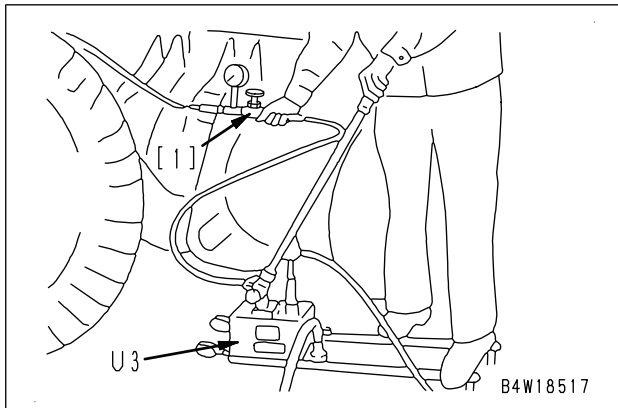


- ★ Bleed air by operating pump U3.

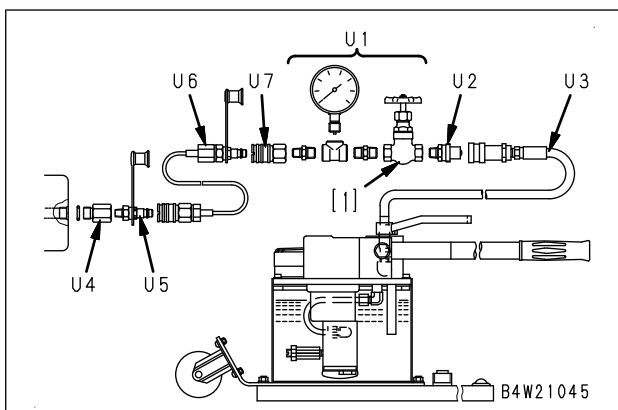


5. Tighten bleeder screw (4), operate pump U3 to increase the pressure to 4.9 MPa {50 kg/cm<sup>2</sup>}, and close stop-valve [1].



6. Leave the brake circuit pressurized for 5 minutes and check lowering of the pressure.
  - ★ If the hose is moved while the pressure is measured, the pressure fluctuates. Accordingly, do not move the hose.
  - ★ After testing the pressure, operate pump U3 to lower the pressure in brake test kit U1, and then remove brake test kit U1.
  - ★ After finishing testing, install the brake tube and bleed air from the brake circuit.
7. After finishing test, remove the testing tools and restore the machine.

Brake test kit



## 30 Testing and adjusting

### Brake system

## Testing wear of wheel brake disc (WA380-G167-001-K-00-A)

### ★ Testing tools

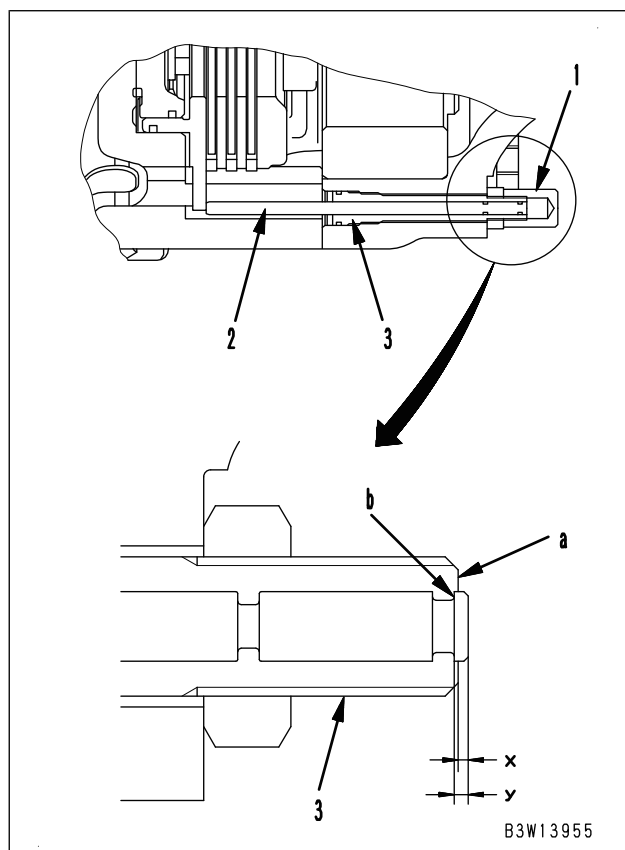
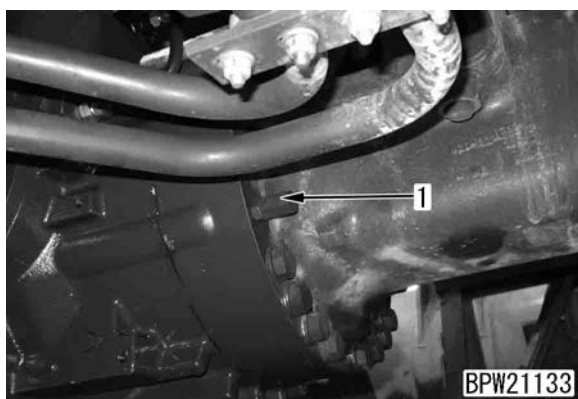
Symbol	Part No.	Part name
V	Commercially available	Vernier calipers

**⚠ Place the machine on a level ground, lower the work equipment to the ground, set the parking brake switch and work equipment lock switch in the LOCK position, stop the engine, and chock the wheels.**

★ There are inspection plugs on the right and left sides of the front and rear axles. Perform the check at all of the four plugs similarly.

## Testing (WA470-G167-389-K-00-A)

1. Remove cap (1).



2. Depress the brake pedal to the travel end.  
3. Push in shaft (2) and measure its projection (x) (distance of wear) from end face (a) of guide (3) with vernier calipers V.

- ★ Keep depressing the brake pedal while measuring the wear.
- ★ If shaft (2) is projected from the end of guide (3) to the groove, replace the disc.
- Projection x from (a): Amount of wear
- Projection y from (a): Wear limit (2.4 mm)
- ★ If face (b) of the shaft is seen, the disc is worn to the repair limit.



4. After finishing test, remove the testing tools and restore the machine.

**Cap (1):**  
29.4 to 39.2 Nm {3.0 to 4.0 kgm}

## Bleeding air from wheel brake circuit (WA470-G200-360-K-00-A)

**⚠** Place the machine on a level ground, lower the work equipment to the ground, set the parking brake switch and work equipment lock switch in LOCK position, stop the engine, and chock the wheels.

- ★ When brake circuit equipment is removed or installed, bleed air from the brake circuit according to the following procedure.
- ★ Take the similar procedure for the front brake circuit and rear brake circuit. (2 places each).
- ★ Perform air bleeding in order of right side of rear axle → left side of rear axle → right side of front axle → left side of front axle → slack adjuster.

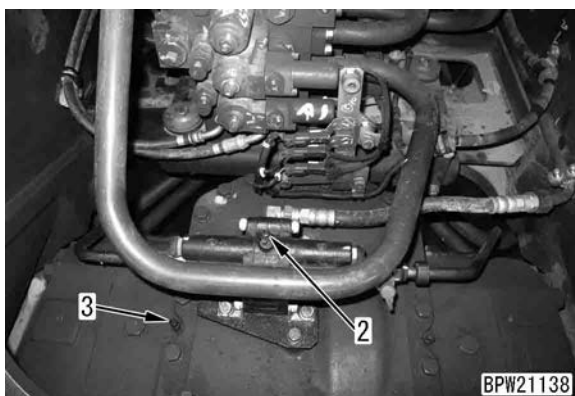
## Bleeding air (WA470-G200-231-K-00-A)

1. Start the engine to accumulate pressure in the accumulator, and then stop the engine.
2. Remove inspection cover (1) of the front frame.

**⚠** When removing the inspection cover with the boom raised, place a stand under the boom to support the boom securely.

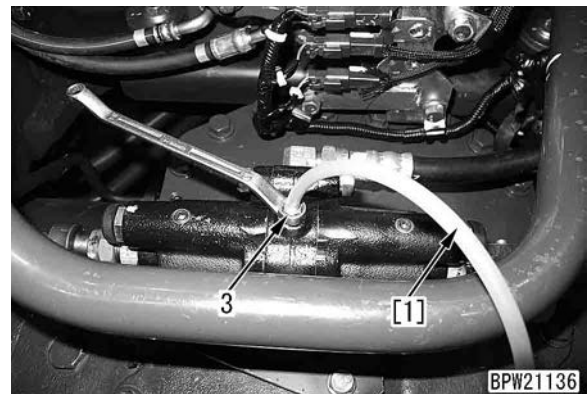


3. Connect hose [1] to bleeder screw (2) of slack adjuster, and place one end of hose [1] in the oil container.



4. Depress the brake pedal, and then loosen bleeder screw (2) to bleed air.

★ Release the brake pedal slowly after tightening bleeder screw (2).



5. Connect hose [1] to bleeder screw (3) of wheel brake, and place one end of hose [1] in the oil container.
6. Depress the brake pedal and then loosen bleeder screw (3) to bleed air.

★ Release the brake pedal slowly after tightening bleeder screw (3).



7. Repeat this operation until the oil flowing through hose [1] becomes free from bubbles. Then depress the pedal fully, and tighten bleeder screw (2) and (3) while the oil is flowing.
8. Bleed air from other brake cylinders by using the same procedure.

★ When a complete bleeding is required, it is advisable to start the operation from the brake cylinder situated farthest from the brake pedal.

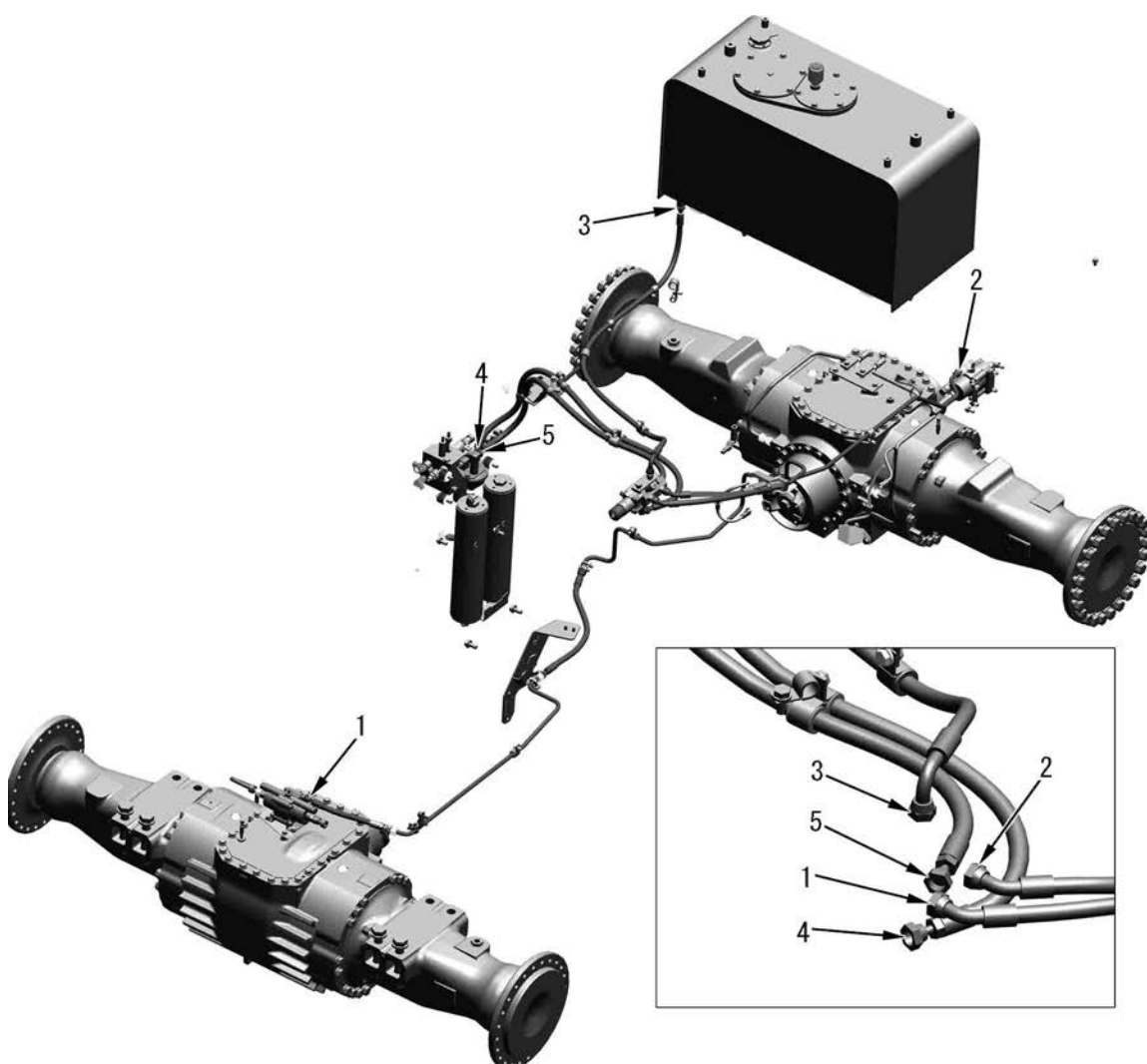
## 30 Testing and adjusting

### Brake system

- ★ If the pressure in the accumulator is decreased, start the engine to charge the accumulator. Then stop the engine and perform air bleeding following the same procedure as described above.
- ★ After finishing bleeding air, run the engine at low idle, and check the oil level in the hydraulic tank. If the level is low, refill with oil to the specified level.

#### Bleeding method after removal and installation of cab

- ★ Perform the following if removing cab for work.
1. Remove hoses (1) to (5) (5 pieces) from brake valve.
  2. Remove hoses of front brake (1), rear brake (2), accumulator (4) and (5), and hydraulic tank (3).
  3. Perform air blowing through inlet of hoses removed from brake valve side. (Blow the air in)
  4. Install hoses (1) to (5) removed.
  5. Perform air bleeding according to procedure for air bleeding.



BPW21139

## Releasing remaining pressure in brake accumulator circuit (WA380-G2F0-001-K-00-A)

**⚠** Before disconnecting any of the following brake accumulator circuits, release remaining pressure in the brake circuit.

### Releasing remaining pressure (WA380-G2F0-22A-K-00-A)

- Between accumulator charge valve and brake accumulator
  - Between accumulator charge valve and parking brake solenoid valve
  - Between brake accumulator and brake valve
1. Stop the engine.
  2. Depress the brake pedal at least 100 times to release the pressure in the brake accumulator circuit.

## 30 Testing and adjusting

### Brake system

## Testing parking brake performance (WA380-GJ20-001-K-00-A)

### ★ Testing conditions

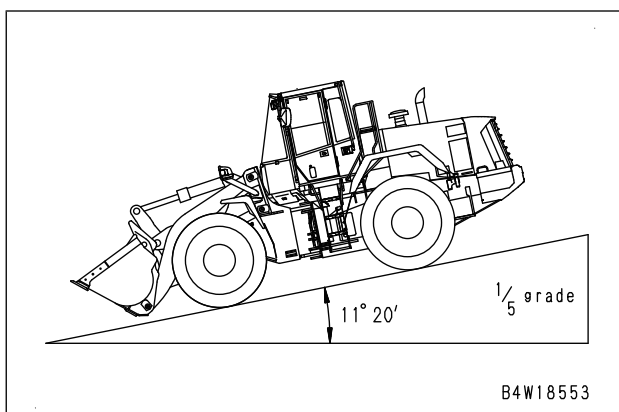
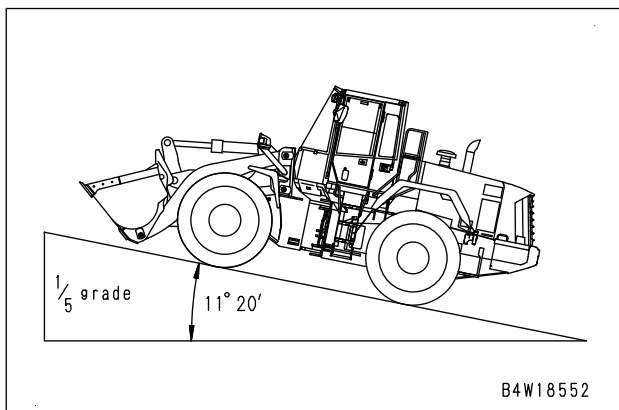
- Tire inflation pressure: Specified pressure
- Road surface: Flat, dry, paved road with (11 deg. 20') grade
- Machine: Operating condition

## Testing (WA380-GJ20-38E-K-00-A)

1. Start the engine and set the machine in the straight travel position, and then drive up a slope of 1/5 gradient with no load in the bucket.
2. Depress the brake pedal to stop the machine, set the directional lever in the "N (neutral)" position, and stop the engine.
3. Turn the parking brake switch ON (to park), and then release the brake pedal gradually. At this time, the machine must not move.

★ When the engine is stopped, the parking brake is turned ON (to park) automatically.

★ Test the parking brake performance on an uphill and a downhill.



## Testing parking brake oil pressure (WA470-GJB0-360-K-00-A)

### ★ Testing tools

Sym- bol	Part No.	Part name
W	1	799-101-5002 Hydraulic tester
		790-261-1204 Digital hydraulic tester
	2	793T-615-1730 Adapter
		07002-11023 O-ring

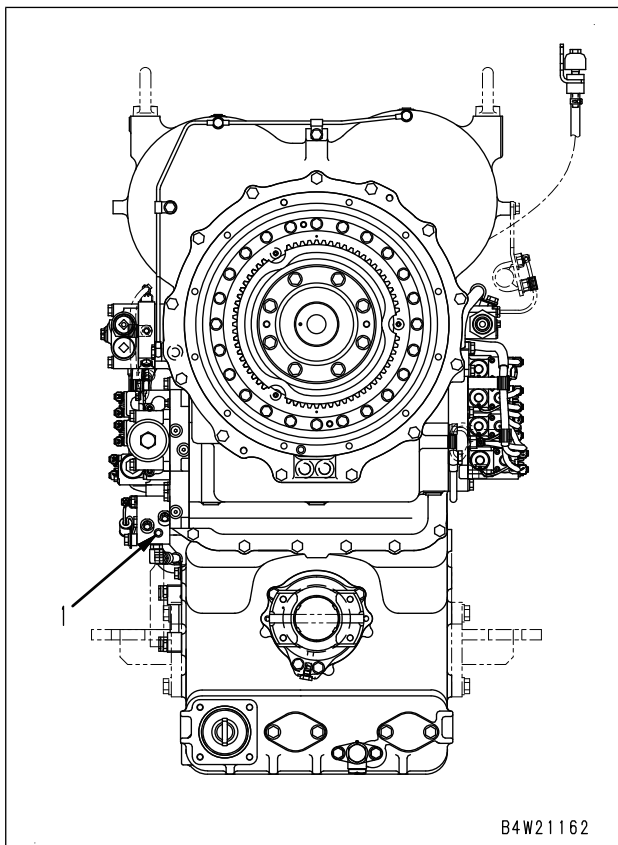
⚠ Place the machine on a level ground, lower the work equipment to the ground, set the parking brake switch and work equipment lock switch in LOCK position, stop the engine, and chock the wheels.

★ Measure the parking brake oil pressure under the following condition.

- Torque converter oil temperature: 80 to 100°C

### Testing (WA470-GJB0-362-K-00-A)

1. Remove side cover (1) on left of rear frame.
2. Remove parking brake oil pressure pickup plug (1).



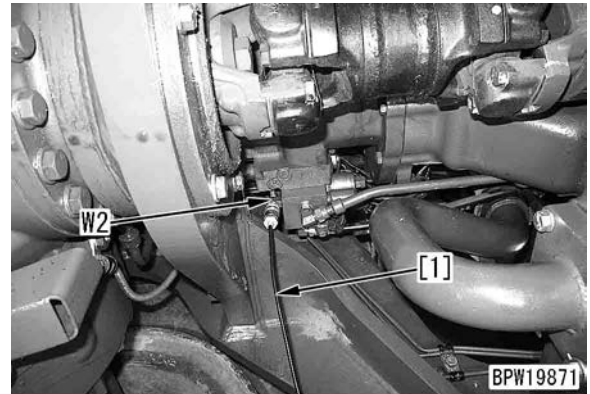
3. Install adapter W2 and hose [1] of hydraulic tester W1, and connect them to gauge [2].

🔧 **Adapter:**

**9.8 to 12.74 Nm {1.0 to 1.3 kgm}**

★ The hose for digital hydraulic tester W2 can also be used.

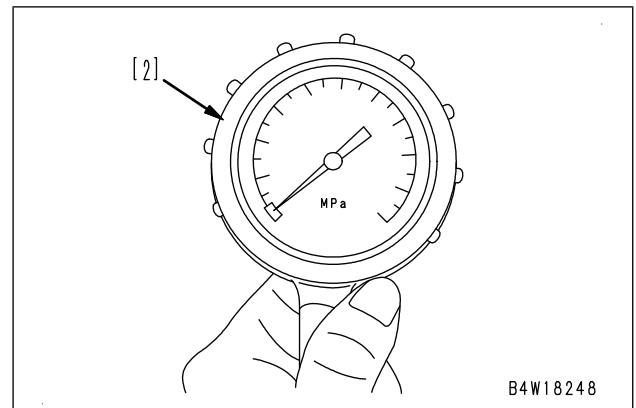
★ Use gauge of 6 MPa {60 kg/cm<sup>2</sup>}.



4. Start the engine, and run it at low idle, and measure the parking brake oil pressure.

⚠ Keep depressing the brake pedal for safety.

★ Measure the oil pressure at when the parking brake switch is turned OFF.



5. After finishing test, remove the testing tools and restore the machine.

🔧 **Parking brake pressure pickup port plug (1):**

**9.8 to 12.74 Nm {1.0 to 1.3 kgm}**

## 30 Testing and adjusting

### Brake system

## Testing wear of parking brake disc

(WA380-GJ72-001-K-00-A)

### ★ Testing tools

Sym-bol	Part No.	Part name
X	Commercially available	Vernier calipers

⚠ Place the machine on a level ground, lower the work equipment to the ground, set the parking brake switch and work equipment lock switch in the LOCK position, stop the engine, and chock the wheels.

★ If the parking brake does not work effectively, check the parking brake disc for wear according to the following procedure.

### Testing

(WA470-GJ72-389-K-00-A)

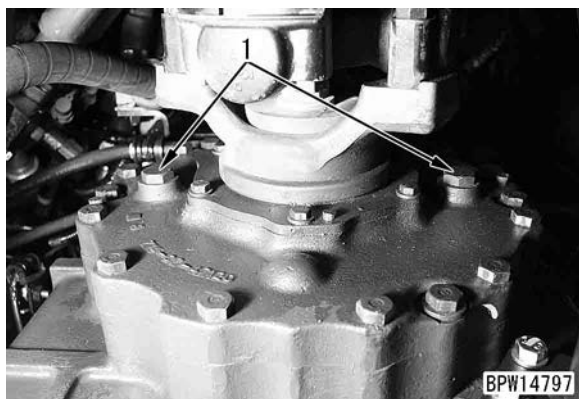
1. Drain the oil from the transmission case.



**Transmission case: 65 ℓ (refill capacity)**

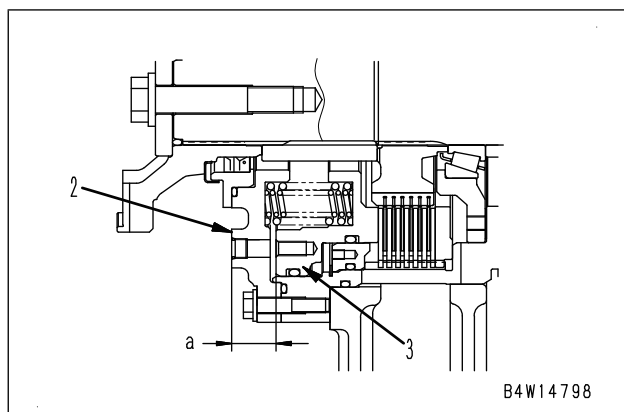
2. Remove one of 2 bolts (1).

★ Prepare an oil container to receive oil flow from the bolt mounting holes.



3. Measure depth (a) from the end of cage (2) to piston (3) by using vernier calipers X.

- Clearance (a): Max. 38.3 mm

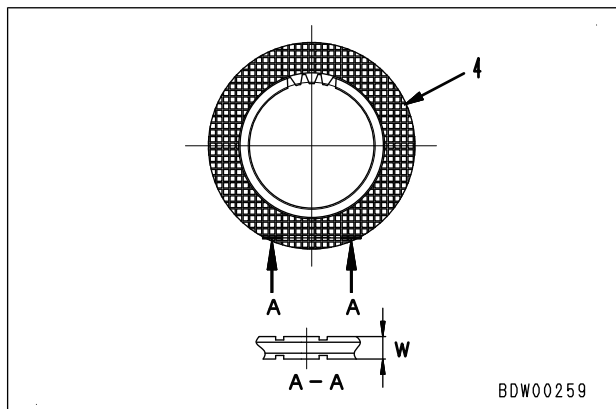


4. If depth (a) is above the standard, remove parking brake disc (4), and measure its thickness (W) of disc, referring to Disassembly

and assembly, "Removal of parking brake discs and plates".

- Judgement criteria of thickness(W): 2.97 mm

★ If the parking brake disc thickness is below the service limit, replace the disc.



- Refilling of oil (transmission case)  
Refill with oil to the specified level through the oil filler port. Run the engine to circulate the oil through the system. Then check the oil level again.



## Method of releasing parking brake manually (WA380-GJ20-001-K-01-A)

⚠ Releasing the parking brake manually is a means to move the machine from a dangerous job site to a safe place. Apply this means only in an emergency.

⚠ Place the machine on a level ground, lower the work equipment to the ground, set the parking brake switch and work equipment lock switch in the LOCK position, stop the engine, and chock the wheels.

★ The parking brake is controlled hydraulically. If you cannot release the parking brake because of a failure in the transmission, emergency release solenoid valve, etc., you can move the machine by releasing the parking brake manually.

### How to release (WA470-GJ20-141-K-00-A)

#### Releasing method by using the parking brake emergency release valve

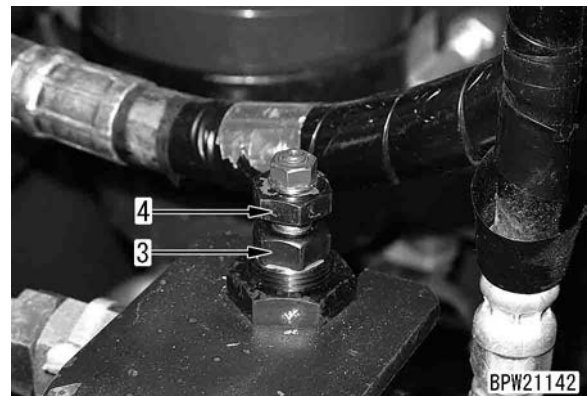
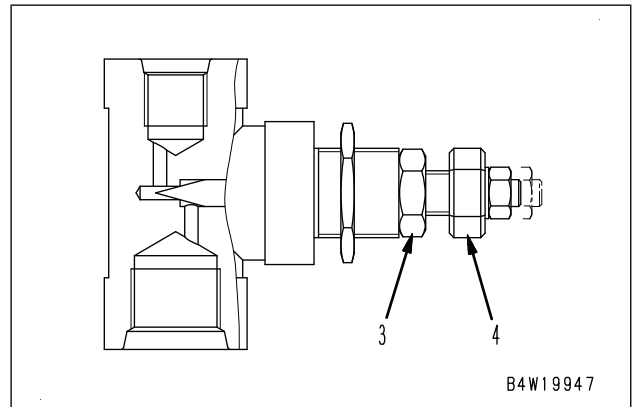
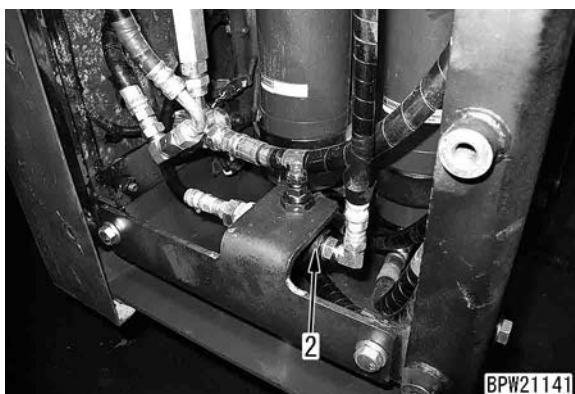
1. Remove inspection cover (1) on the right side of the machine.



2. Loosen lock nut (3) and grip (4) of parking brake emergency release valve (2) and open the release valve.

🔧 Lock nut (3):  
 $19.6 \pm 4.9 \text{ Nm } \{2.0 \pm 0.5 \text{ kgm}\}$

🔧 Grip (4):  
 $19.6 \pm 4.9 \text{ Nm } \{2.0 \pm 0.5 \text{ kgm}\}$



3. Turn the starting switch to ON position, turn the parking brake switch to ON position and then to OFF position.

★ The parking brake is released by the above procedure.

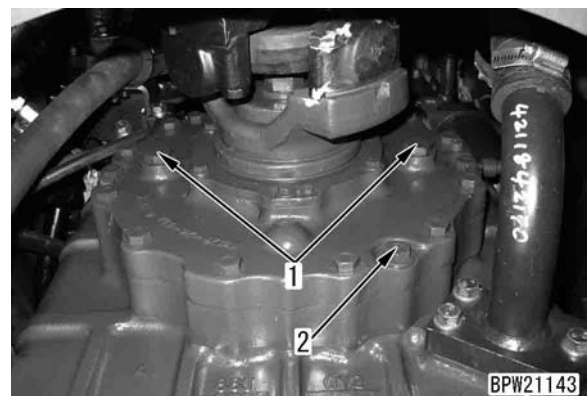
#### Mechanical releasing method

1. Drain the oil from the transmission case.

🔧 Transmission case: 65 l (refill capacity)

2. Remove 2 bolts (1). (Right and left)

★ Prepare an oil container to receive oil flow from the plug mounting holes.



3. Remove mounting bolts (2) (2 pieces), and tighten them alternately into mounting part of bolt (1).