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Hope, In.

Electronic vehicle speed sensor conversion kit for NP241C or NP208C transfer case

Background – The passenger side drop, New Process 208 and 241 transfer cases where a common transfer case used through the 80's and early 90's in full size Chevrolet/GMC applications. The 208 was offered exclusively with a mechanical speedometer drive and the 241 was also equipped with this until the '90 model year when it was switched to offer an electronic vehicle speed sensor. While an NP205 transfer case is a popular case for extreme off roading, the 208 and 241 are very durable and will perform well in light to medium duty four-wheel drive applications. A drawback of them though is that for pairing with modern engine applications, often an electronic vehicle speed signal is required. While the electronic vehicle speed signal 241s are an option, they are difficult to source due to their 2-year production run. This in mind, the solution we've developed is this kit which converts a mechanical speedometer drive case to offer an electronic vehicle speed sensor output.

Kit details – Our conversion kit is a 100% bolt on installation that does not require any irreversible transfer case modifications. Our kit offers an OEM level of durability and reliability for providing an electronic vehicle speed signal all at a price equal or lower than add-on vehicle speed signal adapter options currently available on the market.

Kit includes:

- VSS Adapter plug
- Adapter plug sealing O-ring
- Stainless steel retainer plate
- Reluctor Wheel (in-house design)
- Vehicle speed sensor – **NOTE:** this is a stock NP241 speed sensor. if a replacement is ever needed, It can be sourced through typical auto part suppliers. Example vehicles that would have used this sensor would be 90-91 model year K5 Blazers or Suburbans
- Vehicle speed sensor pigtail

Install Instructions

NP208C (NP241C instructions below)

1. Disconnect speedometer drive cable from transfer case.
2. Unscrew the 10mm bolt holding the speedometer cable drive assembly retainer plate. Once removed, pull speedometer cable drive assembly from rear bearing assembly housing (including internal plastic driven gear).



Speedometer Cable Drive Assembly Installed and Removed (arrow = 10mm bolt)

3. Remove four 15mm bolts holding the rear bearing housing to main housing of the transfer case and then remove rear bearing housing. Output shaft should now be exposed, and you should be able to see the blue, internal plastic drive gear.



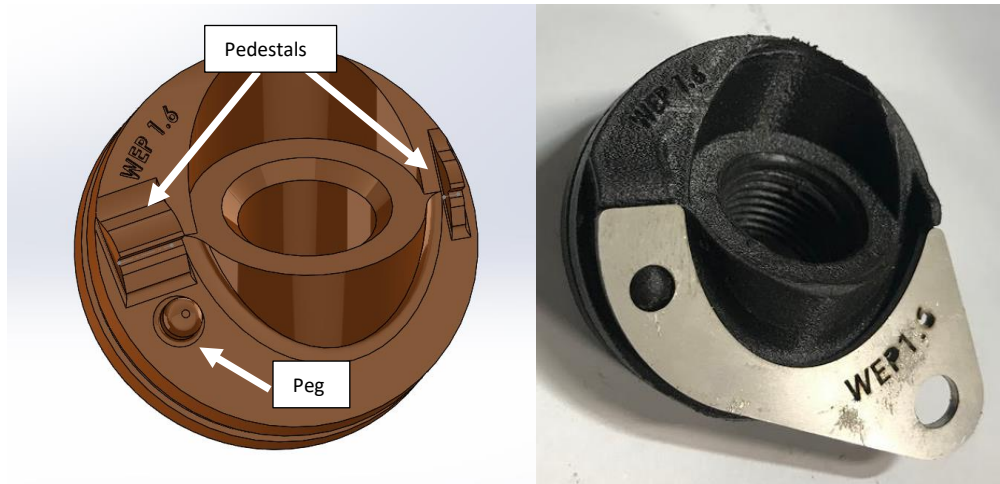
Rear Bearing Housing and Exposed Output Shaft Showing Blue Speedometer Drive Gear (arrow = 15mm bolts)

4. Remove internal plastic drive gear by slipping it off the splined output shaft.
5. Install the supplied reluctor wheel onto the shaft as shown in picture below.



Installed Reluctor Wheel

6. Install provided O-ring into groove of vehicle speed sensor adapter and lubricate the O-ring.
7. Install included retainer plate over molded locator peg on vehicle speed sensor adapter and use it to orient the vehicle speed sensor adapter in the rear bearing housing speedometer drive hole. As shown below, retainer plate hole should line up with rear bearing housing retainer plate bolt hole and retainer plate should fit on top of the molded pedestals.



VSS Adapter and Retainer Plate

8. Push in vehicle speed sensor adapter until fully flush with the transfer case housing. **NOTE:** the fit of the vehicle speed sensor adapter is purposefully tight to prevent transfer case fluid leakage. If installation seems overly difficult, make sure the speedometer drive hole of the transfer case is clean and free of debris and has necessary lubricant.
9. Install retainer plate bolt and tighten to spec.



Installed Adapter with Speed Sensor

10. Apply sealant, reinstall bearing housing assembly, and tighten bolts to factory specs.
11. Install vehicle speed sensor into vehicle speed sensor adapter and tighten until fully seated in adapter. Do not over tighten. As the speed sensor screws into the adapter, it does become difficult to put a wrench on it, especially if the transfer case is already installed in the vehicle. A wrench position that seems to work best is shown below.



Suggested Wrench Positioning

12. Splice on supplied vehicle speed sensor pigtail to your existing wiring harness and connect to vehicle speed sensor. **Note:** Polarity does not matter when splicing the two pigtail wires.

NOTE: If no signal or signal issues, **review troubleshooting section provided at end of document**

NP241C

1. Disconnect speedometer drive cable from transfer case.
2. Unscrew the 10mm bolt holding the speedometer cable drive assembly retainer plate. Once removed, pull speedometer cable drive assembly from rear bearing assembly housing (including internal plastic driven gear).



Speedometer Cable Drive Assembly Installed and Removed (arrow = 10mm bolt)

3. Remove four 15mm bolts holding the rear bearing housing extension to rear bearing housing.



Bearing Housing Extension

4. Remove retaining clip in front of rear bearing.



Location of Retaining Clip, Arrow

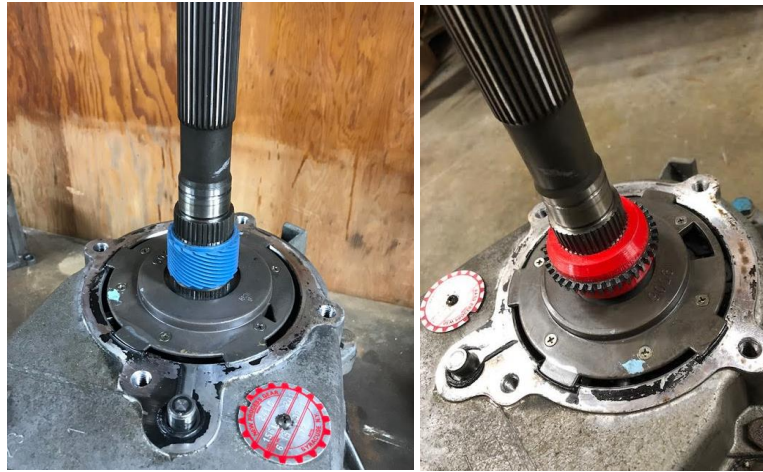
5. Unbolt four 13mm bolts holding rear bearing housing to main housing and remove rear bearing housing. Output shaft with internal, plastic speedometer drive gear should now be exposed.



13mm Bolts Holding Bearing Housing, Arrow

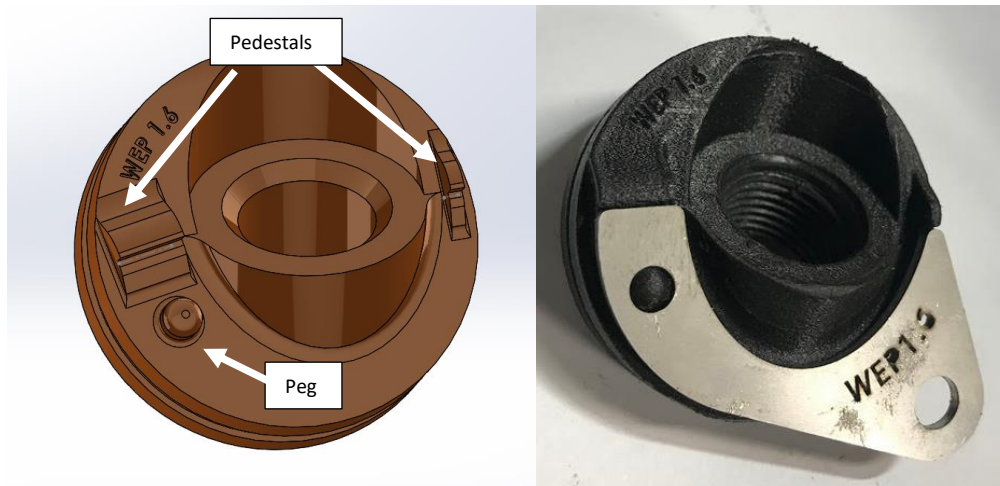
6. Remove retaining clip holding the internal plastic drive gear and slip plastic drive gear off.

7. Install supplied reluctor wheel onto output shaft. One side of the reluctor wheel is marked “this side to front of vehicle”. Please install as directed.
8. Reinstall the retaining clip.



Plastic Speedometer Drive Gear Replaced with Reluctor Wheel

9. Install provided O-ring into groove of vehicle speed sensor adapter and lubricate the O-ring.
10. Install included retainer plate over molded locator peg on vehicle speed sensor adapter and use it to orient the vehicle speed sensor adapter in the rear bearing housing, speedometer drive hole. As shown below, retainer plate hole should line up with rear bearing housing bolt hole and retainer plate should fit on top of the molded pedestals.



VSS Adapter and Retainer Plate

11. Push in vehicle speed sensor adapter until fully flush with the transfer case housing. **NOTE:** the fit of the vehicle speed sensor adapter is purposefully tight to prevent transfer case fluid leakage. If installation seems overly difficult, make sure the speedometer drive hole of the transfer case is clean and free of debris and has necessary lubricant.
12. Install retainer plate bolt and tighten to spec.



Installed Adapter with Speed Sensor

13. Apply sealant, reinstall bearing housing assembly, and tighten bolts to factory specs.
14. Apply sealant and reinstall bearing housing extension.
15. Install vehicle speed sensor into vehicle speed sensor adapter and tighten until fully seated in adapter. Do not over tighten. As the speed sensor screws into the adapter, it does become difficult to put a wrench on it, especially if the transfer case is already installed in the vehicle. A wrench position that seems to work best is shown below.



Suggested Wrench Positioning

16. Splice on supplied vehicle speed sensor pigtail to your existing wiring harness and connect to vehicle speed sensor. **Note:** Polarity does not matter when splicing the two pigtail wires.

Troubleshooting

- If no vehicle speed signal
 - With the speed sensor adapter plug installed, make sure reluctor wheel is centered in adapter plug hole. See blue arrow in figure 1 below.



Figure 1: Reluctor wheel centered in vehicle speed sensor hole

- Make sure black adapter plug is fully pressed into the transfer case housing. Adapter plug should be flush with flat area of the transfer case housing. See blue arrow in figure 2.



Figure 2: speed sensor adapter plug flush with transfer case housing

- With the kit fully installed, test the vehicle speed sensor by using the following procedure.
 - Using a digital multimeter set to AC volts, attach the positive and negative leads to the two vehicle speed sensor pins.
 - By either driving the vehicle or lifting the drive wheels off the ground so they can spin freely, place the transmission in drive and monitor the voltage seen by the multimeter. If the kit and speed sensor or working correctly, you should see the voltage of the multimeter increase as wheel speed increases.
- Check for wire continuity from VSS connector to ECM pin connection.
- If inaccurate vehicle speed signal
 - Check the reluctor wheel for damaged teeth.
 - Be sure the ECM is set up to receive a 4,000 pulse/mile signal.

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