Volvo Chassis - Diagnostic Trouble Codes (DTC's) - MID130 PID160 FMI1 Or FMI2 - For The I-Shift Transmission

Internal Content

On a Volvo Chassis with I-Shift - The installation of replacement parts in an I-Shift transmission (Version - C) may result in diagnostic trouble codes (DTC's) MID130 PID160 FMI1 or FMI2. The DTC's are due to a hardware mismatch of transmission control module - D (TECU-D) or (TECU-C) , cable harness with speed sensor and sensor wheel in the generation D (NEW) or C (OLD) versions of the I-Shift transmissions. To determine the combination of mixed components, a conversion kit is available and used to eliminate the DTC's MID130 PID 160 FMI1 or FMI2. Refer to Technical Service Bulletin 431 - 001A, I-Shift Transmission With Mixed Components found in Impact.

1. Navigate to the Service tab.

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I-Shift Transmission With Mixed Components

V-431-001A

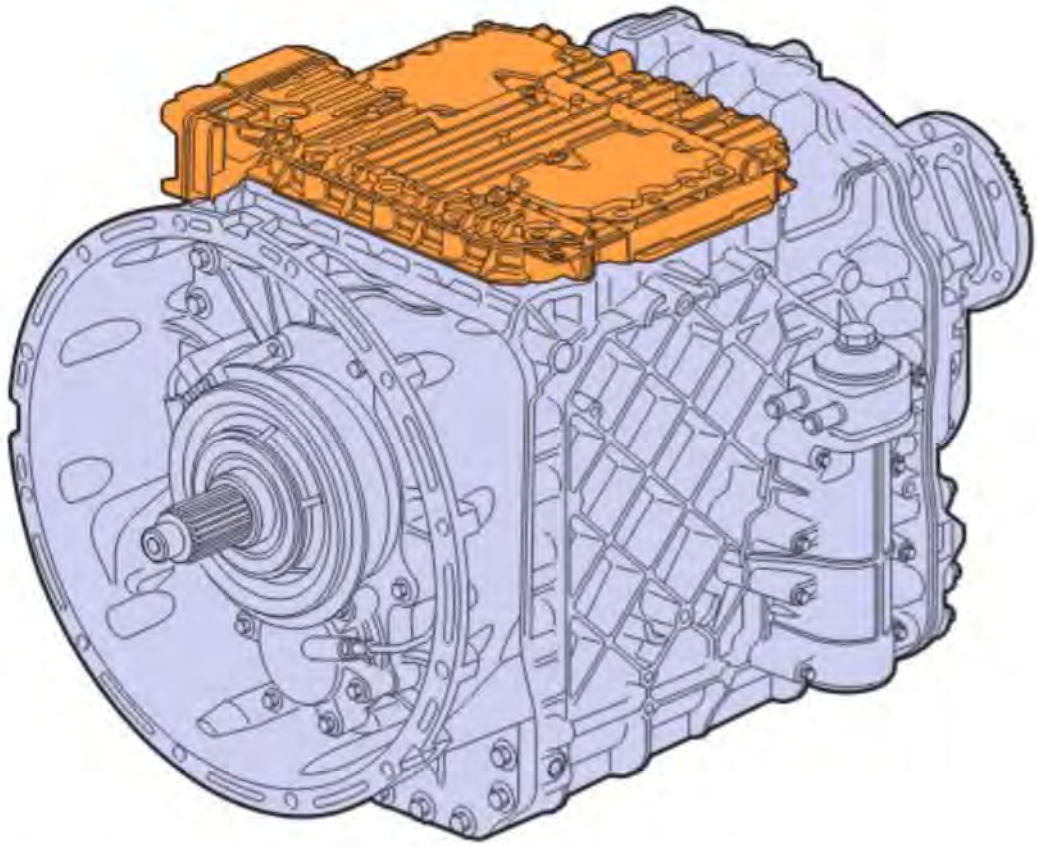
(November 2010)

Valid for

I-Shift transmissions

Case description

The installation of replacement parts in an I-Shift transmission (Version-C) may result in diagnostic trouble codes (DTC's) MID130 PID160 FMI1 or FMI2. The DTCs are due to a hardware mismatch of transmission control module-D (TECU-D) or TECU-C, cable harness with speed sensor and sensor wheel in the generation D (New) or C (Old) versions of the I-Shift transmissions. To determine the combination of mixed components, a conversion kit is available and used to eliminate the DTCs MID130 PID160 FMI1 or FMI2.



You must read and understand the precautions and guidelines in Service Information, group 4, “General Safety Practices, Transmission” before performing this procedure. If you are not properly trained and certified in this procedure, ask your supervisor for training before you perform it.

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Required Parts

TECU Version and Hardware			
TECU Version	Emission Level	Hardware Part Number	Reman Part Number
TECU-C	US07	20829012	N/A
TECU-D	US07 & US10	21274018	N/A
TECU-D	US07 & US10 & OBD13	21484418	85013226

I-Shift Generation-C Transmssion (AT2512C, ATO2512C, and ATO3112C) Conversion Kit Selection			
Item	Control Unit	Conversion Kit	Parameters
1	TECU-D	85120150	KBQ1, KQR1
2	GCU-D	85120151	KBQ1, KBR0

Identify Cable Harness With Speed Sensor			
I-Shift Transmission Version	Cable Harness	Speed Sensor Version	Speed Sensor Number
Generation-C	20775027	Generation-C	4410371001
Generation-D	21068284	Generation-D	4410371051

Sensor Wheel Configuration	
Sensor Wheel Part Number	Sensor Wheel Tooth Number
20542400	30
21034006	72

I-Shift Transmission With Mixed Components

Concerns

All VN, VT and VHD vehicles with I-shift transmissions, generation C (AT2512C, ATO2512C, and ATO3112C).

Problem

DTCs MID130 PID160 FMI1 or FMI2 may occur after installation of replacement parts.

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Reason

As of June, 2009 the new generation I-Shift transmission (Generation D) was released for production. There are three parts used in combination with the generation D (New) or C (Old) versions of the I-Shift transmissions (see figure below).

1. Transmission Electronic Control Unit (TECU).

   TECU-D (New generation) or TECU-C (Old generation)

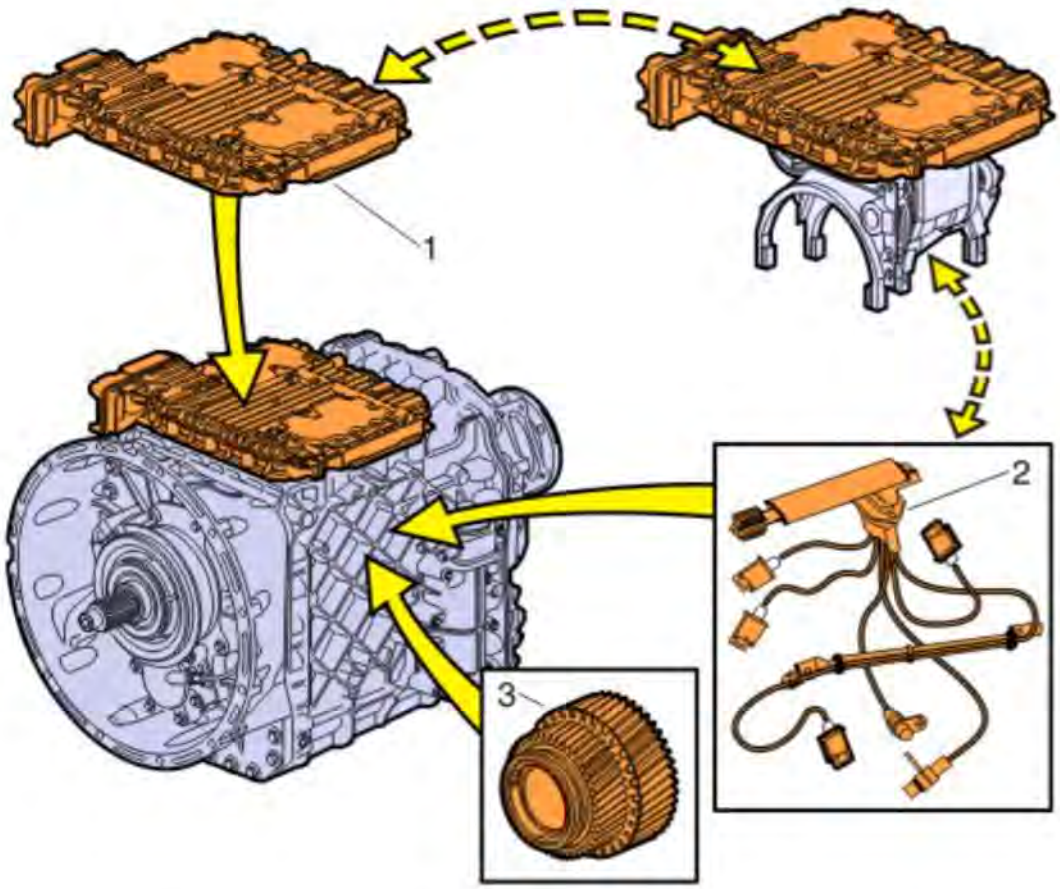
2. Cable harness including speed sensor.

   Speed-sensor-D (New generation) or Speed-sensor-C (Old generation)

3. Sensor wheel.

   72 tooth (New Generation) or 30 tooth (Old Generation)

   Note: The difference between the new generation Gear Control Unit (GCU-D) assembly and the old generation Gear Control Unit (GCU-C) assembly is the TECU-D (1) and the new speed-sensor-D (2). The rest of the GCU is equivalent to the old generation.



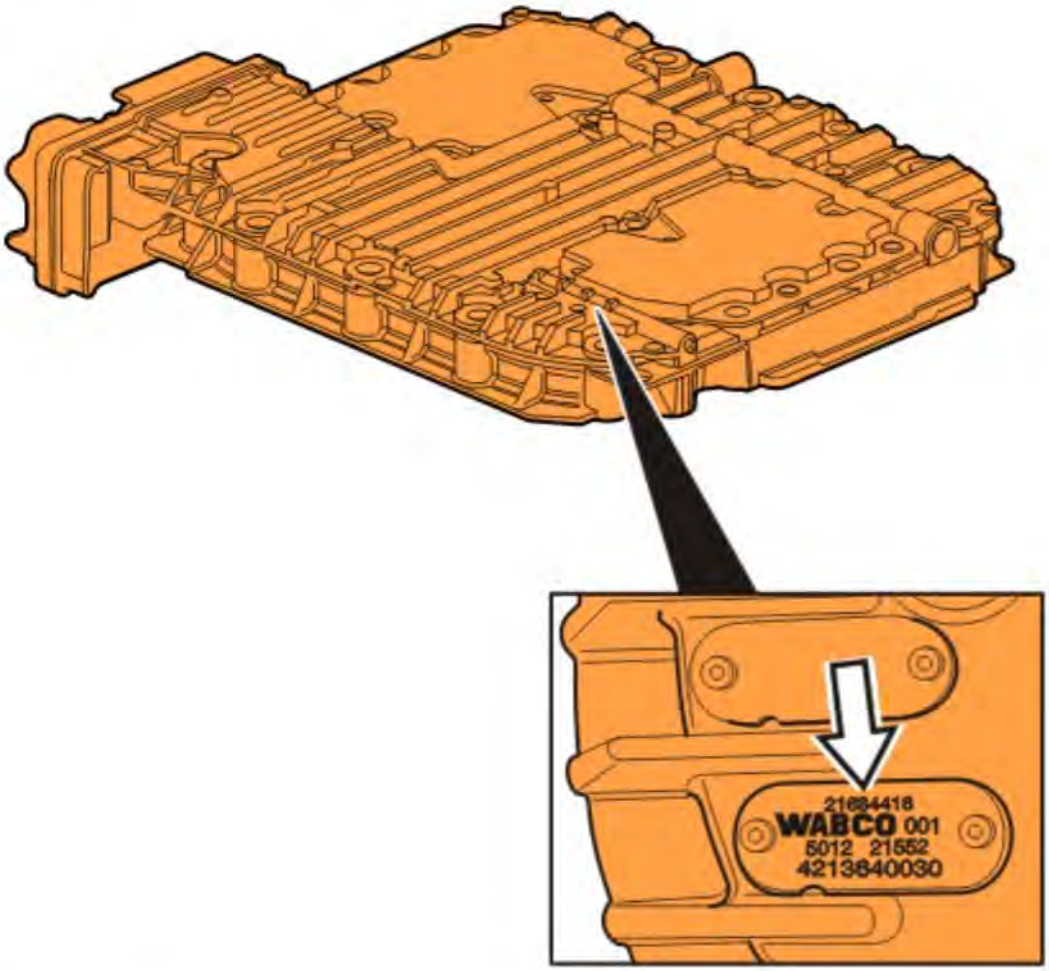
Action/Information

TECU and GCU

When installing a replacement part TECU-D or complete GCU-D assembly in an I-Shift generation C transmission, a conversion kit must be run. Follow with download of software to MID130, enabling the TECU-D to identify if it is installed in an I-Shift generation C transmission. To select the correct conversion kit, TPI 432-014 and TPI 432-015

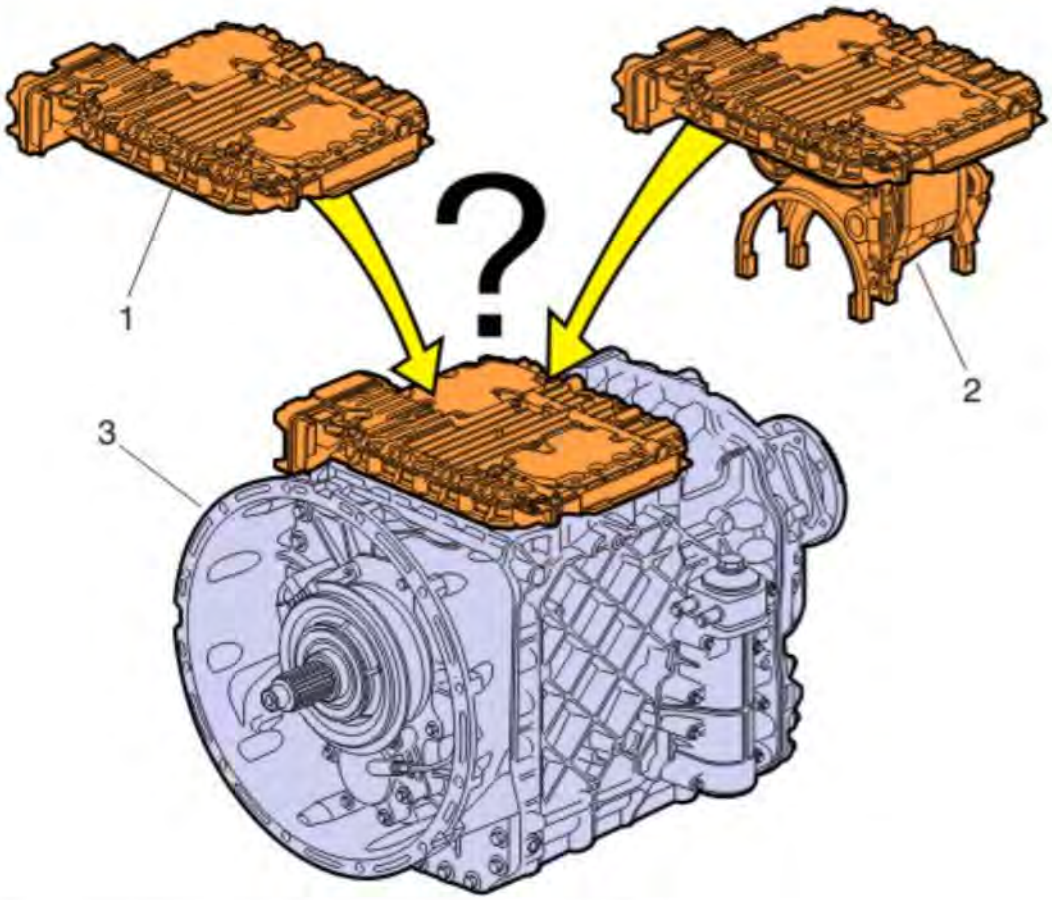
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have been released. Both are connected to the related part numbers in Impact. The conversion kit will add parameters KBQ and KBR to the TECU-D. By setting these in different combinations the software will identify if either a TECU-D or complete GCU-D is installed in an I-Shift generation C transmission. If the correct conversion kit is not run, a DTC MID130 PID160 FMI1 or FMI2 will result.



TECU Version and Hardware			
TECU Version	Emission Level	Hardware Part Number	Reman Part Number
TECU-C	US07	20829012	N/A
TECU-D	US07 & US10	21274018	N/A
TECU-D	US07 & US10 & OBD13	21484418	85013226

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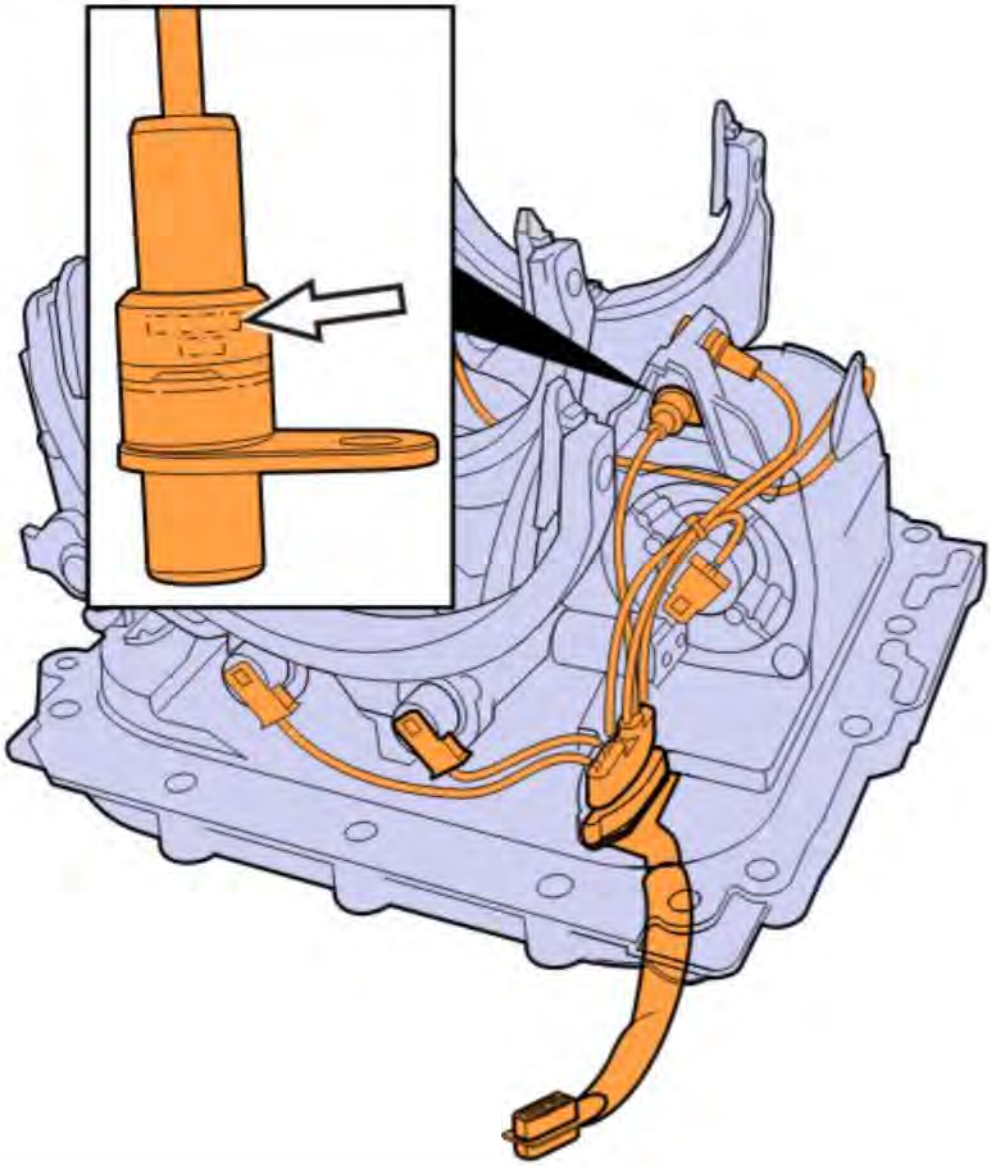
I-Shift Generation-C Transmssion (AT2512C, ATO2512C, and ATO3112C) Conversion Kit Selection			
Item	Control Unit	Conversion Kit	Parameters
1	TECU-D	85120150	KBQ1, KQR1
2	GCU-D	85120151	KBQ1, KBR0

Cable Harness With Speed Sensor

The new cable harness includes a new speed-sensor. The cable harnesses are not marked with different part numbers. To identify the speed sensor generation, look at the number stamped on the sensor.

Note: To identify speed sensor with cable harness, see graphic below for details.

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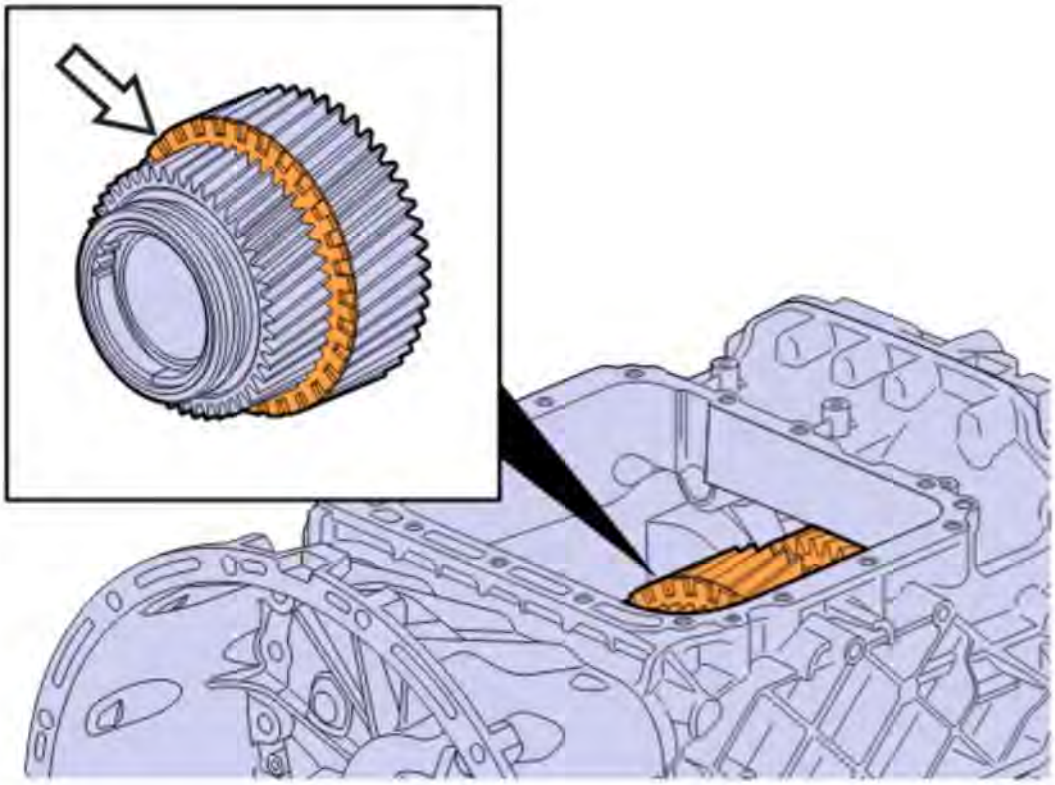


Identify Cable Harness With Speed Sensor			
I-Shift Transmission Version	Cable Harness	Speed Sensor Version	Speed Sensor Number
Generation-C	20775027	Generation-C	4410371001
Generation-D	21068284	Generation-D	4410371051

Sensor Wheel

For the main shaft there is a new sensor wheel which has 72 tooth compared to the old version which had 30 tooth. The 72 tooth sensor wheel is installed in the I-Shift generation D transmissions and I-Shift generation C transmissions built beginning June, 2009. There will be 72 tooth sensor wheels installed in I-shift generation-C Reman units where a complete GCU-D was installed at remanufacturing.

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Sensor Wheel Configuration	
Sensor Wheel Part Number	Sensor Wheel Tooth Number
20542400	30
21034006	72

Information for Future Repairs

The possibility exists for a hardware mismatch in the future. Impact Parts system does not check for changes in vehicle data administration (VDA), causing a hardware mismatch. A hardware mismatch will result in DTC MID130 PID160 FMI1 or FMI2.

DTCs Caused by Hardware Mismatch	
DTC	Description
FMI1	"The main shaft speed differs from both the value of the countershaft speed and the vehicle speed received from the vehicle ECU." This indicates the "incorrect" number tooth sensor wheel.
FMI2	"The sensor indicates wrong travelling direction." This indicates a "wrong" speed sensor (cable harness). The two FMIs should be corrected by setting the parameters KBQ and KBR, with VCADS, to the correct combination. There is no needed to replace the sensor wheel or the speed sensor with harness.

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Parameter Definitions	
Parameter	Definition
KBQ = 0	The main shaft has a 72 tooth sensor wheel
KBQ = 1	The main shaft has a 30 tooth sensor wheel
KBR = 0	There is a speed-sensor-D installed
KBR = 1	There is a speed-sensor-C installed

Examples of How to Correct DTCs Using Parameter Settings	
Example 1	I-Shift generation-C transmission (built before June, 2009) was previously repaired using a complete GCU-D assembly, with KBQ = 1 and KBR = 0 new cable harness with speed sensors included, a speed sensor-C. The mismatch created DTC MID130 PID160 FMI2, that is corrected by changing the parameters, with VCADS, to KBQ = 1 and KBR = 1.
Example 2	The truck was previously repaired with a complete I-Shift generation D transmission, (which has GCU-D, TECU-D, and speed-sensor-D) with 72 tooth sensor wheel, and KBQ = 0 and KBR = 0. The new cable harness with speed sensors included, a speed sensor-C. The mismatch created DTC MID130 PID160 FMI2, that is corrected by changing the parameters, with VCADS, to KBQ = 0 and KBR = 1.

Miscellaneous Information

Note: TECU-C is identified by the part number 20829012 marked on the top cover plate (This is the only part number for the TECU-C).

Note: Prior to any repair, it is recommended to view parameter programming (Operation Number 1700-22-03-03) with VCADS. Identify KBQ and KBR settings to verify sensor wheel and speed sensor combination using the table below. If KBQ and KBR are not present, and TECU-C can be identified by the p/n 20829012 marked on the top cover plate, it is an “Original Equipment Configuration” AMT-C.

To summarize this field service bulletin (FSB), the table below shows various combinations of applicable and non-applicable KBQ and KBR parameter settings for mixed hardware (sensor wheel/ speed sensor) combinations.

KBQ and KBR Parameter Settings for Mixed Hardware		

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Hardware Combinations	30 Tooth Sensor Wheel	72 Tooth Sensor Wheel
TECU-D with speed-sensor-D	KBQ = 1 KBR = 0	KBQ = 0KBR = 0
TECU-D with speed-sensor-C	KBQ = 1KBR = 1	KBQ = 0KBR = 1
TECU-C with speed-sensor-D	Not applicable	Not applicable
TECU-C with speed-sensor-C	"Original" I-Shift generation C software needed where KBQ & KBR have no function. Use conversion kit part number 85124923.	Not applicable

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