

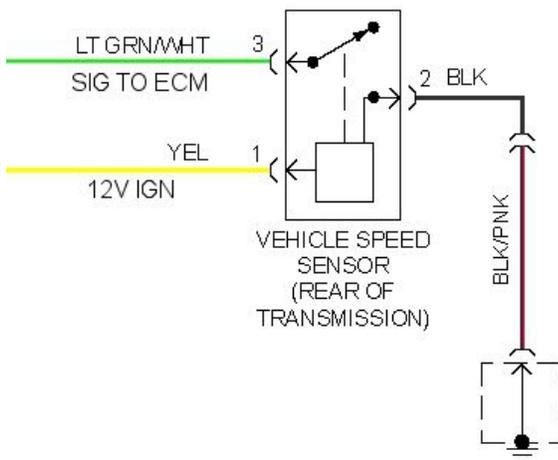
Isuzu Mechanical To Electronic Speedometer Conversion

(Information based on a 1990 Isuzu Trooper, slight variances may exist between different models and years)

All Isuzu Trooper's have a cable driven speedometer up to and including model year 1991. For the most part it works just fine and there is no need to change it. However if your truck is showing its age and especially if it has been subject to some water crossings water can get in the speedometer jacket and sit at the lowest point and slowly but surely rust through the cable. Or you may have decided to change your tire size or gear ratio. On the Isuzu you only have the option of changing the gear tooth count to accommodate 31" tires with 4.77 axle ratio. Anything larger or higher ratio and your out of luck and your speedometer will be off. So in either scenario you may be after a solution. As luck would have it in a 1992 Isuzu began using an electronic speedometer with a VSS unit on the tail of the transfer case. They still used the same transmissions so the VSS unit was built to screw directly onto the old cable drive housing. To convert all you have to do is un screw the sensor from a donor truck or buy a new one. After removing your cable by un threading the collar you insert the small drive shaft and screw the new VSS on. The new VSS has 3 wires, 12V ign power, ground and a signal output. The sensor operates by grounding the signal wire as it rotates. This exactly mimics the way the old mechanical, speedometer mounted VSS worked when it supplied a signal to the secondary VSS which communicated with the ECM and optional cruise control module. So the new VSS mounted to the transfer case is 100% compatible with the secondary VSS so your ECM and Cruise control will both continue to operate as if nothing has changed. So now we have to solve the issue of no speedometer, fortunately the aftermarket has that covered.

When it comes to gauges Auto Meter is the place to shop. They have a full line of electronic programmable speedometers that will accept almost any input. It will accept 4 to 16 volts Hall effect, 4 to 120 volts (10k ohm load) sine wave and 5 volt square wave. For the Trooper an in dash 3 3/8" gauge works out quite nice and will mount in the stock instrument panel cover. If you want you can pick up the matching tachometer for the conversion. Begin by removing the stock instrument panel cover which is secured by 4 screws with T25 Torx heads. With the cover out of the way remove the speedometer. You will have to reach under the dash and depress the push lock in order to get the cable out of the back of the speedometer. With that out of the way you can now take the entire cable out of the truck. The easiest way is to cut the cable ends off with some heavy duty cutters and slide it out of the grommet. The cable goes across the firewall and down the passenger side. Now would be the best time to run the wires for the VSS. You can run all the wires along side the oxygen sensor wiring and up the firewall and use the grommet where the old cable passed through to get the new wires through the firewall. Now all 3 wires will be in the perfect spot for the new speedometer. The old harness for the speedometer only has 1 useful wire and that is the old signal wire that supplies the secondary VSS. Remove all the wires off the old speedometer and remove all the wires, except the light green wire with yellow stripe, from the plug. Use a small jewellers screwdriver to depress the plastic retaining clip inside the plug this will release the terminal and allow you to pull it out. Now you will need to terminate the wires coming from the new VSS but the signal wire from the new VSS and the secondary VSS wire left on the old plug needs to be spliced at this termination with any automotive style 3 pin connector. If you are installing the tachometer at the same time then un screw the circuit board from the back of the tachometer and then clip all the wires. Remove the red wire with the green stripe from the connector, it will not be used. Now one problem is that the old speedometer did not have power or ground and the new VSS and speedometer will need both. The easiest way to do this is simply tap into the tachometer wiring.

12V Ign Pwr	Yellow
Ground	Black
Illumination	Green/ Red tracer
Signal, Ign Coil Neg	Black/ Red trace



This is how the new VSS is wired. Make sure you get the pigtail connector from the junkyard.

Splice into the yellow, black and green/red wires by cutting a portion of the insulation off with a sharp razor blade and then wrapping your new wire around the exposed section and soldering the splice. Cover with electrical tape or shrink tube. This is how the factory does it! If you are keeping the old tachometer then no further work is needed on the tachometer. If you are replacing it with a new one then each of the wires your previously cut off of the old tachometer needs a female spade connector added to it in order to plug into the new tachometer. Once the new connectors are on, plug them into the back of the new tachometer according to the chart above. That finishes the splicing and optional tachometer wiring. Now over to the speedometer. The wires from the tachometer will have to pass behind behind the plastic of the dash board and in order to remove and install the instruments you are going to need to put in a connector. Any automotive style 3 pin connector will work fine. The wires coming off of this connector will now plug into the back of the speedometer and VSS. Terminate the yellow and black wires with a female spade connector but also install a second wire a few inches long into the same connector. The green/red wire for illumination can simply plug into the speedometer after being terminated with a spade connector. The second yellow and black wires you spliced into your spade connectors need to plug into the new VSS. If you already terminated the VSS wires then just use the appropriate matching connector. You will need to add one extra for the speedometer that supplies the pulsed signal from the VSS to the speedometer. That wraps up the wiring. if everything is done right the new gauges can easily be removed from the truck by un screwing the panel and un plugging three plugs.

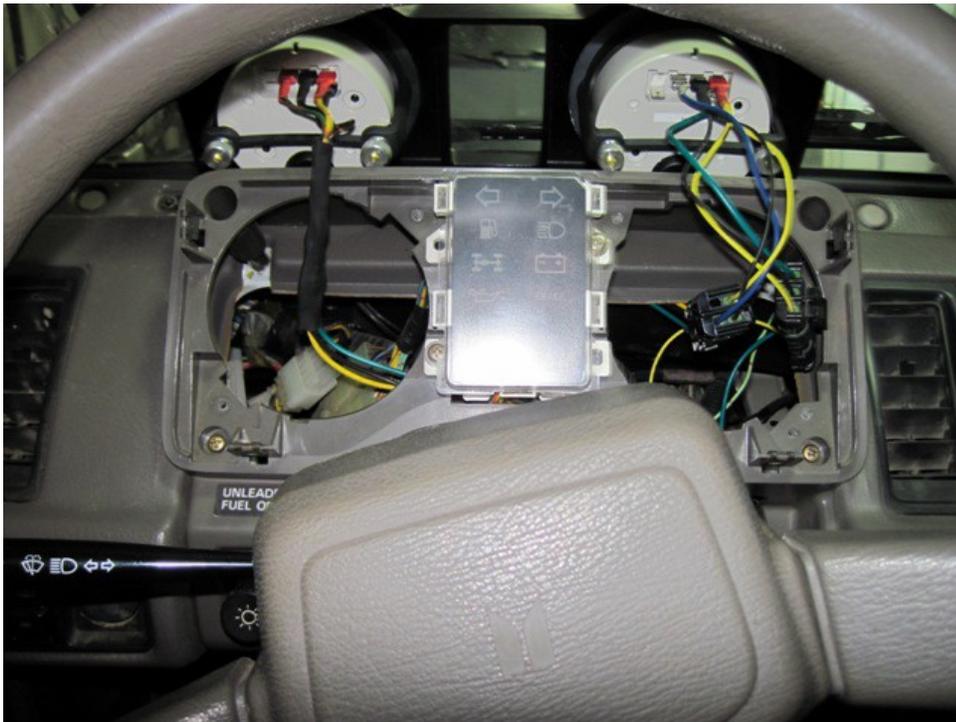
Once you are finished you will have to run through the calibration procedure. The easiest way to do this is with a GPS unit and a helper watching your distance covered. Drive to a calm road and come to a stop and shut the truck off, push and hold the calibration button (trip/reset button when equipped). While holding the button, start the vehicle and continue to hold the button until the pointer sweeps to full scale and stays at full scale. Release the button. You are now in calibration "ready" mode. When you are ready to begin your calibration push and release the button again and the pointer will point straight up. Drive a 2 mile (2 kilometer for metric gauges) distance. The pointer will not move but you will see the odometer LCD screen counting the VSS pulses. Have a friend keep a close eye on the GPS and get them to have you slow down near the end of the 2 mile/kilometre distance and stop right as you hit the end. Push the button one more time and the calibration is now complete. It will be stored indefinitely until you decide to change it. Remember the accuracy of your 2 mile/kilometer distance will directly affect the accuracy of your speedometer. It is ok if you have to stop or drive at varying speeds during the calibration. All the speedometer is concerned with is the number of pulses it counts over the measured distance.



Here are the gauges installed in the stock instrument panel cover. No modifications are needed which makes this such an inviting swap.



Here is how the wiring will look when completed. The black connector on the left attaches to the new VSS wiring. The black connector in the middle goes behind the divider in the dash and the white connector on the lower right is stock tachometer plug. You can see the reinforcement rings made to provide a more solid mount for the gauge retainer. The rings are 3 3/8" ID x 4 1/8" OD 10gauge steel.



Here are the gauges ready for the final step of installation.



This is the new view of the instrument panel. You can choose from several gauge styles to suit your taste. People in countries with metric measurements will have fewer options than those with the standard system.

Written By: Geoff Moore (geoffinbc)