



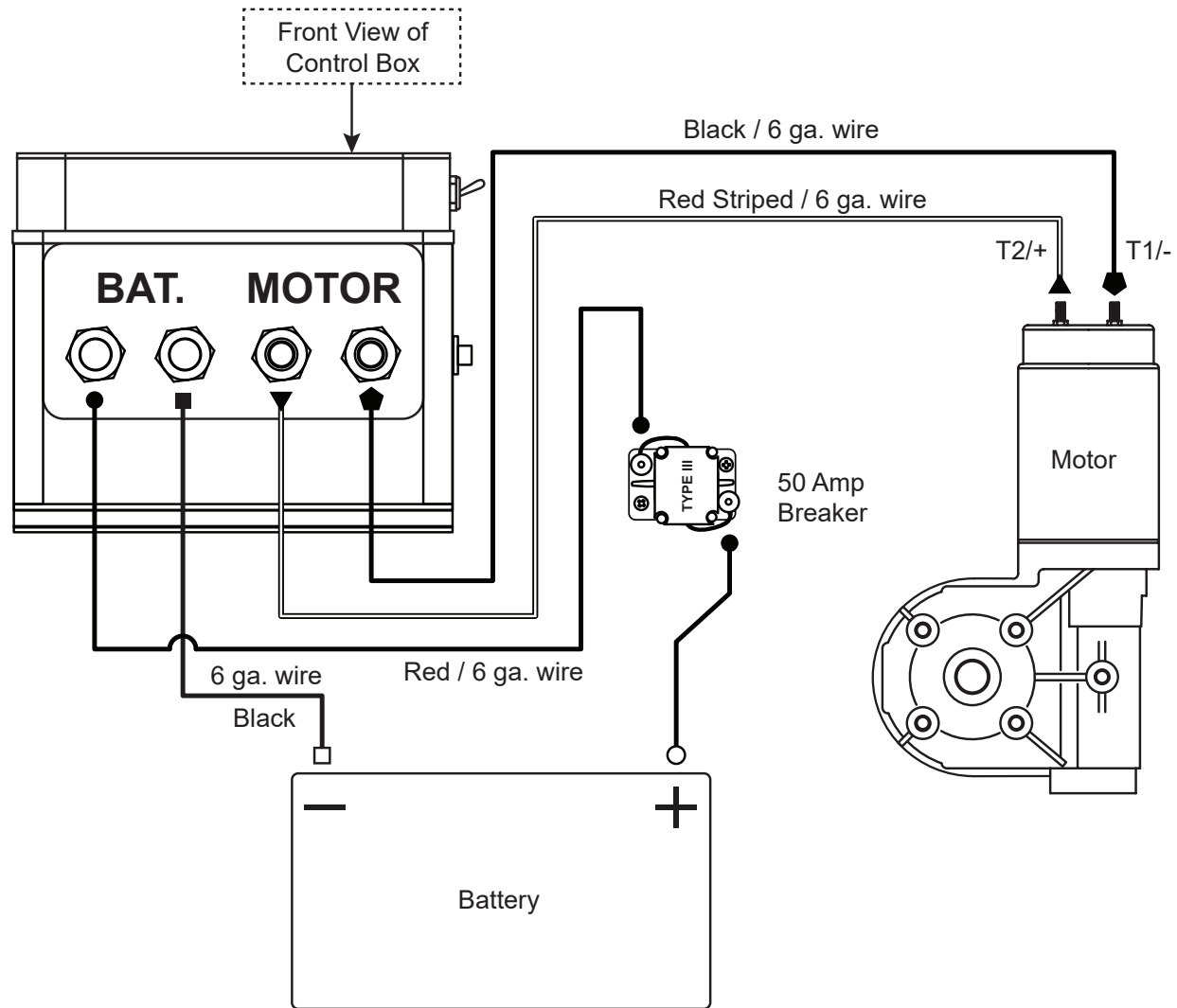
A Safe Fleet Brand



Installation Instructions

12V Smart Switch with External Switch Kit

501-9953





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12V Smart Switch with External Switch Kit

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SAFETY, TOOLS & SYSTEM REQUIREMENTS



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Safety Requirements



Failure to comply with requirements outlined in this document may result in serious injury or property damage.

The following requirements shall be met when installing or servicing electrical components in Pulltarps Automated Tarp Systems:

- All connections to vehicle battery systems, vehicle battery chargers, and external power supplies shall be disconnected during all installation procedures.
- Prior to installing wiring on positive terminals, check voltage on all wires and connection points using a voltmeter.
- The following personal protective equipment shall be worn at all times while installing components:
 - » Safety Glasses or Prescription Glasses with Side Shields.
 - » Steel or Composite Toe Protective Shoes.

Tools and Equipment Required for Installation

The following tools are required for installation of electrical components

- Torque Wrench with range between 50 to 150 in.lb.
- Nut Driver Set.
- Wire Cutters up to 2AWG size wire.
- Wire Insulation Stripping Tool for wire size range from 2 to 8 AWG.
- Wire Insulation Stripping Tool for wire size range from 16 to 18 AWG.
- Wire Terminal Crimping Tool for wire size range from 2 to 8 AWG.
- Wire Terminal Crimping Tool for wire size range from 16 to 18 AWG.
- Heat Gun for application of heat shrink insulation.
- Multi-meter with DC voltage measurement capability.
- Zip Ties.
- Vehicle Chassis Wiring insulated c-clamps capable of carrying 2 to 8 AWG wiring.



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Vehicle Battery Connection Requirements

Main Power to Pulltarps System

- Source Voltage Line to Motor Reversing Relay shall be connected directly to the vehicle battery system.
- The Source Voltage Line shall include an in-line Pulltarps supplied circuit breaker. The circuit breaker shall be no greater than 12 inches from the positive terminal of the vehicle battery system.
- Main Power and Ground Connection through a power distribution box are forbidden.

Main Ground to the Pulltarps System

- Ground line to the Motor Reversing Relay shall be connected directly to the negative terminal of the vehicle battery system.
- Battery terminals shall be coated with dielectric grease to prevent corrosion.
- Appropriate ring terminal or battery terminal at the vehicle battery connection are required.

System Circuit Breaker Requirements

- The breaker shall be installed on the main positive wire within 12 inches of the positive terminal of the vehicle battery system.
- Circuit Breaker shall be mounted on a vertical surface with the input and output wires entering and exiting from the sides. This is the only approved installation orientation for the circuit breaker.
- Terminals of the circuit breaker shall be no less than 2 inches from any surface on the vehicle in all directions.

Control Box



Failure to properly follow all requirements may result in present or future property damage. Pulltarps Motor Reversing Relays contain a hot at all times connection to the vehicle battery system. Care must be taken to prevent contact between battery supply terminals and conductive surfaces of the chassis

**Control Box (Continued)**

The positive terminal of Pulltarps Motor Reversing Relay is hot at all times, breaker connected to the positive terminal of the vehicle battery energy system. Care must be taken to ensure the positive terminals meet the following:

- 1. Connected only with the supplied fasteners to the correct torque (4-6 ft.lb) to prevent a loose, highresistance connection, and...*
- 2. Strain relieved to prevent wire torque and vibration from loosening connection.*
- 3. Completely covered with the proper Red terminal boot.*

Failure to comply may result in excessive heat in the connection due to high resistance.

Control Box Requirements (Part Number 501-9952 or 501-9953)

- Mount the Control Box in a location that it is protected from road debris, ice, snow, and road spray or bombardment.
- Use the terminal boots supplied with the Control Box, according to the following color codes:
 - » B+ is RED indicating the terminal is un-switched, fused, and hot at all times.
 - » B- is Black.
 - » M2 is Black.
 - » M1 is Red.
- All terminals shall be coated with dielectric grease to prevent corrosion and long term connection from debris between electrical terminals.
- The Control Box shall be attached to the surface using only threaded fasteners with torque specification consistent with the fastener size and type.
- All terminal wires shall be strain relieved using insulated C-clamps attached to vehicle body to prevent wire vibration and torque loading from loosening electrical connections.
- Route all electrical wires from the Control Box in a manner that will avoid wire insulation chafing, pinching, and wear from other items on the truck chassis or wear from the environment.
- Torque all electrical connection fasteners to minimum 4-6 ft.lb.



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Switch Requirements

Momentary Rocker Switch and Rotary Switch



Pulltarps Rocker and Rotary switches contain hot-at-all-times connection at the center terminal of the switch. No exterior installation of the rocker or rotary switch is permitted. Contamination from an outside environment may connect the switch center input to the command line, resulting in unexpected movement of the tarp system.

- Use only a Pulltarps supplied Rocker Switch or Rotary Switch with the motor reversing relay.
- Switch terminals shall be protected from contact with conductive materials.
- Switch harness shall be fully insulated.
- Switch spade terminal connections shall be fully seated, preventing exposed conductive surfaces.
- Rocker switch shall be installed such that the switch labels read from left to right.

Gear Motor Installation Requirements

- Gear Motor shall be mounted using all mounting locations provided.
- Electric Motor connections shall be fully coated in dielectric grease.
- Electric motor connection torque requirement: 15 to 22 in.lb.
- To prevent terminal damage - **Do not exceed 25.5 in.lb.**



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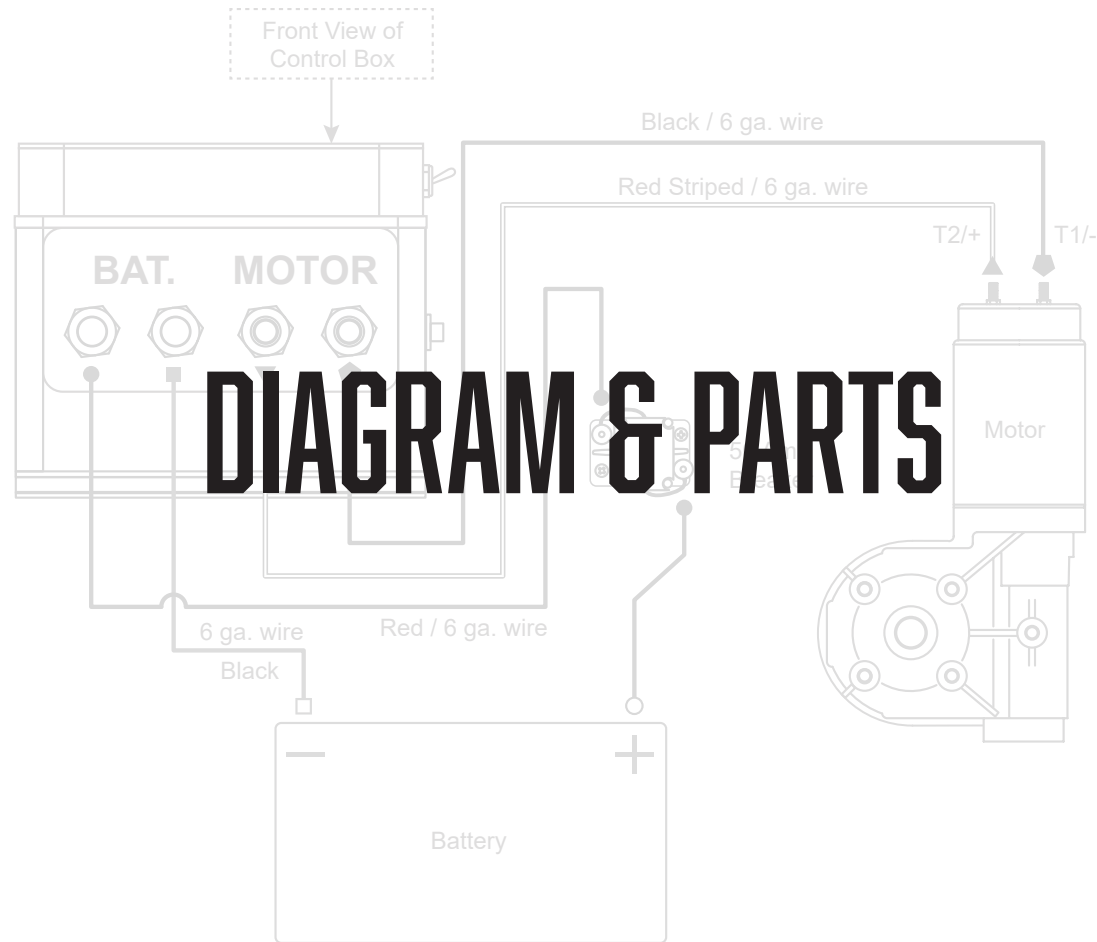


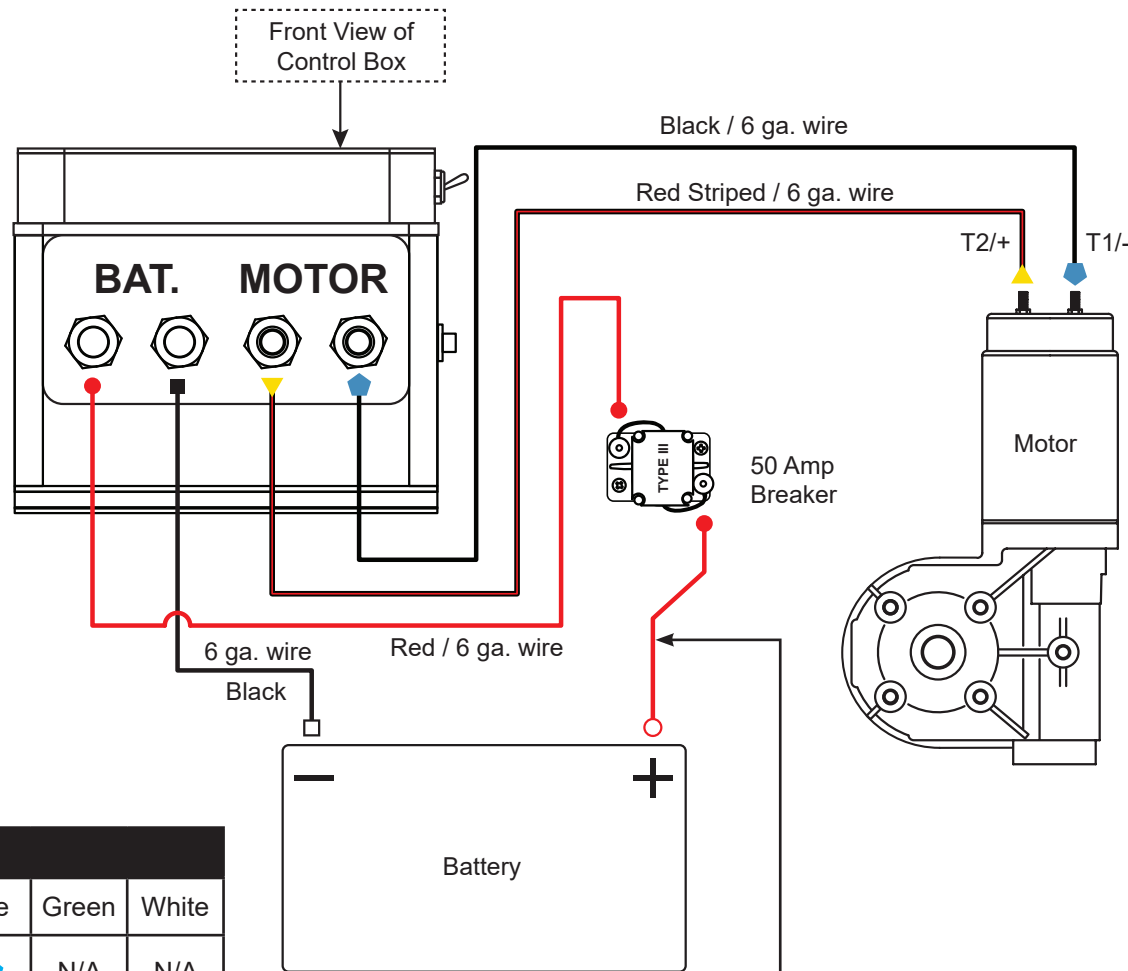
DIAGRAM & PARTS



Installation Instructions

12V Smart Switch with External Switch Kit

Switch with External Switch 20 Volt - Wiring Diagram #501-9953



BOOT COLORS						
	Red	Black	Yellow	Blue	Green	White
With Boot	●	■	▲	◆	N/A	N/A
No Boot	○	□	N/A	N/A	◇	◎

Note: 12" Max distance between Battery and Breaker.



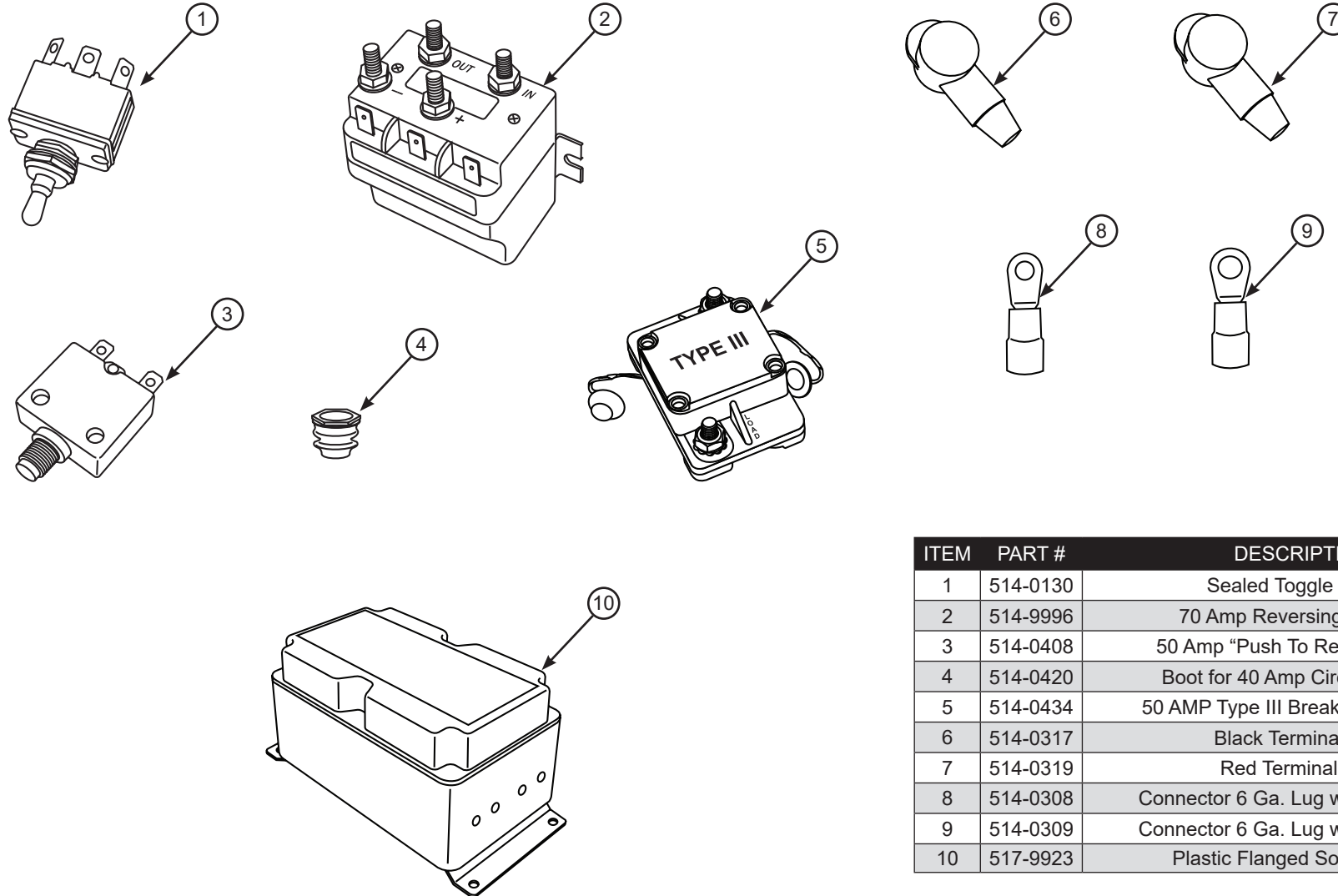
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Installation Instructions

12V Smart Switch with External Switch Kit

Smart Switch with External Switch 12 Volt #501-9953



ITEM	PART #	DESCRIPTION	QTY
1	514-0130	Sealed Toggle Switch	1
2	514-9996	70 Amp Reversing Solenoid	1
3	514-0408	50 Amp "Push To Reset Breaker"	1
4	514-0420	Boot for 40 Amp Circuit Breaker	1
5	514-0434	50 AMP Type III Breaker HIGH-AMP	1
6	514-0317	Black Terminal Boot	2
7	514-0319	Red Terminal Boot	2
8	514-0308	Connector 6 Ga. Lug with 1/4" Eyelet	8
9	514-0309	Connector 6 Ga. Lug with 3/8" Eyelet	2
10	517-9923	Plastic Flanged Solenoid Box	1

REV. 07/19/19 WLH

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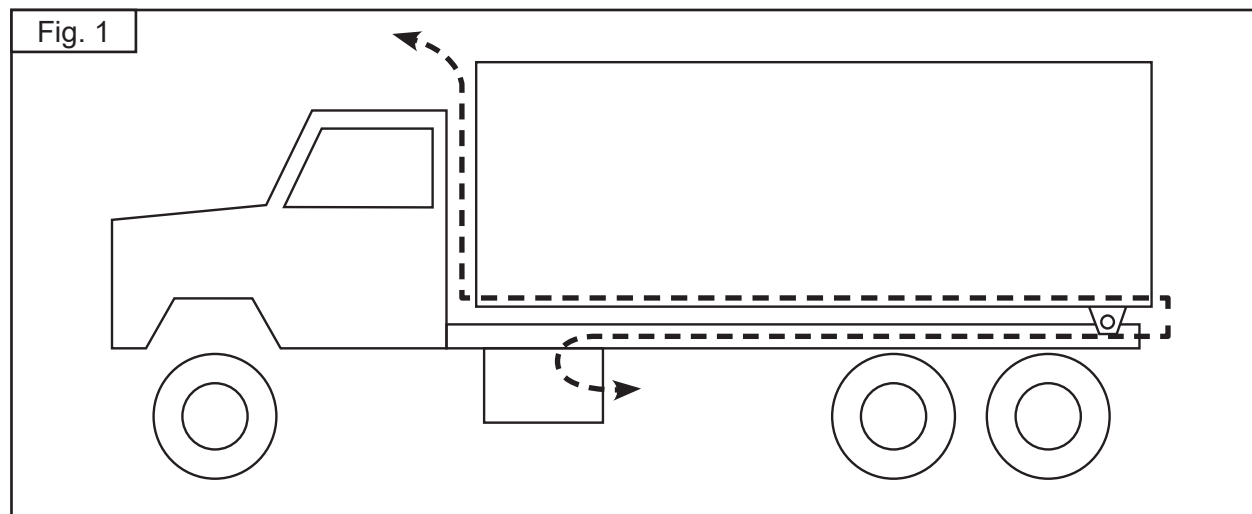
Wiring the Motor

Step 1.

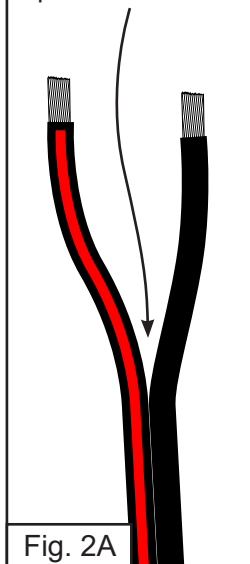
Run the 6 ga. wire to both locations (motor & battery box) and attach to truck body (Fig. 1).

Note: The wire must go beyond the pivot point.

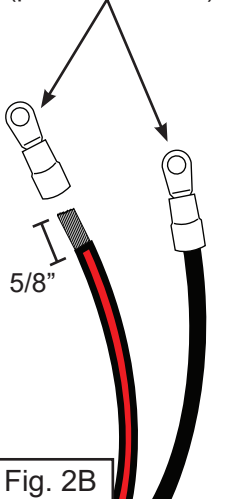
Caution: Make sure wire does not get pinched at the pivot.



Split about 4" back

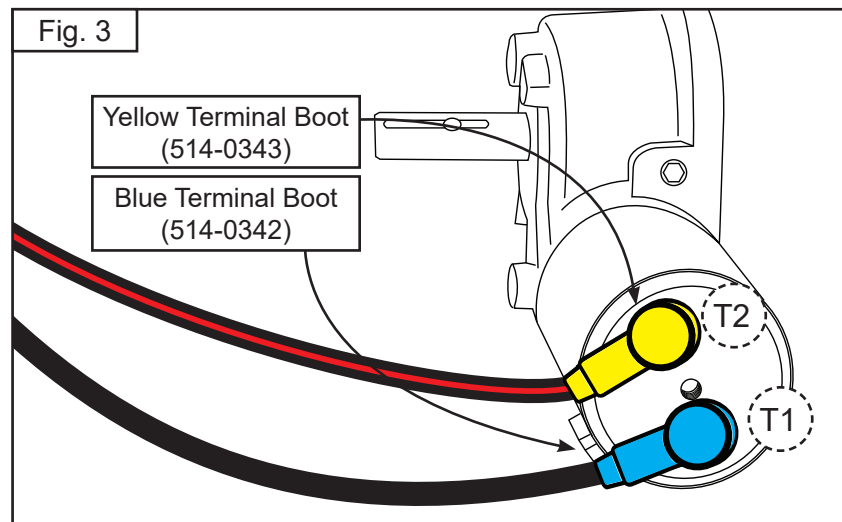


6 ga. 1/4" Lug Connector (part # 514-0308)



Step 2. Preparing the Connectors

On the motor side, split the molded 6 ga. wire approximately 4" (Fig 2A) and strip the ends about 5/8" down. Then attach connectors (part # 514-0308) and crimp (Fig. 2B).



Step 3. Attaching Connectors to the motor

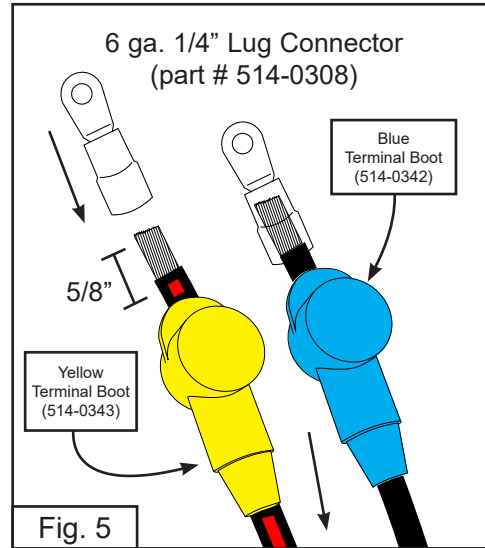
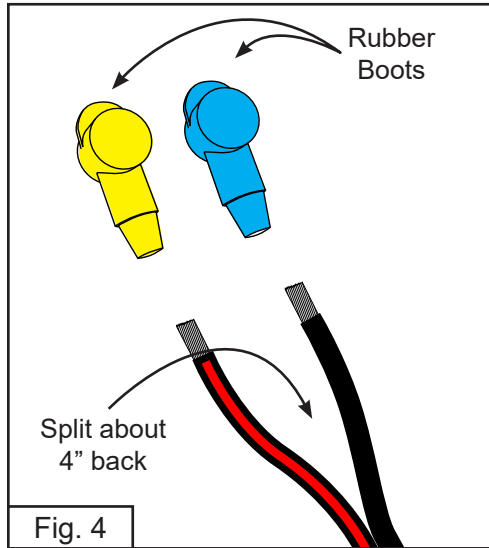
Attach Black wire to Terminal #1 (T1) on motor. Then attach the Red Striped wire to Terminal #2 (T2) on motor (Fig. 3).



Installation Instructions

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Wiring the Smart Switch

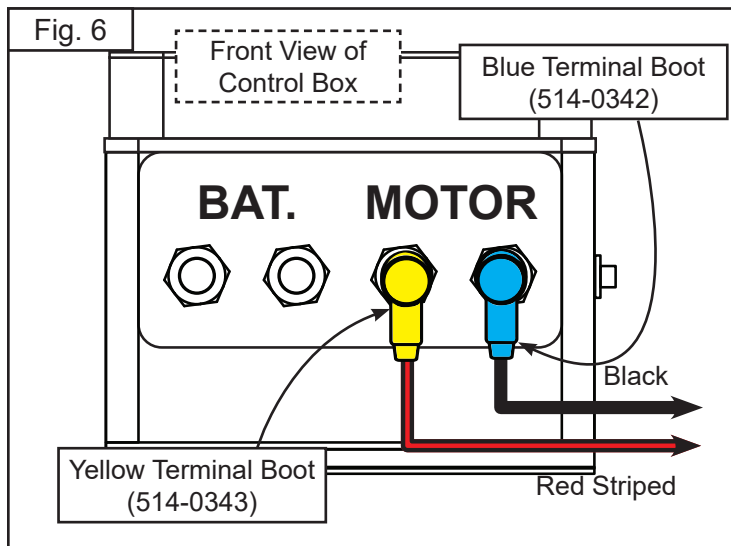


Step 4: Prepping the Wire

Take the other end of the wire and Split the 6 ga. wire at the control box about 4" back and slip on rubber boots - Yellow Boot (part # 514-0343) on Black wire and Blue Boot (part # 514-0342) on Red Striped wire (Fig. 4).

Strip wire about 5/8" and attach connectors (part # 514-0308) (Fig. 4). Crimp Connectors (Fig. 5).

Note: Do not over tighten nuts on connections!



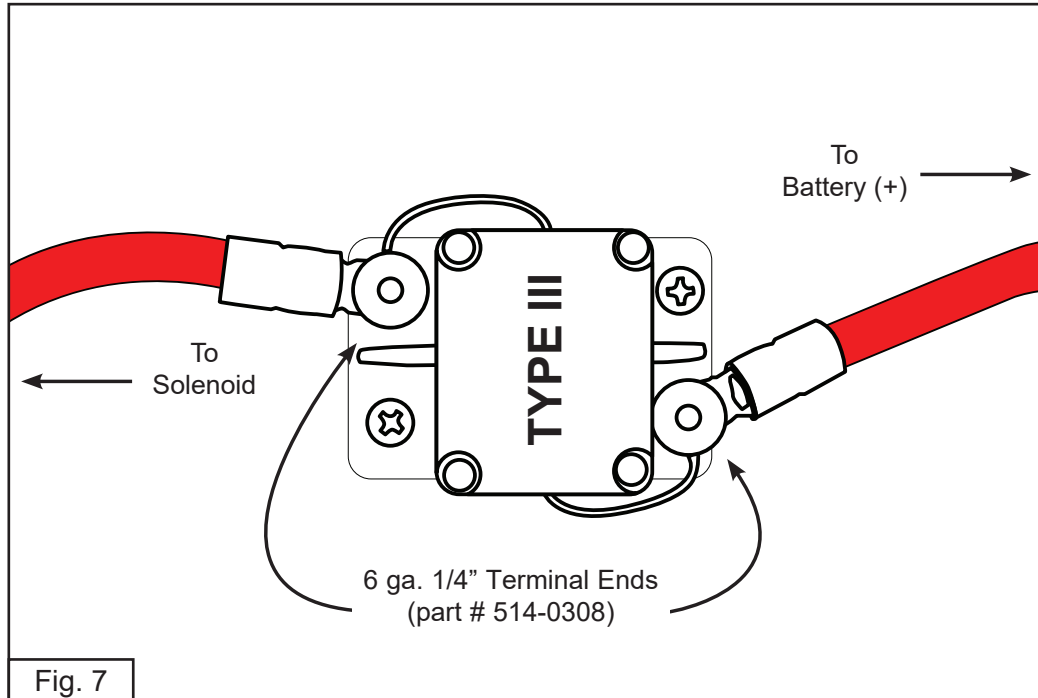
Step 5: Attaching the Connectors

Attach Red Striped Wire to the Motor (+) and connect the Black Wire to Motor (-) on the Control Box (Fig. 6).

Note: Both wires lead to the motor.



Wiring the Breaker



Step 6: Prepping the Wire

Mount breaker in the battery box away from moisture.

Cut a section in the Red 6 ga. wire that will run to the positive terminal on the battery.

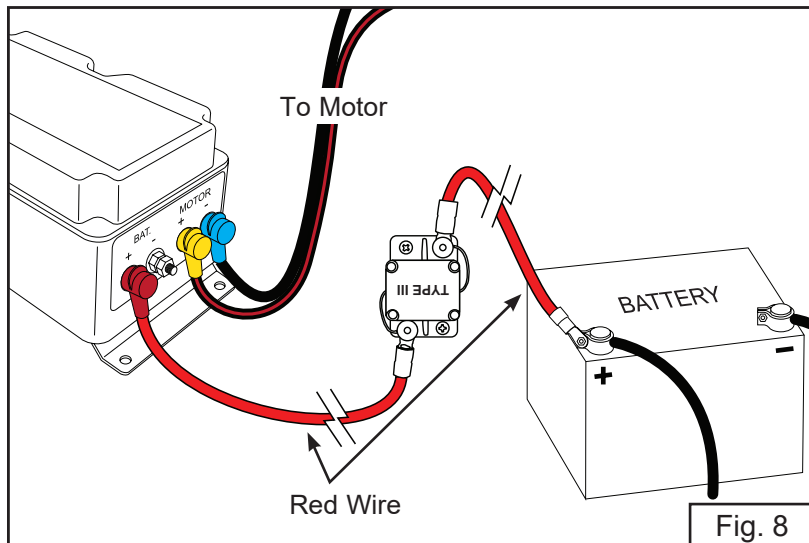
Strip the ends about 5/8" and attach the 6 ga. 1/4" terminal ends (Part # 514-0308). Attach to breaker (Fig. 7).



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Wiring the Battery

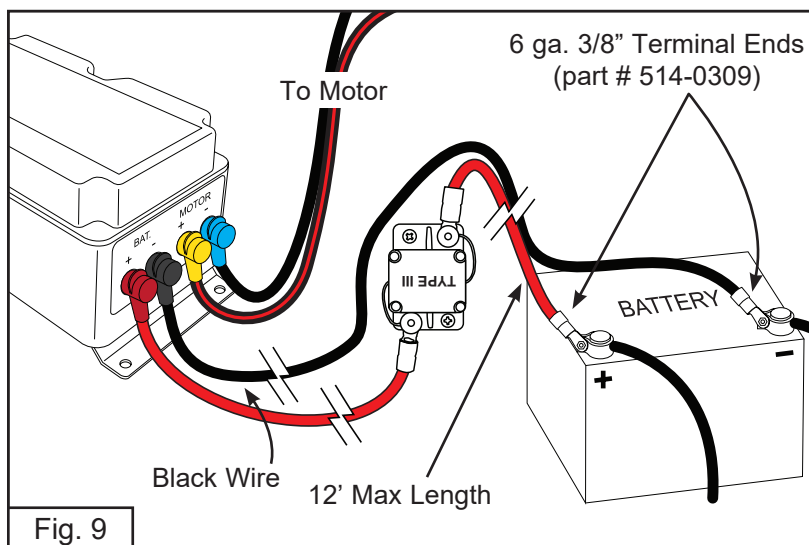


Step 7: Wiring the Battery

Attach the red 6 ga. wire to BAT (+) at the control box.

Slide Red Terminal Boot over the end and connect using the Lug Connector (part # 514-0308) as done in Step 4.

Attach the other end of the red striped 6 ga. wire to the positive terminal on the battery using a 6 ga. 3/8" terminal end (part # 514-0309) at the battery (Fig. 8).



Step 8: Wiring the Battery

Connect the black 6 ga. wire to the negative terminal on the battery using a 6 ga. 3/8" terminal end (part # 514-0309) at the battery.

Attach the other end of the black 6 ga. wire to BAT (-) at the control box as done in Step 4. Slide Black Terminal Boot over the end and connect using the Lug Connector (part # 514-0309) as shown in (Fig. 9).

Warning: You must attach the black 6 ga. wire to the battery first, before attaching it to the box.

Note: If the system operates backwards then reverse the 6 ga. wires on the motor.



Step 9: Motor Check Out Procedure (Fig. 10)

1. Remove leads from motor & attach volt meter to the leads.
2. With the switch in to on position, the volt meter should read 12 volts minimum. If voltage is low recheck with engine running. Recheck wiring and connections (minimum 6 gauge wire must be used).
3. Return switch to the neutral position & reattach leads to motor.
4. Attach volt meter to leads at the motor.
5. With the switch in the on position and the leads attached, the volt meter should read 8.5 volts minimum. If voltage is low recheck with engine running.
6. Recheck wiring and connections (minimum 6 gauge wire must be used).
7. Return switch to the neutral position and attach amp meter to leads at the motor.
8. With the switch in the on position, amp meter should read approximately 30 amps. Constant amperage reading of over 50 amps indicated binding in the system and/or low voltage.
9. Disconnect 6 ga. 1/4" terminal end from the solenoid side of the breaker.
10. Connect the 6 ga. 1/4" terminal end to the battery side of the breaker. This will bypass the breaker.
11. Test the tarp system. If the motor operates properly then replace the breaker.

