CAT® Lift Trucks

Service Manual

K15, K21, K25 Gasoline Engine

K15
K21
K25

For use with GP15N-GP35N, GPE15N-GPE35N
Chassis Service Manual.

99789-87100

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GENERAL INFORMATION

SECTION GI

CONTENTS

HOW TO USE THIS MANUAL GI-2
- Description GI-2
- Definition of Terms GI-2
- Definition of Units GI-2
- Description GI-2

PRECAUTIONS FOR SAFETY AND QUALITY .. GI-3
- Safe Operation GI-3
- Correct Operation GI-4
- Precautions for Radio Equipment Installation . GI-4

PRECAUTIONS GI-5
- Precautions in Draining Engine Coolant GI-5
- Precautions for Disconnecting Fuel Piping GI-5
- Precautions for Removing and Disassembling GI-5
- Precautions for Inspection, Correction, and Replacement GI-5
- Precautions for Assembly and Installation GI-5
- Parts Requiring Angle Tightening GI-6
- Caution With Use of Power Tools GI-6
- Precautions for Liquid Gasket Application GI-6

TIGHTENING TORQUE GI-7
- Standard Bolt Tightening Torque GI-7
- Engine Part Tightening Torque GI-8

SPECIAL SERVICE TOOLS GI-10

ENGINE OUTSIDE DRAWINGS GI-11

MAIN SPECIFICATIONS GI-12

STANDARD AND REPAIR LIMIT GI-16

STAMPED LOCATION OF ENGINE NO. GI-20

TROUBLE DIAGNOSIS GI-21
- Engine Adjustment GI-22
- Engine LPG Fuel System GI-27

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MAINTENANCE

SECTION MA

CONTENTS

ENGINE MAINTENANCE MA-2
Specifications MA-2
Tightening Torque MA-6
Maintenance Schedule MA-8
Oil and Grease, and Capacity MA-9
On Board Inspection and Service MA-10

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ENGINE TUNE-UP

SECTION ET

ET

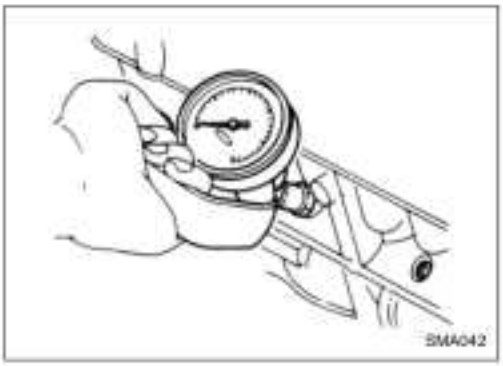
CONTENTS

SPECIFICATIONS ET-2
TIGHTENING TORQUE ET-3
TROUBLE DIAGNOSIS ET-4
ENGINE INSPECTION AND ADJUSTMENT ET-9
Engine Body Related ET-9
Ignition and Fuel Systems ET-13
SPECIAL SERVICE TOOLS FOR CARBURETOR MODEL ET-20

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Engine Body Related (Cont'd)

COMPRESSION PRESSURE INSPECTION



1. Warm up the engine sufficiently and then stop it.
   Release the fuel pressure. (Electric controlled specifications)
2. Remove the spark plug.
3. Apply a compression gauge correctly to the cylinder plug hole to be measured.
4. Set the throttle valve to the fully-open position. Depress the throttle pedal to the fully-open position.
5. Crank the engine and read the gauge.
   (The same operations can be used for both the carburetor and electric control models)
   - Keep the engine speed at approximately 250 rpm.
   - Finish the pressure measurement in as short a time as possible.

Standard compression pressure

K15	1,400 kPa (14.0 bar, 14.3 kg/cm^2, 203 psi)
K21	1,450 kPa (14.5 bar, 14.8 kg/cm^2, 210 psi)
K25	1,510 kPa (15.1 bar, 15.4 kg/cm^2, 219 psi)

6. The compression pressure differences between cylinders must not exceed 98 kPa (1.0 bar, 1 kg/cm^2, 14 psi) /250 rpm. If any cylinder shows an extremely low compression pressure, put a small amount of oil into the cylinder through the spark plug hole and remeasure the pressure.
   - If the pressure rises after filling oil, the piston ring is worn or damaged.
   - If the pressure remains unchanged even after filling oil, the valve is stuck or inappropriately seated.
   - If low compression pressure is observed in two adjacent cylinders and the pressure is not restored even after filling oil, the head gasket is leaking. In this case, oil and water may enter in the combustion chamber.
   - If the engine RPM is not in the specified range: Measure the battery specific gravity.

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Diagnosis Chart by Symptom (Cont'd)

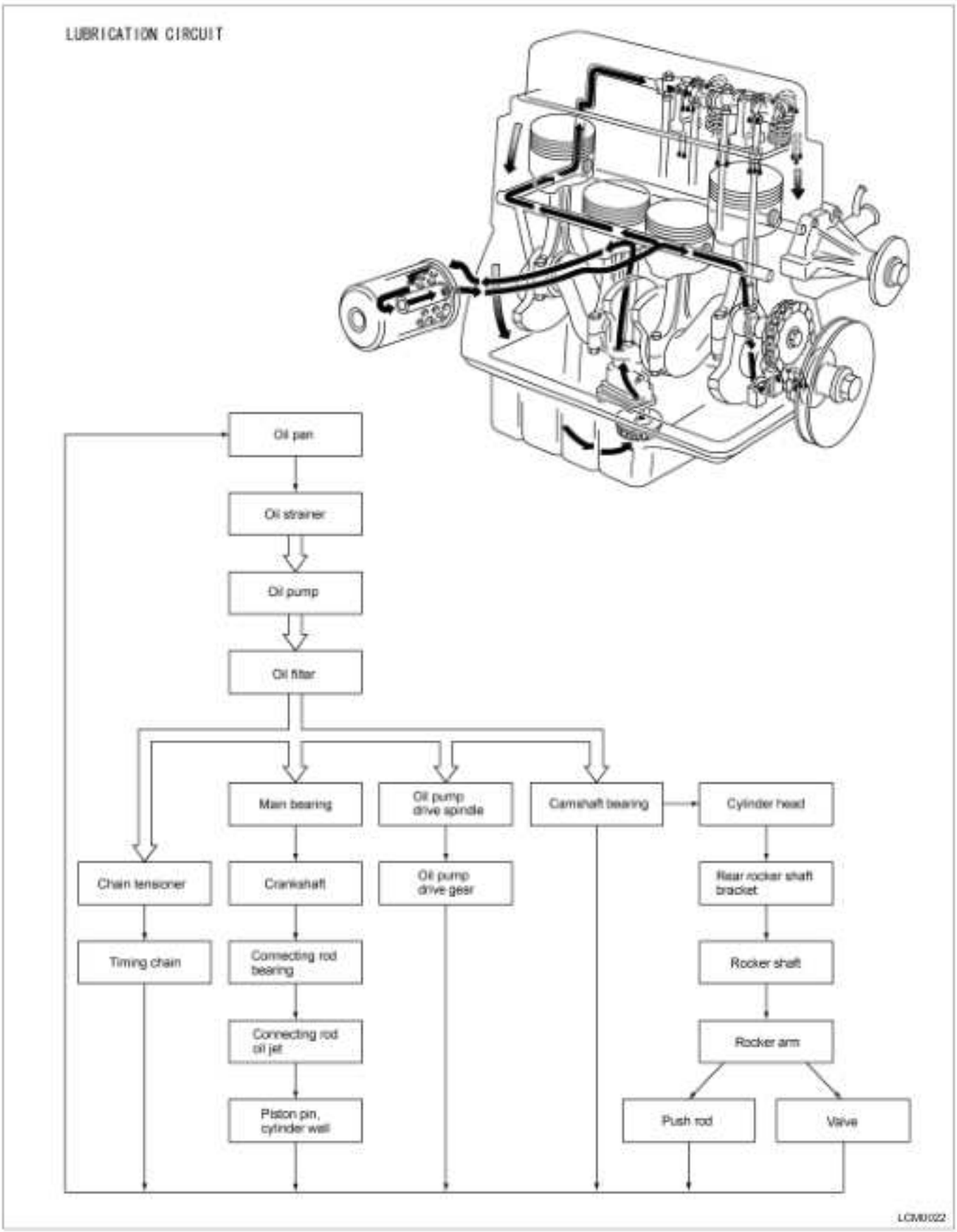
RELATIONSHIPS BETWEEN MALFUNCTIONING SYMPTOMS AND ACTUATOR CIRCUITS

The table below shows the possible symptoms caused by the malfunction of each actuator circuit.

Symptoms			Impossible to start		Poor starting		Poor idle						Poor driving								Engine stall				Other				
			No initial combustion	Initial combustion	When engine is cold	When engine is warming up	Fast idle is not effective	High idle rpm	Low idle rpm	Inconsistent idle when engine is cold.	Inconsistent idle when warming up	Poor power output	Poor acceleration	Engine rpm does not increase smoothly.	During surge and acceleration	During surge and constant speed driving	Knocking	Backfire	After-burn	At idle	Driving	During deceleration	During a heavy load	Engine over temperature (Overheat)	Poor fuel consumption efficiency	Check that symptoms are detected with self-diagnosis.	Check that symptoms are in fail-safe condition.	Description/notable characteristics of the symptom
Actuator malfunction ⊕: Highly possible ♦: Possible																													
Gasoline injector	Power supply circuit	OPEN	♦	♦	♦	♦				⊕	⊕	♦	♦	♦	♦					♦	♦	♦	♦						• No fuel injection to cylinder with open circuit, resulting in LEAN output of heated oxygen sensors. • Starting engine is impossible when the circuits for all the cylinders are open.
		Momentarily open														♦				♦		♦	♦						
	Coil	OPEN	♦	♦	♦	♦				⊕	⊕	♦	♦	♦	♦					♦	♦	♦	♦						
		Momentarily open														♦				♦		♦	♦						
	Drive circuit (ECM side)	OPEN	♦	♦	♦	♦			♦	⊕	⊕	♦	♦	♦	♦		♦	♦		♦	♦	♦	♦						
		Momentarily open														♦													
		SHORT	♦	♦	♦	♦				⊕	⊕	♦	♦	♦	♦				♦	♦	♦	♦	♦						• Continuous fuel injection to cylinder with short circuit, resulting in OVER-RICH and misfiring. • Starting engine is impossible when the circuits for all the cylinders are open.
	Nozzle hole	Foreign material intrusion	♦	♦	♦	♦					⊕	♦	♦	♦		♦			♦	♦	♦	♦	♦						• The cylinder with foreign material will keep injecting.
		Clogging	♦	♦	♦	♦		♦		⊕	⊕	♦	♦	♦		♦	♦	♦		♦	♦	♦	♦						• The symptom depends on clogging status. The correction factor of air-fuel ratio becomes larger.
	Ground circuit (ECM)	OPEN	♦																	♦	♦	♦	♦						• Shocks may be sensed and engine stall may be occur depending on the duration of the operation conditions.
		Momentarily open								♦	♦	♦	♦		♦	♦				♦		♦	♦						
Ignition signal circuit		OPEN	♦	♦	♦	♦			♦	♦	♦	♦	♦	♦	♦				♦	♦	♦	♦	♦		♦				• Slight shocks and surges may be sensed depending on the duration of momentarily open circuit and the operating conditions.
		Momentarily open														♦			♦	♦									
Ignition coil	Power supply circuit	OPEN	♦	♦		♦				♦	♦	♦	♦	♦	♦				♦	♦	♦	♦	♦						•
		Momentarily open														♦			♦	♦									• Engine stall may occur if duration of momentarily open circuit is too long.
	Coil	OPEN	♦	♦		♦				♦	♦	♦	♦	♦	♦				♦	♦	♦	♦	♦						• Shocks may be sensed and engine stall may be occur depending on the duration of the operation conditions.
	Ground circuit	OPEN	♦	♦		♦				♦	♦	♦	♦	♦	♦				♦	♦	♦	♦	♦						• Injects fuel toward spark plug on the cylinder with open circuit.
		Momentarily open														♦			♦	♦									

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Lubrication Schematic Diagram



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