

# ARTESYN LCM600

600 Watt Bulk Front End



Advanced Energy's Artesyn 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 12 V, 15 V, 24 V, 36 V or 48 V, together with an optional 5 V standby output. Each model accepts a universal input of 85–264 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

### # of Outputs:

Single

### Outputs:

12 to 60 V

Optional 5.0 V 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

### COMPLIANCE

- EMI Class B
- EN61000 Immunity

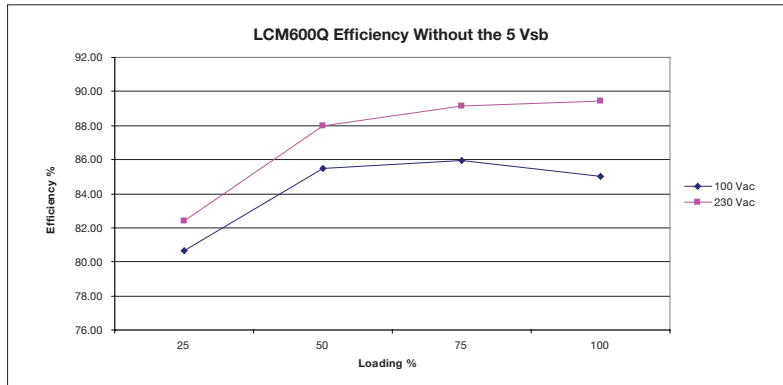
### SAFETY

- 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               EN60601-1

\*\* LCM600 tested according to the medical standard IEC 60601-1-2 4th Edition.

**ELECTRICAL SPECIFICATIONS**

| Input                |   |
|----------------------|---|
| Input range          | 85 - 264 Vac (Operating)<br>115/230 Vac (Nominal) Input through standard IEC connector/<br>TERMINAL BLOCK |
| Frequency            | 47 - 440 Hz, Nominal 50/60  |
| 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 IEC 1000-3-2 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% at full load  |
| Leakage current      | < 0.3 mA at 240 Vac   |
| ON/OFF power switch  | N/A   |
| Power line transient | MOV directly after the fuse   |
| Isolation            | Isolation: PRI-Chassis 2500 Vdc Basic<br>PRI-SEC 4000 Vac Reinforced 2xMOPP<br>SEC-Chassis 500 Vdc        |



## ELECTRICAL SPECIFICATIONS (CONTINUED)

| Output                       |                                      |   |
|------------------------------|--------------------------------------|---|
| Output rating                | See ordering information table       | 85 - 264 Vac  |
| Set point                    | ± 0.5%                               | 85 - 264 Vac  |
| Total regulation range       | Main output ± 2%<br>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<br>5 Vsb @ 0.0 A | No loss of regulation   |
| Output noise (PARD)          | 1% max p-p 50 mV max p-p             | Main output<br>5 Vsb output<br>Measured with a 0.1 µF Ceramic and 10 µF Tantalum Capacitor on any output, 20 MHz                                |
| Output voltage overshoot     | < 300 µSec                           | No overshoot/undershoot outside the regulation band during on or off cycle  |
| Transient response           |                                      | 50% load step @ 1 A/µs<br>Step load valid between 10% to 100% of output rating<br>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   |
| Output isolation             |                                      | Standard per safety requirements  |
| Forced load sharing          | To within 10% of all shared outputs  | Analog sharing control  |
| Overload protection (OCP)    | 105% to 125%<br>120% to 170%         | Main output<br>5 Vsb output   |
| Overvoltage protection (OVP) | 125% to 145%<br>110% to 125%         | 12 V output<br>5 Vsb output   |
| Overtemp protection          | 10 - 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<br>Storage - 30,000 feet                            |
| Shock                 | MIL-STD-810F 516.5, Procedure I, VI. Storage                                  |
| Vibration             | MIL-STD-810F 514.5, Cat. 4, 10. Storage                                       |

ORDERING INFORMATION

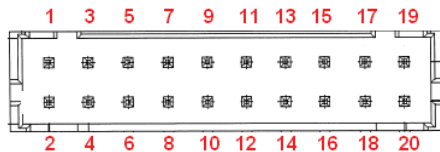
| Model Number* | Output | Nominal Output Voltage Set Point | Set Point Tolerance | Adjustment Range | Current |        | Output Ripple P/P (0-50 °C) | Max Continuous Power | Combined Line/Load Regulation |
|---------------|--------|----------------------------------|---------------------|------------------|---------|--------|-----------------------------|----------------------|-------------------------------|
|               |        |                                  |                     |                  | Min     | Max    |                             |                      |                               |
| LCM600L       | 12 V   | 12 V                             | ±0.5%               | 9.6 - 14.4 V     | 0 A     | 52 A   | 120 mV                      | 600 W                | 2%                            |
| LCM600N       | 15 V   | 15 V                             | ±0.5%               | 12.0 - 19.5 V    | 0 A     | 44 A   | 150 mV                      | 600 W                | 2%                            |
| LCM600Q       | 24 V   | 24 V                             | ±0.5%               | 19.2 - 28.8 V    | 0 A     | 27 A   | 240 mV                      | 600 W                | 2%                            |
| LCM600U       | 36 V   | 36 V                             | ±0.5%               | 28.8 - 43.2 V    | 0 A     | 16.7 A | 240 mV                      | 600 W                | 2%                            |
| LCM600W       | 48 V   | 48 V                             | ±0.5%               | 38.4 - 57.6 V    | 0 A     | 14 A   | 280 mV                      | 600 W                | 2%                            |

\*Note: Add "-T" for terminal block instead of IEC input  
 Add "-N" for low noise model on 12 V or 24 V models  
 Add "-4" for 5 V Standby output  
 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 C10120SD000 Housing and PN C101TD21PE0 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

**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 0.5 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.

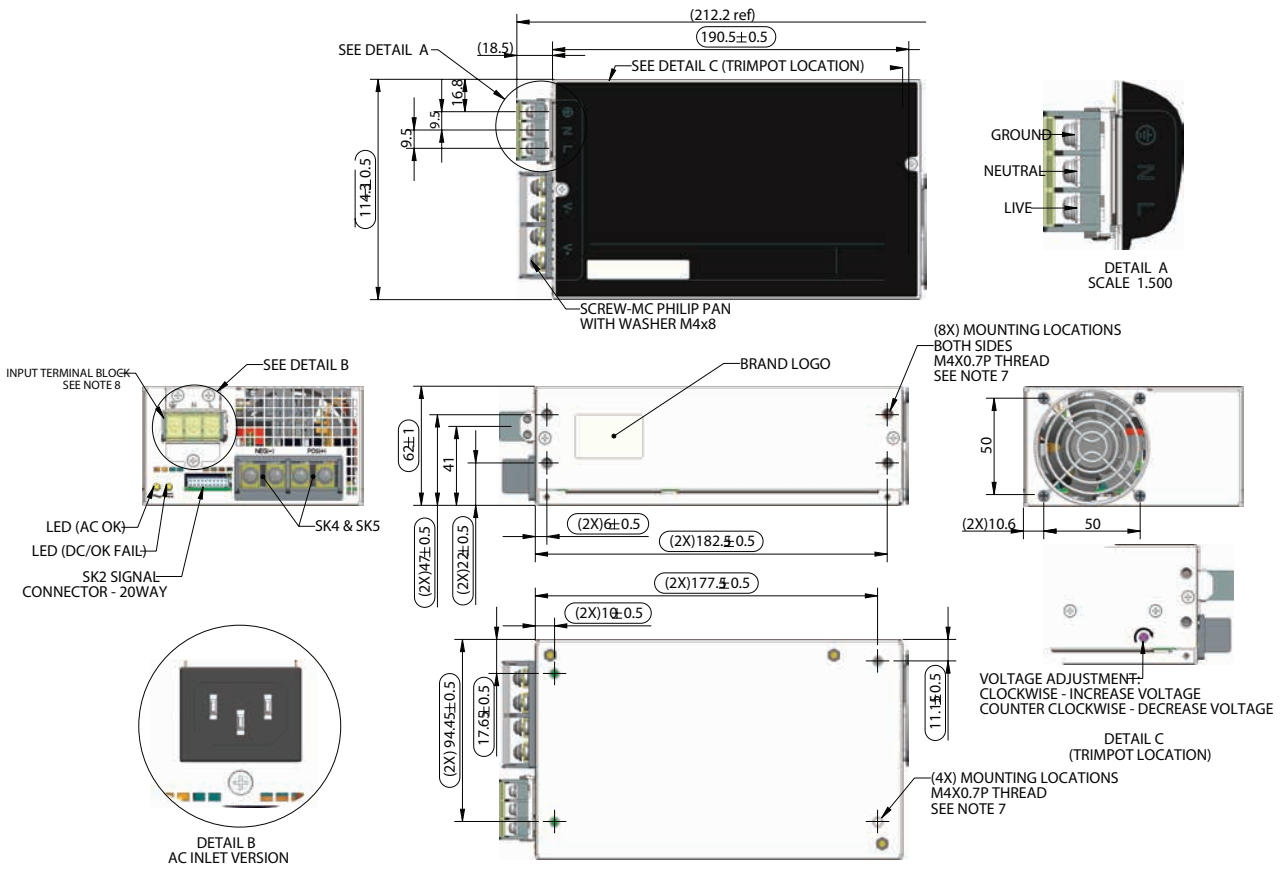
DC\_OK will de-assert when output is loss due to OCP, OVP, OTP, or Fan Fault (for -N option).

**PS\_INHIBIT/ENABLE Signal** 0.0 - 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 =<br>600 = 2.4" x 4.5" x 7.5", 600 W |    |   | Blank = IEC connector |   | Blank = Standard  |   | Blank = No Options |   | Factory Assigned for Modified 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 |   |                       |   |                   |   |                    |   |   |
| N   | 15 |   |                       |   |                   |   |                    |   |   |
| Q   | 24 |   |                       |   |                   |   |                    |   |   |
| U   | 36 |   |                       |   |                   |   |                    |   |   |
| W   | 48 |   |                       |   |                   |   |                    |   |   |

MECHANICAL DRAWINGS



**New Mechanical Reference Drawing:**

Weight: 2.84 lbs (1.29 Kg)

MOUNTING LOCATIONS SCREW PENETRATION DEPTH IS 4.6 mm MAX.

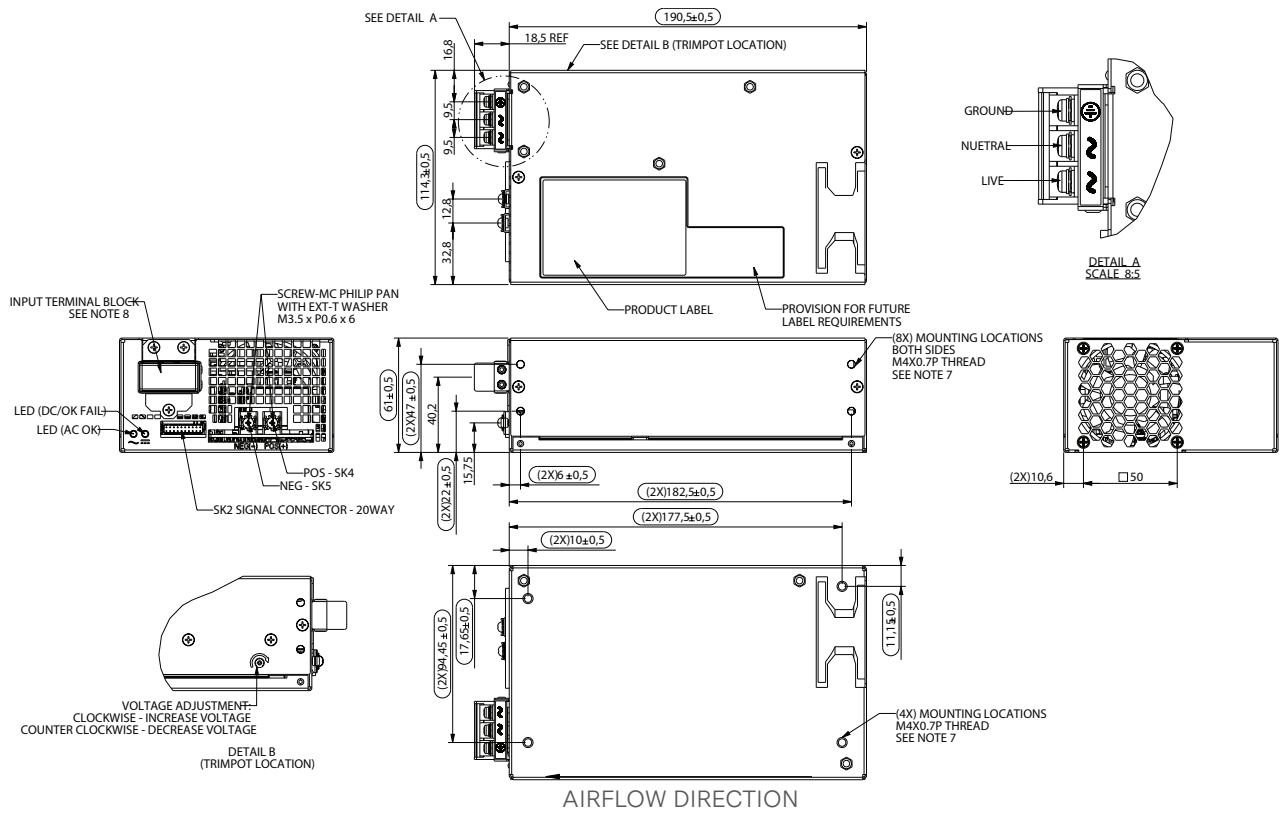
RECOMMENDED SCREW TORQUE:  
 M3.5 x 0.6P = 6 - 8kgf-cm  
 M4.0 x 0.7P = 8 - 10kgf-cm

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

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

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

**MECHANICAL DRAWINGS – TERMINAL BLOCK INPUT**



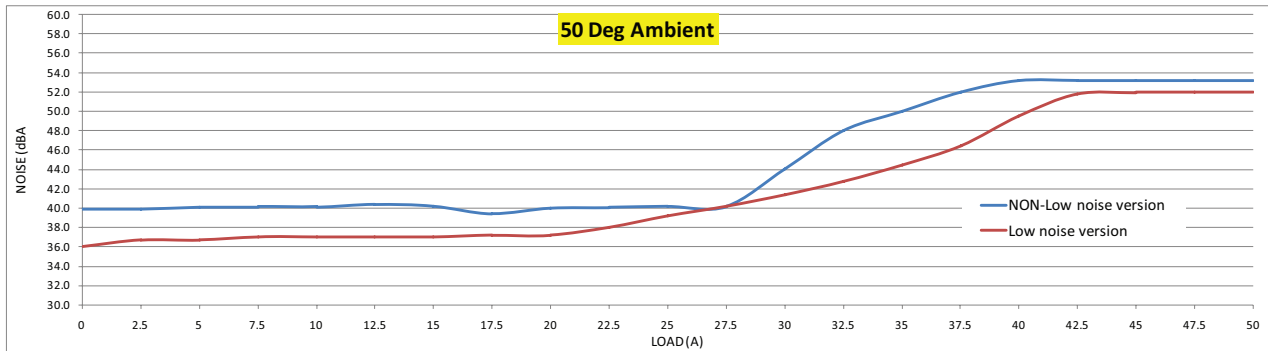
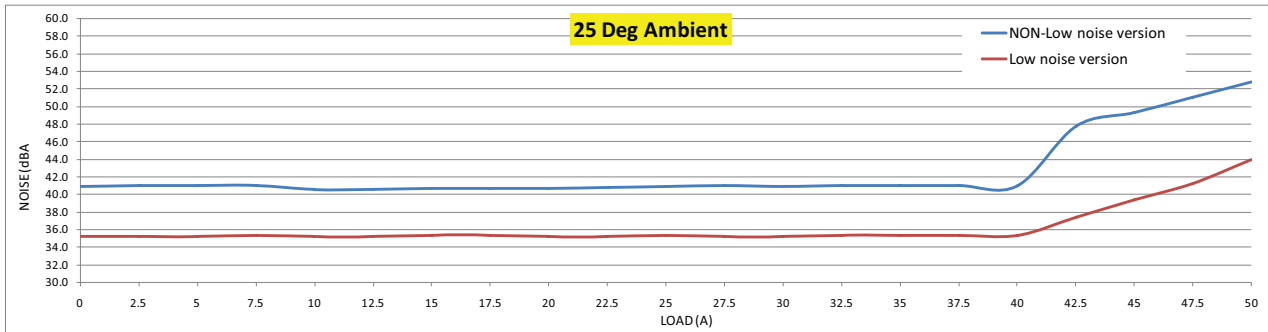
**Old Mechanical Reference Drawing:**

Weight: 2.84 lbs (1.29 Kg)

Note 7 - RECOMMENDED SCREW TORQUE:

- M3.5x0.6P = 6-8kgf-cm
- M4.0x0.7P = 8-10kfg-cm

LOW NOISE VS. NON-LOW NOISE LCM600 MODEL



NON-LOW NOISE VERSION

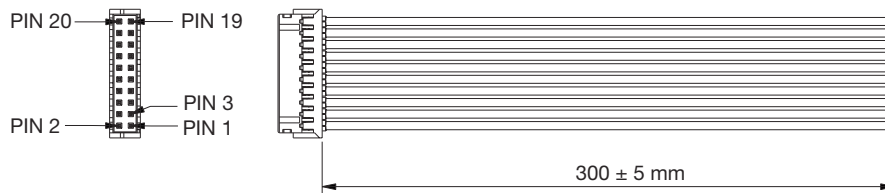
| LOAD (A) | 25 °C ambient |        |             | 50 °C ambient |        |             |
|----------|---------------|--------|-------------|---------------|--------|-------------|
|          | Fan (V)       | RPM    | Noise (dbA) | Fan (V)       | RPM    | Noise (dbA) |
| 0        | 6.254         | 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        |



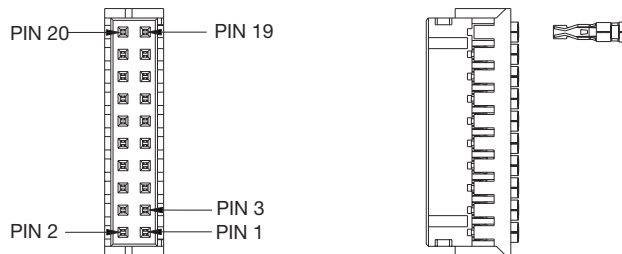
LOW NOISE VERSION

| 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        |

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 - 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 three 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

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