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## Transmission Control Module (TCM) and MID223

Design and Function  
CHU, CXU, GU, TD

## Transmission Control Module (TCM) and MID223, Design and Function

The bulletin provides design and function information for the TCM and MID 223 Gear Selector Control Unit fault codes for MACK CHU, CXU, GU and TD vehicles.

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**Note:** Information is subject to change without notice.  
Illustrations are used for reference only and can differ slightly from the actual engine being serviced. However, key components addressed in this information are represented as accurately as possible.

# Design and Function

## Transmission Control Module (TCM) and MID223

The manufacturer diagnostic tool is the preferred tool for performing diagnostic work. Contact your local dealer for more information or visit "[www.premiumtechttool.com](http://www.premiumtechttool.com)".

The following document details the fault codes associated with the transmission control module (TCM) and MID223. A fault code type, description, symptoms and possible causes is provided (if applicable). Utilize this information to diagnose any fault codes received for the transmission.

Also included are descriptions of the sensors associated with the TCM and MID223.

### Transmission Control Module (TCM)

The TCM communicates with the Gear Selector Control Module (GSCM) and other ECMs in the vehicle through the SAE J1939 and SAE ISO data links. The functionality of the TCM can be different depending on the type of software packages that are installed. The TCM contains the following components:

- SAE ISO data link
- SAE J1939 data link
- CAN 2 data link
- 11 Powerdrivers
- Inclination Sensor
- Temperature Sensor
- 9 Controlling Solenoid Valves

The Transmission Control Module located on the upper portion of the control housing.

### Transmission Control Module (TCM) Sensors

#### Clutch Position Sensor

The Clutch Position Sensor is located on the side of the clutch cylinder assembly (inside bell housing).

#### Main Shaft Speed Sensor(s)

The speed sensors are located on the control housing and measure the speed of the main shaft and the speed of the countershaft.

The main shaft speed sensor is a electronic sensor with a hall element. Using a hall element makes it possible to measure the rotation speed and rotation direction of the shaft.

The countershaft speed sensor is an inductive sensor. Knowing the speed of the countershaft makes it possible to calculate the precise speed of every gear in the transmission.

The speed sensor(s) are located in the transmission on the lower portion of the control housing.

## **Output Shaft Speed Sensor**

The Output Shaft Speed Sensor is located on the outside of the rear transmission housing.

## **Transmission Control Housing Sensors**

There are four position sensors in the transmission control housing. These sensors measure the position of the specific air cylinder within the control housing. The sensors are inductive and the inductive characteristics change depending on the position of the metal pin that follows the movements of the air cylinders.

### *Range Cylinder Position Sensor*

The Range Cylinder Position Sensor is located in the transmission on the lower portion of the control housing.

### *Split Cylinder Position Sensor*

The Split Cylinder Position Sensor is located in the transmission on the lower portion of the control housing.

### *1st/Reverse Cylinder Position Sensor*

The 1st/Reverse Cylinder Position Sensor is located in the transmission on the lower portion of the control housing.

### *2nd/3rd Gear Cylinder Position Sensor*

The 2nd/3rd Gear Cylinder Position Sensor is located in the transmission on the lower portion of the control housing.

## **MID223 Sensors**

### **Gear Selector Electronic Control Unit (GSECU)**

The gear selector communicates with the GSECU using 8 wires. These wires are used to decode a switch matrix inside the GSECU.

Inside the gear selector lever there are a number of switches. Some of the switches are normal and some are hall-effect switches.

The GSECU is located in the center of the dash just rear of the Vehicle ECU.