

DATASHEET

EP1600-UTEZFB2 short-depth power supply

90 - 264V_{AC} Input; 21-58V_{DC} Output; 1600W Output Power - No controller required



Applications

- Wireless & RF Energy
- Optical & Telecommunication Switches
- Industrial Automation, Others

Features

- Short Length with 8.1"/ 206mm
- Universal AC Input Range (90 – 264V_{AC})
- Large Vout 21-58V_{DC} with foldback curve & faster output voltage change
- Optimized fan speed control depending of Temp & Voltages & Current
- Maximum output current of 33.3A @48V_{out} (1600W)
- High reliability & High Efficiency around 95%
- Full load capability at 50°C with derating at higher temperatures
- Communications: Galaxy Protocol / RS485
- Output overcurrent protection (non-latching)
- Overtemperature protection
- Output overvoltage protection
- Minimum of 11ms of holdup time
- Digital Load sharing / Hot-swap
- Active power factor corrected input
- Conformal coating & Cost effective solution
- No Controller required – Stand-alone by default (no red LED blinking)
- Fast Ramp-up - Walk-in disabled by default
- Fast monitoring with single instruction to read 7 key registers on Voltage (I/O), Current (I/O), Power (I), Temp, Status
- Accuracy of input current measurements >95% @230V_{AC}
- Conducted EMI - meets CISPR32 (EN55032) and FCC Class B requirements
- Meets IEC61000-4-5, Level 4 (2kV/4kV)
- Compliant to RoHS EU Directive 2002/95/EC
- UL and cUL approved to UL/CSA62368-1, TUV (EN62368-1), CE Mark (for LVD) and CB Report available
- ISO** 9001 and ISO 14001 certified manufacturing facilities

* 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.

** ISO is a registered trademark of the International Organization of Standards

Technical Specifications

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause permanent damage to the device. These are absolute stress ratings only, functional operation of the device is not implied at these or any other conditions in excess of those given in the operations sections of the data sheet. Exposure to absolute maximum ratings for extended periods can adversely affect the device reliability.

Parameter	Min	Max	Unit
Input Voltage – Continuous operation	90	264	V _{AC}
Input Voltage – no damage	0	285	V _{AC}
Operating Ambient Temperature (see Thermal Considerations section)	-40	75	°C
Storage Temperature	-40	85	°C
Humidity (non-condensing)	5	95	%
Altitude	-400	4000	m
Isolation Voltage – Input to output		3000	V _{AC}
Input to safety ground		1500	V _{AC}
Outputs to safety ground		1000	V _{AC}

Electrical Specifications

Parameter	Min	Typ.	Max	Unit
Operating Input Voltage (1200W for V _{IN} = 90-175V _{AC})	90	115/230	264	V _{AC}
Input Source Frequency	47	50/60	63	Hz
Input Current (V _{IN} = 90V _{AC})			16	A _{RMS}
Input Power Factor (230V _{AC} , Full Load)	0.96	0.99		
Inrush Transient Current (V _{IN} = 265V _{AC} , T _{amb} = 25°C)			25	A _{Peak}
Leakage Current to earth ground (V _{IN} = 265V _{AC})			3.5	mA
Output Voltage Setpoint (as shipped by OmniOn)		48		V _{DC}
Output Voltage Tolerance (due to set point, temperature variations, load and line regulation)	-1		1	%
Output Voltage Adjustment Range through RS485	21		58	V _{DC}
Output Load Regulation			1	%V _{out}
Output Line Regulation			0.5	%V _{out}
Output Ripple and Noise – measured with 230V _{IN} , 48V _{out} , 0.1μF ceramic capacitor in parallel with 10μF electrolytic capacitor Peak-to-peak (20MHz Bandwidth)			500	mV _{p-p}
Dynamic Load Response – 50% to 75% load transient, 1°/μs slew rate			5	%
Output voltage deviation			5	ms
Settling Time			5	ms
Output Current	0		33.3	A _{DC}
Output Current Limit Inception	34	35	36	A _{DC}
Output Capacitance (per unit)	0		10000	μF
Overvoltage protection	59	59.5	59.99	V _{DC}
Current Share Accuracy		+/-3	+/-5	%rated
Efficiency:				
V _{IN} = 230V _{AC} , 20% load	89	91		%
50% load	93	94		%
100% load	91	93		%
V _{IN} = 115V _{AC} , 20% load	87	89		%
50% load	90	92		%
100% load	87	90.5		%
Holdup Time – V _{IN} = 115V _{AC} , 48V _O , 33A _O , T _a > -10°C, output allowed to decay to 40V _{DC}		20		ms
V _{IN} = 230V _{AC} , 48V _O , 33A _O , T _a > -10°C, output allowed to decay to 40V _{DC}		12		ms

Technical Specifications (continued)

General Specifications

Parameter	Symbol	Typ.	Unit
Calculated Reliability based on Telcordia SR-332 Issue 2: Method 1 Case 3 ($V_{IN}=230V_{AC}$, $I_O = 32A$, $T_A = 40^{\circ}C$, 90% confidence)	MTBF	>250,000	Hours
Weight		1400/49.5	g/oz.
Service Life		10	Years

Feature Specifications

Parameter	Min	Typ.	Max	Unit
Turn-on delay		3.5		s
Output Voltage Rise Time (walk-in disabled)		100		ms
Output Voltage Rise Time (walk-in enabled)		20		s
Output Overvoltage Protection	59	59.5	59.99	V_{DC}
Input Undervoltage lockout				
Turn-on Threshold (100% load)	90	95	99	V_{AC}
Turn-off Threshold (100% load)	75	80	85	V_{AC}
Input Overvoltage lockout				
Turn-off threshold		275		V_{AC}
Turn-on threshold		270		V_{AC}

Environmental Specifications

Parameter	Specification/Test
Radiated Emissions (230V 50Hz in, 48V 33.5A out)	CISPR32 Class A with 3dB margin
Conducted Emissions (230V 50Hz in, 48V 33.5A out)	CISPR32 Class A with 6dB margin
ESD	IEC61000-4-2, Level 3 no errors, 4 no damage
Radiated Susceptibility	IEC61000-4-3, Level 3, 10V/m
Electrical Fast Transient Common Mode	IEC61000-4-4, Level 3, +/-2kV
Surge Immunity	IEC61000-4-5, Level 4
Conducted RF Immunity	IEC61000-4-6, Level 3, no errors
Input Voltage Dips	Output stays within regulation for either ½ cycle interruption or 25% dip from nominal line for 1 second
Input Harmonics	IEC61000-3-2
Shock and Vibration	Per IPC-9592B, Class II
Voltage Fluctuations	EN61000-3-3, no errors
Conducted RF	EN61000-4-6, level 3, no errors, 10Vrms
Radiated H field	EN61000-4-8, no errors, 30A/m
Ambient temperature, operating	-40°C to +75°C, start up at -40°C
Ambient temperature, transport	-40°C to +85°C, ETSI EN 300 019-1
Altitude	-400m to +4000m, derate by 1°C for every 200m above 2000m
Audible noise	<55dBA, for 3 units in a shelf, to meet GR-63 Core

Safety Specifications

Parameter	Specification
Dielectric Withstand Voltage (between input and output)	Minimum of 4,250V _{DC} for 1 minute
Insulation Resistance (between input and output)	Minimum of 5 MW
Safety Standards	Class 1, IEC62368-1, EN62368, with the following deviations: Nemko, UL 62368-1 (Recognized Component), cUL (Canadian Approval by UL)

Technical Specifications (continued)

Safety Considerations

The EP1600 power supply is intended for inclusion in other equipment and the installer must ensure that it is installed in compliance with all the requirements of the end application. This product is only for inclusion by professional installers within other equipment and must not be operated as a stand-alone product. The power supply meets Class 1, IEC62368, EN62368, with the following deviations: Nemko. UL62368 (Recognized Component) C-UL (Canadian Approval by UL).

This power supply has fuses in both the “Live” and “Neutral” input lines. Therefore, it may be connected in a phase to phase arrangement with safety, or via wall pugs where Live and Neutral cannot be resolved.

Feature Descriptions

Processor Back Bias Power Supply (A29)

The EP1600 has a back-bias which permits communication with and monitoring of a unit with AC input not present. A single unit shall be able to back-bias a minimum of four others in the same system. The back-bias shall be ~8V and assigned to A29 of the unit's interface. This is not intended for any other use.

Enable (A26)

Connect this pin to GND (A27) to enable the unit to run. A26 should be connected to A27 via a 1k resistor.

Power supply off (B24)

This is a power supply disable signal. It is an opto-isolator diode with 1000R in series. Pass between 3mA and 6mA to turn the power supply off. This pin is referenced to the ALARM-GND (B23).

Power supply present (B26)

This pin is connected to the ALARM-GND pin (B23) inside the unit. Use it for external detection of the presence or absence of the unit.

Address 2, 1, 0 (B28, A28, B27 respectively)

Use the address pins to give each power supply in the system a unique address. If there is no controller, give the power supply the address 111 to stop the front panel LED flashing to indicate communications failure. The address lines have internal pullups. Pull them to GND to set them to 0.

RS485 A, B, gnd (B29, B30, A30 respectively)

Use these pins to communicate with the power supply. Either use a OmniOn controller or your own. If you are not using a OmniOn controller, there is a separate document which explains how OmniOn Galaxy Protocol runs over the RS485 hardware layer.

Output Voltage Adjustment

The output voltage is capable of being adjusted between 21V and 58V using RS485 communications. When the power supply first powers up it will produce the most recently programmed voltage. Our factory ships at 48V. After that it will revert to the most recently programmed voltage.

The frame grounding can be connected such that the power supply may have a positive, or negative, or no ground connection.

Current Share Bus

Pins A25 and B25 are a current sharing signal bus. If you are going to connect the power outputs of multiple units together in parallel, then connect the current share bus. If you have multiple units in the system feeding separate loads, do not connect the current share bus.

Overcurrent Protection

To provide protection in a fault condition (output overload), the power supply is equipped with internal current-limiting circuitry and can endure current limiting continuously. The power supply operates normally once the output current is brought back into its specified range.

Overvoltage Protection

Overvoltage protection is a feature of the power supply that protects both the load and the power supply from an output overvoltage condition. When an overvoltage occurs, the power supply shuts down and restarts once the overvoltage condition is removed. It is not necessary to recycle the input to restart the power supply when this protection is activated.

Overtemperature Protection

The EP1600 also features overtemperature protection in order to provide additional protection in a fault condition.

Technical Specifications (continued)

The power supply is equipped with a thermal shutdown circuit which detects excessive internal temperatures and shuts the unit down. Once the power supply goes into overtemperature shutdown, it will cool before attempting to restart.

Input Under-voltage Lockout

At input voltages below the input under-voltage lockout limit, power supply operation is disabled. The power supply will begin to operate at an input voltage above the under-voltage lockout turn-on threshold.

Fault signal (A23)

This is an open collector output, with 100R in series. Logic low indicates a healthy state. An open circuit indicates a fault state. Maximum current sink is 3mA. This signal is referenced to ALARM-GND (B23).

Alarm signal (A24)

This is an open collector output with 100R in series. Logic low indicates a healthy state. An open circuit indicates an alarm state. Maximum current sink is 3mA. This signal is referenced to ALARM-GND (B23).

Front Panel LEDs

Three LEDs are located on the front faceplate; run, alarm, and fault. These LEDs will indicate the status of the power supply. The power supply conditions for each LED are in order of priority. If a higher order condition exists then the LED shall take the status defined by that condition.

LED Color	LED Status	Rectifier Condition
Green	OFF	Rectifier off due to: <ul style="list-style-type: none"> AC and DC out of range Alarm LED is on, Except for output current overload conditions/constant power FAULT LED is on, Except for communications failure condition
	BLINK	Rectifier preparing / prepared to produce power <ul style="list-style-type: none"> Rectifier in STAND-BY (PS-OFF or GP command) Rectifier "walking in"
	ON	Rectifier on, producing power and: <ul style="list-style-type: none"> Alarm LED is off, Except for output current overload conditions FAULT LED is off, Except for communications failure condition

LED Color	LED Status	Rectifier Condition
Yellow	OFF	Rectifier off due to AC out off range
	ON	Rectifier in one or more of the following recoverable conditions: <ul style="list-style-type: none"> Output current overload / constant power Over temperature warning

LED Color	LED Status	Rectifier Condition
Red	OFF	Rectifier off due to AC out off range
	ON	Rectifier failure due to: <ul style="list-style-type: none"> Fan Failure AC Failure HVSD Overttemperature shutdown Output short circuit overload
	BLINK	Communications loss with the controller

Rectifier State	LED		
	Run	Alarm	Fault
On and producing power	On	Off	Off
No AC	Off	Off	Off
Stand by GP	Blink	Off	Off
Stand by PS-OFF	Blink	Off	Off
Over current / constant power	On	On	Off
Over temperature warning	On	On	Off
Over temperature shutdown	Off	Off	On
AC failure	Off	Off	On
output short circuit	Off	Off	On
Output under voltage	Off	Off	On
Output over voltage	Off	Off	On
Communications loss	On	Off	Blink

Paralleling Outputs

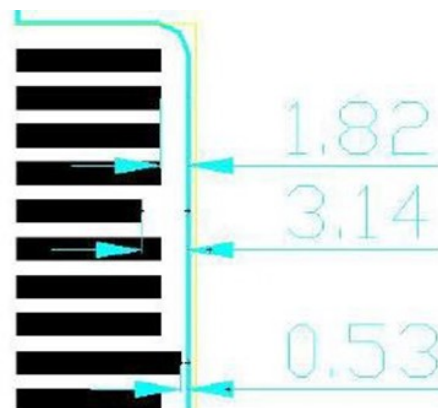
The EP1600-UTEZFB2 is designed to be connected in parallel with other identical units, and to current share with them. No external OR-ing devices are required.

PCB Conformal Coating

The PCBs inside the EP1600 are conformally coated to prevent mild solid and liquid pollution from affecting performance.

Gold Finger Pin Lengths

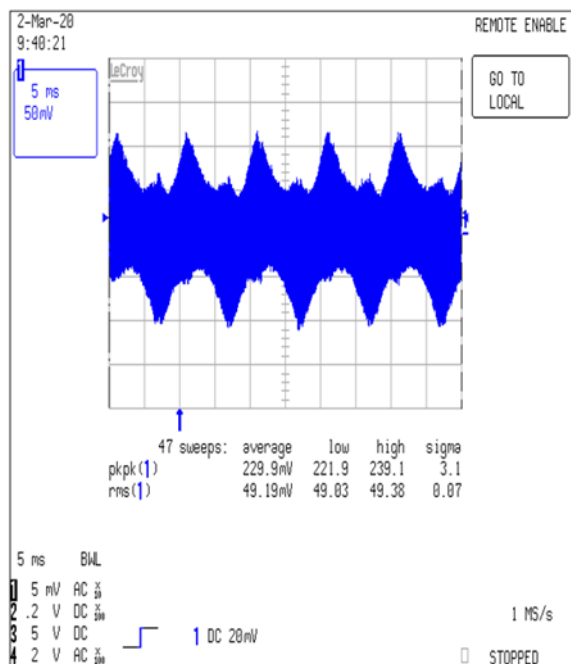
The power supply connector consists of gold plated fingers on the main PCB. They have different lengths, so that some can make first on insertion, and some can break first on extraction (dimensions in mm)



Technical Specifications (continued)

Output voltage ripple

Here is the EP1600 output voltage ripple, with 230V_{IN}, +50°C, 48V_O, 33A_O

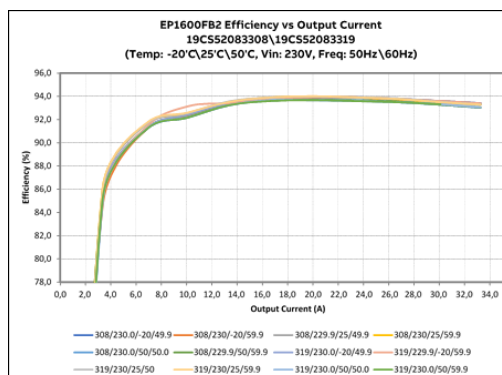


Thermal Considerations

The EP1600 is high efficiency and cools itself with a built-in fan. It will operate over the temperature range -40°C to +75°C, starting at -40°C and meeting specification once internal temperatures reach -20°C. It will dissipate up to 100W. Power supply orientation is unimportant. There is power derating of 2%/°C above 50°C except when V_O is 30-33V_{DC}, then only 15A is available above T_A = 50°C.

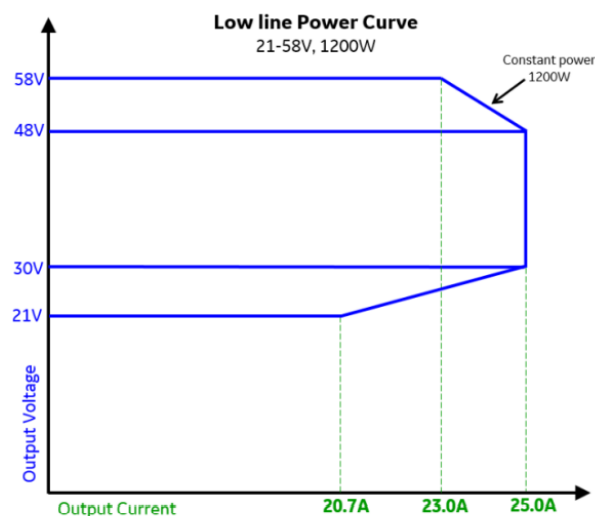
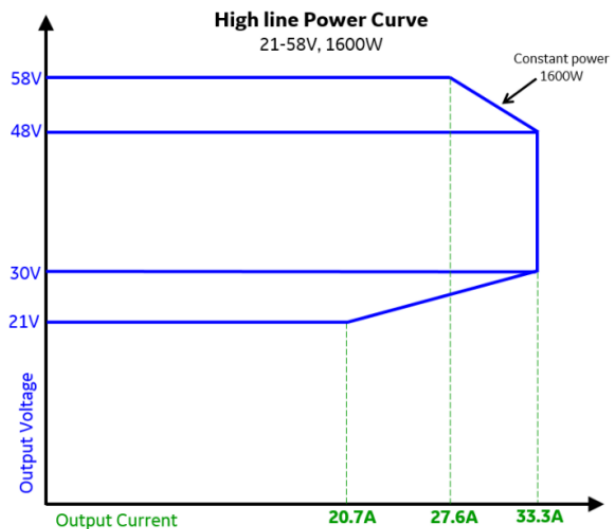
Efficiency Characteristic

Here is the efficiency characteristic of the EP1600, with 230V_{IN}, and at temperatures -40°C, +25°C, and +50°C



Output Characteristic

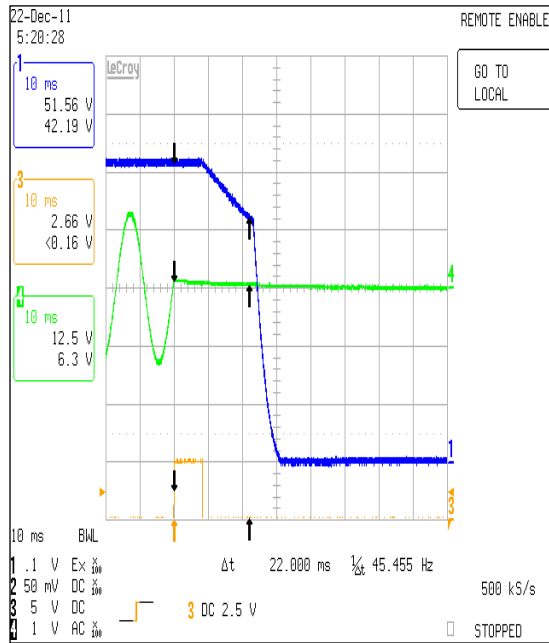
Here are the output characteristics of the EP1600-UTEZFB2 for high line (33.3A) and low line (25A)



Technical Specifications (continued)

Holdup at 230V_{AC} input

Here is the holdup characteristic of the EP1600, 25°C,
230V_{IN}, 48V_O, 33A_O



Technical Specifications (continued)

Galaxy Protocol Interface Commands for New Rectifier

The following table contains the standard GP support for EP1600-UTEZFB2 rectifiers. Many of the commands are architecture specific.

Variable Name	Num	Len	Data Type	Description
DUMMY_RW	00h	00h	null	Used to exercise the protocol for test purposes.
SERIAL_NUMBER_RW	01h	12h	uint8_t[18]	Read/Write serial number as an array of 12 or 18 ASCII characters.
GROUP_ADDRESS_RW	02h	01h	uint8_t	Rectifier group address F6h.
COMCODE_RW Previously PROTOCOL_STATUS_R	03h	0Bh	uint8_t[11]	Tyco's Internal Part Number as an array of 11 ASCII characters. (Ex: CC109578921 or 105777215)
PROTOCOL_CONTROL_W	04h	01h	uint8_t	01h – forces devices to disconnect
STATION_TYPE_R	05h	0Eh	uint8_t[14]	Product Code or Model number as an array of 14 ASCII characters
SERIES_RW Previously PROTOCOL_VERSION_R	06h	07h	uint8_t[7]	Tyco's series number placed on the label of the format xx:xxx (examples: 1:0, 12:1A, 5:10Z, 99:99A)
APPLICATION_VERSION_R	07h	07h	uint8_t[7]	Software version: v.d M/D/Y h:m
CLEI_NUMBER_RW	08h	0Ah	uint8_t[10]	CLEI number as an array of 10 ASCII characters.
TIMEOUT_SCALE_RW	09h	01h	uint8_t	Timeout value for protocol in 1 sec. increments
I_R	0Ah	02h	uint16_t	Output current of rectifier in A x 10
T_INTERNAL_R	0Bh	01h	int8_t	Most important Internal rectifier temperature in degrees C
STATUS_R	0Ch	02h	uint16_t	Device status
ORFET_FAIL_STAT ACF_STAT PREDICT_FAIL_STAT TA_STAT				0001h: 1 = oring FET failed 0002h: 1 = AC input failure 0004h: Predictive failure status, 1=Predicted failure 0008h: 1 = Rectifier shutdown due to thermal alarm
RFA_STAT AC_LOW_LINE_STAT LS_IMBALANCE_STAT LS_STAT				0010h: 1 = Rectifier failure 0020h: 1 = Low line input, 0 = high line input 0040h: 1 = Load share imbalance 0080h: 1 = Participating in digital load share (Enabled)
MAN_STAT TRH_STAT HVSD_STAT ON_STAT				0100h: Manual Off, 1=Manually OFF 0200h: Transfer, 1 = Standby from controller requested 0400h: 1 = Rectifier shutdown due to high voltage 0800h: Rectifier Power Status, 1 = On and producing power
LSABLE_STAT ID_STAT FAN_STAT CL_STAT				1000h: 1 = Ready to participate in digital load share 2000h: 1 = ID # has changed (cleared when read) 4000h: 1 = Fan failed 8000h: 1 = Rectifier is in current limit/Power Limit
CL_RW	0Dh	06h	uint16_t[3]	Current limit set-points. First two bytes as percentage, not saved in flash. uint16_t[0] Float current limit in % uint16_t[1] Boost current limit in % uint16_t[2] Equalize current limit in % Note: With constant power rectifiers a setting of 100% allows the rectifier to output maximum power at all conditions. Settings below 100% assume constant current mode of operation is maintained by the rectifier.

Technical Specifications (continued)

Galaxy Protocol Interface Commands for New Rectifier (continued)

Variable Name	Num	Len	Data Type	Description
				uint16_t[2] Equalize current limit in % Note: With constant power rectifiers a setting of 100% allows the rectifier to output maximum power at all conditions. Settings below 100% assume constant current mode of operation is maintained by the rectifier.
VSET_RW	0Eh	06h	uint16_t[3]	Voltage set-points. uint16_t[0] Float voltage set-point (volts x 400) uint16_t[1] Not Used [reserved for Boost voltage set-point (volts x 400)] uint16_t[2] Not used [Equalize voltage set-point (volts x 400)]
CMD_W	0Fh	02h	uint16_t	Device control
STANDBY_CMD ON_CMD SHVSD_CMD LS_ON_CMD				0001h: Place rectifier in Standby mode 0002h: Place rectifier in On mode 0004h: Controller high voltage shutdown request from controller, shutdown if current is higher than load share percentage +10% of rated capacity 0008h: Participate in digital load share, default enabled
LS_OFF_CMD RESTART_CMD LAMPTEST_CMD TEMP_RESTART_CMD				0010h: Don't participate in digital load share, default disabled 0020h: Restart a rectifier that is in lockdown 0040h: Lamp test, Lamp test shall assert LEDs in the following nature. Single-color LEDs: 8sec On, 2sec Off, Return to Previous state Bi-color LEDs: 1 st color 4sec On, 2 nd color 4sec On, all Off 2sec, Return to Previous state Tri-color LEDs: 1 st color ~2.6sec On, 2 nd color ~2.6sec On, 3 rd color ~2.6 sec On, all Off 2sec, Return to Previous state 0080h: Enable auto restart from high temp shutdown, default enabled
FAULT_LED_ON FAULT_LED_OFF ORFET_TESTON_CMD ORFET_TESTOFF_CMD				0100h: Request fault LED ON 0200h: Request fault LED OFF 0400h: Start Or-ing FET Test 0800h: Stops Or-ing FET Test
----- ----- ----- -----				1000h: Not Used 2000h: Not Used 4000h: Not Used 8000h: Not Used
CAPACITY_R	11h	02h	uint16_t	Current capacity (A x 10) of rectifier. This is the rectifier's nominal ratings at 54.5 and 27.25.
VCMD_RW	13h	02h	uint16_t	Output voltage set point (V x 400)
ISHVSD_RW	15h	02h	uint16_t	Individual selective Float high voltage shutdown (V x 400)
CLCAP_RW	1Ch	02h	uint16_t	Current limit in (A x 10) used for factory calibration. Note: not used in NE rectifiers
ID_R	1Fh	01h or 02h	uint8_t	Rectifier ID #, Defines location of rectifier in the shelf as well as the shelf number. First one or two decimal characters define the shelf number and the last character defines the position. 00 is not configured.

Technical Specifications (continued)

Galaxy Protocol Interface Commands for New Rectifier (continued)

Variable Name	Num	Len	Data Type	Description
VOP_R	20h	02h	uint16_t	Actual output voltage (V x 400) of rectifier
VANODE_R	26h	02h	uint16_t	Anode Output voltage (V x 400)
T_INLET_R	28h	01h	int8_t	Internal temperature in °C
VACIN_RMS_R	29h	02h	uint16_t	Measured AC (~RMS) voltage at input of or rectifier (V x 100)
IACIN_RMS_R	2Ah	02h	uint16_t	Measured AC (~RMS) input current to rectifier (A x 200).
AC_POWER_R	37h	02h	uint16_t	AC input power in Watts
OUTPUT_FANSPEED_R	3Ah	01h	uint8_t	Commanded fan speed in 0% to 100%
MIN_FANSPEED_RW	3Bh	01h	uint8_t	Minimum fan speed setting. 0% to 100%
WALK_IN_RW	40h	01h	uint8_t	1=current walk-in enabled 0=current walk-in disabled
7_REGISTERS_ATONCE_R	D2h	0Dh	int8_t uint16_t	Read seven registers together by one command, the return data is in below order: T_INLET_R (0x28) VACIN_RMS_R (0x29)
			uint16_t uint16_t uint16_t uint16_t uint16_t	IACIN_RMS_R (0x2A) AC_POWER_R (0x37) VOP_R (0x20) I_R (0x0A) STATUS_R (0x0C)
SHORT_RESTART_DELAY_RW	D8h	02h	uint16_t	The restart duration time when short circuit or OCP. The actual OC time is sum of SLIDING_DELAY_R and SHORT_RESTART_DELAY_RW. The default value is 4500ms. Note: Min 0ms to be used only for single PSU operation.
SHORT_COUNTER_R	DBh	02h	uint16_t	The counter of OCP event happens. Note: this value can be clear 0 only during OFF/ON of PSU or AC power cycle.
MAX_RETRY_VALUE_RW	DCh	02h	uint16_t	The max times of restart attempt about OCP. The default value is 10000.
SLIDING_DELAY_R	DDh	02h	uint16_t	The output current duration time when short circuit happens. The default value is 500ms.
RUNMODE_RW	FCh	01h	uint8_t	1= Stand-Alone mode enabled 0= Stand-Alone mode disabled

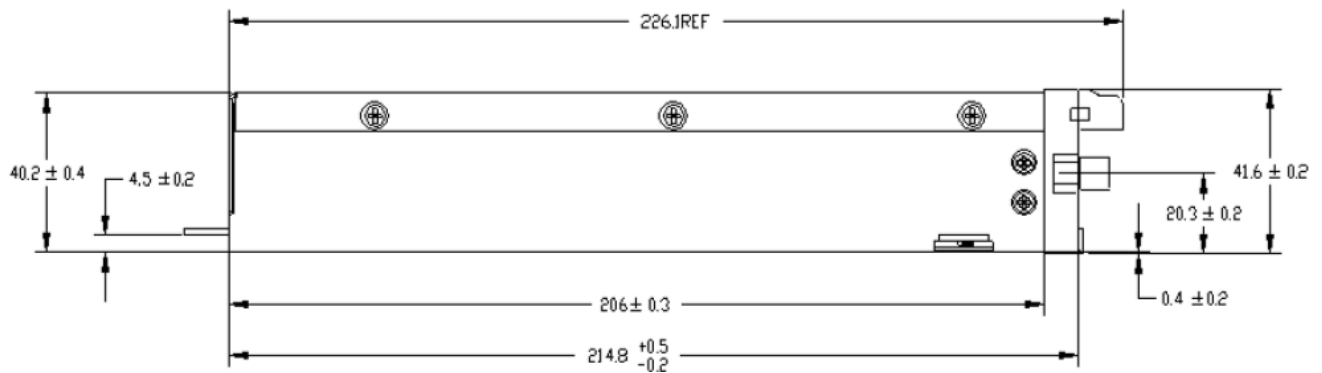
Technical Specifications (continued)

Mechanical Outline

Top View



Side View



3D-View

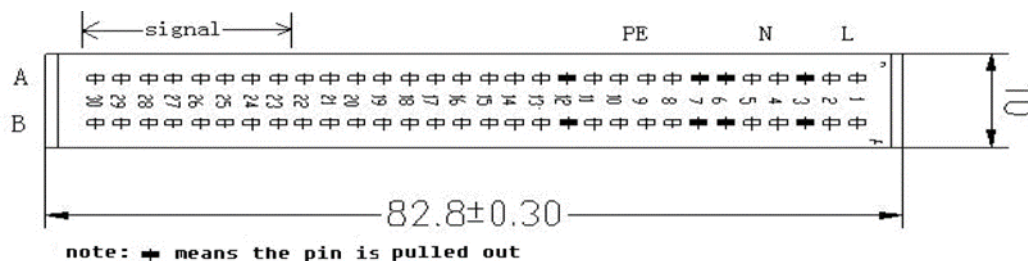


Technical Specifications (continued)

Connector Information

Connector	Connector on Power Supply	Mating Connector
AC power, DC power, and Signals	PCB gold finger arrangement	Huafeng CY8-2.54-60(52)ZSWBJ
		If you need this connector, buy it from OmniOn

Pinout Information



Pin Number	Function
A1, A2, B1, B2	L
A4, A5, B4, B5	N
A8 to A11 B8 to B11	PE
A13 to A22 B13 to B22	48V+
	48V-
A23	FAULT+
A24	ALARM+
B23	ALARM-GND
B24	PS-off
B25	SHARE+
A25	SHARE-
A26	PS-enable
B26	PS-present
A27	GND
B27	ADDR0
A28	ADDR1
B28	ADDR2
A29	8V_INT
A30	ComGND
B29	RS485_A
B30	RS485_B

Technical Specifications (continued)

Ordering Information

Please contact your OmniOn Sales Representative for pricing, availability and optional features.

Table 1. Device Codes

Device Code	Input Voltage Range	Output Voltage	Output Current	RoHS	Output Power	Temperature Range	Ordering code
EP1600-UTEZFB2	90 – 264V _{AC}	21-58V _{DC}	25/33.3A	6	1200/1600	-40 to 75°C	1600279254A
Slot Filler	NA	NA	NA	6	NA	-40 to 75°C	CC848883297

EP1600-UTEZFB2 is the product described in this data sheet.

The slot filler, listed above, can be used in OmniOn SPS shelves where there is no intention to fit a power supply.

It provides an aesthetic improvement over an empty slot, and it also prevents the insertion of foreign materials into the shelf – eg, tools, fasteners, documentation, or leads.

Appropriate Tools

Please contact your OmniOn Sales Representative for description, availability and pricing

- Single-Unit Interface (150033288)
- PCB Mating connector (CC408618813)
- 1U – 19" Shelf – 3 slots / J2007003L052C-CC / 150028854
- Recent! PC GUI with Galaxy Protocol called GPTools
- New! C Library for the Galaxy Protocol – available under NDA

Change History (excludes grammar & clarifications)

Revision	Date	Description of the change
1.3	05/16/2022	Updated as per template and updated safety
1.4	12/18/2023	Updated as per OmniOn template

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