



GSS-3000 Universal Gear Shift Sender

Your new GSS-3000 includes:

Hardware pack / mounting plates



Decoder



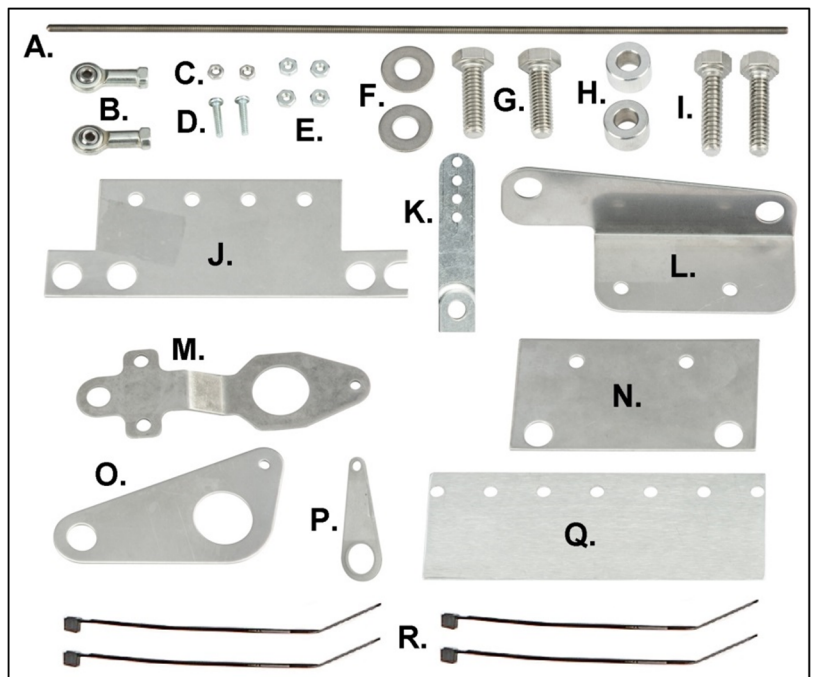
30 Amp Relay



Sensor

393115 package contains:

- A. 1x – threaded rod (M3x9.5")
- B. 2x – Ball joint end assembly
- C. 2x – M3-0.5mm nut
- D. 2x – Screw, 4-40
- E. 4x – Nut, 4-40
- F. 2x – Washer 5/16"
- G. 2x - 5/16" x 1" bolt
- H. 2x – Spacer, 3/8" ID
- I. 2x – M8x30mm bolt
- J. 1x – GM mounting plate
- K. 1x – Long gear shift sender arm
- L. 1x - C-4 mounting plate
- M. 1x - C-4 linkage connector
- N. 1x - C-6 mounting plate
- O. 1x - C-6 linkage connector
- P. 1x – GM linkage connector
- Q. 1x – Universal mounting plate
- R. 4x – Zip Ties



Product Features

The GSS-3000 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.

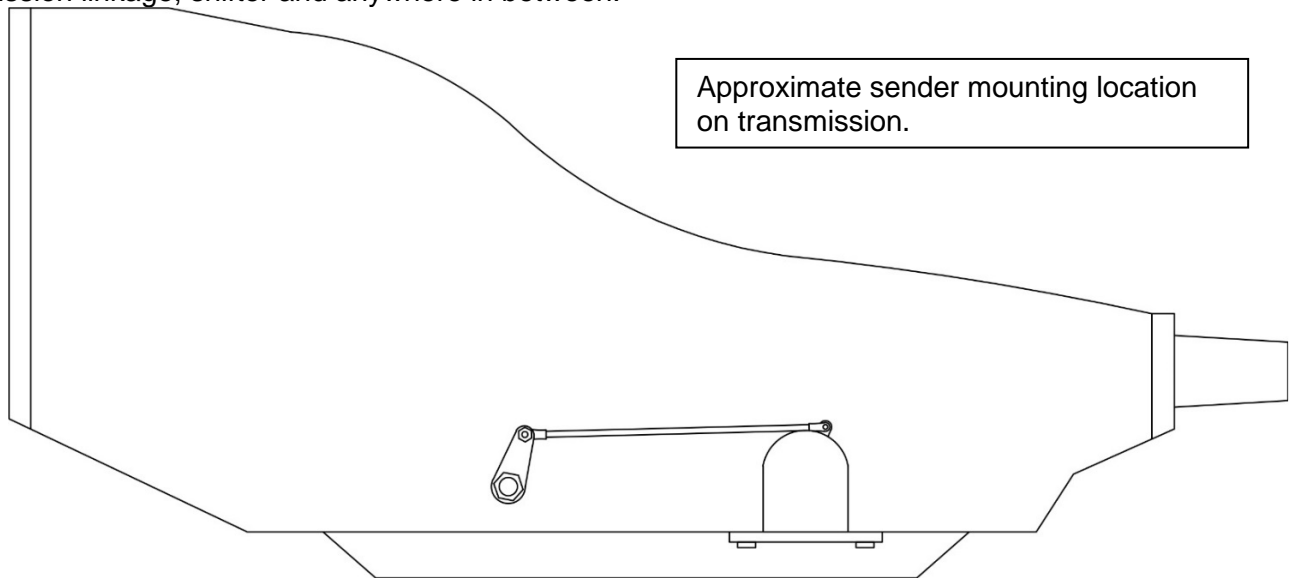
Installation

In a typical installation, the sensor mounts to the side of the transmission using two pan bolts. A stainless steel lever will attach to the transmission detent shaft, and a threaded rod with ball joint ends connects the machined sensor arm to the lever; this allows the sensor arm to move as the transmission is shifted through the gears. The threaded rod can be cut to length to match the application. 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.

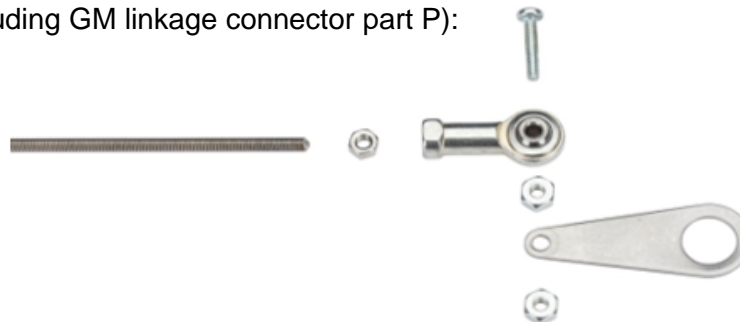
If a Kugel or Lokar adjustable shifter is being used, you will need a Kugel nut to attach the sensor to the shift linkage. KN-3 (standard thread) and KN-4 (metric) Kugel nuts are available from Dakota Digital, Inc.

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.

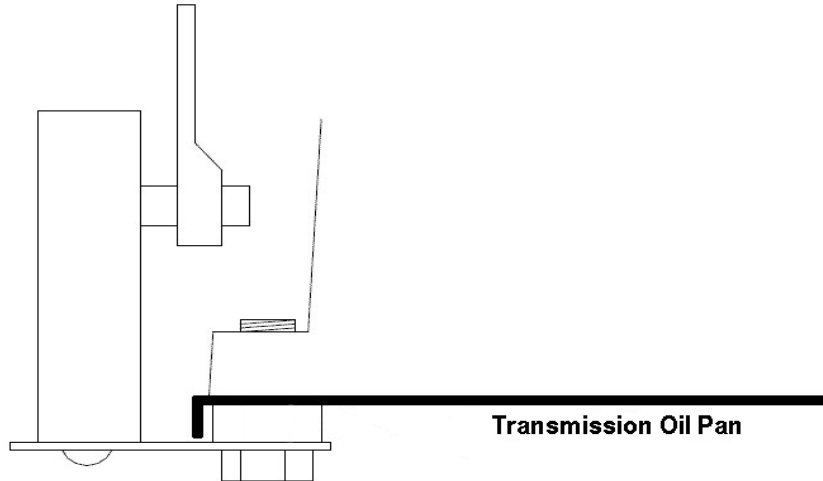


Assembly of rod ends (including GM linkage connector part P):

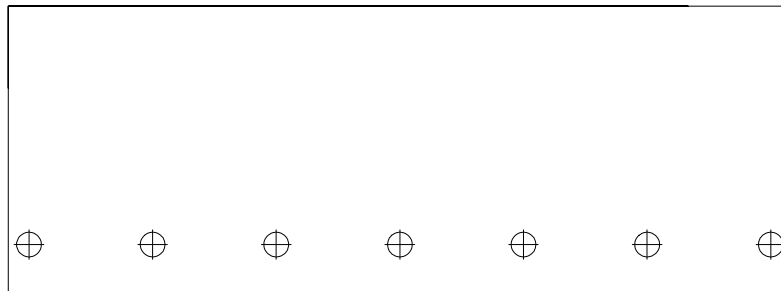


Installation: Mounting plate spacers, universal plate and sensor arm

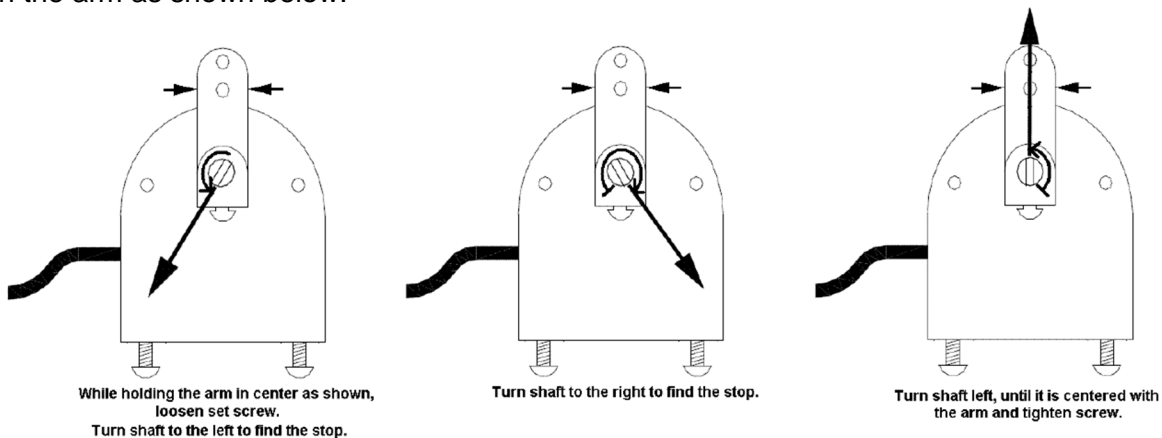
GM TH350/400 and Ford C4/C6 applications can use the supplied 1" 5/16-18 bolts to secure the mounting plate. M8x30mm metric bolts are also supplied for use on some newer model transmissions. 5/8" OD spacers are supplied to get the mounting plate away from the pan lip or shifter cable.



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.



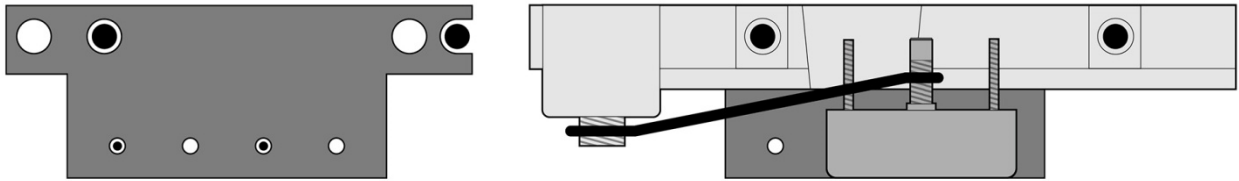
In the event you need to remove or repositioning the sensor arm, be sure the slot in the center of the shaft is aligned with the arm as shown below.



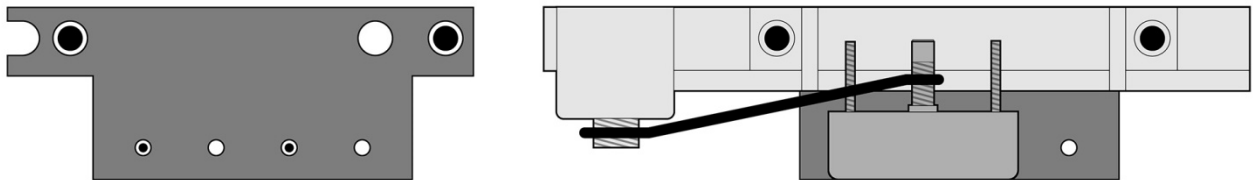
Installation: GM Applications TH350, TH400, 700R4, and 4L60E/4L70E

Connecting rod length for GM applications is typically 4.25" from rod end eye to eye.

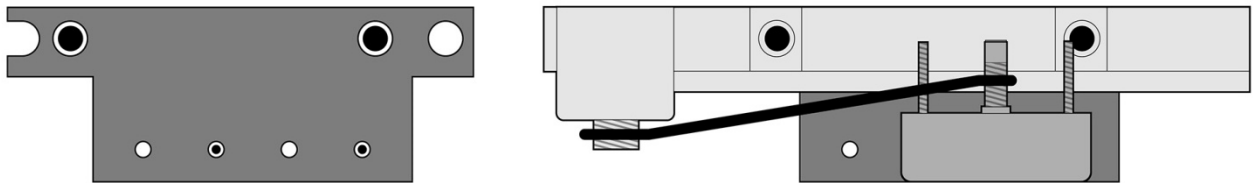
GM TH350 installation, top view



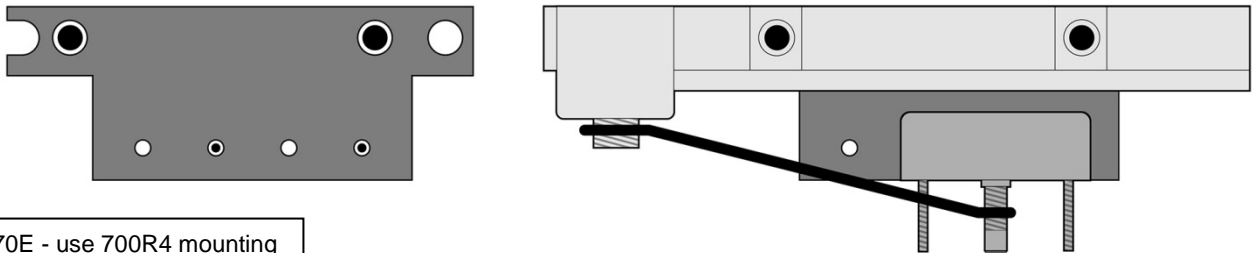
GM TH400 installation, top view



GM 700R4 installation, top view



GM 4L60 installation, top view



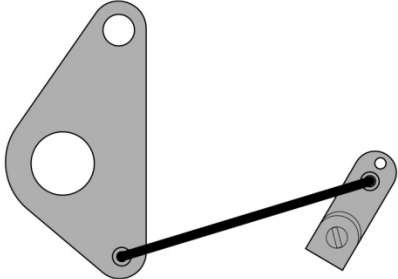
4L60/70E - use 700R4 mounting holes with sensor facing out

Installation: Ford C4 and C6

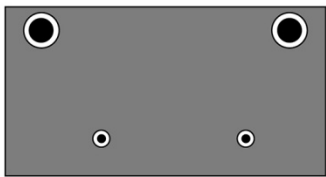
Ford C6

Connecting rod length is typically 4.25" from rod end eye to eye.

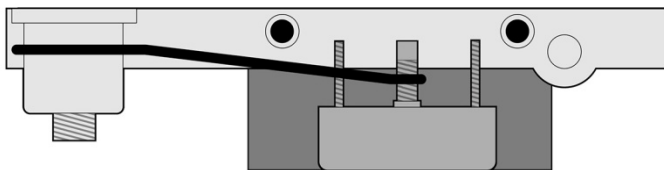
Linkage connector and sensor arm:



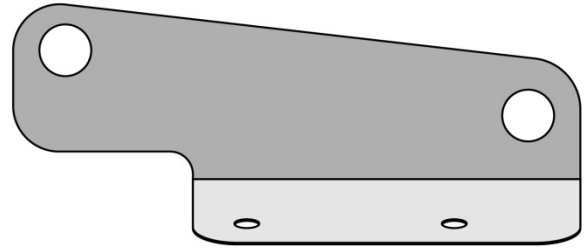
Sensor mounting plate



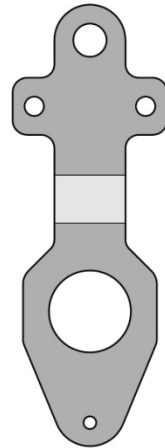
Assembled sensor and plate connected to transmission



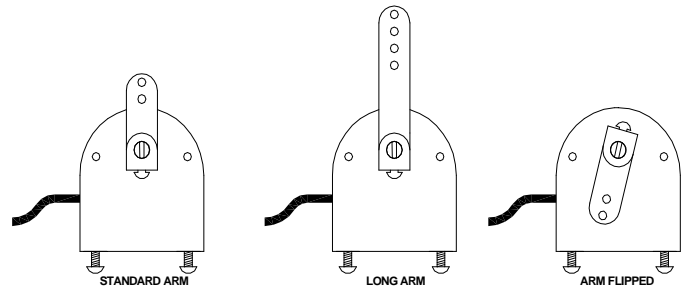
Ford C4



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.
Attach to detent shaft



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.

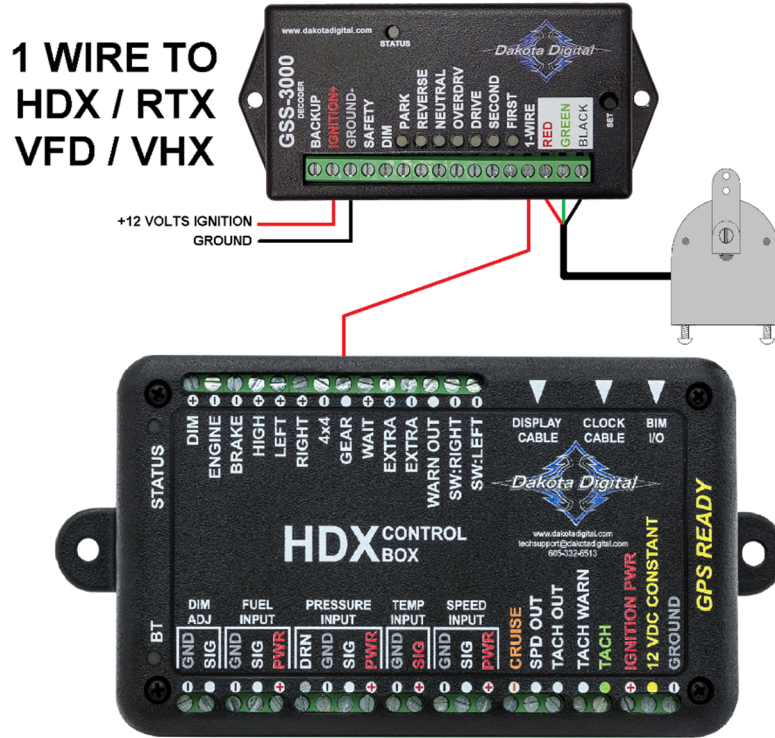
Installation: Wiring

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.

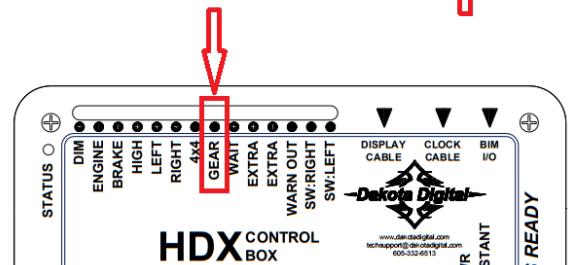
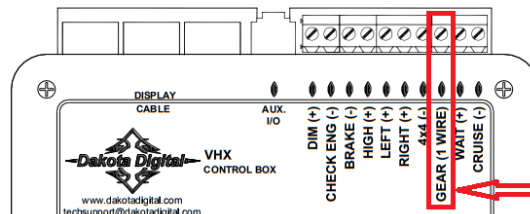
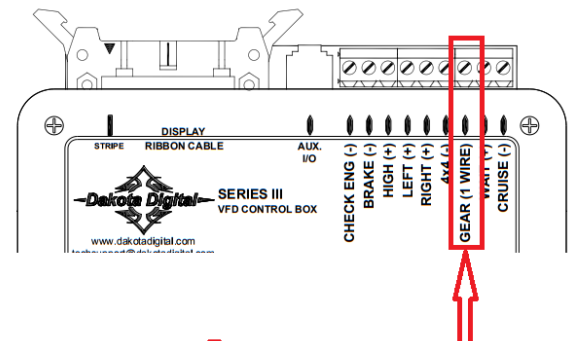
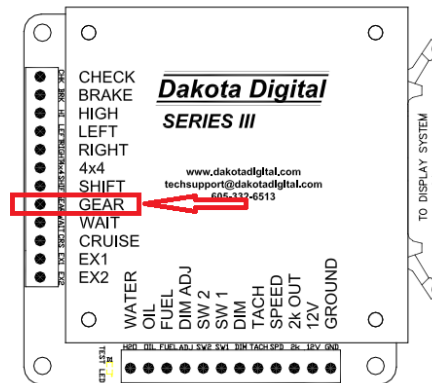
Connecting decoder to Dakota Digital control box

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.

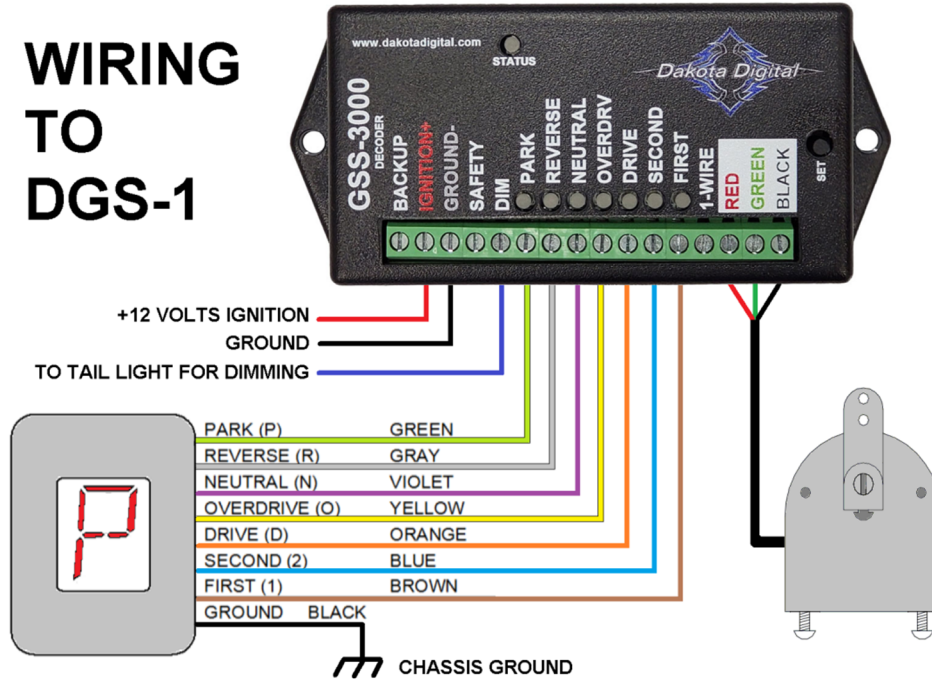


Installation: Wiring

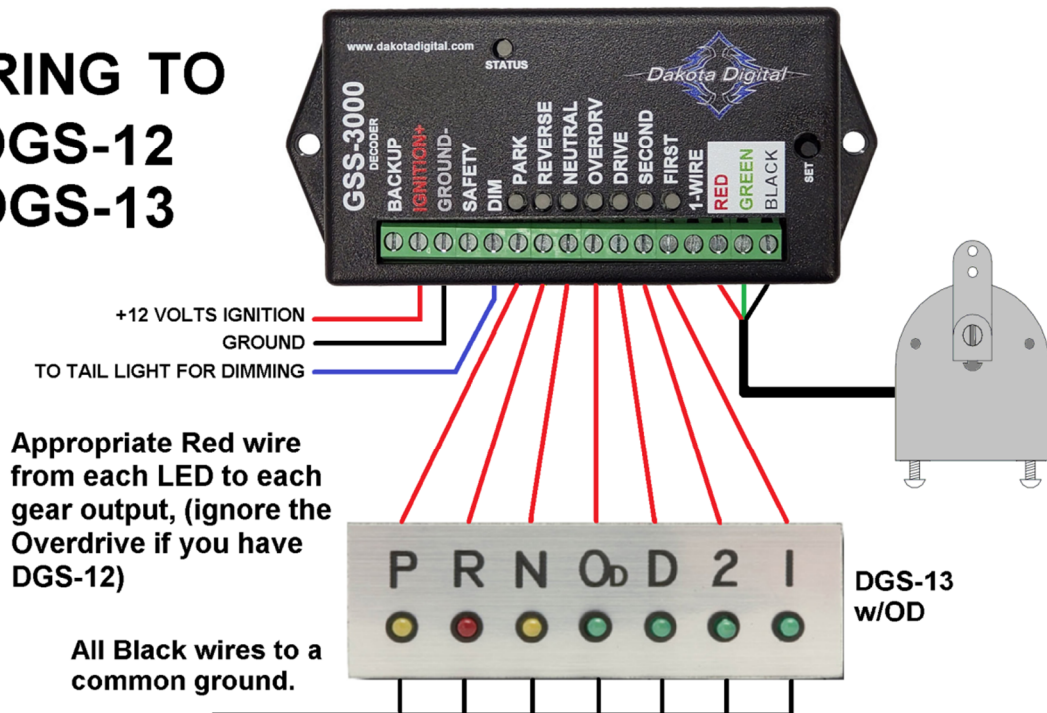
Connecting the decoder to DGS-series indicators

The GSS-3000 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.

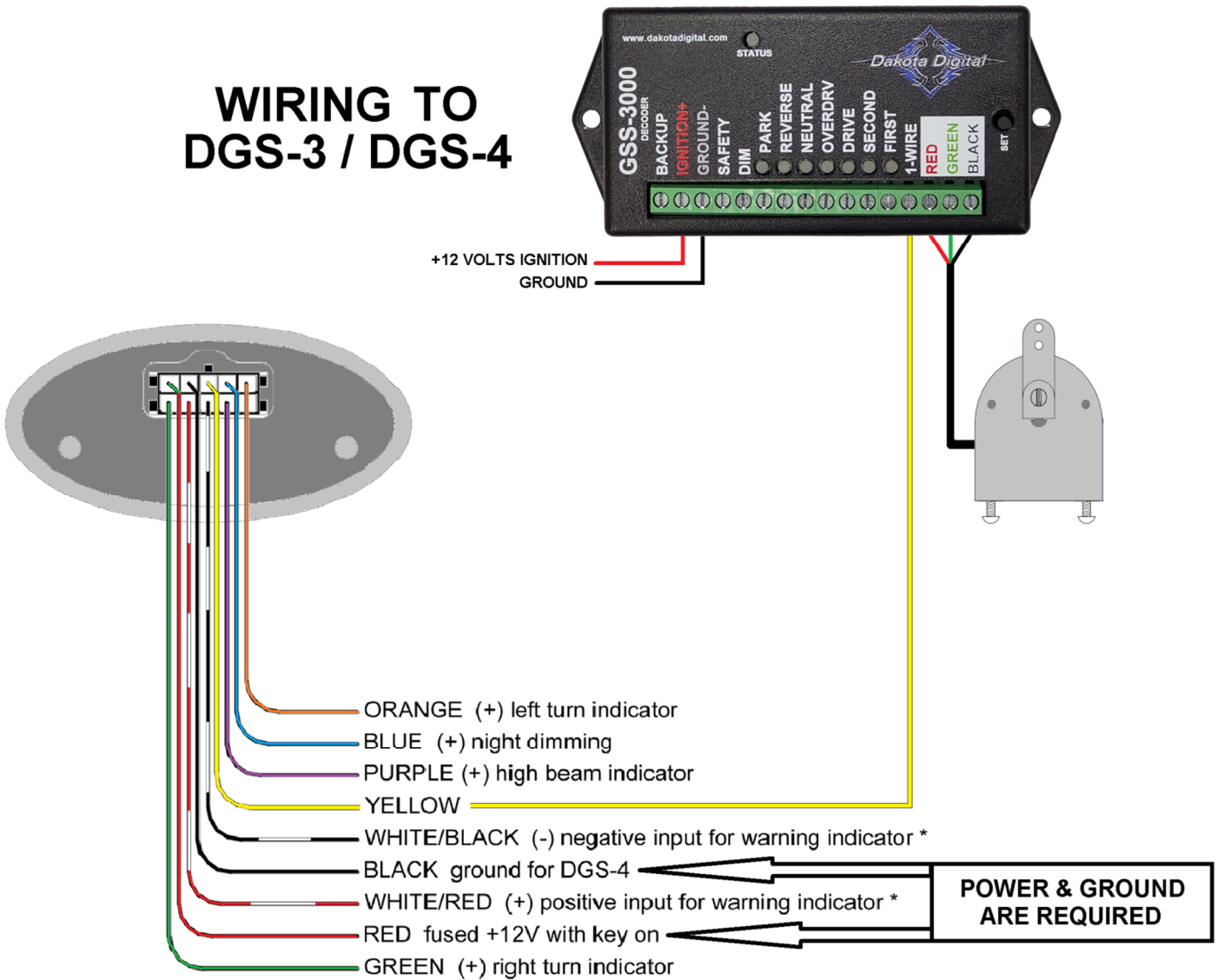
WIRING TO DGS-1



WIRING TO DGS-12 DGS-13

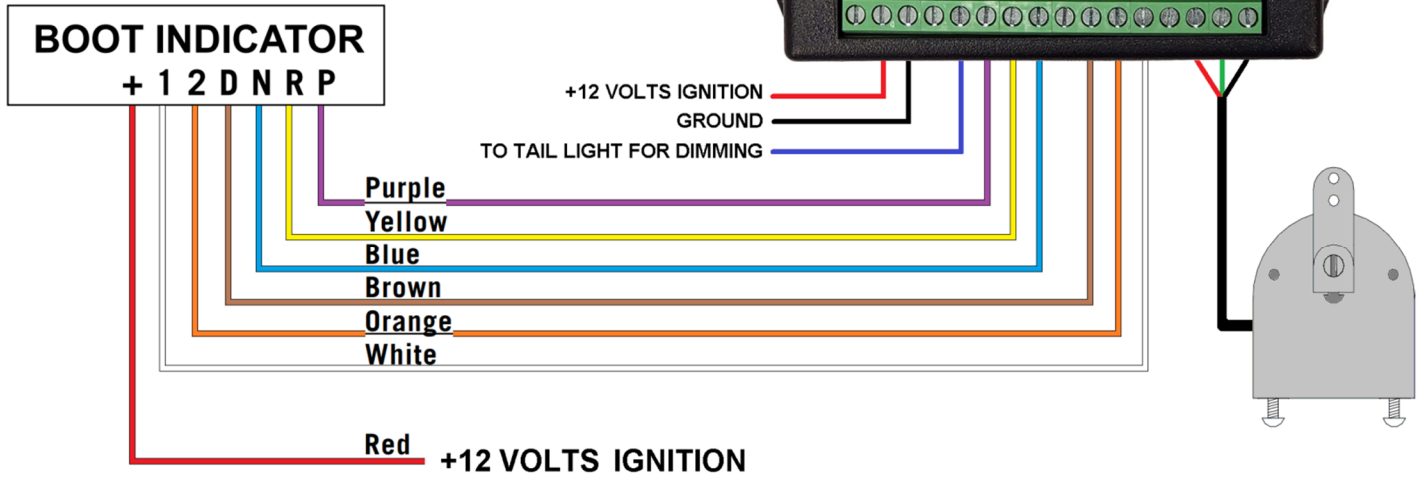


WIRING TO DGS-3 / DGS-4

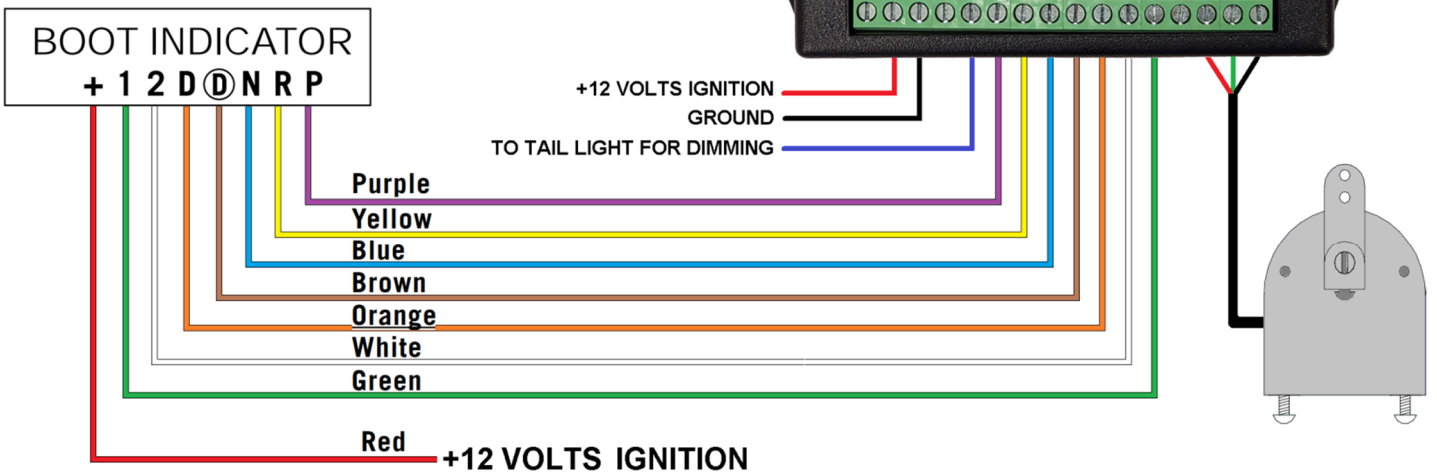


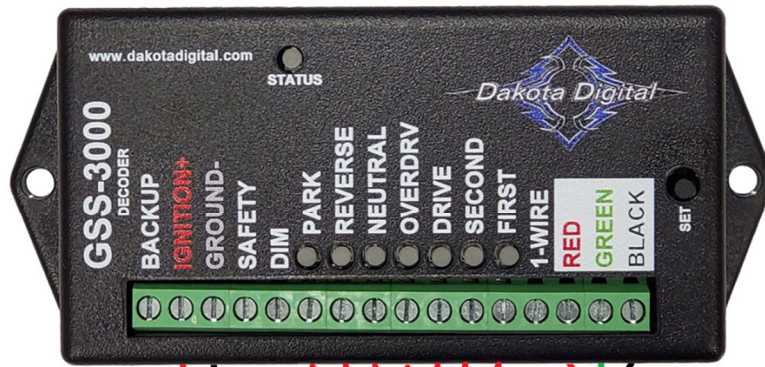
It is important to supply the DGS-3 or DGS-4 with accessory power (Red) and ground (Black) wires in the DGS harness. The display will not operate without supplied power and ground.

WIRING TO LOKAR D,2,1



WIRING TO LOKAR OD

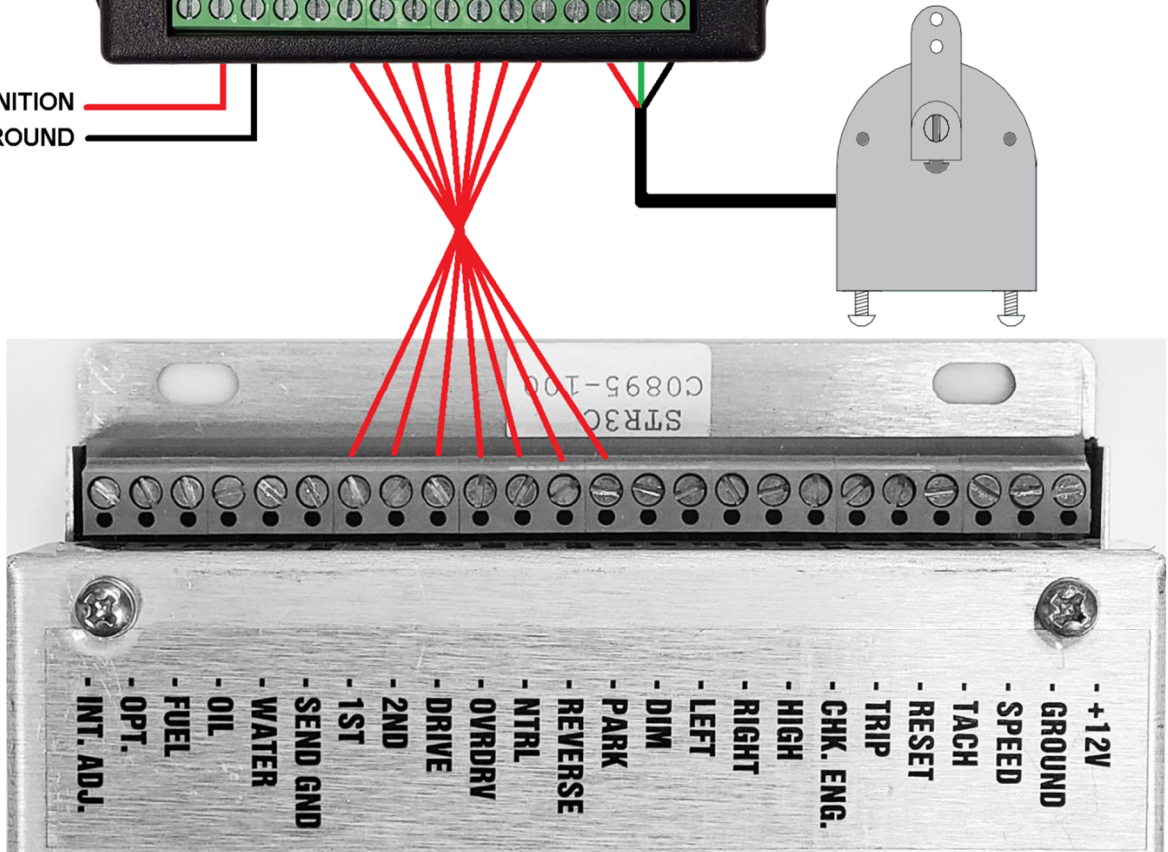




WIRING TO STR CONTROL BOX

ONE WIRE FOR EACH GEAR.

+12 VOLTS IGNITION
GROUND

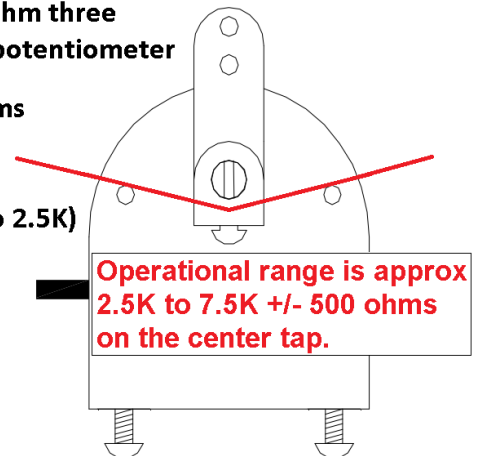


Electrical Specifications

GSS-3000 Specifications		
SUPPLY		
Voltage Input (+12) Range	5.6 to 22 V	
INPUTS		
	DIM Off	DIM On
DIM	< 3 V	> 7 V
OUTPUTS		
	Output Current	
Gear Output	< 0.2 A	
BACKUP	< 15 A	
CURRENT DRAW		
W/O Safety Relay	≈ 20 mA	
W/ Safety Relay	≈ 150 mA	

10K Ohm three wire potentiometer

Red to Black = 10K Ohms
Green to Black or
Green to Red =
2.5K to 7.5K (or 7.5K to 2.5K)



Programming gear positions

- **Programming is done using the SET push button switch and watching the programming lights that light through the case located next to each gear output on the GSS-3000.**
- For reverse valve body, the pattern is different, just shift to each gear that the GSS-3000 is request with the LED flashing. Once programmed, the proper gear pattern will be displayed.
- REVERSE, NEUTRAL, and DRIVE **must** be programmed but all other gear positions are optional, (Some early automatic transmissions had no PARK position).
- To skip a gear in a PRND21 pattern, (no OVERDRIVE)
 - when OVERDRIVE is flashing:
 - Shift the vehicle into DRIVE
 - Tap the button when the OVERDRIVE LED is flashing to skip to DRIVE
 - When DRIVE is flashing, hold the button for 3 seconds to save and continue

- 1) Place the transmission in PARK and make sure the key is off.
- 2) Press and hold the SET switch on the GSS-3000 decoder while turning the key on.
- 3) Release the switch.
- 4) The status LED should be solid RED and the gear indication LEDs should come on either all green or all red.
 - a) Gear indication LEDs –
 - i) RED is for +12V outputs for Dakota Digital and most other displays.
 - ii) GREEN is for ground outputs for Lokar displays.
 - b) Tap SET to change the output type, toggle from RED or GREEN LEDs lit.
 - c) Press and hold the switch, for about 3 seconds, until the LEDs turn off to save the setting.
 - d) Release the switch and begin gear programming.
- 5) The PARK LED should be flashing.
- 6) Press and hold the SET button, for about 3 seconds, until the PARK LED is solid.
 - a) Release the SET switch.
- 7) The REVERSE LED should be flashing,
- 8) Shift to Reverse
- 9) Hold the SET switch until, for about 3 seconds, until the REVERSE LED solid
- 10) Repeat process for each gear
- 11) To finish programming and save the settings
 - a) If FIRST is the last gear: skip to **b)**
 - i) If FIRST is not the last gear, (PRND pattern for six speed transmissions)
 - ii) Tap the switch twice until the FIRST LED is out, (skipping 2nd and 1st gears)
 - iii) Go to **c)**
 - b) Press and hold the switch until the FIRST LED is out
 - c) The STATUS light will be the only LED flashing red
 - d) Press and hold the switch to save the settings and exit setup.

CHANGING GEAR DRIVE POLARITY FOR LOKAR LED DISPLAYS

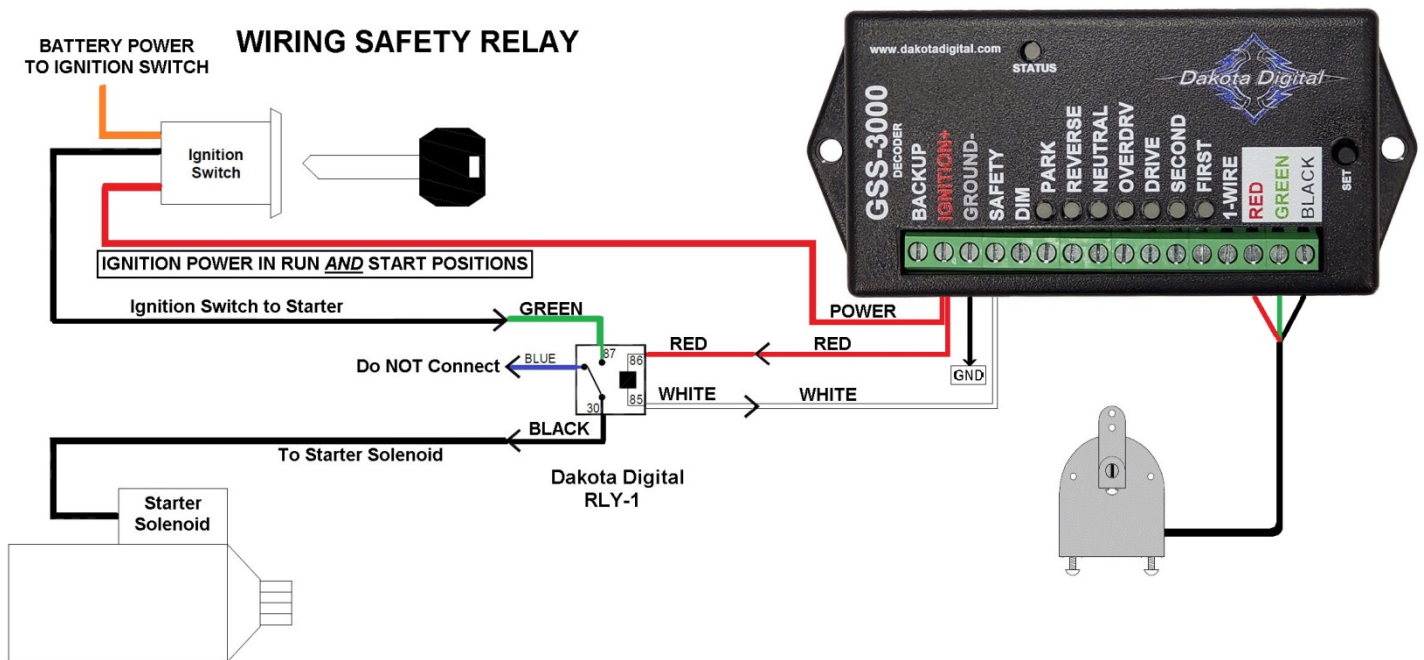
1. Press and hold the SET switch on the GSS-3000 decoder while turning the key on.
2. Release the switch.
3. The STATUS light should be solid RED
 - a. RED is for +12V outputs (Dakota Digital)
 - b. GREEN is for ground outputs (Lokar)
4. Press and release the SET switch to change the output polarity, GREEN LEDs.
5. Press and hold the switch to save it.
6. The Park LED will be flashing Green, and the status LED will be green
7. If the gears have already been programmed and only the output is wrong, DO NOT reprogram the gears!
8. Turn the key off to exit setup.

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-3000

- ✓ 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 3.
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 3.
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.
Gear LED doesn't change and status LED flashes between red and green	GSS did not see the sensor move when gear was changed	Make sure gear position was moved Verify that the sensor arm is secured to the shaft.
Gear pattern PRNO won't save	Reverse, Neutral, and Drive must be part of all programming	Program pattern as PRND

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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