

WHEEL AND TIRE SYSTEM

WT

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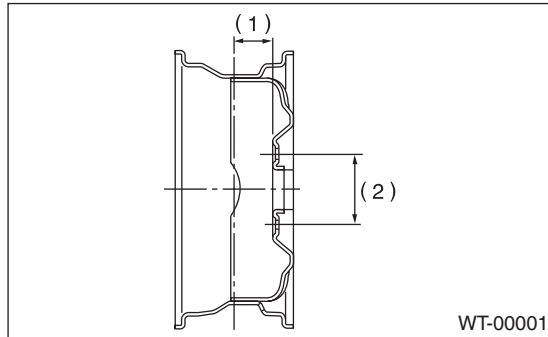
General Description

WHEEL AND TIRE SYSTEM

1. General Description

A: SPECIFICATION

1. WHEEL AND TIRE SIZE



(1) Offset

(2) P.C.D.

Specification		Tire size	Wheel size	Offset mm (in)	P.C.D. mm (in)	Tire inflation pressure kPa (kgf/cm ² , psi)	
						Front wheel	Rear wheel
Sedan	2.5 i, — LTD	P205/55R16 89H	16 × 6 1/2JJ	55 (2.17)	100 (3.94)	220 (2.2, 32)	210 (2.1, 30)
	2.5 GT, — LTD	215/45ZR17	17 × 7JJ			240 (2.4, 35)	230 (2.3, 33)
	OUTBACK 3.0 R	P225/55R17 95V	17 × 7JJ	48 (1.89)		220 (2.2, 32)	210 (2.1, 30)
Wagon	2.5 i, — LTD	205/55R16 89H	16 × 6 1/2JJ	55 (2.17)		220 (2.2, 32)	210 (2.1, 30)
	2.5 GT, — LTD	215/45ZR17	17 × 7JJ			240 (2.4, 35)	230 (2.3, 33)
	OUTBACK 2.5 i, — LTD	P225/60R16 97H	16 × 6 1/2JJ	48 (1.89)		220 (2.2, 32)	210 (2.1, 30)
	OUTBACK 3.0 R, — LTD, — LLB	P225/55R17 95V	17 × 7JJ			220 (2.2, 32)	210 (2.1, 30)
“T-type” Tire	2.5 GT, — LTD	T135/70D17 102M	17 × 4T	40 (1.57)		420 (4.2, 60)	
	2.5 i, — LTD	T135/80R16 101M	16 × 4T	50 (1.97)			
	OUTBACK	T155/70D17 110M	17 × 4T	40 (1.57)			

General Description

WHEEL AND TIRE SYSTEM

2. SERVICE DATA

Part	Axial runout	Radial runout
Steel wheel	1.5 mm (0.059 in)	
Aluminum wheel	1.0 mm (0.039 in)	

3. ADJUSTING PARTS

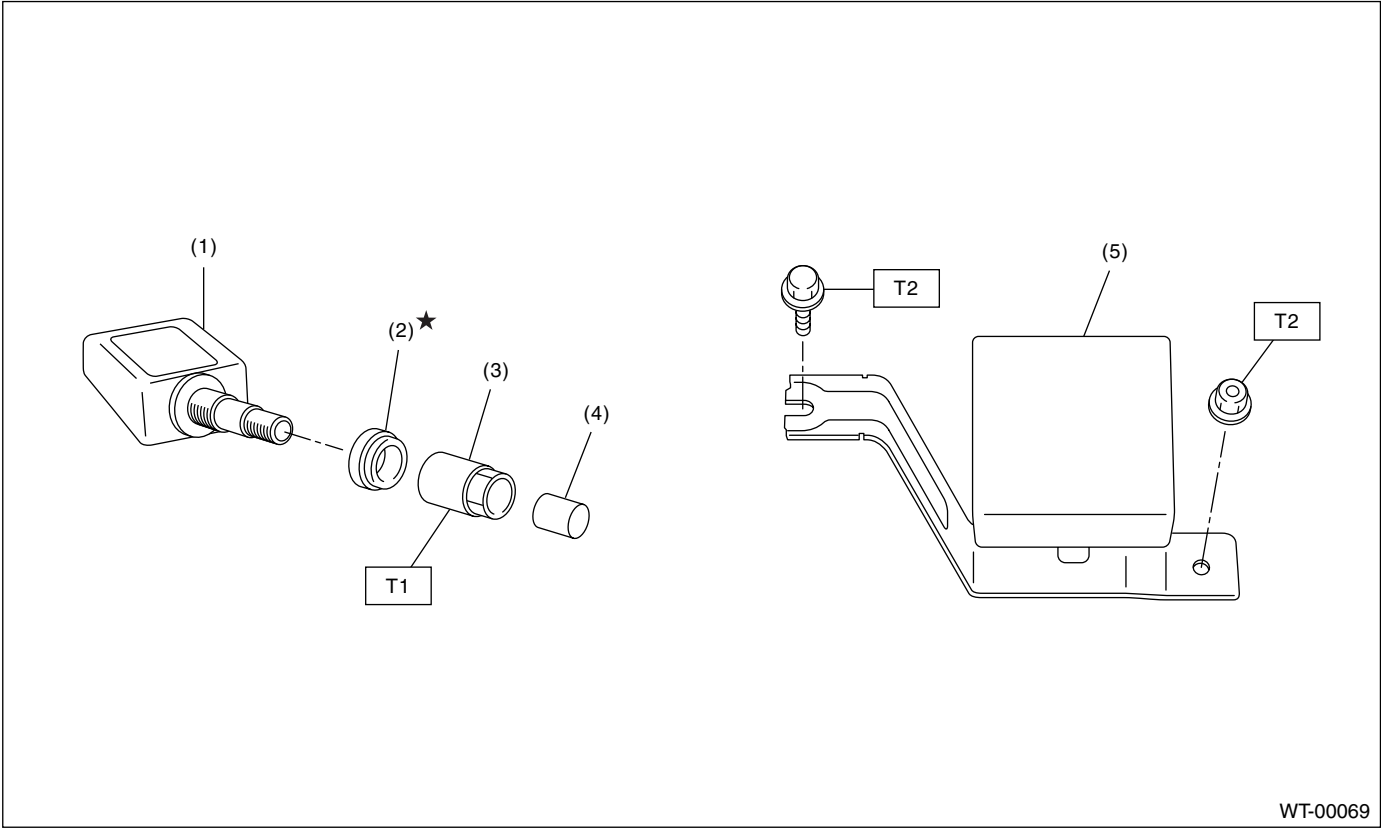
Wheel balancing	Standard	Service limit
Dynamic unbalance	10 g (0.35 oz) or less	

Balance weight part number (Knock-on type weight for steel wheel)	Weight
28101AA001	5 g (0.18 oz)
28101AA011	10 g (0.35 oz)
28101AA021	15 g (0.53 oz)
28101AA031	20 g (0.71 oz)
28101AA041	25 g (0.88 oz)
28101AA051	30 g (1.06 oz)
28101AA061	35 g (1.23 oz)
28101AA071	40 g (1.41 oz)
28101AA081	45 g (1.59 oz)
28101AA091	50 g (1.76 oz)
28101AA101	55 g (1.94 oz)
28101AA111	60 g (2.12 oz)

Balance weight part number (Knock-on type weight for aluminum wheel)	Weight
23141GA462	5 g (0.18 oz)
23141GA472	10 g (0.35 oz)
23141GA482	15 g (0.53 oz)
23141GA492	20 g (0.71 oz)
23141GA502	25 g (0.88 oz)
23141GA512	30 g (1.06 oz)
23141GA522	35 g (1.23 oz)
23141GA532	40 g (1.41 oz)
23141GA542	45 g (1.59 oz)
23141GA552	50 g (1.76 oz)
23141GA562	55 g (1.94 oz)
23141GA572	60 g (2.12 oz)

Balance weight part number (Adhesive type weight for aluminum wheel)	Weight
28101AE00A	5 g (0.18 oz)
28101AE01A	7.5 g (0.26 oz)
28101AE02A	10 g (0.35 oz)
28101AE03A	12.5 g (0.44 oz)
28101AE04A	15 g (0.53 oz)
28101AE05A	17.5 g (0.62 oz)
28101AE06A	20 g (0.71 oz)
28101AE07A	22.5 g (0.79 oz)
28101AE08A	25 g (0.88 oz)
28101AE09A	27.5 g (0.97 oz)
28101AE10A	30 g (1.06 oz)
28101AE11A	32.5 g (1.15 oz)
28101AE12A	35 g (1.23 oz)
28101AE13A	37.5 g (1.32 oz)
28101AE14A	40 g (1.41 oz)
28101AE15A	42.5 g (1.50 oz)
28101AE16A	45 g (1.59 oz)
28101AE17A	47.5 g (1.68 oz)
28101AE18A	50 g (1.76 oz)
28101AE19A	52.5 g (1.85 oz)
28101AE20A	55 g (1.94 oz)
28101AE21A	57.5 g (2.03 oz)
28101AE22A	60 g (2.12 oz)
28101AE23A	62.5 g (2.20 oz)
28101AE24A	65 g (2.29 oz)
28101AE25A	67.5 g (2.38 oz)
28101AE26A	70 g (2.47 oz)
28101AE27A	72.5 g (2.56 oz)
28101AE28A	75 g (2.65 oz)
28101AE29A	77.5 g (2.73 oz)
28101AE30A	80 g (2.82 oz)
28101AE31A	82.5 g (2.91 oz)
28101AE32A	85 g (3.00 oz)
28101AE33A	87.5 g (3.09 oz)
28101AE34A	90 g (3.17 oz)
28101AE35A	92.5 g (3.26 oz)
28101AE36A	95 g (3.35 oz)
28101AE37A	97.5 g (3.44 oz)
28101AE38A	100 g (3.53 oz)
28101AG50A	102.5 g (3.62 oz)
28101AG51A	105 g (3.70 oz)
28101AG52A	107.5 g (3.79 oz)
28101AG53A	110 g (3.88 oz)
28101AG54A	112.5 g (3.97 oz)
28101AG55A	115 g (4.06 oz)
28101AG56A	117.5 g (4.14 oz)
28101AG57A	120 g (4.23 oz)

B: COMPONENT



- (1) Transmitter

(2) Grommet

(3) Nut
- (4) Cap

(5) Tire pressure monitoring control module

Tightening torque: N·m (kgf-m, ft-lb)

T1: 7.5 (0.76, 5.53)

T2: 8 (0.8, 5.8)

C: PREPARATION TOOL

1. GENERAL TOOL

TOOL NAME	REMARKS
Air pressure gauge	Used for measuring tire inflation pressure.
Dial gauge with magnet stand	Used for measuring wheel runout.
Wheel balancer	Used for adjusting wheel balance.

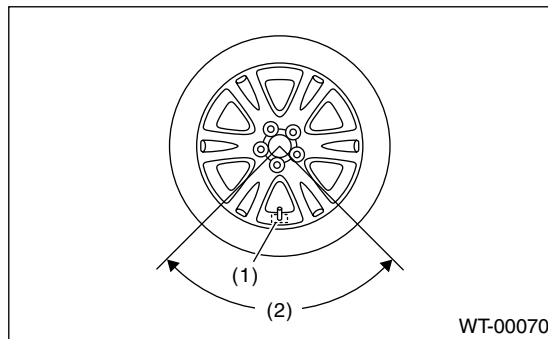
2. Tire

A: INSPECTION

- 1) Take stones, glass, nails etc. out of the tread groove.
- 2) Replace the tire if as follows.

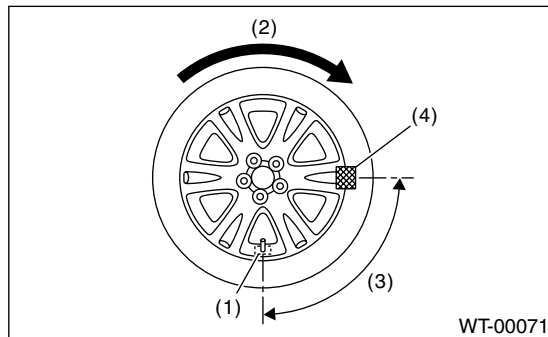
CAUTION:

- When replacing a tire, make sure to use only the same size, construction and load range as originally installed.
- Use a tire changer when removing tire from wheel.
- To prevent damaging of transmitter, do not use the bead breaker in the position as shown in the figure. (Model with tire pressure monitoring system)



- (1) Transmitter
(2) 90° (Do not use bead breaker within this range)

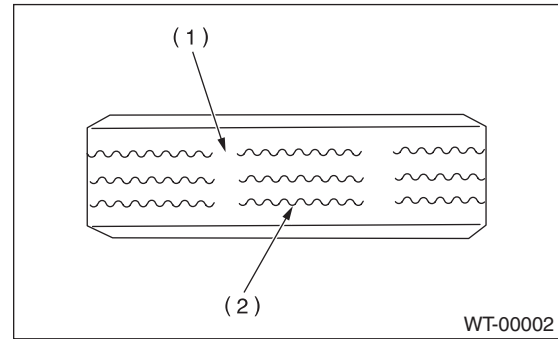
- To prevent damaging of transmitter, set the tire changer boom in the position as shown in the figure.



- (1) Transmitter
(2) Turn table rotation direction
(3) 90°
(4) Tire changer boom

- (1) When large crack on side wall, damage or crack on tread is found.

- (2) When the “tread wear indicator” appears as a solid band across the tread.



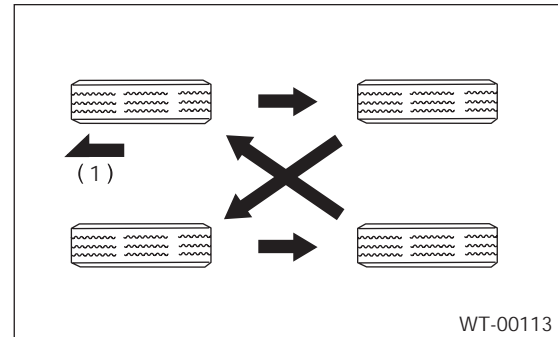
- (1) Tread wear indicator
(2) Tire tread

- 3) When a crack on tire valve is found, replace the tire valve.

1. TIRE ROTATION

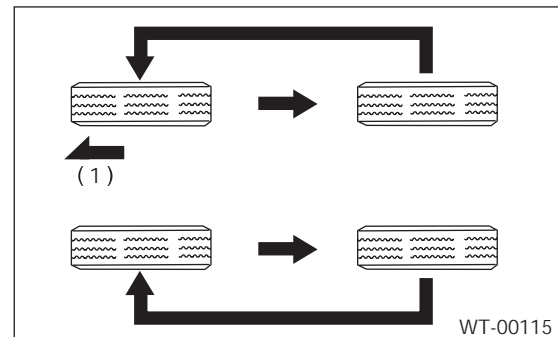
Rotate tires periodically (12,500 km/7,500 miles) as shown in the figure, in order to prevent them from uneven wear and to prolong their life.

- Without instruction for the direction of tire rotation



- (1) Front

- With instruction for the direction of tire rotation



- (1) Front

NOTE:

Re-registration of sensor is necessary for the model with tire pressure monitoring system. <Ref. to TPM(diag)-10, REGISTER TRANSMITTER (ID), OPERATION, Subaru Select Monitor.>

3. Steel Wheel

A: REMOVAL

- 1) Apply the parking brake, and position the select lever to "P" or "LOW".
- 2) Set the shop jacks or a lift to specified point, and support the vehicle with its wheels slightly contacting the floor.
- 3) Loosen the wheel nuts.
- 4) Raise the vehicle until its wheels take off the ground using a jack or a lift.
- 5) Remove the wheel nuts and wheels.

NOTE:

- When removing the wheels, prevent hub bolts from damage.
- Place the wheels with their outer sides facing upward to prevent wheels from damage.

B: INSTALLATION

- 1) Remove dirt from the mating surface of wheel and brake rotor.
- 2) Attach the wheel to the hub by aligning the wheel bolt hole with the hub bolt.
- 3) Temporarily attach the wheel nuts to the hub bolts. (In the case of aluminum wheel, use SUBARU genuine wheel nut for aluminum wheel.)
- 4) Manually tighten the nuts making sure the wheel hub hole is aligned correctly to the guide portion of hub.
- 5) Tighten the wheel nuts in a diagonal selection to the specified torque. Use a wheel nut wrench.

Wheel nut tightening torque:

110 N·m (11.2 kgf-m, 81.1 ft-lb)

CAUTION:

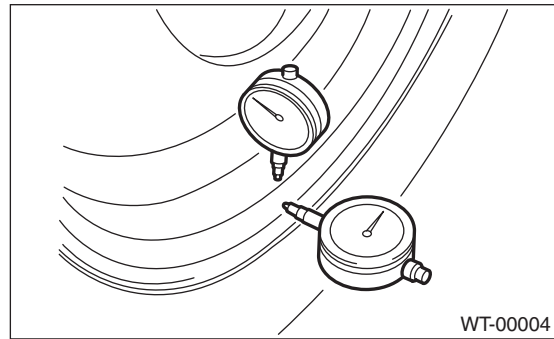
- Tighten the wheel nuts in two or three steps by gradually increasing the torque and working diagonally, until they reach the specified torque.
- Do not depress the wrench with foot. Always use both hands when tightening.
- Make sure the bolt, nut and the nut seating surface of the wheel are free from oil.

- 6) If a wheel is removed for replacement or for repair of a puncture, retighten the wheel nuts to the specified torque after running 1,000 km (600 miles).

C: INSPECTION

- 1) Deformation or damage on the rim may cause air leakage. Check the rim flange for deformation, crack or damage, and repair or replace as necessary.
- 2) Jack-up the vehicle until wheels clear the floor.

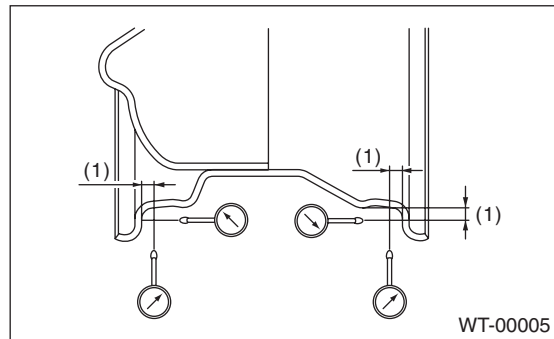
- 3) Slowly rotate the wheel to check rim "runout" using a dial gauge.



Rim runout:

Axial runout specification	Radial runout specification
1.5 mm (0.059 in)	

- 4) If the rim runout exceeds specifications, remove the tire from wheel and check runout while attaching the dial gauge to positions shown in the figure.



(1) Approx. 7 mm (0.28 in)

- 5) If the measured runout still exceeds specifications, replace the wheel.

4. Aluminum Wheel

A: REMOVAL

Refer to “Steel Wheel” for removal procedure of aluminum wheels. <Ref. to WT-6, REMOVAL, Steel Wheel.>

B: INSTALLATION

Refer to “Steel Wheel” for installation procedure of aluminum wheels. <Ref. to WT-6, INSTALLATION, Steel Wheel.>

C: INSPECTION

Refer to “Steel Wheel” for inspection procedure of aluminum wheels. <Ref. to WT-6, INSPECTION, Steel Wheel.>

Rim runout:

Axial runout specification	Radial runout specification
1.0 mm (0.039 in)	

D: CAUTION

Aluminum wheels are easily scratched. To maintain their appearance and safety, do the followings:

- 1) Do not damage the aluminum wheels during removal, installation, wheel balancing, etc. After removing the aluminum wheels, place them on a rubber mat, etc.
- 2) When washing the aluminum wheel, use neutral synthetic detergent and water. Avoid using the cleanser including abrasive, hard brushes or an automatic car washer.

Wheel Balancing

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5. Wheel Balancing

A: ADJUSTMENT

NOTE:

Change the setting of wheel balancer to adhesive type weight as adhesive type weight is adopted for outside balance weight of 16-inch (OUTBACK) and 17-inch wheel.

1) Remove the balance weights.

CAUTION:

- Be careful not to damage the wheel.
- Completely remove the two-sided tape of the adhesive type weight from the wheel.

2) Using the wheel balancer, measure the wheel balance.

3) Select a weight close to the value measured by wheel balancer.

CAUTION:

Use SUBARU genuine balance weight.

Balance weight part number (Knock-on type weight for steel wheel)	Weight
28101AA001	5 g (0.18 oz)
28101AA011	10 g (0.35 oz)
28101AA021	15 g (0.53 oz)
28101AA031	20 g (0.71 oz)
28101AA041	25 g (0.88 oz)
28101AA051	30 g (1.06 oz)
28101AA061	35 g (1.23 oz)
28101AA071	40 g (1.41 oz)
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23141GA532	40 g (1.41 oz)
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23141GA562	55 g (1.94 oz)
23141GA572	60 g (2.12 oz)

Balance weight part number (Adhesive type weight for aluminum wheel)	Weight
28101AE00A	5 g (0.18 oz)
28101AE01A	7.5 g (0.26 oz)
28101AE02A	10 g (0.35 oz)
28101AE03A	12.5 g (0.44 oz)
28101AE04A	15 g (0.53 oz)
28101AE05A	17.5 g (0.62 oz)
28101AE06A	20 g (0.71 oz)
28101AE07A	22.5 g (0.79 oz)
28101AE08A	25 g (0.88 oz)
28101AE09A	27.5 g (0.97 oz)
28101AE10A	30 g (1.06 oz)
28101AE11A	32.5 g (1.15 oz)
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28101AE13A	37.5 g (1.32 oz)
28101AE14A	40 g (1.41 oz)
28101AE15A	42.5 g (1.50 oz)
28101AE16A	45 g (1.59 oz)
28101AE17A	47.5 g (1.68 oz)
28101AE18A	50 g (1.76 oz)
28101AE19A	52.5 g (1.85 oz)
28101AE20A	55 g (1.94 oz)
28101AE21A	57.5 g (2.03 oz)
28101AE22A	60 g (2.12 oz)
28101AE23A	62.5 g (2.20 oz)
28101AE24A	65 g (2.29 oz)
28101AE25A	67.5 g (2.38 oz)
28101AE26A	70 g (2.47 oz)
28101AE27A	72.5 g (2.56 oz)
28101AE28A	75 g (2.65 oz)
28101AE29A	77.5 g (2.73 oz)
28101AE30A	80 g (2.82 oz)
28101AE31A	82.5 g (2.91 oz)
28101AE32A	85 g (3.00 oz)
28101AE33A	87.5 g (3.09 oz)
28101AE34A	90 g (3.17 oz)
28101AE35A	92.5 g (3.26 oz)
28101AE36A	95 g (3.35 oz)
28101AE37A	97.5 g (3.44 oz)
28101AE38A	100 g (3.53 oz)
28101AG50A	102.5 g (3.62 oz)
28101AG51A	105 g (3.70 oz)
28101AG52A	107.5 g (3.79 oz)
28101AG53A	110 g (3.88 oz)
28101AG54A	112.5 g (3.97 oz)
28101AG55A	115 g (4.06 oz)
28101AG56A	117.5 g (4.14 oz)
28101AG57A	120 g (4.23 oz)

4) Install the selected weight to the point designated by wheel balancer.

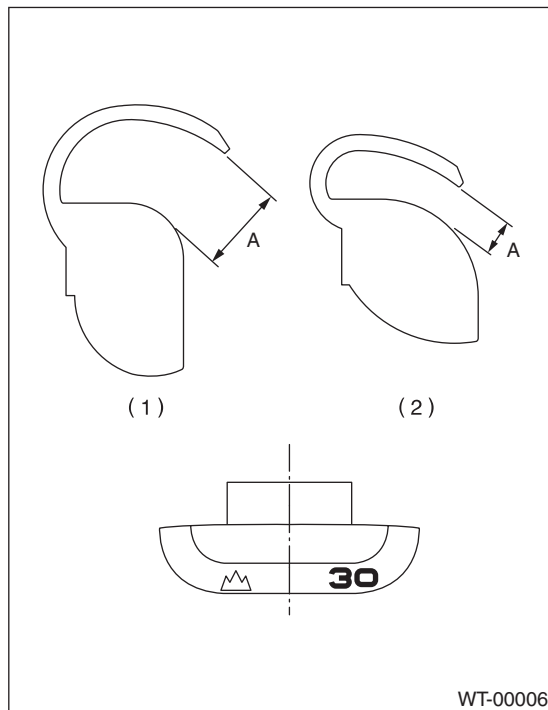
CAUTION:

- Remove grease from adhesive type weight applying surface of wheel.
- Press the adhesive type weight by 25 N (2.5 kgf, 5.6 lb) or more per 5 g (0.18 oz) for 2 seconds at least to attain close contact.
- Make all amounts of the applied adhesive type weight to be 100 g (3.53 oz) or less.
- Make all amounts of the applied adhesive type weight of model with transmitter (tire pressure sensor) to be 120 g (4.23 oz) or less.

5) Using the wheel balancer, measure the wheel balance again. Check that wheel balance is correctly adjusted.

NOTE:

Balance weights of knock-on type weight for aluminum wheel are available for use with any of 15- to 17-inch aluminum wheels.



- (1) Knock-on type weight for aluminum wheel
(2) Knock-on type weight for steel wheel

Service limit A:**Knock-on type weight for steel wheel:**

5 — 25 g (0.18 — 0.88 oz) 2.0 mm (0.08 in)
30 g (1.06 oz) or more 1.8 mm (0.07 in)

Knock-on type weight for aluminum wheel:

5 — 25 g (0.18 — 0.88 oz) 5.0 mm (0.20 in)
30 g (1.06 oz) or more 4.5 mm (0.177 in)

6. “T-type” Tire

A: NOTE

“T-type” tire for temporary use is prepared as a spare tire.

CAUTION:

- Do not drive at a speed greater than 100 km/h (62 MPH).
- For the model with tire pressure monitoring system, the indicator light may blink when running with the “T-type” tire.

B: REPLACEMENT

Refer to “Steel Wheel” for installation procedure of “T-type” tire. <Ref. to WT-6, REMOVAL, Steel Wheel.>

CAUTION:

Replace with a conventional tire as soon as possible since the “T-type” tire is only for temporary use.

C: INSPECTION

- 1) Check the tire air pressure.

Specifications:

420 kPa (4.2 kg/cm², 60 psi)

- 2) Take the stones, glass, nails, etc. out of the tread groove.
- 3) Check the tires for deformation, cracks, partial wear or wear.

CAUTION:

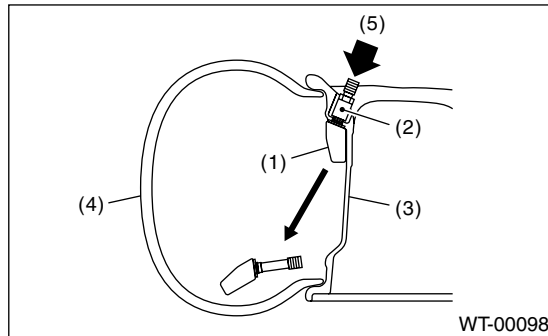
Replace the tire with a new one if defective.

7. Tire Pressure Monitoring System

A: REMOVAL

1. TRANSMITTER (TIRE PRESSURE SENSOR)

- 1) Remove the wheels from vehicle. <Ref. to WT-6, REMOVAL, Steel Wheel.>
- 2) Bleed air from tire valve.
- 3) Remove the nut, and drop the transmitter in the tire.



- (1) Transmitter
- (2) Nut
- (3) Wheel
- (4) Tire
- (5) Push

- 4) Remove the tires from wheels.

CAUTION:

Use a tire changer when removing tire from wheel.

- 5) Remove the nut to take out transmitter.

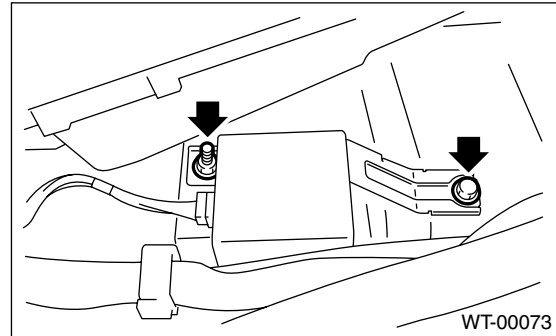
NOTE:

Replace the grommet with a new one when reusing transmitter.

2. TIRE PRESSURE MONITORING CONTROL MODULE

- 1) Remove the driver's seat. <Ref. to SE-9, REMOVAL, Front Seat.>
- 2) Turn up the floor mat in the driver's seat area.

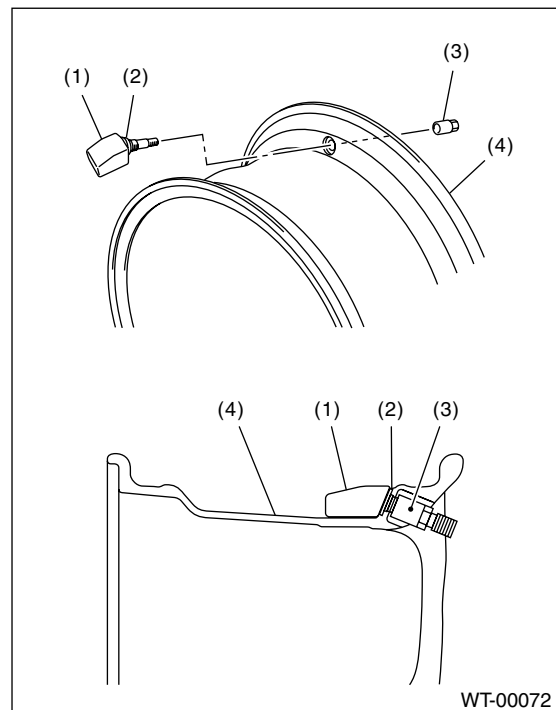
- 3) Remove the connector to remove tire pressure monitoring control module.



B: INSTALLATION

1. TRANSMITTER (TIRE PRESSURE SENSOR)

- 1) Install the transmitter to the wheel by aligning it with valve hole, and then tighten with nuts.



- (1) Transmitter
- (2) Grommet
- (3) Nut
- (4) Wheel

Tightening torque:

7.5 N·m (0.76 kgf-m, 5.53 ft-lb)

- 2) Install the tires to wheels.

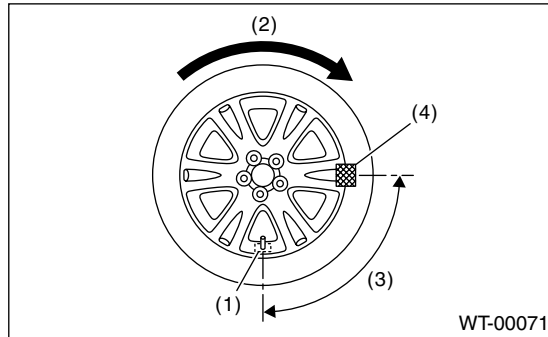
CAUTION:

- **Use a tire changer when installing tire to wheel.**

Tire Pressure Monitoring System

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- To prevent breaking of transmitter, set the tire changer boom in the position as shown in the figure.



- (1) Transmitter
- (2) Turn table rotation direction
- (3) 90°
- (4) Tire changer boom

3) Install the wheels to vehicle. <Ref. to WT-6, INSTALLATION, Steel Wheel.>

4) Register the transmitter ID to tire pressure monitoring control module. <Ref. to TPM(diag)-10, REGISTER TRANSMITTER (ID), OPERATION, Subaru Select Monitor.>

2. TIRE PRESSURE MONITORING CONTROL MODULE

Install in the reverse order of removal.

Tightening torque:

8 N·m (0.8 kgf-m, 5.8 ft-lb)

C: ADJUSTMENT

Re-register the transmitter ID when transmitter has been replaced or tires have been rotated. <Ref. to TPM(diag)-10, REGISTER TRANSMITTER (ID), OPERATION, Subaru Select Monitor.>

8. General Diagnostic Table

A: INSPECTION

Symptom	Possible cause	Corrective action
Wheel wobble.	Improperly inflated tire	Adjust the tire pressure.
	Uneven wear	Check the tire referring to Abnormal tire wear in this table, carry out the procedure and replace the tire.
	Front wheel alignment	Check the front wheel alignments. <Ref. to FS-7, INSPECTION, Wheel Alignment.>
	Rear wheel alignment	Check the rear wheel alignments. <Ref. to RS-8, INSPECTION, Wheel Alignment.>
	Front strut	Check the front strut. <Ref. to FS-23, INSPECTION, Front Strut.>
	Rear shock absorber	Check the rear shock absorber. <Ref. to RS-16, INSPECTION, Rear Shock Absorber.>
	Front axle	Check the front axle. <Ref. to DS-16, INSPECTION, Front Axle.>
	Front hub unit bearing	Check the front hub unit bearing. <Ref. to DS-18, INSPECTION, Front Hub Unit Bearing.>
	Rear hub unit bearing	Check the rear hub unit bearing. <Ref. to DS-21, INSPECTION, Rear Hub Unit Bearing.>
Vehicle is abnormally out of balance.	Improperly inflated tire	Adjust the tire pressure.
	Uneven wear	Check the tire referring to Abnormal tire wear in this table, carry out the procedure and replace the tire.
	Front stabilizer	Check the front stabilizer. <Ref. to FS-15, INSPECTION, Front Stabilizer.>
	Front wheel alignment	Check the front wheel alignments. <Ref. to FS-7, INSPECTION, Wheel Alignment.>
	Rear wheel alignment	Check the rear wheel alignments. <Ref. to RS-8, INSPECTION, Wheel Alignment.>
Abnormal wheel vibration	Improperly inflated tire	Adjust the tire pressure.
	Uneven wear	Check the tire referring to Abnormal tire wear in this table, carry out the procedure and replace the tire.
	Improper wheel balancing	Check the wheel balance. <Ref. to WT-8, ADJUSTMENT, Wheel Balancing.>
	Front axle	Check the front axle. <Ref. to DS-16, INSPECTION, Front Axle.>
	Front hub unit bearing	Check the front hub unit bearing. <Ref. to DS-18, INSPECTION, Front Hub Unit Bearing.>
	Rear hub unit bearing	Check the rear hub unit bearing. <Ref. to DS-21, INSPECTION, Rear Hub Unit Bearing.>

General Diagnostic Table

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Symptom	Possible cause	Corrective action
Abnormal tire wear	Improperly inflated tire	Adjust the tire pressure.
	Improper wheel balancing	Check the wheel balance. <Ref. to WT-8, ADJUSTMENT, Wheel Balancing.>
	Front wheel alignment	Check the front wheel alignments. <Ref. to FS-7, INSPECTION, Wheel Alignment.>
	Rear wheel alignment	Check the rear wheel alignments. <Ref. to RS-8, INSPECTION, Wheel Alignment.>