



Electronic Brake Controller
Hayes BRAKE CONTROLLER P/N 81792K

OPERATIONS MANUAL

For trailers with 2-8 electric brakes and vehicles with 12 volt negative ground systems only.

TIP:
Recommended use with the HBCC dual-mated harness for best results.



READ AND SAVE THESE INSTRUCTIONS

» Before beginning installation, read and become familiar with these instructions.

» Leave in tow vehicle for future reference.

» **IMPROPER INSTALLATION AND OPERATION COULD CAUSE PERSONAL INJURY, AND/OR EQUIPMENT AND PROPERTY DAMAGE.**

» Questions on installation, adjustment, troubleshooting or operation of brake controllers, call 800-892-2676 Monday through Friday between 8:00 a.m. and 5:00 p.m. Eastern Time or access www.hayesbc.com to "Tech Support."

4. Audible Alarm Mode:

The G2 brake controller has an audible alert for faults. This function can be turned off if not wanted. The default is for the audible alert to be set to ON.

Changing audible Alarm Mode (Manual and Automatic)

To do this, follow these steps (If not on the Main Screen, see the supplied Screen Menu for directions):

1. While at the Main Screen push the "enter" button to enter the setup screen, push the "down" button until **Alarm Mode** is highlighted.
2. To turn the audible alert off select **Alert OFF** and push the "enter" button. This will return you to **Setup** screen and prevent the audible alert from being activated when a fault is detected.
3. To turn the audible alert on, follow the above instructions only select **Alert ON**.
4. Push the enter button and audible **Alert ON** is selected and the screen is returned to **Setup** screen.

5. Manual Slide Lever Operation

WARNING:
Manual operation via the manual slide lever may not disengage the Cruise Control on some vehicles



- » The "Manual Slide Lever" (**Fig. 2**) is located on the bottom of the controller.
- » The further the manual slide lever is moved toward the front of the controller, the greater the amount of trailer braking power.
- » The manual slide lever operation is an independent circuit and overrides the maximum power setting to allow full braking power when required.
- » The manual slide lever is used to apply the trailer brakes independently of the tow vehicle brakes or to override the automatic trailer brakes when more braking is required.

SAFETY SYMBOLS

	WARNING Indicates a potentially hazardous situation that, if not avoided, could result in death or serious personal injury.
	CAUTION Indicates a potentially hazardous situation that, if not avoided, could result in damage to product or property.
	TIP Contains helpful information to facilitate operation.

1. AUTOMATIC OPERATION

During braking, the G2 senses deceleration of the tow vehicle. An internal sensor measures the amount of deceleration and sends a proportional amount of power to the trailer brakes. The maximum braking supplied depends on the set up of the controller. The LCD display will indicate the amount of power being sent to the trailer brakes. Once the brake pedal is released, the unit will remain in the "MAIN SCREEN." While standing by and during braking, the controller will display the MAIN SCREEN: % power, voltage bar graph, brake type (electric or hydraulic) and selected Boost setting (B0-B4). Further explanation of the display is included in this document

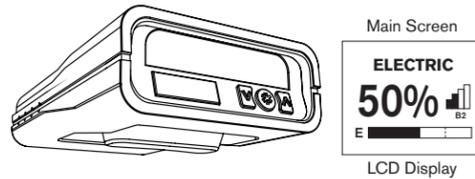


fig. 1 Front View

- » The manual slide lever is used in emergency stop situations when more braking may be required than is available with the maximum power setting or for control of excessive trailer sway.
- » The tow vehicle and trailer brake stoplights will be illuminated during the manual lever activation.

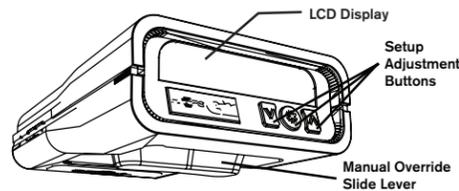


fig. 2

TIP:
It is normal to hear the trailer brake magnets "hum" when operating the trailer brakes.



6. TROUBLESHOOTING IN AUTOMATIC AND MANUAL MODES

To verify the brake controller is properly wired, follow these steps:

- With the trailer connected to tow vehicle and vehicles at rest, make certain that the brake controller is set to the correct **BRAKE TYPE** (reference screen menu sheet).
- From the **SETUP** screen, select **Diagnostics**. From the **DIAGNOSTICS** screen, select **Troubleshoot**. From the **TROUBLESHOOTING** screen, **Battery Volts**, **Stoptlight Volts**, **Output Volts** and **Output Amps** may be selected for checking.
- Select **Battery Volts**. Tow vehicle battery voltage will be displayed on the **BATTERY VOLTAGE** screen.

1.1 LCD Display

The LCD display shows various symbols and numbers that are used for set up and to monitor the trailer brake performance. It is also used when troubleshooting.

1.2 Definitions of Options

WARNING:
Improper adjustment of the controller could result in loss of trailer brakes, aggressive, grabby, pulsating, or delayed trailer brakes.



Power adjustments may be required based upon speed, trailer load, and road conditions.
Maximum trailer braking occurs just prior to lockup of the trailer wheels.
Trailer brake lockup could cause loss of control of the trailer and/or the tow vehicle.

1.3 Main Screen

- » **During braking conditions** - The Main Screen displays the % of power, Boost setting, Brake Type and power/voltage (bar graph) being applied to the trailer brakes.
- » The controller is factory pre-set to **50%** of maximum power. The scale for the power is **10%** to **100%**.
- » The **BRAKE TYPE** is factory pre-set to **Electric**. For hydraulic actuated brakes, the **BRAKE TYPE** must be set to **Hydraulic**. The selected **BRAKE TYPE** is displayed **ELECTRIC** or **HYDRAULIC** at the top of the Main Screen.
- » The BOOST is factory pre-set to **B2 (10%)**.

Maximum Power (for Automatic braking only):

The controller is factory pre-set to 50% of maximum power. When the controller senses maximum deceleration, the most power that the controller will send to the trailer brakes will be 50%.

- Select **Stoptlight Volts**. Voltage to the stoplights will be indicated on the **STOPLIGHT VOLTAGE** screen as either **On** or **Off**. To check for proper operation, apply enough pressure to the tow vehicle brake pedal to activate the stop lights. If the **STOPLIGHT VOLTAGE** screen indicates **On**, the brake controller red lead has been connected to the correct stop light circuit. With the brake pedal released, pull the brake controller manual slide lever toward the front of the controller. The **STOPLIGHT VOLTAGE** screen should also indicate **On**.
- Select **Output Volts**. Pull the manual slide toward the front of the controller. The **OUTPUT VOLTAGE** screen will indicate a voltage that will vary from approximately 10% to nearly 100% of battery voltage depending on the position of the manual slide control.
- Select **Output Amps**. Pull the manual slide toward the front of the controller. The **OUTPUT CURRENT** screen will indicate a current (amps) that will vary in accordance with the number of trailer brakes and the position of the manual slide control. With the manual slide control full on, each brake coil should draw approximately 3 amps. making this feature useful for determining if the total current draw of the trailer is within a proper range. This current reading may vary significantly due to the temperature of the brake coils.

6.1 Road Test and Performance Adjustment

To set the controller up for optimum performance with your tow vehicle / trailer combination, follow these steps:

- Position the tow vehicle and trailer on a hard, flat, dry surface.
- Set the controller display to the **Main Screen**.
- When shipped from the factory, the controller's **Output** power is set to 50% and the **Boost** setting is 10% (**B2**). For changing the **Output** power setting, refer to "**Changing Maximum Power**" section of this manual.

Changing Maximum Power for Automatic operation only (Manual operation is not affected)

Note: To change the maximum power level, the controller must be in "normal" operating mode. If the Main screen is not being displayed, see the supplied Screen Menu for directions.

The maximum power setting under non-braking conditions may be changed as follows:

1. **With the vehicle at rest**, press the "up" or "down" button and the LCD display will show the existing maximum power setting in a percentage format (i.e. **50%**).
2. To increase the maximum power setting, press and release the "up" button. The current maximum power setting will be increased by **5%**. Continue to press and release the "up" button to increase the maximum output to the desired level. Press the "enter" button to save this setting or wait a few seconds and the displayed setting will be saved as the maximum output. The Main Screen will return and display actual outputs.
3. To decrease the maximum power setting, press and release the "down" button. The current maximum power setting will be decreased by **5%**. Continue to press and release the "down" button to decrease the maximum output to the desired level. Press the "enter" button to save this setting or wait a few seconds and the displayed setting will be saved as the maximum output. The Main Screen will return and display actual outputs.

Notes:

- While the vehicle is moving, the maximum power setting can be changed as shown above. This procedure is not recommended if driving in traffic. This should be done in a deserted parking lot or another suitable place with no traffic.
- After a few hours of being inactive (with or without a trailer connected), the display will go blank. While the display is blank, very little power will be used by the G2.

- For changing the minimum or **Boost** level, refer to "**Changing Boost Setting**" section of this manual.
- Accelerate to approximately 25 mph and apply the brakes in a normal manner. The vehicle should come to a stop without the trailer "pushing" the tow vehicle. A firm braking action should occur.
 - If the trailer brakes lock, decrease the **Output** power level.
 - If more braking power is needed, increase the **Output** power level.
 - Repeat this process until the desired amount of braking is achieved.
 - If needed, follow the instructions in the "**Changing Boost Setting**" section to increase or decrease the minimum power. The following guidelines should be used as a starting point for selecting this option:

Boost Setting Guidelines for Different Trailer Weights

If the Loaded Trailer weight is...	Then set the Boost to:
Much less than the tow vehicle	B0 or B1
Less than the tow vehicle	B2
Roughly equal to the tow vehicle	B2 or B3
Slightly greater than the tow vehicle	B3 or B4
Much greater than the tow vehicle	B4

TIP:
Warm trailer brakes tend to be more responsive than cold brakes.



CAUTION:
In the automatic mode and Boost setting of B0, B1 or B2, the trailer brakes are applied only when the sensor detects deceleration.
With the vehicle at rest and the brake pedal depressed, there should be no or slight output to the trailer brakes (when minimum power is set to B0, B1 or B2).
Higher at rest outputs and reverse braking can be obtained by increasing the Boost setting to B3 or B4.



2. BOOST SETTINGS: (for Manual and Automatic operation)

CAUTION:
In the automatic mode and Boost setting of **B0**, **B1** or **B2**, the trailer brakes are applied only when the sensor detects deceleration.



With the vehicle at rest and the brake pedal depressed, there should be no or slight output to the trailer brakes (when minimum power is set to **B0**, **B1** or **B2**).
Higher at rest outputs and reverse braking can be obtained by increasing the Boost setting to **B3** or **B4**.

The controller is factory pre-set to a Boost Setting of **B2 (10%)**. At this setting, the MINIMUM amount of power that will be immediately applied to the trailer brakes is 10% (when the brake pedal is depressed and before deceleration is detected). The selected Boost setting controls the minimum power in automatic and manual operation (as a percentage of total available power).

Changing Boost Setting (Manual and Automatic)

Changing the Boost setting is designed to allow more or less power to be delivered to the brakes when the controller does not sense deceleration. See the section for loaded trailer weight guidelines and select the Boost setting required for your loaded trailer weight.

The Boost setting may be changed in **5%** increments (**B0 = off**, **B1 = 5%**, **B2 = 10%**, **B3 = 15%**, and **B4 = 20%**)

To do this, follow these steps:

1. **With the vehicle at rest**, push the "enter" button while on the Main Screen (if not on the Main Screen, see the supplied Screen Menu for directions). This will pull up the **SETUP** screen.

6.2 Troubleshooting Using the display

The G2 will display warning screens to indicate problems with the trailer, tow vehicle or brake controller.

Short Circuit:

WARNING
OUTPUT SHORT
No Brakes

This indicates that the controller has sensed a direct short between the controller's output and ground. **This condition must be cleared before the controller is used.** It is usually an indication that a "hot" wire is connected to ground.

Current Limit:

WARNING
OVERLOAD
Excessive Amps

This indicates that the controller has sensed a power requirement greater than its maximum rated output but not a direct short. When this occurs, the controller will continue to supply full current (up to the maximum rating), however, the controller will begin to limit this current above this level. This could result from an intermittent short to ground in the trailer wiring, a faulty brake coil, or too many brake coils connected to the controller.

Open Circuit:

WARNING
NO TRAILER

2. Press the "down" button until the cursor is on **Boost Mode**.
3. Press the "enter" button and the **BOOST MODE** screen will be displayed.
4. Move the cursor up or down using the "up" or "down" key until the cursor rests on the desired Boost setting.
5. Press the "enter" button to select the desired boost setting. The new Boost setting is now set.

Note:

The higher the Boost setting the more aggressive the braking. A setting of B0 and B1 will delay the braking output a small amount.

3. BRAKE TYPE:

Most trailers have electric brakes, but some have Electric over Hydraulic brakes. The Electric over Hydraulic brakes should not be connected to a brake controller that checks the electrical connection. For this reason, G2 brake controller needs to know the type brakes that are connected.

Changing the Brake Type:

Most trailers have electric brakes, but some have Electric over Hydraulic brakes. The following will describe how to change between Electric Brakes and Electric over Hydraulic brakes.

1. Enter the **SETUP** screen and select **Brake Type**. This will pull up the **Brake Type** screen.
2. Select the **Brake Type** that best describes your trailer (**Electric** or **Hydraulic**).
3. You will have to **Accept** to store your brake type and return to the Setup screen.

Note:

If the **WARNING/NO TRAILER** screen is displayed all the time, you must change the brake type to **Hydraulic** if this is the correct type of trailer brakes. See above for directions. *(continued below, far left)*

This is an indication that there is no trailer connected to the tow vehicle. The display can be cleared by pressing any button on the controller or connecting a trailer. Connection to electric over hydraulic trailer brakes can also cause this screen to be displayed. If this occurs, the **Brake Type** must be changed from Electric to Hydraulic. Refer to Screen Menu.

Blue Wire Fault:

WARNING
BLUE WIRE FAULT
Voltage Present

This warning will be displayed when external voltage is detected on the blue wire. Removing the external voltage will clear the display. Possible causes can be the blue wire being connected to the wrong place, a short in the wiring or the connector, or a faulty or disconnected breakaway switch.

(continued on back)

Troubleshooting

Symptom: Trailer brakes lock up

Possible Cause: Maximum power set too high
Remedy: Reduce maximum power setting

Possible Cause: Minimum power set too high
Remedy: Reduce Boost setting

Symptom: Low output to trailer brakes

Possible Cause: Maximum power set too low
Remedy: Increase maximum power setting

Possible Cause: Minimum power set too low
Remedy: Increase Boost setting

Symptom: Weak/Ineffective Brakes

Possible Cause: Overloaded trailer
Remedy: Check weight rating

Possible Cause: Loose or poor quality connections
Remedy: Inspect connections/check with meter

Possible Cause: Insufficient wire gauge
Remedy: Inspect/replace

Symptom: No output to trailer brakes (manual or automatic)

Possible Cause: Improper Wiring
Remedy: Check color codes of all wires. If unsure, contact your vehicle dealership or our technical support department at **1-800-892-2676**.

Possible Cause: Improperly grounded
Remedy: Ensure that the following are grounded: controller (white wire); tow vehicle connector; trailer umbilical cord; each brake magnet

Symptom: No output to trailer brakes (automatic only)

Possible Cause: Faulty Brake Light Circuit on tow vehicle
Remedy: Troubleshoot/repair brake light circuit

Symptom: Intermittent or surging brakes

Possible Cause: Improperly grounded
Remedy: Check and repair all ground connections

Possible Cause: Out of round brake drums

Remedy: Repair/replace

Possible Cause: Worn wheel bearings

Remedy: Repair/replace

Symptom: No output to trailer brakes; **Output Short Warning** displayed when brakes applied

Possible Cause: Direct short to ground either in tow vehicle wiring or in trailer wiring
Remedy: Inspect and repair wiring

Possible Cause: Faulty brake magnets

Remedy: Test/replace brake magnets

Symptom: Reduced output to trailer brakes; **Overload Warning** displayed when brakes applied

Possible Cause: Too many brake magnets are attached to controller
Remedy: Controller only handles 1-4 axles with brakes

Possible Cause: Intermittent short to ground in tow vehicle or trailer wiring
Remedy: Inspect and repair wiring

Possible Cause: Defective brake magnets

Remedy: Test/replace brake magnets

Symptom: Trailer brakes lock up when trailer connector cable is attached

Possible Cause: Faulty breakaway switch
Remedy: Test/replace switch

Symptom: **Blue Wire Fault Warning** displayed

Possible Cause: Indicates presence of an unexpected 12Volts on the blue (output) wire due to one of the following: faulty wiring; malfunctioning or disconnected breakaway switch

Remedy: Inspect wiring and breakaway switch. Ensure that there is no voltage on the blue wire when the brake pedal is not depressed.

Symptom: **No Trailer Warning** displayed

Possible Cause: No trailer connected
Remedy: Push any button to clear display or connect trailer

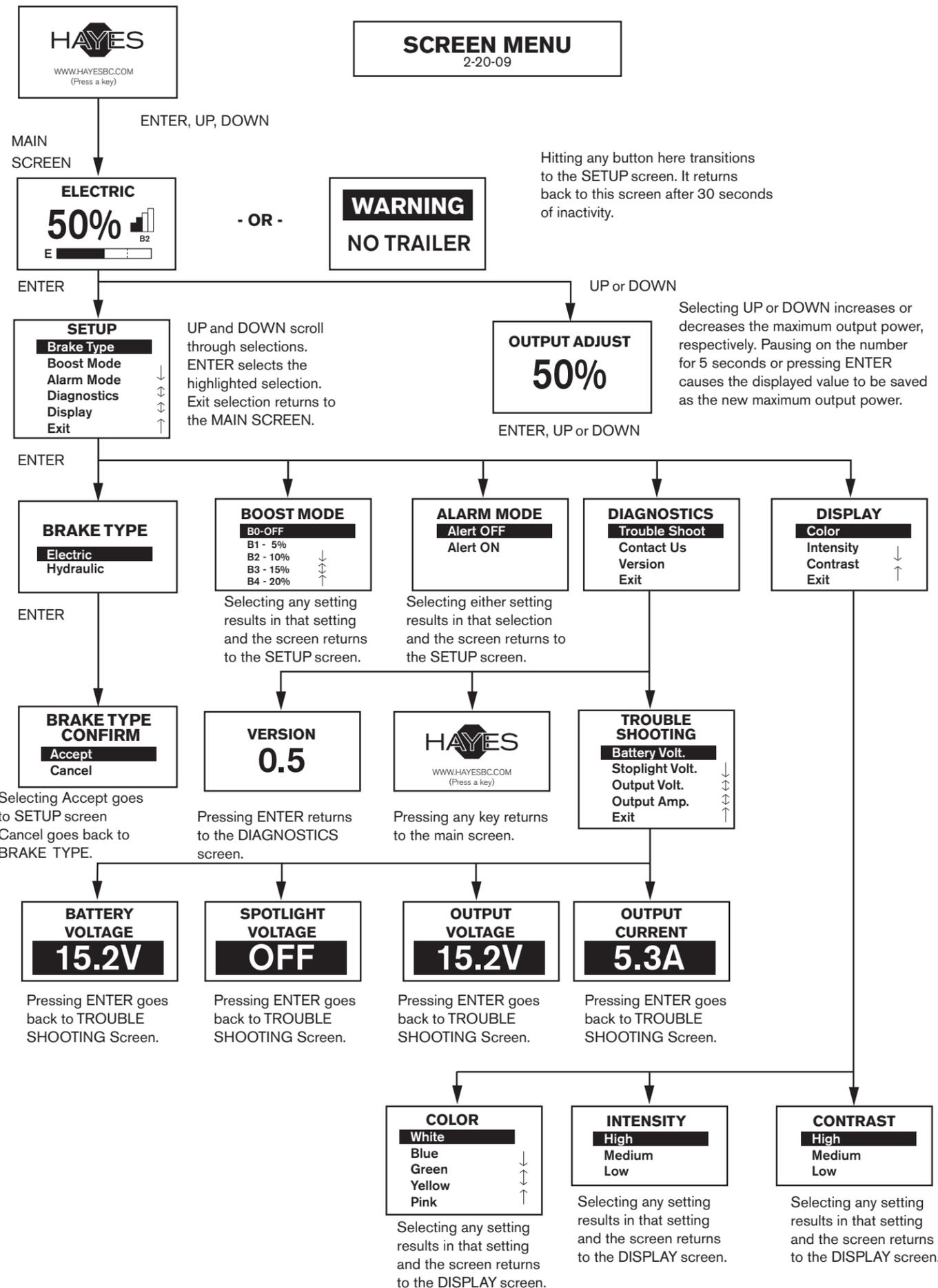
Possible Cause: Trailer with Electric over Hydraulic actuator attached

Remedy: Change **Brake Type** from **Electric** to **Hydraulic** (refer to Screen Menu)

Possible Cause: Blue controller wire not connected to correct wire

Remedy: Inspect and repair wiring

If you are unable to completely remedy the symptoms using the troubleshooting guide, contact our Technical Support Service at 1-800-892-2676.



INFORMATION ONLY

WARNING

NO TRAILER

WARNING

OUTPUT SHORT

No Brakes

WARNING

OVERLOAD

Excessive Amps

WARNING

BLUE WIRE FAULT

Voltage Present

The warning screens are displayed when the relevant condition occurs. The screens are displayed until the situation clears or a button is pressed. When a button is pressed, the screen transitions to the SETUP screen and will remain there for a 30-second period if no other selections are made and then returns back to the warning screen.