



SMARTPTO



High-Voltage Battery Health Guide

Viatec SmartPTO V3 – Battery Health
Revision: 1.5
Revision Date: 10-17-2023

TABLE OF CONTENTS

1.0	BATTERY HEALTH OVERVIEW	3
2.0	UNCRATING THE SMARTPTO	5
2.1.	REMOVING THE TOP AND SIDE PANEL(S) FROM THE CRATE	5
3.0	CONNECTING THE UNIT FOR CHARGING PURPOSES	9
3.1.	CONTROLS EXTENSION HARNESS CONNECTION (MAIN CONTROL PANEL).....	10
3.2.	STANDARD (LEVEL 1) CHARGER HARNESS CONNECTION.....	11
3.3.	EXPORT POWER HARNESS CONNECTION	12
4.0	CHARGING THE SMARTPTO SYSTEM.....	13
5.0	DISCONNECTING AND RE-CRATING STORED UNITS.....	15

1.0 BATTERY HEALTH OVERVIEW

Lithium-ion batteries, such as those used in the SmartPTO battery pack, will wear based on usage and time. Aging may be accelerated by long-term storage of the battery pack at a high state-of-charge (SOC) or when stored in areas subject to more temperature fluctuations. To maximize the life of the SmartPTO battery pack and support worry free operation of your SmartPTO, VIATEC has established the following guidelines for proper storage and charging:

- Viatec ships SmartPTO units with a base charge of at least 65%-75%, providing several months of storage before it will require charging.
- The SmartPTO shouldn't fully self-discharge within 3 months (90 days), but it depends on how and where the unit is stored.
 - If the unit is mounted on a truck, it's likely to be outside and subject to more temperature fluctuations. Verify the State-of-Charge (SOC) Monthly (30 days).
 - If the unit is stored in a warehouse, it's likely to be at a much more stable temperature, so when stored in a warehouse you shouldn't have to worry about charging the unit for three (3) months (90 days).
- After 30 days of no use (powertrain not powered On), the powertrain will automatically enter Long Term Storage Mode - in this mode the high-voltage batteries will be automatically discharged down to 60% SOC while also balancing the battery cells. From this 60% SOC, the SmartPTO shouldn't fully self-discharge within 2 months (60 days) but is entirely dependent on storage conditions.
- FOR INSTALLED UNITS - check the State-of Charge (SOC) of the installed SmartPTO unit Monthly, even if it is not being used. The state of charge should be checked each month (every 30 days) and if it falls below the lower storage limit of 50% SOC, it is recommended to charge the battery pack up to at least 80% SOC.



CAUTION! Never store your SmartPTO at a low state of charge (below 30%) for an extended period (weeks or months) or it could damage the high voltage batteries and void your warranty.

- FOR LONGTERM STORAGE (>30 days) - increase the SmartPTO state of charge to approximately 80%-90% prior to storage. Do not keep it connected to an outlet. The battery pack will self-discharge slowly over time. Periodically, the state-of-charge should be checked and if it falls below the lower storage limit of 50% SOC, it is recommended to charge the battery pack to the upper limit of 80%-90%.
- When connected to a charger, the high-voltage battery will automatically leave Long Term Storage Mode and the 30-day timer for non-use will be restarted.

- When ready to remove your SmartPTO from storage, charge the battery pack for 24 hours to ensure optimal battery balance is restored.
- Once your SmartPTO has been charging for 24 hours, we recommend that you disconnect the charger. Unplugging the SmartPTO when not needed ensures the best long-term health of your SmartPTO battery pack.
- All SmartPTOs come with a Standard Level 1 charger that allows the units to be recharged with a 15-Amp rated 120V extension cord. A 120-Volt receptacle must be available to "Standard Charge" the unit to maintain an adequate State-of-Charge (SOC).

NOTICE! If the SmartPTO unit that requires charging is already fully installed on a vehicle, with all electrical connections completed, reference *Section 4.0 Charging the SmartPTO System* in this guide.

2.0 UNCRATING THE SMARTPTO

Viatec has used various crating options for SmartPTO units. Some crates used locking tabs to assemble the side panels, end panels, and top panel while others used screws to assemble these panels to the base pallet. Also, depending on the SmartPTO order quantity, your delivery may come with either one or two SmartPTO units in the shipping crate.

For all crate types you should remove the top panel first to determine the location of the “fan end/bulkhead end” of the unit(s) to identify what additional panels will need to be removed to access the electrical connections.

2.1. Removing the Top and Side Panel(s) from the Crate

Perform the following steps to uncrate the SmartPTO for charging purposes:

Step 1. Position the shipping crate in a location that allows access to the top and sides.

Step 2. Determine the tools needed to remove the panels:

- For crates with locking tabs you will need a straight edge screwdriver, pliers, and a hammer.
- For crates with screws, you will need a powered screwdriver, Phillips-head bits, hammer, and pry bar.

Step 3. Release the locking tabs, or remove the screws, securing the **TOP** panel of the crate to the end panels and side panels.

Step 4. Visually locate the SmartPTO end panel that covers the Electrical Connections to the SmartPTO unit, as this end of the unit will need to be accessible.

Note: Crates with two SmartPTO units will typically have the Electrical Connections at opposite ends of the crate and will require removal of two of the crate short panels.

Step 5. At the identified panel that needs to be removed for access to the Electrical Connections of the SmartPTO, release the locking tabs or remove screws as needed, and carefully remove the side panel from the crate.

Step 6. If required for a two-unit crate, repeat the above steps for the other short side panel and carefully remove the side panel from the crate.

Step 7. Remove the **ACCESSORIES BOX** from the crate.

IMPORTANT! Keep each accessories box with the SmartPTO unit it belongs with if more than one SmartPTO unit is in the crate.



Figure 1. *Removing Accessories Box from the Crate*

Step 8. Using a T20 Torx bit, remove the eight (8) screws securing the SmartPTO Fan End Panel covering the Hydraulics/Electrical Bulkhead.

Note: Removing this panel provides access to the hydraulic fittings and electrical connectors.



Figure 2. *Removing Hydraulics/Electrical Bulkhead Fan End Panel*

Step 9. Open the Accessories Box from the SmartPTO crate and obtain the following component and harnesses.



Figure 3. *Accessories Box Components*

Remove the following components and harnesses from The Accessories Box for Charging (see next page for visual reference):

- Main Control Panel (with bracket)
- Controls Extension Harness
- Standard Charger Harness
- Export Power Harness
- 15-Amp Rated Outdoor Extension Cord

IMPORTANT! You can use the same components above to charge multiple SmartPTO units if needed, just ensure to return each item to the accessories box for the SmartPTO unit it belongs with.

Step 10. If the Export Power Harness is not terminated with lugs to be able to connect to the 12-Volt Battery, properly terminate the positive and negative cables to match the battery being used.



Figure 4. *Export Power Harness Lugs*

Component	Component Image
Main Control Panel	
Controls Extension Harness	
Standard Charger Harness (Bracket not Needed)	
Export Power Harness	
15-Amp Rated Outdoor Extension Cord	

3.0 CONNECTING THE UNIT FOR CHARGING PURPOSES

It is required to make three (3) electrical connections to the SmartPTO at the bulkhead (fan end) of the unit in preparation for charging:

- Control Extension (Main Control Panel) Harness Connection (12-pin) – Connected from the SmartPTO bulkhead to the SmartPTO Main Control Panel.
- Standard (Level 1) Charger Harness Connection (4-pin) – Connected to the SmartPTO bulkhead and later connected using the 15-Amp Extension Cord.
- 12/24-Volt Export Power Connection (2-pin Anderson) – Connected from SmartPTO bulkhead to a known-good 12V battery.

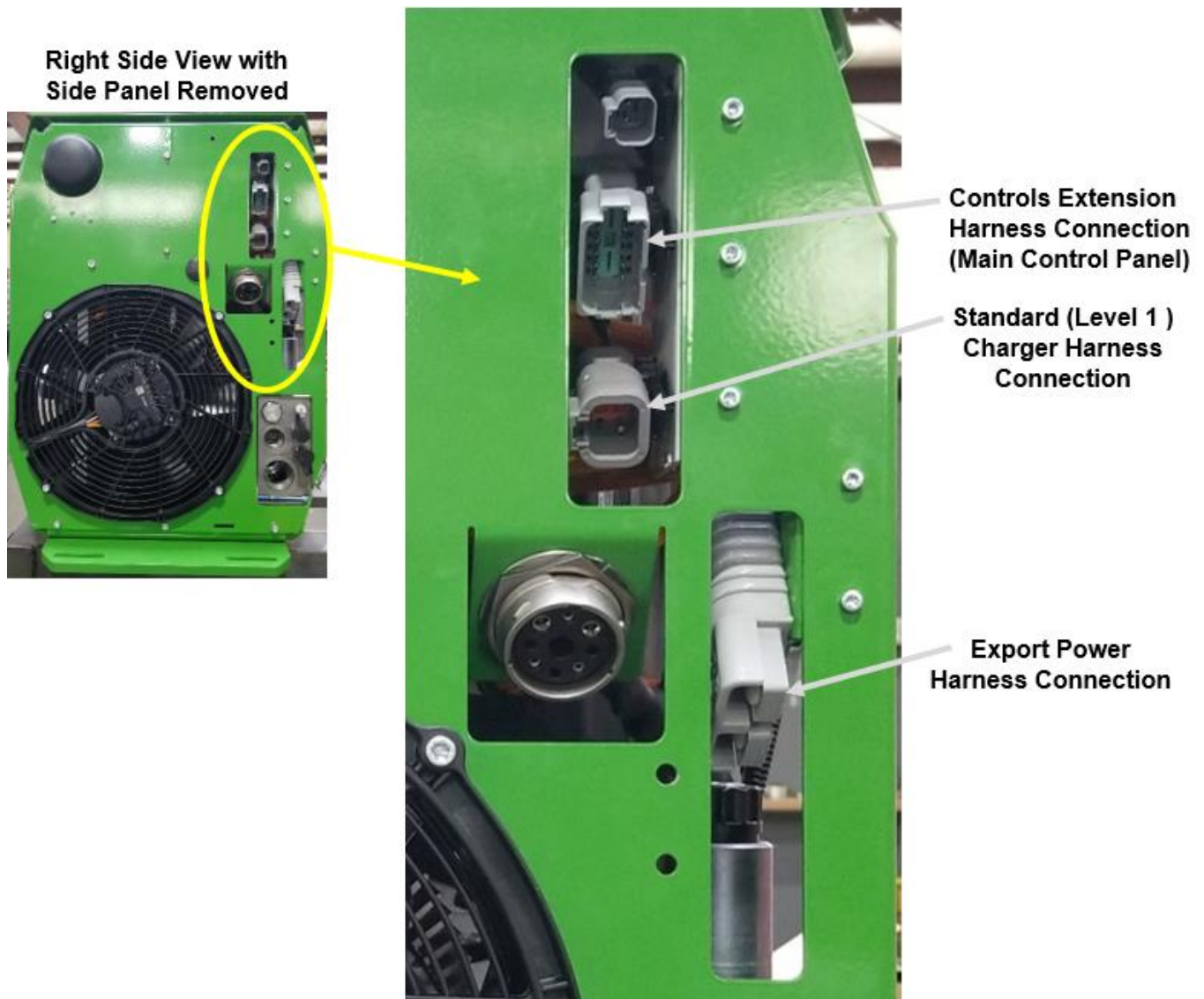


Figure 5. *SmartPTO V3 Electrical Connections for Charging*

3.1. Controls Extension Harness Connection (Main Control Panel)

The SmartPTO system requires the Controls Extension Harness for the Main Control Panel to be connected to the SmartPTO. The Emergency Stop must also be reset prior to charging.



Figure 6. *SmartPTO Main Control Panel and Controls Extension Harness*

1. Locate the Controls Extension Harness and connect the harness to the 12-pin Deutsch connector at the SmartPTO bulkhead. Ensure the connector is fully seated and locked.



Figure 7. *Connecting Controls Extension Harness*

2. Connect the Controls Extension Harness from the SmartPTO bulkhead to the back of the Main Control Panel. Ensure connectors are fully seated and locked.
 - a. Connect the Pump Toggle Switch
 - b. Connect the Emergency Stop Switch
 - c. Connect the Touch Encoder

3.2. Standard (Level 1) Charger Harness Connection

To supply power to the Standard Charger inside the SmartPTO enclosure the Standard (Level 1) Charger Harness will need to be connected to the bulkhead. This harness will be connected to an outside 120V power source when ready to charge.

1. Locate the Standard (Level 1) Charger Harness and connect the harness to the 4-pin Deutsch connector at the SmartPTO bulkhead.

Note: For the purpose of charging the unit(s), the bracket will not be required.



Figure 8. *Connecting Standard Charger Harness*

In addition to the Standard (Level 1) Charger Harness connection at the SmartPTO bulkhead, there will be an electrical connection made between the Standard (Level 1) Charger Harness Receptacle and the Viatec-provided 15A Outdoor-rated Extension Cord which will need to be connected to a 120V receptacle to provide the power for charging.



Figure 9. *Viatec-provided 15A Outdoor Rated Extension Cord*

3.3. Export Power Harness Connection

To provide the SmartPTO unit with a stable 12-volt power source for the System Controller, the Export Power Harness should be connected from the bulkhead to a known-good 12V battery.

1. Locate the Export Power Harness and connect the harness to the Anderson connector at the SmartPTO bulkhead.



Figure 10. *Connecting Export Power Harness*

2. Connect the Export Power Harness to the 12V battery:
 - a. Connect Export Power Harness **Positive (red wire)** cable to the positive battery terminal.
 - b. Connect Export Power Harness **Negative (black wire)** cable to negative battery terminal.

NOTICE! The Export Power Harness will need to be properly terminated with lugs used to connect to the 12V battery being used for this process.



Figure 11. *Export Power Harness Lugs*

4.0 CHARGING THE SMARTPTO SYSTEM

With these three electrical connections made at the SmartPTO bulkhead and with the Main Control Panel fully connected, charging the SmartPTO System is as simple as plugging the SmartPTO charge connection into a properly rated 120-Volt outlet. Plug into the SmartPTO charging connection using the supplied properly rated electrical cord. The cord should be rated for a minimum of 15 Amps continuous draw. The SmartPTO will draw approximately 10-11 Amps for the duration of the charge cycle.

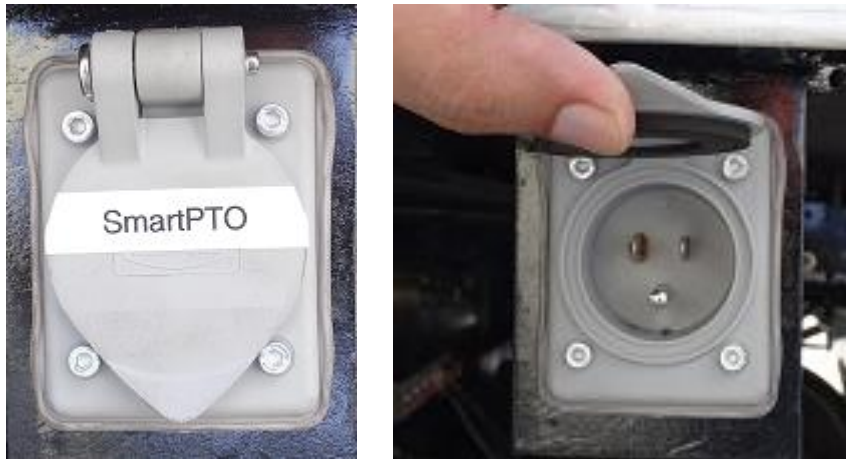


Figure 12. *SmartPTO Charge Connection*



WARNING! Using an improperly rated electrical cord could cause the cord to heat up, melt, or start a fire.

When charging, the SmartPTO LED Array will be activated to indicate charging and the battery state-of-charge can be monitored. Each segment indicates a 10% increment in the battery state-of-charge. The segment will switch from “flashing” to solid when that 10% has completed and the next 10% segment will begin “flashing”. The image below indicates the unit is at least at 70% state-of-charge and the “flashing” (half) segment indicates the charger is working to bring the state-of-charge from 70% to 80%.

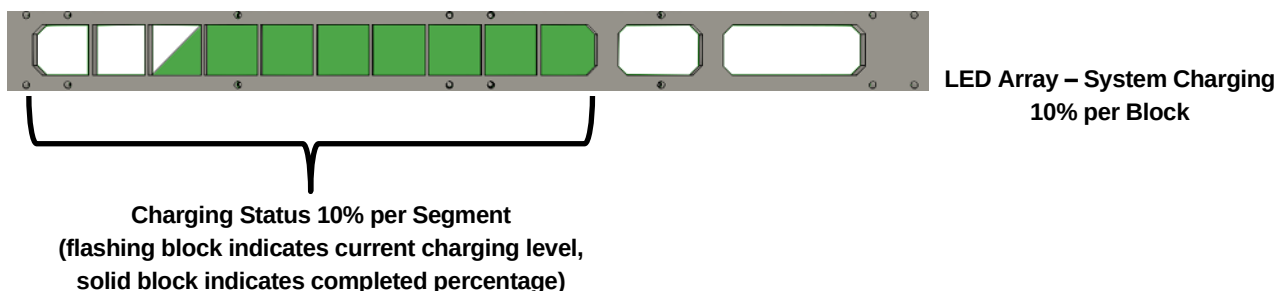


Figure 13. *LED Light Interpretation when Charging*

The Touch Encoder can also be used to check the exact State-of-Charge and the estimated time to charge the unit to 100% SOC.



Figure 14. Touch Encoder Home Screen and Charging Screen

NOTICE! Allow the unit to charge to 80%-90% SOC and then disconnect it from the 120-volt outlet.

For installed units, record the date when the unit was charged and then check the unit monthly, recharging as needed.

5.0 DISCONNECTING AND RE-CRATING STORED UNITS

Once the SmartPTO unit has been charged to 80%-90%, you can disconnect from the unit and re-crate the unit for storage.

1. Disconnect the Viatec-provided 15A Outdoor-rated Extension Cord from the 120V receptacle and then disconnect it from the Standard (Level 1) Charger Harness Receptacle.
2. Disconnect the Export Power Harness from the 12V battery:
 - a. Disconnect Export Power Harness **Negative (black wire)** cable from the negative battery terminal.
 - b. Disconnect Export Power Harness **Positive (red wire)** cable from the positive battery terminal.
3. Disconnect the Export Power Harness from the Anderson connector at the SmartPTO bulkhead.
4. Disconnect the Standard (Level 1) Charger Harness at the SmartPTO bulkhead.



Figure 15. *Disconnecting Standard Charger Harness*

5. Disconnect the Controls Extension Harness from the back of the Main Control Panel.
 - a. Disconnect the Pump Toggle Switch
 - b. Disconnect the Emergency Stop Switch
 - c. Disconnect the Touch Encoder

6. Disconnect the Controls Extension Harness at the SmartPTO bulkhead.



Figure 16. *Disconnecting Controls Extension Harness*

7. Using a T20 Torx bit, install the eight (8) screws securing the SmartPTO Fan End Panel covering the Hydraulics/Electrical Bulkhead.



Figure 17. *Installing Hydraulics/Electrical Bulkhead Fan End Panel*

8. If not using the same harnesses and Main Control Panel to charge additional units, properly coil and secure each harness, then return the harnesses and Main Control Panel to the ACCESSORIES BOX and place box back inside the crate.

IMPORTANT! Keep each accessories box with the SmartPTO unit it belongs with if more than one SmartPTO unit is in the crate.

9. Reassemble the crate (screws or locking tabs).

10. Record the date the unit was charged and then check the unit again after three (3) months, recharging as needed.
11. Return the unit to its storage location.

If there are any concerns with charging an installed or stored SmartPTO unit, contact the Viatec Customer Care Team:

VIATEC CONTACT INFORMATION:

Phone: (833) 484-2832 (833-4-VIATEC)

Email: service@viatec.us

Website: www.viatec.us