



Operation & Maintenance Manual

FC/MC

GP15N	ET34L-02001-up	DP15N	ET16D-01001-up
GP18N	ET34L-42001-up	DP18N	ET16D-41001-up
GP20CN	ET34L-61001-up	DP20CN	ET16D-61001-up
GP20N	ET17DL-01001-up	DP20N	ET18C-01001-up
GP25N	ET17DL-53001-up	DP25N	ET18C-55001-up
GP30N	ET13FL-02001-up	DP30N	ET14E-04001-up
GP35N	ET13FL-51001-up	DP35N	ET14E-53001-up

Keep this manual in your lift truck as a ready reference

Original Instructions

99710-6W110

[illegible]

(2) THE FIGURE OF THE CONNECTOR SHOWN IN THIS DRAWING MEANS ONE OF THE MAIN HARNESS SIDE.

Schematic No.	Used for	Truck Model	Serial No.
ES019-6M110 3/6	99719-6M110	DP 15N	ET16D-01001 up
		DP 18N	ET16D-41001 up
		DP 20CN	ET16D-61001 up
		DP 20N	ET18C-01001 up
		DP 25N	ET18C-55001 up
		DP 30N	ET14E-04001 up
		DP 35N	ET14E-53001 up

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Inspections after Disassembly

(1) Axle shaft

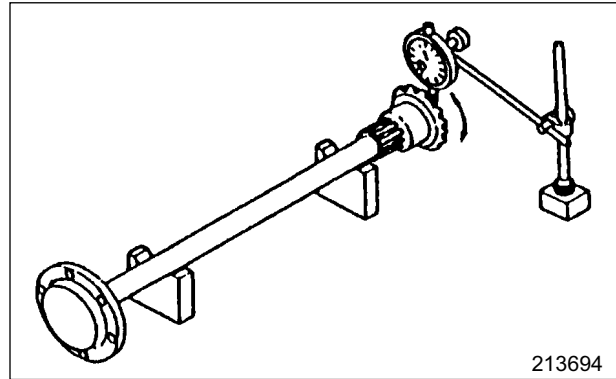
(a) Looseness of mating splines

Mount the differential bevel gear on the splined end of the shaft and set a dial indicator as shown. Rotate the bevel gear in the direction shown and read the free play (looseness of mating splines).

Unit: mm (in.)

Axle shaft Looseness of mating splines	A	0.09 to 0.28 (0.004 to 0.011)
	B	0.5 (0.020)

A: Standard value B: Repair or service limit



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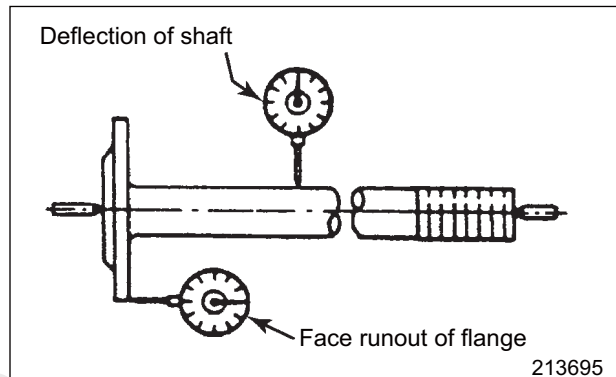
(2) Shaft deflection and flange runout

(a) Set a dial indicator at the middle part of the axle shaft. Rotate the shaft and read the dial indicator (deflection of axial shaft).

Unit: mm (in.)

Shaft deflection (1/2 of indicator reading)	A	0.5 (0.020) maximum
	B	1.0 (0.040)

A: Standard value B: Repair or service limit



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(b) Set a dial indicator against the flange of the axle shaft as shown. Rotate the shaft and read the face runout of flange.

Unit: mm (in.)

Face runout of axle shaft flange	A	0.08 (0.003)
	B	0.5 (0.020)

A: Standard value B: Repair or service limit

(3) Axle housing

- Check the surfaces of axle housing in contact with the mast bearing for damage.
- Check the entire axle housing for distortion, dents and other defects. Pay particular attention to the welds to see if any of the welds are cracked enough to require repair.

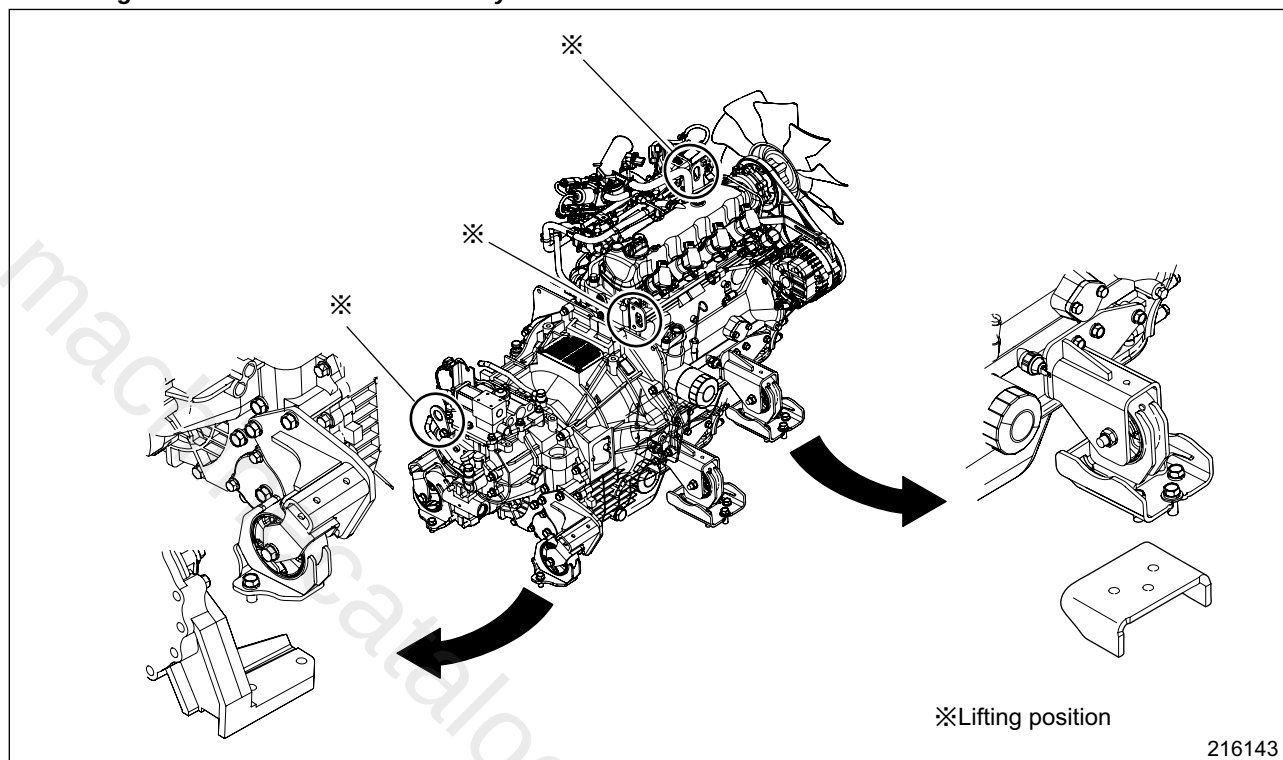
(4) Others

- Check the outer surface of oil seal and retainer for wear or damage.
- Check the outer and inner oil seals for wear or damage.

4. Troubleshooting

Hydraulic tank	Hydraulic tank heats excessively	Not enough oil in hydraulic tank	Refill.
		Oil viscosity improper	Change upon referring to "Fuel and Lubricant Specifications" on chapter 13 Service data 4.2 Fuel and Lubricant Specifications.
		Overload	Check working conditions and, if overloaded, urge the operator to stay within the load limit.
		Local overheating of oil line due to a large restriction to flow	Clean oil line.
		Relief valve adjustment improper	Readjust pressure setting.
		Pressure drop due to fatigued or broken springs	Disassemble or replace and readjust pressure.
		Gear pump worn	Replace pump.
		Outlet pipe or tube flattened, or restriction to flow	Repair or replace.
	Cylinders move too slow	Shortage of oil due to a natural loss	Replenish oil upon referring to "Fuel and Lubricant Specifications" on chapter 13 Service data 4.2 Fuel and Lubricant Specifications.
		Oil leakage due to damaged oil line and seals	Repair or replace.
		Oil viscosity too high	Change upon referring to "Fuel and Lubricant Specifications" on chapter 13 Service data 4.2 Fuel and Lubricant Specifications.
Gear pump	Cylinders move too slow	Gear pump does not pump oil	Check pump and piping; repair or replace.
		Oil leakage from oil line	Check oil for level and condition; add or change oil.
		Gear pump internally leaking	Replace pump.
	Noisy	Poor pumping	Replenish oil upon referring to "Fuel and Lubricant Specifications" on chapter 13 Service data 4.2 Fuel and Lubricant Specifications.
		Cavitation	(1) Check suction pipe for any flat portion or loose connection; retighten or replace. (2) Check shaft oil seal for airtightness; replace pump. (3) Check pump body for any outside interference; repair.
	Pump case, drive gear or pump port flange damaged	Pressure too high	Replace pump. (Check to see if relief valve setting is correct.)
		Distortion or damage due to external strain or stress	Replace pump. (1) Check to see if return line is blocked or restricted. (2) Check to see if pipe connections have been externally strained or stressed.
	Oil leakage from pump	Oil oozes out through the oil seal	Replace shaft seal.
		Oil oozes out onto the drive shaft sliding surfaces	Replace whole pump assembly.
		Loose bolts that secure the pump	Retighten. Replace if needed.
		Degraded performance of sealing inside pump	Replace gasket.

1.1.4 Engine and transmission assembly



Removal sequence

- 1 Transmission mounting bolt
- 2 Engine mounting bolt

3 Engine and transmission assembly

Start by

Lift the engine and transmission assembly with a hoist and slings.

Unit: kg (lb)

Weight	Approx. 250 (551.3)
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Suggestions for Removal

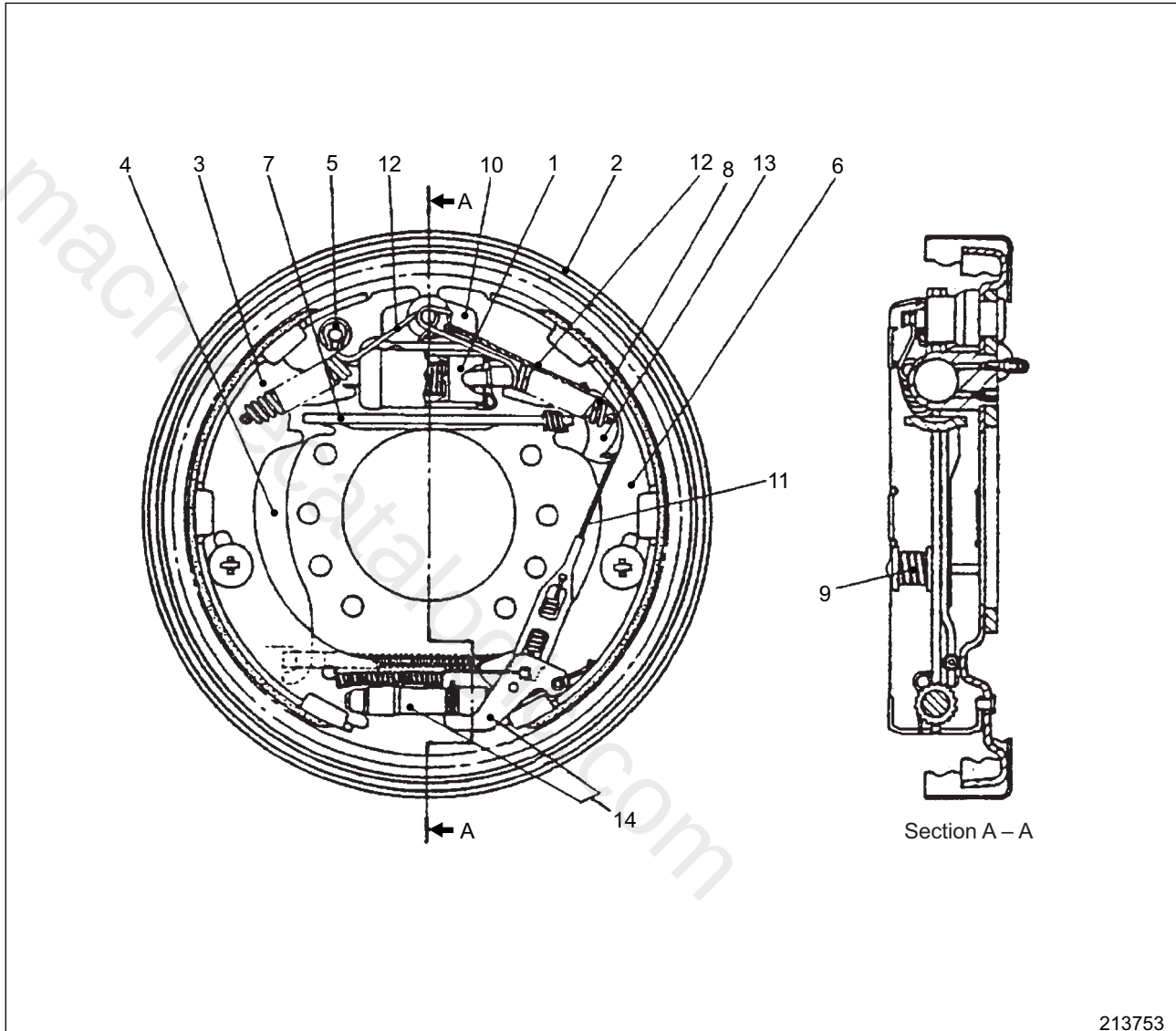
- (1) Lift the engine and transmission assembly just the amount necessary to remove the load on the mounting cushion before removing the mounting bolts 1 and 2. Remove the engine support mounting bolts.
- (2) By hooking wire into 3 hooks, slowly lift the engine and transmission assembly 3 out by moving it backwards while maintaining its balance.

Note: 1. With the engine and transmission assembly suspended, drain the transmission oil and clutch oil.

2. There is only one drain plug in the powershift transmission.

2.2.4 Reassembly

1 ton class



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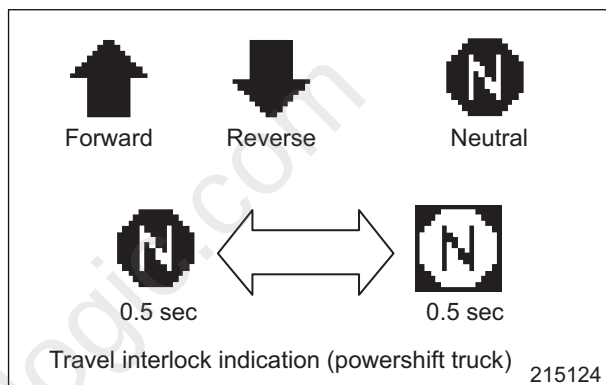
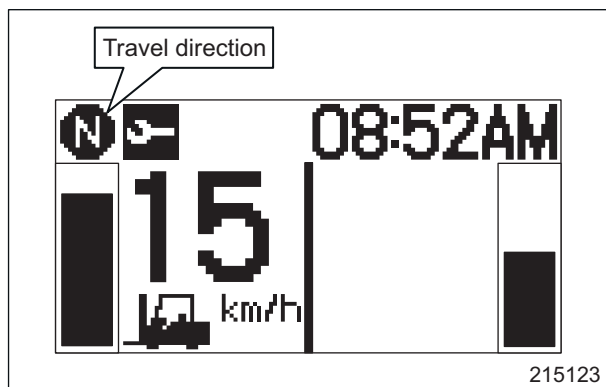
Reassembly sequence

- | | |
|-------------------------------|--------------------------------------|
| 1 Wheel cylinder | 9 Hold-down spring, Cup, Pin |
| 2 Backing plate | 10 Shoe guide plate |
| 3 Shoe and lining (primary) | 11 Fitting cable |
| 4 Parking brake lever | 12 Return spring |
| 5 Retainer, Washer | 13 Cable guide, Sheave, Pin, Washer |
| 6 Shoe and lining (secondary) | 14 Adjusting lever, Adjusting screw, |
| 7 Strap | Adjusting spring |
| 8 Anti-rattle spring | |

5.2.5 Direction display

This shows truck traveling direction. When starting the engine, if the direction lever is positioned to a place other than N (Neutral) position, symbol N blinks and the engine can not be started. In the powershift truck, if an operator leaves the seat while the engine is running and the direction lever is positioned to a place other than the N (Neutral) position, the symbol N blinks and the transmission is shifted to N (neutral).

Note: 1. Truck direction display is changed by direct lever signal.



♦Clearance G1

Clearance between side roller circumference and inner mast side roller thrust surface: Move the side roller to the upper end of the inner mast and slide the lift bracket to either the left-most or rightmost position. Take measurement of clearance G1 between the roller circumference and inner mast.

Adjust the clearance with shims (d) to the specification.

Unit: mm (in.)

Clearance G1	0.1 to 0.5 (0.004 to 0.020)
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(1) Choosing correct roller diameters

- ♦Measure clearance F for upper rollers 2, middle rollers 3 and lower rollers 4. If the measured clearances do not conform to the standard values, replace with rollers of correct diameters listed in the table on the right.

Note: For measuring procedures, refer to "Inspection and Adjustment."

- ♦The rollers should rotate smoothly when installed.

(2) Adjusting clearance G between the middle roller and thrust plate

Note: The following adjustment is not required for the upper roller.

- ♦Measure clearance G between the middle roller and thrust plate. If the measured clearance does not conform to the standard value, adjust clearance G in the manner described below.

Note: For measuring procedures, refer to "Inspection and Adjustment."

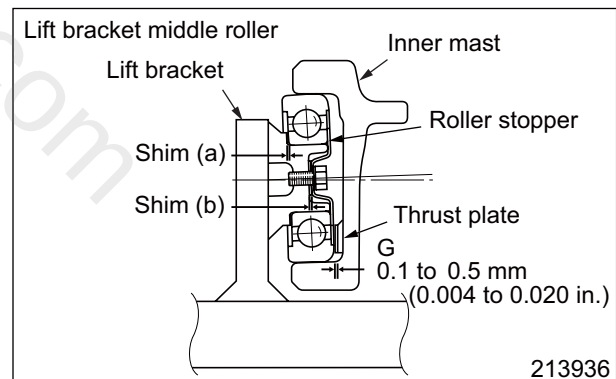
♦Adjusting method

If clearance G is excessive, increase the thickness of shims (a) as required. Increase the thickness of shims (b) by the same amount that are added to shims (a). Shim (a) is available in two sizes: 1 mm (0.004 in.) and 0.5 mm (0.020 in.). Shim (b) is available in only one size, 1 mm (0.004 in.). If shims (a) are increased by 0.5 mm (0.020 in.), shims (b) do not need to be increased by the equal amount.

At the factory, shims (a) are usually adjusted to 1 mm (0.004 in.) and shims (b) to 2 mm (0.08 in.) for the shipment.

Unit: mm (in.)

Size (diameter)	Truck type	
	1 ton class	2 ton class 3 ton class
S	99 (3.90)	113.8 (4.48)
M	100 (3.94)	115 (4.53)
L	101 (3.98)	116 (4.57)
LL	102 (4.02)	117 (4.61)



Full Version Available

Caterpillar GP20HN Forklift Service and Operator Manual (99719-6M110)

Caterpillar GP20HN Forklift service manual, covers hydraulics, mast, drive unit, wiring, and engine service. Searchable PDF download.

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