

# ***Dakota Digital***

## Universal Gear Shift Sender GSS-1

*The latest in digital electronics technology for the  
street rodder, car, and truck enthusiast.*

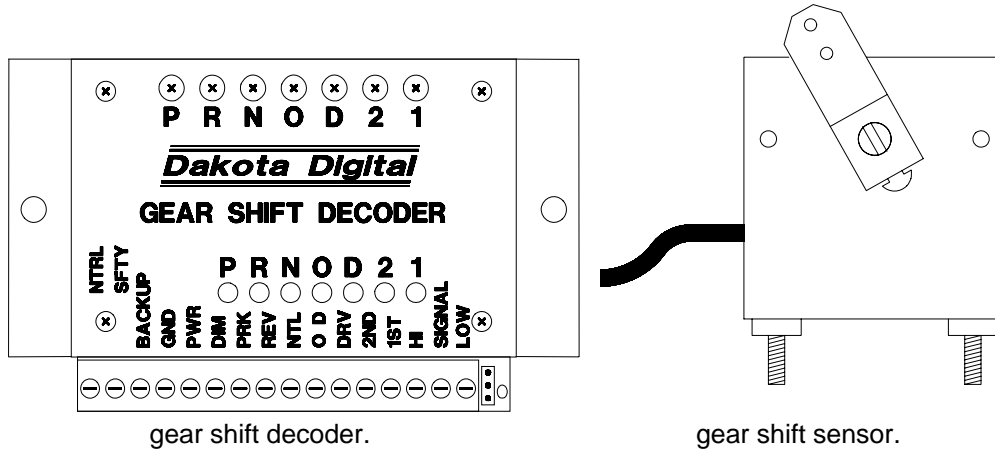
### INSTALLATION AND OPERATION MANUAL

*Please read this before beginning installation or wiring.*

# ***Dakota Digital***

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# Universal Gear Shift Sender GSS-1



The Dakota Digital universal gear shift sender consists of 3 main components, these are the sensor, decoder, and mounting brackets. The sender mounts to the transmission and converts the transmission linkage arm position into an electrical signal. The decoder converts the electric signal from the sender into the individual outputs for each gear and provides the neutral safety and backup features. The mounting brackets attach the sensor to the transmission housing and linkage arm.

The only parts of the gear shift sender that are different for the different transmissions are the mounting brackets. The GM 350, 400, and 700-R4 use the same linkage connector and mounting plate, but different holes in the mounting plate. The Ford C-6 and C-4 each have different mounting plates and linkage connectors.

For other transmissions, a universal mounting plate is provided. 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 and 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.

The arm which is mounted on the sender allows for a 1 3/4" throw with the outside hole and 1 5/16" throw with the inside hole. The longer arm which is sent in the kit allows for throws from 3 1/2" with the outside hole to 2 3/16" with the inside hole. The sensor does not have to use all of the travel available to work, but the more travel that is used the easier it will be to set each gear.

## PARTS LIST

description	quantity
gear shift decoder	1
gear shift sender with 10' cable	1
long gear shift sender arm	1
spacer (7/16" hex nut)	2
5/16" x 1" bolt	2
5 1/4" rod	1
4 1/4" rod	1
3 1/4" rod	1
1/8" retainer clips for rods	6
GM mounting plate	1
GM linkage connector	1
C-4 mounting plate	1
C-4 linkage connector	1
C-6 mounting plate	1
C-6 linkage connector	1
universal mounting plate	1

## WIRING

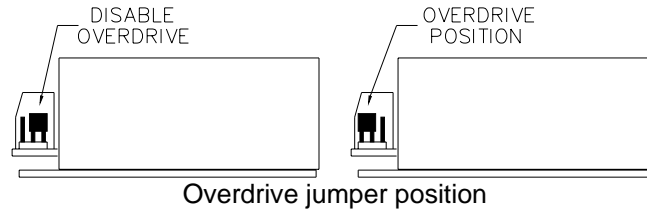
The terminals on the decoder are connected as follows:

NTRL	Cut the wire going to your starter solenoid. Connect the
SFTY	wires to the two neutral safety terminals.
BACKUP	positive side of backup lights
GND	chassis ground
PWR	Ignition terminal from fuse panel
DIM	Park light or tail light circuit
PRK	to park indicator
REV	to reverse indicator
NTL	to neutral indicator
O.D.	to overdrive indicator
DRV	to drive indicator
2nd	to second indicator
1st	to first indicator
HI	+ wire from gear sensor
SIGNAL	green wire from gear sensor
LOW	- wire from gear sensor

The neutral safety and backup light features do not have to be connected for gear sender to work. These are optional features provided for vehicles which do not already have these provisions.

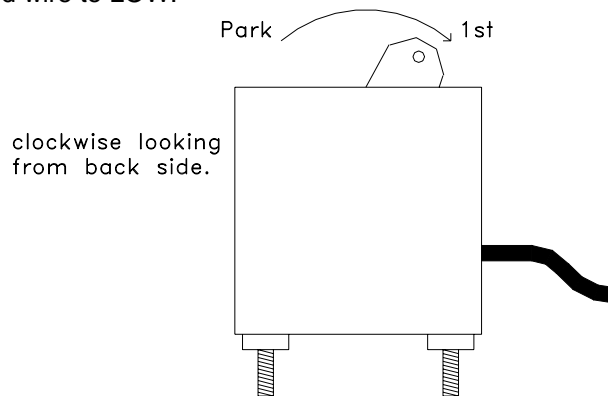
### ENABLE/DISABLE THE OVERDRIVE OUTPUT

The black jumper located on the right side of the terminal strip is used to enable the overdrive output. If you are using an overdrive transmission place the jumper on the front two posts next to the O. If you are using a standard automatic transmission place the jumper on the back two posts.



### CONNECTING SENSOR TO DECODER

The sensor has a 10 foot gray cable attached to it. This cable contains 3 wires which connect to the decoder. Connect the green wire to the terminal marked SIGNAL. The connection for the red and black wires depends on the sensor mounting and transmission. If the sensor arm moves clockwise going from park to low, connect the red wire to the HI terminal and the black wire to LOW. If the sensor arm moves counter-clockwise from park to low, connect the black wire to HI and the red wire to LOW.

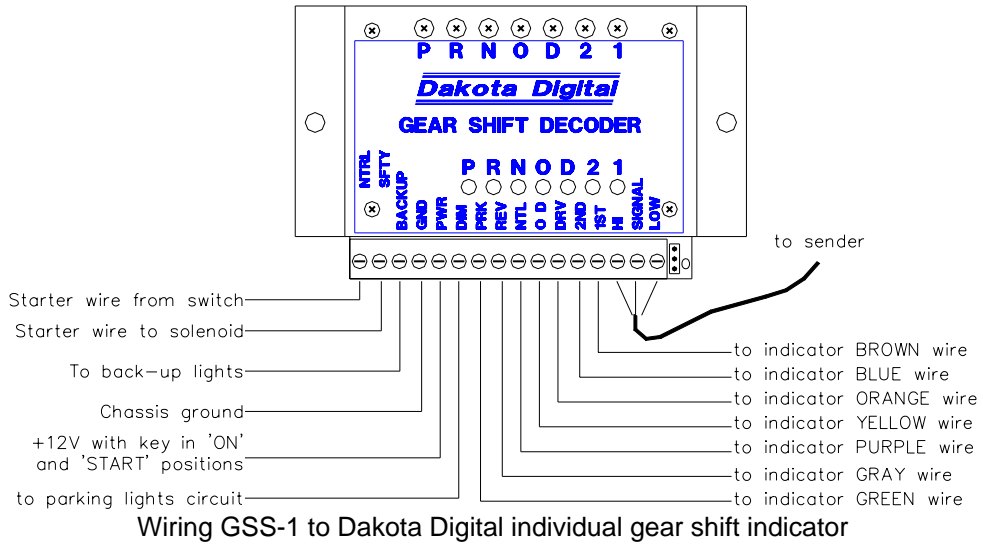
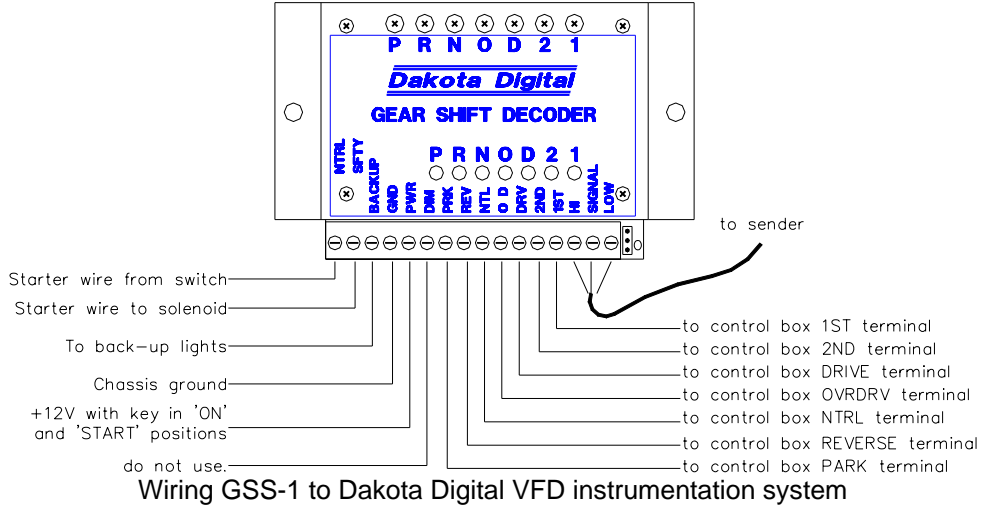


### PROGRAMMING THE GEARS

To program the gear positions into the decoder, begin by turning all of the adjustments fully counter clockwise. Care should be taken to not overturn the adjustments. Each adjustment has a stop at its fully clockwise and fully counter clockwise position. The adjustments have 3/4 rotation from stop to stop. Forcing the adjustment to turn past its stop will damage the adjustment. A tool is provided for turning the adjustments, although they can be made using a #1 or #0 Phillips screwdriver. All of the programming lights should now be out. Set the parking brake and then place the transmission in park. Turn the 'P' adjustment clockwise until the 'P' programming light comes on. You will probably have to turn the adjustment 1/2 turn or more. Place the transmission in reverse. The park light should still be on. Turn the 'R' adjustment clockwise until the 'R' programming light comes on. You should not have to turn it as far as you did for park. The 'P' light will go out at the same time the 'R' light comes on. Repeat this procedure until all of the gears are programmed.

## CONNECTING TO GEAR SHIFT DISPLAY

Gear shift displays are not included with the GSS-1, but it will interface with all of the standard display systems available. Each gear output will provide 12 volts at up to 0.3 amperes. 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. The GSS-1 will also work with any Dakota Digital vacuum florescent display system. Connect wire jumpers between the decoder and the display system control box.



### **CONNECTING THE NEUTRAL SAFETY SWITCH**

If your vehicle already has a neutral safety switch in the wiring harness to prevent the vehicle from starting while it is in gear, then you do not need to connect this neutral safety switch.

Otherwise, cut the wire that goes from your starter switch to the starter solenoid.

Connect one end of the wire to the first terminal on the decoder box and connect the other end to the second terminal on the decoder box. For wiring harnesses which provide wires for the neutral safety, connect one wire to the first terminal and the other wire to the second terminal.

For the neutral safety switch to operate properly, the 12V terminal must have power when the key is in both the run and start positions.

### **CONNECTING BACKUP LIGHTS TO THE GSS-1**

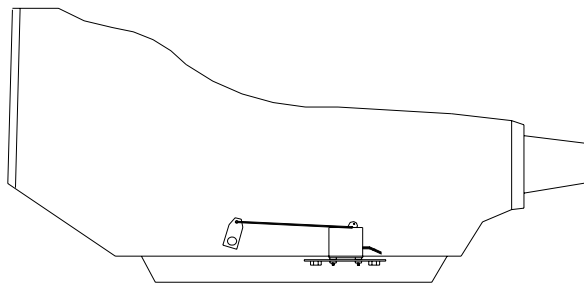
If your vehicle already has a backup light switch, then you do not need to connect anything to the BACKUP terminal. If you do not have a backup switch and will be using backup lights on your vehicle, then connect the hot side of the backup lights to the terminal marked BACKUP. This circuit is designed to supply up to 15 amps.

### **MOUNTING SENSOR TO TRANSMISSION.**

The diagrams on the following pages show the mounting hardware used and mounting location for the most common transmissions. For most applications, the sensor mounts to the side of the transmission using a couple of the transmission pan bolts. An metal plate will attach to the transmission linkage so that it rotates as the transmission is shifted. A rod with a couple of bends in it connects the sensor arm to the plate on the transmission linkage. 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 decoder converts these positions into separate a 12 volt output for each gear.

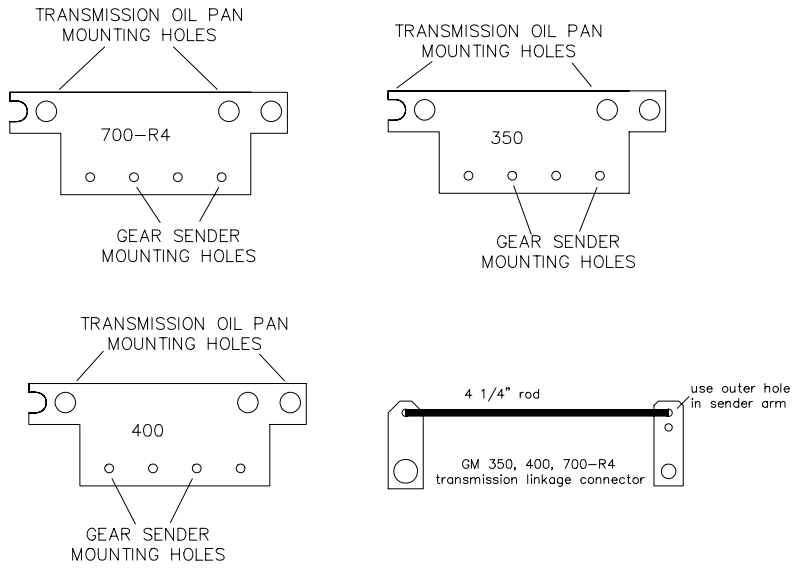
If a Kugel adjustable shifter is being used, you will need a Kugel nut to attach the sensor to the shift linkage. The Kugel nut is available from Dakota Digital.

As the transmission is shifted through all of the gears, the sensor arm should not hit either of its stops, or get 'bound' or 'hung up'. When properly adjusted, the sensor arm will move through about 1/2 or more of its full travel. If the sensor arm moves through less than 1/2 of its travel, it may be difficult for the decoder to distinguish between gears.

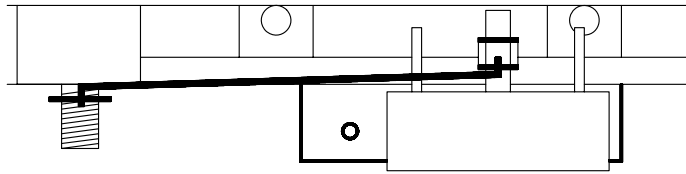


Approximate sender mounting location on transmission.

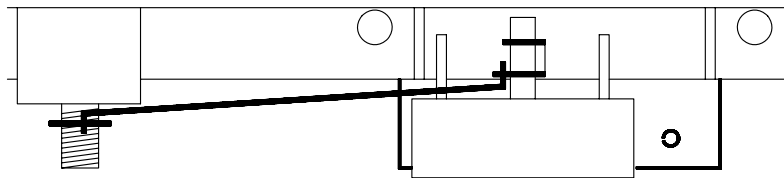
# Mounting to a GM 350, 400, or 700-R4 transmission.



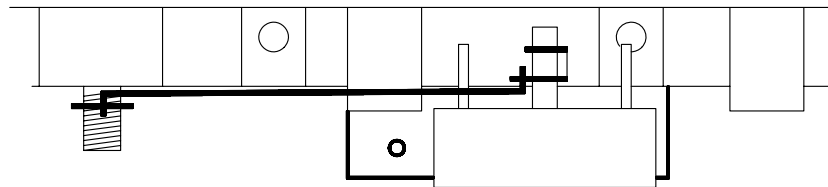
top left side view of GM 700-R4 transmission



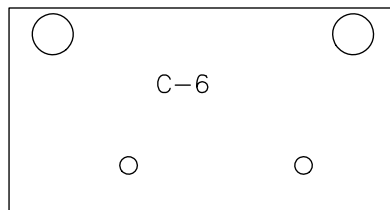
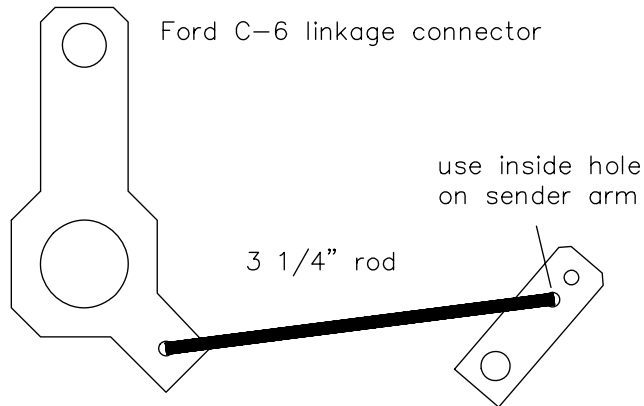
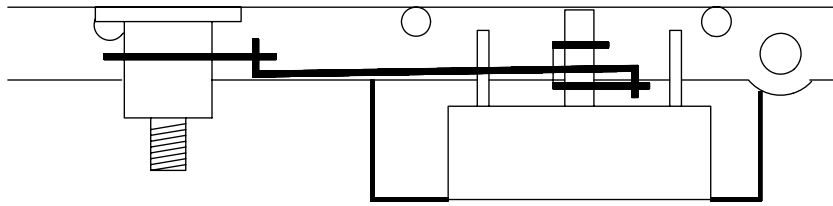
top left side view of GM 400 transmission



top left side view of GM 350 transmission

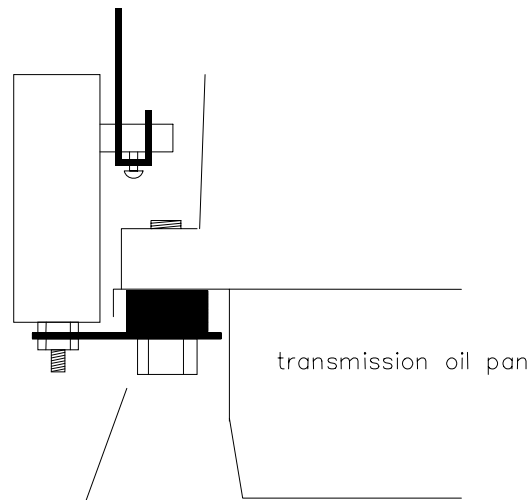


### Mounting to a Ford C-6 transmission



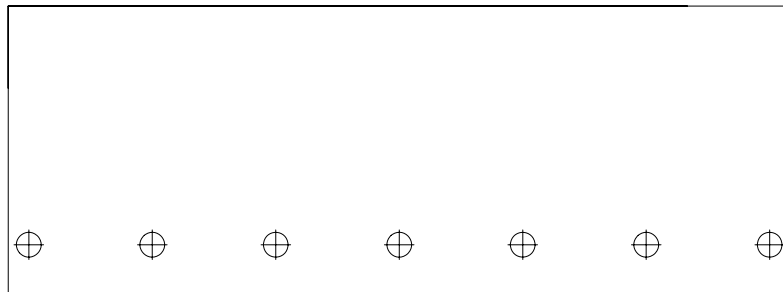
Depending on the shifter you are using, you may use the linkage connector provided. The bottom hole is for the sensor rod, the center hole is a pivot point for the connector, and the upper hole connects to the linkage rod. A nylon cable tie can be passed around the linkage connector and transmission shift arm to keep the linkage connector secured tightly. If this does not fit your shifter, then you will need to drill an 1/8" hole into your shift linkage arm to attach the rod to.

The GM, Ford C-6, and universal mounting plates secure to the transmission oil pan using the supplied 1" bolt, spacer, and washer provided in the kit. On the universal mounting plate, the holes will have to be drilled to line up with the pan bolts being used on the transmission.



use 3/8" x 1" bolt and 3/8" spacer  
as shown above to secure mounting  
plate to transmission

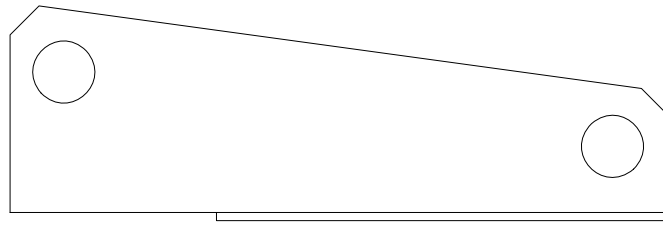
Use 5/16" x 1" bolt and spacer (7/16" nut) as shown above to  
secure the mounting plate to the transmission



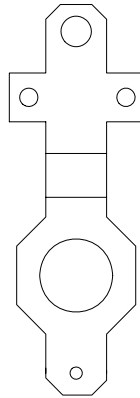
Universal mounting plate.

This can be used with transmissions for which a specific mounting plate is not provided.

### Mounting to a Ford C-4 transmission

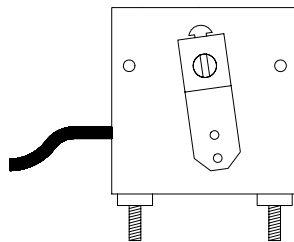


This mounting plate connects to the lower two bolts of the four bolt plate located on the left side of the transmission just behind the shift linkage arm.



Ford C-4 linkage connector.

Depending on the shifter you are using, you may use the linkage connector provided. The bottom hole is for the sensor rod, the center hole is a pivot point for the connector, and the upper hole connects to the linkage rod. A nylon cable tie can be passed through the two side holes and around the linkage connector to keep the linkage connector secured tightly. If this does not fit your shifter, then you will need to drill an 1/8" hole into your shift linkage arm to attach the rod to.



For the C-4 transmission 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.

## TROUBLE SHOOTING GUIDE

<b>Problem</b>	<b>Cause</b>	<b>Solution</b>
None of the lights will come on.	Power wire not connected.	Make sure +12 volt wire is connected.
	Ground wire not connected.	Make sure the ground wire is connected to a good ground.
	Sensor wire not connected.	Make sure all three wires from the sensor are connected.
Always shows the same gear or will not set properly.	Sensor wire not connected.	Make sure all three wires from the sensor are connected.
	Sensor arm not connected.	Make sure the sensor arm moves as the gear selector is moved.
	Sensor linkage connector is stuck or bound up.	Make sure the linkage connector and sensor arm move freely as the trans. is shifted through the gears
Will not set correctly after neutral.	Sensor wired incorrectly.	Reverse the red and black wires from the sensor
	Overdrive jumper is missing.	Place a jumper across the correct jumper posts.
More that one light comes on in some gears.	Overdrive jumper is in the wrong position.	Move the overdrive jumper to the correct position.
	Incorrect adjustments.	Move the selector back to the first gear that lights up correctly and then reset the remaining gears.
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 <b>on</b> and <b>start</b> positions.

### **GSS-1 UNIVERSAL GEAR SHIFT SENDER LIMITED LIFETIME WARRANTY**

**DAKOTA DIGITAL, Inc.** (the Company) warrants to the ORIGINAL PURCHASER of this product that should the included electronic decoder or sender modules under normal use and condition, be proven defective in material or workmanship DURING THE LIFETIME OF THE CAR IN WHICH IT WAS ORIGINALLY INSTALLED, such defect(s) will be repaired or replaced (at the Company's option) without charge for parts or labor directly related to repairs of the defect(s).

To obtain repair or replacement within the terms of this Warranty, the product is to be delivered with proof of warranty coverage (e.g. dated bill of sale), specification of defect(s), transportation prepaid, to the factory. This Warranty is valid for the original purchaser only and may not be transferred.

This Warranty does not extend to damage to vehicle electrical system. 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.

This Warranty is in lieu of all other express warranties or liabilities. ANY IMPLIED WARRANTIES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY, SHALL BE LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. ANY ACTION FOR BREACH OF ANY WARRANTY HEREUNDER INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY MUST BE BROUGHT WITHIN A PERIOD OF 30 MONTHS FROM DATE OF ORIGINAL PURCHASE. IN NO CASE SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES FOR BREACH OF THIS OR ANY OTHER WARRANTY, EXPRESSED OR IMPLIED, WHATSOEVER. No person or representative is authorized to assume for the Company any liability other than expressed herein in connection with the sale of this product.

The Company does not warrant that this product cannot be compromised or circumvented. THE EXTENT OF THE COMPANY'S LIABILITY UNDER THIS WARRANTY IS LIMITED TO THE REPAIR OR REPLACEMENT PROVIDED ABOVE AND, IN NO EVENT, SHALL THE COMPANY'S LIABILITY EXCEED THE PURCHASE PRICE PAID BY THE PURCHASER FOR THE PRODUCT.

Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation if incidental or consequential damage so the above limitations or exclusion may not apply to you. This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

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