

# TIRE PRESSURE MONITORING SYSTEM

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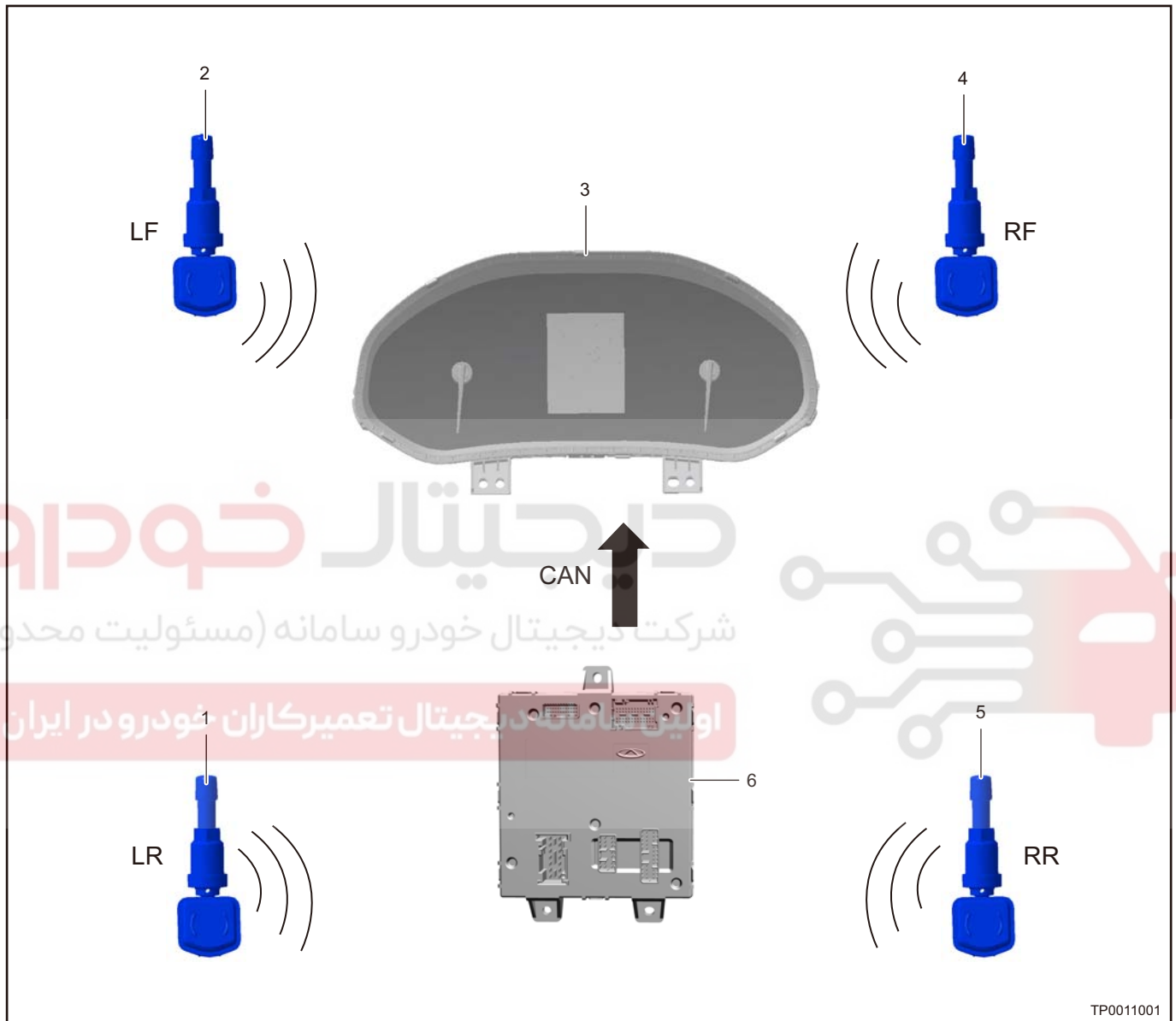
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# GENERAL INFORMATION

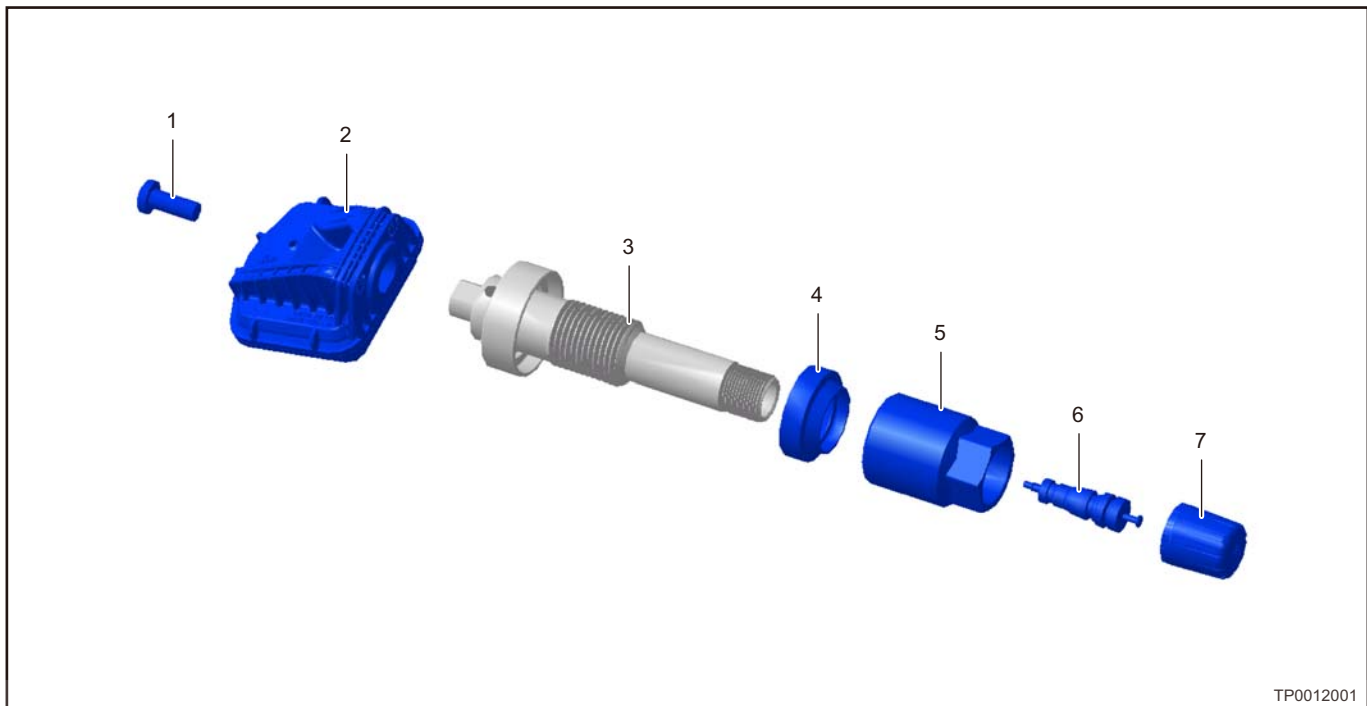
## Overview

### Description



TP0011001

1 - Rear Left Tire Pressure Sensor	2 - Front Left Tire Pressure Sensor
3 - Instrument Cluster	4 - Front Right Tire Pressure Sensor
5 - Rear Right Tire Pressure Sensor	6 - Body Control Module



TP0012001

1 - Screw	2 - Tire Pressure Sensor
3 - Valve Lever	4 - Gasket
5 - Tire Pressure Sensor Nut	6 - Valve Core
7 - Valve Cap	

Tire Pressure Monitoring System (TPMS) is an active safety device, which can monitor tire pressure and temperature in real time and display tire pressure and temperature on meter. When tire pressure is too low or temperature is too high, tire pressure monitoring system will warn the driver of driving danger.

## Operation

Tire pressure sensor is the transmitting terminal of tire information, body control module is the receiving terminal of tire information, meter is the display terminal of tire information, and tire pressure sensor is the core of tire pressure monitoring system. Tire pressure sensor is installed on rim, which collects data such as pressure, temperature inside tire, and sends these data to body control module as radio-frequency signal. The wireless communication frequency between tire pressure sensor and body control module is 433 MHz.

The body control module receives radio-frequency signal sent from tire pressure sensor and processes these data. Body control module processes data of tire pressure sensor, then sends them to meter via CAN bus. Tire pressure value is displayed on meter via CAN bus signal. When tire pressure is too high or too low, or temperature is too high, it informs driver of abnormal tire.

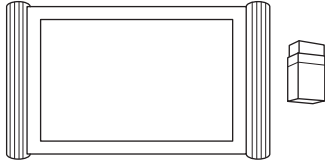

## Specifications

### Torque Specifications

Description	Torque (N·m)
Body Control Module Fixing Nut	5 ± 1
Tire Pressure Sensor Fixing Nut	5 ± 1

**Tools**

Special Tools

<p>X-431 PAD Diagnostic Tester</p>	 <p>RCH000106</p>
<p>Low Frequency Trigger</p>	 <p>RCH009806</p>

General Tool

<p>Digital Multimeter</p>	 <p>RCH0002006</p>
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## Tire Pressure System Warning Information

### High Temperature or Low Pressure

When there is a low pressure or high temperature alarm due to abnormal pressure or temperature inside the wheel, the tire pressure warning light on meter illuminates immediately and the meter switches to tire pressure monitoring system display screen automatically from normal display screen and indicates which tire is sending the alarm.

### System Malfunction

When system malfunction is received by meter, the tire pressure warning light on meter flashes for 75 seconds and then remains on, the center meter display will display "Please inspect the tire pressure monitoring system", and then the meter switches to tire pressure monitoring system display screen automatically from normal screen.

### Low Pressure Alarm

When vehicle tire pressure is less than 1.8 bar, and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will send a low pressure alarm within 5 minutes. With ENGINE START STOP switch turned from OFF to ON position, the system will also send a low pressure alarm if tire pressure displayed on meter is less than 1.8 bar.

When there is a low pressure alarm, the warning light remains on and normal screen switches into tire pressure screen directly: The tire with low pressure (e.g., front right tire) will flash and its tire pressure and temperature will be displayed.

The tire pressure is too low, please resume it to normal pressure as soon as possible. Too low tire pressure will increase fuel consumption and tire wear. And seriously worn tire will cause an accident such as flat tire.

Please resume the tire pressure to 2.3 bar (with an error limit of 0.1 bar). When the vehicle tire pressure resumes to 2.3 bar (with an error limit of 0.1 bar) and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will deactivate the low pressure alarm automatically within 5 minutes.

### High Temperature Alarm

When the vehicle tire temperature is higher than 85°C and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will send a high temperature alarm automatically within 5 minutes. With ENGINE START STOP switch turned from OFF to ON position, the system will also send a high temperature alarm if tire temperature displayed on meter is higher than 85°C.

When there is a high temperature alarm, the warning light remains on and normal screen switches to tire pressure screen directly: The tire with high temperature (e.g., front right tire) will flash and its tire pressure and temperature values will be displayed.

When a high temperature alarm occurs, stop vehicle to cool the tire naturally, otherwise there is a danger of accident. When tire temperature is too high, never cool the tire by pouring cold water, otherwise, tire may be damaged, resulting in an accident.

When the vehicle wheel temperature is lower than 80°C and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will deactivate high temperature alarm automatically within 5 minutes. The system stores the history DTCs.

### System Malfunction

When the vehicle speed is higher than 30 Km/h, if the tire pressure monitoring system fails to receive radio frequency signal from one or more sensors within 10 minutes, it will send a system malfunction alarm, the meter will display "Please inspect and repair the tire pressure monitoring system", and the indication symbol will remain on after flashing for 75 seconds. The meter system will also switch to tire pressure monitoring system display screen automatically.

### High Pressure Display

If the tire pressure is higher than 3.5 bar, the tire pressure will be displayed as --; but the temperature will be displayed normally.

If the tire pressure is less than 3.5 bar, it will resume normal display within 5 minutes.

If the alarm is caused by high tire pressure, it is necessary to resume it to 2.3 bar.

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## Configuration & Learning for Tire Pressure Monitoring System

### Warning:

- Perform tire pressure sensor learning when rotating tire and replacing tire pressure sensor.
- Tire pressure monitoring function is turned on after BCM is replaced, then it is necessary to perform learning of tire pressure sensor again.

### Hint:

- Configuration and learning content of tire pressure monitoring system is only for vehicle models equipped with tire pressure configuration!

### Diagnosis Procedure

#### Hint

Use following procedures to troubleshoot the tire pressure monitoring system.

<b>1</b>	<b>Vehicle brought to workshop</b>
----------	------------------------------------

#### Result

Proceed to
Next

Next

<b>2</b>	<b>Judge if tire pressure monitoring function of Body Control Module (BCM) is turned on</b>
----------	---

Turn ENGINE START STOP switch ON but do not start vehicle, adjust steering wheel button and switch instrument cluster conventional interface. If there is tire pressure interface, it indicates that tire pressure display function of BCM is turned on; If not, it indicates that tire pressure display function of Body Control Module (BCM) is not turned on.

#### OK

Meter can enter tire pressure information screen successfully

#### Result

Result	Proceed to
OK	A
NG	B

NG

Turn on tire pressure monitoring function of Body Control Module (BCM)

OK

51

<b>3</b>	<b>Perform tire pressure sensor learning</b>
----------	--

#### Result

Proceed to
NEXT

NEXT

**4** Perform running test with a vehicle speed more than 30 km/h for 45 seconds

**Result**

Proceed to
NEXT

NEXT

**5** Check if tire pressure information is displayed correctly

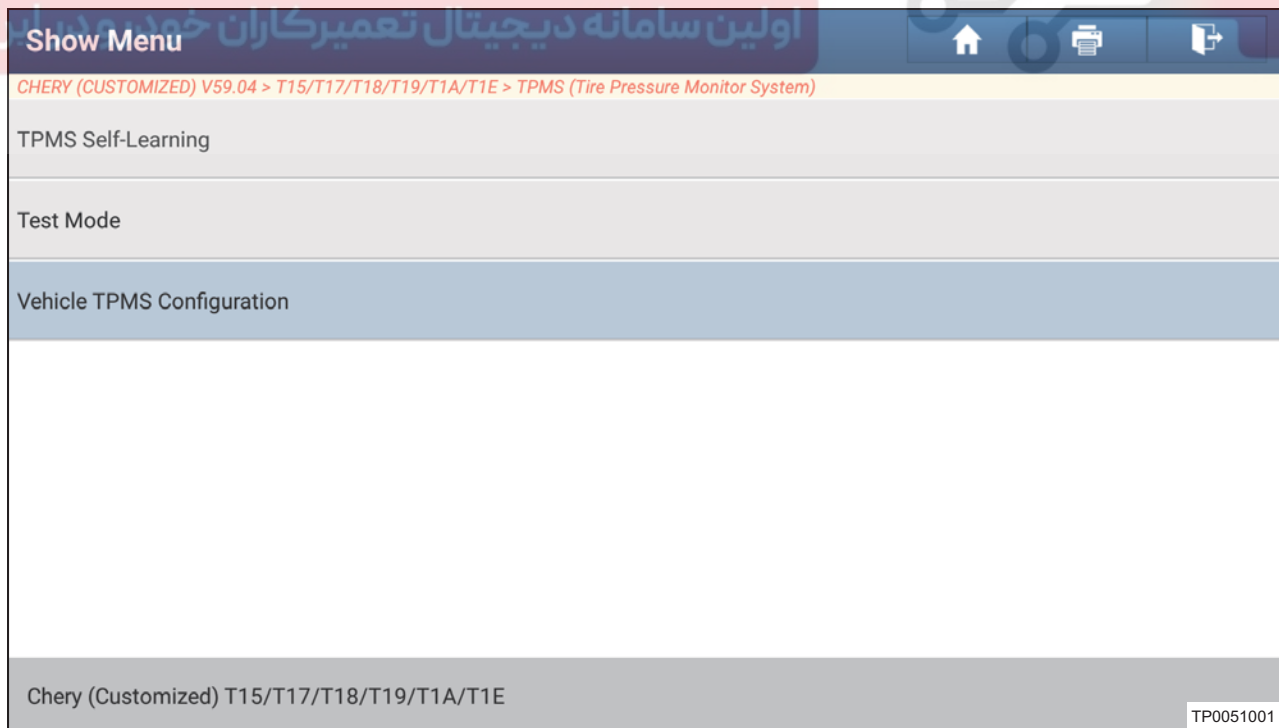
**Result**

Result	Proceed to
OK	A
NG	B

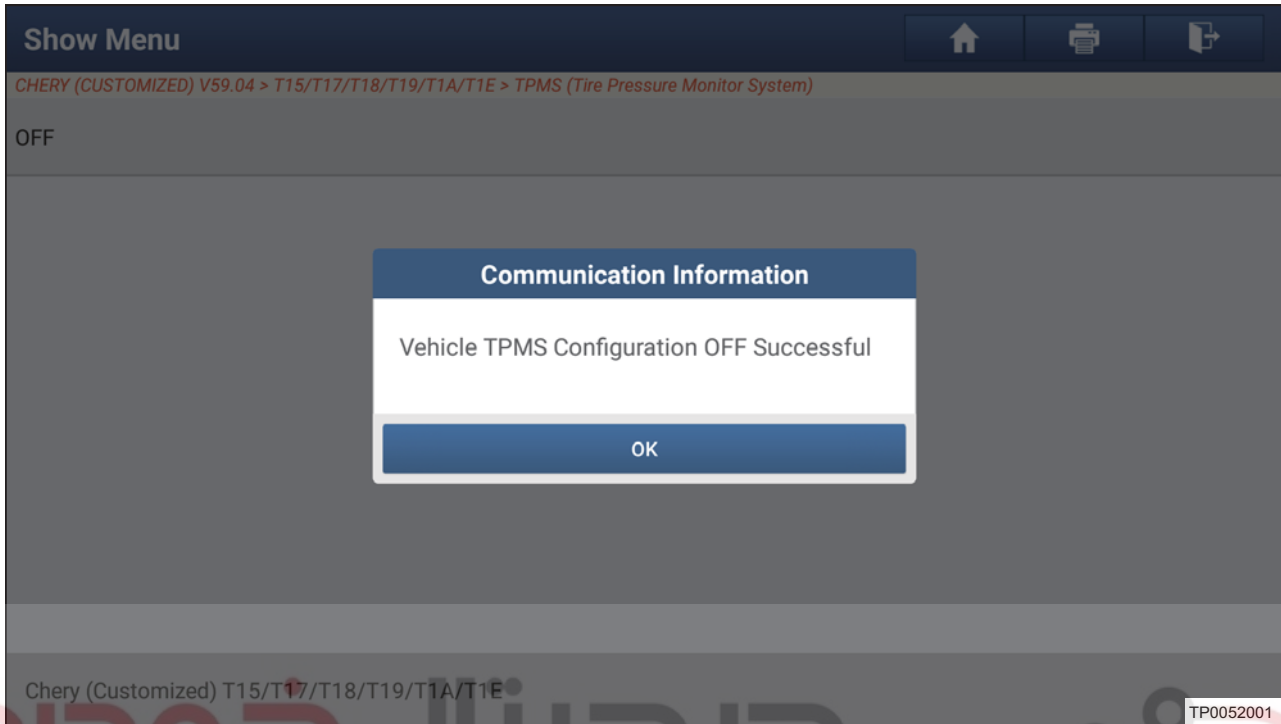
OK	End
NG	Repair according to tire pressure monitoring system malfunction.

**Turning ON and OFF BCM Tire Pressure Monitoring Function**

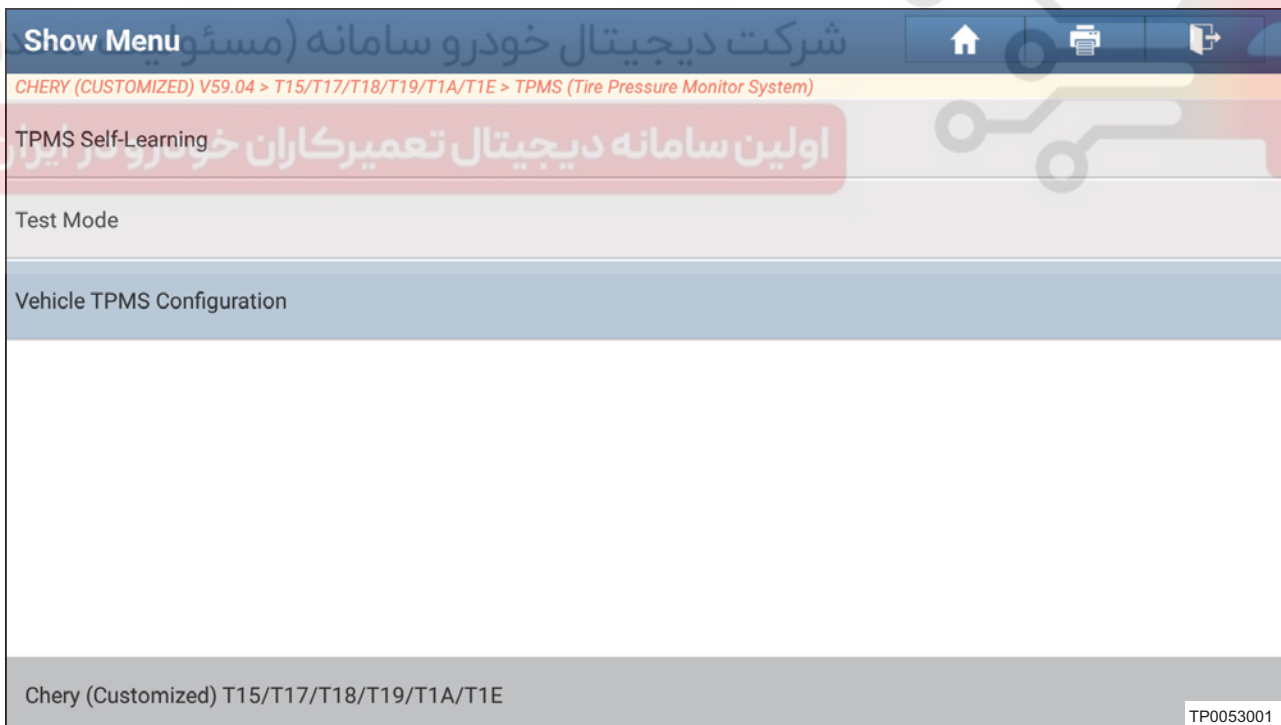
1. Connect the diagnostic tester to select TPMS (Tire Pressure Monitoring System), then select Show Menu and click "Vehicle TPMS Configuration".



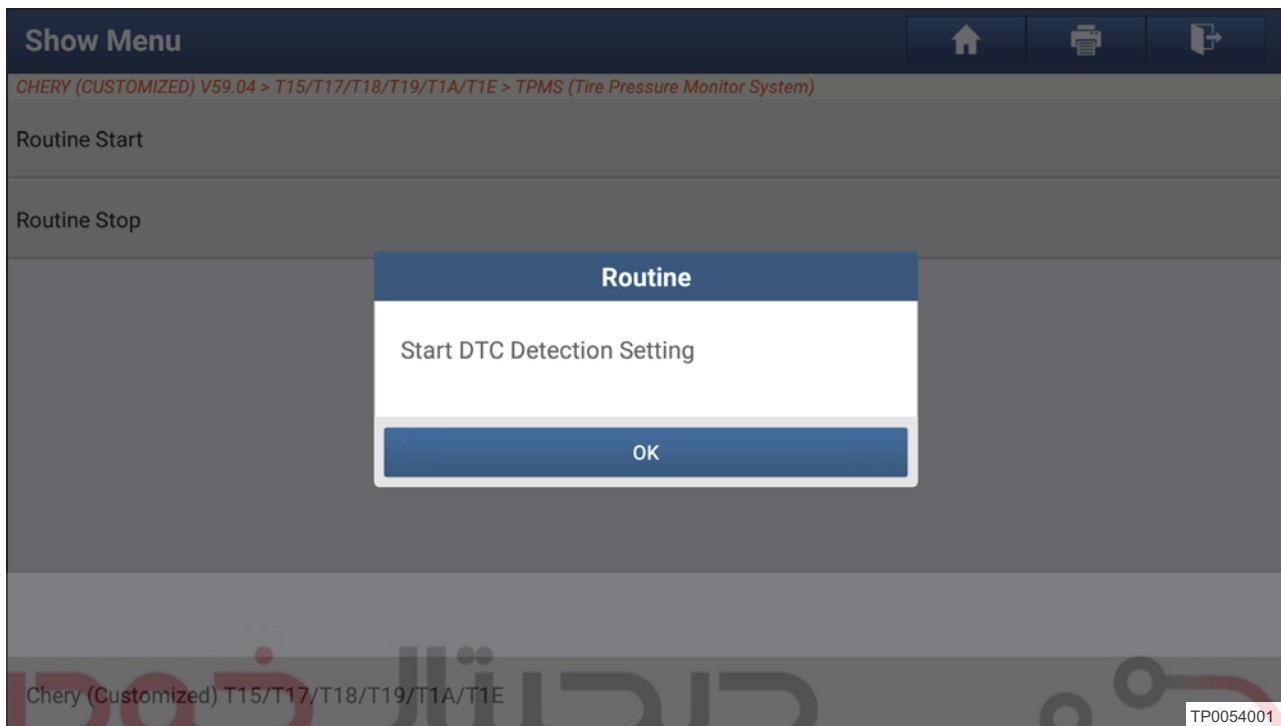
- Click "OFF". If the tire pressure display function is "OFF" on meter currently, the menu will display "ON" for current meter's tire pressure display function.



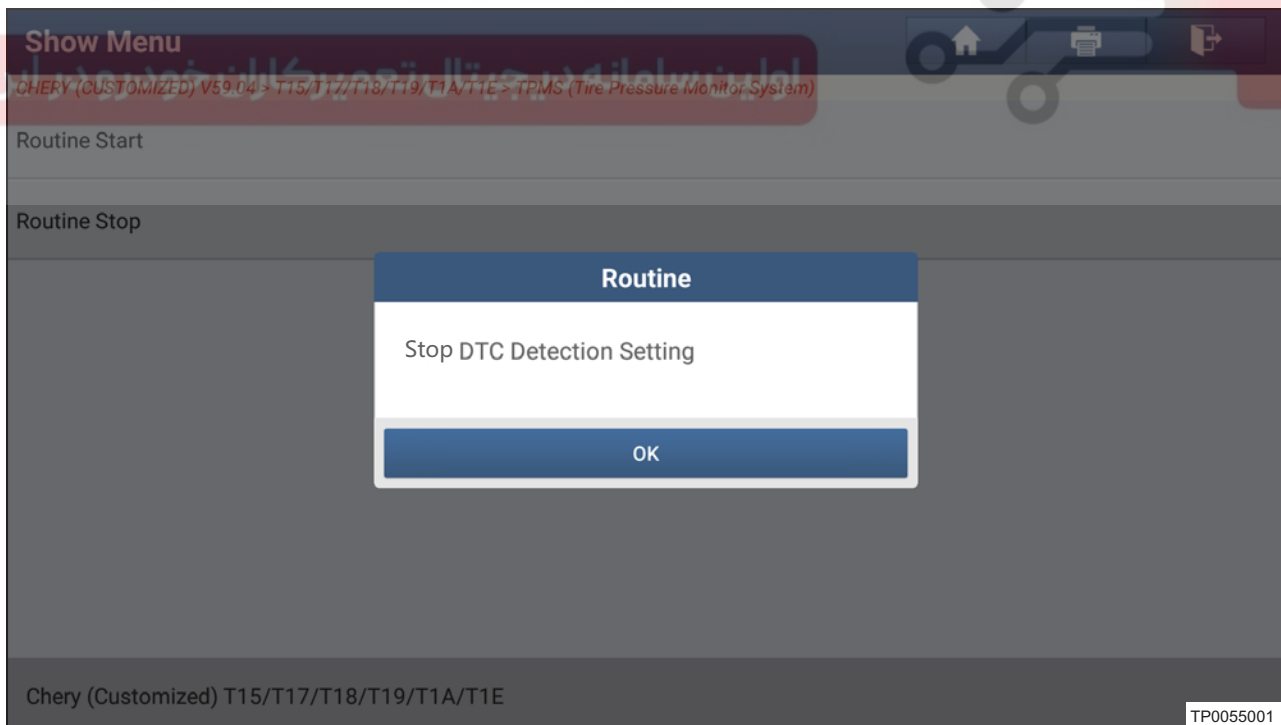
- By clicking "Test Mode" on "Show Menu" screen, it is also possible to test if the tire pressure display function is turned on.



4. After clicking "Routine Start", the tire pressure malfunction indicator on meter will flash. If a prompt "Start DTC Detection Setting" is given from the diagnostic tester, it indicates that the tire pressure display function is turned on successfully.



5. Current test mode will be exited if you click "Routine Stop". The tire pressure malfunction light on meter will turn off, and diagnostic tester will give a prompt "Stop DTC Detection Setting", then return to previous menu.

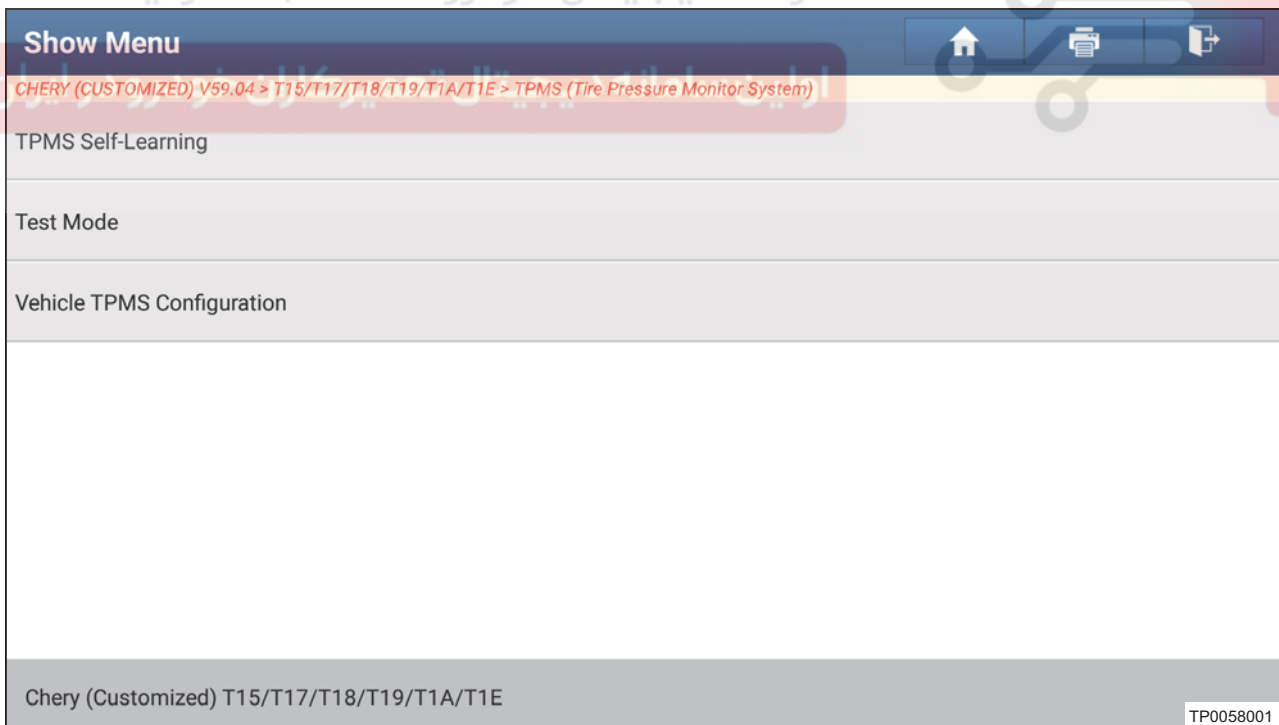


### Perform Tire Pressure Sensor Learning

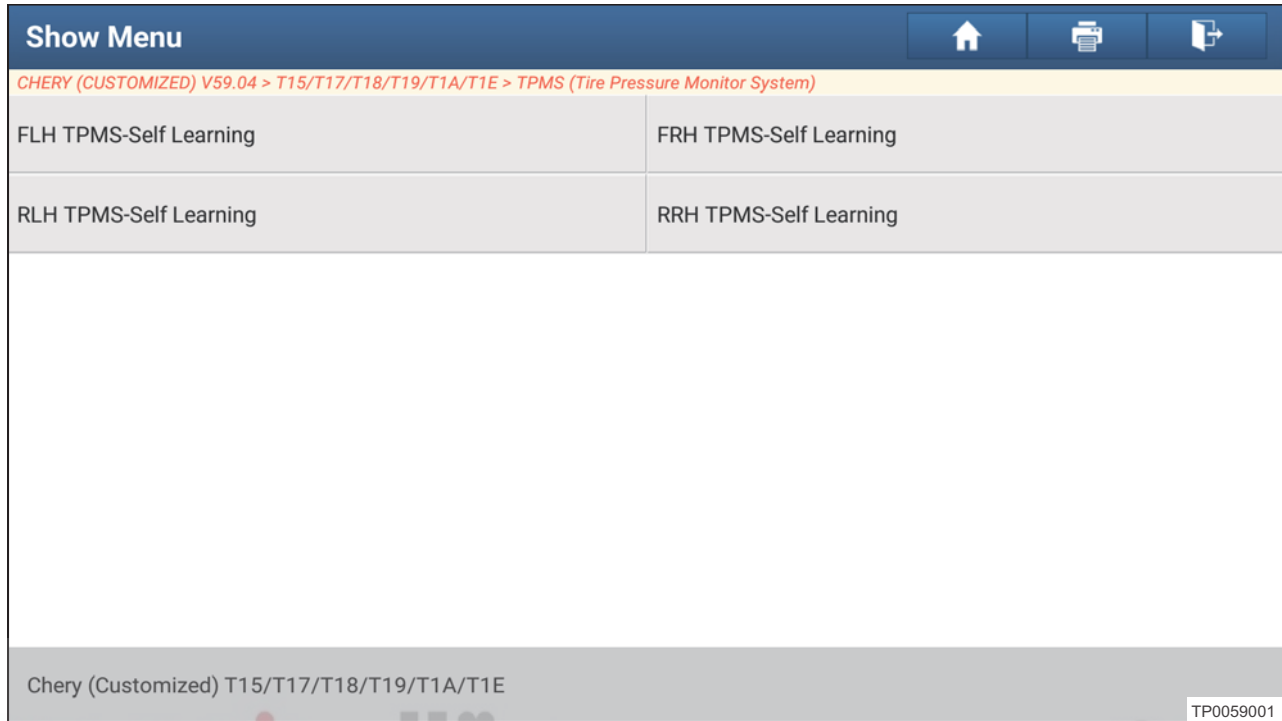
1. Connect the diagnostic tester and turn ENGINE START STOP switch to ON.
2. Select TPMS (Tire Pressure Monitoring System).
3. Select "Special Operation" menu.



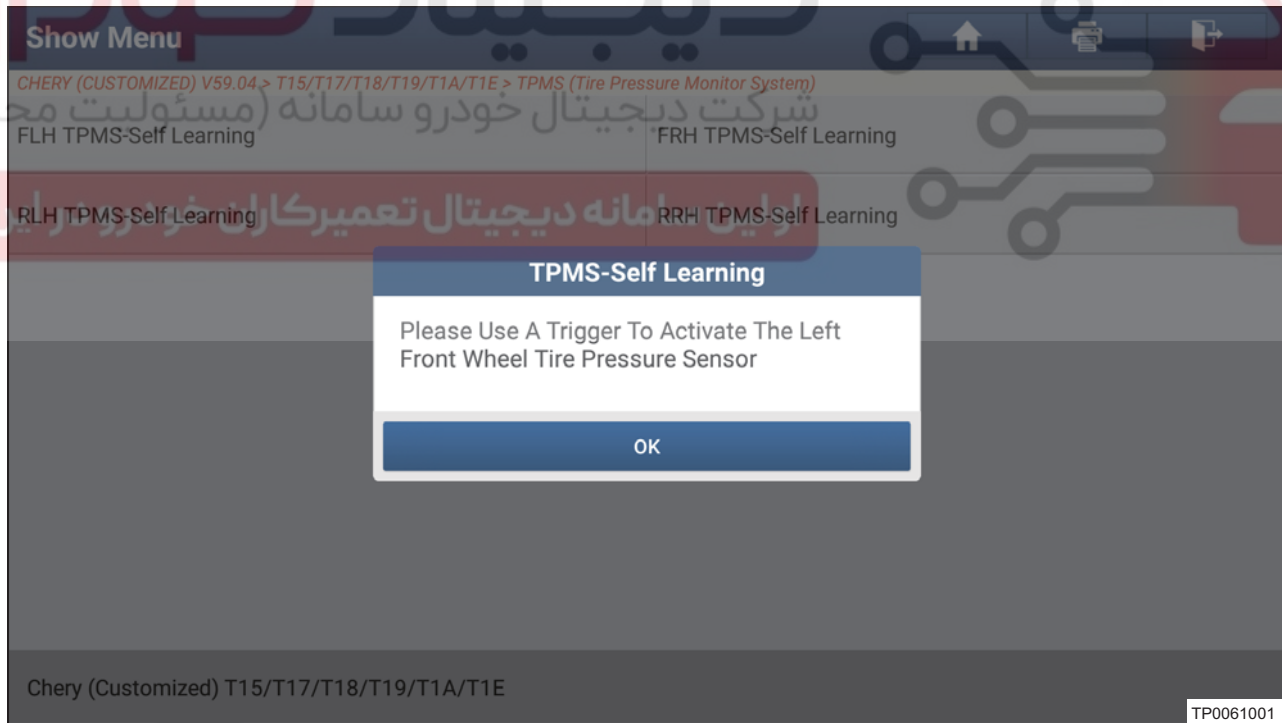
4. Click "TPMS Self-Learning" menu.



5. Click tire menu that needs to learn (take front left tire as an example).



6. Operates according to prompt on diagnostic tester.



**Caution:**

- There are two methods for tire pressure sensor learning. One is air bleeding, the other is low-frequency trigger learning. If low-frequency trigger is used, air bleeding is not available.
7. When clicking "OK" button on diagnostic tester, it will enter learning status: Instrument cluster turn signal indicator lights and outside turn signal lights blink, and tire pressure warning light comes on.
8. After learning of front left tire pressure sensor is successful, left and right turn signal lights stop blinking, tire pressure data of this tire can be displayed on instrument cluster.

## Tire Pressure Sensor Learning Methods

### 1. Precautions

No.	Precautions	Details
1	Avoid error learning of tire	Tire learned on diagnostic tester menu must be matched with bleeding tire
2	Avoid error learning of tire	Only operate one tire every time, and do not bleed (or inflate) other tires at this time
3	Avoid error learning of tire	Keep away from other vehicles with tire pressure sensor, avoiding error learning or interference

If only one tire is to be replaced, other tires should not be replaced and their positions should not be changed, only learn one tire separately.

### 2. Correction methods for tire pressure monitoring system are as follows:

- Keep vehicle speed more than 30 Km/h for about 45 seconds;
- If tire pressure monitoring system can operate normally, pressure information of four tires will be displayed.
- If certain tire pressure information is still not displayed, tire configuration may error and needs to be relearned.

## Tire Pressure Learning Method for Inflating/Bleeding

### Caution:

- After learning is finished, use tire pressure gauge to inflate tire to standard pressure, then perform correction on tire pressure monitoring system with vehicle speed higher than 30 Km/h for 45 seconds.

<b>1</b>	<b>Start</b>
----------	--------------

### Result

Proceed to
NEXT

NEXT

<b>2</b>	<b>There is enough pressure in tire (full loaded pressure is recommended)</b>
----------	---

### Result

Proceed to
NEXT

NEXT

51

<b>3</b>	<b>Operate the diagnostic tester to enter tire pressure learning status: Left and right turn signal lights start blinking</b>
----------	---

### Result

Proceed to
NEXT

NEXT

**4** Perform tire pressure bleeding to the corresponding tire (for about 20 seconds)

Result

Proceed to
NEXT

NEXT

**5** Left and right turn signal lights stop blinking, the corresponding tire pressure data can be displayed on instrument cluster, it indicates that tire pressure learning of this tire is completed, click "OK" button on diagnostic tester to exit learning status.

Result

Proceed to
NEXT

NEXT

**6** Check if you need to perform learning of other tires, it is necessary to perform learning at intervals of 1 minute if you perform learning of multiple tire pressure sensor.

Result

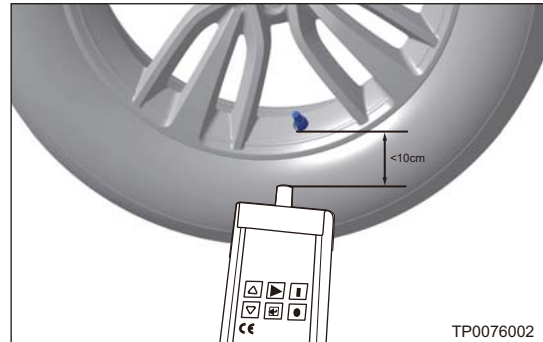
Proceed to
NEXT

NEXT

Road test: Vehicle speed is more than 30 Km/h for 45 seconds, and make sure that tire pressure data is displayed on instrument cluster correctly.

## Tire Pressure Learning Method for Low-Frequency Trigger

1. Distance between low-frequency trigger and tire pressure sensor is less than 10 cm.
2. After turning the ENGINE START STOP switch to IGN-ON and learning status is entered, the sensor can send wireless tire pressure signal with low-frequency trigger (without inflating/deflating the tire). After the triggering operation is finished, tire pressure for the wheel learned will be displayed on the meter, which indicates that the learning is finished successfully.
3. If the malfunction is suspected in tire pressure sensor, you can use the low-frequency trigger to perform test. Place the antenna of low-frequency trigger near the suspected faulty tire pressure sensor and press the triggering button on low-frequency trigger. After it is triggered successfully, low-frequency trigger display will display the relevant information such as ID, air pressure value and temperature value of corresponding tire, it indicates that tire pressure sensor operates normally. If not, it indicates that this sensor is faulty.



<b>1</b>	<b>Start</b>
----------	--------------

**Result**

Proceed to
NEXT

**NEXT**

<b>2</b>	<b>ENGINE START STOP switch is in IGN-ON</b>
----------	--

**Result**

Proceed to
NEXT

**NEXT**

<b>3</b>	<b>Operate the diagnostic tester to enter tire pressure learning status: Left and right turn signal lights blink</b>
----------	--

**Result**

Proceed to
NEXT

**NEXT**

**4** Trigger the learned tire pressure sensor using the low-frequency trigger

**Result**

Proceed to
NEXT

NEXT

**5** Tire pressure sensor ID, temperature and pressure values are displayed on low-frequency trigger

**Result**

Proceed to
NEXT

NEXT

**6** Left and right turn signal lights stop blinking, the corresponding tire pressure data can be displayed on instrument cluster, it indicates that tire pressure learning of this tire is complete, click "OK" button on diagnostic tester to exit learning status.

**Result**

Proceed to
NEXT

NEXT

**Road test: Vehicle speed is more than 30 Km/h for 45 seconds, and make sure that tire pressure data is displayed on instrument cluster correctly.**

### Inspection of Tire Pressure Monitoring System Learning Status

- After reconfiguring tire pressure monitoring system, use reading datastream function to perform inspection for each tire pressure sensor learning status in tire pressure monitoring system (take front left wheel as an example).
  - Front left sensor ID can be read using diagnostic tester, if learning status is successful, it indicates that body control module is matched with front left sensor successfully. If not, it indicates that the match is not successful and front left wheel sensor should be relearned.
- Use diagnostic tester to read following datastreams with vehicle speed higher than 30 Km/h for more than 45 seconds:
  - Front left sensor pressure: 2.2 Bar
  - Front left sensor temperature: 26 °C
  - Temperature is not default and actual tire pressure value is close to the value displayed on meter, which indicate that body control module can receive wireless signals from front left tire pressure sensor. Or, it indicates that learning is not successful or tire pressure sensor is faulty.

## Ground Inspection

Ground points are very important to the proper operation of circuits. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) may increase load resistance. This situation may change the way in which a circuit works. Circuits are very sensitive to proper grounding. A loose or corroded ground can affect the control circuit. Check the ground points as follows:

1. Remove ground bolt or nut.
2. Check all contact surfaces for tarnish, dirt and rust, etc.
3. Clean as necessary to ensure that contact is in good condition.
4. Reinstall ground bolt or nut securely.
5. Check if add-on accessories interfere with ground circuit.
6. If several wire harnesses are crimped into one ground terminal, check for proper crimps. Make sure that all wire harnesses are clean and securely fastened while providing a good ground path.

## Diagnosis Procedure

### Hint

Use following procedures to troubleshoot the brake control system.

<b>1</b>	<b>Vehicle brought to workshop</b>
----------	------------------------------------

### Result

Proceed to
NEXT

NEXT

<b>2</b>	<b>Check battery voltage</b>
----------	------------------------------

Check if battery voltage is normal.

### OK

Standard voltage: Not less than 12 V.

### Result

Result	Proceed to
OK	A
NG	B

<b>NG</b>	<b>Replace battery</b>
-----------	------------------------

OK

<b>3</b>	<b>Customer problem analysis</b>
----------	----------------------------------

### Result

Proceed to
NEXT

NEXT

**4 Read DTCs**

**Result**

Result	Proceed to
DTC occurs	A
No DTC	B

No DTC

**Perform repair according to Problem Symptoms Table**

DTC occurs

**5 Read DTCs (current DTC and history DTC)**

**Result**

Result	Proceed to
Current DTC	A
History DTC	B

History DTC

**Troubleshoot according to intermittent DTCs malfunction procedures**

Current DTC

**6 Perform repair according to Diagnostic Trouble Code (DTC) Chart**

**Result**

Proceed to
NEXT

NEXT

**7 Adjust, repair or replace**

**Result**

Proceed to
NEXT

NEXT

**8 Conduct test and confirm malfunction has been repaired**

**Result**

Proceed to
NEXT

NEXT

End

# دیجیتال خودرو

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## Diagnostic Content

### Problem Symptoms Table

#### Hint:

Use symptoms table below to help determine cause of problem. Check each suspected area in sequence. Repair, replace or adjust faulty components as necessary.

Symptom	Suspected Area	Troubleshooting
Low pressure alarm (warning light remains on, malfunctioning wheel symbol flashes)	Tire pressure is less than 1.8 bar	Check and charge tire pressure
	Tire pressure sensor function is disabled	Replace, perform configuration and learning
	Body Control Module (BCM) is damaged	Replace body control module and perform sensor learning
High temperature alarm (warning light remains on, wheel symbol flashes)	Tire temperature is higher than 85°C	Cool down naturally
	Tire pressure sensor function is disabled	Replace, perform configuration and learning
	Body Control Module (BCM) is damaged	Replace body control module and perform sensor learning
	Tire pressure system set	Check and repair
System malfunction alarm (warning light remains on after flashing for 75 seconds, tire pressure value of corresponding wheel does not display and wheel symbol will flash)	Tire pressure sensor function is disabled	Replace, perform configuration and learning
	Incorrect configuration and learning when replacing with new wheel (spare tire included)	Perform configuration and learning
	Electromagnetic interference/shield	Eliminate shielded objects outside of tire/ strong electromagnetic radio interference
	Body Control Module (BCM) is damaged	Replace
	Tire pressure system set	Check and repair
All tire pressure information cannot be displayed (all tire pressure information for four wheels display as "--")	Display status cannot be reached	Vehicle speed is more than 30 Km/h for 45 seconds
	Replaced tire pressure sensor is not configured correctly, sensor is not learned	Perform configuration and learning
	Body Control Module (BCM)	Replace Body Control Module (BCM) and perform sensor learning
	Electromagnetic interference/shield	Eliminate shielded objects outside of tire/ strong electromagnetic radio interference
	Four sensors are not installed or all of them are damaged (very rare)	Reinstall or replace
	Tire pressure sensor function is disabled	Replace, perform configuration and learning
Certain tire pressure information cannot be displayed (certain tire pressure information displays as "--")	Incorrect configuration and learning when replacing with new wheel (spare tire included)	Perform configuration and learning
	Electromagnetic interference/shield	Eliminate shielded objects outside of tire/ strong electromagnetic radio interference
	Body Control Module (BCM) is damaged	Replace
	Tire pressure system set	Check and repair

### Diagnosis Tools

#### Diagnostic Tester

- Connect diagnostic tester (the latest software) to Data Link Connector (DLC) for communication with vehicle.
- DLC is located at driver side instrument panel crossmember.
- DLC uses a trapezoidal design which can hold 16 terminals.

#### Digital Multimeter

When using digital multimeter:

- Troubleshoot electrical malfunctions and wire harness system.
- Look for basic malfunction.
- Measure voltage, current and resistance.

## Diagnostic Help

1. Connect diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
2. Confirm that malfunction is current, and carry out diagnostic test and repair procedures.
3. If Diagnostic Trouble Code (DTC) cannot be cleared, it indicates that there is a current malfunction.
4. Only use a digital multimeter to measure voltage of electronic system.
5. Refer to any Technical Bulletin that may apply to this malfunction.
6. Visually check the related wire harness.
7. Check and clean all system grounds related to the latest DTCs.
8. If multiple trouble codes were set, use circuit diagrams and look for any common ground circuit or power supply circuit applied to DTC.

## Intermittent DTC Troubleshooting

If malfunction is intermittent, perform the followings:

- Check if connector is loose.
- Check if wire harness is worn, pierced, pinched or partially broken.
- Wiggle related wire harness and connector and observe if signal in related circuit is interrupted.
- If possible, try to duplicate conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Check for broken, bent, protruded or corroded terminals.
- Inspect wheel speed sensors and mounting areas for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- If multiple trouble codes were set, refer to circuit diagrams to look for any common ground circuit or power supply circuit applied to DTC.
- Refer to any Technical Bulletin that may apply to this malfunction.

## DTC Confirmation Procedure

Confirm that battery voltage is normal before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software) to Data Link Connector (DLC).
- Turn ENGINE START STOP switch to ON.
- Use diagnostic tester to record and clear DTCs stored in tire pressure monitoring system.
- Turn ENGINE START STOP switch to OFF and wait for several seconds.
- Start engine, drive vehicle at a speed more than 30 km/h and perform road test with diagnostic tester connected to Data Link Connector (DLC).
- Using the diagnostic tester, select Read DTCs.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If no DTC is detected, malfunction indicated by DTC is intermittent. Please refer to Intermittent DTC Troubleshooting.

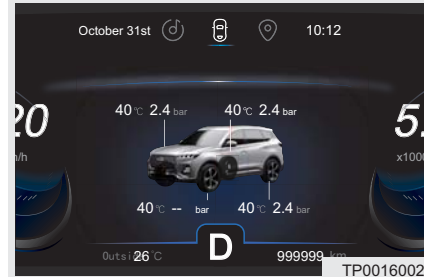
## Precautions for Maintaining Tire Pressure Monitoring System

1. Active condition for tire pressure monitoring system

No.	Conditions to Be Met
1	IGN-ON
2	Vehicle continuously drives with a speed higher than 30 Km/h for more than 45 seconds.

When the ENGINE START STOP switch is in IGN-ON and the vehicle is driving continuously with a speed more than 30 Km/h for more than 45 seconds, the tire pressure monitoring system can start normally. When the ENGINE START STOP switch is not in IGN-ON, body control module cannot receive radio frequency signal from tire pressure sensor; when the vehicle speed fails to reach 30 Km/h or driving period is very short, tire pressure sensor will not send a radio frequency signal.

- With vehicle stopped, the meter displays tire pressure and temperature information when the ENGINE START STOP switch is turned to IGN-ON from IGN-OFF.
- When vehicle is driving continuously with a speed more than 30 km/h for more than 45 seconds, instrument cluster can display tire pressure and temperature value in real time.



- Tire pressure sensor and BCM communicates with each other via radio frequency signal. If there are strong electromagnetic interference or other electrical devices are added on the vehicle, tire pressure signal reception may be affected, resulting in tire pressure monitoring system alarm. It is not recommended to add electrical products personally.
- If there is large variation in tire pressure, tire pressure sensor will send a radio frequency signal suddenly. If the ENGINE START STOP switch is turned to IGN-ON, tire pressure monitoring system will process the signal sent from tire pressure sensor immediately.

## 2. Tire inflation

- Do not inflate tires depending on values displayed from tire pressure monitoring system. Tire pressure monitoring system can monitor tire pressure and temperature in real time only when vehicle speed is more than 30 km/h. If inflating tires using pressure values displayed from tire pressure monitoring system, inflation value may be higher than tire standard value, which will cause accidents. Do not inflate tires with high tire temperature, which will cause serious damage to the tire, even blowouts, resulting in accidents.

## 3. Tire pressure sensor

- When system is faulty or disabled, check tire pressure sensor and judge if it is the tire pressure sensor in new Tiggo 8 of Chery Automobile Co., Ltd. If tire pressure sensor of other manufacturers (not in new Tiggo 8 of Chery Automobile Co., Ltd.) is used by customer, configuration and learning for tire pressure sensor cannot be performed and system is abnormal or disabled.
- Tire pressure sensor is integrated with functions of common valve nozzle, and inflating/deflating operation is the same as common valve nozzle. Use genuine sensor fittings, without replacing components inside of sensor. After maintenance, install genuine waterproof cap of tire pressure sensor correctly. Do not reuse disposed tire pressure sensor components, otherwise air leakage may be caused, resulting in a possibility of danger. When performing inflation/deflation and tire removal operations, it is not necessary to remove nut from the sensor. If the tire pressure sensor nut is removed with tire pressure higher than atmosphere pressure, there is possibility of danger.
- Always use torque wrench when installing tire pressure sensor, with a torque of  $5 \pm 1$  N·m at a tightening speed of 0 rpm - 350 rpm. If the torque is relatively low, air leakage may occur, resulting in a risk of danger; if the torque is relatively high, tire pressure sensor or related components may be damaged, resulting in a risk of danger.

## 4. Tire pressure value increases

- When vehicle is driving normally, heat is generated in the tire due to friction, which will cause tire pressure to increase. For every 10°C increase in tire temperature, tire pressure will increase by about 0.1 bar.

5. Replace tires

- If replacing tires with tire pressure monitoring system with ones without tire pressure monitoring system, system malfunction alarm will occur. If replacing with tire equipped with tire pressure sensor (new Tiggo 8 of Chery Automobile Co., Ltd.), system malfunction alarm still will occur without performing configuration and learning. Spare tire in new Tiggo 8 is not equipped with tire pressure sensor, so tire pressure monitoring system is still malfunctioning when spare tire is used in vehicle with tire pressure monitoring system.
- When replacing tire, perform operations following assembly specification of tire pressure, to avoid damaging tire pressure sensor during replacement. For installation and removal of tire, refer to Installation and Removal of Tire Pressure Sensor sections. Never allow tire bead breaker and tire tread to squeeze the sensor.

**Diagnostic Trouble Code (DTC) Chart**

DTC	DTC Definition
C1403-29	Front Left Hand Sensor Signal Invalid
C1403-55	Front Left Hand Sensor Not Configured
C1403-96	Front Left Hand Sensor Component Internal Fail
C1404-29	Front Right Hand Sensor Signal Invalid
C1404-55	Front Right Hand Sensor Not Configured
C1404-96	Front Right Hand Sensor Component Internal Fail
C1405-29	Rear Left Hand Sensor Signal Invalid
C1405-55	Rear Left Hand Sensor Not Configured
C1405-96	Rear Left Hand Sensor Component Internal Fail
C1406-29	Rear Right Hand Sensor Signal Invalid
C1406-55	Rear Right Hand Sensor Not Configured
C1406-96	Rear Right Hand Sensor Component Internal Fail
C1413-98	Front Left Hand Tire Temperature Component or System Over Temperature
C1414-98	Front Right Hand Tire Temperature Component or System Over Temperature
C1415-98	Rear Left Hand Tire Temperature Component or System Over Temperature
C1416-98	Rear Right Hand Tire Temperature Component or System Over Temperature
C1417-16	Front Left Hand Sensor Voltage Component or System Low Voltage
C1418-16	Front Right Hand Sensor Voltage Component or System Low Voltage
C1419-16	Rear Left Hand Sensor Voltage Component or System Low Voltage
C141A-16	Rear Right Hand Sensor Voltage Component or System Low Voltage
C142A-49	Receiver Internal Electronic Failure

<b>DTC</b>	<b>C1403-29</b>	<b>Front Left Hand Sensor Signal Invalid</b>
<b>DTC</b>	<b>C1404-29</b>	<b>Front Right Hand Sensor Signal Invalid</b>
<b>DTC</b>	<b>C1405-29</b>	<b>Rear Left Hand Sensor Signal Invalid</b>
<b>DTC</b>	<b>C1406-29</b>	<b>Rear Right Hand Sensor Signal Invalid</b>

**Description**

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1403-29	Front Left Hand Sensor Signal Invalid	Vehicle speed is more than 30 Km/h for 45 seconds	Abnormal tire pressure sensor, no signal or weak signal. Abnormal BCM receiver, tire pressure sensor signal cannot be received.
C1404-29	Front Right Hand Sensor Signal Invalid		
C1405-29	Rear Left Hand Sensor Signal Invalid		
C1406-29	Rear Right Hand Sensor Signal Invalid		

**Procedure**

**1** Check power supply voltage of body control module

- (a) Using a digital multimeter, measure voltage between power supply terminal of body control module and ground.
- (b) Power supply voltage should be not less than 12 V.

**OK**

Power supply voltage is normal.

**Result**

Result	Proceed to
OK	A
NG	B

**NG** Check and repair battery and power supply system

**OK**

**2** Check body control module ground circuit

- (a) Check if the body control module ground is loose or corroded.

**Result**

Proceed to
OK
NG

NG

Tighten or replace body control module ground circuit

OK

**3 Check for electromagnetic interference/shield**

- (a) Check if snow chains are installed on the tires and if there is electromagnetic interference to the tire pressure system  
Check if the vehicle is equipped with electronic equipment and if there is electromagnetic interference to the tire pressure system

**Result**

Proceed to
OK
NG

NG

Remove the equipment causing electromagnetic interference/shield

OK

**4 Check tire pressure sensor of malfunctioning wheel**

- (a) Trigger the tire pressure sensor of faulty wheel using low-frequency trigger, if sensor is normal, the ID, pressure value and temperature value of tires will be displayed on low-frequency trigger.

**Result**

Proceed to
OK
NG

NG

Replace tire pressure sensor of malfunctioning wheel

OK

**5 Check Body Control Module (BCM)**

- (a) Replace the body control module at first, write the correct configuration codes, then turn on tire pressure monitoring function and finally perform sensor learning.

**Result**

Proceed to
OK
NG

51

OK

System detection is normal

NG

Repair or replace Body Control Module (BCM)

<b>DTC</b>	<b>C1403-55</b>	<b>Front Left Hand Sensor Not Configured</b>
<b>DTC</b>	<b>C1404-55</b>	<b>Front Right Hand Sensor Not Configured</b>
<b>DTC</b>	<b>C1405-55</b>	<b>Rear Left Hand Sensor Not Configured</b>
<b>DTC</b>	<b>C1406-55</b>	<b>Rear Right Hand Sensor Not Configured</b>

**Description**

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1403-55	Front Left Hand Sensor Not Configured	Vehicle speed is more than 30 Km/h for 45 seconds	TPMS function is not configured, or sensor learning is abnormal.
C1404-55	Front Right Hand Sensor Not Configured		
C1405-55	Rear Left Hand Sensor Not Configured		
C1406-55	Rear Right Hand Sensor Not Configured		

**Procedure**

**1 Check power supply voltage of body control module and ground**

- (a) Using a digital multimeter, measure voltage between power supply terminal of body control module and ground.
- (b) Power supply voltage should be not less than 12 V.

**Result**

Proceed to
OK
NG

**NG** **Check and repair battery and power supply system**

**OK**

**2 Check for electromagnetic interference/shield**

- (a) Check if snow chains are installed on the tires and if there is electromagnetic interference to the tire pressure system  
Check if the vehicle is equipped with electronic equipment and if there is electromagnetic interference to the tire pressure system

**Result**

Proceed to
OK
NG

NG

Remove the equipment causing electromagnetic interference/shield

OK

**3 Check configuration of tire pressure monitoring system**

(a) After configuration is finished, drive vehicle with a speed higher than 30 km/h for a period of time.

**Result**

Proceed to
OK
NG

NG

Reconfigure tire pressure sensor of malfunctioning wheel

OK

**4 Check tire pressure sensor of malfunctioning wheel**

(a) Trigger the tire pressure sensor of faulty wheel using low-frequency trigger, if sensor is normal, the ID, pressure value and temperature value of tires will be displayed on low-frequency trigger.

**Result**

Proceed to
OK
NG

NG

Replace tire pressure sensor of malfunctioning wheel

OK

**5 Check Body Control Module (BCM)**

(a) Replace the body control module at first, write the correct configuration codes, then turn on tire pressure monitoring function and finally perform sensor learning.

**Result**

Proceed to
OK
NG

51

OK

System detection is normal

NG

Replace Body Control Module (BCM)

<b>DTC</b>	<b>C1403-96</b>	<b>Front Left Hand Sensor Component Internal Fail</b>
<b>DTC</b>	<b>C1404-96</b>	<b>Front Right Hand Sensor Component Internal Fail</b>
<b>DTC</b>	<b>C1405-96</b>	<b>Rear Left Hand Sensor Component Internal Fail</b>
<b>DTC</b>	<b>C1406-96</b>	<b>Rear Right Hand Sensor Component Internal Fail</b>

**Description**

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1403-96	Front Left Hand Sensor Component Internal Fail	Vehicle speed is more than 30 Km/h for 45 seconds	Sensor operates abnormally, and RF data sent shows a malfunction in sensor.
C1404-96	Front Right Hand Sensor Component Internal Fail		
C1405-96	Rear Left Hand Sensor Component Internal Fail		
C1406-96	Rear Right Hand Sensor Component Internal Fail		

**Procedure**

**1 Check power supply voltage of body control module and ground**

- (a) Using a digital multimeter, measure voltage between power supply terminal of body control module and ground.
- (b) Power supply voltage should be not less than 12 V.

**Result**

Proceed to
OK
NG

**NG** **Check and repair battery and power supply system**

**OK**

**2 Check for electromagnetic interference/shield**

- (a) Check if snow chains are installed on the tires and if there is electromagnetic interference to the tire pressure system  
Check if the vehicle is equipped with electronic equipment and if there is electromagnetic interference to the tire pressure system

**Result**

Proceed to
OK
NG

NG

Remove the equipment causing electromagnetic interference/shield

OK

**3 Check configuration of tire pressure monitoring system**

(a) After configuration is finished, drive vehicle with a speed higher than 30 km/h for a period of time.

**Result**

Proceed to
OK
NG

NG

Reconfigure tire pressure sensor of malfunctioning wheel

OK

**4 Check tire pressure sensor of malfunctioning wheel**

(a) Trigger the tire pressure sensor of faulty wheel using low-frequency trigger, if sensor is normal, the ID, pressure value and temperature value of tires will be displayed on low-frequency trigger.

**Result**

Proceed to
OK
NG

NG

Replace tire pressure sensor of malfunctioning wheel

OK

**5 Check Body Control Module (BCM)**

(a) Replace the body control module at first, write the correct configuration codes, then turn on tire pressure monitoring function and finally perform sensor learning.

**Result**

Proceed to
OK
NG

51

OK

System detection is normal

NG

Replace Body Control Module (BCM)

<b>DTC</b>	<b>C1413-98</b>	<b>Front Left Hand Tire Temperature Component or System Over Temperature</b>
<b>DTC</b>	<b>C1414-98</b>	<b>Front Right Hand Tire Temperature Component or System Over Temperature</b>
<b>DTC</b>	<b>C1415-98</b>	<b>Rear Left Hand Tire Temperature Component or System Over Temperature</b>
<b>DTC</b>	<b>C1416-98</b>	<b>Rear Right Hand Tire Temperature Component or System Over Temperature</b>

**Description**

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1413-98	Front Left Hand Tire Temperature Component or System Over Temperature	Vehicle speed is more than 30 Km/h for 45 seconds	Wheel temperature is too high during driving due to abnormal wheel.
C1414-98	Front Right Hand Tire Temperature Component or System Over Temperature		
C1415-98	Rear Left Hand Tire Temperature Component or System Over Temperature		
C1416-98	Rear Right Hand Tire Temperature Component or System Over Temperature		

**Procedure**

<b>1</b>	<b>Check configuration of tire pressure monitoring system</b>
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- (a) When the temperature of one or more tires is higher than 85 °C and the vehicle is continuously driving with a speed higher than 30 Km/h for certain period of time, the system will send a high temperature alarm.
- (b) When a high temperature alarm occurs, stop vehicle to cool the tire naturally, otherwise there is a danger of accident.
- (c) When tire temperature is too high, never cool the tire by pouring cold water, otherwise, tire may be damaged, resulting in an accident.
- (d) When the vehicle wheel temperature is lower than 80°C and the vehicle is continuously driving with a speed higher than 30 Km/h, the system will deactivate high temperature alarm automatically within 5 minutes. The system stores the history DTCs.

**Result**

Proceed to
OK
NG

<b>NG</b>	<b>Cool down naturally and clear history DTCs</b>
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OK

**2 Check tire pressure sensor of malfunctioning wheel**

- (a) Trigger the tire pressure sensor of faulty wheel using low-frequency trigger, if sensor is normal, the ID, pressure value and temperature value of tires will be displayed on low-frequency trigger.

**Result**

Proceed to
OK
NG

NG

Replace tire pressure sensor of malfunctioning wheel

OK

**3 Check Body Control Module (BCM)**

- (a) Replace the body control module at first, write the correct configuration codes, then turn on tire pressure monitoring function and finally perform sensor learning.

**Result**

Proceed to
OK
NG

OK

System detection is normal

NG

Replace Body Control Module (BCM)



<b>DTC</b>	<b>C1417-16</b>	<b>Front Left Hand Sensor Voltage Component or System Low Voltage</b>
<b>DTC</b>	<b>C1418-16</b>	<b>Front Right Hand Sensor Voltage Component or System Low Voltage</b>
<b>DTC</b>	<b>C1419-16</b>	<b>Rear Left Hand Sensor Voltage Component or System Low Voltage</b>
<b>DTC</b>	<b>C141A-16</b>	<b>Rear Right Hand Sensor Voltage Component or System Low Voltage</b>

**Description**

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1417-16	Front Left Hand Sensor Voltage Component or System Low Voltage	Vehicle speed is more than 30 Km/h for 45 seconds	Sensor internal battery voltage is low, and sensor battery voltage is lower than 2.2 V
C1418-16	Front Right Hand Sensor Voltage Component or System Low Voltage		
C1419-16	Rear Left Hand Sensor Voltage Component or System Low Voltage		
C141A-16	Rear Right Hand Sensor Voltage Component or System Low Voltage		

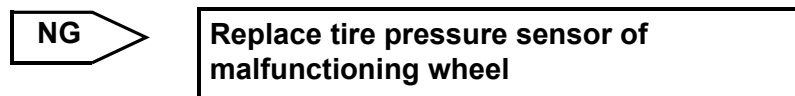
**Procedure**

**1 Check tire pressure sensor of malfunctioning wheel**

- (a) Trigger the tire pressure sensor of faulty wheel using low-frequency trigger, if sensor is normal, the ID, pressure value and temperature value of tires will be displayed on low-frequency trigger.

**Result**

Proceed to
OK
NG



**2 Check Body Control Module (BCM)**

- (a) Replace the body control module at first, write the correct configuration codes, then turn on tire pressure monitoring function and finally perform sensor learning.

Result

Proceed to
OK
NG

OK	System detection is normal
NG	Replace Body Control Module (BCM)

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



<b>DTC</b>	<b>C142A-49</b>	<b>Receiver Internal Electronic Failure</b>
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**Description**

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C142A-49	Receiver Internal Electronic Failure	Vehicle speed is more than 30 Km/h for 45 seconds	Receiver internal circuit failure, sensor signal cannot be received.

**Caution:**

- When above DTCs occur, refer to CAN system of entire vehicle and perform inspection to find out the trouble area and perform troubleshooting.

# دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



## ON-VEHICLE SERVICE

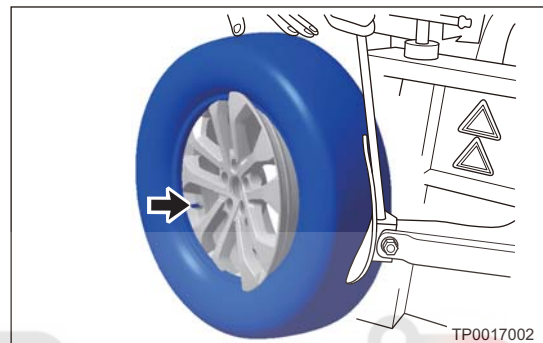
### Tire

#### Removal

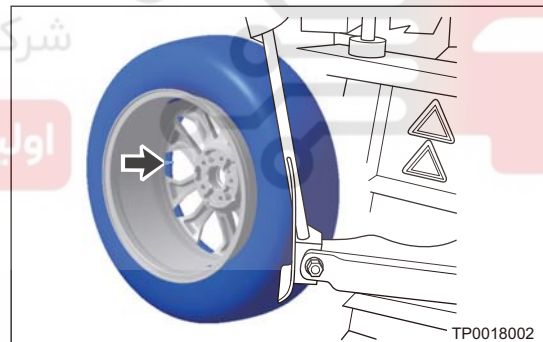
1. Remove tire and deflate tire completely.

**Caution:**

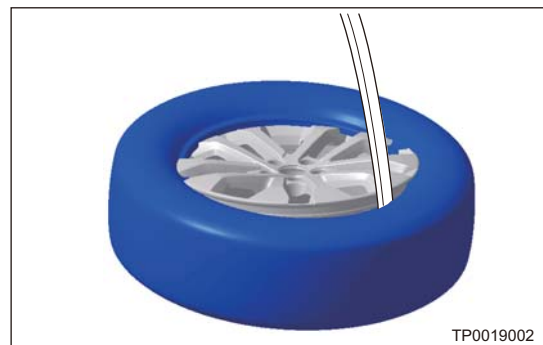
- During tire bead breaking, follow the operation specification, never damage the tire pressure sensor.
2. Keep one side with tire pressure sensor 30 cm away from separation shovel (arrow), and put shovel block between rim and tire, then depress the pedal to separate rim and tire.



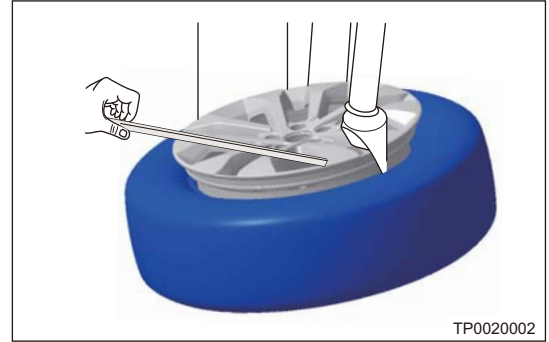
3. Turn over tire to keep one side with tire pressure sensor 30 cm away from separation shovel (arrow), and put shovel block between rim and tire, then depress the pedal to separate rim and tire.



4. Lock tire on wheel, lower replacer head and keep it 5 - 15 cm away from sensor.



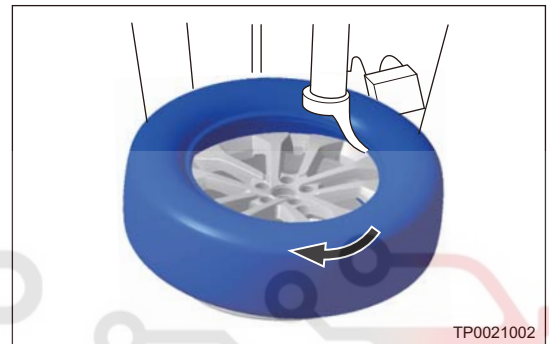
5. Use crowbar to pry out outside tire, and sleeve it to replacer head, then take away crowbar.



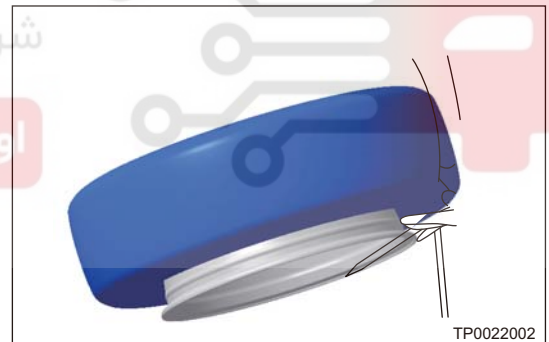
**Caution:**

- Both crowbar and tire cannot contact with sensor!

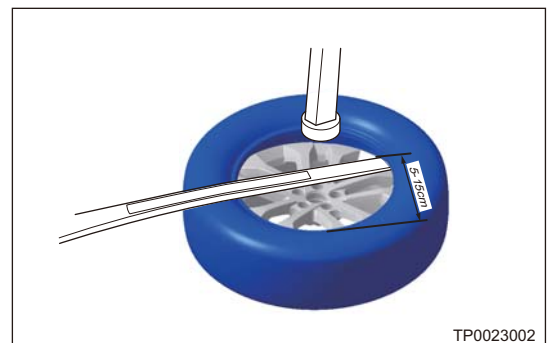
6. Remove the wheel.
- (a) Rotate wheel, and the movable direction of wheel should be the direction that replacer head is gradually kept away from tire pressure sensor (rotation arrow), then remove upper part of tire.



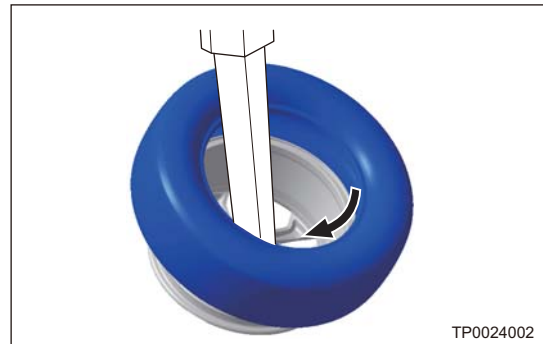
- (b) Lift tire and pry out lower part of tire using crowbar.



- (c) Lower replacer head and pry out lower side tire tread using crowbar, then sleeve it on replacer head and keep it 5 - 15 cm away from sensor.



- (d) Rotate wheel, and the movable direction of wheel should be the direction that replacer head is gradually kept away from tire pressure sensor (rotation arrow), then pry out tire completely.

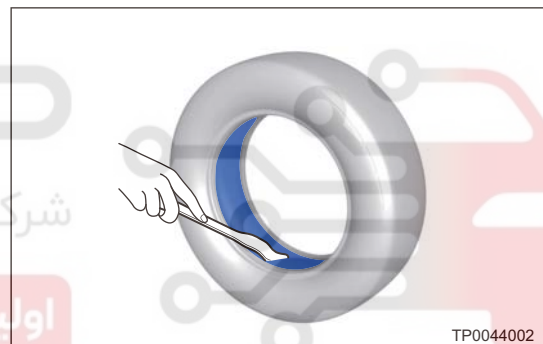


## Installation

### Warning/Caution/Hint

#### Caution:

- During tire removal, be sure to observe the operation regulation to prevent tire pressure sensor from being damaged.
  - Both crowbar and tire cannot contact with sensor.
  - Confirm that distance between intersection and valve stem is proper.
1. Installation is the same as common tire. Before loading tire, apply soapy water or glycerin to tire bead along inner circle.



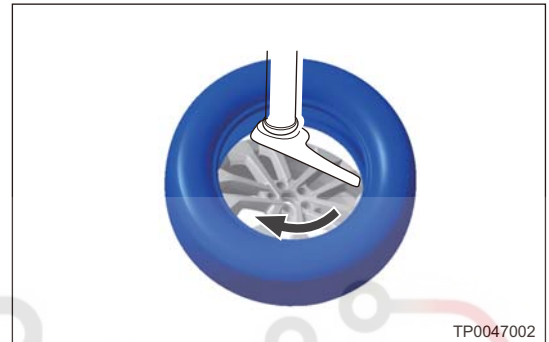
2. Put tire on hub and keep intersection between hub and tire edge 15 - 20 cm away from valve stem.



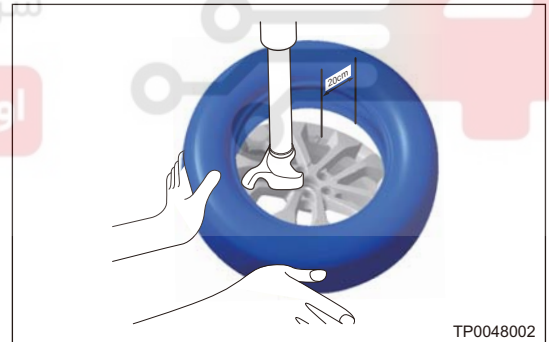
3. Install bottom tire to make sure the distance between intersection and valve stem is about 20 cm.



4. Rotate wheel to install one side of tire into hub. Rotation direction of wheel (rotation arrow) should be the direction that makes replacer head get farther and farther away from sensor.



5. Put another side of tire in place, so that intersection between tire edge and hub is 20 cm away from valve stem. Curving arrow indicates rotation direction of wheel.



6. Rotate wheel to install another side of tire into hub.

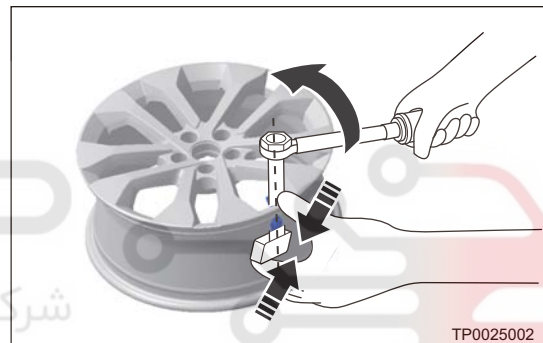


## Tire Pressure Sensor

### Removal

#### Caution:

- Avoid dropping the sensor. If tire pressure sensor is dropped from a place 1 m high to the ground, it is interpreted as fault in tire pressure sensor.
  - Tire pressure sensor must be installed on clean and dry hub.
  - Valve cap must be on the valve, except inflation, deflation, air pressure inspection, etc.
  - During removal and installation, do not contact the tire pressure sensor with the tools used, to avoid damage to the tire pressure sensor.
  - Sensor air pressure inlet cannot be covered partially or completely by lubricant or other materials.
  - During removal and installation of tire, used tools cannot contact with tire pressure sensor, and tires cannot extrude tire pressure sensor, to avoid damage to the tire pressure sensor.
1. Using an appropriate tool, rotate nut counterclockwise until it separates from tire pressure sensor completely.



2. Remove tire pressure sensor from wheel hub.

### Installation

#### Warning/Caution/Hint

#### Caution:

- Always use torque wrench instead of normal wrench when installing tire pressure sensor, with a torque of  $5 \pm 1$  N·m at a tightening speed of 0 rpm - 350 rpm. If the torque is relatively low, air leakage may occur, resulting in a risk of danger; if the torque is relatively high, tire pressure sensor or related components may be damaged, resulting in a risk of danger.

1. Installation step instructions

- (a) Insert valve stem of tire pressure sensor into hub, and pre-tighten the tire pressure sensor nut.
- (b) As shown in figure, hold both sides of tire pressure sensor with left hand with white cover plate of tire pressure sensor faces to spoke surface, pass the valve stem into rim along valve hole center axis, and insertion direction is from inward to outward of tire assembly. Tighten tire pressure sensor nut with right hand clockwise, pre-tighten it 4 to 5 turns and always keep tire pressure sensor from deflecting with left hand.



- (c) As shown in figure, white cover plate of tire pressure sensor faces back to spoke surface, and the installation method is incorrect.

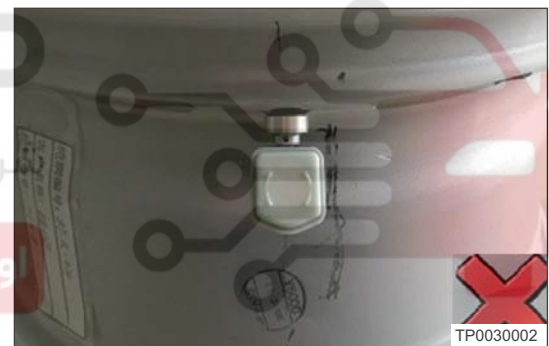


## 2. Installation qualification standard inspection

- (a) After installation, white cover plate of tire pressure sensor faces to spoke surface, and the installation is qualified.



- (b) White cover plate of tire pressure sensor faces back to spoke surface, and the installation is unqualified.

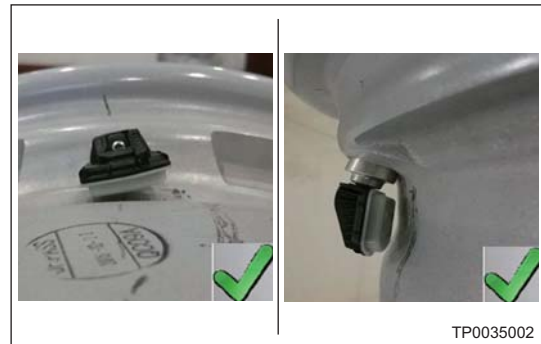


## 3. Tighten tire pressure sensor nut

- (a) Tighten the nut with automatic torque wrench as shown in figure. Hold both sides of tire pressure sensor with left hand and keep tire pressure sensor stable. The axis of automatic torque wrench sleeve should be in the same straight line as that of valve stem without any angle. Start the automatic torque wrench fitting button to tighten the tire pressure sensor nut in clockwise direction, and the tightening process is completed when torque reaches  $5 \pm 1$  N·m.



- (b) After the installation is completed, the tire pressure sensor housing is qualified if it does not contact the rim.

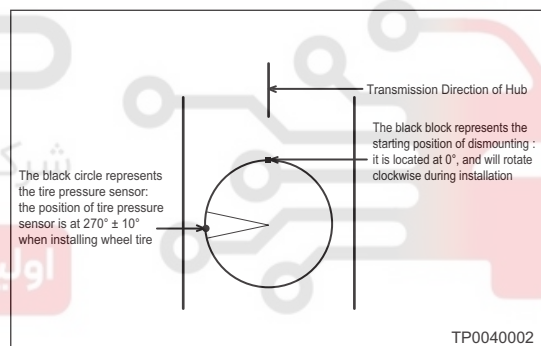


- (c) After the installation is completed, the tire pressure sensor housing is unqualified if it contacts the rim.



4. Requirements of sensor position when the tire is installed

- (a) When the tire is packaged, the position of the tire pressure sensor should be  $270^\circ \pm 10^\circ$ , so as not to damage the tire pressure sensor directly or indirectly during the installation process.



5. Detection requirements of tire pressure sensor

If assembly of tire pressure sensor is performed in tire sub assembly workshop, it is necessary to perform test after tire assembly is assembled. After tire assembly is assembled, the sensor should meet

- The low frequency wake-up function of tire pressure sensor is intact, that is, low frequency trigger device can wake up the tire pressure sensor.
- Detection function of tire pressure sensor is intact, that is, sensor can detect pressure value and temperature value inside tires.
- Communication function of tire pressure sensor is intact, that is, sensor can send pressure value and temperature value inside tires as high frequency signal.