION**	**SK2 PIN NUMBER**
A2	EEPROM Address	1
-VPROG	Return Connection of External Supply for Margin Programming	2
A1	EEPROM Address	3
-Vsense	Remote Sense Return	4
ISHARE	Load Share Voltage	5
A0	EEPROM Address	6
SDA1	Serial Data Signal (I2C)	7
+VPROG	Positive Connection of External Supply for Margin Programming	8
SCL1	Serial Clock Signal (I2C)	9
+Vsense	Remote Sense Positive	10
5VSB	5 V Standby	11
GND	5 V Standby Return	12
5VSB	5 V Standby	13
G_DCOK_C	Global DCOK Collector	14
GPIOA6	EEPROM Write Protect	15
G_DCOK_E	Global DC_OK Emitter (GND)	16
GND	Return GND for O/P Signal and I^2C communication	17
G_ACOK_C	Global AC_OK Collector	18
INH_EN	Turn Off Main Output	19
G_ACOK_E	Global AC_OK Emitter (GND)	20

Note: Mating connector for SK2 is:
LANDWIN
(LWE PN: 2050S) Housing
(LWE PN: 2053T) Contact
CVILUX
(CX PN: CI0120SD000) Housing
(CX PN: CI01TD21PE0) Contact



PSU Front View (24V & 48V UNITS)



Signal Output Signal Connectors (SK2)

CI0120P1HD0-LF

PIN ASSIGNMENT (CONTINUED)

LED INDICATORS

2 provided are clearly visible up to a 45 degree offset from vertical with office environment ambient lighting. The status is reflected in the indicator color.

The DC_OK LED shall light green if the DC output is within specification, and shall be off if the output falls out of specification.

The AC_OK LED is green if the AC within specification and off when AC out of specification.

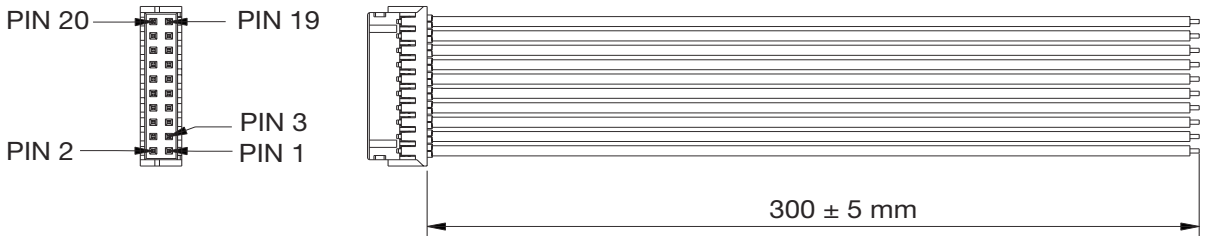
CONTROL SIGNALS

AC_OK open collector 0.5 V maximum at 10 mA. Both emitter and collector access provided.

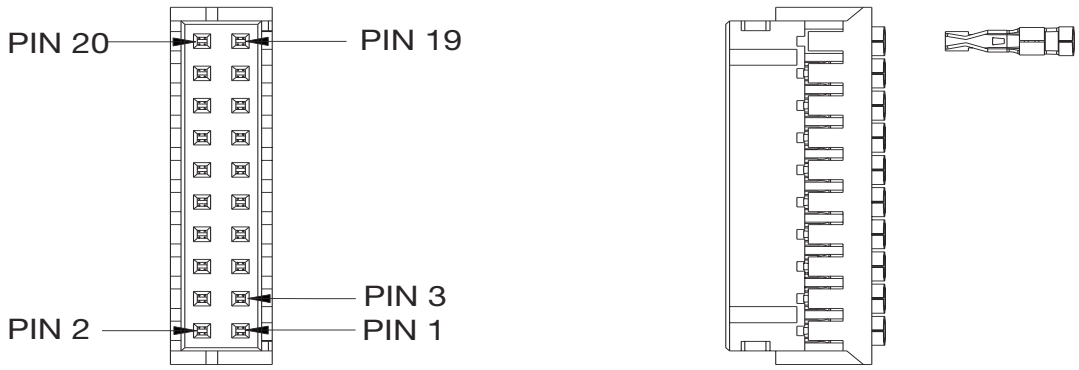
DC_OK open collector 0.5 V maximum at 10 mA. Both emitter and collector access provided.

PS_INHIBIT/ENABLE Signal 0.0 to 0.5 V contact closure, output OFF

OPTIONAL ACCESSORIES



Orderable kit part number: 73-788-001



Orderable kit part number: 73-788-002

MISCELLANEOUS SPECIFICATIONS

BURN-IN

100% Burn-in at 45°C, at 80% to 90% load. Duration of burn-in determined by Quality Assurance Procedures.

MTBF

The power supply has a minimum MTBF of 300K hours using the Bell core 332, issue 6 specification @ 25 °C and 40 °C, ambient, at full load. With the power supply installed in a system in a 25°C ambient environment and operating at full load, capacitor life shall be 10 years, minimum for all electrolytic capacitors contained within this power supply. The power supply shall demonstrate a MTBF level of > 500,000 hours.

QAV

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

WARRANTY

AE will warrant the power supply to be free of defects in materials and workmanship for a minimum period of three 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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