



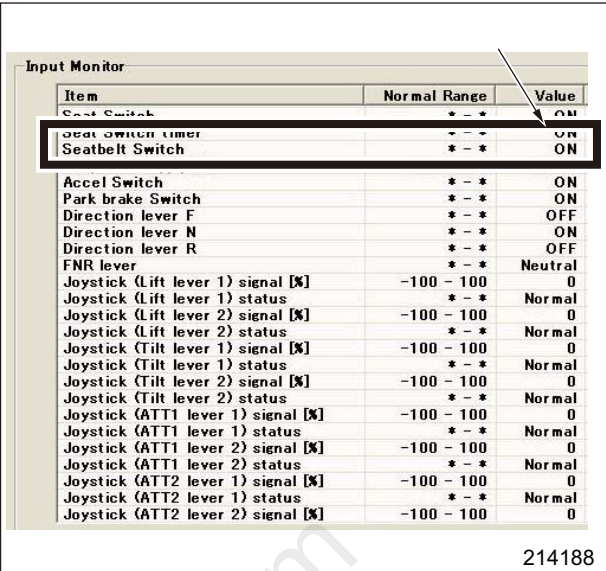
Service Manual

Chassis & Mast

MC/FC

DP40N	CT12C-00011-up
DP45N	CT19E-50001-up
DP50CN	CT19E-80001-up
DP50N	CT28D-50001-up
DP55N	CT28D-80001-up
GP40N	CT40A-00011-up
GP45N	CT29E-50001-up
GP50CN	CT29E-80001-up
GP50N	CT33D-50001-up
GP55N	CT33D-80001-up

- (5) Make sure that the seat belt switch turns ON on the input monitor screen and the seat belt warning lamp on the instrument panel goes out when the seat belt is properly fastened.



Item	Normal Range	Value
Seat Switch	* - *	ON
Seat Switch timer	* - *	ON
Seatbelt Switch	* - *	ON
Accel Switch	* - *	ON
Park brake Switch	* - *	ON
Direction lever F	* - *	OFF
Direction lever N	* - *	ON
Direction lever R	* - *	OFF
FNR lever	* - *	Neutral
Joystick (Lift lever 1) signal [%]	-100 - 100	0
Joystick (Lift lever 1) status	* - *	Normal
Joystick (Lift lever 2) signal [%]	-100 - 100	0
Joystick (Lift lever 2) status	* - *	Normal
Joystick (Tilt lever 1) signal [%]	-100 - 100	0
Joystick (Tilt lever 1) status	* - *	Normal
Joystick (Tilt lever 2) signal [%]	-100 - 100	0
Joystick (Tilt lever 2) status	* - *	Normal
Joystick (ATT1 lever 1) signal [%]	-100 - 100	0
Joystick (ATT1 lever 1) status	* - *	Normal
Joystick (ATT1 lever 2) signal [%]	-100 - 100	0
Joystick (ATT1 lever 2) status	* - *	Normal
Joystick (ATT2 lever 1) signal [%]	-100 - 100	0
Joystick (ATT2 lever 1) status	* - *	Normal
Joystick (ATT2 lever 2) signal [%]	-100 - 100	0
Joystick (ATT2 lever 2) status	* - *	Normal

214188

Fig. 3-2 Input monitor screen

•If Seat belt SW does not indicate ON

Check the seat switch operation and wiring connections by referring to "Harness codes of section 8", the "VCM-4 controller of section 9.1", and the "Seat switch/Seat belt switch of section 9.2."

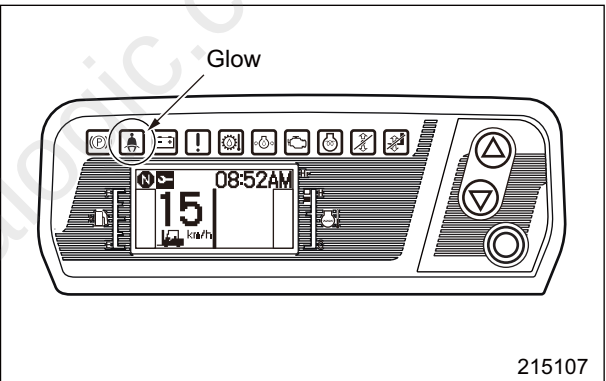


Fig. 3-3 Instrument panel screen

3. Disassembly and Reassembly

3.1 Disassembly and Reassembly of Wheel Hub

Disassembly sequence

- 1 Hub cap
- 2 Lock nut (hexagon nut)
- 3 Lock plate
- 4 Lock nut (hexagon nut)
- 5 Bearing cone
- 6 Hub (with bearing cup)
- 7 Bearing cone
- 8 Oil seal
- 9 Bearing cup
- 10 Bearing cup

Suggestions for Disassembly

- (1) Remove rear wheels beforehand.
- (2) Check the hub for looseness. If there is looseness, the bearing may be worn.
- (3) If the bearing is not damaged, it is not necessary to remove it.
- (4) The cup and the cone of the bearing make a pair. When replacing, replace them as a set.
- (5) When removing the oil seal 8, replace it with a new one. Do not reuse it.
- (6) Use a special service tool to remove the bearing.

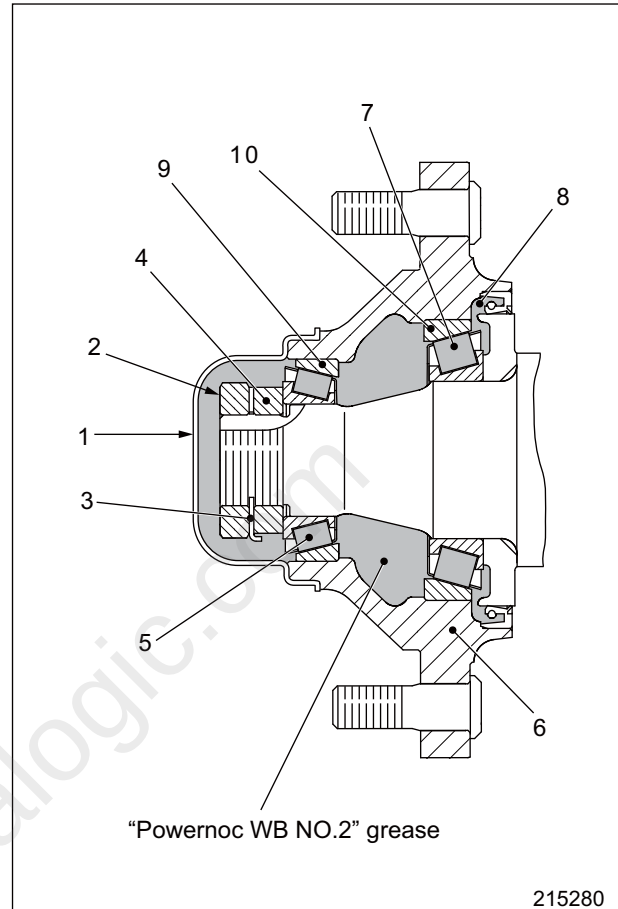
Inspections after Disassembly

- (1) Bearing
Replace the bearing if damage, seizure, peel, rotation failure or unusual noise is found.
- (2) Hub
Replace the hub if cracks are detected by dye check.
- (3) Oil seal
Replace the damaged or worn oil seal with a new one.

Suggestions for Reassembly

For reassembly, follow the disassembly sequence in reverse, while observing the instructions below.

- (1) Fill "Powernoc WB No.2" grease or an equivalent wheel bearing grease into the shaded area as shown in the illustration on the right. Make sure that sufficient grease is applied to the roller retainer. Also, apply grease to the oil seal lip groove.
- (2) Adjust the bearing. Refer to "Adjusting procedure of wheel bearing reassembly" on the next page.
- (3) Before installation, fill the inside of the hub cup 1 with grease, then install the hub cup 1 to the wheel hub.



6. MC Control Valve

6.1 Outline

This multiple control valve (MSV06A) is a manual control valve for exclusive use of load control of truck. It is a combined control valve incorporating a steering flow priority valve, an electromagnetic lift lock valve, an electromagnetic unload valve and a flow control valve.

6.1.1 Hydraulic circuit

A hydraulic control system of this valve is of an open center parallel circuit arrangement (Fig. 1). It has a center bypass function so that an oil pressure source becomes free of load when a spool is in the neutral position. When more than one spool is fully stroked, their moving sections act simultaneously, but they do not always act in the same manner. This is because of the pressure difference between moving sections, as they have different loads and areas. In this situation, a moving section under the smallest load pressure acts first, and the one under the largest load acts last. In a hydraulic control system it is necessary to adjust a stroke of each valve according to its load pressure so that all moving sections operate in the same manner. For example, a change-over valve under a heavy load pressure must be fully stroked while change-over valves under smaller load pressure may need only half of the full stroke.

- 1 Priority valve
- 2 Main relief valve
- 3 Steering system relief valve
- 4 Lift valve
- 5 Lift lock valve
- 6 Solenoid for lift lock valve
- 7 Tilt valve
- 8 Attachment valve
- 9 Unloader valve
- 10 Solenoid for unloader valve
- 11 Center bypass port
- 12 Solenoid for lift lock valve
- 13 Flow regulator valve

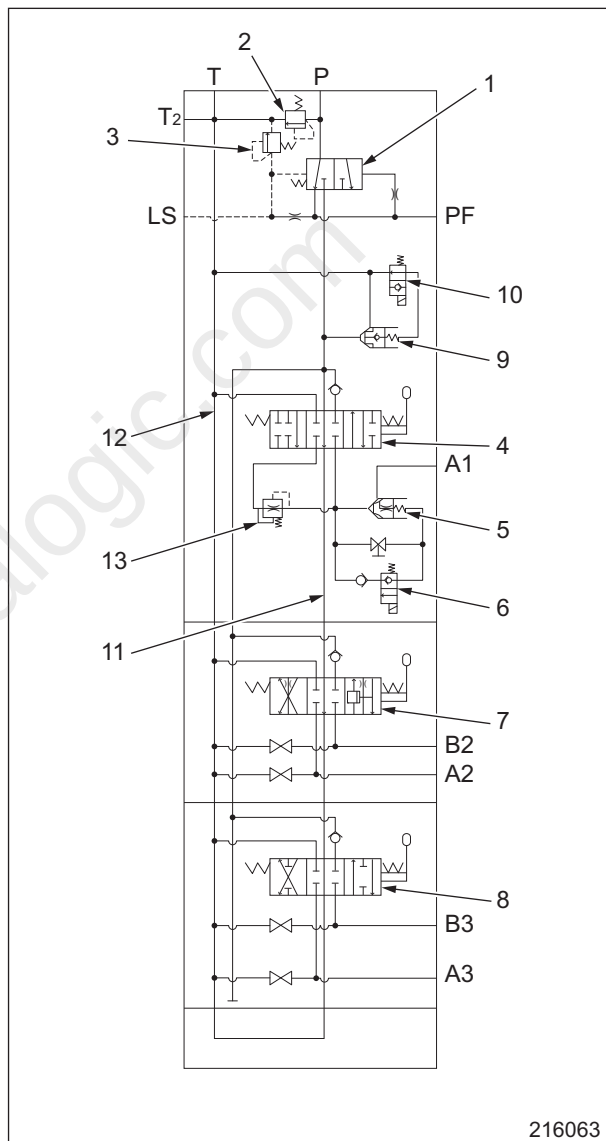


Fig. 1 An example of a hydraulic circuit

6.2 Inspection and Repair

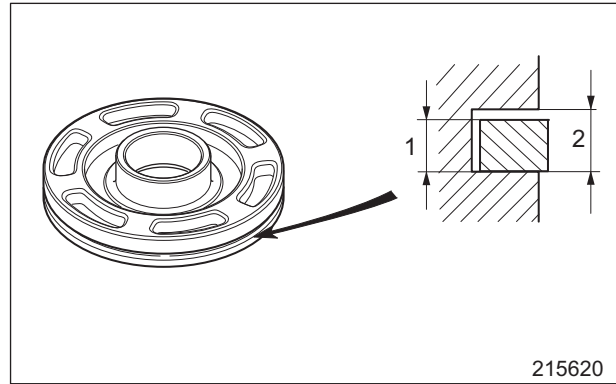
(1) Clutch piston

- (a) Inspect sliding area for wear and damage.
If any scratches are found, polish the scratched surface using a fine grit sandpaper. If significant scratches are found, replace the clutch piston with a new one.
- (b) Measure the width of both the clutch piston seal groove and the piston seal, and if the measured width exceeds the service limit, replace it with a new one.

Unit: mm (in.)

Clutch piston seal width 1	A	$4 \begin{smallmatrix} 0 \\ -0.1 \end{smallmatrix} (0.16 \begin{smallmatrix} 0 \\ -0.004 \end{smallmatrix})$
	B	3.8 (0.150)
Clutch piston seal groove width 2	A	$4 \begin{smallmatrix} +0.2 \\ +0.1 \end{smallmatrix} (0.16 \begin{smallmatrix} +0.008 \\ +0.004 \end{smallmatrix})$
	B	4.3 (0.169)

A : Standard value B: Service limit



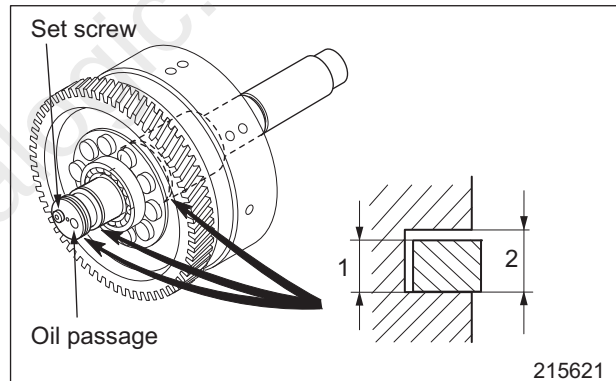
(2) Clutch shaft

- (a) Check both the spline and bearing mounting portions for wear or damage.
- (b) Measure the width of both the seal ring and clutch shaft groove, and if the measured width exceeds the service limit, replace it with a new one.

Unit: mm (in.)

Clutch shaft seal ring width 1	A	$2.5 \pm 0.05 (0.098 \pm 0.0020)$
	B	2.3 (0.091)
Clutch shaft groove width 2	A	$2.5 \begin{smallmatrix} +0.2 \\ +0.1 \end{smallmatrix} (0.098 \begin{smallmatrix} +0.008 \\ +0.004 \end{smallmatrix})$
	B	2.8 (0.110)

A : Standard value B: Service limit



- (c) Check oil passage for clogs.

If the passage is clogged, remove the set screw, and blow out the passage with compressed air.

Note: 1. After the set screw is removed, apply LOC-TITE 242 to the set screw before reinstalling.

2. Be sure to use filtered compressed air.

- (d) Check the fit between the clutch drum and clutch shaft and check rivets for looseness.

(3) Gear

Check gears for wear or damage.

(4) Clutch drum

Check clutch piston sliding portion, mating plate contact area and snap ring groove for wear or damage.

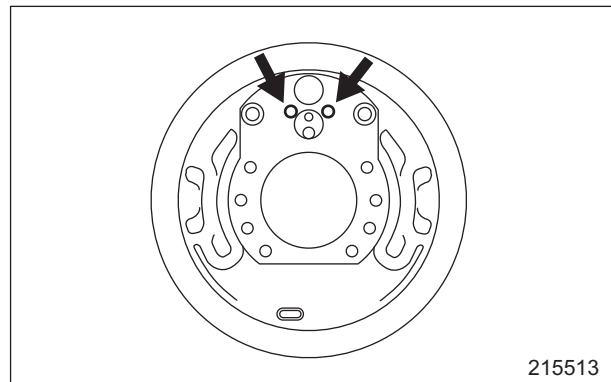
Suggestions for Reassembly

(1) Installing wheel cylinder

Tighten the wheel cylinder to the backing plate with bolts. Torque to specifications.

Unit: N·m (kgf·m) [lbf·ft]

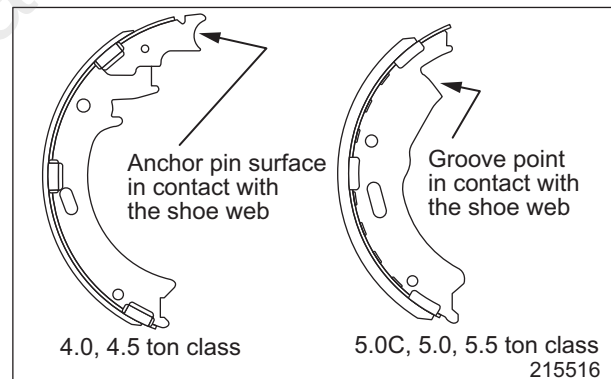
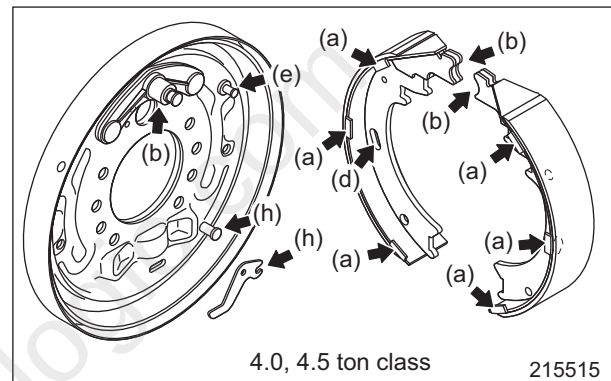
Item	Weight class	
	4.0, 4.5 ton class	5.0C, 5.0, 5.5 ton class
Tightening torque	17.65 to 26.48 (1.8 to 2.7) [13.03 to 19.54]	17.65 to 26.48 (1.8 to 2.7) [13.03 to 19.54]



(2) Greasing

Apply a thin coat of the brake grease (AKB100) to the following areas.

- (a) Shoe ledge (6 locations)
(Contact surface between the backing plate and the shoe)
- (b) Contact surface of the shoe web and the anchor pin of the backing plate. (4.0, 4.5 ton class)
- (c) Contact surface of the shoe web and the groove of the backing plate. (5.0C, 5.0, 5.5 ton class)
- (d) Contact surface of the cup of the hold-down spring and the shoe.
- (e) Contact part of the fitting cable and the sheave, and the pin. (4.0, 4.5 ton class)
- (f) Contact part of the fitting link and the toggle lever, and the pin. (5.0C, 5.0, 5.5 ton class)
- (g) Contact part of the adjusting lever and the pin.



(3) Installing shoe and lining assembly

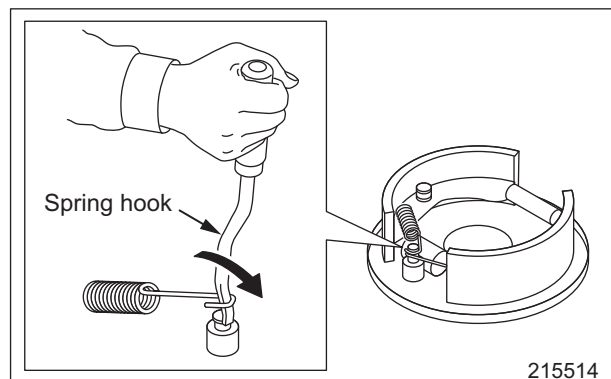
Ensure that each connector link of the wheel cylinder has been correctly inserted into the shoe web.

(4) Installing return spring

Use a special tool to install the return springs to the backing plate pins.

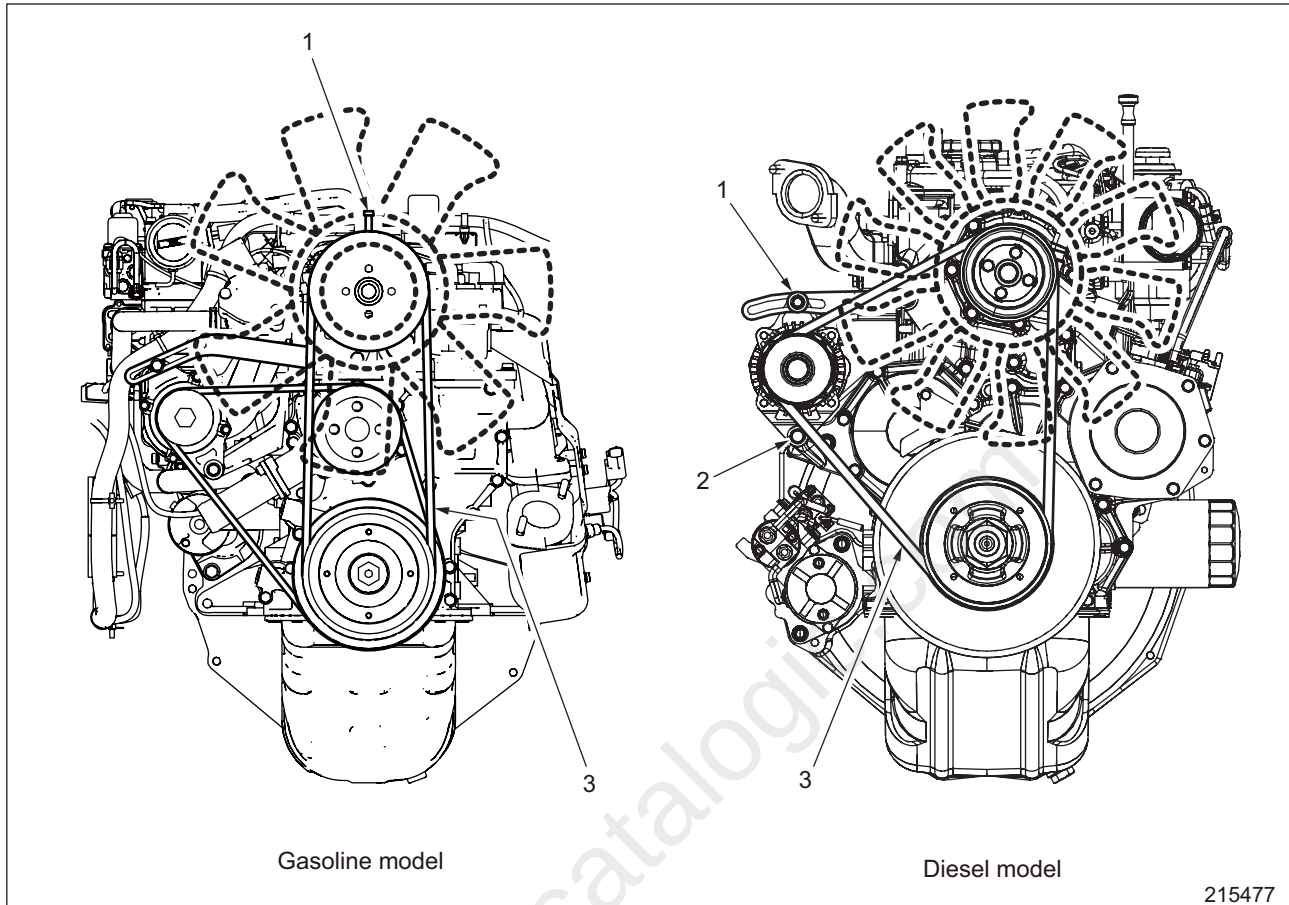
Special tool

Spring installer	65309-15413
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3. Removal and Installation

3.1 Fan Belt Removal



- 1 Tension assembly (pulley lock bolt)
- 2 Alternator lock bolt

- 3 Fan belt

3.1.1 Start by

Remove the radiator cover.

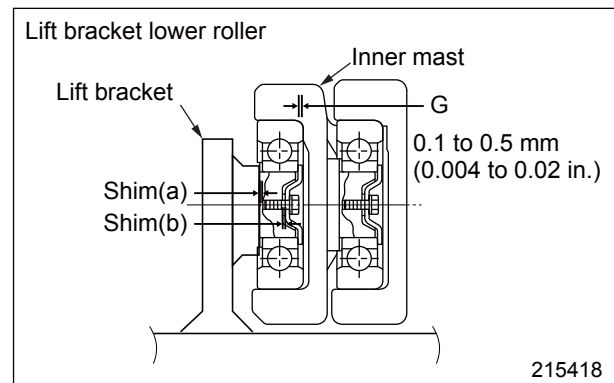
(3) Adjusting clearance G between the lower rollers and the inner mast

- Measure clearance G between the lower rollers and the inner mast. If the measured clearance G does not meet the standard value, adjust clearance G by referring to the following steps.

Note: For clearance measurement, refer to "14.4 Adjusting Clearance between Lift Bracket Roller and Inner Mast."

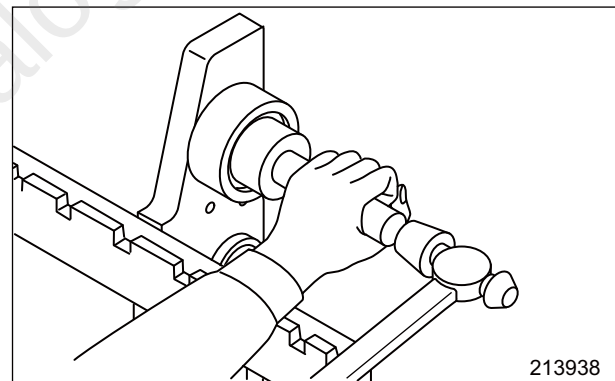
♦ Adjustment steps

- 1) If clearance G is large, increase the number of shims (a) as required.
- 2) Adjust the number of shims (b) so that the shims (b) thickness equals that of shim (a).
- 3) Shims (a) are available in two thicknesses: 0.5 and 1 mm (0.02 and 0.04 in.) and shims (b) are available in only 1 mm (0.04 in.) thicknesses.
- 4) If a shim with a thickness of 0.5 mm (0.02 in.) is added to shim (a) thickness adjustment using shim (b) is unnecessary.



(4) Installing Main Rollers

To install main rollers on shafts, use a driving tool, and be careful not to strike the outer roller surface with the driving tool. The side of the roller with larger chamfering must face toward the outside. Make sure the rollers rotate smoothly when installed.



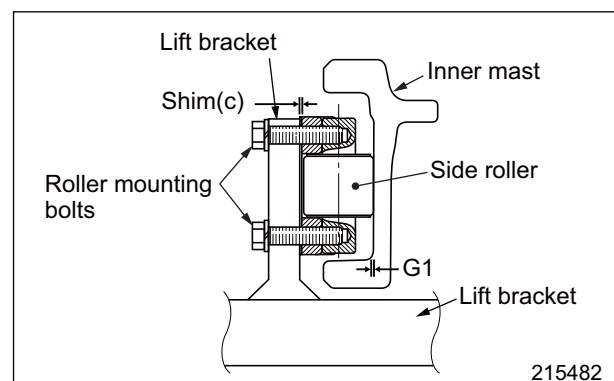
(5) Adjusting clearance G1 between the side roller and the inner mast

- Measure clearance G1 between the side roller's rolling contact surface and the inner mast. If the measured clearance G1 does not meet the standard value, adjust clearance G1 by referring to the following steps.

Note: For clearance measurement, refer to "14.4 Adjusting Clearance between Lift Bracket Roller and Inner Mast."

♦ Adjustment steps

If clearance G1 is large, increase the number of shims (c) as required. Shim (c) is available in two thicknesses: 0.5 and 1 mm (0.02 and 0.04 in.)



Full Version Available

Caterpillar DP50CN Forklift Service, Operator and Schematic Manual (99739-6E110)

Caterpillar DP50CN forklift service manual, covers hydraulics, mast, drive unit, wiring, and engine. Searchable PDF download.

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