**Dakota Digital**

**SGI-5**

**UNIVERSAL SIGNAL INTERFACE UNIT**

This unit can recalibrate a speedometer signal or convert a speed signal from one type to another type. The different functions it can perform are as follows:

1. Recalibrate a high speed (64,000ppm – 250,000ppm) signal for an OEM speedometer or engine/transmission computer. **Do not use this unit to adjust a signal going to an anti-lock braking system.**
2. Recalibrate a low speed (8000ppm – 4000ppm) signal for an OEM or aftermarket speedometer or fuel injection computer.
3. Convert a high-speed signal found on newer GM transmissions down to a low speed signal to run a speedometer, cruise control, or fuel injection computer.
4. Convert an 8000ppm signal from an aftermarket signal generator to a 4000ppm or 2000ppm to run an OEM cruise control or fuel injection computer.
5. Convert a 16000ppm signal from a VDO Hall Effect signal generator to an 8000ppm, 4000ppm, or 2000ppm to run a cruise control or fuel injection computer.
6. Convert a 4000ppm signal from an OEM transmission speed sensor or ECM output to an 8000ppm signal for an aftermarket speedometer.
7. Convert a signal from a flywheel gear-tooth sensor to an ignition tachometer signal (diesel tachometer application).

Customers using a Classic Instruments speedometer will use either application 3 or 6. Each of the different applications will be described in detail in the following sections. Here is a general overview of the unit functions.

The unit has 5 different outputs for speed signals. Some of the outputs are AC (a voltage output that goes above and below ground) and some are open collector (a switch that closes to ground). The output functions are as follows:

<table>
<thead>
<tr>
<th>SW #2</th>
<th>SPD IN</th>
<th>OUT1</th>
<th>OUT2</th>
<th>OUT3</th>
<th>OUT4</th>
<th>OUT5</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>64k-256k</td>
<td>128k AC</td>
<td>128k oc</td>
<td>8000 AC</td>
<td>4000 oc</td>
<td>2000 oc</td>
</tr>
<tr>
<td>ON</td>
<td>4k-16k</td>
<td>8000 AC</td>
<td>8000 oc</td>
<td>4000 AC</td>
<td>4000 oc</td>
<td>2000 oc</td>
</tr>
</tbody>
</table>

Connect the PWR terminal to 12V accessory, GND terminal to ground.
APPLICATION #1
Recalibrate a high speed (64,000ppm – 250,000ppm) signal for an OEM speedometer or engine/transmission computer. **Do not use this unit to adjust a signal going to an anti-lock braking system.** Anti-lock braking systems may not operate correctly or behave erratically due to the signal processing done to recalibrate the speed signal.

These speed sensors have a two-pin connector that plugs into the transmission or transfer case. One of the wires will be a ground and the other will be the signal wire. The wires will usually go up under the dash and into the speedometer, vehicle speed buffer, or engine/transmission computer. The signal wire will need to be cut so the SGI-5 can recalibrate it. The sensor side of the wire will go to the SPD IN terminal. The speedometer or buffer side will go to the OUT1 terminal. If the speedometer does not operate correctly after installation of the SGI-5 you may need to switch to OUT2 instead of OUT1. Connect the PWR terminal to a 12-volt accessory wire and connect the GND terminal to a good ground location.

Begin with the switches as follows and then determine how far off the calibration is.

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<thead>
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<th>1</th>
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</tbody>
</table>

You can determine how far the speedometer is off by having it checked with radar or following another vehicle going at a set speed. Once you know how far it is off at a certain speed, use the following equation and then look up the switch setting in the table.

\[
\text{Actual speed} \quad \frac{\text{-------------}}{\text{speedometer reading}} = \text{Cal ratio}
\]

As an example, if you are following a vehicle going at 55 mph and your speedometer shows 60 mph, then:

\[
\frac{55}{60} = 0.917 \quad \text{from the table: OFF-ON-ON-OFF-OFF-ON-ON-ON}
\]
APPLICATION #2
Recalibrate a low speed (8000ppm – 4000ppm) signal for an OEM or aftermarket speedometer or fuel injection computer.

Either two wire or three wire sensors can be recalibrated with this unit. Two wire sensors will typically have one wire as a ground and the other as the signal. Three wire sensors will have an additional power wire. You must first determine which wire is the signal. The signal wire will need to be cut so the SGI-5 can recalibrate it. The sensor side of the wire will go to the SPD IN terminal. The speedometer or computer side will go to the OUT1 terminal. If the speedometer does not operate correctly after installation of the SGI-5 you may need to switch to OUT2 instead of OUT1. Connect the PWR terminal to a 12-volt accessory wire and connect the GND terminal to a good ground location.

Begin with the switches as follows and then determine how far of the calibration is.

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</table>

You can determine how far the speedometer is off by having it checked with radar or following another vehicle going at a set speed. Once you know how far it is off at a certain speed, use the following equation and then look up the switch setting in the table.

Actual speed

\[
\frac{\text{speedometer reading}}{\text{Actual speed}} = \text{Cal ratio}
\]

As an example, if you are following a vehicle going at 55 mph and your speedometer shows 60 mph, then:

\[
55 \quad 3 \quad 4 \quad 5 \quad 6 \quad 7 \quad 8 \quad 9 \quad 10 \\
60 \quad \quad \text{----- = 0.917 from the table: OFF-ON-ON-ON-OFF-OFF-ON-ON-ON-ON}
\]
APPLICATION #3
Convert a high-speed signal found on newer GM transmissions down to a low speed signal to run a speedometer, cruise control, or fuel injection computer.

These speed sensors have a two-pin connector on the transmission or transfer case. One of the pins will be a ground and the other will be the signal. The ground pin will go to the GND terminal along with the ground wire. The signal pin will go to the SPD IN terminal. It is best to twist the signal and ground wires from the sensor around each other. This helps eliminate any electrical interference. If nothing else is connected to the speed sensor it does not matter which pin is used as the ground. Connect the PWR terminal to accessory power. The output connections will depend on your particular application. Here are some typical examples:

OUT3, 8000ppm AC: most aftermarket speedometers and cruise controls
OUT4, 4000ppm oc: most TPI computers and some OEM cruise controls
OUT5, 2000ppm oc: most TBI computers and some OEM cruise controls

Begin with the switches as follows and then determine how far off the calibration is. If you are using an adjustable speedometer, then you can skip the SGI-5 calibration and use the speedometer's calibration routine.

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<td>ON</td>
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<td>ON</td>
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</tbody>
</table>

You can determine how far the speedometer is off by having it checked with radar or following another vehicle going at a set speed. Once you know how far it is off at a certain speed, use the following equation and then look up the switch setting in the table.

\[
\frac{\text{Actual speed}}{\text{speedometer reading}} = \text{Cal ratio}
\]

As an example, if you are following a vehicle going at 55 mph and your speedometer shows 60 mph, then:

\[
\frac{55}{60} = 0.917 \quad \text{from the table: OFF-ON-ON-ON-OFF-OFF-ON-ON}
\]
APPLICATION #4
Convert an 8000ppm signal from an aftermarket signal generator to a 4000ppm or 2000ppm to run an OEM cruise control or fuel injection computer.

Either two wire or three wire sensors can be recalibrated with this unit. Two wire sensors will typically have one wire as a ground and the other as the signal. Three wire sensors will have an additional power wire. You must first determine which wire is the signal. The signal wire will be tapped into so the SGI-5 can read it. The sensor signal wire will go to the SPD IN terminal. Connect the PWR terminal to a 12-volt accessory wire and connect the GND terminal to a good ground location. If nothing else is connected to a two wire sensor, then connect one wire to the GND terminal also. The output connections will depend on your particular application. Here are some typical examples:

OUT3, 4000ppm AC: most TPI computers and some OEM cruise controls
OUT4, 4000ppm oc: use this if OUT3 does not provide a good signal
OUT5, 2000ppm oc: most TBI computers and some OEM cruise controls

Begin with the switches as follows. You may not need to change the calibration from this initial setting. If you want to adjust the calibration ratio, see application #2.

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APPLICATION #5
Convert a 16000ppm signal from a Hall Effect VDO signal generator to 8000ppm, 4000ppm, or 2000ppm to run a cruise control or fuel injection computer.

The Hall Effect sensor will have three wires. The white wire is the signal. The signal wire will be tapped into so the SGI-5 can read it. The sensor signal wire will go to the SPD IN terminal. Connect the PWR terminal to a 12-volt accessory wire and connect the GND terminal to a good ground location. The output connections will depend on your particular application. Here are some typical examples:

OUT1, 8000ppm AC: most aftermarket cruise controls
OUT3, 4000ppm AC: most TPI computers and some OEM cruise controls
OUT4, 4000ppm oc: use this if OUT3 does not provide a good signal
OUT5, 2000ppm oc: most TBI computers and some OEM cruise controls

Set the switches as follows.

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</table>
APPLICATION #6
Convert a 4000ppm signal from an OEM transmission speed sensor or ECM output to an 8000ppm signal for an aftermarket speedometer.

The speed sensors have a two-pin connector on the transmission or transfer case. One of the pins will be a ground and the other will be the signal. The ground pin will go to the GND terminal along with the ground wire. The signal pin will go to the SPD IN terminal. It is best to twist the signal and ground wires from the sensor around each other. This helps eliminate any electrical interference. If nothing else is connected to the speed sensor it does not matter which pin is used as the ground. If you are picking up a signal coming out of the ECM there will be only one wire to the SPD IN. Connect the PWR terminal to accessory power and the GND terminal to ground. Connect OUT1 to your aftermarket electric speedometer.

Set the switches as follows. Any calibration adjustment should be done at the speedometer.

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<td>ON</td>
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</table>

APPLICATION #7
Convert a signal from a flywheel gear-tooth sensor to an ignition tachometer signal (diesel tachometer application).

For using a standard 4-6-8 cylinder tachometer on a diesel engine, the SGI-5 can convert a flywheel sensor signal into an 8-cylinder gas ignition signal. Calibration is accomplished by counting the number of teeth on the flywheel or using another tachometer as a reference. An inductive, gear-tooth sensor such as VDO part #340 020 should be mounted so the teeth pass by the end of the sensor. The GND terminal on the SGI-5 should be connected to a good ground as well as to one of the terminals on the gear-tooth sensor. The SPD IN terminal will connect to the other terminal. Connect the PWR terminal to 12V accessory power. OUT4 will provide the signal to the tachometer. Set the programming switches as follows:

<table>
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<th>1</th>
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</thead>
<tbody>
<tr>
<td>ON</td>
<td>OFF</td>
<td>See calibration table</td>
<td></td>
<td></td>
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</tbody>
</table>

Switch #1 provides a 10k pull-up to 12 volt for the ground switch output of OUT4. This will allow most tachometers to work correctly. If your tachometer does not show any reading after installing the SGI-5, use a voltmeter to check the voltage at OUT4 with it connected to the tachometer and the engine running. Once you have done this, contact a Dakota Digital technical service representative for assistance.
Setup tips:

- If, without the interface, your speedometer reads much too fast, then you will most likely need to use application 3.
- If, without the interface, your speedometer reads about ½ what it should, then you will most likely need to use application 6.
- If your speedometer reads, but is just off, you will probably need application 1 or 2.

Trouble shooting guide

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Cause</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speedometer will not work at all.</td>
<td>Wrong output type.</td>
<td>Try switching from an oc to AC output or from an AC to oc output.</td>
</tr>
<tr>
<td></td>
<td>No input signal.</td>
<td>Test for 1-20 volts AC at the signal terminal with the wheels spinning.</td>
</tr>
<tr>
<td></td>
<td>Grounding interference.</td>
<td>Make sure both the speed sensor and SGI-5 are grounded at the same point.</td>
</tr>
<tr>
<td></td>
<td>No power to SGI-5.</td>
<td>Check the power and ground terminals on the SGI-5. Should be 11-15 V dc.</td>
</tr>
<tr>
<td>Speedometer will not read at low speeds</td>
<td>SGI-5 set for wrong input type.</td>
<td>If switch #2 is off, turn it on.</td>
</tr>
<tr>
<td>Speedometer will read OK up to a certain speed and then stops.</td>
<td>Speed signal is too low.</td>
<td>Check speed connections for ground problems or shorts. Test the ground connection between SGI-5 and sensor. Check for another device loading down the sensor.</td>
</tr>
<tr>
<td>Speedometer will read when the vehicle is sitting still.</td>
<td>Tach wire too close to speed signal wire.</td>
<td>Route the speed signal and tachometer wires away from each other to avoid interference.</td>
</tr>
<tr>
<td></td>
<td>Signal In and OUT wires routed too close.</td>
<td>Route the input and output wires away from each other to avoid feedback. Make sure the speed sensor and SGI-5 are grounded together.</td>
</tr>
</tbody>
</table>