



Service Manual

Chassis, Mast & Options

DP60

T20C-20001-up

DP70

T20C-70001-up

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3.2.2 Inspection and Repair**(1) Cylinder body**

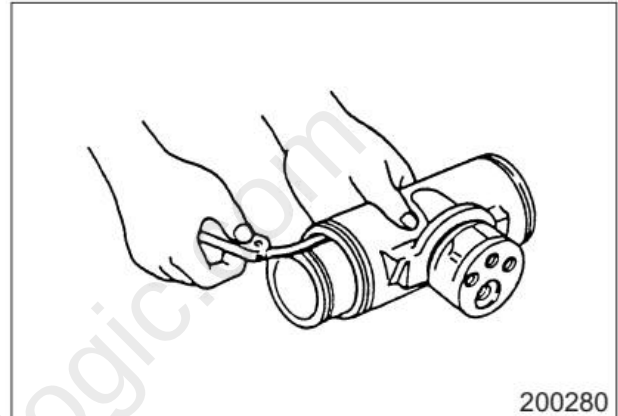
- (a) Check the bore of the cylinder body for rust, corrosion, and scoring.
- (b) Check the bleeder screw and oil pipe screw connections for damage.

(2) Piston

- (a) Check the sliding surfaces of the piston for rust or scoring.
- (b) Insert the piston into the cylinder body and measure the clearance between them.

If this clearance exceeds the service limit, replace the wheel cylinder assembly as a whole.

Clearance between cylinder body and piston	Standard value	0.020 to 0.105 mm (0.00079 to 0.00413 in.)
	Repair or service limit	0.15 mm (0.0059 in.)

**(3) Piston cup**

Check each cup for expansion or damage, and replace whichever has any defect, however minor.

Interference between piston cup and cylinder body	Standard value	1.85 mm (0.0728 in.)
	Repair or service limit	0.65 mm (0.0256 in.)

(4) Boot

Replace the boot if it has become hard or has otherwise aged and deteriorated. Replace it once per year.

3.2.3 Reassembly

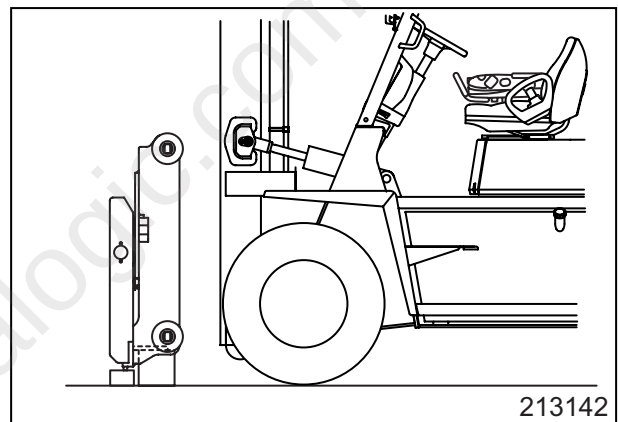
Reassembly should be performed in the sequence reverse to that of disassembly, but the following precautions must be observed.

- (1) Apply an even coat of brake fluid to the cylinder bore and piston cups.
- (2) Be careful not to damage the lips of the piston cups.
- (3) Also make sure the cups are correctly aligned.

- (4) Removing lift bracket
- (a) Remove the split pins from the lift chain, and remove the anchor nut and lock nut.
- (b) Remove the lift bracket with the following procedure.
- Bind the ends of the two lift chains with a rope, etc. Leave an extra 3 m (10 ft) length at the ends of the rope.
 - Bind the four hoses in the same manner with a rope, leaving an extra 3 m (10 ft) length at the ends of the rope.
 - Start the engine and raise the inner mast up to a position where the main rollers of the lift bracket come off. At this point, pull the lift chains and hoses taut by drawing the attached rope downward to prevent them from coming off from the chain wheels or hose reels.
 - When the inner masts reach to the position where the main rollers of the lift bracket can be removed, reverse the truck, and separate the lift bracket from the truck.



When the masts are rising, never touch any control levers except the lift lever.



4.2 Inspection and Repair

4.2.1 Lift bracket

- (1) Check the main rollers and side rollers for sticking, wear or cracks.
- (2) Check the welded part of the lift bracket for cracks.
- (3) Check the guide bars whether they are bent or deformed.

4.2.2 Fork

- (1) Check the fork for bend, misalignment of tips, and cracks.

4.2.3 Hose

- (1) Replace the hoses every two years.

(3) Suggestion for reassembly

- (a) When any of the hub drum assembly parts has been replaced, reassemble the hub drum assembly. Align the extension valve grooves in the brake drum and front wheel hub.

When installing the oil deflector, do not forget to apply gasket adhesive to the mating surfaces.

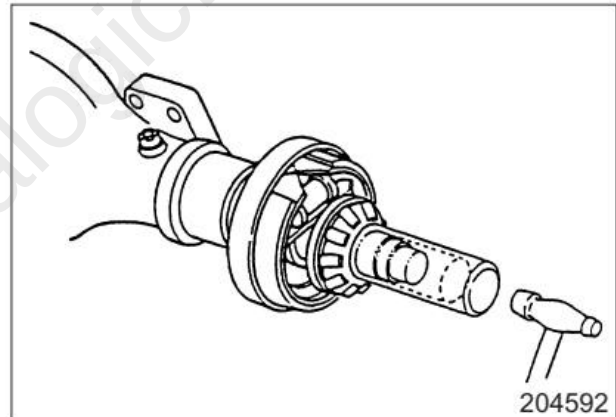
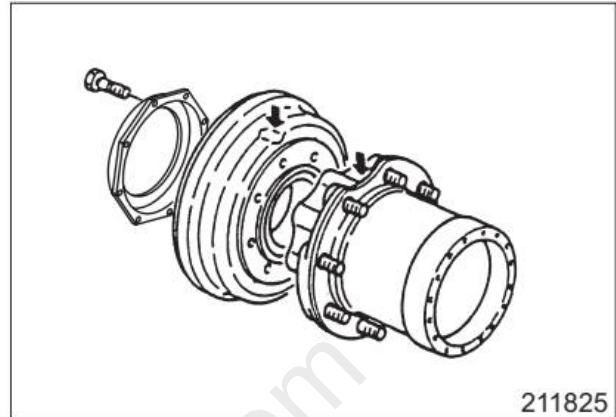
Tightening torque of brake drum nut	$245 \pm 24.5 \text{ N}\cdot\text{m}$ $(25.0 \pm 2.5 \text{ kgf}\cdot\text{m})$ $[181 \pm 18.1 \text{ lbf}\cdot\text{ft}]$
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NOTE

Replace all oil seals that have been installed in the front axle housing with new ones.

- (b) Reassembling tapered roller bearing (inner race)

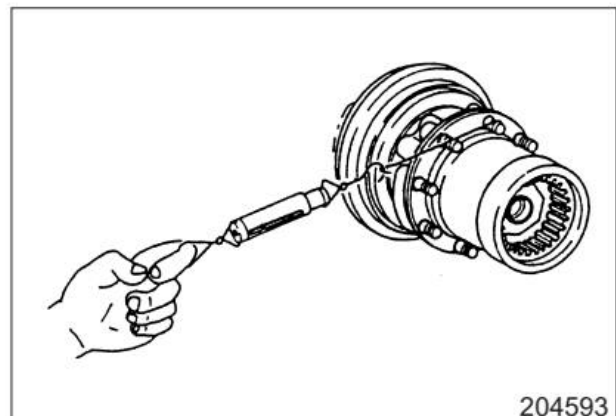
Using an installer, replace the tapered roller bearing inner race in position together with the seal retainer.



- (c) Wheel hub bearing preload adjustment

Hook a spring scale to one of the hub bolts and measure the preload. Adjust the preload by means of the nut that holds the ring gear. However, it is advisable to aim at a value of preload in the lower tolerance limit, if the bearings have long been in service.

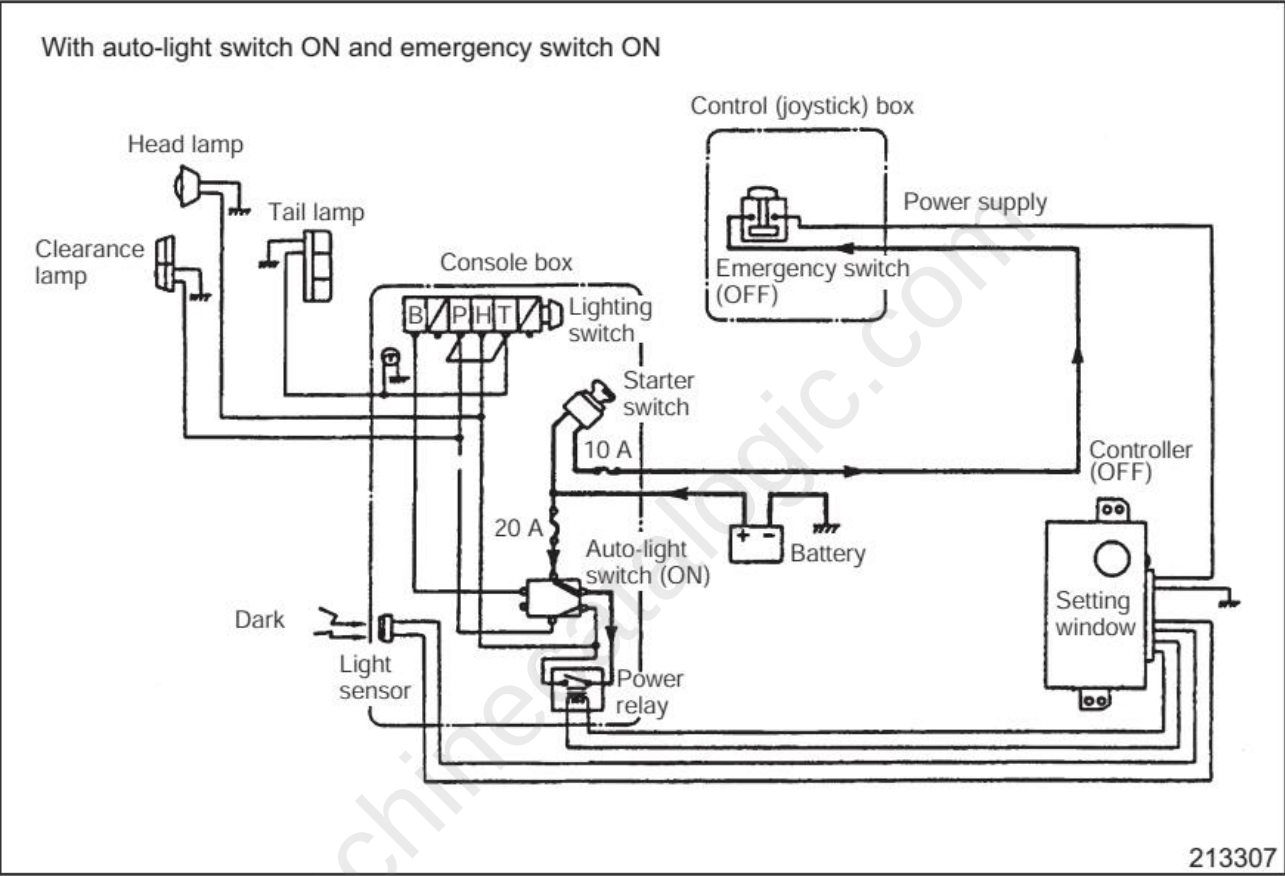
Preload of hub bearing (force applied to the hub bolt in the tangential direction)	$147 \text{ to } 167 \text{ N}$ $(15 \text{ to } 17 \text{ kgf})$ $[33 \text{ to } 38 \text{ lbf}]$
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- (2) Suggestion for Reassembly
- (a) During reassembly, do not forget to replace the Repair Kit parts marked with an asterisk (*) in the figure.
- (b) Completely remove oil from the mating surfaces of the cover 1 and 14 and 24 and body 4 and 17.
- (c) Apply grease to the oil seal lip.
- (d) Be careful not to damage the lip of the oil seal with the spline edges of drive gear 5.
- (e) Tighten the bolts evenly.

Tightening torque of bolt 12	55.9 to 62.7 N•m (5.7 to 6.4 kgf•m) [41.2 to 46.2 lbf•ft]
Tightening torque of bolt 16	55.9 to 62.7 N•m (5.7 to 6.4 kgf•m) [41.2 to 46.2 lbf•ft]
Tightening torque of bolt 26	38.2 to 43.1 N•m (3.9 to 4.4 kgf•m) [28.2 to 31.8 lbf•ft]

- (4) Turning OFF the emergency switch with the auto-light switch ON causes the power relay to remain OFF. Under this condition, all lamps will remain OFF. If the auto-light switch is OFF, the lighting switch is effective and can turn ON each selected light, regardless of the emergency switch and starter switch.



Operation-3

Operation logic:

Auto-light switch OFF				Auto-light switch ON					
				Dark			Bright		
Lighting switch	OFF	1st position	2nd position	OFF	1st position	2nd position	OFF	1st position	2nd position
Clearance, tail lamps		O	O	O	O	O			
Head lamps			O	O	O	O			

5. Disassembly and Reassembly

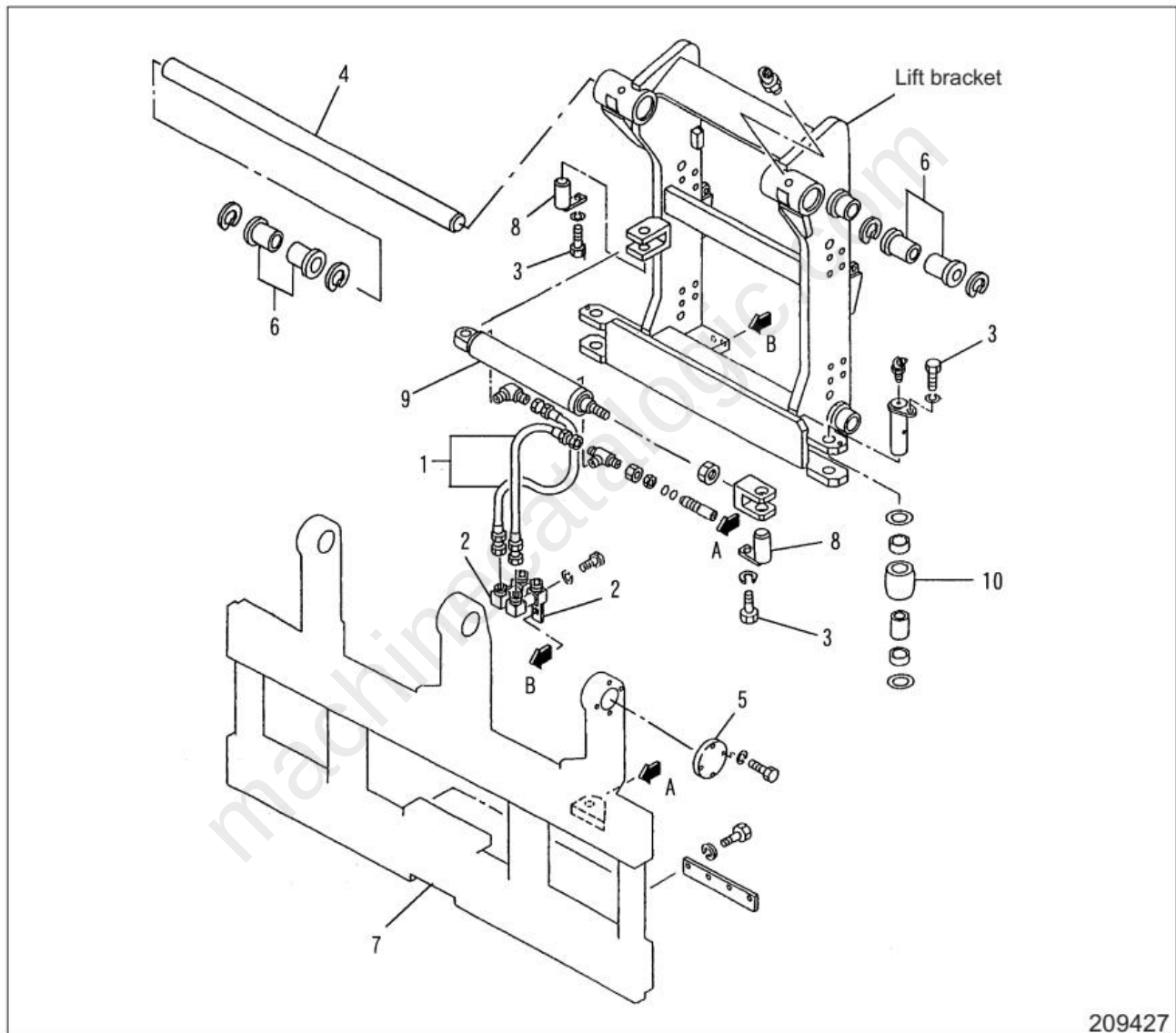
5.1 Side shifter assembly

5.1.1 Disassembly

(1) Preparation

- (a) Place the fork positioner assembly removed from the truck on wooden blocks with the lift bracket on the bottom side.

- (b) Prepare containers to receive oil, which should remain in the cylinder and hydraulic hoses.



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(2) Disassembly sequence

- | | |
|------------------------|-----------------------|
| 1 Hose (cylinder side) | 6 Bushing |
| 2 Joint | 7 Carriage |
| 3 Bolt | 8 Pin |
| 4 Guide bar | 9 Side shift cylinder |
| 5 Stopper plate | 10 Shifter roller |

Safety Cautions

⚠ WARNING

Fire and explosion

Keep flames away

Store fuel and engine oil in a well ventilated designated area.

Make sure that the caps of fuel and engine oil containers are tightly closed.



Do not use flames, do not smoke, and do not work near a heater or other fire hazard where fuel or oil is handled or when cleaning solvent is being used for washing parts.

Wipe off spilled fuel, oil and LLC immediately and thoroughly. Spilled fuel, oil and LLC may ignite and cause a fire.

Keep surrounding area tidy and clean

Do not leave combustible or explosive materials, such as fuel, engine oil and LLC, near the engine. Such substances can cause fire or explosion.

Remove dust, dirt and other foreign materials accumulated on the engine and surrounding parts thoroughly. Such materials can cause fire or the engine to overheat. In particular, clean the top surface of the battery thoroughly. Dust can cause a short-circuit.

Always operate the engine at a position at least 1 m [3.28 ft.] away from buildings and other equipment to prevent possible fire caused by engine heat.

Avoid accessing crankcase until engine cools

Do not attempt to open the side cover of the crankcase before the engine cools down. Wait at least 10 minutes after stopping the engine.

Opening the cover when the engine is hot allows fresh air to flow into the crankcase, which can cause oil mist to ignite and explode.

Care about fuel, oil and exhaust gas leakage

If any fuel, oil or exhaust gas leakage is found, immediately take corrective measures to stop it.

Such leakages, if left uncorrected, can cause fuel or engine oil to reach hot engine surfaces or hot exhaust gas to contact flammable materials, possibly leading to personal injury and/or damage to equipment.

Use explosion-proof lighting apparatus

When inspecting fuel, engine oil, coolant, battery electrolyte, etc., use a flameproof light. An ordinary light, if accidentally broken, may ignite and cause an explosion.

Prevent electrical wires from short-circuiting

Avoid inspecting or servicing the electrical system with the ground cable connected to the battery. Otherwise, a fire could result from short-circuiting. Be sure to disconnect the battery cable from the negative (-) terminal before beginning with the work procedure.

Short-circuits, possibly resulting in fire, may be caused by a loose terminal or damaged cable/wire. Inspect the terminals, cables and wires, and repair or replace the faulty parts before beginning with the service procedure.

Keep fire extinguishers and first-aid kit handy

Keep fire extinguishers handy, and become familiar with their usage.

Keep a first-aid kit at the designated place where it is easily accessible by anyone at any time.



Establish response procedures to follow in the event of fire or accident. Provide an emergency evacuation route, contact points, and means of communication in case of emergency.

Full Version Available

Caterpillar DP60 Forklift Service and Operator Manual (99709-67100)

Caterpillar DP60 forklift service manual, covers hydraulics, drive unit, wiring, mast and engine work. Searchable PDF. Instant PDF download.

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