POWER

# LCM600

## 600 Watt Bulk Front End

**Data Sheet**

**Total Power:** 600 W
**# of Outputs:** Single
**Outputs:** 12 to 60 V
Optional 5.0 V standby

RoHS 6/6 COMPLIANT

## 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

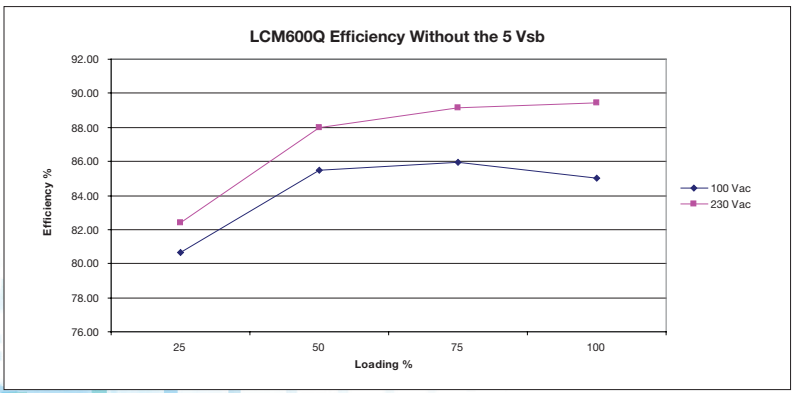
- EMI Class B
- EN61000 Immunity

## SAFETY

- UL 60950-1
  1598/1433
  60601-1
- CSA 60950-1
- VDE 60950-1
  60601
- China CCC
- CB Scheme Report/Cert

## 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 264 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 |




ARTESYN™
EMBEDDED TECHNOLOGIES

## Electrical Specifications

| 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<br>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: | | No overshoot/undershoot outside the regulation band during on or off cycle |
| Transient response: | < 300 µSec | 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:** | 20 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

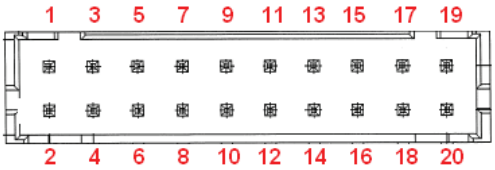
Add "-A" will be automatically added to all orders to denote new Aesthetics style chassis unless otherwise specified

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 CI0120P1HD0-LF




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

### 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** 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 = | | | | | | | | | |
| 600 = 2.4" x 4.5" x 7.5", 600W | | | 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 | | | | | | | | |
| N | 15 | | | | | | | | |
| Q | 24 | | | | | | | | |
| U | 36 | | | | | | | | |
| W | 48 | | | | | | | | |

## Mechanical Drawings

### New Mechanical Reference Drawing:

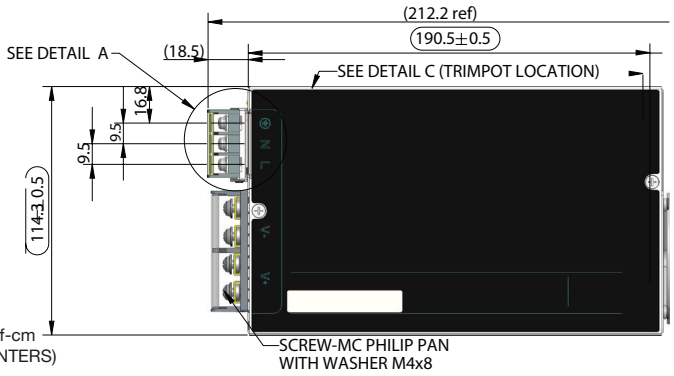
Weight: 2.84 lbs (1.29 Kg)

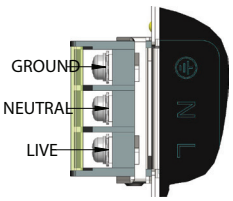
MOUNTING LOCATIONS SCREW
PENETRATION DEPTH IS 4.6 mm MAX.

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

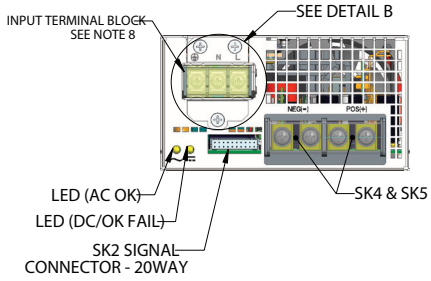
Note 7 RECOMMENDED SCREW TORQUE:
M3.5x0.6P = 6-8kgf-cm
M4.0x0.7P = 8-10kfg-cm

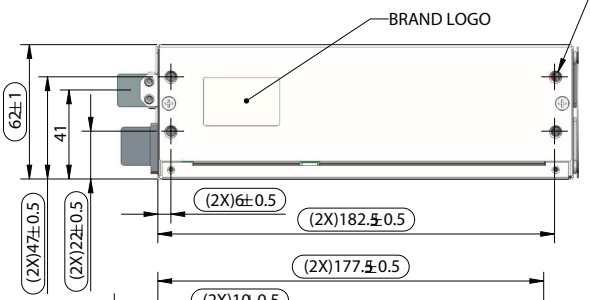
Note 8 INPUT: TERMINAL BLOCK TYPE.
M3.5 SCREW TORQUE VALUE OF 12kgf-cm
USING WIRE GAUGE 22-19 (9.5mm CENTERS)

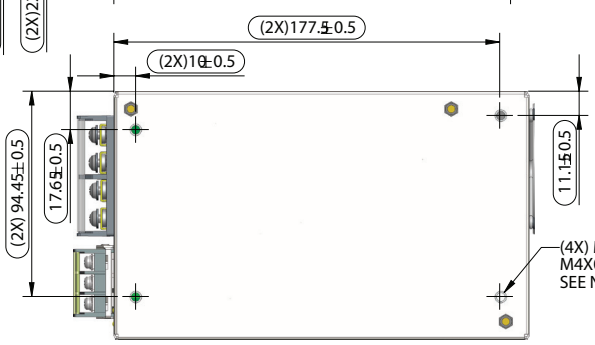


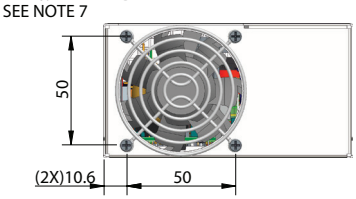



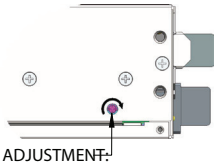

DETAIL A
SCALE 1.500



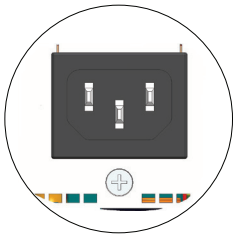



VOLTAGE ADJUSTMENT:
CLOCKWISE - INCREASE VOLTAGE
COUNTER CLOCKWISE - DECREASE VOLTAGE

DETAIL C
(TRIMPOT LOCATION)



DETAIL B
AC INLET VERSION

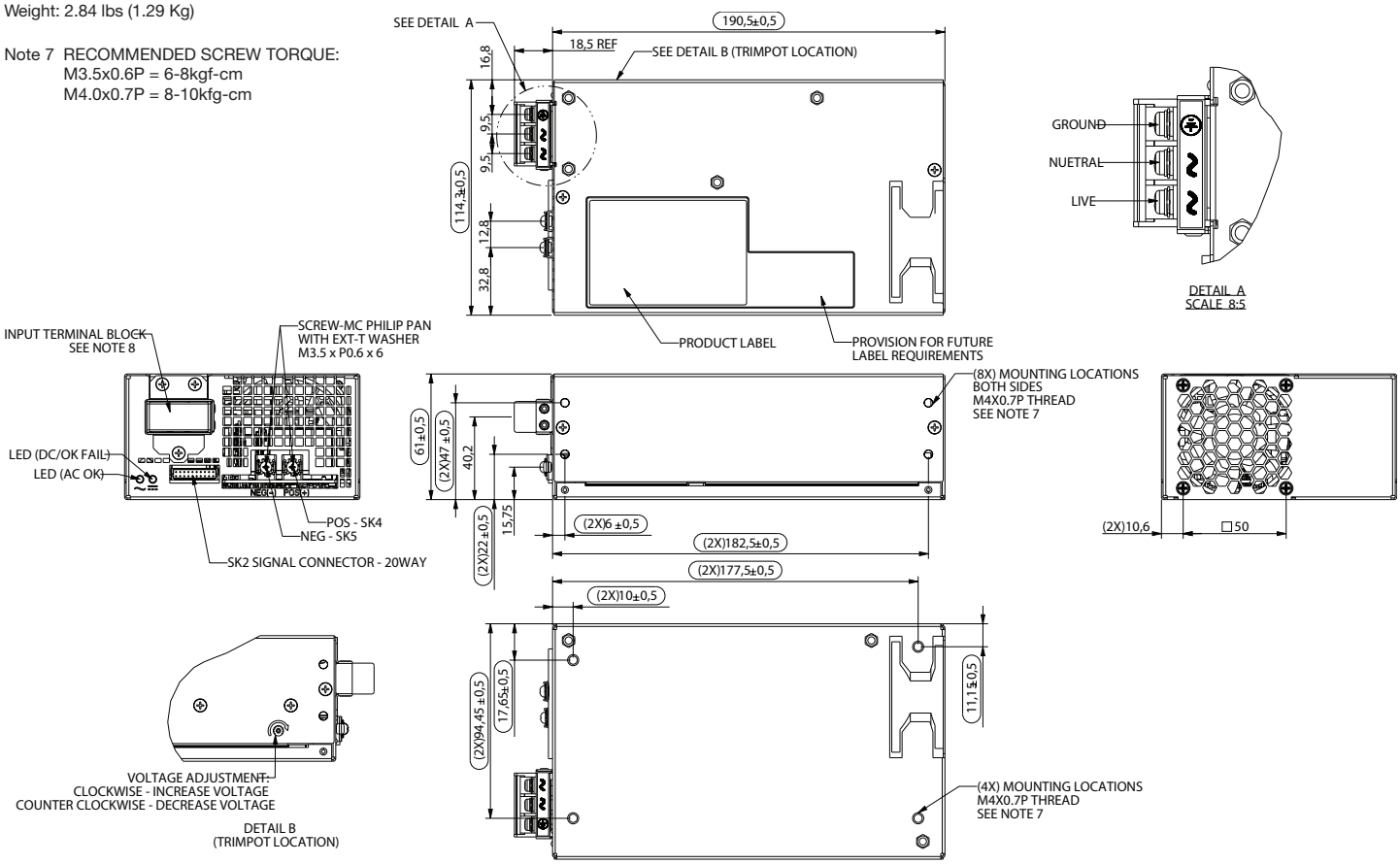
NOTE: OPTIONAL BARRIER STRIP OUTPUT TERMINAL AVAILABLE
OPTIONAL MOLEX TYPE CONNECTOR OUTPUT AVAILABLE

# Mechanical Drawings – Terminal Block Input

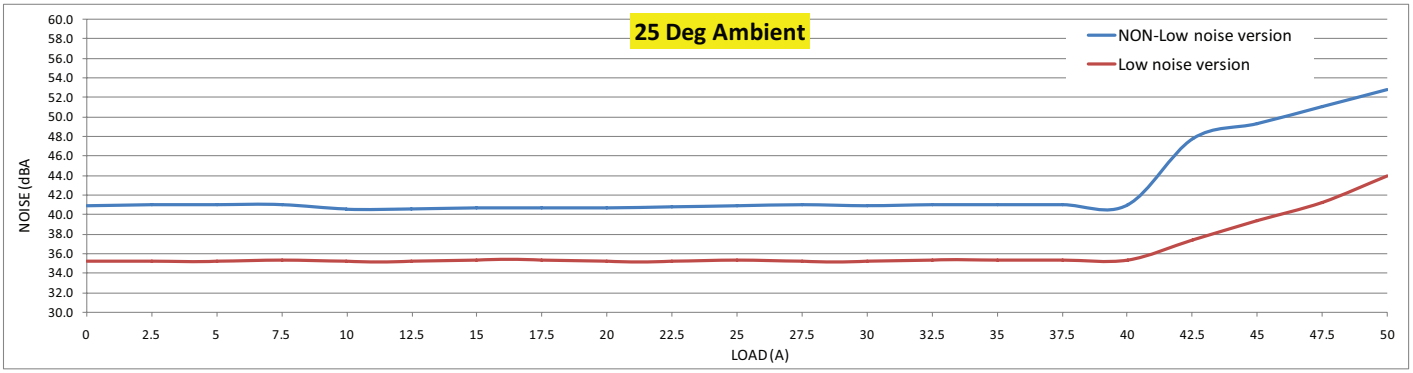
## Old Mechanical Reference Drawing:

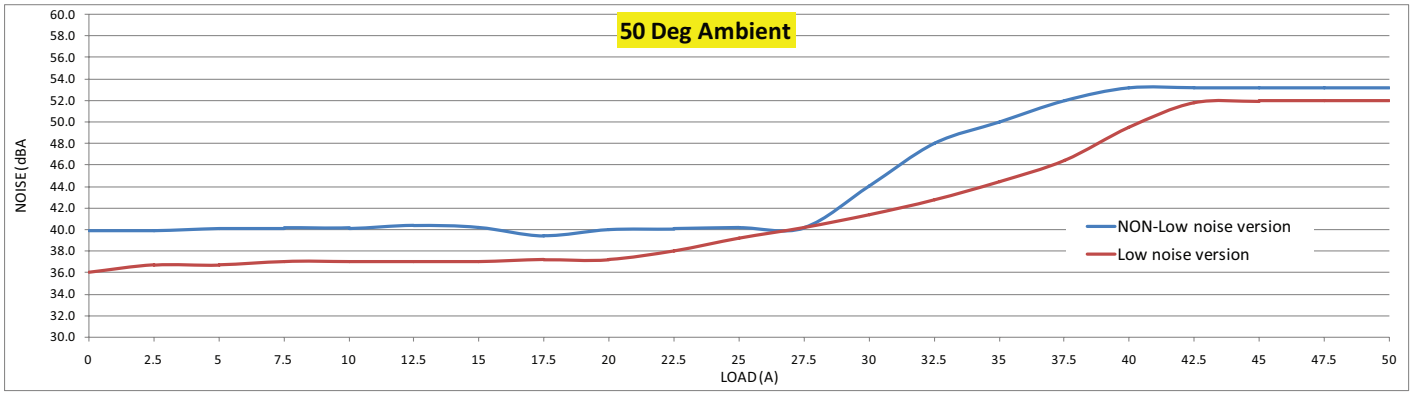
Weight: 2.84 lbs (1.29 Kg)

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



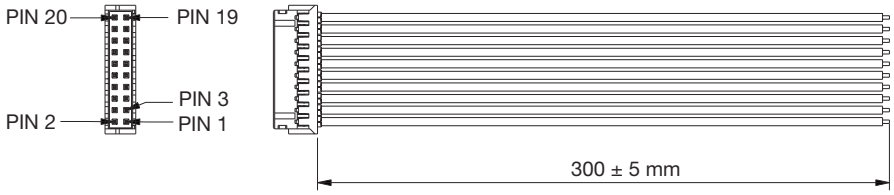

## NON-Low noise version

| | 25°C ambient | | | 50°C ambient | | |
|---|---|---|---|---|---|---|
| LOAD (A) | 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 |

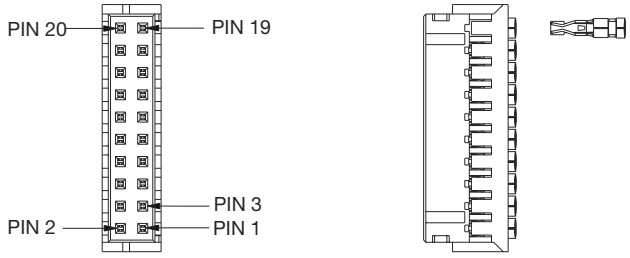
## Low noise version

| | 25°C ambient | | | 50°C ambient | | |
|---|---|---|---|---|---|---|
| PWM | 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 Technologies Standards with reports available upon request.

### WARRANTY

Artesyn Embedded Technologies 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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