STACK STACK STACK

PRO-CONTROL STEPPER MOTOR
FUEL LEVEL GAUGE

2650-1445-00

IMPORTANT
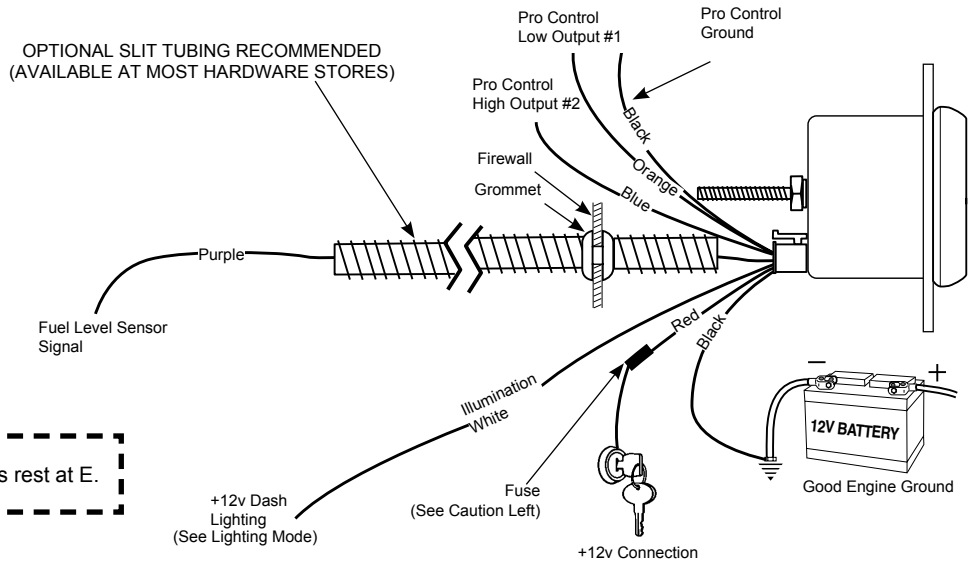
WEAR SAFETY GLASSES

GB

As a safety precaution, the +12V terminal of this product should be fused before connecting to the 12V ignition switch. We recommend using a 1 Amp, 3AG fast-acting type cartridge fuse.

OPTIONAL SLIT TUBING RECOMMENDED
(AVAILABLE AT MOST HARDWARE STORES)

Pro Control Low Output #1
Pro Control Ground
Pro Control High Output #2
Firewall
Grommet
Black
Orange
Blue
Purple
Fuel Level Sensor Signal
Red
Black
12V BATTERY
Good Engine Ground

When the ignition is off the pointer may not always rest at E.

Illumination White
+12v Dash Lighting (See Lighting Mode)
Fuse (See Caution Left)
+12v Connection

Installation - Fuel Level

1. Check that you have all parts required for installation, and that the engine is cool.
2. Disconnect the negative (-) battery cable.
3. Gauge mounts in a 52.4mm hole.
4. Connect the purple Sensor wire to the fuel level Sensor. Existing wires may be used, or route the purple Sensor wire to the fuel tank. (The stock fuel level gauge, if equipped, must be disconnected.)
5. Connect the white wire to dash lighting or switchable 12V light source.
6. Connect one of the black wires to a good ground. (Either black wire, does not matter which one)
7. Connect the red power wire to a switched +12V source.
8. Reconnect the negative (-) battery cable.

Setting the Sensor Type

1. The gauge ships pre-programmed to read 0-90 ohm Sensors.
2. If any other Sensor type is required press and hold the "A" button and apply power to the gauge. Keep holding the "A" button until the dial illuminates blue (about 15 seconds).
3. Release the "A" button, the dial will move to the 1/8 tank mark indicating the current selected Sensor.
4. Press the "A" button to move the pointer down to the next 1/8 tank mark or press the "B" button to move up to the next 1/8 tank mark stopping at the desired Sensor type (see chart below). Holding the "A" or "B" button will

allow the pointer to sweep in the selected direction stopping briefly at each 1/8 tank mark.
5. Remove power from the gauge to store the new Sensor type by turning off ignition switch.
6. Re-apply power to the gauge, and confirm that it reads the proper fuel level. If the proper fuel level is not read, return to step 3 and recalibrate. If the proper fuel level is still not indicated, perform Custom Sensor Calibration.

Custom Sensor Calibration

The fuel level gauge can be custom calibrated to accurately display the output from any fuel level Sensor with an output between 0 and 270 ohms.

1. Make sure the fuel level Sensor is connected to the gauge and that the fuel tank is empty, or nearly empty, before proceeding.
2. Press and hold the "A" button and apply power to the gauge. Keep holding the "A" button until the dial illuminates blue (about 15 seconds).
3. Release the "A" button, the dial will move to the 1/8 tank mark indicating the current selected Sensor (see chart below).
4. Press and hold the "B" button until the pointer sweeps to the 7/8 tank mark. This will select the custom Sensor.
5. Remove power from the gauge to enter custom calibration mode.

6. Re-apply power to the gauge, the pointer will move to a position just below the empty mark, indicating that the empty calibration point can be entered.
7. With an empty or nearly empty tank, capture the empty calibration point by momentarily (less than one second) pushing the "A" button. After approximately 1 second, the pointer will move to just above the full mark.
8. Fill the tank and momentarily (less than one second) press "B" button to capture the full calibration point. After approximately one second, the gauge will reset, and begin reading fuel level per the custom calibration.
9. Confirm that the gauge reads the proper fuel level.
10. If proper fuel level is not read, return to step 2 and recalibrate.

Sensor Error

If no Sensor is connected, the pointer will move to the empty position indicating an error. Approximately 4 seconds after the Sensor is connected, the pointer will move to the indicated fuel level and will resume normal operation. The pointer will move counter clockwise to the stop pin and then moves to the current gauge reading. This procedure is an auto-calibration function and is performed on every power-up. While this test is being performed, the gauge may make a clicking sound. This is normal.

Sensor Select Chart

Sensor Type	Pointer Position
73 - 10 ohms	E
16 - 158 ohms	1/8
0 - 30 ohms	1/4
0 - 90 ohms	3/8
240 - 33 ohms	1/2
107.5 - 7 ohms	5/8
131 -12 ohms	3/4
Custom Calibration	7/8
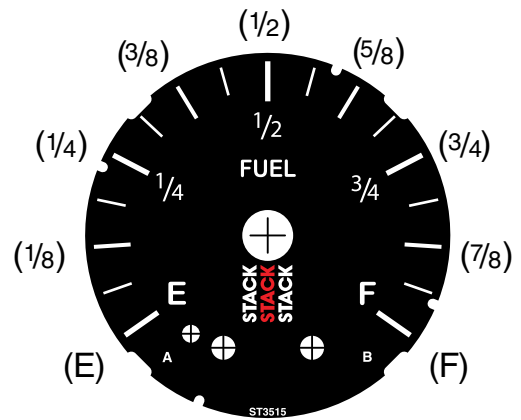
Peak Recall

Press and hold the **B** button to recall the highest fuel level reading since the memory was last cleared. To clear the memory, press and hold the **B** button, and while still holding the **B** button, press the **A** button. The pointer will move to the stop pin to indicate that the memory has been cleared. Release the **B** and **A** buttons to resume normal operation. The peak recall point is retained when power is removed from the gauge.

This gauge features full dial warning. When a warning point is reached, the entire dial illuminates in the programmed warning Colour. This feature is available for both a high and low warning set point. In addition, the warning Colour will flash when an over warn point is reached.

Pro Control High Warning Set Point

To adjust the high warning set point, press and release the **A** button. The warning light will begin to flash and the pointer will move to the previous high warning set point signifying that warning set mode has been selected. Once in set mode, press the **A** button to move the pointer down, or press the **B** button to move the pointer up. Three seconds after the last button press, the warning light will stop blinking and the pointer will return to the current reading. The warning set points are retained when power is removed from the gauge.

Pro Control High Over Warn Set Point

To adjust the high over warn set point, press and hold the **A** button. After three seconds the warning light will begin to flash and the pointer will move to the previous high over warning set point signifying that over warn set mode has been selected. Release the warn button. Once in set mode, press the **A** button to move the pointer down, or press the **B** button to move the pointer up. Three seconds after the last button press, the warning light will stop blinking and the pointer will return to the current reading. The over warn set points are retained when power is removed from the gauge.

To adjust the low warning set point, press and hold the **A** button, and while still holding the **A** button, press and release the **B** button. The warning light will begin to flash and the pointer will move to the previous low warning set point signifying that warning set mode has been selected. Once in set mode, press the button to move the pointer down, or press the button to move the pointer up. Three seconds after the last button press, the warning light will stop blinking and the pointer will return to the current reading. The warning set points are retained when power is removed from the gauge.

Pro Control Low Over Warn Set Point

To adjust the low over warn set point, press and hold the **A** button, and while still holding the **A** button, immediately press and hold the **B** button. After three seconds the warning light will begin to flash and the pointer will move to the previous low over warning set point signifying that over warn set mode has been selected. Release both buttons. Once in set mode, press the **A** button to move the pointer down, or press the **B** button to move the pointer up. Three seconds after the last button press, the warning light will stop blinking and the pointer will return to the current reading. The over warn set points are retained when power is removed from the gauge.

With power off, press and hold the **A** button. Apply power to the gauge. Release the **A** button. Press and release the **B** button. The pointer will move to half scale and the dial will illuminate with the current Backlight Colour. Press and hold the button to cycle through the available Colours. Once you have selected the desired Colour, release and don't press any buttons for about three seconds. The dial will flicker white several times to indicate the desired setting has been saved and the gauge will return to normal operation with your new Colour selection. Colour selections are saved when power is off.

Change Low Warn Colour

(Region A Colour)

Warn Colour Set Mode:
With power off, press and hold the **A** button. Apply power to the gauge. Release the **A** button. The pointer will be at the stop pin and the dial illumination will be off. Press and release the **A** button to cycle between **HIGH** warn Colour set and **LOW** warn Colour set modes. In High Warn Colour set mode, the pointer will move to full scale and the dial will illuminate with the current High Warn Colour. In Low Warn Colour set mode, the pointer moves to the minimum position and the dial will illuminate with the current Low Warn Colour.

To change Low Warn Colour:
When the Low Warn Colour set mode has been selected (see above), press and **HOLD** the **A** button to cycle through the available Colours. Once you have selected the desired Colour, release the **A** button. Don't press any buttons for about three seconds. The dial will flicker white several times to indicate the desired setting has been saved and the gauge will return to normal operation with your new Low Warn Colour selection. Colour selections are saved when power is off.

Change High Warn Colour

(Region C Colour)

Warn Colour Set Mode:
With power off, press and hold the **A** button. Apply power to the gauge. Release the **A** button. The pointer will be at the stop pin and the dial illumination will be off. Press and release the **A** button to cycle between **HIGH** warn Colour set and **LOW** warn Colour set modes. In High warn Colour set mode, the pointer will move to full scale and the dial will illuminate with the current High Warn Colour. In Low Warn Colour set mode, the pointer moves to the minimum position and the dial will illuminate with the current Low Warn Colour.

To change High Warn Colour:
When the High Warn Colour set mode has been selected (see above), press and hold the **A** button to cycle through the available Colours. Once you have selected the desired Colour, release the **A** button. Don't press any buttons for about three seconds. The dial will flicker white several times to indicate the desired setting has been saved and the gauge will return to normal operation with your new High Warn Colour selection. Colour selections are saved when power is off.

Lighting Mode

(Region B Colour)

This gauge allows the dial lighting to operate in two modes, Full On or Dimmable. Factory default is Full On.

Full On: In this mode, the white lighting wire is ignored. The gauge dial lighting is always on at full brightness. (unless you select NO Colour when setting the Backlight Colour). If using Full On mode, white wire hook-up is not needed.
Dimmable: In this mode, the white wire is used to set the intensity of the dial lighting from full brightness down to off.

To change the Lighting Mode:
With power off, press and hold the **B** button. Apply power to the gauge. Release the **B** button and the dial face will illuminate with either white lighting or blue lighting. Press and release the B button to toggle between Full On (dial is illuminated white) and Dimmable (dial is illuminated blue). Once you have selected the desired mode, don't press any buttons for about three seconds. The dial will flicker white several times to indicate the desired setting has been saved and the gauge will return to normal operation with your new mode selection. Mode selections are saved when power is off

Gauge Reset

It may be desired to reset the gauge. This clears programmable settings to a system default.
With power off, hold in both buttons. Apply power to the gauge, wait two seconds, and release both buttons. The dial face will flicker white several times and return to normal operation. At this point, the gauge has been reset.

Reset Settings:

High Warning Set Point: Max Value
Low Warning Set Point: Lowest Value
Peak: Lowest Value
High Warning Colour: Green
Low Warning Colour: Red
Backlighting Colour: White
Lighting Mode: Full On
High Warning Pro Control State: Active High
Low Warning Pro Control State: Active Low
High Over Warn Set Point: Max Value
Low Over Warn Set Point: Lowest Value

The active region for Pro Control outputs are user configurable. For example, consider a pressure gauge with a low warning set point at 20 PSI . The gauge can be configured so the associated Pro Control output is active when the pointer falls below the set point [less than 20 PSI] (active low) OR when the pointer is beyond the set point [greater than 20 PSI] (active high). Likewise, consider a pressure gauge with high warning set point at 95 PSI. Again, the gauge can be configured so the associated Pro Control is active when the pointer falls below the set point [less than 95 PSI] (active low) OR when the pointer progresses beyond the set point [greater than 95 PSI] (active high).

With power off, press and hold the button. Apply power to the gauge. Release the button. Press and release the button. The gauge is now in Active State Set Mode. The pointer will point straight up at the value in the top center of the dial. Press and release the button to toggle back and forth between the low and high warning point active state modes. Doing so will cause the dial to change back and forth between green and red. When

setting the low warning active state the dial face will be green. When setting the high warning active state the dial face will be red.

Once the designated warning mode is selected (green or red) press and hold the button to toggle between active high and active low. As you hold the button the pointer will continuously sweep from the left of center and to the right of center pausing at each side. Left of center is active low and right of center is active high. Release the button when the pointer is in the position of the desired active state. Once you have selected the desired state, don't press any buttons for about three seconds. The dial will flicker white several times to indicate the desired setting has been saved and the gauge will return to normal operation with your new state selection. State selections are saved when power is off.

> **NOTE**: The Pro Control Active State does not affect the Colour of each dial region.

The Pro Control feature activates a switched ground output at a user defined set point. Pro Control can be used to switch on a relay to activate ignition kill, cooling fans, lamps, alarms, etc. The set points define three regions on the gauge dial, the region below the low set point, between the set points, and above the high set point.
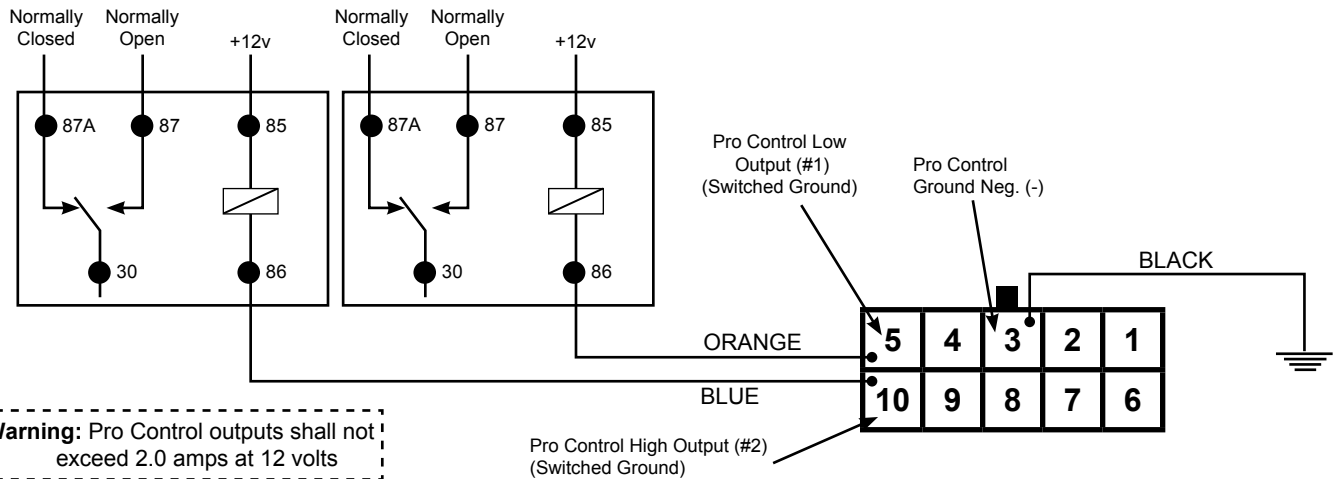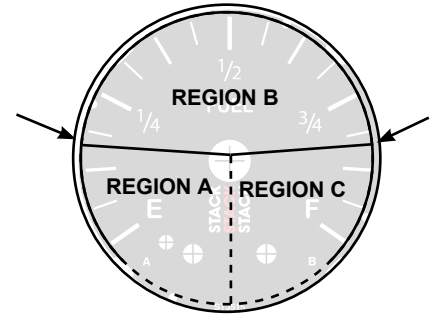
EXAMPLE

Low Set Point - ACTIVE STATE LOW (ORANGE WIRE)

Pointer Region	Pro Control Output #1	Normally Open Contact	Normally Closed Contact	Dial Colour
A	Active (ON)	CLOSED (ON)	OPEN (OFF)	Low Warn Colour
B	OFF	OPEN (OFF)	CLOSED (ON)	Backlight Colour
C	OFF	OPEN (OFF)	CLOSED (ON)	High Warn Colour

Low Set Point - ACTIVE STATE HIGH (ORANGE WIRE)

Pointer Region	Pro Control Output #1	Normally Open Contact	Normally Closed Contact	Dial Colour
A	OFF	OPEN (OFF)	CLOSED (ON)	Low Warn Colour
B	Active (ON)	CLOSED (ON)	OPEN (OFF)	Backlight Colour
C	Active (ON)	CLOSED (ON)	OPEN (OFF)	High Warn Colour

High Set Point - ACTIVE STATE HIGH (BLUE WIRE)

Pointer Region	Pro Control Output #2	Normally Open Contact	Normally Closed Contact	Dial Colour
A	OFF	OPEN (OFF)	CLOSED (ON)	Low Warn Colour
B	OFF	OPEN (OFF)	CLOSED (ON)	Backlight Colour
C	Active (ON)	CLOSED (ON)	OPEN (OFF)	High Warn Colour

High Set Point - ACTIVE STATE LOW (BLUE WIRE)

Pointer Region	Pro Control Output #2	Normally Open Contact	Normally Closed Contact	Dial Colour
A	Active (ON)	CLOSED (ON)	OPEN (OFF)	Low Warn Colour
B	Active (ON)	CLOSED (ON)	OPEN (OFF)	Backlight Colour
C	OFF	OPEN (OFF)	CLOSED (ON)	High Warn Colour

Warning: Pro Control outputs shall not exceed 2.0 amps at 12 volts

---

Warranty

www.stackltd.com
Stack Ltd. Wedgwood Road, Bicester OX26 4UL UK