OMEGA

AVANT GAUGES

AVANT.INSTRUCT

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INTRODUCTION

Advanced Feature Speedometers offer features found in complete clusters, OE instrument systems and data loggers, all in a standalone unit. While all of the features listed in this manual are available, they are not all required to be used. You can use your speedometer simply as a way to monitor your speed or as a performance meter.

Some of the advanced features include:

- OLED high resolution display
- Drive-a-mile self calibration
- Integration with OE and aftermarket speed signal and PCM outputs
- GPS input compatible
- Overspeed warning output (AMP Plug models)
- MPH/KPH speed toggle
- Performance meter 0-60, 1/8 and 1/4 mile times/speed capture

Installation:
Advanced feature speedometers are offered in perimeter lit (incandescent bulb) or backlit (LED backlighting) depending on the series.

They are identified by the back:

- If bulb sockets are installed, you have a perimeter incandescent unit.
- If the holes are plugged, you have an LED backlit unit.

Connections:
Speedometers are offered in either a studded or AMP plug connection. All of the wires on the AMP plug may be used depending on the application. Check further in the manual for more details.

TERMS WHEN USING THIS BOOKLET

Scroll - Pressing and releasing of the remote button to move through menu options.

Short push - Briefly holding the remote button and releasing it.

Long Push - Holding the remote button for one second or until a menu display changes.

With all of the features packed into Advanced Feature Speedometers, options are divided into different menus.

Your speedometer has a main "RUN" menu and a "SETUP" menu.

- The RUN menu utilizes the features used during normal operation.
- The SETUP menu stores all of the items that are setup during the installation process.
- Items can be changed any time after, if desired, and are separate to prevent inadvertently changing them during normal use.

During installation please contact our experienced tech team with questions.

AUTOCAL (Drive-A-Mile Self-Calibration) Quick Set-Up

Check that your digital input filter is set to the proper input setting (see more later in manual if needed). All advanced speedometers are shipped with the input set on **HIGH** (suitable for most applications) with 16,000 PPM.

Enter the setup menu by holding the remote button and turning on the key (start vehicle).

Scroll to auto calibrate (3RD ITEM).

Hold button until screen displays **READY TO DRIVE? YES**

Hold button until display shows **COUNTING 0**

Drive exactly one mile (or KM), speed does not effect accuracy. You may or may not see action on the speedometer before or during calibration. Display will show counting with the digits increasing below. This is the speedometer counting the number of pulses it is receiving from the signal source. If the display does not count, check your signal source or input filter, the speedometer is not reading a signal.

At the end of the mile (vehicle can be moving or stationary), hold the button until **SET YES** appears.

If **NO PULSES** is displayed, a signal was not read by the speedometer. Check your input filter selection and speed signal.

Hold button until **SAVED!** appears.

The speedometer is now calibrated. Pressing the button will take you through the rest of the setup menu features. To resume normal operation, turn off the vehicle and restart.

INSTALLATION BASICS:

- Use a minimum of 20 gauge insulated, stranded wire. All connections should be connected with a crimp connection or solder and heat shrink.
- Keep speed signal wire(s) away from potential "noise" sources like ignition wires, tach signal wires, fan motors, pumps, etc.
- Studded speedometers use #8 studs. Use applicable eye terminals for wiring.
- Use a maximum of 1A fuse for the entire cluster. This is usually already in your fuse block.
- Commonize wiring, ground power and lights can be common on all gauges and "daisy chained."

Speedometer Operation Menus:
With all of the features packed into advanced feature platform Speedometers, we have divided them into different menus.

Your speedometer has a main "RUN" menu, and a "SETUP" menu.

- The RUN menu utilizes the features used during normal operation.
- The SETUP menu stores all of the items that are setup during the installation process.
- Items can be changed any time after, if desired, and are separate to prevent inadvertently changing them during normal use.

RUN Menu Functions:

Features can be accessed in the run menu during normal operation with the key on. To scroll to the various displays in the OLED screen, use a short push or tap of the remote button.

Main Odometer:
Displays total distance traveled in miles or kilometers depending on the model. This display does not show tenths.

Trip Meter:
Displays current trip distance. Press and hold the button and the odometer will reset to 0. This display will show tenths and will not have any zeros in front of the distance traveled.

RUN Menu Functions Continued…

Service:
This is used to see when your next service interval is due (oil change, tire rotation…) The interval is set in the **SETUP** menu in the next section. This screen is to display the interval remaining.

When the service interval has been reached, the **SERVICE REQUIRED** warning will display at vehicle startup. The interval can be reset in the **SETUP** menu.

MPH:
This will display your current Miles Per Hour you are traveling.

KPH:
This will display the current Kilometers Per Hour you are traveling.

Peak Speed:
This will display the highest speed achieved since last reset. Press and hold the button and the odometer will reset to 0.

Performance Timers: (where applicable)
Displays 1/4 and 1/8 mile time and trap speed as well as 0-60 time. Enter the performance mode you wish to measure, hold the button until the dialog to start is displayed, enter **YES** to start or **NO** to reset. Start driving. (Professional driver only on a closed course). Note: this feature is available on select models only, check product feature documentation.

Set Up Menu Functions:

The SETUP menu contains menus used for functions not used during normal operation. These features are in this sub-menu to avoid inadvertently changing them during normal operation.

While the vehicle is off press and hold the button. Turn the vehicle on. The odometer will display **SETUP MENU**. Short pushes on the button will scroll through these features and long hold of the button will select the item. To exit the **SETUP MENU** turn off the vehicle and restart. You may operate the speedometer in setup mode if required, the speedometer will operate to make fine tuning easier.

Service Reset: (Push and hold button to enter)
This is used to reset service interval if you have saved any (oil changes, tire rotations, tune ups...) You can set service intervals later in this menu (Service Set section). Short push to scroll, long push to select.

Manual Calibrate: (Push and hold button to enter)
Manual calibration of the speedometer is used to manually enter the pulse setting. You must know the pulse setting of the speed signal to use this feature. Common uses are on OE (pre-configured) senders, GM PCMs GPS senders.

Note: Using this method will usually get you close enough and fine tuning or auto calibration may be required. Although many speed senders are standard output, various gear ratios and tire sizes will change the pulse settings depending on the vehicle build. The speedometer will accept between 2,000-250,000 PPM. See next page for a chart with common pulse settings.

To enter the manual calibration mode, hold the button until the current pulse setting is shown. We ship all speedometers with a 16,000 PPM setting. If the number shown is not 16,000 the speedometer has already been auto-calibrated by the end user. If the pulse count shows zero, the previous autocal attempts resulted in not receiving a speed signal. Check your sender and input filter.

Continue to next page.

Manual Calibrate Continued...

The current pluses will be shown, with the first number highlighted. To change that number short push scrolling will increase the digit. Stop on the number required and hold the button to select the next number and follow the same sequence until all numbers are correct and your are on the last digit to the right.

The final dialog box will display asking to set. Select **Y** to accept, **N** to cancel. Hold the button on **Y** and the setting will be saved. The speedometer is now manually calibrated.

Auto Calibrate:
This feature allows the speedometer to automatically calibrate the speedometer by driving a measured mile (or kilometer). See quick setup earlier in this manual for instructions.

Input Filter:
The digital filter in the speedometer is used to properly read the signal from virtually any pulsed source. Enter the filter by holding the button. Scroll to the filter selection desired, refer to the chart below. Select L, M or H (low, medium, high). Hold the button to select **FILTER**, set **YES** or **NO**, hold to select **SAVED!** Will display to indicate a successful session. You can change this at any time to adjust as needed or to experiment for the best results for your application.

Source	Typical PPM	Signal Type	Input Filter Set
GM PCM (All)	4,000	5-12V Hall Effect	5V=M, 12V=H
Aftermarket 3 Wire	16,000	12V Hall Effect	H
Aftermarket 2 Wire	8,000 or 16,000	AC Sinewave	L
OE 2 Wire (GM)	40,000	AC Sinewave	L
NV4500	108,000	AC Sinewave	L
Tremec	16,000 or 40,000	Low AC Sinewave	L
GPS Sender	8,000 or 16,000	Varies	5V=M, 12V=H

SETUP Menu Functions Continued...

Overspeed:
Available on AMP-Plug and commercial units only. The overspeed output can be used to trigger a relay that can operate a buzzer or lamp. Never connect the overspeed output directly to the device to be used, always connect with a relay or speedometer. Damage will result. The output on the overspeed is 12V+ less than .2 amp.

To set the overspeed enter the **SETUP MENU** and scroll to overspeed. Hold in the button to enter the menu. The current overspeed setting will be displayed:

To change the overspeed setting, scroll to YES, then hold the button, the current warning level will be shown with the first digit highlighted. To change the digit, tap the button to increase the number. To move to the next number, hold the button until the next is highlighted. Proceed with the same procedure until all 3 digits are changed. On the last number hold until the display shows the speed and set? **YES**. The saved speed will be shown. If there is an error you can select **NO** or turn off the gauge and no changes will be made.

Set Odometer:
The **SET ODOMETER** function is a one-time setting that the end user can change during the first 100 miles of operation. The user can set the mileage to the existing vehicle mileage to maintain a proper vehicle record. Once the mileage has passed 100 miles, the feature will no longer be available. To enter the set odometer menu, scroll to **SET ODOMETER** and hold in the button. You will see one time set ? **YES**. Hold in the button.

000000 will be shown with the first digit highlighted. To change the digit, tap the button to increase the number. To move to the next number, hold the button until the next is highlighted. Proceed with the same procedure until all digits are changed. On the last number hold until the display shows the mileage **SET YES?** Hold in the button and **SAVED!** will appear. Turn off and restart the vehicle, mileage is now set.

SETUP Menu Functions Continued…

Program Version Number:
This displays the current software version stored in the instrument. The version will vary based on the model you have. It is only required if you have an issue with your speedometer as this information will be useful when contacting for service.

Speedometer Troubleshooting Basics:

Speedometers are just like any other gauge in respect that it has the same three requirements; power, ground and a signal. The troubleshooting process is the same, start at the end of the system and work your way toward the gauge. As with all gauge systems there are 3 components: The gauge, the wire and the sender or signal source. All three need to be checked for the entire system to operate properly.

- Turn on the key, does the gauge power up? If not then check power or gauge fault.
- Turn on the lights, does the gauge light up? If not then check your ground.

Speedometer will not calibrate:
All speedometers require a speed signal to operate properly. We first need to check the senders.

Hall Effect Cable Output Replacement Style:

- Pull the plug from the back of the sender, check for power on the red wire, ground on the black.
- Pull the sender from the trans, turn on the key and spin the sender with a drill. Speedo operates, then check mechanical engagement issue with the transmission drive gear, check as needed. Speedo does not operate, check the sender wire using a test lamp.

Hall Effect Speed Sender Test:

- The hall effect sender will alternate positive and negative pulse when turning the sender slowly by hand. Use a test lamp or multi meter to check by probing the signal wire and the hot then the ground lead.

2-Wire Speed Sender, AC Sine Wave and Magnetic Pickup:

- Check that the ground lead is as short as possible
- Check for continuity between the sender and the gauge
- Pull the sender from the trans, turn on the key and spin the sender with a drill. Speedo operates then mechanical engagement issue with the transmission drive gear, check as needed. If speedo does not operate, then check the sender wire using a test lamp.

Speed Sender Test 2-Wire:

- Set your multi meter on AC voltage, lowest setting or 20V. Probe the sender wire with the red lead, ground the back lead. Spin the sender; you should see between 8-18V on the signal wire. Low or no voltage indicates a bad sender or sender that will be going bad soon. This test can also be performed on the cable output style by removing and spinning with a drill to check for a mechanical issue (see above).

Note on Ford Style Cable Output Senders:
Check that the drive gear is installed on the sender. The spin with a drill test should be made with the drive gear on and off to rule out an out-of-square drive on the gear.

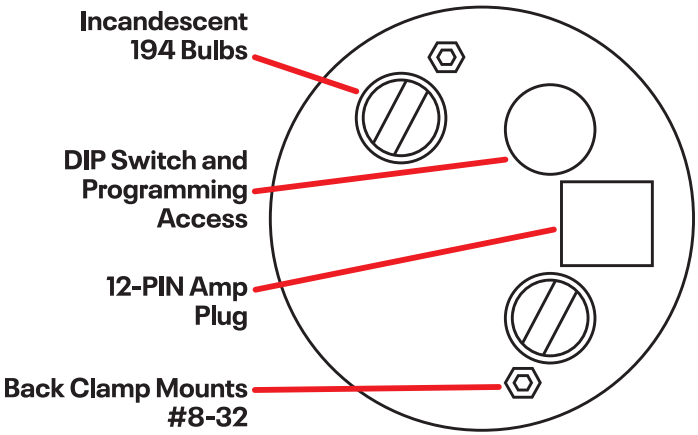
PCM/ECU:
Testing the signal is the same as above methods but it is also important to check the VSS on the transmission to ensure a signal is reaching the PCM first. Without that signal the PCM will not be able to send a signal to the speedometer.

The Back of Your Gauge:

All advanced feature gauges with 12-pin AMP plugs have the same features on the rear. You will find the plug location, back clamp attachments, bulb locations (perimeter lit models only) and programming/DIP-switch settings.

Lighting: All perimeter lit incandescent gauges have standard 194 bulbs installed in a removable socket that is powered on the circuit board. To remove, twist counterclockwise and remove. Bulbs can be changed to different colors or even LED bulbs.

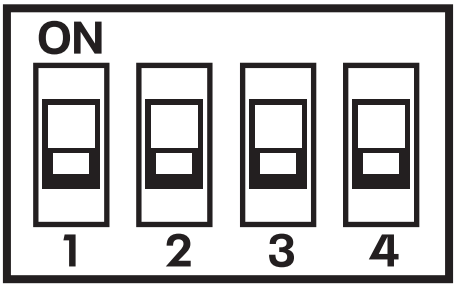
All LED backlit gauges have LED lighting incorporated onto the circuit board and are not changable. To dim the LEDs you will need a LED dimmer. When wiring LED bulbs do not wire to the stock dimmer circuit as the bulbs will not dim or may not operate. You should connect to the parking lamp function for a constant supply of power.



The features are shown at right. To access the DIP switches, remove the rubber plug. All 3-3/8 and 4-3/8 gauges have the same layout.

Programmable Fuel Gauge for 3n1 & Quad Gauges

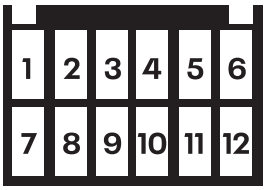
All advanced feature platform multifunction gauges feature stepper motor micorprocessor driven internals that feature programmable fuel level sender inputs. This allows for the setting to be changed at time of installation removing the need for a new sender or dropping the tank. Follow the chart below for proper DIP-switch settings for your fuel tank. Change the DIP switches with the power off. Use a pointed object like a pick or small screwdriver to change the settings. Ensure the switch is fully ON or OFF.



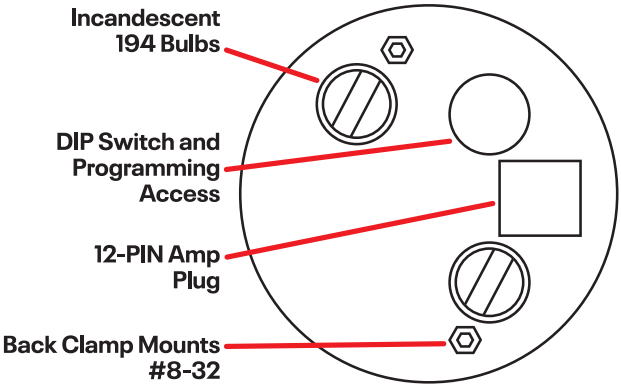
Sender Type Make/Year	Range E-F	1	2	3	4
Early GM/Ford Pre-'65	0-30	OFF	OFF	ON	OFF
GM '65-89	0-90	OFF	ON	OFF	OFF
GM '90s-Up	40-250	OFF	ON	ON	OFF
Ford AMC Mopar '65-86	73-10	OFF	OFF	OFF	ON
Ford '87-Up	20-145	ON	ON	OFF	OFF
Universal / SW	240-33	ON	OFF	OFF	OFF
Custom/Early Ford	168-15	ON	OFF	ON	OFF

Speedometer Wiring/Connections - AMP Plug Speedo

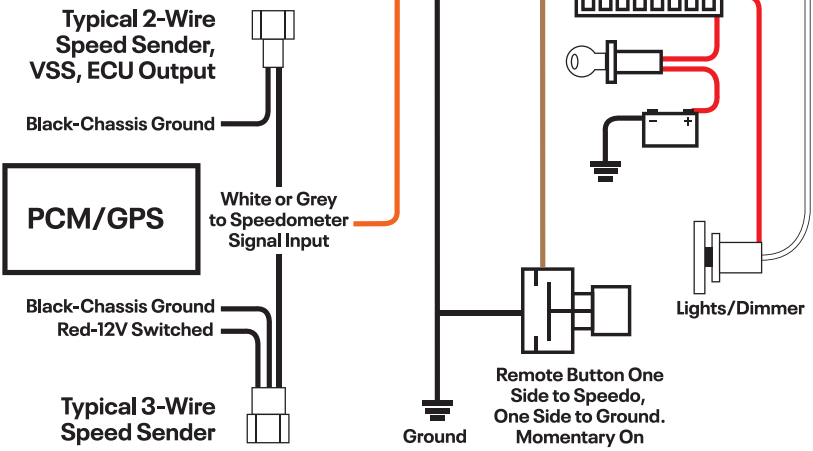
Standalone speedometers with AMP plugs are incandescent perimeter, backlit or LED backlit. Incandescent bulbs will be in the access holes installed into the circuit board. DIP-switch settings are not required on speedometers. 3-3/8" and 4-3/8" are the same configuration.



12-PIN AMP Plug
Plug #174045-2
PIN #173681-1



PIN	Color	Function
1	RED	12V+ Switched 1A
2	GR/YEL	Not Used
3	ORANGE	Speed Signal
4	YELLOW	Not Used
5	TAN	Not Used
6	WHITE	Lighting
7	BLACK	Ground
8	VIOLET	Not Used
9	GREY	Not Used
10	BLUE	Not Used
11	GREEN	*Aux Input*
12	BROWN	Remote Button



Quad Gauge Installation/Wiring

Use a minimum 20 gauge insulated, strand wire. Keep wire, connectors, solder, heat shrink and zip ties available for installation. Tie common connections together such as power, ground, lighting. Use 1A fuse for up to 8 gauges.

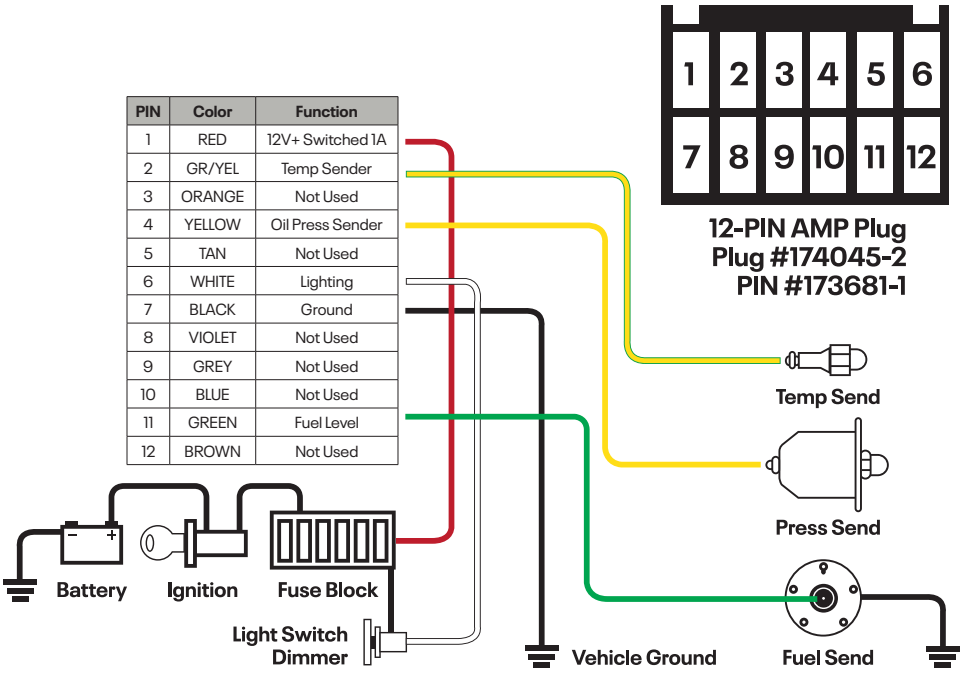
Properly ground your gauge kit to a chassis ground and check the main black and battery grounds.

Senders require a ground connection, ensure this ground is clean.

Sender Threads: Senders that are grounded through the base should not use sealant on the threads, this will degrade the ground to the sender. If sealant is required, use it at the top of the threads so the bottom threads will bite into the base material.

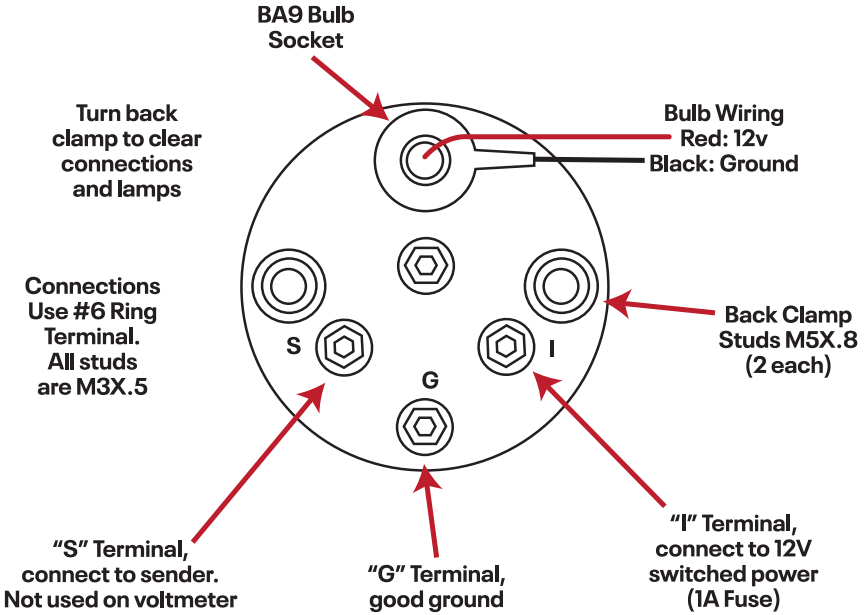
Sender Threads: All senders have a 1/8-27 pipe thread. If a different size is required, bushings that can adapt to other sizes can be used as well as elbows and extensions to aid in fitment.

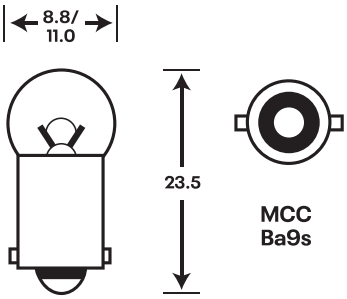
PIN	Color	Function
1	RED	12V+ Switched 1A
2	GR/YEL	Temp Sender
3	ORANGE	Not Used
4	YELLOW	Oil Press Sender
5	TAN	Not Used
6	WHITE	Lighting
7	BLACK	Ground
8	VIOLET	Not Used
9	GREY	Not Used
10	BLUE	Not Used
11	GREEN	Fuel Level
12	BROWN	Not Used

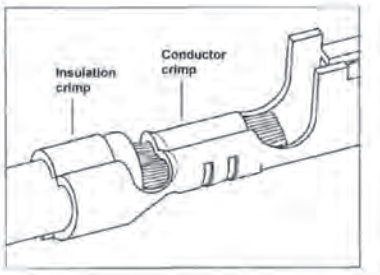


2-1/16" Gauges - Short Sweep Aircore

All short sweep aircore gauges feature rugged movements, shielded metal cases and incandescent lighting. Dial lighting may be perimeter lit (around the dial) or backlit (through the dial). Studded connections require a #6 ring terminal. Always use the proper, matching senders for each gauge. Matching senders for pressure and temperature, factory or aftermarket fuel senders for fuel.







BA 9 Bulb
If you wish to convert to LED bulbs, simply replace with a BA9 base LED bulb. Choose a bulb that has a wide spread and is not wider than the socket opening. LED lights are different colors and may not light backlit dials the same way.

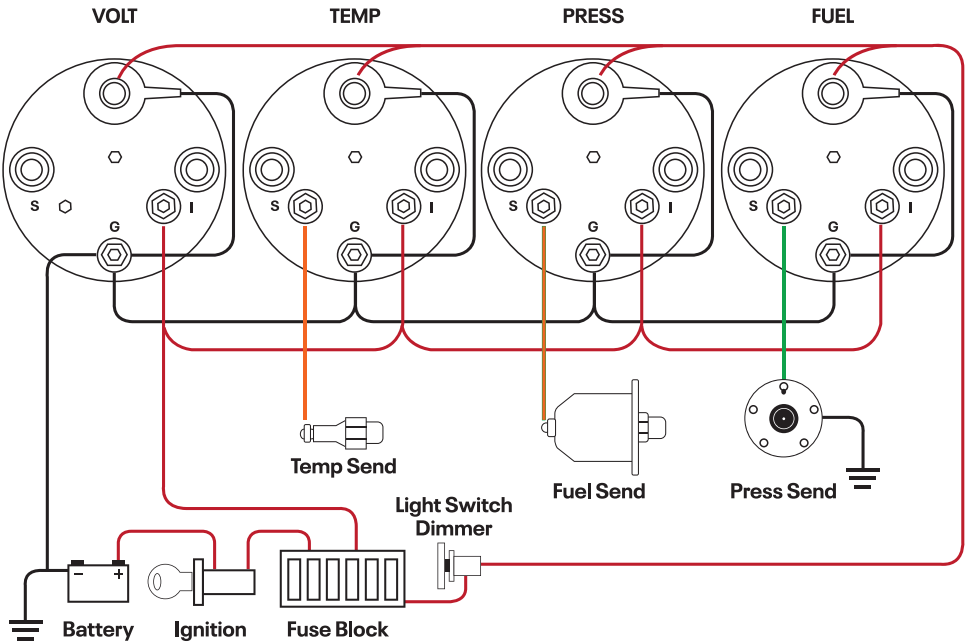
Connections
Follow proper terminal crimping procedures for a good connection. A bad crimp is the number one cause of gauge issues and the most difficult to diagnose due to an intermittent problem.

Wiring Multiple Gauges

Above is an example of wiring a grouping of gauges together. The number one thing to remember is to commonize the basic three connections (power, ground, lights) and then run the sender wires. To simplify things even further, you can jump the lamp ground to the gauge ground. Use a minimum of 20 gauge stranded automotive grade wire.

Wire the lighting to the stock dash lights unless you are using LED bulbs, then wire them to the parking lamp circuit. An LED dimmer will be required to dim LED lights.

When installing, you must use the matching senders provided. OE senders for pressure and temperature will not operate the gauges properly. You may use an OE sender for fuel level when using a matching gauge. See chart on next page for more information on OE sender ranges.



Senders and Signals

Senders are the part of the gauge system that send a signal to the gauge to be read, and then displayed on the dial face. There are four types of senders, resistance bases pressure, temperature and level (fuel), voltage input pressure transducers, and pulsed speed inputs.

Temperature Senders:
Signal type is resistance to ground. Resistance DECREASES as temperature rises. All advanced feature temperature gauges use a High-Match temperature sender. The sender will read between 450-500 ohms at room temperature. Both low and high read gauges use the same sender.

Pressure Senders:
Pressure senders are resistance to ground signal. All of our pressure senders are 240-33 ohm, 0-100 PSI regardless of the pressure range.

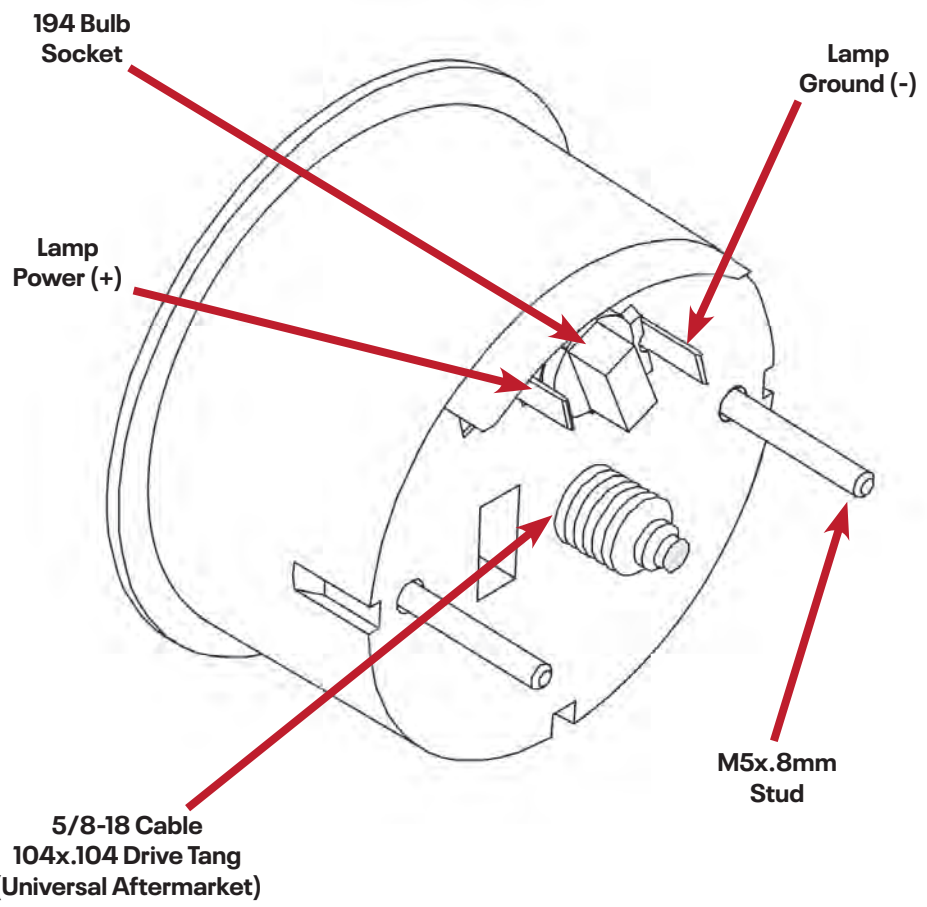
Pressure Transducers:
Pressure transducers send a voltage signal to the gauge to be read. Typically a linear .5V-4.5V signal can be read by any transducer gauge. There are typically 3 wires to the transducer, signal, ground and 5V power (from the gauge or module).

Fuel Level Senders:
Fuel level Senders are also resistance to ground. A float arm rotates on a rheostat in the fuel tank and changes the resistance as the float arm moves. This is also available in a tube type sender. The ranges can vary depending on the OE manufacturer. You ALWAYS need to match the fuel gauge to the sender. We offer a universal fit 240-33 ohm and 0-90 ohm unit for aftermarket applications. The senders are universal and mount from the top of the tank and have a universal 5-hole flange. These are not intended to replace the stock sender for the tank which was specially manufactured for that tank size/shape/orientation. Use a stock ender if at all possible to make things easier on yourself.

Type	SW/UNIV	GM Late	GM Early	Ford Early	Ford Late	GM Mod
Years	All	'64/'65-90s	Pre-'64	'64-87	'88-Up	'90s-Up
Range E/F	240-33	0-90	0-30	73-10	20-150	40-250

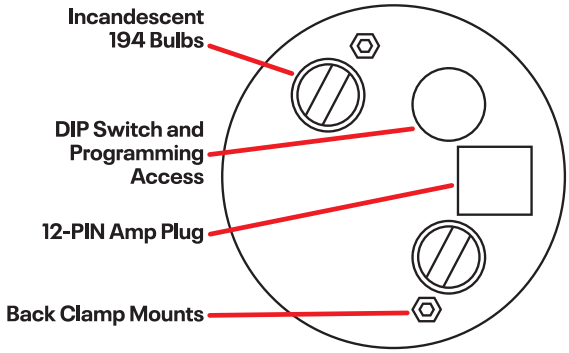
Mechanical Speedometer

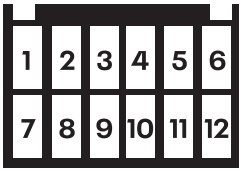
Mechanical speedometers operate from a mechanical drive cable connected directly to the transmission or transfer case. The drive ratio is 1:1 and cannot be altered. To change the calibration, the cable drive gear in the transmission must be changed, a variety of gears with different tooth counts are available for this purpose.



Programmable Tachometer Wiring

Standalone tachometers with AMP plugs are incandescent perimeter, backlit or LED backlit. Incandescent bulbs will be in the access holes installed into the circuit board. DIP-switch settings are not required on tachometers. 3-3/8" and 4-3/8" are the same configuration.



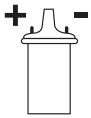


12-PIN AMP Plug
Plug #174045-2
PIN #173681-1

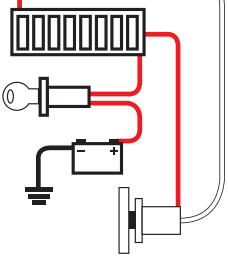
PIN	Color	Function
1	RED	12V+ Switched 1A
2	GR/YEL	*Aux Input*
3	ORANGE	Not Used
4	YELLOW	*Aux Input 2*
5	TAN	Not Used
6	WHITE	Lighting
7	BLACK	Ground
8	VIOLET	Tach Signal
9	GREY	Not Used
10	BLUE	Not Used
11	GREEN	Not Used
12	BROWN*	Remote Button*

* Not used on tachometer without OLED display

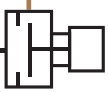
PCM/CDI May require pull up resistor (see later in this book)



Ignition coil. Connect to negative side of the coil



Lights/Dimmer



Oled Models Only: Remote Button One Side to Gauge, One Side to Ground. Momentary On

See Tach Signal Section of this manual.
Do not connect to high energy system directly.
Call us first with any questions.

Ground

Tachometer Signals

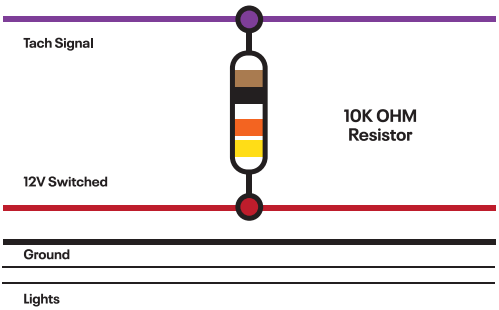
Ignition Coil: Even today the most common ignition source is the traditional coil. (incorporates the coil and either points or electronic ignition all into the distributor.) Use the negative side of the coil when using a distributor style with traditional points or electronic ignition. The signal is a high-voltage pulsed signal.

Coil On Plug (COP) is essentially the same as a traditional coil with the exception of each cylinder having its own individually fired coil. This setup is used in conjunction with PCMs. If you use the trigger on a COP the tachometer should be set to 1 cylinder (2PPR) operation.

AFTERMARKET HIGH ENERGY IGNITION SYSTEM

Aftermarket distributors "MSD" boxes, CDI, etc. **ALWAYS HAVE TACH OUTPUT. DO NOT CONNECT TO THE COIL OR DAMAGE WILL RESULT.** These types of systems have multiple high energy signals going to the coil and will produce overvoltage feedback damaging to the tachometer. This is why there is a separate tach signal.

GM PCM have an open collector signal tach output, consult your PCM documentation for exact PIN. You will need a 10K-ohm pullup resistor to change the open collector signal to a square wave (see diagram). This is installed to pull up the signal between the power and tach signal from the PCM. All GM PCMs output a 4-cylinder signal regardless of number of cylinders or if it is gas or diesel.



Crank Trigger type generates an AC sinewave signal by using a magnetic sender to "count" the number of teeth. Your NVU tachometer may require bypassing of the internal filter call for more information. You will also need to calibrate the PPR (programmable models with OLED) (pulse per revolution) to the number of teeth or magnets on the flywheel.

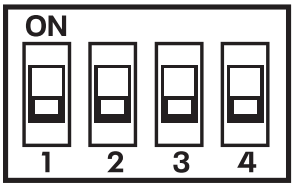
Alternator "W" Terminal also outputs an AC sinewave like the above crank trigger, a reference tachometer is the best way to determine the exact RPM, then the tach can be properly calibrated by setting the PPR (programmable models with OLED).

Programmable Tachometers Without OLED Screen

Programmable tachometers feature easy to set up operation and are ready to run on 4-cycle engines. With 1 (COP Coil On Plug), 4, 6 and 8 cylinder settings. Your tachometer can be pre-set to any pulse configuration (contact the factory for more details). Signals typically are from the negative side of the coil, CDI box or PCM (computer). You may require a pull-up resistor on GM PCMs, see later in this book. All tachometers are shipped from the factory set at 8 cylinder selection and signal filter off (most applications).

Cylinder Selection

Power down the unit, settings will not take effect until the power is cycled off. Remove the black cover on the back of the unit. The first 3 DIP switches are for setting the number of cylinders, the last one adjusts the filtering (next segment). Follow the chart and select the proper settings for your application. 1 cylinder is used for COP (Coil On Plug) ignitions where a separate tachometer signal is not available. Use a small pointer object to change the switch settings if required. Check that the switch is fully engaged in the "ON" or "OFF" position. If cylinder setting is not available for your application, contact the factory and your setting can be custom programmed for a nominal charge.



#4 Switch for Filter Setting (below)

	SWITCH		
CYL	1	2	3
1	ON	ON	ON
2	ON	ON	OFF
4	ON	OFF	ON
6	ON	OFF	OFF
8	OFF	ON	ON
10	OFF	ON	OFF
12	OFF	OFF	ON

Filter Settings

Tachometers are shipped with the signal filter off (DIP-Switch #4 in the OFF position). This will be appropriate for most applications that use a 12V square wave or coil signal. To use on a lower power signal, with the power off, place switch #4 in the "ON" position.

For additional filtering options, contact the factory. We can bypass the internal filter and adjust to suit your custom input.

Senders and Signals

Speedometer Signals:
All speedometers will accept a speed signal from just about any speed signal sender or PCM output. Below is a brief description of each signal type followed by a chart for input DIP-Switch settings for optimum use. NOTE: if you have a speedometer that is functioning but may have erratic movement at certain speeds, experimentation with switching DIP-Switch 1 and 2 may help with stabilizing the pointer readout. This will not cause any damage when properly reading from a speed signal source.

Hall Effect Sender:
This type of sender is identified by having 3 wires. The sender uses power and ground to create a square wave signal which is alternating positive and negative. The speedometer reads each alternating "pulse." These are commonly used on cable-output senders which replace the traditional cable on the transmission.

AC Sine Wave Sender:
Commonly referred to as a pulse generator. This unit is identified by 2 wires, one is a ground, one is the signal. This type of sender also is commonly used to replace the cable on the transmission. This type creates an AC sine wave signal, which has 2 components: amplitude and frequency. The sender generates an AC voltage, typically between 8-18 volts which is the strength, or amplitude. The rate that the voltage alternates (AC like in your home) is the frequency, which is the "pluses" the speedometer reads.

Magnetic Pickup:
This sender is the exact same as the AC sine wave pulse generator above but it is usually installed in the transmission at the factory. The sender or "pickup" bolts into the transmission and a reluctor (toothed) ring spins below it. As each tooth passes a "pulse" of AC voltage is generated and is sent to the speedometer. This type of sender also must generate 8-18v to operate properly. There are also variants on this sender that mount on the axle or driveshaft but the principle is the same.

PCM/Computer:
Very popular in the past decade, most OE and aftermarket PCMs will read the speed signal from the speed sender and output a speed signal (often called VSS or vehicle speed signal). It is usually a 5V square wave (hall effect) and sometimes an AC sine wave. The connection is the same, simply run the VSS signal to the speed sender input on the speedometer.

GPS Sender:
This type reads the vehicle position and calculates speed, then a microprocessor directs the unit to send the appropriate number of pulses to the speedometer unit. The only thing to do when setting up this type of sender is to make sure the speedometer and GPS unit are in sync with the proper number of pulses. For example, your GPS unit outputs 8,000 PPM (Pulses Per Mile) you need to set the speedometer manually to 8,000 PPM so that they are both at the same setting.

Auxillary Inputs

Our instruments feature add-on functions that can be displayed directly on the OLED screen as needed. This can be accomplished by adding a matching pressure or temperature sender. Custom options are available, feel free to contact us for your needs.

How it works:
Every speedometer (standalone and 3-1) has one auxiliary input wire on the harness. Pin #11 on your AMP harness will be **GREEN**.

Every Tachometer with OLED (standalone and 3-1) and speedo/tach combo gauge has 2 auxiliary inputs. Each is on the AMP plug. (No aux input without screen)
AUX 1: PIN 2 **GREEN/YELLOW**
AUX 2: PIN 4 **YELLOW**

All 3 inputs have the same features and menu settings. There are 3 types of inputs standard and all are resistant to ground.

1. TEMPERATURE - All standard auxiliary inputs for temperature run from a standard hi-match temperature sender part number 99320-04. You must use this sender to monitor any temp readings. This sender is separate from any other sender you are using to monitor any other setting on the gauge itself. (You cannot "split" a sender signal.) Custom ranges are available at additional cost. Contact us for more details.

2. PRESSURE - All standard axillary inputs for pressure operate from a standard pressure sender 0-100 PSI, 240-33 ohm part number 90100-04. This range works well for anything that uses at least 40% of the scale. (no less than 40 PSI). If you need a different range, custom inputs are available. Contact us for more details.

Sender grounds: The above sender operate by varying the resistance to ground through the base of the sender (threads). If you are monitoring the temperature or pressure by attaching to a non-metal surface (plastic, rubber or insulated line) you will require a floating ground sender. This has an additional terminal for grounding the unit.

3. SHIFTER - Shift inputs operate on resistance to ground. Please see part number 99440-04 shift input terminal for exact specifications for shift inputs. This terminal box accepts ground signals from various manufacturer's shift drivers and converts the signal to be compatible with any advanced feature instrument with a display.

Setting Up The Auxillary Inputs

Install sender as needed, run minmum 20 gauge wire to the appropriate input wire. To set up the functions using the OLED display screen, the vehicle does not need to be running.

Enter the SETUP menu by holding in the programming button while turning on the key.

Scroll to **AUX INPUT SETUP** or **AUX 2 SETUP**

Speedometers use AUX Input (Green wire) ONLY
Tachometers and speedo/tachs use AUX INPUT (Green/yellow) and AUX 2 (Yellow wire)

Customs and specialty instruments please check your wiring diagram.

Once you have entered the specified input setting, scroll to the desired reading you would like to display on the OLED screen.

AUX INPUT SELECTION	AUX 2 INPUT SELECTION	DISPLAY ON OLED SCREEN	SENDER USED
AUX INPUT NOT USED	AUX 2 NOT USED	NOT VISIBLE	
AUX INPUT OIL TEMP	AUX 2 OIL TEMP	168 °F	TEMPERATURE 99320-04
AUX INPUT TRANS TEMP	AUX 2 TRANS TEMP	167 °F	TEMPERATURE 99320-04
AUX INPUT WTR TEMP	AUX 2 WTR TEMP	168 °F	TEMPERATURE 99320-04
AUX INPUT OIL PRESS	AUX 2 OIL PRESS	45 PSI	PRESSURE 99100-04
AUX INPUT FUEL PRESS	AUX 2 FUEL PRESS	45 PSI	PRESSURE 99100-04
AUX INPUT BOOST	AUX 2 BOOST	46	PRESSURE 99100-04
AUX INPUT SHIFTER	AUX 2 SHIFTER		SHIFT DRIVER

Setting Up The Auxillary Inputs Continued...

Once you are on the desired function to be displayed, press and hold the programming button until the **INPUT SET** screen is displayed.

This can be changed at any time, just follow the preceeding setup process. You may now continue on to other programming features or you can restart the instrument. You must turn the power off and re-cycle the power before setting will take effect. You do not have to start the vehicle, just simply turn the key off and back on again.

Normal Operation:
The auxiliary inputs are designed to be just that, additional instrument features that you may or may not need to be viewing at all times. To view a particular input while using the instruments, tap the programming button to scroll to the display you would like to view. It will remain visible until the button is depressed again.

More Information:
The additional inputs are designed to measure temperature and pressure using matching (or equivalent) senders. The temperature or pressure of virtually anything can be measured, for example Trans temp is shown on the display with a "T" this can be for anything you like, axles, trans, t-case, it's up to you. So keep your mind open when it comes to the vitals you would like to watch.

We have the wiring tools you need!

910-7706

910-55516

728-45229

910-55666

910-55667

728-11477

910-55672

910-12100

728-11412

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