# ARTESYN LCM3000

3000 Watts Bulk Front End



Advanced Energy's Artesyn LCM3000 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 90 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

3000 W

### Input Voltage

90 to 264 VAC
128 to 370 VDC

### # of Outputs

Single

## SPECIAL FEATURES

- 3000 W output power
- Low cost
- 2.5" x 7.0" x 10.9"
- 15.7 Watts per cubic inch
- -40 °C to 70 °C with derating
- 5 V @ 2 A housekeeping
- High efficiency: 90% typical
- Variable speed "Smart Fans"
- DSP controlled
- Conformal coat option
- ± 25% adjustment range
  Up to +33% on LCM30007-T
- V-Programming from 20% to 125%
  Up to 133% on LCM30007-T
- VAR configurable to any voltage from a single unit
- Semi F47 compliance at high line
- Five-year warranty

## COMPLIANCE

- EMI Class A, with 6db margin
- EN61000 Immunity

## SAFETY

- ULcUL Recognized ITE (UL/CSA62368-1)
- ULcUL Recognized Medical (ANSI/AAMI ES60601-1)
- TUV-SuD ITE + Medical (EN62368-1 and EN60601-1)
- CE LVD (EN62368-1 + RoHS)
- CB Report

- through Demko for IEC60950-1
- through TUV-SuD for IEC60601-1**
- through DEMKO for IEC62368-1

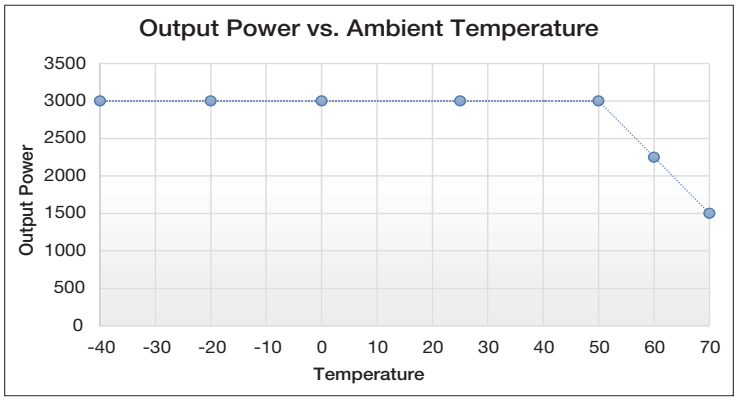
- CE and UKCA Mark

LCM3000 tested according to the medical standard IEC 60601-1-2 4th Edition.

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## ELECTRICAL SPECIFICATIONS

| Input | |
|---|---|
| Input Range | 90 to 264 VAC (Operating) Derate to 1500 W below 180 VAC input<br>128 to 370 VDC (Operating)<br>115/230 VAC (Nominal)<br>TERMINAL BLOCK |
| Frequency | 47 to 63 Hz, Nominal 50/60 Hz |
| Input Fusing | Internal 30 A fuses, both lines fused |
| Inrush Current | ≤ 35 A peak, at 110 VAC and <60 A at 230 VAC |
| Power Factor | 0.95 typical, meets EN61000-3-2 |
| Harmonics | Meets IEC 1000-3-2 requirements |
| Input Current | 20 A RMS max input current, at 100 Vac |
| Hold Up Time | 14 ms minimum for norminal output voltage, at full rated load |
| Efficiency | > 90% typical at full load / 230 VAC nominal |
| Leakage Current[3] | < 500 µA @ 240 Vac |
| Power Line Transient | MOV directly after the fuse |
| Isolation Voltage | PRI-Chassis 2000 VAC/2828 VDC<br>PRI-SEC 4000 VAC 2xMOPP<br>SEC-Chassis 500 VDC |



## ELECTRICAL SPECIFICATIONS

| Output | | |
|---|---|---|
| Output Rating | See table 1 | |
| Set Point | ± 0.5% | |
| Total Regulation Range | Main Output: ± 1%<br>5 Vsb: ± 5% | Combined line/load/transient when measured at output terminal |
| Rated Load | 3000 W maximum<br>(Derate to 1500W when input is <180 Vac) | Derate linear to 50% from 50°C to 70°C |
| Minimum Load | Main Output @ 0.0A<br>5 Vsb @ 0A | No loss of regulation |
| Output Noise (PARD) | 1% max p-p<br>100 mV max p-p | Main output<br>5Vsb output<br>Measured with 0.1 µF Ceramic and 10 µF Tantalum Capacitor on any output, 20 MHz |
| Output Voltage Overshoot | < 5% of voltage setting must settle within 300 mSec | Rise is monotonic |
| Transient Response | ± 5% of nominal output voltage | 50% load step @ 1 A/µs<br>Note: Consult specification for transient response for loads <10% 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 8 |
| 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 | Digital sharing control |
| Overload Protection (OCP) – Constant Current Mode | 105% to 125%<br>120% to 140% | Main output<br>5 Vsb output |
| Overvoltage Protection (OVP) | 110% to 130%<br>110% to 125% | Main output<br>5 Vsb output |
| Overtemperature Protection | 10 to 15 °C above safe operating area | Both PFC and output converter monitored |
| | | |

## ENVIRONMENTAL SPECIFICATIONS

| | |
|---|---|
| Operating Temperature | -40°C to +70°C, linear derating to 50% from 50°C to 70°C<br>Operation at -40°C requires a 5 minute operating warm-up at -20°C |
| Storage Temperature | -40°C to +85°C |
| Humidity | 10% to 90% non-condensing. Operating. Conformal coat option available |
| Acoustic Noise | < 40 dBA, 60% load at 30°C |
| Altitude | < 80% power derating is required for 5000 m<br>100% load at 3000 m |
| Shock (Operating) | MIL-STD-810E, method 516.4, Procedure I |
| Vibration (Operating) | MIL-STD-810E, method 514.4, Procedure I, Category 10 |
| Fan Noise | < 45 dBA, 80% load at 30°C  For the "L" version, the noise is <61dB at 80% load at 25°C |

## ORDERING INFORMATION TABLE 1

| Model Number* | Nominal Output Voltage Set Point | Adjustment Range | | Max Current (3000W) | Max Current (1500W) | Output Ripple P/P (0-50 ˚C) | Combined Line/Load Regulation | Trim Range ± 25% | "Vprog Adjustment" 0 V to 6 V (20% to125% Vout) |
|---|---|---|---|---|---|---|---|---|---|
| | | Max Load | Max Power (3000 W) | | | | | | |
| LCM3000L-T | 12V | 2.4 V - 12 V | 12 V - 15 V | 250 A | 125 A | 150 mV OR 1% whichever is higher | 1% | 9 V - 15 V | 2.4 V - 15 V |
| LCM30008-T | 18V | 3.6 V – 18 V | 18 V - 22.5 V | 166.7 A | 83.3 A | 180 mV OR 1% whichever is higher | 1% | 13.5 V – 22.5 V | 3.6 V – 22.5 V |
| LCM3000Q-T | 24V | 4.8 V - 24 V | 24 V - 30 V | 125 A | 62.5 A | 240 mV OR 1% whichever is higher | 1% | 18 V - 30 V | 4.8 V - 30 V |
| LCM3000U-T | 36V | 7.2 V – 36 V | 36 V – 45 V | 83.3 A | 41.7 A | 360 mV OR 1% whichever is higher | 1% | 27 V – 45 V | 7.2 V – 45 V |
| LCM3000W-T | 48V | 9.6 V - 48 V | 48 V - 60 V | 62.5 A | 31.3 A | 480 mV OR 1% whichever is higher | 1% | 36 V - 60 V | 9.6 V - 60 V |
| LCM30007-T | 72V | 14.4 V – 72 V | 72 V – 96 V | 41.7 A | 20.8 A | 720 mV OR 1% whichever is higher | 1% | 54 V – 96 V | 14.4 V – 96 V |

Notes:
(1) Minimum Current is 0A
(2) Set Point Tolerance is ±0.5%
(3) Outputs above 60 Vdc are not SELV rated
(4) Vprog adjustment range for LCM30007-T is 20% to 133% and trim range is -25% to +33%

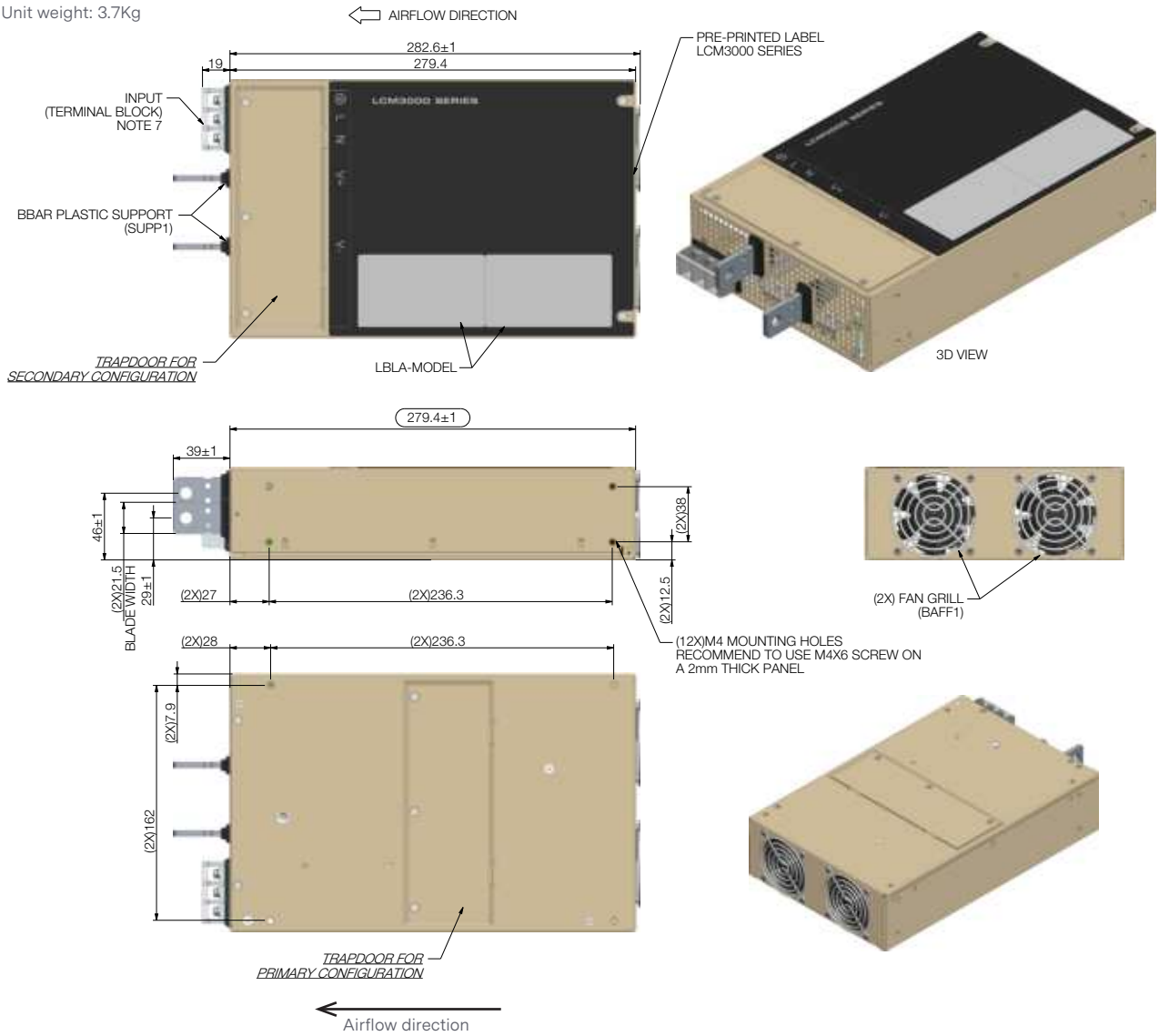
## ORDERING INFORMATION TABLE 2

| LCMXXXXY | | - | A | - | B | - | ### |
|---|---|---|---|---|---|---|---|
| Case Size | | | Input Termination | | Option Codes* | | Hardware Code |
| 1-Phase input where XXXX = | | | | | | | |
| 3000 = 2.5" x 7.0" x 11", 3000 W | | | | | Blank = No Options | | |
| | | | T = Terminal Block | | 1 = Conformal Coat | | Factory Assigned for Modified Standards |
| Voltage Code Y = | | | | | 2 = Reverse Air | | |
| Code | | | | | 3 = Opt 1 + 2 | | |
| L | 12 | | | | RL = Reverse Logic for Inhibit / Enable | | |
| 8 | 18 | | | | | | |
| Q | 24 | | | | | | |
| U | 36 | | | | | | |
| W | 48 | | | | | | |
| 7 | 72 | | | | | | |

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

## MECHANICAL DRAWINGS (LCM3000 Series - All Voltages)

Unit weight: 3.7Kg



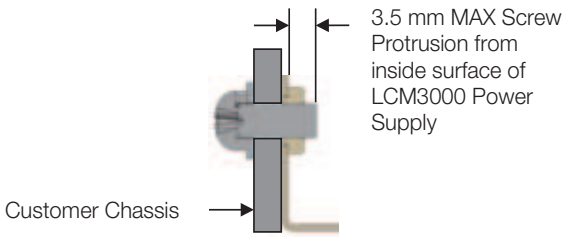

RECOMMENDED SCREW TORQUE:
M3.5 x 0.6P = 6 - 8 kgf-cm
M4.0 x 0.7P = 8 - 10 kgf-cm

INPUT TERMINAL BLOCK:
M4.0 screw with recommended torque of 16 kgf-cm
Recommended wire gage 18-10 (13 mm centers)

SUITABLE MATING CONNECTORS:
HSG-DR 20CKT (Landwin P/N: 2050S2000) or (Civilux P/N: CI0120SD00)
TERM-#22-28 (Landwin P/N: 2053T021V) or (Civilux P/N: CI01TD21PE0)

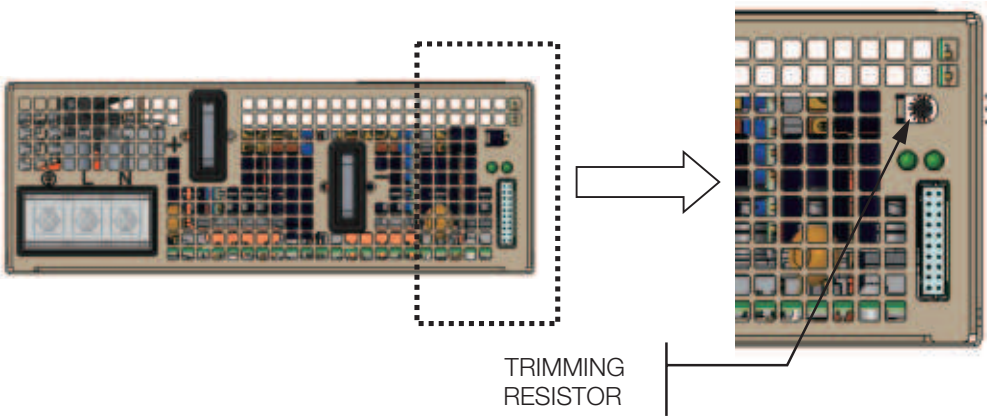
Note: For customer mounting, Dimension should be from external surface.
Max screw protrusion will be 4.5mm (1.0mm chassis thickness)

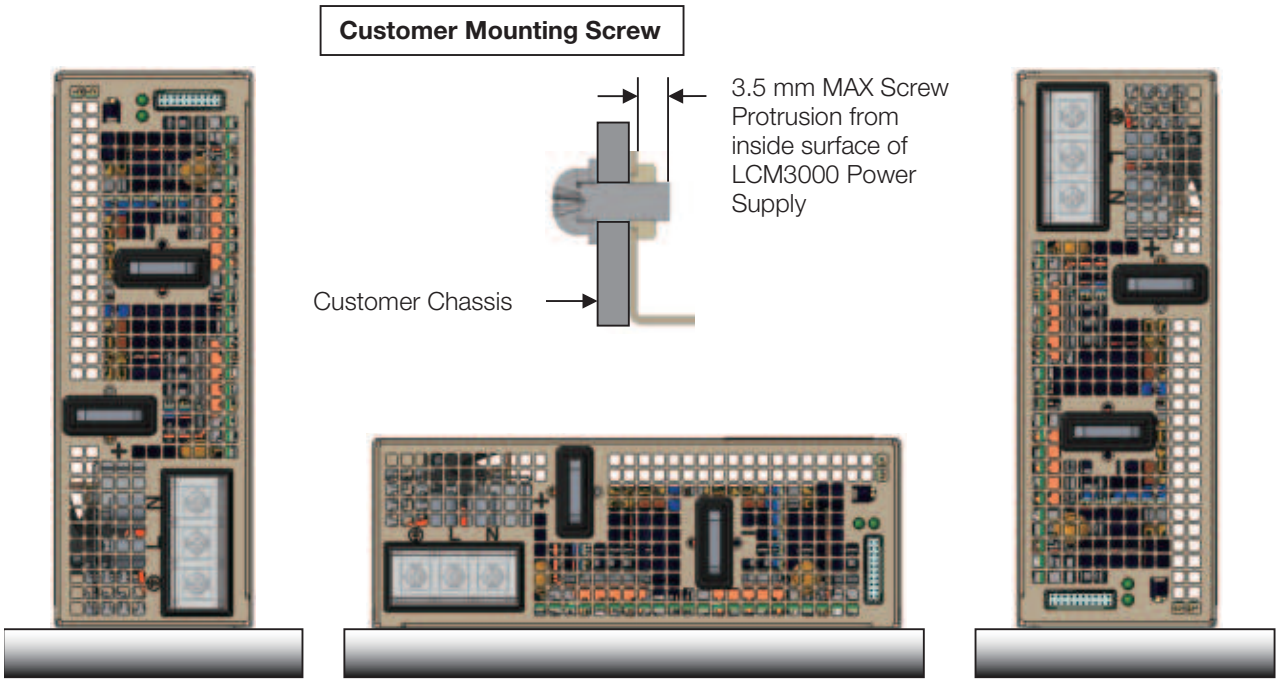
**Customer Mounting Screw**



## MECHANICAL DRAWINGS (LCM3000 Series - Trimming Resistor location)

A precision screw with positive (+) point should be used on the trimmer.
Rotating in clockwise direction will increase the voltage set point. Access must be from the front panel.



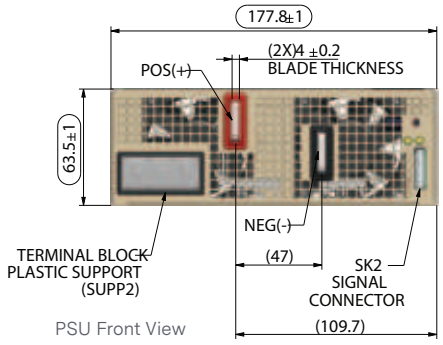
## PIN ASSIGNMENT

| SIGNALS | DESCRIPTION | PIN # |
|---|---|---|
| +Vout | Power rail | SK4 |
| GND | Power Ground | SK5 |
| **SIGNALS** | **DESCRIPTION** | **SK2 PIN NUMBER** |
| A2 | EEPROM Address | 1 |
| -VPROG | Return connection of external supply for V-Programming from 20% to 125% | 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 V-Programming from 20% to 125% | 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 |

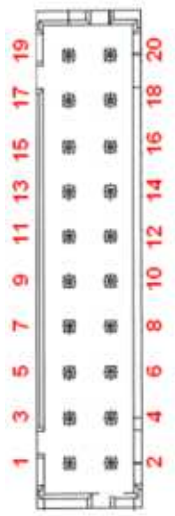
Note: Mating connector for SK2 is:

LANDWIN: PN 2050S2000 Housing and PN 2053T021V Contact

CIVILUX: PN CI0120SD000 Housing and PN CI01TD21PE0 Contact




PSU Front View




Signal Output Signal Connectors (SK2)

## 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 is within specification and off when out of specification.

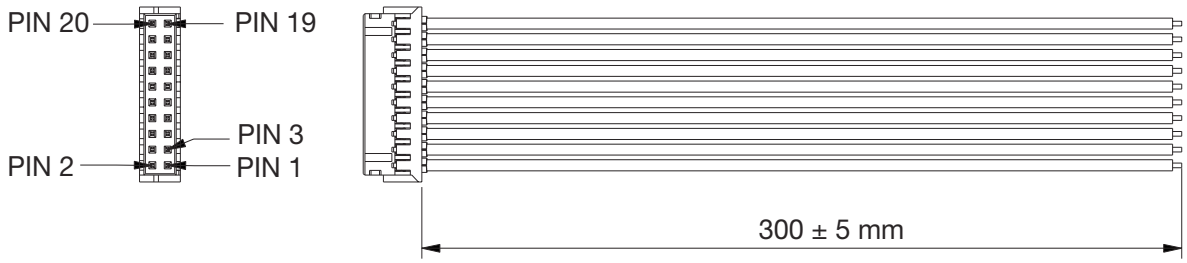
## CONTROL SIGNALS

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

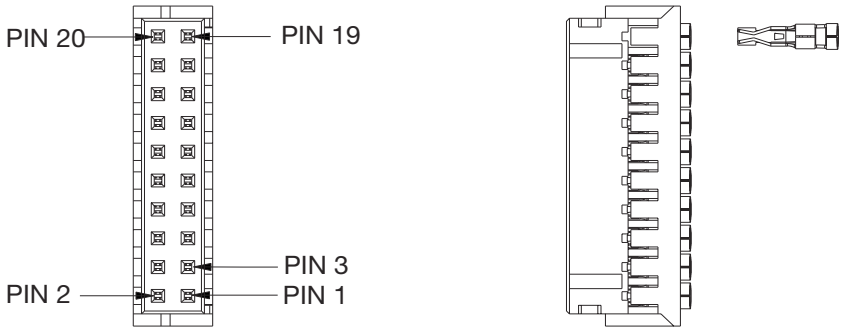
**DC_OK** Open collector 0.5 V maximum at 10 mA. Both emitter and collector access provided.

**PS_INHIBIT/ENABLE Signal** 0.0 - 0.5 V contact closure, output OFF; Option code “A” = 0.0 to 0.5 V or contact closure, output ON.

## ACCESSORIES




Order kit part number 73-788-001 for control connector interface with 0.3 m 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 200K hours using the Telcordia 2 Method, with specifications @ 25 °C, ambient, at full load. With the power supply installed in a system in a 35 °C ambient environment and operating at full load, capacitor life shall be 5 years, minimum for ALL electrolytic capacitors contained within this power supply. The power supply shall demonstrate an MTBF level of > 500,000 hours based on actual field population operational hours.

### QUALITY ASSURANCE

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

### WARRANTY

Advanced Energy shall 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 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 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.

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