APPLICATION NOTE

VideoRay

Portable Power Supply

DOCUMENT	REVISION	DATE	AUTHOR	CHECK	APPROVE
AN-007	SK001	04/24/2023	Joe Vespaziani	PEND	PEND

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1.0 INTRODUCTION

The purpose of this procedure is to outline the use of a VideoRay PPS system

1.1 Safety Requirements

Do not open the battery storage panel unless you have read these instructions in entirety and been properly trained. High shock hazard.

Charging should never take place without removing the battery storage panel prior. Only charge in a well ventilated room.

1.2 Tools Needed

1/2” wrench

9/16” wrench

T20 Torque driver

1.3 Accessories and Hardware

1.3.1 Standard Accessories

- Inverter manual
- Battery Monitor Manual
- [72914] Std power cord (for OCC)

- [72892] 3 outlet U.S. Extension cord

- [72915] Battery Power Main leads (2 Gauge)

- [72785] Black 30” positive cable
- [72786] Red 30” negative cable
- [72783] Red and Black 14” series cable

1.3.2 Hardware

- [70256] M6 male thumb screw

- [71838] M6 female thumb screw

1.3.3 Additional Accessories

1.3.3.1 [72797] M24 battery integration kit

- [72917] M24 hold down plate

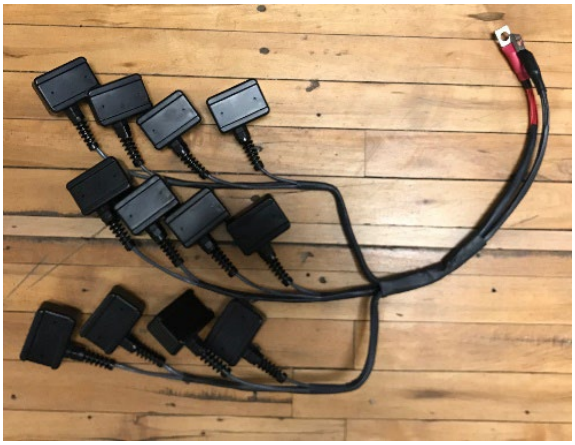
- [71765] Battery Support Foam; M24

1.3.3.2 [72798] XX90 battery integration kit

- [72881] XX90 base tray

- [72882] XX90 top plate

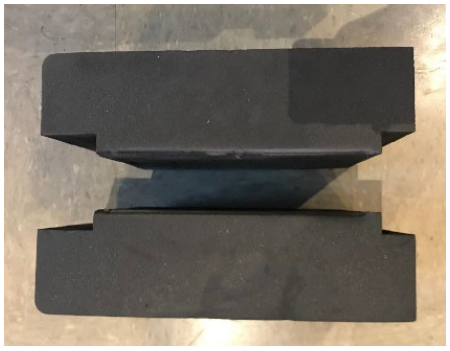
- [72916] XX90 battery harness



1.3.3.3 [72796] 6T battery integration kit

- [71605] 6T battery hold down plate

- [71767] battery support foam; 6T



1.3.3.4 PPS [73507] 12-63V 8A battery charger

**** for use with M24 or 6T battery packs only ****

1.4 VideoRay recommended battery packs

1.4.1 "M24"

Two (2) "group 24 type M" batteries may be purchased at local auto parts store. The physical constraint of each battery is roughly 10.25" x 6.65" x 8.35" or 260mm x 169mm x 211mm. Terminal type M is preferred. **The PPS system has a maximum L input of 10.5"

Caution: Always replace both batteries at once. Do not mix used and new batteries.

Recommended battery: AC Delco M24AGM

1.4.2 "XX90's"

Twelve (12) batteries are needed. The physical constraint of each battery is roughly 4.4" x 2.4" x 5.0" or 112mm x 61mm x 127mm.

It is not necessary to replace all battteries at once. Mixing used and new batteries is ok.

Recommended battery: BT-70791CG, BT-70791CK, BT-70791CE, BT-70790B, BT-70791JV, BT-70791A, BT-70791BK **ALL 12 batteries being used MUST be of the same chemistry**

1.4.3 "6T"

One (1) battery is needed. The physical constraint of each battery is roughly 9.85” x 10.5” x 9.05” or 250mm x 267mm x 230mm. **The PPS system has a maximum L input of 10.5”

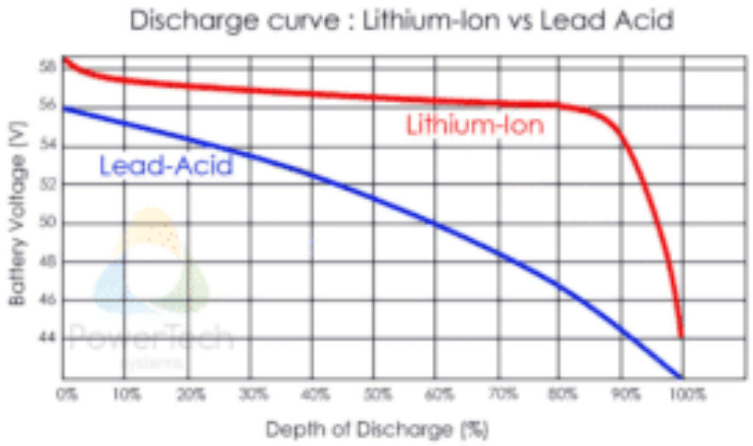
Recommended battery: BT-70939

1.4.4 Performance Comparison

Useable capacity mainly depends on battery chemistry and rate of use. For these calculations 24V and average load of 1Kw are used. Discharge potential: lithium – 95%, Lead acid – 50%, NiMh – 72%

Battery Pack	Total Capacity	Approximate run time *dependant on usage
(2) M24 AGM batteries in series **AC Delco M24AGM**	116 Ah – 58Ah useable	1.0 – 1.73 hours
(1) 6T lithium battery **BT-70939AP**	103 Ah – 98Ah useable	3.6 – 6.2 hours
(12) XX90 batteries in parallel **BT-70791CG**	118 Ah – 110Ah useable	4.9 – 8.5 hours
(12) XX90 batteries in parallel BT-70791CK	90 Ah – 84Ah useable	3.8 – 6.5 hours
(12) XX90 batteries in parallel BT-70790B	58.8 Ah – 43Ah useable	1.5 – 3.0 hours

Various battery chemistries have different voltage curves during discharge. Lithium batteries will have more useable AH than lead acid, AGM, and NiMh.



2.0 BATTERY PACKS - INSTALLATION AND REMOVAL

2.1 M24 Batteries

Required parts:

-Two (2) M24 batteries

-[72915] Battery main leads (2 Gauge)

-[72797] M24 battery integration kit

- [72917] M24 hold down plate

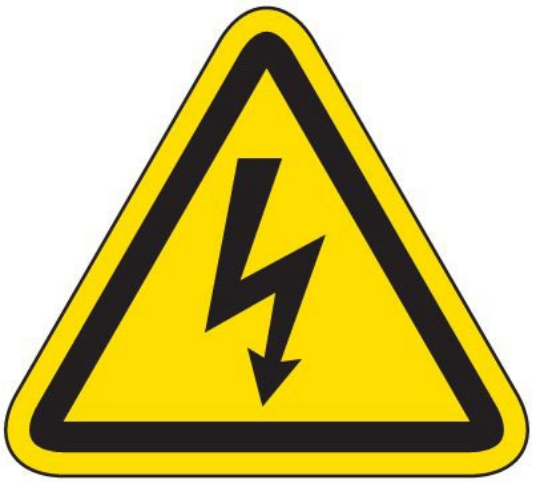
- [71765] Battery Support Foam; M24

Step	Description	Notes
1.	Refer to section 2.2 & 2.3 for the removal process of XX90 battery packs or 6T battery packs.	
2.	Open the pelican case lid to access the battery storage panel. 	

Step	Description	Notes

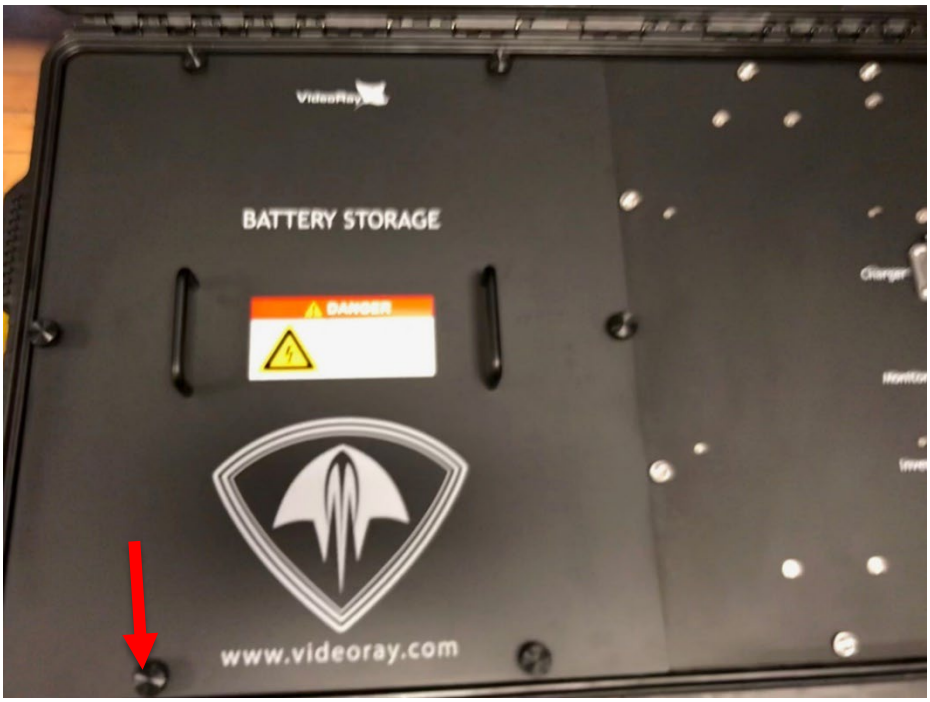
3. Assure that the power main switch is set to the “OFF” position, and that nothing is plugged into the PPS power outlet. The inverter switch should also be set to “OFF”

4. ***Read through all of these steps prior to starting. **Caution** high risk of electric shock. Be very cautious of your tools, touching multiple terminals with your tool could result in a DC short. ***

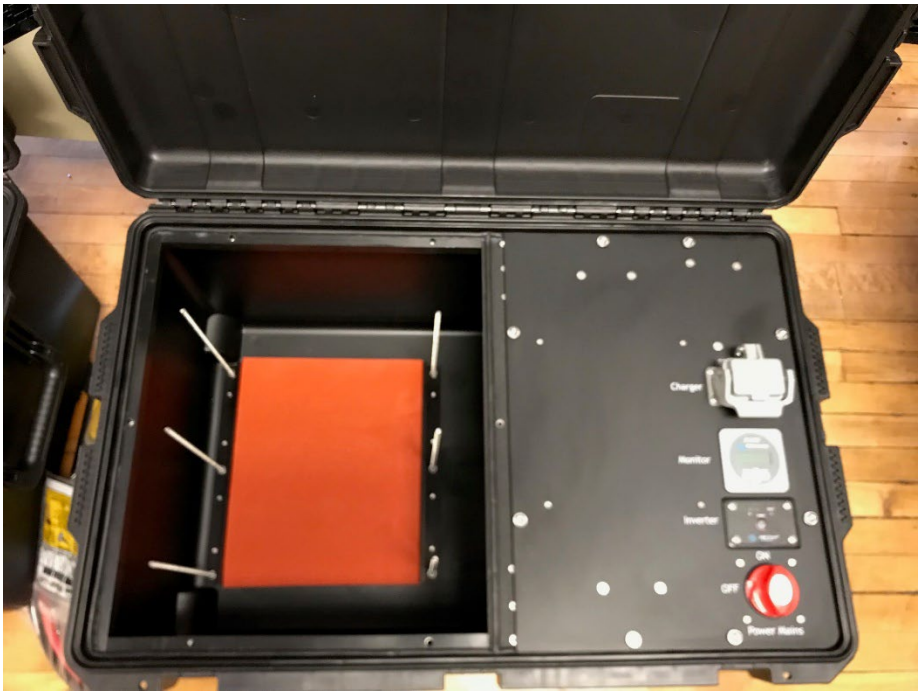


Step	Description	Notes

5. Remove the six (6) M6 male thumb screws[70256] securing the battery storage panel in place. Store these thumb screws safely to the side.



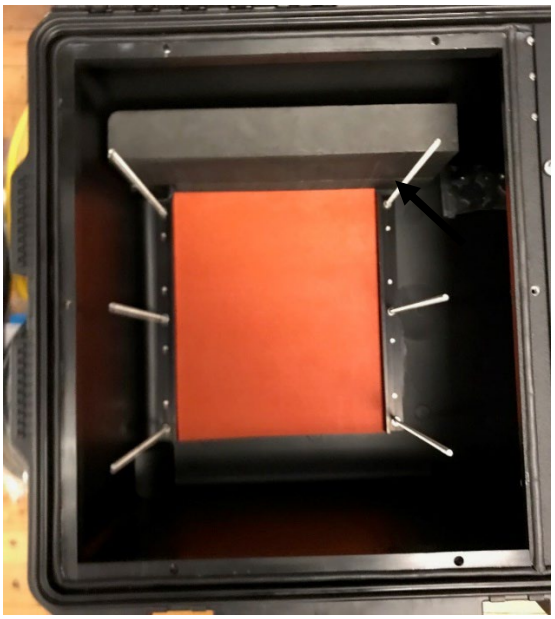
6. Remove the battery storage panel and store it safely to the side.



Step	Description	Notes

7. Install the back side of the Battery support foam; M24 [71765] into the case.

The cutout on the bottom of the foam should sit over the wheel well inside the case.



8. Place the first battery into the case. Note the orientation of the battery.

Step	Description	Notes

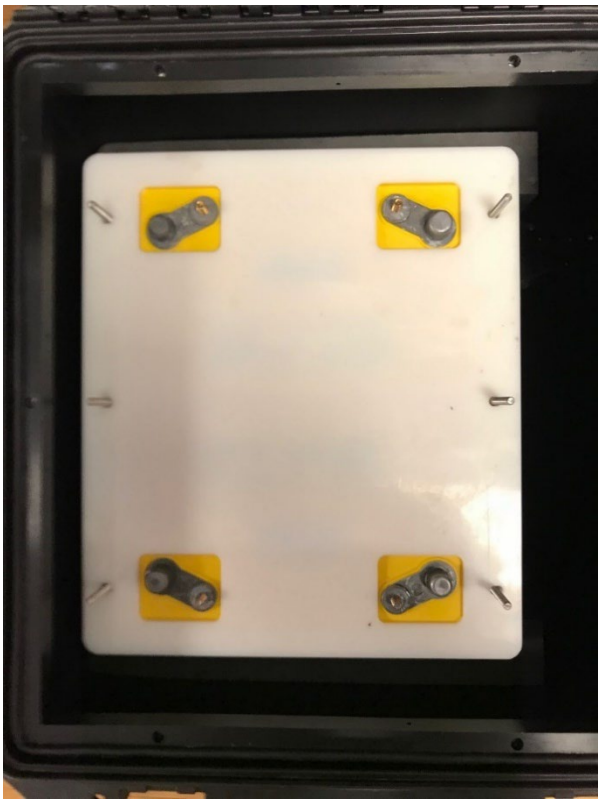
9. Place the second battery into the case. Note the orientation of the battery. The terminals of the batteries should be on opposing sides of each other.

Step	Description	Notes

10. Insert the second piece of the battery support foam; M24 [71765]. Press the foam firmly down into place as seen below.

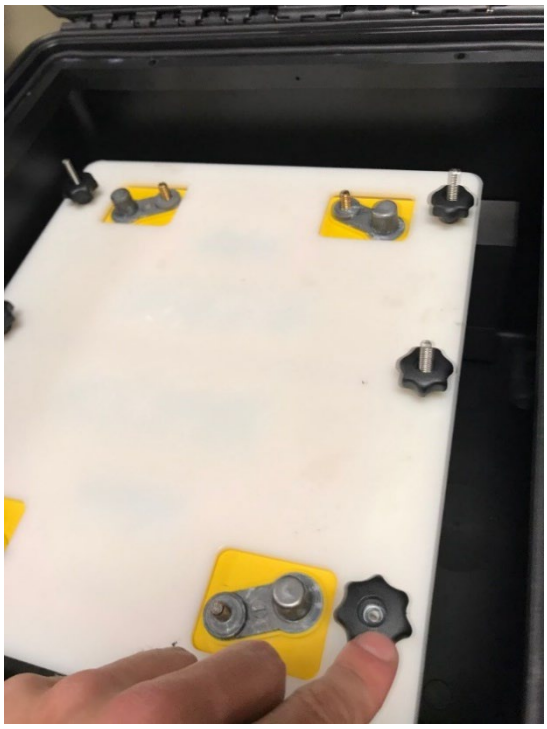
Step	Description	Notes

11. Install the M24 hold down plate [72917] onto the batteries.



Step	Description	Notes

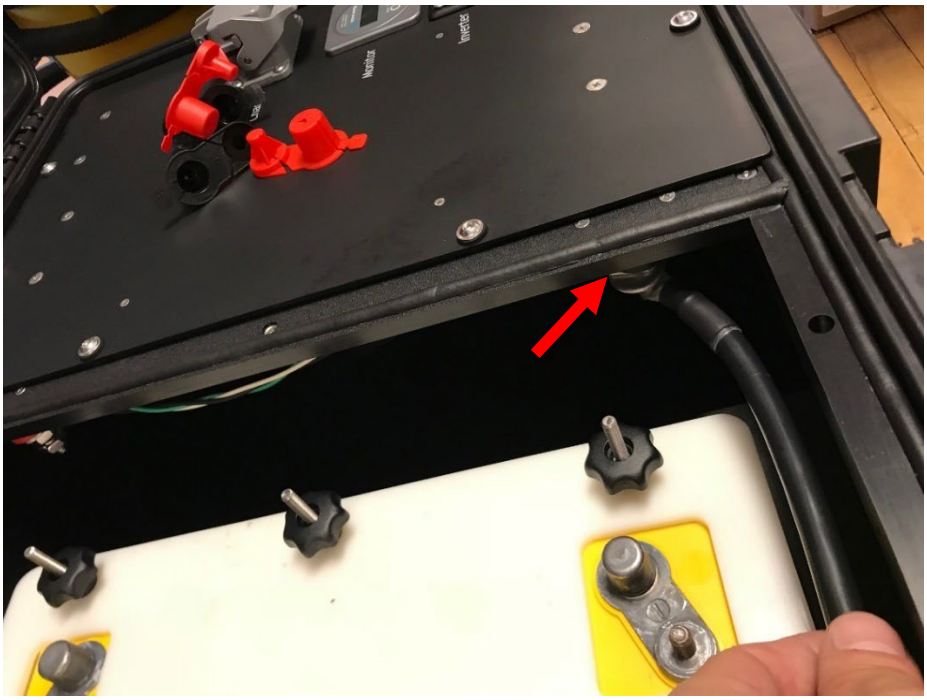
12. Install six (6) M6 female thumb screws [71838]. Tighten down firmly.



13. Gather the battery main leads (2 gauge) [72915]

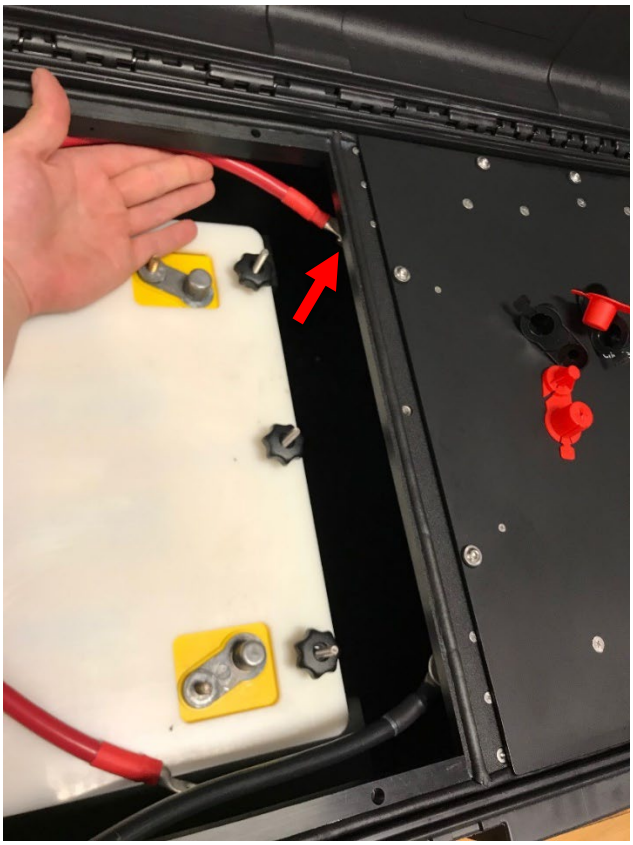
Step	Description	Notes

14. Attach the battery Main leads (2 gauge) into the system. The black 30” cable should be closest the front of the case. Use a 9/16” wrench. Do NOT overtighten. **Be very careful not to touch the battery terminals with your wrench**.



Step	Description	Notes

15. Install the red 30” cable to the red terminal in the back of the case. Tighten with a 9/16” wrench. **Be very careful not to touch the battery terminals with your wrench**.



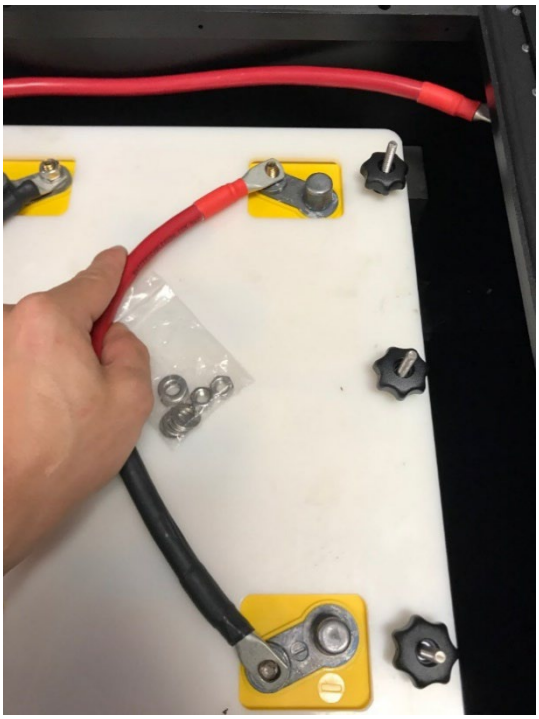
Step	Description	Notes

16. Attach the Black negative DC cable to the first battery installed. Assure that the terminal shows a (-) symbol. Use a ½" wrench to tighten. **Be very careful not to touch the battery terminals with your wrench**.

17. Carefully attach the red positive DC cable to the battery that is closest to you. Assure that the terminal shows a (+) symbol. Use a ½" wrench to tighten. **Be very careful not to touch the other battery terminals with your wrench**.

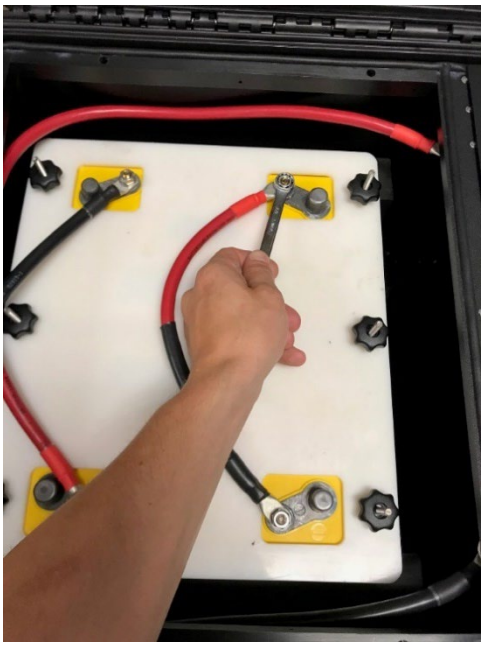
Step	Description	Notes

18. Carefully attach the red and black 14” series cable between the two batteries. Attach the red side to the positive terminal of the first battery. Attach the black end to the negative terminal of the second battery. It is normal to see small spark while making this connection. **Be very careful not to touch the other battery terminals with your wrench**.



Step	Description	Notes

19. Tighten down the all the connections of the batteries with a ½" wrench. **Be very careful not to touch the battery terminals with your wrench**.

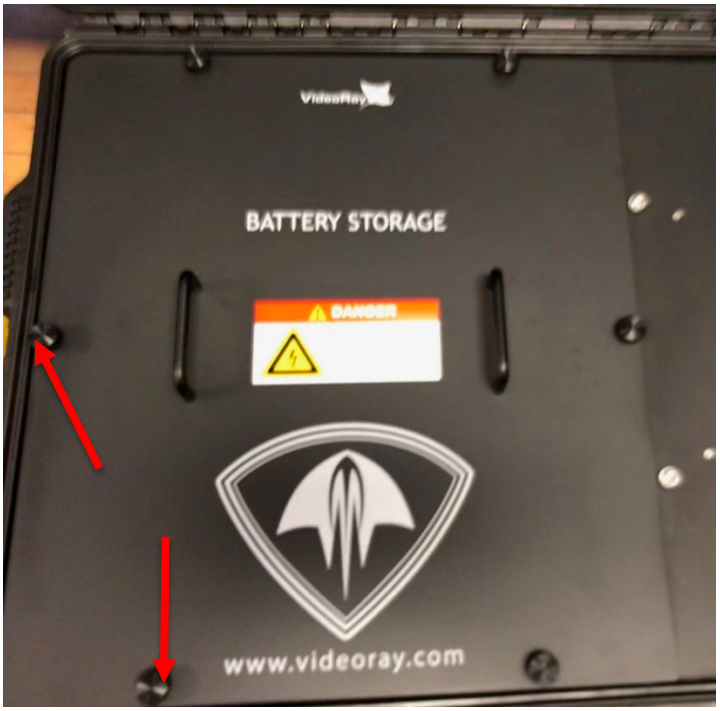


20. At this point, flip the inverter switch to "monitor" and observe the battery monitor to see if the system is receiving idle power. If the display lights up or shows a reading, the system has been properly connected. If the battery monitor does not have a reading, double check your steps and or see troubleshooting section 7.0.

Step	Description	Notes

21. If the test was successful, Place the battery storage panel back in place.

22. Reinstall the six (6) M6 male thumb screws [70256]. Tighten snugly by hand. Do NOT overtighten.



Step	Description	Notes
23.	Be sure to load the M24 settings configuration into the battery monitor before using the system. See section 3.0 for further details.	
24.	If the batteries were just charged, assure to set the state of charge to 100%. This can be done quickly by holding the + and – key on the face of the battery monitor for 3 seconds.	
25.	To remove an M24 battery pack simply follow these instructions in reverse.	

2.2 XX90 Batteries

Required parts:

- Twelve (12) XX90 batteries. ALL 12 batteries **MUST** be of the same battery chemistry.
- [72798] XX90 integration kit
    - [72881] XX90 base tray
    - [72882] XX90 battery hold down plate
    - [72916] XX90 battery harness

Step	Description	Notes
26.	Refer to section 2.1 & 2.3 for the removal process of M24 battery packs or 6T battery packs.	
27.	Warning; ALL twelve (12) batteries MUST be of the same battery chemistry	

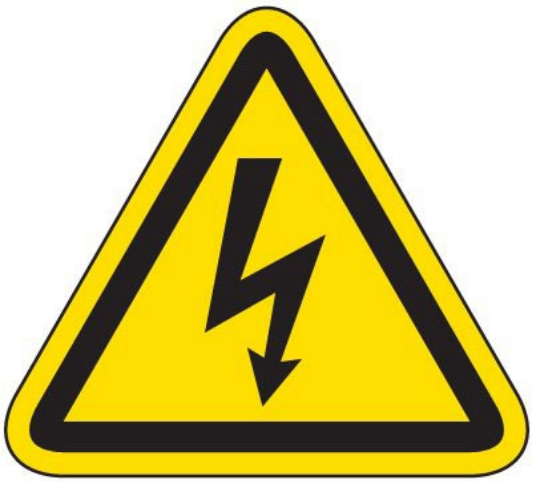
Step	Description	Notes

28. Open the pelican case lid to access the battery storage panel.

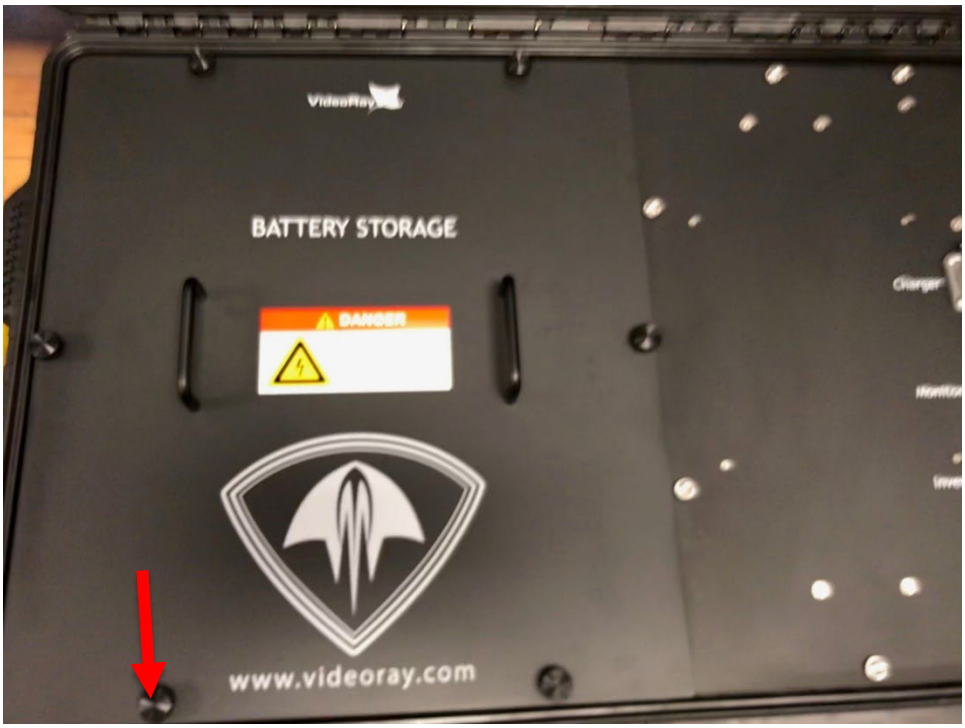
29. Assure that the power main switch is set to the “OFF” position, and that nothing is plugged into the PPS power outlet. Assure the inverter switch is set to ‘OFF’

Step	Description	Notes

30. ***Read through all of these steps prior to starting. **Caution** high risk of electric shock. Be very cautious of your tools, touching multiple terminals with your tool could result in a DC short. ***

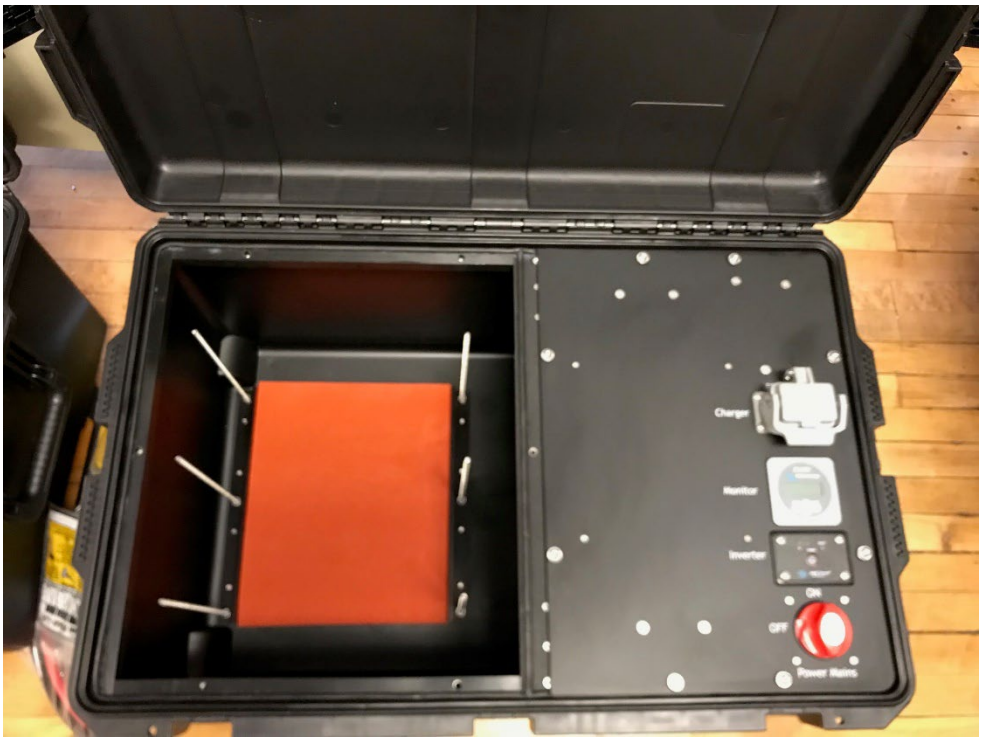


31. Remove the six (6) M6 male thumb screws [70256] securing the battery storage panel in place. Store these thumb screws safely to the side.

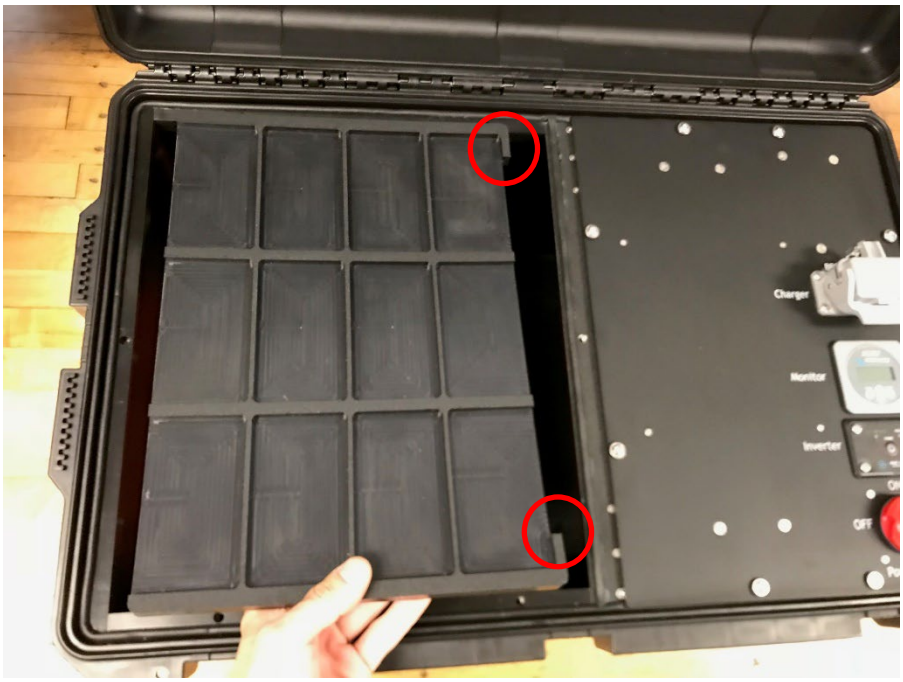


Step	Description	Notes

32. Remove the battery storage panel and store it safely to the side.

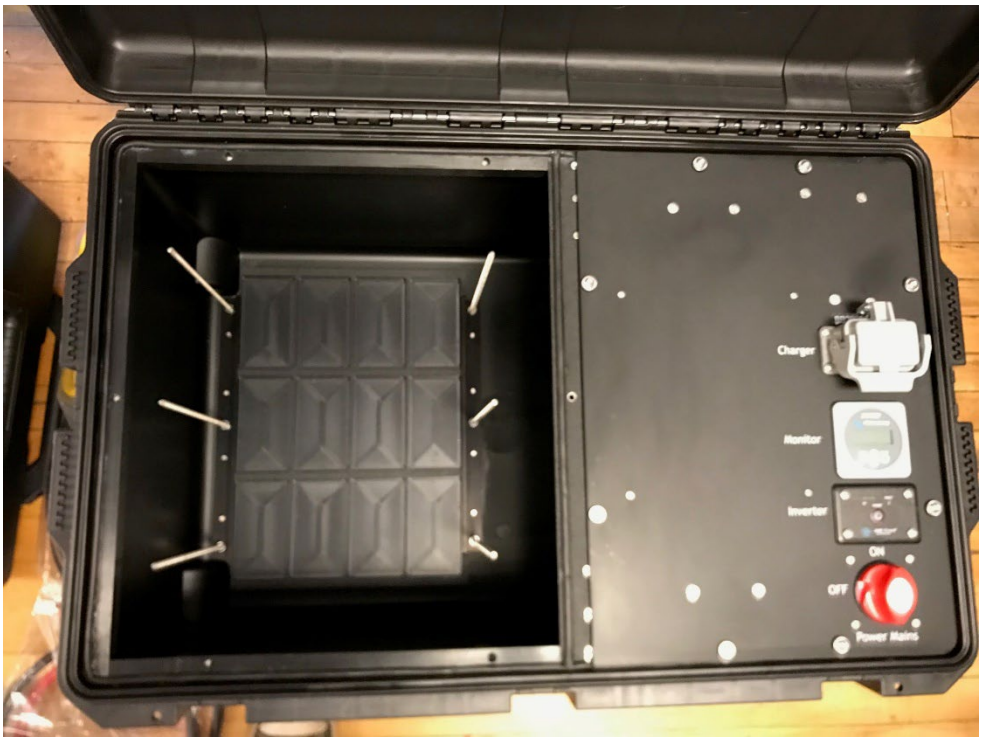


33. Install the XX90 base plate [72881] in the case. Notice the orientation of the plate, the notches circled should be facing toward the inside of the box.



Step	Description	Notes

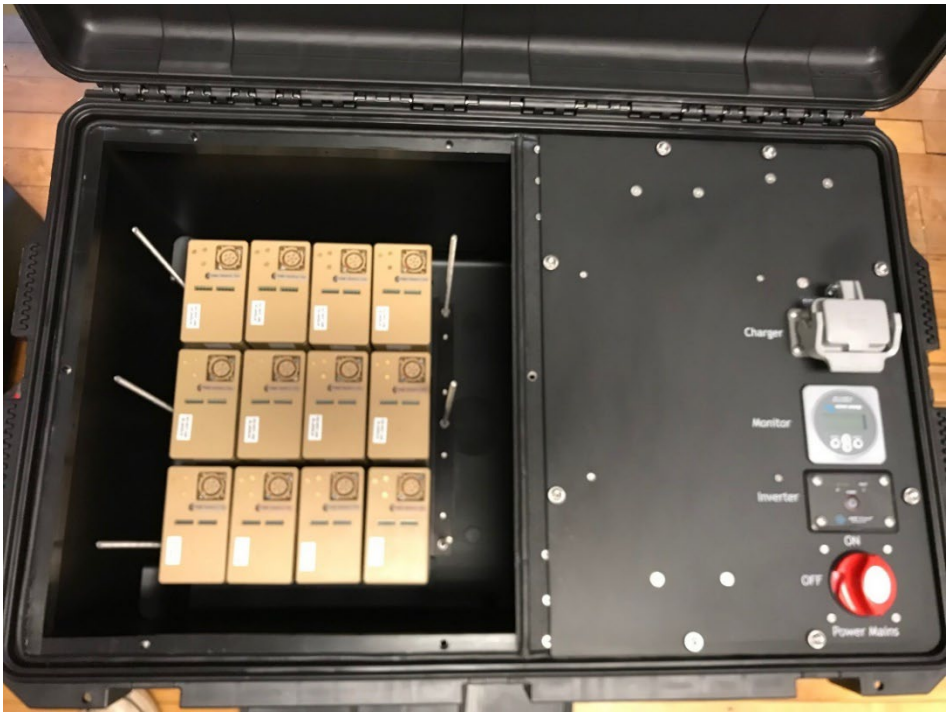
34. Install the XX90 base plate[72881] all the way to the base of the case.



Step	Description	Notes

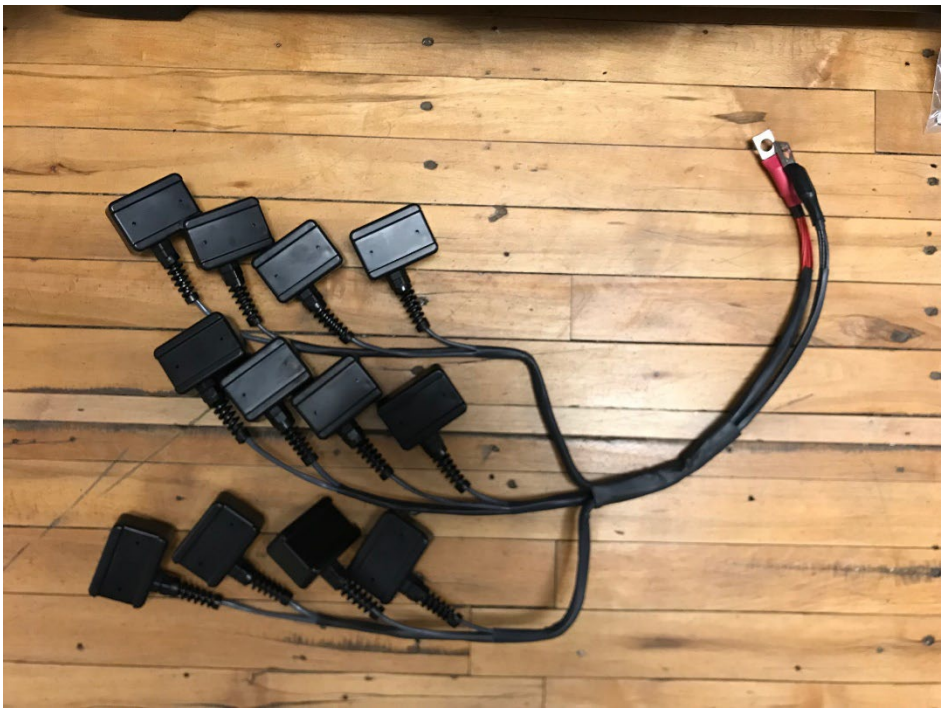
35. Install twelve (12) XX90 batteries into the case. For any questions regarding battery type please see section 1.4 for approved battery packs. Install batteries in the orientation seen below.

36.

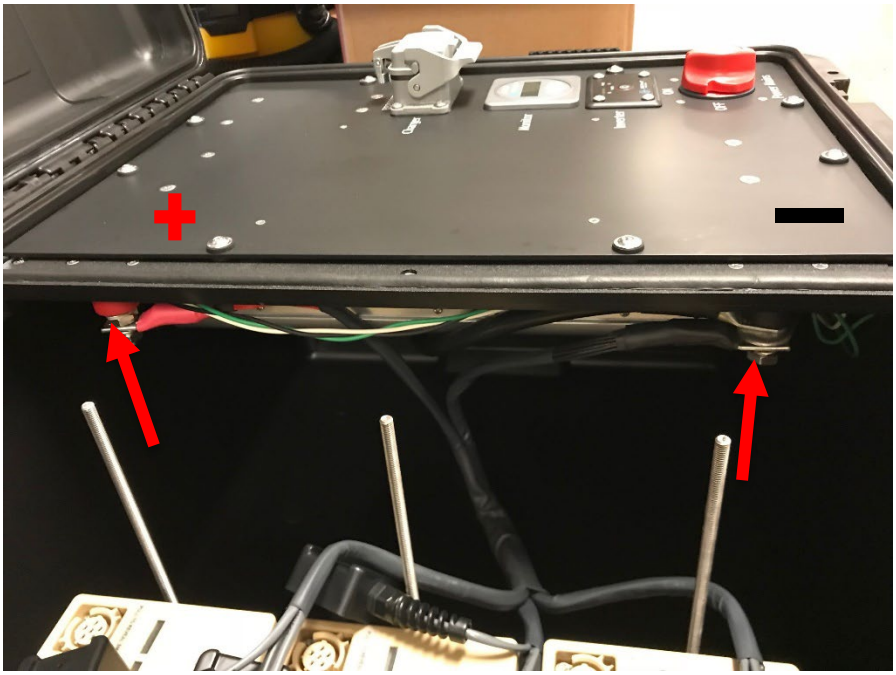


Step	Description	Notes

37. Gather the XX90 battery harness [72916]



38. Place the XX90 battery harness[72996] in the case. The negative side of the harness should be attached to the DC bus closest to you. The positive side of the hardness should be attached the DC bus furthest from you. Use a 9/16” wrench, do NOT overtighten.



Step	Description	Notes

39. Connect the battery harness to each battery. Follow the pattern shown below. Notice where the leads of the harness sit in respect to the threaded rods.

40. At this point, flip the inverter switch to “monitor” and observe the battery monitor to see if the system is receiving idle power. If the display lights up or shows a reading, the system has been properly connected. If the battery monitor does not have a reading, double check your steps and or see troubleshooting section 7.0.

Step	Description	Notes

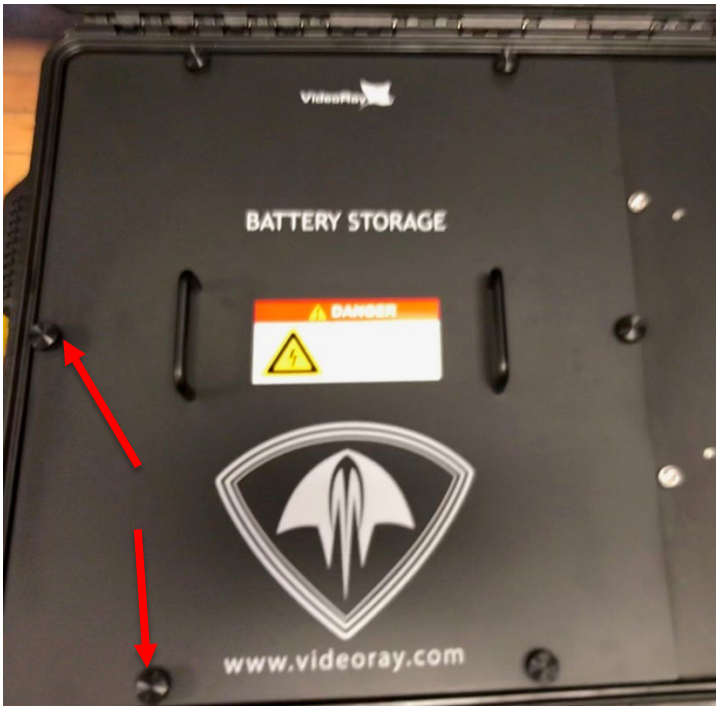
41. Install the XX90 battery hold down plate[72882]. Use six (6) M6 female thumb screws[71818] to secure the plate.

Step	Description	Notes

42. Place the battery storage panel back in place.

Step	Description	Notes

43. Reinstall the six (6) M6 male thumb screws [70256]. Tighten snugly by hand. Do NOT overtighten.



44. Be sure to load the 2590 settings configuration into the battery monitor before using the system. See section 3.0 for further details.

45. If the batteries were just charged, assure to set the state of charge to 100%. This can be done quickly by holding the + and – key for 3 seconds.

46. To remove an XX90 battery pack simply follow these instructions in reverse.

2.3 6T Battery

Required parts:

- One (1) 6T battery.

[72915] Battery main leads (2 Gauge)

- Black 36” positive cable
- Red 36” negative cable

-[72796] 6T battery Integration kit

- 6T battery pack hold down plate
- Battery support foam; 6T

Step	Description	Notes
47.	Refer to section 2.1 & 2.2 for the removal process of M24 battery packs or XX90 battery packs.	
48.	Open the pelican case lid to access the battery storage panel.	

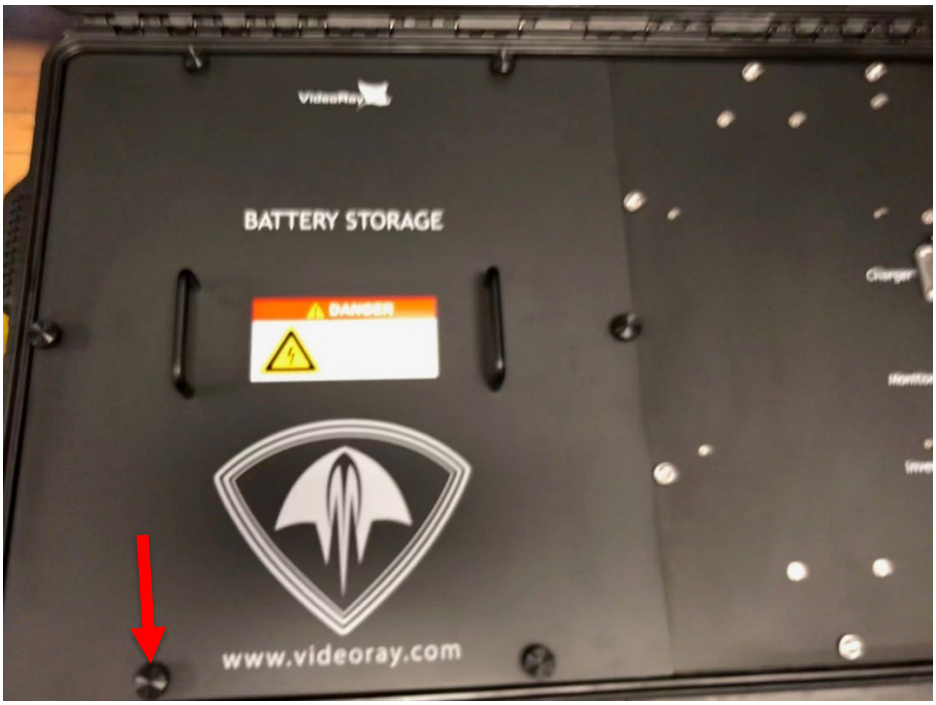
Step	Description	Notes

49. Assure that the power main switch is set to the “OFF” position, and that nothing is plugged into the PPS power outlet. Assure the inverter switch is set to ‘OFF’

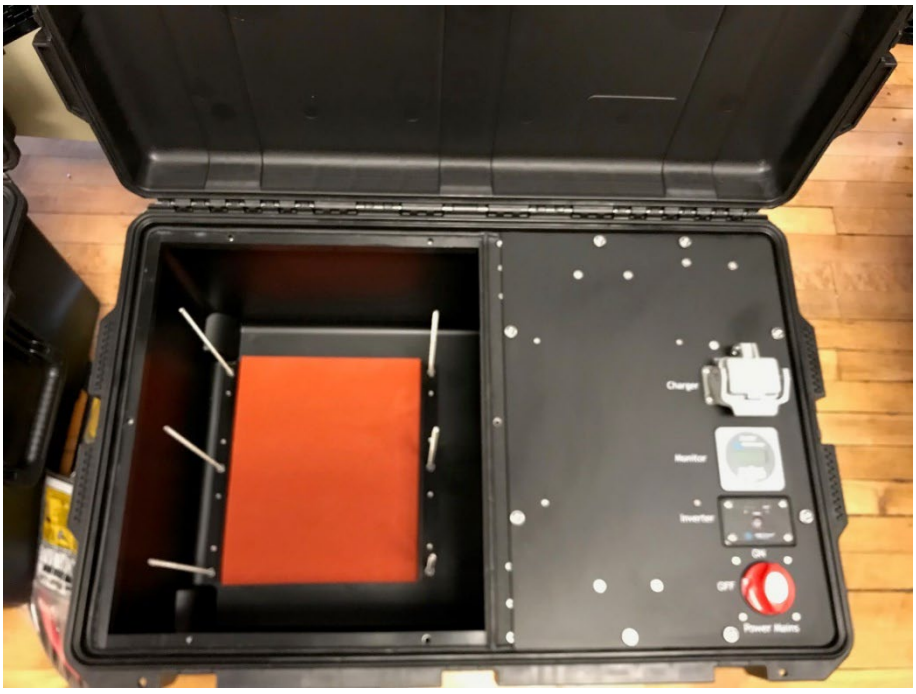
50. ***Read through all of these steps prior to starting. **Caution** high risk of electric shock. Be very cautious of your tools, touching multiple terminals with your tool could result in a DC short. ***

Step	Description	Notes

51. Remove the six (6) M6 male thumb screws [70256] securing the battery storage panel in place. Store these thumb screws safely to the side.

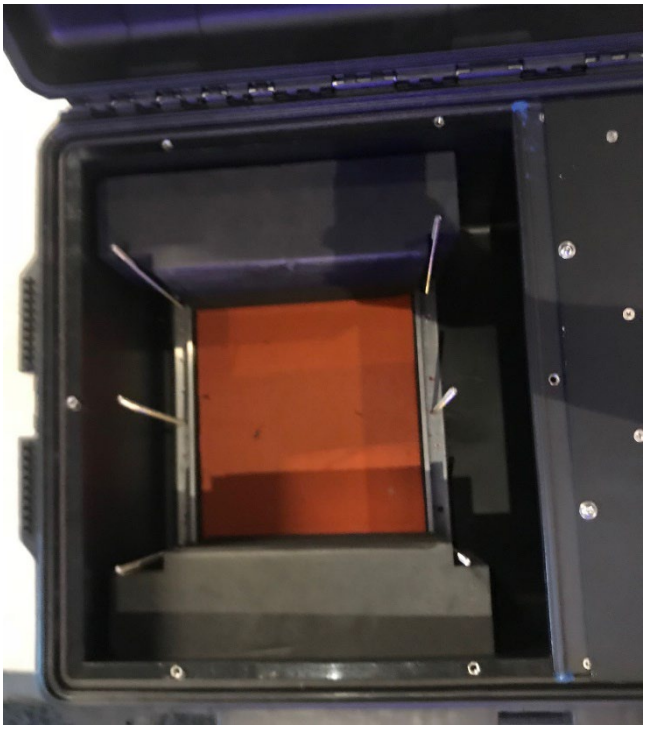


52. Remove the battery storage panel and store it safely to the side.



Step	Description	Notes

53. Install the Battery support foam; 6T [71767] into the case. Assure the cut outs for the wheel wells of the care are in the correct orientation.



54. Place the 6T battery between the foam in the following orientation

Step	Description	Notes

55. Press the 6T battery down into the case. Note the orientation of the battery. Assure the handles are tucked between the threaded rods

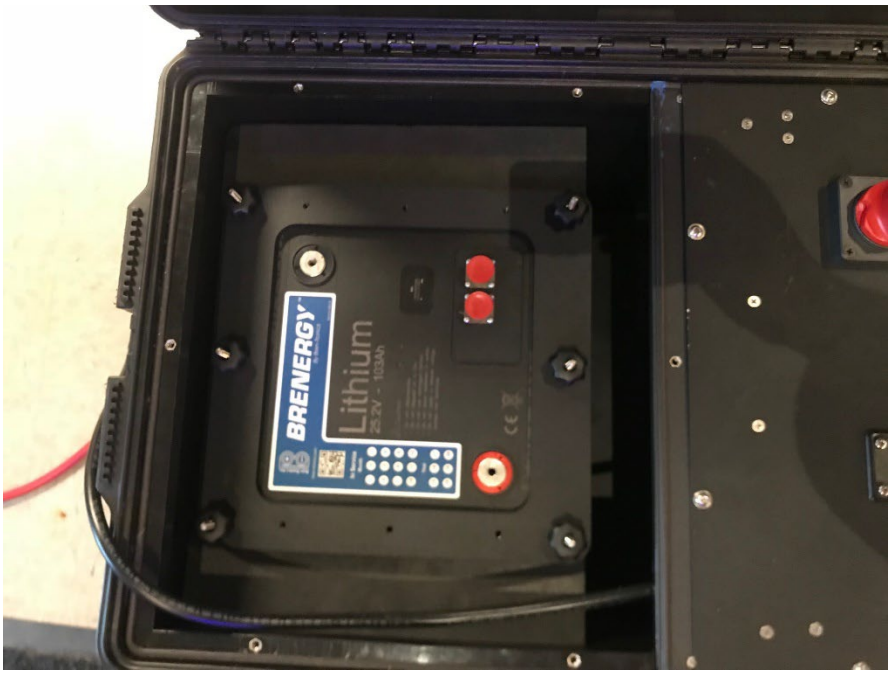
56. Install the 6T hold down plate [71605] onto the battery.

Step	Description	Notes

57. Install six (6) M6 female thumb screws [71838]. Tighten snugly by hand.

58. Attach the Battery Main leads (2 gauge) into the system.

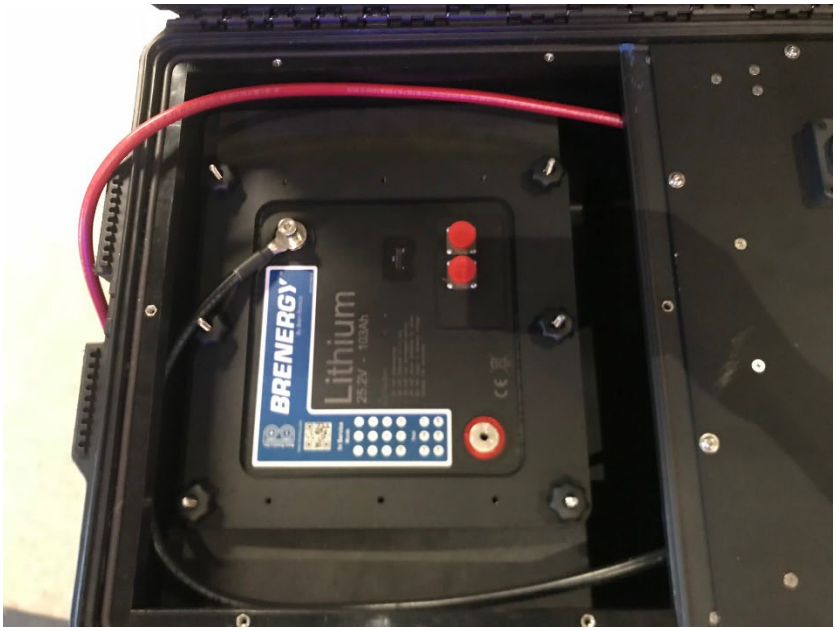
Install the negative cable closest to the front of the case. Use a 9/16 wrench. Do NOT overtighten.



Step	Description	Notes

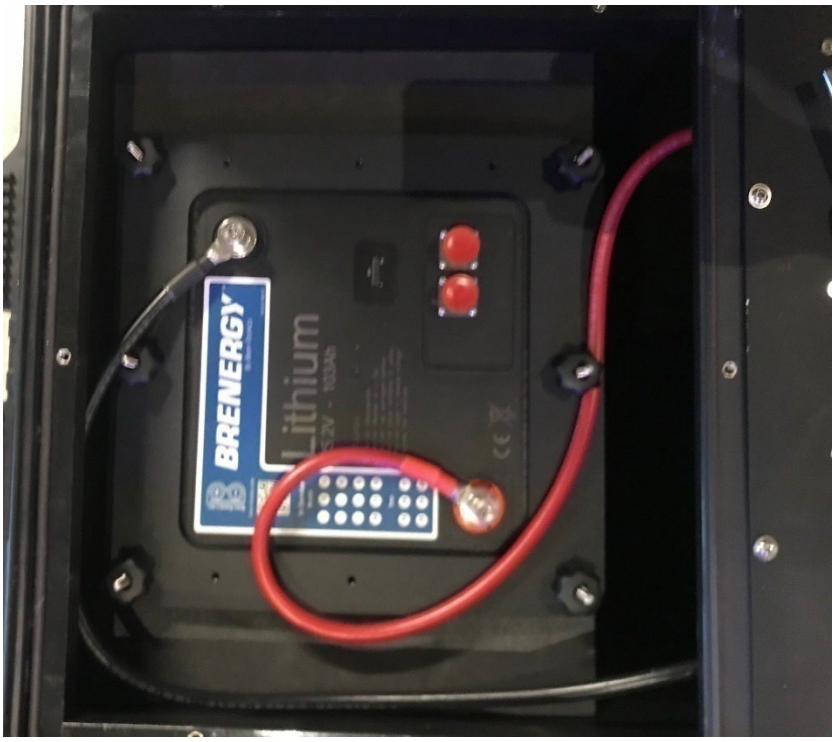
59. Install the positive cable closer to the back of the case. Use a 9/16 wrench. Do NOT overtighten.

60. Attach the main leads to the battery. Attach the negative - DC cable to the black terminal of the battery labeled -. Use a T20 torque bit to tighten.



Step	Description	Notes

61. The red positive + DC cable should connect to the positive + battery terminal. It is normal to see small spark while making this connection. Use a T20 torque bit to tighten.



62. Assure all connections are tight while being very cautious of your tools. Touching multiple terminals with your tool could result in a DC short. Use a T20 torque bit to tighten.

Step	Description	Notes

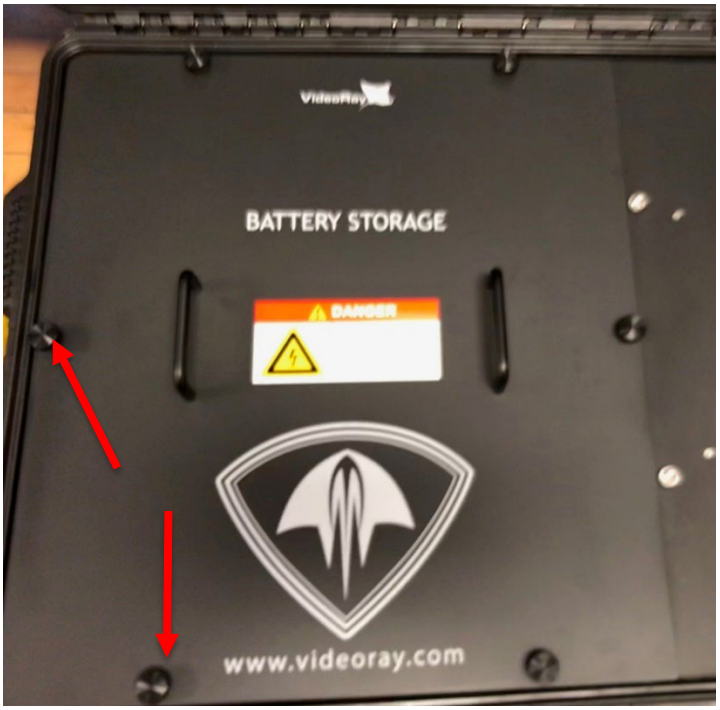
63. At this point, flip the inverter switch to “monitor” and observe the battery monitor to see if the system is receiving idle power. If the display lights up or shows a reading, the system has been properly connected. If the battery monitor does not have a reading, double check your steps and or see troubleshooting section 7.0.

Step	Description	Notes

64. Place the battery storage panel back in place.

Step	Description	Notes

65. Reinstall the six (6) M6 male thumb screws [70256]. Tighten snugly by hand. Do NOT overtighten.



66. Be sure to load the 6T battery settings configuration into the battery monitor before using the system. See section 3.0 for further details.

67. To remove an 6T battery pack simply follow these instructions in reverse.

3.0 CHARGING

Required parts: PPS charger [73507]

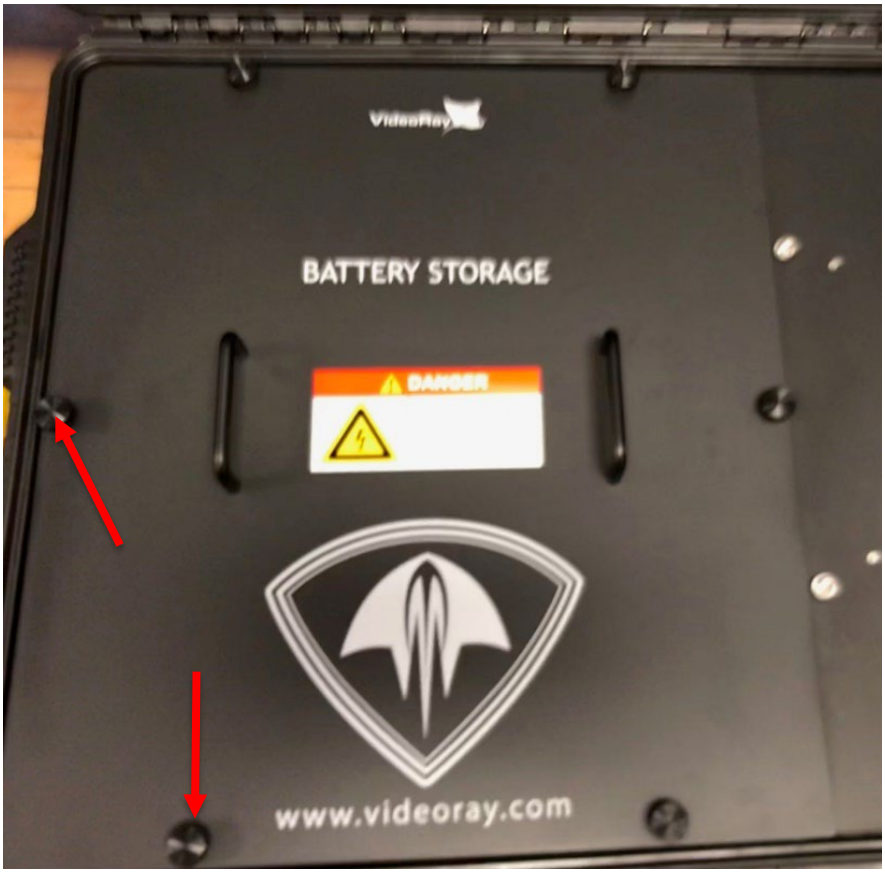
Step	Description	Notes

68. Open the latches of the pelican case

69. Whenever charging a PPS System assure that the battery storage compartment is open prior to charging.

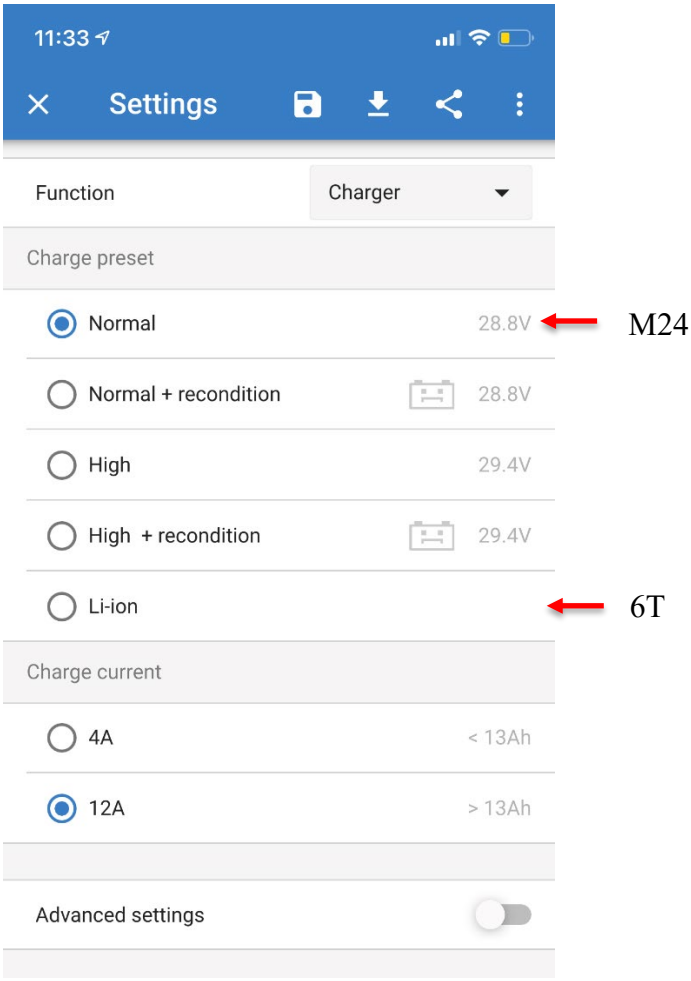
Step	Description	Notes

70. Remove the six (6) M6 male thumb screws [70256] and remove the battery compartment lid.



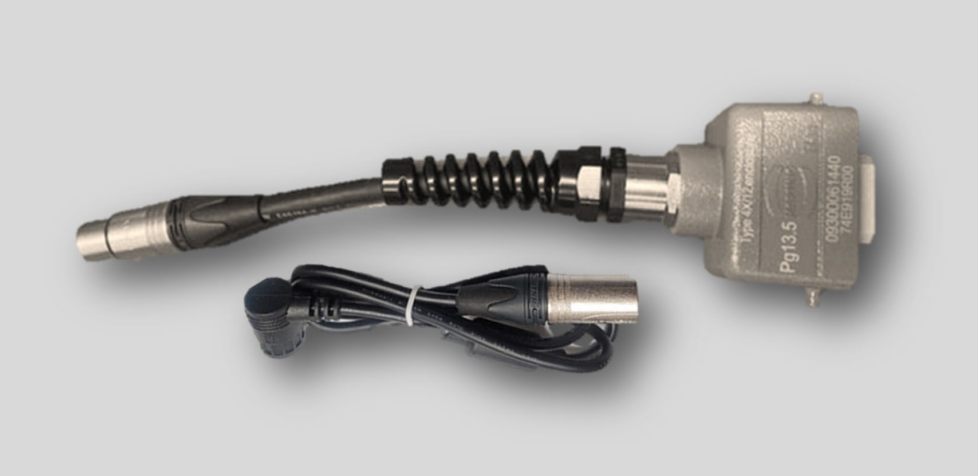
Step	Description	Notes

71. Ensure that the charger is configured for the battery chemistry you are trying to charge. See charger configuration Section 3.3 for more information.



Step	Description	Notes

72. Gather the two parts of the charging cord.



73. Align and connect the two XLR ends of the charging cords, push firmly to lock.

Step	Description	Notes

74. Plug the cord into the charging port of the charger. Twist connector cap clockwise to lock in to place.

75. Open the charger port on the panel of the PPS system.

Step	Description	Notes

76. Ensure the inverter switch is in the ‘Monitor’ position before continuing. The display of the monitor should show a reading. If not, see troubleshooting section 7.0

77. Take the connector from the PPS charger and plug it into the charging port with the printed side facing towards you.

Step	Description	Notes

78. Lift up on the latch to secure the connector in place.

79. Plug the connector of the AC power cord into the charger's AC port.

Step	Description	Notes

80. Plug the charger's power cord into AC power. Once plugged in, the charger will power on.

Use the two buttons to cycle through the charging profiles until the desired profile is displayed. There are only two profiles compatible for the PPS – 'Lead Acid' for M24 and XX90 batteries or '6T Lithium' for a 6T Lithium battery.

81. When the desired profile is displayed, press and hold the bottom button and release when *OKAY* is displayed.

Step	Description	Notes

82. If *CONNECT BATTERY* is displayed after pressing and releasing the bottom button, press and hold the bottom button again and then release when *Force Start* appears.

Step	Description	Notes

83. It will take a few seconds for the battery to begin charging. The battery icon on the left side of the display will then indicate charging status.

84. At this point you should see the voltage starting to increase on the battery monitor display.

85. See the Victron app for further details on charging. Charging typically takes between 6-12 hours depending on the depth of discharge and size of the battery.

4.0 SETTINGS CONFIGURATION

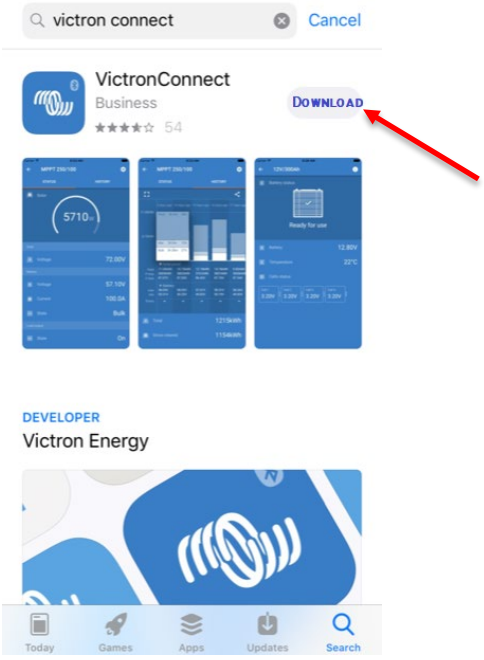
4.1 Battery Monitor Configuration by Bluetooth connectivity (quick method)

Required parts:

Smartphone with Bluetooth connectivity

If no Bluetooth device is available, please see section 3.2 for manual programming instructions.

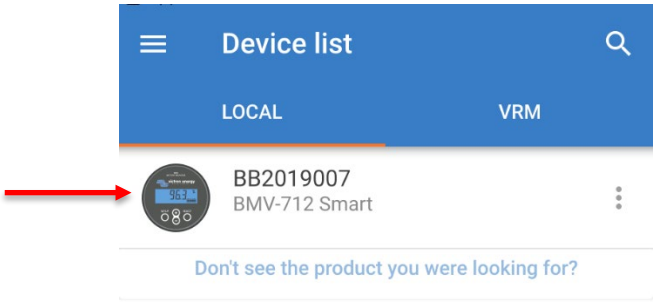
Step	Description	Notes
86.	** There must be a battery pack installed within the PPS to allow for Bluetooth connectivity **	
87.	Using your smart phone or tablet access the app store and search for “Victron connect”, Download the app.	



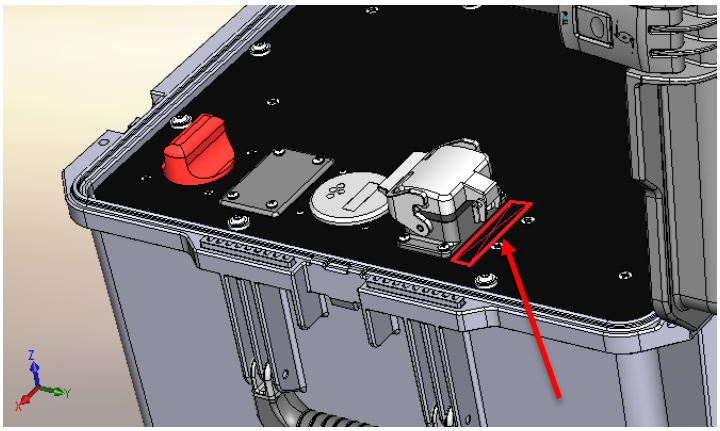
Step	Description	Notes

88. Once installed, open the application. The default Pin code is 000000.

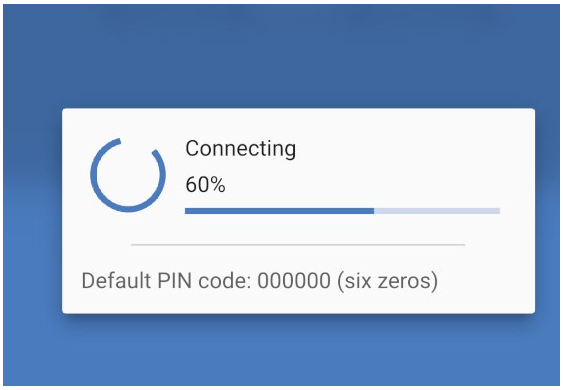
The first screen will show you available battery monitors in your area. ****Assure your Bluetooth is ON****



The portable power supply is listed by the S/N of the unit. If there are multiple PPS systems nearby, check the S/N of the specific PPS of interest. The S/N location is marked by the red X.



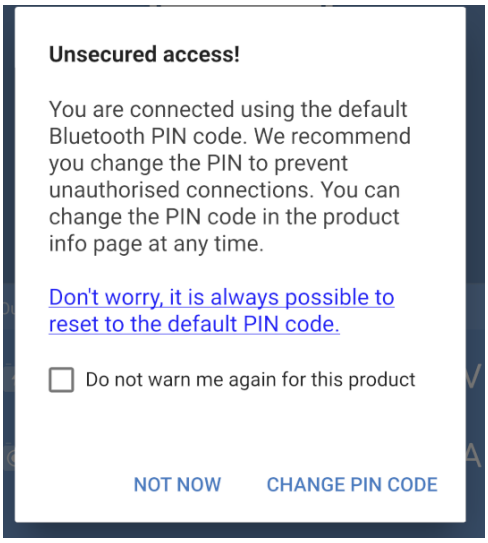
89. The default pin code is 000000. If you forget your pin code, See troubleshooting; section 7.0



Step	Description	Notes

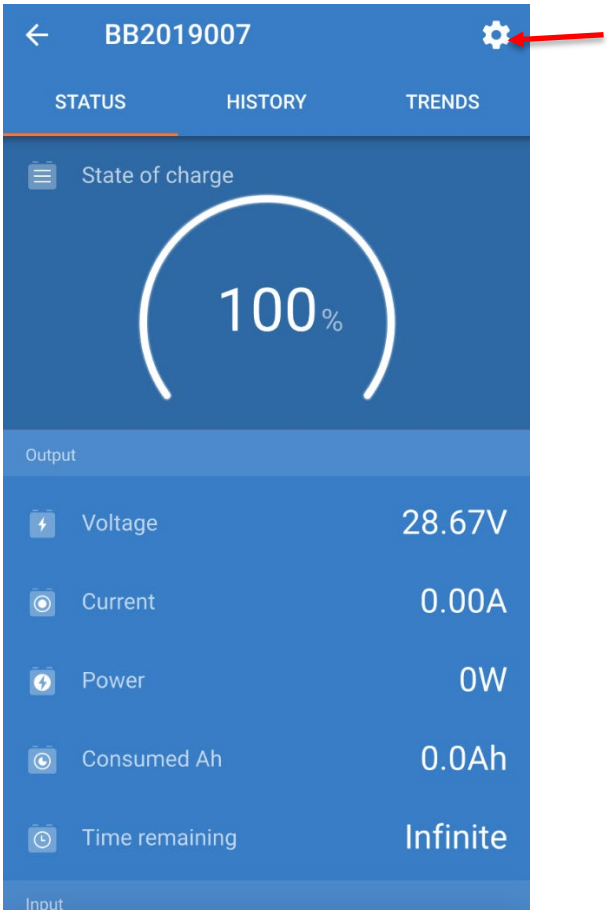
90. If there are any new available firmware updates, you will be prompted for them now. Allow the firmware to be updated.

91. Until you change your pin code from the default, or select the “do not warn me again” box, you will be prompted to change your pin each time you connect to the product. If you need to change your pincode or forget your pincode, see troubleshooting; section 7.0



Step	Description	Notes

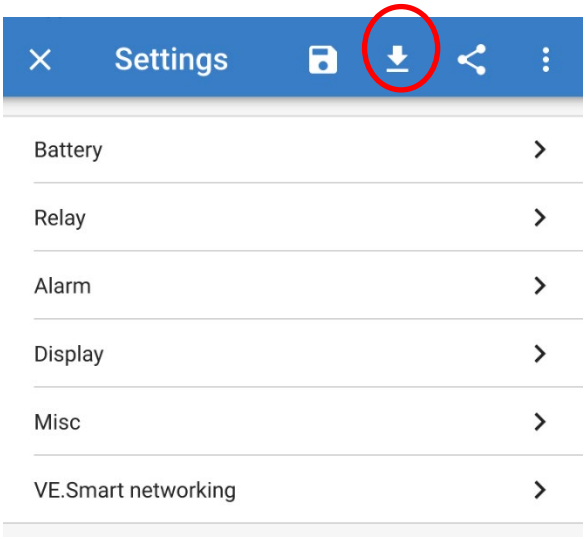
92. This is the main menu of the battery monitoring system. Various data can be observed from this screen before, during, and after the use of a PPS system.



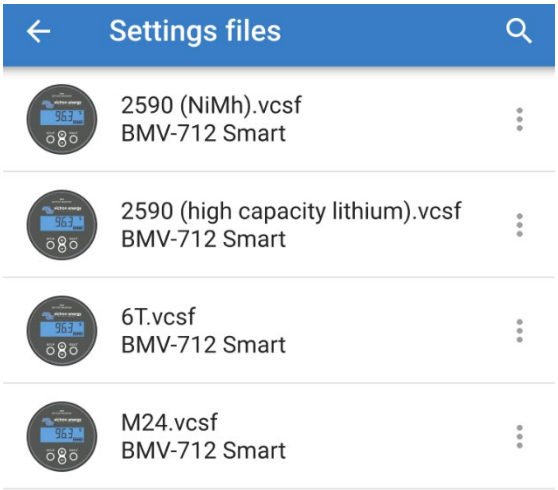
To access battery monitor settings, click the cog symbol in the top right corner.

Step	Description	Notes

93. Depending on the battery pack used, a settings profile must be loaded. Select the load button.

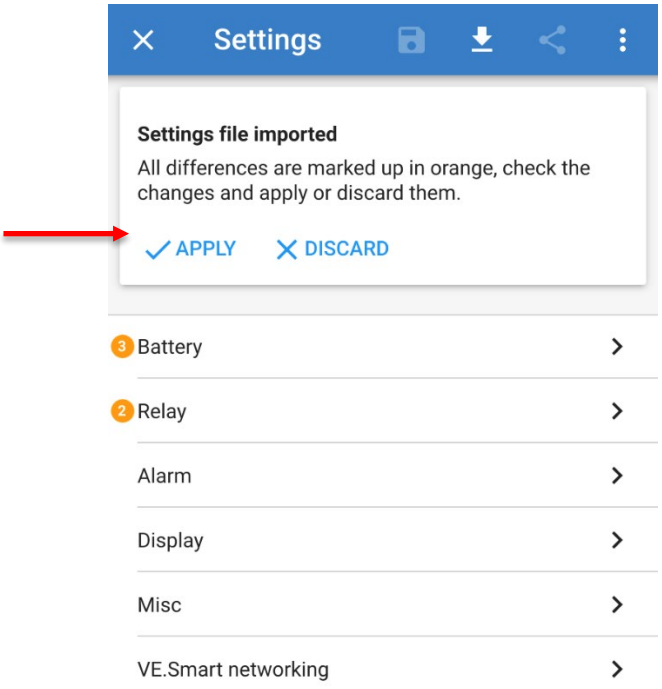


94. Select which battery pack is being used. If these options are not available on your screen, visit VideoRay.com/downloads/_____ to download the following settings profiles.

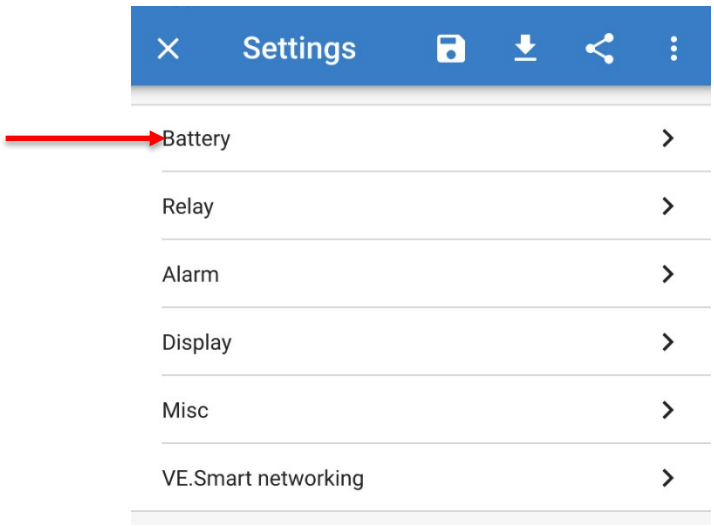


Step	Description	Notes

95. There will be a prompt that shows the difference between current settings and the selected settings. Press apply.

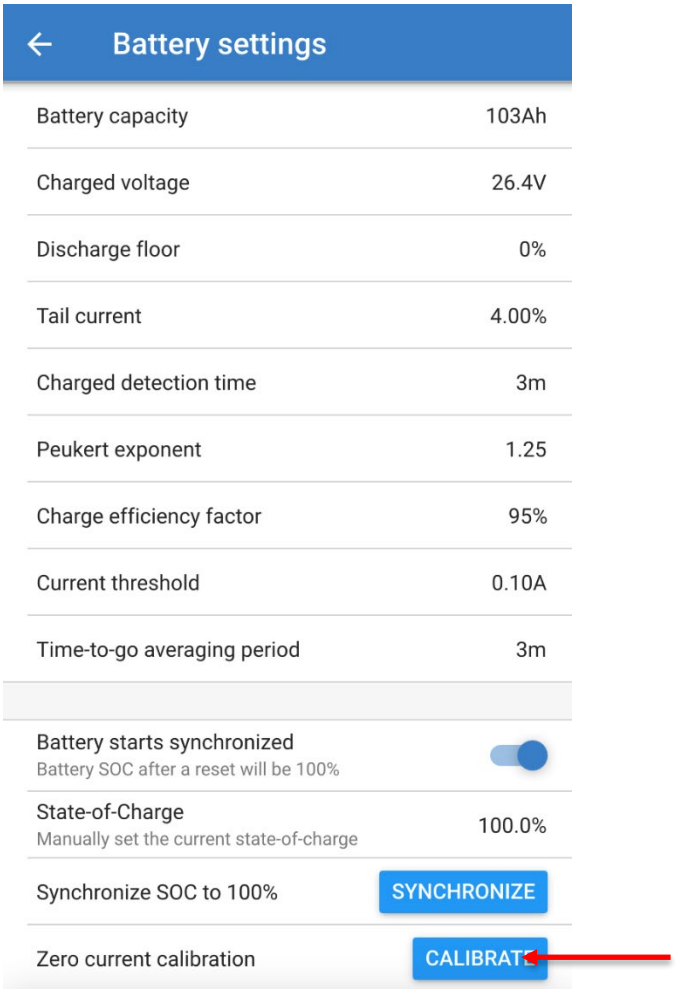


96. After, you will be brought back to the main settings menu. Click on battery.



Step	Description	Notes

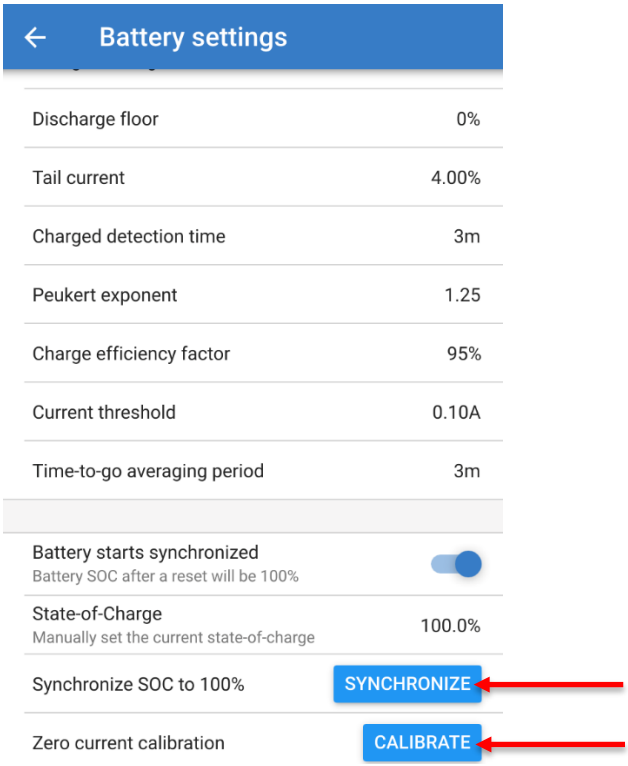
97. Within the battery menu, first tune the zero current calibration by clicking "Calibrate"



Step	Description	Notes

98. So long as the battery pack is fully charged, click “synchronize” to set the state of charge to 100%. As the PPS is used, the battery monitor gathers data on the battery and use cycles; this allows for a more accurate reading of SOC and remaining time-to-go. **This step should be completed after every recharge.**

You can also select to manually input the state of charge.



4.2 Battery Monitor Manual Configuration (long method)

Step	Description	Notes
99.	** There must be a battery pack installed within the PPS to allow for Bluetooth connectivity **	
100.	Assure that the power main switch is set to the “OFF” position, and that nothing is plugged into the PPS power outlet. 	
101.	Hold the ‘Setup’ button of the display of the battery monitor for 5 seconds. 	

Step	Description	Notes

102. You have now entered the settings menu. Use the +/- buttons to page between settings 1-69. Click the select button to enter a particular setting menu, click the setup menu to return to the main settings menu.

103. Press the select button on setting **number 1**, set the value of Battery Capacity in occordinance with the battery installed in the system.

M24	58 Ah
6T	103 Ah
XX90 (Lithium)	110 Ah
XX90 (NiMh)	43 Ah

104. Press the select button on setting **number 2**, set the value of Nominal Voltage in occordinance with the battery installed in the system.

M24	26.0
6T	28.0
XX90 (Lithium)	32.0
XX90 (NiMh)	26.0

105. Assure the system is not being used and drawing energy…Press the select button on setting **number 9**, press select to set the zero-current calibration.

106. So long as the battery is fully charged, press the select button on setting **number 10**, press select to synchronize the battery SOC. This should be done after every charge cycle to allow the system to collect data on the battery being used.

107. Press the select button on setting **number 18**, set the value of Low Voltage Cutoff in occordinance with the battery installed in the system.

M24	0.0
6T	0.0
XX90 (Lithium)	24.0
XX90 (NiMh)	19.0

Step	Description	Notes

108. Press the select button on setting **number 19**, set the value to Clear the Low Voltage Cutoff in occordinance with the battery installed in the system.

M24	0.0
6T	0.0
XX90 (Lithium)	25.5
XX90 (NiMh)	20.5

109. Press the select button on setting **number 33**, set the value of Low SOC Alarm in occordinance with the battery installed in the system.

M24	60%
6T	20%
XX90 (Lithium)	20%
XX90 (NiMh)	50%

110. Press the select button on setting **number 34**, set the value of Clear SOC Alarm in occordinance with the battery installed in the system.

M24	70%
6T	30%
XX90 (Lithium)	30%
XX90 (NiMh)	60%

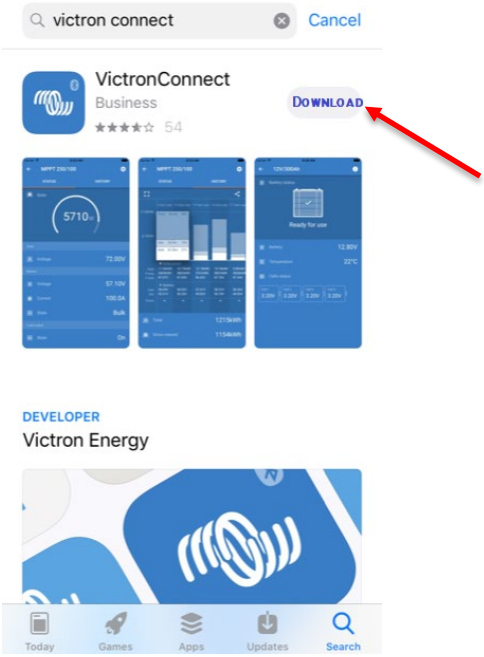
111. The settings are now complete. click the setup menu to return to the main settings menu. Click the setup button again to return to the main display.

112. For additional information or to perform a reset of the battery monitor, See the Battery monitor manual included with the standard accessories kit listed in Section 1.3.1.

4.3 PPS2412 Charger Configuration (Bluetooth Only)

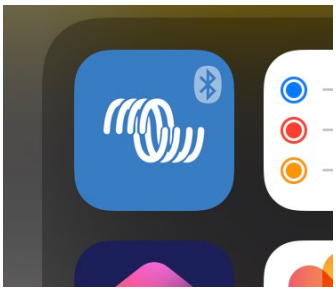
Step	Description	Notes

113. Using your smart phone or tablet access the app store and search for “Victron connect”, Download the app.



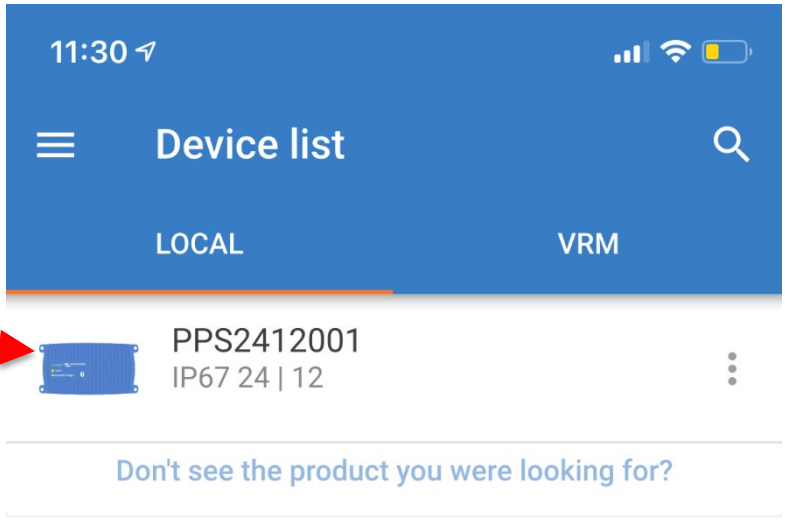
114. Assure that your PPS charger is plugged in to an AC outlet and powered on. You should see lights flashing, indicating its status.

115. Find the App and launch it.



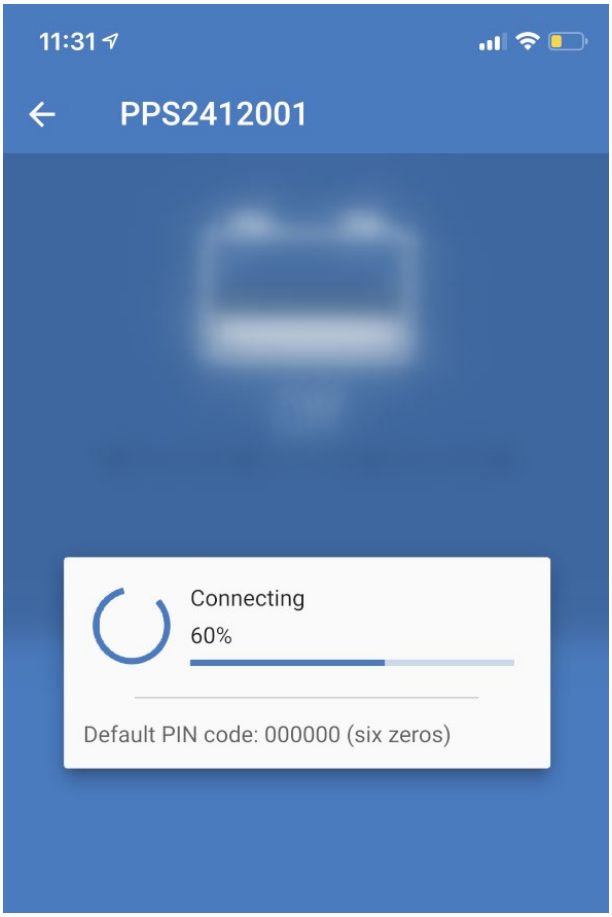
Step	Description	Notes

116. The App will show you the devices available near you. Your actual PPS system may also appear. Be sure to select the charger.



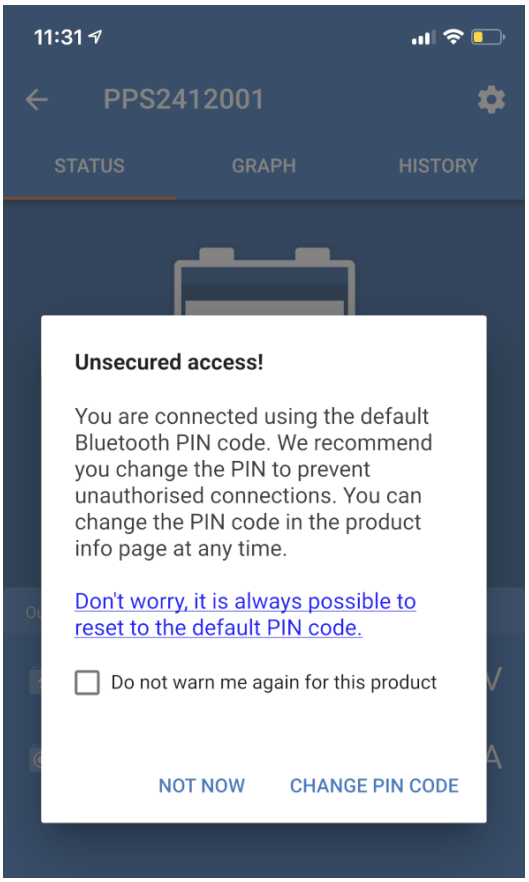
Step	Description	Notes

117. The default pin code is 000000. If you forget your pin code, See troubleshooting; section 7.0



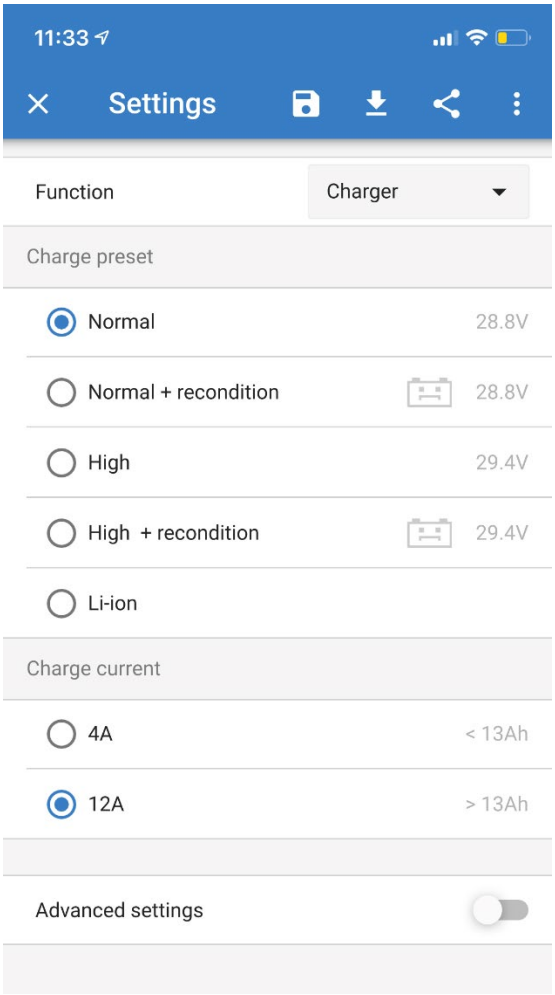
Step	Description	Notes

118. Until you change your pin code from the default, or select the “do not warn me again” box, you will be prompted to change your pin each time you connect to the product. If you need to change your pincode or forget your pincode, see troubleshooting; section 7.0



Step	Description	Notes

119. At this screen, please select which battery you are trying to charge. XX90 batteries can not be charged in system. Assure the system is set for 12A.



M24

6T

120. The charger is now configured. It will retain these settings until manually changed.

5.0 HOW TO OPERATE PPS

5.1 Start up procedure

Step	Description	Notes

121. Open the latches of the pelican case

Step	Description	Notes

122. Turn the Inverter switch to ‘Monitor’, The battery monitor should turn on. If it does not turn on.. See troubleshooting section 7.0

123. If your batteries have just been freshly charged, Hold the + and – keys on the monitor simulatenously for 3 seconds to set the SOC at 100%.

Step	Description	Notes

124. Note the value of voltage displayed on the battery monitor.

125. Now, turn the PPS power mains switch 90° clockwise. The switch is on when green is visible.

Step	Description	Notes

126. Watch the voltage on the Battery monitor screen, If the voltage dips by more than 1 Volt after turning the Power mains, Wait approximately 30 seconds for the voltage to rebound. Now, Turn the inverter switch to the ‘ON’ Position.

Step	Description	Notes

127. A green light should be seen here, indicating the status of the inverter. If a red light is seen or no light is present; refer to section 7.0 for basic trouble shooting.

128. The system is now ready to delivery power. See the next section for instructions to power equipment from the PPS system.

5.2 How to Operate PPS with MSS OCC (MSS ICB)

Required parts:

-[72914] Standard power cord (for MSS OCC)

Step	Description	Notes

129. Open the latches of the pelican case

Step	Description	Notes

130. At this time the PPS system should be powered up and a green light should be seen here. If a green light is not seen, Follow Start up procedure 4.0.

131. Assure that the MSS OCC power switch is in the off position before proceeding.

Step	Description	Notes

132. Plug in the standard power cord (for MSS OCC) [72914] to the power outlet of the PPS system. Install the plug in the position show, turn clockwise until it latches in place.

133. Plug the other end of the standard power cord into the VideoRay MSS OCC.

Step	Description	Notes

134. Now, turn on the switch of the VideoRay OCC unit.

135. Monitor the PPS system using the Victron Connect app, or by paging through the main menu of the battery monitor on the control panel. Keep a close eye on the SOC level and the ‘time to go’ for a successful mission.

136. Always turn off the devices plugged into the PPS system before turning off the Inverter switch & power mains.

137. Always close the seal cap of the PPS whenever it is not in use.

6.0 DISCHARGING

Required parts:

-[72892] Three outlet U.S. Extension

-an electric device that draws high power (electric heater preferred)

Step	Description	Notes

138. Open the latches of the pelican case

Step	Description	Notes

139. Follow to steps of section 4.1 to start up the PPS system.

If the system is properly on, a green light should be seen here.

140. Plug in the three outlet U.S. extension [72892] to the power outlet of the PPS system. Install the plug in the position show, turn clockwise until it latches in place.

Step	Description	Notes

141. An LED is visible at the end of the three outlet U.S. extension [72892]. This light indicates that AC power is present.

142. Plug in an electric heater or another AC powered device and allow the system to drain power. For most lithium batteries; a SOC below 30% is required for shipping purposes.

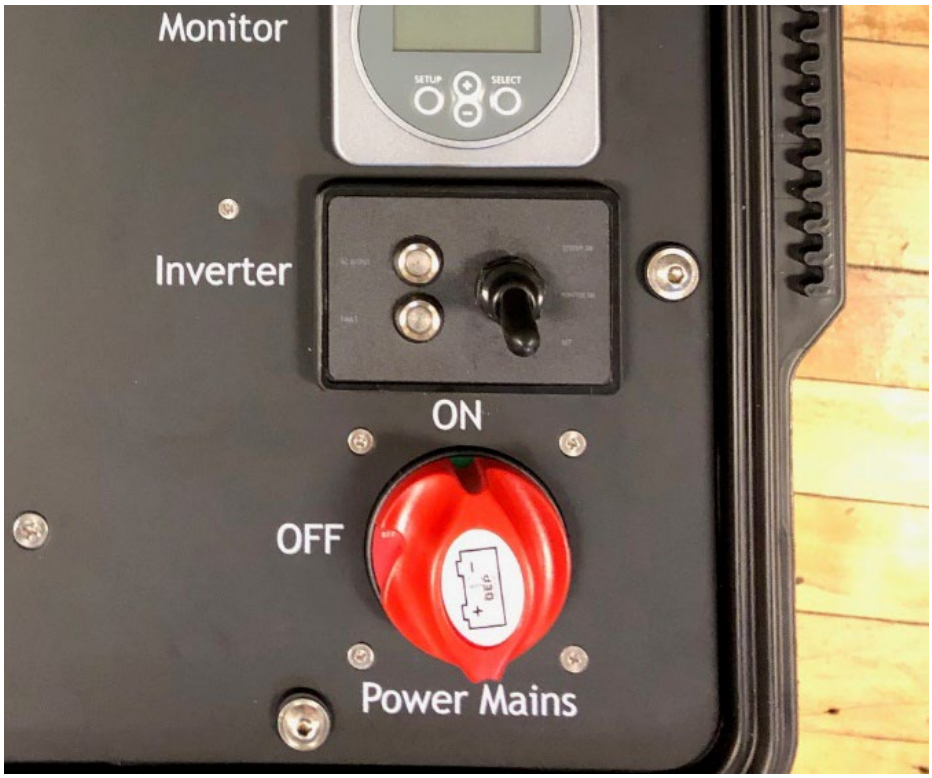
Step	Description	Notes

143. The most accurate reading of SOC is visible on the physical batteries themselves.

Only XX90 and 6T batteries have a SOC indicator. M24 batteries typically do not.

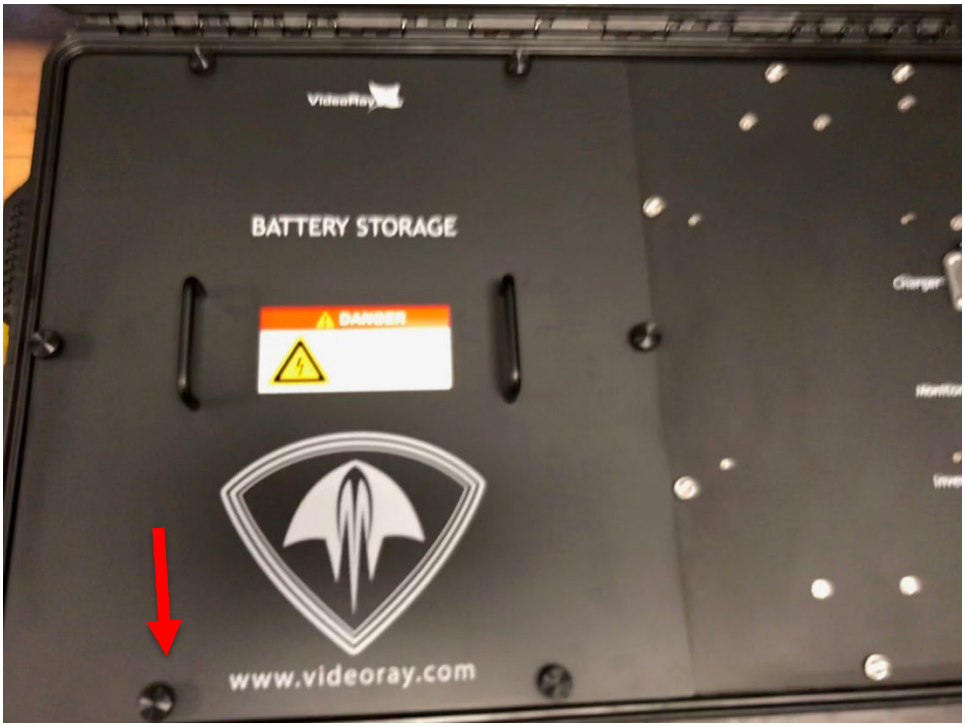
To check the SOC for XX90 or 6T batteries, proceed with opening the battery storage panel

Assure the PPS System off by checking that the power mains and inverter switch are in the ‘OFF’ position

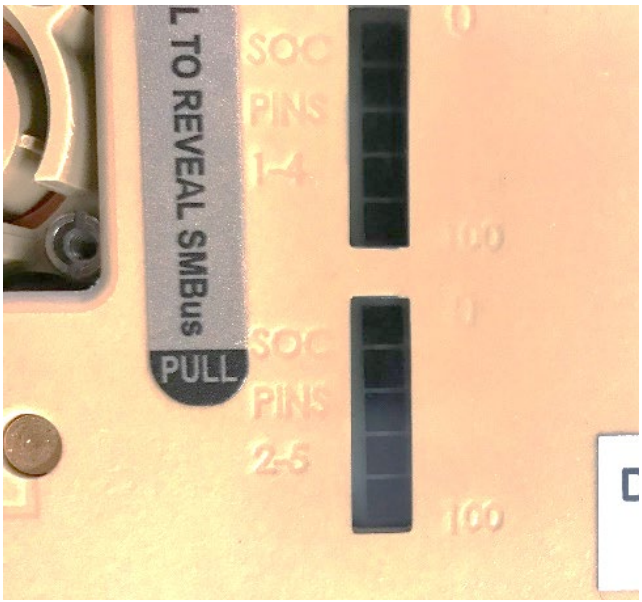


Step	Description	Notes

144. Remove the six (6) M6 male thumb screws [70256] securing the battery storage panel in place. Store these thumb screws safely to the side.



145. Once the Battery storage panel has been removed and set to the side. Check the SOC indicators on the batteries in use. The SOC indicators pictured below show the batteries at full charge.



7.0 BASIC TROUBLESHOOTING

For additional support;
Email: Support@VideoRay.com
Phone: +1 610 458 3000, Option 1
Fax: +1 610 458 3010

7.1 FAQ

- I forgot my pin code, now what?
    - You can restore factory settings on the monitor by holding the ‘setup’ and ‘select’ buttons simultaneously for 3 seconds. Be sure to program your monitor again before use by following section 3.0.

- Can I purchase any two car batteries to use within the PPS?
    - Please refer to section 1.4 for battery recommendations and requirements. Many batteries will function in the box but only particular batteries will fit as they should. Keep a close eye on battery dimensions; particulary length and width.

- When idle, my system shows a load value other than 0 watts.
    - With the inverter remote in the “monitor” position, perform a “zero current calibration”; see section 3.1 step 79.

- Why is the SOC reading not perfectly accurate?
    - The battery monitor system gets more accurate as its used. It usually takes about 10 charge / discharge cycles till the system becomes well synced with the battery.
    - Changing battery types often will prevent the system from becoming well synced.

- Can I charge the XX90 batteries in system?
    - No, the XX90 battery harness has diodes for each battery to keep the batteries from self equalizing their charge. This prevents charging XX90 batteries in system.

- Can I swap XX90 batteries while the system is operating?

- Yes, the system needs (10) XX90 batteries to operate, this allows for up to (2) batteries being swapped at any time.

- Do the batteries discharge in any defined order?
  - No, the batteries should discharge proportionally. Subtle differences in how fully charged the batteries are may cause some to deplete sooner than others. Keep an eye on the SOC indicators on the tops of the XX90 batteries.

- Why does the battery monitor need to be set up for different battery types?
  - This allows the battery monitor to collect data during use of your battery and compare to the battery's nominal values. This helps the system slowly become more accurate for SOC and time-to-go.

- Why do the XX90 batteries need a Low voltage cutoff?
  - These batteries have an internal PCB that monitors them and cuts out if they are overdrawn. If one battery were to shut down from overdraw, the others would cascade as well. The low voltage cutoff is a floor value that helps allow for smooth operation

- Can the SOC be manually entered?
  - Yes, the SOC can be manually entered but only from the Victron Connect interface. Within the Victron Connect App click the settings Cog in the top right, select 'battery', towards the bottom you will see 'state-of-charge' select it, input value, press 'ok'

- Why is it necessary to turn the system to 'monitor' before charging?
  - The battery monitor collects data during a discharge as well as during charging. The system can perform column counting and various other data acquisition that allow the system to get to know your batteries.

7.2 No Power output from PPS

7.2.1 is the battery monitor functional?

With a battery pack installed, flip the inverter switch to "monitor".

If yes,

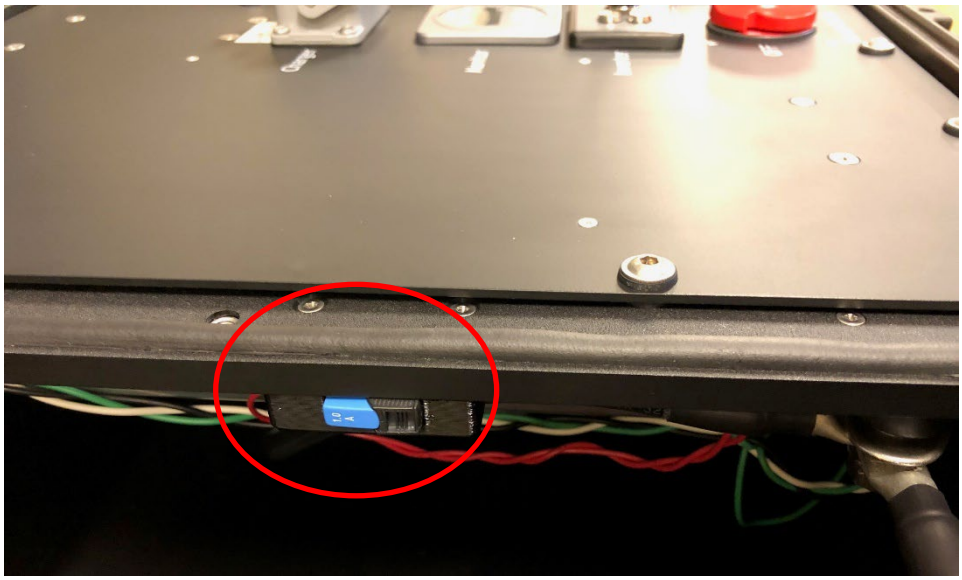
proceed to 7.2.2.

If no,

- Assure your battery pack is installed properly.

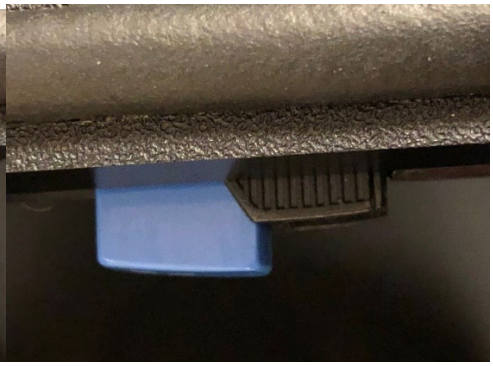
-Check the battery monitor breaker. Reset, only if the breaker has tripped.

The breaker is located beneath the battery storage panel, under the center rail. See below.



Not tripped

Tripped



To reset, push the blue button in until it clicks.

If the battery monitor is still not functional, contact VideoRay Support.

7.2.2 What is the voltage of the system?

If the voltage is below 24V and you're using an XX90 battery pack, it is time to charge your batteries.

If the voltage is below 24V and you're using an M24 or 6T battery pack, see section 3.0 and assure your battery monitor settings are correct. Assure the low voltage relay is set to OFF.

If the voltage is above 24V proceed to 7.2.3.

If no display is shown on the battery monitor, revisit section 7.2.1

7.2.3 Is the inverter functional?

Follow section 4.0 to properly turn on the system.

Check for the green light on the inverter switch.

If a green light can be seen, but your equipment is not working; Check the AC output of the PPS system. Follow section 6.0 for hooking up the three outlet U.S. extension [72892]. Check for the light indicating presence of AC power.

If the light can be seen on the three outlet U.S. extension [72892], but your equipment still is not working; it is possible there is a problem with your equipment. Test it using shore AC power. If the equipment works on Shore power but not the PPS system; this equipment may not be compatible with a PPS system.

If the green LED is visible by the inverter switch, but the light can not be seen on the three outlet U.S. extension [72892]; there is an issue with the AC output of the system. Assure your battery monitor settings are correct by following section 3.0. If you are still having trouble contact VideoRay support.

7.2.4 Continous faults occur during operation

System low on charge.

Thrusters are set too high.

One of your batteries may be damaged. Test them independently.