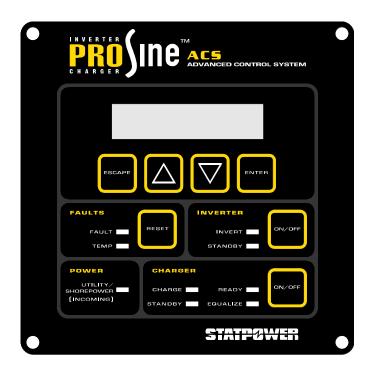


OWNER'S MANUAL





The Power to Make it Happen"

7725 Lougheed Highway Burnaby, BC V5A 4V8 Canada Tel: (604) 420-1585 Fax: (604) 420-1591 http:// www. statpower.com

PROsine™ 2.5/3.0 ACS Panel (Advanced Control System)

Owner's Manual

Table of Contents

1.	INTRODUCTION	1
1.1. 1.2.		1
2.		
2.1.	MENU SELECTION	(
2.2.		
	2.2.1. AC INFORMATION	
	2.2.2. BATTERY INFO	8
	2.2.3. INVERTER	8
	2.2.4. CHARGER	9
	2.2.5. SYSTEM INFO	
	2.2.6. STATPOWER INFO	
2.3.	CONFIGURING "INSTALLER-SETTABLE" PARAMETERS	10
3.	INSTALLATION	11
4.	TROUBLESHOOTING	12
5.	WARRANTY	15
6.	WARRANTY SERVICE	10

COPYRIGHT © 1998 STATPOWER TECHNOLOGIES CORPORATION. ALL RIGHTS RESERVED. **STATPOWER** IS A REGISTERED TRADEMARK OF STATPOWER TECHNOLOGIES CORPORATION. **PROSINE** AND **THE POWER TO MAKE IT HAPPEN** ARE TRADEMARKS OF STATPOWER TECHNOLOGIES CORPORATION.

1. Introduction



WARNING

Please review the Important Safety Instructions found at the beginning of the PROsine Inverter•Charger Owner's Manual and Installation Manual, paying particular attention to the CAUTION and WARNING statements, before proceeding with the installation and operation of the PROsine ACS. If you have misplaced these manuals, please contact Statpower Customer Service for replacement.

The Advanced Control System (ACS) Panel enables you to monitor and control your PROsine Inverter•Charger from a remote location and comes standard with a 50 foot (15 metre) 4 conductor telephone cord. The ACS Panel provides you with a finer degree of both monitoring and operating control over the standard Control Panel shipped with the PROsine 2.5 Inverter•Charger. If you purchased a PROsine 3.0, it comes standard with the ACS Panel in place of the standard Control Panel. The digital readout of the ACS gives you a detailed display of many parameters for the system, while the menu structure allows advanced configuration as well as the convenience to change system settings when you need to. Configuration settings made with the ACS Panel will over-ride those settings made by configuring the DIP switches on the chassis of the PROsine Inverter•Charger.

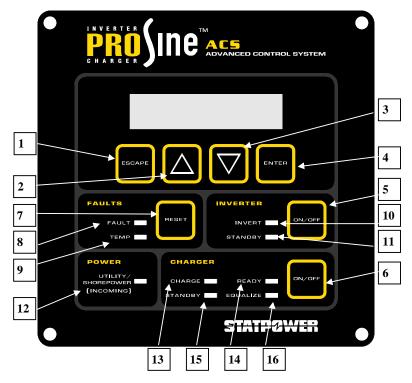
1.1. LCD Display

The ACS Panel has a two-line LCD display with backlight to facilitate reading. You can cycle the LCD panel through a menu tree of items that provides both system display information and adjustable parameters. Some display screens allow you to set parameters and some screens have parameters that can be set only by the installer after a key sequence has been entered that allows access to these settings. Refer to Section 2.3.

The backlight for the LCD panel illuminates when any key on the ACS is pressed. The backlight will remain on for one minute after the last key press, or after a warning has been displayed.

1.2. ACS Control Panel Functionality

The following diagram and tables will help you get familiar with the buttons and LEDs on the ACS Panel and their functionality.



Control Buttons:

Button		What it does:	Comments:
1 ESCAPE		Moves up one level in the menu tree.	In a screen with settable values to be changed, does not change the last value set.
	1.	Moves up one option in the selected menu, or	This button is shown as ▲ in the following instructions.
	2.	Selects the next higher value (or previous choice) in a screen that allows the user or installer to scroll through settable values.	For some menus, if you hold the button down, it will scroll rapidly through the numerical values.
3	1.	Moves down one option in the selected menu, or	This button is shown as ▼ in the following instructions.
V	2.	Selects the next lower value (or next choice) in a screen that allows the user or installer to scroll through settable values.	For some menus, if you hold the button down, it will scroll rapidly through the numerical values.
<u>Button</u>		What it does:	Comments:
4 ENTER	1.	Selects the menu level, or	You can then use the ▲ or ▼ buttons to move through the screens at that level.

	2.	If editing of the displayed value is permitted, this key places the value in edit mode, allowing you to scroll through the allowed values, then	If the screen has selectable options, you can then use the ▲ or ▼ buttons to move through the options.
	3.	When pressed again, the current value displayed will be the new value for that menu item.	
INVERTER ON/OFF	1.	Press the ON/OFF button to switch the PROsine inverter to standby mode if AC power is available, or to ON if no AC power is available. In standby mode, the	The inverter STANDBY LED is lit when the inverter is in standby mode.
		inverter switches on automatically when AC power fails or is disconnected and conditions are suitable for inverting.	The INVERT LED is lit when the inverter is in invert mode.
	2.	Press the ON/OFF button again to switch the inverter off.	When the inverter is switched off, both the INVERTER STANDBY and INVERT LEDs are off. Incoming AC power will still be passed through to the load terminals.
CHARGER ON/OFF	1.	Press the ON/OFF button to switch the PROsine charger to standby mode if no AC power is available, or to ON if AC power is available. In standby mode, the	The charger STANDBY LED is lit when the charger is in standby mode.
		charger switches on automatically when AC power becomes available and conditions are suitable for charging.	The CHARGE LED is lit when the charger is on.
	2.	Press the ON/OFF button again to switch charger off.	Both the STANDBY and CHARGE LEDs are off.
	3.	Hold the charger ON/OFF button down for 5 seconds to enter Equalize mode. CAUTION: Equalizing the batteries improperly can lead to battery damage. Refer to the PROsine Owner's Manual.	The EQUALIZE LED is lit.
FAULTS		Press this button to silence an audible	Note:
7 RESET		alarm and clear a warning from the screen.	This button does not reset the system, nor does it remove the condition that led to the alarm.

Indicator LEDs

The function of the indicator LEDs on the PROsine ACS panel are as follows:

LED	Status Description:	Comments:	
FAULTS			

FAULT	Battery voltage is high, or Battery voltage is low, or Battery current is high, or any other fault.	When flashing , indicates a temporary fault, that if removed will allow the system to automatically recover and continue operation.
		When this LED stays on, it indicates a serious fault that cannot be recovered from automatically. Serious faults require user intervention. You need to disconnect incoming AC or DC power and correct the condition that caused the fault.
9 TEMP	Flashing light indicates: Internal temperatures are above	1. Check that the load is within specified limits.
	maximum allowable ratings.	2. Increase ventilation to lower the
	The PROsine has shut down and	ambient temperature of the room
	will re-start automatically when	where the PROsine is located and
	it has cooled.	increase air flow around the
INVERTER		PROsine.
10 INVERT	ON when the PROsine is	AC output power is available from
	operating in inverter mode.	the PROsine.
	FLASHING when the PROsine	Inverter is waiting for a load to be
CTANDDY .	inverter is in Search mode.	detected and is in powersave mode.
STANDBY	Lights when the PROsine	Acts as a backup power system so
	inverter is enabled, ready to provide AC output when	when AC power fails, or is disconnected, the inverter begins
	required.	delivering AC power to the loads.
POWER	required.	derivering the power to the roads.
12 UTILITY/	ON when PROsine is receiving	If the LED is OFF, your PROsine
SHOREPOWER	AC power that is within	is disconnected from the AC
(INCOMING)	operating range from the electric	source, or the supply from the
	power utility. The inverter will	utility is off, or the AC power is
	be OFF or in STANDBY and	not suitable (e.g. the voltage is too
	the load connected to the	low or too high).
	PROsine AC output is powered directly from the electric utility	
	power.	
LED	Status Description:	Comments:
CHARGER		
13 CHARGE	ON when charger is operating in	
	charger mode	
DEADY	D	
READY	Batteries are charged.	

14		
STANDBY	Charger is enabled, ready to charge the battery when AC utility power is available.	
16 EQUALIZE	ON when Equalize (over - voltage) mode has been enabled.	Flashing CHARGE and EQUALIZE LEDs indicates PROsine charger is equalizing the batteries. Equalize (over voltage) charging is used to break down sulfation of the battery plates and should only be done on flooded cell batteries as recommended by the battery manufacturer. Refer to the PROsine Inverter•Charger Owner's Manual for detailed information regarding battery equalization.

2. ACS Panel Operation / Menu Navigation

The top level screen for the ACS panel displays battery voltage and battery current. This screen should be the usual screen displayed as it provides overall status of your batteries and informs you of current either being drawn from the batteries (a "-" in front of the current reading) or delivered to the batteries (a "+" in front of the current reading). The "-" indicates the PROsine Inverter•Charger is in inverter mode (negative current direction from the battery) while the "+" indicates charger mode operation (positive current direction to the battery).

2.1. Menu Selection

To navigate the menu and select parameters, follow these instructions:

- 1. Press the \triangle or ∇ buttons to scroll up or down through the menu and values.
- 2. Press the **ENTER** button to select the desired item.
- 3. If the parameter is "user settable", you can then press ENTER, then the ▲ or ▼ button to scroll (up or down) through the available choices. Press ENTER again when your choice of the setting is displayed to select it.
- 4. For "installer settable" parameters, refer to Section 2.3.
- 5. Press **ESCAPE** to move up one level in the menu. Press **ENTER** to select a level in the menu and use the ▲ or ▼ buttons to scroll through the options at that level.

The following "tree" illustrates the top level screen and the secondary level menu items:

- PROSINE BAT: 13.4V +90A

SELECT FROM:
AC INFORMATION

SELECT FROM:
BATTERY

SELECT FROM:
INVERTER

SELECT FROM:
CHARGER

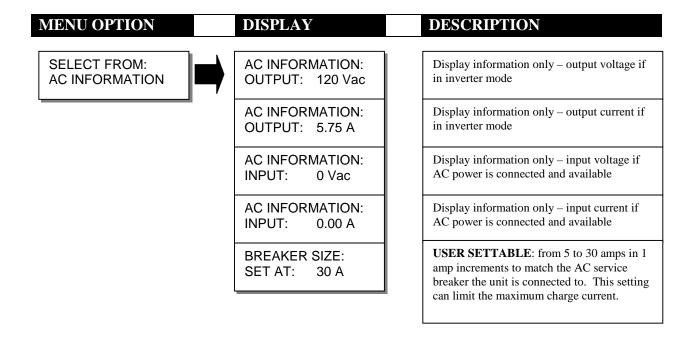
SELECT FROM:
SYSTEM INFO

SELECT FROM:
SYSTEM INFO

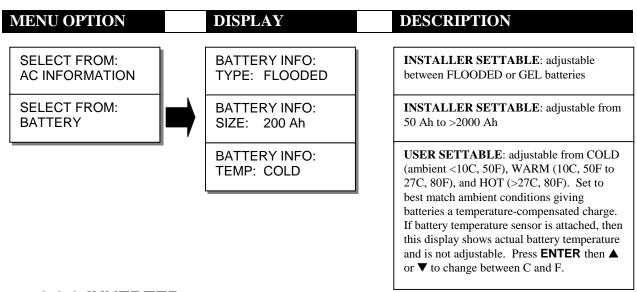
2.2. PROsine ACS Menus

The following section will take you through each menu option of the ACS panel, illustrating LCD display information and providing a description of the displayed parameter. In addition, the parameters will be identified as USER or INSTALLER selectable with the parameter range of values also being identified.

2.2.1.AC INFORMATION



2.2.2.BATTERY INFO



2.2.3.INVERTER

MENU OPTION		DISPLAY	DESCRIPTION
	L		
SELECT FROM: AC INFORMATION		LOAD SENSE TURN-	USER SETTABLE: adjustable between 0 and 1401 watts, 0 = Search mode disabled
SELECT FROM: BATTERY		LOAD SENSE INTERVAL: 2.0 s	USER SETTABLE: from 2 to 26.5 seconds. Longer delay = lower standby power draw
SELECT FROM: INVERTER		DC INPUT RANGE: LO ALARM: 10.5 V	INSTALLER SETTABLE: from 10-12V on 12V products or 20-24V on 24V products
	•	DC INPUT RANGE: HI ALARM: 15,5 V	INSTALLER SETTABLE: from 14-16V on 12V products or 28-32V on 24V products
		DC INPUT RANGE: LO CUTOFF: 10.0 V	INSTALLER SETTABLE: from 10-12V on 12V products or 20-24V on 24V products
		DC INPUT RANGE: HI CUTOFF: 16.0 V	INSTALLER SETTABLE: from 14-16V on 12V products or 28-32V on 24V products

Note: The DC input ranges are factory configured for the maximum range allowed for proper operation of the PROsine 2.5/3.0 Inverter•Charger. The installer may wish to narrow this range of operation for optimization of the system. For example, the LO ALARM setpoint could be raised to 11.5V if you want an early warning that the battery is being discharged. Or, raising the LO CUTOFF to 11.0V would ensure that the battery is never fully discharged.

2.2.4.CHARGER

MENU OPTION	DISPLAY	DESCRIPTION
SELECT FROM: AC INFORMATION	CHARGER STA	
SELECT FROM: BATTERY	CHECK STATE EQUALIZE REQU	
SELECT FROM: INVERTER		equalization charging. Final YES or NO toggle is required to begin equalizing.
SELECT FROM: CHARGER	OVERRIDE CHAR OPERATING M	SETTABLE: force charger to FLOAT charge or EQUALIZE charge. If
NOTE C. DDO: I		EQUALIZE selected, then final YES or NO toggle is required to begin equalizing.

NOTE: See PROsine Inverter•Charger Owner's Manual for complete information on Battery Equalization.

2.2.5.SYSTEM INFO

MENU OPTION	DISPLAY	DESCRIPTION
SELECT FROM: AC INFORMATION	SYSTEM INFO: DEFAULT INV/CHG	USER SETTABLE: between 4 initial power- up combinations of inverter and charger ONOFF
SELECT FROM: BATTERY	SYSTEM INFO: ALARM AUDIBLE	USER SETTABLE: between audible alarm ENABLED and DISABLED
SELECT FROM: INVERTER	SYSTEM INFO: LAST FAULT # 0	Display information only: 0 = no faults have occurred, see error code section of manual
SELECT FROM: CHARGER	CHASSIS TEMP. T1: 20C	T1-T4 indicate temperature readings for various points in the unit, to be used mainly for system troubleshooting. Readings may
SELECT FROM: SYSTEM INFO	CHASSIS TEMP. T2: 20C	be as high as 60C to 100C (140F to 212F) under heavy load or low battery voltage conditions. Temperature readings can
	CHASSIS TEMP. T3: 20C	provide insight into how "hard" the inverter is working, with high readings indicating the inverter is functioning at a high level due to high load or high ambient temperature
	CHASSIS TEMP. T4: 20C	operating conditions. Press ENTER then ▲ or ▼ to change between C and F.
	SYSTEM INFO: DC BUS: 220Vdc	Display information only used for system troubleshooting

2.2.6.STATPOWER INFO

MENU OPTION	DISPLAY	DESCRIPTION
SELECT FROM: AC INFORMATION	STATPOWER INFO: TEL: 604-420-1585	Main Switchboard number at Statpower Technologies Corporation
SELECT FROM: BATTERY	STATPOWER INFO: FAX: 604-420-1591	Main fax number at Statpower
SELECT FROM: INVERTER	VERSION No. OF THIS DISPLAY: 1	Software version used within ACS (Advanced Control System) Display
SELECT FROM: CHARGER	VERSION No. OF MASTER IC: 4	Software version of Master Processor
SELECT FROM: SYSTEM INFO	VERSION No. OF ISOLATED IC: 4	Software version of Isolated Processor
SELECT FROM: STATPOWER INFO		

2.3. Configuring "Installer-settable" Parameters



WARNING

The following information is for qualified installation/service personnel only. Incorrect configuration can lead to battery damage and risk of fire hazard.

To navigate the menu and select parameters, follow these instructions:

- 1. Press the ▲ or ▼ buttons to scroll up or down through the menu and values.
- 2. Press the **ENTER** button to select the desired item.
- 3. If the parameter is "installer settable", it is meant to be configured by a professional installer who is familiar with not only the system settings on the inverter but also the ramification of changing those system settings. Setting these parameters incorrectly could cause damage to connected equipment (e.g. batteries) or could severely affect the performance of your system. You will not be able to change parameters that are installer settable unless you enter the ACS Panel into "installer" mode. To enter installer mode, hold down ESCAPE and ▼ for approximately 5 seconds, until the audible signal is heard from the ACS Panel. The parameter can now be adjusted. Exiting to the top level menu, where voltage and current are displayed will disable installer mode. Disable installer mode before putting the unit into service.

3. Installation

The ACS Panel should be installed in a location that is most convenient for you so the important display and control information is easily accessible.

To connect the Control Panel

- 1. Decide on the location of choice for the ACS Panel. For flush mount installation onto a wall, the remote panel requires an opening with the measurements of 4 1/8 inches by 4 1/8 inches (10.5cm by 10.5cm). Ensure there is no wiring or other obstruction within the wall before making this opening as the ACS Panel requires approximately 2 inches (5cm) of free space within the wall to accommodate its depth.
- 2. Connect the supplied cable to the ACS panel and route the cable back through the wall opening and back to the PROsine unit. Keep the EMI bead (large yellow bulb on cable) close to the PROsine unit and don't plug the cable in with the EMI bead closer to the ACS Panel (it is far more effective close to the base chassis). Connect the cable to the REMOTE output connector jack found on the side of the PROsine itself (the panel can be connected to either output).
- 3. If you purchased the ACS Panel as an accessory to be used with your PROsine 2.5, the ACS Panel and standard supplied panel can both be used at the same time. Either connect the standard panel to the OUTPUT jack on the back of the ACS Panel, or connect the standard panel to the REMOTE output connector jack on the side of the PROsine Inverter•Charger. The standard panel can then be mounted close by the PROsine unit for system monitoring in that location and the ACS Panel can be mounted remotely in some other area where you want the more detailed operating information and control capability.

4. Troubleshooting

Should a fault occur, the fault LED will illuminate and an error code will be displayed in the LCD. These error codes will over-ride any other menu items being displayed. The following table lists the error codes, likely causes and suggested solutions.

Error Code	Description of Fault	Cause	Solution
000, 255	No Fault	There has been no fault since the PROsine has been turned ON.	
001	Battery Temperature is too high or too low	Room temperature around the batteries is too high or too low. Faulty battery causes self	Keep the temperature around batteries moderate. In cold weather, try a Battery Heating Blanket. Replace the faulty battery.
		heating. 3. Faulty connection of	3. Check connections /
002	Battery Voltage is too low	battery temperature probe. 1. Discharged battery. 2. Old or faulty battery.	replace probe. 1. Charge battery. 2. Check if battery can hold the charge by measuring the Voltage at the battery terminals when the battery is discharging.
		3. Battery cables to the PROsine Inverter•Charger are too small, too long, or there is a loose connection.	3. Check cables.
003	Battery Voltage is too high	 External charger or alternator has output voltage greater than 16 V. The PROsine Inverter•Charger is connected to a 24V battery (two batteries in series). 	 Correct external charging source. Re-wire batteries to give the correct input voltage (12 Volts).
006,065	Micro Processor communication error	Remote display cable is pinched or has loose connection.	Unplug all cables from REMOTE OUT Jacks on side of PROsine. If problem persists, call Statpower.

Error Code	Description of Fault	Cause	Solution
008-015	Ambient temperatures or internal component temperatures are too high or too low.	Power supplied to AC load is too high. Blocked ventilation. Room temperature too high or too low.	Reduce AC load to specified limits. Reduce AC load below rated maximum if room temperature is above 25 °C / 77 °F. See temperature de-rating curve in Owner's Manual. Allow more room for air circulation around unit. Allow more ventilation in compartment.
064	AC Output Overcurrent	Temporary AC output overload. The higher the output current, the faster the unit will shut down (Minimum 2 seconds).	Reduce AC load so that even for short times, the AC output current does not exceed 26 A. See Overcurrent Protection curve in PROsine Owner's Manual.
066	Communication Fault	Faulty cable between PROsine and remote panel. Internal Fault	Replace cable. Record the error code and contact Statpower.
129-136 192-196	Internal fault	Various	Record the error code and contact Statpower.
197	Unexpected AC output voltage	AC Input Line & Neutral is reversed.	Check AC Input wiring. There should be less than 5V RMS between AC Input Neutral and Earth Ground.
198-201	Internal fault	Various	Record the error code and contact Statpower.
202	Relay Contact Fault (Line side)	One of the relay contacts is stuck in the closed position. Note, this error may also be caused by error #203.	Contact Statpower. Caution: The inverter is designed to shut off while there is a relay fault. Do not allow the inverter to operate under this condition as there may be dangerous voltage fed back to the AC Input wiring even if no utility power is present.
203	Relay Contact Fault (Neutral / Ground side)	One of the relay contacts may be stuck in the closed position. This error may be caused by error #202.	See error code #202.
204	AC Input Neutral Warning	AC Input Neutral voltage is greater than 10 V with respect to Earth Ground.	Check the AC Input wiring. 1. Neutral and Line connection is reversed. 2. Long and/or loose connections to the utility/shore power can result in a high neutral voltage.

Error Code	Description of Fault	Cause	Solution
205	Internal fault	Various	Record the error code and contact Statpower.
206	AC Output voltage too high	Some loads, like motors, can feed power back into the output of the PROsine. This may result in a temporary over-voltage which may trigger a fault condition. There is an internal	Contact Statpower if you find incompatibility with certain type of loads. Record the error code and
		hardware or software fault	contact Statpower.
207	Internal DC Bus voltage low.	Temporary condition caused by low battery voltage in conjunction with an overload condition.	1. Check if battery is OK (see error code 002). Disconnect AC and DC power to the PROsine. Reconnect DC and AC power after 15 minutes. If the problem persists, contact Statpower Customer Service.
		2. Internal Fault.	2. Contact Statpower.

5. Warranty

Statpower manufactures its products from parts and components that are new or equivalent to new in accordance with industry-standard practices. Statpower warrants the PROsine ACS Panel to be free from defects in workmanship or materials for 24 months from the date of purchase. Proof of purchase is required for warranty service. During the warranty period, Statpower will, at its option, repair or replace the defective product free of charge. This warranty will be considered void if the unit has suffered any physical damage or alteration, either internally or externally, and does not cover damage arising from improper use or from use in an unsuitable environment. This warranty will be considered void where the product has been misused, neglected, improperly installed, or repaired or modified by anyone other than Statpower without prior authorization by Statpower.

Repair or replacement are your sole remedies and Statpower shall not be liable for damages, whether direct, incidental, special, or consequential, even though caused by negligence or fault.

Statpower owns all parts removed from repaired products. Statpower uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If Statpower repairs or replaces a product, its warranty term is 90 days or the balance of the original warranty, whichever is longer.

This is Statpower's only warranty, and the Company makes no warranties, express or implied, including warranties of merchantability and fitness for a particular purpose.

6. Warranty Service

If your PROsine ACS Panel requires service, please return it to the place of purchase. If you are unable to contact your merchant, or the merchant is unable to provide service, contact Statpower directly:

PHONE: (604) 420-1585. Ask for the Customer Service Department.

FAX: (604) 420-1591

EMAIL: support@statpower.com

MAIL: Statpower Technologies Corporation

7725 Lougheed Highway Burnaby, BC V5A 4V8

CANADA

You must obtain a Return Authorization Number from Statpower before returning the PROsine ACS Panel directly to Statpower. **Do not return the PROsine ACS Panel to Statpower without first obtaining a Return Authorization Number. Returned goods received without an RA# will be shipped back collect.** When you contact Statpower to obtain service, be prepared to supply the serial number of your PROsine ACS Panel.

If you are returning the unit from the USA, follow this procedure:

- 1. Obtain a Return Authorization Number from Statpower. You will be required to provide name, telephone number, return shipping address, and a Federal ID or Social Security number required by US Customs.
- 2. Package the unit safely, preferably using the original box and packing materials. Include the Return Authorization Number, a return ship-to address, a contact telephone number, and a brief description of the problem. You are required to provide a copy of a proof of purchase date showing product description to qualify for warranty service.

Ship the unit to the following address, freight prepaid:

Statpower Technologies Corporation c/o International Parcel Service Warehouse #8 - 14th Street Blaine, WA 98230

If you are returning the unit from Canada, follow the procedure above but ship the unit, freight prepaid, to the following address:

Statpower Technologies Corporation 7725 Lougheed Highway Burnaby, BC V5A 4V8 CANADA

If you are returning the unit from outside North America please contact the place of purchase or the local Statpower dealer in your country.

PROsine ACS Owner's Manual Rev. 1.0 08/12/98 Part #445-0055 Artwork #445-3012