The E/K Display Manual

Installation & Configuration

PRELIMINARY RELEASE - GPCB 1.0

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Quick Start Guide

Only 5 connections are needed for basic operation to display engine temp, oil pressure and system voltage. Connect additional wires for added functionality, such as torque converter lockup or an alarm for out-of-bounds conditions. Details can be found in the ***Installation Section****.*

Eldorado / Seville 1984-85 shown.

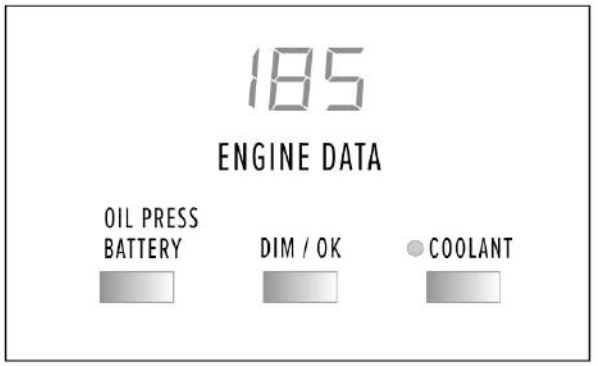
The function buttons are designed to respond much like the original system, complete with delay. Press the left button for OIL PRESSURE; press it again for BATTERY (System Voltage). Press the right function button to return to COOLANT TEMP, which is the startup default.

Your selection will remain displayed unless a situation arises which requires your attention; in that case, the out-of-bounds variable will be displayed and your factory chime will sound (if connected).

The DIM/OK button serves two purposes. Under normal conditions, each press of this button will step the display through 3 intensities (Normal, Medium & Dim). If you've connected the Park Light and Rheostat wires, your dashboard instrument panel brightness knob will override this feature when park or head lights are on.

The second purpose of this button is to acknowledge ("OK") an alert and "unlock" the display. It will also silence the chime if active.

Coolant Temperature Display



Eldorado / Seville 1982-83 shown.

- Tap the **COOLANT TEMP** button to display the current engine temperature.

- Temperature is always shown as 3-digits to help differentiate it at a glance from Oil Pressure. The display has an effective range from 0°F to 275°F, which is the range of the sensor.

- The display can also be set to show Celsius; see the **Setup Section** for details.

Coolant Temperature Display - *Cont'd*

The controller features two pre-settable **Over-Temperature Alerts** plus a **Hot Start Delay** option.

Level 1 Alert: Should the engine reach your Level 1 temp, the display will default to show Coolant Temp and the chime will sound momentarily to get your attention to let you know things are starting to heat up. You can even connect your existing Coolant Temp dash light to illuminate at the same time.

Level 2 Alert: This is a more serious alert. The factory warning light was designed to come on if engine temps were in the 250F+ range. I personally think this is too high, especially for an older engine. When the Level 2 temp is reached, the display will lock on to Coolant Temp at full brightness, and the chime will sound continuously. - Press the **"DIM/OK"** button to silence the chime and unlock the display.

Hot Start Delay: "Hot Start Delay" lets you set an amount of time you'd like the controller to ignore engine temp after a hot restart to give your engine a chance to cool down as coolant circulates. This avoids nuisance alarms.

See the **Setup Section** on how to configure these options.

Oil Pressure Display

• Tap the **OIL PRESS / BATTERY** button once to display engine Oil Pressure.

• Oil Pressure is displayed in PSI from 0-60. For values less than 10, the leading zero is blanked to aid in readability at low pressure.

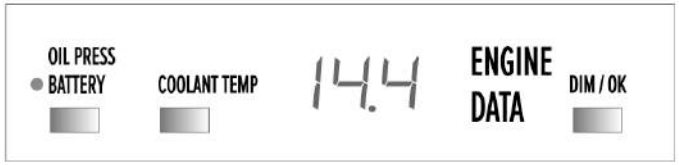
• Should oil pressure fall below a user-specified minimum value for more than 3 seconds, the display will switch to full brightness, change to show current oil pressure if not already, and sound the chime. Press "**DIM/OK**" to silence the chime.

See the **Setup Section** to:

1. Customize a minimum oil pressure alert.
2. Enable/Disable the alarm feature.
3. Skip directly to Battery directly when the button is pressed, should you not want to install the pressure sending unit and wiring at this time.

• Since this unit is likely to be used with carbureted engines which can sometimes stall out upon cold-start, a timer is built-in that ignores "loss of oil pressure" for the first 90 seconds after "good oil pressure" is first measured. This helps prevent nuisance alarms.

Battery Display



- Selecting BATTERY will display the instantaneous system voltage. The display has a 0.1V accuracy and a range from 6.0 to 20.0 volts.

- Should system voltage ever exceed 16.0V, the chime will sound momentarily to alert you to a possible electrical system problem. The display will also switch over to show voltage if not already selected. The chime will not sound again nor will the display default back to BATTERY until after a key-cycle.

Good to Know

- Due to voltage drop, measurements directly at the alternator or battery may be slightly higher or lower, however the displayed value gives a good indication of an under or over-charge situation. This is also typical of most OEM systems.

- While unusual, a bad voltage regulator, defective battery or loose batt connections can cause the alternator to output such high voltages. Operating above 16 volts will dramatically shorten the life of incandescent bulbs and may lead to damage of onboard electronics (HEI, Radio, Climate Control, etc).

Installation Guide

For best results, please read through the complete installation instructions before you start cutting wires.

If you're planning on only basic operation, the driver side under dash is a good location with access to the fuse block. If you intend to operate more advanced features such as the TCC lockup, then the passenger side is preferred as it gives you access to the ECM's wiring. You may also be able to leverage the existing grommet on the passenger side used for the old MAP sensor tubing/radio antenna cable to run your engine bay wiring.

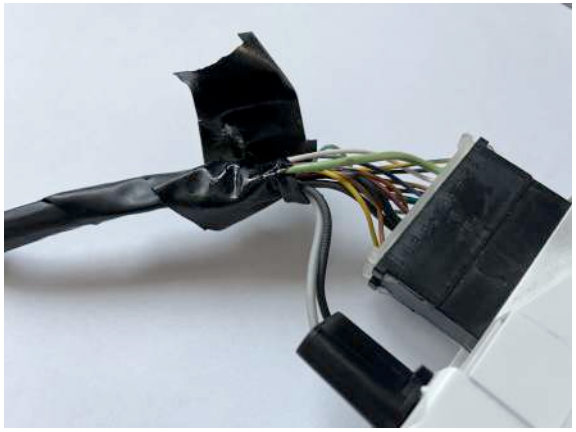
The controller enclosure can be screw-mounted, or tie straps threaded through the screw holes to secure around an available bracket or wire harness bundle.

Coolant Temp: NTK EF0008. The threads are pre-coated, but teflon tape can be added if necessary. Install this sensor in the path of flowing coolant for an accurate reading. The mating connector is Dorman 85100; wire polarity does not matter.

Oil Pressure: VDO 360-003 / SEN-10-2. Like many analog gauges, the ground return for this sensor is through the engine block and ground strap back to frame and body. But unlike an analog gauge with vague markings, the E/K readout is precise to 1 PSI. For an accurate reading, ensure your ground straps are in place and ground points are clean. Do NOT use teflon tape on the sensor's threads. In extreme cases, a separate wire can be run from the controller's Ground terminal to the engine block directly.

Display: To connect to your existing display, remove the woodgrain trim bezel from the dash center. On Eldo/Seville, it's attached by two Philips head screws located at the top of the trim piece. Tilt the trim down and away, then remove the two self-tappers that secure the display itself. If you have a dual-shaft radio, you will also need to remove the radio knobs (they pull straight off) as well as the nuts behind them.

Now, twist-out the backlight bulb, unplug the display and set it aside. The factory connector & wiring will no longer be used, so tuck it back into the dash, but first unwrap enough harness tape so that the backlight bulb can still reach the display module (see photo).



Fish the new connector & cable through the rear dash cutout to the display and plug it in. Then reinstall the lamp and screw the display back into place, but don't yet install the trim.

Acrylic Lens: Carefully using a small flat head screwdriver or knife tip, lift the retaining tab on the display housing to free the original plastic insert. Remove the lens, **being very careful not to touch the dark plastic filter with your fingers** or you'll leave fingerprints. Wear latex gloves if you have them.

Now, install the new laser-cut plastic insert, holding it by its edges. If you smudge the backside or leave a fingerprint, use a soft microfiber or lens cleaning cloth to avoid scratches.

Take your time, being careful to make sure all corners and tabs are engaged. Some finessing may be required for a good fit depending on the age and production run of your original housing. The '82/83 Eldo & Seville housings are especially problematic with a small engagement area on the originals. If you flex the housing's plastic finger inward on this version after removing the original lens it tends to grip the new insert better.

Then reinstall the woodgrain trim being careful not to over-tighten the screws. Just snug them up. Now it's time to wire up the controller.

General Tips: For best results and accurate measurements, all connections should be soldered/shrink-wrapped; avoid plastic splices and taps. Any holes drilled through the firewall should use a grommet to prevent wire chaffing. Take care to avoid hot surfaces/exhaust when routing in the engine bay. And as always, check both sides of the firewall before breaking out the drill.

Connection List Summary

#1 Switched 12V+ : This circuit is powered when the key is in the On/Run position. This is the unfused **Pink Wire** that leaves the ignition switch and feeds the fuse block and relay center. Be sure to use the included inline fuse when you connect, as this is your protection from jump starting and reverse battery connections.

#2 Ground: A reliable ground connection is extremely important. Not only can a poor ground result in erratic readings, this is also the ground return path for the TCC solenoid should you choose to enable that feature.

#3 Oil Pressure: This is the single wire that runs to the pressure sending unit. Note one end of the wire has a ring terminal already crimped to it (turn-key kit).

If you don't wish to monitor oil pressure, you can disable this option by going to Config Setting #6 and setting it to "0.0". The display will now automatically jump to BATTERY when the button is pressed.

#4 Park Light Circuit (optional)**:** This tells the controller when the park/headlights are on so it can dim the display. A connection to terminal **#8** is also required for this feature. If you don't want to connect wires #4 and #8, you can always press the **DIM/OK** button for 3 levels of brightness at any time.

#5 & #6 Temp Sensor: These connect to the engine temp sensor. Polarity (+/-) doesn't matter. Note the wire pair already has the connector attached to one end (turn-key kit), so snake the cut end through from the engine bay side and trim to length.

#7. Alarm/Chime (optional)**:** This terminal "grounds out" when active. You can connect this to the factory chime on the passenger side of the dash, or to the low side of a 12V buzzer. For the factory chime, tap into either of the light green wires in cavity F of the chime's connector. The chime is between the radio and glove box on the Eldo/Seville and visible with the liner removed.

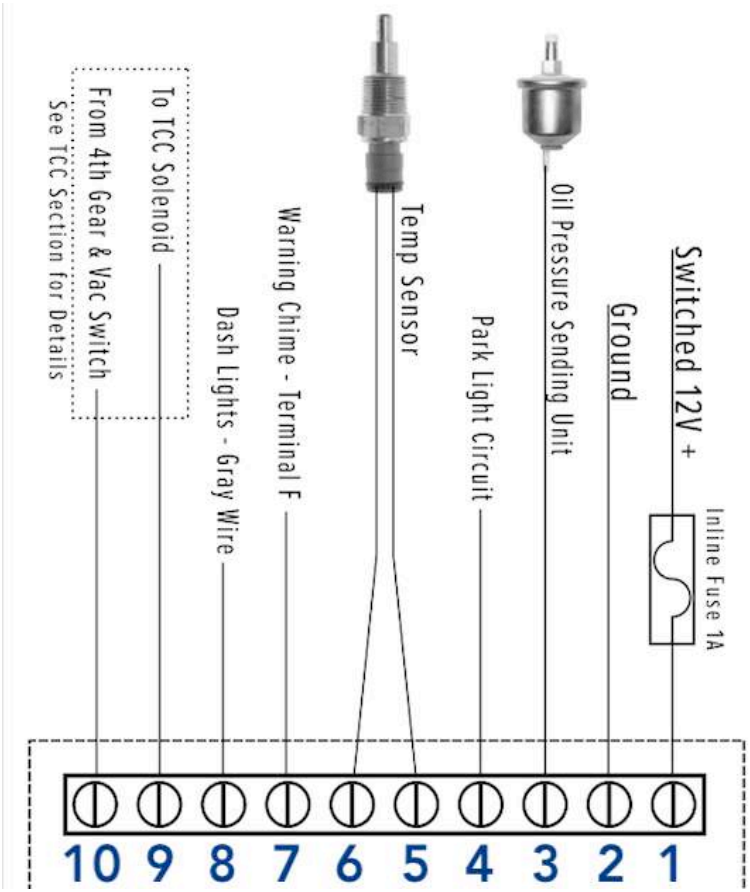
#8. Rheostat (optional)**:** This connects to your dash light circuit to provide controlled dimming with your other factory displays. A connection to terminal **#4** is also required for this option to work. This circuit can be picked up by tapping the gray wire at any dash backlight, such as the one for the Fuel Data display bulb, or Windshield Wiper bulb, or even the gray wire in the 4-pin power connector at the back of the radio.

#9. TCC (optional)**:** The factory torque converter clutch is fed by a +12V fused circuit. The TCC terminal "grounds out" when active, just like the factory ECU, to energize the solenoid. #10 must also be connected as an input.

#10. 4th Gear Input (optional)**:** This is fed from the transmission's 4th gear switch (and aftermarket vacuum switch) to let the controller know when conditions have been met to engage the TCC. #9 must also be connected.

This oil pressure wire and the two wires for the coolant temp sensor need to be run to the engine bay. ***If you drill a hole in the firewall, be sure to install a grommet to keep the wires from shorting out.*** *Alternatively, you may have some newly unused circuits you can pick off at the ECM if you've done an engine swap.*

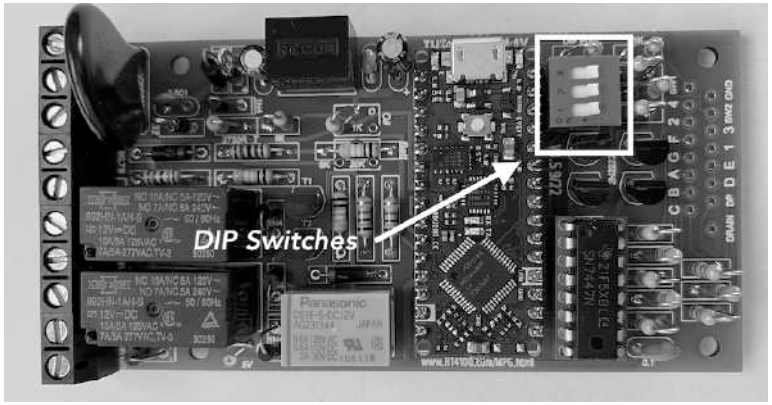
When making connections to the unit, strip only as much insulation as needed (< 1/4") for full insertion into the terminal strip. Permanent damage can result if wire strands short out to adjacent terminals. Do not over-torque the screws.



Setup Section

E/K Display setup is straightforward, utilizing a combination of DIP switches and a software menu directly accessible through the display which can be changed at any time to allow customization.

You'll find 3 DIP switches on the circuit board that should be set during initial installation.



	Up / On	Down / Off
1: Temp Display Units	°C	°F
2: 4th Gear Input	Switch Closes in 4th	Switch Opens in 4th
3: TCC Lockup	Option Enabled	Option Disabled

DIP 1: This sets the units for the Coolant Temp display. Move "up" for Celsius, "down" for Fahrenheit.

DIP 2: This sets the type of 4th Gear Switch you have should you want to use the TCC feature. 1982-85 Cadillacs use a 4th gear trans switch that -**opens**- when you're in 4th gear. Leave the DIP switch down for this transmission. If you're running a non-stock trans with a switch that -closes- (grounds out) in 4th gear, move this switch up.

DIP 3: This enables or disables the TCC feature. If you aren't using the TCC option, leave the switch "down" to disable it.

With wiring complete and DIP switches set, install the housing and screws and proceed to customizing your settings in the Configuration Mode.

Configuration Mode

The Config Mode allows you to customize the display directly from the front panel.

- To enter Config Mode, turn ignition key to ON. Press and hold the **Coolant Temp** button approx. 5 seconds until the display changes to show the software version number. The chime will sound (if connected) and the status LEDs will illuminate to indicate "menu mode".

- Tap the **OIL PRESS/BATTERY** button to step through the available settings (0-12) shown on the next page.

- The **DIM/OK** button is used to "enter" the desired setting, and after review or changes are made, press it again to save & exit back to the main menu. When you are finished with all changes, simply turn the ignition key to OFF, or advance to "0" and press **DIM/OK**. This second option is handy if your engine is running and you don't want to restart. Either method will save all entered data.

- **Settings #0-5 are intended for all users.**
- **Settings #6-11 are specialized and do not normally require adjustment.**
- **Setting #12 will reset the unit to factory default values.**

Menu Summary

For simplicity, the OIL/BATT button will be referred to as "left" and the COOLANT button referred to as "right" for the following actions.

All Users:

0. Exit Config Mode, Return to Normal Operation
1. Alert Temp 1
2. Alert Temp 2
3. TCC Lockup Delay
4. Hot Start Delay
5. Oil Press Alarm Enable / Min Pressure Alert

Expert Level:

6. Oil Pressure Constant / Display Skip
7. Oil Pressure PSI/ADC Value
8. Oil Pressure Offset
9. Voltage Display Offset
10. Rheostat Cutoff Value
11. TCC Diagnostics
12. Reset to Factory Defaults

If the default values on the following pages for #1-5 are acceptable to you, no changes are necessary. *#6-11 do not normally require adjustment.*

1: Level 1 Temp Alert (t1)**:** *Default: 225F*

This is your "*it's starting to get hot*" temp which triggers a momentary chime. Adjustable from 50°F to 255°F in 5° steps. Press left button to decrease, right button to increase temp. This setting is always in Fahrenheit even if Celsius is selected for the primary display. Press DIM/OK to save & exit.

2: Level 2 Temp Alert (t2)**:** *Default: 240F*

This is your "*engine overheating, better shut it down*" temp which sounds a continuous chime. Adjustable from 50°F to 255°F in 5° steps. Press left button to decrease, right button to increase temp. This setting is always in Fahrenheit even if Celsius is selected for the primary display. Press DIM/OK to save & exit.

3: TCC Lockup Delay (tcc): *Default: 5 Sec*

Note: *This setting is only available if you have DIP switch 3 "on" to enable the TCC option.*

When the torque converter clutch locks, engine RPM naturally drops and engine load changes. This can sometimes result in the vacuum switch opening, which unlocks the TCC, and a repetitive lock/unlock cycle begins.

The factory ECM included a delay to allow engine load to stabilize to help prevent such an occurrence. The E/K controller does the same thing, and allows custom adjustment from 1 to 15 seconds. This sets the delay for torque converter clutch engagement after "go" conditions are met.

Left button decreases, right button increases delay in 1 sec increments. Press DIM/OK to save & exit.

4: Hot Start Delay (td): *Default: 1 Min*

Let's say it's a hot day, your engine has been working hard, and you pull up to the pump for gas. When you shut the car off, engine temperature will start to rise since coolant stops circulating. You hop in after topping off the tank, start the engine, and drive away. Your engine temp may momentarily be higher than your Temp Alert settings. To avoid a nuisance alarm, Hot Start Delay allows you to specify an amount of time that engine temp is ignored after startup.

Delay is set in minutes from 0.0 to 9.5. *E.g. 0.5 = 30 seconds*. Left button decreases, right button increases in 30 sec increments. Press DIM/OK to save & exit.

5: Oil Pressure Alarm: *Default: 5 PSI*

This sets the minimum oil pressure in PSI that will trigger the warning chime.

Adjustable from 2 to 10 PSI. Many GM factory switches are set between 4 & 5 PSI. Left button decreases, right button increases in 1 PSI increments.

You can also disable the alarm feature entirely by tapping the left button until "88" appears. Press DIM/OK to save & exit.

12: Restore Factory Defaults:

To reset all settings to their default values, step to setting #12, then hold in the DIM/OK button for approximately 5 seconds until the display shows "888", then release. If you have the factory chime connected, it will momentarily sound for additional confirmation. Key-Off to exit.

Congratulations, your E/K Display setup is now complete!