TIRE PRESSURE MONITORING SYSTEM

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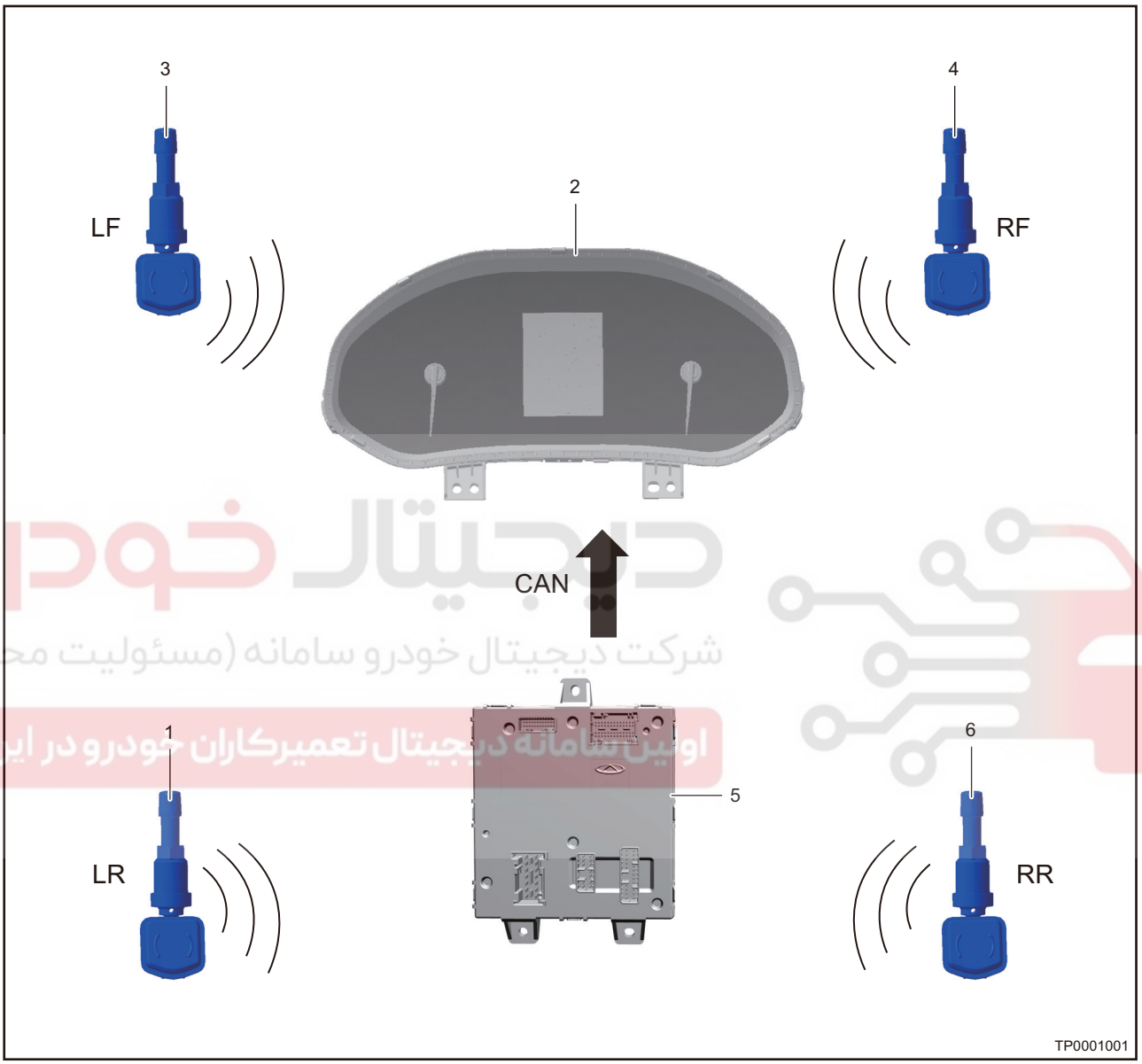
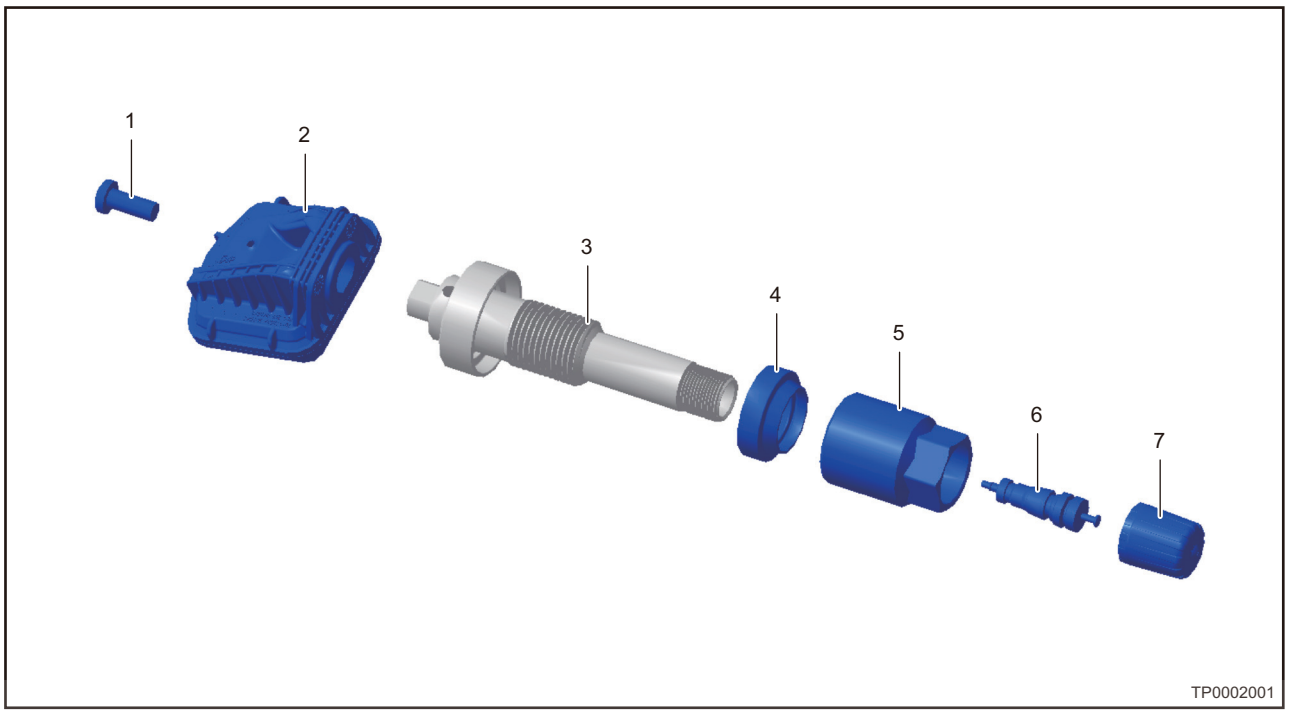
GENERAL INFORMATION

Overview

Description



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



1 - Valve Stem	2 - Sensor Body
3 - Seal Washer	4 - Rubber Nozzle
5 - 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.

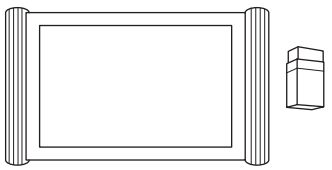
Specifications

Torque Specifications

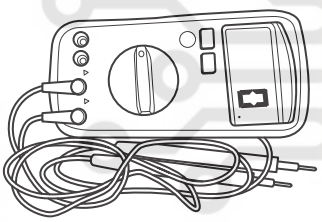
Description	Torque (N·m)
Body Control Module Fixing Nut	5 ± 1
Tire Pressure Sensor Fixing Nut	8 ± 1

Tools

Special Tools

Diagnostic Tester	 001
Low Frequency Trigger	 098

General Tool

Digital Multimeter	 002

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 waring 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.
For Tiggo 8 model produced by Chery Automobile Co., Ltd., 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 temperature of front wheel reaches 88°C, which is higher than high temperature alarm threshold (85°C), the system will send high temperature alarm, front left wheel symbol will flash, the tire pressure and temperature values will be displayed and tire pressure warning light remains on.
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.
For Tiggo 8 model produced by Chery Automobile Co., Ltd, when the vehicle tire temperature is less than 80°C and the vehicle is continuously driving with a speed higher than 30 km/h, the system will deactivate the 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, just resume it to 2.3 bar.

Configuration & Learning for Tire Pressure Monitoring System

Warning:
- Perform tire pressure sensor learning when rotating tire and replacing tire pressure sensor.

Hint:
- Configuration and learning of tire pressure monitoring system involves configuration of tire pressure receiver and meter and learning of tire pressure sensor.

Diagnosis Procedure

Hint

Use following procedures to troubleshoot the tire pressure monitoring system.

1	**Vehicle brought to workshop**

Result

Proceed to
NEXT

NEXT

2	**Check if meter can enter tire pressure information screen**

Check if battery voltage is normal.

OK

Meter can enter tire pressure information screen successfully

Result

Proceed to
OK
NG

NG → **Reconfigure body control module and meter**

OK

3	**Perform tire pressure sensor learning**

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

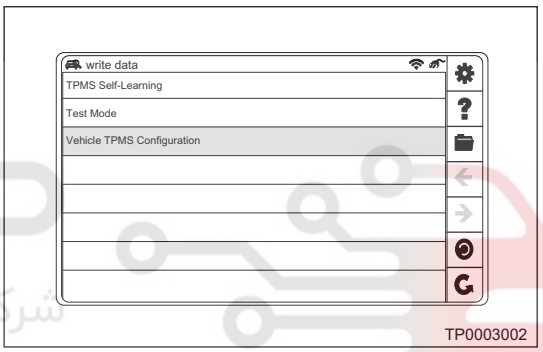
Result

Proceed to
OK
NG

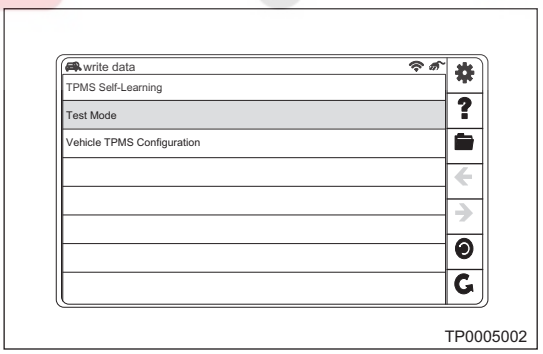
OK	End
NG	Reconfigure body control module and meter

Configuration for Body Control Module and Meter

1. Use diagnostic tester to enter "write data" menu, and click "Vehicle TPMS Configuration".



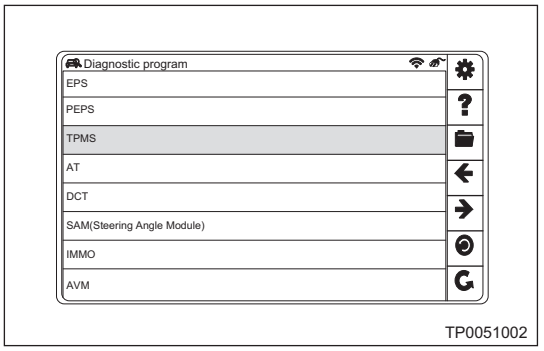
2. Click "OFF". If the tire pressure display function is "OFF" on meter currently, the menu will display "ON" for current meter's tire pressure display function.
3. By clicking "Test Mode" on "write data" menu, it is also possible to test if the tire pressure display function is turned on.



4. After clicking "Routine Start", the tire pressure malfunction indicator on meter will flash. If a prompt "Started successfully" is given from the diagnostic tester, it indicates that the tire pressure display function is turned on successfully. 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 "Stopped successfully", then return to previous menu.

Tire Pressure Monitoring System Enters Sensor Learning Status By Operating Diagnostic Tester

1. Connect the X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC).
2. Turn the ENGINE START STOP switch to "ON", and select "Tiggo 8" menu.
3. Select "TPMS" menu.



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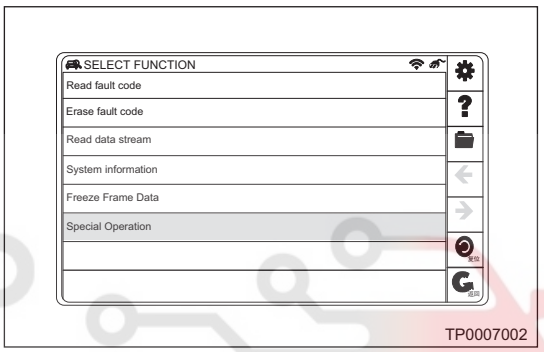
4. Select "Special Operation" menu.



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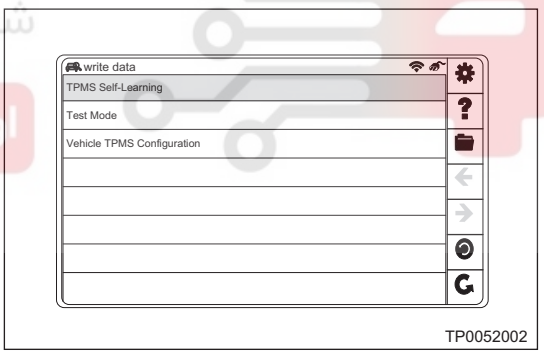
5. Click "TPMS Self-Learning" menu.



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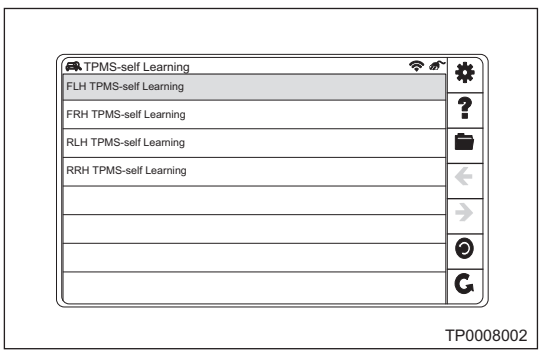
6. "TPMS-self Learning" screen is shown in illustration, click tire menu that needs to learn (take front left tire as an example).



TP0008002

7. During learning, prompt will be displayed 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.

8. When clicking "OK" button on diagnostic tester, tire pressure learning screen is displayed on meter and tire pressure warning light flashes. Perform tire pressure sensor learning when tire pressure monitoring system enters sensor learning status.
9. After front left tire pressure sensor learning is successful, tire pressure malfunction indicator on meter goes off, front left tire pressure value is displayed and "Procedure has finished" is displayed on diagnostic tester which indicates that front left tire pressure sensor learning has been finished.

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.
3. Tire pressure learning method for inflating/bleeding

Learning Process

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.

1	**Start**

Result

Proceed to
NEXT

NEXT

2	**There is enough pressure in tire (full loaded pressure is recommended)**

Result

Proceed to
NEXT

NEXT

3	Tire pressure monitoring system enters learning status by operating diagnostic tester

Result

Proceed to
NEXT

NEXT

4	Perform tire pressure bleeding (for about 20 seconds)

Result

Proceed to
NEXT

NEXT

5	Learned tire pressure value can be displayed on meter

Result

Proceed to
NEXT

NEXT

6	Learning is successful

Result

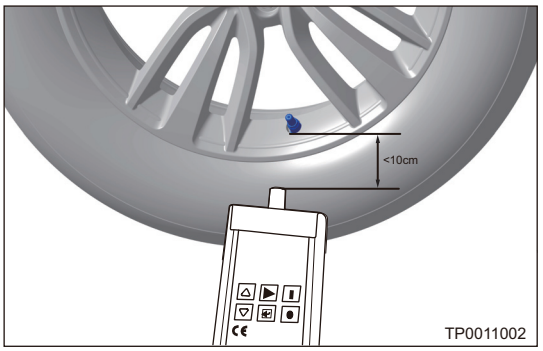
Proceed to
NEXT

NEXT

End

Tire Pressure Learning Method for Low-Frequency Trigger

1. If the malfunction is suspected in tire pressure sensor, use the low-frequency trigger to perform test.
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. Distance between low-frequency trigger and tire pressure sensor is less than 10 cm. Place the antenna of low-frequency trigger near the tire with tire pressure sensor on the wheel, and then press triggering button on low-frequency trigger. After the low-frequency trigger is successfully triggered, relative information about learned tire such as tire ID, pressure and temperature will be displayed, which indicates that the sensor is operating normally. Otherwise, replace the tire pressure sensor.



1	Start

Result

Proceed to
NEXT

NEXT

2	ENGINE START STOP switch is in IGN-ON

Result

Proceed to
NEXT

NEXT

3	Tire pressure monitoring system enters learning status by operating diagnostic tester

Result

Proceed to
NEXT

NEXT

4	Trigger tire pressure sensor to be learned using 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	**Learning is successful**

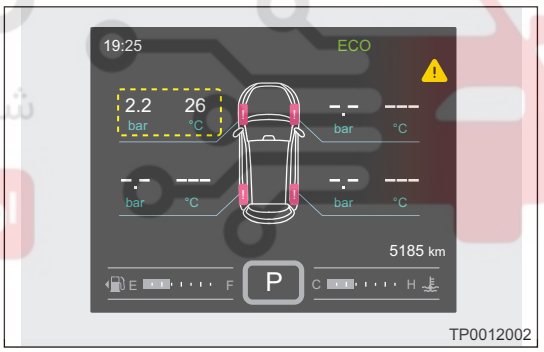
Result

Proceed to
NEXT

NEXT → **End**

Meter Screen for Successful Tire Pressure Sensor Learning

- After inflating/deflating learning or low-frequency trigger learning is performed successfully, tire pressure and temperature values will be displayed on the meter.



- The turn signal lights stops flashing, the displayed tire pressure is 2.2 bar and the temperature is 26°C for front left wheel, which indicate that the front left wheel is learned successfully.
- The tire pressure monitoring system is performing learning of front left wheel, and left and right turn signal lights will stop flashing after deflating operation. At this time, the tire pressure monitoring system has finished the learning process for one tire pressure sensor, please click "OK" to finish learning of front left wheel.
- The learning methods for front right, rear right and rear left tire pressure sensor are the same as that of front left tire pressure sensor described above. 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.

Inspection of Tire Pressure Monitoring System Learning Status

1. 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).
   (a) 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.
2. Use diagnostic tester to read following datastreams with vehicle speed higher than 30 km/h for more than 45 seconds:
   (a) Front left sensor pressure: 2.2 Bar
   (b) Front left sensor temperature: 26°C
   (c) Temperature is not default and tire pressure 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 tire pressure monitoring system.

1	Vehicle brought to workshop

Result

Proceed to
NEXT

NEXT

2	Check battery voltage

Check if battery voltage is normal.

OK

Standard voltage: Not less than 12 V.

Result

Proceed to
OK
NG

NG → Check and repair battery

OK

3	Customer problem analysis

Result

Proceed to
NEXT

NEXT

4	Check for DTCs (current DTC and history DTC)

Result

Proceed to
No DTC
Current DTC
History DTC

History DTC

5	Problem Repair (No DTC)

Result

Proceed to
NEXT

NEXT → Go to step 7

6	Troubleshoot according to Diagnostic Trouble Code (DTC) chart

Result

Proceed to
NEXT

NEXT → Go to step 7

7	Troubleshoot according to Problem Symptoms Table

Result

Proceed to
NEXT

NEXT

8	Adjust, repair or replace

Result

Proceed to
NEXT

NEXT → End

DIAGNOSIS & TESTING

Diagnosis 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 1.9 bar	Check and charge tire pressure
	Tire pressure sensor function is disabled	Replace, perform configuration and learning
	Body Control Module (BCM) damage	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) damage	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) damage	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) damage	Replace body control module 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
Certain tire pressure information cannot be displayed (certain tire pressure information displays as "--")	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) damage	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 DTC cannot be deleted, malfunction is current.
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 40 km/h or more and perform road test with diagnostic tester connected to Data Link Connector (DLC).
- Use diagnostic tester to 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.

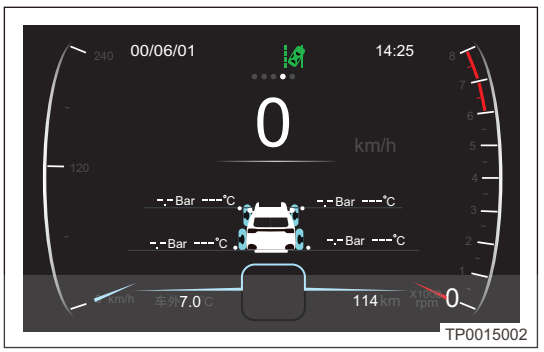
Precautions for Maintaining Tire Pressure Monitoring System

1. Active condition for tire pressure monitoring system

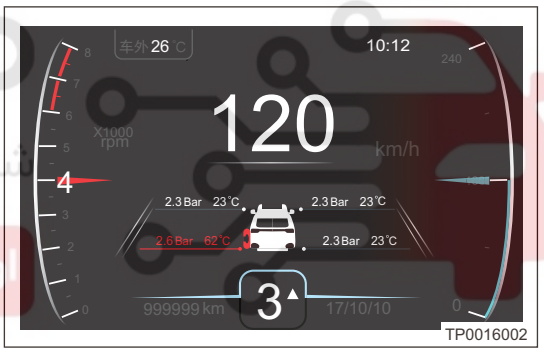
No.	Conditions to Be Met
1	IGN-ON
2	Vehicle continuously drives with a speed higher than 30 km/h for more than 45 seconds.

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 does not display tire pressure and temperature information when the ENGINE START STOP switch is turned to IGN-ON from IGN-OFF.



- When the ENGINE START STOP switch is turned to IGN-ON and the vehicle is driving continuously with a speed higher than 30 km/h for more than 45 seconds, tire pressure information for 4 wheels will be displayed.



- 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 Tiggo 5x of Chery Automobile Co., Ltd. If tire pressure sensor of other manufacturers (not in Tiggo 5x 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 8 ± 1 N·m. If the torque is relatively low, air leakage may occur, resulting in a possibility of danger; if the torque is relatively high, tire pressure sensor or related components may be damaged, resulting in a possibility 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 (Tiggo 5x of Chery Automobile Co., Ltd.), system malfunction alarm still will occur without performing configuration and learning. Spare tire in Tiggo 5x 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
U0129-87	Lost Communication with BSM
U0155-87	Lost Communication with ICM

DTC	C1403-29	Front Left Hand Sensor Signal Invalid

DTC	C1404-29	Front Right Hand Sensor Signal Invalid

DTC	C1405-29	Rear Left Hand Sensor Signal Invalid

DTC	C1406-29	Rear Right Hand Sensor Signal Invalid

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	• Tire pressure sensor fails to send RF signal or the sent signal is too weak. • The reception effect of body control module is poor, and no RF signal is 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

Proceed to
OK
NG

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 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) After replacement, perform configuration and test.

Result

Proceed to
OK
NG

NG → **Replace tire pressure sensor of malfunctioning wheel**

OK

5	Check Body Control Module (BCM)

(a) After replacement, it is necessary to perform configuration.

Result

Proceed to
OK
NG

OK → **System detection is normal**

NG → **Repair or replace Body Control Module (BCM)**

DTC	C1403-55	Front Left Hand Sensor Not Configured

DTC	C1404-55	Front Right Hand Sensor Not Configured

DTC	C1405-55	Rear Left Hand Sensor Not Configured

DTC	C1406-55	Rear Right Hand Sensor Not Configured

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	• Perform BCM function configuration, learning function is not finished.
C1404-55	Front Right Hand Sensor Not Configured		
C1405-55	Rear Left Hand Sensor Not Configured		
C1406-55	Rear Right Hand Sensor Not Configured		

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

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.

Result

Proceed to
OK
NG

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 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 body control module of malfunctioning wheel

(a) After replacement, perform configuration and test.

Result

Proceed to
OK
NG

NG → **Replace body control module of malfunctioning wheel**

OK

5	Check tire pressure sensor of malfunctioning wheel

(a) After replacement, it is necessary to perform configuration.

Result

Proceed to
OK
NG

OK → **System detection is normal**

NG → **Replace tire pressure sensor of malfunctioning wheel**

DTC	C1403-96	Front Left Hand Sensor Component Internal Fail

DTC	C1404-96	Front Right Hand Sensor Component Internal Fail

DTC	C1405-96	Rear Left Hand Sensor Component Internal Fail

DTC	C1406-96	Rear Right Hand Sensor Component Internal Fail

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		

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

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.

Result

Proceed to
OK
NG

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 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 body control module of malfunctioning wheel

(a) After replacement, perform configuration and test.

Result

Proceed to
OK
NG

NG → **Replace body control module of malfunctioning wheel**

OK

5	Check tire pressure sensor of malfunctioning wheel

(a) After replacement, it is necessary to perform configuration.

Result

Proceed to
OK
NG

OK → **System detection is normal**

NG → **Replace tire pressure sensor of malfunctioning wheel**

DTC	C1413-98	Front Left Hand Tire Temperature Component or System Over Temperature

DTC	C1414-98	Front Right Hand Tire Temperature Component or System Over Temperature

DTC	C1415-98	Rear Left Hand Tire Temperature Component or System Over Temperature

DTC	C1416-98	Rear Right Hand Tire Temperature Component or System Over Temperature

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	• Sensor operates abnormally, and RF data sent shows a malfunction in sensor.
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		

Caution:

When performing electrical equipment diagnosis and test, always refer to circuit diagram for related circuit and component information.

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.

Result

Proceed to
OK
NG

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 configuration of tire pressure monitoring system

(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 is continuously driving with a speed higher than 30 km/h for certain period of time, the high temperature alarm can be deactivated automatically.

Result

Proceed to
OK
NG

NG → **Cool down naturally**

OK

4	Check body control module of malfunctioning wheel

(a) After replacement, perform configuration and test.

Result

Proceed to
OK
NG

NG → **Replace body control module of malfunctioning wheel**

OK

5	Check tire pressure sensor of malfunctioning wheel

(a) After replacement, it is necessary to perform configuration.

Result

Proceed to
OK
NG

OK	System detection is normal
NG	Replace tire pressure sensor of malfunctioning wheel

DTC	C1417-16	Front Left Hand Sensor Voltage, Component or System Low Voltage
DTC	C1418-16	Front Right Hand Sensor Voltage, Component or System Low Voltage
DTC	C1419-16	Rear Left Hand Sensor Voltage, Component or System Low Voltage
DTC	C141A-16	Rear Right Hand Sensor Voltage, Component or System Low Voltage

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	• Battery is depleted
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 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.

Result

Proceed to
OK
NG

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 if tire pressure information is displayed

(a) If tire pressure information of malfunctioning wheel is still not displayed, it is necessary to replace tire pressure sensor.

Result

Proceed to
OK
NG

NG → **Replace tire pressure sensor**

OK

4	Check body control module of malfunctioning wheel

(a) After replacement, perform configuration and test.

Result

Proceed to
OK
NG

OK → **System detection is normal**

NG → **Replace body control module of malfunctioning wheel**

DTC	C142A-49	Receiver Internal Electronic Failure

DTC	U0129-87	Lost Communication with Brake System Module - Missing Message

DTC	U0155-87	Lost Communication with Instrument Cluster Module - Missing Message

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	• CAN system is malfunctioning.
U0129-87	Lost Communication with Brake System Module - Missing Message		
U0155-87	Lost Communication with Instrument Cluster Module - Missing Message		

Caution:

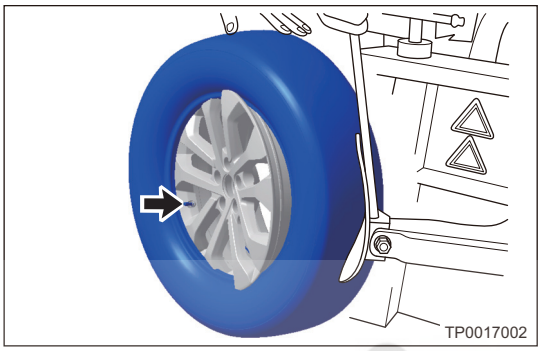
- When above DTCs occur, perform inspection on CAN system of entire vehicle to find out the trouble area and perform troubleshooting.

ON-VEHICLE SERVICE

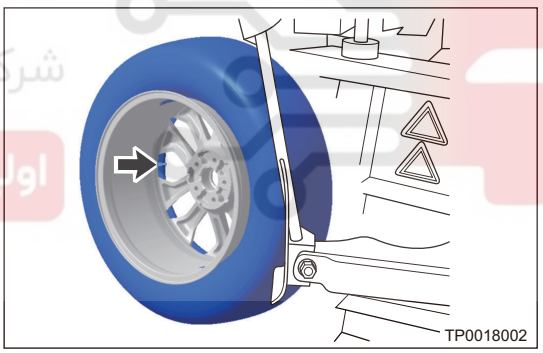
Tire

Removal

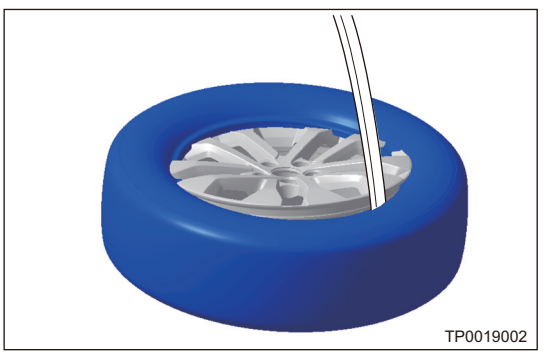
1. Remove tire and deflate tire completely.
   Caution:
   - During tire bead breaking, follow the operation specification, never damage the tire pressure sensor.
2. Keep one side with tire pressure sensor 30 cm away from separation shovel (arrow), and put shovel block between rim and tire, then depress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



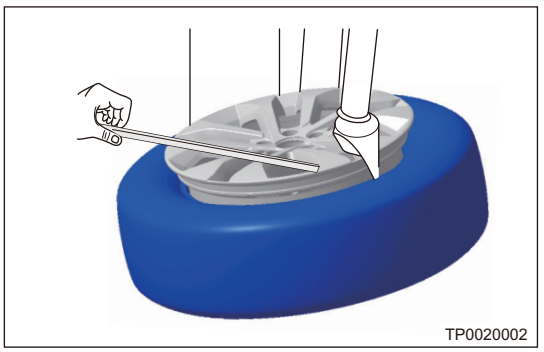
3. Turn over tire to keep one side with tire pressure sensor 30 cm away from separation shovel (arrow), and put shovel block between rim and tire, then depress the pedal to separate rim and tire.



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



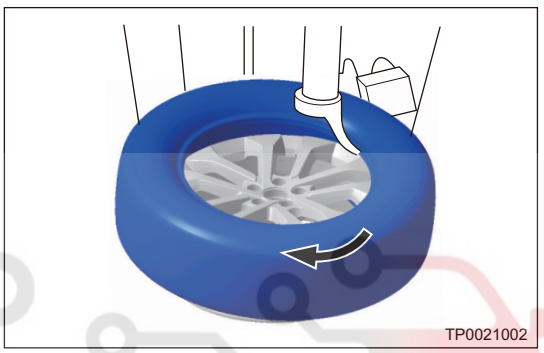
5. Use crowbar to pry out outside tire, and sleeve it to replacer head, then take away crowbar.


TP0020002

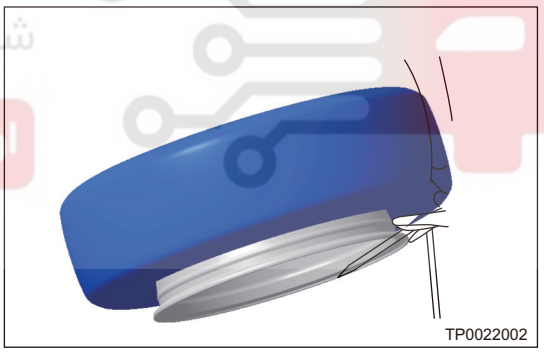
Caution:
- Both crowbar and tire cannot contact with sensor!

6. Remove the wheel.

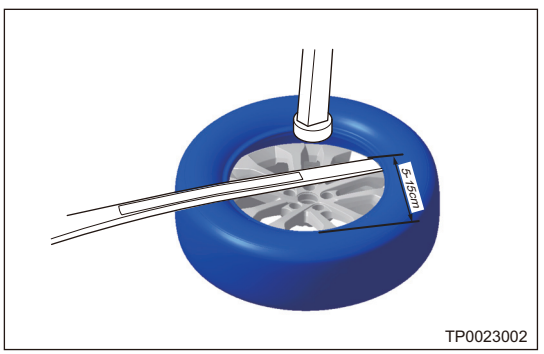
(a) Rotate wheel, and the movable direction of wheel should be the direction that replacer head is gradually kept away from tire pressure sensor (rotation arrow), then remove upper part of tire.


TP0021002

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

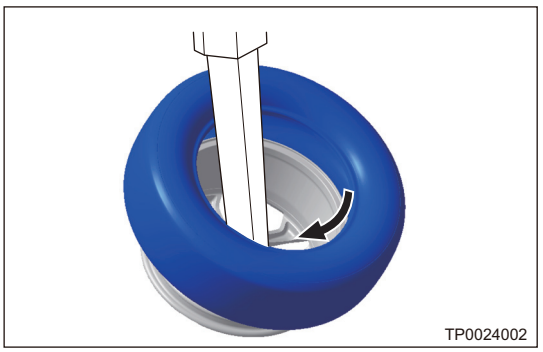

TP0022002

(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.



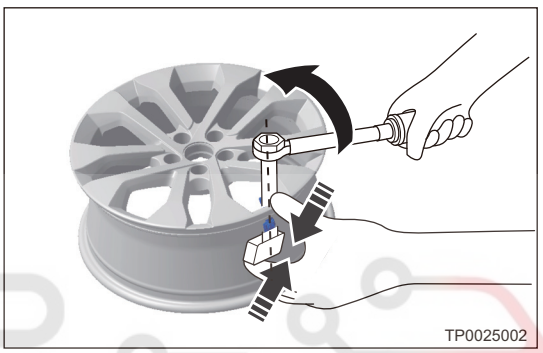
TP0023002

(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.


TP0024002

Removal of Tire Pressure Sensor

1. Using an appropriate tool, rotate nut counterclockwise until it separates from tire pressure sensor completely.


TP0025002

2. Remove tire pressure sensor from wheel hub.

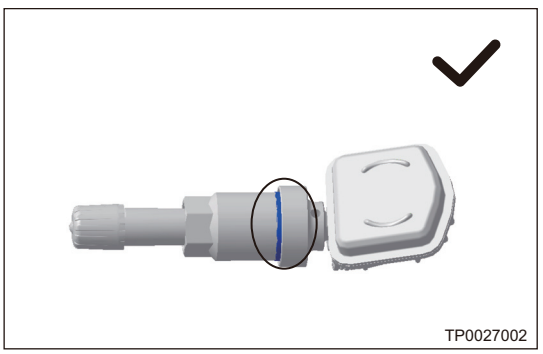
Installation

Warning/Caution/Hint

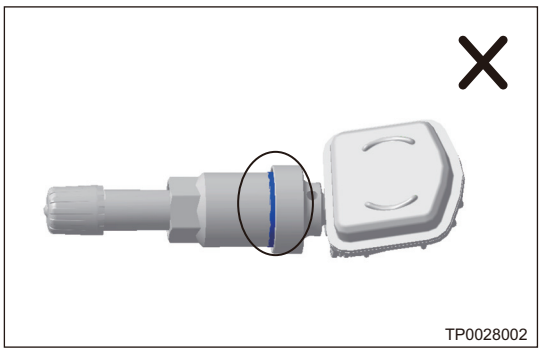
Caution:

- Always use torque wrench when installing tire pressure sensor, common wrench cannot guarantee a torque of 8 ± 1 N·m. 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. Adjust plane direction of seal washer cutout.
   (a) When removing sensor body, first check if seal washer cutout plane is parallel with the polyester plane. If they are not parallel and there is an angle between two planes, turn seal washer to make seal washer cutout plane parallel with polyester plane.
   (b) If seal washer cutout plane is parallel with polyester plane, it indicates that assembly is qualified.

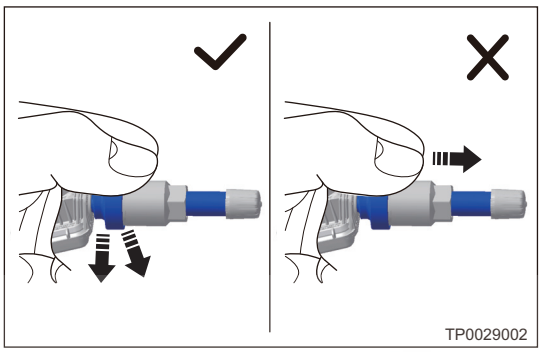

TP0027002

(c) If seal washer cutout plane is not parallel with polyester plane and there is a large angle between two planes, it indicates that assembly is not qualified.

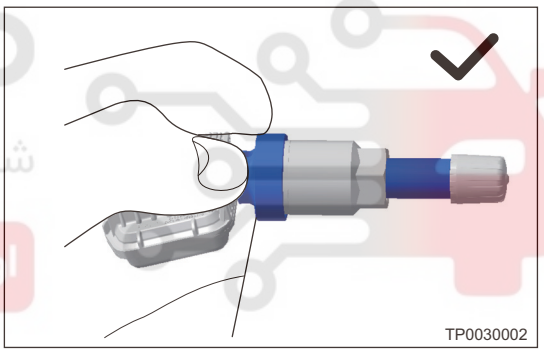

TP0028002

2. Adjust the valve stem position.

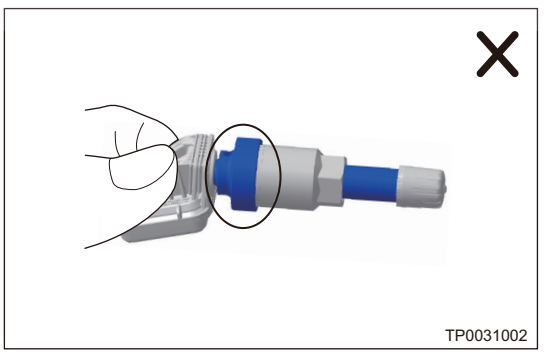
(a) Press root of valve stem using middle part of your thumb with a downward force in groove direction, so that root of valve stem can be seated in the groove fully; then, keep middle part of thumb pressed against valve stem and tip part of thumb pressed against the gasket with a vertical downward force applied along seal washer, so that the valve stem can bend to maximum angle. It is not allowed to apply horizontal force along the seal washer.


TP0029002

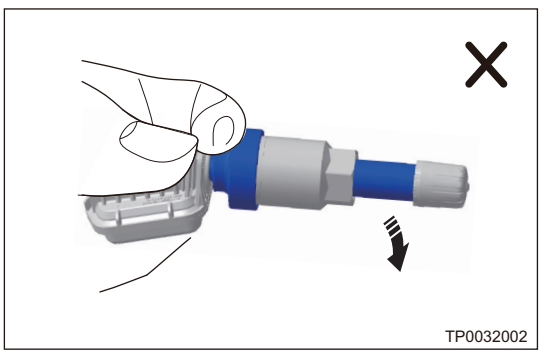
(b) If root of valve stem enters groove completely and valve stem bends to limit, it indicates that assembly is qualified.


TP0030002

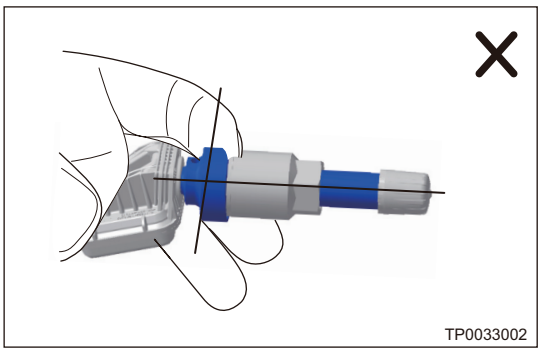
(c) If root of valve stem dose not enter groove fully and valve stem dose not bend to limit, it indicates that assembly is not qualified.


TP0031002

(d) If valve stem dose not bend to limit, it indicates that assembly is not qualified.

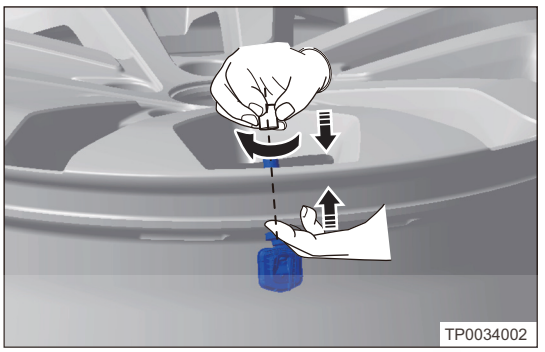

TP0032002

(e) If seal washer plane is not perpendicular to valve stem after a horizontal force is applied along the seal washer, it indicates that assembly is not qualified.

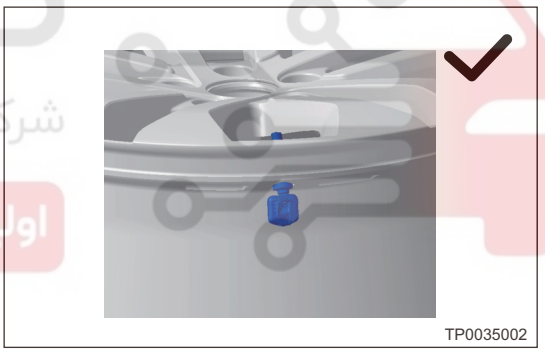

TP0033002

3. Insert valve stem of tire pressure sensor into hub and pretightened nut.

(a) Hold the tire pressure sensor vertically with four fingers of the left hand in upward direction, never apply inward component force in horizontal direction; hold the outer edge of rim with left thumb, and apply a downward force to press both sides of sensor housing firmly against the rim. Pass the valve stem into rim along valve hole center axis, and insertion direction is from inward to outward of tire assembly. Tighten the nut with right hand in clockwise direction until the tire pressure sensor is fixed without any movement.


TP0034002

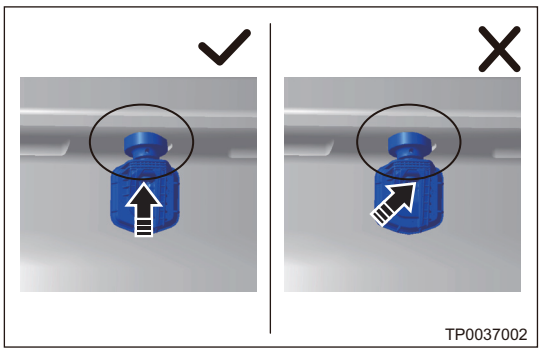
(b) If valve stem is fully seated into the groove, sensor is fully fixed without any movement and sensor housing is pressed against rim firmly, it indicates that assembly is qualified.


TP0035002

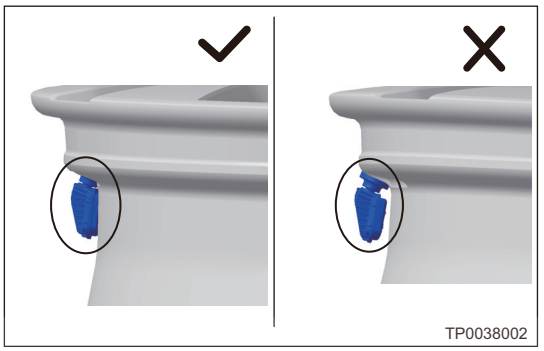
(c) If the pretightened nut is not tightened into place with too much valve stem screw exposed and sensor is not fixed, it indicates that assembly is unqualified.


TP0036002

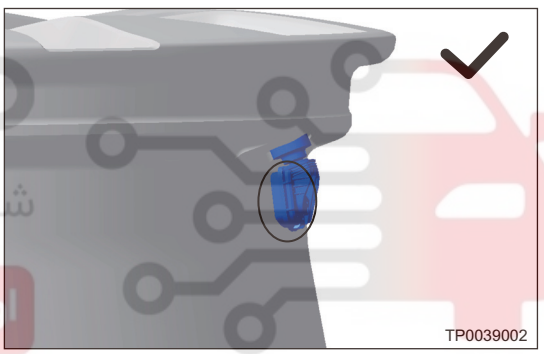
(d) If the sensor valve stem slides out form metal groove after a horizontal inward component force is applied, it indicates that assembly is unqualified.



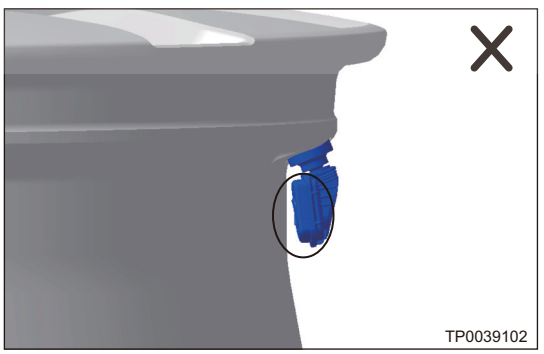
(e) If right side of sensor is not pressed against the rim firmly, it indicates that assembly is unqualified.



(f) If left side of sensor is pressed against the rim firmly, it indicates that assembly is qualified.

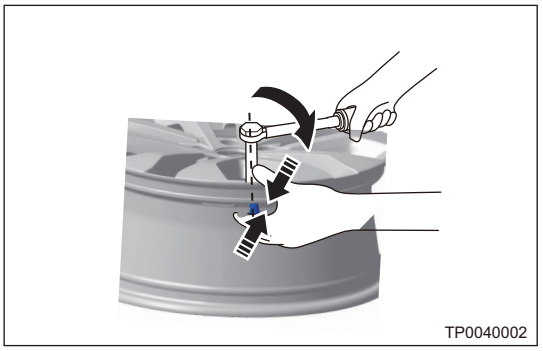


(g) If left side of sensor is not pressed against the rim firmly, it indicates that assembly is unqualified.

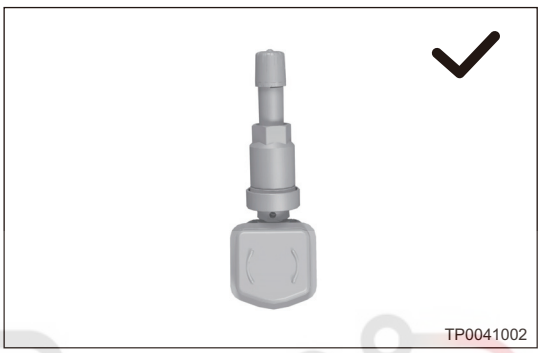


4. Tighten the nut firmly.

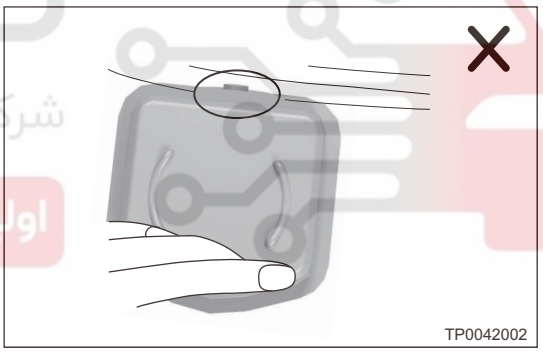
(a) Hold bottom part of the sensor using four fingers of left hand with a upward force. Hold the rim edge with left thumb with a downward force. Press the tire pressure sensor against the rim firmly, and keep the sensor position fixed during tightening process. The axis of manual torque wrench sleeve should be overlaped with that of valve stem without any angle. Start the fitting button to tighten the nut in clockwise direction, and the tightening process is finished after torque reaches 8 ± 1 N·m. Do not tighten the nut again after it is tightened.


TP0040002

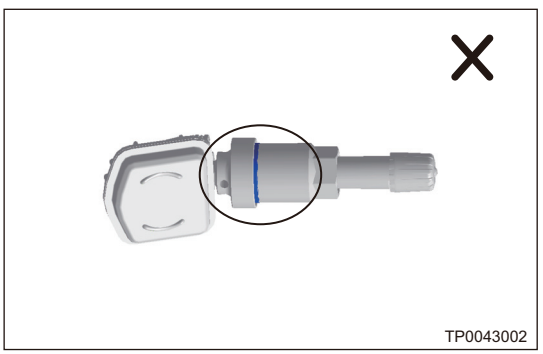
(b) If valve stem is fully seated in metal groove, sensor is fully fixed without any movement and both sides of the sensor housing are pressed against rim firmly, it indicates that assembly is qualified.


TP0041002

(c) If valve stem slides out of metal groove, it indicates that assembly is unqualified.


TP0042002

(d) If seal washer and seal ring are deformed or damaged due to excessive torque, it indicates that assembly is unqualified.


TP0043002

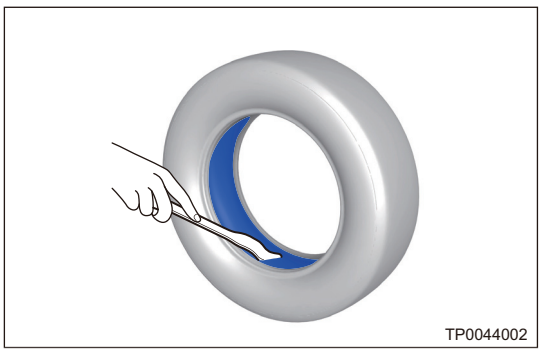
Installation of Tire

Warning/Caution/Hint

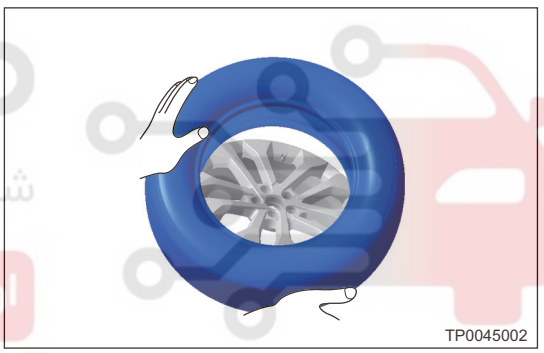
Caution:

- 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.

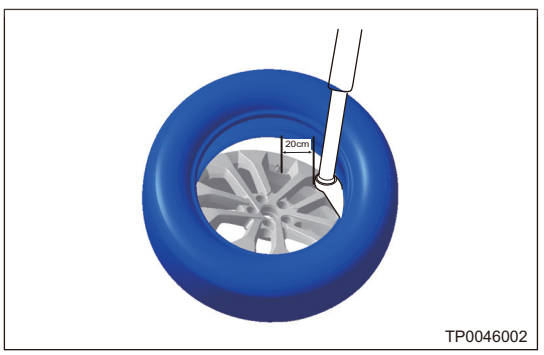
1. Installation is the same as common tire. Before loading tire, apply soapy water or glycerin to tire bead along inner circle.


TP0044002

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

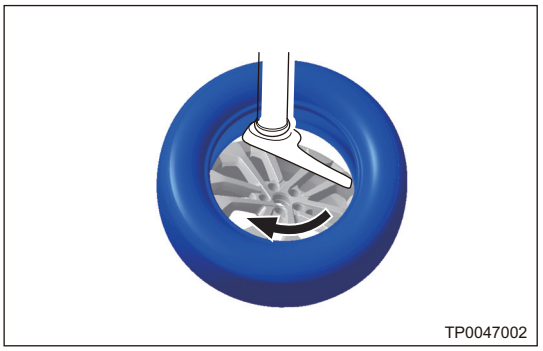

TP0045002

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

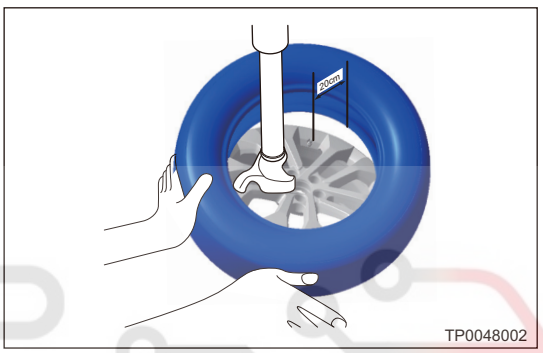


TP0046002

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.

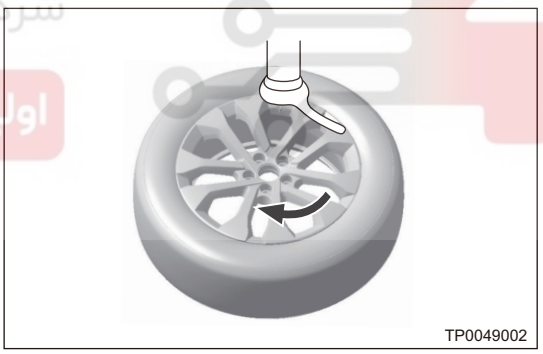

TP0047002

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.



TP0048002

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


TP0049002

Tire Pressure Sensor

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, used tools cannot contact with tire pressure sensor, to avoid damage to the tire pressure sensor.
- Sensor air pressure inlet cannot be covered partially or completely by lubricant or other materials.
- Tire pressure sensor screw cannot be tightened again after it is loosened.

- MEMO -