



# Programming the Revolution Charger

This material is provided by Power Designers USA LLC

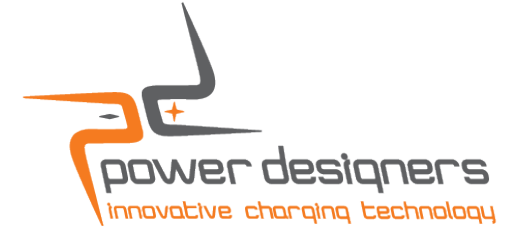
[www.powerdesigners.com](http://www.powerdesigners.com)



# Revolution Series

## Charger Programming

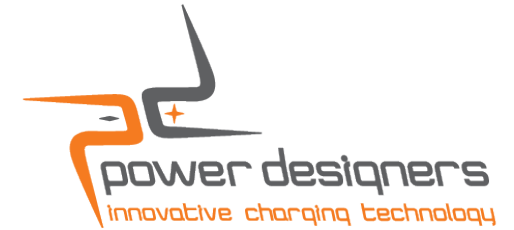
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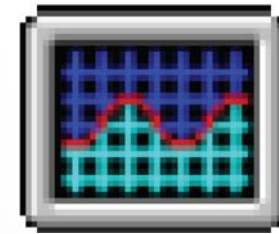
- + Revolution series chargers are delivered per order preset to the requested Battery Voltage, Battery Capacity, Charge profile: Conventional, Opportunity, or Fast; along with settings as needed for use with any Feedback device, or Monitor
- + With chargers delivered for stock orders where a default battery and profile are preset it is necessary to adjust the programmed parameters specific to the end user battery and profile requirements.
- + This module is intended to provide familiarity with the tools and techniques to adjust chargers in the field. Additionally this module will provide familiarity with the history and other data functions available from the charger

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## Charger Programming Data Link Tool



PowerCharge DataLink is a software tool that allows the user to download charge history, view data, create charts, view parameters, and edit parameters on all Power Designers' chargers.



powercharge™  
DataLink

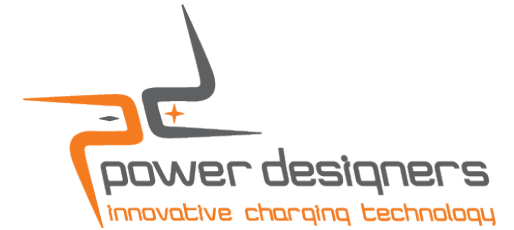
- + PowerChargeDataLinkUser is downloaded from our website
  - Fill out the form and a link is e-mailed to you with access to download the software.
  - Included in the software package are instructions and all supporting software.
- + Power Designers uses industry standard commercially available cables to connect the chargers and the PC running the PowerCharge Data Link software
  - The cable of choice is the USB type A to USB type B cable
  - You probably know it better as the **“Printer Cable”**



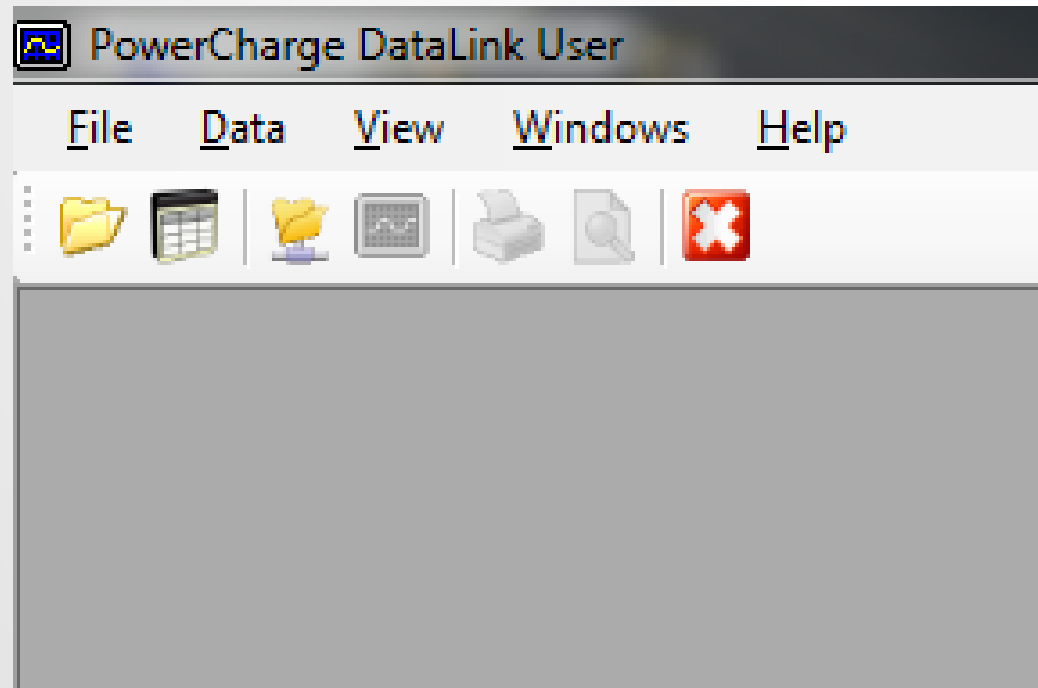
# Revolution Series

## PowerCharge DataLink User Launch Screen

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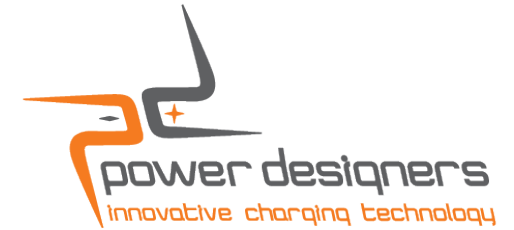


The software opens to a screen containing only menu items and icons. The icons are used to navigate the software, access features and parameters of the charger, and generate reports.

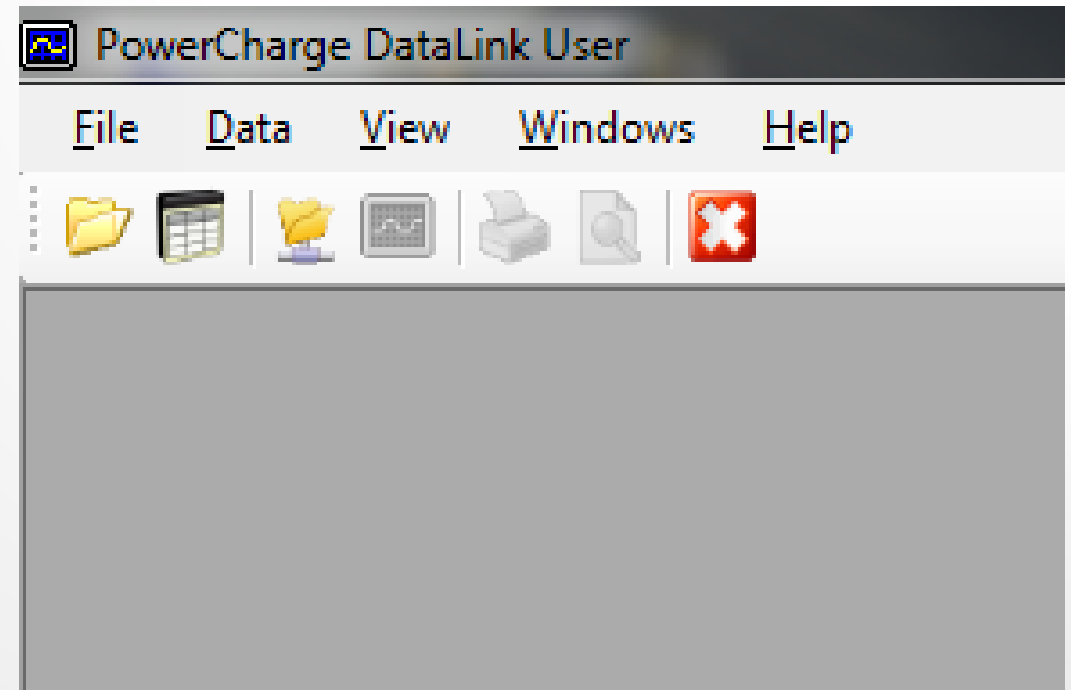


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## PowerCharge DataLink Database Screen



- + Selecting either the file folder icon or using the pull down menu under the word “File” allows you to create and access databases to work with the charger information
- + Once opened a Database, displayed in the PowerCharge Info window, is used to store the files that are downloaded from the charger.
- + Database management includes options to:
  - Open an existing Database
  - Create a new Database
  - Export to new Database
  - Import from an existing Database

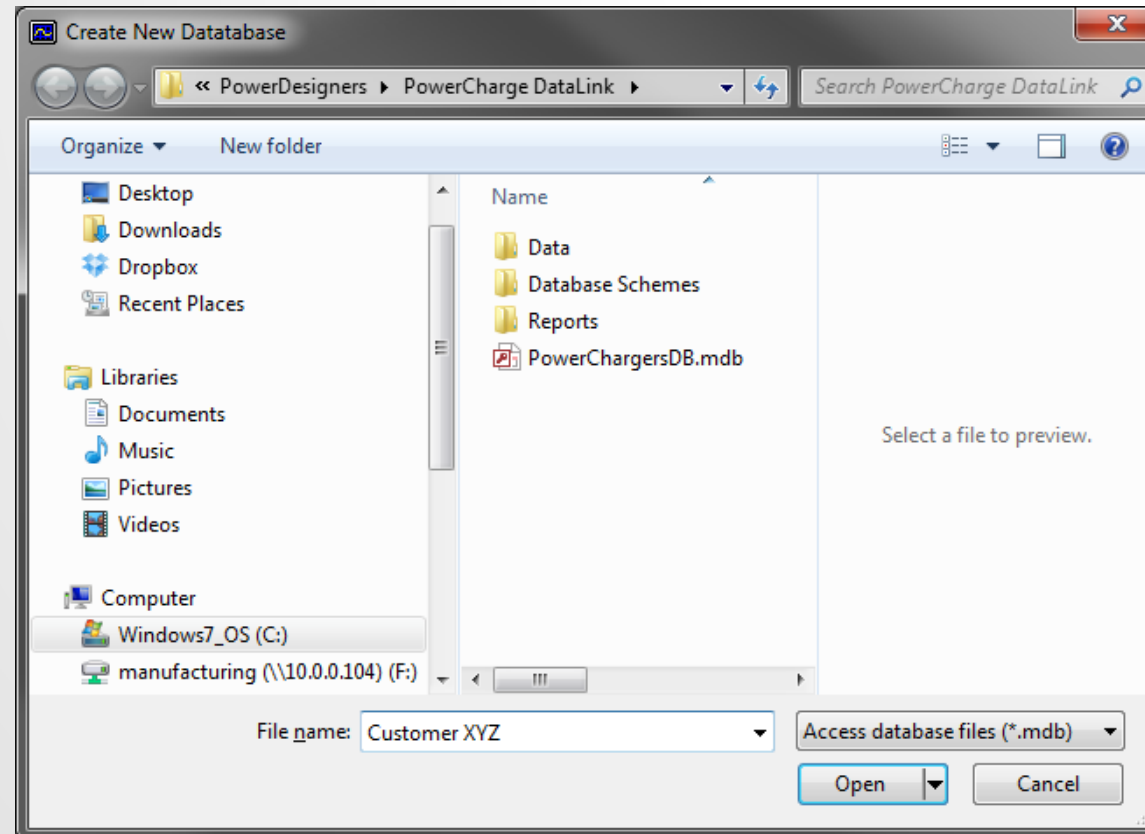


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## PowerCharge DataLink Database Creating and Naming

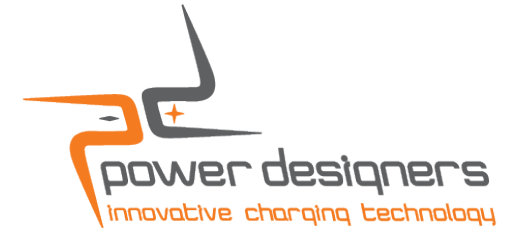


When creating a new database it will be necessary to provide a name for the database that will contain the charger information

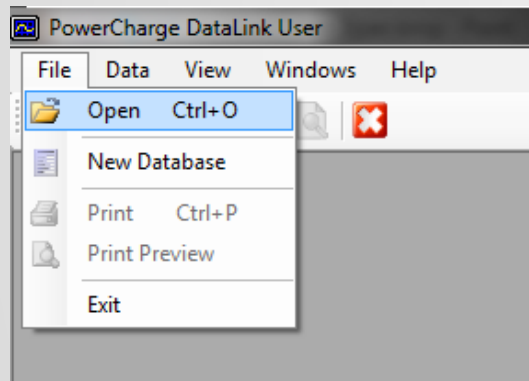


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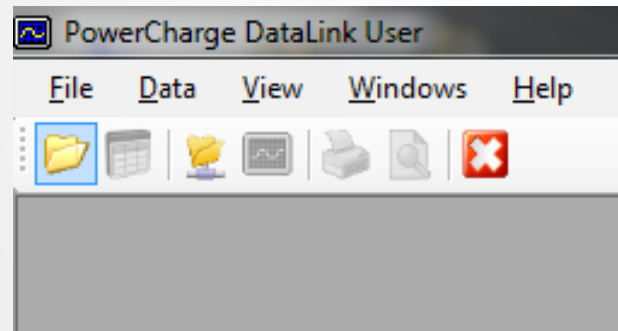
## PowerCharge DataLink Database Opening or Creating



- + To create a **new** database you **must** use the pull down file menu.
- + To open a database either the pull down or the file folder is used



OR



- + The default database is PowerChargersDB
- + Once opened the information screen is available showing existing chargers by serial number

PowerCharge Info

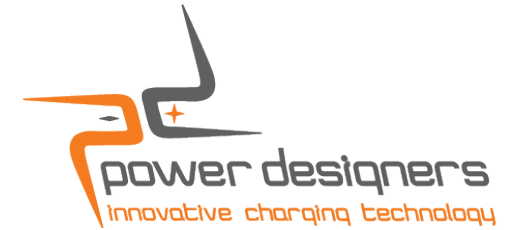
	FactoryID	Records	FirstEvtTime	LastEvtTime
<input checked="" type="checkbox"/>	R05361305C000001	4	1/1/2000 12:00:00 AM	9/3/2014 2:53:00 PM
<input type="checkbox"/>	R08481401P000007	400	9/12/2014 10:19:00 AM	9/12/2014 10:03:00 AM
<input type="checkbox"/>	R12481305F000001	400	4/21/2014 1:58:00 PM	9/12/2014 10:55:00 AM

Time Interval:  All Events  Filter By Period  
Start Date: 9/16/2014 End Date: 9/16/2014  
Temperature:  Centigrade  Fahrenheit

Reports: Equalization Summary Report [Load]  
Charger History [Charger Summary]

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## PowerCharge DataLink Database Selecting a Charger



Within the database, placing a check in the box will select the charger for:

- + Reports
- + History
- + Summary Information

The screenshot shows a window titled "PowerCharge Info" with a table of charger data and several control panels below it.

	FactoryID	Records	FirstEvt Time	LastEvt Time
<input checked="" type="checkbox"/>	R05361305C000001	4	1/1/2000 12:00:00 AM	9/3/2014 2:53:00 PM
<input type="checkbox"/>	R08481401P000007	400	9/12/2014 10:19:00 AM	9/12/2014 10:03:00 AM
<input type="checkbox"/>	R12481305F000001	400	4/21/2014 1:58:00 PM	9/12/2014 10:55:00 AM

**Time Interval**

All Events     Filter By Period

Start Date: 9/16/2014    End Date: 9/16/2014

**Temperature**

Centigrade     Fahrenheit

**Reports**

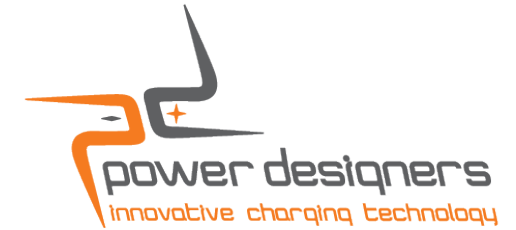
Equalization Summary Report [Load]

Charger History    Charger Summary



# Revolution Series

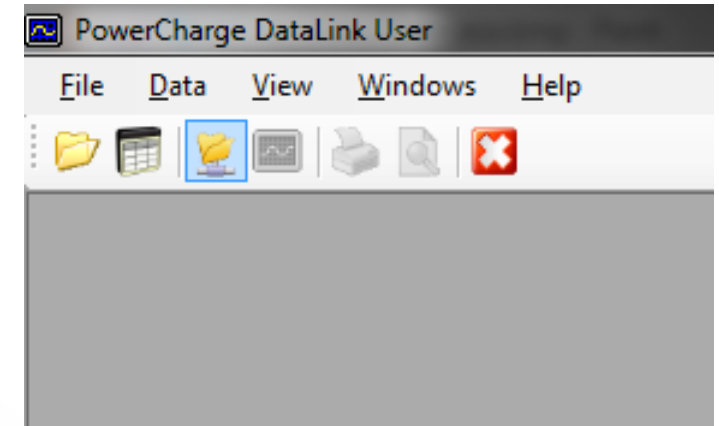
## Direct Connection to a Charger



Direct Connection is used to select a charger for purposes of :

- + Data Download
- + Parameter Adjustment

Simply Click the Direct connection Icon



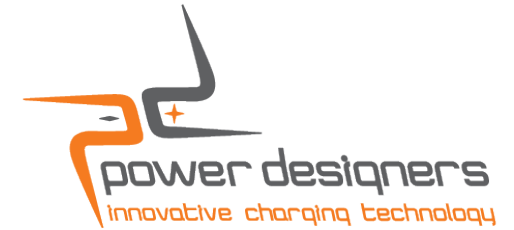
Charger Settings	Profiles	System Settings	Charge
Charger Model	Profile 0	Present Date	Trickle Current
Factory ID	Trickle	Present Time	Trickle Voltage
Drawer V Rating	CV Mode	Battery Autodetect	CC Current
Drawer I Rating	Finish	Charge Autostart	CV Voltage
Power Rating	Equalize	Temp Format	CV Finish State
Cable R[mOhms]	Pulse Charge	Daylight Savings	Finish Current
Charger Type	Profile 1	Active Profile	Finish Voltage
Firmware Rev.	Trickle	Profile Autoswitch	Equalize Current
	CV Mode	Tmp Sensor Detect	Equalize Voltage
Battery Settings	Finish	Precharge High	Total Timer
Battery Capacity	Equalize	Precharge Low	Trickle Timer
Battery Voltage	Pulse Charge	Precharge Idle	CC Charge Timer
Batt Lo Temp Comp		Equalize Mode	CV Charge Timer
Batt Hi Temp Comp	Profile 0 Finish	Use PT Params	Finish DV
Hi Comp Temp [F]	Finish Enable Mode	Ignore PT Faults	Finish DT
Batt Max Temp [F]	Weekdays		Finish Timer
Amb Max Temp [F]	Start hour		Equalize Timer
	Duration		High Pulse Time
			Zero Pulse Time

Select COM Port: COM7 [v] [Connect] [Quick Look] [Download History] [Charger Monitor]

The connection screen allowing you to initialize communications to the charger opens and becomes the active window.

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## Direct Connection to a Charger



- + Make sure you have the cable between the PC and the charger plugged in
- + Make sure the charger is powered up
- + Select the USB port from the Menu
- + Press connect

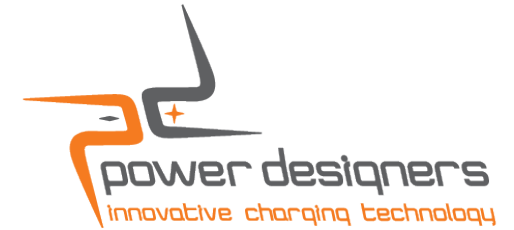
Batt Lo Temp Comp		Profile 0 Finish
Batt Hi Temp Comp		Finish Enable Mode
Hi Comp Temp [F]		Weekdays
Batt Max Temp [F]		Start hour
Amb Max Temp [F]		Duration

Select

COM Port  
USB Port

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## Direct Connection to a Charger



After connecting to the charger, these options become active:

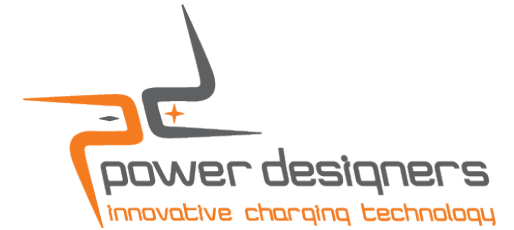
- + Quick Look
- + Download History
- + Charger Monitor

Hi Comp Temp [F]		Weekdays		
Batt Max Temp [F]		Start hour		
Amb Max Temp [F]		Duration		

Select

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## Charger Quick Look



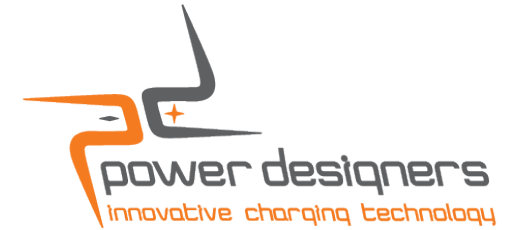
Quick Look will populate the screen with the present charger information

Charger Settings		Profiles		System Settings		Charge Params/Timers	
Charger Model	RV-06.5-150-36V	Profile 0		Present Date	9/10/2014	Trickle Current	15
Factory ID	R05361305C000001	Trickle	Enabled	Present Time	15:50:33	Trickle Voltage	1.85
Drawer V Rating	48	CV Mode	Enabled	Battery Autoselect	No	CC Current	170
Drawer I Rating	25	Finish	Disabled	Charge Autostart	No	CV Voltage	2.42
Power Rating	1300	Equalize	Disabled	Temp Format	Fahrenheit	CV Finish State	75
Cable R[mOhms]	1.5			Daylight Savings	Yes	Finish Current	25
Charger Type	Parallel	Profile 1		Active Profile	Profile 0	Finish Voltage	2.5
Firmware Rev.	2.29	Trickle	Enabled	Profile Autoswitch	Yes	Equalize Current	15
		CV Mode	Enabled	Voltage Detect	Yes	Equalize Voltage	2.55
		Finish	Enabled	Tmp Sensor Detect	No	Trickle Timer	12:00
Battery Settings		Equalize	Enabled	Equalize Mode	Timer Limit	CC Charge Timer	03:00
Battery Capacity	500			Use PT Params	No	CV Charge Timer	03:00
Battery Voltage	48	Profile 0 Finish		Ignore PT Faults	Yes	Finish DV	5
Batt Lo Temp Comp	2	Finish Enable Mode	Default			Finish DT	20
Batt Hi Temp Comp	4	Weekdays	Su,M,Tu,W,Th,Fr,Sa			Finish Timer	03:00
Hi Comp Temp [F]	126	Start hour	22:00			Equalize Timer	06:00
Batt Max Temp [F]	129	Duration	8:00				
Amb Max Temp [F]	140						

Select

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## Charger Download History



- + Download History initially shows progress of the history file transfer

Yes	Finish DV	5
No	Finish DT	20
	Finish Timer	03:00
	Equalize Timer	06:00
	High Pulse Time	60
	Zero Pulse Time	1

Events Downloaded: 112

- + Then opens the database file allowing you to check and select the charger of interest

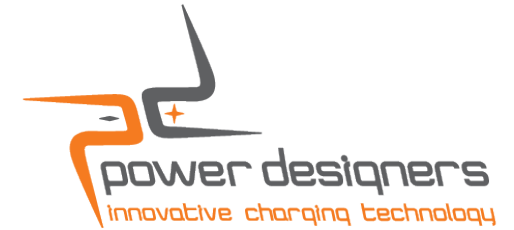
FactoryID	Records	FirstEvtTime	LastEvtTime
<input checked="" type="checkbox"/> R05361305C000001	4	1/1/2000 12:00:00 AM	9/3/2014 2:53:00 PM
<input type="checkbox"/> R08481401P000007	400	9/12/2014 10:19:00 AM	9/12/2014 10:03:00 AM
<input type="checkbox"/> R12481305F000001	400	4/21/2014 1:58:00 PM	9/12/2014 10:55:00 AM

Time Interval:  All Events  Filter By Period  
Start Date: 9/16/2014 End Date: 9/16/2014  
Temperature:  Centigrade  Fahrenheit

Reports: Equalization Summary Report [Load]  
Charger History [Charger Summary]

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## Charger Download Reports



Select any charger in the database

- + **NOTE Summary Reports available from the pull down menu apply to all chargers in the database simultaneously**
- + Use the pull down menu to select one of the following reports:
  - Equalization Summary
  - Fault Summary
  - Operation Summary

The screenshot shows a software window titled "PowerCharge Info". It contains a table with the following data:

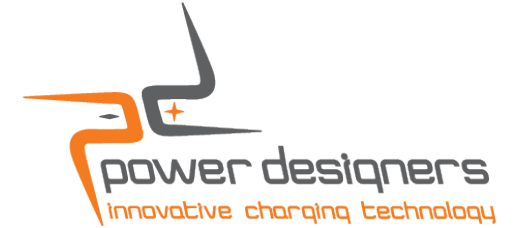
	FactoryID	Records	FirstEvt Time	LastEvt Time
<input checked="" type="checkbox"/>	R05361305C000001	4	1/1/2000 12:00:00 AM	9/3/2014 2:53:00 PM
<input type="checkbox"/>	R08481401P000007	400	9/12/2014 10:19:00 AM	9/12/2014 10:03:00 AM
<input type="checkbox"/>	R12481305F000001	400	4/21/2014 1:58:00 PM	9/12/2014 10:55:00 AM

Below the table are several control panels:

- Time Interval:** Radio buttons for "All Events" (selected) and "Filter By Period". Below are "Start Date:" and "End Date:" dropdown menus, both set to "9/16/2014".
- Temperature:** Radio buttons for "Centigrade" (selected) and "Fahrenheit".
- Reports:** A dropdown menu currently showing "Equalization Summary Report" and a "Load" button.
- Buttons for "Charger History" and "Charger Summary".

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## Equalization Summary Report



The Equalization Summary Report provides the percentage of total charge cycles that terminated in a equalize cycle.

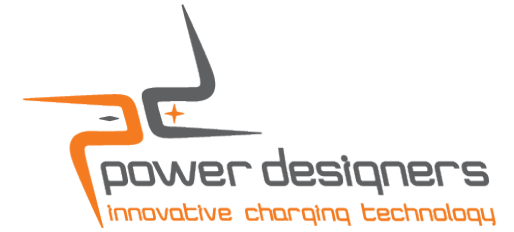
The screenshot shows a software window titled "Equalization Summary Report". It includes a "Filter" section with "Filter By Day" and "Filter By Period" both set to "9/16/2014". There is a "Days Of Week" section with checkboxes for Su, M, Tu, W, Th, Fr, and Sa, all of which are currently unchecked. A "Load" button is located to the right of the checkboxes. Below the filter section is a table with three columns: "SerialNumber", "PercentEqCycles", and "TotalCycles".

SerialNumber	PercentEqCycles	TotalCycles
R05361305C000001	0	4
R08481401P000007	16	400
R12481305F000001	6.75	400

- + This percentage is used with knowledge of the application to provide a figure of merit with respect to the maintenance of the battery and restoration of full charge.
- + A conventional charging application should read near 100% as a conventional charge ends with the finish and equalization cycles.
- + An opportunity or fast charging application with 6 charges per day, 6 days per week and equalization on the weekend is expected to typically show 2% to 4%

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## Fault Summary Report



The Fault Summary Report provides the percentage of total charge cycles that terminated in a fault.

The screenshot shows a software window titled "Fault Summary Report". At the top, there is a "Filter" section with two checkboxes: "Filter By Day" (checked) and "Filter By Period" (unchecked). Both are set to "9/16/2014". A "Load" button is to the right. Below the filter is a table with the following data:

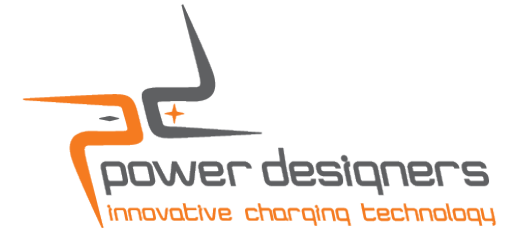
Serial Number	Total Cycles	% Fault Cycles	# Fault Cycles	% OC	% AC	% OT	% Timeout	% Comm Faults	% Battery OT	% PT Faults	% Others	% Fan
R05361305C000001	4	50	2	0	100	0	0	0	0	0	0	0
R08481401P000007	400	6	24	12.5	4.17	0	50	0	25	0	0	8.33
R12481305F000001	400	6	24	12.5	41.67	4.17	20.83	0	0	0	0	20.83

- + This report provides a gauge of the charger and battery health.
- + The first charger in this example shows poor AC input to the charger



# Revolution Series

## Operation Summary Report



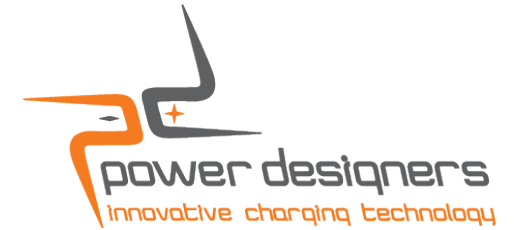
The Operation Summary Report is another window into the health of both the battery and charger, providing more detail with regards to the battery than is available in the fault summary report. The report focuses on battery temperatures, and full charge cycles. This report is most meaningful, when used with batteries that have a temperature sensor or battery monitor installed to provide battery data to the charger.

The screenshot shows the "Operation Summary Report" window. It includes a "Settings" section with radio buttons for "All Events" and "Filter By Period", both set to "9/16/2014". There are input fields for "Low Temperature Limit" (86 °F) and "High Temperature Limit" (113 °F), along with "Apply Filters" and "Preview Charts" buttons. An "Exception Filter" section contains checkboxes and spinners for: "% Usage <" (100), "% Completed Cycles <" (100), "% Equalization Cycles <" (100), "% Full Charge Cycles <" (100), "% Temp > 113°F" (0), and "% Fault Events >" (0). There are "Apply Filters" and "Preview Report" buttons here as well. Below the settings is a table with the following data:

Serial Number	Total Cycles	% Usage	% EQ Cycles	% Fault Events	% Completed	% Full Charge	% Temp < 86°F	% Temp 86°F - 113°F	% Temp > 113°F
R05361305C000001	4	0	0	75	0	0	100.0	0.0	0.0
R12481305F000001	400	7	6.75	23.5	6	10	97.8	2.3	0.0
R08481401P000007	383	8.9	16	11	23.75	22	74.7	21.9	3.4

# Revolution Series

## Charger History Report



The Charger History Report, is a detailed look at the charger cycles, active profiles, voltages and other information specific to the operation of the selected charger.

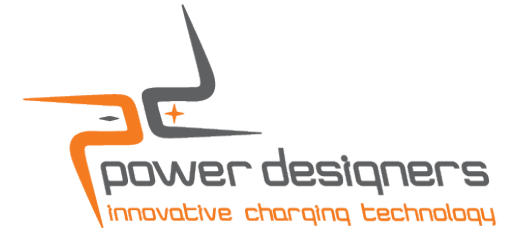
The screenshot shows a software window titled "Charger History - FID: R12481305F000001". It includes a filter section with dropdown menus for "Cycle Start Date" (set to 9/16/2014) and "Cycle Finish State" (set to IDLE), and a "Load" button. Below the filter is a "Cycle Profiles" section with checkboxes for TR, CC, CV, FIN, EQ, and DE. The main part of the window is a table with the following columns: Cycle ID, Cycle Start, Cycle Duration, Cycle Ahrs, Begin Voltage, End Voltage, Begin Temp [°C], End Temp [°C], Charge Profile, Finish State, FactoryID, and PT FactoryID. The table contains 17 rows of data, with the first row (Cycle ID 261) highlighted in blue.

Cycle ID	Cycle Start	Cycle Duration	Cycle Ahrs	Begin Voltage	End Voltage	Begin Temp [°C]	End Temp [°C]	Charge Profile	Finish State	FactoryID	PT FactoryID
261	4/21/2014 1:58 PM	02:28:37	309	0.4	51.5	24.6	25.4	CC	STOPPED	R12481305F000001	N/A
262	5/1/2014 10:49 AM	00:00:01	0	39.3	39.3	24.7	24.7	TR	STOPPED	R12481305F000001	N/A
263	5/1/2014 10:49 AM	00:00:20	0	39.3	39.5	-31	-31	TR	STOPPED	R12481305F000001	N/A
264	5/1/2014 10:50 AM	00:02:06	3	39.3	45	-31	-31	TR CC CV	COMPLETED	R12481305F000001	N/A
265	5/1/2014 10:53 AM	00:14:47	36	38	37.4	-31	-31	TR CC	STOPPED	R12481305F000001	N/A
266	5/1/2014 11:08 AM	00:01:02	2	36.6	37.4	-31	-31	TR CC	STOPPED	R12481305F000001	N/A
267	5/1/2014 11:09 AM	03:33:03	501	36.4	43.2	-31	-31	TR CC CV	OV FAULT	R12481305F000001	N/A
268	5/1/2014 2:44 PM	01:36:27	34	41	43.5	-31	-31	TR CC CV FI EQ	STOPPED	R12481305F000001	N/A
269	5/2/2014 7:54 AM	00:01:13	2	0.4	43	-31	-31	CC CV	STOPPED	R12481305F000001	N/A
270	5/2/2014 7:55 AM	00:03:18	7	0.4	43.3	-31	-31	CC CV	STOPPED	R12481305F000001	N/A
271	5/2/2014 7:59 AM	02:00:22	299	0.4	43.1	-31	-31	CC CV	CV TIMEOUT	R12481305F000001	N/A
272	5/2/2014 10:07 AM	06:00:22	894	0.4	43.1	-31	-31	CC CV	CV TIMEOUT	R12481305F000001	N/A
273	5/5/2014 7:36 AM	02:06:12	312	0.4	43.1	-31	-31	CC CV	STOPPED	R12481305F000001	N/A
274	5/5/2014 3:21 PM	00:00:18	0	0.4	46.1	-31	-31	CC CV	COMPLETED	R12481305F000001	N/A
275	5/5/2014 3:23 PM	00:00:18	0	0.4	46.2	-31	-31	CC CV	COMPLETED	R12481305F000001	N/A
276	5/5/2014 3:25 PM	00:00:20	0	0.4	50.8	-31	-31	CC CV	COMPLETED	R12481305F000001	N/A
277	5/5/2014 3:27 PM	00:56:22	26	0.4	44.1	-31	-31	CC	STOPPED	R12481305F000001	N/A

+ In the example shown there are Constant Voltage (CV) time outs that have occurred , indicating that either the CV time or the CV voltage transition to finish requires adjustment

# Revolution Series

## Charger Summary Report



The Charger Summary Report, provides information with respect to the selected charger.

- + This report is not intended as a diagnostic tool, rather to convey basic information on model number and utilization over the chargers life.

Charger Summary - FID: R12481305F000001

Filter

All Events  Filter By Period

Low Temperature  °F

High Temperature  °F

9/16/2014 9/16/2014

Summary

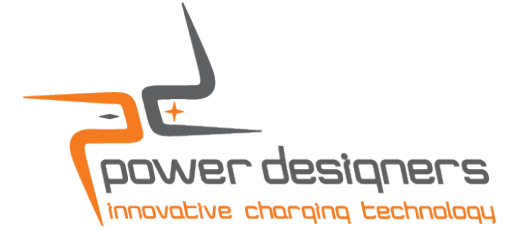
<b>Charger Settings</b>	<b>Charger Life Time</b>
Model Number: RV-15.6-300-48V	Manufacture Date: 2/26/2014 3:33:00 PM
Serial Number: R12481305F000001	First Charge Cycle: 2/26/2014 3:35:34 PM
Current Rating: 300 A	Lifetime Charge Ahrs: 12631
Power Rating: 15600 W	Lifetime Charge KWhrs: 498
Firmware Revision: 2.39	

<b>Charger Operation</b>	<b>Temperature Distribution</b>
% Charger Usage: 6.6	% of Cycles < 86 °F: 97.8
% Equalize Cycles: 6.75	% of Cycles > 86 °F and < 113 °F: 2.3
% Fault Cycles: 23.5	% of Cycles > 113 °F: 0.0
% Completed Cycles: 6	
% Full Cycles: 10	

# Revolution Series

## Quiz Time

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What is the common name for the USB type A to USB type B cable used between the charger and PC?

A printer cable

What is the name of the utility used to communicate with the charger?

PowerCharge Data Link

A Quick Look serves what function?

It populates the screen with the current information about the charger

Summary reports apply to \_\_\_\_\_ chargers in the database?

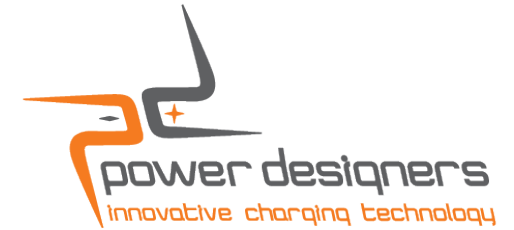
All

Equalize percentages of total charge cycle should be approximately \_\_\_\_\_ percent for conventional charging

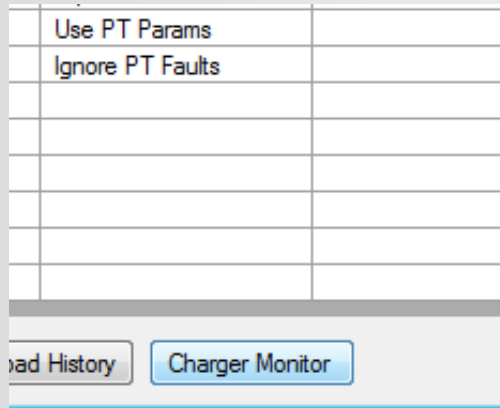
100%

# Revolution Series

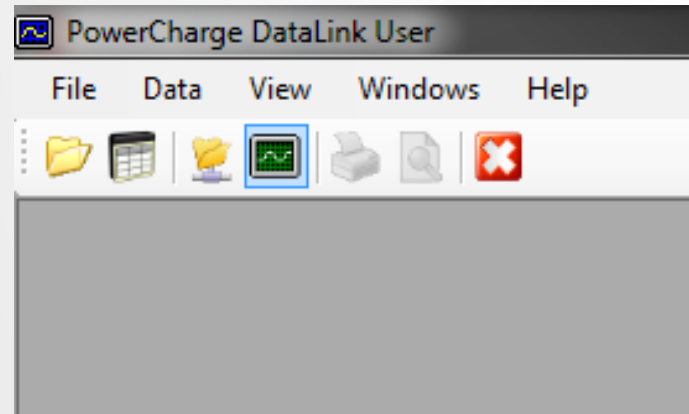
## PowerCharge DataLink Charger Monitoring and Programming



To access the chargers parameters for monitoring and programming. Either the Monitor button in the direct connection screen, or the Monitor icon is used.

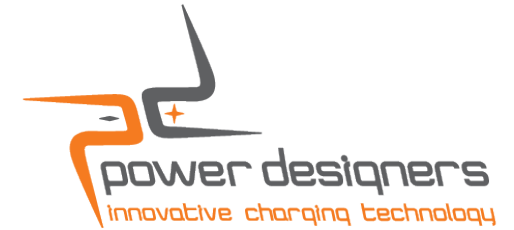


OR



# Revolution Series

## PowerCharge DataLink Charger Monitoring and Programming

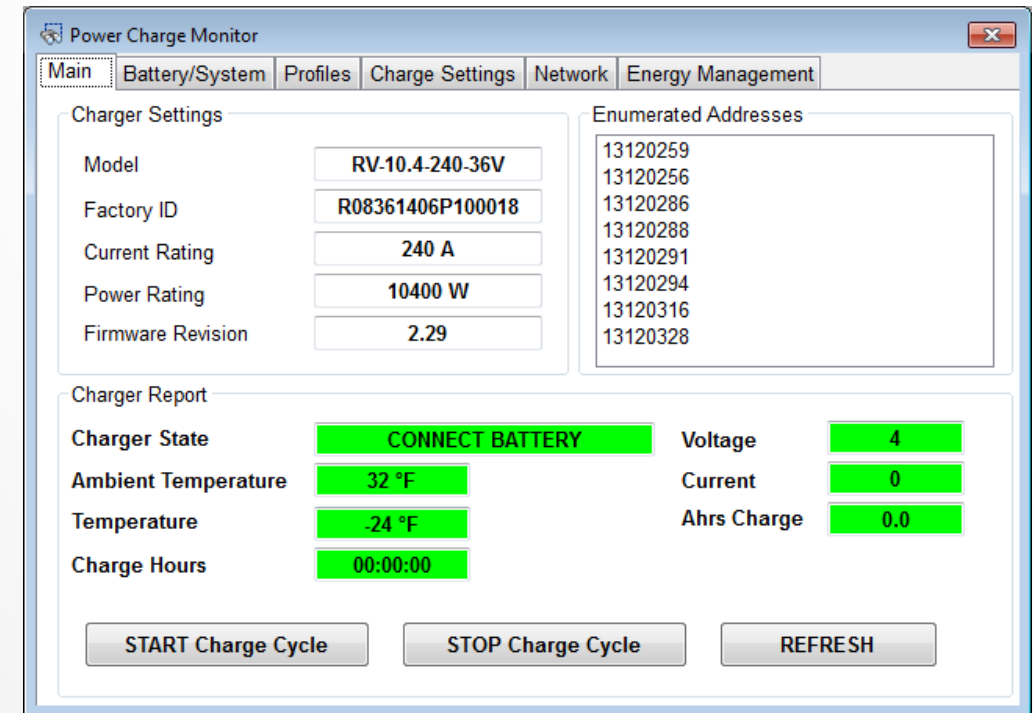


The main window of the Monitor has buttons at the bottom to:

- + Start and Stop charge cycles, and to refresh the screen at any time.

Tabs are available for to specific functions:

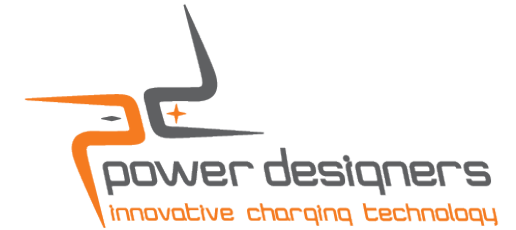
- + **Main**
- + Battery System
- + Profiles
- + Charge Settings
- + Network
- + Energy Management



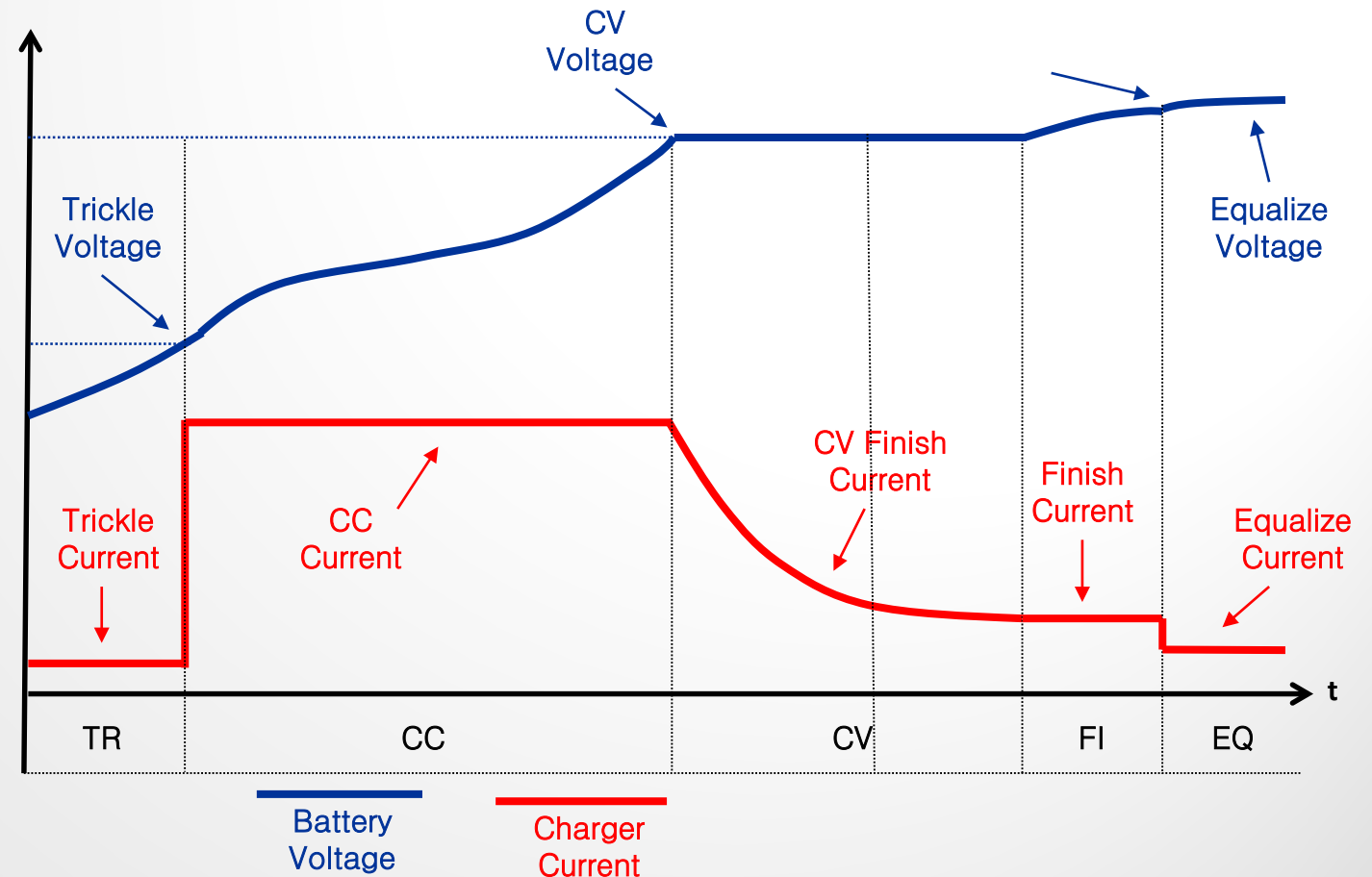
The main window shows the model number and factory identification of the charger. While providing the serial number of all installed power units

# Revolution Series

## Charge Curve

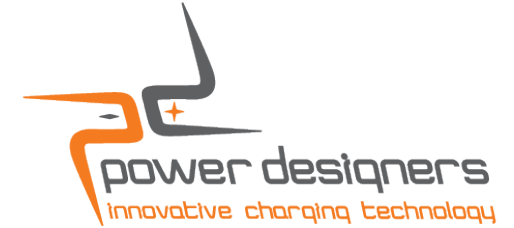


- + The charge curve governs the amount of current provided to the battery based on the batteries volts per cell and the charge profile chosen. Profiles specify which portions of the curve apply to the charge cycle, and on which days.
- + As noted earlier conventional charging the equalize portion of the cycle runs daily, while opportunity charging equalizes only with a profile operating on a weekend



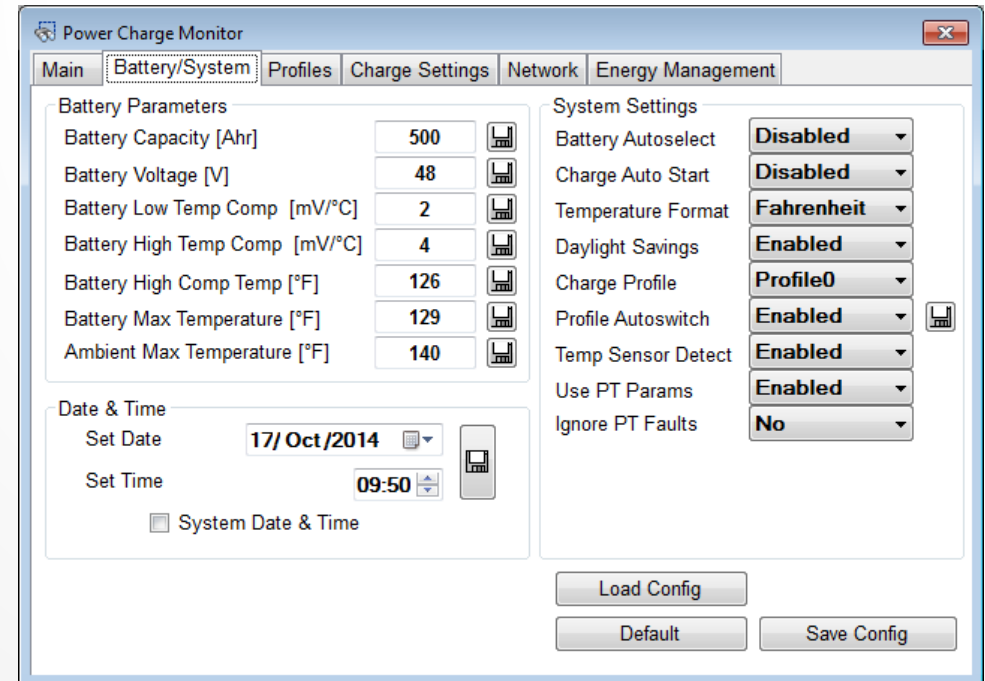
# Revolution Series

## Battery and Systems Settings



The battery and systems setting tab is split into 2 sections, with the left hand side allowing modification of the battery parameters and the right hand side allowing the system operation to be modified.

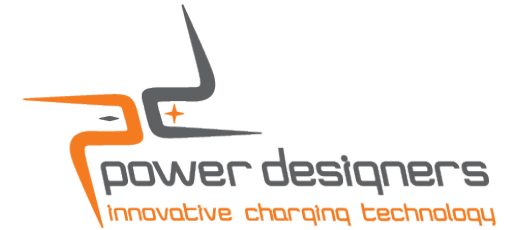
- + In general only the battery Ahr capacity and the battery voltage should need to be modified when a different battery is associated with the charger on this tab.





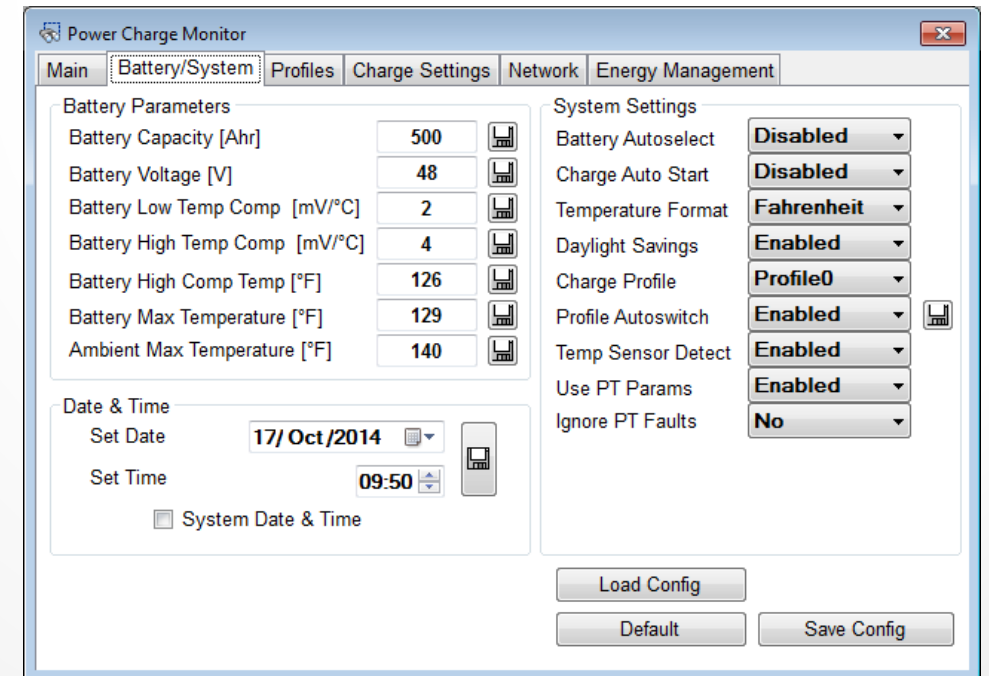
# Revolution Series

## Battery and Systems Settings



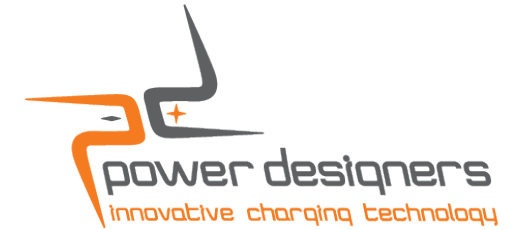
Systems settings can be modified to allow the charger to:

- + automatically select between batteries of the same capacity with differing voltages
- + allow the charge to start automatically when the battery is connected
- + change between profiles for opportunity charging; detect a temperature sensor
- + to use the parameters stored in a PowerTrac to set the charger to the battery being connected.



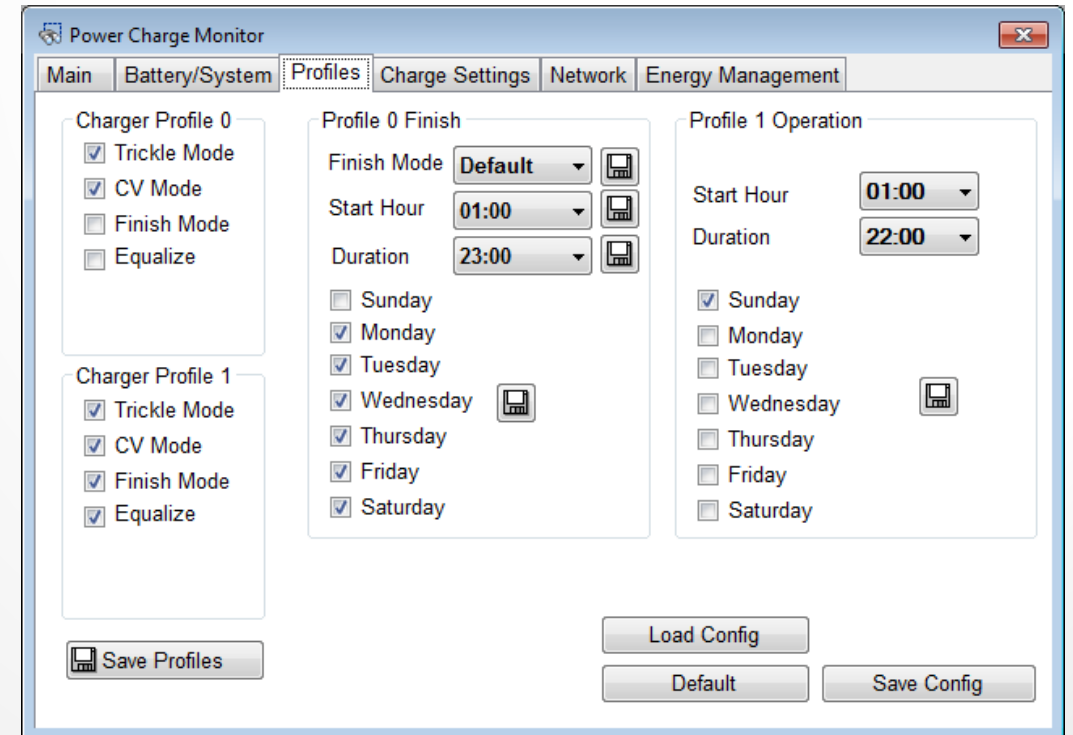
# Revolution Series

## Profile Settings



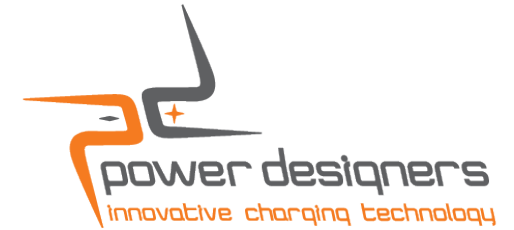
Profiles determine which portions of the charge curve are executed on a daily basis. Conventional charging uses profile 0 daily and has finish and equalize enabled.

- + Profile 0 and profile 1 are used for opportunity charging, depending on the energy return desired profile 0 may or may not have finish enabled, while profile 1 will always have both finish and equalization enabled.
- + Profile 1 is set to the day of the week when there is sufficient time available allow for finish and equalization typically Saturday or Sunday



# Revolution Series

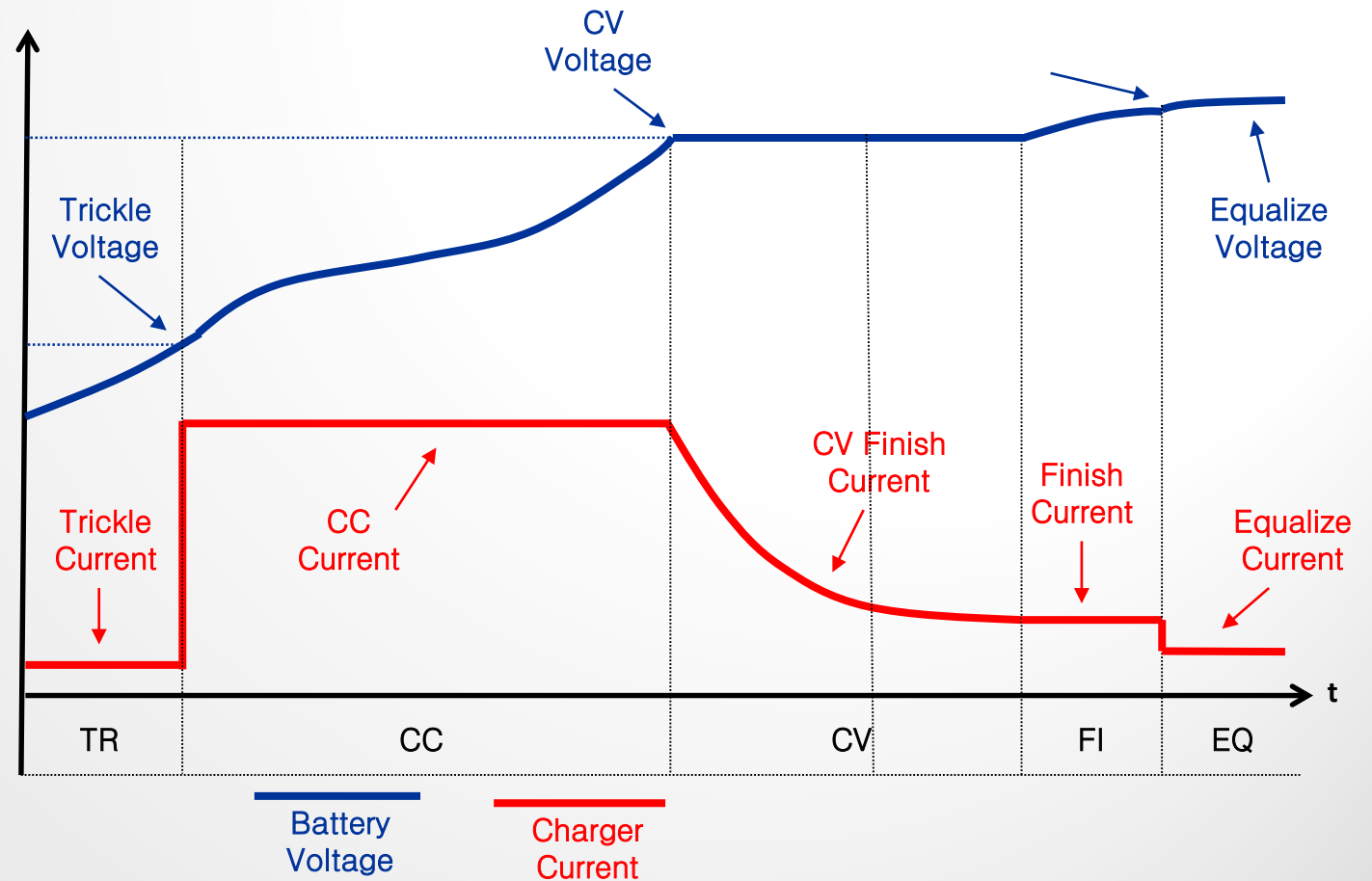
## Charge Curve and Charge Settings



The charge curve has several modes:

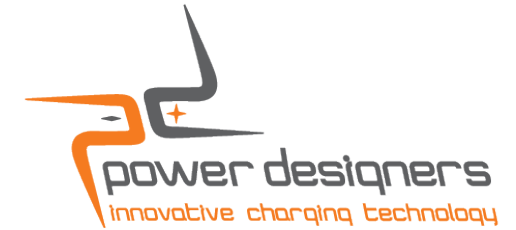
- + Trickle
- + Constant Current (CC)
- + Constant Voltage (CV)
- + Finish
- + Equalize

The Charge Settings tab is when the specific currents, voltages, and time limits for each portion of the curve is adjusted.



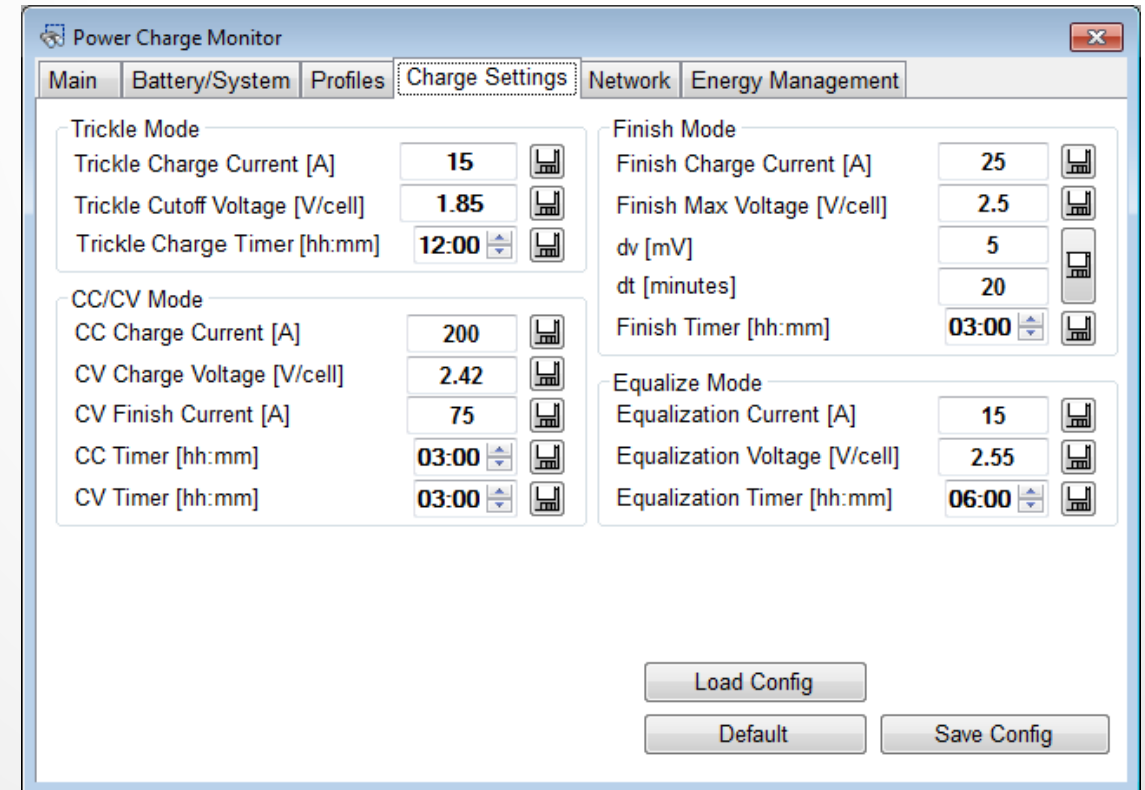
# Revolution Series

## Charge Settings



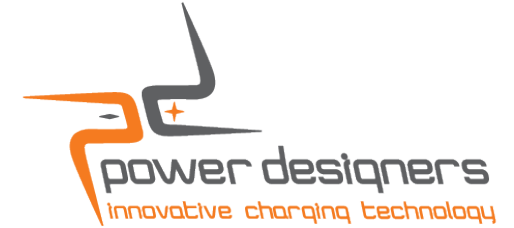
Revolution chargers are preset to the specified charging mode prior to shipment, be it Conventional, Opportunity, or Fast. All transition voltages, all currents and timers are based on the charging mode along with the battery capacity and voltage.

- + As the battery ages, it may be necessary to adjust the transition voltages and / or timers to account for the batteries loss of efficiency and capacity with age.
- + This is also the screen where values would need to be input if a stock charger were being converted from conventional to opportunity charge.



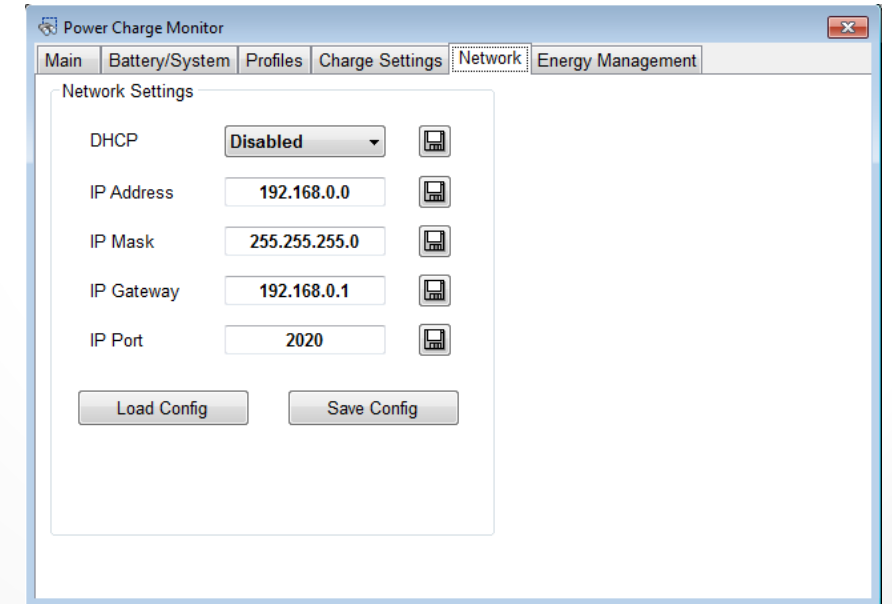
# Revolution Series

## Network Settings



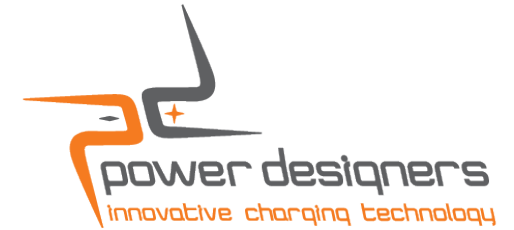
When equipped with the optional network interface allowing the charger to be remotely controlled, monitored and configured using the PowerCharge.net application; this tab allows configuration and addressing of the charger on the network.

- + It is necessary to either enable the Direct host Control Protocol (DHCP) or to provide the network addresses as input



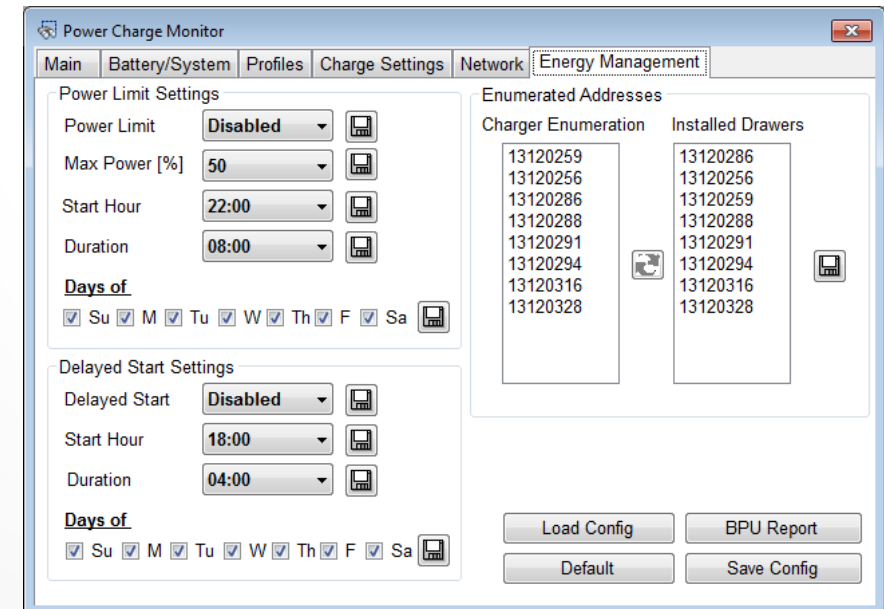
# Revolution Series

## Energy Management Settings and BPU



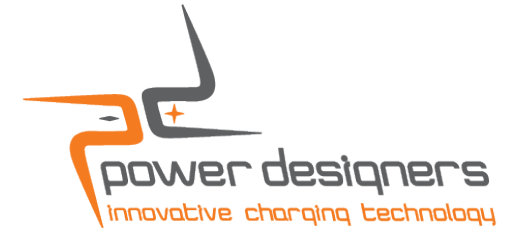
The Energy Management tab is split left to right.

- + Settings on the left are **reserved for future implementation** and will include; the ability to limit the power output from the charger based on time of day, and percentage of maximum power; along with the ability to delay automatic start of the charge to off peak times on the left.
- + The right hand side presents BPU functions and reporting allowing you to verify or change the number of active enumerated BPU's



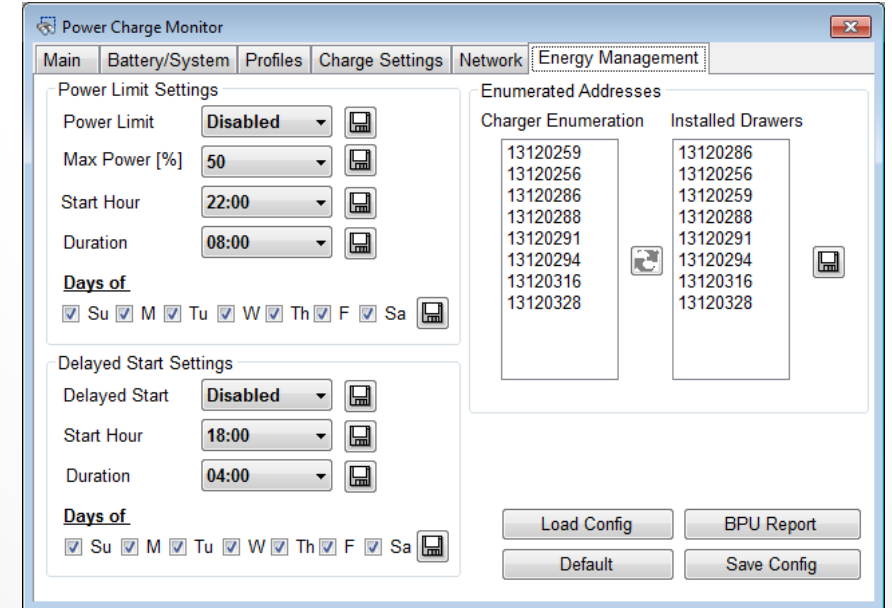
# Revolution Series

## Energy Management Settings and BPU



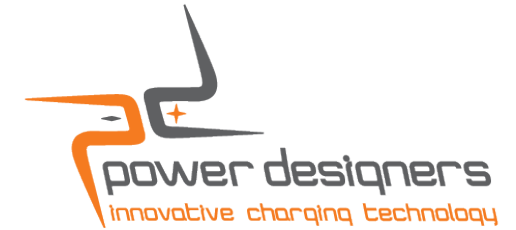
When servicing or replacing BPU's it is necessary to define the installed BPU's to the charger controller. This is accomplished by enumerating the BPU serial numbers and then using the icons to transfer the BPU's from inactive to active on the list.

- + There is a dedicated BPU report button that allows a detailed look at the status of the installed BPU's



# Revolution Series

## BPU Report



The example BPU report taken during a charge shows that only one of the units is running, at 15 amperes, the charger has idled the remaining units as the battery voltage is representative of a constant voltage charge, when current is reduced and units are disabled to maintain maximum efficiency.

The screenshot shows a window titled "BPU Detailed Report" with a table containing 8 rows of data. The table has 17 columns: STATE, MAC Address, BPU Ver., Volt. Rating, Curr. Rating, Status Bits, Read Current, Read Voltage, Sent Current, Comm Errors, OC, OV, Input UV, OT, Timeout, OCP, and Fan. The first row is highlighted in blue and shows a "Discovered" unit with MAC 13120286, BPU Ver. 13.05, Volt. Rating 36, Curr. Rating 30, Status Bits IDLE, Read Current 0, Read Voltage 0, Sent Current 0, Comm Errors 0, OC 0, OV 0, Input UV 0, OT 0, Timeout 0, OCP 0, and Fan 0. The second row is highlighted in green and shows a "Discovered" unit with MAC 13120256, BPU Ver. 13.05, Volt. Rating 36, Curr. Rating 30, Status Bits IDLE, Read Current 0, Read Voltage 0, Sent Current 0, Comm Errors 0, OC 0, OV 0, Input UV 0, OT 0, Timeout 0, OCP 0, and Fan 0. The third row is highlighted in green and shows a "Discovered" unit with MAC 13120259, BPU Ver. 13.05, Volt. Rating 36, Curr. Rating 30, Status Bits IDLE, Read Current 0, Read Voltage 0, Sent Current 0, Comm Errors 0, OC 0, OV 0, Input UV 0, OT 0, Timeout 0, OCP 0, and Fan 0. The fourth row is highlighted in green and shows a "Discovered" unit with MAC 13120288, BPU Ver. 13.05, Volt. Rating 36, Curr. Rating 30, Status Bits IDLE, Read Current 0, Read Voltage 0, Sent Current 0, Comm Errors 0, OC 0, OV 0, Input UV 0, OT 0, Timeout 0, OCP 0, and Fan 0. The fifth row is highlighted in green and shows a "Discovered" unit with MAC 13120291, BPU Ver. 13.05, Volt. Rating 36, Curr. Rating 30, Status Bits IDLE, Read Current 0, Read Voltage 0, Sent Current 0, Comm Errors 0, OC 0, OV 0, Input UV 0, OT 0, Timeout 0, OCP 0, and Fan 0. The sixth row is highlighted in orange and shows a "Runing" unit with MAC 13120294, BPU Ver. 13.05, Volt. Rating 36, Curr. Rating 30, Status Bits RUN, Read Current 15, Read Voltage 39.61, Sent Current 15, Comm Errors 0, OC 0, OV 0, Input UV 0, OT 0, Timeout 0, OCP 0, and Fan 0. The seventh row is highlighted in green and shows a "Discovered" unit with MAC 13120316, BPU Ver. 13.05, Volt. Rating 36, Curr. Rating 30, Status Bits IDLE, Read Current 0, Read Voltage 0, Sent Current 0, Comm Errors 0, OC 0, OV 0, Input UV 0, OT 0, Timeout 0, OCP 0, and Fan 0. The eighth row is highlighted in green and shows a "Discovered" unit with MAC 13120328, BPU Ver. 13.05, Volt. Rating 36, Curr. Rating 30, Status Bits IDLE, Read Current 0, Read Voltage 0, Sent Current 0, Comm Errors 0, OC 0, OV 0, Input UV 0, OT 0, Timeout 0, OCP 0, and Fan 0. Below the table, the text "Number Of BPUs: 8" is displayed.

STATE	MAC Address	BPU Ver.	Volt. Rating	Curr. Rating	Status Bits	Read Current	Read Voltage	Sent Current	Comm Errors	OC	OV	Input UV	OT	Timeout	OCP	Fan
Discovered	13120286	13.05	36	30	IDLE	0	0	0	0	0	0	0	0	0	0	0
Discovered	13120256	13.05	36	30	IDLE	0	0	0	0	0	0	0	0	0	0	0
Discovered	13120259	13.05	36	30	IDLE	0	0	0	0	0	0	0	0	0	0	0
Discovered	13120288	13.05	36	30	IDLE	0	0	0	0	0	0	0	0	0	0	0
Discovered	13120291	13.05	36	30	IDLE	0	0	0	0	0	0	0	0	0	0	0
Runing	13120294	13.05	36	30	RUN	15	39.61	15	0	0	0	0	0	0	0	0
Discovered	13120316	13.05	36	30	IDLE	0	0	0	0	0	0	0	0	0	0	0
Discovered	13120328	13.05	36	30	IDLE	0	0	0	0	0	0	0	0	0	0	0

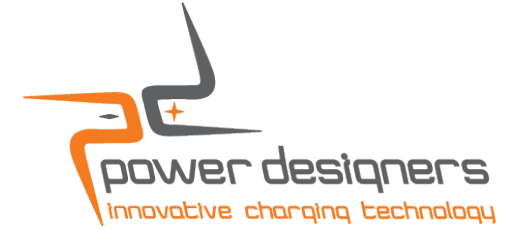
Number Of BPUs: 8



# Revolution Series

## Quiz Time

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To access the charger for monitoring or programming a \_\_\_\_\_ connect is required?

Direct

What are the two charger commands available on the main screen?

Start and Stop Charge

Opportunity charging uses how many profiles?

Two, profile 0 that runs daily, and profile 1 that runs when equalize is required

As a battery ages and becomes less efficient what tab would I use to adjust timers or transition voltages?

Charge Settings

The Revolution charger maintains high efficiency by disabling power units when less than full power output is required True or False

True

How many BPU's were running in the sample report?

1

Thank You  
On Behalf of  
Power Designers  
For Your  
Participation