CAT® Lift Trucks

Service Manual

FC

DP70N AT20D-10011-up

For use with 854E Diesel Engine Service Manual 99709-68100

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Chapter 1 GENERAL INFORMATION

1. Model View 1-1
2. Applicable Truck Models 1-2
3. Serial Number Locations 1-3
4. Dimensions 1-4
5. Specifications 1-5
6. Performance 1-6

Chapter 2 COOLING SYSTEM

1. Specifications 2-1
2. Structure 2-2
3. Removing Fan Belt 2-3
   - 3.1 Preparation 2-3
   - 3.2 Removal Sequence 2-4
   - 3.3 Suggestions for Removal 2-4
4. Inspecting Fan Belt 2-5
5. Removing Intercooler, Oil Cooler, and Radiator 2-5
   - 5.1 Preparation 2-5
   - 5.2 Removal Sequence 2-5
   - 5.3 Installation 2-5
6. Installing Fan Belt 2-6
   - 6.1 Suggestions for Installation 2-6
7. Inspecting Radiator 2-7
   - 7.1 Radiator 2-7
   - 7.2 Expansion Tank 2-7
   - 7.3 Radiator Rubber Mount (Rubber Cushion) 2-7
   - 7.4 Pressure Cap 2-7
8. Connecting Hoses 2-7
9. Coolant 2-8
   - 9.1 Intercooler 2-8
   - 9.2 Oil Cooler for Transmission 2-9
10. Troubleshooting 2-9

Chapter 3 ELECTRICAL SYSTEM

1. Electrical Components and Wiring Outline 3-1
   - 1.1 Electrical Components and Wiring Diagram of Each Component 3-2
2. Console Box 3-7
   - 2.1 Outline of Console Box 3-7
   - 2.2 Removing Meter Panel 3-8
   - 2.3 Installing Meter Panel 3-9
3. Main Electrical Components 3-10
   - 3.1 Meter Panel 3-10
   - 3.2 Key Switch (Anti-Restart Switch) 3-12

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3.3 Light Switch and Turn Signal Switch 3-13
3.4 Direction (FNR) Switch 3-14
3.5 Horn 3-15
3.6 Tank Unit 3-15
3.7 Stop Light Switch 3-16
3.8 Thermoswitch (T/C Oil) 3-17
3.9 Fuse Box 3-18
3.10 Relay Box 3-19
3.11 List of Lights 3-24
4. Battery and Maintenance 3-25
4.1 Battery Specific Gravity Condition and Adjustment 3-25
4.2 Relationship Between Electrolyte Specific Gravity and State of Charge 3-25
4.3 Precautions for Battery Charging 3-26
5. Meter Panel 3-27
5.1 Meter Panel Layout 3-27
5.2 Basic Display 3-29
5.3 Basic Operation 3-33
5.4 When a Warning Occurs 3-40
5.5 When Several Warnings Occur Simultaneously 3-42
5.6 Warning Symbols 3-45
5.7 Warning Icons 3-46
5.8 Optional Features 3-47
5.9 Hour Meter 3-54
5.10 Troubleshooting 3-56
6. Wire Color 3-57
6.1 List of Wire Color Codes 3-57
7. Troubleshooting 3-58
7.1 Engine Startup Problem 3-58
7.2 Gauge-Related Problem 3-58
7.3 Light Related Problems 3-59
7.4 Warning Device Problem 3-60
7.5 Battery-Related Problem 3-61

Chapter 4 CONTROLLER

1. Outline 4-1
2. Main Functions of Controllers 4-2
2.1 Meter Panel 4-3
2.2 VCM-6 (Vehicle Control Module) 4-3
2.3 ECM (Engine Control Module) 4-3
2.4 Input and Output Units 4-3
2.5 Gateway 4-3
2.6 GSE Connector 4-4
3. Service Tool 4-5
3.1 Service Tool Menus 4-5
3.2 Outline of Toolbox 4-7
4. Mast Interlock System 4-22
4.1 Function 4-22
4.2 Checking the Operation of Mast Interlock System of VCM-6 Controller 4-23

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4.3 Active Test Inspection Procedure 4-26
5. Driving Interlock System 4-29
5.1 Controller Function 4-29
5.2 Checking the Operation of Driving Interlock Function 4-30
5.3 Active Test Inspection Procedure 4-34
6. Seat Belt Warning Icon 4-35
6.1 Function of Seat Belt Warning Icon 4-35
6.2 Checking the Operation of Seat Belt Warning Icon 4-36
7. Parking Brake Warning Alarm and Warning Icon 4-37
7.1 Checking the Operation of Parking Brake Warning Alarm/Warning Icon 4-37
7.2 Parking Brake Warning Alarm 4-38
7.3 Checking the Operation of Parking Brake Warning Alarm/Warning Icon With Key in OFF Position 4-40
8. Harness Codes 4-41
8.1 VCM-6 4-41
8.2 Input Unit and Output Unit (FC model) 4-44
8.3 Input Unit and Output Unit 4-48
8.4 ECM 4-52
8.5 Meter Panel 4-56
8.6 Seat Switch 4-58
8.7 Parking Brake Switch 4-58
8.8 Direction Lever Switch 4-58
8.9 Travel Speed Sensor 4-59
8.10 T/M Solenoid 4-59
8.11 Unload Solenoid 4-59
8.12 Warning Alarm 4-60
8.13 Warning Alarm Relay 4-60
8.14 Warning Alarm Circuit 4-61
9. Truck Status Display and Troubleshooting 4-62
9.1 Truck Status Display 4-62
9.2 Diagnosis Table (F Code) 4-63
9.3 LED Blink Pattern 4-75
9.4 Diagnostic Codes and Troubleshooting 4-76

Chapter 5 POWER TRAIN

1. Removal and Installation 5-1
1.1 Overhead Guard, Covers, and Air Cleaner Element 5-2
1.2 Removing Harness 5-3
1.3 Removing Driving Control Related Parts 5-4
1.4 Removing Pipes, Hoses, and Radiator 5-5
1.5 Removing Engine and Transmission Unit 5-6
1.6 Installation 5-7
2. Removal and Installation 5-9
2.1 Suggestions for Removing Engine Cover and Seat 5-9
2.2 Suggestions for Removing Harnesses and Cables (Between Transmission and Frame) 5-10
3. Service Data 5-11

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Diagnostic code	Diagnostic code name	Probable cause	Check items
F-50	Lift up solenoid warning	1. Connector contact bad	1. Connector connection check
		2. Diode bad	2. Diode connection check
		3. Harness bad	3. Harness connection check
		4. Lift up solenoid bad	4. Lift up solenoid connection check
		5. Controller bad	
F-52	Lift down solenoid warning	1. Connector contact bad	1. Connector connection check
		2. Diode bad	2. Diode connection check
		3. Harness bad	3. Harness connection check
		4. Lift up solenoid bad	4. Lift up solenoid connection check
		5. Controller bad	
F-54	Lift solenoid leak	1. Connector contact bad	1. Connector connection check
		2. Diode bad	2. Diode connection check
		3. Harness bad	3. Harness connection check
		4. Lift up solenoid bad	4. Lift up solenoid connection check
		5. Controller bad	
F-55	Tilt FW solenoid warning	1. Connector contact bad	1. Connector connection check
		2. Diode bad	2. Diode connection check
		3. Harness bad	3. Harness connection check
		4. Tilt FW solenoid bad	4. Tilt FW solenoid connection check
		5. Controller bad	
F-57	Tilt BW solenoid warning	1. Connector contact bad	1. Connector connection check
		2. Diode bad	2. Diode connection check
		3. Harness bad	3. Harness connection check
		4. Tilt BW solenoid bad	4. Tilt BW solenoid connection check
		5. Controller bad	
F-59	Tilt solenoid leak	1. Connector contact bad	1. Connector connection check
		2. Diode bad	2. Diode connection check
		3. Harness bad	3. Harness connection check
		4. Tilt lock solenoid bad	4. Tilt solenoid connection check
		5. Controller bad	
F-60	Attachment 1A solenoid warning	1. Connector contact bad	1. Connector connection check
		2. Diode bad	2. Diode connection check
		3. Harness bad	3. Harness connection check
		4. Attachment 1A solenoid bad	4. Attachment 1A solenoid connection check
		5. Controller bad	

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5. Troubleshooting

Item	Condition	Possible cause	Action
Wheel brake	Lack of braking force	Oil leaks from primary cup in master cylinder	*Replace piston cup(s) if cylinder is free from unacceptable wear. Replace the cup(s) and fluid if the cup(s) is distorted.
		Oil leaks from wheel cylinder cup	
		Oil leaks from pipe joints	Tighten, or replace pipe and connector
		Worn shoe lining	Replace
		Shoe lining is contaminated with oil, grease, etc.	Clean, repair, or replace
	Excessive pedal stroke	Air trapped in brake fluid lines	Bleed air from master and wheel cylinders
		Piston cup defective in master cylinder	Replace piston cup
		Not enough fluid in reservoir	Add
		Too much clearance of master cylinder push rod	Adjust
		Brake fluid leaks	See * above
		Automatic adjuster is not working	Check if cable guide and adjusting spring are correctly installed. If it does not work, replace cable fitting, lever, and adjusting screw
	Uneven braking effect	Lining or drum contaminated with grease or oil	Wash with a cleaning fluid. If contamination cannot be removed, replace
		Wobbly or loose-mounted drum in less effective brake	Replace drum. Adjust and tighten if loosely mounted.
		Wheel tires are inflated unequally	Inflate tires to the specified pressure
	Brake squeaks	Lining is slippery	Grind the surface with sandpaper
		Lining is worn	Replace shoe and lining assembly
		Backing plate mounting bolts are loosened	Tighten
		Wheel bearings are loosely connected	Adjust preload, and tighten
		Brake drum is contaminated	Wash with a cleaning fluid.
	Brake squeaks (clicking noise)	Shoe anchor end rattles against anchor	Repair or replace
		Shoe ledges are excessively worn	Replace backing plate
		Piston in the wheel cylinder is excessively worn	Replace wheel cylinder
	Pedal is heavy	Vacuum hose joint looseness	Repair
		Vacuum hose flat or ruptured	Replace hose
		Vacuum pump not working	Repair or replace
		Inclusion of foreign matter or valve damage in the vacuum valve and atmospheric pressure valve of brake booster	Repair or replace
		Brake booster element clogged	Clean or replace
		Brake booster diaphragm defective	Replace
		Entry of foreign matter inside brake cylinder	Wash, and fill brake fluid
	Pedal feels spongy	Lack of brake cylinder fluid	Add
		Brake cylinder fluid leaks	Repair or replace
		Air trapped in system	Bleed air

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4.3 Adjustment Value and Oil Capacity

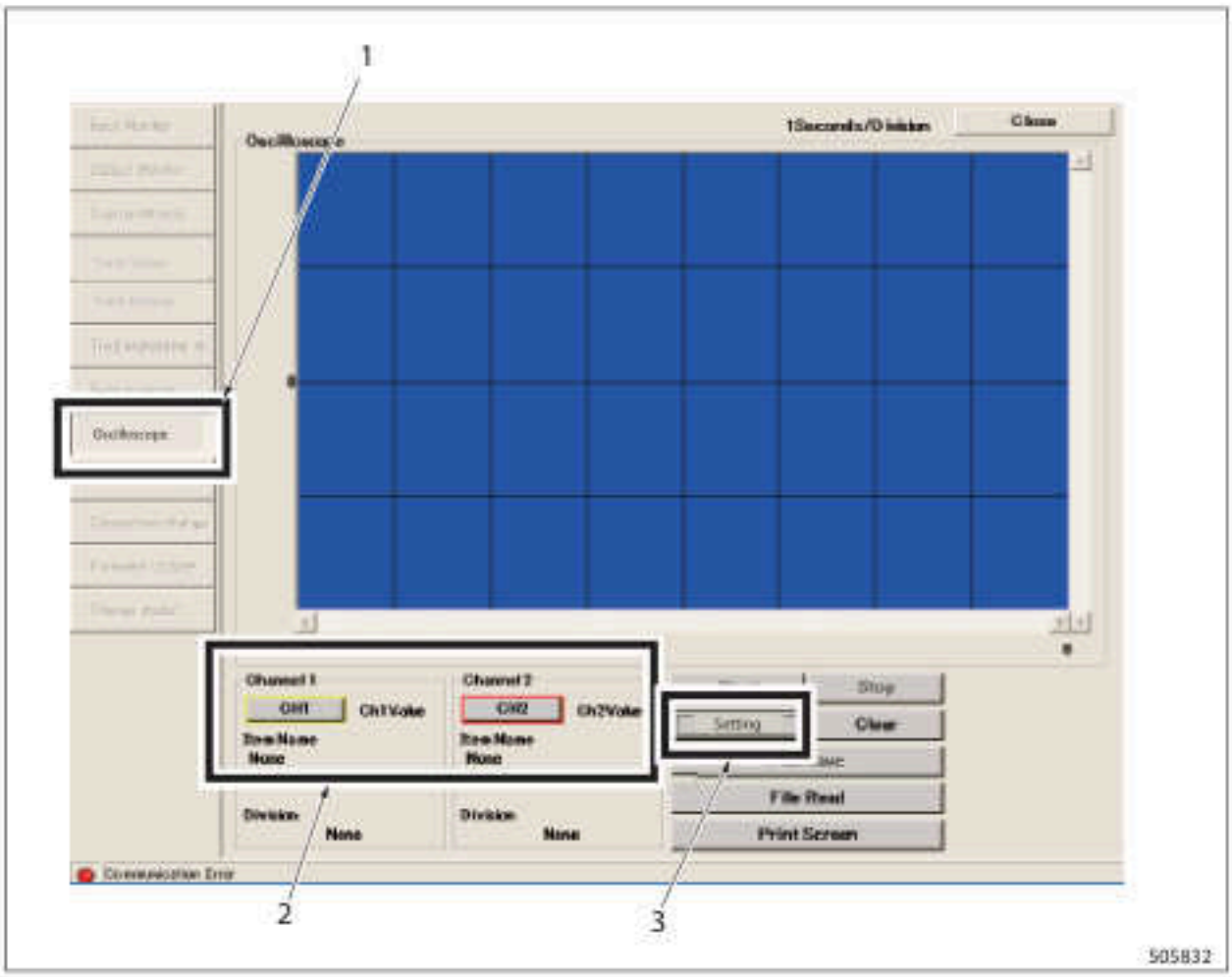
Note: The values in the table below are for the standard model.

Item		Specification
Alternator drive belt deflection when pushed inward with 98 N (10.0 kgf) [22.03 lbf] force		8 mm (0.32 in.)
Engine idle speed		800 min^{-1}
Steering wheel free play (when measured at rim with engine idling)		70 mm (2.76 in.)
Inching pedal free play		30 to 49 mm (1.18 to 1.93 in.)
Brake pedal free play		22 to 41 mm (0.87 to 1.61 in.)
Tire size	Front tire	8.25-15-12PR
	Rear wheel	8.25-15-12PR
Tire pressure	Front tire	700 kPa
	Rear wheel	700 kPa
Tightening torque for wheel nuts	Front tire	403 N·m (41.1 kgf·m) [297.24 lbf·ft]
	Rear wheel	403 N·m (41.1 kgf·m) [297.24 lbf·ft]
Lift chain elongation limit	(mm/20 links)	654 mm (25.75 in.)
Fuel tank capacity		180 L (47.56 US gal.)
Coolant capacity		15.3 L (4.042 US gal.)
Engine oil	Engine body	8.0 L (2.114 US gal.)
	Oil filter	1 L (0.26 US gal.)
	Total	9.0 L (2.378 US gal.)
Transmission oil		22 L (5.81 US gal.)
Transfer and differential gear oil level		14 L (3.70 US gal.)
Hydraulic oil	N level	105 L (27.74 US gal.)
Battery electrolyte specific gravity, corrected to 20° (68°)		1.28

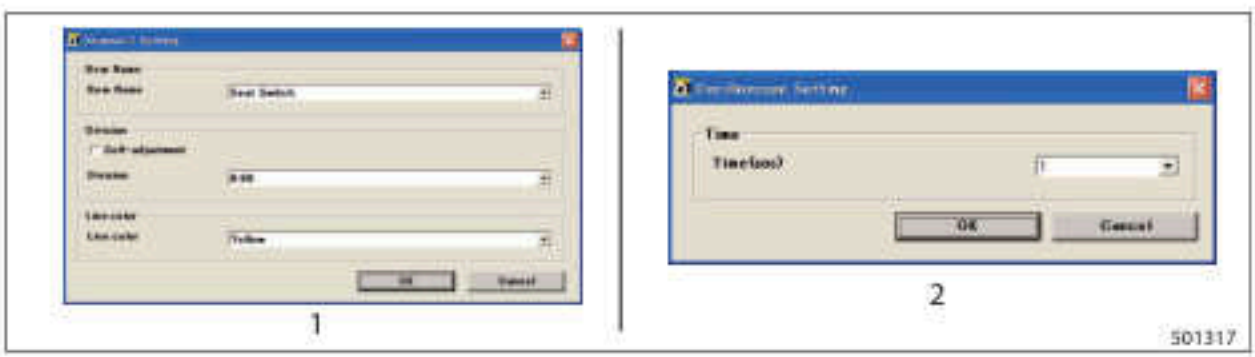
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Oscilloscope

Click the oscilloscope button from the menu or toolbox to display the oscilloscope screen in the main window. The oscilloscope screen shows a graph of the input/output values you wish to check. The user can set up two items (CH1 and CH2) as input/output values to be expressed in the graph. The time axis of the graph is expressed in seconds. The user also can store the data of the graph being displayed on the screen, and display the graph by reading it from the memory. The graph screen can be printed out on a printer by clicking the Print Screen button. Note that these graphs will have some amount of lag in the wave pattern and a margin of error due to the simple function of an oscilloscope. To obtain an accurate wave pattern, use a dedicated measuring instrument.



1. Oscilloscope button
2. Input/output read set-up button
3. Time axis set-up button



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9. Truck Status Display and Troubleshooting

9.1 Truck Status Display

Truck status display

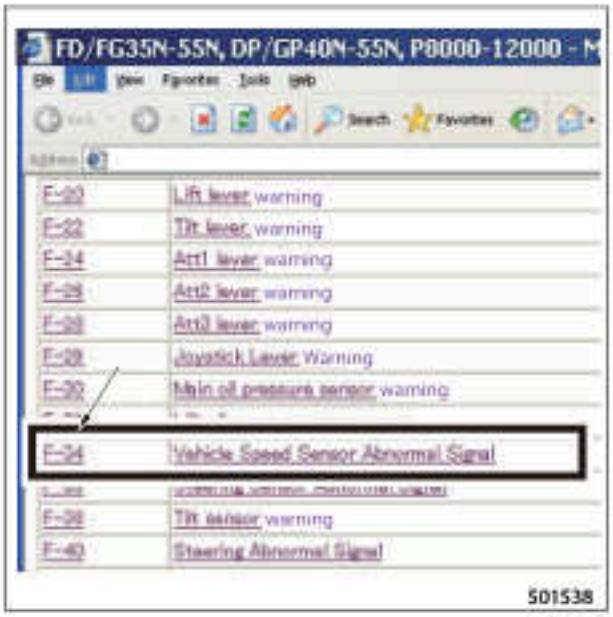
Warnings that have been present are displayed.

Troubleshooting

Display the truck status screen by clicking the truck status button either from the monitor menu or toolbox. When the screen is displayed, press the troubleshooting button on the bottom right of the screen to display a list of diagnostic codes and their descriptions.

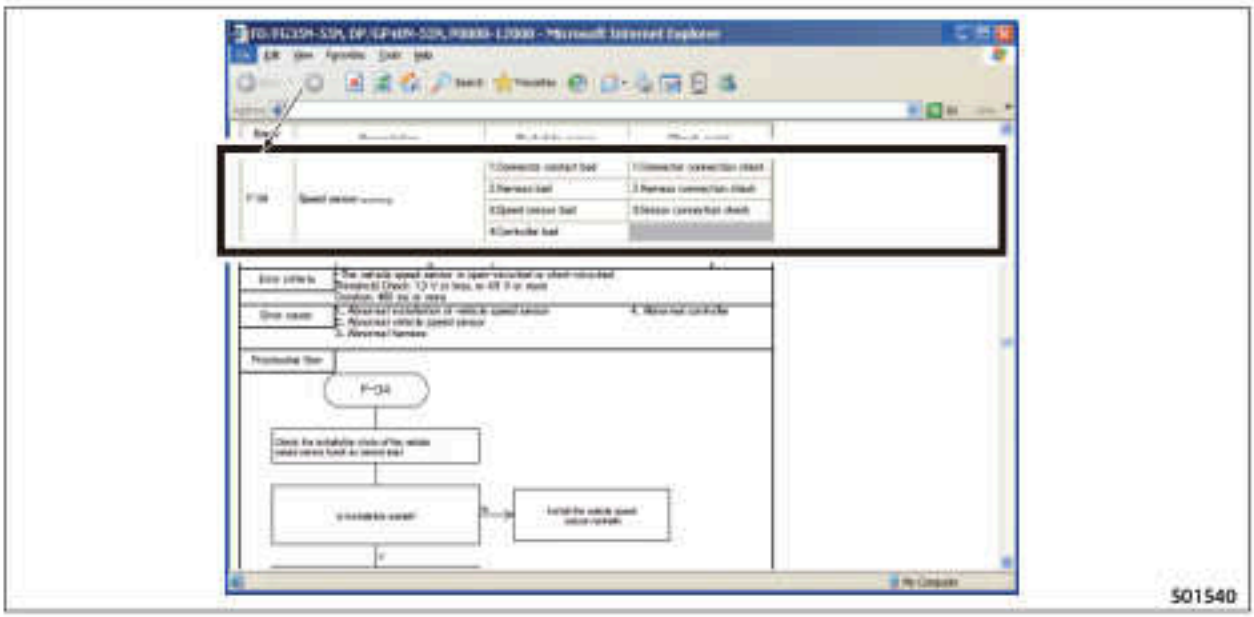
Example: Diagnostic code 34 (Speed sensor warning)

(1) Connector contact bad
(2) Harness bad
(3) Speed sensor bad
(4) Controller bad



Check items

(1) Connector connection check
(2) Harness connection check
(3) Sensor connection check



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