CAT® Lift Trucks

# Service Manual

## Chassis & Mast

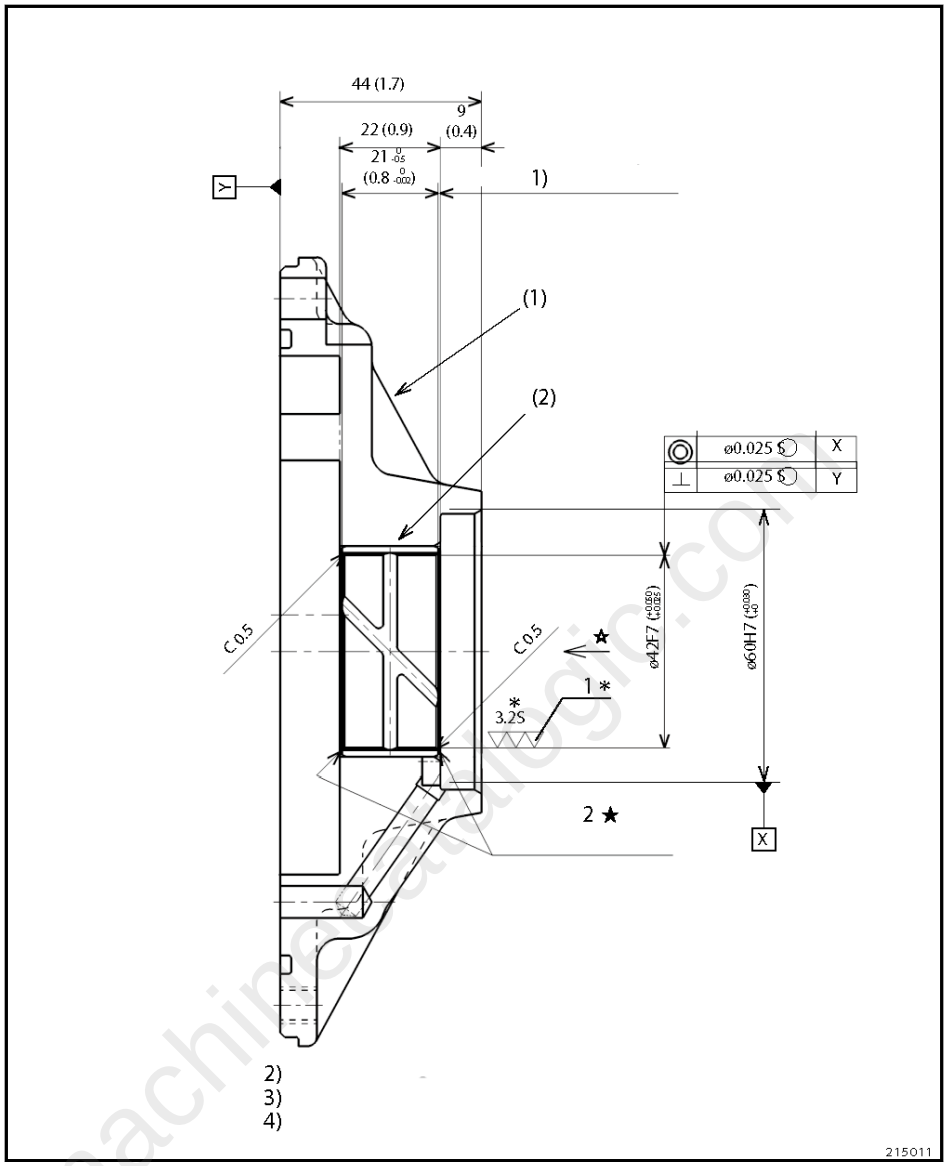
### MC/FC

| | | | |
|---|---|---|---|
| 2P3000 | AT34-30121-49999 | GP15NM | AT34-T0100-T9999 |
| 2P3500 | AT34-30121-49999 | GP18NM | AT34-W0100-W9999 |
| 2PC4000 | AT34-80121-99999 | GP20CNM | AT34-P0100-P9999 |
| 2P4000 | AT35-30121-49999 | GP20NM | AT17D-P0100-P9999 |
| 2P5000 | AT35-30121-49999 | GP25NM | AT17D-T0100-T9999 |
| 2P5500 | AT36-30121-49999 | GP25NM-HP | AT35-T0100-T9999 |
| 2P6000 | AT13F-30121-49999 | GP30NM | AT13F-P0100-P9999 |
| 2P6500 | AT13F-80121-99999 | GP35NM | AT13F-T0100-T9999 |
| 2P7000 | AT13F-80121-99999 | | |
| 2PD4000 | AT18C-30121-49999 | | |
| 2PD5000 | AT18C-30121-49999 | | |
| 2PD5500 | AT37-30121-49999 | | |
| 2PD6000 | AT14E-30121-49999 | | |
| 2PD6500 | AT14E-80121-99999 | | |
| 2PD7000 | AT14E-80121-99999 | | |



**For use with S4S and K21 / K25 Engine Service Manuals.**

99719-8M110




**UNIT: MM (IN.)**

(1) PUMP BODY

(2) BUSHING

1 BUFFING

2 SYMBOL (SEE NOTE (2))

1) POSITION OF BUSHING = 0 TO 1.0 MM (0 TO 0.04 IN.)

2) AFTER PRESSING (2) BUSHING, THE DIMENSION OF * MARK MAST BE MACHINED (BUFFING).

3) (2) BUSHING MUST NOT PROTRUDE ON BOTH ENDS OF MARK.

4) PRESS (2) BUSHING FROM THE DIRECTION OF * MARK.

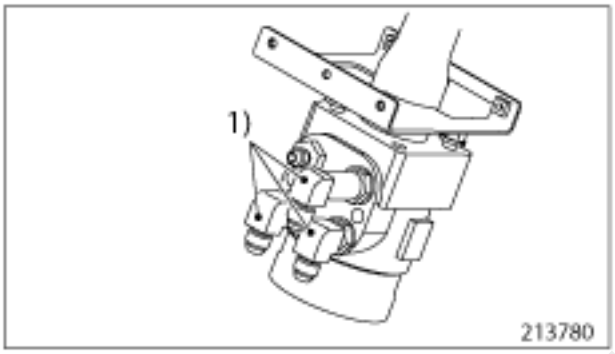
#### 10.2.3.2 INSTALLATION

To install the steering valve, follow the removal sequence in reverse, while following the instructions below:

(1) Apply grease on the serrated area on the lower part of the steering shaft.

(2) Tighten the mounting bolt to the specified torque.

(3) Be careful about the orientation when installing the elbow on the steering valve. Tighten it to the specified torque.



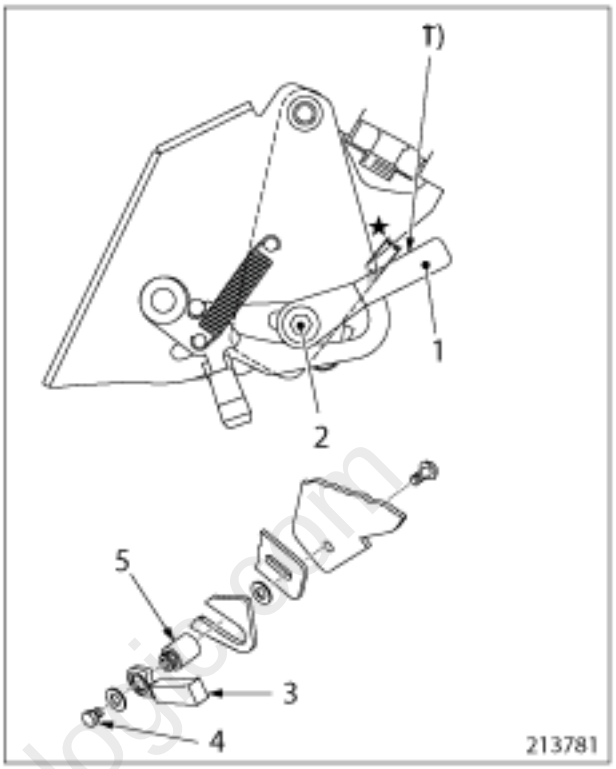

1) FACE THE ELBOW RIGHT DOWNWARD TO INSTALL.
TIGHTENING TORQUE OF NUT:
34 TO 39 N•M (3.47 TO 3.98 KGF•M) [25.1 TO 28.8 LBF•FT]

### 10.2.4 TILT LOCK LEVER

#### 10.2.4.1 DISASSEMBLY

(1) Put alignment marks on the tilt lock lever and the nut (B) for proper installation at assembly.

(2) Remove the bolt (A) and then, remove the tilt lock lever.




1) TOP FACE OF LEVER

1. TILT LOCK LEVER
2. LEVER MOUNTING BOLT
3. TILT LOCK LEVER
4. BOLT (A)
5. NUT (B)

#### 10.2.4.2 ASSEMBLY

If the alignment marks have disappeared, or the lever is being replaced with a new lever, install the lever by seeing the following steps:(The illustration shows the relation of the parts when the tilt position is in the NEUTRAL and the column lock lever is locked.)

(1) Tighten the nut B to the tightening torque of 11 to 15 N·m (1.1 to 1.5 kgf·m) [8.1 to 11.1 lbf·ft]. (This represents a lever-locked condition.)

(2) Select the optimal position for the tilt lock lever in a locked condition, and fit the tilt lock lever into the serrated section of nut B. The optimal position is where the star-marked notch section of the bracket intersects with the top face of the lever.

### 5.3.2 How to adjust the screen contrast

Turn the key switch to the ON position. Screen contrast can be adjusted while the engine is running.

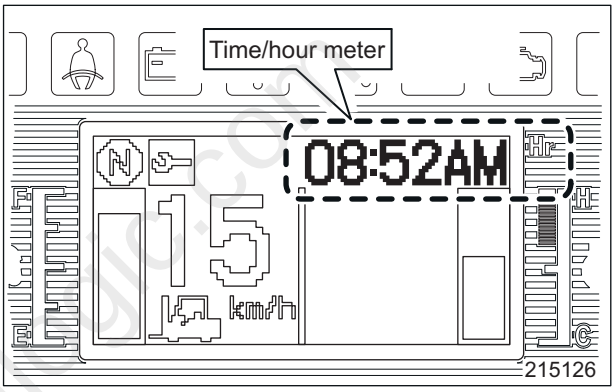
| Button | Press | Display |
|---|---|---|
| △ | Short | Light → Dark |
| ▽ | | Dark → Light |

Note: The screen becomes dark when the temperature inside the instrument panel (ambient temperature) is high, and the screen becomes light when the temperature is low.

### 5.3.3 How to display the clock time

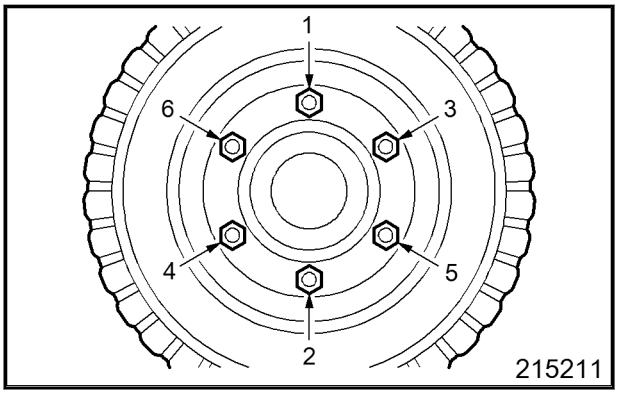
Turn the key switch to the ON position. This operation is available while the engine is running. With a short press of ○ button, the display changes between the hour meter and the clock time.

| Button | Press | Display |
|---|---|---|
| ○ | Short | Hour meter ←→ clock |



| Tightening torque | 1 ton class | 2 to 3 ton class |
|---|---|---|
| Wheel nuts | 141.2 to 172.6 (14.398 to 17.6) [104.14 to 127.3] | 210.1 to 256.7 (21.424 to 26.176) [154.959 to 189.329] |

Unit: N·m (kgf·m) [lbf·ft]




### 8.2.1.3 REMOVAL OF AXLE ASSEMBLY

**Sequence**

(1) Wheel nut (6 places)
(2) Rear wheel
(3) Hose or pipe
(4) Bolt
(5) Rear axle (with cylinder)
(6) Bushing support

**Suggestions for Removal**

(1) See the description of "Removal of rear wheels, Page 8-6" to remove the rear wheels.
(2) Raise the lift truck with a jack and support the bottom of both sides of the frame with jack stands. (Approximately. 500 mm (19.7 in.) is enough for the distance between the bottom of the frame and the ground.)
(3) Disconnect the hose or pipe **3** from the cylinder elbow (2 places). Disconnect the tire sensor harness from the connector.
(4) Place a garage jack under the axle to support the axle.
(5) Remove rear axle mounting bolts.
(6) Lower the garage jack and pull out the rear axle (with cylinder) from the lift truck.

**Inspections after Disassembly**

(1) Bushing support
(2) Replace, if it is damaged or worn.
(3) Place the mating surface downward to replace.
(4) Apply a sufficient amount of grease to assemble.

### 8.2.1.4 INSTALLING AXLE ASSEMBLY

To install, follow the removal sequence in reverse. Also follow the instructions listed below:

(1) Adjust the total play (front and rear) to be 0.8 mm (0.031 in.) or less.

**⚠ CAUTION**

Place the shims equally.

(2) Apply grease (AUTOLEX A or equivalent) through grease nipple.
(3) Tighten bolts **4** to the specified torque.

- Clearance G
  Clearance between roller side surface and inner mast thrust surface (right-to-left play):
  Clearance G is used for determining the correct amount of shims at the bearing seat.
  Move the lift bracket to the top of the inner mast and slide the bracket to either the left-most or right-most position. Take measurements of clearance G between the side surface of roller and inner mast.

**NOTE:** It is unnecessary to adjust the lift bracket upper roller with shims.

Adjust the clearance to the specification with shims (a) and (b) for the middle roller and with shim (c) for the lower roller.

| | |
|---|---|
| Clearance G | 0.1 to 0.5 (0.004 to 0.020) |

Unit: mm (in.)

- Clearance F
  Clearance between roller circumference and inner mast thrust surface (back-to-front play):
  Clearance F is used for determining the proper size of the rollers.
  Select appropriate diameter rollers so that the clearance meets the specification.
  Make sure the rollers rotate smoothly when installed.

| | |
|---|---|
| Clearance F | 1 (0.04) maximum |

Unit: mm (in.)

- 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 right-most position. Take measurement of clearance G1 between the roller circumference and inner mast.
  Adjust the clearance with shims (d) to the specification.

| | |
|---|---|
| Clearance G1 | 0.1 to 0.5 (0.004 to 0.020) |

Unit: mm (in.)

(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 below table

**NOTE:** For measuring procedures, see "Adjusting Clearance Between Lift Bracket Roller and Inner Mast, Page 12-52".

- 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, see "Adjusting Clearance Between Lift Bracket Roller and Inner Mast, Page 12-52".

- 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 (0.04 in.) and 0.5 mm (0.020 in.). Shim (b) is available in only one size, 1 mm (0.04 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.

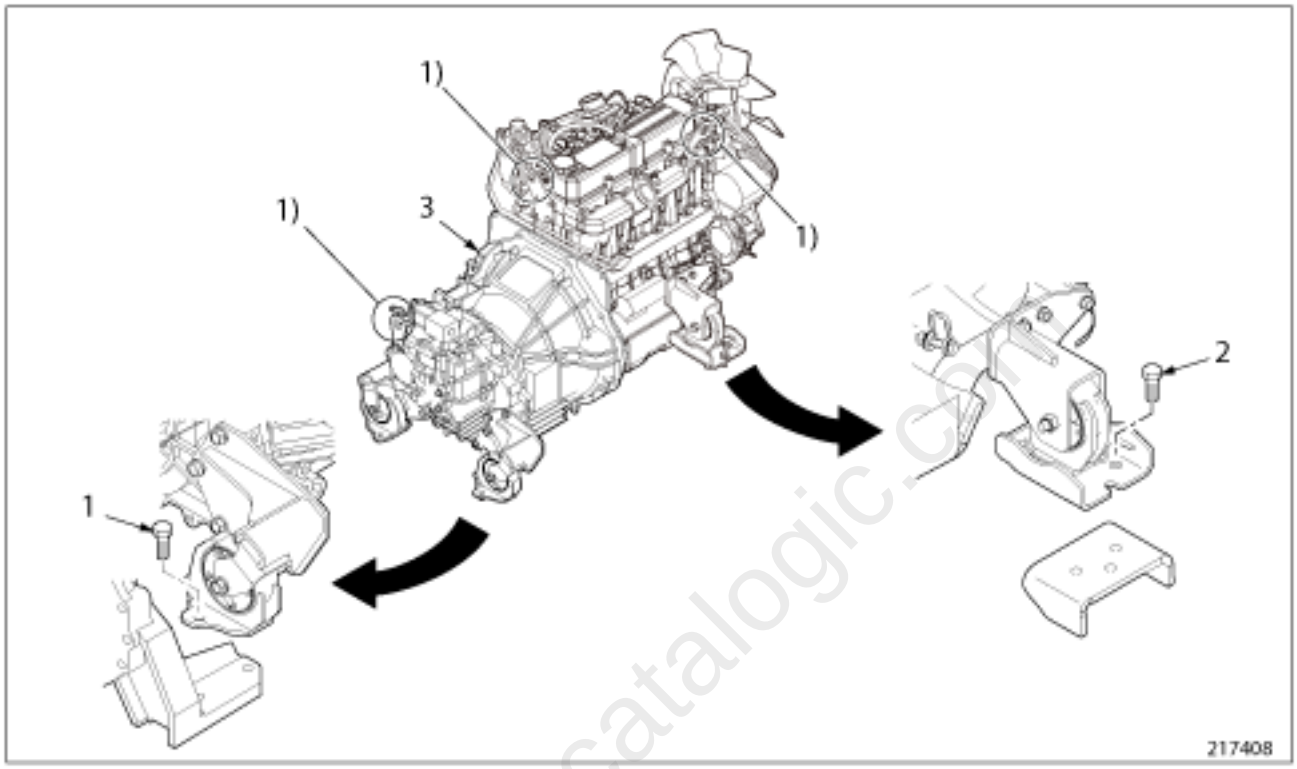
At the factory, shims (a) are usually adjusted to 1 mm (0.04 in.) and shims (b) to 2 mm (0.08 in.) for shipment.

| **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) |

Unit: mm (in.)

### 5.1.1.5 ENGINE AND TRANSMISSION ASSEMBLY

**Removal sequence**




1) LIFTING POSITION

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.

| | |
|---|---|
| Weight | Approximately 250 [551.2] |

Unit: kg [lb.]

**Suggestions for Removal**

(1) Lift the engine and transmission assembly just the amount enough 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:** With the engine and transmission assembly suspended, drain the transmission oil and clutch oil.

**Installation**

To install, follow the removal sequence in reverse.

**Suggestions for Removal**

(1) Engine and transmission assembly

a. Slowly lift the assembly.

# Full Version Available

## Caterpillar 2PD5000 Forklift Service Manual (99719-8M110)

Caterpillar 2PD5000 Forklift service manual, covers hydraulics, drive unit, wiring, mast, and engine repairs. Searchable PDF download.