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

**General Information**

The VDO Programmable Tachometers featured in this installation manual are available in three diameters: 3 ¾" (80 mm); 3 ⅜" (85 mm), and 4" (100 mm). All tachometers can be programmed to function with gasoline engines or with diesel engines, and can be used with most ignition coils. These instructions describe the installation, wiring, calibration and operation of all VDO Programmable Tachometers.

Each tachometer’s analog display clearly shows the number of revolutions per minute, and the LCD display shows the accumulated engine hours. This display is also used in the programming, calibration and line tuning of the VDO Programmable Tachometer.

Signal pulses needed by the tachometer are provided from .5 to 200 pulses per revolution using an optional VDO mounting bracket and nuts.

**Sensor Installation**

The sensor necessary to provide the signal to your new VDO Tachometer is not included. This sensor is available from your auto parts dealer. (Part numbers for the VDO Generator Sensor is Part #340 001. VDO’s Inductive Sensor is Part #340 020.)

**I. Mounting the Tachometer**

1. Refer to Diagram B for dimensions. The 3 ¾" (80 mm) tachometer requires a hole diameter of 3 ⅜" (80mm); the 3 ⅜" (85 mm) tachometer requires a hole diameter of about 3 ⅜" (85mm); and the 4" (100 mm) tachometer requires a hole diameter of about 4" (100 mm). If you are mounting the tachometer into an existing panel, remember that the panel cannot be more than ¾" (20 mm) thick. Minimum mounting depth is 3 ⅛" (91mm).

2. Careful measuring is a must for proper mounting of your tachometer. 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. **Note:** If you plan to calibrate your tachometer, perform this step LAST! Place the tachometer in the opening and secure it with the supplied VDO Spin-Lok clamp as shown in Diagram C. You may also mount the tachometer using an optional VDO mounting bracket and nuts.

**Diagram B**

**Diagram A**

VDO Tachometer with Hourmeter is programmable from .5 to 200 pulses per revolution

**Parts List**

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Tachometer</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. #161 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>

**CAUTION!!!**

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

**II. Wiring the Tachometer**

1. Prepare insulated ¼" spade terminals for use with the tachometer. 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 pin #4 at this junction (i.e. fuse block, etc.). Refer to Diagram D.

3. Connect a wire from pin #5 to a constant +12 or +24 volt source.

4. 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 connector to ground this wire.

5. Attach the wire from pin #8 to the positive (+) tachometer signal source [usually a terminal on the ignition coil or the generator in a diesel system] using a butt splice and a crimping tool.

6. Attach the wire from pin #7 to the negative (–) terminal of the sender or floating ground [usually a terminal on the ignition coil or the generator in a diesel system] using a butt splice and a crimping tool.

7. Crimp a spade connector onto a short wire, and attach the connector to a terminal on one of the supplied lamp sockets. This lamp socket is referred to as Socket A.

8. Crimp the other end of the short wire, along with

[Text continues at #9]
Diagram D

Proper wiring of the tachometer with:

1. Ignition; Electronic Control Box; alternator*
2. Generator* and Inductive* senders

*dieSEL applications

Generator Sender:
G or the S is the signal wire that connects to pin #8
C is the ground wire that connects to pin #7
When you see the method you wish to use, let go of the button and that function will be enabled.

1. Programming the Cylinder/Engine type

Programming the tachometer for the number of cylinders in your gasoline engine can be done easily using the `SELECT` mode.

The display lists the cylinder/engine-type selection mode as `SELECT`; the impulse-per-revolution mode as `PULSE`; and the reference/fine-tune mode as `ADJ.LSE`. When you see the method you wish to use, let go of the button and that function will be enabled.

2. Manual Calibration with a known value ($P_x$)

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

To calibrate your VDO Tachometer manually:

1. Press and hold in the button on the tachometer as you start the engine. Hold in the button until the word "PULSE" is displayed on the LCD readout.

2. As soon as you see the word "PULSE," release the button. After a few seconds, the display will start flashing a series of numbers (factory default setting) that you can change to represent the impulse-per-revolution value of the ignition in your vehicle. For example, a number like "P 14.70" will show on the display, with each digit flashing in turn from right to left, except the right-most digit, a zero, which is fixed.

3. As each number flashes, press the button and hold it until the correct digit appears. Refer to Diagram H.

For example, let's say the number that represents the correct calibration value for the diesel engine and ignition system in your vehicle is 16.5 pulses-per-revolution. When you begin the manual calibration process, the LCD displays a default value. When the first digit starts flashing, press the button to start cycling through the numbers. 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. Press the button again, and hold it until the number "6" appears. Release the button. Repeat the procedure until the "1" appears. Again, release the button. At this point, the correct calibration for the tachometer/ignition combination has been properly set...in our example, 16.5 pulses-per-revolution. After a few seconds, the value you have entered will be downloaded into the tachometer’s microprocessor, and the LCD display will automatically revert to its normal mode. Manual calibration of the tachometer is now 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.

Diagram C

Proper mounting of the VDO Tachometer

Diagram E

The LCD on the tachometer will show this display

III. Calibrating the Tachometer

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

- By programming in the number of cycles and the number of cylinders in the gasoline engine you are using...
- By the input of the known pulse-per-revolution for the diesel engine and ignition system being used with the tachometer...
- Using a reference point for adjustment or fine-tuning.

The display lists the select mode as `SELECT`; the impulse-per-mile mode as `PULSE`; and the reference/fine-tune mode as `ADJ.LSE`. When you see the method you wish to use, let go of the button and that function will be enabled. See Diagram F.

You gain access to the calibration functions by pressing the button on the back of the tachometer and holding it 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.

Diagram F

Calibration modes as displayed on the Tachometer’s LCD

1. Programming the Cylinder/Engine type (`SELECT`)

Diagram G

LCD Sequences as they appear when programming in the "SELECT" mode

Diagram H

LCD Sequences that appear when calibrating in the "PULSE" mode
3. Analog (Pointer) Calibration

You can adjust the calibration of the tachometer’s analog display (the pointer showing revolutions per minute) by using speed test equipment and the "\( \text{Adj} \)" function on the LCD readout. The pointer can be repositioned anywhere within the calibration range of the tachometer.

To manually calibrate the pointer on the analog display:
1. Press and hold in the button on the tachometer as you turn on the ignition and start the engine. Hold in the button until the word "\( \text{Adj} \)" shows up. When it does, release the button. Set the RPM using a reference tachometer at a value above idle (e.g. 2000 RPM).
2. Press the button once, and the word "\( \text{Up} \)" will be displayed on the LCD readout. Press it twice rapidly then release it for a second, and the word "\( \text{Down} \)" will be displayed. So if you need an upward calibration of the pointer, press the button once. If you need a downward calibration, press the button twice rapidly and release it.
3. When either "\( \text{Up} \)" or "\( \text{Down} \)" 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.

Adjustments between \(-30\%\) and \(+100\%\) are possible, but must be done WITH A REFERENCE TACHOMETER ONLY!!

It is recommended that these adjustments be done only by experienced mechanics.

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 tachometer will revert back to the normal operating mode.

**Diagram I**

Calibration of the analog (pointer) display on the tachometer

**Diagram J**

Fine calibration of the tachometer reading

4. Fine Calibration

When the ignition is on and power is supplied to the tachometer you can select the fine calibration function to very accurately adjust the running speed — difference ratio. This allows for compensation of alternator slippage over various speed ranges, for example. This function also allows for synchronization of two engines.

To access and use the fine calibration function:
1. Press and release the pushbutton on the back of the tachometer. This enables you to adjust the running speed/difference ratio between \(-20\%\) and \(+20\%\).
2. Adjustments are made in \(+\) or \(-\) steps of 0.5% by pressing and holding the button. When the adjustment is complete, release the button. After a short time, the display reverts back to its normal mode. See Diagram J for examples of:
   - Display 1: 0.0% difference to the adjusted value;
   - Display 2: 2.0% difference to the adjusted value;
   - Display 3: 2.5% difference to the adjusted value.

TO COMPLETE THE INSTALLATION:
Perform Step 4 of Section One on Page 1. When the tachometer is secure in the panel, your installation is finished.

**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 calibration limit, the LCD display will also flash, and you will only be able to adjust the pointer upward.

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**TECHNICAL DATA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage:</td>
<td>10.8 – 32 Volts</td>
</tr>
<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>3 ³⁄₈” (80 mm) 3 ³⁄₈” (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>0.5 to 200 pulses per revolution</td>
</tr>
</tbody>
</table>

**Programming Tachometers with Generator Sender**

1. Use pulse instruction to program tachometer.
2. Must use tachometer with engine hour meter.
3. If your ratio is 1:1 use 4 pules
   - If your ratio is 2:1 use 2 pules

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Merchandise warranted 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 VDO part or VDO product found to be defective after examination by manufacturer, manufacturer will only repair or replace the merchandise through the original selling dealer. Manufacturer 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 of fitness, and any other obligation on the part of manufacturer, or selling dealer.

(NOTE: This is a "Limited Warranty" as defined by the Magnuson-Moss Warranty Act of 1975.)