



**Fig. 20: Neutral Position Sensor**  
Courtesy of CHRYSLER GROUP, LLC

The Neutral Position Sensor (NPS) (1) is a component of the automatic stop/start feature on KL platform vehicles with manual transmissions. It is located on the transmission shift cable and it is only serviced by replacing the shift cable assembly.

## **OPERATION**

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The purpose of the Neutral Position Sensor (NPS) is to provide an output from the sensor to a controller concerning gear range position. On vehicles equipped with a manual transmission, the shift cable position is interpreted by the controller from the NPS to determine if the transmission is in neutral or in some gear range, for the purpose of determining when the stop/start system can safely restart the vehicle without the clutch pedal being depressed. The switch outputs a PWM signal whose percentage of duty cycle corresponds to the ranged denoted in Neutral, in a gear range, or as a fault value. The NPS is attached to shift cable such that it is nominally outputting 50% duty cycle at or when the vehicle is shifted to Neutral. Higher or lower duty cycle outputs are denoted as the magnet on the shift cable moves with respect to the NPS when the vehicle is shifted to gear range positions.

The NPS receives an Input of 5 volts excitation, has a common ground and outputs Pulse-width modulated signal to the controller.

Outputs reading less than 5% or more than 95% of duty cycle will trigger diagnostic trouble codes. Outputs reading between 5-25% or 75-95% represent in-gear positions and outputs readings between 25-75% represent Neutral position. Check that the sensor is attached properly to shift cable (inside the center console, at the shifter) and that wiring lead is attached to wiring harness coming up from rearward in vehicle from shifter. Check that the shift cable is properly attached to shifter and transmission ends to levers and load reaction points. With a jumper, voltages from the sensor input and output can be read with a voltmeter and compared with

This NPS is not available to order as a standalone component. To obtain the NPS, the Shift Cable assembly will need to be ordered.

## REMOVAL

## REMOVAL

## INSTALLATION

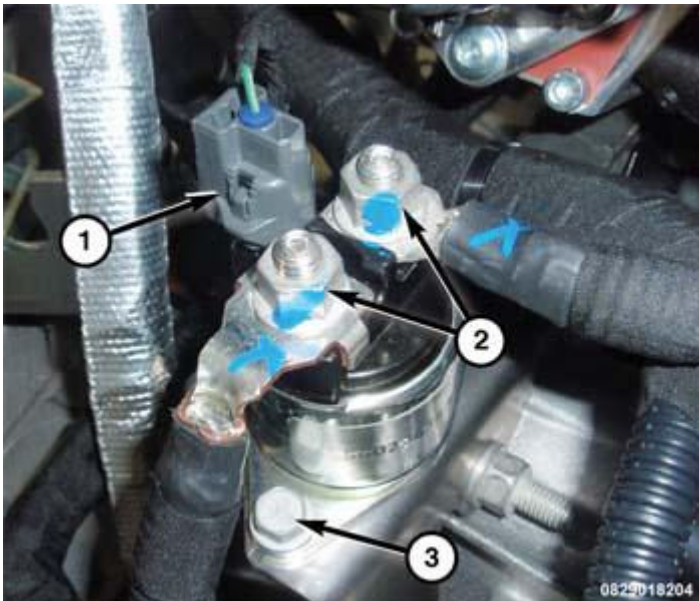
## INSTALLATION

## RELAY, IN-RUSH CURRENT REDUCTION

## DESCRIPTION

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## In-rush Current Reduction Relay



**Fig. 21: In-Rush Current Reduction (ICR) Relay Module**

<b>2014 Jeep Cherokee Latitude</b>
2014 ENGINE Starting - Service Information - Cherokee

The In-rush Current Reduction (ICR) Relay Module is intended to reduce the in-rush current drawn by the starter motor during the initial stage of the crank sequence, thus maintaining an adequate voltage level and allowing critical electrical/electronic systems to function without interruption, or reset. At the same time, the relay will allow sufficient current and voltage to reach the starter motor, to allow cranking the engine at an adequate speed, so that the engine can generate the air-fuel mixture necessary for self-sustained operation, even under adverse conditions.

This component is mounted to a bracket that mounts to the top of the starter assembly. The relay is serviceable and is shipped along with a bracket that secures the ICR.

## **OPERATION**

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In-Rush Current Reduction Relay.

Within the ICR relay, prior to the starter motor solenoid's contact closure, the shorting bar opens contacts, thus routing the starter motor current through a resistor bar (10 mOhm for V6 Pentastar). The increase in series resistance reduces/eliminates the initial current spike (or, inrush current) and reduces the consequent voltage drop. After a set time (185 msec), the power to the ICR relay is cut, the shorting bar closes the contacts, removing the resistor bar from the circuit and restoring full power to the starter motor. At this point, there is a rebound of the current surge and subsequent drop in voltage; however, neither is as intense as they would be would be without initial jump in resistance.