Installation & Service Manual
Slim Rack Bunk Lift System with Control Box 1510000199 or 1510000260

 # **3010002675**, Rev. 0D

Figure 1

Installation and Service Manual Dual Planetary Gearmotor Slim Rack Bunk Lift System

CONTENTS

NOTE

Bunk lift systems are engineered to provide years of trouble free service. Changes to weight, stroke, weight distribution, rail position, controller, power supply, seals, etc, all have an effect on the performance of the system. In order to secure warranty coverage, each new application or changes to existing applications must be audited and approved by Power Gear with a signed document. Audits can be arranged by contacting your account representative.

Introduction

SYSTEM DESCRIPTION:
The Power Gear Slim Rack Bunk Lift System is a rack and pinion design operated by a 12 Volt DC electric Motor. The system is designed to move a bunk of no more than 100 pounds vertically. Bunk Lift systems rated for higher weight or longer strokes can be obtained. Please contact Power Gear for application assistance.

MAJOR COMPONENTS:

- Touchpad control that mounts to the wall. It allows bunk movement and provides end user feedback.
- A specially designed control that gives the user full control of bunk movement, up or down. The control has programmable stops that stop the motor when the bunk is fully raised or lowered and the ability to detect faults for ease in troubleshooting.
- Vertical channel (two to four) with 12V DC gear motor which mounts to bunk, and gear rack arms that mount to the vertical structure.
- Harnesses to connect touchpad and motors to control box (sold separately).
- Bunk Lift Systems are equipped with a manual override that allows you to raise/lower the bunk in the event of a loss of power.

Installation

GENERAL REQUIREMENTS:

- Power input and wiring size must be such that there are **no less than 10.5 running volts** supplied at the motor leads under maximum load.
- To ensure long, trouble free life of the bunk lift system, a maximum amp draw per motor should be less than 40% of motor stall. The system will operate at higher loads/amp draws but system component life will be reduced as the amp draw per motor is increased above the rating. Contact Power Gear with motor part number for more information on stall specs.
- Bunk lift system controls must be supplied from Power Gear. Controls supplied by other companies will void warranty.
- Voltage supply must come from a 12VDC automotive/RV type battery.

Power Gear Bunk Lift System Components

Figure 2

Installation (Continued)

Mechanical Components:

1. See **Figure 2** above for components of the bunk lift system. Harnesses not shown.
2. Secure bunk lift motor channel assembly to O.E.M supplied bed frame assembly.
3. Position bunk rack assembly against vertical structure, makes sure the gear rack is vertically positioned, and use a builder's level against gear rack to ensure gear rack is plumb.
4. Secure top rack/end brackets to a vertical structure. NOTE: Secure using four (4) flat head #10 screws (See **FIGURE 3** below) into a structure that can support the weight of the bunk and sleeping occupants.
5. Using the builder's level make the gear rack is plumb, secure the bottom rack /end brackets to the vertical structure. Use four (4) flat head #10 screws.
6. Repeat steps 2-5 for attaching motor channel assembly and rack/end bracket assembly to other end of the bunk.

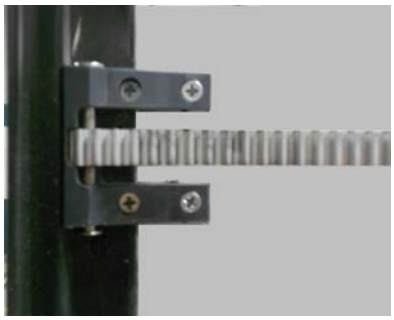


Figure 3

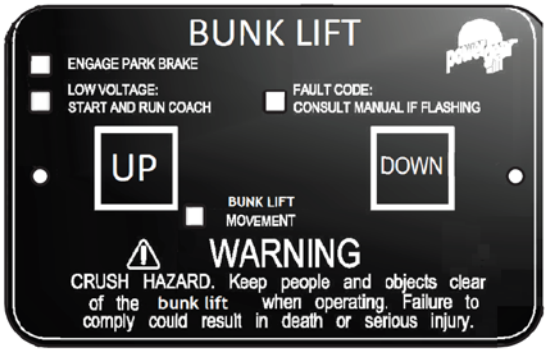


Figure 4 *Touchpad*

Figure 5 *Touchpad Harness assemblies*

Installation (Continued)

Electrical Components:

1. Mount the **CONTROL BOX** (**FIGURE 1, page 1**) in a clean and dry, weather tight location that will keep it from being damaged, but is easily accessible for service. **The control is not waterproof**.
2. Reference page 9 (**FIGURES 14, 15, 16, 17, & 18)** for wiring details.
3. Determine location to mount **TOUCHPAD** (**FIGURE 4, page 2**). Location needs to be in view of bunk lift and have minimum depth of 1" inside the wall. Cut a 3 1/8" wide by 2" high rectangular opening in the wall paneling to mount the touchpad.
4. Route and attach the touchpad harness (**FIGURE 5**) to the touchpad where the touchpad will be mounted. After system has been programmed (**see PROGRAM MODE, page 4**), mount **TOUCHPAD** (**FIGURE 4**) with two (2) screws.
5. Route the motor/sensor harnesses from the bunk lift motors to the control box. Mark the motor leads at both ends to aid in connections after routing harness.

Note: *It is important that the bunk lift motors be plugged in to the proper receptacle at the control box. Please see the **FIGURE 7** below for proper bunk lift motor designation. Failure to properly connect the motors to the control will result in programming issues (**see FAULT DIAGNOSIS/TROUBLESHOOTING, page 6**).*

5. Route and attach the **proper gauge wires** (**FIGURE 6**) from the control to the 12V DC battery using a 30A fuse or circuit breaker.

Installation of the bunk lift is now complete. You are now ready to program the up and down stops (see **PROGRAM MODE, page 4**).

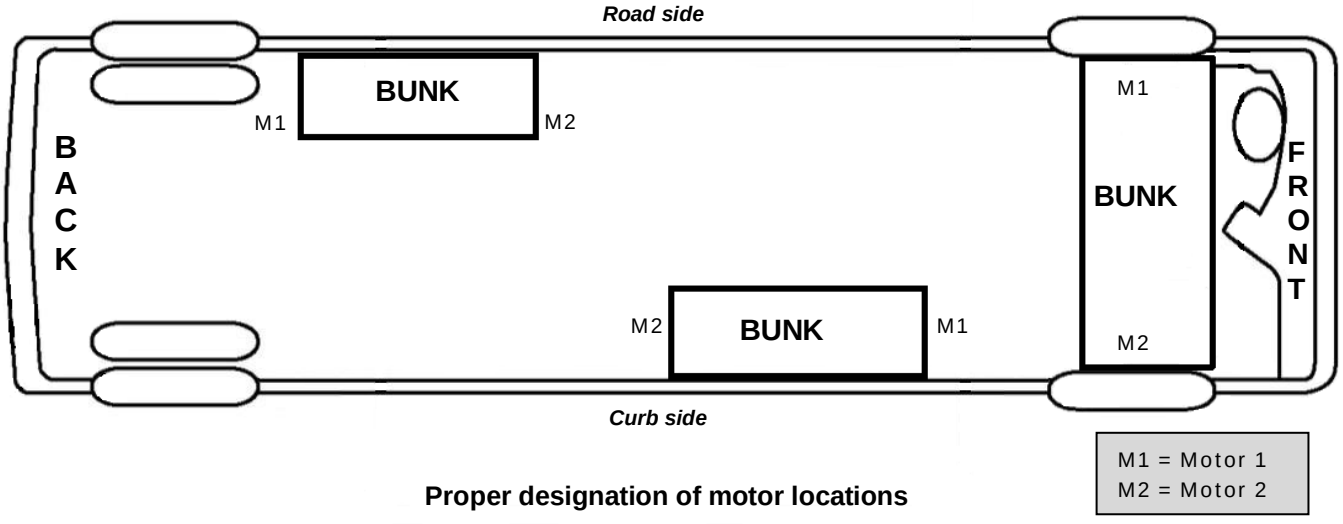
Wire Gauge	Maximum Length
16	10 feet
14	15 feet
12	25 feet
10	40 feet

Wire must be sized so that a minimum of 12.5 VDC is measured at the control while under a load.

Figure 6 *Information is given as reference only*

Figure 7

Possible Bunk Lift Locations



Proper designation of motor locations

WARNING

- Always make sure that the bunk lift path is clear of people and objects before and during operation of the bunk.
- Always keep away from the gear racks when the bunk is being operated. The gear assembly may pinch or catch on loose clothing causing personal injury.

Program Mode

Use this procedure to initially set the UP and DOWN stops or to change the current stop settings.

Note: *At any time during the program procedure, the unit will exit program mode if the bunk has not been moved for two (2) minutes or if a fault is detected during programming. The **FAULT CODE** and **BUNK LIFT MOVEMENT** LED's will flash rapidly for 10 seconds to indicate that the programming procedure failed. After the 10 seconds of flashing, the control will automatically default to **FAULT CODE 1** (see **FAULT CODES, page 7**) and programming must be restarted.*

1. If the **TOUCHPAD** (**FIGURE 4**) is mounted to the wall, remove it to access the buttons (**FIGURES 8 & 9**) on the back side.

2. Press and hold the **SET STOPS/CLEAR FAULT** (**FIGURE 8**) button on the back of the bunk lift touchpad for five (5) seconds. The **FAULT CODE** and **BUNK LIFT MOVEMENT LED's** will light while the button is held down.
   - After five (5) seconds, the **GREEN LED** will begin flashing and the **RED LED** will remain lit (**FIGURE 10**).
3. You are now ready to set the **UP** stop. **The UP stop must be programmed first.**
   a. Press and hold the bunk lift motor buttons (**MOTOR 1 and MOTOR 2, FIGURE 9**) on the back of the bunk lift **TOUCHPAD (FIGURE 4)** that correspond to the bunk lift motors you want to move. These buttons correspond to the bunk lift motors.
   b. Press the **UP** button on the front of the bunk lift **TOUCHPAD.**
   c. Move the bunk lift to the fully raised position. Release buttons. Press and release the SET **STOPS/CLEAR FAULT** (**FIGURE 9**) button on the back of the bunk lift touchpad to program the UP stop position. The **RED LED** will now start to flash and the **GREEN LED** (**FIGURE 10**) will remain lit.

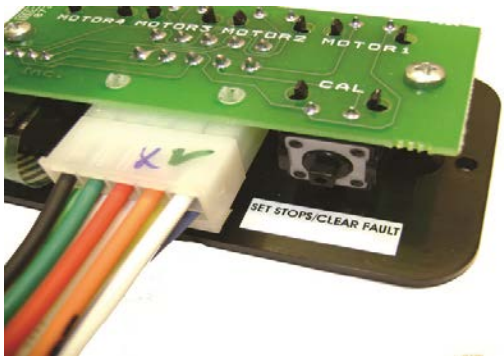


Figure 8 Set *Stops/Clear Fault Button*

Figure 9 *Bunk Lift Motor Buttons*

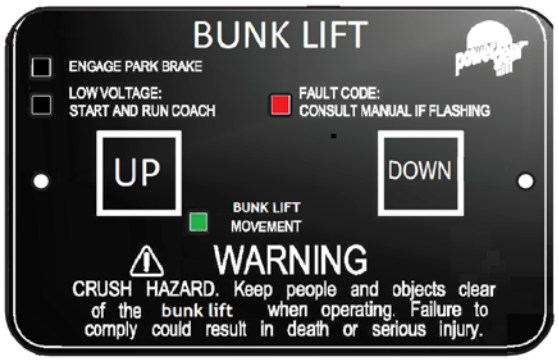


Figure 10 *Bunk Lift Touchpad Programming Lights*

WARNING

- Always make sure that the bunk lift path is clear of people and objects before and during operation of the bunk lift.
- Always keep away from the gear racks when the bunk lift is being operated. The gear assembly may pinch or catch on loose clothing causing personal injury.

Program Mode (Continued)

4. You are now ready to set the **DOWN** stop.
    a. Press and hold the same bunk lift motor buttons (**MOTOR 1 and MOTOR 2**) as you did **in STEP 3a, page 4**.
    b. Press the **DOWN** button on the front of the wall **TOUCHPAD (FIGURE 10, page 4)**.
    c. Move the bunk to the fully lowered position. Release the buttons.
    d. Press and release the SET **STOPS/CLEAR FAULT** (**FIGURE 8, page 4**) button on the back of the bunk lift touchpad to program the down stop position.
        - If both LED's flash rapidly for one (1) second and then shut off, the control has been programmed correctly and is now in normal operation mode.
        - If both LED's flash rapidly for 10 seconds, the control has ***NOT*** been programmed correctly or the system is wired incorrectly. The **TOUCHPAD** (**FIGURE 4, page 2**) will flash the fault code that occurred during programming. Refer to the **FAULT DIAGNOSTICS/TROUBLESHOOTING** section (**page 6**), repair the fault, and repeat the **PROGRAM MODE** procedure starting with **STEP 1, page 4**.
        - The control must be programmed correctly before it will operate in normal mode. *NOTE: The **UP stop** must be programmed before the **DOWN stop**.*
5. Re-install the bunk lift **TOUCHPAD** (**FIGURE 4, page 2**). Programming of the control is now complete.

Installation Issues

The control is equipped to help troubleshoot the system during installation. Count the number of LED flashes and refer to the **FAULT DIAGNOSTICS/TROUBLESHOOTING** section starting on **page 6** of this manual.

If you are still having difficulties programming the system (and prior to replacing the control), verify that the system has been wired correctly and that the **UP** stop location was programmed before the **DOWN** stop location. See **FIGURE 7, page 3** for proper connection of the motors to the bunk lift control.

Operation Mode

Please note:

- The bunk lift system will not function until the stops are properly set or faults are cleared.
- The **GREEN** LED (**FIGURE 11, page 4**) indicates the system operation.
    - A solid **GREEN** LED indicates bunk movement.
- The **RED** LED (**FIGURE 11, page 4**) indicates a fault or a problem with the system. Refer to the **FAULT DIAGNOSTICS/TROUBLESHOOTING** (**page 6**) for additional information.

Prior to moving the bunk lift:

- Make sure the engine or generator is running to ensure ample voltage is being supplied to the bunk lift system motors.
- Make sure bunk path is clear of obstructions.

Lowering the bunk:

1. The engine or generator must be running, or plugged into shore power.
2. Transmission must be in PARK or NEUTRAL. (If applicable).
3. Level the unit.
4. Remove the locking pins. (If applicable).
5. Turn "on" the on/off switch or key. (If applicable).
6. Press and hold the **DOWN** button (**FIGURE 10, page 4**). There will be a slight delay before the bunk will begin to move, this is normal.
7. Release the button when the bunk is fully lowered and stops moving.
8. Turn "off" the on/off switch or key. (If applicable).

WARNING

- Always make sure that the bunk lift path is clear of people and objects before and during operation of the bunk lift.
- Always keep away from the gear racks when the bunk lift is being operated. The gear assembly may pinch or catch on loose clothing causing personal injury.

Operation Mode (continued)

Raising the bunk:

1. The engine or generator must be running, or plugged into shore power.
2. Transmission must be in PARK or NEUTRAL. (If applicable).
3. Level the unit.
4. Turn "on" the on/off switch or key. (If applicable).
5. Press and hold the "in" button (**FIGURE10, page 4**).
6. Release the button when the bunk is fully in raised position.
7. Turn "off" the on/off switch or key. (If applicable).
8. Install the locking pins. (If applicable).

Preventative Maintenance

Your Power Gear bunk lift system has been designed to require very little maintenance. To ensure the long life of your bunk lift system, read and follow these few simple procedures:

- When the bunk is in the down position, visually inspect the gear rack assemblies. Check for excess build up of dirt or other foreign material; remove any debris items that may be present.
- If the system squeaks or makes any noises, blow out any debris from the gear rack arms and apply a dry lubricant to prevent and/or stop squeaking.

If you have any problems or questions, please see the contact tab on our website at www.powergearus.com

Fault Diagnostics/Troubleshooting

This control has the ability to detect and display several faults. When a fault is detected, the bunk movement will stop and two (2) different LED's will flash in a pattern.

- The **FAULT CODE** LED (**FIGURE 10, page 4**) will flash **RED** a number of times corresponding to a specific fault code. Refer to the **TROUBLESHOOTING** chart on **page 7** to best determine what caused the fault.
- The **BUNK MOVEMENT** LED (**FIGURE 10, page 4**) will flash **GREEN** a number of times corresponding to which motor had the associated fault.
  - For example: if you are seeing four (4) **RED** flashes and two (2) **GREEN** flashes, it means that there is a motor fault on motor 2.

There are two (2) types of faults, **MINOR** and **MAJOR**, and fault must be cleared in order for the bunk to operate.

- **MINOR** faults can be cleared by pushing and releasing the **UP** or **DOWN** buttons on the bunk lift touchpad (**FIGURE 10, page 4**).
- After the problem has been repaired, **MAJOR** faults must be cleared by pushing and releasing the **SET STOPS/CLEAR FAULTS** button located the back of the bunk lift touchpad (**FIGURE 8, page 4**).

Note: *For major faults, the control must be overridden by following the **EMERGENCY BUNK MOVEMENT** in the **OVERRIDE MODES** section on starting on **page 7**. The control will then have to be re-programmed by the O.E.M authorized dealer when the problem is repaired.*

*A listing of **FAULT CODES** including probable causes and possible solutions begins on page 7.*

Fault Diagnostics/Troubleshooting (continued)

FIGURE 11 ***FAULT CODES***

Fault Code	Fault Type	Description	Possible Cause	Possible Solutions
1	Major	Stops not programmed	• Stops have not been set • Stops were cleared • Stops were improperly set	Stops need to be programmed according to the PROGRAM MODE instructions starting on page 3.
2	Minor	System Fault	• Obstruction present • Excessive system drag	Run bunk lift in opposite direction. If bunk continues to move in the opposite direction, remove obstruction, excessive weight in bunk or repair of damaged component. If bunk stops moving in opposite direction, observe fault code and refer to this chart.
4	Major	Motor Fault	• Bad wire connection • Bad motor	Refer to TIP Sheet 82-S0530 for troubleshooting.*
6	Minor	Excessive Battery Voltage	Supply voltage to control is 17 V DC or greater.	Consult manufacturer of unit charging system for troubleshooting assistance.

*This tip sheet and other updated troubleshooting information can be found on our website at www.powergearus.com.

# of RED flashes	# of GREEN flashes

Figure 12

Override Modes

In the event of component failure or loss of system power, your bunk can be manually overridden and bunk moved for travel.

Note: *At any time during the override procedure, the unit will exit this mode if the bunk has not been moved for two (2) minutes or if a fault is detected during bunk movement. The **FAULT CODE** and **BUNK MOVEMENT** LED's will flash rapidly for 10 seconds to indicate that the override procedure failed. After the 10 seconds of flashing, the control will automatically default to **FAULT CODE 1** (see **FAULT CODES, FIGURE 11**) and programming must be restarted.*

Note: The bunk control will need to be re-programmed by an authorized dealer after the system has been overridden.

A. EMERGENCY BUNK MOVEMENT TO UP POSITION:
*Use this procedure when there is **NO** loss of power or electrical problem with the system.*

1. Remove the touchpad (**FIGURE 4, page 2**) from the wall.
2. Prior to clearing the MAJOR fault, record the number of RED and GREEN flashes (**FIGURE 12**) observed on the touchpad. This information will help your dealer/service center in troubleshooting the bunk lift system.
3. Press and hold the **SET STOPS/CLEAR FAULTS** button (**FIGURE 8, page 4**) on the back for the touchpad for five (5) seconds. Both **RED** and **GREEN** LED's will be on solid while this button is pressed. After five (5) seconds, the **GREEN** LED will begin flashing and the **RED** LED will remain lit.
4. The unit is now ready to raise the bunk. Press and hold the **BUNK LIFT MOTOR** buttons 1 and 2 on the back of the **TOUCHPAD** (**FIGURE 9, page 4**).

Caution: ***It is very important to note that during this procedure, the bunk lift control has NO stop locations. Damage to the bunk lift can occur if the bunk is raised or lowered too far.***

5. Press the UP button on the front of the wall touchpad until the bunk is fully raised position. If one side of the of the bunk needs to be raised further in order to fully raise, press and hold the motor button corresponding to only the motor you want to move. Press the UP button on the front of the touchpad to raise the bunk the remainder of the way. Install lock pins

Step 6 continued on page 8

WARNING

- Always make sure that the bunk lift path is clear of people and objects before and during operation of the bunk.
- Always keep away from the gear racks when the bunk lift is being operated. The gear assembly may pinch or catch on loose clothing causing personal injury.

Override Modes (continued)

6. Re-install the wall touchpad.
7. Take the unit to a coach manufacturer dealer for repairs.

B. MANUAL EMERGENCY BUNK MOVEMENT TO UP POSITION.
Use this procedure when the above procedures do not work.

In the event that power is lost to the bunk motor(s) or **OVERRIDE MODE "A"** (**page 7**) will not work, the bunk can be manually raised by following these steps:

1. Use a voltmeter and check to see if power is being delivered to the control module.
2. If no DC power is being delivered from coach, use another 12 VDC battery power source to power the module and retract the bunk using the **UP** button on the touchpad.
3. If power source is not available, then use the following steps:
   a. Gain access to motor channel on each side of the O.E.M bunk frame by first removing the mattress.
   b. Remove the O.E.M top cover plate of each bunk frame channel assembly.
   c. Loosen motor retainer screw or motor retainer spring. Do not remove the screw. (FIGURE 13)
   d. Remove each motor from the channel assembly. Bunk will drop if in the raised position.
   e. Disconnect motor connectors and place motors in a safe location. They will be needed when bunk lift is serviced.
   f. Manually push up bunk lift.
4. When bunk in fully raised position, install pins to keep it in place.

Note: ***The bunk lift will have to be inspected at a coach manufacturer dealer for troubleshooting and repairs. The bunk control will need to be re-programmed by a coach manufacturer dealer after the system has been overridden.***

Figure 13

Figure 13

Wiring Information

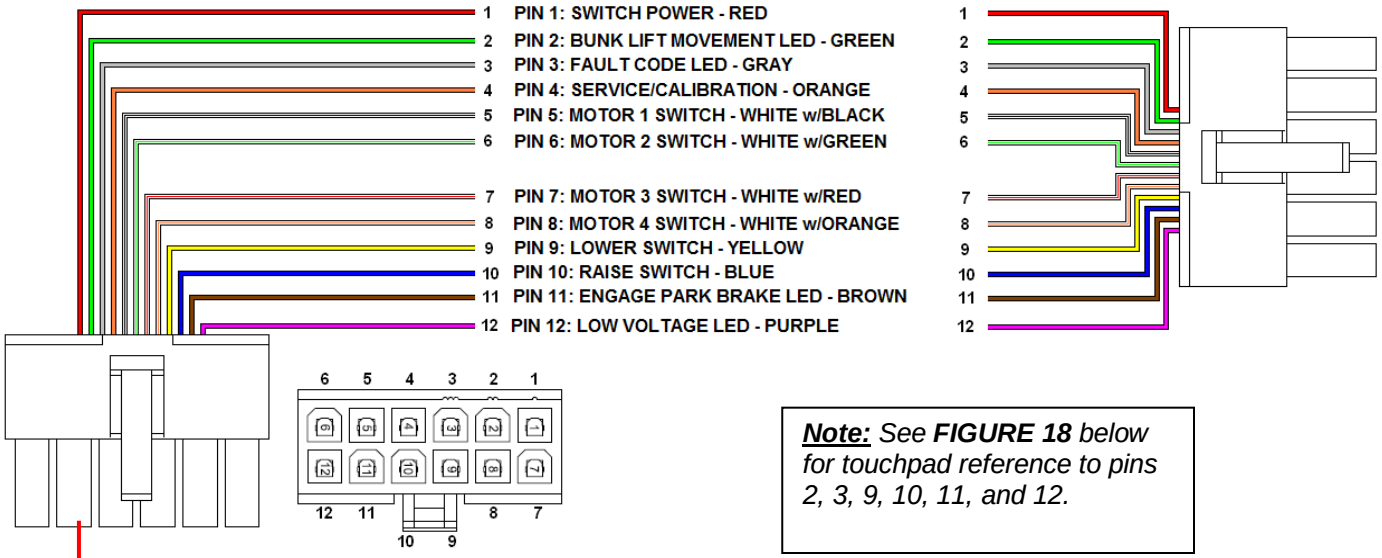


Figure 14 *1510000195 Control to touchpad harness*

Note: *See **FIGURE 18** below for touchpad reference to pins 2, 3, 9, 10, 11, and 12.*

Figure 17 *Control Box 1510000199 or 1510000260*

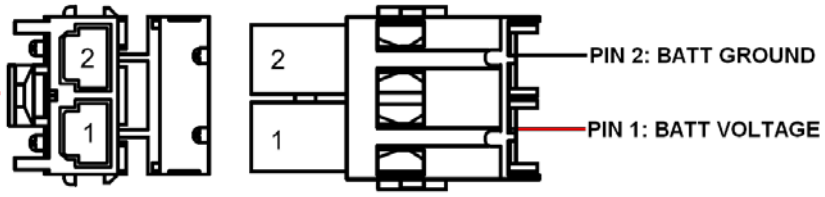


Figure 15 *Power harness- Molex Minifit Sr. PN: 42816-0212*

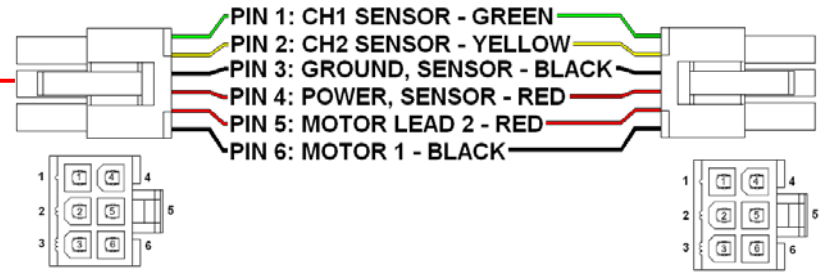


Figure 16 *1510000194 control to motor harness*

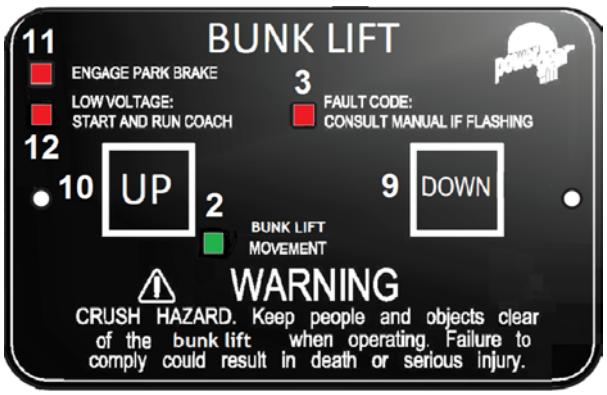


Figure 18 *Touchpad. Reference of pins 2, 3, 9, 10, 11, and 12 from **FIGURE 14** above.*

Additional Reference publications located at www.powergearus.com

3010002678	Owner's manual slim rack bunk lift system with control box 1510000199 or 1510000260
82-S0530	Trouble shooting Bunk Lift control box 1510000199 or 1510000260 for In-Wall Slim Rack Systems
82-S0531	Encoder Test 1 Dual Planetary Gear Motor Sync with Control Box 1510000199 or 1510000260
82-S0532	Encoder Test 2 Dual Planetary Gear Motor Sync with Control Box 1510000199 or 1510000260