GSS-2000

Universal Gear Shift Sender

Your new GSS-2000 includes:

Hardware pack / mounting plates

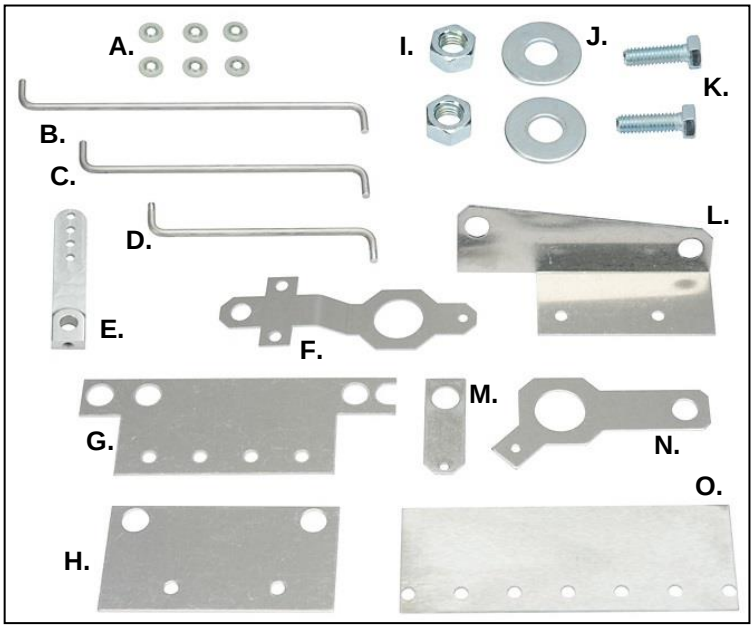
Decoder

30 Amp Relay

Sensor

393003 package contains:

A. 6x - 1/8” rod retainer clip
B. 1x - 5 1/4” rod
C. 1x - 4 1/4” rod
D. 1x - 3 1/4” rod
E. 1x - long gear shift sender arm
F. 1x - C-4 linkage connector
G. 1x - GM mounting plate
H. 1x - C-6 mounting plate
I. 2x - spacer (7/16” hex nut)
J. 2x - flat washer
K. 2x - 5/16” x 1” bolt
L. 1x - C-4 mounting plate
M. 1x - GM linkage connector
N. 1x - C-6 linkage connector
O. 1x - universal mounting plate



Product Features

The GSS-2000 consists of three main components; the sensor, decoder, and mounting brackets. The sensor mounts to the transmission and converts the transmission linkage arm position into an electrical signal. The decoder converts the electric signal from the sensor into specific output(s) for the respective display/readout as well as provides the neutral safety and reverse-light outputs. The individual gear-position outputs are selectable for positive or negative signals. The mounting brackets attach the sensor to the transmission housing and linkage arm.
You can use as many or as few features as your application requires.

Installation

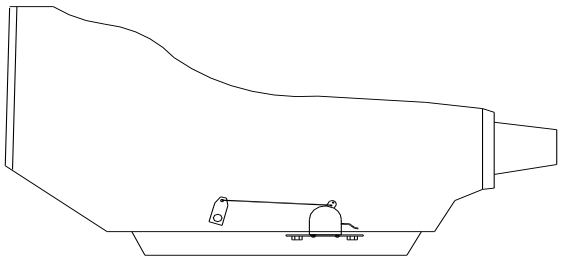
In a typical installation, the sensor mounts to the side of the transmission using two pan bolts. A stamped aluminum lever will attach to the transmission detent shaft, and a 1/8" rod connects the machined sensor arm to the lever; this allows the sensor arm to move as the transmission is shifted through the gears. Each gear will correspond to a different position for the sensor arm. The location of Park does not matter, nor does the direction the sensor arm turns going from Park to Low. Once the Decoder has been programmed, it will read all of the gears correctly and remember their positions.

If a Kugel or Lokar adjustable shifter is being used, you will need a Kugel nut to attach the sensor to the shift linkage. KN-3 (standard thread) and KN-4 (metric) Kugel nuts are available from Dakota Digital, Inc.

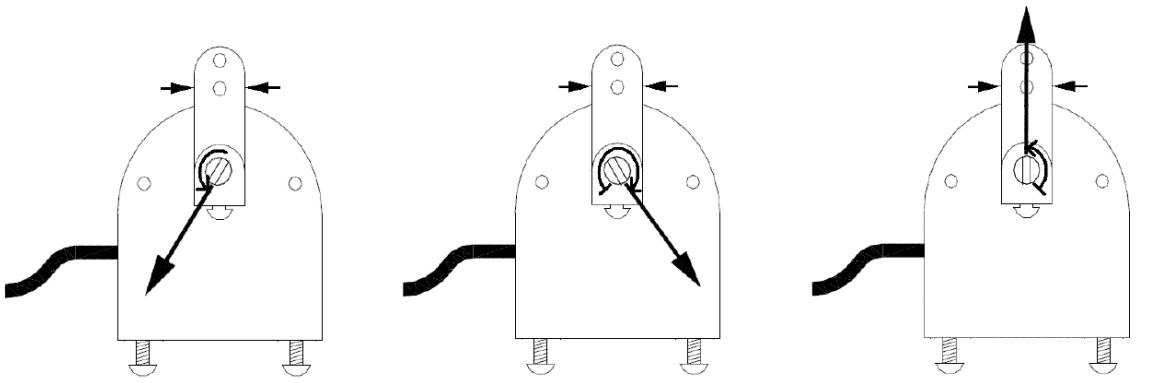
When properly adjusted, the sensor arm will use most of its range of motion. If the sweep is too short, the decoder may have trouble distinguishing each gear. As the transmission is shifted through all of the gears, the sensor arm should not hit either of its stops, bind or get 'hung up'.

If the typical mounting location for the sensor will not work, the sensor can be mounted anywhere that will allow the sensor arm to move as the gear shift selector moves. The sensor arm can attach the transmission linkage, shifter and anywhere in between.

A universal mounting plate is included to make custom fabrication easier. This plate has several mounting holes for the sensor, but no holes for mounting the plate to the transmission. To use this plate, first determine the best mounting location on your transmission, then mark and drill holes into the universal plate to secure it. In most instances the entire length of the plate will not be needed and it can be cut down using a hack saw or metal shears.



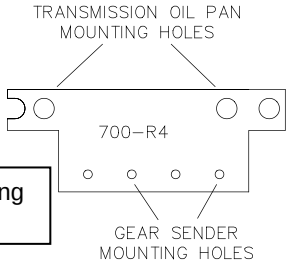
Approximate sender mounting location on transmission.

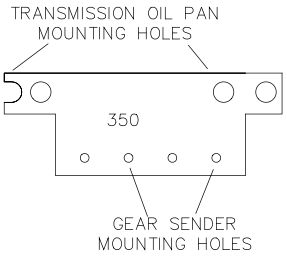


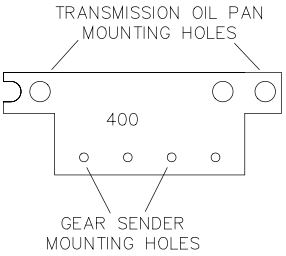
When moving or repositioning the sensor arm, be sure the slot in the center of the shaft is aligned with the arm as shown here.

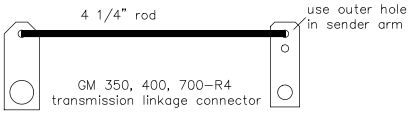
Installation: GM 700R4, TH350, TH400 and 4L60E/4L70E

4L60/70E - use 700R4 mounting holes with sensor facing out

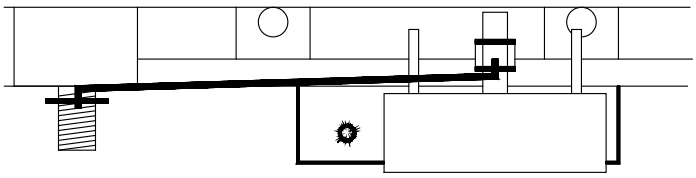




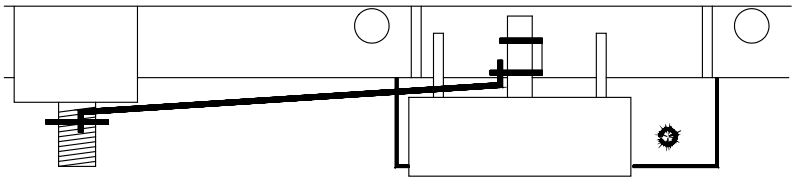




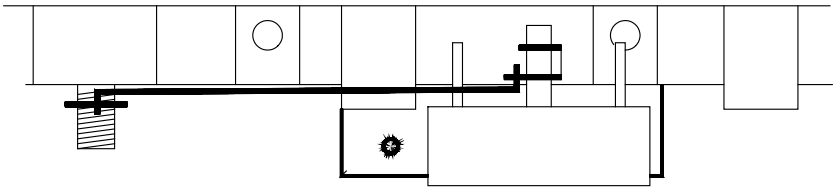
top left side view of GM 700–R4 transmission



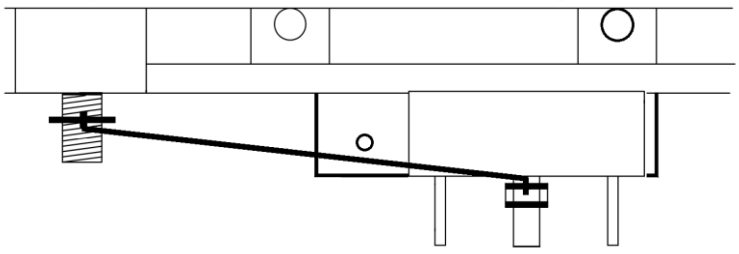
top left side view of GM 400 transmission



top left side view of GM 350 transmission

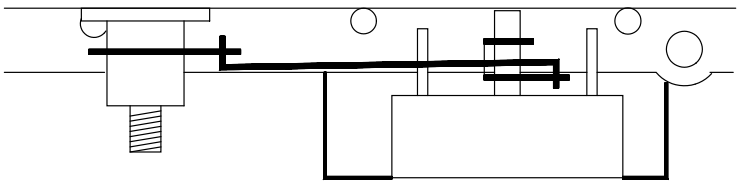


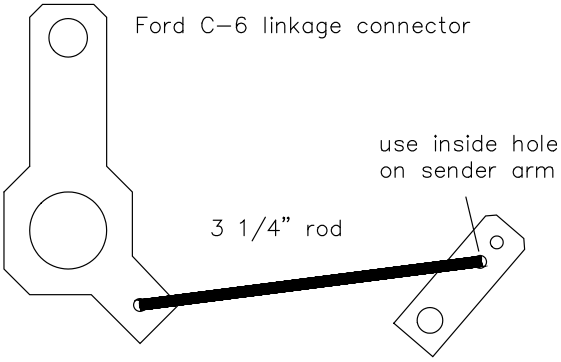
Top left side view of GM 4L60E Transmission, with sensor facing outward

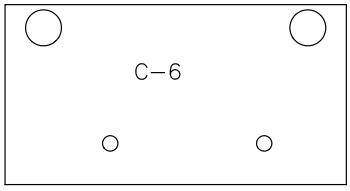


Installation: Ford C4 and C6

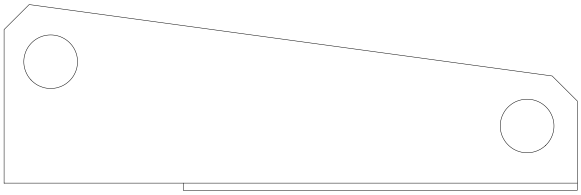
Ford C6



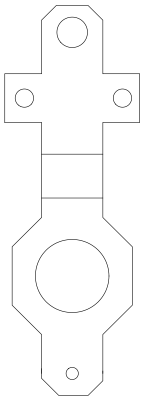




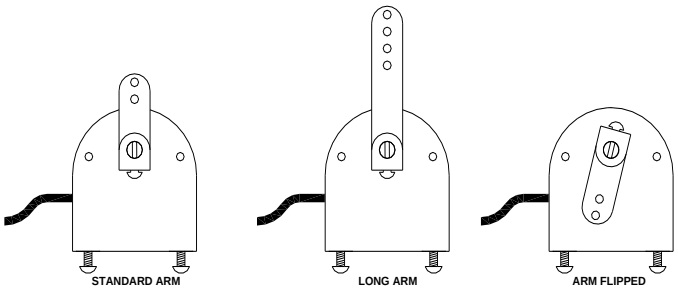
Ford C4



The C4 mounting plate uses the lower two bolts of the four bolt plate located on the left side of the transmission, just behind the shift linkage arm.



Ford C-4 linkage connector



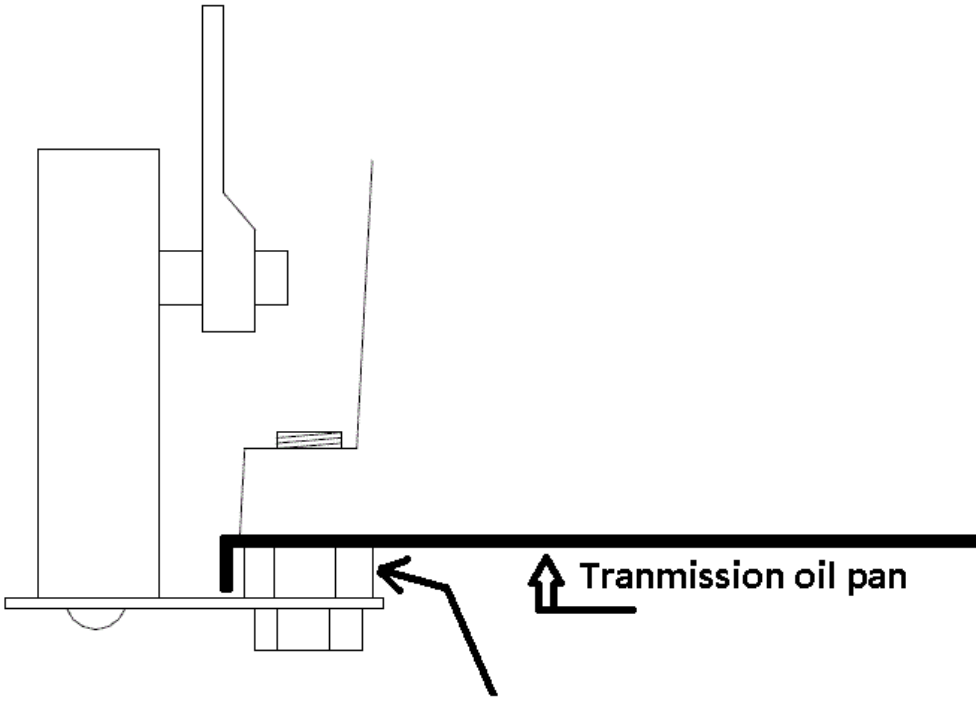
The arm on the gear shift sender will need to be flipped around so that it rotates on the bottom half. Make sure that the slot in the shaft is in line with the sender arm as shown in the diagram.

C6 and C4:

Depending on your shifter, you may use the linkage connector provided. The bottom hole is for the sensor rod, the center hole slips over the transmission detent shaft, and the upper hole connects to the shifter linkage. Alternatively, drill a 1/8" hole into your shift linkage arm to attach the rod.

Installation: plate spacer and universal plate

GM TH350/400 and Ford C4/C6 applications can use the supplied 1” 5/16-18 bolts to secure the mounting plate. 7/16” nuts are supplied to act as spacers to get the mounting plate away from the pan lip or shifter cable.



Use the 5/16" x 1" bolts, and 7/16" nuts (acts as a 3/8" spacer) as shown, to mount the plate to the transmission pan

The universal mounting plate requires mounting holes be drilled to line up with the pan bolts on the transmission. This can be used with transmissions for which a specific mounting plate is not provided.

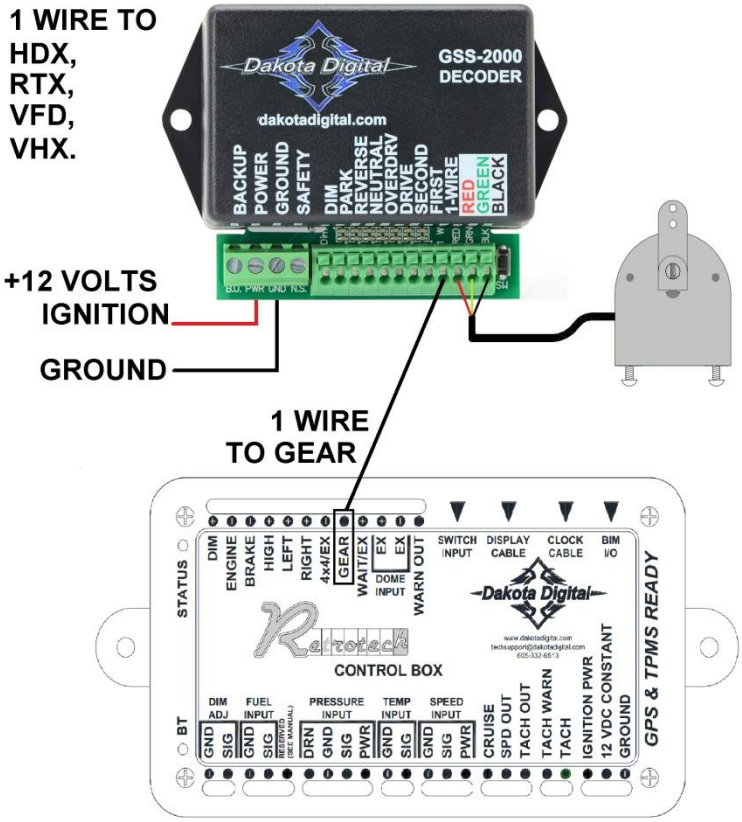
Installation: Wiring

Connecting the sensor to decoder

The gray cable (10 feet long) attached to the sensor contains three wires which connect to the decoder. Simply match the wire colors to the labels on the decoder: RED wire to the terminal marked RED, GREEN to GREEN, and BLACK wire to BLACK.

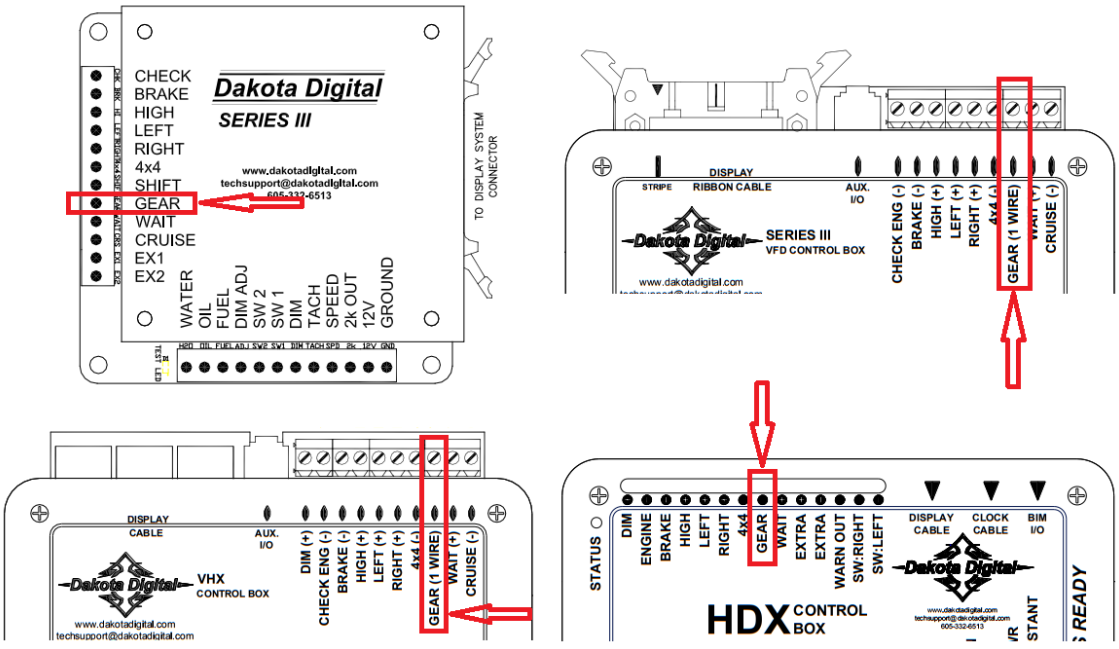
Connecting decoder to Dakota Digital control box

The 1-WIRE terminal on the decoder connects to a Dakota Digital instrument system control box. See graphics below for nomenclature on each generation of control box.



Various “GEAR” inputs on Dakota Digital control boxes.

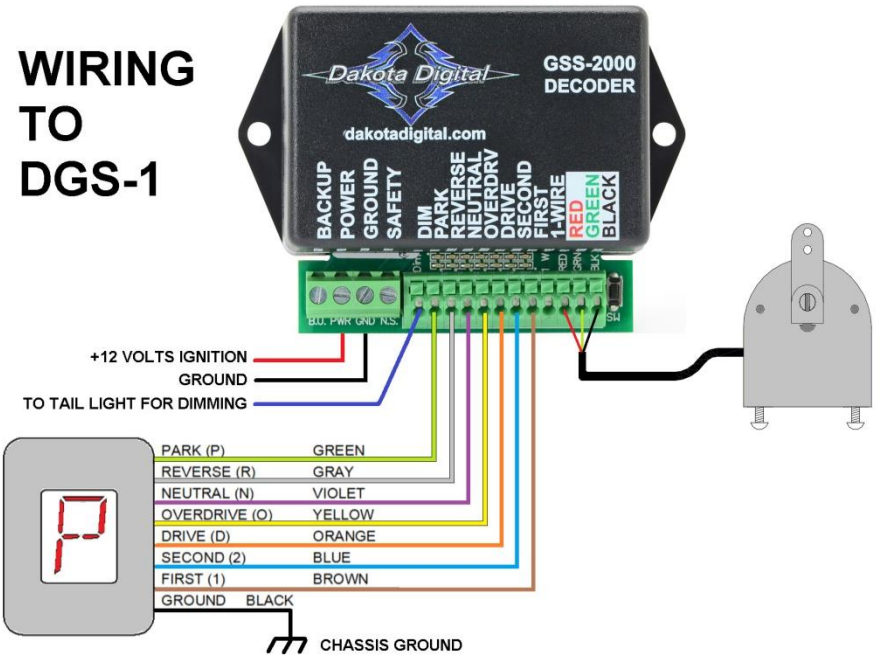
STR-series control boxes have an input for each gear.
Please see page 10.

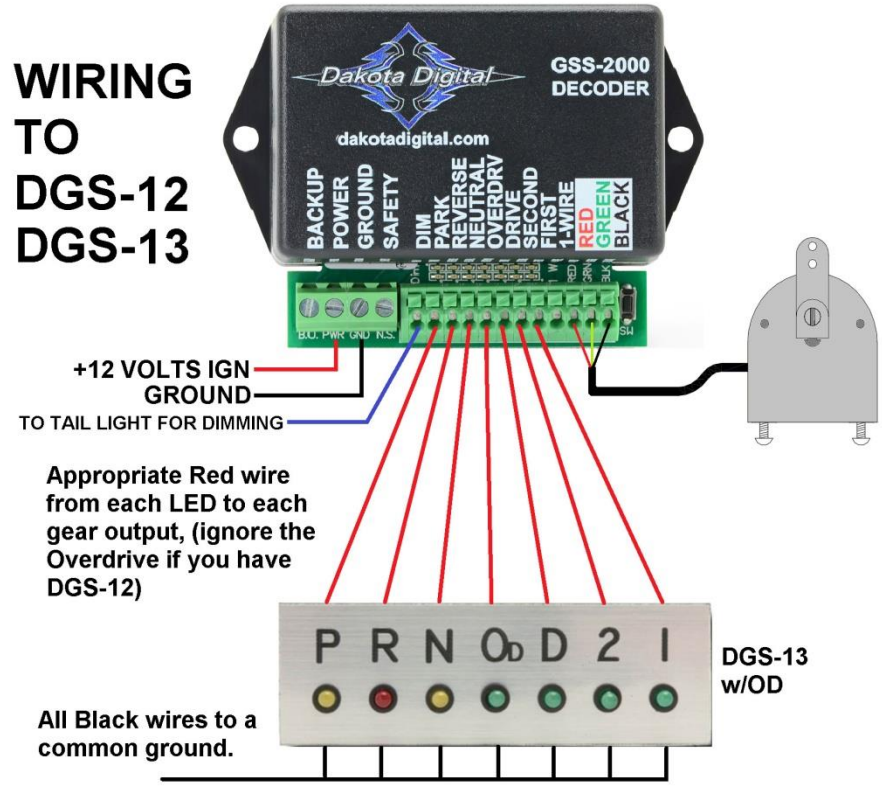


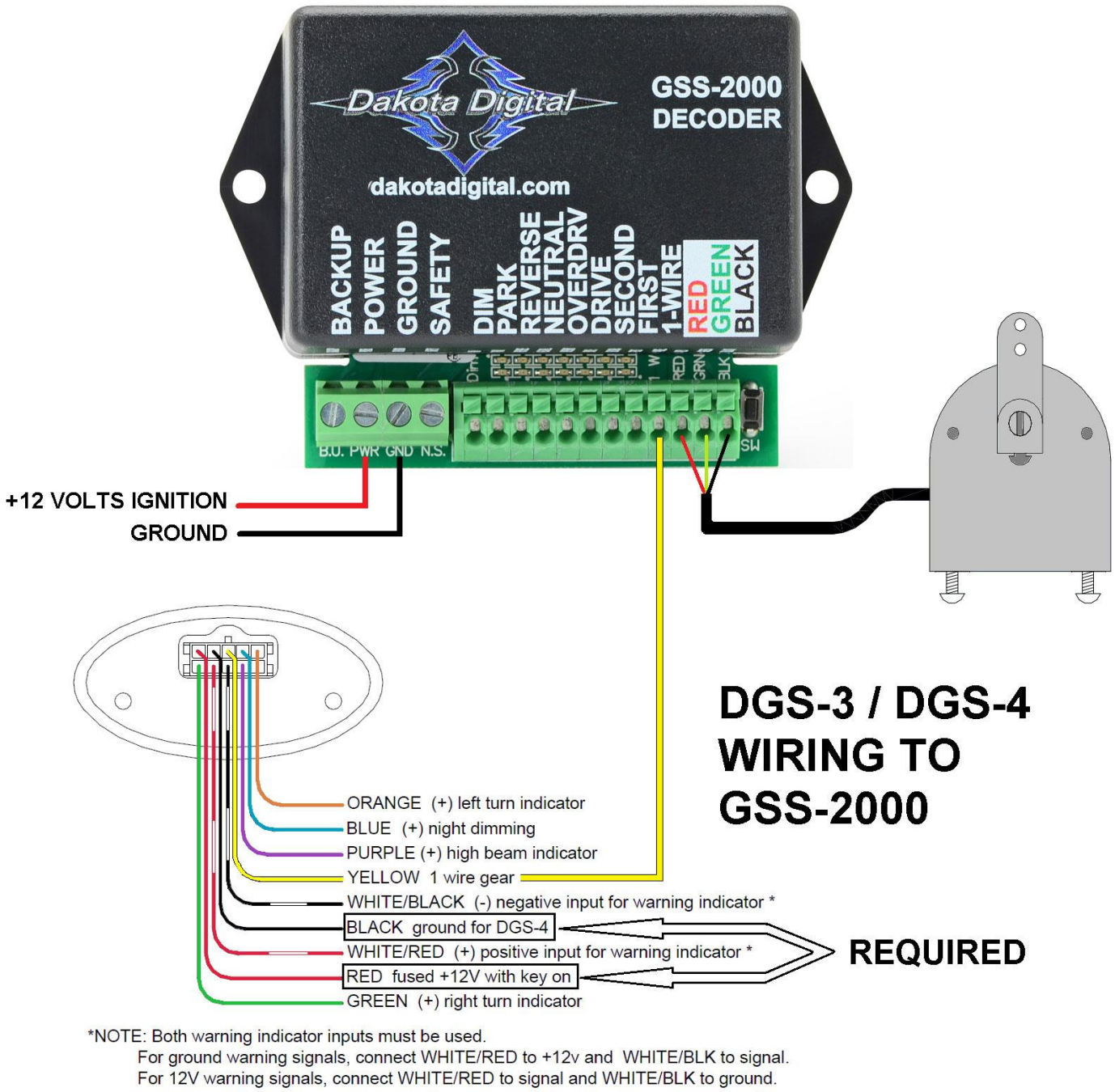
Installation: Wiring

Connecting the decoder to DGS-series indicators

The GSS-2000 will interface with all of the standard display systems available. Each gear output will provide 12 volts at up to 0.2 amperes or can be programmed to provide grounding outputs. This is enough current capacity for any LED indicator or low power incandescent bulbs. When individual lights are used for each gear, connect the negative wire to ground and the positive wire to the appropriate gear output terminal on the decoder. When using Dakota Digital's Digital Gear Shift Indicator, connect the wires to the decoder according to the instructions provided with the indicator.

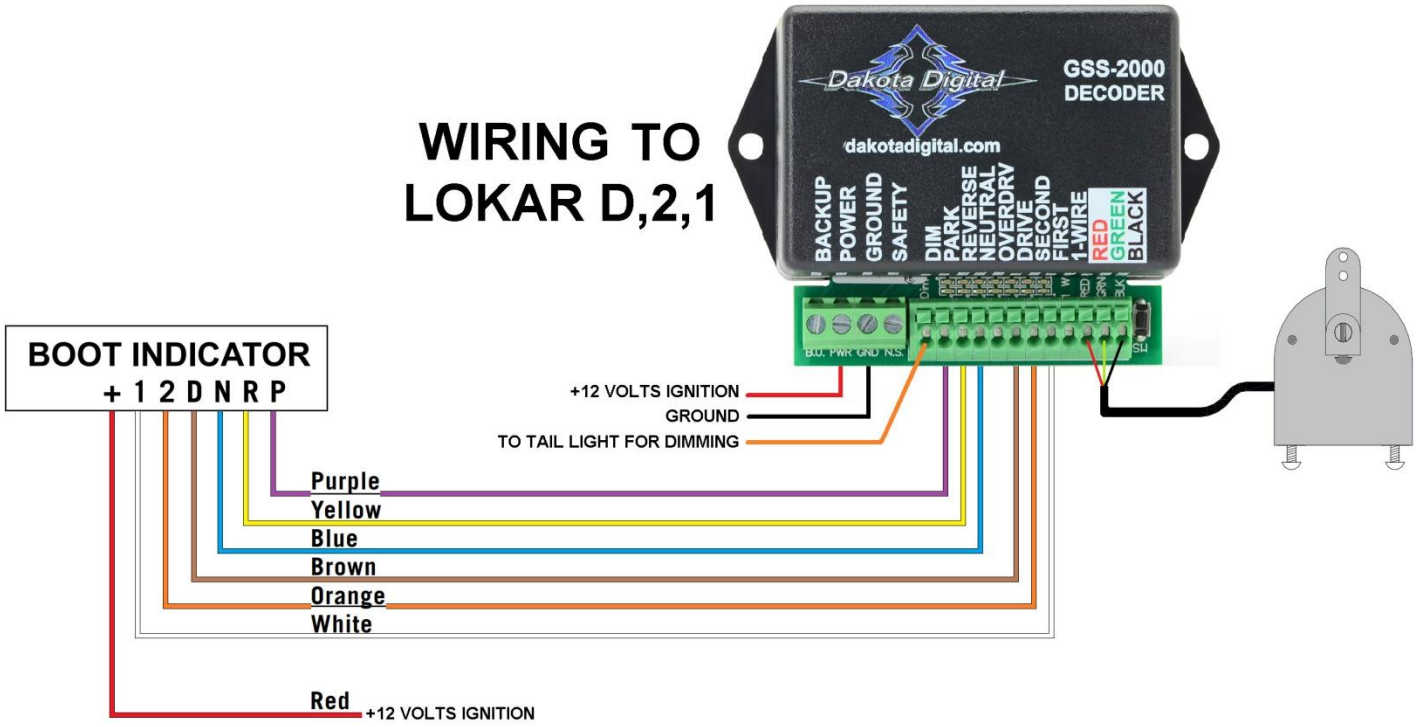




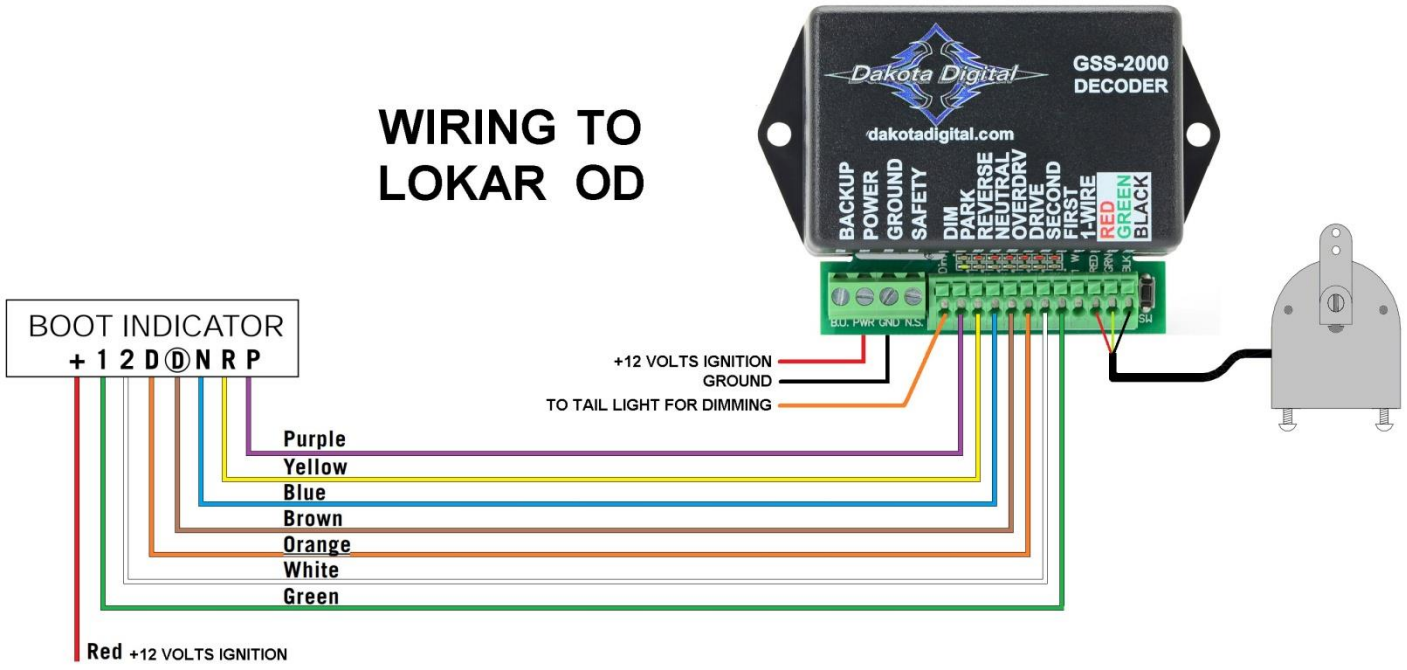


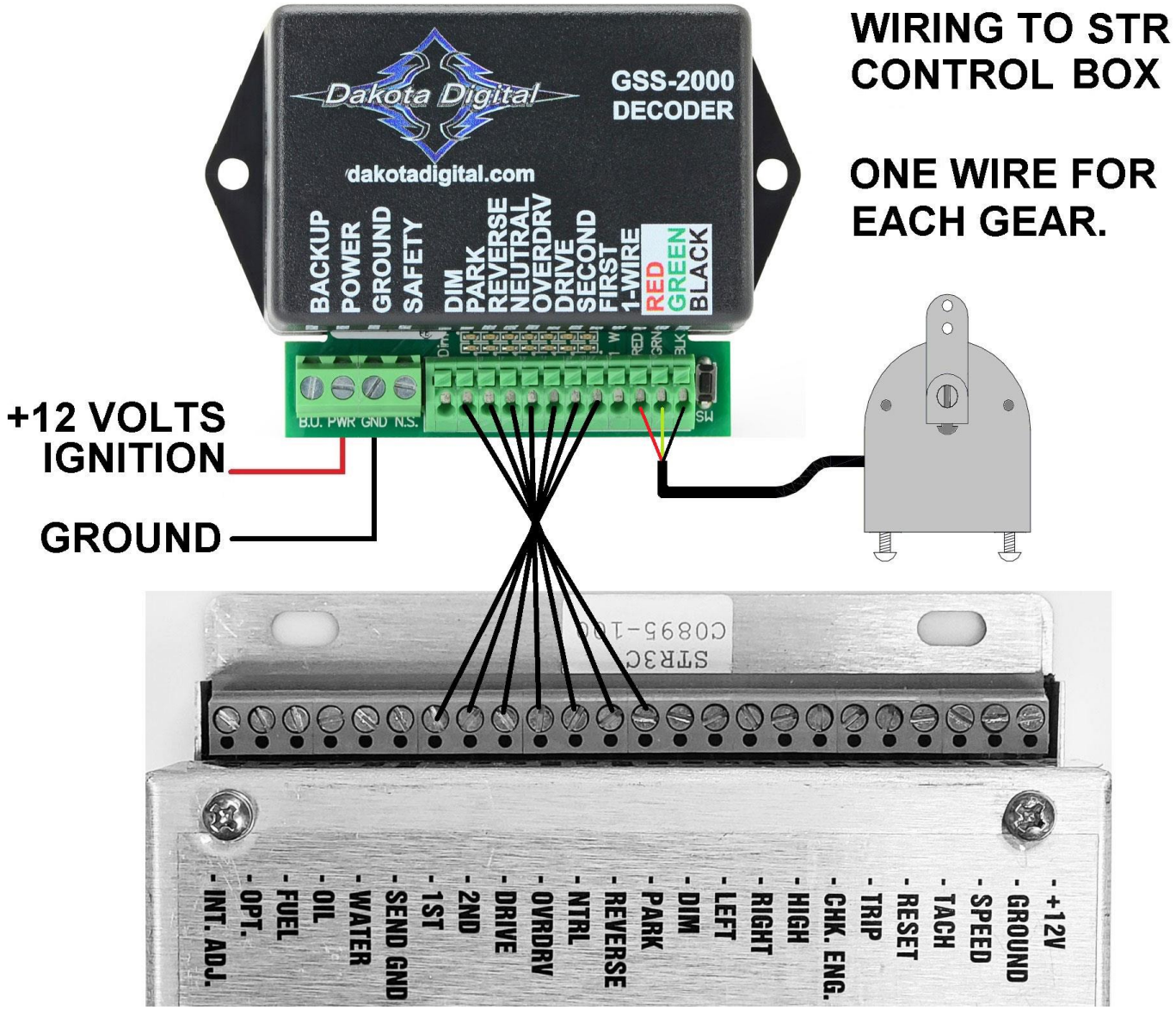
It is important to supply the DGS-3 or DGS-4 with accessory power (Red) and ground (Black) wires in the DGS harness. The display will not operate without supplied power and ground.

WIRING TO LOKAR D,2,1



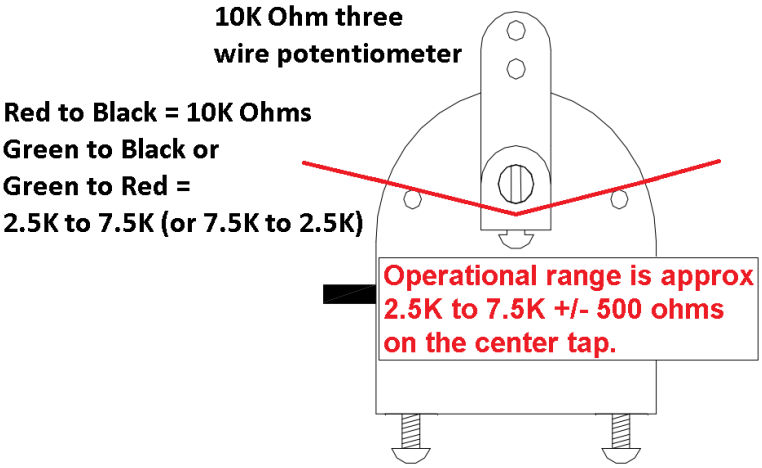
WIRING TO LOKAR OD





Electrical Specifications

GSS-2000 Specifications			
SUPPLY			
Voltage Input (+12) Range		5.6 to 22 V	
INPUTS			
		DIM Off	DIM On
DIM		< 1.6 V	> 4.0 V
OUTPUTS			
		Output Current	
Gear Output		< 0.2 A	
BACKUP		< 15 A	
CURRENT DRAW			
	Park-Neutral	Reverse	Drive
W/O Safety Relay	≈ 30 mA	≈ 80 mA	≈ 20 mA
W/ Safety Relay	≈ 160 mA	≈ 80 mA	≈ 20 mA



Programming gear positions

- ***To program the unit, use the small switch on the decoder, located near the sensor connection terminals, and watch the programming LED's (not visible until power applied) located near each gear output on the decoder.***

✓ The PARK light is directly behind the PARK terminal, REVERSE light is directly behind the REVERSE terminal, etc.

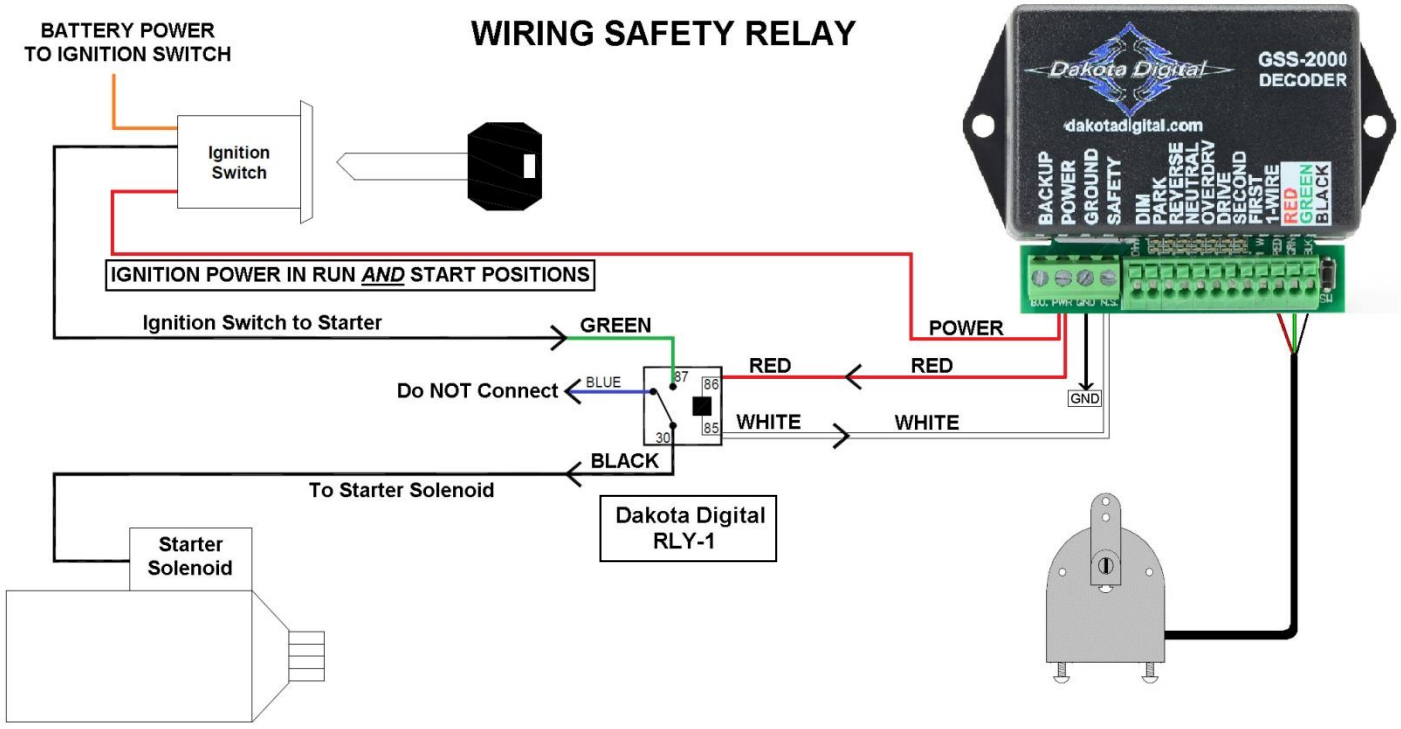
1. Place the transmission in PARK and make sure the key is off.
2. Press and hold the switch on the GSS-2000 decoder while turning the key on.
3. The LEDs should come on all green or all red. RED is for +12V outputs for Dakota Digital and most other displays. GREEN is for ground outputs for Lokar displays.
4. Press and release the switch to change the output type; change from RED or GREEN LEDs lit. Press and hold the switch, for about 4 seconds, until both RED and GREEN LEDs turn on to save the setting. Release the switch and begin gear programming.
5. The PARK LEDs will be flashing between RED and GREEN (transmission should be in PARK).
6. Press and hold the switch. The PARK LED should remain on steady, not flashing.
7. Release the switch. The REVERSE LEDs should begin flashing RED and GREEN; the PARK light will go out.
8. Shift the transmission to REVERSE.
9. Press and hold the switch. The REVERSE LED should remain on steady.
   (If the REVERSE LED will not quit flashing, the sensor is not turning or following.)
10. Release the switch. The NEUTRAL LEDs should begin flashing and the REVERSE LED will go out.
11. Shift the transmission to NEUTRAL.
12. Press and hold the switch. The NEUTRAL LED should remain on steady.
    (If the LED will not quit flashing, then the sensor is not turning.)
13. Release the switch. The OVERDRIVE LEDs should begin flashing and the NEUTRAL LED will go out.
14. Shift the transmission to OVERDRIVE. (If you do not have overdrive, then shift to DRIVE.)
15. Press and hold the switch. The OVERDRIVE LED should remain on steady.
    (If the LED will not quit flashing, then the sensor is not turning.)
16. Release the switch. The DRIVE LEDs should begin flashing and the OVERDRIVE LED will go out.
17. Shift the transmission to DRIVE. (If it is already in drive, then do not move it.)
18. Press and hold the switch. The DRIVE LED should remain on steady.
19. Release the switch. The SECOND LEDs should begin flashing and the DRIVE LED will go out.
20. Shift the transmission to SECOND. (If you do not have second, then shift to FIRST.)
21. Press and hold the switch. The SECOND LED should remain on steady.
    (If the LED will not quit flashing, then the sensor is not turning.)
22. Release the switch. The FIRST LEDs should begin flashing and the SECOND LED will go out.
23. Shift the transmission to FIRST. (If it is already in first, then do not move it.)
24. Press and hold the switch. The FIRST LED should remain on steady.
25. Release the switch. The FIRST LED will go out and then come back on steady.
26. Shift the transmission through each of the gears to verify that the programming LEDs match correctly, turning on steady when in appropriate gear.

Wiring: Optional outputs

Connecting neutral safety relay

- ✓ **If your vehicle already has a neutral safety switch in the wiring harness to prevent the vehicle from starting while it is in gear, you do not need to connect this neutral safety switch.**
- Cut the wire that goes from your starter switch to the starter solenoid.
- ✓ The wire you cut and connect to the relay should provide +12V to the starter solenoid when the ignition switch is in the start position, which engages the starter motor.
- Connect one end of the wire to the GREEN wire from the relay and connect the other end to the BLACK wire from the relay.
    - For wiring harnesses which provide wires for the neutral safety, connect one side to the GREEN wire and the other side to the BLACK wire.
- ✓ The WHITE wire from the relay connects to the SAFETY terminal on the decoder. The RED wire connects to the power wire for the decoder.

For the neutral safety switch to operate properly, the POWER terminal on the decoder as well as the red wire on the relay must have power when the key is in both the run and start positions.



Connecting Park-Neutral signals to ECM

- ✓ If your vehicle is fuel injected and the ECM requires a signal when the transmission is in either park or neutral, the neutral safety terminal can be used. The SAFETY terminal provides a ground output when the transmission is in park or neutral.
- ✓ The SAFETY terminal can be used for both a neutral safety and ECM signal at the same time.

Connecting reverse-lights to GSS-2000

- ✓ **If your vehicle already has a backup light switch, then you do not need to connect anything to the BACKUP terminal**.
- Connect the “hot side” of the backup lights to the terminal marked BACKUP. This circuit is designed to supply +12V up to 15 amps when the transmission is in reverse.

Troubleshooting Guide

Problem	Cause	Solution
None of the lights will come on.	Power wire not connected. Ground wire not connected	Ensure a +12 volt wire is connected. Make sure the ground wire is connected to a good ground.
Always shows the same gear or will not set properly	Sensor wire not connected. Sensor arm not connected. Sensor linkage connector is stuck or bound up. Decoder is set for wrong output type. Decoder has not been set.	Make sure all three wires from the sensor are connected. Be sure the sensor arm moves as the gear selector is moved. Check the linkage connector and sensor arm; they must move freely as the trans is shifted through the gears. Repeat steps 1-4 on page 11 and select all red lights on. Program the decoder. See page 11.
Indicator LEDs are all on except for the correct gear.	Decoder is set for wrong output type.	Repeat steps 1-4 on page 11 and select the opposite light color. (red or green).
Reverse and Overdrive LEDs are on at the same time.	Sensor ground wire open. Sensor is moving out of its operating range.	Check sensor wire connections. Loosen sensor arm set screw. Rotate the sensor shaft so that the slot in the end aligns with the sensor arm. Retighten set screw. See page 2.
Overdrive and Second LEDs are on at the same time.	Sensor RED wire open. Sensor signal wire is shorted to ground. Sensor is moving out of its operating range.	Check sensor wire connections. Check sensor cable. Check sensor wire connections. Loosen sensor arm set screw. Rotate the sensor shaft so that the slot in the end aligns with the sensor arm. Retighten set screw. See page 2.
Overdrive, Neutral, and Drive LEDs are flashing.	Decoder settings are incorrect or have been corrupted.	Reprogram the decoder. See page 11.
The neutral safety relay and decoder make “clicking” sound.	Decoder is losing power	Make sure PWR terminal has 12 volts when the key is in both the **on** and **start** positions.
The neutral safety does not allow the starter to engage.	Decoder is losing power when key is placed in the start position.	Make sure PWR terminal has 12 volts when the key is in both the **on** and **start** positions.

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.

⚠**WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

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