LCM3000

3000 W Bulk Front End



Advanced Energy's 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

# 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
- V-Programming from 20% to 125%
- 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

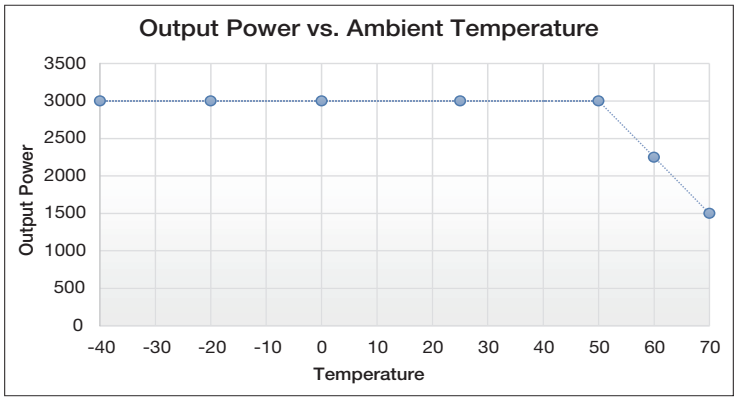
- CE and UKCA Mark

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 115/230 VAC (Nominal) 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 PRI-SEC 4000 VAC 2xMOPP SEC-Chassis 500 VDC



ELECTRICAL SPECIFICATIONS

Output		
Output Rating	See table 1	
Set Point	± 0.5%	
Total Regulation Range	Main Output: ± 1% 5 Vsb: ± 5%	Combined line/load/transient when measured at output terminal
Rated Load	3000 W maximum (Derate to 1500W when input is <180 Vac)	Derate linear to 50% from 50°C to 70°C
Minimum Load	Main Output @ 0.0A 5 Vsb @ 0A	No loss of regulation
Output Noise (PARD)	1% max p-p 100 mV max p-p	Main output 5Vsb output 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 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% 120% to 140%	Main output 5 Vsb output
Overvoltage Protection (OVP)	110% to 130% 110% to 125%	Main output 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 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 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 - 90V	41.7 A	20.8 A	720 mV OR 1% whichever is higher	1%	54 V – 90 V	14.4 V – 90 V

Notes:
(1) Minimum Current is 0 A
(2) Set Point Tolerance is ±0.5%
(3) Outputs above 60 Vdc are not SELV rated

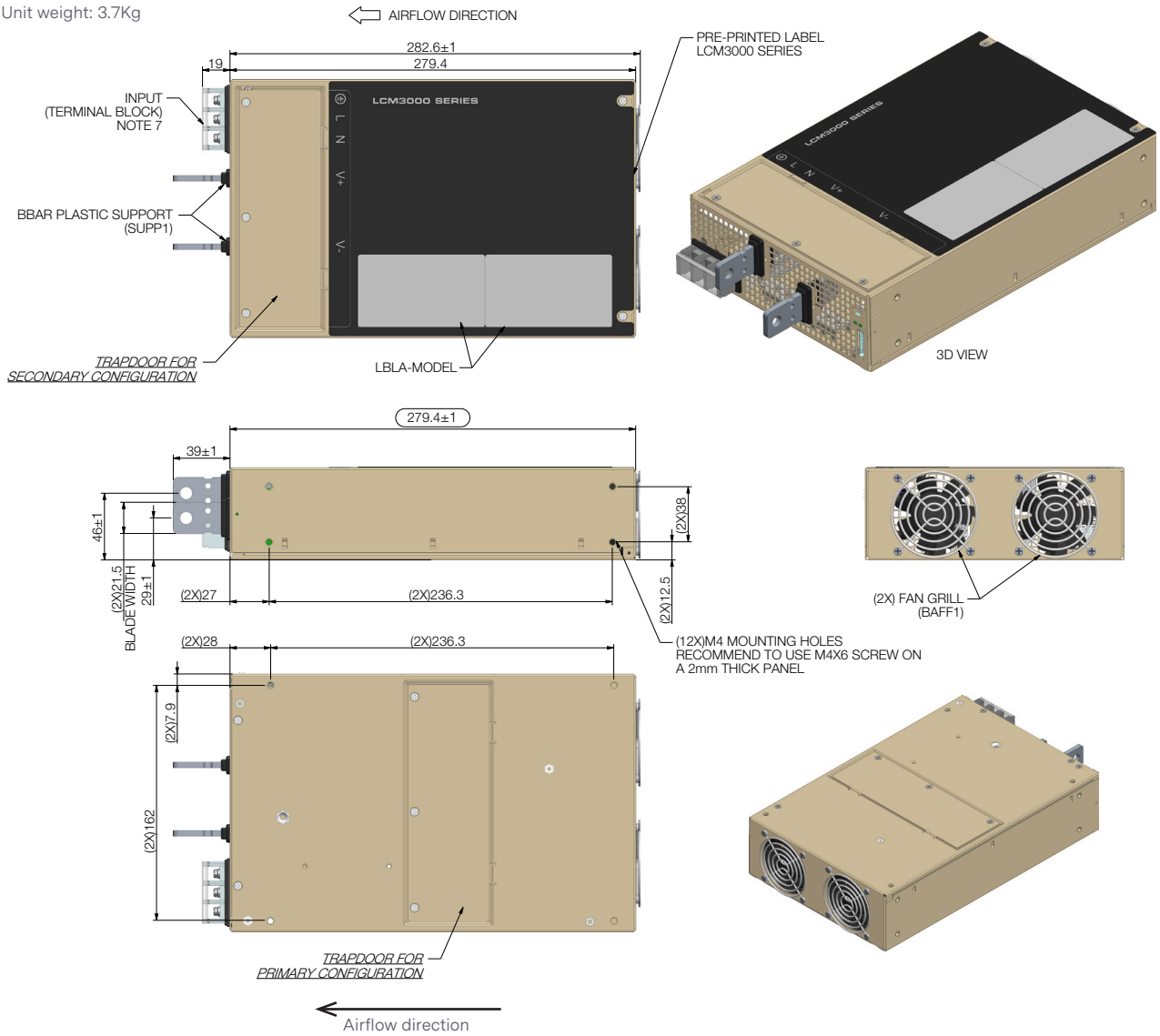
ORDERING INFORMATION TABLE 2

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



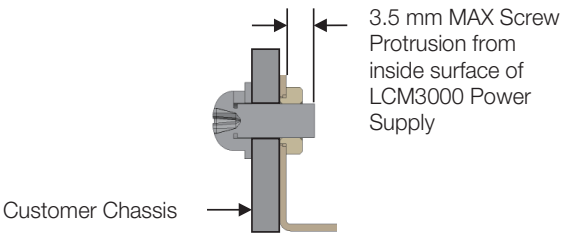
RECOMMENDED SCREW TORQUE:
M3.5 x 0.6P = 6 - 8 kgf-cm
M4.0 x 0.7P = 8 - 10 kgf-cm

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)

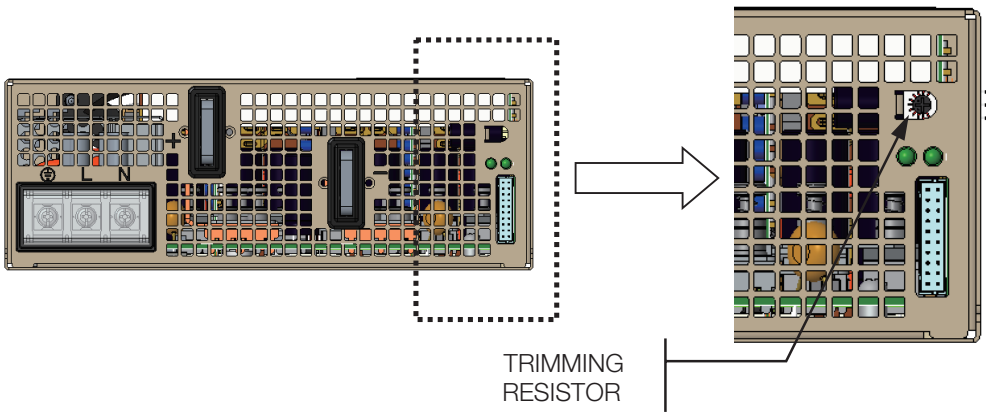
Customer Mounting Screw

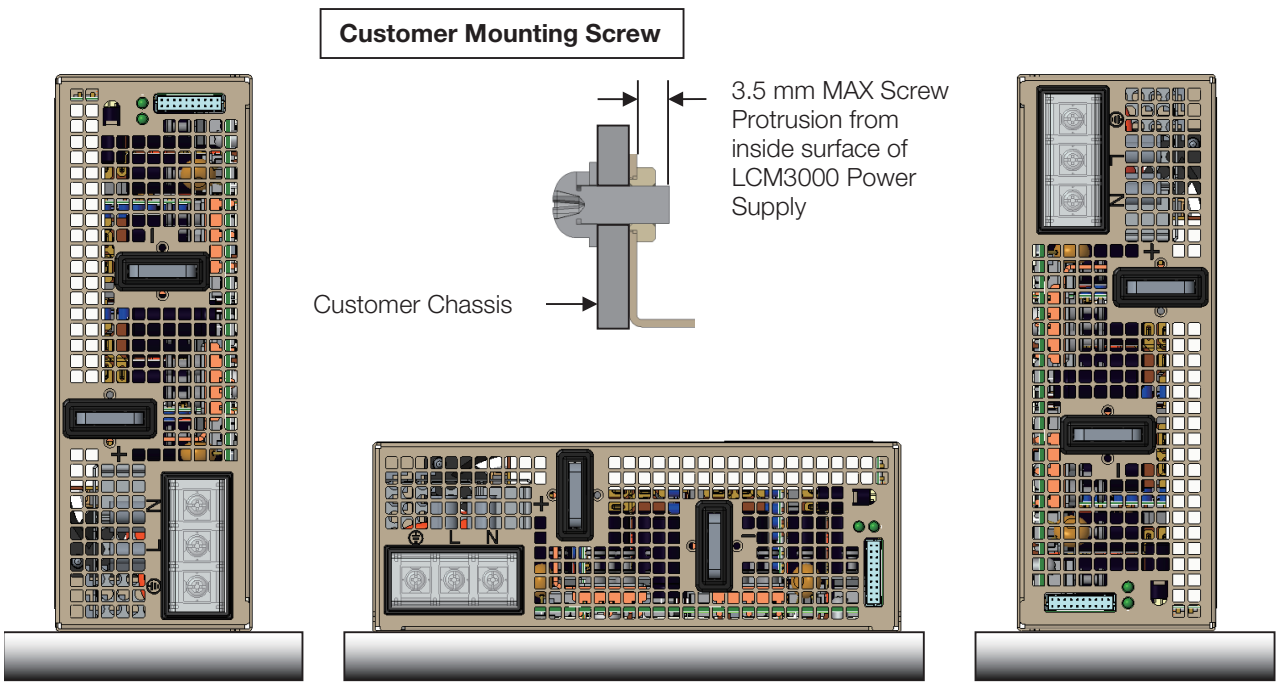


MECHANICAL DRAWINGS (LCM3000 Series - Trimming Resistor location)

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.





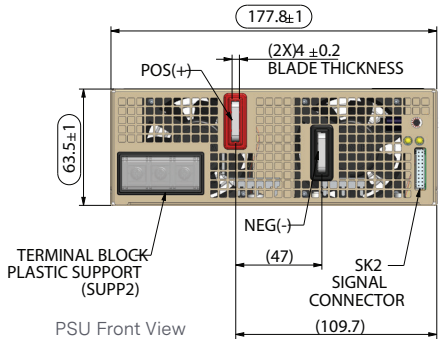
PIN ASSIGNMENT

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

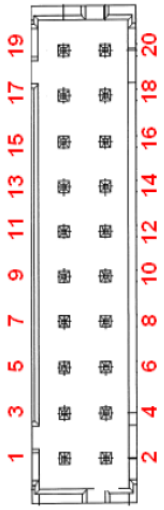
Note: Mating connector for SK2 is:

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.

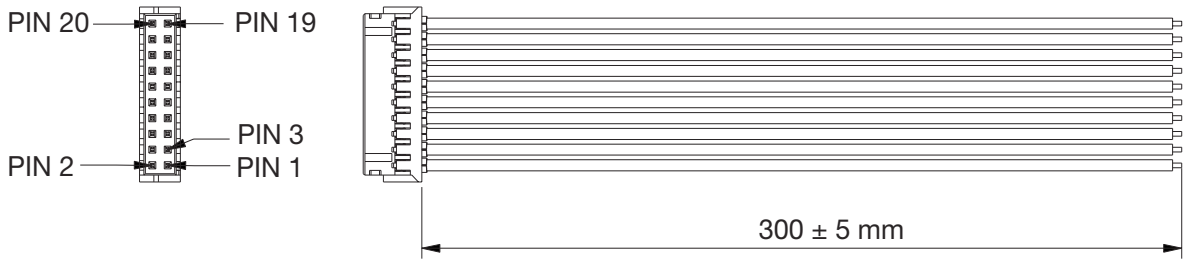
CONTROL SIGNALS

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

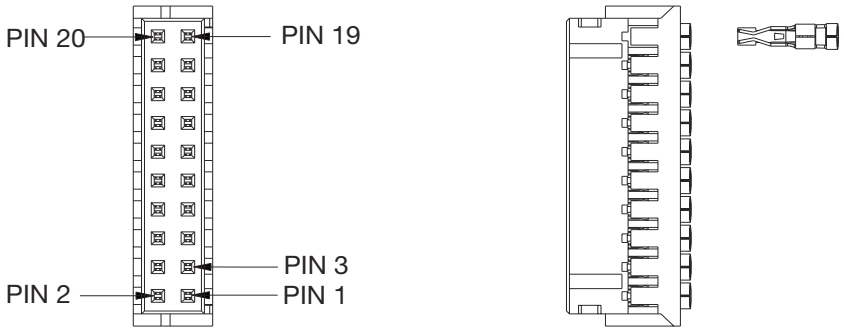
DC_OK Open collector 0.5 V maximum at 10 mA. Both emitter and collector access provided.

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 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.

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