

## Product Description

The PH500 is a 500W High Efficiency Power Factor Corrected (PFC) AC to AC converter.

Included protection modes and features include;

- Output Over-Voltage (OVP)
- Input Under-Voltage (UVLO) and Input Over-voltage (OVLO)
- Over Temperature Protection (OTP)
- Primary Over Current Protection (OCP)

### Important Note.

Maximum load is 500W. The load is defined as LED loads and iBus cable. The losses in the iBus cable contribute to the 500W payload. iBus losses must be accounted for at 1.2W per 10M length

When using the Power Hub the correct sequence of events should be:

1. Connect iBUS to Power Hub.
2. Terminate iBus cable properly with iTerm, a termination device. Shown on right.
3. Check integrity of all connections.
4. Apply AC Power to iHub.
5. Applying Step 4 before steps 1 through 3 will cause the Hub to trip.



- The Power Hub is the heart of the Isotera system and provides centralised power conversion for a large number of LED lighting fixtures.
- The Power Hub generates a 50kHz AC (HFAC) resonant quasi-sinusoidal constant current that is distributed over a single uninterrupted twisted pair cable called the iBus. The cool-running Power Hub combines very high efficiency with superior reliability and durability.
- Wiring in of the Power Hub is made fast and secure with latching GST18 (input side) and GST15 (output side) connectors. Mains voltage stops at the input port of the Power Hub.
- The Power Hub produces clean and safe power for LED lighting with zero electric shock risk from the 50kHz output.

## Input Specifications

Parameter	Description	Min	Nom	Max
VAC RMS	Input Supply	198	230	264
Frequency	AC RMS (Hz)	47	50	60
PFC / THD %	125W Output	0.80 / 3.3	0.85 / 3.5	0.91 / 3.8
PFC / THD %	250W Output	0.92 / 2.8	0.95 / 2.9	0.97 / 3.0
PFC / THD %	375W Output	0.96 / 2.5	0.976 / 2.6	0.987 / 2.7
PFC / THD %	500W Output	0.977 / 2.3	0.984 / 2.4	0.992 / 2.5
ON / UVLO	AC RMS	178 / 157	180 / 159	182 / 161

## Efficiency

Parameter	Output Load	Min	Nom	Max
Efficiency Note 2.	125W	91%	93%	94%
	250W	93%	95%	96%
	375W	93%	95%	96%
	500W	94%	95%	96%

**Note 2.** Meets the European code of conduct for energy efficiency Level 4.

## Output Specifications

Parameter	Description	Min	Nom	Max
Power rating	Maximum Power			500
Load Regulation	0W-500W Output	+/- 0.95%	+/- 1.45%	+/- 1.95%
O/P Frequency	AC iBus Frequency	49 kHz	50 kHz	51 kHz
O/P Current	iBus Loop Current (rms)	1.805A	1.9A	1.995A
Start Time	Turn On Time	460mS	480mS	500mS

## Environmental

Parameter	Description	Min	Nom	Max
Operating Temp	Thermal Environment	-10C	25C	40C
Non Operating Temp	Thermal Environment	-40C		70C
Storage temperature		-40C		100C
Non Operating humidity	Non Condensing. Note 3	0%		95%
Operating humidity	Non Condensing	0%		85%
Altitude Operating	10,000 Feet			
Altitude Non Operating	50,000 Feet			
IP rating Indoor use only.	IP 10, NEMA Type 1			

**Note 3.** 95% RH is achieved with a dry bulb temperature of 55 °C and a wet bulb temperature of 54 °C

## Protection And Status Indicator

- To facilitate fault diagnosis, the PH500 has a bi-colour (red & green) status indicator.
- When the PH500 is performing normally the status indicator is solid GREEN.

LED status indicator	Description	Operating mode	Action
Steady Amber	Hub shuts down below 160Vac.	UVLO Low Voltage Lock Out	Automatically restarts above 180Vac
Flashing Amber, 1 Flash per sec. 50% duty cycle	Automatic lockout when input supply exceeds 270Vac.	HVLO High Voltage Lock Out	The Power Hub automatically restarts when input supply < 264Vac
Green to Flashing RED and back. When flashing red, 2 flashes per sec. 50% duty cycle.	Output power exceeds system capacity. Too many loads fitted to the iBus.	OPP Over Power Protection	Check system loading. The system automatically resumes normal mode of operation.
Solid RED . The Power Hub instantly latches OFF.	<ol style="list-style-type: none"> <li>1. Output loop open circuit. Check iBUS for damage and end terminator is fitted.Can also be caused by the addition of a high power fitting to an already heavily loaded system.</li> <li>2. The unit has detected a 50kHz ground fault current.</li> </ol>	<ol style="list-style-type: none"> <li>1. OLP Open Lop Protection</li> <li>2. GFD Ground Fault Detection</li> </ol>	<ol style="list-style-type: none"> <li>1. When fault condition alleviated (by connecting/closing the iBus) press reset button. NOTE: Only 3 resets permitted before turning AC mains supply off and on required.</li> <li>2. Ground Fault Protection can only be cleared by recycling the AC input supply/</li> </ol>
Flashes RED, 1 flash per second, 50% duty cycle	Power Hub case temperature exceeds 90°C (+/-5°C). The Power Hub shuts down until the temperature drops to the reset level. This may take several minutes.	OTP Over Temperature	The Power Hub automatically restarts when temperature drops to 75°C. The Power Hub will latch OFF permanently after 3 automatic restarts. Then press reset button to restart.
Flashing Green	The Control Port on the Power Hub has received an OFF command.	Power Hub RJ11 Switch control Emergency Power Modules are still being charged.	The Power Hub signals to the iCouplers to turn off.
Flashing Red, 1 flash every 2 seconds. System is ON	A fault has been detected on the Control Port of the Power Hub.	Control Port fault	Internal monitoring has detected that signal into the Control Port is incorrect. Any existing OFF command is cancelled.

### Warning:

The reset button on the Power Hub can only be pressed 3 times then it will latch OFF.

The Power Hub must be reset by disconnecting it from the AC mains supply, waiting until the status indicator has extinguished and then reconnecting it.

### No shock hazard

The unique features of the Isotera system make it inherently safe.

- The PH500 acts as a circuit breaker and RCD.
- If the iBus cable is cut, the Output Over-voltage protection is instantly activated and the Power Hub switches off.

If the double insulation of the iBus cable is breached and makes contact with conducting material, the Power Hub detects a ground fault and switches off. Power is extracted from the iBus without breaking into the cable's insulation (see Isotera Contactless Couplers)

- Both PH200 and PH500 have cables isolated from Mains AC by double/reinforced insulation.
- The output is balanced about earth in the same way as a safety isolation transformer.
- The average voltage of the i-bus is the chassis voltage of the hub, in effect local PE. The end of the i-bus can be held safely even at full load
- Prospective fault current is limited to 3.8A RMS maximum and is further limited by impedance and RCD in the case of PH500.
- The human body model for electrical shock indicates that, at 50kHz, the effect of i-bus current is ~1/15 x that at 50Hz.



## System Control

The PH500 has an RJ11 port to control all loads on the system as a group. A retractive switch can be plugged into this analogue control port to switch on/off all loads on the iBus attached to the Power Hub using a White iSmooth. If the Power Hub is switched OFF in this way the LED iClips will turn off but power continues in the iBus cable to allow Isotera's Emergency Light solution iEscape to function.

## Compliance

Title	Description	Edition/Date
EN 55015	Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment	2006 + A2:2009
EN61547	Specification for equipment for general lighting purposes. EMC immunity requirements	2009
EN61000	Harmonic Current Emissions	EN61000-3-2:2006 & EN61000-3-3:2008 EN61000-6-1:2007 & EN61000-6-3:2007 & A1:2011
EN61347	Safety requirements for electronic control gear for use on DC supplies up to 250 V and AC supplies up to 1 000 V at 50 Hz or 60 Hz and at an output frequency which can deviate from the supply frequency, associated with LED modules.	EN61347-2-13:2006 used in conjunction with EN61347-1:2008+A1:2011
EN62493	Human exposure to electromagnetic fields.	EN62493:2010

## Part Numbers

Isotera part number	Description
IS-H-PH-500-120	120V Input 500W PH500
IS-H-PH-500-220	220V Input 500W PH500
IS-H-PH-200-220	220V Input 200W PH200
HEM-005-3019	GST 18 Female Input Connector
HEM-005-3020	GST 15 Male Output Connector
IS-H-TCS-02	iTerm Termination for iBus cable

## Mechanical

