



**ODY-17-2**

## **DIGITAL COMPASS with OUTSIDE TEMPERATURE**

### Introduction:

The Odyssey gauge series from Dakota Digital, Inc. incorporates the reliability and quality of our standard gauges, along with several unique features and easy mounting. These features include:

- Microprocessor accuracy.
- Night dimming feature.
- Standard letter heading abbreviation.
- Temperature readout is switchable between Fahrenheit and Celsius.
- Can be calibrated to compensate for vehicle's magnetic interference.
- Can be calibrated to compensate for difference between magnetic north and true, or map, north.
- Does not require constant power to maintain calibration settings.
- High Visibility full character VFD display.

The Odyssey series digital compass display will show the current heading direction your vehicle is traveling in as well as the current outside air temperature. The vehicle calibration procedure ensures accurate information will be presented.

All compasses, whether electronic or mechanical, determine the current heading from the earth's magnetic field. Automobiles have many electric accessories and high current devices, such as the alternator, ignition system, headlights, etc. Each of these also creates a small magnetic field. Since all of these magnetic fields add together, a standard compass can be fooled into showing a false reading. Because the major sources of interference in the vehicle are fairly constant, the Dakota Digital compass has a calibration procedure that filters these out.

The earth's magnetic field also does not match up exactly with true north, also referred to as map north. The magnetic field is tilted. Due to this the difference between two is not same in different parts of the globe. The Dakota Digital compass has a calibration procedure that allows you to add an offset to the reading to compensate for the deviation.

In spite of the many advanced features of there are some things that can still fool the compass and cause small deviations. A high current device being switches on or off (like the headlights or air conditioner) can cause deviations of  $\pm 5$  to  $\pm 10$  degrees. A large truck passing by you can cause up to  $\pm 5$  degrees variation. Travelling over or under a bridge or other large steel structure can cause  $\pm 5$  to  $\pm 10$  degree variations. Driving in a hilly region can cause  $\pm 5$  to  $\pm 10$  degree variations due to the tilt of the vehicle and the sensor.

For the outside temperature sensing, the best location will be in the front grill or another location at the front of the vehicle where it will have good air flow while the vehicle is moving. Do not mount the sensor too close to the engine or exhaust. Doing so will cause the temperature reading to be much higher than the actual outside temperature. Please note that with the sensor mounted in the front grill the temperature will be very accurate while the vehicle is moving, but the temperature will rise when the vehicle is sitting still. This is due to the engine heat radiating forward.

### **Operation:**

The gauge needs the red and black wires connected to light up. It also requires the sensor connected to the gauge in order to operate. The red wire should have switched 12 volt power from an ACC. point on the fuse panel. The black wire should be connected to a good ground point. When the blue wire has 12 volts, it will dim the display for night viewing. The six pin connector plugs into the mating connector from the compass sensor. The black button found on the front of the unit is used for calibration and for selecting the temperature units. Pressing this button while the unit is operating will cause the temperature to change from F to C or from C to F. Immediately after pressing the button the letter after the temperature will drop off. Then at the next update interval the temperature will be displayed with the new units. It can take up to 2 seconds for the temperature to change. Hold this button in while turning on the power to enter CAL mode. Units without a bezel do not have a switch on their front. The white wire in the harness on these units should connect to an external 12 volt switch.

### **Vehicle magnetic field calibration:**

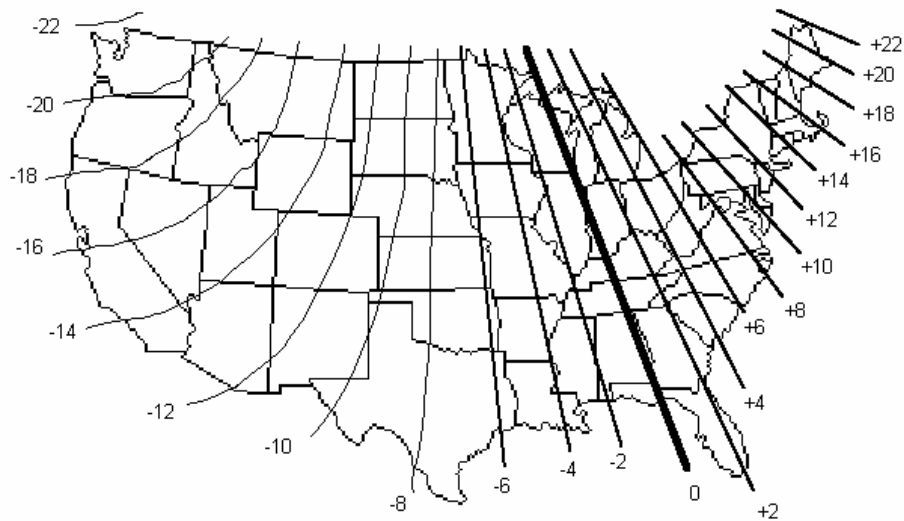
The Dakota Digital compass has a calibration procedure to compensate for the vehicle magnetic field. This magnetic field is produced by the hard iron of the vehicle as well as any electric accessories which are operating. This calibration should be done with the engine running as well as any accessories which are normally used. It is best to do the calibration in an open area so that there is no interference from nearby vehicles or power lines.

1. Make sure the ignition key is off so the compass is not lit up.
2. Hold in the button located on the front of the bezel while you start the engine. (12 volts to white wire on bezel-less units)
3. After the display lights up, release the button. The display will show a number.
4. Press and release the button until "CAL" is displayed.
5. Press and hold the button. The display will show "CALIBRAT".
6. Release the button. Once the compass has taken its initial reading, it will display "TURN 180".
7. Move the vehicle so that it is facing the exact opposite direction.
8. Press and release the button, the display will show "WORKING" and then "COMPASS".
9. The unit will now return to normal operation.

### True North calibration:

The Dakota Digital compass has a calibration procedure to compensate for the difference between true north and magnetic north. (This feature can also be used to compensate for misalignment of the compass with the front of the vehicle.) The compensation range is from  $-30$  to  $+30$  in 2 degree increments. The calibration number is stored in a non-volatile memory component that does not require power to keep its memory.

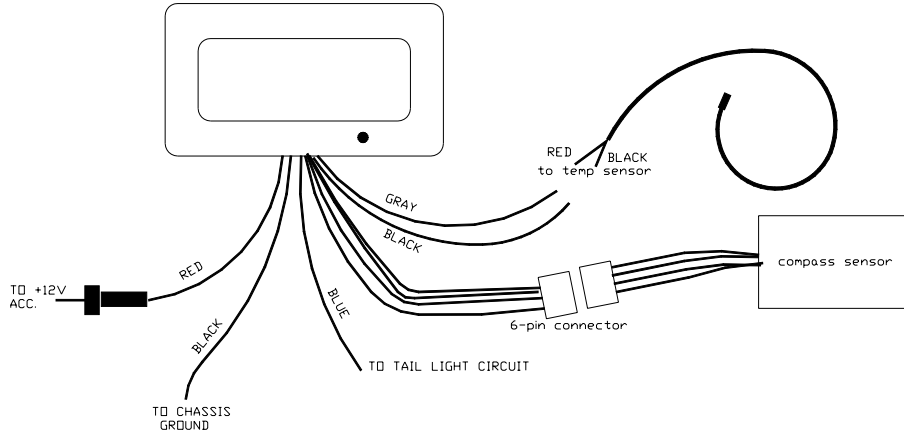
1. Make sure the ignition key is off so the compass is not lit up.
2. Hold in the button located on the front of the bezel while the key is turned on. (12 volts to white wire on bezel-less units)
3. Release the button. The display should show the current cal. number.
4. Press and release the button to increment the cal. number.
5. When the desired cal. number is displayed, press and hold the button.
6. After the display shows "STORED", release the button.
7. The unit will now return to normal operation with the new cal. number



True north calibration chart for the United States

### Wiring:

- BLACK - connect to a good ground point in the vehicle.
- RED - connect to switched 12 volt power point.  
(An accessory terminal will work for this.)
- BLUE - connect to the tail light circuit.
- GRAY - connect to temp sensor red wire.
- Short BLACK - connect to temp sensor black wire.
- 6-pin connector - connect to mating connector from compass sensor.
- WHITE - (only on bezel-less units) connect to 12V pushbutton switch.

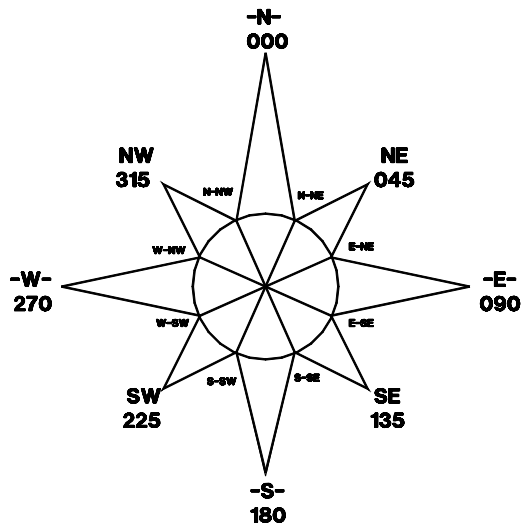


### Compass Sensor Mounting:

The sensor element is sensitive to tilt and should be mounted as flat as possible. The mounting bracket provides many mounting positions so that even if sensor is not being mounted to a flat surface, the sensor itself will be level.

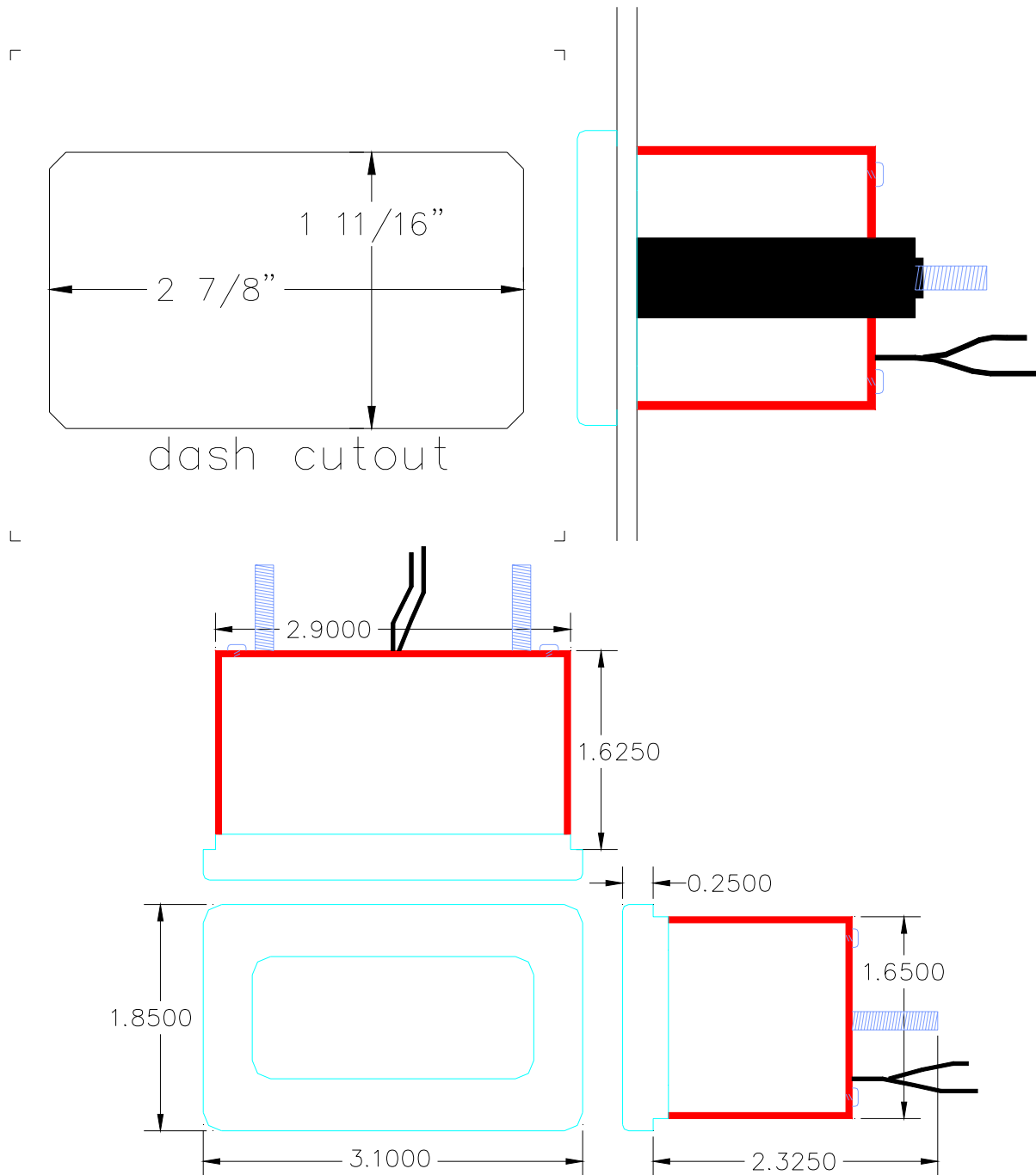
The sensor is also sensitive to any high current wires near it or any steel bars or rods. High current wires should be kept away from the sensor. The interference from a wire drops off very rapidly with distance. When the wire is 2x farther away the interference drops  $\frac{1}{4}$ ., if the wire is 3x farther away the interference drops  $\frac{1}{9}$ . Steel rods or bars affect the sensor by bending the magnetic field. The magnetic field will have a tendency to follow the steel. Due to these limitations, we do not recommend mounting the sensor under the dash.

Good mounting locations for the sensor are under a seat or in the roof headliner. The direction the sensor faces is also very important. The arrow on the sensor should point towards the front of the vehicle.



**Mounting:**

The gauge requires a rectangular cut out that is about 2 7/8" x 1 11/16". It should be inserted into the opening from the front and the U-clamp will be installed from the back. Tighten the two nuts on the U-clamp so that the gauge is secure. Figure 2 shows the required cut out for the gauge. Figure 3 shows how the gauge mounts.



## Troubleshooting guide.

| Problem                                       | Possible cause   | Solution  |
|---|--|---|
| Gauge will not light up                       | Red wire does not have power.<br>Black wire is not getting a good ground.<br>Fuse is blown.<br>Gauge is damaged.   | Connect to a location that has power when the key is on.<br>Connect ground to a different location.<br>Replace in line fuse. (2 amp only.)<br>Return gauge for repair. (see instructions)   |
| Gauge lights up, but does not read correctly. | Loose connection on red power wire.<br>Poor ground connection.<br>Sensor not connected properly.   | Reconnect red wire.<br>Move ground to different location<br>Make sure that the 6-pin connector is plugged in to the compass sensor.<br>Make sure the temperature sensor is connected properly.<br>Return sensor for repair. (see instructions)  |
| Compass display will not change.              | Sensor cable is cut or damaged<br>Calibration is not correct.<br>Sensor is damaged.<br>Gauge is damaged.<br>Compass sensor is not connected.<br>Compass has not been calibrated properly.<br>Poor ground connection.<br>Signal wire is grounded or broken.<br>Sensor is damaged. | Repeat calibration procedure.<br>Return sensor for repair. (see instructions)<br>Return gauge for repair. (see instructions)<br>Connect the sensor to the gauge.<br>Repeat vehicle calibration procedure.<br>Move ground to different location<br>Inspect sensor cable for cuts or abrasions.<br>Return sensor for repair. (see instructions) |
| Gauge will not dim.                           | Gauge is damaged.<br>Blue wire is not connected correctly.   | Return gauge for repair. (see instructions)<br>Check wiring connections.  |
| Gauge remains dim at all times.               | Blue wire is getting power all of the time.<br>Battery is very low.<br>Gauge is damaged.   | Connect blue wire to location that only has power when the headlights are on.<br>Recharge or replace vehicle battery.<br>Return gauge for repair. (contact factory)   |

## 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 units.

Should you ever need to send the unit back for repairs, please 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 a complete description of the problem, your full name and address (street address preferred), and a telephone number where you can be reached during the day. An authorization number for products being returned for repair is not needed. Do not send any money. We will bill you for the repair charges. Any returns for warranty work must include a copy of the dated invoice or bill of sale.

## Technical specifications

|  |   |  |
|--|---|--|
| Minimum operating voltage  | - | 7 volts                                  |
| Maximum operating voltage  | - | 18 volts                                 |
| (operating at or near maximum rating for an extended time can damage unit) |   |  |
| Minimum temperature reading  | - | -67 °F (-55°C)                           |
| Maximum temperature reading  | - | 255 °F (125°C)                           |
| Compass Resolution   | - | 23°                                      |
| Compass accuracy   | - | ±2° (not including vehicle interference) |
| True North calibration range   | - | ±30°                                     |
| Temperature resolution   | - | ±1°                                      |
| Temperature accuracy   | - | ±1°                                      |
| Update rate  | - | 2 - 2.5 seconds                          |
| Typical current draw (@ 13.8V)   | - | 0.13 A                                   |

## **ODYSSEY SERIES DIGITAL GAUGE LIMITED WARRANTY**

DAKOTA DIGITAL (the Company) warrants to the ORIGINAL PURCHASER of this product that should it, under normal use and condition, be proven defective in material or workmanship within 24 MONTHS FROM THE DATE OF PURCHASE, 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), name, address, phone number, and specification of defects, transportation prepaid, to the factory. This Warranty is valid for the original purchaser only and may not be transferred.

This warranty does not cover nor 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 24 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 TO 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 exclusions 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.

# **Dakota Digital**

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