



PRO Charging Systems

Sentinel10® Charger/Maintainer

This product is a charger, trickle charger, and maintainer for use with 6V, 8V, and 12V batteries. Intelligent microprocessor-controlled algorithms allow multi-stage charging of various battery types and chemistries.



**IMPORTANT: READ AND SAVE THIS SAFETY INSTRUCTION
MANUAL KEEP IT WITH OR NEAR CHARGER AT ALL TIMES**

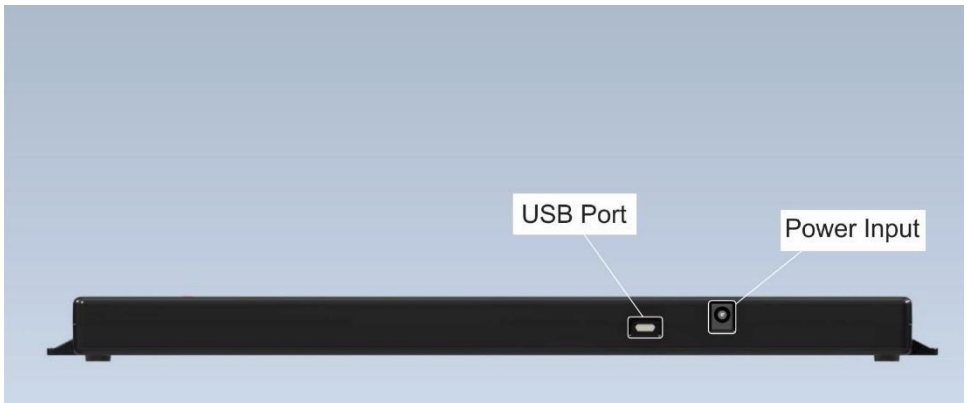
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Manual P/N: 70383 Rev. 063022

Model Numbers and Options:


7QP-12F950P25-**C00**: Wireless option is not installed

7QP-12F950P25-**C01**: Wireless option is installed



- Charge algorithm controls BOTH voltage and current for precise charging
- LCD Display with Menu Select, Microprocessor Controlled, Fully Automatic
- Read Charge Voltage, Amperage, Errors, and more in plain LCD Display Text
- Up to 500mA Charging Power Per Channel

1. USER SAFETY OPERATIONS GUIDE

 Throughout this manual, look for this symbol. It means 'BE ALERT – YOUR SAFETY IS INVOLVED'. If you do not follow these safety instructions, personal injury or property damage may occur.


 **WARNING – RISK OF EXPLOSIVE GASES.**

WORKING WITH RECHARGEABLE BATTERY(S) IS DANGEROUS. EXPLOSIVE GASES DEVELOP DURING NORMAL BATTERY OPERATION. READ THIS MANUAL EACH TIME AND MAKE CERTAIN YOU FULLY UNDERSTAND IT AND FOLLOW THE SAFETY AND OPERATING INSTRUCTIONS AT ALL TIMES.

- To reduce risk of battery explosion, follow all safety instructions below and those published by the battery manufacturer. Review cautionary markings on vehicle or equipment containing the battery.
- CAUTION: To reduce the risk of injury, charge only rechargeable LEADACID batteries. Do not use battery charger for charging dry-cell batteries that are commonly used with home appliances. These batteries may burst causing personal injury and damage. If uncertain about battery type or charging procedure contact the battery manufacturer. The charger is not intended to supply power to low-voltage electrical systems other than applications using rechargeable lead-acid type batteries
- Use of an attachment not recommended or sold by the battery charger manufacturer may result in a risk of fire, electric shock or injury to persons.
- Do not operate this charger if it has received a sharp blow, was dropped or otherwise damaged in any manner. Refer to a qualified service agent.
- Charger contains no serviceable parts. If it fails during its warranty period, contact your dealer to obtain a warranty replacement.
- To reduce risk of electric shock, unplug charger from AC outlet before attempting any maintenance or cleaning.
- For external cleaning use a clean damp towel.
- Have your distributor, dealer or other qualified service agent, repair or replace worn or damaged parts immediately. **Repairs should not be attempted by people who are not qualified.**
- Whenever removing AC Plug from the receptacle, pull from the Plug Body, not from the cord.
- Do not operate the charger if it is malfunctioning. Personal injury or property damage could result.
- Locate charger as far away from battery as DC cables permit and never allow DC output terminals to touch each other.
- Never place charger directly above battery being charged; gases from battery will corrode and damage charger.
- Never allow battery acid to drip on charger when reading gravity or filling battery.
- Do not operate charger in a closed-in area or restrict ventilation in any way.
- Do not set a battery on top of charger.

2. PERSONAL PRECAUTIONS WHILE WORKING WITH BATTERIES

- Have someone within range of your voice to come to your aid if needed.
- Have plenty of fresh water and soap nearby in case battery acid contacts your skin, clothing or eyes. Wear eye and clothing protection and avoid touching eyes.
- If battery acid contacts skin or clothing, wash immediately with soap and water.
- If acid enters eye, immediately flush eye with running cold water for at least 10 minutes. Get medical attention immediately.
- **NEVER** smoke or allow a spark or flame in vicinity of battery.
- Be extra cautious not to drop a metal tool onto battery. It might spark or short circuit battery or other electrical part that may cause an explosion.
- Remove personal metal items such as rings, necklaces, watches, etc. Batteries can produce a short-circuit current high enough to weld such items causing a severe burn.
- **NEVER** charge a frozen battery. Thaw it out for safer and more efficient charging.
- Be sure area around battery is well ventilated while battery is being charged. Gas can be forcefully blown away using a non-metallic material like cardboard.
- Clean battery terminals. Be careful to keep corrosion from coming into contact with eyes.
- Add distilled water in each cell until battery acid reaches level specified by battery manufacturer. This helps purge excessive gas from cells. Do not overfill. For a battery without caps, carefully follow manufacturer's recharging instructions.
- Study all battery manufacturer's specific precautions such as removing or not removing cell caps while charging and recommended rates of charge.
- Determine voltage of battery by contacting battery manufacturer and make sure it matches output rating of battery charger.
- Do not use this charger for charging or maintaining more than one Rechargeable Battery per Channel.
- If problems arise connecting the output leads to the Rechargeable Battery, contact the dealer where charger was purchased to obtain a suitable connection device for your application.

 **WARNING: CHARGERS CAN IGNITE FLAMMABLE MATERIALS AND VAPORS. DO NOT USE NEAR FUELS, GRAIN DUST, SOLVENTS, OR OTHER FLAMMABLES. TO REDUCE THE RISK OF AN ELECTRIC SHOCK, KEEP THE CHARGER DRY. DO NOT EXPOSE IT TO RAIN OR WATER.**

3. A.C. AND UTILITY REQUIREMENTS

- The use of an improper extension cord could result in a risk of fire or electric shock. If an extension cord must be used, it must be UL and/or CSA approved. Locate all cords so that they will not be stepped on, tripped over or otherwise subjected to damage or stress. Extension cord must be properly wired and in good electrical condition, and large enough for the AC rating of charger as specified in this TABLE:

RECOMMENDED MINIMUM AWG SIZE FOR
EXTENSION CORDS FOR BATTERY CHARGERS

| | | | | |
|------------------------|----|----|-----|-----|
| Length of cord (feet): | 25 | 50 | 100 | 150 |
| AWG size of cord: | 18 | 18 | 18 | 18 |

- Refer to the Product ID Label affixed to the product and identify the input requirements such as '120Vac, 60Hz, 10Amps'. Ensure that the product will be connected to a matching utility power rating. For example, if product is rated at 60Hz, do not connect to a 50Hz utility.
- Do not connect product to AC receptacles that share power with any other moderate to heavy loads such as air conditioners, motors, and other common appliances. Most appliances turn on/off at random and cause power surges and power droops that can severely affect the product connected to that same power circuit.
- Inspect AC Receptacles for general wear, including loose or hanging receptacles and be very aware of potentially worn contacts. If any heat is felt in and around the receptacle while the charger is operating, this is an immediate indication of danger caused by a worn receptacle.


4. SAFE GROUNDING INSTRUCTIONS


- Do not remove Ground Pin from charger's Power Supply AC Plug, or connect to utility power via an adaptor that bypasses the product's ground pin connection. The product must be grounded at all times when connected to utility power.
- This battery charger's Power Supply must be grounded to reduce the risk of electric shock. The Power Supply is equipped with an AC cord set having an equipment-grounding conductor. This AC cord set must be connected to an appropriate receptacle that is properly installed and grounded in accordance with the National Electrical Code and all local codes and ordinances.


 **WARNING: IMPROPER CONNECTION OF THE EQUIPMENTGROUNDING CONDUCTOR CAN RESULT IN A RISK OF AN ELECTRIC SHOCK.**

- The conductor with insulation having an outer surface that is green, with or without yellow stripe(s), is the equipment-grounding conductor. If repair or replacement of the charger's AC cord set is necessary, refer to a qualified service agent, and do not connect the equipment-grounding connector to a live terminal.

5. PREPARING TO CHARGE

 **WARNING: The product's supplied Power Supply is matched to the Charger Power Requirements and may only be replaced with a Manufacturer's Approved Power Supply.**

 **WARNING:** The **CHARGE MODE** setting affects all charge channels, simultaneously. **DO NOT** mix battery types on various charge channels. For example, Large Capacity batteries cannot charge with Low Capacity Batteries; nor may Lithium batteries be mixed with Lead Acid Batteries. The **MODE Select** is accessed via the **MENU** button.

 **WARNING:** Each Charge Channel may only be connected to a single battery that is electrically isolated from all other batteries that may be connected to other channels. For example, a 48V battery pack that is comprised of (4) 12V batteries that are interconnected in an electrical Series Configuration, such as those found in Golf Carts, may not be connected to (4) 12V channels of this battery charger. **Non-Warranty Damage** to the charger may occur.

AC and DC Cable Connections:

- Connect the Power Supply output cable to the charger's input Power Jack located on the back side of the 10-Channel Charger.
 - Connect the DC Cord Output Charge Cable(s) to any front side Output Jack Charge Channel.
 - Then connect the DC Cord's Red Clamp to the Battery's Positive ('+', Pos.) Terminal and the DC Cord's Black Clamp to the Battery's Negative ('-', Neg.) Terminal.
 - Reversing the output connection to a battery should be avoided but will not damage the charger. When connected in reverse, charging will not start – disconnect the charger clip connections from the battery and remake the connections.
 - Approximately 3 seconds after connection to a battery, the charger starts its multi-Stage charging process.
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- **DO NOT** connect more than one battery to a single channel.
 - **DO NOT** connect multiple outputs to a single battery or allow Red/Black clips to touch each other.
 - **DO NOT** connect charge outputs to batteries installed in a battery pack configuration, such as those found in golf carts and other similar applications.
 - Always plug output cords into charger first, then connect clips to battery terminals.
 - Battery discharged to less than 2.4 volts will not pass the charger's initial battery test and that channel, consequently, may not turn on.
 - Dependent on a battery's capacity and level of charge, it can take several hours to days to fully charge/maintain battery.
 - The charger is factory preset to charge in **MODE-1**, optimizing it for **SLI-Type Automotive Batteries**. Do not change this setting if the charger is being used to charge typical car or truck batteries. If a more applicable setting is desired, please consult the following Charge Mode Values And Setting Table below.

- The MODE Setting affects all Channels simultaneously. If, for example, the factory preset MODE-1 is used, any and all batteries connected to the outputs must be the same or very similar Lead Acid Batteries.

The CHARGE MODE VALUES AND SETTINGS is selected via the use of the MENU button. Follow these steps to select an alternate Charge MODE:

- Hold depressed the MENU Button for 3 seconds, then release. The LCD displays the **CHARGE MODE** menu.
- Depress/release the MENU Button again, which then displays the **SOFTWARE VERSION** menu.
- Depress/release the MENU Button again, which then displays the **CHARGE MODE SELECT** Menu
- Now, depress and hold depressed for 3seconds again, and then release the MENU Button to enter into the CHARGE MODE operation.
 - Each depress/release of the MENU button now increments the MODE Number ○ Stop depressing/releasing the MENU button when the desired MODE Number is reached ○ Hold depressed for 3 seconds the MENU Select Button to select the new MODE setting chosen, then release to select the CHARGE MODE that is displayed. If this action is not performed, the function times out, exits and returns without changing to a new CHARGE MODE.

CHARGE MODE VALUES AND SETTINGS TABLE

| MODE | Battery Type/Name | Type | AH | Volts/Cell* |
|-------------|--------------------------------|-------------|-----------|--------------------|
| 01 | 12V General Lead Acid | Flooded | 32AH | 2.400V |
| 02 | 12V General Lead Acid | AGM | 32AH | 2.450V |
| 03 | 12V General Lead Acid | Flooded | 18AH | 2.400V |
| 04 | 12V General Lead Acid | AGM | 18AH | 2.450V |
| 05 | 12V General Lead Acid | Flooded | 10AH | 2.400V |
| 06 | 12V General Lead Acid | AGM | 10AH | 2.450V |
| 07 | 12V General Lead Acid | Flooded | 5AH | 2.400V |
| 08 | 12V General Lead Acid | AGM | 5AH | 2.450V |
| 09 | 6V General Lead Acid | Flooded | 32AH | 2.400V |
| 10 | 6V General Lead Acid | AGM | 32AH | 2.450V |
| 11 | 6V General Lead Acid | Flooded | 18AH | 2.400V |
| 12 | 6V General Lead Acid | AGM | 18AH | 2.450V |
| 13 | 6V General Lead Acid | Flooded | 10AH | 2.400V |
| 14 | 6V General Lead Acid | AGM | 10AH | 2.450V |
| 15 | 6V General Lead Acid | Flooded | 5AH | 2.400V |
| 16 | 6V General Lead Acid | AGM | 5AH | 2.450V |
| 17 | 12V GEL Lead Acid | Flooded | 40AH | 2.333V |
| 18 | 12V GEL Lead Acid | Flooded | 90AH | 2.333V |
| 19 | 6V General Lead Acid | Flooded | 225AH | 2.400V |
| 20 | 6V General Lead Acid | AGM | 213AH | 2.400V |
| 21 | 6V General Lead Acid | AGM | 220AH | 2.450V |
| 22 | 12V Odyssey PC680 | Pure Lead | 16AH | 2.433V |
| 23 | 12V Optima OPT-D31M | Spiral | 75AH | 2.450V |
| 24 | 8V General Lead Acid | Flooded | 170AH | 2.400V |
| 25 | 4cell Lithium – 'Green' LiFePO | | 30AH | 3.650V |

| | | | |
|----|--------------------------------|------|--------|
| 26 | 4cell Lithium – ‘Green’ LiFePO | 15AH | 3.650V |
| 27 | 3cell Lithium – ‘ION’ Li+ Ion | 20AH | 4.050V |
| 28 | 3cell Lithium – ‘Green’ LiFePO | 15AH | 3.650V |
| 29 | 2cell Lithium – ‘ION’ Li+ Ion | 20AH | 4.050V |
| 30 | 2cell Lithium – ‘Green’ LiFePO | 15AH | 3.650V |
| 31 | 1cell Lithium – ‘ION’ Li+ Ion | 5AH | 4.050V |
| 32 | 1cell Lithium – ‘Green’ LiFePO | 5AH | 3.650V |

- ‘AH’ is an abbreviation for ‘Ampere-Hour’ and denotes the capacity rating of the battery. For example, a battery rating of 32AH stores more energy and has a higher energy capacity than an 18AH battery. These AH capacities also help establish charge safety timer values, explained further in the next section.
- Lead Acid batteries are typically 2V per cell.
 - 12V Lead Acid batteries contain 6cells
 - 8V Lead Acid batteries contain 4cells
 - 6V Lead Acid batteries contain 3cells
- *NOTE: The Absorption Value is listed as Volts Per Cell and is one of the most important parameters pertaining to that charge algorithm. Different batteries have differing number of cells – multiply the number of cells times the ‘Volts-Per-Cell’ value to obtain the voltage the charger will regulate during the Absorption Charge Stage. Two Examples are shown:
 - MODE-1 12V General Lead Acid has 6 Cells $2.400V \times 6$ Absorption = 14.40Vdc
 - MODE-25 4cell Lithium – ‘Green’ has 4 cells $3.650V \times 4$ Absorption = 14.60Vdc

6. LED, LCD Display And Menu Button

LED Charge Channel Indicators:

- Yellow Charge LED – illuminates continuously or flashes while charging
- Green Charged LED – illuminates continuously when charge completes
- Yellow / Green Alternate Flash – Charge error occurred on that channel
- If the Yellow/Green LEDs of a particular Channel, flash Alternately, then charging on that Channel only, has terminated due to a Charge Error Condition. Refer to the Charge Error Table for a description of the possible causes of failure. Resetting a Channel Error is easy - disconnect / connect DC Cable to battery, and/or refer to charge error table.

MENU SELECT BUTTON:

- Depress and hold depressed for approximately 3seconds or more and then release to enter into the Menu Selection items.
- If no further MENU Button depress/release actions are done, a timeout of approximately 10seconds automatically exits the Menu Selection.
- While a Menu Selection is shown, depress the MENU Button for a minimum of 3 seconds to select that menu item shown. For example, the first Menu Item displayed is the ‘CHARGING MODE’. To select this menu item, depress and hold depressed the MENU Button until the CHARGING MODE menu item enters. This menu item then displays the active and current Charge Mode and Battery Type information.

- The SOFTWARE VERSION Menu Item displays information concerning the product's firmware. Enter this menu item the same way as you would the CHARGING MODE.
- When not in the Menu Selection Mode, each depress/release operation of the MENU Button will advance the channel display to display the charging status and Amps/Volts readings of that display. If channel displayed is Channel-10, the LCD display will roll over to display Channel-1.

LCD Display:

At Power-On:

- The LCD Backlight illuminates
- For approximately 5 seconds, the CHARGE MODE and Battery Type are displayed
- For approximately 5 seconds the SOFTWARE VERSION displayed

After approximately 10 seconds, the display defaults to displaying Channel-1 shown as CH01 in the upper left corner of the LCD display. Depress/Release the **MENU Button** to increment the display to an alternate channel. When battery is connected, LCD Displays:

1. Upper left corner of LCD Displays the channel number. CH01 is 'Channel-1
2. 'VOLT' is the measured voltage of the battery – this is a voltmeter function.
3. 'AMPS' is the charge current flowing into battery – this is an ammeter function.
4. Bottom left of LCD displays the charge status. Typical messages are:
 - a. cPQT - Pre-Qualification Charging – testing battery
 - b. cCCT - Constant Current Stage Charging battery
 - c. cCVT - Constant Voltage Stage Charging battery
 - d. cTOP - Top-Off Stage Charging battery
 - e. cFIN - Float/Maintenance Stage - Charge finished

When no battery is connected, the bottom left corner of the LCD displays 'NoBt'. This corner also displays other codes when necessary and are referenced throughout this manual.

CHARGE ERROR TABLE

| <u>LOG ERROR CODE</u> | <u>ERROR MESSAGE</u> | <u>ERROR DESCRIPTION</u> | <u>POSSIBLE CAUSE (REMEDY)</u> |
|------------------------------|-----------------------------|--------------------------------------|---|
| ERR05 | B/Cel Wrong Type | Battery voltage higher than expected | 12V Battery connected to 6V MODE setting |
| ERR24 | Chg.Stg Timer-00 | Safety timer timed out | Battery capacity incorrect for charger MODE setting |
| ERR25 | Chg.Stg Timer-01 | Safety timer timed out | Battery capacity incorrect for charger MODE setting |
| ERR07 | BatPack UnBal -V | Battery cells unbalanced | Defective Battery |

| | | | |
|-------|------------------|-------------------------------------|---|
| ERR26 | Chg.Stg Timer-02 | Safety timer timed out | Battery capacity incorrect for charger MODE setting |
| ERR08 | BatPack UnBal -A | Battery cells unbalanced | Defective Battery |
| ERR27 | Chg.Stg Timer-03 | Safety timer timed out | Battery capacity incorrect for charger MODE setting |
| ERR13 | BatLoad Overload | Battery overloaded by external load | Heavy Battery load during FLOAT charge |

7. CHARGING A RECHARGEABLE BATTERY

Each set of Yellow and Green LEDs on the front of the charger are used to indicate the charge status state for the channel associated with the set of LEDs.

- Yellow LED Flashing – Battery testing in progress
- Yellow LED Solid – Continuous charging
- Green LED Solid – Battery charged
- Yellow/Green LEDs flash alternately – Charge failure on that channel

Multi-Stage Charge Algorithms

There are up to 8 charging Stages! Depending on the MODE selected, these stages are already preset, and implementation of each stage will vary from one CHARGE MODE setting to the next, dependent on the type of battery intended to be charged. These charge stages ‘typically’ include:

➤ PRE-QUALIFICATION-TEST Charge Stage:

- Tests Lead Acid battery for sulphation by applying a low-level charge current and analyzes voltage and current values and rates of change to determine if the battery is ready to transition to the next high-power Bulk Charge Stage.
- For Lithium cells, this stage is extremely brief and may not be annunciated. It checks for minimum and maximum cell voltages. If a fully charged cell is detected, a transition to ‘Charge Complete’ is done, bypassing all other charge stages.

➤ BULK Charge Stage (also known as ‘Constant-Current’):

- High Power charge, charges at a constant current or constant power rate to deliver the ‘bulk’ of the charge needed
- Upon completion of this stage, approximately 80% of total charge is delivered to the battery

➤ ABSORPTION Charge Stage (also known as ‘Constant-Voltage’):

- Charge voltage is held at a constant level to optimize the amount of energy the battery absorbs.
- Charge Amperage decreases as the energy is being absorbed.
- Termination of this stage occurs when the charge current decreases to a preset value. Duration of this stage is dependent on many factors such as size, type, age, and chemistry of battery.

- Upon completion of this stage, approximately 95% to 100% of total charge is delivered to the battery.

➤ **TOP-OFF Charge Stage (also known as 'Finish'):**

- Charger charges at either a constant voltage, or constant current, or a combination of constant-current / constant voltage to 'Top-Off' the charge in a battery.
- This stage employs timing based on 'timers' measured and recorded during previous charge stages, in combination with dv/dt and/or di/dt.
- Variations in this charge stage are highly dependent on the battery Charge MODE selected. Flooded Lead Acid batteries are often aggressively charged to high voltage levels to force internal gassing which helps to mix the electrolyte. AGM (Absorbed Glass Mat) batteries differ in that this stage limits upper voltage regulation levels which helps prevent them drying out.
- Upon completion of this stage, nearly 100% of total charge is delivered to a typical lead acid battery. (This stage is typically not applied to Lithium cells)

➤ **FLOAT / MAINTENANCE Charge Stage:**

- The entry into this stage typically signifies that the battery is FULLY charged and has a Green LED 'Charged' indicator associated with it.
- No further charging action occurs. However, all batteries, regardless of chemistry, self-discharge at a rate that is proportional to ambient temperature meaning that if a battery sits on a table completely disconnected from all loads, it will self-discharge over many months.
- This charge stage, depending on the MODE selected will either:
 - Regulate at a low voltage level to supply a 'trickle current' to 'MAINTAIN' battery at full charge (prevent self-discharge), or
 - Re-start charging if the battery voltage decays below a trigger voltage level

Common Traits Applied to All Charge Stages:

- Each Charge Stage employs the use of a 'Safety Timer' to time out and end that stage if the stage process took too long without achieving the desired targeted results.
- Normally, each Stage ends when the charger detects that the battery has reached the proper level of charge for that stage. However, each Charge Stage has a preset timer that limits how long that stage may run. In cases where the battery capacity has diminished that timer may expire before the Stage completes charging.
- The Safety Timers are preset according to the MODE selected and their time-out durations are based on the size of battery (Ampere-Hour rating of the battery – also known as 'AH')
- Upon Safety Timer time out, a decision is automatically established to transition to the next stage or advance immediately to the final stage –

Float/Maintenance Standby Stage or terminate charge and display an Error Code.

- When a Stage Timer expires before the proper charge level is reached, the charger controller makes a decision to either transition to the next stage, advance immediately to the final Float/Maintenance Standby Stage, or terminate charging and display an Error Code.

8. USB INTERFACE

Any high quality standard Micro-USB cable can be used to connect your PC directly to the Charger's USB Connector, located on the rear side. Through this connection, these functions are accessed:

- Reflash and upgrade the internal microcontroller firmware. Currently, this option is only available from the factory. Please contact the RMA department to have the product returned for upgrade.
- Download charge history and recent charge data. Visit the product information on the company website: www.pcsdv.com to download APPs specifically developed to work with these products.

9. WIRELESS CONNECTION AND USE (-C01 Model Only)

Download, Install APP (for wireless product model only: '-C01')

- Look for the APP on the Google Play Store, 'DPI 10-Channel C01 Charger' □
Download the app and install it
- Open the APP and follow the easy guide instructions to connect your mobile device
- As of the date of print of this manual, I-Phone is not yet supported

With these APPs, the following functions are possible:

- Voltage and Charge Amps for all channels, displayed
- Charge Status such as 'Charging' or 'Charged' are displayed via color indicator
- Error messages for any channel are displayed
- Multiple Chargers operating in the same vicinity can be named with Aliases and identified
- Read and/or set the Real Time clock

USING THE APP:

Establishing Aliases for Multiple Charger Devices:

- Users can discover available devices and setup an alias for each device. When the APP is first started, press the SCAN button to list all currently active devices within reception range. When a device is first discovered it will be listed by an identifier starting with letters "BLE".

- User can then setup an Alias for any device listed by pressing and holding the device entry. The Alias entry dialog will be displayed, and an Alias Name in text can then be entered. After the Alias Name is set for the selected device, the device will appear in the list under that Alias instead of "BLE" identifier.
- Best approach for setting Alias Names for multiple devices is to turn ON each 10-Channel charger one at the time, then click "SCAN" and set an Alias Name for that one device. Then repeat this operation for each additional charger.
- After devices has been discovered, user can switch to devices monitoring by tapping device entry in the list.

APP DISPLAY:

- Setting The Real Time Clock (RTC):
 - Press/select the "Write RTC" button
 - APP will use the Smartphone's internal clock to set the RTC time in the charger product
- Reading the Real Time Clock (RTC):
 - Press/select the "Read RTC"
 - Time will be displayed using your current time zone settings
- Channel Charge and Error Display:
 - Channel Status is displayed as a color:

| | |
|------|------------------------|
| cPQT | Pre-qualification Test |
| cCCT | Constant Current |
| cCVT | Constant Voltage |
| cTOP | Top Off |
| cFIN | Finished/Maintenance |

- Channel Charge Amps and Battery Voltage are all displayed along with the colored Channel Status chart above, and the values are in real time pertaining to the associated charge Channel.
- Channel Error text is displayed in RED – below the Voltage and Current boxes
- User can switch back to Device List Screen by tapping on the "back arrow" on the top of the screen.

10. MAINTENANCE

Your new charger requires only a little maintenance. Store in a clean, dry place and occasionally clean the case and cords (while the Power Supply is unplugged) with a slightly damp cloth.

11. ONE YEAR LIMITED WARRANTY

Pro Charging Systems, LLC (PCS) warrants exclusively to the original purchaser that this charger will be replaced or repaired, at CSI's option, if it fails during the first year after the date of purchase due to defect in material or workmanship. Proof of purchase is required for all claims.

Return product to:

Pro Charging Systems, LLC
1551 Heil Quaker Blvd
LaVergne, TN 37086
(615) 471-5300

This warranty does not cover failure arising out of improper use, maintenance or operation of the product. Repair or replacement as provided under this warranty is the exclusive remedy of the consumer. PCS shall not be liable for any incidental or consequential damages for breach of any expressed or implied warranty on this product. Except to the extents provided by applicable law, any implied warranty of merchantability or fitness for a particular purpose on this product is limited in duration to the duration of this warranty. Some states do not allow the exclusion or limitation of incidental or consequential damages or allow limitations on how long an implied warranty lasts, so the above limitations or exclusions may not apply to you. This limited warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

For further information, product updates, technical information, or general inquiries, please also visit our web site at:

www.pcsdv.com