

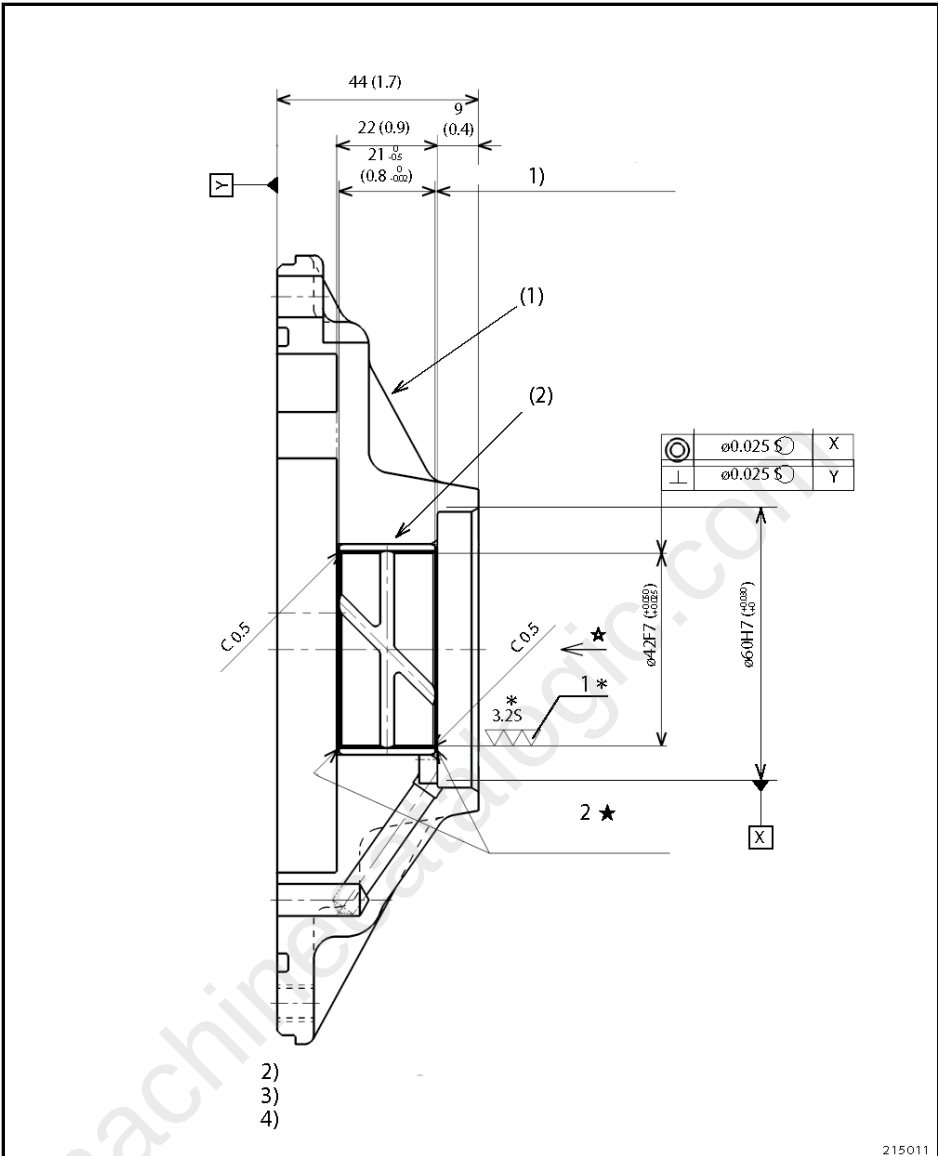


Service Manual

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		



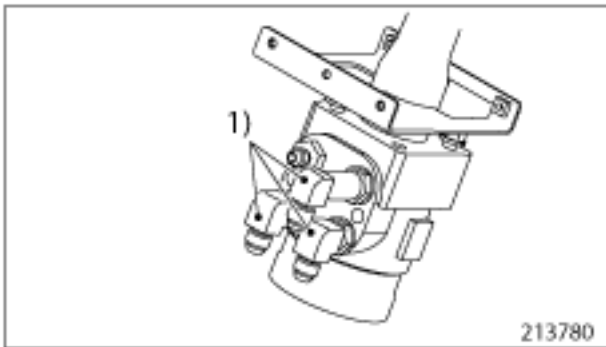
UNIT: MM (IN.)

- | | | | |
|-----|-----------------------|----|---|
| (1) | PUMP BODY | 1) | POSITION OF BUSHING = 0 TO 1.0 MM (0 TO 0.04 IN.) |
| (2) | BUSHING | 2) | AFTER PRESSING (2) BUSHING, THE DIMENSION OF * MARK MUST BE MACHINED (BUFFING). |
| 1 | BUFFING | 3) | (2) BUSHING MUST NOT PROTRUDE ON BOTH ENDS OF MARK. |
| 2 | SYMBOL (SEE NOTE (2)) | 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.

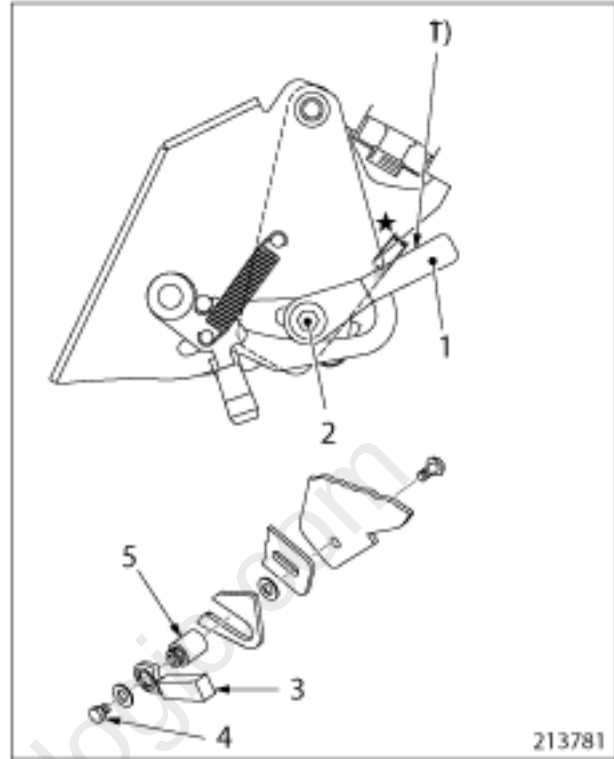


- 1) FACE THE ELBOW RIGHT DOWNWARD TO INSTALL.
TIGHTENING TORQUE OF NUT:
34 TO 39 N·M (3.47 TO 3.98 KGF·M) [25.1 TO 28.8 LBF·FT]

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.

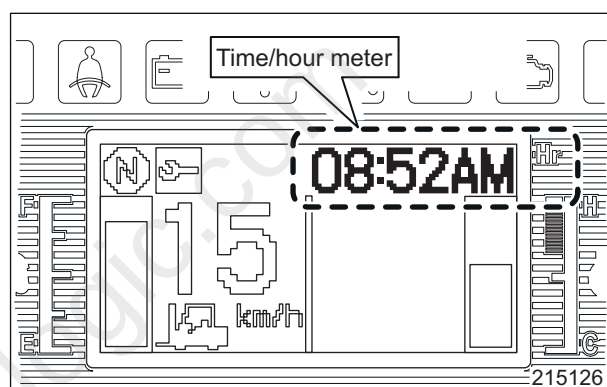
Button	Press	Display
△	Short	Light → Dark
▽		Dark → Light

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

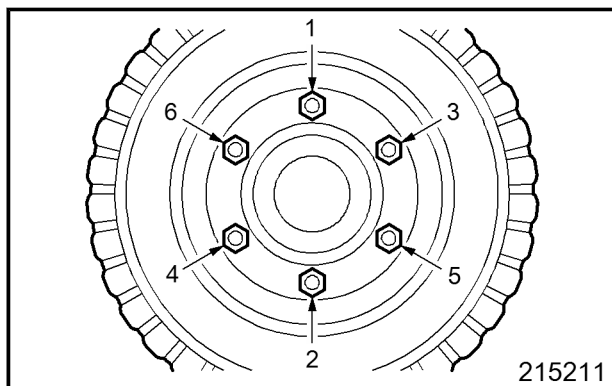
Turn the key switch to the ON position. This operation is available while the engine is running. With a short press of  button, the display changes between the hour meter and the clock time.

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)
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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
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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)
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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.

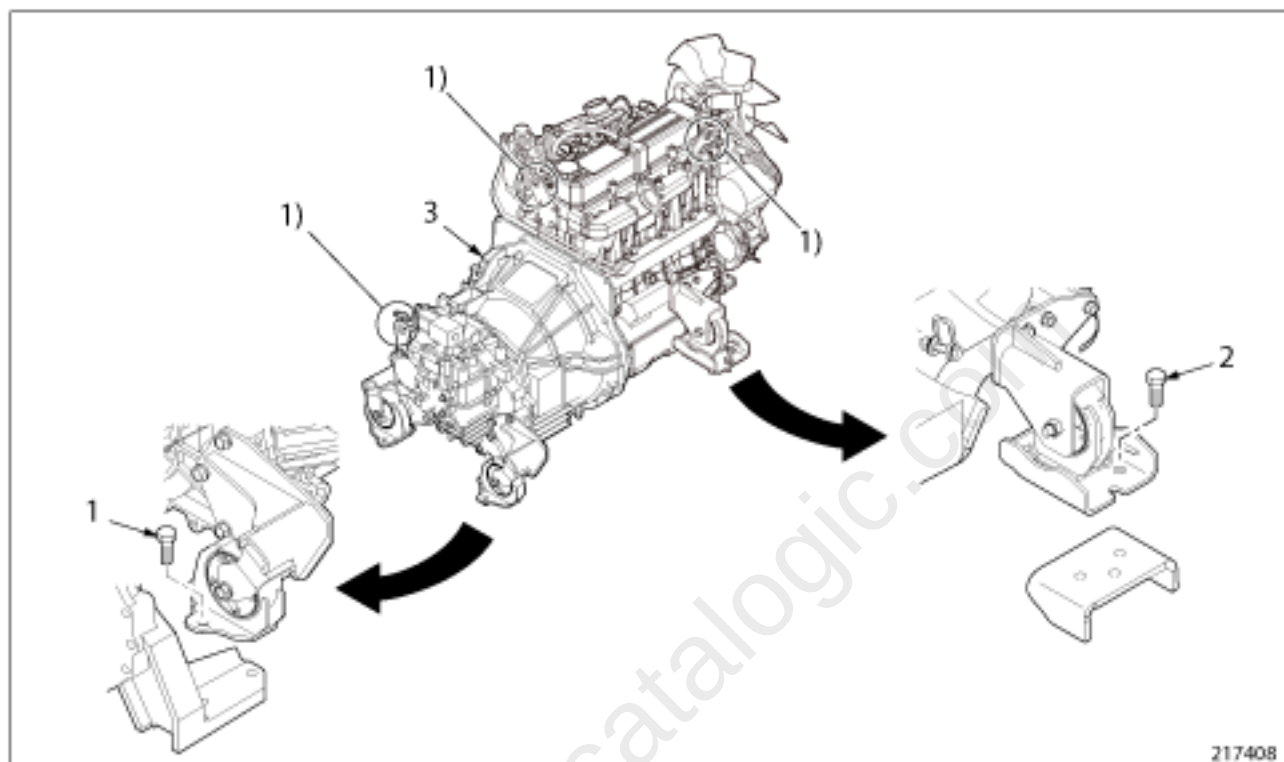
At the factory, shims (a) are usually adjusted to 1 mm (0.04 in.) and shims (b) to 2 mm (0.08 in.) for shipment.

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

Start by

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

Weight	Approximately 250 [551.2]
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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.

3. ENGINE AND TRANSMISSION ASSEMBLY

- (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.

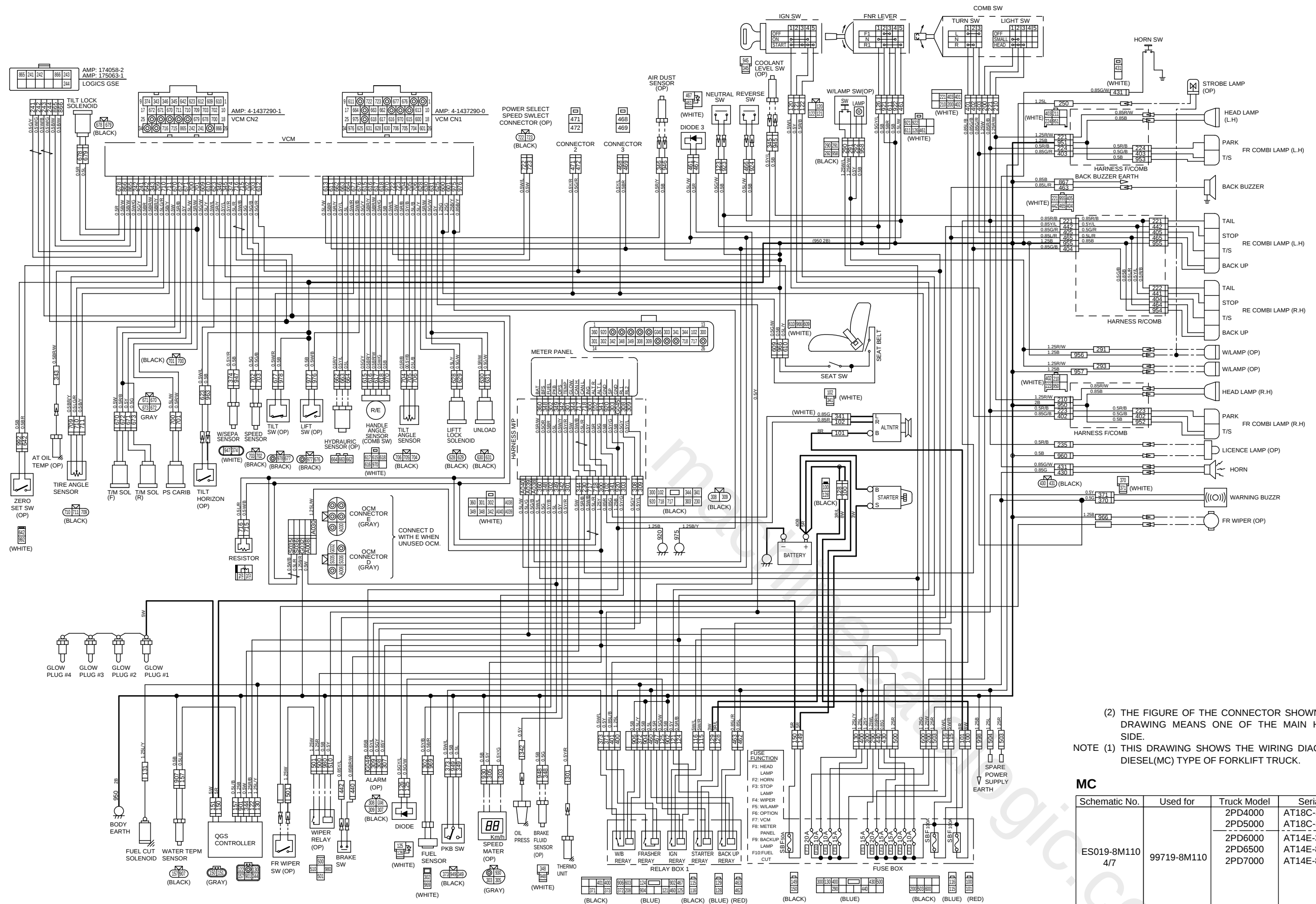
Installation

To install, follow the removal sequence in reverse.

Suggestions for Removal

- (1) Engine and transmission assembly
 - a. Slowly lift the assembly.

Electrical Schematic (4/7)



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

NOTE (1) THIS DRAWING SHOWS THE WIRING DIAGRAM OF DIESEL(MC) TYPE OF FORKLIFT TRUCK.

MC

Schematic No.	Used for	Truck Model	Serial No.
ES019-8M110 4/7	99719-8M110	2PD4000	AT18C-30121 up
		2PD5000	AT18C-30121 up
		2PD6000	AT14E-30121 up
		2PD6500	AT14E-80121 up
		2PD7000	AT14E-80121 up

Safety Cautions

⚠ WARNING

Fire and explosion

Keep flames away

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

Make sure the fuel and engine oil container caps 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 over-heat. 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.

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 2PD6500 Forklift Service Manual (99719-8M110)

Caterpillar 2PD6500 Forklift service manual, covers hydraulics, drive unit, mast, wiring, and engine service. Instant PDF download.

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