International Power Source

8552 Series

Operator's Manual

Manual Part Number 59500150, Rev. 1.3

Quick Start Guide

1 Unpack and connect AC input cord set to inlet and wall outlet. See Section 4, pg. 11 for installation details.

2 Switch power on. See section 5, pg. 12 for operation details.

3 Press [High Range] or [Low Range] to select range.

Press again to switch output power on.
Press again to switch output power off.

Output Power	
Off =	Disabled
Yellow =	Standby
Green =	Enabled

4 Select [Volts 2] to set output volts.

or

Select [Current Limit 6] to set output current limit.

or

Select [Hz 5] to set output frequency.

5 Then turn knob to desired setting and select [Enter] to enter data

or

Type in desired setting using numerical digits (including decimal) in green.

Enters data when third or fourth digit or is selected. [Enter]

Quick references:

Input power requirements: Section 3.3, pg. 7

Output power specifications: Section 3.4, pg. 8

Basic operating instructions: Section 5, pg. 12

Outputs which draw in-rush current: Section 7, pg. 30

Overload conditions and error codes: Section 11, pg. 45

Important Safety Instructions

Read manual before connecting power to unit and before operating unit.

This device is a measurement category III type of device. It is intended to be used to power and measure hazardous voltages.

Safety Notices
- DANGER–AC sources can supply up to 276V at the High Range output sockets.
- Disconnect power before servicing/cleaning.
- To prevent fire or shock hazard, do not expose the equipment to rain or moisture.
- To avoid electrical shock, do not open the equipment enclosure.
- Refer servicing and repair to qualified personnel only. (See Warranty and Service Section, pg. 49)
- No user-serviceable parts inside. Return the product to Interpower Corporation for service and repair to ensure that safety features are maintained.
- Do not defeat cord set safety ground feature.
- Plug into a grounded outlet.
- Do not install substitute parts or perform any unauthorized modifications to the product.
- Only for use indoors. Not for use outdoors. Do not expose to temperatures exceeding 40°C or below 0°C. Do not expose to conditions exceeding 85% humidity.
- To prevent damage from electrostatic discharge, wear ESO (electrostatic overstress) wriststrap when servicing equipment.
- Turning off the IPS with the main power switch before disengaging the output is not recommended because the output sockets are still energized until the output bus is discharged (See section 8.3.2, pg. 33).

This instrument is a Class I grounded device (provided with a protective ground terminal.) The instrument shall be connected to the AC power mains through a grounded power cord with the ground wire firmly connected to the electrical ground at the power outlet. Any interruption of the protective ground conductor or disconnection of the protective earth terminal may cause a potential shock hazard that could result in personal injury. Only use provided input AC cord set or one with equivalent ratings.

Ensure the instrument is only connected to circuits which are capable of providing the required power. Know and understand power requirements of equipment under test connected to IPS to prevent overload situations. Follow all building wiring code configurations.

Damage in transit
Equipment should be inspected when it is received. If the equipment is visibly damaged, do not connect it to input power. Please contact Interpower Customer Service immediately. (See section 17, pg. 54) Please include part number and serial number when referring to the equipment.

Read and follow all installation and operating instructions. To reduce the risk of severe injury or death, read and follow all installation and operating instructions. Do not use equipment in any manner not specified by Interpower.

Symbols


Earth ground terminal (bonding ground)


Protective conductor (earth ground) terminal


Risk of electric shock


Important operating and maintenance instructions


Earth ground equipotentiality


ESO (Electrostatic Overstress)

Liability limitations
Interpower shall not be liable for damages incurred with misuse, abnormal or normal use of the IPS. Interpower will accept liability for only the purchase price of equipment, parts, software, and applicable freight charges. Interpower is not liable for any costs for issues such as production delays, rework, late deliveries, etc.

Overview of Features

Low range voltage output outlet (10–138VAC).
Yellow indicates Standby. Green indicates low range output power on.
(See section 5.2, pg. 12)

(Green) Neutral side of output tied to earth ground.
(Clear) Output is isolated from earth ground.
(See section 5.10.4, pg. 25)

Display, keypad, adjustment knob, on/off power with overcurrent protection.
(See section 5, pgs. 12–26)
Operation of controls.
(See section 5, pgs. 12–26)

Rack mount flanges can be removed for table top use.
(See section 4, pg. 11)

Tilt stand and feet can be removed for rack mount installation.
(See section 4, pg. 11)

High range voltage output outlets (10–276VAC).
Yellow indicates Standby. Green indicates high range output power on.
Warning!
All High Range outlets are "ACTIVE" when selected.
(See section 5.2, pg. 12)

Part number and serial number label and warning.

Optional computer interface connections, Interpower International Power Source Interface Software, and LabVIEW™ Drivers.
(See section 9, pg. 36)

Fan and ventilation holes. Maintain 1.75 (1U) inch clearance above and below unit when rack mounting.
(See section 4, pg. 11)

Inlet for input cord set.
(See section 4, pg. 11)

Table of Contents

1 Introduction

1.1 The IPS (International Power Source) provides a clean, convenient source of AC power for testing products at the various operating voltages and frequencies found around the world.

1.2 Please read and follow this manual to ensure safe and proper use. This manual contains information on the operation, calibration and maintenance of the IPS.

2 General Description

2.1 The Interpower IPS is an AC power source with a universal AC power input that will operate on most AC sources worldwide, 100–240VAC and 50–60Hz. Output is selectable for low range, 10–138VAC operation, or high range, 10–276VAC at 47–450Hz.

2.2 Maximum output power for the 855217XX series is 1000W and 1500W for the 855222XX series IPS based on connection to input power source. See section 3, pg. 7 for Specifications and Safe Operating Area chart.

2.3 Front panel key pad or adjustment knob is used to set voltage, frequency and current limit. Settings are shown on the front display.

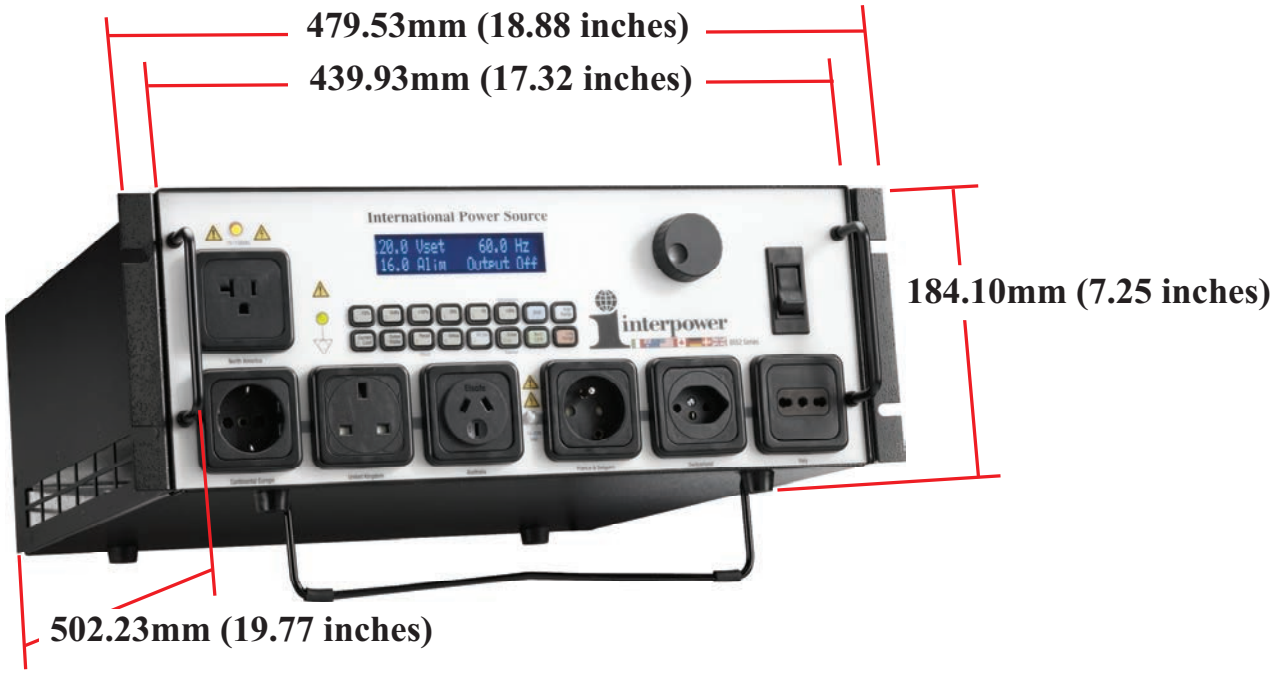
2.4 Worldwide sockets included on the front panel of the IPS are:

High Range
- Continental Europe-CEE 7
- UK/Ireland-BS 1363
- Australia/New Zealand-AS–3112
- France & Belgium-NBN C 61–112–1
- Switzerland-SEV 1011
- Italy-CEI 23–16 and CEI 23–50

Low Range
- US/Canada/Mexico/Japan-NEMA 5–20R

3 Product Specifications

3.1 Overall dimensions



3.2 Weight

12.3kg (26.5lbs)

3.3 Input Power

Parameter:	Product Rating
Voltage (V_{in}):	100–240VAC, RMS
Frequency:	50–60Hz
Current (I_{in}):	IPS 855217XX: 12A IPS 855222XX: 16A

3.4 Output Power

3.4.1 Output Specification for 855217XX Series

Parameter:	Value	Output Setting	Output Measurement
Power: Volt Amps:	1000W 1725VA	 ± 1VA	± 0.75% of reading ± 10W
Voltage (V_{out}), Low Range: High Range	10.0–138.0VAC, or 10.0–276.0VAC, RMS	± 0.1V ± 0.2V	± 0.25% of reading ± 0.1V ± 0.25% of reading ± 0.2V
Current (I_{out}), Low Range High Range Low Range High Range	0.0–12.5A, max, RMS 0.0–6.25A, max, RMS 0.0–37.5A, peak 0.0–18.75A, peak	Resolution to ± 0.1A Resolution to ± 0.1A Resolution to ± 0.1A Resolution to ± 0.1A	±0.5% of reading ± 0.3A ±0.5% of reading ± 0.3A ±0.5% of reading ± 0.3A ±0.5% of reading ± 0.3A
Frequency Accuracy:	47.0 to 450Hz	Settable to 0.1Hz 47.0 to 99.9Hz, and 1Hz, 100 to 450Hz	
Voltage Regulation:	Line plus Load	± 0.1% of full scale	
Wave Form:	Sine		
Total Harmonic Distortion	47–450Hz 0.5%		

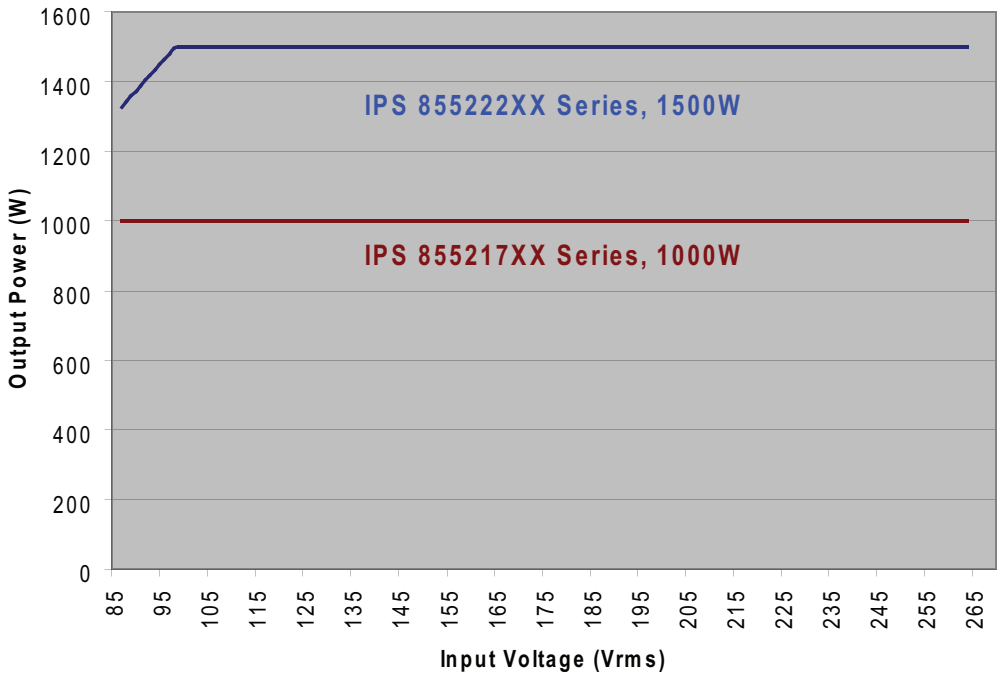
3.4.2 Output Specification for 855222XX Series

Parameter:	Value	Output Setting	Output Measurement
Power: Volt Amps:	1500W 2200VA	 ± 1VA	± 0.75% of reading ± 10W
Voltage (V_{out}), Low Range: High Range	10.0–138.0VAC, or 10.0–276.0VAC, RMS	± 0.1V ± 0.2V	± 0.25% of reading ± 0.1V ± 0.25% of reading ± 0.2V
Current (I_{out}), Low Range High Range Low Range High Range	0.0–16.0A, max, RMS 0.0–8.0A, max, RMS 0.0–48.0A, peak 0.0–24.0A, peak	Resolution to ± 0.1A Resolution to ± 0.1A Resolution to ± 0.1A Resolution to ± 0.1A	±0.5% of reading ± 0.3A ±0.5% of reading ± 0.3A ±0.5% of reading ± 0.3A ±0.5% of reading ± 0.3A
Frequency Accuracy:	47.0 to 450Hz	Settable to 0.1Hz 47.0 to 99.9Hz, and 1Hz, 100–450Hz	
Voltage Regulation:	Line plus Load	± 0.1% of full scale	
Wave Form:	Sine		
Total Harmonic Distortion:	47–450Hz 0.5%		

3.5 Protection

Parameter:	Value	Accuracy
855217XX	Output Current Limit ($I_{out\ lim}$) Low range: 0.0 to 12.5A_{rms} High range: 0.0 to 6.25A_{rms}	± 2% of full scale, ± 0.1A ± 2% of full scale, ± 0.1A
855222XX	Output Current Limit ($I_{out\ lim}$) Low range: 0.0 to 16.0A_{rms} High range: 0.0 to 8.0A	± 2% of full scale, ± 0.1A ± 2% of full scale, ± 0.1A
Circuit Protection:	20A circuit breaker on input power.	

3.6 Safe Operating Area



The maximum output power of the IPS is dependent on the IPS unit power rating and input voltage. The 855222XX series IPS is rated for 1500W, but cannot deliver full power at all allowable input voltages. The user must be aware of this limitation if trying to run the IPS at full power with minimum input voltage. For example, if the user connects the IPS to an input voltage of only 90V (also taking into consideration voltage drop due to input power cables,) then the most power the IPS can provide is 1373W (90V * 18.6 A * 0.82 = 1373W,) where 18.6A is the input current limiter trip point and the 0.82 is the worst-case end-to-end efficiency. The Safe Operating Area chart aids the user in determining how much power is available at various input voltages. To use the chart, the user should find the input voltage on the x-axis and then follow a vertical line up until it intersects with the maximum output power line on the y-axis.

3.7 Regulatory Requirements

3.7.1 Product Safety Classification: Test and Measurement Equipment

United States: UL 61010–1
Canada: CAN/CSA–C22.2 NO. 61010–1
Europe: IEC/EN 61010–1

3.7.2 Electromagnetic Compatibility

FCC Part 15, Class A, using Avtron model K490 AC resistive load bank set at 1500W
EN 61326
EN 61000-3-2 Class A, using Avtron model K490 AC resistive load bank set at 1500W
EN 61000-3-3

3.8 Environmental Requirements

3.8.1 Temperature

Operational	0°C to 40°C
Storage	-40°C to 70°C

3.8.2 Altitude

Up to 3000 meters

3.8.3 Rated Pollution Degree

UL 61010–1, Pollution Degree 2 (normally only non-conductive pollution occurs)

3.8.4 Current Harmonics

IEC 60000–3–2

3.8.5 Efficiency

82%, at a resistive load of 1000W, 230VAC in, 120VAC out, typical
82%, at a resistive load of 1000W, 120VAC in, 240VAC out, typical

4 Installation

4.1 Unpacking and quick start. (See pg. 2)

4.2 Equipment should be inspected when it is received. If the equipment is visibly damaged, do not connect to input power. (See Warnings and Cautions on pg. 3)

4.3 Make sure these standard items are included with your shipment:

8552 series base unit
AC input power cord set
(Note: cord sets are model and country specific and are chosen at time of order. If you need additional cord sets, please contact Customer Service.)
Operator's manual
(Note: Updates to the manual are online at www.interpower.com/ips.)

4.4 Optional equipment that may be included with your shipment:

LabVIEW™ driver on CD
USB cable
RS 232 Null Modem Cable

4.5 Ventilation

Air intake—sides
Exhaust—rear

4.6 Bench top applications

Optional: Remove rack mount flanges. Remove two screws for each rack flange with Phillips screwdriver and store for later use.
Must provide 25–50mm (1–2 inches) clearance around side air intake for proper ventilation.
Must provide 25–50mm (1–2 inches) clearance at rear exhaust for proper ventilation.

4.7 Rack mount applications

The IPS is designed to fit into a standard 482.60mm (19-inch) rack. Interpower recommends providing side or rear support guides (not included) to support IPS weight.
Optional: Remove four rubber feet and tilt stand from bottom of the IPS and store for later use.
Utilize left and right rack-mount flanges (each with two screws.)
Must provide 1 U 44.5mm (1.75 inch) clearance above and 1 U 44.5mm (1.75 inch) clearance below IPS for proper ventilation and temperature management.
Use star washer with threaded hardware to ensure proper grounding. If necessary, remove paint from rack-mount flange to ensure metal-to-metal contact.

4.8 Input Cord Set WARNING:

Only use provided input AC cord set or one with equivalent ratings.
Connect input cord set to inlet on back panel.
Then connect to wall outlet. (See input power ratings in section 3.3, pg. 7)

5 Operation

5.1 Length of Output Load Cables

For Immunity Compliance output load cables, connecting International Power Source to Equipment under test, are limited to a length of 30 meters (98 ft.).

5.2 Front panel operation

Low range voltage output socket (10–138VAC) Yellow indicates standby. Green indicates low range output power on

Display, keypad, knob, On/Off power with circuit breaker.

Notes: Output power is not available from both Low and High Range outlets at the same time.

Turning off the IPS with the main power switch before disengaging the output is not recommend because the output sockets are still energized until the output bus is discharged (See section 8.3.2, pg. 33).

High range voltage output socket (10–276VAC). Yellow indicates standby. Green indicates high range output power on.

V_{set} = Output voltage setting
V_{rms} = Actual output voltage in RMS
(V_{set} reverts to V_{rms} in 3 seconds when output enabled)

Frequency setting and actual output.

Voltage	Frequency
Current Limit	Output Information

A_{lim} = Current limit setting
A_{rms} = Actual current draw in RMS
(A_{lim} reverts to A_{rms} in 5 seconds)
(**See section 3.4, pg. 8** for maximum output limits.)

Output Off = No output power
W = Wattage output
VA = Voltage Amperage output
PF = Power Factor output
CF = Crest Factor output
Apk = Peak current
HP= Horse Power
HSNK = Heat Sink Temperature
XFMR = Isolation Transformer Temperature
CPU = Processor Temperature
(See sections 5 through 9 pgs. 12–38)

5.3 To select High or Low Output Range and sockets:

Press [Low Range] or [High Range] to select and toggle

Low Range

	Output Power
Off =	Disabled
Yellow =	Standby
Green =	Enabled

Only this socket

	Output Power
Off =	Disabled
Yellow =	Standby
Green =	Enabled

Same as indicators near sockets

High Range

	Output Power
Off =	Disabled
Yellow =	Standby
Green =	Enabled

All lower sockets on or off at the same time.

Notes: Pressing [Enter] does not enable output power.

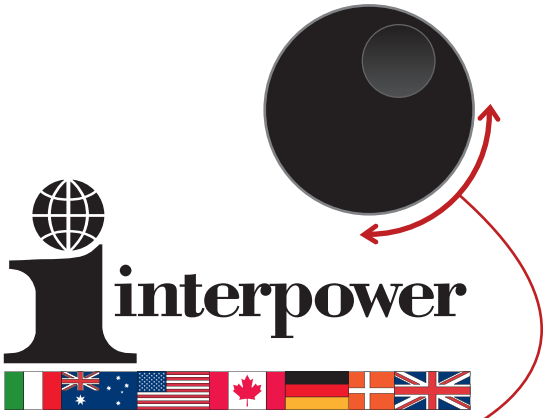
Only [Low Range] or [High Range] enable output power.

In situations where one range of outlets has output power enabled (e.g. High Range), voltage measurement between outlet contacts to ground on the disabled range of outlets (e.g. Low Range), may indicate voltage present. This is due to the high impedance of volt ohm meters and is not a concern.

5.4 To Set Voltage Output (Two Methods)

1 Press Volts 2

2 Highlights "Vset" for 3 seconds



3 Turn to set Voltage. Note arrows in display

4 Press Volts 2 or Enter Enter when done

Or

1 Press Volts 2

2 Highlights "Vset" for 3 seconds

Note:
See Backspace and Cancel functions in section **5.10, pg. 22**

3 Press Num Lock

4 Select numerical digits in Green, including decimal.
For example, 120.0
Enters typed numbers in display.

Enters data when fifth digit or Enter Enter selected.

5.5 To Set Current Limit (Two Methods)

Note:
The current limit can be set from zero to the maximum current available.

1 Press [Current 6 Limit]

2 Highlights "Alim" for 3 seconds

3 Turn to set Current Limit. Note arrows in display

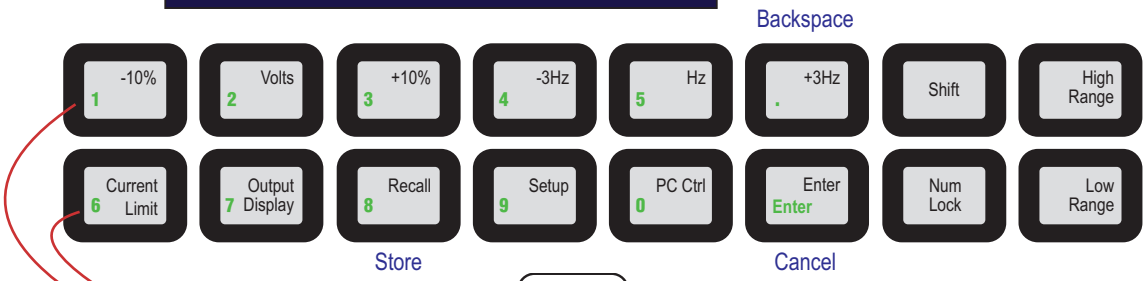
4 Press [Current 6 Limit] or [Enter Enter] when done

Or

1 Press [Current 6 Limit]

2 Highlights "Alim" for 3 seconds

Note:
See Backspace and Cancel functions in section **5.10, pg. 22**



3 Press [Num Lock]

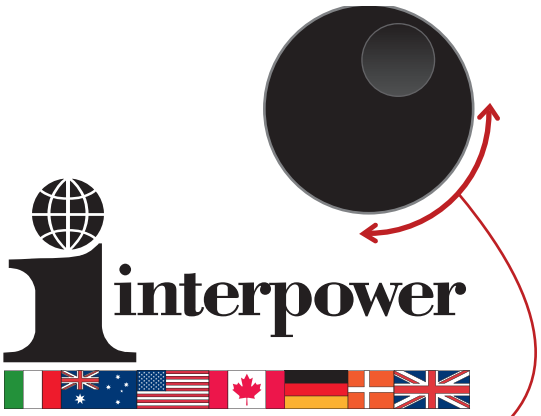
4 Select numerical digits in Green, including decimal.
For example, 10.0
Enters typed numbers in display.

Enters data when fourth digit or [Enter Enter] selected.

5.6 To Set Frequency (Two Methods)

1 Press [Hz / 5]

2 Highlights "Hz" for 3 seconds



3 Turn to set Frequency. Note arrows in display

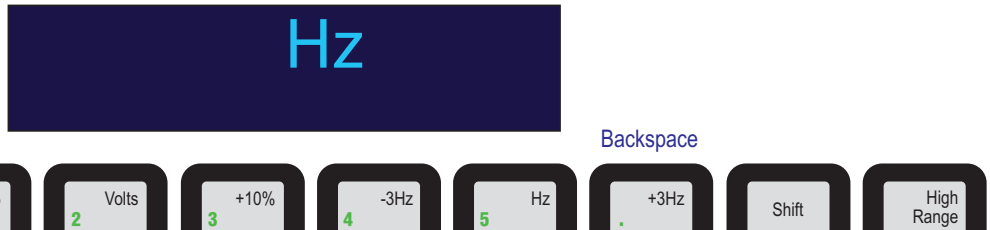
4 Press [Hz / 5] or [Enter / Enter] when done

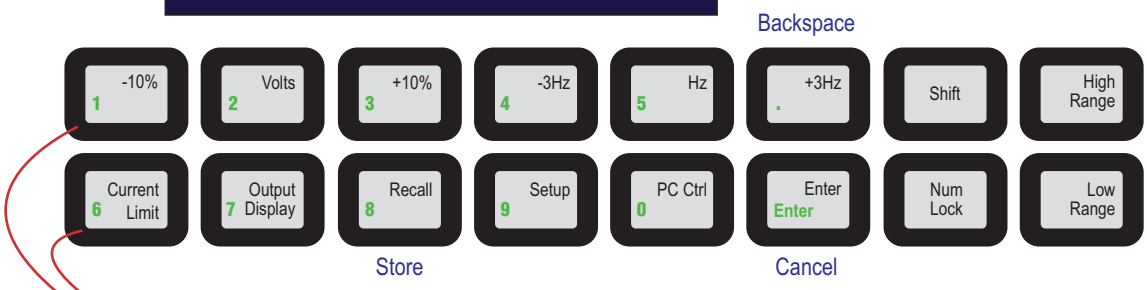
Or

1 Press [Hz / 5]

2 Highlights "Hz" for 3 seconds

Note:
See Backspace and Cancel functions in section **5.10.1, pg. 22**





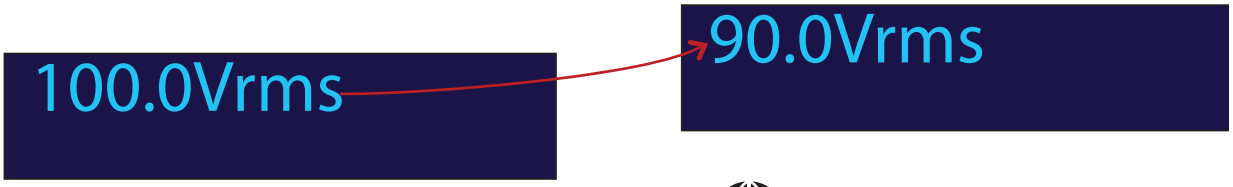
3 Press [Num Lock]

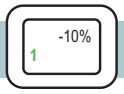
4 Select numerical digits in Green, including decimal.
For example, 50.0
Enters typed numbers in display.

Enters data when fourth digit or [Enter / Enter] selected.

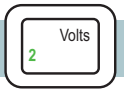
5.7 To Select -10% or +10% Voltage, in high or low range, when output is enabled or on standby:
Purpose: For testing equipment at high and low line conditions, typically tested at 10% above or below nominal supply voltage.

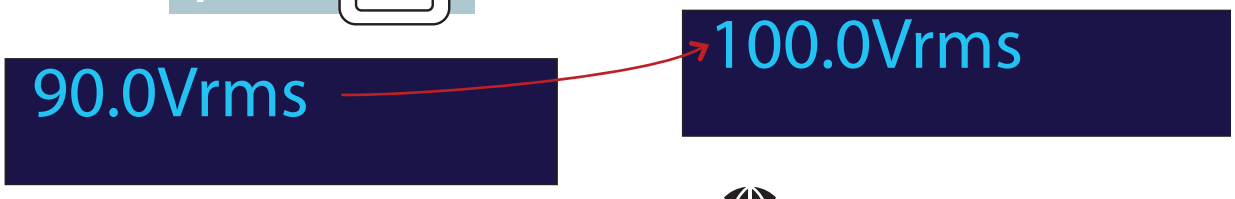
1 For example: Output originally at 100.0VAC



2 Press 

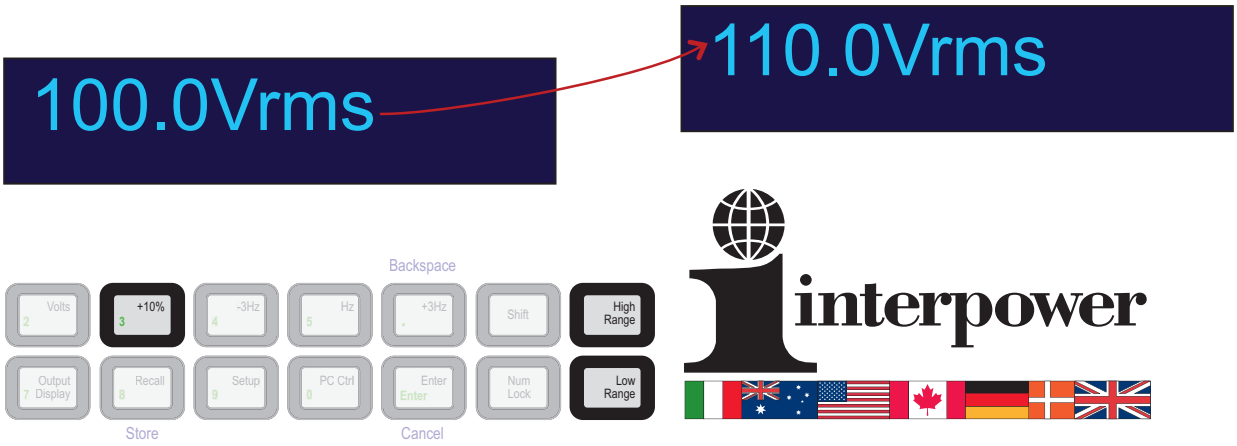
3 Output drops 10% of original 100.0VAC to 90.0VAC

4 Press 



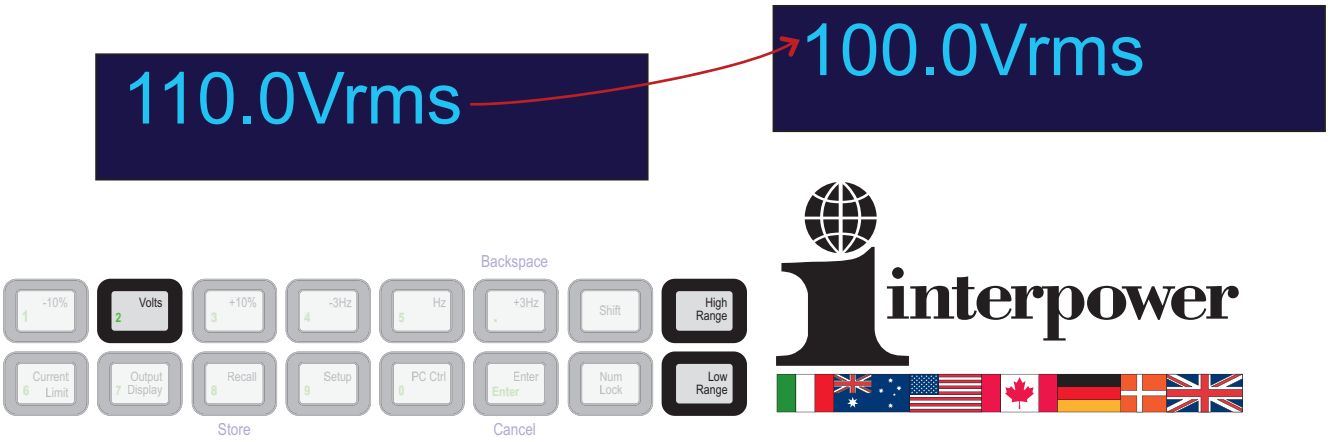
Output returns to original 100.0VAC

5 Press +10% (1)



6 Output increases 10% of original 100.0VAC to 110.0VAC

7 Press Volts (2)

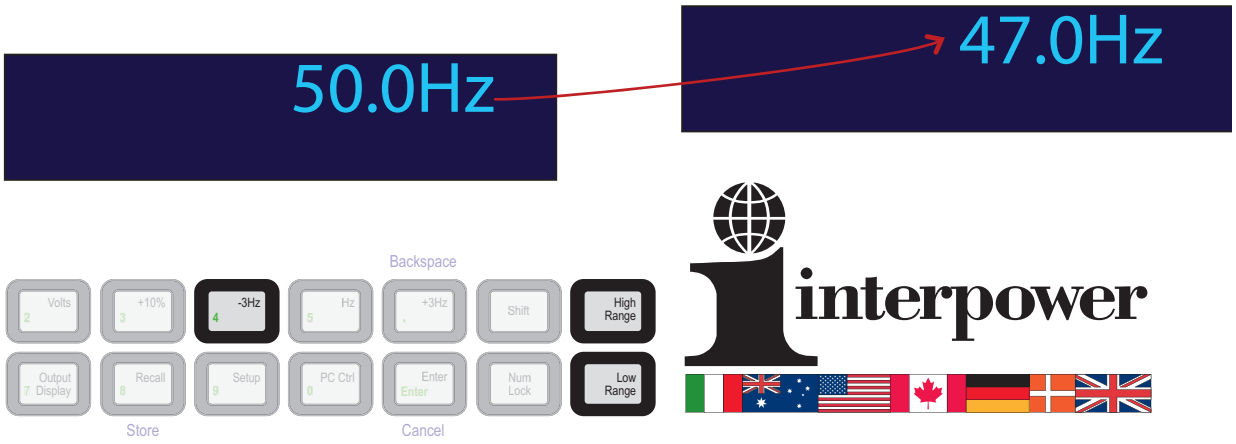


8 Output returns to original 100.0VAC

5.8 To Select -3Hz or +3Hz, in high or low range, when output is enabled or on standby:

Purpose: For testing equipment within variance of supply frequency nominal.

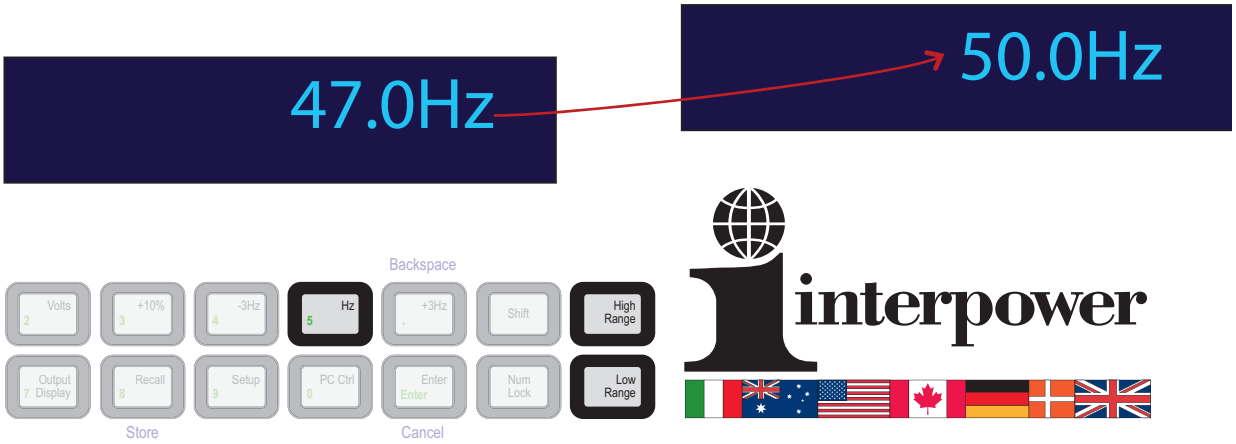
1 For example: Output originally at 50.0Hz



2 Press -3Hz

3 Output drops 3Hz from original 50.0Hz to 47.0Hz

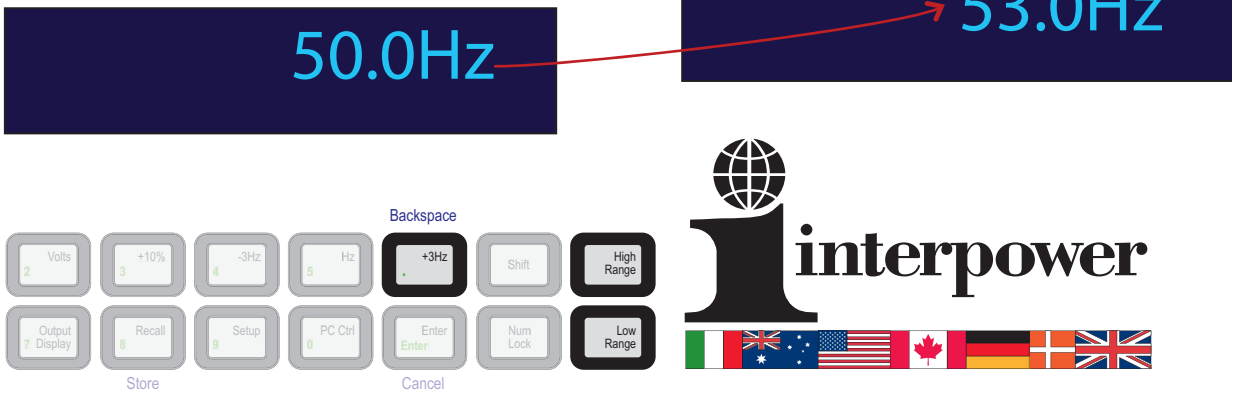
Press Hz



Output returns to original 50.0Hz

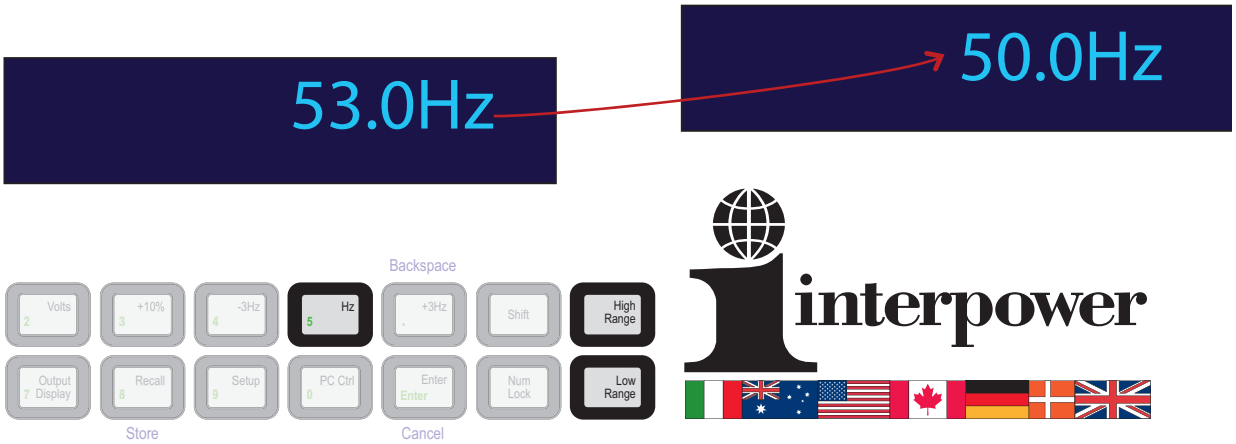
5.8 Continued

4 Press +3Hz (4)



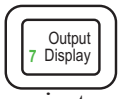
5 Output increases 3Hz from original 50.0Hz to 53.0Hz

6 Press Hz (5)

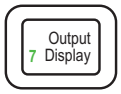


7 Output returns to original 50.0Hz

5.9 Output Display mode

Press 

to change lower right display mode.
Press again to change to the next mode.

Continue to press 

until desired mode displayed

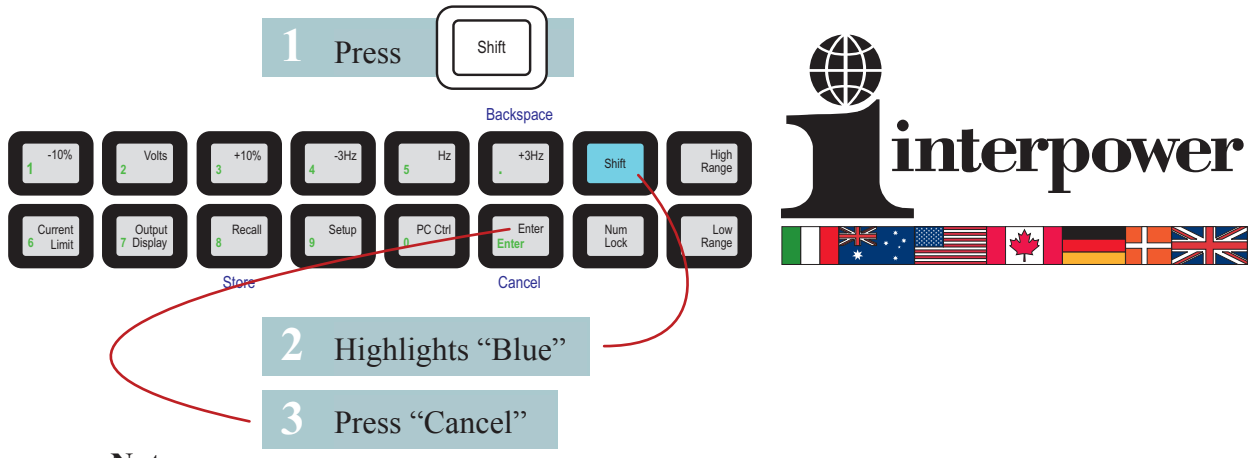
Display modes are:

Output Off = No output power
W = Wattage output
VA = Voltage Amperage output
PF = Power Factor output
CF = Crest Factor output
A_{pk} = Peak current
HP = Horse Power
HSNK = Internal heat sink temperature limit of 70 °C*
XFMR = Internal isolation transformer temperature limit of 120 °C*
CPU = Internal DSP processor temperature limit of 70 °C*

* If exceeded over temperature message displayed, see section 11, pg. 45.

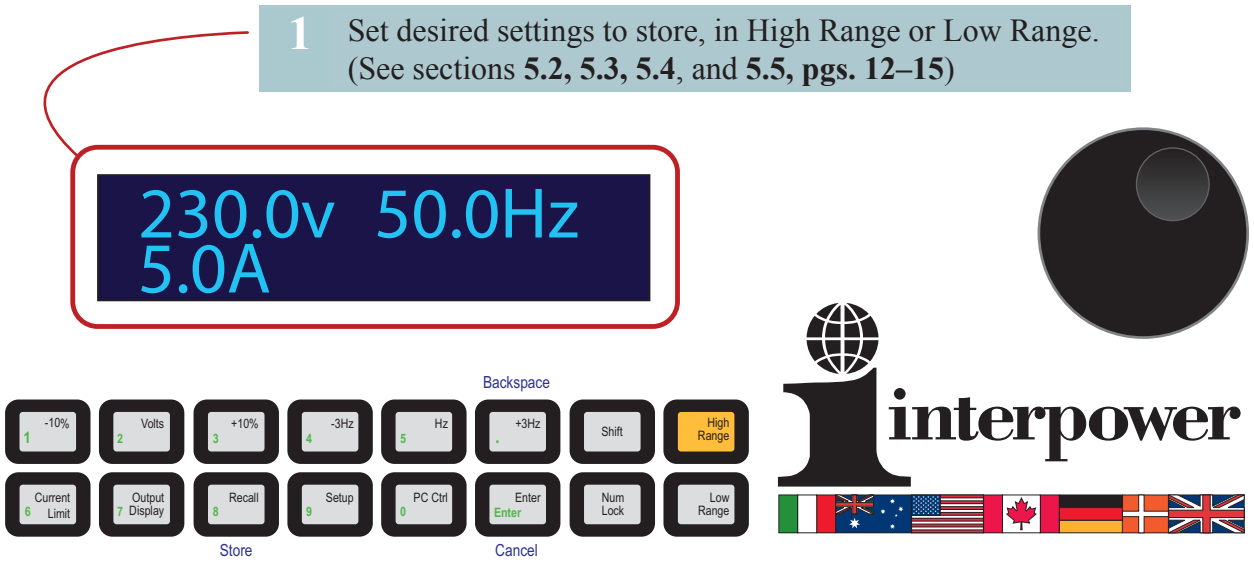
5.10 Other functions:

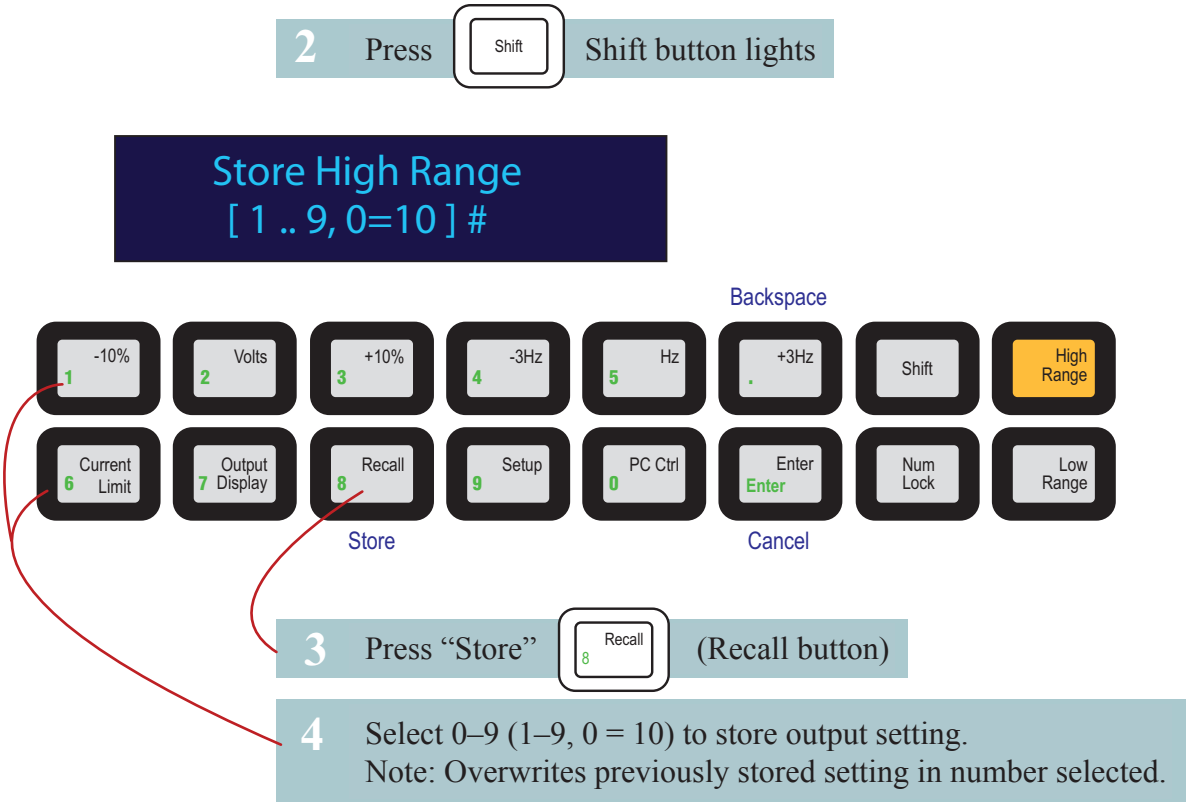
5.10.1 Backspace or Cancel numeric data input in Num Lock mode:



Notes:
Backspace only functions in Num Lock mode, allowing backspace of only one digit at a time.

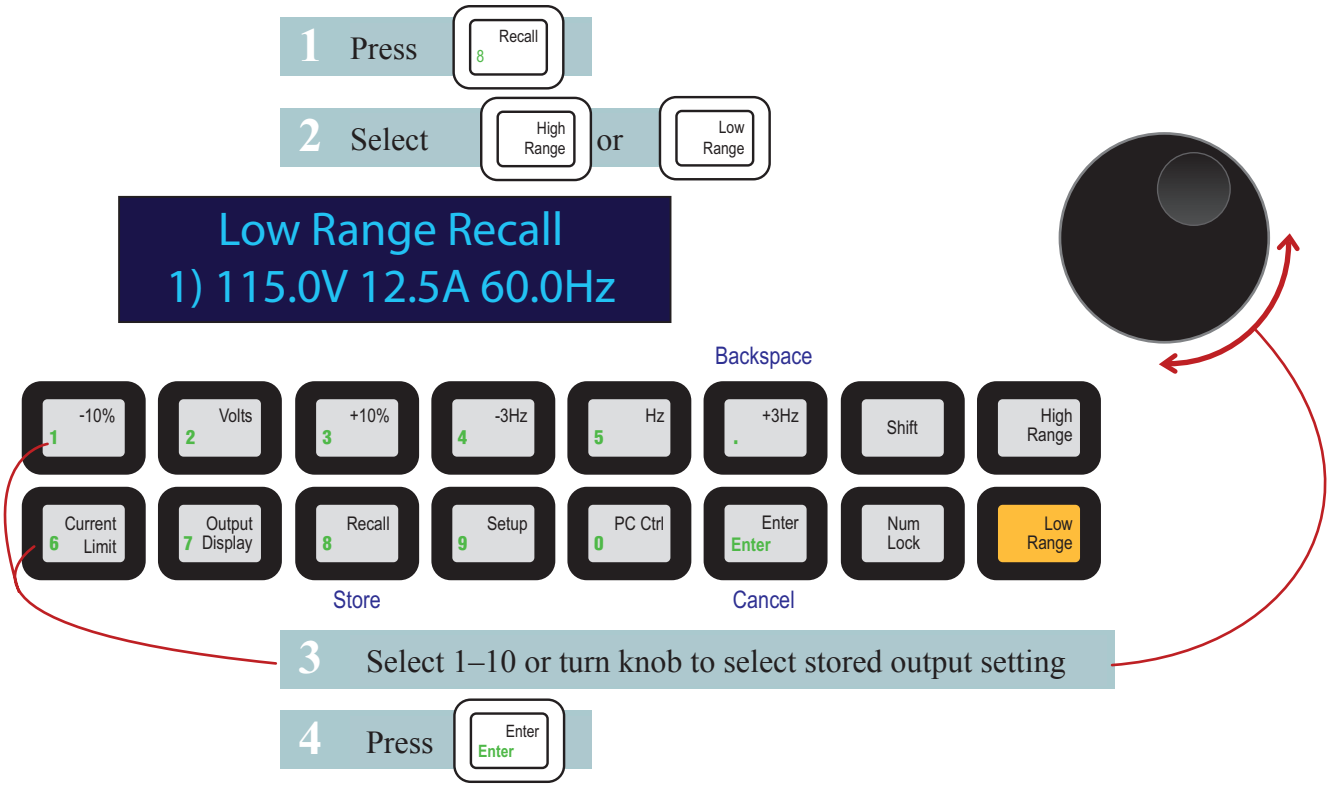
5.10.2 To store output settings:



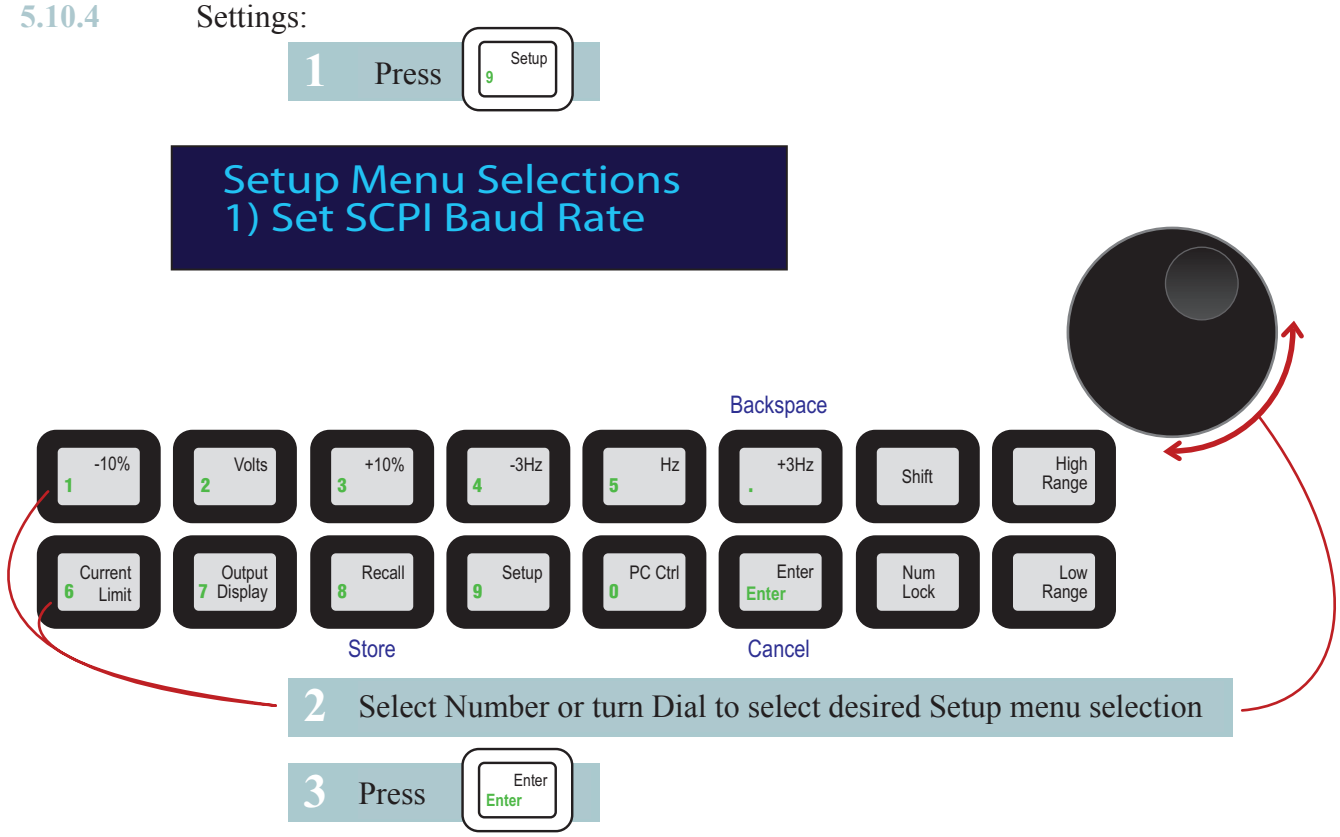


5.10.3 Storing and Recalling output settings (Volts, Hz, Current Limit)

To Recall stored output settings:



5.10.4 Settings:



1 Setup Menu Selections are as follows:

1) Set SCPI Baud	=	Set SCPI Baud Rate
2) Brightness	=	Set Display Brightness
3) Sys Info	=	System Information
4) Calibration	=	Calibration of IPS
5) Output Isolation	=	Output Isolation – Earth Ground Equipontentiality
6) Startup Mode	=	Startup Mode settings
7) Temperatures	=	Internal IPS Temperatures

Set SCPI Baud Rate

Purpose: For matching PC Baud Rate in PC Control mode. (See section 8, pg. 31–35)
SCPI is a standard set of commands for controlling programmable test and measurement devices in instrumentation systems. Use this menu for adusting the SCPI baud rate, i.e. the computer to IPS communication signaling rate. Initially displays current Baud Rate setting of IPS.

1. Select desired setting to change:
   Baud rate in bits per second (Always set to 57600 N-8-1 for optional Interpower Interface Software)
   Parity (Always set to N=None)
   Data Bits (Always set to 8)
   Stop bits (Always set to 1)
   Important: Power IPS off/on after changing baud rate to finalize setting
2. Select number on keypad or turn dial to select number. Then press Enter Enter.
3. Select Shift then Enter Enter to return to Setup Menu, if desired.
4. Select Shift then Enter Enter to return to normal display mode, if desired.

2 Set Brightness

Purpose: To adjust brightness of display.

1. Select 1–8, where 1 = darkest, 8 = brightest, or turn dial to select number. Then press 

.
2. Select 

then 

to return to Setup Menu, if desired.
3. Select 

then 

to return to normal display mode, if desired.

3 System Information

Purpose: To display system settings.

1. Select 1–6 or turn dial to display settings.
2. Settings include:

Model
Serial number
ARM SW (Software) Version
ARM HW (Hardware) Version
DSP SW (Software) Version
DSP HW (Hardware) Version

4 Calibration

Purpose: To calibrate IPS low or high range V_{rms}, A_{rms}, and Watts.
(See section 6, pg. 27)

5 Output Isolation - Earth Ground Equipotentiality

Purpose: To configure the output ground setting. This allows testing of equipment with Earth Ground tied to Output Neutral, or Earth Ground isolated from Output Neutral. Default is Earth Ground tied to Neutral.

1. Earth Isolated (from Neutral) ◯ **Clear**
2. Earth Neutral (Earth & Neutral are tied together) ● **Green**
3. Select 

then 

to return to Setup Menu, if desired.
4. Select 

then 

to return to normal display mode, if desired.

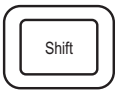
6 Start up Mode

Purpose: To compensate for output loads which have an in-rush current for short periods of time during start up. (See Section 7)

7 Temperatures

Purpose: Internal IPS Temperatures for Troubleshooting purposes. All temperatures are displayed in °C.

HSNK = Temperature of internal heat sink (limit of 70° C)
XFMR = Temperature of internal isolation transformer (limit of 120° C)
CPU = Temperature of internal DSP (Digital Signal Processor, limit of 70° C)

1. Select 

then 

to return to Setup Menu.

2. Select 

then 

to return to normal display mode, if desired.

5.11 Overload Conditions and error messages (See section 11, pg. 45)

5.12 Powering up the IPS

5.12.1 Output power always disabled after power up.

6 IPS System Calibration

6.1 Routine calibration is important for ensuring the accuracy of the Interpower IPS.

6.2 Interpower Corporation recommends the IPS be calibrated annually using the procedure described. The calibration procedure requires no entry inside the IPS. Calibration is performed by a software routine and prompts for input of required voltage, current and watt values.

Calibration Options
- Customer self-calibration
- Send to third party calibration lab
- Return to Interpower Corporation or service center authorized by Interpower Corporation
- Contact Interpower Customer Service (see section 17, pg. 54 for information).

6.3 There are six parameters requiring calibration.
These are: low range V_{rms}, A_{rms} and Watts, and high range V_{rms}, A_{rms}, and Watts.

6.4 There are three parameters displayed that do not require calibration namely:
Voltage Set (V_{set}), Current Limit (A_{lim}), and Frequency (Hz).

6.4.1 There are also five parameters displayed that are derived mathematically, namely:
Power Factor (PF), Crest factor (CF), Volt-Amperes (VA), Vpeak (V_{pk}) and Horsepower (HP).

6.4.2 On start-up, IPS stored calibration values are checked by an internal processor to ensure the stored values are within a specified tolerance for each output range. If the calibration values are found to be out of tolerance, a CALIB_ERROR message is displayed and a re-calibration will have to be performed.

6.5 Required Test Equipment

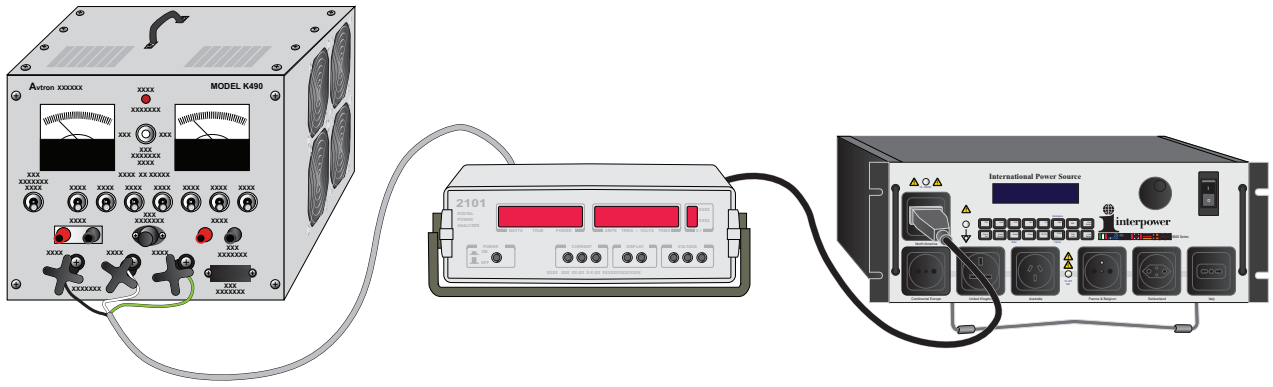
6.5.1 Avtron Manufacturing: 10KW AC Resistive Load Bank model K490D27011 or equivalent.

6.5.2 Valhalla Scientific: Digital Power Analyzer model 2100/2101 or equivalent.

6.6 Recommended Calibration Load Settings

6.6.1 When calibrating the 855217XX Series Unit (1725VA,) it is recommended to use a 500W load or calibrate at the specific load for the test.

6.6.2 When calibrating the 855222XX Series Unit (2200VA,) it is recommended to use a 1000W load or calibrate at the specific load for the test.



6.7 Calibration Procedure

Please note: Calibration is conducted for Low and High Range individually. The internal calibration values are reset to defaults at the start of a new calibration cycle. The output shown on the meter during the start of each calibration cycle is an uncalibrated voltage.

6.7.1 Low Range Calibration Procedure

a. Low Range calibration will automatically be conducted at 120VAC, 60Hz.

b. To begin low range calibration, connect IPS to test equipment per section 6.7, select 

, then menu selection 4 for CALIBRATION and press 

to confirm.

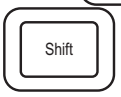
c. Select 

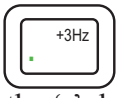
.

d. IPS automatically enables Low Range output.

e. Read output volt reading on test meter and enter measurement into IPS with numeric keypad and press 

.

f. Note: Press 

then press 

button to delete entered digits one at a time. Also, it is not necessary to enter the '.' decimal when decimal portion of output readings are '0'.

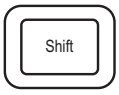
g. Read output current draw reading on test meter and enter measurement into IPS with numeric keypad and press 

.

h. Read output wattage reading on test meter and enter measurement into IPS with numeric keypad and press 

.

i. Display indicates Low Range Calibration is complete.

j. Continue to section 6.9.2 to calibrate High Range or press 

, then press 

to return to main display.

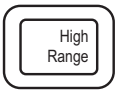
6.7.2 High Range Calibration

a. High Range calibration will automatically be conducted at 240VAC, 50Hz.

b. To begin High Range calibration, connect IPS to test equipment per section 6.7, select 

, then menu selection 4 for CALIBRATION and press 

to confirm.

c. Select 

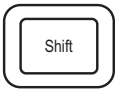
.

d. IPS automatically enables High Range output.

e. Read output voltage reading on test meter and enter measurement into IPS with numeric keypad and press 

.

6.7.2 Continued

f. Note: Press 

then press 

button to delete entered digit, one at a time.

Also, it is not necessary to enter the '.' decimal when decimal portion of output readings are '0'.

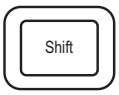
g. Read output current draw reading on test meter and enter measurement into IPS with numeric keypad and press 

.

h. Read output wattage reading on test meter and enter measurement into IPS with numeric keypad and press 

.

i. Display indicates High Range Calibration is complete.

j. Continue to section 6.9.1 to calibrate Low Range or press 

, then press 

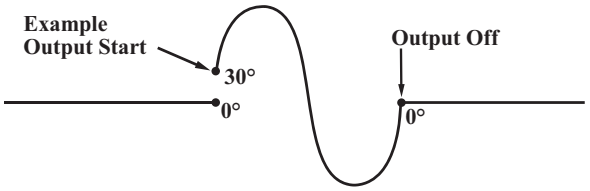
to return to main display.

7 Output Loads that Draw In-rush Current

7.1 Start up mode selection procedure

7.2 Set Voltage Phase Angle and/or Ramp Time

Purpose: To set output voltage phase angle (0–359°) or ramp time (0–5 seconds) range. Certain applications may require adjusting the ramp or phase angle, especially for starting inductive loads such as motors. Ramping the voltage can start a motor having an instantaneous current requirement that would otherwise cause over-current faults on the International Power Source. Using phase-angle turn on at other than 0° could be used for a variety of reasons, but perhaps most useful would be in starting a load connected by a series DC-blocking capacitor.



a. Press 

b. Turn the knob until you get to the “Startup Mode” menu

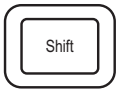
c. Press 

d. Turn the knob to select either “Ramp Time” or “Phase Angle”

e. Press 

f. Type in the phase angle or the length of time to ramp and press 

. This will accept your entry and return you to the “Setup Menu”

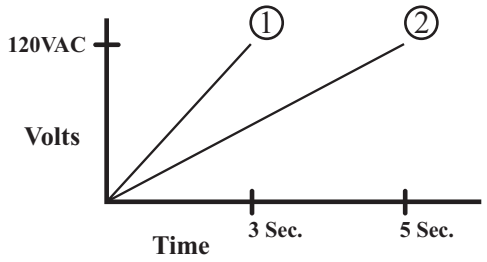
g. Press 

then 

to leave the Setup Menu and return to the main display.

When output is engaged, it will either ramp up in the time selected or it will turn on at the phase angle selected.

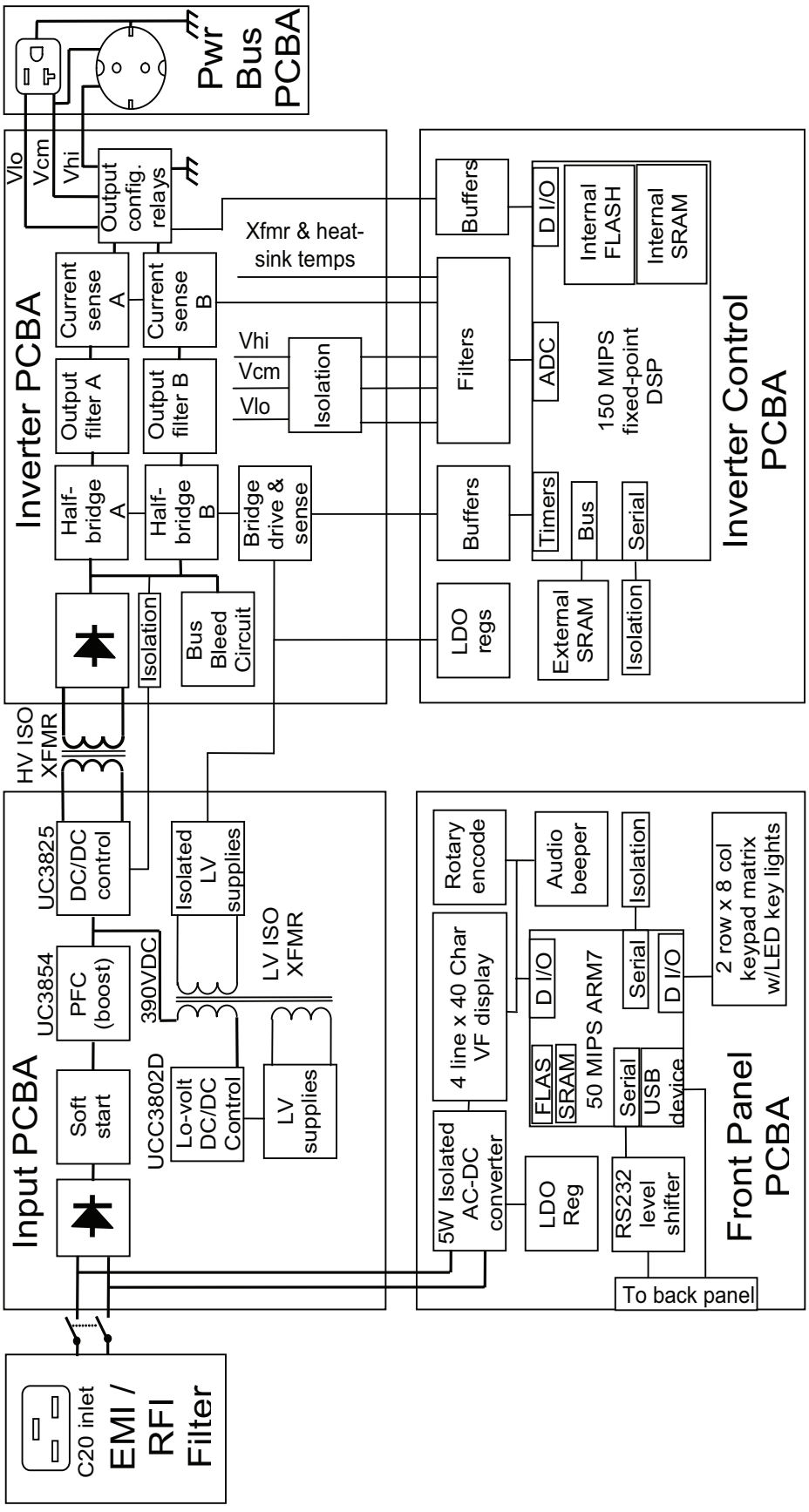
Default is phase angle set to 0°.



Example
① V_{set} is 120VAC Ramp 3 seconds
② V_{set} is 120VAC Ramp 5 seconds
Default is 0 seconds.

8 Theory of Operations

8.1 Block Diagram



8.2 Input

8.2.1 EMI / RFI filter

The EMI / RFI filter at the input of the IPS is responsible for removing any electromagnetic emissions which might otherwise prevent the product from passing regulatory standards, from exiting the case and getting onto the power cord. For conducted emissions the main job of the filter is to greatly reduce the 50KHz saw-tooth waveform which rides on top of any low-frequency line current. High frequency emissions caused by the switching of power and digital components inside the IPS must also be reduced or removed. All of the filter components along with the C20 inlet are mounted inside of a metal can at the back of the IPS. The can forms a Faraday cage to help prevent any radiated emissions from exiting.

8.2.2 Power Switch

The power switch, located on the front panel of the IPS, is a double-pole, single throw switch with built-in over-current protection. In its ON state, the switch connects both legs of the incoming power to the electronics. In its OFF state both legs are interrupted. Only the filter and two large traces on the input PCB remain powered when the switch is in the OFF position. The switch is rated for continuous operation at 20A. Since it operates based on internal self-heating, its trip-point and time-to-act are dependant on the environmental conditions. Colder conditions will cause the breaker to hold at higher input currents.

8.2.3 Input Rectifier

The input rectifier is a full-wave bridge configuration consisting of four discrete diodes in TO247 packages which are mounted on the input PCB and are in good thermal contact with the heat-sink in the IPS. While the IPS input is designed for operation up to 264VAC RMS, the diodes have a reverse rating of 800V. At low line input voltages and full power output, the input rectifier is one of the least power-efficient elements in the IPS and proper thermal connection to the heat-sink is critical.

8.2.4 Soft-Start Circuit

The soft start circuitry consists of a relay, SCR, current-limiting resistor, and timing device. The circuit prevents excess current flow in the input elements during the period of time in which the output capacitors in the (PFC) power factor corrector circuit are being initially charged. During this time the current is limited to a maximum of about 25A at worst-case high-line conditions. After a fixed period of about 50mS have elapsed, the relay in the soft-start circuit is engaged and the current-limit imposed by the soft-start circuit is no longer in effect.

8.2.5 Power Factor Corrector (PFC)

The (SMPS) power factor corrector is a SMPS (switch-mode power supply) configured in a boost arrangement. It operates at a fixed-frequency of 50KHz. The PFC converts the rectified AC input voltage into a regulated 390V DC output voltage which is used by subsequent sections of the power electronics. In addition to regulating its output voltage, the main function of the PFC is to ensure the input current remains precisely in-phase with the input voltage. This is required in order to meet certain regulatory requirements for electronic equipment. The detailed operation of the PFC is beyond the scope of this document, but persons interested should consult the data sheet and design guides for the TI UC3854 integrated circuit.

8.2.6 High Voltage DC-DC Converter

The 390V DC output of the PFC feeds the input of the high-voltage DC-DC converter which is a SMPS configured in a full-bridge arrangement operating at a fixed frequency of 50KHz. The primary of the high-voltage transformer is driven by a full-bridge transistor circuit connected to the output of the PFC. Twin secondary windings of the transformer are individually full-wave rectified and filtered on the inverter board. The output voltage is fed-back to the DC-DC control circuit on the input board which regulates the output at 450V DC. Current feedback is accomplished via a current sense transformer connected in series with the high-voltage transformer primary. The detailed operation of the high-voltage DC-DC converter is beyond the scope of this document, but persons interested should consult the data sheet and design guides for the TI UC3825 IC.

8.2.7 Low Voltage DC-DC Converter

The 390V DC output of the PFC feeds the input of the low-voltage DC-DC converter which is a SMPS configured in a fly-back arrangement and operating at a fixed frequency of 50KHz. The primary of the low-voltage transformer is connected to the output of the PFC on one end and driven by a single transistor on the other. There are three secondary windings on the low-voltage transformer. The main secondary has two taps and creates isolated 12V and 5V supplies used to power control circuits in the high-voltage DC-DC converter as well as some down-stream circuits on the inverter and inverter-control boards. Another secondary creates a loosely-regulated 18V which is referenced to the AC line input. It then feeds a 5V linear used to power control circuits in the PFC. The last secondary creates a loosely-regulated 17V that is referenced to the isolated high-voltage DC secondary. It is used in the gate-drive section of the inverter circuit. The detailed operation of the low-voltage DC-DC converter is beyond the scope of this document, but persons interested should consult the data sheet and design guides for the TI UCC3802 IC.

8.3 Inverter

8.3.1 High-voltage DC-DC Output

As mentioned in section **8.2.6** on pg. 32, the secondary of the DC-DC converter, associated output rectifier and filter components are located on the inverter board. Dual secondary windings are individually full-wave rectified (eight diodes total) and stacked in series to create a 450V DC (+/- 225V DC) output. The output is filtered using a large inductor and four large aluminum electrolytic capacitors. The output of the DC-DC converter is used to power the output stage of the inverter.

8.3.2 Bus Bleed Circuit

The output capacitors of the DC-DC converter, which are charged to 450V during normal operation, are discharged by the bus bleed circuit within about 20 seconds after removing power from the IPS. The bus bleed circuit monitors the gate drive voltage produced by the low-voltage DC-DC converter and discharges the high-voltage DC bus after the gate drive voltage collapses. An op-amp in the bus-bleed circuit controls the base of a high-voltage transistor which maintains a constant current of about 85mA and discharges the capacitors in about 10 seconds. The energy stored in the capacitors is converted into heat in the transistor which is deposited into the heat-sink.

8.3.3 Inverter Output Circuit

The inverter output consists of two identical half-bridge transistor circuits (A & B) connected across the 450V output of the DC-DC converter. The transistors drive output filter circuits which are connected to the output configuration relays and finally the output load itself. The A & B half-bridge circuits are driven 180 degrees out of phase with one another at a fixed frequency of 50KHz. The output configuration relays can place the two half-bridge circuits either in parallel to create a low-voltage, high-current output or in series to create a high-voltage, low-current output. These are referred to as “low-range” and “high-range” respectively throughout the IPS documentation. Because the A and B half-bridges run opposite in phase with one another, the 50KHz fundamental switching frequency is canceled out leaving only a 100KHz component to be filtered. This reduces the size of filter inductors and capacitors needed to create a smooth AC output.

8.3.4 Inverter Drive Circuit

The transistors in the inverter output circuit are driven by opto-isolators which are in-turn driven by the inverter-control PCBA (Printed Circuit Board Assembly). The opto-isolators block the high-voltage used in the inverter output and keep it from damaging the low-voltage circuits used on the inverter-control board.

8.3.5 Output Configuration Relays

As mentioned in section **8.3.3** the output configuration relays can place the A and B inverter half-bridges in either a series or parallel configuration. Recall that the DC-DC converter output, which is located on the inverter board, is produced using a pair of output windings which are individually rectified and stacked together to create a 450V output which can also be accessed as two 225V supplies.

When configured in low-range the output configuration relays connect the middle-point of the two 225V supplies directly to one leg of the output. The other output leg is created by connecting the filtered A and B half-bridges in parallel with one another. In this configuration the IPS can create outputs of up to 138VAC at 16A_{rms}.

When configured in high-range, the output configuration relays connect the filtered A-side half-bridge to one leg of the output and the filtered B-side half-bridge to the other leg of the output. In this mode, the center point of the 450V supply is not directly connected to the output structure. When configured in high-range the IPS can create outputs of up to 276VAC at 8A_{rms}.

A separate function of the output configuration relay section is to connect one leg of the output to earth ground (chassis) or isolate the output from earth ground completely. The coils of all output configuration relays are driven by transistors which are commanded by the inverter-control board.

8.3.6 Output Current Sense

The inverter output current is sensed by a pair of hall-effect transducers, one for the A channel and one for the B channel. The transducers provide galvanic isolation from the output and produce a low-voltage output which is proportional to the current flow. The transducers provide linear output in the range of +/- 48A which is necessary because of the 3x crest factor rating of the IPS output (16A * 3 = 48A_{rms} ~= 68A_{pk}.) In low-range, each transducer sees only one half of the current (34A_{pk} max) so it is necessary to read both and add them together mathematically. In high range the transducers are both in series with the output and so only reading either transducer is sufficient.

8.3.7 Output Voltage Sense

The inverter output voltage is sensed by circuitry on the inverter-control board. High-valued resistors on the inverter board combined with low-value resistors on the inverter-control board form a voltage divider to protect the low-voltage analog circuits on the inverter-control board. While high and low range outputs appear on two separate nodes from the output configuration relays, it is necessary to have both low-range and high range voltage dividers.

8.3.8 Bridge Switching Sense

Delays in the inverter drive circuitry and asymmetry in the switching characteristics of transistors used in the inverter half-bridges can lead to distortion in the output waveform. To counter these effects, the inverter-control board monitors the high voltage switching nodes of the A and B half-bridges. As with the output voltage sensing, a voltage divider is used to protect the low-voltage circuits on the inverter-control board from the high voltage which is present on the half-bridge switching nodes. Precise timing with sub 10nS resolution is used on the inverter-control board to determine the exact time of the switching events on each half-bridge output.

8.4 Inverter Control

8.4.1 Power

Power for the inverter-control board is provided by one of the low-voltage secondary outputs of the transformer on the input board. Two voltages, 12V and 5V are brought from the input board to the inverter board and then to the inverter-control board. Two LDO regulators create 3.3V and 1.9V used by the CPU, memory and other circuitry on the inverter-control board.

8.4.2 DSP & SRAM

The DSP used on the inverter-control board is a TMS320F2812 running at 150MHz. The DSP contains 256KB of internal FLASH memory and 36KB of high-speed internal SRAM. An optional slower-speed external SRAM (64KB – 512KB) was added to the board for additional code and data space.

The DSP has several built-in peripherals which are needed to control the inverter power stage. These include multiple timers, some with sophisticated capture, compare and PWM generation features and a 16-channel, 12-bit ADC. Using these peripherals, software can synthesize the output sine wave, generate the PWM needed to command the half-bridges on the inverter board,

measure the difference between the generated PWM and the actual PWM produced, apply the necessary counter modulation to remove the error and monitor the output voltage and current. The ADC in the DSP is also used to monitor the temperature of the main isolation transformer and the heat sink.

The DSP uses digital I/O to control the output configuration relays on the inverter board and to monitor several status bits from the input board. Additional functions performed by the DSP include RMS calculations for current, voltage and power as well as calculations for apparent power, power factor, peak current and crest factor.

8.4.3 Communications

The DSP communicates with the front-panel board via an asynchronous serial interface. The ASART (Universal Synchronous Asynchronous Receiver Transmitter) is a built-in peripheral on the DSP. The front-panel board is earth-ground referenced whereas the inverter control board is referenced to the floating ground on the inverter board. Therefore it is necessary to provide isolation and yet allow bi-directional serial communication to take place between the two boards. To accomplish this, a special-purpose transceiver is used on the inverter-control board which provides up to 4KV of galvanic isolation to the front panel board.

8.5 Front Panel

8.5.1 Power

Power for the front-panel board is derived from a small AC-to-DC SMPS module mounted on the front panel board. The module is connected to the AC line input just after the on/off switch. The module creates regulated 5V DC for the front panel board. It provides galvanic isolation between the AC input and the DC output which is referenced to earth ground (chassis). A linear regulator creates 3.3V from 5V for use on various circuits including the CPU (Central Processing Unit). The CPU IC contains a 1.8V linear regulator which is used for its core supply.

8.5.2 User Interface

The front panel board handles all UI (user interface) for the IPS. UI elements include a 4-line x 40 character VF display, a 2 row x 7 column keypad with LED key lights, several discrete LEDs, a rotary encoder and an audio transducer. Nearly all UI elements are directly connected to digital I/O pins on the front panel board's microcontroller.

8.5.3 Communications

The front panel board interfaces to the inverter control board using an isolated serial port as discussed in **8.4.3** above. The front panel board is the communications master and the inverter control board is the slave. Based on user input, the front panel board commands the inverter control board to change output voltage and frequency, change ranges, adjust current limit set points and so forth. The front panel board also polls the inverter control board for information such as the RMS voltage, current and power readings, etc.

The front panel board can also communicate with the outside world via a 3-wire RS232 serial port and/or via a full-speed USB device port, both of which are brought out to two connectors on the back panel of the IPS as an optional feature. The user may remotely control the IPS by connecting either of these two communications ports to a PC running proprietary GUI (Graphical User Interface) software or through LabVIEW™ by loading proprietary drivers. If configured with the communications option, the GUI software and LabVIEW™ drivers are supplied with the IPS.

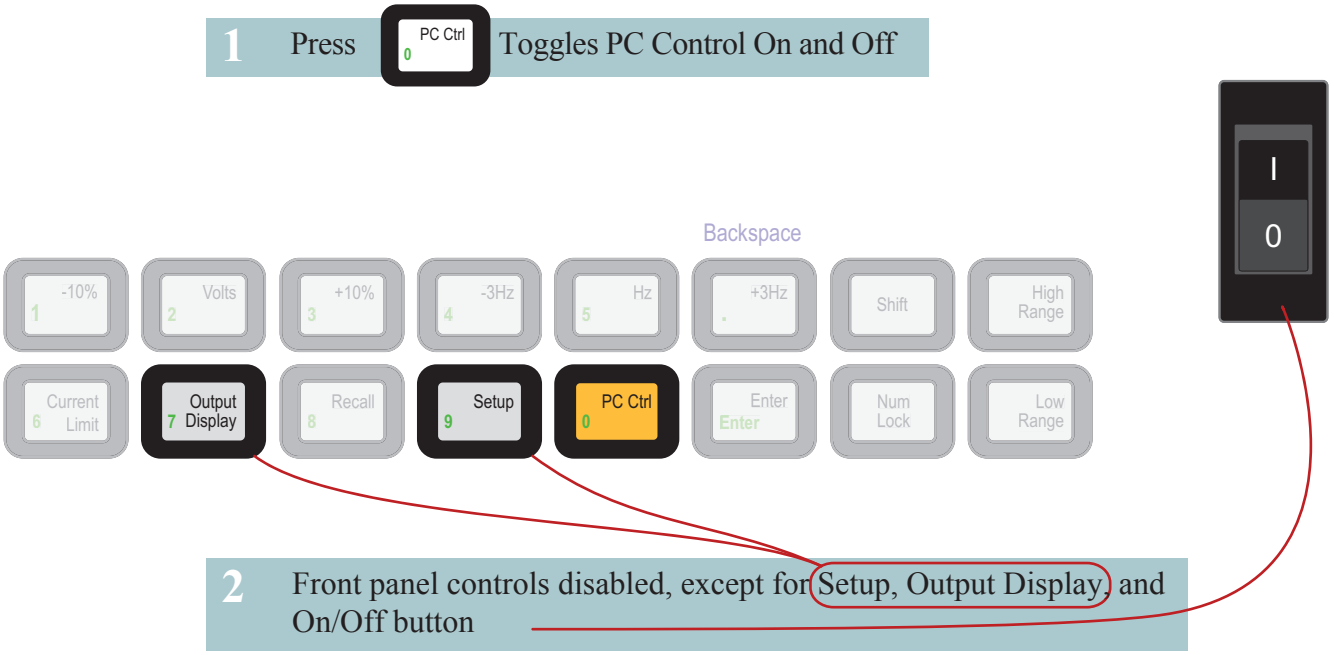
8.5.4 Microcontroller & Memory

The microcontroller used on the front panel board contains an ARM7-class processor core running at 48MHz, 256KB of FLASH and 64KB of SRAM. It also contains three on-chip serial communications elements, a USB device controller, GPIO (General Purpose Input/Output) controller, timers and various other on-chip peripherals. A small proprietary RTOS (Real-Time-Operating-System) is loaded in the on-chip flash in addition to the front panel application itself.

9 Optional Interpower IPS Software and Computer Interface

9.1 PC Control

Purpose: Toggle PC Control mode On, Off.
Note: Optional IPS Software required.



9.2 Optional computer interface for computer control with software

The Interpower IPS can be configured for computer control with the following interfaces as factory installed options:

RS232
USB
IEEE 488 / GPIB (Available only when using a USB to GPIB Converter)

Note: For Immunity compliance, USB and RS232 PC cables are limited to 3 meters (9.8 feet) per emissions certification.
Contact Interpower Customer Service for more information. (See pg. 54 for information.)

9.3 Optional LabVIEW™ drivers

Optional LabVIEW™ drivers are available for interfacing the Interpower IPS with National Instruments LabVIEW™. LabVIEW™ drivers for the Interpower IPS are available at www.interpower.com/ips.

9.4 Interpower IPS Interface Software

Optional computer graphical user interface software is available for creation of AC power test routines, graphic AC power tests, and fast testing at AC world voltages and frequencies. To obtain this optional software, contact Interpower Customer Service or visit www.interpower.com/ips.

Note: Interpower Corporation does not provide support for National Instruments' LabView™ software, nor for custom SCPI and LabView™ applications or programming. See section 10.

9.5 SCPI and SCPI Commands

SCPI (Standard Commands for Programmable Instrumentation) is a standard set of commands for controlling programmable test and measurement devices in custom instrumentation systems. Refer to section 5.10.4, for adjusting the SCPI baud rate, i.e. the computer to International Power Source communication signaling rate.

9.5 Continued

The following SCPI commands can be programmed into custom test systems for commanding the Interpower International Power Source as needed.

SOURCE / MEASURE: The keywords ‘SOUR’ and ‘MEAS’ are used to indicate whether the current command is from the SOURCE or MEASURE command set. It also determines the active command set. Subsequent commands do not require the leading keyword. For example, if the first command is MEAS:VOLT?, a second command FREQ? would have the same meaning as MEAS:FREQ?

SOURCE COMMANDS: The Source commands set and get the values that are used to control the output of the device. These settings can also be set by adjusting the input panel on the device. Note: if the UI board encounters an unrecoverable error condition, all of the values will be returned as zero.

[SOUR:]CLEAR
- Clears any errors currently in the system (input/output overcurrent, etc.).

[SOUR:]VOLT <voltage>
- Sets the value the power supply will output when the output is turned ON. Valid Low Range settings are 0–138.0. Valid High Range settings are 0–276.0.

[SOUR:]VOLT?
- Returns the value the power supply will output when the output is turned ON.

[SOUR:]CURR <amps>
- Sets the maximum current setting the power supply will allow. Valid Low Range settings are 0–16.0. Valid High Range settings are 0–8.0.

[SOUR:]CURR?
- Returns the maximum current setting the power supply will allow. Note this is not the actual output value. To measure this value, use the measure command.

[SOUR:]FREQ <hertz>
- Sets the value the power supply frequency will output when the output is turned ON. Valid settings are 47–450.

[SOUR:]FREQ?
- Returns the value the power supply frequency will output when the output is turned ON.

[SOUR:]VOLT:RANG HIGH_ON | HIGH_OFF | LOW_ON | LOW_OFF
- Set the Low/High Range setting on the power supply and its on/off state.
  Note: The Low Range and the High Range of the power supply each have their own individual voltage, maximum current, and frequency settings. There needs to be a delay of at least 500 milliseconds after this command is issued.

[SOUR:]VOLT:RANG?
- Returns the Low/High Range setting and the on/off state of the power supply.

[SOUR:]MODE?
- Returns the power on mode -- PHASE_ANGLE or RAMP.

[SOUR:]RAMP <seconds>
- Set power on ramp time. Valid settings are 0,1,2,3,4,5 seconds.

[SOUR:]RAMP?
- Return the power on ramp time. Valid settings are 0,1,2,3,4,5 seconds.

[SOUR:]PHASE_ANGLE <degrees>
- Set power on phase angle delay. Valid settings are 0–359 degrees C.

[SOUR:]PHASE_ANGLE?
- Returns the power on phase angle delay. Valid settings are 0–359 degrees C.

9.5 Continued

[SOUR:]EARTH_RELAY NEUTRAL | ISOLATED

- Sets the state of the Earth Relay. Valid settings are NEUTRAL and ISOLATED.

[SOUR:]EARTH_RELAY?

- Returns the state of the Earth Relay. Valid settings are NEUTRAL and ISOLATED.

[SOUR:]AUTOOFF ON | OFF

- 'AutoOff' causes the IPS power to shut off if no SCPI command is received within 10 seconds.

[SOUR:]AUTOOFF?

- Returns the current state of 'AutoOff'. Valid settings are ON and OFF.

[SOUR:]AUPD ON|OFF

- Get and set auto update mode. When auto update mode is on, data will constantly be streamed out at a specified rate. Values streamed out include voltage, current, power, volt amps, power factor, frequency, crest factor, peak current and horse power.

[SOUR:]AUPD? ON OFF

- Get and set auto update mode. When auto update mode is on, data will constantly be streamed out at a specified rate. Values streamed out include voltage, current, power, volt amps, power factor, frequency, crest factor, and peak current.

9.6 Installation of USB Driver

Connection of the International Power Source to a PC via USB requires installation of a USB driver. The USB driver is automatically installed once the IPS is powered on and is connected to the computer via a USB cable. USB Driver is of type "USB Test and Measurement Class." If the USB driver does not automatically install, contact Interpower.

10 Interpower IPS Interface Software

10.1 Quick Start

See contact information in section 17 for obtaining the optional Interpower IPS (International Power Source) Interface Software.

Note, if connecting via USB, see section 9.6.

To install the Interpower IPS Interface Software, follow the installation instructions in section 10.9.

Upon installation of the software, connect the IPS to your computer via USB or RS232. Then follow the instructions in section 10.10.

You may control the IPS from your computer using the following features:

- Control Panel of the IPS for manual control.
- Programmable routines.
- Guide to worldwide plugs, sockets, voltages and frequencies.
- Graphing IPS output and reports.

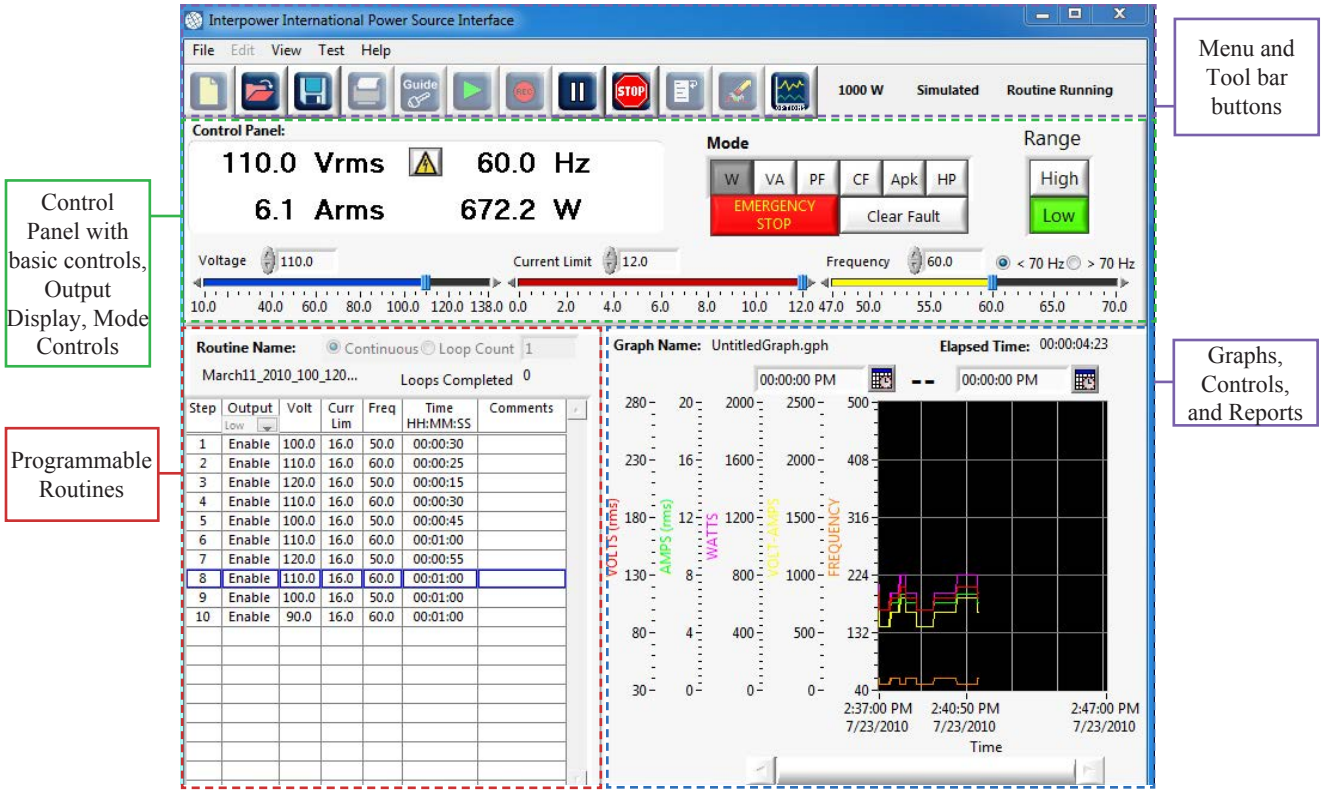
Refer to the software Help menu and IPS Software Help for detailed instructions.

10.2 Overview

The optional IPS Interface Software extends the capabilities of the IPS, providing convenient off-the-shelf computer functionality. Such as:

- Graphical user interface computer control of the IPS
- Programmable routines for repeat equipment testing
- Fast look up and selection of worldwide plugs, sockets, voltages and frequencies
- Graphical reporting of all IPS outputs during equipment testing
- IPS Interface Software simulation mode for evaluation, demonstration, and training purposes, and for creation of routines on other computers if main computer and IPS are in testing.

Below is an overview of the IPS Interface Software window. See Help menu of software for details.



10.3 Conditions of Software Use, License Agreement, Copyright, Network Installations

Interpower IPS Interface Software License Number is recorded on the CD Jacket. License number is keyed to a specific IPS front panel serial number. Interpower IPS Interface Software can be installed on multiple computers, but can only be used with an IPS that the license number is keyed to. Multiple license numbers are available for users with multiple IPS units. See section 10.11 for instructions to enter multiple license numbers.

License agreement

License agreement is available for review and acceptance during installation of software.

See Help menu and About IPS to view the IPS License Agreement.rtf.

Copyright

Network Installations

Not intended or licensed for installation on networks, only for stand-alone computer applications.

10.4 System Requirements

- Computer system: Intel® and AMD® processors. Not supported on Apple Mac® based machines.
- Microsoft Windows XP, or VISTA SP1, or Windows 7, 32 or 64 bit operating systems
- Recommended video memory minimum 256MB
- Communication ports: USB 2.0 or later, RS232, or GPIB (requires converter)
- CD drive
- Mouse or other pointing device
- Internet Explorer version 6.x or 7.x, 8.x, 9.x or Firefox
- Adobe Reader
- Internet connection for updates

10.5 Obtaining the Interpower IPS Interface Software

The optional Interpower IPS (International Power Source) Interface Software is delivered on CD when ordered. In some situations, it may be available for download from www.interpower.com/ips. Please contact Customer Service. See Section 17 for contact information.

10.6 Obtaining Interpower IPS Interface Software License Number

The software license number is listed on the CD jacket if CD was provided when purchased. New or additional license numbers may be obtained by contacting Interpower Customer Service. See section 17 for contact information.

10.7 Software Version and Updates

The software version is displayed in the Help menu and About IPS to view.

To obtain software updates, visit www.interpower.com/ips.

IPS Interface Software updates will be emailed to the address given to Interpower at the time of software purchase. To change the email address or to download the latest update, visit www.interpower.com/ips.

10.8 Important Notes

The user must have full administrative rights on the computer to properly install this software application.

The Interpower IPS Interface Software can be installed on multiple computers, but can only be used with an IPS that the license number is keyed to. Multiple license numbers are available for users with multiple IPS units enabling one PC to interface with multiple IPS units.
Note: Only one instance of the application should run on a computer at a time to ensure proper communication between the IPS and computer.

See section 10.11 for instructions to enter multiple license numbers.

10.9 Installation Instructions

Connect IPS to Computer

Ensure computer is on. Connect the IPS to computer via USB, RS232 or GPIB (GPIB requires converter). Turn on the IPS and press the PC Ctrl button until it is yellow. If connecting with USB, see section 9.6 for installation of USB driver. For serial RS232, baud rate must be 57600 N-8-1. See section 5.10.4.

Obtain IPS Interface Software License Number (On CD Jacket).

Install IPS Interface Software

From CD part number 85501010, run Setup.exe. If downloading from www.interpower.com/ips, run downloaded file as instructed.

Follow all instructions when prompted.

Enter License Number during install if prompted. License Number can be re-entered after install if necessary. If the user does not have a license number or plans to use the application in Simulated Mode only, simply fill the four data entry fields with any character. For example '0.'

10.10 Start up of the Interpower IPS Software with the IPS

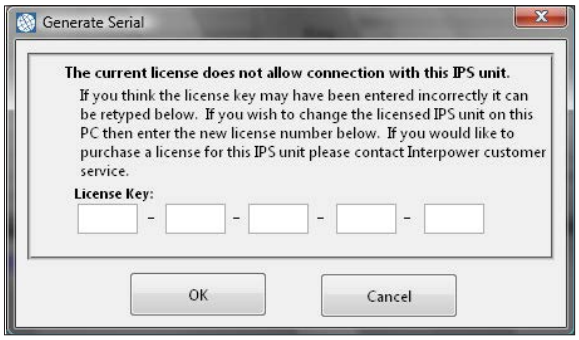
Step 1 Enable PC Ctrl Button on IPS Front Panel

Step 2 Go to START in Microsoft Windows, locate Interpower, and select International Power Source Software.

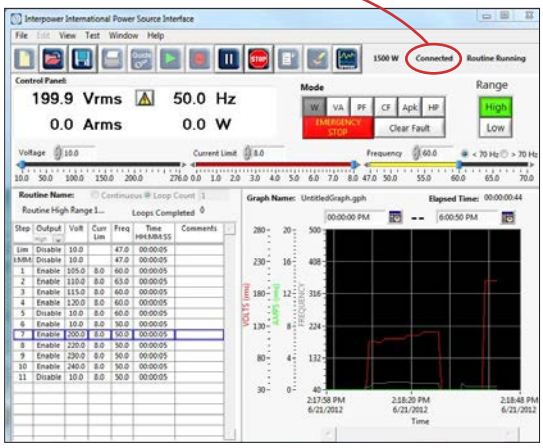
Step 3 Select communication port from drop down box, and Connect. Rescan communication ports if necessary. Simulated mode also available.

Step 4 Software Title Pg. Loads

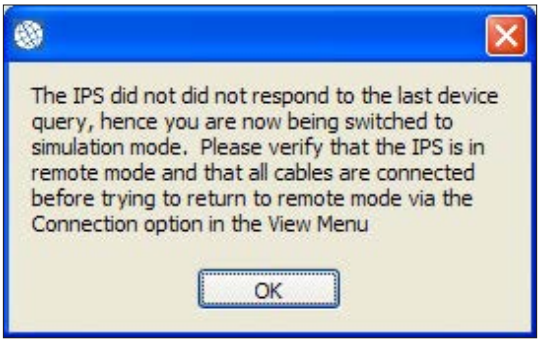
Step 5 Enter License Number if requested. See Sections 10.6 and 10.9.



Step 6 IPS Interface Software Installed and Connected



Note: If this pop-up box is displayed, ensure PC Ctrl button is enabled and cables are connected. Open software and adjust communication connections. A rescan of communication ports might be necessary. See step 3.

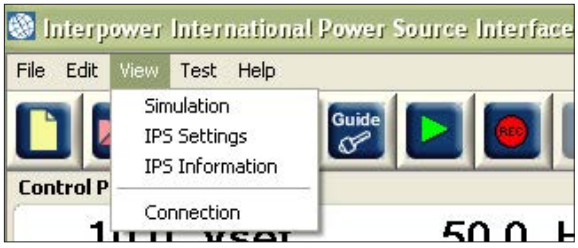


10.11 Configuring Computer for Multiple IPS Interface License Numbers

A single computer can be configured to operate multiple IPS units, one at a time. Interfacing multiple IPS units with the IPS Interface Software requires a specific license number associated with each IPS. See section 10.8.

To configure a computer with an additional IPS Interface Software license number, make the interface connections between the PC and the IPS, and then enter the additional license key when prompted.

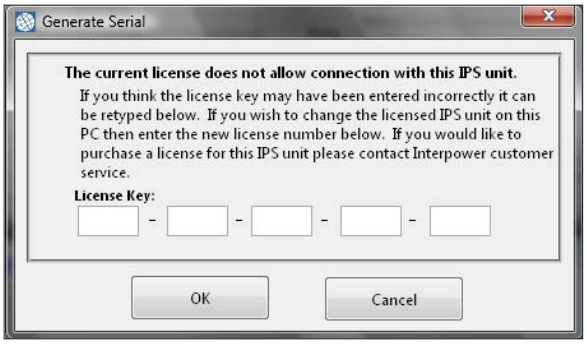
1. Open the View Menu then Connection.



2. When the "Connect" window is displayed, connect the additional IPS Communication cable to the computer. Turn the IPS unit on and enable the PC Ctrl button.

3. Rescan communication ports. Select desired communication port and select connect.

4. A new window will appear for entry of additional IPS Interface Software license numbers.



10.12 Help on the on the IPS Interface Software.
Refer to the Help menu in the software.

10.13 Troubleshooting
See section 12 of the manual.

11 Hardware Troubleshooting

Error Messages		
ERROR_INPUT_OVERCURRENT		
A	**Problem**	**Solution**
	You have exceeded the hardware input current limiter. See section 3.6, pg. 9 of manual.	1.) Hit "Enter" to clear error. 2.) Verify input current. Refer to section 3, pg. 7 of manual. 3.) IPS will disable output.
ERROR_OUTP_CURRENT		
B	**Problem**	**Solution**
	You have exceeded the front panel current limit adjustment. See section 3.4, pg. 9 of manual.	1.) Hit "Enter" to clear error. 2.) IPS will disable the output.
ERROR_INPUT_OVERCURRENT OR ERROR_OUTP_CURRENT IN MOTOR STARTING APPLICATIONS		
C	**Problem**	**Solution**
	Your application requires starting a motor, and you either have exceeded the hardware input current limiter, or the front panel current limit adjustment	Consider adjusting voltage phase angle or ramp time. See section 7, pg. 30 of manual, Set Voltage Phase Angle and/or Ramp Time.
OVERTEMPERATURE		
D	**Problem**	**Solution**
	Internal IPS temperature has exceeded hardware thermal protection limits.	1.) Hit "Enter" to clear error. 2.) Verify ambient temperature does not exceed maximum operating temperature of 40 degrees C.
Calibration Required		
E	**Problem**	**Solution**
	One or more stored calibration values are out of tolerance or have been corrupted.	A system calibration must be performed. Refer to section 6, pg. 28 of manual. Contact customer service if this is a recurring error as there may be a processor fault.
Calibration Failed		
F	**Problem**	**Solution**
	One or more entered calibration values are incorrect.	A system calibration must be performed. Refer to section 6, pg. 28 of manual.

Other Faults		
Front panel display or indicators are not lit		
A	**Problem**	**Solution**
	Front panel display or indicators are not lit.	1.) Check input power cord connections (if still not lit) 2.) Check if front panel circuit breaker has been tripped, if so reset

Or contact Customer Service (contact information on pg. 54).

12 IPS Interface Software Troubleshooting

Application will not start or displays an error on startup		
A	**Problem**	**Solution**
1	Error—(Unable to locate the LabVIEW™ Run-Time Engine)	Reinstall the application in administrator mode. Details: This error appears when the LabVIEW™ run-time engine was not installed correctly. This can occur when the application is not installed by a user with administrator privileges or when a portion of the installation is cancelled. An error dialog will generally appear during installation if not in administrator mode.
IPS unit does not respond to application		
B	**Problem**	**Solution**
1 2	Indicators display 0 values. Error—(The IPS did not respond to the last device query…)	1.) Verify that the IPS is in PC Ctrl mode. 2.) Verify that all cables are securely connected to the IPS and the PC. 3.) Verify that the correct IPS drivers have been installed on the PC. (Reinstall correct drivers if unsure) 4.) Verify that the VISA software drivers are installed by navigation to the windows control and viewing the installed applications. Locate the "National Instruments Software" item and click the add/remove button for that item. Look for an item on the list in this new window labeled "NI-VISA runtime." If that VISA item or the "National Instruments Software" items do not exist, reinstall the application in Administrator mode.
IPS unit does not appear on the list of available COM ports		
C	**Problem**	**Solution**
1	The IPS does not appear on the connection screen.	1.) Verify that the IPS is in PC Ctrl mode. 2.) Verify that all cables are securely connected to the IPS and the PC. 3.) Verify that the correct IPS drivers have been installed on the PC. (Reinstall correct drivers if unsure)
The correct COM port is grey and can not be selected.		
D	**Problem**	**Solution**
1	IPS COM port is grey on the connection screen.	Restart the PC. Details: The com port resource was not correctly released by the windows operating system.

13 Glossary

ADC: Analog to Digital Converter

A_{lim}: Current Limit

Alternating Current (AC): An electric current that reverses its direction at regularly recurring intervals.

Amps Peak (A_{pk}): Maximum current during a cycle.

ARM: Advanced RISC Machine, a processor architecture.

A_{rms}: Amps RMS

CPU: Central processing unit

Crest Factor (CF): The ratio of the peak voltage to the RMS voltage.

Current (I): The rate of transfer of electrical charge. Measured in amperes.

Current Limit (A_{lim}): An overload protection setting which limits the maximum output current to a preset value.

Direct Current (DC): Movement of a constant electrical charge, in one direction, through a defined conductive path.

DSP: Digital Signal Processor

Faraday Cage: an enclosure formed by conducting material or by a mesh of some material. Such an enclosure blocks out external static and non-static fields.

Frequency (Hz): Number of periods per unit time measured in hertz.

GPIB: (General Purpose Interface Bus) An IEEE 488 standard parallel interface used for attaching sensors and programmable instruments to a computer. Using a 24-pin connector, up to 15 devices can be daisy chained together. HP's version is the HPIB.

HP: Horse power, a unit of power

IEEE 488: See GPIB.

IPS: Interpower's International Power Source

LabVIEW™: Laboratory Virtual Instrumentation Engineering Workbench is a platform and development environment for a visual programming language from National Instruments™.

LDO: Low dropout

MIPS: Million instructions per second

NEC: Abbreviation for National Electrical Code. United States electrical code published by the National Fire Protection Association.

NI: Abbreviation for National Instruments™

Null Modem: RS232 cable in which the transmit and receive lines are criss crossed. The IPS null modem cable requires that both TX/RX (2&3) are cross linked.

Ohm's law: The fundamental mathematical relationship between current (I), voltage (E) and resistance (R) discovered by George Simon Ohm. The passage of one Ampere through one Ohm produces one Volt. E=IR.

PCB: Printed Circuit Board

Power Factor (PF): The ratio of watts to apparent power (volts x amps).

PWM: Pulse Width Modulation

RISC: Reduced Instruction Set Computing

Root Mean Square (RMS): The square root of the average of the square of the value of the function taken through one period. For a sine wave, 0.707 x Peak Value.

RS-232: Standard for serial transmission between computers and peripheral devices.

SCPI: The Standard Commands for Programmable Instrumentation defines a standard set of commands to control programmable test and measurement devices in instrumentation systems.

SCR: Silicon Controlled Rectifier

SMPS: Switch Mode Power Supply

SRAM: Static Random Access Memory

UI: User Interface

USB: Universal Serial Bus. A widely used hardware interface for attaching peripheral devices.

VAC: Volts AC

VFD: Vacuum Fluorescent Display

Volt (V): Basic unit of electrical potential

Voltage (E): A derivative of electrical quantity, measured in the unit Volts and defined in terms of the independently obtained Ampere, I, and the unit resistance, Ohm (R) by Ohm's Law, E = IR.

Voltampere (VA): Apparent power (volts x amps)

V_{rms}: Volts RMS

V_{set}: Output Voltage Setting

Watt (W): Unit of measurement of power equal to 1 joule per second. Watt = Voltampere x power factor (VA x PF).

XFMR: Transformer

14 Warranty and Service

14.1 Standard Warranty

Interpower warrants to the original purchaser, the IPS and software to be free from defects in material and workmanship for a period of one year from the date of shipment. Interpower will have the IPS serviced, replaced, or repaired free of charge, when returned freight prepaid, and when examination reveals the fault has not occurred because of misuse, abnormal conditions of operation, user modification, or attempted user repair. Repairs for returned equipment not meeting the above warranty conditions will be charged at applicable rates. If so requested, Interpower will submit estimates for such charges before commencing repairs. Parts, equipment repairs, and services are warranted to be free from defects in material and workmanship for 90 days from the date of return shipment.

14.2 Procedure for Service

Should the IPS require maintenance or repair, contact Customer Service (see contact information on pg. 54) giving full details, including part number and serial number. On receipt of this information, service information or an RMA (Return Material Authorization) number will be given. Package equipment carefully, preferably in original packaging to prevent transportation damage and add the RMA number to the shipping label. If replacement packaging is needed, contact Customer Service. Ship freight prepaid to the appropriate Interpower location. Interpower will not be responsible for repair of damage due to improper handling or packaging. Equipment returned freight collect or without the RMA number will be refused. Equipment repaired under warranty will be returned by prepaid surface freight. Equipment repaired outside the warranty period will be returned freight collect. If requested, an estimate of repair charges will be made before work begins on repairs not covered by the warranty. Refer service and repair of the Interpower International Power Source to qualified personnel only. Qualified personnel are experienced, qualified, and ideally certified in sensitive electronic circuitry and high power AC and DC electrical power supply circuits, to properly and safely service the Interpower International Power Source. Interpower Corporation and Interpower Components Ltd. are not liable for issues resulting from service and repair work conducted by non-Interpower personnel.

Customer Support Information

14.3 Contact Customer Service (see contact information on pg. 54).

Disposal

14.4 Dispose of this product according to local standards and regulations.

15 General Care and Cleaning

15.1 General Care

15.1.1 Protect the IPS unit from adverse weather conditions. The IPS is not waterproof.

15.1.2 Do not store or leave the IPS where the VFD/Front Panel will be exposed to direct sunlight for long periods of time.

15.1.3 To avoid damage to the IPS, do not expose to sprays, liquids, or solvents.

15.2 Cleaning

15.2.1 Inspect the IPS as often as operation conditions require. To clean the IPS exterior, perform the following steps:

1. Remove loose dust on the outside of the IPS with a lint-free cloth. Use care to avoid scratching the blue VFD display filter.
2. Use a soft cloth or paper towel dampened with water to clean the IPS. Denatured alcohol or isopropyl alcohol can be used for more efficient cleaning.

15.2.2 To avoid damage to the surface of the IPS, do not use any abrasive or chemical cleaning agents.

GUIDE TO WORLDWIDE PLUG/SOCKET PATTERNS & POWER MAINS (SINGLE-PHASE)

The most frequently specified plug pattern for electrical or electronic equipment will appear in bold type. Note that the information provided for developing countries is not precise. The data given for single phase voltages and frequencies are nominal and are subject to a standard tolerance of 10%, but in some areas—particularly in developing countries—tolerances may be much greater. The information was compiled from several sources, including the BSI publications "World Electricity Supplies" and "Electrical Plugs and Wiring." Information current as of the time of publication. Subject to change without notification. Call our Customer Service Department for current information.

Rev. 1-15

Country	Voltage	Freq./Hz	Pattern
Afghanistan	220	50	A, B
Algeria	220	50	**A**, B, **F**
American Samoa	120/220	60	**C**, K, N, M
Angola	220	50	A,B
Anguilla (U.K.)	120/240	60	D
Antigua	120/240	60	**D**, K, N
Argentina	220	50	T
Armenia	220	50	A, B
Aruba	127/220	60	A, B, K., N
Australia	230	50	**C**, P
Austria	230	50	A, B
Azores (Portugal)	230	50	A, B
Bahamas	120	60	**B**, K, N, G, D
Bahrain	230/240	50	D, G
Bangladesh	230	50	D, G
Barbados	115	50	**K**, N
Belarus	220	50	**A**, B
Belgium	230	50	B, F
Belize	110/220	60	**K**, N, G
Benin	220	50	A, N
Bermuda	120	60	K, N
Bolivia	230	50	A, B, K, N
Bosnia-Herzegovina	220	50	A, B
Botswana	230	50	**D, G**
Brazil	127–220	60	**B**, K, N, O
Bulgaria	220	50	**A**, B
Burkina Faso	220/230	50	D, **G**
Burundi	220	50	**A**, B
Cambodia	220	50	A, B
Cameroon	220–260	50	B, F
Canada	120	60	**K**, N
Canary Islands (Spain)	220	50	A, B, F
Cape Verde, Rep. of	220	50	A, B
Cayman Islands	120	60	K, N
Central African Rep.	220	50	A, B
Chad	220	50	**A**, F, B
Channel Islands	240	50	B, **D**
Chile	220	50	**A**, B, I
China, People's Rep. of	220	50	**X**
Christmas Is. (Austral.)	240	50	C
Colombia	120	60	K, N
Congo, Rep. of	220–240	50	A, B, F
Cook Is. (N.Z.)	240	50	C, P
Costa Rica	120/240	60	**D**, K, N
Croatia	230	50	A, B
Cuba	115/230	60	A, B, K, N
Curacao Is.	110/220	60	A, K, N
Cyprus	230	50	**D**, G
Czech., Rep. of	230	50	B, F
Denmark	230	50	B, **E**
Djibouti, Rep. of	220	50	B, **F**
Dominica	230	50	D, G
Dominican Rep.	120/240	60	**K**, N
Ecuador	110	60	**K**, N
Egypt	220	50	A, B, D
El Salvador	120, 240	60	**K**, N
England	230	50	**D**, G
Equatorial Guinea	220	50	B
Estonia	220–330	50	A, B
Ethiopia	230	50	A, B, **I**
Fiji	240	50	**C**, P
Finland	230	50	**A**, B
France	230	50	B, **F**
French Guiana	220	50	B, F
Gabon	220	50	B, F
Gambia	220	50	D, G
Germany	230	50	A, B
Ghana	220	50	**D**, G
Gibraltar	240	50	D, G
Greece	230	50	A, **B**
Greenland (Den.)	230	50	B, **E**
Grenada	230	50	**D**, G
Guadeloupe	220	50/60	B, F
Guam	120/240	60	**K**, N
Guatemala	110/220	60	**K**, N
Guinea	220	50	B, F
Guinea-Bissau	220	50	A, B
Guyana	120/240	50–60	**D**, G, K, N
Haiti	110/220	60	**K**, N
Honduras	110/220	60	**K**, N
Hong Kong	220	50	**D**, G
Hungary	230	50	A, B
Iceland	230	50	**A**, B
India	230	50	G
Indonesia	220	50	A, B, F
Iran	220	50	A, B
Iraq	220	50	A, B, **D**, G
Ireland, Rep. of (S.)	230	50	**D**
Israel	230	50	B, **H**
Italy	230	50	B, **I**
Ivory Coast	230	50	A, B
Jamaica	110	50	K, D, G
Japan	100	50 & 60	J, M
Jordan	230	50	A, B, **D**
Kenya	240	50	**D**, G
Kuwait	230–240	50	**D**, G
Kyrgyzstan	220	50	**A**, B
Laos	220	50	A, B, F, **K**, N
Latvia	220	50	A, B
Lebanon	220	50	A, B, D, G
Lesotho	220	50	D, G
Liberia	220–230	50	A, N, K
Libya	220	50	A, G, K, N
Liechtenstein	230	50	L
Lithuania	230	50	**A, B**
Luxembourg	230	50	**A, B**
Macao	220	50	D, **G**
Madagascar	110/220	50	B, F
Malawi	230	50	D, G
Malaysia	240	50	D, G
Maldives	220	50	D, G
Mali, Rep. of	220	50	B, F
Malta	230	50	D
Martinique	230	50	B, F
Mauritania	220	50	A, B
Mauritius	230	50	**D**, G
Mexico	127	60	**K**, N
Moldova	220	50	A, B
Monaco	220	50	A, **B, F**
Mongolia	220	50	A, B
Montserrat	230	60	**D**, K, N
Morocco	220	50	A, B, F,
Mozambique	220	50	A, B, G
Myanmar (formerly Burma)	230	50	**D**, G
Namibia (W.S.Africa)	220	50	D, G
Nepal	220	50	G
Netherlands	230	50	A, B
Neth. Antilles	115–127/220	50/60	A, **B**, K,
New Caledonia	220	50	B, F
New Zealand	230	50	C, P
Nicaragua	120/240	60	**K**, N
Niger	220	50	A, B
Nigeria	230	50	**D**, G
North Ireland	230	50	D
North Korea	220	60	**A**, B
Norway	230	50	A, B
Oman	240	50	A, B, **D**, G
Pakistan	230	50	G
Panama	120/240	60	**K**, N
Papua New Guinea	240	50	**C**, P
Paraguay	220	50	A, B
Peru	220	60	A, B
Philippines	220	60	**K**, N
Pitcairn Is. (U.K.)	240	50	G
Poland	230	50	A, B, F
Portugal	230	50	**A**, B
Puerto Rico	120	60	**K**, N
Qatar	240	50	**D**, G
Romania	230	50	A, B
Russia Federation	220	50	A, B
Rwanda	220	50	A, B, L
Saudi Arabia	127/220	60	A, D, F, G, **K**
Scotland	230	50	D
Senegal	220	50	F, G
Seychelles	230	50	D, G
Sierra Leone	230	50	D, G
Singapore	230	50	D, G
Slovakia	230	50	B, F
Slovenia	220	50	A, B
Somalia	110/220–230	50	B, G
South Africa	220–250	50	D, G
South Korea	110/220	60	A, B
Spain	230	50	B, F
Sri Lanka	230	50	D, G
St. Pierre & Miquelon (Fr.)	115	60	K, N
St. Kitts & Nevis	230	60	**D**, G
St. Lucia	240	50	D
St. Vincent	230	50	D
Sudan	240	50	B, D, G
Suriname	127/220	60	A, B, K, N
Svalbard (Norway)	220	50	A, B
Swaziland	230	50	D, G
Sweden	230	50	A, B
Switzerland	230	50	L
Syria	220	50	A, B, F
Tahiti	110–127 & 220	60	A, B, F, K, N
Taiwan	110/220	60	C, **K**, N
Tanzania	230	50	**D**, G
Thailand	220	50	A, B, K, N
Togo	230	50	B, F
Tonga	240	50	C, P
Trinidad & Tobago	115/230	60	K, N
Tunisia	220	50	A, B, F
Turkey	220	50	A, B, D, G
Uganda	240	50	**D**, G
Ukraine	220	50	A, B
United Arab Emir.	220–240	50	**D**, G
United Kingdom & Ire.	230	50	**D**, G
United States	120	60	K, **N**
Uruguay	220	50	A, B, C*, **I**
Venezuela	120/208/277	60	**K**, N
Vietnam	220	50	**B, F**, K, N
Virgin Islands	120	60	**K**, N
Wales	230	50	D, G
Western Samoa	230	50	C
Yemen	250	50	**D, G**
Yugoslavia	230	50	A, B
Zaire, Rep. of	220–240	50	A, B, F
Zambia	230	50	D, G
Zimbabwe	220–230	50	**D**, G

* This country uses the Australia standard with modifications. The contacts are approximately 1mm longer than the Australian (18.2mm).

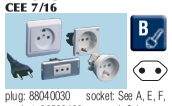
Interpower Corporation
P.O. Box 115 • 100 Interpower Ave.
Oskaloosa, IA 52577 (USA)
Telephone: (800) 662-2290
Fax: (800) 645-5360

Interpower Components Ltd.
10 Kelvin Drive • Knowlhill • Milton Keynes
Buckinghamshire • MK5 8NH • UK
UK, Ireland, Germany, Switzerland, Austria
Freephone: 00800 5566 5566
Freefax: 00800 5655 5655
International Phone: +44 (0)1908 295 300
International Fax: +44 (0)1908 295 301

Cont. Europe (Schuko) CEE 7

plug: 88010920 socket: 88011081
cordset: 86230110

Europlug CEE 7/16



plug: 88040030 socket: See A, E, F, I, & L
cordset: 86532100

Australia/New Zealand AS/NZS 3112

plug: 88010713 socket: 88010512
cordset: 86210030

United Kingdom/Ireland BS 1363

plug: 88040011 socket: 88010621
cordset: 86240150

Denmark Afsnit 107-2-D1

plug: 88010741 socket: 88010541
cordset: 86280010

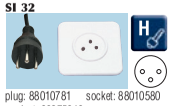
France/Belgium CEE 7

plug: 88010801 socket: 88010550
cordset: 86230110

India/South Africa BS 546 (old British standard)

plug: 88010764 socket: 88010562
cordset: 86265010

Israel SI 32



plug: 88010781 socket: 88010580
cordset: 86275010

Italy CEI 23-50

plug: 88010772 socket: 88010572
cordset: 86394000

Japan JIS 8303

plug: not available socket: not available
cordset: 86589000

North America NEMA 5-15

plug: 88030100 socket: 88010641
cordset: 70401020244

Switzerland SEV 1011

plug: 88010732 socket: 88010530
cordset: 86285010

Japan Ungrounded

plug: 88100011 socket: not available
cordset: 86532140

North America NEMA 1-15

plug: not available socket: 88010641
cordset: 86532120

Australia Ungrounded

plug: not available socket: 88010512
cordset: 86532110

Argentina IRAM 2073

plug: not available socket: not available
cordset: 86270010

China GB 2099-1 & GB 1002-1

plug: not available socket: 88040260
cordset: 86517040

Brazil NBR 14136

plug: 88040200 socket: not available
cordset: 86286110

North American Non-locking NEMA Configurations

Use this chart to determine which general purpose NEMA plug or receptacle is needed for specific applications.

	2 pole 2-wire		2 pole 3-wire grounding			3 pole 3-wire		3 pole 4-wire grounding		4-wire
	125V	250V	125V	250V	277V	125/250V	3ø 250V	125/250V	3ø 250V	3ø 120/208V
15A Receptacle	 1-15R		 5-15R	 6-15R	 7-15R		 11-15R	 14-15R	 15-15R	 18-15R
Plug	 1-15P	 2-15P	 5-15P	 6-15P	 7-15P		 11-15P	 14-15P	 15-15P	 18-15P
20A Receptacle		 2-20R	 5-20R	 6-20R	 7-20R	 10-20R	 11-20R	 14-20R	 15-20R	 18-20R
Plug	 1-20P	 2-20P	 5-20P	 6-20P	 7-20P	 10-20P	 11-20P	 14-20P	 15-20P	 18-20P
30A Receptacle		 2-30R	 5-30R	 6-30R	 7-30R	10-30R	11-30R	14-30R	15-30R	18-30R
Plug	1-30P	2-30P	5-30P	6-30P	7-30P	10-30P	11-30P	14-30P	15-30P	18-30P
50A Receptacle			5-50R	6-50R	7-50R	10-50R	11-50R	14-50R	15-50R	18-50R
Plug			5-50P	6-50P	7-50P	10-50P	11-50P	14-50P	15-50P	18-50P
60A Receptacle								14-60R	15-60R	18-60R
Plug								14-60P	15-60P	18-60P

Information obtained from ANSI/NEMA WD-6 standard. Face and pin sizes not necessarily to scale. For reference only.

EC DECLARATION OF CONFORMITY

Manufacturer Name & Address:

U.S. Contact
Interpower Corporation
100 Interpower Avenue
Oskaloosa, IA 52577 U.S.A.
Phone: 641/673-5000
Fax: 641/673-5100

European Contact
Interpower Components, Ltd.
10 Kelvin Drive
Knowlhill, Milton Keynes
Buckinghamshire, MK5 8NH
UK
Phone: +44 (0)1908 29300
Fax: +44 (0)1908 295301

Declares that the following product

Model Number(s):
8552XXXX

Product Description:
IPS (International Power Source)

Note: "X" indicates any number 0–9.

Conform to the following product specifications:

Safety:	EN 61010-1: 2001	
EMC:	EN 61000-3-2	Class A
	EN 61000-3-3	

Supplementary Information:

The product herewith complies with the requirements for the (LVD) Low Voltage Directive 2006/95/EC, EMC directive 2004/108/EC, Waste Electrical and Electronic Equipment Directive (WEEE).

Oskaloosa Location
August 2015 Date

Joe Caligiuri, Product Compliance Specialist

17 Contact Information

For technical assistance, warranty, calibration and service needs, contact Customer Service at:

Interpower Corporation
P.O. Box 115
100 Interpower Avenue
Oskaloosa, Iowa 52577
Telephone: (641) 673-5000
Fax: (641) 673-5100

Toll-Free Numbers (US/PR/VI):
Phone: (800) 662-2290
Fax: (800) 645-5360

Interpower Components, LTD.
10 Kelvin Drive
Knowlhill, Milton Keynes
Buckinghamshire, MK5 8NH
UK
Telephone: +44 (0)1908 295 300
Fax: +44 (0)1908 295301

For UK, Ireland, Germany, Switzerland, Austria:
Freephone: 00800 5566 5566
Freefax: 00800 5655 5655

Customer Service email: info@interpower.com
www.interpower.com
www.interpower.com/ips/

Owner's Record

The part number and serial number are located at the rear of the International Power Source unit. For your reference, record the part number and serial number in the space provided below. Refer to the part number and serial number when contacting Interpower.

Part number: _____

Serial number: _____

Software License number: _____

Manual part number 59500150

www.interpower.com/ips

Updated copies of this manual are available at www.interpower.com/ips or by contacting Customer Service. Copies of this manual are also available in other languages at www.interpower.com/ips. Contact Customer Service for a complete list and part numbers.