



# Service Manual

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## EP16KT, EP18KT, EP20KT Chassis, Mast, & Controller

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EP16KT	ETB4A-00011-99999 (48 V)
EP16KT	ETB4B-00011-99999 (36 V)
EP18KT	ETB5A-00011-49999 (48 V)
EP18KT	ETB5B-00011-49999 (36 V)
EP20KT	ETB5A-50001-99999 (48 V)
EP20KT	ETB5B-50001-99999 (36 V)

Product: Caterpillar EP16KT, EP18KT, EP20KT Chassis, Mast, & Controller Forklifts Service Repair Workshop Manual(99719-67110)  
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## FOREWORD

This service manual is a guide to servicing of Caterpillar® Lift Trucks. The instructions are grouped by systems to serve the convenience of your ready reference.

Long productive life of your lift trucks depends to a great extent on correct servicing — the servicing consistent with what you will learn from this service manual. We hope you read the respective sections of this manual carefully and know all the components you will work on before attempting to start a test, repair or rebuild job.

The descriptions, illustrations and specifications contained in this manual were of the trucks of serial numbers in effect at the time it was approved for printing. Caterpillar reserves the right to change specifications or design without notice and without incurring obligation.

### Safety Related Signs

The following safety related signs are used in this service manual to emphasize important and critical instructions:

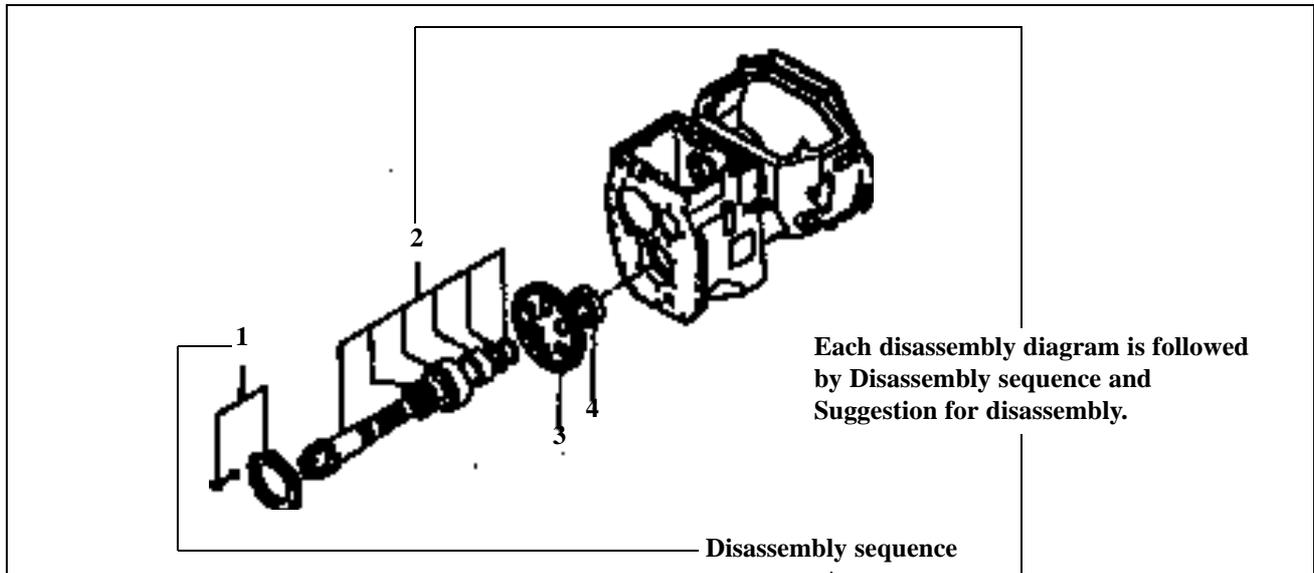
 **WARNING** Indicates a specific potential hazard resulting in serious bodily injury or death.

 **CAUTION** Indicates a specific potential hazard resulting in bodily injury, or damage to, or destruction of, the machine.

 **NOTE** Indicates a condition that can cause damage to, or shorten service life of, the machine.

## HOW TO READ THIS MANUAL

### Disassembly diagram (example)



- 1 Cover, Bolt, Washer (part name)
- 2 Output shaft (part name)

**Suggestion for disassembly**  
 (1) Output shaft removal



Unit: mm (in.)		
Clearance between cylinder and piston	A	0.020 to 0.105 (0.00079 to 0.00413)
	B	0.15 (0.0059)

A: Assembly standard  
 B: Repair or service limit

## GROUP INDEX

Group	Items involved	
GENERAL INFORMATION	Serial number locations, Dimensions, Technical data	<b>1</b>
VEHICLE ELECTRICAL COMPONENTS	Console box, Key switch, Lamp specification chart	<b>2</b>
MAIN CONTROLLER	Controller components, Inspection and adjustment, Service data	<b>3</b>
TROUBLESHOOTING FOR CONTROL CIRCUITS	Faulty central vehicle monitor system, Faulty diagnosis indication, or Other abnormalities	<b>4</b>
POWER TRAIN	Procedure and key points for removal and installation	<b>5</b>
MOTORS	Drive motor, Pump motor, EPS motor	<b>6</b>
TRANSFER UNIT	Procedures and key Points for Disassembly and Assembly	<b>7</b>
REAR AXLE	Rear axle, Rear wheels	<b>8</b>
BRAKE SYSTEM	Caliper, Brake pedal, Master cylinder	<b>9</b>
STEERING SYSTEM	Steering control valve	<b>10</b>
HYDRAULIC SYSTEM	Tank, Pump, Control valve, Lift and tilt cylinders, Flow regulator valve, Down safety valve	<b>11</b>
MASTS AND FORKS	Simplex mast, Duplex mast, Triplex mast	<b>12</b>
SERVICE DATA	Inspection standards, Periodic replacement of parts, Lubrication standards, Main component weight, Tightening torque for standard bolts and nuts, Special tools	<b>13</b>

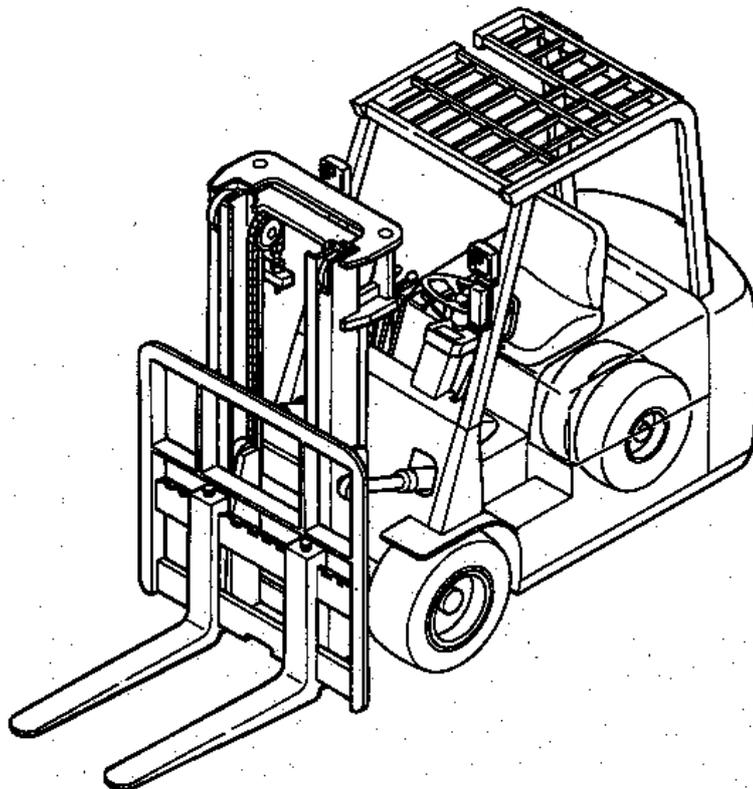


# GENERAL INFORMATION

Vehicle Exterior.....	1 - 1
Models.....	1 - 1
Vehicle Number Stamping Positions .....	1 - 2
External Specifications .....	1 - 4
Technical Data.....	1 - 5



**Vehicle Exterior**



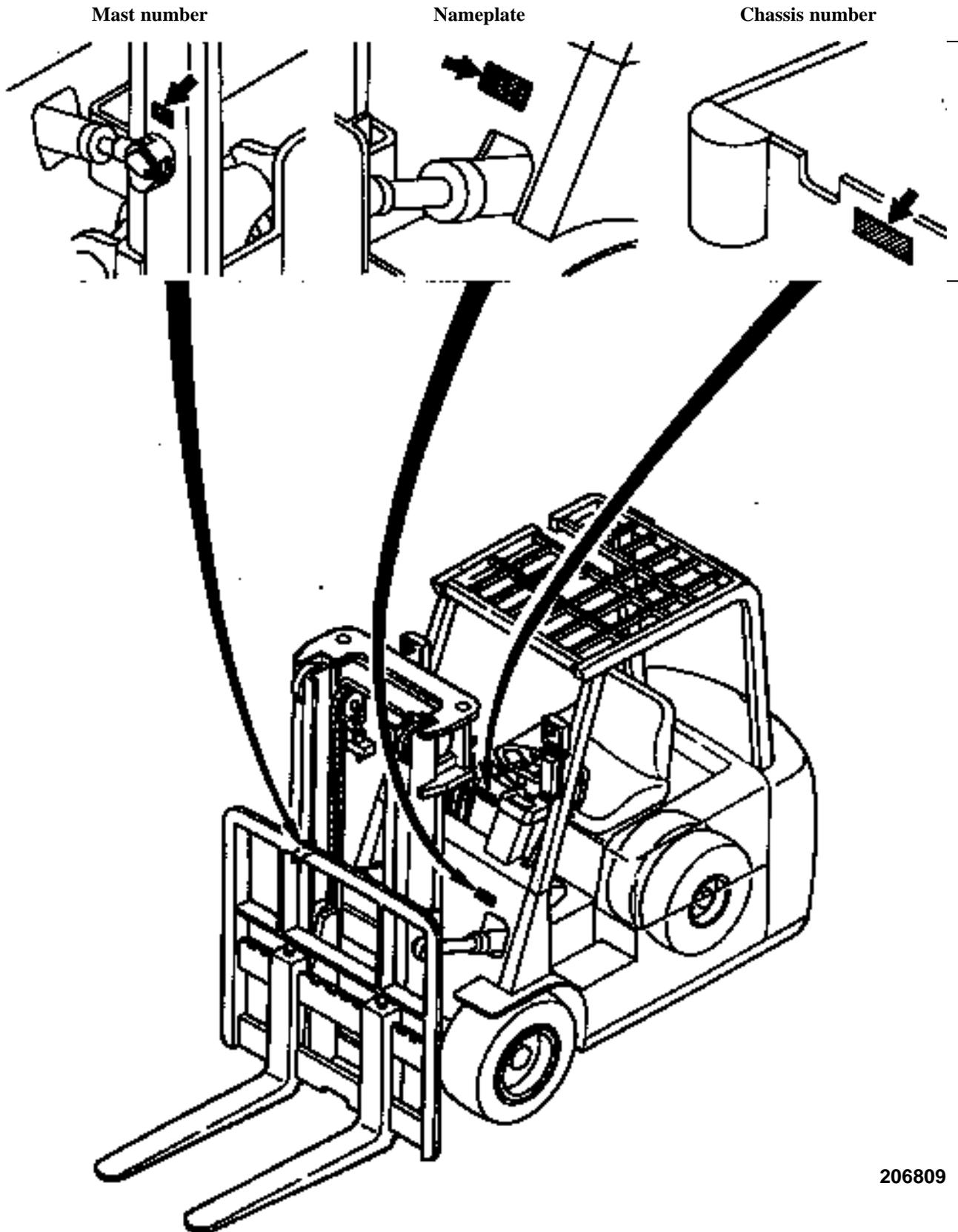
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**Models**

This manual applies to EP16KT, EP18KT, and EP20KT.

Truck Models	Serial Numbers
EP16KT	EFB4A-00011-99999 (48 V)
	EFB4B-00011-99999 (36 V)
EP18KT	EFB5A-00011-49999 (48 V)
	EFB5B-00011-49999 (36 V)
EP20KT	EFB5A-50001-99999 (48 V)
	EFB5B-50001-99999 (36 V)

# Vehicle Number Stamping Positions

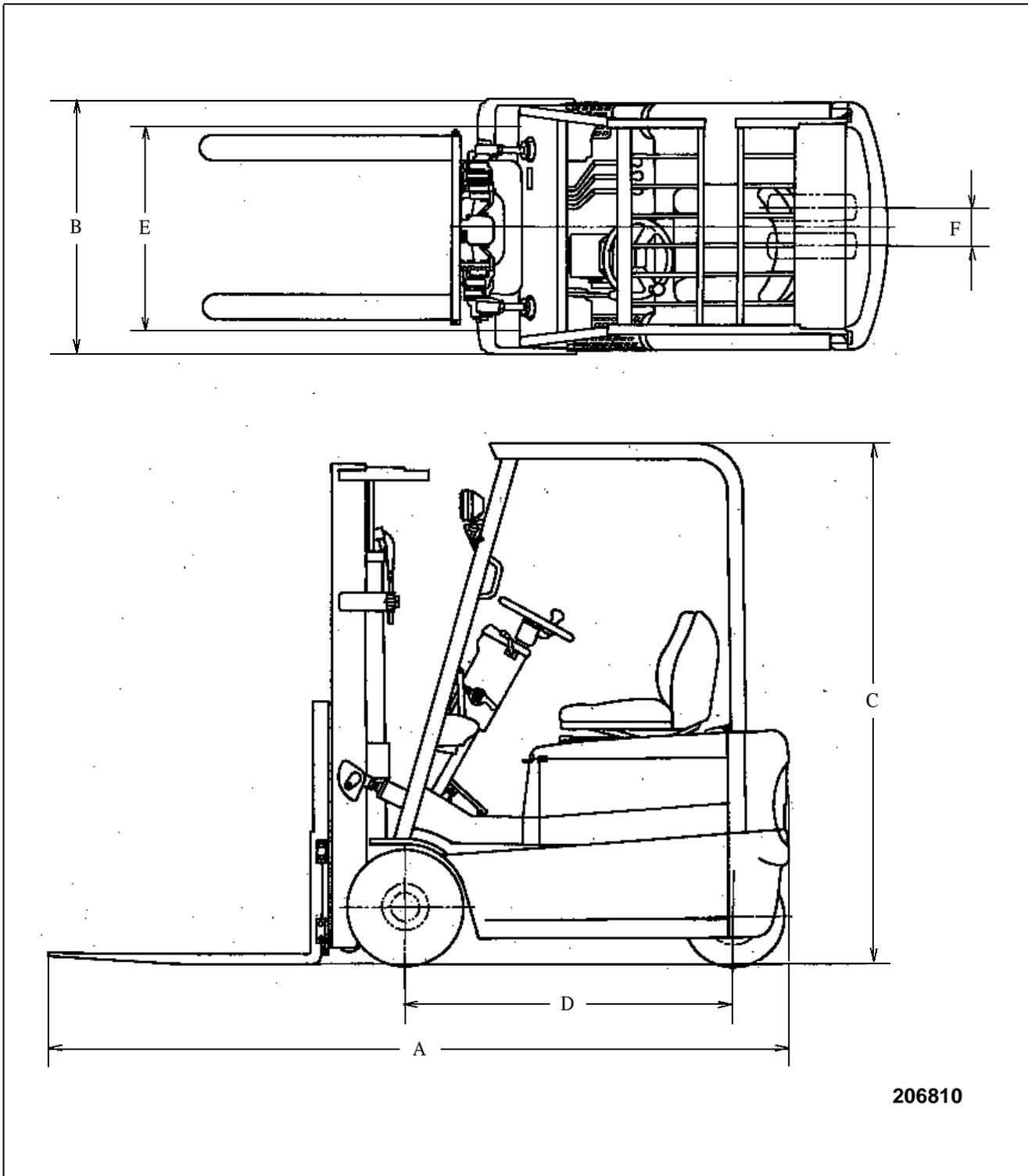


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**MEMO**

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**External Specifications**



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**Technical Data**

Truck Models		EP16KT	EP18KT	EP20KT	
Class		1.6t	1.8t	2.0t	
Load Capacity/Load Center	N (kgf)/mm [lbf/in.]	15680 (1600)/500 [3000/24]	17640 (1800)/500 [3500/24]	19600 (2000)/500 [4000/24]	
Truck size Length to Fork Face	A mm (in.)	1897 (78.2)	1997 (78.6)	2032 (80)	
Width for MCFE (w/SE tire)	B mm (in.)	1100 (43.3)	1100 (43.3)	1168 (46)	
for MCFA (w/cushion tire)	mm (in.)	1080 (42.5)	1080 (42.5)	1080 (42.5)	
Height of Overhead Guard	C mm (in.)	2040 (80.3)	2040 (80.3)	2040 (80.3)	
Wheelbase	D mm (in.)	1310 (51.6)	1410 (55.5)	1410 (55.5)	
Service Weight (W/O Battery)	kg (lb)	2164 (4769)	2324 (5122)	2344 (5166)	
Tread Front/Rear	E/F mm (in.)	913/170 (35.9/6.7)	913/170 (35.9/6.7)	947/170 (37.3/6.7)	
Tires Number Front/Rear		2/2	2/2	2/2	
Tires Size Front		18 ¥ 7.8	18 ¥ 7.8	200/50-10	
Rear		15 ¥ 4.5-8	15 ¥ 4.5-8	15 ¥ 4.5-8	
Turning Radius		mm (in.)	1530 (60.2)	1630 (64.2)	1665 (65.6)
Travel Speeds	48 V km/h (mph)	16/14 (10/8.7)	16/14 (10/8.7)	16/14 (10/8.7)	
Unloaded/Loaded	36 V km/h (mph)	15/13 (9.3/8)	15/13 (9.3/8)	15/13 (9.3/8)	
Gradeability Loaded	48 V %	19	17	15	
	36 V %	19	17	15	
Lift Speeds Loaded	48 V m (in.)/sec	0.42 (16.5)	0.41 (16.1)	0.4 (15.7)	
	36 V m (in.)/sec	0.32 (12.6)	0.31 (12.2)	0.3 (11.8)	
Battery Voltage		V	48	48	
Battery Rated Capacity (5 hrs.) MAX		Ah	600	720	
Battery Compartment Length ¥ Width ¥ Height		mm (in.)	531 ¥ 1016 ¥ 650 (20.9 ¥ 40 ¥ 25.6)	634 ¥ 1016 ¥ 650 (25 ¥ 40 ¥ 25.6)	
Traction Motor, 60 min rating		kW	2 ¥ 4.5	2 ¥ 4.5	
Hydraulic Motor		kW	11.5	11.5	
Traction Motor Control Method			IGBT/MOSFET	IGBT/MOSFET	
Hydraulic Motor Control Method			IGBT/MOSFET	IGBT/MOSFET	



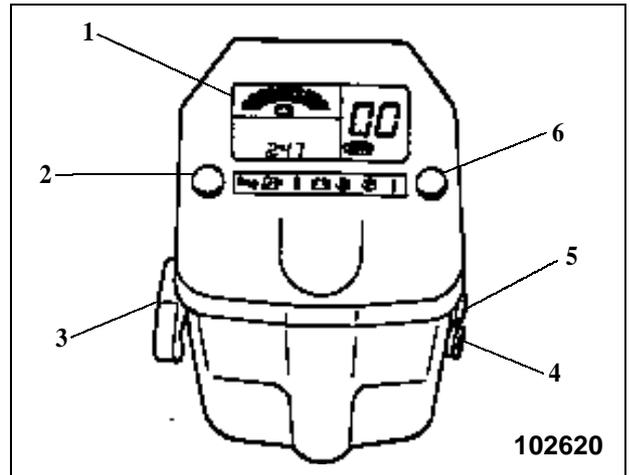
# VEHICLE ELECTRICAL COMPONENTS

Console Box .....	2 - 1
Functions of Central Vehicle Monitor System.....	2 - 1
Electrical Components in Console Box .....	2 - 3
Disassembly and Assembly .....	2 - 4
Forward/Reverse Lever .....	2 - 5
Accelerator Control.....	2 - 6
Key Switch .....	2 - 7
Light Switch .....	2 - 7
Fuses .....	2 - 8
Lamp Specification Chart .....	2 - 9
Electrical Schematic (Type: Chopper) .....	2 - 11
Electrical Schematic (Type: Contactor) .....	2 - 13
Electrical Diagram (Type: Chopper) .....	2 - 15
Electrical Diagram (Type: Contactor) .....	2 - 17

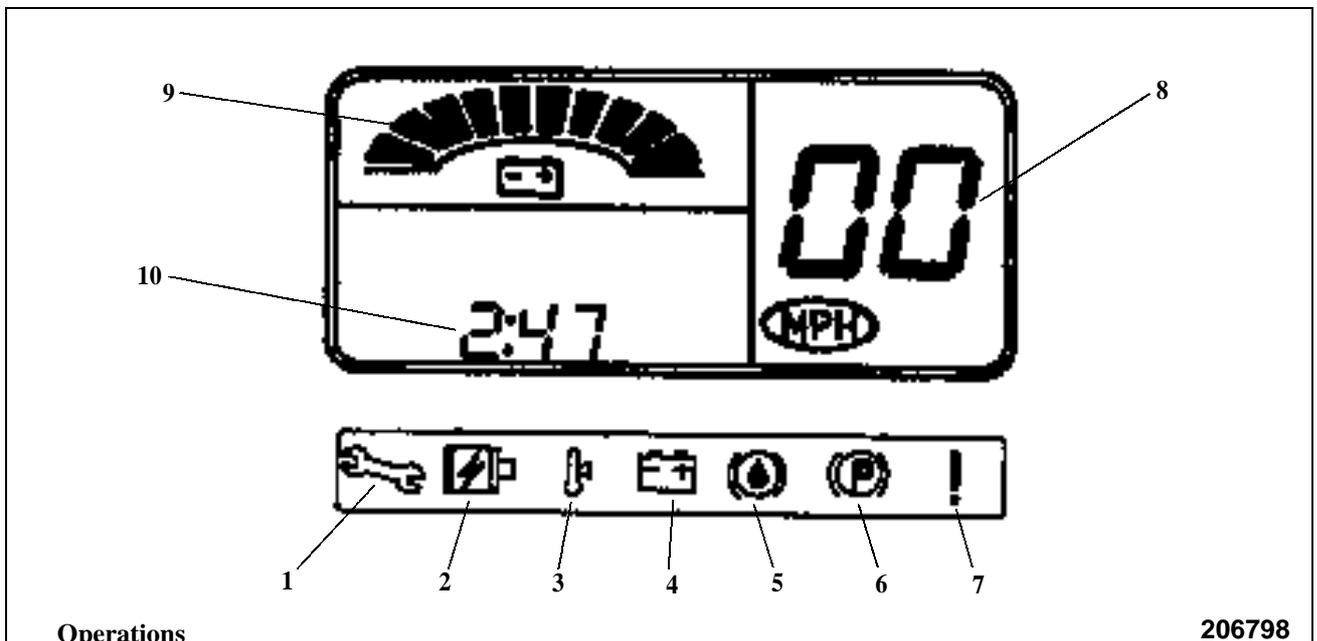


**Console Box**

- 1 Central vehicle monitor system (CVMS)
- 2 Mode selector button
- 3 Tilt steering lock lever
- 4 Key switch
- 5 Light switch
- 6 Mode check button

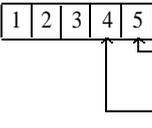


**Functions of Central Vehicle Monitor System (CVMS)**



No.	Monitor name	When OFF	When ON or flashing	Remarks
1	Service indicator	Starts flashing 20 hours before set time. Remains ON when set time is reached.		
2	Worn motor brush lamp	Drive motor and pump motor brushes in operable condition	Worn brushes	After brushes are replaced, lamp turns OFF.
3	Controller/motor overheat lamp	Controller, drive motors and pump motor in normal temperature	Overheat	Overheat causes significant output loss. When component temperature lowers to normal level, output power returns.
4	Remaining battery charge warning lamp	Normal battery condition	Flashing indicates battery need to be recharged soon. ON indicates battery needs to be recharged and lifting function inoperable.	
5	Brake fluid level lamp	Normal fluid level	Low fluid level	

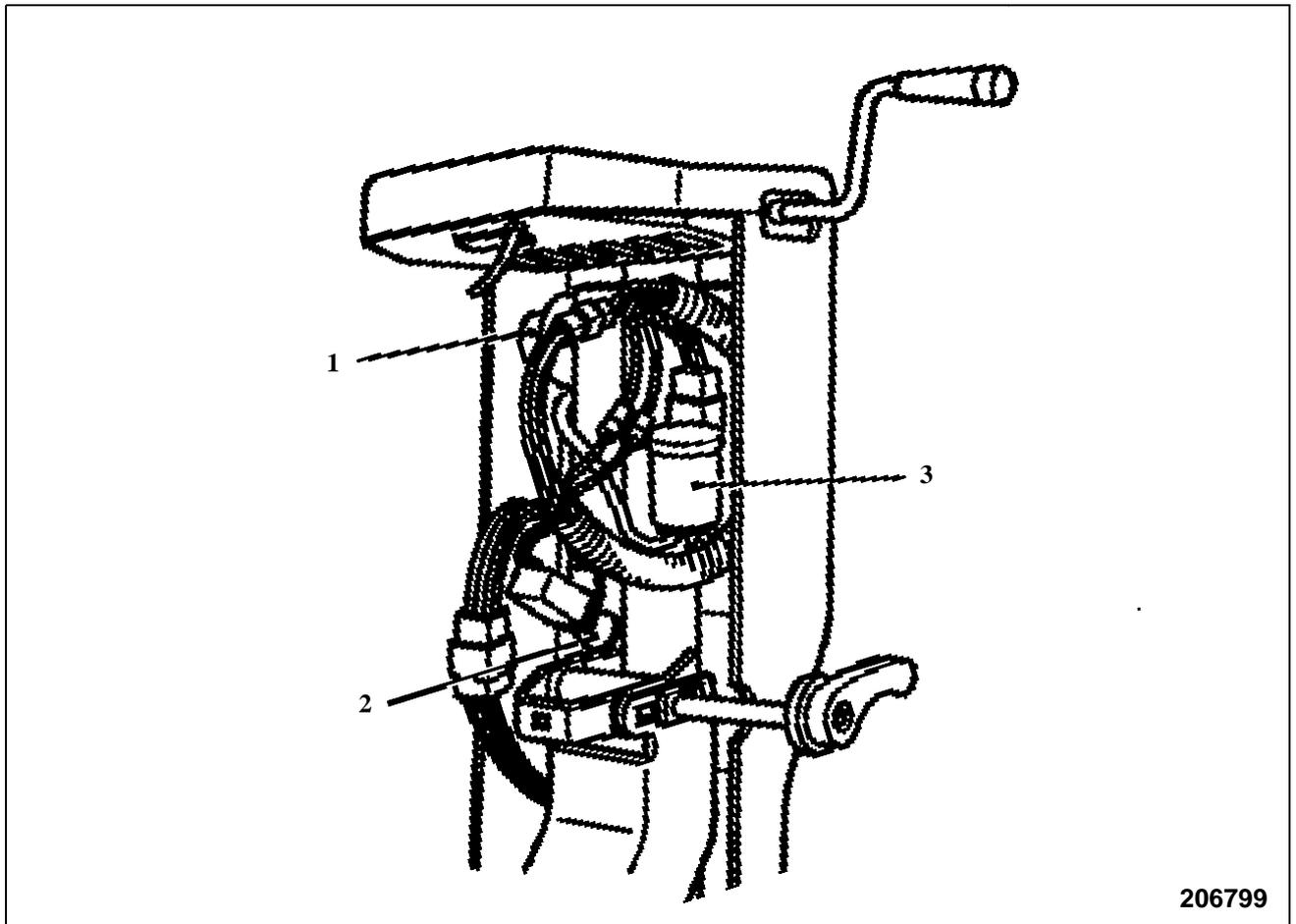
VEHICLE ELECTRICAL COMPONENTS

6	Parking lamp	Parking brake engaged	Parking brake disengaged	
7	Malfunction lamp	Normal	Vehicle malfunction	
8	Speedometer	KPH, MPH		
	Error indicator			
9	Battery discharge indicator	When no bars show, vehicle is drivable but lifting function is inoperable.	Indicates remaining battery power.	
10	Hour meter	 <p>Advances every 0.1 hour (Number advances every 6 minutes.) Hour indication</p>		

**Error indicator**

Indication	Condition
<b>E</b> <input type="checkbox"/>	When key switch is set to [ON] with forward/reverse lever in [F] or [R] position. Turns OFF when the lever is set to [N].
<b>E</b> <b>0</b> ON	Right drive motor overheat
<b>E</b> <b>1</b> ON	Left drive motor overheat
<b>E</b> <b>2</b> ON	Pump motor overheat
<b>E</b> <b>3</b> ON	Controller overheat
<b>E</b> <b>4</b> ON	Worn right drive motor brush
<b>E</b> <b>5</b> ON	Worn left drive motor brush
<b>E</b> <b>6</b> ON	Worn pump motor brush
<b>H</b> <b>1</b> ON	Faulty setting of lift lever
<b>H</b> <b>2</b> ON	Faulty setting of tilt lever
<b>H</b> <b>3</b> ON	Faulty setting of attach-1 lever
<b>H</b> <b>4</b> ON	Faulty setting of attach-1 lever (Option)

Electric Components in Console Box

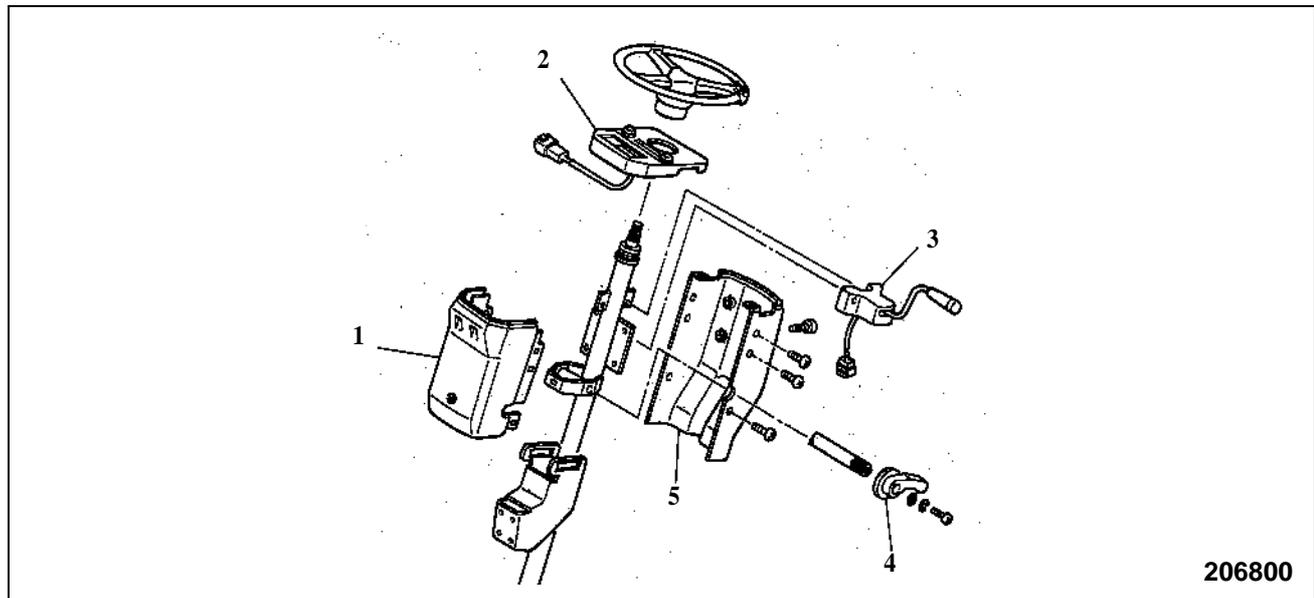


- 1 Key switch
- 2 Light switch

- 3 Flash relay

**Disassembly and Assembly**

**Disassembly**



**Sequence**

- |   |                            |
|---|----------------------------|
| 1 Console box (front panel)                 | 4 Tilt steering lock lever |
| 2 Central vehicle monitor panel             | 5 Console box (rear panel) |
| 3 Turn signal switch, forward/reverse lever |                            |

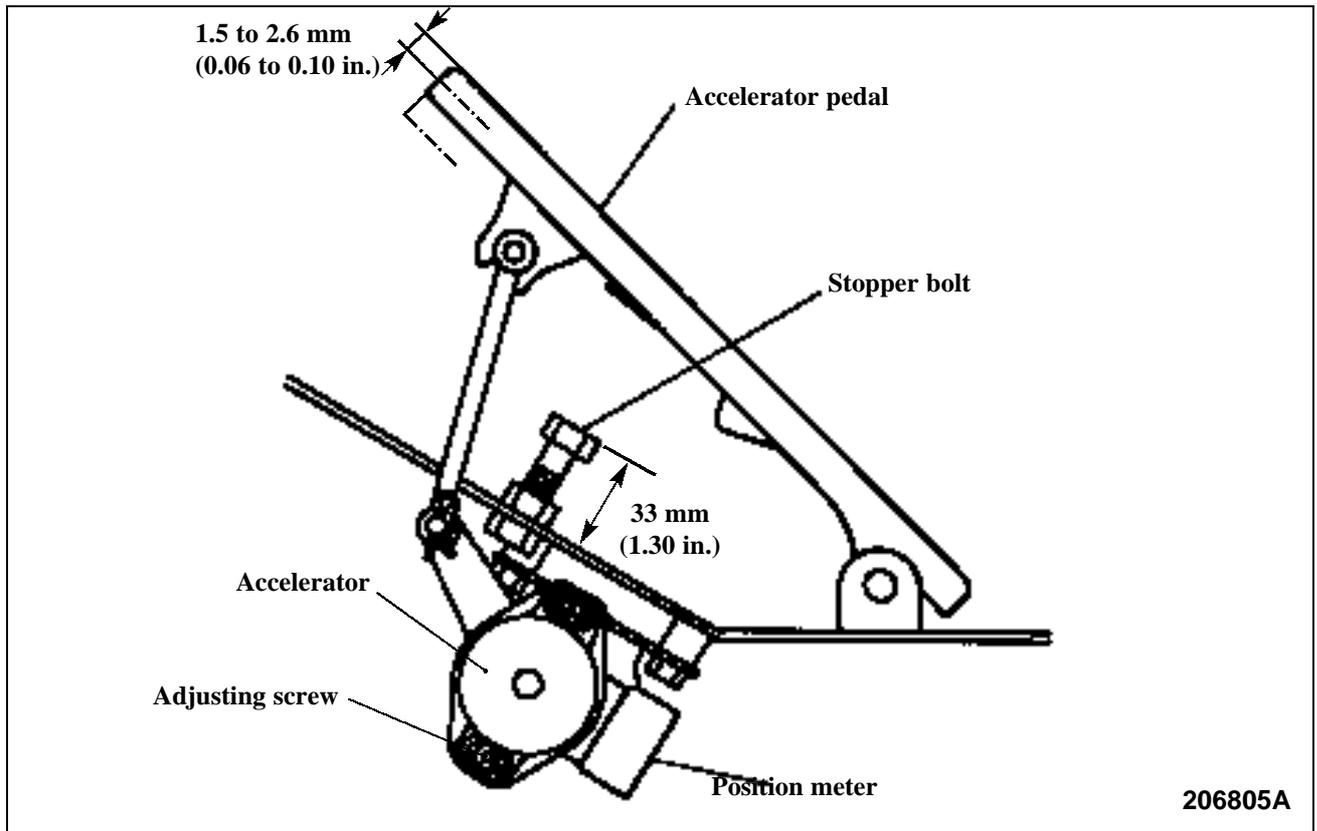
**Disassembly procedure**

- (1) Remove the front panel and monitor panel from the console box.
- (2) Disconnect the harness connectors of the horn, turn signal switch and forward/reverse lever.
- (3) Remove the screw from the tilt steering lock lever, and remove the lever from the rear panel of the console box.
- (4) Remove the rear panel.

**Assembly**

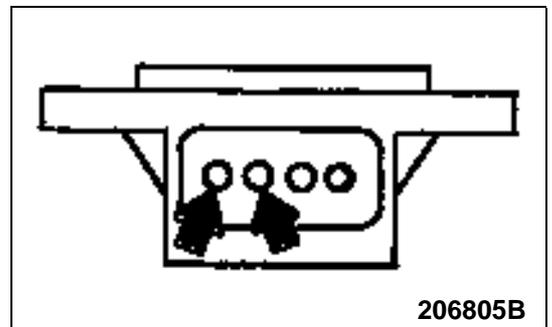
Follow the disassembly procedure in reverse.

**Accelerator Control**

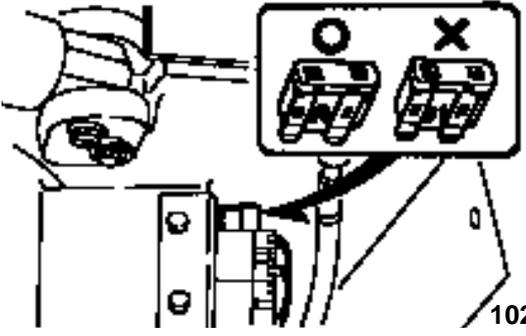


**Adjustment procedure**

- (1) Disconnect the battery plug.
- (2) Fix the stopper bolt to 33 mm (1.30 in.) from the floor to the upper face of bolt.
- (3) Adjust the mounting angle of the position meter using the adjusting screw so the switch inside the position meter turns on when the accelerator pedal is depressed 1.5 to 2.6 mm (0.06 to 0.10 in.).  
Make sure the inside switch ON by continuity between two arrow terminals using a tester.
- (4) Enter Self Diagnostics (Page 3-22.) Cycle to the Accelerator Test (Page 3-27.) The display should read OFF and Speed 0 without the accelerator depressed. The display should change to ON before the speed changes from 0 to 1. If not then readjust Accelerator switch.
- (5) Make sure when the accelerator is fully depressed the display reads Speed 16. If not readjust the Stop Bolt.



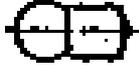
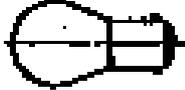
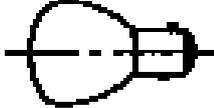
**Fuses**

Capacity (A)	Location	Main connecting device	
80	Main controller	Battery	Refer to main controller section
500			
325		Loading hydraulic motor	
15	Fuse holder	Electric parts	 <p>102644</p>
10		Controller	

**NOTE**

Refer to Parts Manual for proper replacement fuses.

**Lamp Specification Chart**

Items Lamps		Quantity	Bulb color	Bulb		Remarks
				48 V/36 V	External diagram	
Head lamps		2	Clear	40 W		
Combination lamps (front)	Turn signal lamps	2	Orange	25 W		
	Clearance lamps	2	Clear	10 W		
Combination lamps (rear)	Stop lamps and tail lamps	2	Red	25 W/10 W		
	Turn signal lamps	2	Orange	25 W		
	Backup lamps	2	Clear	10 W		
Rear lamp		1	Clear	40 W		

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