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Rovers North Digital Speedometer Instructions for Defender

Part Nr. RNDSKIT2
Fits: Early Defenders without an ECU

READ ALL INSTRUCTIONS COMPLETELY BEFORE BEGINNING!

Suggested Tools:

- Safety glasses
- Phillips screw driver
- Zip-ties and/or tape
- Wire cutting tool
- Wire stripping tool
- 4x your preferred way to connect wires (butt connectors, snap connectors, or soldering iron, solder and heat shrink).
- Electrical tape
- 10mm deep well socket
- Multi-meter or test light

Included components:
-New Digital Speedometer
-Hall effect sending unit AKA "transducer"
-Speedometer wiring harness
-Connector plug for wiring harness


Wire Cutting Tool


Phillips Screw Driver


Small zip-ties


Wire Stripping Tool

For your convenience, Rovers North has pre-programed your VDO speedometer with the "pulse" count off our test Defender. Due to variations in gearing and tire sizes, you should run the auto-calibration feature described below to get an accurate reading for your Defender. NOTE: This kit is designed for Defenders without an ECU.


Electrical Tape


Safety Glasses


10mm Deep Well Socket


1/4" Socket Driver


Wire Crimpers


Soldering Iron

Fitting Instructions for Rovers North Digital Speedometer – Defender

Pre-Installation

1. Remove the driver's seat cushion, open the battery box and disconnect the positive battery terminal. Replace the seat cushion so you can sit down while working on the dash.

2. Remove the 4 screws holding in the instrument panel.

3. Remove the speedometer: Pinch the cable where it goes into the speedometer, squeeze, and pull straight back. Loosen the thumb screws and remove the speedometer retaining clips (early style) or unscrew the retaining ring (late style). Pull the bulbs out of the speedometer and leave them dangling for now. Remove the gauge from the instrument panel.

Installation

1. Place your new speedometer in the instrument panel, screw in the retaining ring on the back. Straighten and tighten.

2. Plug the 8-pin and 12-pin connecters from the wiring harness into the back of the new speedometer. Push firmly to ensure they are properly seated.

3. Temporarily tape the opposite end of the wiring harness (three wires with bare terminals) to your speedometer cable. Affix the wires well past the end of the speedometer cable so the taped bundle presents a small profile for being pulled through the grommet. Open the bonnet of your truck and pull the speedometer cable through, paying special attention to not disrupt the grommet while you pull the new wiring harness into the engine bay. If the taped bundle is tight, you can cut the thick end off the no-longer-needed speedometer cable or use something else as a pull cord. Once through the grommet, remove the tape from the speedometer cable or pull cord, freeing the wiring harness.

4. Protect the wiring harness outside the bulkhead by inserting it into the provided wiring loom (flexible black sheathing) starting at the sender side of the wiring harness (three wires with bare terminals). Use electrical tape or zip-ties every few feet to secure the loom on the wiring harness.

5. Route the wiring harness along the bulkhead, then on top of the chassis, being careful to avoid dangerous spots such as the exhaust or any moving/rotating parts. Unlike the speedometer cable, the wiring harness is quite flexible and can be routed out of harm's way. Use zip-ties or tape to secure the new wiring harness in place. Close your bonnet.

6. Once the wiring harness is in place and the end of the wiring harness is positioned near the transfer box, insert the 3 wires into the plug that goes to the sender unit as shown in the attached image (Figure 1). Double check before inserting the wires, because once they are seated it takes a special tool to remove them (it's possible with a paper clip). If in doubt, look closely inside the sending unit and you will see the terminals labeled +, - and A; the red wire goes to the +, the black wire goes to the – and the green/white wire goes to the A. When seating the terminals into the connector, they will only go in one way, so rotate the wire until the terminal slides fully into the connector. When all the wires are in the plug, push the small yellow finisher into the tip of the plug to lock the terminals into place.

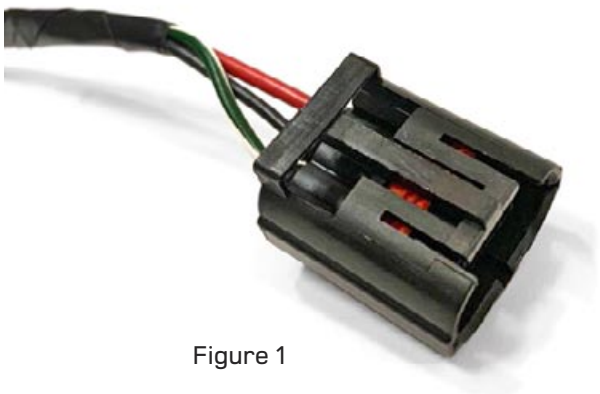

Figure 1

7. Use a socket to remove the bolt (or nut on the early version) that attaches the speedometer cable to the transfer case. You can now completely remove the old speedometer cable from the vehicle.

8. Install the transducer unit into the transfer box, paying special attention to line up the square shaft so it fits inside the gear nicely. Be sure to use a lamp so you can see that the tip of the transducer is correctly seated into the gear. Gently tighten the transducer into place, being careful not to over-tighten. Please note that transfer boxes from other markets and applications may not have the correct sized gear to receive the shaft from the transducer. In the very rare case where the hole in the gear appears too large for the transducer, we recommend purchasing the correct gear (FRC3310), or you can cut a thin piece of aluminum from a soda can and wrap the shaft of the transducer for a temporary (perhaps permanent) solution. If the transducer is too large to fit into the gear, the gear must be replaced.

9. Plug the wiring harness into the transducer sending unit.

10. Tidy up the wiring, making a loop to take out any additional slack. Use zip-ties to ensure the harness is routed away from any hazards (things that get hot or rotate) and up high so it cannot get snagged while off-roading.

11. Back at the dash, find (or make) a ground wire in your dash and connect that to the single black wire coming out of the speedometer's wiring harness using your preferred method of wire connection (solder, butt connectors, snap connectors, etc.).

12. Behind the instrument panel, find a +battery wire (constant power) and connect it to the brown wire on the new speedometer harness using your preferred method.

13. Behind the instrument panel, find a switched power wire (turns on with ignition switch) and connect it to the white wire on the speedometer's wiring harness.

14. Connect the + illumination circuit wire to the blue/red wire on the speedometer wiring harness. One way to do this is to cut and reuse the + wire off the bulb out of your old speedo. Note: there were typically two bulbs in the original speedometers, so you will want to cut and safely tape off the unused + illumination circuit wire.

15. Reconnect the positive battery terminal. Replace the battery box lid and driver's seat bottom.

16. Turn on the ignition and check to see that the display in the ignition powers on. Turn on the driving lights to ensure that the gauge illumination is working. If so, proceed to the next step. If not, review the above steps and begin problem-solving.

17. With the ignition on, configure as described below. Once complete, wait 30 seconds (to ensure configuration is saved), switch off the ignition and remove the 12-pin plug. Place a piece of duct or electrical tape across the now unused 12-pin connector (to prevent shorting). Tuck the 12-pin connector out of harm's way inside the dash, replace the instrument panel and affix it with the 4 screws.

18. Clock, trip meter, and brightness can be adjusted outside of "setup mode" (with the 12 pin connector unplugged). To reset trip, use short pushes to navigate to trip counter and hold for 3 seconds. To set the clock, navigate to the clock, press and hold for 3 seconds, then use short presses to change hour, hold for 3 seconds to change minutes, short presses to adjust minutes and hold for 3 seconds to save. From odometer screen you can do a long 3-second press to adjust brightness in the same manner.

Configuration

To enter setup mode, plug in the 12-pin connector and turn the ignition on. The presence of the 12-pin connector puts your gauge in setup mode. Loosely set the gauge back in place where you can see and use it during setup.

Use the single button in the speedometer to navigate through the menu. A short press (less than 1 second) scrolls through the menus. A long press (3 seconds) selects a parameter to adjust, after which a short press changes the value and a long press saves the value then returns you to the main menu.

In setup mode, users can select the dial color (white, amber, red, yellow, blue, green), select display color (white, amber, red, yellow, blue, green), adjust brightness and calibrate the speedometer. If other VDO gauges (volts, water temp, fuel level, etc.) are connected, the CAN bus system will pass color and brightness settings to the other gauges.

After completing the configuration, be sure to wait until the speedo automatically exits the setup screen (about 30 seconds), then switch off the ignition without removing battery power. Failure to wait 30 seconds and/or disconnecting battery power and ignition power at the same time will cause configuration errors, especially when used in conjunction with our +3 gauge kit, RNDSKIT3.

After successfully saving the configuration, remove the 12-pin plug.

Speedometer Auto-Calibration

1. Figure out how you are going to measure 1 mile. This is easy if you have a road with mile markers that you can pull over next to (it is safest to begin calibration from a stop). Otherwise, you can use your favorite GPS tracking app, like Gaia or Strava. If you do not already have a GPS distance-recording app, iPhone users might try downloading "GPS Odometer Lite" from the App Store, as it is free, simple to use and displays distance traveled.

2. Enter setup mode on the speedometer as described above.

3. Use short presses to navigate to the screen where it displays the pulse rate and Auto-Cal.

4. Use a long press (3 seconds) until "Detect" begins to flash.

5. Drive exactly 1 mile at any speed with as many stops as needed to safely navigate.

6. At 1 mile, use a short press to end the calibration. You can end the calibration from any speed; it is not necessary to come to a stop.

7. Your new pulse rate is now displayed. If there was an error, the speedometer will abort and it will be necessary to restart the process.

Once the setup and calibration are complete, wait 30 seconds to ensure that the configurations have been saved, then turn off the vehicle. Unplug the large 12-pin connector, place a piece of duct or electrical tape across it (to prevent shorting), tuck the 12-pin connector loosely into the dash, put the instrument panel back in place and affix it with the 4 screws.