SGI-100BT
UNIVERSAL SIGNAL INTERFACE UNIT

The Dakota Digital SGI-100BT is designed to recalibrate a speedometer or tachometer signal or correct signal incompatibilities.

This unit can:
- Recalibrate or convert a speed signal
- Recalibrate or convert a gas tach signal
- Recalibrate or convert a diesel tach signal
- Recalibrate both a speedometer and a tachometer signal at the same time.

Setup is done with either the switches and display on the SGI-100BT or by using the Dakota Digital Accessory app available for IOS or Android. The instructions are separated into three sections, speed signal, ignition tach signal, and diesel tach signal.

The terminal connections on the SGI-100 are divided into power/ground, speed input/output, diesel input, and finally gas tach input with tach output for both gas and diesel. Several different speed outputs are provided and their usage varies depending on the specific application.

Two different tachometer outputs are provided:
- The NORM (normal) tach output is a traditional 0-12V signal that will drive most tachometers.
- The HI VLT (high voltage) tach output can generate either a 6-18V signal swing or a 12-24V signal swing for some tachometers that require high voltage signals to operate.

MAN# 650701
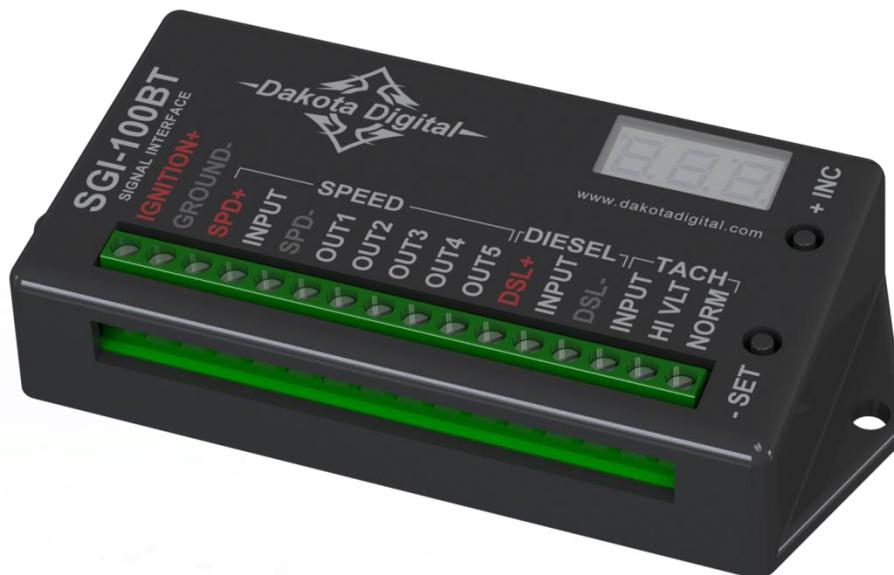
Setup menu overview

To simplify the setup procedure, please download out IOS or Android app 'Dakota Digital Accessory'
Setup is entered by holding the SET switch while turning the key on. The INC switch is used to change selections and the SET switch is used to save or select.

Main Menu	Sub Menu			Description
5Pd	OUt	H-H		high speed signal in, high speed signal out
		H-L		high speed signal in, low speed signal out
		L-H		low speed signal in, high speed signal out
		L-L		low speed signal in, low speed signal out
	CAL			set speed cal value from 25% - 400%
	In	5 I9		set speed input for low or high voltage signal
		P-U		set speed input pullup on or off
		bAC		return to previous menu
	rEF			send a reference signal out for testing or diagnostics
	r5t			do a factory reset of the speed section
	bAC			return to previous menu
tCH	9A5	In		set engine cylinder count from 1 – 16
		OUt		set tachometer cylinder count from 1 – 16
		5 I9		set tach input for 5V or 12V signal type
		ULt		set high voltage output range
		bAC		return to previous menu
	d5L	5Et	ALt	select alternator input, cal value is from 0.250 – 4.00
			FLY	select flywheel input, cal value is from 32 – 254 teeth
			t9r	select timing gear input, cal value is from 1 – 64 teeth
		OUt		set tachometer output for 4, 6, or 8 cylinder signal
		ULt		set high voltage output range
		bAC		return to previous menu
	r5t			do a factory reset of the tachometer section
	bAC			return to previous menu
bLU	4 digit ID code			tap INC to scroll the Bluetooth ID across the display
	5Et			select to allow changes only while in setup
	ALL			select to allow changes anytime
	bAC			return to previous menu
UEr				show software revision for tech support assistance
End				exit setup

SPEED SIGNAL USE

Here are some typical applications for calibrating or converting speed signals:

1. Recalibrate a high speed (32,000ppm – 250,000ppm) signal for an OEM speedometer. **Do not use this unit to adjust a signal going to an anti-lock braking system.**
2. Recalibrate a low speed (32,000ppm – 4,000ppm) 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 an 8000ppm or 16000 ppm signal up to a high-speed 128,000ppm signal for a newer fuel injection computer.

Wiring connections:

Please Note: **This is a technically advanced product and if not installed correctly may cause incorrect vehicle operation and/or damage to vehicle components.**

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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 close to actual speed, you will probably need application 1 or 2.
- If, without the interface, your speedometer reads much too slow, then you will most likely need to use application 7.

Here is a general overview of the SGI-100BT's control functions.
Each of the different applications below will be described in detail starting on page 5 in this manual.

Setup

Set output mode: Select the output mode depending on your application.

H-H: high speed in, high speed out. OUT3&4 = ½ of OUT1, OUT5 = ¼ of OUT1

H-L: high speed in, low speed out.
        OUT3 = 1/16 of OUT1, OUT4 = 1/32 of OUT1, OUT5 = 1/64 of OUT1

L-H: low speed in, high speed out. OUT3&4 = x16 of OUT1, OUT5 = x8 of OUT1

L-L: low speed in, low speed out. OUT3&4 = ½ of OUT1, OUT5 = ¼ of OUT1

1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " - ".
3. Release the SET switch. The display will show "*SPd*".
4. Tap the SET switch. The display will show "*oUt*".
5. Tap the SET switch. The current output mode will be shown, *H-H, H-L, L-H,* or *L-L*. Tap the INC switch to change the output mode. Tap the SET switch to save it.
6. Turn the key off or select "*bAC*".

Advanced Setup

Change input signal settings: These settings are set automatically when the output mode is selected. If needed, they can be manually changed. The signal type can be changed between low voltage and high voltage signal types. The input pullup can be turned on or off.

   S ig: *Lo* or *H I*

   P-U: *on* or *oFF*

1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " - ".
3. Release the SET switch. The display will show "*SPd*".
4. Tap the SET switch and then tap the INC switch until " *In*" is shown.
5. Tap the SET switch. Tap the INC switch to select "*S ig*", "*P-U*", or "*bAC*".
6. Tap the SET switch. Tap the INC switch to change the setting, Tap the SET switch to save it.
7. Turn the key off or select "*bAC*".

Calibration

Adjust while driving:
1. Press and hold both switches until "$5EE$" is displayed.
2. Release the switches.
3. Tap the INC switch until "$5Pd$" is displayed.
4. Press and hold the SET switch until "Adu" is displayed.
5. Release the switch. The display will show the current speed cal value.
6. To increase the speedometer reading, press and hold the + push button switch. To decrease the speedometer reading, press and hold the - push button switch. The calibration will only change when the vehicle is in motion and a speed signal is present.
7. To exit the speed adjust, press and hold both switches until "End" is displayed.

Preset or adjust while parked: The calibration value can be set from 0.250 – 4.00. Values below 1.00 will display as three digits with no decimal point. (0.250 = 250)

1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " $-$ ".
3. Release the SET switch. The display will show "$5Pd$".
4. Tap the SET switch and then tap the INC switch until "CAL" is displayed.
5. Tap the SET switch. The display will show the ones digit of the currently stored calibration value. Tap the INC switch to set this from 0.-4. for your desired calibration value.
6. Once finished, tap the SET switch to move to the tenths digit. Tap the INC switch until your desired value is shown.
7. Tap the SET switch to move to the hundredths digit. Tap the INC switch until your desired value is shown.
8. Tap the SET switch to save the hundredths digit. If the value is 1.00 or higher the calibration value will be saved. The calibration set is done.
9. If the value is 0.99 or lower the thousands digit will now be set. Tap the INC switch until the desired value is shown. Tap the SET switch to save and finish.
10. The display should now show the next menu option, " In". Turn the key off or select "bAC".
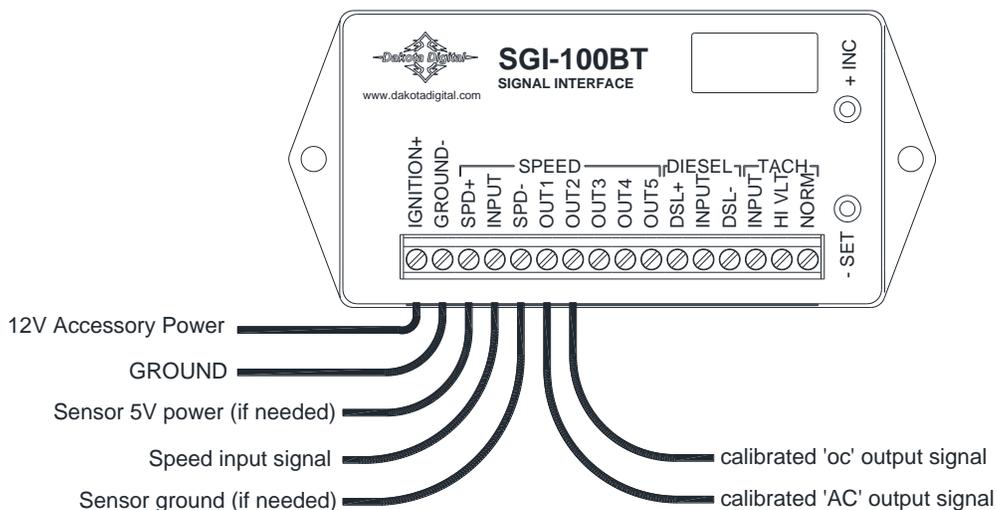
APPLICATION #1 (*H‑H*)

Recalibrate a high speed (32,000ppm – 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 (signal high) will need to be cut so the SGI-100 can recalibrate it. The sensor side of the wire will go to the SPEED INPUT terminal. The speedometer or buffer side will go to the OUT1 terminal. If the speedometer does not operate correctly after installation of the SGI-100 you may need to switch to OUT2 instead of OUT1. Connect the IGNITION terminal to a 12-volt accessory wire and connect the GROUND terminal to a good ground location.

You can determine how far the speedometer is off by having it checked with radar, a GPS unit, or following another vehicle going at a set speed. Once you know how far it is off at a certain speed, you can use the push button switches to adjust the speedometer while you drive or use the following equation and then follow the instructions for calibration preset on page 3.

$$\frac{\text{Actual speed}}{\text{speedometer reading}} \times \text{current Cal ratio} = \text{new Cal ratio}$$
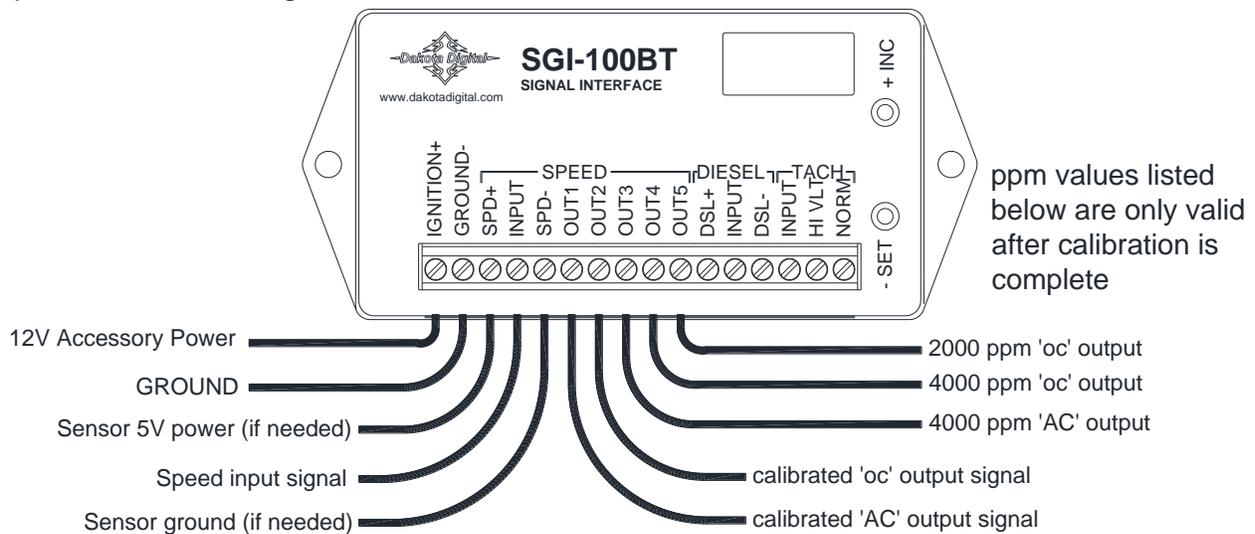

12V Accessory Power
GROUND
Sensor 5V power (if needed)
Speed input signal
Sensor ground (if needed)

calibrated 'oc' output signal
calibrated 'AC' output signal

APPLICATION #2 (L-L)

Recalibrate a low speed (32,000ppm – 4,000ppm) 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-100 can recalibrate it. The sensor side of the wire will go to the SPEED INPUT terminal. The speedometer or computer side will go to the OUT1 terminal. If the speedometer does not operate correctly after installation of the SGI-100 you may need to switch to OUT2 instead of OUT1. Connect the IGNITION terminal to a 12-volt accessory wire and connect the GROUND terminal to a good ground location.

You can determine how far the speedometer is off by having it checked with radar, a GPS unit, or following another vehicle going at a set speed. Once you know how far it is off at a certain speed, you can use the push button switches to adjust the speedometer while you drive or use the following equation and then follow the instructions for calibration preset on page 3.

$$\frac{\text{Actual speed}}{\text{speedometer reading}} \times \text{current Cal ratio} = \text{new Cal ratio}$$

SGI-100BT
SIGNAL INTERFACE
Dakota Digital
www.dakotadigital.com

+ INC
- SET

IGNITION+ GROUND- SPEED SPD+ INPUT SPD- OUT1 OUT2 OUT3 OUT4 OUT5 DIESEL DSL+ INPUT DSL- TACH INPUT HI VLT NORM

ppm values listed below are only valid after calibration is complete

12V Accessory Power
GROUND
Sensor 5V power (if needed)
Speed input signal
Sensor ground (if needed)

2000 ppm 'oc' output
4000 ppm 'oc' output
4000 ppm 'AC' output
calibrated 'oc' output signal
calibrated 'AC' output signal
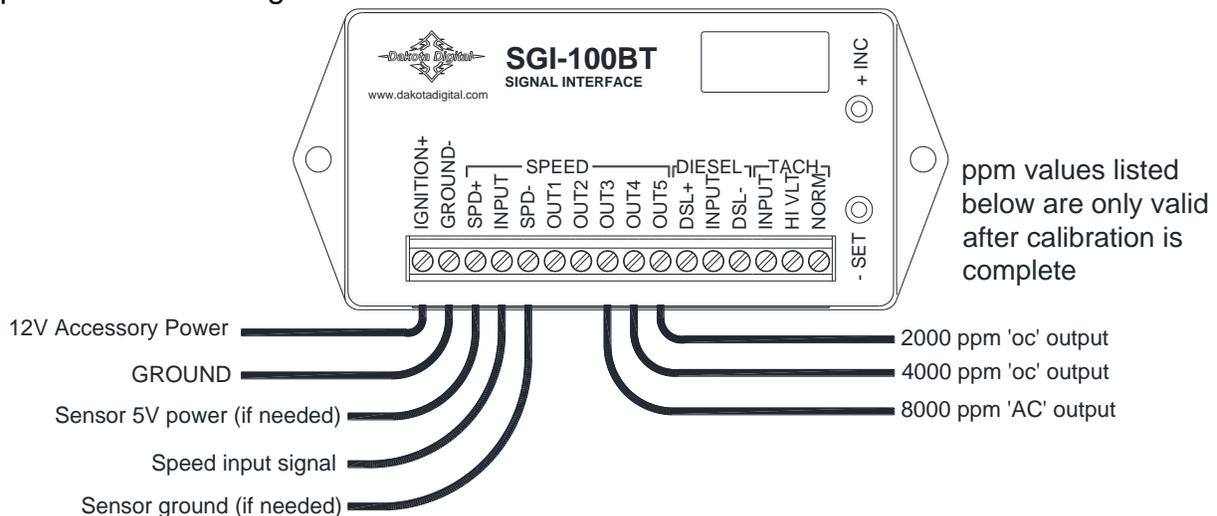
APPLICATION #3 (H-L)

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 SPD- terminal. The signal pin will go to the SPEED INPUT 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 IGNITION terminal to a 12-volt accessory wire and connect the GROUND terminal to a good ground location. 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

You can determine how far the speedometer is off by having it checked with radar, a GPS unit, or following another vehicle going at a set speed. Once you know how far it is off at a certain speed, you can use the push button switches to adjust the speedometer while you drive or use the following equation and then follow the instructions for calibration preset on page 3.

$$\frac{\text{Actual speed}}{\text{speedometer reading}} \times \text{current Cal ratio} = \text{new Cal ratio}$$

ppm values listed below are only valid after calibration is complete

12V Accessory Power
GROUND
Sensor 5V power (if needed)
Speed input signal
Sensor ground (if needed)

2000 ppm 'oc' output
4000 ppm 'oc' output
8000 ppm 'AC' output

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APPLICATION #4 (L-L)

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-100 can read it. The sensor signal wire will go to the SPEED INPUT terminal. Connect the POWER terminal to a 12-volt accessory wire and connect the GROUND terminal to a good ground location. If using a Jeep or Chrysler 3-wire, 8000ppm generator, the Sensor Power wire can be used to feed power to the IGNITION terminal If nothing else is connected to a two wire sensor, then connect one wire to the SPD- terminal. 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

APPLICATION #5 (L-L)

Convert a 16000ppm signal from a Hall Effect 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-100 can read it. The sensor signal wire will go to the SPEED INPUT terminal. Connect the IGNITION terminal to a 12-volt accessory wire and connect the GROUND terminal to a good ground location. The output connections will depend on your particular application. **The CAL ratio should be set to 0.500 as a starting point.** 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

ppm values listed below are only valid after calibration is complete

12V Accessory Power
GROUND
Sensor 5V power (if needed)
Speed input signal
Sensor ground (if needed)

2000 ppm 'oc' output
4000 ppm 'oc' output
4000 ppm 'AC' output
8000 ppm 'oc' output signal
8000 ppm 'AC' output signal
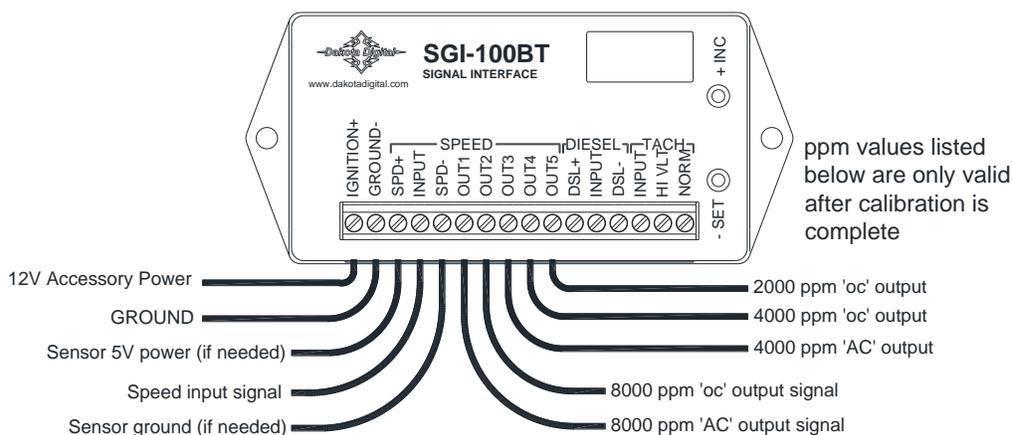
APPLICATION #6 (L-L)

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 the SPD- terminal. The signal pin will go to the SPEED INPUT 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 SPEED INPUT. Connect the IGNITION terminal to accessory power and the GROUND terminal to ground. **The CAL ratio should be set to 2.000 as a starting point.** Connect OUT1 to your aftermarket electric speedometer.

APPLICATION #7 (L-H)

Convert a 8000ppm or 16000ppm signal from a cable drive speed sensor to a 128000ppm signal for an OEM speedometer or ECM.

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-100 can read it. The sensor signal wire will go to the SPEED INPUT terminal. Connect the IGNITION terminal to a 12-volt accessory wire and connect the GROUND terminal to a good ground location. If nothing else is connected to a two wire sensor, then connect one wire to the SPD- terminal. The output connections will depend on your particular application. **With an 8000ppm signal the CAL ratio can start out at 1.00. If starting with a 16000ppm signal the CAL ratio should be set to 0.500 as a starting point.** Here are some typical examples:

OUT3, 128000ppm AC: most common if OEM sensor connected to ECM direclty
OUT4, 128000ppm oc: most common if an ECM was fed by another electronic module
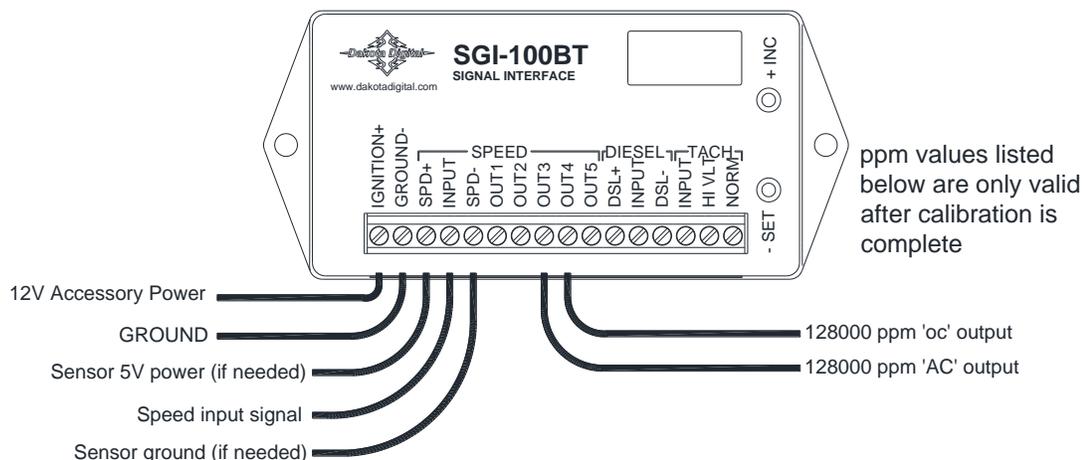
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Diagnostic Testing

The basic power up and operation can be verified with the display on the SGI-100. The dot in the upper left corner will be on steady when the unit is powered up and not getting a speed signal. The dot will be flashing when a speed signal is present. After the key is on if the INC switch is pressed the current, incoming speed signal frequency will be displayed. If the frequency displayed has a decimal point, then the reading is kHz, otherwise the reading is Hz.

Both the input and outputs can be tested with special diagnostic modes.

To test the outputs and speedometer reading while sitting still:
1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " ‾ ".
3. Release the SET switch. The display will show "5Pd".
4. Tap the SET switch and then tap the INC switch until "rEF" is shown.
5. Tap the SET switch. The display will show "33" and be supplying a 33Hz signal on OUT1 and OUT2.
6. Tap the INC switch to select "33", "67", " 133", "267", or "533". The output signal will change immediately.
7. Tap the SET switch or turn the key off to turn the output signal off.

To test the input while driving:
1. With the SGI-100 connected, begin driving.
2. Anytime the INC switch is pressed the display will show the frequency. This can be done while driving at a specific speed (like 30MPH or 60MPH) to determine the type of signal being fed to the SGI-100. This information can be supplied to tech support to assist in setup and configuration of the unit.

Troubleshooting guide

Problem	Possible Cause	Solution
Speedometer will not work; no lights on display.	No power to SGI-100.	Check the power and ground terminals on the SGI-100. Should be 11-15 V dc
Speedometer will not work; dot on steady.	No input signal. SGI-100 set for wrong input type. Grounding interference.	Test for 1-20 volts AC at the signal in terminal with the wheels spinning. Check input type setup. Make sure both the speed sensor and SGI-100 are grounded at the same point.
Speedometer will not work; dot is flashing.	Wrong output type.	Try switching from an OC to AC output or from an AC to OC output.
Speedometer will not read at low speeds.	SGI-100 set for wrong input type Speed signal is too low.	Change input signal setup to LO. Check speed connections for ground problems or shorts. Test the ground connection between SGI-100 and sensor. Check for another device loading down the sensor.
Speedometer will read when the vehicle is sitting still.	Tach wire too close to speed signal wire. Signal In and OUT wires routed too close Ground interference. Sensitivity set incorrectly	Route the speed signal and tachometer wires away from each other to avoid interference Route the input and output wires away from each other to avoid feedback.. Make sure the speed sensor and SGI-100 are grounded together. Change input signal setup to HI.
Transmission does not shift properly, or not at all.	Wired improperly Incorrect application Input pull-up interfering	Contact technical support Change speed pull-up setup to OFF.

IGNTION TACHOMETER SIGNAL USE
ᴛᴄH: 9ᴀs

This unit can recalibrate an ignition system tachometer signal. Adjustment is done by setting the cylinder count for the incoming engine signal (1-16) and the cylinder count for the outgoing gauge signal (1-16). Fine adjustment can also be done to make corrections to the gauge needle reading.
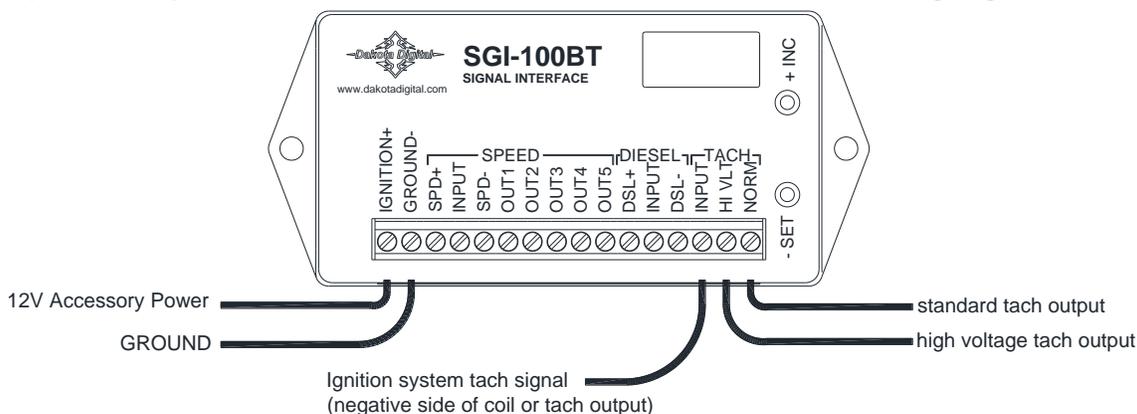
Note: If the TACH NORM output does not drive your tachometer, use TACH HI VLT.

Setup

9ᴀs : ᴏᴜᴛ: set output (gauge) cylinder count. 1 – 16 allowed. (Fine cal is set to 1.00)
        A 2000 RPM signal will be generated reflecting the current cylinder count for gauge testing.
9ᴀs : ɪn: change input (engine) cylinder count. 1 – 16 allowed. (Fine cal is set to 1.00)
9ᴀs : s I9:   change between 5V low voltage "ʟᴏ" and 12V normal "H ɪ" signal types.
9ᴀs : ᴜʟᴛ: change the high voltage output between 18V and 24V if needed.

1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " - ".
3. Release the SET switch. The display will show "sᴘᴅ".
4. Tap the INC switch until "ᴛᴄH" is shown.
5. Tap the SET switch and then tap the INC switch until "9ᴀs" is shown.
6. Tap the SET switch. The display will show " ɪn".
7. Tap the INC switch until the desired setup option is displayed: ɪn, ᴏᴜᴛ, s I9, ᴜʟᴛ, bᴀᴄ.
8. Tap the SET switch to select the setup option.
9. Tap the INC switch to change the setting. Tap the SET switch to save it.
10. When finished turn the key off or select "bᴀᴄ".

Setup example:
If you have a factory 6 cylinder tachometer and are now using an 8 cylinder engine, set the engine cylinder count " ɪn" to 8 and the gauge cylinder count "ᴏᴜᴛ" to 6.

Diagnostic Testing

The basic power up and operation can be verified with the display on the SGI-100. The dot in the upper left corner will be on if it is powered up. The dot in the lower right will be off when there is no tachometer signal present, flashing when a tachometer signal is present on the TACH INPUT, or flashing rapidly if a signal is present on the DIESEL INPUT instead of the TACH INPUT. During normal operation if the SET switch is pressed the incoming speed signal frequency will be displayed. If the frequency displayed has a decimal point, then the reading is kHz, otherwise the reading is Hz.

Both the input and outputs can be tested with special diagnostic modes.

To test the outputs and tachometer reading with the engine off:
1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " - ".
3. Release the SET switch. The display will show "5Pd".
4. Tap the INC switch until "tCH" is shown.
5. Tap the SET switch and then tap the INC switch until "9A5" is shown.
6. Tap the SET switch and then tap the INC switch until "oUt" is shown.
7. Tap the SET switch. The display will show the current gauge cylinder setting and be supplying a 2000 RPM signal.
8. Tap the INC switch until the gauge reading is close to 2000 RPM. Tap the SET switch to save it.

To test the input while driving:
1. With the SGI-100 connected, start the engine.
2. Press and hold the SET switch. The display will show the current frequency. This can be done to determine the type of signal being fed to the SGI-100. This information can be supplied to tech support to assist in setup and configuration of the unit.

To make small adjustments to the tachometer reading:
1. With the SGI-100 connected, start the engine.
2. Press and hold both switches until "5Et" is displayed.
3. Release the switches. The display will show "5Pd".
4. Tap the INC switch until "tCH" is shown.
5. Press and hold the SET switch until "Adj" is displayed.
6. Release the switch. The display will show the current fine adjust cal value.
7. To increase the tachometer reading, press and hold the + push button switch. To decrease the tachometer reading, press and hold the - push button switch. The calibration will only change when the engine is running and a tach signal is present.
8. To exit the tach adjust, press and hold both switches until "End" is displayed.

Troubleshooting guide

Problem	Possible Cause	Solution
Tachometer will not work; no lights on display.	No power to SGI-100.	Check the power and ground terminals on the SGI-100. Should be 11-15 V dc.
Tachometer will not work; lower left dot off.	No input signal.	Test for 1-20 volts AC at the tach input in terminal with the engine running.
	SGI-100 set for wrong input type.	Change the *tCH : gAS : S19* option. See instructions on page 12.
	OEM filter circuit between SGI-100 and gauge.	Make sure SGI-100 connects directly to the gauge.
Tachometer will not work; dot is flashing.	Wrong output type.	Try switching from TACH NORM to TACH HI VLT terminal.
	High voltage boost required.	Change the *tCH : gAS : ULt* option to *24*.
Tachometer will not work; dot is flashing rapidly.	Input type set to DSL. Input connected to DIESEL	Change to *tCH : gAS : In* Connect tach signal to TACH INPUT
Tachometer will not read at high rpm.	SGI-100 set for wrong input type.	Change the *tCH : gAS : S19* option. See instructions on page 12.
Tachometer is reading incorrectly.	Engine or gauge setting incorrect.	Change the Setup *In* or *OUt* values. See instructions on page 12.
	Gauge requires fine adjust.	See the small adjustment instructions on page 12.

MAN# 650701

DIESEL TACHOMETER SIGNAL USE

This unit can provide a tachometer signal to drive a standard ignition system tachometer. The input signal can be from a tachometer output from the alternator, from a gear tooth sensor reading the flywheel teeth, or from an engine timing gear sensor. In addition to the setup mode calibration using gear tooth count, fine adjustment can be done during normal operation to fine tune the gauge needle position if needed. The + and – buttons allow fine adjustment to be performed with the engine running.

Here is a general overview of the SGI-100's control functions.
Each of the different applications below will be described in detail starting on page 16 in this manual.

Setup
d5L : 5Et : ALt: alternator 'W' terminal tach signal
d5L : 5Et : FLY: flywheel gear tooth sensor signal
d5L : 5Et : t9r: timing gear tooth sensor signal
d5L : OUt: set output (gauge) cylinder count. 4, 6, or 8 allowed.
      A 2000 RPM signal will be generated reflecting the current cylinder count for gauge testing.
d5L : ULt: change the high voltage output between 18V and 24V if needed.

Set input mode: Select the input mode depending on your application.
1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " - ".
3. Release the SET switch. The display will show "5Pd".
4. Tap the INC switch until "tCH" is shown.
5. Tap the SET switch and then tap the INC switch until "d5L" is shown.
6. Tap the SET switch. The display will show "5Et".
7. Tap the SET switch. The current input mode will be shown, ALt, FLY, or t9r. Tap the INC switch to change the input mode. Tap the SET switch to save it.
8. The CAL value will be set next. See the detailed instructions listed later in the manual for your specific application.

Set output mode: Select the output gauge cylinder count. 4, 6, or 8
1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " - ".
3. Release the SET switch. The display will show "5Pd".
4. Tap the INC switch until "tCH" is shown.
5. Tap the SET switch and then tap the INC switch until "d5L" is shown.
6. Release the SET switch. The display will show "5Et".
7. Tap the INC switch until "OUt" is displayed.
8. Tap the SET switch. The current cylinder count will be shown, 4, 6, or 8. A 2000 rpm output signal will be generated reflecting the current cylinder count for gauge testing.
9. Tap the INC switch to change it; Tap the SET switch to save it.

ALTERNATOR TACH INTERFACE USE
dSL: SEt: ALt

Convert a signal from an alternator 'W' terminal to an ignition tachometer signal.

For using a standard 4-6-8 cylinder tachometer on a diesel engine, the SGI-100 can convert an alternator tach output signal or 'W' terminal into a standard gas ignition signal. ***Not all alternators have a 'W' terminal.*** The unit is adjustable to allow for the different numbers of poles on the alternator as well as different pulley sizes on the engine and alternator. Calibration should be done using a light tach or another known reference for engine speed.

The SGI-100 has an adjustable range of 4.00 to 0.250. Calibration can be set using the setup mode and display or adjusted in real time while the engine is running. Wiring instructions are provided below. The GROUND terminal on the SGI-100 should be connected to a good ground. The DIESEL INPUT terminal will connect to one terminal from the sensor and the DSL- terminal will connect to the other. Connect the IGNITION terminal to 12V accessory power. NORM terminal will provide the standard signal to the tachometer. If your tachometer will not read from this then try the HI V terminal.

Determining required calibration ratio.

It is easiest to begin with the CAL ratio set to 1.00. The new calibration ratio to make the tach read correctly is found using the equation below.

(Actual RPM) ÷ (Tach reading) = calibration ratio
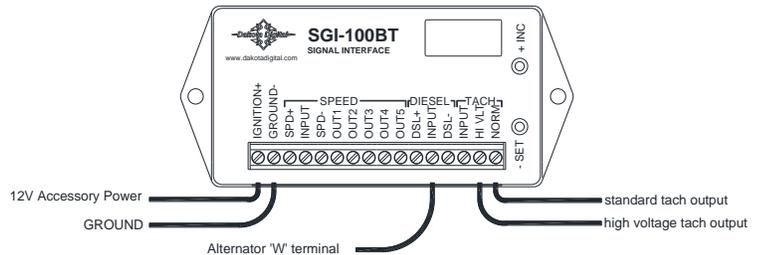
Calibration

Preset or adjust: The calibration value can be set from 0.250 – 4.00.
1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " - ".
3. Release the SET switch and then tap the INC switch until "tCH" is shown.
4. Tap the SET switch and then tap the INC switch until "dSL" is shown.
5. Tap the SET switch. The display will show "SEt".
6. Tap the SET switch and then tap the INC switch until "ALt" is displayed
7. Tap the SET switch. The display will show the ones digit of the currently stored calibration value. Tap the INC switch to set this from 0. - 4. for your desired calibration value.
8. Once finished tap the SET switch to move to the tenths digit. Tap the INC switch until your desired value is shown.
9. Tap the SET switch to move to the hundredths digit. Tap the INC switch until your desired value is shown.
10. Tap the SET switch to save the hundredths digit. If the value is 1.00 or higher the calibration value will be saved. The calibration set is done.
11. If the value is 0.99 or lower the thousands digit will now be set. Tap the INC switch until the desired value is shown. Tap the SET switch to save and finish.
12. The display should now show the next menu option, "OUt". Turn the key off or select "bAC".

Adjust with engine running:
1. With the SGI-100 connected, start the engine.
2. Press and hold both switches until "SEt" is displayed.
3. Release the switches. Tap the INC switch until "tCH" is shown.
4. Press and hold the SET switch until "Adj" is displayed.
5. Release the switch. The display will show the current fine adjust cal value.
6. To increase the tachometer reading, press and hold the + push button switch. To decrease the tachometer reading, press and hold the - push button switch. The calibration will only change when the engine is running and a tach signal is present.
7. To exit the tach adjust, press and hold both switches until "End" is displayed.

FLYWHEEL TACH INTERFACE USE

dSL:SEt:FLY

Convert a signal from a flywheel gear-tooth sensor to an ignition tachometer signal.

For using a standard 4-6-8 cylinder tachometer on a diesel engine, the SGI-100 can convert a flywheel sensor signal into a standard gas ignition signal. Calibration is accomplished by determining the number of teeth on the flywheel or using another tachometer as a reference. An inductive, gear-tooth sensor such as Dakota Digital, Inc. part # 620008 should be mounted so the teeth pass by the end of the sensor. The GROUND terminal on the SGI-100 should be connected to a good ground. The DIESEL INPUT terminal will connect to one terminal from the sensor and the DSL- terminal will connect to the other. Connect the IGNITION terminal to 12V accessory power. NORM terminal will provide the standard signal to the tachometer. If your tachometer will not read from this then try the HI V terminal.
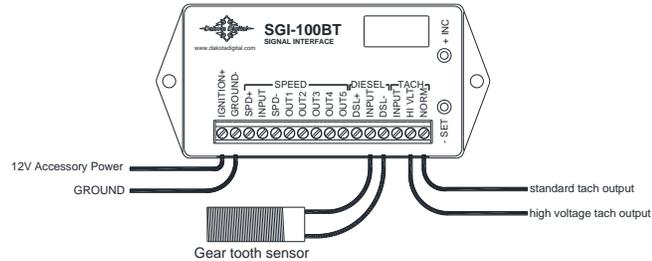
Calibration

Preset or adjust: The calibration value (tooth count) can be set from 32 – 254.

1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show "-".
3. Release the SET switch and then tap the INC switch until "tCH" is shown.
4. Tap the SET switch and then tap the INC switch until "dSL" is shown.
5. Tap the SET switch. The display will show "SEt".
6. Tap the SET switch and then tap the INC switch until "FLY" is displayed.
7. Tap the SET switch. The display will show the hundreds digit of the currently stored calibration value. Tap the INC switch to set this from 0-2 for your desired calibration value.
8. Once finished Tap the SET switch to move to the tens digit. Tap the INC switch until your desired value is shown.
9. Tap the SET switch to move to the ones digit. Tap the INC switch until your desired value is shown.
10. Tap the SET switch to save the ones digit and finish.
11. The display should now show the next menu option, "OUt". Turn the key off or select "bAC".

Adjust with engine running:

1. With the SGI-100 connected, start the engine.
2. Press and hold both switches until "SEt" is displayed.
3. Release the switches. The display will show "SPd".
4. Tap the INC switch until "tCH" is shown.
5. Press and hold the SET switch until "Adj" is displayed.
6. Release the switch. The display will show the current fine adjust cal value.
7. To increase the tachometer reading, press and hold the + push button switch. To decrease the tachometer reading, press and hold the - push button switch. The calibration will only change when the engine is running and a tach signal is present.
8. To exit the tach adjust, press and hold both switches until "End" is displayed.

TIMING GEAR TACH INTERFACE UNIT
dSL: SEt: tgr

Convert a signal from an engine timing gear-tooth sensor to an ignition tachometer signal.

For using a standard 4-6-8 cylinder tachometer on a diesel engine, the SGI-100 can convert a timing gear sensor signal into an a standard gas ignition signal. Calibration is accomplished by determining the number of teeth on the timing gear or using another tachometer as a reference. Consult a vehicle service manual to determine the sensor color code and connection. The GROUND terminal on the SGI-100 should be connected to a good ground. The SIGNAL IN terminal will connect to the timing gear sensor signal. Connect the POWER terminal to 12V accessory power. NORMAL terminal will provide the standard signal to the tachometer. If your tachometer will not read from this then try the HI VOLT terminal.
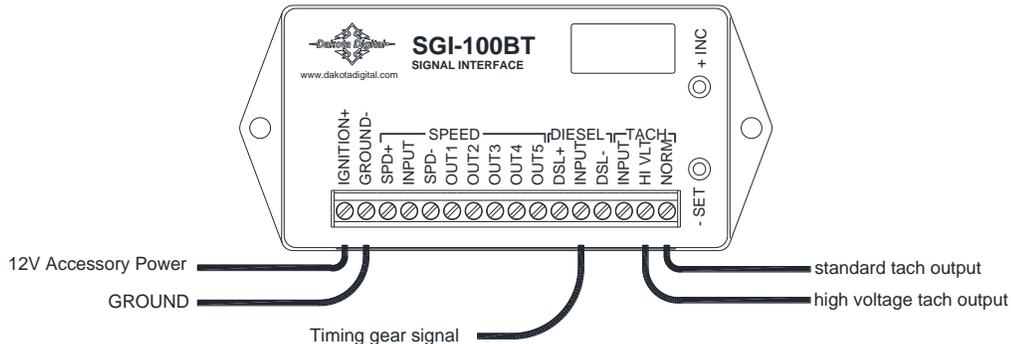
Calibration

Preset or adjust: The calibration value (tooth count) can be set from 1 – 64.
1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " ‐ ".
3. Release the SET switch and then tap the INC switch until "tCH" is shown.
4. Tap the SET switch and then tap the INC switch until "dSL" is shown.
5. Tap the SET switch. The display will show "SEt".
6. Tap the SET switch and then tap the INC switch until "tgr" is displayed.
7. Tap the SET switch. The display will show the tens digit of the currently stored calibration value. Tap the INC switch to set this from 0-6 for your desired calibration value.
8. Tap the SET switch to move to the ones digit. Tap the INC switch until your desired value is shown.
9. Tap the SET switch to save the ones digit and finish.
10. The display should now show the next menu option, "OUt". Turn the key off or select "bAC".

Adjust with engine running:
1. With the SGI-100 connected, start the engine.
2. Press and hold both switches until "SEt" is displayed.
3. Release the switches. The display will show "SPd".
4. Tap the INC switch until "tCH" is shown.
5. Press and hold the SET switch until "Adj" is displayed.
6. Release the switch. The display will show the current fine adjust cal value.
7. To increase the tachometer reading, press and hold the + push button switch. To decrease the tachometer reading, press and hold the - push button switch. The calibration will only change when the engine is running and a tach signal is present.
8. To exit the tach adjust, press and hold both switches until "End" is displayed.

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Diagnostic Testing

The basic power up and operation can be verified with the display on the SGI-100. The dot in the upper left corner will be on if it is powered up. The dot in the lower right will be off when there is no tachometer signal present, flashing when a tachometer signal is present on the DIESEL INPUT, or flashing rapidly if a signal is present on the TACH INPUT instead of the DIESEL INPUT. During normal operation if the SET switch is pressed the incoming speed signal frequency will be displayed. If the frequency displayed has a decimal point, then the reading is kHz, otherwise the reading is Hz. Both the input and outputs can be tested with special diagnostic modes.

Both the input and outputs can be tested with special diagnostic modes.

To test the outputs and tachometer reading with the engine off:
1. Begin with the key off.
2. Press and hold the SET switch while turning the key on. The display will show " - ".
3. Release the SET switch. The display will show "5Pd".
4. Tap the INC switch until "tCH" is shown.
5. Tap the SET switch and then tap the INC switch until "d5L" is shown.
6. Release the SET switch and then tap the INC switch until "OUt" is displayed.
7. Tap the SET switch. The current cylinder count will be shown, 4, 6, or 8. A 2000 rpm output signal will be generated reflecting the current cylinder count for gauge testing.
8. Tap the INC switch to change it; Tap the SET switch to save it.

To test the input with the engine running:
1. With the SGI-100 connected, start the engine.
2. Press and hold the SET switch. The display will show the current frequency. This can be done to determine the type of signal being fed to the SGI-100. This information can be supplied to tech support to assist in setup and configuration of the unit.

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Troubleshooting guide

Problem	Possible Cause	Solution
Tachometer will not work; lights are off.	No power to SGI-100.	Check the power and ground terminals on the SGI-100. Should be 11-15 V DC.
Tachometer will not work; lower left dot off.	No input signal. Grounding interference.	Test for 1-20 volts AC at the signal in terminal with the engine running. Make sure both the speed sensor and SGI-100 are grounded at the same point.
Tachometer will not work; dot is flashing.	Wrong output type. High voltage boost required.	Try switching from TACH NORM terminal to the TACH HI VLT terminal. Change the *tCH : dSL : ULt* option to *24*.
Tachometer will not work; dot is flashing rapidly.	Input type set to GAS. Input connected to TACH	Change to *tCH : dSL : SEt* Connect tach signal to DIESEL INPUT
Tachometer will not read at low RPM.	Tach signal is too low.	Check sensor connections for ground problems or shorts. Test the ground connection between SGI-100 and sensor. Check for another device loading down the sensor.
Tachometer will read when the engine is off	Ignition wire too close to sensor signal wire. Signal In and OUT wires routed too close. Ground interference.	Route the sensor signal and ignition or injector wires away from each other to avoid interference. Route the input and output wires away from each other to avoid feedback. Make sure the speed sensor and SGI-100 are grounded together.

SERVICE AND REPAIR

DAKOTA DIGITAL offers complete service and repair of its product line. In addition, technical consultation is available to help you work through any questions or problems you may be having installing one of our products. Please read through the Troubleshooting Guide. There, you will find the solution to most problems.

Should you ever need to send the unit back for repairs, please call our technical support line, (605) 332-6513, to request a Return Merchandise Authorization number. Package the product in a good quality box along with plenty of packing material. Ship the product by UPS or insured Parcel Post. Be sure to include the RMA number on the package, and include a complete description of the problem with RMA number, your full name and address (street address preferred), and a telephone number where you can be reached during the day. Any returns for warranty work must include a copy of the dated sales receipt from your place of purchase. Send no money. We will bill you after repair.

Dakota Digital Limited Lifetime Warranty

DAKOTA DIGITAL warrants to the ORIGINAL PURCHASER of this product that should it, under normal use and condition, be proven defective in material or workmanship for the lifetime of the original vehicle it was installed in, such defect(s) will be repaired or replaced at Dakota Digital's option.

This warranty does not cover nor extend to damage to the vehicle's systems, and does not cover diagnosis, removal or reinstallation of the product. This Warranty does not apply to any product or part thereof which in the opinion of the Company has been damaged through alteration, improper installation, mishandling, misuse, neglect, or accident.   Dakota Digital assumes no responsibility for loss of time, vehicle use, owner inconvenience nor related expenses.

Dakota Digital will cover the return standard freight once the product has been evaluated for warranty consideration, however the incoming transportation is to be covered by the owner.

This Warranty is in lieu of all other expressed warranties or liabilities. Any implied warranties, including any implied warranty of merchantability, shall be limited to the duration of this written warranty. No person or representative is authorized to assume, for Dakota Digital, any liability other than expressed herein in connection with the sale of this product.

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