The Power of Reliability

Pro Series DC Power Supply
Instruction Manual
855-343-001

HELIOS POWER SOLUTIONS

heliosps.com

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SAFETY GUIDELINES

Principles of Safe Operation and Maintenance

Safety must always be the top priority of all personnel involved in the installation, operation, and maintenance of this unit as it operates at high voltages that could be potentially lethal. Technicians must adhere to the appropriate standards and manufacturer's recommendations to minimize hazards.

Do not attempt to perform the tasks described in this manual if you are not a qualified professional.

It is essential that all safety devices and emergency response systems be fully operational and within their certification periods before starting any service.

Visual Communication

This manual uses extensive visual aids and tries to adhere to ANSI and ISO safety symbol standards. These symbols describe the following situations:

WARNING indicates a hazardous situation that, if not avoided, may result in death or severe injury or damage to equipment and property.

CAUTION indicates a hazardous situation that, if not avoided, may result in minor or moderate injury or damage to equipment and property.

NOTICE indicates practices not related to physical injury but may result in equipment damage, environmental hazards, loss of data, and other undesirable consequences.

General Alerts

Risk of serious personal injury or damage to equipment and property. Always observe the following:

- Install and operate unit in a restricted access location. A restricted access location is an area to which access can be gained only by service personnel using a special tool, lock and key, or other means of security and which is controlled by the authority responsible for the location.
- Install the unit in locations where children are likely not to be present.
- Install chassis ground to the unit before connecting AC input.
- Installation, operation, and service must be done by qualified technicians, with all wiring and connections done in accordance with the local electrical codes.
- Input voltages can range up to 240 volts AC. All upstream AC, load and battery breakers must be shut OFF prior to installation. The system must be completely de-energized.
- All AC connections must conform to local codes and regulations.
- Use caution when handling unit under load as surfaces may be hot.

Always observe the following for applications requiring a backup battery:

- Use a battery with rating and capacity appropriate for the model of power supply in use.
- Use an appropriate DC overcurrent protection device in-line with the backup battery connection.
- Use wire and connectors rated for the maximum load current.
- Ensure battery polarity is correct before connecting.
- Do not attempt to charge a frozen battery.
- Handle batteries with care. Never short-circuit battery terminals.
- Always install batteries in well-ventilated areas.
- Always consult with and observe all battery manufacturer recommendations.

Risk of personal injury or damage to equipment and property. Always observe the following:

- Install in a protected environment and keep sources of moisture away from unit.
- Ensure the total power consumption of the load does not exceed the continuous rated capacity of the power supply output.
- Provide adequate support for the rear of the unit without obstructing the air inlet or outlet openings.
- Remove all metallic jewelry before working with the unit.
- Wear appropriate eye protection and always use appropriate tools during installation.
- DC-AC inverters should not be connected to any of the load connection points without a battery connected to the system. DC-AC inverters create significant inrush current and may damage the circuitry or interfere with the operation of power supplies when there is no battery connected. Connecting a DC-AC inverter in this way may void the product warranty.

Risk of damage to equipment, environmental hazards, loss of data and other undesirable consequences. Always observe the following:

- The unit must be properly handled, mounted, and installed.
- Do not block air inlet or outlet openings.
- Due to environmental factors which are common at outdoor communications sites, power surges from lightning strikes, electrostatic discharge, and utility power feeds can occur. These surges can damage connected equipment.
- Third-party surge suppression devices must be utilized to protect AC input power feeds, every exposed DC power conductor, and exposed data cables. These protection devices must be installed at both ends of the exposed conductor, in close proximity to installed equipment. Periodically inspect these surge protection devices for proper function.
- Consult with manufacturers of surge suppression devices to select appropriately rated protection device(s) and proper installation methods.
- ICT's product warranty does not cover damage caused by power surges and electrostatic discharge events including lightning.

Product Alerts

Risk of serious personal injury or damage to equipment and property. Always observe the following:

- Operate the supply from a grounded 3-wire 120-volt AC or 230/240-volt AC source (50 or 60 Hz) with a branch circuit breaker rated 20 amps or less.
- Do not connect a battery to the "+ BAT" terminal when more than one Pro Series power supply is connected in parallel.
- Battery current through the "+ BAT" terminal and internal LVD relay must not exceed the maximum current limit rating of the Pro Series power supply. Use a suitably rated overcurrent protection device and disconnect in line with the "+ BAT" terminal and external battery positive.
- Use of lithium-ion battery is not recommended.
- Do not place the power supply directly above or below a battery, due to possible presence of corrosive and/or flammable gasses.

Do not connect power supplies of different output voltage ratings in parallel as this may damage the units or the connected loads.

GENERAL INFORMATION

Document Number: 855-343-001

Models:

ICT1190-12S	ICT1190-24S	ICT1190-48S
ICT1190-12SB	ICT1190-24SB	ICT1190-48SB
ICT690-12S	ICT690-24S	ICT690-48S
ICT690-12SB	ICT690-24SB	ICT690-48SB

This manual also applies to models containing "A" (e.g. ICT1190A-12SB).

Date and Revision: June 2025, Revision 2.00

Disclaimer

ICT shall not be held liable for any damage or injury involving this product if it has been subjected to misuse and exposure to environmental conditions not conforming to the product's limits of operation, improper installation, or maintenance.

The illustrations in this manual are for illustrative purposes only. Review the drawings before proceeding. If there are questions and concerns regarding the product, refer to the FAQs section or contact ICT.

Contact Information

- North America toll-free: +1 877.930.0717 ext. 810
- International: +1 604.856.6303 ext. 810
- E-mail: techsupport@ictcorporate.com

ICT LIMITED WARRANTY

The warranty period on ICT products is two (2) years from date of purchase from an authorized ICT reseller or OEM with valid proof of purchase, or from date of shipment from the ICT manufacturing facility. The warranty period for a repaired product or part is ninety (90) days or the remainder of the unexpired term of the new product warranty period, whichever is greater. Repair or replacement of a defective product or part does not extend the original warranty coverage period.

The ICT Limited Warranty is only intended for the benefit of the original purchaser and user of this product. This Warranty is not transferable or assignable without the prior written permission of ICT. ICT's sole obligation and liability under this warranty is limited to either repairing or replacing defective products at the sole discretion of ICT. When repairing or replacing the products, ICT may use products or parts that are new, equivalent to new or re-conditioned. Parts repaired or replaced during the warranty period will be under warranty for the remainder of the warranty period.

No claim will be accepted unless written notice of the claim is received by ICT in accordance with ICT's Return Material Authorization (RMA) procedure, as soon as reasonably possible after the defect is discovered. A valid product serial number must be provided with the RMA claim to prove eligibility. The RMA procedure is available on the ICT website at www.ict-power.com/support/warranty-repair/.

The Purchaser shall at their own risk and cost return the defective product to ICT's factory or designated repair center once an RMA is issued by ICT. Return of the products to the customer after repair is completed shall be prepaid by ICT unless otherwise mutually agreed between the parties. Products shipped to ICT which have incurred freight damage will not be covered by this Warranty and any repairs or replacement parts, components or products needed will be invoiced in the full current price amount and returned freight collect to the Purchaser. It is the Purchaser's responsibility to check the product upon receipt for any damage during shipping and to contact the carrier or shipper regarding such damage. Product that is returned as defective, which is determined to operate within published specifications will be returned to the Purchaser freight collect.

ICT assigns to the Purchaser any warranties which are made by manufacturers and suppliers of components of, or accessories for, the ICT product and which are assignable. ICT makes no representations as to the effectiveness or extent of such warranties, assumes no responsibility for any matters which may be warranted by such manufacturers or suppliers and extends no additional coverage under this Warranty to such components or accessories.

In no event shall ICT be liable for any special, indirect, or consequential damages such as, but not limited to, loss of use, business or goodwill, loss of revenue, or loss of profits, which may result, either directly or indirectly, from defects in products provided by ICT.

This Warranty will be void if the product has been subjected to misuse, neglect, accident, exposure to environmental conditions not conforming to the products' limits of operation, improper installation or maintenance, improper use of an electrical source, defects caused by sharp items or by impact pressure, a force majeure event, has been modified or repaired by anyone other than ICT or its authorized representative, has been subjected to unreasonable physical, thermal or electrical stress, improper maintenance, or causes external to the unit including but not limited to general environmental conditions such as rust, corrosive atmospheres, sustained temperatures outside the specified operating range of the equipment, exposure to power surges and/or electrical surges, improper grounding, mold or dust, animal or insect damage, water damage or immersion in liquid of any kind, or if the serial number has been altered, defaced, or removed.

ICT does not control the installation and use of any ICT product. Accordingly, it is understood this does not constitute a warranty of performance or a warranty of fitness for a particular purpose. This Warranty represents the entire agreement between ICT and Purchaser with respect to the subject matter herein and supersedes all prior verbal or written communications, representations, understandings, or agreements relating to this subject.

Return Material Authorization Procedure

1. Request RMA number from ICT through telephone, e-mail, or website from Monday to Friday between 8:00am and 4:30pm Pacific Time.

    - North America toll-free: +1 877.930.0717 ext. 810
    - International: +1 604.856.6303 ext. 810
    - E-mail: techsupport@ictcorporate.com
    - ICT website: https://ict-power.com/support/warranty-repair

2. Provide the following information when requesting an RMA:

    - ICT model number
    - Serial number
    - Return ship-to address
    - The preferred shipping courier and account number, if applicable
    - An estimate of what the possible failure cause might be

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1.0 INTRODUCTION

The ICT Pro Series is a high-performance, cost effective, and high efficiency DC power supply in a 1RU rack mount design with power factor corrected AC input and FCC Class B compliance for low electromagnetic interference, ideal for industrial and wireless communications applications. The Pro Series provides 690 or 1,200 watts with an isolated 12-, 24- or 48-volt DC output for use in either positive or negative voltage applications; and can function either as a standalone DC power supply or as a complete DC power system with an optional battery backup feature. SB models provide a battery backup and Low Voltage Disconnect (LVD) option with selectable battery charge parameters. Pro Series can be paralleled to provide up to 3,600 watts of combined output power.

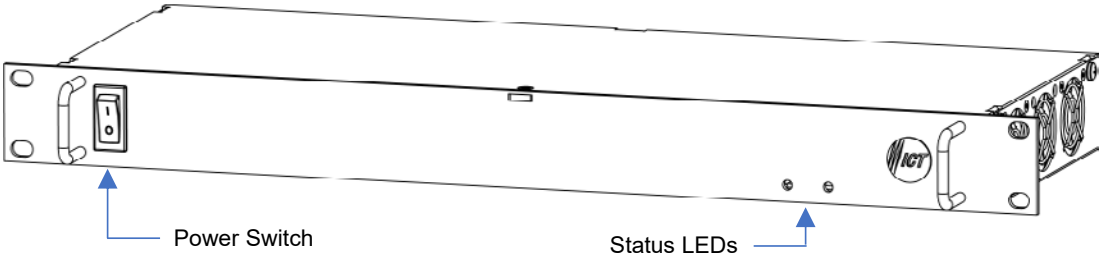

Figure 1. Front View

Table 1. Power Supply Ratings

Model[1]	Output Voltage Range (V)[2]	Default Output Voltage (V)	Maximum Output Current (A)	Continuous Current (A)
ICT1190-12S ICT1190-12SB	12–15	13.8	100	87
ICT1190-24S ICT1190-24SB	24–30	27.6	50	44
ICT1190-48S ICT1190-48SB	48–60	55.2	25	22
ICT690-12S ICT690-12SB	12–15	13.8	50	50
ICT690-24S ICT690-24SB	24–30	27.6	25	25
ICT690-48S ICT690-48SB	48–60	55.2	12.5	12.5

[1] The models with factory installed battery backup feature with LVD option are designated by the letter "B".
[2] Factory adjustable, specify at time of ordering.

1.1 Features

- 690 or 1,200 watts of output power
- Power Factor Corrected wide range AC input
- 12-, 24- or 48-volt nominal DC output (floating ground)
- Isolated design allows operation with positive or negative ground
- Factory adjustable output voltage
- 90 to 93% efficiency
- −30°C to +60°C operating temperature range
- Form-C alarm contacts
- Remote on/off control input for external control of the output
- Optional factory installed battery backup and LVD with selectable battery charge current
- Parallel operation allows up to three Pro Series to be connected in parallel for up to 3,600 watts of nominal power output

2.0 INSTALLATION

The following is the recommended sequence for the installation process.

2.1 Unpacking and Inspection

Perform a physical check of the unit as it is being taken out of the box to ensure it has not been damaged during shipping. Check that the system configuration matches the version ordered, and that the accessories under the package contents section were shipped with the unit.

NOTE: In case of shipping damage, your freight carrier should be notified immediately.

2.2 Package Contents

- Quick Start Guide
- Power supply
- One nut on the ground stud (installed)
- One power cord
- Bag containing the following:
  - DC output bus bar cover
  - Instruction Manual (USB drive)
  - One 5-pin Form-C alarm/remote connector plug
  - Two 1/4-inch bolt/washer/nut sets for the DC output bus bar connection
  - One 1/4-inch bolt/washer/nut set for the BAT bus bar connection (if SB model)
  - Two 6-32 x 1/4-inch screws for installing the bus bar cover

2.2.1 Tools and Parts Needed

- Two 7/16-inch wrenches for the output connection
- Wire stripper and crimper
- Four screws to install the unit into the equipment rack
- #1 Phillips screwdriver for the connections of the rack ears and output bus bar cover
- 3/32-inch flathead screwdriver for the connections of the Form-C alarm/remote wires

2.3 Quick Install Guide

- Unpack and check that the unit and all materials have been delivered.
- Obtain the recommended tools.
- Mount the unit into a 19-inch rack.
- Connect the chassis ground according to the site design and in accordance with local electrical code standards.
- Connect the alarms and remote-control lines, if needed.
- Connect the battery, if applicable.
- Connect the load devices using third-party surge protection.
- Connect and energize the AC power source, using third-party surge protection.
- Verify the system wiring.
- Energize the loads and battery connections.

2.4 System Configuration

The Pro Series has a floating output which can supply either positive or negative voltage, and can function either as a standalone DC power supply or as a complete DC power system when using the optional Battery Backup feature. Up to three power supplies of the same voltage rating can be connected in parallel.

NOTE: Accessories must be ordered separately.

Table 2. Available Accessories

Description	Model No.
Secondary power supply output bus bar jumper strap (for paralleling two or more power supplies)	ICT-PAR

2.5 Rack Mounting

Provide adequate support for the rear of the unit without obstructing the air vents.

Mount the unit in an enclosed, standard 19-inch equipment rack or other restricted access location, using rack mounting screws (not supplied). Support the rear of the unit with rack shelf supports or back rail if required.

2.6 Ground Connection

WARNING

De-energize the unit/system before making any change to the wiring and connections.

NOTICE

All DC outputs of ICT's DC power systems are isolated from chassis ground (floating). DC output returns can remain isolated from ground (DC-I) or can be grounded (DC-C), as per site grounding requirements and/or local or national electrical codes. Ensure that all relevant electrical code standards are followed.

Connect a ground bonding wire from the chassis ground stud to a nearby common grounding point. Use a ground bonding wire that is sized in accordance with NEC Table 250.122 (see Table 3). Ensure that the selected ground bonding wire is rated to handle the maximum current rating of the unit.

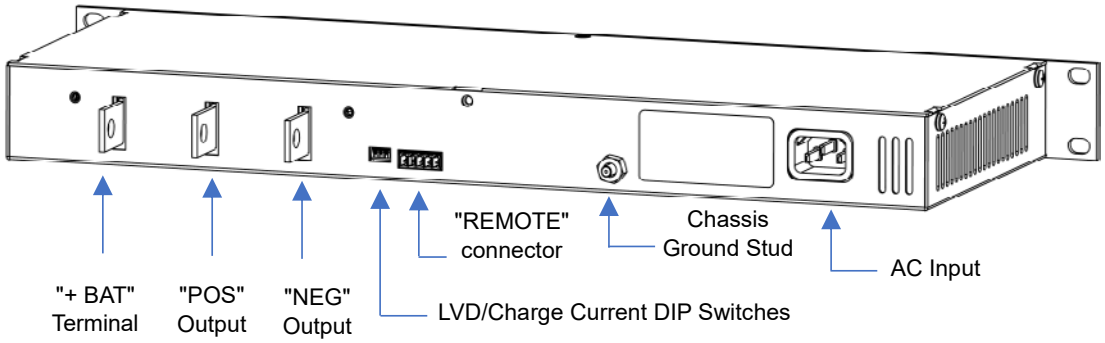

Figure 2. Rear View (SB Model)

Table 3. Minimum Size Equipment Grounding Conductors for Grounding Raceway and Equipment

Maximum Circuit Breaker Size (Amps)	Conductor Size (AWG or kcmil)	
	Copper	Aluminum or Copper-Clad Aluminum
15	14	12
20	12	10
30	10	8
40	10	8
60	10	8
100	8	6

This is sourced from "National Electrical Code 2005 Edition", p. 70-112.

2.7 Surge Protection Device(s) Installation

Third-party surge suppression devices must be utilized to protect AC input power feeds and every exposed DC power conductor. These protection devices must be installed at both ends of the exposed conductor, in close proximity to installed equipment. Periodically inspect these surge protection devices for proper function.

NOTE: Consult with manufacturers of surge suppression devices to select appropriately rated protection device(s) and proper installation methods.

2.8 Alarm and Remote Control Connections

The REMOTE connector allows the Pro Series to report faults to an external monitoring device through a form-C contact; and to remotely disable the unit.

1. Install the 5-pin cage clamp style REMOTE connector.

2. Connect external Remote on/off control wiring to pins 1 and 2 on the REMOTE connector as shown in Table 4 using 14–30 AWG wire, if external on/off control of the power supply output is required (see Section 6.3).

3. If needed, connect form-C contact monitoring wiring to the Alarm Output contacts on the REMOTE connector as shown in Table 3. Use 22–26 AWG wire. Refer to Table 7 for which conditions will trigger a form-C alarm.

Table 4. REMOTE Connector

Pin Number	Name	Function
1	REMOTE SD +	Remote shutdown, positive (2–12 VDC)
2	REMOTE SD −	Remote shutdown, return
3	ALARM NC	Alarm NC (alarm state)
4	ALARM NO	Alarm NO (alarm state)
5	ALARM COMMON	Alarm output common

2.9 Battery Connections (if applicable)

Risk of serious personal injury or damage to equipment and property. Observe the following:

- Use a battery with rating and capacity appropriate for the model of power supply in use.
- Use an appropriate DC overcurrent protection device in line with the backup battery connection.
- Use wire and connectors rated for the maximum load current.
- Ensure battery polarity is correct before connecting.
- Do not attempt to charge a frozen battery.
- Always install batteries in well-ventilated areas.
- Handle batteries with care. Never short-circuit the battery terminals.
- Always consult with and observe all battery manufacturer recommendations.

- When connecting a battery ensure the nominal battery voltage is correct, and that the battery positive is connected to a positive terminal and the battery negative is connected to a negative terminal.
- Note that the "+ BAT" terminal (on SB model) is internally tied to the "POS" DC output through the LVD contactor.
- Do not connect either of the unit's main outputs to the BAT terminal, as this may short-circuit the battery or bypass the internal LVD circuitry in the SB models.
- Use wire and connectors appropriately rated for the highest possible unit current when making connections to the battery, "+ BAT", and main DC output.
- Do not connect a battery to the "+ BAT" terminal when more than one Pro Series power supply is connected in parallel.
- Use wire and connectors appropriately rated for the highest possible unit current when making connections to the battery.

- Use of lithium-ion battery is not recommended.
- Leave the battery breaker open until loads have been connected.

An external lead-acid battery with the same nominal voltage as the power supply may be connected directly to the output terminals, or to the "+ BAT" terminal (on SB models) to provide a DC backup capability.

On SB models, the internal LVD contactor will disconnect the battery should it discharge below the voltage level which is set through the SW switches on the rear panel (see Section 6.1.1).

1. Choose a lead-acid battery with a nominal DC voltage rating (12, 24, or 48 volts) that matches the power supply's output voltage and has an amp-hour (Ahr) capacity rating of at least three times the maximum charge current setting of the power supply. Adjust the system LVD Setting and Charge Current Limit (see Section 6.1.2) to match the battery requirements, if required.

NOTE: Use wire and connectors appropriately rated for the maximum unit current when making connections to the battery.

2. Connect the backup battery positive lead to the "+ BAT" terminal, and the backup battery negative lead to the "NEG" terminal. Install an appropriate in-line DC overcurrent protection device, such as a fuse or circuit breaker, on the battery positive lead. Leave the fuse or breaker open until unit configuration is complete.

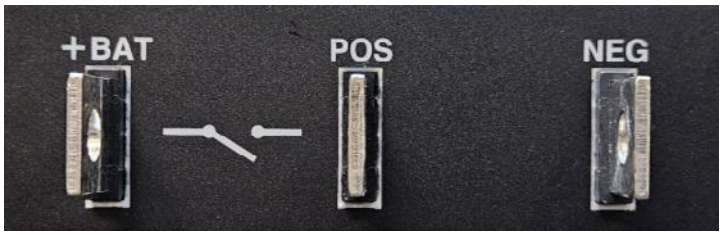

Figure 3. The "+ BAT" Terminal

NOTE: See Section 2.14 for the battery connection on parallel units.

2.10 Load Connections

CAUTION

- DC-AC inverters should not be connected to any of the load connection points without a battery connected to the system. DC-AC inverters create significant inrush current and may damage the circuitry or interfere with the operation of power supplies when there is no battery connected. Connecting a DC-AC inverter in this way may void the product warranty.
- Do not mix polarity of the load devices.
- Install appropriately rated surge suppression systems on both AC and DC connections.

1. Ensure that the front-panel power switch is in OFF position.

2. Make connections to the load using wire and connectors appropriately rated for the maximum load current. Connect the load positive lead to the "POS" terminal, and the load negative lead to the "NEG" terminal (see Figure 4).

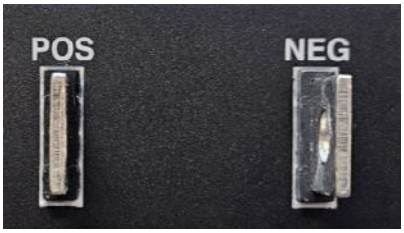

Figure 4. DC Output Bus Bars

2.11 AC Power Source Connections

WARNING

AC input wiring to the Pro Series unit must be protected using an outlet with a branch rated circuit breaker of 20 amps or lower value.

CAUTION

Install appropriately rated surge suppression systems on both AC and DC connections.

The ICT Pro Series provides DC power from single-phase AC power between 100- and 265-volts AC.

1. Ensure that the front-panel power switch is in OFF position.
2. Plug the AC connector into the AC input on the unit rear panel.
3. Connect the source end of the cord to a standard wall socket or de-energized AC source equipped with a branch rated circuit breaker of 20 amps or less.
4. Energize the AC feed.

2.12 System Wiring Final Verification

1. Check that all connections to the power supply are correct and properly tightened.
2. Install the protective bus bar cover using the screws provided.

2.13 Energize Loads and Battery Connections

1. Turn ON the front-panel power switch to energize the loads.
2. Close the backup battery breaker (if an external battery is used) to connect the backup battery string to the system.

2.14 Parallel Power Supply Installation (if applicable)

WARNING

- Do not use the "+ BAT" terminal for parallel applications.
- Batteries used with a Pro Series parallel system must be connected to the "POS" / "NEG" terminals and use an external LVD.

CAUTION

Risk of personal injury or damage to equipment and property. Always observe the following:

- Do not connect the power supplies of different output voltage ratings in parallel as this may damage the units or the connected loads.
- Do not connect power supplies in series; they are meant for parallel operation only.

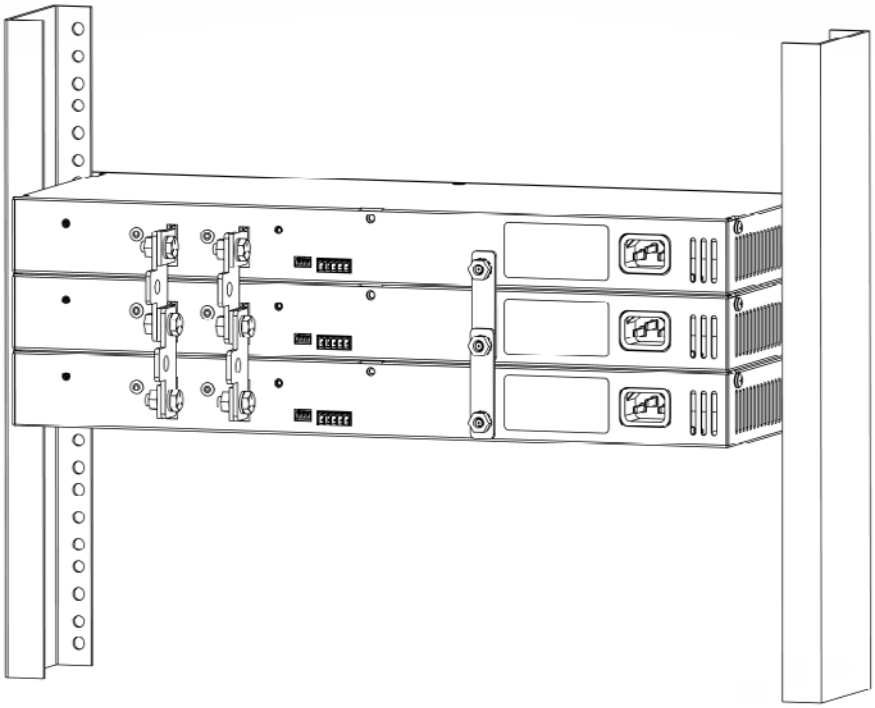

Figure 5. Pro Series Connected in Parallel

Up to three Pro Series power supplies with the same output voltage rating can be connected in parallel by installing additional AC line input connections and using parallel bus bars (ICT-PAR) to link the output terminals. A battery and an external Low Voltage Disconnect (LVD) may also be connected directly to the parallel output terminals of the power supplies.

The power supplies must be installed as a set into adjacent rack locations to ensure the output parallel bus bars (ICT-PAR) will correctly fit.

1. Connect the positive terminals (labelled "POS") of each unit together at a common positive load point using the Parallel Bus Bars (ICT-PAR) as shown in Figure 5. See Section 2.10.

2. Connect the negative terminals (labelled "NEG") of each unit together at a common negative load point using the Bus Bar Strap (ICT-PAR), then install the plastic bus bar covers using the supplied hardware. See Section 2.10.

3. Connect the backup battery positive lead to the "POS" parallel output terminals, and the backup battery negative lead to the "NEG" parallel output terminals. Install an appropriate in-line DC overcurrent protection device, such as a fuse or circuit breaker on the battery positive lead. Leave battery breaker open. Use an external LVD. See Section 2.9.

4. Connect external Remote on/off control wiring and alarm monitoring wiring to the REMOTE connector on each power supply if desired, to control the supply output and remotely monitor alarm conditions of each power supply. See Section 2.8.

5. Connect a separate AC power cord to each power supply, using independent AC circuits rated for the full power operation of each power supply. See Section 2.11.

6. Connect a load to the parallel power supply output terminals to utilize the combined power of all Pro Series connected in parallel. Connect the load to the external LVD if using a backup battery. See Section 2.10.

3.0 OPERATION: FRONT DISPLAY PANEL (not applicable)

4.0 OPERATION: GRAPHICAL USER INTERFACE (not applicable)

5.0 OPERATION: PARALLEL (if applicable)

Do not use the Battery Backup/LVD option "+ BAT" terminal on units connected in parallel, as there is a risk that the potential current could be higher than the rating of the internal low voltage disconnect relay. Otherwise, damage to the unit, load, and/or personal injury may occur if the battery output current through the "+ BAT" terminal exceeds the rating for an individual power supply.

Do not connect power supplies of different output voltage ratings in parallel as this may damage the units or the connected loads.

When operating in parallel mode, up to three Pro Series power supplies with the same output voltage rating can be connected to increase total power capacity, providing up to 3,600 watts of DC power. The unit with the highest output voltage will initially supply most of the load current. As the load increases, the output current will tend to balance across the connected units, ensuring even load distribution among the parallel power supplies.

A connected battery with an external Low Voltage Disconnect (LVD) provides a DC backup capability. The battery charges and discharges through the same "POS" and "NEG" parallel output terminals used for power supply operation.

6.0 OPERATION: STANDARD POWER SHELF

Energize the external AC source and turn the front-panel power switch to ON position to power up the unit.

Check that the green "POWER" LED is lit, indicating normal operation. A lit red "FAULT" LED indicates an alarm on the unit (see Section 6.2).

The Pro Series will start up and operate at the factory default settings when AC power is connected, generally requiring no other set up or adjustment for basic operation.

6.1 Battery Settings

Do not connect a battery to the "+ BAT" terminal when more than one Pro Series power supply is connected in parallel.

6.1.1 Configure LVD Settings

Set the Low Voltage Disconnect (LVD) Disconnect and Reconnect Voltage points by setting the switches 1 and 2 on the rear panel of the unit (see Figure 6 and Table 5).

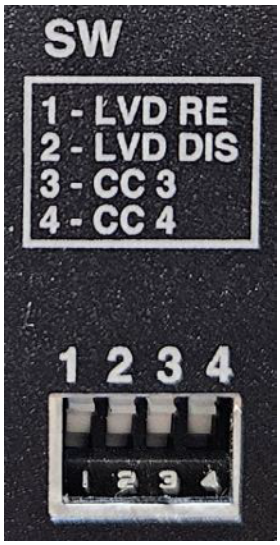

Figure 6. LVD/Charge Current DIP Switches

Table 5. LVD Disconnect/Reconnect Voltage Switch Settings

LVD Setting	12 V	24 V	48 V	SW1[1]	SW2[1]
Disconnect V (default)	11.5	23	46		1
Disconnect V (low setting)	10.5	21	42		0
Reconnect V (default)	12.5	25	50	1	
Reconnect V (low settings)	12	24	48	0	

[1] 1 = Up, 0 = Down

6.1.2 Configure Battery Charge Current Limit

Set the battery charge current limit by setting the switches 3 and 4 on the rear panel of the unit (see Figure 6 and Table 6).

Table 6. Maximum Charge Current Switch Settings

Max Charge (% of Output)	Max Charge (100 A Models)	Max Charge (50 A Models)	Max Charge (25 A Models)	Max Charge (12 A Models)	SW3[1]	SW4[1]
100% (default)	100 A	50 A	25 A	12.5 A	1	1
75%	75 A	38 A	19 A	9.4 A	1	0
50%	50 A	25 A	12.5 A	6.3 A	0	1
25%	25 A	12.5 A	6.3 A	3.1 A	0	0

[1] 1 = Up, 0 = Down

6.2 Status Indicators and Alarms

The status of the Pro Series is indicated by two LEDs on the front panel. The form-C contact on the rear panel will be triggered for any condition that lights the red "FAULT" LED or shuts down the output of the unit.

Table 7. Power Supply Alarms

Alarm Condition	Trigger Condition	LOAD Output	BATT LVD	Red FAULT LED	Green POWER LED
Input AC OK, battery charging	Normal Operation, battery charging	Enabled	Closed	Off	On
Input AC OK, battery charged	Normal Operation, battery charged	Enabled	Closed	Off	On
DC Output Failure (Overvoltage)	Output voltage rises above 16.5/33/66 VDC for 1 second (clears when input power cycled off/on)	Battery power only	Closed	On	Off
AC Undervoltage warning	Input voltage drops below approx. 90 VAC	Enabled	Closed	On	On
AC Failure	AC fails or front-panel power switch is off (battery above LVD level)	Battery power only	Closed	On	On
System Failure	Internal circuit fault (clears when all fault conditions are cleared)	Battery power only	Closed	On	Off
Overtemperature Shutdown	Internal temperature too high	Battery power only	Closed	On	Off
Battery low (when AC off)	Battery voltage below the LVD threshold	Off	Open	On	Off
Battery Overvoltage fault (AC present)	Battery voltage exceeds the internal Over-Voltage Protection (OVP) threshold for 1 second	Enabled	Open	Off	On

6.3 External Remote Shutdown

External Remote Shutdown control lines (TTL compatible signal) can be connected to the Pro Series power supply if external on/off control of the power supply output is required. An opto-isolated 2 to 12 volts signal will activate Remote Shutdown (Hi = output off, Lo = output on).

NOTE: The External Remote Shutdown does not alter the state of the battery contactor on SB models.

7.0 FAQs

7.1 Can Pro Series provide negative voltage?

Yes. The Pro Series has a floating output and can provide a positive or negative voltage.

7.2 How do I connect a battery to the units connected in parallel?

Do not connect a battery to the "+ BAT" terminal when more than one Pro Series power supply is connected in parallel, as there is a risk that the potential current could be higher than the rating of the internal LVD relay. Damage to the unit, load, and/or personal injury may occur if the battery output current through the "BAT" terminal exceeds the rating for an individual supply.

Connect a battery directly to the parallel output terminals and use an external low voltage disconnect (LVD).

Connect the battery positive lead to the "POS" parallel output terminals, and the battery negative lead to the "NEG" parallel output terminals. Install an appropriate in-line DC overcurrent protection device, such as fuse or circuit breaker on the battery positive lead. Use an external LVD.

7.3 Can Pro Series be used with lithium-ion batteries?

Use of lithium-ion batteries is not recommended. The Pro Series is designed and optimized for lead-acid batteries.

7.4 Can I adjust the output voltage settings?

The output voltage can be adjusted by the factory.

8.0 PRODUCT SPECIFICATIONS

8.1 Electrical Specifications

Table 8. Overall Electrical Specifications

Parameters	Rating
AC Input Nominal Rating	120 / 240 VAC; 50 / 60 Hz
AC Input Operating Range	100 to 265 VAC
AC Input Maximum Range	100 to 265 VAC
Input Power Factor (typical)	0.99
Efficiency	Up to 93%
Output V Line Regulation	0.1%

Table 9. Power Supply Specifications (cont'd on next page)

Rating	12 V 100 A 1190 W	12 V 50 A 690 W	24 V 50 A 1190 W	24 V 25 A 690 W	48 V 25 A 1190 W	48 V 12.5 A 690 W
AC Input Current (A_{rms} at 230 VAC)	6 A max	3.5 A max	6 A max	3.5 A max	6 A max	3.5 A max
AC Input Current (A_{rms} at 115 VAC)	12 A max	7 A max	12 A max	7 A max	12 A max	7 A max
Default Output Voltage (Nominal Battery float Voltage) (+/− 0.5%)	13.8 VDC	13.8 VDC	27.6 VDC	27.6 VDC	55.2 VDC	55.2 VDC
Output Voltage Range (adjustable)	12–15 VDC	12–15 VDC	24–30 VDC	24–30 VDC	48–60 VDC	48–60 VDC
Output Power (max)	1,200 W	690 W	1,200 W	690 W	1,200 W	690 W
Output Current (continuous)	87 A	50 A	44 A	25 A	22 A	12.5 A
Output Derating	2% / °C (above 50°C)					
Efficiency (typical)	90%	90%	91%	91%	93%	93%
Heat Dissipation	451 BTU/hr	262 BTU/hr	402 BTU/hr	233 BTU/hr	306 BTU/hr	178 BTU/hr

Rating	12 V 100 A 1190 W	12 V 50 A 690 W	24 V 50 A 1190 W	24 V 25 A 690 W	48 V 25 A 1190 W	48 V 12.5 A 690 W
Output Noise (max mV_{rms})	30 mV_{rms}	30 mV_{rms}	30 mV_{rms}	30 mV_{rms}	40 mV_{rms}	40 mV_{rms}
Output V Load Regulation	0.5%	0.5%	0.5%	0.5%	0.5%	0.5%
Max total Battery Current through LVD	100 A	50 A	50 A	25 A	25 A	12.5 A
LVD Threshold V (Default)	11.5 V	11.5 V	23.0 V	23.0 V	46.0 V	46.0 V
LVD Reconnect V (Default)	12.5 V	12.5 V	25.0 V	25.0 V	50.0 V	50.0 V

8.2 Physical Specifications

Table 10. Physical Specifications

Parameters	Configuration
Output Grounding	Floating, may be connected with positive or negative ground
Alarm Output	Form-C contact, 0.5 A, 60 VDC max
DC Connectors: (Output, Battery)	Bus Bar, 5/16-inch bolt hole
Remote Alarm Connector	5-pin removable plug, cage clamp type 14–30 AWG
Remote Shutdown (isolated)	External 2–12 V will disable output
AC Input Connector	IEC C14 Connector
Operating Temperature Range	−30 to +60°C[1]
Storage Temperature Range	−40 to +70°C
Humidity	Operating: 10–90% (non-condensing) Storage: 5–95% (non-condensing)
Cooling	Temperature Controlled Fans

[1] Ambient Temperature. De-rate output 2% per °C above 50°C.

8.3 Regulatory Specifications

Table 11. Regulatory Compliance

Category	Certification
Safety, EMC-Emissions, EMC-Immunity, CE, RoHS	RoHS. Designed to meet UL/CSA 60950-1, FCC Class B and CE EMC Directive.

8.4 Mechanical Specifications

Table 12. Dimension and Weight

Physical Property	Value
Dimension - L x W x H	8.5 x 19.0 x 1.7 in. (217 x 483 x 44 mm)
Weight	7.4 lbs. (3.36 kg)

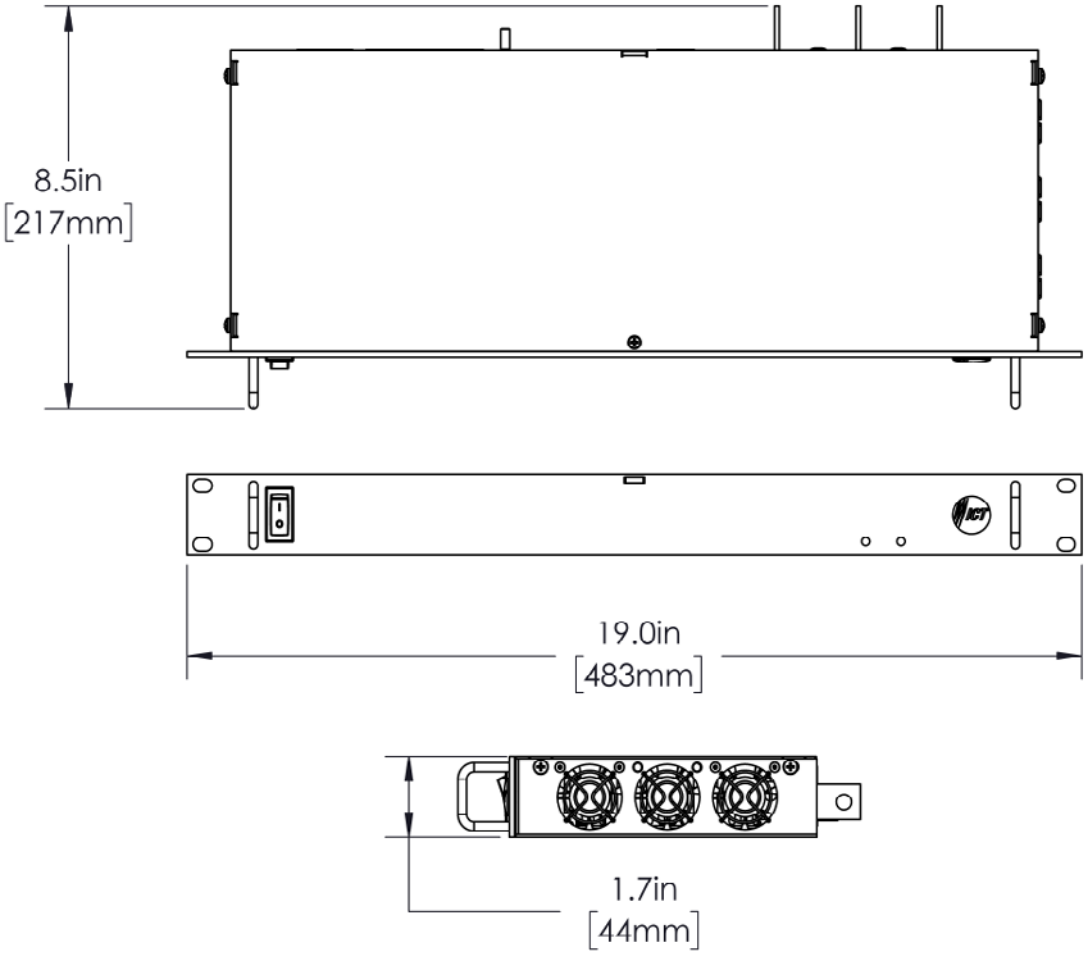

Figure 7. Dimensions

9.0 GLOSSARY

- 1RU — One Rack Unit; 1.75-inch (44.55 mm) of rack height
- A, amps — Amperes
- A_{rms} — Amperes (Root Mean Square)
- Ah — Ampere-Hours
- ANSI — American National Standards Institute
- AWG — American Wire Gauge
- BTU — British Thermal Unit
- CE — Conformité Européenne
- CSA — Canadian Standards Association
- DIP — Dual In-line Package
- EMC — Electromagnetic Compatibility
- FCC — Federal Communications Commission
- Hr — Hour
- HTTPS — Hypertext Transfer Protocol Secure
- Hz — Hertz
- ISO — International Organization for Standardization
- LVD — Low Voltage Disconnect
- NEC — National Electrical Code
- OEM — Original Equipment Manufacturer
- OVP — Over-Voltage Protection
- RMA — Return Material Authorization
- RoHS — Restriction of Hazardous Substances
- SW — Switch
- TTL — Transistor-Transistor Logic
- UL — Underwriters Laboratories
- V — Volts
- VAC — Volts, Alternating Current
- VDC — Volts, Direct Current
- V_{rms} — Volts (Root Mean Square)
- W — Watts