
SUSPENSION SYSTEM

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22.1 TIRE PRESSURE MONITORING SYSTEM

1 Warning and Precaution

1.1 Warning

In order to avoid possible property loss, personal injury or death, always follow the instructions below before repair:

- (1) When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.
- (2) Be sure to wear necessary safety equipment to prevent accidents, when removing tire pressure sensor.
- (3) 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.
- (4) 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.
- (5) Always use torque wrench when installing tire pressure sensor, common wrench cannot guarantee a torque of $8 \pm 1 \text{ N}\cdot\text{m}$. 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.

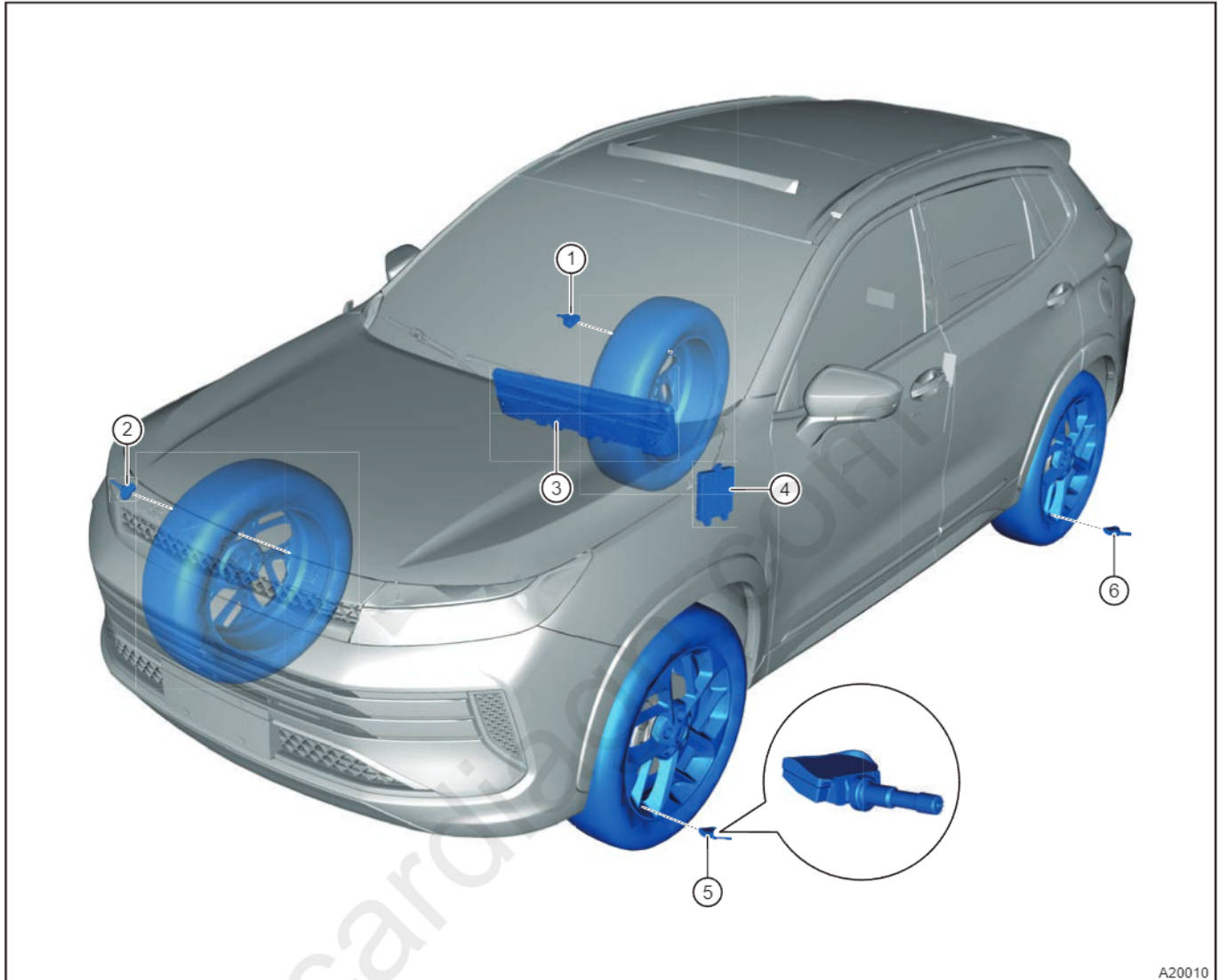
1.2 Precautions

In order to avoid dangerous operation and damage to the vehicle before repair in this section, always follow the instructions below before repair:

- (1) Operate carefully to avoid damaging tire pressure sensor, when removing tire pressure sensor.
- (2) 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.
- (3) Tire pressure sensor must be installed on clean and dry hub.
- (4) Valve cap must be on the valve, except inflation, deflation, air pressure inspection, etc.
- (5) During installation, do not contact the tire pressure sensor with used tools, to avoid damage to the tire pressure sensor.
- (6) Sensor air pressure inlet cannot be covered partially or completely by lubricant or other materials.
- (7) Tightening speed : $\leq 30 \text{ rpm}$; Installation torque: $8 \pm 1 \text{ N}\cdot\text{m}$ when installing tire pressure sensor.
- (8) When removing and installing steering system, suspension system, brake, tire, etc., it is necessary to turn off power supply of EPS (vehicle power supply is turned off), so as to avoid reverse impact, resulting in EPS internal protection circuit breakdown.

2 System Overview

2.1 System Component Diagram

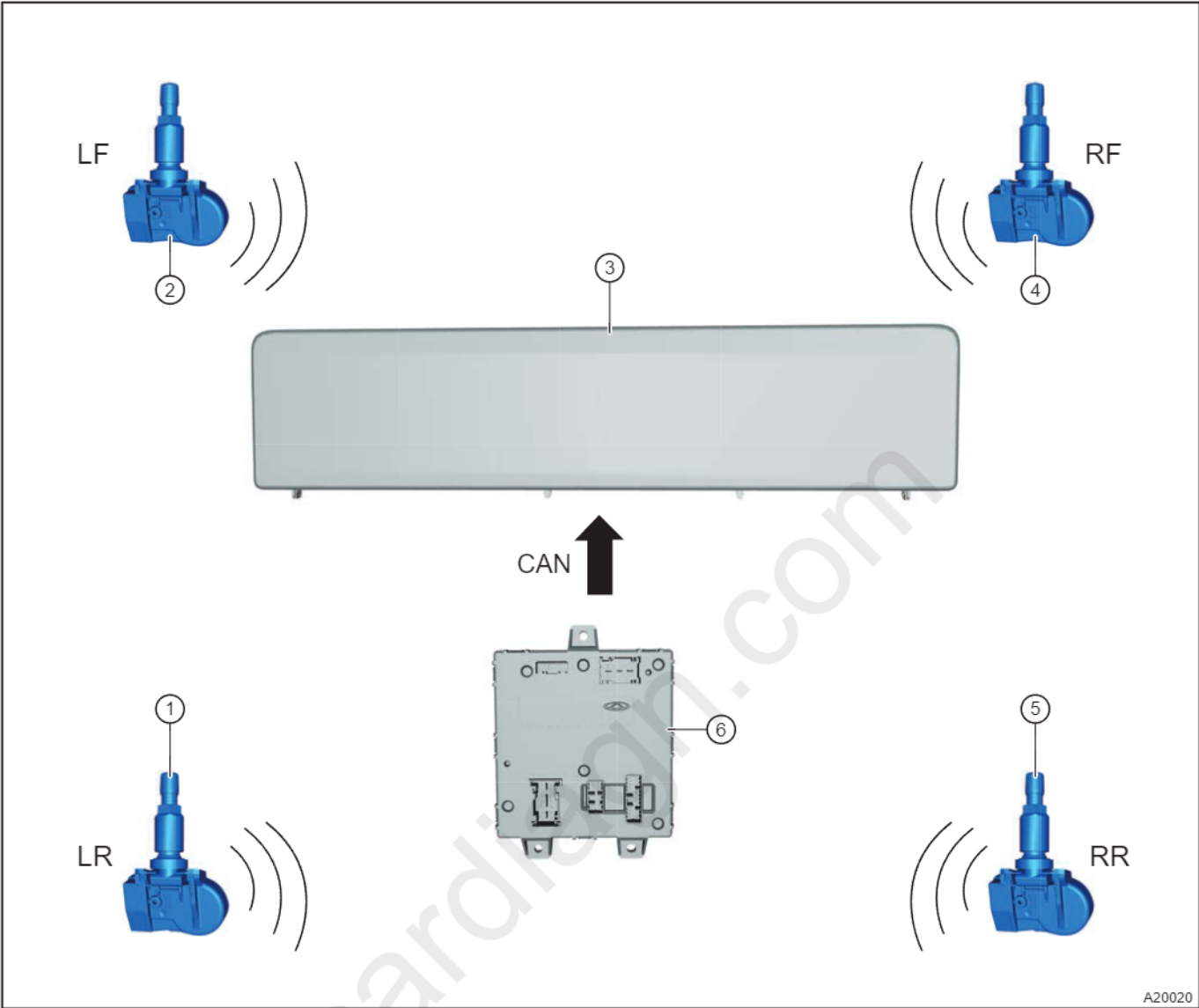


A20010

1	Rear Right Tire Pressure Sensor	4	Body Control Module
2	Front Right Tire Pressure Sensor	5	Front Left Tire Pressure Sensor
3	Dual LCD	6	Rear Left Tire Pressure Sensor

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

2.2 System Schematic Diagram



A20020

1	Rear Left Tire Pressure Sensor	4	Front Right Tire Pressure Sensor
2	Front Left Tire Pressure Sensor	5	Rear Right Tire Pressure Sensor
3	Dual LCD	6	Body Control Module

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 and temperature value are 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.

2.3 Tire Pressure Monitoring System (TPMS) Alarm Information

■ Low Pressure Alarm

When vehicle tire pressure is less than 1.72 bar, and the vehicle is continuously driving for more than 45 s with a speed higher than 25 Km/h, the system will send a low pressure alarm. 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 1.72 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 left tire) symbol turns red and its tire pressure and temperature will be displayed.



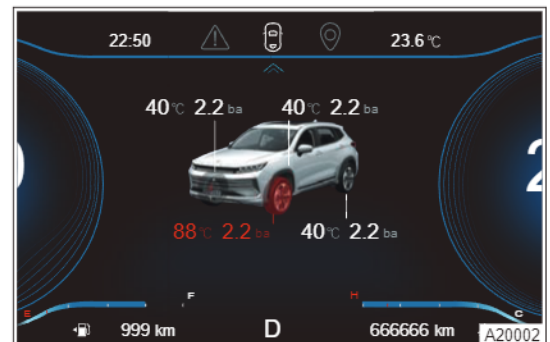
⚠ Caution

- **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.**

When tire pressure is high or low, please resume the tire pressure to error range between 2.0 bar and 2.4 bar. When the vehicle tire pressure resumes to error range 2.0 bar and 2.4 bar and vehicle is continuously driving with a speed higher than 25 Km/h, the system will deactivate the low pressure alarm automatically within 45 minutes.

■ High Temperature Alarm

Take front left wheel as an example, when temperature of front left wheel reaches 75°C, which is higher than high temperature alarm threshold (75 °C), the system will send high temperature alarm, front left wheel symbol will be red, 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) symbol will be red and its tire pressure and temperature values will be displayed.



⚠ Caution

- **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 75°C and the vehicle is continuously driving with a speed higher than 25 Km/h, the system will deactivate high temperature alarm automatically within 45 minutes. The system stores the history DTCs.

■ System Malfunction

When the vehicle speed is higher than 25 Km/h, if the tire pressure monitoring system fails to receive radio frequency signal from one or more sensors within 45 minutes, it will send a system malfunction alarm, the meter will display "Tire Pressure Monitoring System Malfunction", 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 3.40 bar, the tire pressure will be displayed as –; but the temperature will be displayed normally. If the tire pressure is less than 3.20 bar, it will resume normal display within 45 minutes.



Hint:

If the alarm is caused high tire pressure, just resume it to range between 2.0 bar and 2.4 bar.

■ Automatic Positioning

This model has automatic tire pressure positioning function: If tires are exchanged, or sensor is replaced due to damage, and the vehicle stops for more than 20 minutes, when vehicle is continuously driving with a speed higher than 25 Km/h within 45 minutes, system can automatically learn tire pressure and match it to corresponding position.

⚠ Caution

- If two or more sensors are replaced, tire pressure position displayed on meter may be inconsistent with actual position within 10 minutes during driving. And it will be updated to correct position after successful positioning within 10 minutes.
- During automatic positioning, ID stored in receiver defaults to previous ID and corresponding position. If tire rotation is performed, pressure and temperature display position and low/high temperature alarm position of meter may be inconsistent with actual position. And it will be updated to correct position after successful positioning.

2.4 Precautions for Maintaining Tire Pressure Monitoring System

■ Active Condition for Tire Pressure Monitoring System

No.	Conditions to Be Met
1	IGN-ON
2	Vehicle continuously drives with a speed higher than 25 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 25 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 25 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 25 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.

■ 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 25 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.

■ Tire Pressure Sensor

- When system is faulty or disabled, check tire pressure sensor and judge if it is the tire pressure sensor of automobile manufacturer. If tire pressure sensor of other manufacturers 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 air valve, and inflating/deflating operation is the same as common air valve. 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.
- Tire pressure sensor should be installed from inside of rim, sensor should be installed firmly to rim and check carefully; Use 11 mm socket to install sensor nuts with a torque of $5 \pm 0.5 \text{ N} \cdot \text{m}$.

■ Increased Tire Pressure Value

- 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.

■ Tires Replacement

- 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, system malfunction alarm still will occur without performing configuration and learning. Spare tire 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.

2.5 Component Operation Description

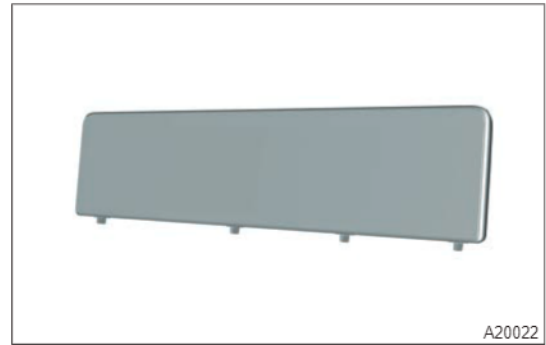
■ Tire Pressure Sensor

Tire pressure sensor can monitor tire pressure and temperature, and send tire pressure and temperature information to body control module. When tire pressure is too high or too low and temperature is too high, instrument cluster will inform driver of abnormal tire.



■ Dual LCD

Body control module processes data of tire pressure sensor, then sends them to dual LCD via CAN bus. Tire pressure value and temperature value are displayed on dual LCD via CAN bus signal. When tire pressure is too high or too low, or temperature is too high, it informs driver of abnormal tire.



■ Body Control Module

Body control module receives radio-frequency signal sent from tire pressure sensor, processes these data and sends them to dual LCD via CAN bus.



3 Diagnosis & Testing

3.1 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 turns red)	Tire pressure is less than 1.72 bar	Check and charge tire pressure to 2.2 bar (with an error limit of 0.1 bar)
	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
High temperature alarm (warning light remains on, wheel symbol turns red)	Tire temperature is higher than 75 °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 sensor function is disabled	Replace, perform configuration and learning

Symptom	Suspected Area	Troubleshooting
	Incorrect sensor 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 sensor 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 body control module and perform sensor learning
	Tire pressure system set	Check and repair

3.2 Diagnosis Tools

■ Diagnostic Tester

When using diagnostic tester:

- Connect diagnostic tester (the latest software) to diagnostic interface for communication with vehicle.
- Diagnostic interface is located at driver side instrument panel crossmember.
- Diagnostic interface 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.

3.3 Diagnostic Help

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

3.4 DTC Confirmation Procedure

Confirm that battery voltage is not less than 12 V before performing following procedures.

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- 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 several seconds.
- Start engine, drive vehicle at 30 km/h or more and perform road test with diagnostic tester connected to diagnostic interface.
- Turn ENGINE START STOP switch to ON, and check DTCs in system again.
- If DTC is detected, it indicates current malfunction.
- If no DTC is detected, malfunction indicated by DTC is intermittent. Please refer to Intermittent DTC Troubleshooting.

3.5 Intermittent DTC Troubleshooting

- 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.
- Check tire pressure 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.

3.6 Tire Pressure Sensor Learning

■ Air Bleeding

Hint:

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

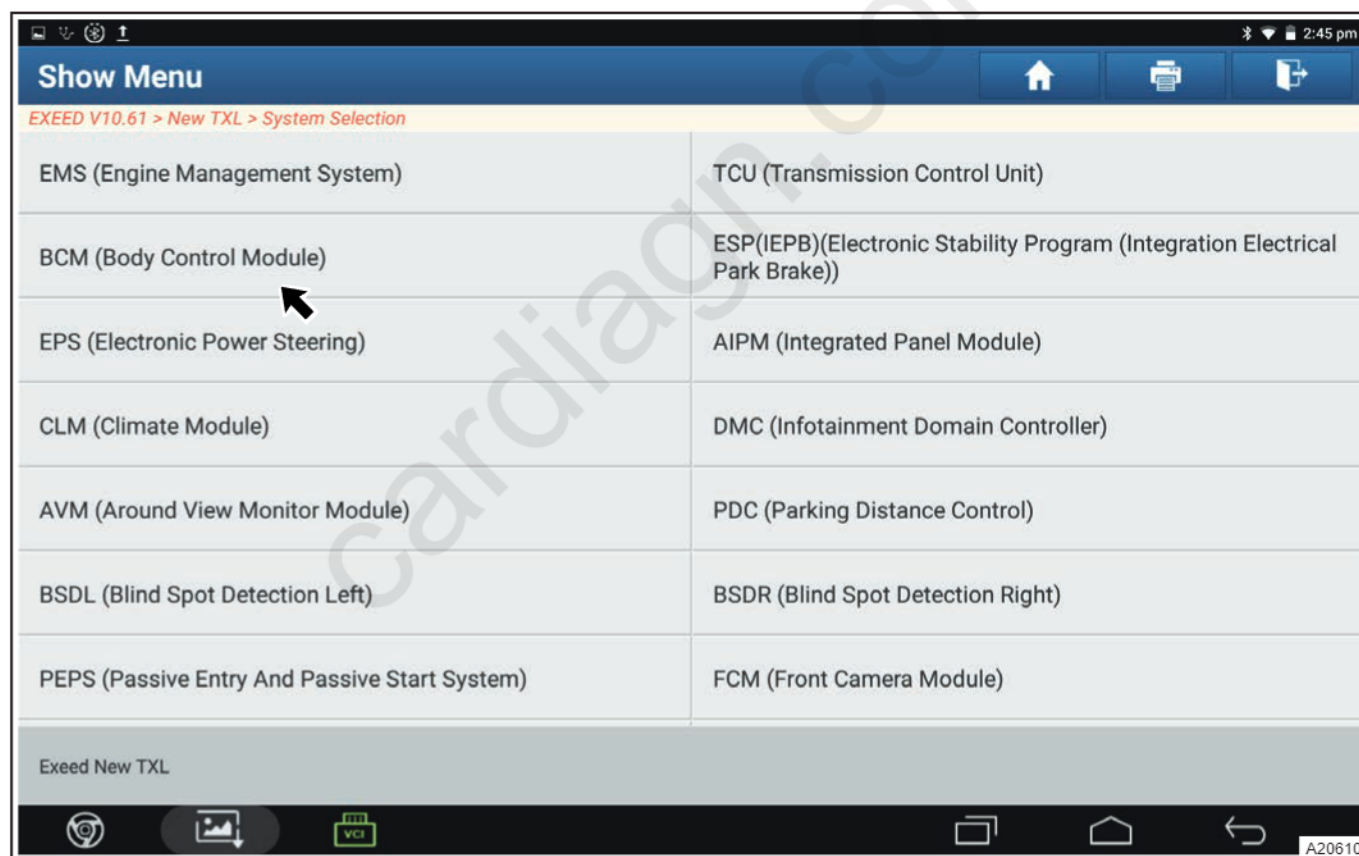
Precautions	Description
Avoid error learning of tire	Learned tire must be matched with bleeding tire

Precautions	Description
	Only operate one tire every time, and do not bleed (or inflate) other tires at this time
	Keep away from other vehicles with tire pressure sensor, avoiding error learning or interference

- If tire learned in system does not matched with bleeding tire, system will recognize an error, resulting in tire information displayed in instrument cluster not corresponding to actual tire information.
- When learning a tire, please do not inflate or bleed other tires. Bleeding or inflating the tire will cause error tire learning.
- When learning tire pressure monitoring system, please do not approach other vehicles equipped with tire pressure sensor and with tire pressure sensor in activated state, otherwise it may lead to error learning or failure to learn.
- After completing learning, please confirm whether four tire pressure sensor ID of actual vehicle is consistent with tire pressure sensor ID recorded by BCM.

(1) Connect diagnostic tester and turn ENGINE START STOP switch to ON.

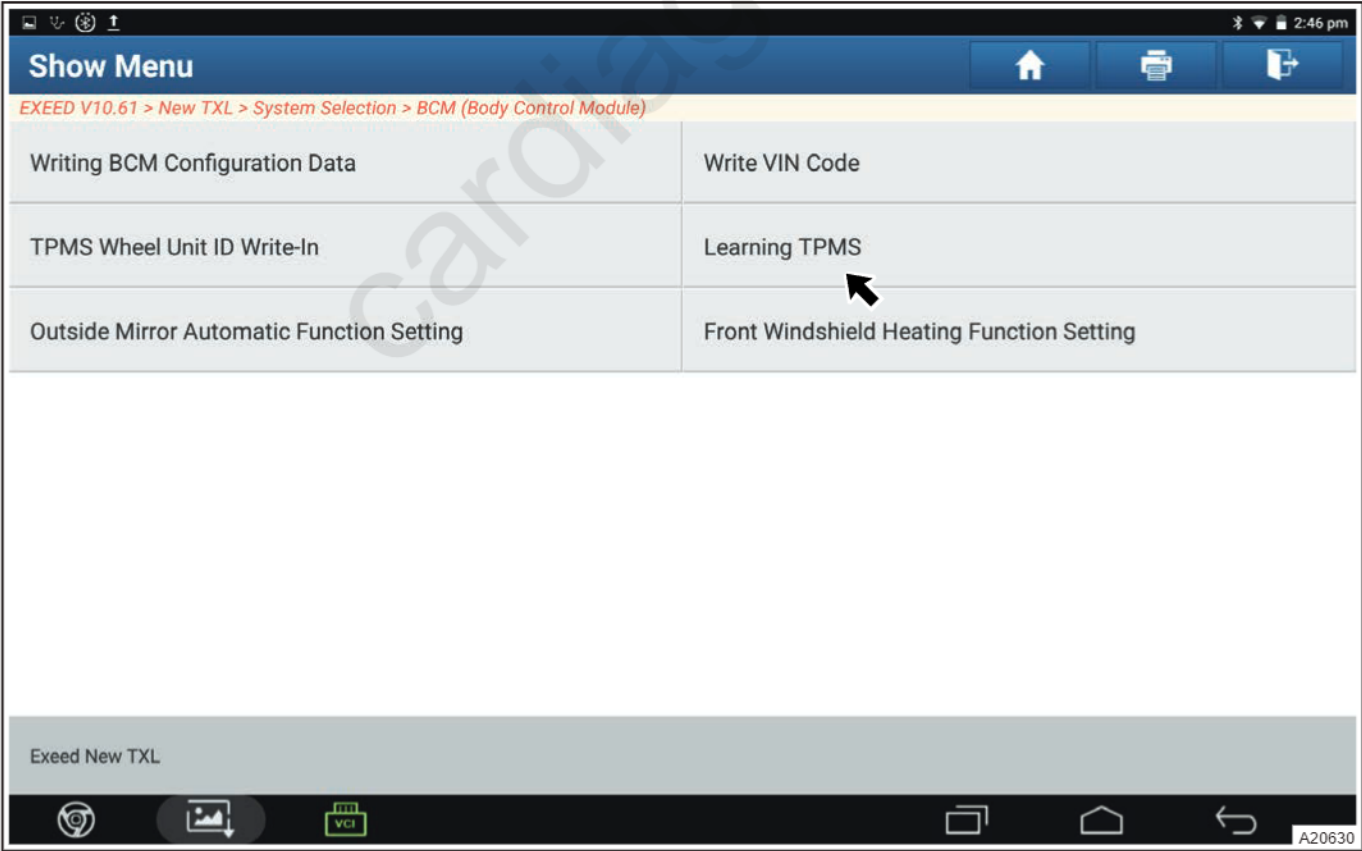
(2) Click “BCM(Body Control Module)” .



(3) Click “Special Function” .



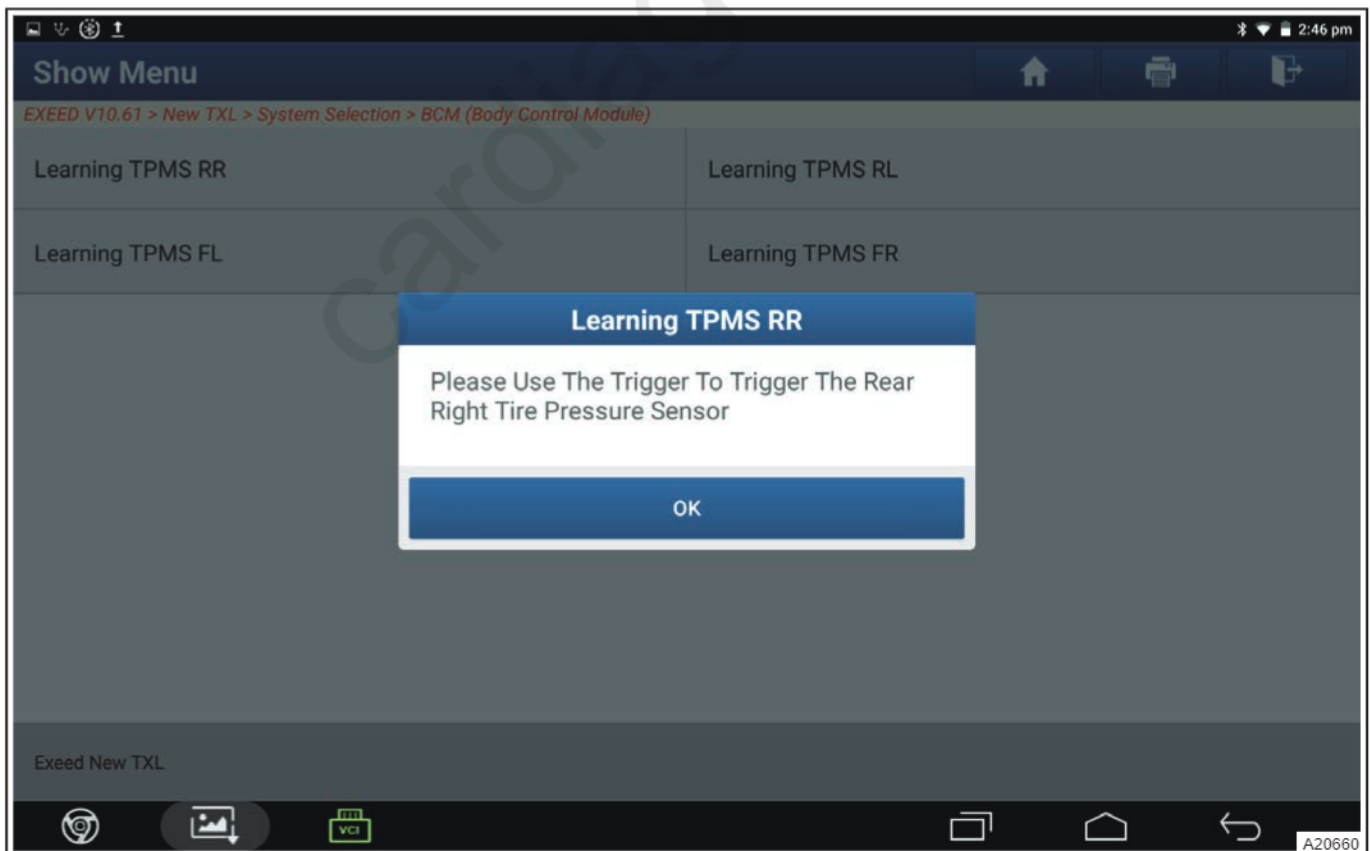
(4) Click “Learning TPMS” .



(5) Click “Learning TPMS RR” .



(6) Operates according to prompt on diagnostic tester.

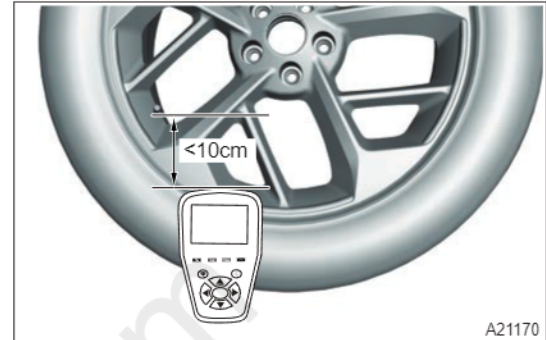


- (7) When clicking "OK" button on diagnostic tester, tire pressure learning screen is displayed on meter and tire pressure warning light flashes. Perform tire pressure sensor learning when tire pressure monitoring system enters sensor learning status.
- (8) Perform bleeding operation for front left wheel. 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 completed" is displayed on diagnostic tester which indicates that front left tire pressure sensor learning has been finished.

■ Tire Pressure Learning Method for Low-Frequency Trigger

There is enough pressure in tire (full loaded pressure is recommended), BCM turns on tire pressure monitoring function.

- If the malfunction is suspected in tire pressure sensor, use the low-frequency trigger to perform test.
- Distance between low-frequency trigger and tire pressure sensor is less than 10 cm. Place the antenna of low-frequency trigger near the rubber 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.



1	Start	Next
2	ENGINE START STOP switch is in ON; but do not start vehicle	Next
3	Switch conventional screen to tire pressure screen on meter; Operate diagnostic tester and select "TPMS Self-learning" menu in "Special Operation"	Next
4	Select tire to be learned with diagnostic tester	Next
5	Enter tire pressure learning status, left and right turn signal lights start blinking	Next
6	Trigger wheel sensor to be learned using low-frequency trigger	Next
7	Tire pressure sensor ID, temperature and pressure values are displayed on low-frequency trigger	

Next

8

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

Next

9

Check if other tire sensors are also learned

Yes

Step 4

No

10

Rode test: Vehicle speed is more than 30 Km/h for 45 seconds

Next

11

Select tire to be learned with diagnostic tester

No

Step 2

Yes

12

End

■ Meter Screen Display for Successful Tire Pressure Sensor Learning

- (1) Left and right turn signal lights stop blinking, and tire pressure data is displayed on meter, indicating that tire pressure learning is completed, such as left front wheel.

The displayed tire pressure is 2.4 bar and the temperature is 40 °C for front left wheel, which indicate that the front left wheel is learned successfully.



⚠ Caution

- Only after learn is successful, click "OK", otherwise learning will not be successful.

■ Inspection of Tire Pressure Monitoring System Learning Status

After repairing or reconfiguring tire pressure monitoring system, perform inspection of tire pressure monitoring system learning status. Select Read Data Stream to check learning status of tire pressure system.

- (1) Click sensor learning status to check sensor learning status and whether learning is successful. If learning is not successful, unsuccessful learning will be displayed.

Data Stream			
EXEED V10.61 > New TXL > System Selection > BCM (Body Control Module)			
Name	Value	English	Metric
Front tyre cold pressure	230.34	kPa	
Rear tyre cold pressure	230.34	kPa	
Tyre high pressure	342.07	kPa	
Tyre high temp warning value	75	degC	
Test Interface RF output ctrl	Closed		
Test Interface output auto_loc ctrl	Closed		
(1 / 1)			
Exeed New TXL Compare Sample Save Sample Graph Report Record Help			

■ Automatic Positioning Learning Method

There is automatic tire pressure positioning function:

If tires are exchanged, or sensor is replaced due to damage, and the vehicle stops for more than 20 minutes, when vehicle is continuously driving with a speed higher than 25 Km/h within 45 minutes, system can automatically learn tire pressure and match it to corresponding position.

⚠ Caution

- If two or more sensors are replaced, tire pressure position displayed on meter may be inconsistent with actual position within 10 minutes during driving. And it will be updated to correct position after successful positioning within 10 minutes.
- During automatic positioning, ID stored in receiver defaults to previous ID and corresponding position. If tire rotation is performed, pressure and temperature display position and low/high temperature alarm position of meter may be inconsistent with actual position. And it will be updated to correct position after successful positioning.

3.7 Diagnostic Trouble Code (DTC) Chart

DTC	DTC Definition
C1020-87	Wheel-Sensor Mute Failure FL
C1021-87	Wheel-Sensor Mute Failure FR
C1022-87	Wheel-Sensor Mute Failure RL
C1023-87	Wheel-Sensor Mute Failure RR
C1050-00	Low Tire Pressure FL
C1051-00	Low Tire Pressure FR
C1052-00	Low Tire Pressure RL

DTC	DTC Definition
C1053-00	Low Tire Pressure RR
C1054-00	High Tire pressure FL
C1055-00	High Tire pressure FR
C1056-00	High Tire pressure RR
C1057-00	High Tire pressure RL
C1058-00	High Tire Temp FL
C1059-00	High Tire Temp FR
C105A-00	High Tire Temp RL
C105B-00	High Tire Temp RR
C105C-00	Wheel-Sensor Battery Low FL
C105D-00	Wheel-Sensor Battery Low FR
C105E-00	Wheel-Sensor Battery Low RL
C105F-00	Wheel-Sensor Battery Low RR
C1060-00	Wheel-Sensor Not Matched
C1061-00	Invalid Wheel Tick Number Received
C1062-00	Wheel Tick Number Not Received
C1603-00	Wheel-Sensor Not All learned

3.8 DTC Diagnosis Procedure

■ Wheel Sensor Mute Failure

DTC	C1020-87	Wheel-Sensor Mute Failure FL
DTC	C1021-87	Wheel-Sensor Mute Failure FR
DTC	C1022-87	Wheel-Sensor Mute Failure RL
DTC	C1023-87	Wheel-Sensor Mute Failure RR

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1020-87	Wheel-Sensor Mute Failure FL	Vehicle speed is more than 25 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.
C1021-87	Wheel-Sensor Mute Failure FR		
C1022-87	Wheel-Sensor Mute Failure RL		
C1023-87	Wheel-Sensor Mute Failure RR		

■ DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

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.

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.

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 25 km/h for a period of time.

NG

Reconfigure tire pressure sensor of malfunctioning wheel.

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

- (a) After replacement, perform configuration and test.

NG

Replace tire pressure sensor of malfunctioning wheel.

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

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

OK

System detection is normal.

NG

Repair or replace Body Control Module (BCM).

■ **Low Tire Pressure**

DTC	C1050-00	Low Tire Pressure FL
DTC	C1051-00	Low Tire Pressure FR

DTC	C1052-00	Low Tire Pressure RL	
DTC	C1053-00	Low Tire Pressure RR	

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1050-00	Low Tire Pressure FL	Vehicle speed is more than 25 km/h for 45 seconds	Perform BCM function configuration, learning function is not finished.
C1051-00	Low Tire Pressure FR		
C1052-00	Low Tire Pressure RL		
C1053-00	Low Tire Pressure RR		

■ DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

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.

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.

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 25 km/h for a period of time.

NG

Reconfigure tire pressure sensor of malfunctioning wheel.

OK

4 Check tire pressure sensor of malfunctioning wheel

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

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

■ High Tire Pressure

DTC	C1054-00	High Tire pressure FL
DTC	C1055-00	High Tire pressure FR
DTC	C1056-00	High Tire pressure RR
DTC	C1057-00	High Tire pressure RL

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1054-00	High Tire pressure FL	Vehicle speed is more than 25 km/h for 45 seconds	Sensor operates abnormally, and RF data sent shows a malfunction in sensor.
C1055-00	High Tire pressure FR		
C1056-00	High Tire pressure RR		
C1057-00	High Tire pressure RL		

■ DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

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.

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.

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 25 km/h for a period of time.

NG

Reconfigure tire pressure sensor of malfunctioning wheel.

OK

4 Check tire pressure sensor of malfunctioning wheel

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

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

5 Check tire pressure sensor of malfunctioning wheel

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

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

6 Check tire pressure sensor of malfunctioning wheel

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

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

■ High Tire Temp

DTC	C1058-00	High Tire Temp FL
DTC	C1059-00	High Tire Temp FR
DTC	C105A-00	High Tire Temp RL
DTC	C105B-00	High Tire Temp RR

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1058-00	High Tire Temp FL	Vehicle speed is more than 25 km/h for 45 seconds	Sensor operates abnormally, and RF data sent shows a malfunction in sensor.
C1059-00	High Tire Temp FR		
C105A-00	High Tire Temp RL		
C105B-00	High Tire Temp RR		

■ DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

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.

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.

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 75 °C and the vehicle is continuously driving with a speed higher than 25 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 25 km/h for certain period of time and tire temperature is less than 75 °C, the high temperature alarm can be deactivated automatically.

NG

Reconfigure tire pressure sensor of malfunctioning wheel.

OK

4

Check tire pressure sensor of malfunctioning wheel

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

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

5

Check tire pressure sensor of malfunctioning wheel

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

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

6

Check tire pressure sensor of malfunctioning wheel

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

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

■ Wheel Sensor Battery Low

DTC	C105C-00	Wheel-Sensor Battery Low FL
DTC	C105D-00	Wheel-Sensor Battery Low FR
DTC	C105E-00	Wheel-Sensor Battery Low RL
DTC	C105F-00	Wheel-Sensor Battery Low RR

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C105C-00	Wheel-Sensor Battery Low FL	Vehicle speed is more than 25 km/h for 45 seconds	Battery is depleted.
C105D-00	Wheel-Sensor Battery Low FR		
C105E-00	Wheel-Sensor Battery Low RR		
C105F-00	Wheel-Sensor Battery Low RL		

■ DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).
- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

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.

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.

NG	Tighten or replace body control module ground circuit.
----	--

OK

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

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

NG

Reconfigure tire pressure sensor of malfunctioning wheel.

OK

4 Check tire pressure sensor of malfunctioning wheel

- (a) After replacement, perform configuration and test.

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

5 Check tire pressure sensor of malfunctioning wheel

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

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

6 Check tire pressure sensor of malfunctioning wheel

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

OK

System detection is normal.

NG

Replace tire pressure sensor of malfunctioning wheel.

■ Wheel-Sensor Not Matched

DTC	C1060-00	Wheel-Sensor Not Matched
DTC	C1061-00	Invalid Wheel Tick Number Received
DTC	C1062-00	Wheel Tick Number Not Received
DTC	C1063-00	Wheel-Sensor Not All learned

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1060-00	Wheel-Sensor Not Matched	Vehicle speed is more than 25 km/h for 45 seconds	• Sensor failure. • Sensor signal interference. • BCM failure. • Wheel speed sensor failure. • Manual learning is not performed.
C1061-00	Invalid Wheel Tick Number Received		
C1062-00	Wheel Tick Number Not Received		
C1063-00	Wheel-Sensor Not All learned		

■ DTC Confirmation Procedure

- Turn ENGINE START STOP switch to OFF.
- Connect the diagnostic tester (the latest software).

- Start engine and warm it up, and then read DTC again. If DTC is detected, malfunction is current.
- If DTC is not detected, malfunction is intermittent.

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.

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.

NG

Tighten or replace body control module ground circuit.

OK
3 Calibrate tire pressure sensor manually

(a) Calibrate the tire pressure sensor manually.

NG

Calibrate sensor manually.

OK
4 Check wheel speed sensor, signal interference

(a) If manual calibration of tire pressure sensor still fails to solve the problem, check wheel speed sensor and whether there is signal interference around the wheel (snow chain, etc.).

OK

Replace wheel speed sensor, remove signal interference.

OK
5 Check tire pressure sensor

(a) Check the tire pressure sensor.

NG

Replace tire pressure sensor.

OK
6 Check body control module

(a) After replacement, perform configuration and test.

OK

System detection is normal.

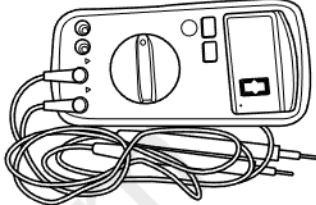
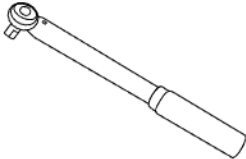
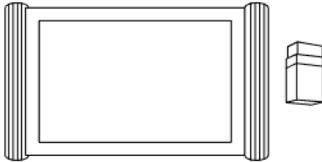
NG

Replace body control module.

4 On-vehicle Service

4.1 Tool

■ General Tool

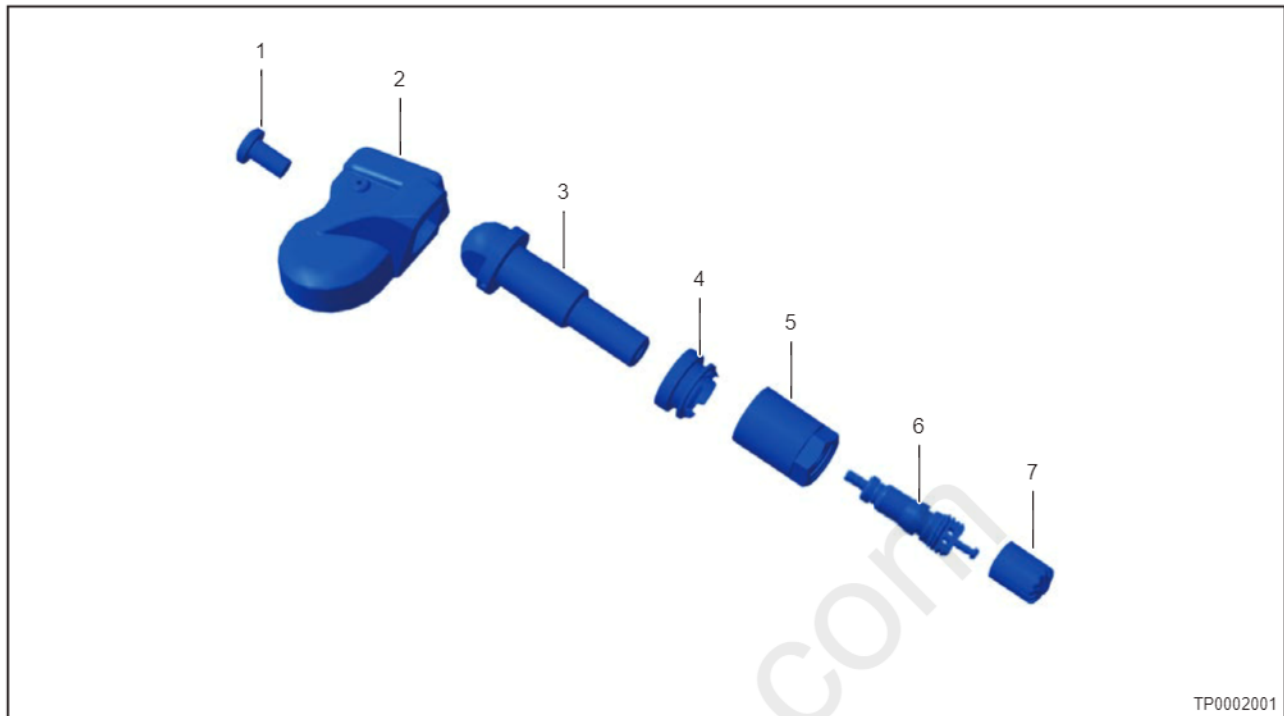
Tool Name	Tool Drawing
Digital Multimeter	 S00002
5 - 25 N·m Torque Wrench	 S00079
Diagnostic Tester	 S00001

■ Special Tool

Tool Name	Part No.	Tool Drawing
Low Frequency Trigger	/	 S00069

4.2 Replacement of Tire Pressure Sensor

■ Description



TP0002001

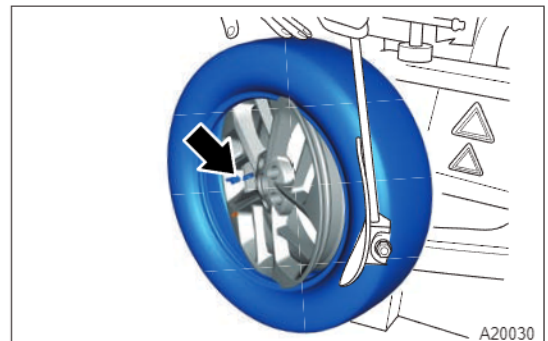
1	Screw	5	Valve Stem Cover
2	Sensor	6	Valve Core
3	Valve Stem	7	Valve Cap
4	Seal Washer and Seal Ring Assembly		

■ Removal

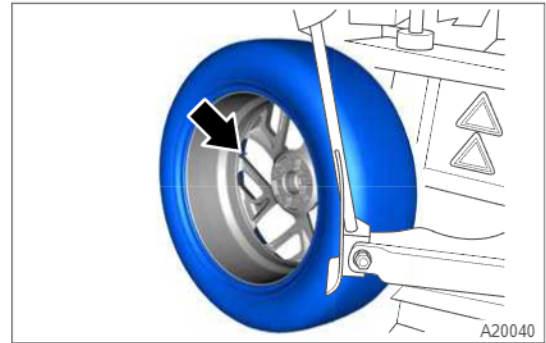
⚠ Caution

- 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.
- Valve cap must be on the valve, except inflation, deflation, air pressure inspection, etc.
- During removal, do not contact the tire pressure sensor 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 tire bead breaking, follow the operation specification, never damage the tire pressure sensor.
- Both crowbar and tire cannot contact with sensor!

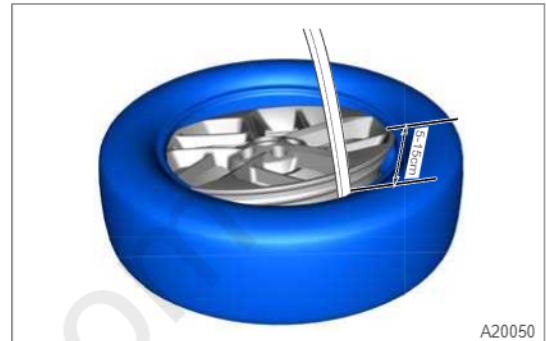
- (1) Remove wheel from vehicle and deflate tire completely.
- (2) Keep one side with tire pressure sensor 30 cm away from separation shovel, and put shovel block between rim and tire, then depress the pedal to separate rim and tire.



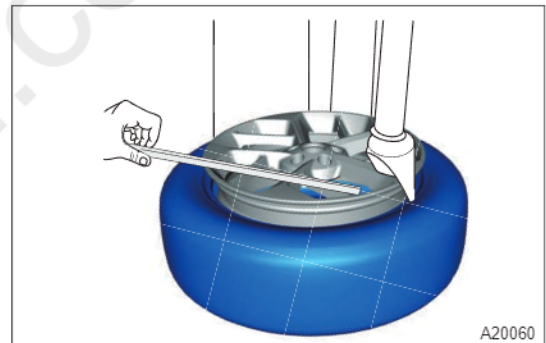
- (3) Turn over tire to keep one side with tire pressure sensor 30 cm away from separation shovel, and put shovel block between rim and tire, then depress the pedal to separate rim and tire.



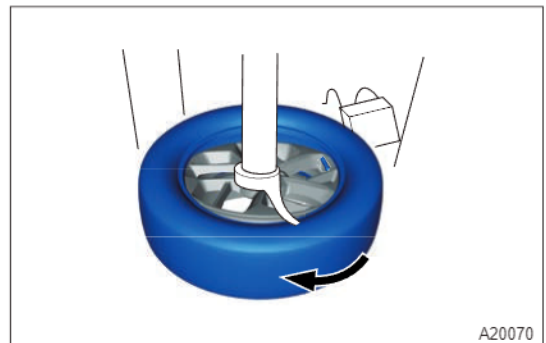
- (4) Lock tire on wheel, lower replacer head and keep it 5 - 15 cm away from sensor.



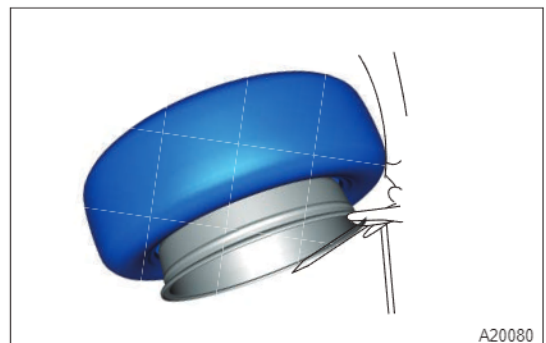
- (5) Use crowbar to pry out outside tire, and sleeve it to replacer head, then take away crowbar.



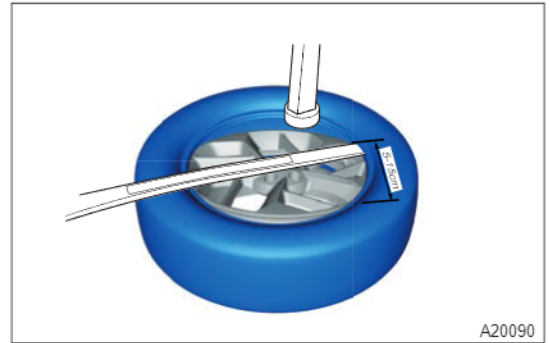
- (6) Rotate wheel, and the movable direction of wheel should be the direction that replacer head is gradually kept away from tire pressure sensor, then remove upper part of tire.



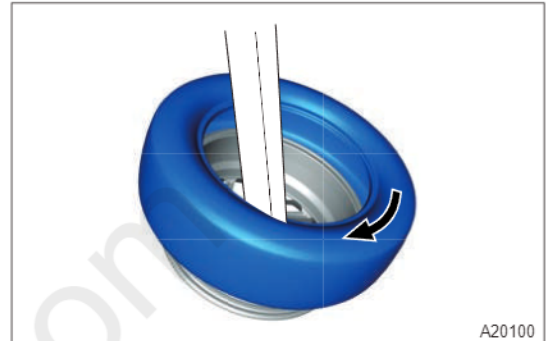
- (7) Lift tire and pry out lower part of tire using crowbar.



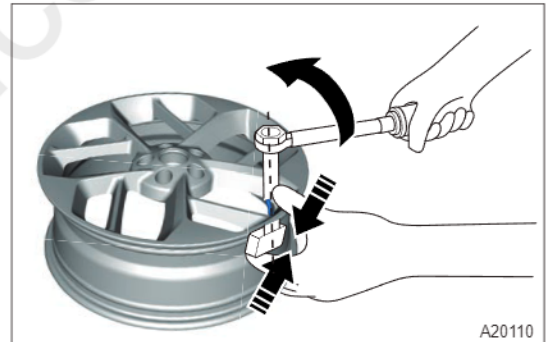
- (8) Lower replacer head and pry out lower side tire tread using crowbar, then sleeve it on replacer head and keep it 5 - 15 cm away from sensor.



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



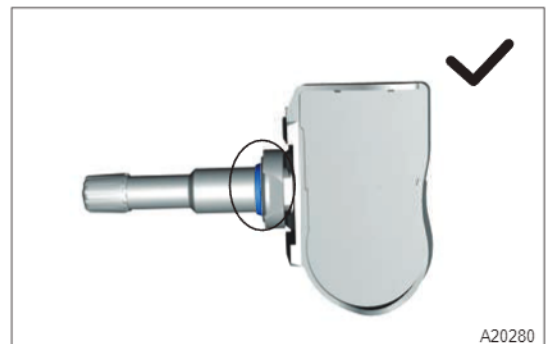
- (10) Using an appropriate tool, rotate nut counterclockwise until it separates from tire pressure sensor completely.



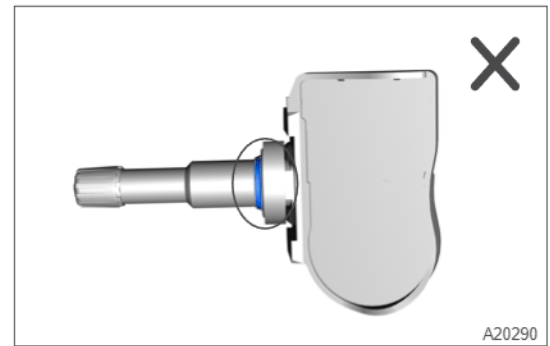
- (11) Remove tire pressure sensor from wheel hub.

■ Inspection

- (1) 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.
- (2) If seal washer cutout plane is parallel with polyester plane, it indicates that assembly is qualified.

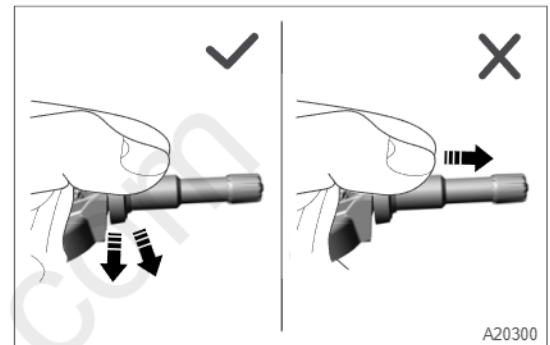


- (3) If seal washer cutout plane is not parallel with polyester plane and there is a large angle between two planes, it indicates that assembly is not qualified.

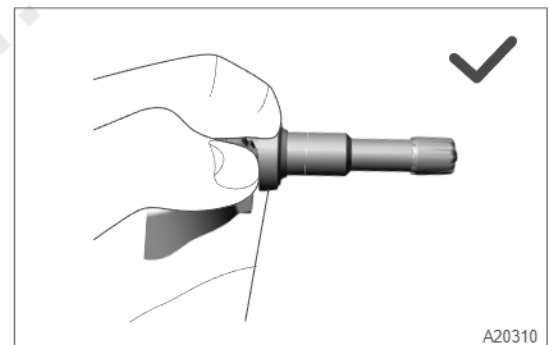


■ Adjustment

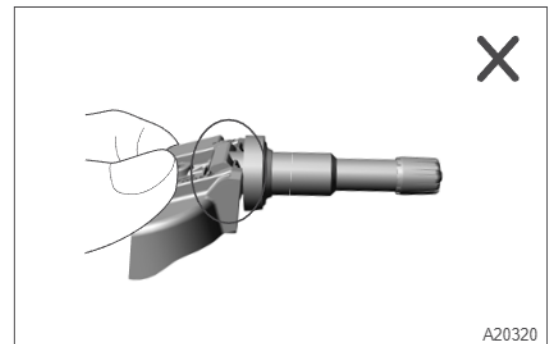
- (1) Press root of valve stem using middle part of your thumb with a downward force in groove direction, so that root of valve stem can be seated in the groove fully; then, keep middle part of thumb pressed against valve stem and tip part of thumb pressed against the seal washer with a vertical downward 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.



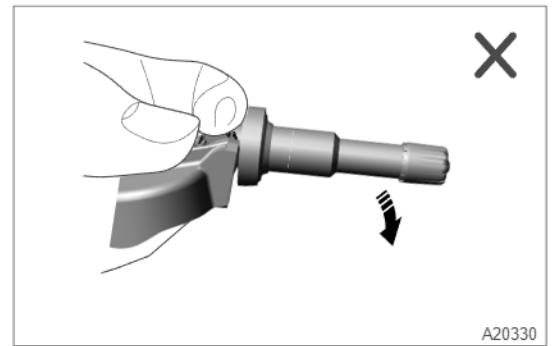
- (2) If root of valve stem enters groove completely and valve stem bends to limit, it indicates that assembly is qualified.



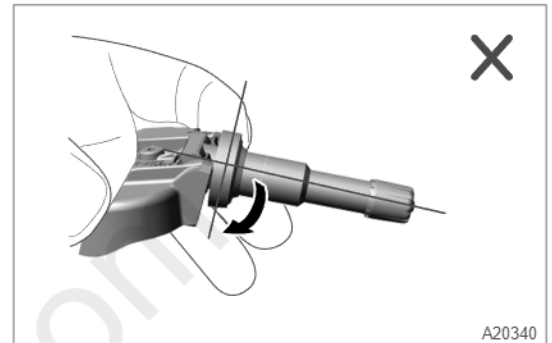
- (3) If root of valve stem dose not enter groove fully and valve stem dose not bend to limit, it indicates that assembly is not qualified.



- (4) If valve stem does not bend to limit, it indicates that assembly is not qualified.



- (5) 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.

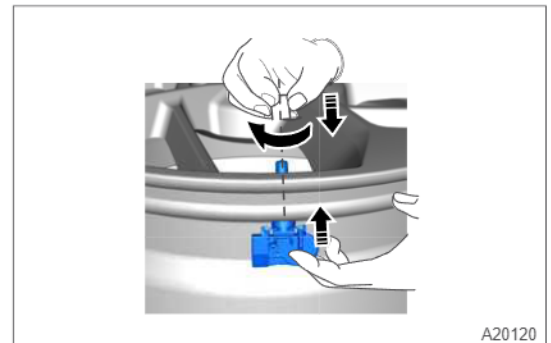


■ Installation

⚠ 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 installation, do not contact the tire pressure sensor with used tools, to avoid damage to the tire pressure sensor.
- Sensor air pressure inlet cannot be covered partially or completely by lubricant or other materials.
- Always use torque wrench when installing tire pressure sensor, common wrench cannot guarantee a torque of $8 \pm 1 \text{ N}\cdot\text{m}$. 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.
- Required tightening speed: $\leq 30 \text{ rpm}$; Assembly torque: $8 \pm 1 \text{ N}\cdot\text{m}$.

- (1) 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.



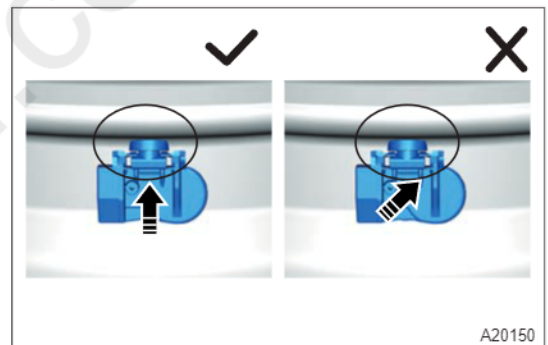
- (2) If valve stem is fully seated into the groove, sensor is fully fixed without any movement and sensor housing is pressed against rim firmly, it indicates that assembly is qualified.



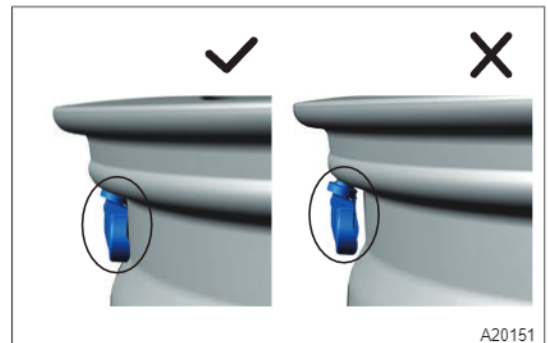
- (3) If the pretightened nut is not tightened into place with too much valve stem screw exposed and sensor is not fixed, it indicates that assembly is unqualified.



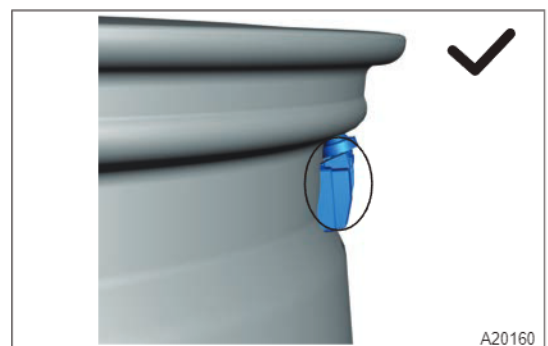
- (4) If the sensor valve stem slides out from metal groove after a horizontal inward component force is applied, it indicates that assembly is unqualified.



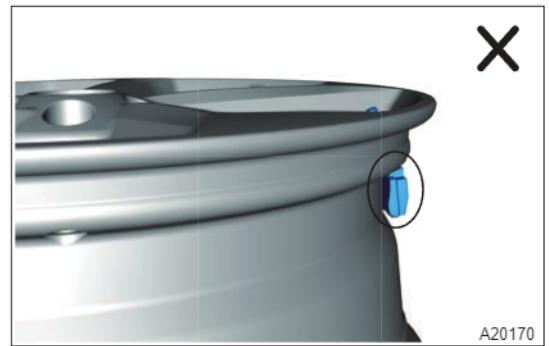
- (5) If right side of sensor is not pressed against the rim firmly, it indicates that assembly is unqualified.



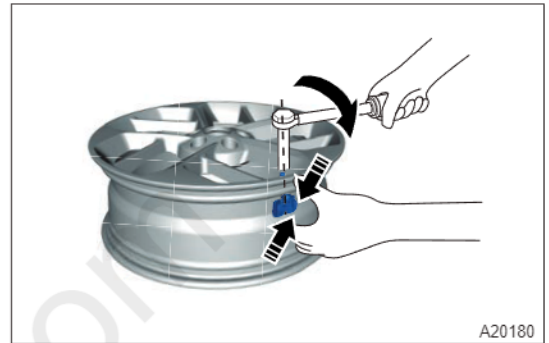
- (6) If left side of sensor is pressed against the rim firmly, it indicates that assembly is qualified.



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



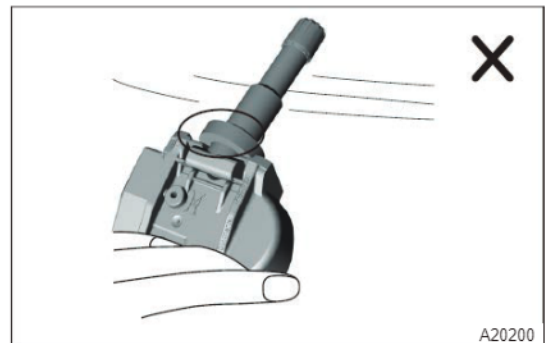
- (8) Hold bottom part of the sensor using four fingers of left hand with an upward force. Hold the rim edge with left thumb with a downward force. Press the tire pressure sensor against the rim firmly, and keep the sensor position fixed during tightening process. The axis of manual torque wrench sleeve should be overlapped 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.



- (9) 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.



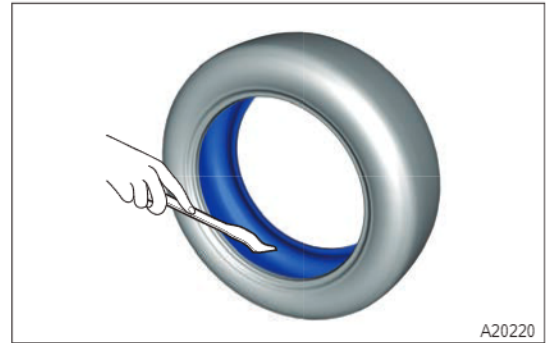
- (10) If valve stem slides out of metal groove, it indicates that assembly is unqualified.



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



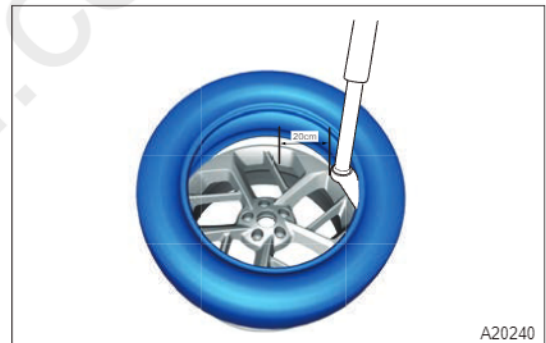
- (12) Installation is the same as common tire. Before loading tire, apply soapy water or glycerin to tire bead along inner circle.



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



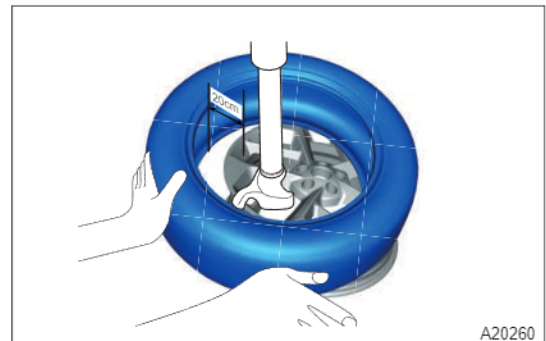
- (14) Install bottom tire to make sure the distance between intersection and valve stem is about 20 cm.



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



- (16) Put another side of tire in place, so that intersection between tire edge and hub is 20 cm away from valve stem.



(17) Rotate wheel to install another side of tire into hub.



⚠ Caution

- 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.