LCM600

600 Watt Bulk Front End



Advanced Energy's LCM600 series of 2U high distributed power front-end AC-DC power supplies provides a very cost effective bulk power solution. The series comprises five models, offering outputs of 12V, 15V, 24V, 36V or 48V, together with an optional 5 V standby output. Each model accepts a universal input of 85 to 264 VAC and has a typical full load efficiency of 89%. Carrying industrial and medical safety approvals, these power supplies can deliver up to 600 watts and offer versatile bulk power for a wide variety of industrial, medical, military and process automation applications.

DATA SHEET

Total Power

600 W

Input Voltage

85 to 264 VAC

# of Outputs

Main + Standby

SPECIAL FEATURES

- 600 W output power
- Low cost
- 2.4” x 4.5” x 7.5”
- 7.41 W/cu-in
- Industrial/Medical safety
- -40°C to 70°C with derating
- Optional 5 V @ 2 A housekeeping
- High efficiency: 89% typical
- Variable speed “Smart Fans”
- DSP controlled front end
- Conformal coat option
- ± 20% adjustment range
- Margin programming
- OR-ing FET
- Terminal block input option
- Semi F47 compliance at high line

COMPLIANCE

- EMI Class B
- EN61000 Immunity

SAFETY

UL/CSA	UL/CSA62368-1
TUV	EN62368-1
CB Report	IEC60950-1, IEC60601-1
CCC	GB4943, GB9254 and GB17625
UL/CSA	ES60601-1/CSA C22.2 No. 60601-1
TUV	EN60601-1SEMI F47
CE and UKCA Mark	

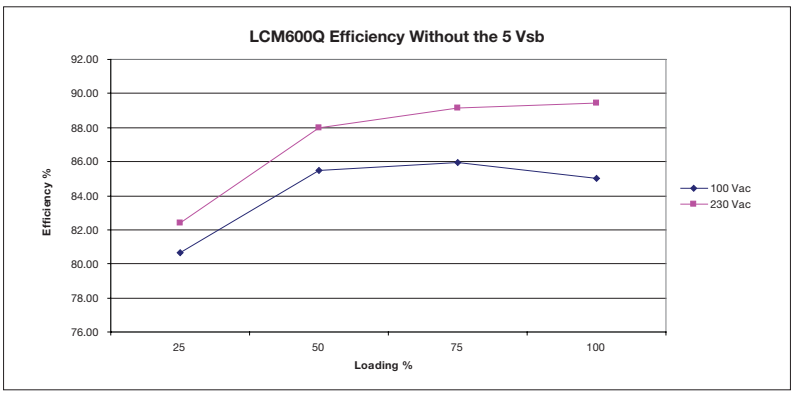
** LCM600 tested according to the medical standard IEC60601-1-2 4th Edition.

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ELECTRICAL SPECIFICATIONS

Input	
Input Range	85 to 264 VAC (Operating) 115/230 VAC (Nominal) Input through standard IEC connector/ TERMINAL BLOCK
Frequency	47 to 440 Hz, Nominal 50/60 Hz
Input Fusing	Internal 10 A fuses, both lines fused
Inrush Current	≤ 25 A peak, either hot or cold start
Power Factor	0.99 typical, meets EN61000-3-2
Harmonics	Meets IEC61000-3-2 requirements
Input Current	8 A RMS max input current, at 100 VAC
Hold up time	20 ms minimum for main O/P, at full rated load
Efficiency	89% typical at full load
Leakage Current	< 0.3 mA at 240 VAC
Power Line Transient	MOV directly after the fuse
Isolation	Isolation: PRI-Chassis 2500 VDC Basic PRI-SEC 4000 VAC Reinforced 2xMOPP SEC-Chassis 500 VDC



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ELECTRICAL SPECIFICATIONS (CONTINUED)

Output		
Output Rating	See ordering information table	
Set Point	± 0.5%	
Total Regulation Range	Main output ± 2% 5 VSB ± 1%	Combined line/load/transient when measured at output terminal
Rated Load	600 W maximum	Derate linear to 50% from 50°C to 70°C
Minimum Load	Main output @ 0.0 A 5 VSB @ 0.0 A	No loss of regulation
Output Noise (PARD)	1% max p-p 50 mV max p-p	Main output 5 VSB output Measured with a 0.1 µF Ceramic and 10 µF Tantalum Capacitor on any output, 20 MHz
Output Voltage Overshoot	10% maximum	No overshoot/undershoot outside the regulation band during on or off cycle
Transient Response	Peak Deviation 2% Recovery time < 300 µSec	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 10
Short Circuit Protection	Protected, no damage to occur	Bounce mode
Remote Sense		Compensation up to 500 mV
Forced Load Sharing	To within 10% of all shared outputs	Analog sharing control
Overload Protection (OCP)	105% to 125% 120% to 170%	Main output 5 VSB output
Overvoltage Protection (OVP)	125% to 145% 110% to 125%	Main output 5 VSB output
Overtemp Protection	10 to 15°C above safe operating area	Both PFC and output converter monitored
Fan Fault Protection		For -N option only. Will shutdown output and DC_OK

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-40°C to +70°C, linear derating to 50% from 50°C to 70°C
Storage Temperature	-40°C to +85°C
Humidity	10 to 90%, non-condensing. Operating. Conformal coat option available
Fan Noise	< 45 dBA, 80% load at 30°C "-N" Low Noise Option < 35 dBA, 80% Load at 30°C
Altitude	Operating - 16,404.2 feet Storage - 30,000 feet
Shock	MIL-STD-810F 516.5, Procedure I, VI. Storage
Vibration	MIL-STD-810F 514.5, Cat. 4, 10. Storage

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ORDERING INFORMATION

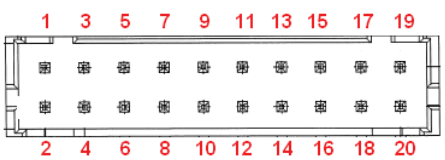
Model Number*	Output	Nominal Output Voltage Set Point	Set Point Tolerance	Adjustment Range	Current		Output Ripple P/P (0-50˚C)	Max Continuous Power	Combined Line/Load Regulation
					Min	Max			
LCM600L	12 V	12 V	±0.5%	9.6 to 14.4 V	0 A	52 A	120 mV	600 W	2%
LCM600N	15 V	15 V	±0.5%	12.0 to 19.5 V	0 A	44 A	150 mV	600 W	2%
LCM600Q	24 V	24 V	±0.5%	19.2 to 28.8 V	0 A	27 A	240 mV	600 W	2%
LCM600U	36 V	36 V	±0.5%	28.8 to 43.2 V	0 A	16.7 A	360 mV	600 W	2%
LCM600W	48 V	48 V	±0.5%	38.4 to 57.6 V	0 A	13 A	480 mV	600 W	2%

*Note: Add “-T” for terminal block instead of IEC input
Add “-N” for low acoustic noise model on 12 V or 24 V models
Add “-4” for 5 V Standby output
Add “-8” for constant current mode
Add “-A” will be automatically added to all orders to denote new Aesthetics style chassis unless otherwise specified
Example: a 24 V with terminal block, low noise and standby with new Aesthetics would be LCM600Q-T-N-4-A

PIN ASSIGNMENT

Signals	Name Description	Pin Number(s)
+Vout	Power rail	SK4
GND	Power GND	SK5
Signals	**Name 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	5V standby	11
GND	5V standby Return	12
5VSB	5V standby	13
G_DCOK_C	Global DCOK Collector	14
GPIOA6	EEPROM Write Protect	15
G_DCOK_E	Global DCOK Emitter (GND)	16
GND	Return Ground for output signal and I2C communication	17
G_ACOK_C	Global ACOK Collector	18
INH_EN	Turn Off Main Output	19
G_ACOK_E	Global ACOK Emitter (GND)	20

Note: Mating connector for SK2 is:
LANDWIN: PN 2050S2000 Housing and PN 2053T021V Contact
CIVILUX: PN CI0120SD000 Housing and PN CI01TD21PE0 Contact
JST: PN PHDR-20VS housing and PN: SPHD-001T-P0.5



Signal Output Signal Connectors (SK2)
SK2 Mating Connector: JST Part Number PHDR-20VS
Contact Pins: JST Part Number SPHD-001T-P0.5

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PIN ASSIGNMENT (CONTINUED)

LED Indicators

Two (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 LED is bicolor. It shall light green if the DC output is within specification, and amber if the output falls out of specification.

The AC_OK LED LED is green if the AC is within specification and off when out of specification. Note: With 5 V standby, Amber also indicates that PSU is in standby mode/output off.

Control Signals

AC_OK Open collector 0.7 V maximum at 10 mA. Normally low when input AC is within specification.

DC_OK Open collector 0.7 V maximum at 10 mA. Normally low when Output votage within specification.

DC_OK will de-assert when output is loss due to OCP, OVP, OTP, or Fan Fault (for -N option).

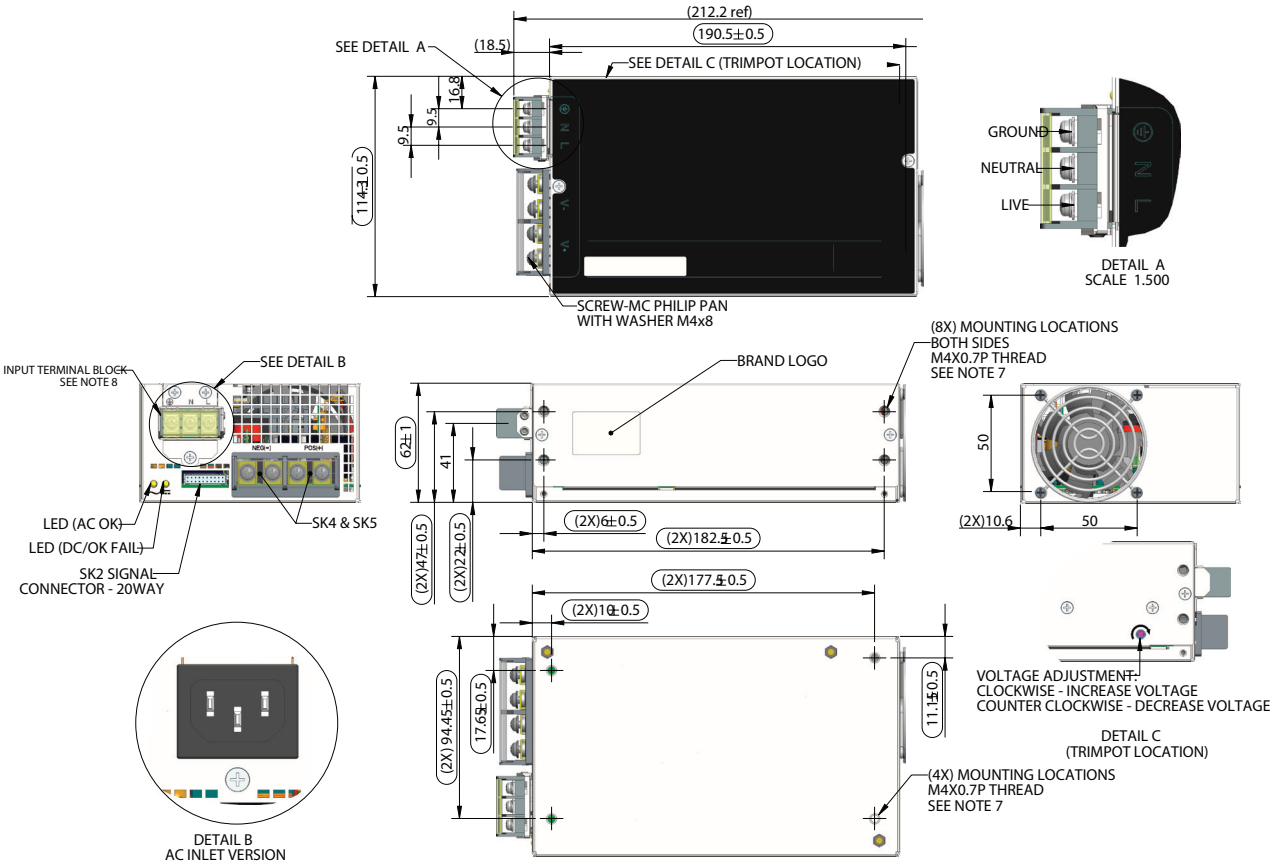
PS_INHIBIT/ENABLE Signal 0.0 to 0.5 V contact closure, output OFF

ORDERING INFORMATION

LCMXXXXY		-	A	-	B	-	C	-	###
Case Size			Input Termination		Acoustic Noise		Option Codes		Hardware Code
1-Phase input where XXXX =									
600 = 2.4” x 4.5” x 7.5”, 600 W			Blank = IEC connector		Blank = Standard		Blank = No Options		Factory Assigned for Modiefied standards
			T = Terminal Block		N = Low Noise Fan		1 = Conformal Coat		
Voltage Code Y =							4 = 5 V Standby		
Code							5 = Opt 1 + 4		
L	12						8 = Constant Current		
N	15								
Q	24								
U	36								
W	48								

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MECHANICAL DRAWINGS



Mechanical Reference Drawing:

Weight: 2.84 lbs (1.29 kg)

MOUNTING LOCATIONS SCREW
PENETRATION DEPTH IS 4.6 mm MAX.

RECOMMENDED SCREW TORQUE:
M3.5 x 0.6P = 6 to 8 kgf-cm
M4.0 x 0.7P = 8 to 10 kgf-cm

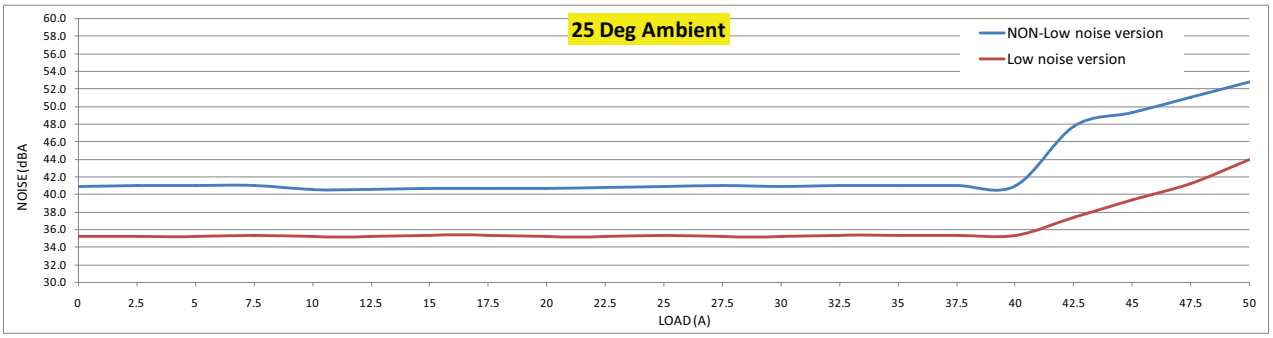
NOTE: OPTIONAL BARRIER STRIP OUTPUT TERMINAL AVAILABLE
OPTIONAL MOLEX TYPE CONNECTOR OUTPUT AVAILABLE

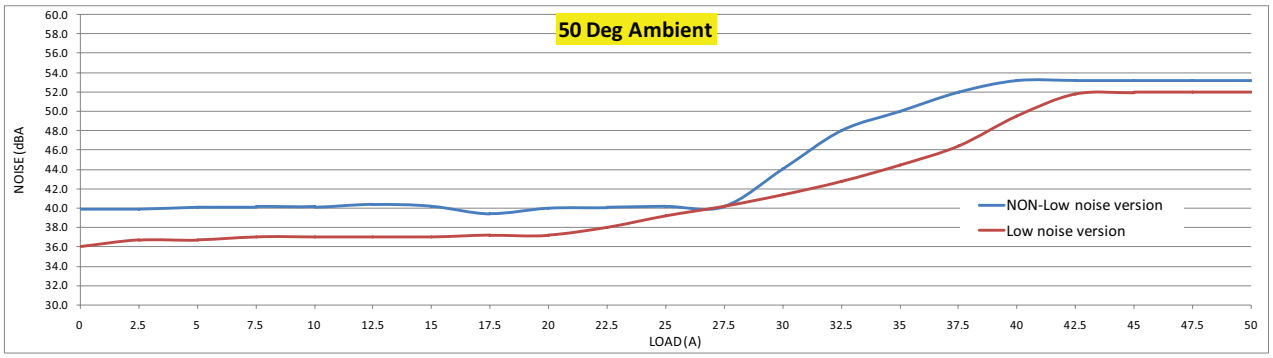
Note 7 RECOMMENDED SCREW TORQUE:
M3.5x0.6P = 6 to 8 kgf-cm
M4.0x0.7P = 8 to 10 kfg-cm

Note 8 INPUT: TERMINAL BLOCK TYPE.
M3.5 SCREW TORQUE VALUE OF 12 kgf-cm
USING WIRE GAUGE 22-19 (9.5 mm centers)

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LOW NOISE VS. NON-LOW NOISE LCM600 MODEL





NON-LOW NOISE VERSION

LOAD (A)	25°C ambient			50°C ambient		
	Fan (V)	RPM	Noise (dbA)	Fan (V)	RPM	Noise (dbA)
0	6.254	3558.0	40.9	6.228	3460.9	39.9
2.5	6.257	3559.8	41.0	6.228	3460.9	39.9
5	6.262	3562.0	41.0	6.230	3494.3	40.1
7.5	6.263	3562.0	41.0	6.242	3526.6	40.1
10	6.242	3528.9	40.5	6.242	3526.6	40.1
12.5	6.251	3530.9	40.6	6.237	3515.6	40.4
15	6.251	3538.3	40.7	6.229	3504.9	40.2
17.5	6.226	3538.2	40.7	6.205	3482.8	39.4
20	6.223	3541.0	40.7	6.217	3490.1	40.0
22.5	6.242	3545.1	40.8	6.227	3493.8	40.1
25	6.253	3553.9	40.9	6.234	3504.3	40.2
27.5	6.254	3564.1	41.0	6.212	3501.7	40.2
30	6.253	3552.2	40.9	6.642	3787.4	44.1
32.5	6.264	3559.7	41.0	7.893	4652.3	48.0
35	6.262	3559.6	41.0	9.153	5463.4	50.0
37.5	6.262	3560.8	41.0	11.035	6600.2	52.0
40	6.262	3559.8	41.0	11.605	6993.9	53.2
42.5	7.637	4521.2	47.8	11.608	6997.2	53.2
45	8.919	5362.2	49.3	11.608	6997.2	53.2
47.5	10.068	6139.5	51.0	11.608	6997.2	53.2
50	11.362	6893.4	52.8	11.608	6997.2	53.2

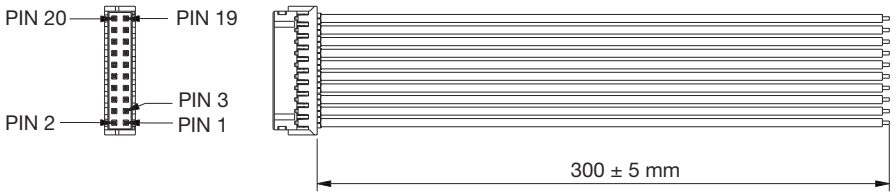
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LOW NOISE VERSION

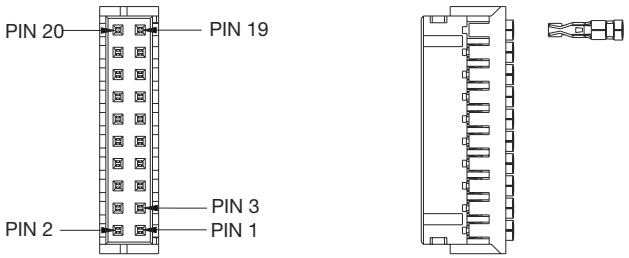
PWM	25˚C ambient			50˚C ambient		
	LOAD (A)	RPM	Noise (dbA)	LOAD (A)	RPM	Noise (dbA)
0%	0	3028	35.2	0	3180	36.0
5%	2.5	3028	35.2	2.5	3300	36.7
10%	5	3028	35.2	5	3300	36.7
15%	7.5	3060	35.4	7.5	3360	37.0
20%	10	3028	35.2	10	3360	37.0
25%	12.5	3028	35.2	12.5	3360	37.0
30%	15	3060	35.4	15	3360	37.0
35%	17.5	3060	35.4	17.5	3388	37.2
40%	20	3028	35.2	20	3388	37.2
45%	22.5	3028	35.2	22.5	3540	38.0
50%	25	3060	35.4	25	3840	39.2
55%	27.5	3028	35.2	27.5	4104	40.2
60%	30	3028	35.2	30	4408	41.4
65%	32.5	3060	35.4	32.5	4736	42.7
70%	35	3060	35.4	35	5184	44.5
75%	37.5	3060	35.4	37.5	5728	46.4
80%	40	3060	35.4	40	6688	49.5
85%	42.5	3420	37.4	42.5	7560	51.8
90%	45	3868	39.3	45	7584	51.9
95%	47.5	4376	41.3	47.5	7584	51.9
100%	50	5040	43.9	50	7584	51.9

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ACCESSORIES



Order kit part number 73-788-001 for control connector interface with .3m wires attached



Order kit part number 73-788-002 for control connector interface with unloaded housing and 20 pins

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.

Quality Assurance

Full QAV testing shall be conducted in accordance with Artesyn Embedded Power Standards with reports available upon request.

Warranty

Artesyn Embedded Power shall 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.

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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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