

NP1300 Constant Current Front-End Power Supply 85 Vac to 264 Vac Input; 21 Vdc to 28 Vdc Output



Applications

- Optical routing and switching
- Broadband access
- Storage area networks
- Enterprise networks
- Indoor wireless

Description

The NP1300 front-end power supply is specifically designed to operate as an integral part of a 24-Volt distributed power system, with or without battery backup. A full complement of alarm and shutdown features has been incorporated into the power supply to protect the system in the event of a fault condition. The flexible feature set makes this front end power supply an excellent choice for applications requiring modular ac-dc bulk intermediate voltages, such as distributed power and dc UPS. Features reflect an emphasis on worldwide acceptance of this power system.

* IEC is a trademark of International Electrotechnical Commission.

† UL is a registered trademark of Underwriters Laboratories, Inc.

‡ CSA is a registered trademark of Canadian Standards Association.

§ VDE is a trademark of Verband Deutscher Elektrotechniker e.V.

** This product is intended for integration into end-use equipment. All the required procedures for CE marking of end-use equipment should be followed. (The CE mark is placed on selected products.)

Features

- 1360 Watt high-line and 1250 Watt low-line output from $21 \leq V_{OUT} \leq 29$ Vdc
- 50A output from $21 \leq V_{OUT} < 27.2$ Vdc
- Rated for -5 to +55°C operation
- Voltage programming range – 27.2V default, programmable from 21V to 28V
- Voltage margining with optional Network Protocol Card (NPC) from 21V to 28V
- Redundant parallel operation
- Temperature dependent variable-speed fan
- Hot insertion/removal (hot plug)
- Output may be powered-up with 25,000 μ F capacitive load
- Active load sharing
- Remote sense
- Remote On/Standby
- Over-temperature protection
- Optically isolated alarm signals with a common return
- Front panel LED status indicators
- Power Factor Correction (meets EN61000-3-2)
- CISPR Class B EMI (radiated and conducted)
- UL[†]60950 Recognized, CSA[‡] C22.2 No. 60950-00 Certified, and EN 60950 (VDE[§]0805):2001-12 Licensed (UL and c-UL Listings are provided at the shelf level.)
- CE** marking for low-voltage (73/23/EEC) and EMC (93/68/EEC) directives

Electrical Specifications

Table 1. Input

Parameter	Min	Typ	Max	Unit	Note
Input Voltage	85 150	120 230	135 276	Vac	Unit will start at 5 Volts over min value. Output remains in regulation with line excursions to 300Vac. Output will operate normally when input voltage is distorted by 25%.
Frequency	47	—	63	Hz	—
Input Current	—	—	15	A	At 115 Vac
Inrush Current			40	A _{peak}	Measured at 25°C for all rated line conditions. Does not include charging of X-capacitors.
Input Leakage Current	—	—	3.2	mA	276 Vac, 60 Hz.
Power Factor	0.97 0.87		—		From 50% to full load. From 20% to 40% of full load. Above conditions for nominal input voltage of 120V and 240V ac.
Efficiency	84			%	From 50 to 100% load with output at 27.2V.
Line Swell	20			%	Surge above highest rated nominal for 2 seconds
Hold Over Time	20			ms	Alarm 5 ms prior to shutdown. Output voltage allowed to droop to 23V into a 1250/1360W constant power load.
Total Harmonic Distortion			6	%	From 50% load to full load.

Table 2. Output

Parameter	Min	Typ	Max	Unit	Note
Vo Set Point		27.2		Vdc	Set point tolerance is 1%. Factory default output voltage set to 27.2V.
Total Output Power	1250 1360			W	85Vac to 132Vac operation. (Derated to account for 12A maximum rated input at low-line conditions.) 150Vac to 264Vac operation, nominal setting is 1360W; however, rectifier is capable of delivering 105% of nominal rating, or 1428W.
Programmable Vo Range	21		28	Vdc	Factory programmable in 60 mV increments. Consult factory for details.
Margining Range (option)	21		28	Vdc	Output voltage may be margined via optional Network Protocol Cards. Consult factory for details.
Regulation	-1		+1	%	Total regulation line, load, aging and temperature.
Remote Sense Drop			1.0	Vdc	Short to any SELV voltage source with no damage. Open circuit failure of remote sense should not cause unit to go outside the 2% regulation range when measured at the output.

Electrical Specifications (continued)

Table 2. Output (continued)

Parameter	Min	Typ	Max	Unit	Note
Vfullpower	27.2	—	28	Vdc	Full power is 1360W. Rated full power is nominal 1360W at high-line and 1250W at low-line. See Note.
Vhiccup		9	12	Vdc	Current tail does not start before 12V.
IOUT		50 46		A	From 22V to 27.2V and at high-line. From 22V to 27.2V and at low-line.
ILIM Range	30	52.5		A	Factory programmable in 0.5A steps.
ILIM Set Point		52.5		A	At 27.2V.
Ishortcircuit	—	—	10 200	A %	Average over hiccup period. Excluding current pulses less than 500 μ s.
Ripple and Noise Transmission Noise Psophometric Noise			250 55 2	mVp-p dBnC mV	20 MHz bandwidth under any load condition. C-message weighted.
Output Rise Time	20	—	150	msec	Measured between the 10% and 90% points of the output-voltage-rising waveform for any rated load condition.
Turn-On Overshoot		0	1.5	Vdc	Overshoot is with respect to the initial set point.
Backup High Voltage Shutdown	29	30	31	Vdc	With rectifier output margined to 28V, no step load change will cause high-voltage shutdown. If output voltage is operating within specified range for greater than 50ms, unit will shutdown.
Maximum Voltage During HVSD	—	—	65	Vdc	Duration of overvoltage condition above 30V limited to maximum 100ms.
Capacitive Load	—	500	1700	μ F per A	25,000 μ F Typ.
Active Load Sharing			10	%	Averaging method proportional to full scale output voltage. For currents more than 50% full load current each rectifier will share to within 10% of the value that would be observed if all rectifiers were sharing perfectly.
Reverse Output Current Protection			0.5	A	ORing Diode
Turn on Delay			3.5	s	Measured from application of valid ac voltage for default unit setpoint.
Transient Response (Voltage Deviation)			5	%	25% step load change at 25% to 75% load 10% step load change at 0% to 25% load No HV shutdown for any transient load change. Load transient current delta to be within 250 \pm 25 μ s. The induced output voltage transient settles to within 1% of the final voltage in less than 10 ms. All data given are for resistive loads.

Note: Rectifiers may be purchased with the output set to any voltage in the range $21 \leq V_O \leq 28V$ with the output performance as noted above. Users may also margin the output voltage to any voltage in the range $21 \leq V_O \leq 28V$ with an optional Network Protocol Card. When the rectifier is programmed to an output voltage within the range of $27.2V \leq V_O \leq 28V$, the rectifier output current is adjusted so that a constant power is delivered. However, when the rectifier is programmed to an output voltage within the range of $21V \leq V_O < 27.2$, the output current is maintained at that for 27.2V, therefore, the rectifier produces less power. For example, if the NP1300 is programmed to 24V, the resultant output power would be 1224W (24V x 51A---51A is the current limit set point for the NP1300). Consult factory for more details.

Electrical Specifications (continued)

Table 3. Bias Output

The bias output is used to power the failed unit alarms and LEDs in up to one unit that has an internal bias failure. It is also used to power up to one initialization I²C EEPROM.

Parameter	Min	Typ	Max	Unit	Note
V _o Set Point		12		Vdc	
Total Output Power			0.5	A	
V _{fullpower}			3	s	Measured from application of valid ac voltage.

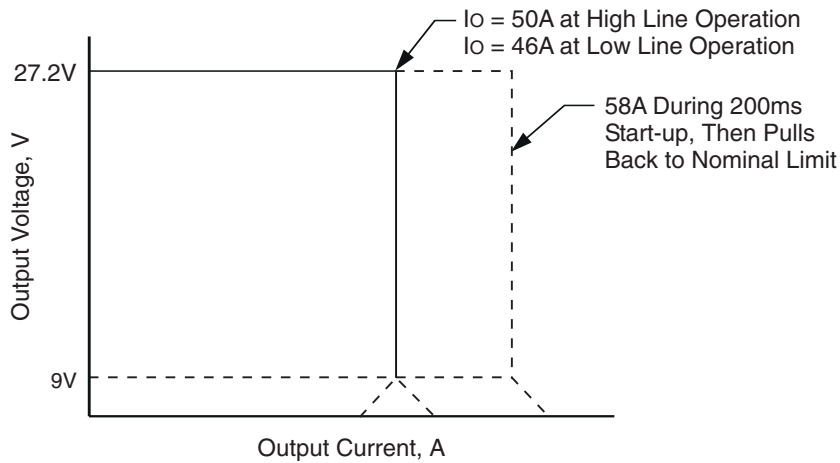


Figure 1. NP1300 24V Voltage Set Point and Corresponding Current Curve

Environmental Characteristics

Table 4. Environmental Characteristics

Parameter	Min	Typ	Max	Unit	Note
Storage Temperature	-40	—	85	°C	
Operating Temperature (air inlet to power unit)	-5		+55	°C	Airflow front to back with 3 inch clearance for exhaust air in unpressurized enclosure.
Sound Pressure	—	—	60	dBa	Sound pressure level measured on a system consisting of three rectifiers operating with normal fan speed in Power systems shelf from the bystander position per Telcordia GR-63-CORE in a 25°C ambient.
Humidity	5	—	95	%	Relative humidity noncondensing.
Altitude	-60 (-200)	—	4000 (13000)	m (ft.)	For operation above 2500m (8000 ft.), maximum operating temperature is derated by 2°C per 305m (1000 ft.)
Shock and Vibration	—	—	—	—	1) Meets Network Equipment Building System (NEBS) GR-63-CORE 2) ASTM-D-4728-91 with an 8 hour duration on each axis.
Earthquake Rating	4	—	—	Zone	All floors, when installed with NP Shelf and 3 rectifiers in 19 in. rack.
Harmonic Emissions					Per EN/IEC61000-3-2
Radiated Emissions	—	—	—	—	FCC and CISPR22 (EN55022) Class B, individually and in system with NP Shelf and 3 rectifiers.
Conducted Emissions	—	—	—	—	FCC and CISPR22 (EN55022) Class B
Radiated Immunity	3	—	—	level	Error free per EN/IEC 61000-4-6 (10 Vrms) Error free per EN/IEC 61000-4-3 (10 V/m)
Electrical Fast Transient Burst	3	—	—	level	Error free per EN/IEC 61000-4-4 (1 kV on I/O and control ports, 5 kHz repetition rate) for occurrences at 1 minute intervals.
Lightning Surge Error-free	4	—	—	level	Operates with 320V surge of 2 second duration.
Damage-free	B3	—	—	level	EN/IEC61000-4-5 Level 4 (4 kV) ANSI C62.41 B3 (6 kV)
Conducted Immunity	3	—	—	level	Error free per EN/IEC 61000-4-6 (10 Vrms)
Reliability (calculated)	395k	—	—	hours	Fully loaded in a 25°C ambient with fan at normal speed. Method I, Case III per Telcordia SR-332, Reliability Prediction for Electronic Equipment.
Service Life	10	—	—	years	25°C ambient, full load excluding fans.
Connector Life	100			insertions	Final contact resistance of signal pins is less than 100 milli ohm or 0.25 watt power dissipation whichever is less.

Note 1: Error Free is defined as the rectifier continuing to operate without shutting down and requiring user intervention. Output voltage may deviate from setpoint; however, it must settle back to its setpoint after application of test voltage.

Note 2: Damage free is defined as the rectifier suffering no permanent damage; however, shutdown is acceptable.

Physical Descriptions

Definition of Terms

Power-Factor Correction

All NP-Series power supplies comply with the specifications set forth in EN61000-3-2.

Input Overcurrent Protection

An internal fuse is provided in each unit for input protection in compliance with safety agency requirements.

Overcurrent Protection

In the event of an overload condition, the power supply limits the output current. See Figure 1 for details.

Overvoltage Protection

The power unit turns itself off before the output voltage reaches a specified threshold.

Overtemperature Protection

In the event of an overtemperature condition, the power unit protects itself by shutting off. Restart can be accomplished with a toggle of Remote On/Standby or by power cycling.

ORing Diode

A diode at the output of the power unit protects the dc bus in the event of a power supply failure or hot plugging of the power unit.

Remote On/Standby

An opto-isolated input signal. An external 1 mA, 5 V source activates a standby condition in the power module.

Voltage Margining

Output voltage may be adjusted between 21V and 28V. Call factory for details.

Current Share (I_SHARE)

A single-wire interface between each of the power units forces them to share the load current.

Remote Sense (R_SENSE)

These signals permit the power units to compensate for a voltage drop across the output distribution.

Reset

Toggle the Remote On/Standby line to accomplish reset.

Redundant Bias Supply (EX_BIAS_12—15 V)

This protected feed from the internal bias supply may be used to externally power the alarm and control logic.

Variable Speed Fan

Fan spins at lower rpm at room ambients. When ambient temperature exceeds approximately 27°C, the fan speed is linearly increased until approximately 35°C when the fan spins at full speed.

Front Panel LEDs

AC OK (green): The unit has input ac in the correct range.

DC OK (green): The unit is powered up and the output is in regulation.

Fault (red): The unit has detected an internal fault.

Status Signals

The following are the optically isolated open-collector signals (minimum 1 mA sinking capability):

Fault: The unit has detected an internal fault.

Overtemperature Warning (OTW): The unit is overheating; shutdown is imminent (8 second warning).

Power Fail Warning: The output of the power unit will fail in at least 5 ms.

Front-End Power Supply Interfaces

Input Voltages

The product can be used with any standard global line voltage; consult the factory for any particular regional application concerns.

Input Connector

The ac input connection is through an IEC60320 C-13 connector rated for the currents involved.

Grounding

Frame ground can be connected so that the output may have a positive or negative ground.

Connector Information and Signal Definitions

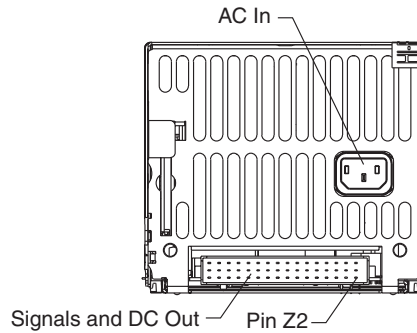


Figure 2. NP1300 Connectors

DC Connector

Each NP1300 rectifier has a DIN 41612 Type F Connector with level 2 gold plating.* Pin-out configuration and function descriptions are as described in Table 5.

Table 5. Rectifier Output Connector Pin Outs

	32	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2
D	Missing Module + (Line)	EX_BIAS_12-15V (Bus)	PFW+ (Line)	OTW + (Bus)	A2 (Bus)	SERIAL INTERRUPT (Bus)	Future Use Bus (Bus)	SHELF PRESENT (Bus)	Vout - (Bus)	Vout - (Bus)	Vout - (Bus)	Vout - (Bus)	Vout + (Bus)	Vout + (Bus)	Vout + (Bus)	Vout + (Bus)
B	Long Pin Vout - (Bus)	A3 (Bus)	ALM_RTN (Bus)	Reserved for mfr's use	A1 (Line)	SERIAL CLOCK (Bus)	RS485- (Bus)	Missing Module - (Line)	Vout - (Bus)	Vout - (Bus)	Vout - (Bus)	Vout - (Bus)	Vout + (Bus)	Vout + (Bus)	Vout + (Bus)	Long Pin Vout + (Bus)
Z	A4 (Bus)	REMOTE_ON/STBY (Line)	I_SHARE (Bus)	FAULT + (Bus)	A0 (Line)	SERIAL DATA (Bus)	RS485+ (Bus)	SERIAL RTN (Bus)	Vout - (Bus)	Vout - (Bus)	Vout - (Bus)	RS- (Bus)	Vout + (Bus)	Vout + (Bus)	Vout + (Bus)	RS+ (Bus)

Note: The (Bus) and (Line) suffixes are indications of how signals are wired on the standard 19 inch NP Shelf.

(Bus) indicates that this signal is routed in parallel to all rectifiers in a specific shelf.

(Line) indicates that each rectifier is individually connected through that pin.

* Please see the *NP Rectifier and NP Shelf Application Note* for more information.

Physical Specifications

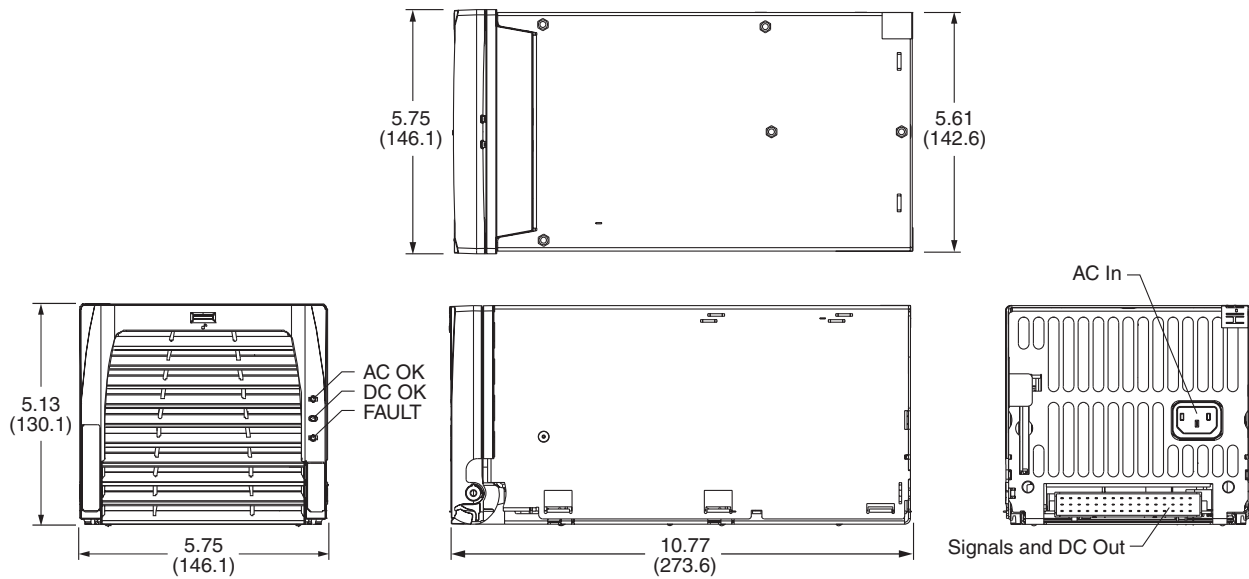


Figure 3. NP1300 Rectifier Specifications

Table 6. Rectifier Physical Specifications

Parameter	Min	Typ	Max	Unit	Notes
Length	—	10.77	—	inches	—
Width	—	5.61	—	inches	Chassis
	—	5.75	—	inches	Face plate
Height	—	5.13	—	inches	Chassis
	—	5.13	—	inches	Faceplate
Weight	—	9.5	—	lbs.	Without shipping package
Weight	—	11	—	lbs.	With shipping package

Physical Specifications (continued)

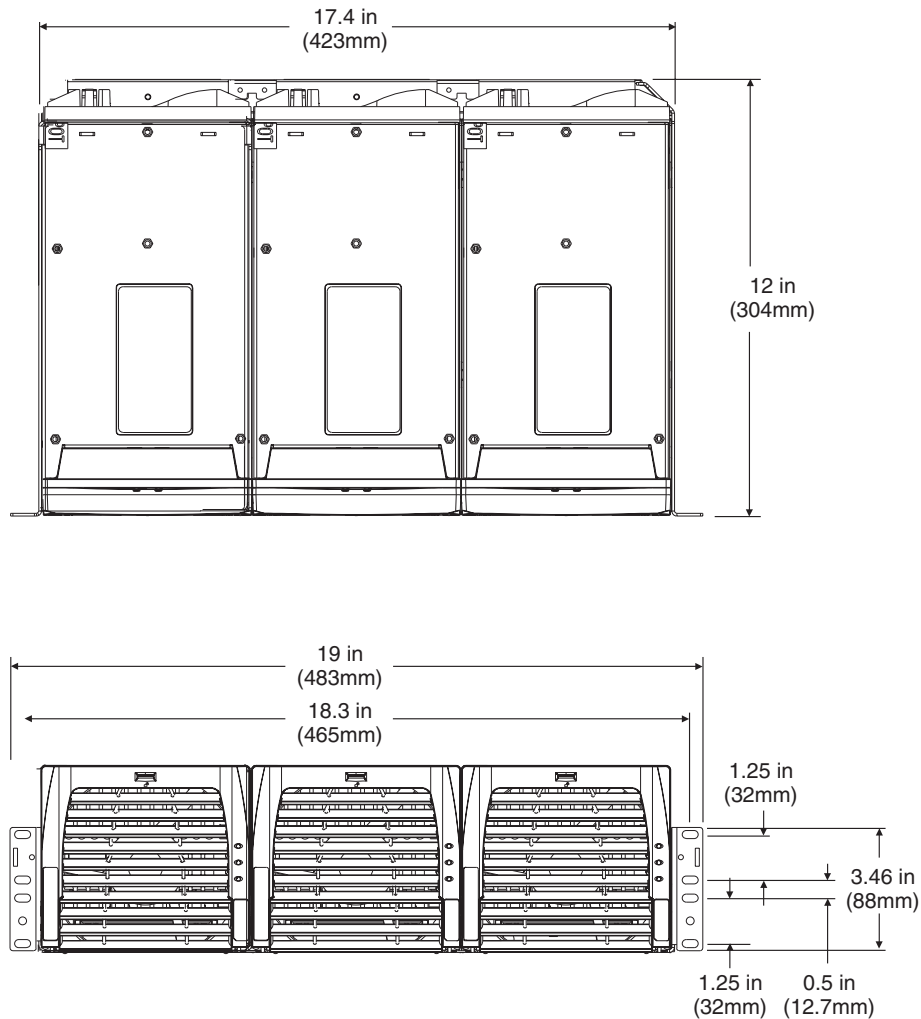


Figure 4. NP1300 System Dimensions - Three NP1300 Rectifiers in NP Shelf

Warranty Information

When used within specified operating conditions, Tyco Electronics will warrant that this product will conform to published specifications and is free of material and workmanship defects for the period of two (2) years from date of manufacture. This warranty applies only to units having the date code of warranty period or less when returned to Tyco Electronics for repair. Tyco's liability will be limited to the repair or replacement, at our option, of the returned unit. Our warranty does not extend to any unit which has been subjected to abuse, misuse, or neglect or to units that have been repaired or altered by anyone other than Tyco Electronics or an authorized agent. Additional details are provided in contract documents and other full-warranty statements.

Ordering Information

Table 7. Product Codes

Product	Description	Comcode	Shipping Weight
NP1300 Rectifier	One (1) NP1300 Rectifier	108985268	11 lbs
NP Shelf	One (1) NP Shelf with dc output cables*, holds up to three (3) rectifiers	CC109121844	9 lbs
NP Shelf LC	One (1) NP Shelf without dc output cables, holds up to three (3) rectifiers	CC109122537	8 lbs

* includes redundant 6 gauge, 3 ft 10 in length dc output cables

Table 8. AC Cord Sets*

Region	AC Cord Sets	Appliance Connector	Wall Plug	Comcode
North America	15 A/125 Vac, 10 A/250 Vac†	IEC60320 C-13 Right Angle	NEMA 5-15P	848545166
Italy	10 A/250 Vac	IEC60320 C-13 Right Angle	MP231 CEI13-16/VII	848545216
Europe	10 A/250 Vac	IEC60320 C-13 Right Angle	IEC 884/ CEE 7/7 Exception to CEE 7/7: Switzerland SEV 1011	848545208
United Kingdom	13 A/250 Vac	IEC60320 C-13 Right Angle	BS1363, w/13 A fuse	848545224
Australia	10 A/250 Vac	IEC60320 C-13 Right Angle	AS3112	CC848788661
Argentina	10 A/250 Vac	IEC60320 C-13 Right Angle	IRSM 2073:1982	CC848788678
China	10 A/250 Vac	IEC60320 C-13 Right Angle	GB2099.1-1996	CC848788686
Japan	15 A/125 Vac	IEC60320 C-13 Right Angle	JIS 8303	848545182

* The appliance connector used on all of the region-specific ac cord sets is the IEC60320 C-13 right angle.

All ac cord sets are 10 feet in length.

Contact factory for RoHS status.

† For high-line operation, qualified service personnel must replace the wall plug with an appropriate UL Listed/CSA plug, as required in compliance with local electrical codes and standards. (UL is a registered trademark of Underwriters Laboratories, Inc.)

Notes

**World Wide Headquarters**

Tyco Electronics Power Systems, Inc.
3000 Skyline Drive, Mesquite, TX 75149, USA
+1-800-843-1797
(Outside U.S.A.: +1-972-284-2626)
power.tycoelectronics.com
e-mail: techsupport1@tycoelectronics.com

Europe, Middle-East and Africa Headquarters

Tyco Electronics (UK) Ltd
Tel: +44 1344 469 300, Fax: +44 1344 469 301

Caribbean-Latin America-Brazil Headquarters

Tyco Electronics Power Systems
Tel: +56 2 209 8211, Fax: +56 2 223 1477

Asia-Pacific Headquarters

Tyco Electronics Singapore Pte Ltd
Tel: +65 6416 4283, Fax: +65 6416 4299

India

Tyco Electronics Systems India Pte Ltd
Tel: +91 80 841 1633 x3001

Tyco Electronics Corporation reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed as a result of their use or application. No rights under any patent accompany the sale of any such product(s) or information.

©2006 Tyco Electronics Power Systems, Inc., (Mesquite, Texas) All International Rights Reserved.
Printed in U.S.A.

November 2006
DS03-200 Rev 3