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2016 JEEP Wrangler Rubicon OEM Service and Repair Workshop Manual

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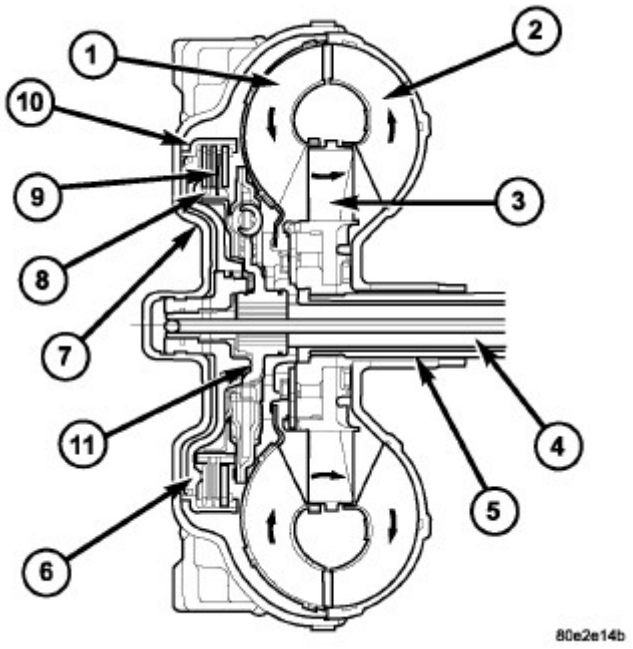
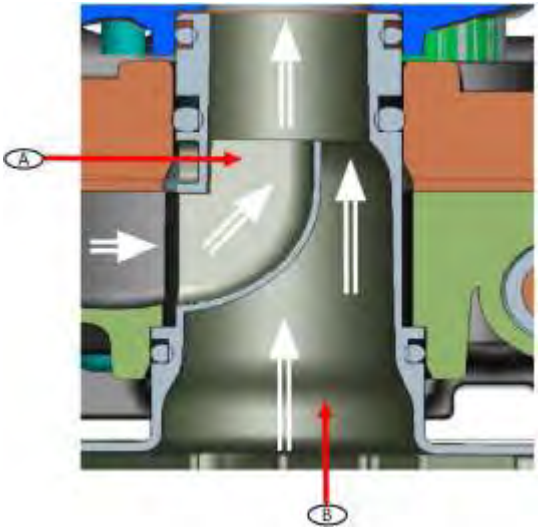


1 - Turbine	7 - Cover Shell
2 - Impeller	8 - Internally Toothed Disc Carrier
3 - Stator	9 - Clutch Plate Set
4 - Input Shaft	10 - Externally Toothed Disc Carrier
5 - Stator Shaft	11 - Turbine Damper
6 - Piston	

The torque converter housing has a unique shape to incorporate the TCC and flex plate connection. The torque converter uses the typical turbine, impeller and stator assemblies found in a standard torque converter assembly. The torque converter drives the pump through the splines on the inside of the hub. The torque converter uses a multi-disc torque converter clutch system that improves the durability and the holding pressure in the lock-up circuit. The torque converter incorporates a turbine dampening system. This system suppresses torsional vibrations from the engine to ensure optimal shift quality and reduce noise and vibration concerns.

TCC RELEASE - When the TCC is open, the TCC piston is pushed to its default position by torque converter chamber pressure. The Torque Converter Switch Valve (SV-TC) provides pressure for torque converter operation which has been regulated by the Torque Converter Pressure Regulating Valve (TC-V). After exiting



A - Surplus Oil (Charge Duct) from the System Delivery Valve
B - Oil from the Filter Built into the Sump

The system delivery valve is managed through the control pressure from the system pressure control solenoid valve. This solution improves the noise, reducing the possibility of cavitation and increasing the pump efficiency by increasing the pressure on the intake side.

FUNCTIONAL DESCRIPTION - VALVE BODY

DESCRIPTION

CAUTION

The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

7 - Solenoid E	14 - Park Hold Solenoid

The solenoids are integrated into the Transmission Control Module Assembly (TCMA) of the 8HP transmission. The solenoids are not serviced or replaced individually.

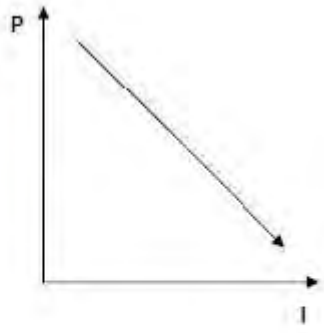
OPERATION

CAUTION

The Transmission Control Module (TCM), or Transmission Control Module Assembly (TCMA) is extremely sensitive to Electrostatic Discharge (ESD). Always use a ground strap and follow the ESD guidelines in ELECTROSTATIC DISCHARGE (ESD) SENSITIVE DEVICES. Failure to follow these instructions may result in damage to the TCM/TCMA.

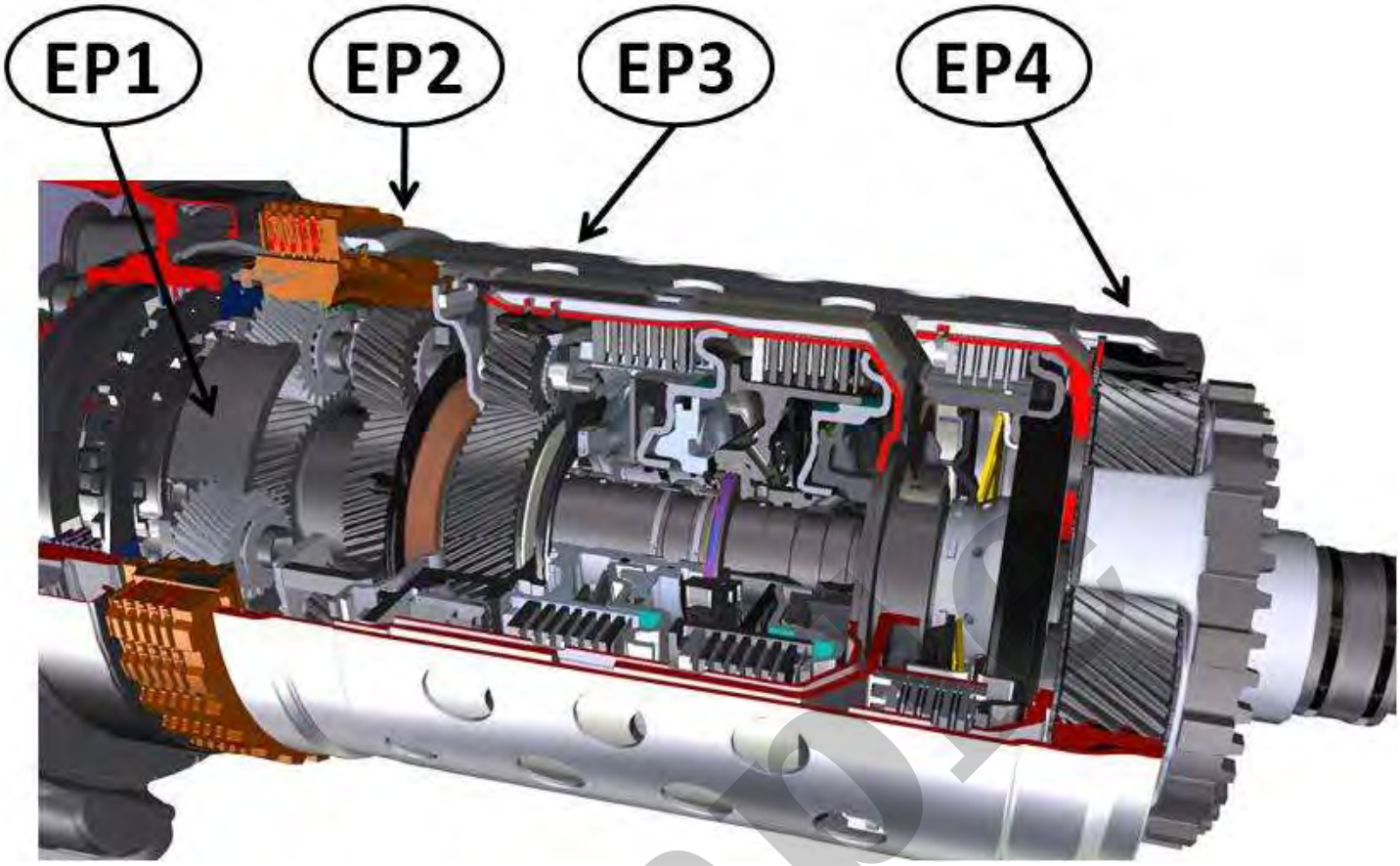
The TCM will actuate the valves via solenoids based on the position of the shifter, transmission fluid temperature, engine operating conditions, traction conditions, and driver demands. During a shift, the TCM will actuate the solenoids to match the gear ranges to the optimal torque range of the engine. This is based on input signals from the accelerator pedal, shifter position, Input Speed Sensor (ISS), Output Speed Sensor (OSS) and vehicle speed as determined by the Powertrain Control Module (PCM) and Anti-lock Brake System (ABS) module.

SOLENOID FUNCTIONALITY: There are two types of transmission solenoids designed for regulating pressure. The transmission solenoids are identified by two distinct colors to help differentiate their characteristics and function:



Technical data

Pressure range	as of 4.7 to 0 bar
Operating voltage	12 V
Resistance	5,05 Ω at –20°C
Characteristic curve	falling



EP1, EP2, EP3, EP4 = Epicyclic gear train.

The 8 forward gears, and reverse are implemented by connecting four single-arm epicyclic gear trains. The two front gear trains have a common sun gear, while the power is always output through the fourth epicyclic gear train planet carrier.

FUNCTIONAL DESCRIPTION - ENGAGEMENT ELEMENTS (BRAKES AND CLUTCHES)

There are five engagement elements divided as shown in the graphic.

balanced, the shift comfort is significantly improved and safe opening and closing of the clutch is ensured at all speeds.

BRAKE CLUTCH ENGAGEMENT MATRIX TABLES

All the gear shifts from first to the eighth speed in either direction are called overlapping engagement/disengagement because during the shift, one clutch must maintain the ability to transmit torque with a reduced pressure, until the other clutch is able to take on the torque.

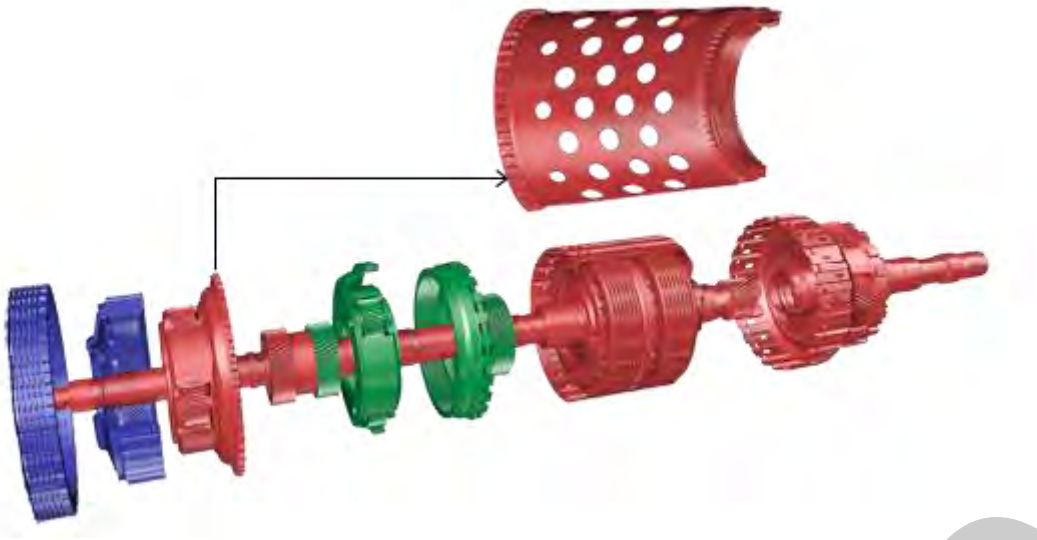
The gear shift is supported by a brief reduction in torque when shifting up, or a brief increase in torque when shifting down. Thanks to the crossed movements, we can say that the freewheel clutches have been replaced by hydraulic clutch control, with a saving in weight and size.

GEAR	Brake A	Brake B	Clutch C	Clutch D	Clutch E
REVERSE	X	X		X	
1st	X	X	X		
2nd	X	X			X
3rd		X	X		X
4th		X		X	X
5th		X	X	X	
6th			X	X	X
7th	X		X	X	
8th	X			X	X
PARK/NEUTRAL	X	X			

Engaged = X

Brake/Clutch Engagement Control Solenoid Valves

GEAR	Brake A	Brake B	Clutch C	Clutch D	Clutch E

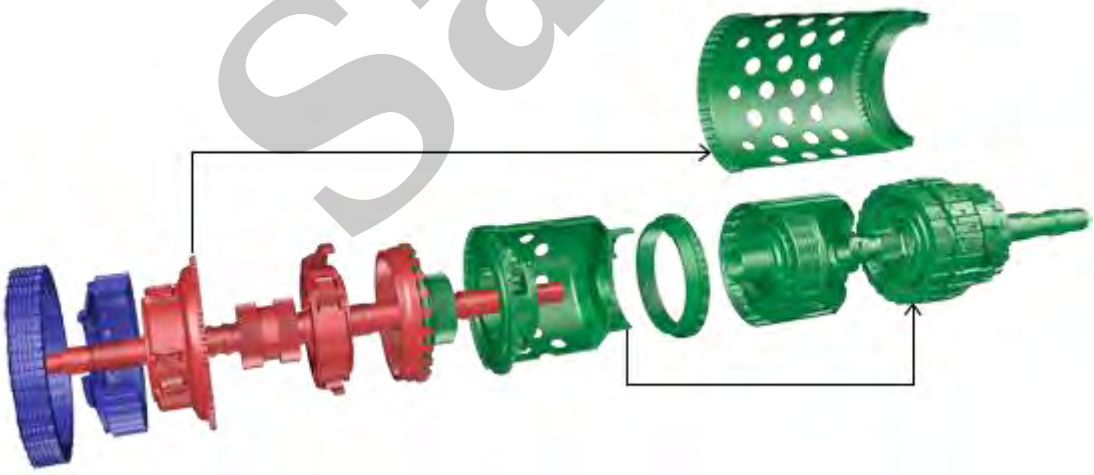


Engagement elements activated: B, C and E.

- Turbine shaft → clutch C → sun gear 4 → planet gears 4 → epicyclic gear train 4.
- Clutch C → clutch E → internal crown gear C2 → planet gears 2 (EP2 is blocked since C2 and PT2 are connected through clutches C and E).
- Turbine shaft → planet carrier 2 (EP2 blocked) → sun gear 1 → planet gear 1 → planet carrier 1 → internal crown gear 4.

The connection from the epicyclic gear train EP1 to the internal crown gear H4 produces a corresponding transmission ratio in the epicyclic gear train EP4 (see force flow in 1st gear).

4th GEAR



Engagement elements activated: B, D and E.

- Clutch E blocks the epicyclic gear train EP3 and clutch D and EP3 being blocked cause the epicyclic gear train EP4 to be blocked (gear trains 3 and 4 rotate at the same speed = output.

1 - Hydraulic Impulse Solenoid

A hydraulic impulse solenoid is installed on the transmission, inserted in the transmission housing close to the mechatronic unit solenoid valves. The HIS provides a hydraulic pressure reserve, to be sent to the mechatronic unit during engine starting due to the Engine Stop Start (ESS) function. The component is used for the ESS function as it allows the gear to be engaged in just 350 milliseconds from starting the engine, so that the driver does not perceive the engagement delay. The HIS charges when the engine is running, since the pump sends part of the oil to the HIS, in addition to sending it to the mechatronic unit.

The HIS is fixed to the transmission housing. It receives and accumulates about 1 liter of oil from the transmission oil pump through a connector. The oil sent to the HIS by the pump, must pass through a regulating valve. The HIS is composed of a piston with a small hole and a spring. During accumulation, the oil only passes through the small hole in the piston. When the oil enters the HIS, the pressure overcomes the force of the spring. The spring is compressed and allows the piston to withdraw and attach to a blocking point controlled by a solenoid valve. If the HIS is powered or the oil pump is operating, the piston will remain blocked.

During Start & Stop operation, namely when the engine is off, the HIS is powered in order to keep the piston blocked, even when the oil is no longer being pumped. When the vehicle is restarted, the HIS will no longer be powered and the spring will be able push the piston, which will send the oil under pressure to the

YOUR CURRENT VEHICLE

Transmission Shifter

TRANSMISSION SHIFTER

DESCRIPTION: The Electronic Shift Module (ESM) is a switch/module mounted to the instrument panel. The ESM communicates driver inputs to the Transmission Control Module (TCM) via the Controller Area Network-Chassis (CAN-C) bus. The ESM also uses a private can bus between the TCM and ESM. If the private bus goes down, the ESM will still communicate with the vehicle and TCM over the CAN C bus. The ESM also incorporates the 4WD, hill decent, and axle locker functions.

OPERATION: The ESM uses a rotary switch control knob to supply driver input to the TCM which controls the transmission. The ESM assembly incorporates P, R, N, D. positions. Each shifter position has a detent to keep the knob in the position it is placed in. The ESM uses an actuator or solenoid that allows the rotary knob to be locked for purposes of the Brake/Transmission Shift Interlock (BTSI) function. Locking is controlled by the TCM.

If any clutch does not appear to be functioning with the air, add some 8HP transmission fluid and try the test again. Some circuits will not operate without fluid.

Refer To List:

List 1

- 21 - Transmission and Transfer Case / Automatic - 8HP50/850RE / VALVE BODY / Removal and Installation
- 21 - Transmission and Transfer Case / Automatic - 8HP75 / VALVE BODY / Removal and Installation
- 21 - Transmission and Transfer Case / Automatic - 8P75PH / VALVE BODY / Removal and Installation

List 2

- 21 - Transmission and Transfer Case / Automatic - 8HP50/850RE / Standard Procedure
- 21 - Transmission and Transfer Case / Automatic - 8HP75 / Standard Procedure
- 21 - Transmission and Transfer Case / Automatic - 8P75PH / Standard Procedure