**General Information**

The VDO Programmable Speedometers featured in this installation manual are available in three diameters: 3 1/4” (80 mm); 3 3/4” (85 mm), and 4” (100 mm). The speedometers are also available with different dial faces: MPH, Kmh, or MPH-Kmh.

Incorporated into each speedometer is the latest VDO microprocessor technology for measuring speed and distance. These versatile instruments can be used in Original Equipment Manufacturer applications as well as aftermarket installations.

VDO Programmable Speedometers can be used with inductive, hall-effect, reed and on manual transmissions, with OEM sensors. Use with electronic transmissions requires the speedometer be hooked up to the electronic transmission control box. Intermittent shifting may occur when connecting directly to OEM sensors in electronic transmissions.

These instructions describe the installation, wiring, calibration and operation of all VDO Programmable Speedometers with LCD display.

**CAUTION!!!**

These instructions contain information about gauges of different sizes. **You must determine the size of your gauge before cutting any holes!**

**Tools and Materials Needed For Installation:**
- Hole saw or jigsaw (may not be needed)
- ¼” spade terminals
- Miscellaneous electrical connectors
- Phillips and/or flathead screwdriver
- Pliers and/or wrenches
- Crimping tool and/or soldering iron (may not be needed)

**Parts List**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Speedometer</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Lamp Socket (Push in, wedge-type)</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>Light Bulb (12-volt / G.E. #158 or equivalent)</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>VDO Spin-Lok™ Mounting Clamp</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Installation/Operation Instructions</td>
<td>1</td>
</tr>
</tbody>
</table>

**I. Mounting the Speedometer**

1. Refer to Diagram B for dimensions. The 3 1/4” (80 mm) speedometer requires a hole diameter of 3 1/4” (80mm); the 3 3/4” (85 mm) speedometer requires a hole diameter of about 3 3/4” (85 mm); and the 4” (100 mm) speedometer requires a hole diameter of about 4” (100 mm). If you are mounting the speedometer into an existing panel, remember that the panel cannot be more than 1 1/8” (20 mm) thick. Minimum mounting depth is 3 3/4” (91 mm).

2. Careful measuring is a must for proper mounting of your speedometer. An improperly placed hole would be a costly mistake, so measure everything twice. **REMEMBER: THERE ARE NO SECOND CHANCES ONCE YOU HAVE MADE YOUR HOLE! MEASURE TWICE... CUT ONCE!**

3. Cut the hole. If you do not have a hole saw the exact size needed, use the closest SMALLER size, and carefully widen the hole with a half-round file or other similar device.

4. Place the speedometer in the opening and secure it with the supplied VDO Spin-Lok clamp as shown in Diagram C. You may also mount the speedometer with a VDO mounting bracket and nuts (optional – must be purchased separately; they are available from your VDO dealer).

**II. Wiring the Speedometer**

1. Prepare insulated ¼” spade terminals for use with the speedometer. Make sure all wires are long enough to reach the necessary positive and negative terminals and any wires from the sensor.

2. Connect the wire from pin #4 to a switched +12 volt or +24 volt source. A switched +12 or 24 volt wire can be found coming from the ignition switch. Follow this wire to a junction, and attach the wire from the speedometer. Refer to Diagram D for the proper wiring of the speedometer.

3. Attach the wire from pin #3 to a ground (negative) source. One such source can always be found where the battery is attached to the metal frame of the vehicle. Use an appropriate electrical connector to ground this wire.

4a. If you are using a hall effect speed sensor, attach the three hall effect sensor wires to the speedometer head as follows:

   a) RED to Terminal #2;  
   b) BLACK to be piggy-backed to Terminal #3 and on to a suitable ground;  
   c) the OFF-WHITE wire to a butt-spike with two wires coming out of the butt-spike going to Terminals #6 and #8.

4b. If you are using an inductive speed sensor, connect one terminal to pin #7. Connect the other terminal to pin #8.

4c. If you are using an electronic transmission, connect its speed signal wire to pin #8.

[Text continues at #@]
Diagram D
Proper wiring of the speedometer with: ⚫ Hall-Effect sensors; ⚫ Inductive sensors; or ⚫ Electronic transmissions
III. Calibrating the Speedometer

Calibration of the VDO Speedometer with LCD Display is a relatively simple procedure, and can be accomplished in any of three ways:

- Automatic calibration when driving on a road with the exact distance of 1 mile clearly defined; or on a dynomometer...
- By the input of the known pulse-per-mile (kilometer) for the vehicle and sensor being used with the speedometer...
- Using a reference point for adjustment or fine tuning.

You gain access to the calibration functions by pressing the button on the front of the speedometer and holding it in while you turn on the ignition. As you continue to hold in the button, the display will change...scrolling through the three calibration methods and stopping on each one for about two seconds.

5. For wiring of the lights, see Diagram D.

6. Reconnect the battery and turn on the ignition to make sure the speedometer is working. When you turn on the ignition, the speedometer will do an automatic self-test. During this self-test, the pointer moves over the whole scale range, and the LCD display shows the word “TEST”. After the test is completed, the display will reveal either the trip distance or the total distance, depending on which one was selected when the ignition was turned off. Since this is the first time power has been applied to the instrument, the reading will be 0.0, or [0.0]. If everything is working properly, the installation is complete. If it isn’t, re-check your wiring.

Diagram C
Proper mounting of the VDO Speedometer

Diagram E
The LCD on the speedometer will show this display during, then after the self-test.

Diagram F
Calibration modes as displayed on the Speedometer’s LCD

Diagram G
LCD Sequences as they appear during Automatic Calibration

Diagram H
LCD Sequences as they appear during Manual Calibration

However, if the speedometer detects any kind of error during your run, the LCD will display the following message: “F 0.0”. This means no useful impulse was detected. In this case, simply turn off the ignition, and start the process again.

Diagram I
Diagram J
Diagram K
Diagram L
Diagram M
Diagram N
Diagram O
Diagram P
Diagram Q
Diagram R
Diagram S
Diagram T
Diagram U
Diagram V
Diagram W
Diagram X
Diagram Y
Diagram Z

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LCD Sequences as they appear during Automatic Calibration

Diagram H
LCD Sequences as they appear during Manual Calibration

2. Manual Calibration with a known value ( \( \text{PULSE} \))

If you know the exact calibration value for the vehicle and type of sensor you are using (pulse-per-mile or pulse-per-kilometer), you may use that value to manually calibrate the speedometer.

To calibrate your VDO Speedometer manually:

1. Press and hold in the button on the front of the speedometer as you turn on the ignition. Hold in the button until the word “\( \text{PULSE} \)” is displayed on the LCD readout.

4. When you have gone exactly one mile, press the button again. If the electronic impulse rate detected by the speedometer’s microprocessor is within the calibration range limits of 500 to 399,999, the rate will be shown on the LCD display. For example, your reading might be “316000 \( \text{PULSE} \)”. Such a display indicates that the impulse rate detected during the reference mile you drove exactly matches the microprocessor’s programmed rate for 1 mile. That means the speedometer is now perfectly calibrated to provide the most accurate display possible of both speed and distance. The speedometer finishes its autocalibration by moving the pointer through a full sweep, then back down to zero.

3. As each number flashes, press the button to change it until the correct digit appears (that is, the number you wish to input).

For example, let’s say the number that represents the correct calibration value for your vehicle and sensor is “43850.” When you begin the manual calibration process, the LCD displays a default value. Each digit, except the one farthest to the right, will flash, in turn, from right to left. Wait until the second digit from the right starts to flash again. When it does, press the button to start cycling through the numbers available for this digit. When the number “5” appears, release the button.
At this point, the number “5” is set, and the digit to its immediate left begins to flash — the middle digit. Press the button again, and hold it until the number “8” appears. Release the button. Now, the second digit from the left begins to flash. Again, hold in the button until the number “3” appears. When it does, all but the left-most digit are set. Repeat the process to set the “4” and the value in our example is set. The value “93850” should be displayed on the LCD readout.

4. When you are satisfied you have properly entered the correct calibration value — when that value is displayed on the LCD readout — take your finger off the button and wait. After a few seconds, the value you have entered will be downloaded into the speedometer’s microprocessor, and the speedometer will revert back to normal operating mode. At this point, the manual calibration process is complete.

In the future, you can use this method to update the calibration value stored in the computer should it ever become necessary. This function also allows you to manually adjust the calibration value after you perform the automatic calibration process.

3. Manual Calibration (Fine Tuning)

You can fine-tune the calibration of the speedometer’s analog display (the pointer showing miles-per-hour or kilometers-per-hour) by using speed test equipment and the “AdjSt” function on the LCD readout. The pointer can be repositioned anywhere within the calibration range of the speedometer.

To manually calibrate the pointer on the analog display (with the car on a dyno at the specified speed):

1. Press and hold in the button on the speedometer as you turn on the ignition and start the engine. Hold in the button until the word “AdjSt” shows up. When it does, release the button.
2. Press the button once, and the word “Up” will be displayed on the LCD readout. Press it twice, in rapid succession, and “dn” [for down] will be displayed.
3. When either “Up” or “dn” is showing, press the button again, and hold it in. If you hold the button in for just a short time, the pointer will move slowly either upwards or downwards, depending on which mode you selected. This allows for a very accurate adjustment of the pointer. Holding the button in for a longer period of time makes the pointer move faster.
4. When you have repositioned the pointer where you want it, release the button and wait. If no further adjustments are made within one minute, the speedometer will revert back to the normal operating mode.

NOTE: If you move the pointer past the upper limit of the calibration range, the LCD display will flash and you will only be able to adjust the pointer downward. If you move the pointer past the lower limit of the calibration range, the LCD display will also flash, and you will only be able to adjust the pointer upward.

IV. Operating the Speedometer

When the speedometer is in the normal operating mode, the LCD readout acts as an odometer, allowing you to display either total miles driven, or trip distance. Total mileage is counted up to 999,999.9 miles. Trip distance is counted up to 99,999.9 miles.

To display either Total Mileage or Trip Distance:

Press the button. If the Total Mileage had been showing on the LCD readout, it will change to Trip Distance when you push the button. If the Trip Distance had been showing, the display will change to reveal Total Mileage.

Siemens VDO Limited Warranty

VDO North America warrants all merchandise against defects in factory workmanship and materials for a period of 24 months after purchase. This warranty applies to the first retail purchaser and covers only those products exposed to normal use or service. Provisions of this warranty shall not apply to a VDO product used for a purpose for which it is not designed, or which has been altered in any way that would be detrimental to the performance or life of the product, or misapplication, misuse, negligence or accident. On any part or product found to be defective after examination by VDO North America, VDO North America will only repair or replace the merchandise through the original selling dealer or on a direct basis. VDO North America assumes no responsibility for diagnosis, removal and/or installation labor, loss of vehicle use, loss of time, inconvenience or any other consequential expenses. The warranties herein are in lieu of any other expressed or implied warranties, including any implied warranty of merchantability or fitness, and any other obligation on the part of VDO North America, or selling dealer

NOTE: This is a “Limited Warranty” as defined by the Magnuson-Moss Warranty Act of 1975.

Diagram I

Calibration of the analog (pointer) display on the speedometer

Diagram J

The LCD display showing Total Mileage

Diagram K

The LCD display showing Trip Distance

TECHNICAL DATA

<table>
<thead>
<tr>
<th>Operating voltage:</th>
<th>10.8 – 32 Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating current:</td>
<td>&lt;100 mA \ (&lt;600 mA with light)</td>
</tr>
<tr>
<td>Operating temperature:</td>
<td>-4° F to 158° F \ (-20° C to 70° C)</td>
</tr>
<tr>
<td>Protection:</td>
<td>IP65 (Front) \ Ozone and UV resistant housing</td>
</tr>
<tr>
<td>Dimensions—</td>
<td></td>
</tr>
<tr>
<td>Depth:</td>
<td>3.6” (91 mm)</td>
</tr>
<tr>
<td>Diameter:</td>
<td>3¼” (80 mm) \ 3¾” (85 mm) \ 4” (100 mm)</td>
</tr>
<tr>
<td>Illumination:</td>
<td>Backlit/ Frontlit dial and display</td>
</tr>
<tr>
<td>Calibration range:</td>
<td>500 to 399,999 pulses per mile or kilometer</td>
</tr>
</tbody>
</table>

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