

TIRE PRESSURE MONITORING SYSTEM

GENERAL INFORMATION	55-3	C1403-55	55-23
Description	55-3	C1404-55	55-23
Operation	55-4	C1405-55	55-23
Specifications	55-4	C1406-55	55-23
Tools	55-5	C1403-96	55-25
		C1404-96	55-25
DIAGNOSIS & TESTING	55-6	C1405-96	55-25
Problem Symptoms Table	55-6	C1406-96	55-25
Diagnosis Tools	55-8	C1413-98	55-27
Diagnostic Help	55-8	C1414-98	55-27
Intermittent DTC Troubleshooting	55-8	C1415-98	55-27
Precautions for Maintaining Tire Pressure Monitoring System	55-9	C1416-98	55-27
Configuration & Learning for Tire Pressure Monitoring System	55-10	C1417-16	55-30
Ground Inspection	55-17	C1418-16	55-30
Diagnosis Procedure	55-17	C1419-16	55-30
Diagnostic Trouble Code (DTC)		C141A-16	55-30
Chart	55-18	C142A-49	55-32
C1403-29	55-20	ON-VEHICLE SERVICE	55-33
C1404-29	55-20	Tire Pressure Sensor	55-33
C1405-29	55-20	Removal	55-33
C1406-29	55-20	Installation	55-40

شرکت دیجیتال خودرو (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران

دیجیتال خودرو

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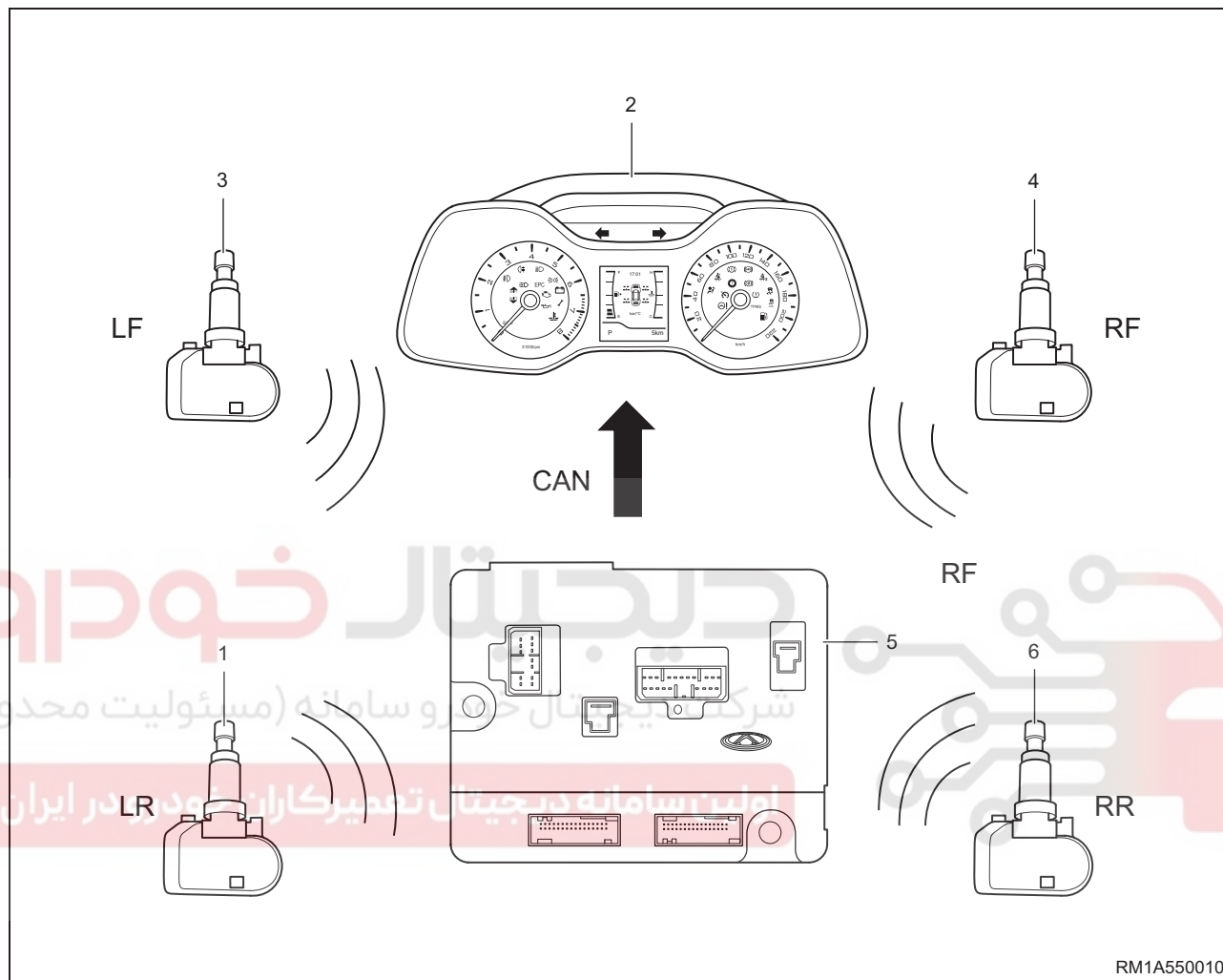


GENERAL INFORMATION

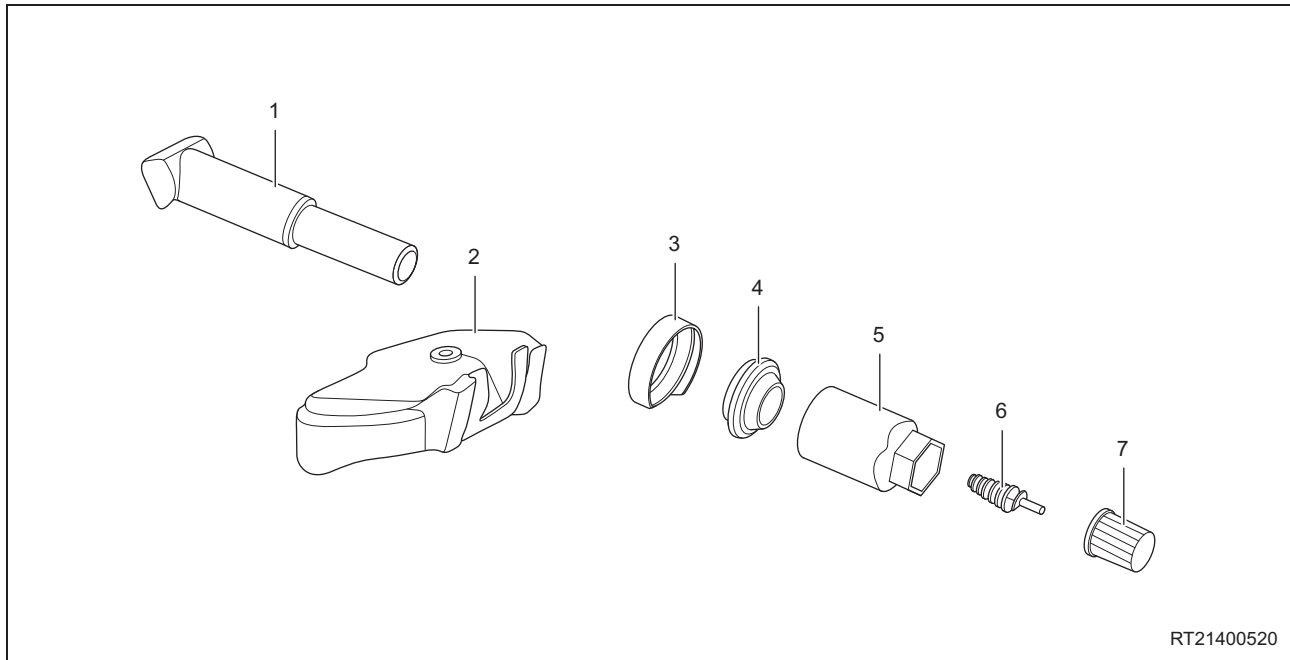
Description

Tire Pressure Monitoring System

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



1 - Valve Body	2 - Sensor Body
3 - sealing washer	4 - seal ring
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 on meter. When tire pressure is too low or temperature is too high, tire pressure monitoring system will warn.

Operation

Tire pressure sensor is the transmitting terminal of tire information, body controller is the receiving terminal of tire information and meter is the display terminal of tire information. Tire pressure sensor is core component 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 controller by radio-frequency signal. Frequency of wireless communication between tire pressure sensor and body controller is 433 MHz.

Body controller receives radio-frequency signal from tire pressure sensor and processes these data. Body controller processes data of tire pressure sensor, then sends them to meter via CAN bus. Tire pressure value displays 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

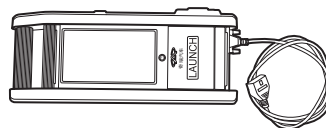
Torque Specifications

Description	Torque (N·m)
Body Controller Fixing Nut	5 ± 1

Tools

Special Tool

X-431 3G Diagnostic Tester

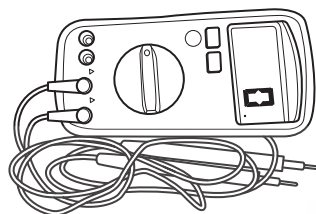


RCH0000001

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General Tool

Digital Multimeter



RCH0000002

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DIAGNOSIS & TESTING

Problem Symptoms Table

HINT:

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Use symptoms table below to help determine cause of problem.

Check each suspected area in sequence. Repair or adjust faulty components, or replace as necessary.

Meter self-check: For meter with tire pressure display function, from ACC/OFF to ON, meter drives LED (tire pressure indicator) to come on for 3 seconds. After self-check is finished, LED state is controlled by corresponding systems of vehicle. (If meter self-check indicator does not come on during self-check, check and repair the meter.)

Position Light, Low Beam Light, High Beam Light

Symptom	Suspected Area	Troubleshooting	See page
Low pressure warning (warning light remains on, malfunctioning wheel sign flashes)	Wheel pressure < 1.9 bar	Check and charge tire pressure	-
	Tire pressure sensor function is disabled	Replace, perform configuration and learning	55-10
	Body controller (BCM) is damaged	Replace body controller and perform sensor learning	55-10
	Tire pressure system set	Check and repair	-
	Tire temperature > 85°C	Cool down naturally	-
High temperature warning (warning light remains on, wheel sign flashes)	Tire pressure sensor function is disabled	Replace, perform configuration and learning	55-10
	Body controller (BCM) is damaged	Replace body controller and perform sensor learning	55-10
	Tire pressure system set	Check and repair	-
System malfunction warning (warning light remains on after flashing for 75 seconds, tire pressure value of corresponding wheel does not display and wheel sign will flash)	Tire pressure sensor function is disabled	Replace, perform configuration and learning	55-10
	Sensor configuration and learning are performed incorrectly when replacing new wheels (spare tire included)	Perform configuration and learning	55-10
	Electromagnetic interference/shield	Repair shielded objects outside of tire/strong electromagnetic radio interference	-
	Body controller (BCM) is damaged	Replace	55-10
	Tire pressure system set	Check and repair	-

55 - TIRE PRESSURE MONITORING SYSTEM

Symptom	Suspected Area	Troubleshooting	See page
All of tire pressure information cannot be displayed (all of tire pressure information for four wheels display as "--")	Display status cannot be reached	Vehicle speed > 25 Km/h for 30 seconds	55-9
	Replaced tire pressure sensor is not configured correctly, sensor is not learned	Perform configuration and learning	55-10
	Body controller (BCM)	Replace body controller and perform sensor learning	55-10
	Four sensors are not installed or all of them are damaged (very rare)	Reinstall or replace	55-10
Some tire pressure information cannot be displayed (some tire pressure information displays as "--")	Electromagnetic interference/shield	Repair shielded objects outside of tire, strong electromagnetic radio interference	-
	Sensor configuration and learning are performed incorrectly when replacing new wheels (spare tire included)	Reconfigure and learn	55-10
	Sensor function is disabled	Replace, perform configuration and learning	55-10
	Body controller (BCM)	Replace body controller and perform sensor learning	55-10
	Tire pressure system set	Check and repair	-

Diagnosis Tools

X-431 3G Diagnostic Tester

When connecting X-431 3G diagnostic tester:

- Connect X-431 3G 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 X-431 3G 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 the malfunction.
6. Visually check the related wire harness.
7. Check and clean all system grounds related to the latest DTC.
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 connectors are loose.
- Check if wire harnesses are worn, pierced, pinched or partially broken.
- Wiggle related wire harnesses and connectors and observe if signal in related circuit is interrupted.
- If possible, try to duplicate the conditions under which DTC was set.
- Look for data that has changed or DTC to reset during wiggle test.
- Look for broken, bent, protruded or corroded terminals.
- Check mounting areas of instrument cluster, wire harness or wire harness connector and so on for damage, foreign matter, etc. that will cause incorrect signals.
- Check and clean all wire harness connectors and ground parts related to DTC.
- Remove instrument cluster from malfunctioning vehicle, then install it to a new vehicle and perform a test. If this DTC cannot be cleared, instrument cluster is malfunctioning. If DTC can be cleared, reinstall instrument cluster to original vehicle.
- 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 malfunction.

Precautions for Maintaining Tire Pressure Monitoring System

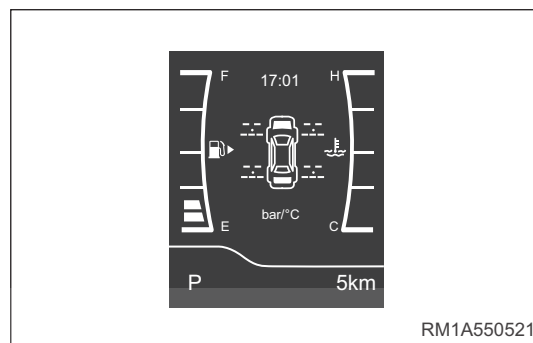
1. Effective conditions for tire pressure monitoring system

No.	Necessary Conditions
1	IGN-ON
2	Vehicle speed > 25 km/h, and continuous driving time is more than 45 seconds

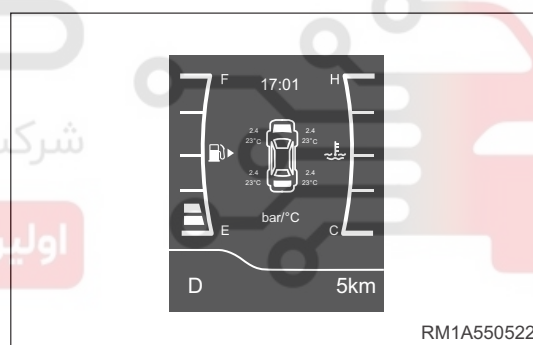
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Tire pressure monitoring system can be started normally only when key is in IGN-ON and vehicle driving speed is more than 25 km/h for more than 45 seconds. When key is not in IGN-ON, body controller cannot receive radio-frequency signal from tire pressure sensor; when vehicle speed cannot reach 25 km/h or driving time is short, tire pressure sensor cannot send radio-frequency signal.

- When vehicle is stationary and key is turned from IGN-OFF to IGN-ON, tire pressure and temperature information cannot be displayed on meter.



- When key is turned to IGN-ON, vehicle driving speed is more than 25 km/h and continuous driving time is more than 45 seconds, four wheel tire and temperature information will be displayed.



- If wheel pressure changes largely, tire pressure sensor will sent radio-frequency signal suddenly. If key is turned to IGN-ON, tire pressure monitoring system will process 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 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 damage to the tire, even blowouts, resulting in accidents.

3. For tire pressure sensor

When system is fault or disabled, check tire pressure sensor and judge if it is the tire pressure sensor in Project M1A of Chery Automobile Co., Ltd. If tire pressure sensor of other manufacturers (not Project M1A 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/bleeding 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. Never reuse disposed tire pressure sensor components, or it may cause leakage, resulting in accident. When inflating/bleeding or tire bead breaking, do not remove the sensor nuts. When tire

55 - TIRE PRESSURE MONITORING SYSTEM

pressure is more than external ambient pressure, if tire pressure sensor nuts are removed, there may be an accident.

- Tire pressure sensor must be assembled with a torque wrench, and tightening torque should be 8 ± 1 N.m. If torque is smaller, it will cause leakage, resulting in accident; if torque is larger, tire pressure sensor or its related components may be damaged, resulting in accident.

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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 warning will occur. If replacing with tire equipped with tire pressure sensor (Project M1A of Chery Automobile Co., Ltd.), but configuration and learning are not performed, system malfunction warning still will occur. Spare tire in Project M1A 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 assembly and removal of tire, refer to Assembly and Removal of tire pressure sensor section. Never allow tire bead breaker and tire tread to squeeze the sensor.

Configuration & Learning for Tire Pressure Monitoring System

CAUTION

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

1. Flowchart

HINT:

For configuration and learning of tire pressure monitoring system, refer to the configuration of tire pressure receiver and meter and the learning of tire pressure sensor.

1

Vehicle brought to workshop

NEXT

2

Check if meter can enter tire pressure information screen

NG

Reconfigure body controller and meter

OK

3

Perform tire pressure sensor learning

NEXT

4

Perform running test and vehicle speed is more than 25 km/h for 45 seconds

NEXT

5

Check if tire pressure information is displayed correctly

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NG

Reconfigure body controller and meter

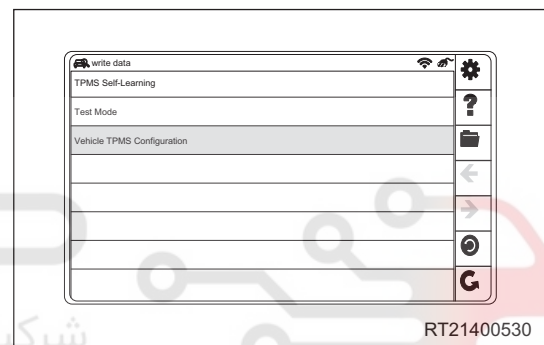
OK

6

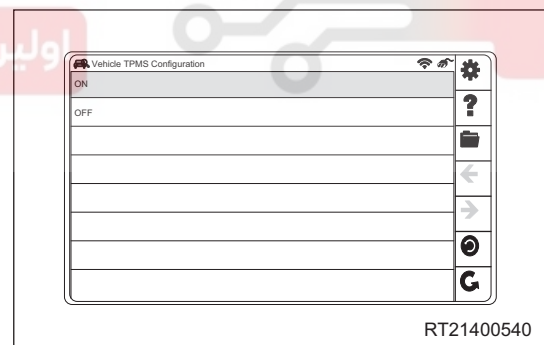
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2. Configuration of body controller and meter

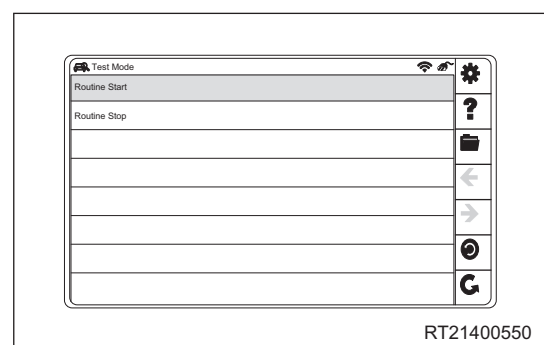
- a. Use diagnostic tester to enter write data menu, and click "Vehicle TPMS Configuration".



- b. If tire pressure display function of meter is turned off currently, click "Vehicle TPMS Configuration" to turn on the function.



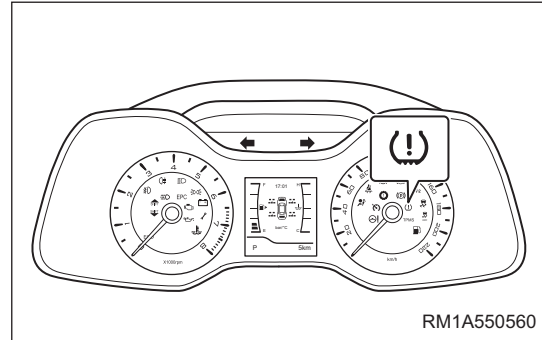
- c. Click Test Mode menu to detect if tire pressure display function of meter is turned on.



55 - TIRE PRESSURE MONITORING SYSTEM

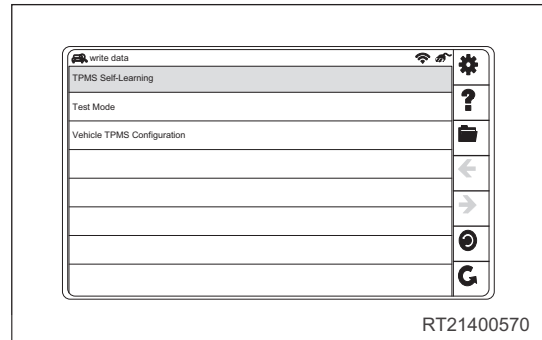
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- d. When clicking "Routine Start" on meter, tire pressure malfunction indicator flashes and "Routine Start Successfully By The Tester" is displayed on diagnostic tester, which indicates that tire pressure display function of meter has been turned on successfully. Click "Routine Stop" to exit current test mode and tire pressure malfunction indicator on meter goes off. "Routine Stopped" is displayed on diagnostic tester, then return to previous menu.

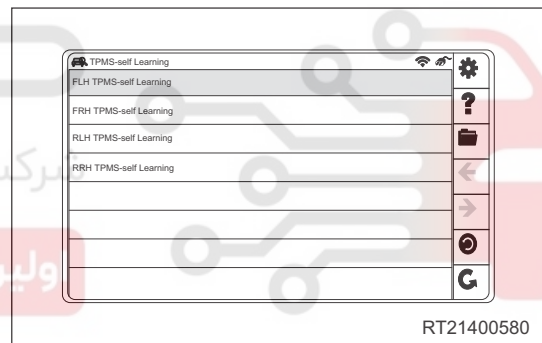


3. Tire pressure monitoring system enters sensor learning status by operating diagnostic tester

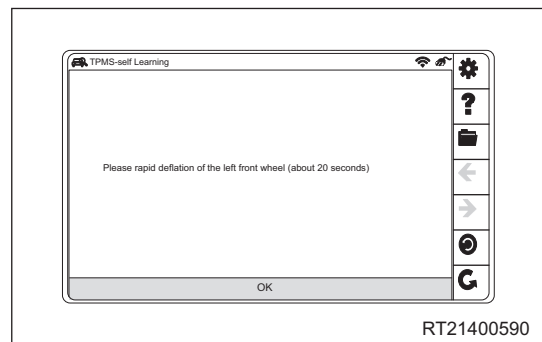
- a. Turn ignition switch to ON, select write data menu and click TPMS Self-Learning.



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



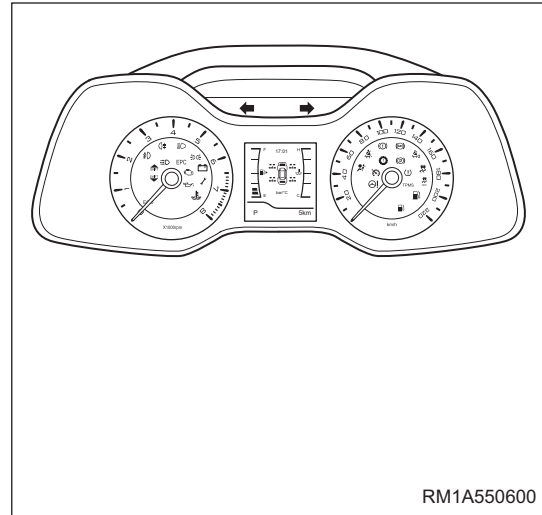
- c. During learning, hint will be displayed on diagnostic tester.



CAUTION

- There are two methods for tire pressure sensor learning. One is air bleeding, another is low-frequency trigger learning. If low-frequency trigger is used, air bleeding will not be performed.

- d. When clicking "OK" button on diagnostic tester, tire pressure 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.



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- e. 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 is finished" is displayed on diagnostic tester which indicates that front left tire pressure sensor learning has been finished.

4. Tire pressure sensor learning methods

a. 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 (inflate) for other tires at this time
3	Avoid error learning of tire	Keep away from vehicle with tire pressure sensor, avoiding error learning or interference.

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

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

- Keep vehicle speed more than 25 km/h for about 45 seconds;
- If tire pressure monitoring system can be operated normally, pressure information of four tires is displayed;
- If certain tire pressure information is still not displayed, tire configuration may error and needs to be relearned.

c. Tire pressure learning method for inflating/bleeding

- After entering learning status with ignition key in IGN-ON, bleed the wheel to be learned quickly (bleeding for about 20 seconds). At this time, check pressure value of learned tire through meter, and learning is successful. If multiple wheels should be learned, one minute interval is required among each wheel learning.

HINT:

Use following procedures to troubleshoot the instrument cluster system.

1	Start
---	-------

NEXT

55 - TIRE PRESSURE MONITORING SYSTEM

2

There is enough pressure in tire (full loaded with pressure recommended)

NEXT

55

3

Tire pressure monitoring system enters learning status by operating diagnostic tester

NEXT

4

Perform tire pressure bleeding (for about 20 seconds)

NEXT

5

Learned tire pressure value can be displayed on meter

NEXT

6

Learning is successful

NEXT

7

End

 CAUTION

- After learning is finished, use tire pressure gauge to inflate tire to standard pressure, then correct tire pressure monitoring system with vehicle speed more than 25 km/h for 45 seconds.

d. Tire pressure learning method for low-frequency trigger

After entering learning status with key in IGN-ON, tire pressure wireless signal will be generated from sensor directly using low-frequency trigger (inflating/bleeding for tire is not needed). After triggering is finished, pressure value of learned wheel will be displayed on meter, and learning is successful.

HINT:

Use following procedures to troubleshoot the instrument cluster system.

1

Start

NEXT

2

Key is in IGN-ON

NEXT

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

NEXT

55

4	Trigger tire pressure sensor to be learned using low-frequency trigger
---	--

NEXT

5	Sensor ID, temperature value and pressure value are displayed on low-frequency trigger
---	--

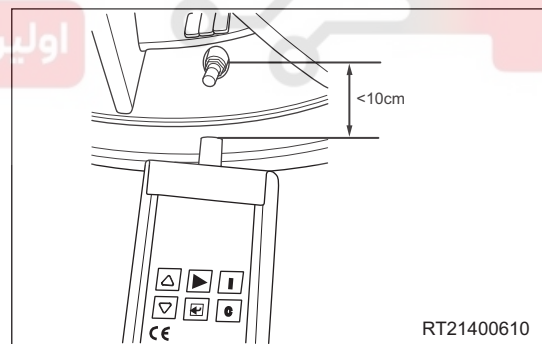
NEXT

6	Learning is successful
---	------------------------

NEXT

7	End
---	-----

- Distance between low-frequency trigger and tire pressure sensor is less than 10 cm, make antenna of low-frequency trigger close to tire around tire pressure sensor on wheel, then press trigger button on low-frequency trigger. After low-frequency trigger is triggered successfully, related information such as learned tire ID, pressure value and temperature value will be displayed.

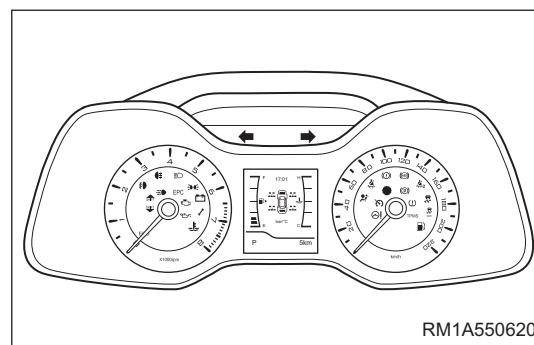


CAUTION

- After learning is finished, use tire pressure gauge to inflate tire to standard pressure, then correct tire pressure monitoring system with vehicle speed more than 25 km/h for 45 seconds.

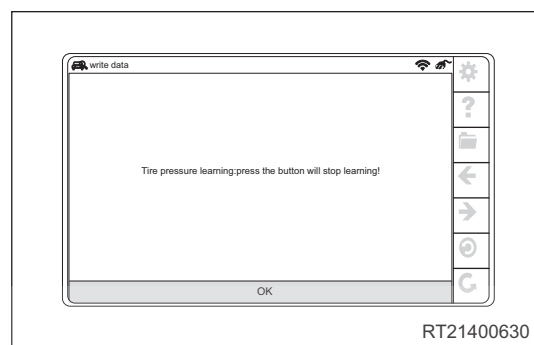
Meter display image with tire pressure sensor learning successfully

After inflating/bleeding learning or low-frequency trigger learning is successful, tire pressure value and temperature value will be displayed on meter.



If turn light stops flashing, front left wheel pressure value is 2.3bar and temperature value is 11°C, front left wheel learning is successful.

If tire pressure monitoring system is learning front left wheel, left and right turn lights will stop flashing after bleeding. At this time, one tire pressure sensor is learned successfully by tire pressure monitoring system, please click "OK" to finish front left wheel learning.

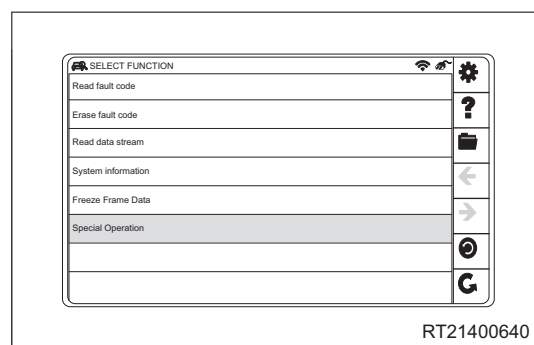


Learning methods for front right, rear right and rear left tire pressure sensors are the same as that for front left tire pressure sensor. If only one tire shall be replaced, other tires should not be replaced and positions should not be changed, only learn one tire separately.

5. Inspection of tire pressure monitoring system learning status

a. After reconfiguring tire pressure monitoring system, use reading function of datastream to perform inspection for each tire pressure sensor learning status in tire pressure monitoring system (take front left wheel as an example).

- Read following datastreams: front left sensor ID, front left sensor learning status.
- Front left wheel sensor ID can be read using diagnostic tester, if learning status is successful, it indicates that body controller 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.



b. Use diagnostic tester to read following datastreams with vehicle speed higher than 25 km for 45 seconds or more.

- Front left wheel sensor pressure: Bar
- Front left wheel sensor temperature: °C
- Temperature is not default and tire pressure is close to the value displayed on meter, it indicates that body controller can receive wireless signals from front left tire pressure sensor. Or it indicates that learning is not successful or tire pressure sensor is fault.

Ground Inspection

Groundings are very important to entire circuit system, which are normal or not can seriously affect the entire circuit system. Ground points are often exposed to moisture, dirt and other corrosive environments. Corrosion (rust) and oxidation may increase load resistance. This situation will seriously affect the normal operation of 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 contacting 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 all wire harnesses are clean, securely fastened with providing a good ground path.

Diagnosis Procedure

HINT:

Use following procedures to troubleshoot the instrument cluster system.

1	Vehicle brought to workshop
---	-----------------------------

NEXT

2	Check battery voltage
---	-----------------------

Standard voltage: 11 to 14 V

If voltage is below 11 V, recharge or replace the battery before proceeding to next step.

NEXT

3	Customer problem analysis
---	---------------------------

NEXT

4	Check for DTCs (current DTC and history DTC)
---	--

DTC
occurs

For current DTC, go to step 6

No
DTC

For history DTC, go to step 7

5	Problem repair (no DTC), then go to step 8
---	--

NEXT

6 Troubleshoot according to Diagnostic Trouble Code (DTC) chart, then go to step 8

NEXT

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7 Troubleshoot according to Problem Symptoms Table, then go to step 8

NEXT

8 Adjust, repair or replace

NEXT

9 Conduct test and confirm malfunction has been repaired

NEXT

10 End

Diagnostic Trouble Code (DTC) Chart

DTC Code	DTC Definition
C1400-16	Power Supply Circuit Voltage Below Threshold
C1400-17	Power Supply Circuit Voltage Above Threshold
C1403-29	Front Left Hand Sensor Signal Invalid
C1403-54	Front Left Hand Sensor Missing Calibration
C1403-55	Front Left Hand Sensor Not Configured
C1403-96	Front Left Hand Sensor Component Internal Failure
C1404-29	Front Right Hand Sensor Signal Invalid
C1404-54	Front Right Hand Sensor Missing Calibration
C1404-55	Front Right Hand Sensor Not Configured
C1404-96	Front Right Hand Sensor Component Internal Failure
C1405-29	Rear Left Hand Sensor Signal Invalid
C1405-54	Rear Left Hand Sensor Missing Calibration
C1405-55	Rear Left Hand Sensor Not Configured
C1405-96	Rear Left Hand Sensor Component Internal Failure
C1406-29	Rear Right Hand Sensor Signal Invalid
C1406-54	Rear Right Hand Sensor Missing Calibration

55 - TIRE PRESSURE MONITORING SYSTEM

DTC Code	DTC Definition
C1406-55	Rear Right Hand Sensor Not Configured
C1406-96	Rear Right Hand Sensor Component Internal Failure
C140B-00	Front Left Hand Tire Pressure, Component or System Over Pressure
C140C-00	Front Right Hand Tire Pressure, Component or System Over Pressure
C140D-00	Rear Left Hand Tire Pressure, Component or System Over Pressure
C140E-00	Rear Right Hand Tire Pressure, Component or System Over Pressure
C140F-00	Front Left Hand Tire Pressure, Component or System Low Pressure
C1410-00	Front Right Hand Tire Pressure, Component or System Low Pressure
C1411-00	Rear Left Hand Tire Pressure Component or System Low Pressure
C1412-00	Rear Right Hand Tire Pressure, Component or System Low Pressure
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
U0073-88	CAN Bus Off
C1402-44	TPMS EEPROM Access Fail Data Memory Failure

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

Self-diagnosis Detection Logic

DTC Code	DTC Definitions	DTC Detection Conditions	DTC Setting Conditions
C1403-29	Front Left Hand Sensor Signal Invalid	Vehicle speed > 25 km/h for 45 seconds	- No RF signals are sent from tire pressure sensor, or sent signal is too weak. - Reception of body controller is poor, and no RF signals are 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		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 V and 14 V before performing the following procedures.

- Turn ignition switch to LOCK.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- Turn ignition switch to ON.
- Using X-431 3G diagnostic tester, record and clear DTCs stored in instrument cluster control system.
- Turn ignition switch to LOCK and wait for a few seconds.
- Turn ignition switch to ON, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent (See page 55-8).

CAUTION

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Diagnosis Procedure**1 Check body controller power supply voltage**

- a. Using digital multimeter, measure voltage between body controller power supply terminal and ground.
b. Power supply voltage should be between 11 V and 14 V.

NG**Check and repair battery and power supply system****OK****2 Check body controller ground circuit**

- a. Check if body controller ground is loose or corroded.

NG**Tighten or replace body controller ground circuit****OK****3 Check configuration of tire pressure monitoring system**

- a. After configuration is finished, drive vehicle with speed higher than 25K/h for a period of time.

NG**Reconfigure tire pressure sensor of malfunctioning wheel****OK****4 Check body controller of malfunctioning wheel**

- a. After replacement, perform configuration and test.

NG**Replace body controller of malfunctioning wheel****OK****5 Check tire pressure sensor of malfunctioning wheel**

- a. After replacement, perform configuration.

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

OK

6 System detection is normal

55

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



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

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1403-55	Front Left Hand Sensor Not Configured	Vehicle speed > 25 km/h for 45 seconds	Configure BCM function and 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		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 V and 14 V before performing the following procedures.

- Turn ignition switch to LOCK.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- Turn ignition switch to ON.
- Using X-431 3G diagnostic tester, record and clear DTCs stored in instrument cluster control system.
- Turn ignition switch to LOCK and wait for a few seconds.
- Turn ignition switch to ON, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 55-8](#)).

CAUTION

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Diagnosis Procedure

1	Check body controller power supply voltage
---	--

- Using digital multimeter, measure voltage between body controller power supply terminal and ground.
- Power supply voltage should be between 11 V and 14 V.

55 - TIRE PRESSURE MONITORING SYSTEM

NG

Check and repair battery and power supply system

OK

55

2

Check body controller ground circuit

a. Check if body controller ground is loose or corroded.

NG

Tighten or replace body controller ground circuit

OK

3

Check configuration of tire pressure monitoring system

a. After configuration is finished, drive vehicle with speed higher than 25K/h for a period of time.

NG

Reconfigure tire pressure sensor of malfunctioning wheel

OK

4

Check body controller of malfunctioning wheel

a. After replacement, perform configuration and test.

NG

Replace body controller of malfunctioning wheel

OK

5

Check tire pressure sensor of malfunctioning wheel

a. After replacement, perform configuration.

NG

Replace tire pressure sensor of malfunctioning wheel

OK

6

System detection is normal

DTC	C1403-96	Front Left Hand Sensor Component Internal Failure
DTC	C1404-96	Front Right Hand Sensor Component Internal Failure
DTC	C1405-96	Rear Left Hand Sensor Component Internal Failure
DTC	C1406-96	Rear Right Hand Sensor Component Internal Failure

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1403-96	Front Left Hand Sensor Component Internal Failure	Vehicle speed > 25 km/h for 45 seconds	Sensor is abnormal, RF data indicates that sensor is malfunctioning.
C1404-96	Front Right Hand Sensor Component Internal Failure		
C1405-96	Rear Left Hand Sensor Component Internal Failure		
C1406-96	Rear Right Hand Sensor Component Internal Failure		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 V and 14 V before performing the following procedures.

- Turn ignition switch to LOCK.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- Turn ignition switch to ON.
- Using X-431 3G diagnostic tester, record and clear DTCs stored in instrument cluster control system.
- Turn ignition switch to LOCK and wait for a few seconds.
- Turn ignition switch to ON, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 55-8](#)).

CAUTION

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

Diagnosis Procedure

1	Check body controller power supply voltage
---	--

- Using digital multimeter, measure voltage between body controller power supply terminal and ground.

55 - TIRE PRESSURE MONITORING SYSTEM

b. Power supply voltage should be between 11 V and 14 V.

NG

Check and repair battery and power supply system

OK

55

2

Check body controller ground circuit

a. Check if body controller ground is loose or corroded.

NG

Tighten or replace body controller ground circuit

OK

3

Check configuration of tire pressure monitoring system

a. After configuration is finished, drive vehicle with speed higher than 25K/h for a period of time.

NG

Reconfigure tire pressure sensor of malfunctioning wheel

OK

4

Check body controller of malfunctioning wheel

a. After replacement, perform configuration and test.

NG

Replace body controller of malfunctioning wheel

OK

5

Check tire pressure sensor of malfunctioning wheel

a. After replacement, perform configuration.

NG

Replace tire pressure sensor of malfunctioning wheel

OK

6

System detection is normal

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

Self-diagnosis Detection Logic

DTC	DTC Definition	DTC Detection Condition	Possible Cause
C1403-96	Front Left Hand Tire Temperature, Component or System Over Temperature	Vehicle speed > 25 km/h for 45 seconds	Sensor is abnormal, RF data indicates that sensor is malfunctioning.
C1404-96	Front Right Hand Tire Temperature, Component or System Over Temperature		
C1405-96	Rear Left Hand Tire Temperature, Component or System Over Temperature		
C1406-96	Rear Right Hand Tire Temperature, Component or System Over Temperature		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 V and 14 V before performing the following procedures.

- Turn ignition switch to LOCK.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- Turn ignition switch to ON.
- Using X-431 3G diagnostic tester, record and clear DTCs stored in instrument cluster control system.
- Turn ignition switch to LOCK and wait for a few seconds.
- Turn ignition switch to ON, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 55-8](#)).

55 - TIRE PRESSURE MONITORING SYSTEM

 CAUTION

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

55

Diagnosis Procedure

1 Check body controller power supply voltage

- Using digital multimeter, measure voltage between body controller power supply terminal and ground.
- Power supply voltage should be between 11 V and 14 V.

NG

Check and repair battery and power supply system

OK

2 Check body controller ground circuit

- Check if body controller ground is loose or corroded.

NG

Tighten or replace body controller ground circuit

OK

3 Check tire temperature

- When temperature of one or more tires is higher than 85°C, system will send a high temperature warning while driving speed is higher than 25 km/h and driving for a period of time.
- When high temperature warning occurs, stop vehicle and cool down the tire naturally, or it may cause accidents.
- When tire temperature is too high, do not cool it down with cold water, which will cause tire damage, resulting in accidents.
- When driving speed is higher than 25 km/h for a period of time and tire temperature is lower than 80°C, high temperature warning will release automatically.

NG

Cool down naturally

OK

4 Check body controller of malfunctioning wheel

- After replacement, perform configuration and test.

NG

Replace body controller of malfunctioning wheel

OK

5	Check tire pressure sensor of malfunctioning wheel
---	--

a. After replacement, perform configuration.

NG

Replace tire pressure sensor of malfunctioning wheel
--

OK

6	System detection is normal
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55

دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



DTC	C1417-16	Front Left Hand Sensor Voltage, Component or System Low Voltage
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DTC	C1418-16	Front Right Hand Sensor Voltage, Component or System Low Voltage
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DTC	C1419-16	Rear Left Hand Sensor Voltage, Component or System Low Voltage
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DTC	C141A-16	Rear Right Hand Sensor Voltage, Component or System Low Voltage
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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 > 25 km/h for 45 seconds	Battery is discharged.
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		

DTC Confirmation Procedure

Confirm that battery voltage is between 11 V and 14 V before performing the following procedures.

- Turn ignition switch to LOCK.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- Turn ignition switch to ON.
- Using X-431 3G diagnostic tester, record and clear DTCs stored in instrument cluster control system.
- Turn ignition switch to LOCK and wait for a few seconds.
- Turn ignition switch to ON, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 55-8](#)).

CAUTION

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

55

Diagnosis Procedure**1 Check body controller power supply voltage**

- Using digital multimeter, measure voltage between body controller power supply terminal and ground.
- Power supply voltage should be between 11 V and 14 V.

NG

Check and repair battery and power supply system

OK

2 Check body controller ground circuit

- Check if body controller ground is loose or corroded.

NG

Tighten or replace body controller ground circuit

OK

3 Check if tire pressure information is displayed

- If tire pressure information of malfunctioning wheel is still not displayed, replace tire pressure sensor.

NG

Replace tire pressure sensor

OK

4 Check body controller of malfunctioning wheel

- After replacement, perform configuration and test.

NG

Replace body controller of malfunctioning wheel

OK

5 System detection is finished

DTC	C142A-49	Receiver Internal Electronic Failure
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Self-diagnosis Detection Logic

55

DTC	DTC Definition	DTC Detection Condition	Possible Cause
U142A-49	Receiver Internal Electronic Failure	System malfunction warning occurs, four wheel sensor signals are not received	There is internal circuit fault in receiver, no sensor signals are received.

DTC Confirmation Procedure

Confirm that battery voltage is between 11 V and 14 V before performing the following procedures.

- Turn ignition switch to LOCK.
- Connect X-431 3G diagnostic tester (the latest software) to Data Link Connector (DLC), and make it communicate with vehicle electronic module through data network.
- Turn ignition switch to ON.
- Using X-431 3G diagnostic tester, record and clear DTCs stored in instrument cluster control system.
- Turn ignition switch to LOCK and wait for a few seconds.
- Turn ignition switch to ON, and then select Read Code.
- If DTC is detected, malfunction indicated by DTC is current. Go to diagnosis procedure - Step 1.
- If DTC is not detected, malfunction indicated by DTC is intermittent ([See page 55-8](#)).

CAUTION

- When performing circuit diagnosis and test, always refer to the circuit diagram for specific circuit and component information.

ON-VEHICLE SERVICE

Tire Pressure Sensor

Removal

55

CAUTION

- Avoid dropping the sensor; if tire pressure sensor is dropped from the place with 1 m in height, it is interpreted as fault in tire pressure sensor.
- Tire pressure sensor must be installed on clean and dry hub.
- Valve cap must be installed on valve, except for inflation, bleeding and pressure inspection, etc.
- During installation and removal, used tools cannot touch 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.

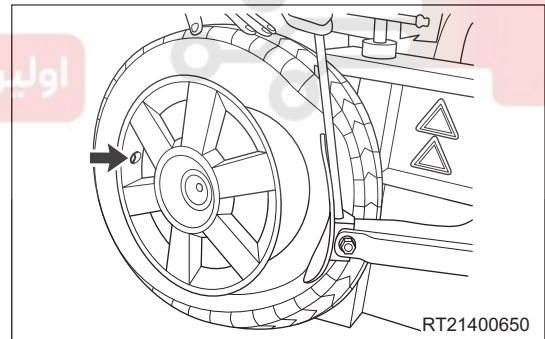
Remove the tire.

1. Remove tire and bleed air in tire completely.

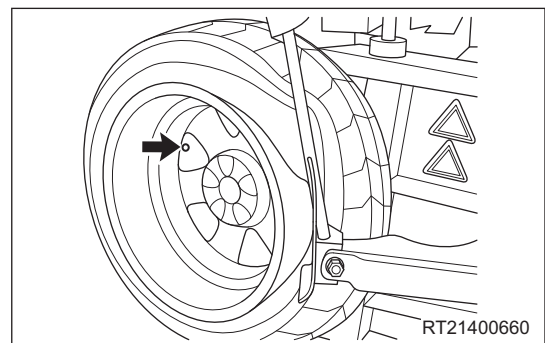
CAUTION

- During tire bead breaking, follow the operation specification, never damage the tire pressure sensor.

2. Keep one side with tire pressure sensor away from separation shovel (arrow) for about 30 cm, and put shovel block between rim and tire, then depress the pedal to separate the rim and tire.



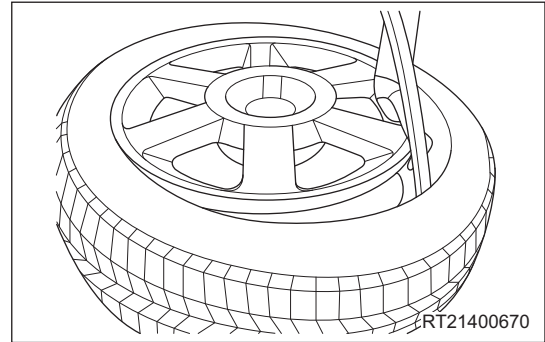
3. Turn over tire to keep one side with tire pressure sensor away from separation shovel (arrow) for about 30 cm, and put shovel block between rim and tire, then depress the pedal to separate the rim and tire.



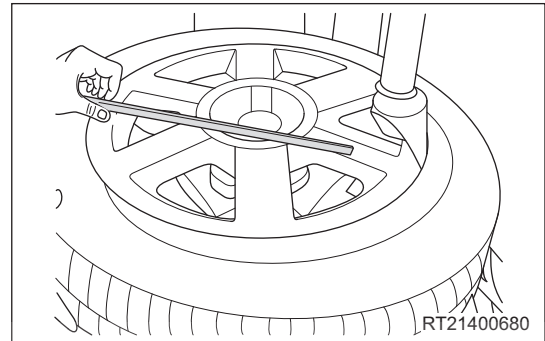
55 - TIRE PRESSURE MONITORING SYSTEM

55

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



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

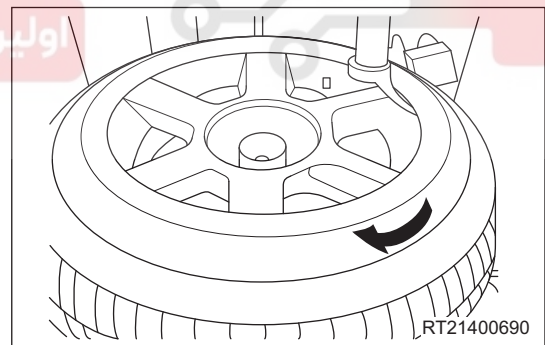


 CAUTION

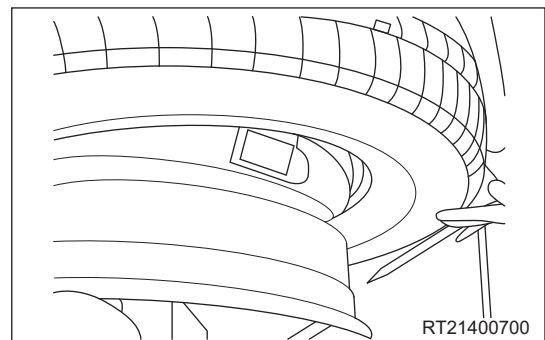
- Both crowbar and tire cannot touch with sensor.

6. Remove the tire.

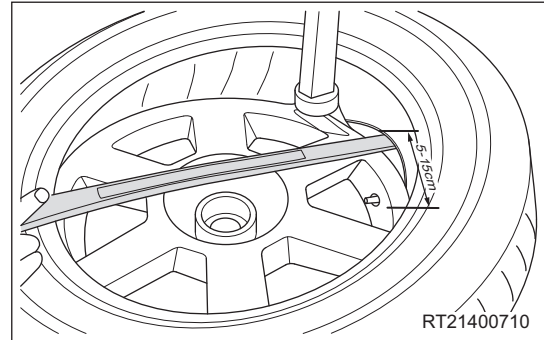
- a. Rotate wheel, and the movable direction of wheel should be the direction that replacer head is gradually kept away from tire pressure sensor (rotation arrow), then remove tire from upper part.



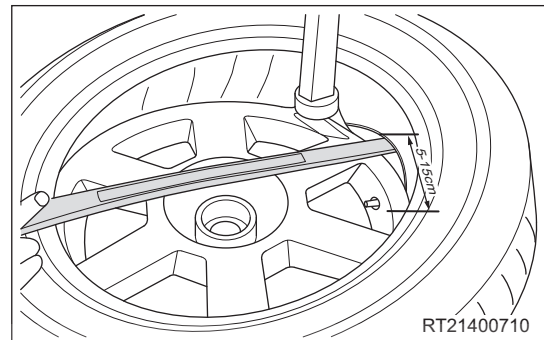
- b. Lift tire and pry out tire from lower part using crowbar.



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



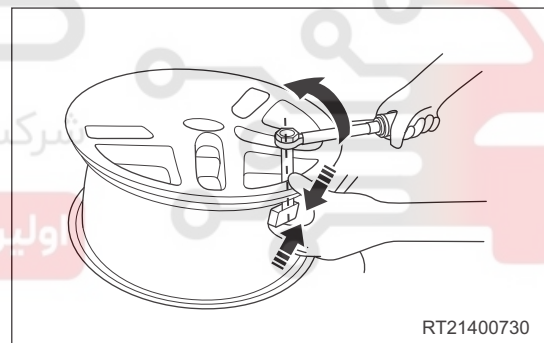
- d. Rotate wheel, and the movable direction of wheel should be the direction that replacer head is gradually kept away from tire pressure sensor (rotation arrow), then pry out tire completely.



55

Remove the tire pressure sensor.

1. Using a proper tool, turn nut counterclockwise until it separates from tire pressure sensor completely.



2. Remove tire pressure sensor from wheel hub.

Install the tire pressure sensor

CAUTION

- Tire pressure sensor must be assembled with a torque wrench, and normal wrench cannot confirm the torque of 8 ± 1 N.m. If torque is smaller, it will cause leakage, resulting in accident; if torque is larger, tire pressure sensor or its related components may be damaged, resulting in accident.

Tire Pressure Sensor Tightening Speed and Assembling Torque List

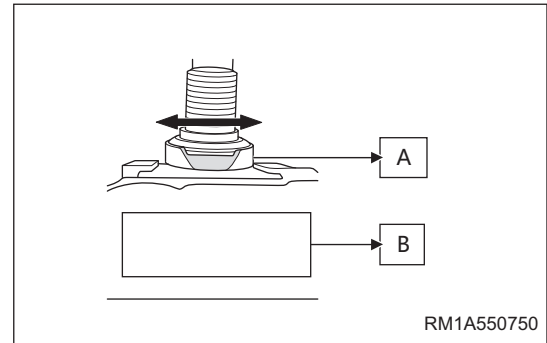
Tightening Speed	≤ 30 rpm
Assembling Torque	8 ± 1 N.m

55 - TIRE PRESSURE MONITORING SYSTEM

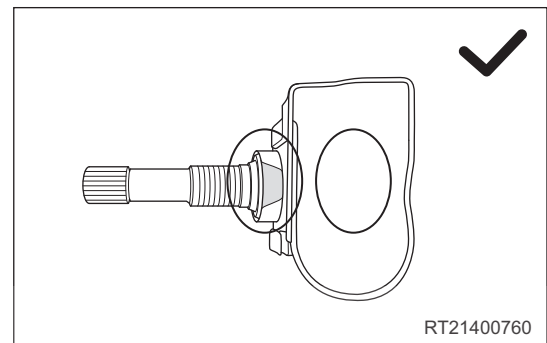
55

1. Adjust plane direction of seal washer cutout.

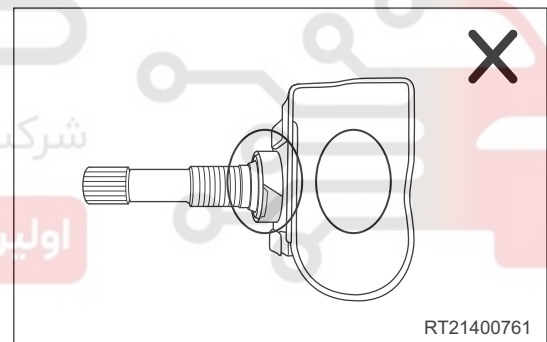
- a. When removing sensor body, first check if seal washer cutout plane "A" is parallel with polyester plane "B". If they are not parallel and there is an angle between two planes, turn seal washer to make seal washer cutout plane parallel with polyester plane.



- b. If seal washer cutout plane is parallel with polyester plane, it indicates that assembly is qualified.

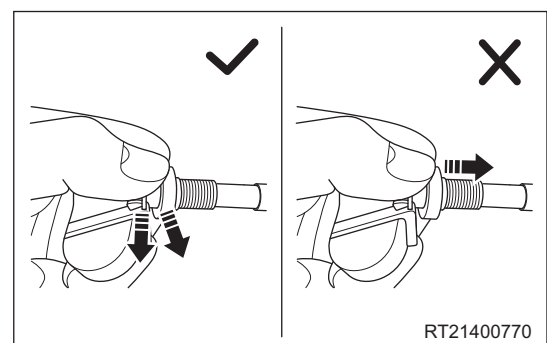


- c. If seal washer cutout plane is not parallel with polyester plane and there is a large angle between two planes, it indicates that assembly is not qualified.

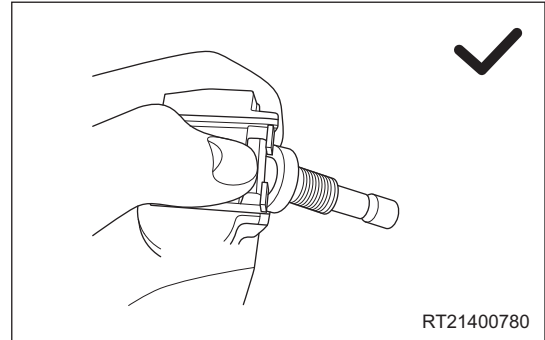


2. Adjust the valve lever position.

- a. Press root of valve lever using middle of thumb with action force downward along groove direction, so that root of valve lever enters groove completely; then, keep pressing valve lever using middle of thumb and press seal washer using tip of thumb with action force vertically downward along seal washer, so that valve lever bends with maximum angle, never apply horizontal action force along seal washer.

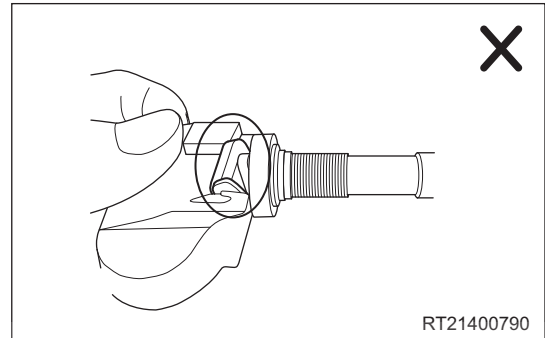


- b. If root of valve lever enters groove completely and valve lever bends with maximum angle, it indicates that assembly is qualified.

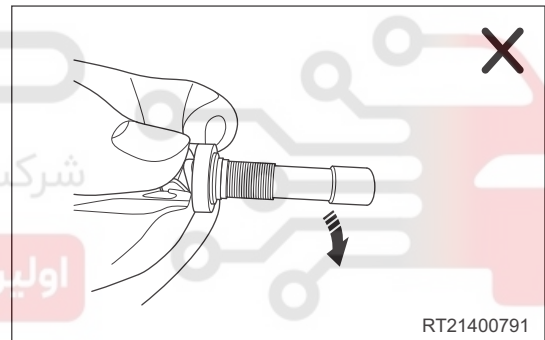


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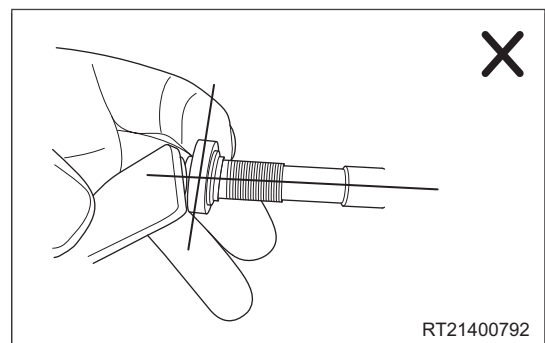
- c. If root of valve lever does not enter groove completely and valve lever does not bend with maximum angle, it indicates that assembly is not qualified.



- d. If valve lever does not bend with maximum angle, it indicates that assembly is not qualified.



- e. If seal washer plane is not perpendicular to valve lever after action force is applied along horizontal direction of seal washer, it indicates that assembly is not qualified.

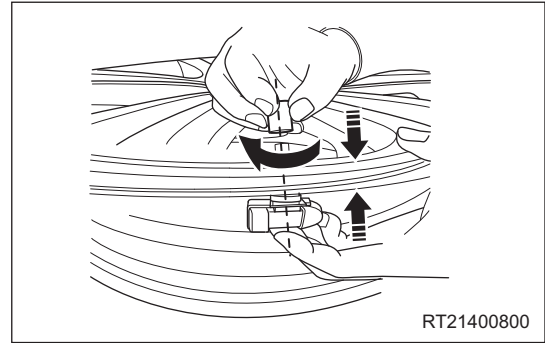


55 - TIRE PRESSURE MONITORING SYSTEM

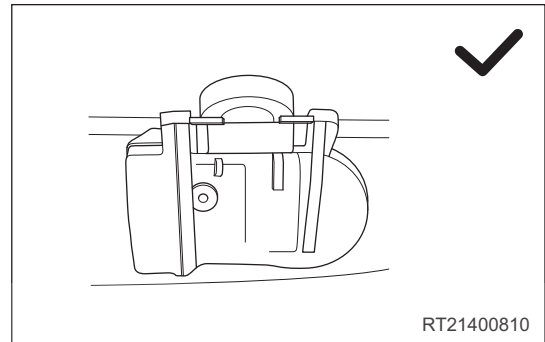
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3. Insert valve lever of tire pressure sensor into hub and pretightened nut.

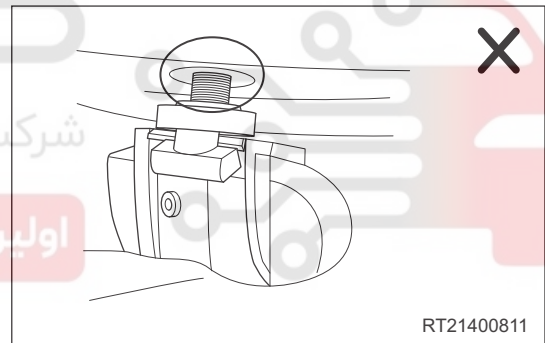
- a. Support tire pressure sensor using four fingers of left hand vertically upward, and do not apply horizontal inward force; hold outer edge of rim using thumb of left hand with force downward, so that both sides of sensor housing attaches with rim firmly. Pass valve lever through rim along center shaft of valve nozzle hole, with insert direction from internal part of tire assembly to external part of tire assembly. Tighten nut clockwise with right hand until tire pressure sensor is secured firmly.



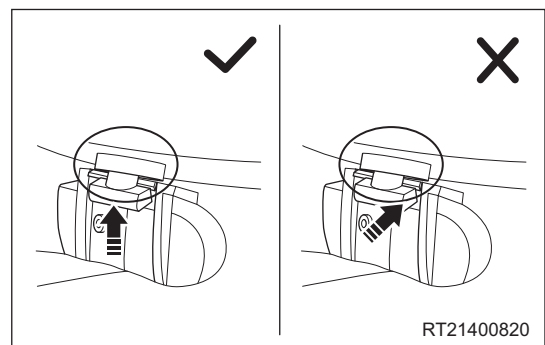
- b. If valve lever enters groove completely, sensor is secured completely and firmly and sensor housing attaches with rim firmly, it indicates that assembly is qualified.



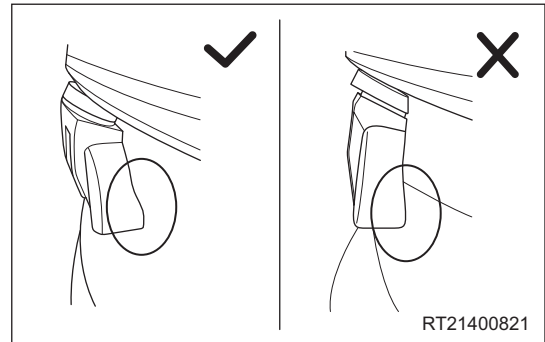
- c. If pretightened nut is not tightened in place, many threads exposed from valve lever can be seen and sensor is not secured, it indicates that assembly is not qualified.



- d. If horizontal inward force is applied and valve lever of sensor slides out of groove, it indicates that assembly is not qualified.

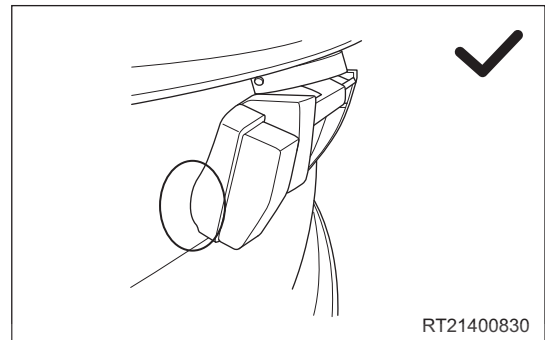


- e. If right side of sensor does not attach with rim firmly, it indicates that assembly is not qualified.

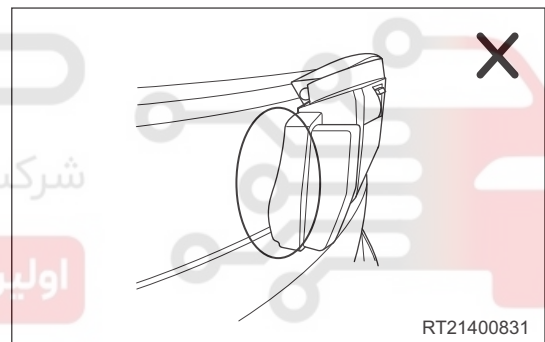


55

- f. If left side of sensor attaches with rim firmly, it indicates that assembly is qualified.

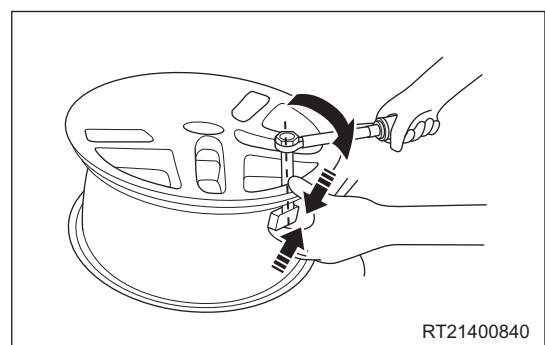


- g. If left side of sensor does not attach with rim firmly, it indicates that assembly is not qualified.



4. Tighten the nut firmly.

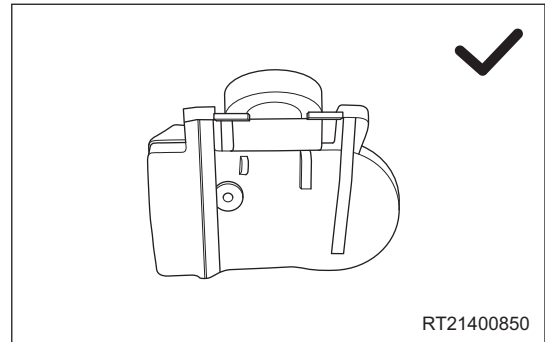
- a. Support bottom of sensor using four fingers of left hand with action force upward. Hold rim edge using thumb of left hand with action force downward. Apply force to make tire pressure sensor attach with rim firmly, and sensor cannot move during tightening. Axis of manual torque wrench socket overlaps with axis of valve lever without an angle. Tighten nut clockwise, and the tightening is finished when torque reaches 8 ± 1 N·m. Nut cannot be tightened again after tightening is finished.



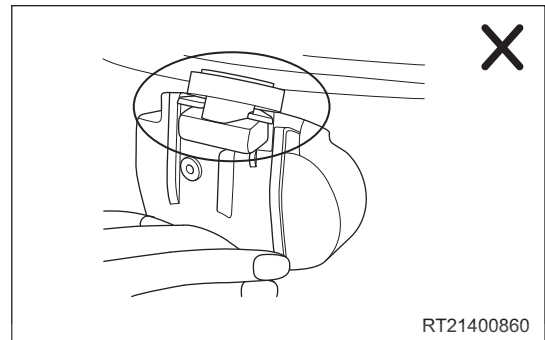
55 - TIRE PRESSURE MONITORING SYSTEM

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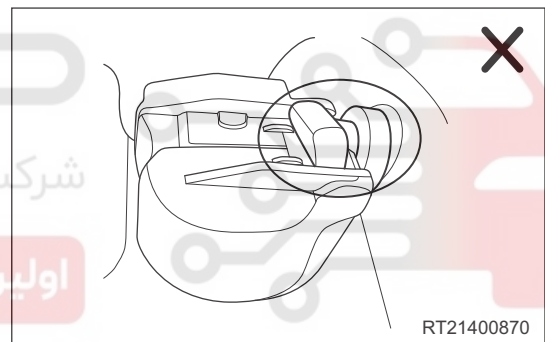
- b. If valve lever enters groove completely, sensor is secured completely and firmly and both sides of sensor housing attach with rim firmly, it indicates that assembly is qualified.



- c. If valve lever slides out of groove, it indicates that assembly is not qualified.



- d. If seal washer and seal ring are deformed and damaged due to excessive torque, it indicates that assembly is not qualified.



Installation

Install the tire.

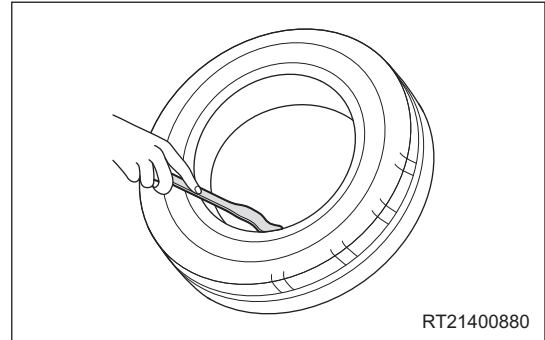
CAUTION

- Follow the operation specification, never damage the tire pressure sensor.
- Both crowbar and tire cannot touch with sensor.
- Confirm that distance between intersection and valve lever is proper.

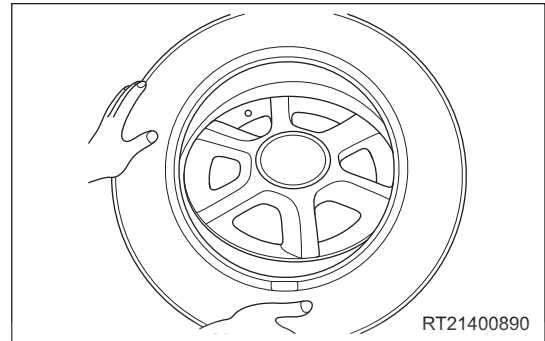
55 - TIRE PRESSURE MONITORING SYSTEM

55

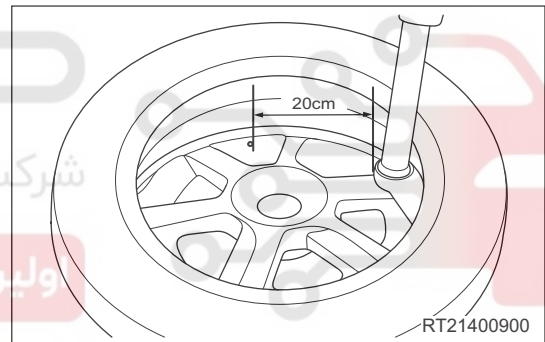
1. Installation is the same as common tire. Before loading tire, apply soapy water or glycerin to tire bead along inner circle.



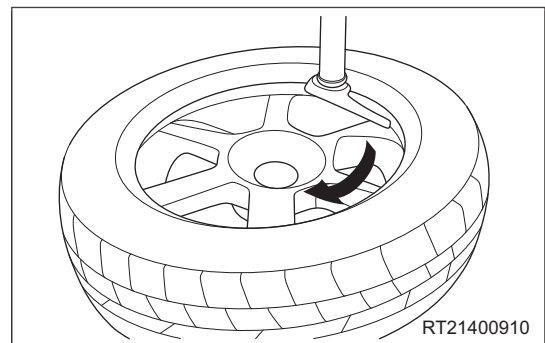
2. Put tire on hub and keep intersection between hub and tire edge away from valve lever for 15 - 20 cm.



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



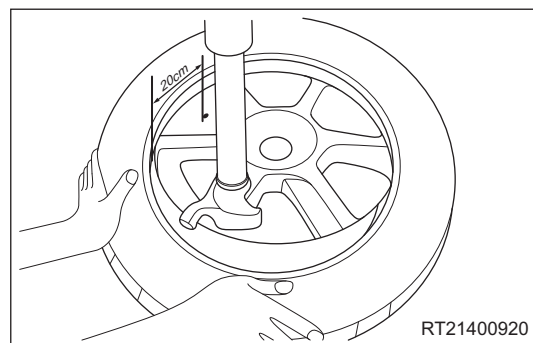
4. Rotate wheel to install one side of tire into hub. Rotation direction of wheel (rotation arrow) should be the direction that makes replacer head get farther and farther away from sensor.



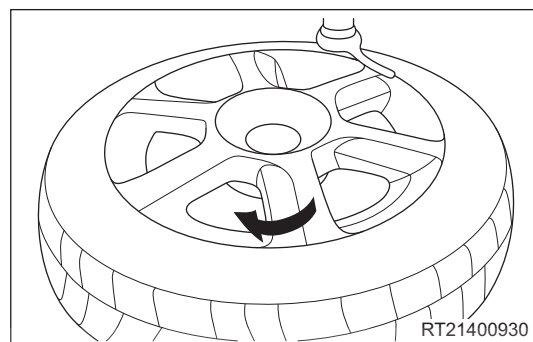
55 - TIRE PRESSURE MONITORING SYSTEM

55

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



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



دیجیتال خودرو

شرکت دیجیتال خودرو سامانه (مسئولیت محدود)

اولین سامانه دیجیتال تعمیرکاران خودرو در ایران



A

Abbreviation Table, Introduction	02-28
Adjustment Item, Maintenance	05-7
Air Conditioning	30-1
Air Conditioning, Preparation	03-33
Air Conditioning, Service Specifications	04-39
Audio/Visual System	40-1
Audio/Visual System, Preparation	03-43
Audio/Visual System, Service Specifications	04-49
Axle	22-1
Axle, Preparation	03-25
Axle, Service Specifications	04-28

B

Body Dimensions	52-1
Brake	26-1
Brake Control System	25-1
Brake Control System, Preparation	03-28
Brake Control System, Service Specifications	04-33
Brake, Preparation	03-29
Brake, Service Specifications	04-34

C

CAN Communication	53-1
CAN Communication, Preparation	03-53
Circuit Diagnosis Information, Introduction	02-15
Circuit Information, Introduction	02-22
Clutch	19-1
Clutch, Preparation	03-23
Clutch, Service Specifications	04-25

Constant Speed Cruise System	35-1
Constant Speed Cruise System, Preparation	03-38
Constant Speed Cruise System, Service Specifications	04-44
Cylinder Block Unit Repair, E4T15B Engine Mechanical	07-79

D

Diagnosis & Inspection, E4T15B Engine Mechanical	07-19
Diagnosis & Testing, Air Conditioning	30-15
Diagnosis & Testing, Audio/Visual System	40-11
Diagnosis & Testing, Axle	22-8
Diagnosis & Testing, Brake	26-8
Diagnosis & Testing, Brake Control System	25-12
Diagnosis & Testing, CAN Communication	53-6
Diagnosis & Testing, Clutch	19-6
Diagnosis & Testing, Constant Speed Cruise System	35-5
Diagnosis & Testing, Differential	21-6
Diagnosis & Testing, Door Lock	38-15
Diagnosis & Testing, E4T15B Cooling System	12-10
Diagnosis & Testing, E4T15B Exhaust System	11-5
Diagnosis & Testing, E4T15B Intake System	10-8
Diagnosis & Testing, Engine Immobilizer	33-15
Diagnosis & Testing, Horn	42-6
Diagnosis & Testing, Hydraulic Assist Steering	29-6
Diagnosis & Testing, Instrument Cluster	39-9
Diagnosis & Testing, Lighting System	36-22
Diagnosis & Testing, Parking Brake	27-6
Diagnosis & Testing, PEPS System	34-15

INDEX

Diagnosis & Testing, QR019CHB CVT	18-20
Diagnosis & Testing, QR525MHJ Transmission.....	17-10
Diagnosis & Testing, Rear View Mirror.....	45-7
Diagnosis & Testing, Reversing Radar System.....	41-7
Diagnosis & Testing, Seat Belt	32-7
Diagnosis & Testing, Sliding Roof	51-6
Diagnosis & Testing, SQRE4G15B Charging System.....	16-6
Diagnosis & Testing, SQRE4G15B Emission Control System	09-6
Diagnosis & Testing, SQRE4G15B Fuel Supply System	08-9
Diagnosis & Testing, SQRE4G15B Ignition System.....	14-6
Diagnosis & Testing, SQRE4G15B Lubrication System.....	13-8
Diagnosis & Testing, SQRE4G15B Starting System	15-7
Diagnosis & Testing, SQRE4T15B Engine Management System.....	06-23
Diagnosis & Testing, Steering Column	28-7
Diagnosis & Testing, Supplemental Restraint System	31-9
Diagnosis & Testing, Suspension.....	23-8
Diagnosis & Testing, Tire and Wheel	24-5
Diagnosis & Testing, Tire Pressure Monitoring System	55-6
Diagnosis & Testing, Windshield/Window Glass	44-12
Diagnosis & Testing, Wiper and Washer.....	37-7
Differential	21-1
Differential, Preparation	03-24
Differential, Service Specifications.....	04-27
Door Lock.....	38-1
Door Lock, Preparation	03-41
Door Lock, Service Specifications.....	04-47

Drive Shaft.....	20-1
Drive Shaft, Service Specifications	04-26

E

E4T15B Cooling System	12-1
E4T15B Cooling System, Preparation	03-15
E4T15B Cooling System, Service Specifications	04-17
E4T15B Engine Mechanical	07-1
E4T15B Engine Mechanical, Preparation	03-5
E4T15B Engine Mechanical, Service Specifications	04-4
E4T15B Exhaust System	11-1
E4T15B Exhaust System, Preparation	03-14
E4T15B Exhaust System, Service Specifications	04-16
E4T15B Intake System.....	10-1
E4T15B Intake System, Preparation	03-13
E4T15B Intake System, Service Specifications	04-15
Engine Hood/Door.....	48-1
Engine Hood/Door, Preparation	03-49
Engine Hood/Door, Service Specifications	04-56
Engine Immobilizer.....	33-1
Engine Immobilizer, Preparation	03-36
Engine Immobilizer, Service Specifications	04-43
Exterior	49-1
Exterior, Preparation	03-50
Exterior, Service Specifications.....	04-58

G

General Information, Air Conditioning	30-3
General Information, Audio/Visual System	40-3
General Information, Axle	22-3

General Information, Body Dimensions.....	52-3
General Information, Brake	26-3
General Information, Brake Control System.....	25-3
General Information, CAN Communication	53-3
General Information, Clutch	19-3
General Information, Constant Speed Cruise System.....	35-3
General Information, Differential	21-3
General Information, Door Lock	38-3
General Information, Drive Shaft.....	20-3
General Information, E4T15B Cooling System	12-3
General Information, E4T15B Engine Mechanical	07-3
General Information, E4T15B Exhaust System.....	11-3
General Information, E4T15B Intake System	10-3
General Information, Engine Hood/Door.....	48-3
General Information, Engine Immobilizer.....	33-3
General Information, Exterior	49-3
General Information, Horn.....	42-3
General Information, Hydraulic Assist Steering.....	29-3
General Information, Instrument Cluster	39-3
General Information, Instrument Panel	46-3
General Information, Interior	50-3
General Information, Lighting System.....	36-3
General Information, Other System.....	43-3
General Information, Parking Brake	27-3
General Information, PEPS System	34-3
General Information, QR019CHB CVT	18-3

General Information, QR525MHJ Transmission.....	17-3
General Information, Rear View Mirror	45-3
General Information, Reversing Radar System.....	41-3
General Information, Seat	47-3
General Information, Seat Belt	32-3
General Information, Sliding Roof	51-3
General Information, SQRE4G15B Charging System.....	16-3
General Information, SQRE4G15B Emission Control System	09-3
General Information, SQRE4G15B Fuel Supply System	08-3
General Information, SQRE4G15B Ignition System.....	14-3
General Information, SQRE4G15B Lubrication System.....	13-3
General Information, SQRE4G15B Starting System	15-3
General Information, SQRE4T15B Engine Management System.....	06-5
General Information, Steering Column	28-3
General Information, Supplemental Restraint System	31-3
General Information, Tire and Wheel	24-3
General Information, Tire Pressure Monitoring System	55-3
General Information, Windshield/Window Glass	44-3
General Information, Wiper and Washer	37-3

H

Horn	42-1
Horn, Preparation	03-45
Horn, Service Specifications.....	04-51
Hydraulic Assist Steering	29-1
Hydraulic Assist Steering, Preparation	03-32
Hydraulic Assist Steering, Service Specifications.....	04-38

INDEX

I

Inspection Items, Maintenance	05-8
Instrument Cluster	39-1
Instrument Cluster, Preparation	03-42
Instrument Cluster, Service Specifications	04-48
Instrument Panel	46-1
Instrument Panel, Preparation	03-48
Instrument Panel, Service Specifications	04-54
Interior	50-1
Interior, Preparation	03-51
Interior, Service Specifications	04-59
Introduction	02-1

L

Lighting System	36-1
Lighting System, Preparation	03-39
Lighting System, Service Specifications	04-45

M

Maintenance	05-1
Maintenance Items, Maintenance	05-3

O

On-vehicle Service, Air Conditioning	30-19
On-vehicle Service, Audio/Visual System	40-28
On-vehicle Service, Axle	22-9
On-vehicle Service, Brake	26-11
On-vehicle Service, Brake Control System	25-79
On-vehicle Service, Clutch	19-7
On-vehicle Service, Constant Speed Cruise System	35-8

On-vehicle Service, Differential	21-7
On-vehicle Service, Door Lock	38-39
On-vehicle Service, Drive Shaft	20-5
On-vehicle Service, E4T15B Cooling System	12-13
On-vehicle Service, E4T15B Engine Mechanical	07-24
On-vehicle Service, E4T15B Exhaust System	11-6
On-vehicle Service, E4T15B Intake System	10-9
On-vehicle Service, Engine Hood/Door	48-11
On-vehicle Service, Engine Immobilizer	33-26
On-vehicle Service, Exterior	49-8
On-vehicle Service, Horn	42-8
On-vehicle Service, Hydraulic Assist Steering	29-10
On-vehicle Service, Instrument Cluster	39-49
On-vehicle Service, Instrument Panel	46-8
On-vehicle Service, Interior	50-8
On-vehicle Service, Lighting System	36-83
On-vehicle Service, Other System	43-5
On-vehicle Service, Parking Brake	27-7
On-vehicle Service, PEPS System	34-42
On-vehicle Service, QR019CHB CVT	18-104
On-vehicle Service, QR525MHJ Transmission	17-12
On-vehicle Service, Rear View Mirror	45-10
On-vehicle Service, Reversing Radar System	41-8
On-vehicle Service, Seat	47-7
On-vehicle Service, Seat Belt	32-8
On-vehicle Service, Sliding Roof	51-8

On-vehicle Service, SQRE4G15B Charging System.....	16-7
On-vehicle Service, SQRE4G15B Emission Control System	09-7
On-vehicle Service, SQRE4G15B Fuel Supply System	08-13
On-vehicle Service, SQRE4G15B Ignition System.....	14-8
On-vehicle Service, SQRE4G15B Lubrication System.....	13-12
On-vehicle Service, SQRE4G15B Starting System	15-9
On-vehicle Service, SQRE4T15B Engine Management System.....	06-282
On-vehicle Service, Steering Column	28-10
On-vehicle Service, Supplemental Restraint System	31-89
On-vehicle Service, Suspension.....	23-10
On-vehicle Service, Tire and Wheel	24-7
On-vehicle Service, Tire Pressure Monitoring System	55-33
On-vehicle Service, Windshield/Window Glass	44-48
On-vehicle Service, Wiper and Washer	37-20
Other System	43-1

P

Parking Brake.....	27-1
Parking Brake, Preparation	03-30
Parking Brake, Service Specifications.....	04-36
PEPS System.....	34-1
PEPS System, Preparation	03-37
Preparation.....	03-1

Q

QR019CHB CVT	18-1
QR019CHB CVT, Preparation	03-22
QR019CHB CVT, Service Specifications.....	04-23
QR525MHJ Transmission	17-1

QR525MHJ Transmission, Preparation	03-20
QR525MHJ Transmission, Service Specifications.....	04-22

R

Rear View Mirror	45-1
Rear View Mirror, Preparation	03-47
Rear View Mirror, Service Specifications.....	04-53
Replacement Instruction, Maintenance	05-6
Reversing Radar System	41-1
Reversing Radar System, Preparation	03-44
Reversing Radar System, Service Specifications.....	04-50

S

Seat	47-1
Seat Belt.....	32-1
Seat Belt, Preparation	03-35
Seat Belt, Service Specifications.....	04-42
Seat, Service Specifications.....	04-55
Service Information, Introduction	02-3
Service Specifications	04-1
Sliding Roof.....	51-1
Sliding Roof, Preparation	03-52
Sliding Roof, Service Specifications.....	04-60
SQRE4G15B Charging System	16-1
SQRE4G15B Charging System, Preparation	03-19
SQRE4G15B Charging System, Service Specifications.....	04-21
SQRE4G15B Emission Control System.....	09-1
SQRE4G15B Emission Control System, Preparation	03-12
SQRE4G15B Emission Control System, Service Specifications.....	04-14
SQRE4G15B Fuel Supply System	08-1
SQRE4G15B Fuel Supply System, Preparation	03-11

INDEX

SQRE4G15B Fuel Supply System, Service Specifications.....	04-13
SQRE4G15B Ignition System	14-1
SQRE4G15B Ignition System, Preparation	03-17
SQRE4G15B Ignition System, Service Specifications.....	04-19
SQRE4G15B Lubrication System	13-1
SQRE4G15B Lubrication System, Preparation	03-16
SQRE4G15B Lubrication System, Service Specifications.....	04-18
SQRE4G15B Starting System.....	15-1
SQRE4G15B Starting System, Preparation	03-18
SQRE4G15B Starting System, Service Specifications.....	04-20
SQRE4T15B Engine Management System	06-1
SQRE4T15B Engine Management System, Preparation	03-3
SQRE4T15B Engine Management System, Service Specifications.....	04-3
Steering Column	28-1
Steering Column, Preparation	03-31
Steering Column, Service Specifications.....	04-37
Supplemental Restraint System.....	31-1
Supplemental Restraint System, Preparation	03-34
Supplemental Restraint System, Service Specifications.....	04-41
Suspension	23-1
Suspension, Preparation	03-27
Suspension, Service Specifications.....	04-30

T

Tire and Wheel.....	24-1
Tire and Wheel, Service Specifications.....	04-32
Tire Pressure Monitoring System.....	55-1
Tire Pressure Monitoring System, Preparation	03-54
Tire Pressure Monitoring System, Service Specifications.....	04-61

V

Vehicle Fuse & Relay, Wire Harness	54-31
Vehicle Ground Distribution, Wire Harness	54-24
Vehicle Information, Introduction	02-11
Vehicle Power Distribution, Wire Harness	54-12
Vehicle Wire Harness Layout, Wire Harness	54-35

W

Wheel Alignment, Suspension	23-33
Windshield/Window Glass.....	44-1
Windshield/Window Glass, Preparation	03-46
Windshield/Window Glass, Service Specifications.....	04-52
Wiper and Washer.....	37-1
Wiper and Washer, Preparation	03-40
Wiper and Washer, Service Specifications.....	04-46
Wire Harness	54-1
Wire Harness Information, Wire Harness	54-3