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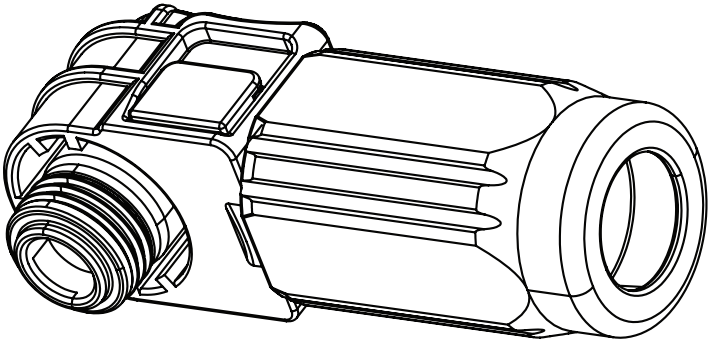

HELIOS ESS Battery Cable Terminal Connector Set Manual

READ AND SAVE THESE INSTRUCTIONS

Battery Cable Terminal Connector Set 950-0076

INTRODUCTION

The HELIOS ESS Battery Cable Terminator Set consists of a Positive (Orange) Connector and a Negative (Black) Connector. The connectors secure battery cables to the front terminals on the HELIOS ESS battery.

1. AUDIENCE, MESSAGES, WARNINGS, GENERAL SAFETY, PERSONAL PROTECTIVE EQUIPMENT

1.1 Audience

Configuration, installations, service, and operating tasks should only be performed by qualified personnel in consultation with local authorities having jurisdiction and authorized dealers. Qualified personnel should have training, knowledge, and experience in the:

- Installation of electrical equipment
- Application of electrical codes, safety, and installation standards
- Analysis and reduction of hazards involved in performing electrical work
- Installation and configuration of batteries

1.2 Warning, Caution, Notice, and Note Messages

Messages in this manual are formatted according to this structure.

⚠ WARNING

Important information regarding hazardous conditions that may result in personal injury or death.

⚠ CAUTION

Important information regarding hazardous conditions that may result in personal injury.

NOTICE

Important information regarding conditions that may damage the equipment but not result in personal injury.

NOTE

Ad hoc information concerning important procedures and features unrelated to personal injury or equipment damage.

1.3 Warnings and General Safety

⚠ WARNING

ELECTRIC SHOCK AND FIRE HAZARD

Do not lay tools or other metal parts across battery terminals.

Failure to follow these instructions may result in death or serious injury.

⚠ CAUTION

ELECTRIC SHOCK HAZARD

- Do not touch the energized surfaces of any electrical component in the Battery Module Combiner or battery system.
- Before servicing, follow all procedures to fully de-energize the Battery Module Combiner and battery system.
- Follow "Safe Handling Procedures" when working with the Battery Module Combiner or battery system.

Failure to follow these instructions may result in injury.

1.4 Safe Handling Procedures

Before using the Battery Cable Terminal Connector Set, read all instructions and cautionary markings on the units and all appropriate sections of this manual.

- Use personal protective equipment when working with the Battery Cable Terminal Connector.
- Dispose of or recycle a Battery Cable Terminal Connector following local regulations.
- Do not modify, re-manufacture, or attempt to insert foreign objects into the Battery Cable Terminal Connector.
- Do not immerse or expose the Battery Cable Terminal Connector to water or other liquids, fire, explosion, or other hazards.
- Use the Battery Cable Terminal Connector only with HELIOS ESS batteries or equipment that Discover Energy Systems specifies as compatible.
- Do not lift or carry while in operation.
- Take precautions when handling electrical cables.
- Do not submerge the Battery Cable Terminal Connector.
- Do not install the Positive (Orange) Battery Cable Terminal Connector on the negative battery cable.
- Do not install the Negative (Black) Battery Cable Terminal Connector on the positive battery cable.
- Do not use the Battery Cable Terminal Connector with batteries or equipment that exceeds the specifications. Using batteries or equipment that exceeds Battery Cable Terminal Connector specifications may present a fire risk or other hazards.

- Do not short-circuit or allow metallic conductive objects to contact cable ends and Battery Cable Terminal connectors.
- If the Battery Cable Terminal Connector is damaged, replace it.

1.5 Personal Protective Equipment

When handling or working near a battery:

- Use Personal Protective Equipment, including clothing, glasses, insulated gloves, and boots.
- Do not wear rings, watches, bracelets, or necklaces when handling or working near the battery.

2. ITEMS SHIPPED IN THE BOX

Table 2-1, HELIOS ESS Battery Cable Terminal Connector Set

Items	Description
1	Positive (Orange) Push/Pull Connector
1	Negative (Black) Push/Pull Connector

3. SPECIFICATIONS

3.1 Electrical Specifications

The HELIOS ESS Battery Cable Terminal Connector Set is designed for use with HELIOS ESS Batteries.

Table 3-1. HELIOS ESS Battery Cable Terminal Connector Electrical Specifications

Electrical Specifications	HELIOS ESS Battery Cable Terminal Connector
Rated Voltage	1600 Vdc
Withstanding Voltage	6800 Vac (1 minute)

3.2 Mechanical Specifications

Table 3-2. HELIOS ESS Battery Cable Terminal Connector Mechanical Specifications

Mechanical Specifications	HELIOS ESS Battery Cable Terminal Connector
Height	34.4 mm (1.35 in)
Width	27 mm (1.06 in)
Length	83.6 mm (3.29 in)
Cable Acceptance	55 mm² (1/0 AWG) – 70 mm² (2/0 AWG)
IP Rating	IPX8, IPXXB
Regulatory	UL94-V0, UL94 HB

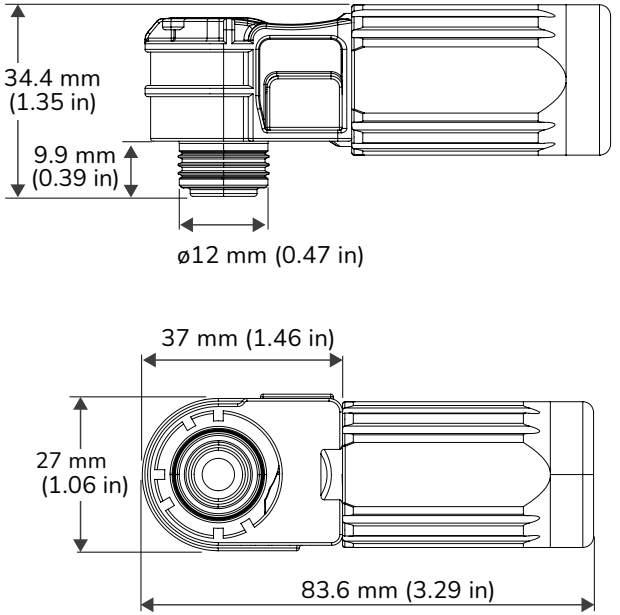

Figure 1. HELIOS ESS Battery Cable Terminal Connector Dimensions

4. HANDLING

Before handling

- Keep the Battery Cable Terminal Connector away from water, heat, and fire.
- De-energize all sources of power before handling a Battery Cable Terminal Connector.
- De-energize all sources of power before disconnecting a Battery Cable Terminal Connector.
- Protect the Battery Cable Terminal Connector from short-circuiting and touch.
- Do not lift or carry equipment by the Battery Cable Terminal Connector.

5. THEORY OF OPERATION AND FEATURES

On the Battery Cable Terminal Connector, turn the Tail Nut counterclockwise to screw it off and reveal the Grommet inside. The battery cable is passed through the Tail Nut and Grommet, and into the drum. The cable is secured by crimping the drum and cable together. Put the Plug Assembly, Grommet, Wire Clamp, and Tail Nut back together by screwing the Tail Nut back onto the Plug Assembly to encapsulate the cable after crimping. The assembled Battery Cable Terminal Connector attaches to a male receiving terminal pin, one of several on the sides of the HELIOS ESS battery, when you push the connector onto the receiving pin.

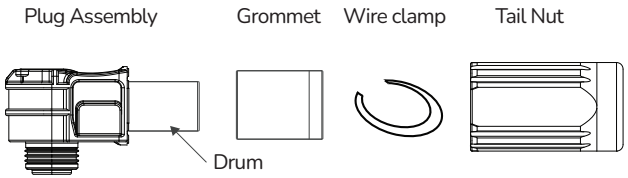

Figure 2. Battery Cable Terminal Connector parts

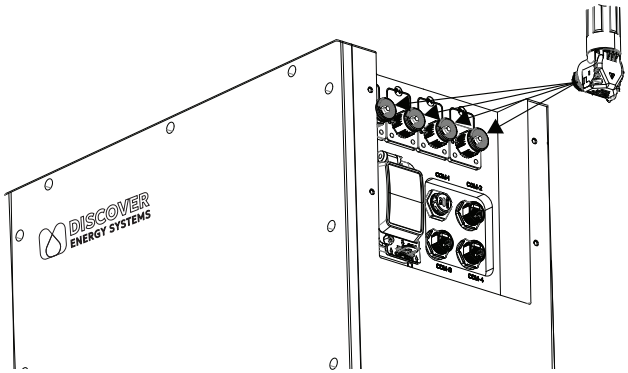

Figure 3. Battery Cable Terminal Connector Mated with a Terminal on the HELIOS ESS Battery

6. TOOLS

- Cable cutting tool
- Hydraulic Hand Crimper, Mechanical Rachet Crimper, or Compression Lug Crimper that can perform a cable compression ratio of 55% to 65% for a 55 mm^2 (1/0 AWG) or 70 mm^2 (2/0 AWG) cable and a cable pullout force of 2700 N (607 lbf)
- True RMS Multimeter
- Personal protective equipment

7. ASSEMBLY

The HELIOS ESS Battery Cable Terminal Connector consists of four pieces: Plug Assembly, Grommet, Wire Clamp, and Tail Nut.

The battery cable is passed through the Tail Nut and Grommet, and into the Drum, and the cable is secured by crimping the drum and cable together. After clipping on the Wire Clamp, put the Plug Assembly, Grommet, and Tail Nut together by screwing the Tail Nut back onto the Plug Assembly to encapsulate the cable after crimping.

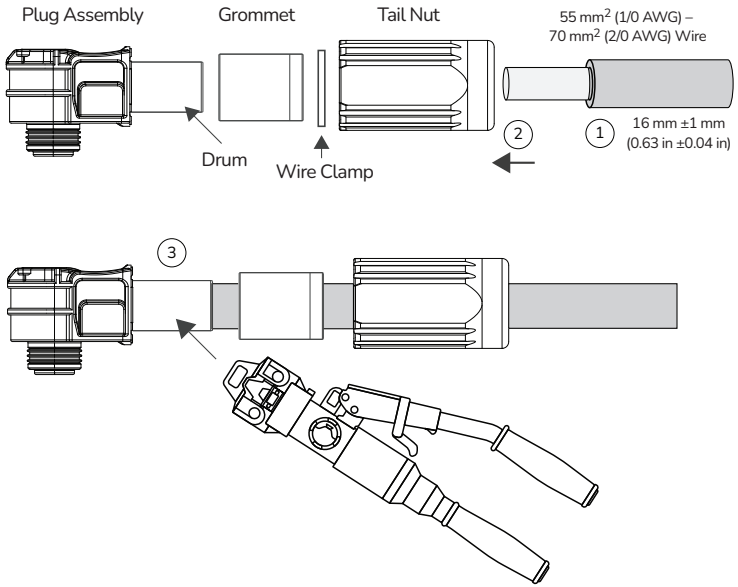

Figure 4. HELIOS ESS Battery Cable Terminal Connector Assembly

1. **Prepare the cable.** Cut the battery cable to the desired length. Strip 16.0 mm ±1 mm (0.63 in ±0.04 in) of insulation from one end of the cable.
2. **Insert cable into Plug Assembly.** Pass the cable through the Tail Nut and Grommet (keep the Wire Clamp handy). Insert the bare end of the cable into the drum of the Plug Assembly.
   a. Ensure the cable is fully inserted so that the insulation is right next to the drum, with no bare sections of the cable visible.
   b. Ensure the chamfer of the Grommet is facing the Tail Nut.

3. **Crimp the Cable.** Use a Hydraulic Hand Crimper, Mechanical Rachet Crimper, or Compression Lug Crimper tool to crimp the drum of the Plug Assembly to the battery cable.
   a. Aim for a compression ratio of 55% to 65% and a cable pullout force of 2700 N (607 lbf). There should be no obvious gaps or spaces between the drum and the cable.

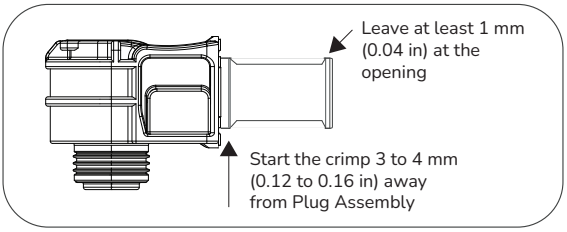

Figure 5. Shape and Dimensions of Crimped Drum

4. **Secure the Grommet.** Push the Grommet over the drum, and ensure it fits snugly against the Plug Assembly. Maneuver the Wire Clamp onto the cable, placing it between the Grommet and the Tail Nut, and secure the Wire Clamp so it is flush against the Grommet.

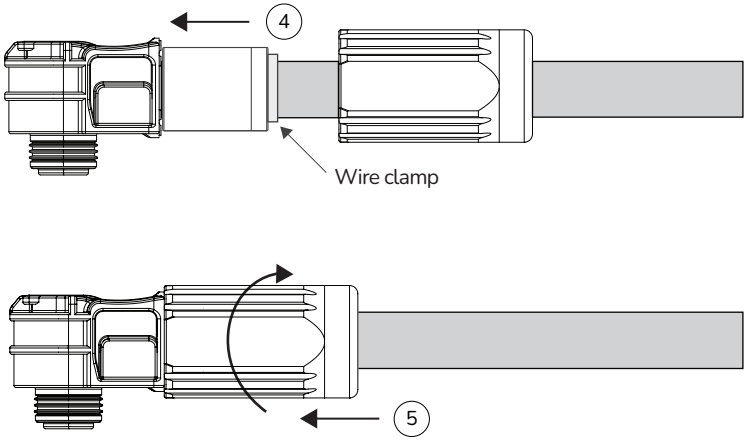

Figure 6. Putting Together the Battery Cable Terminal Connector

5. **Finalize the assembly.** Push the Tail Nut onto the Plug Assembly and twist it to screw it closed.

8. CONNECTING TO THE BATTERY

⚠ WARNING

ELECTRIC SHOCK AND FIRE HAZARD

- Always assume the HELIOS ESS Battery is energized, even if it LED shows that the battery is OFF.
- Even if the HELIOS ESS Battery LED is OFF, it may be energized by power from the Power Conversion System (inverter-charger / MPPT controller).
- Verify the terminal voltage with a voltmeter before handling any components in the Energy Storage System.

Failure to follow these instructions may result in death or serious injury.

8.1 Connecting to Battery Terminals

The HELIOS ESS Battery Cable Terminal Connector mates with a receiving pin of one of the male terminals on the sides of the HELIOS ESS battery.

1. De-energize all HELIOS ESS batteries and Power Conversion Equipment.
2. Attach the orange, positive (+) connector to the red, positive (+) push/pull terminal on the battery and push to lock the connector to the terminal.
3. Attach the black, negative (-) connector to the black, negative (-) terminal on the battery and push to lock the connector to the terminal.

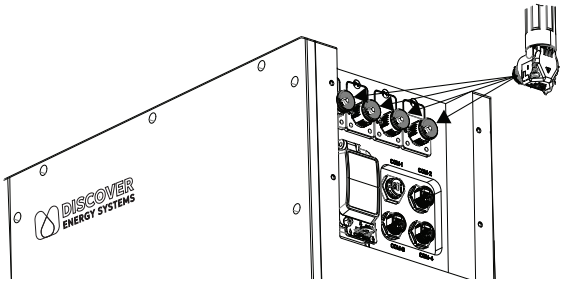

Figure 7. Connection with the Battery

8.2 Disconnecting from Battery Terminals

1. De-energize all HELIOS ESS batteries and Power Conversion Equipment.
2. Detach the orange, positive (+) connector from the positive (+) terminal on the battery by holding down the Release button on the side of the Plug Assembly and pulling it away from the battery.

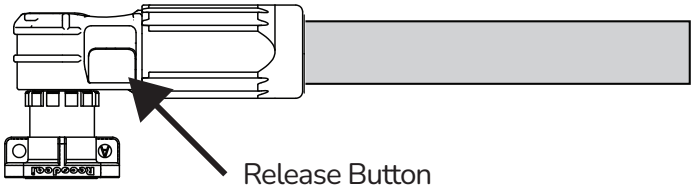

Figure 8. HELIOS ESS Battery Cable Terminal Connector Disconnection

3. Detach the black, negative (-) connector from the black, negative (-) terminal on the battery by holding down the Release button on the side of the Plug Assembly and pulling it away from the battery.

9. ROUTINE INSPECTION

Periodically inspect the Battery Cable Terminal Connector:

1. Ensure that all terminal connections are secure and tight.
2. Ensure that the contact location is clean and free of debris.
3. Inspect the Battery Cable Terminal Connector covers for cracks.
4. Replace any damaged Battery Cable Terminal Connectors.
5. Replace any cracked, frayed, or damaged cables.