CAT® Lift Trucks

Service Manual

K15, K21, K25 Gasoline Engine

K15	000001-up
K21	000001-up
K25	004868X-up

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

99789-85110

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ENGINE TUNE-UP

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- Difference of weight (Piston combination) (g)
  Standard 4 or less

CRANKSHAFT

- Bend (mm)
  Repair limit 0.05
- End play (mm)
  Standard 0.05 - 0.18
  Repair limit 0.20
- Journal dimension (mm)
  Standard 62.942 - 62.955
- Pin standard dimension (mm)
  Standard 44.961 - 44.974 (K15, K21, K25)
- Journal oil clearance (mm)
  Standard 0.020 - 0.073
  Repair limit 0.10
- Pin oil clearance (mm)
  Standard 0.032 - 0.066

FLYWHEEL

- Flywheel surface swing (mm)
  Repair limit 0.10
- Ring gear surface swing (mm)
  Repair limit 0.50
- Flatness (mm)
  Repair limit 0.30

CAMSHAFT

- Bend (mm)
  Repair limit 0.05
- Camshaft height (mm)
  Standard 36.750 - 36.800 (For both intake and exhaust)
  Size reduction limit 36.5
- Journal dimension (mm)

Standard	Front	45.434 - 45.447
	Center	43.897 - 43.910
	Rear	41.218 - 41.231

- End play (mm)
  Standard 0.025 - 0.255
  Repair limit 0.40
- Journal oil clearance (mm)

Standard	Front	0.025 - 0.051
	Center	0.038 - 0.064
	Rear	0.025 - 0.051
Repair limit	Front	0.10
	Center	0.15
	Rear	0.10

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RELATIONSHIP BETWEEN MALFUNCTIONING SYMPTOM AND THE ENGINE MAIN BODY/AUXILIARY COMPONENT

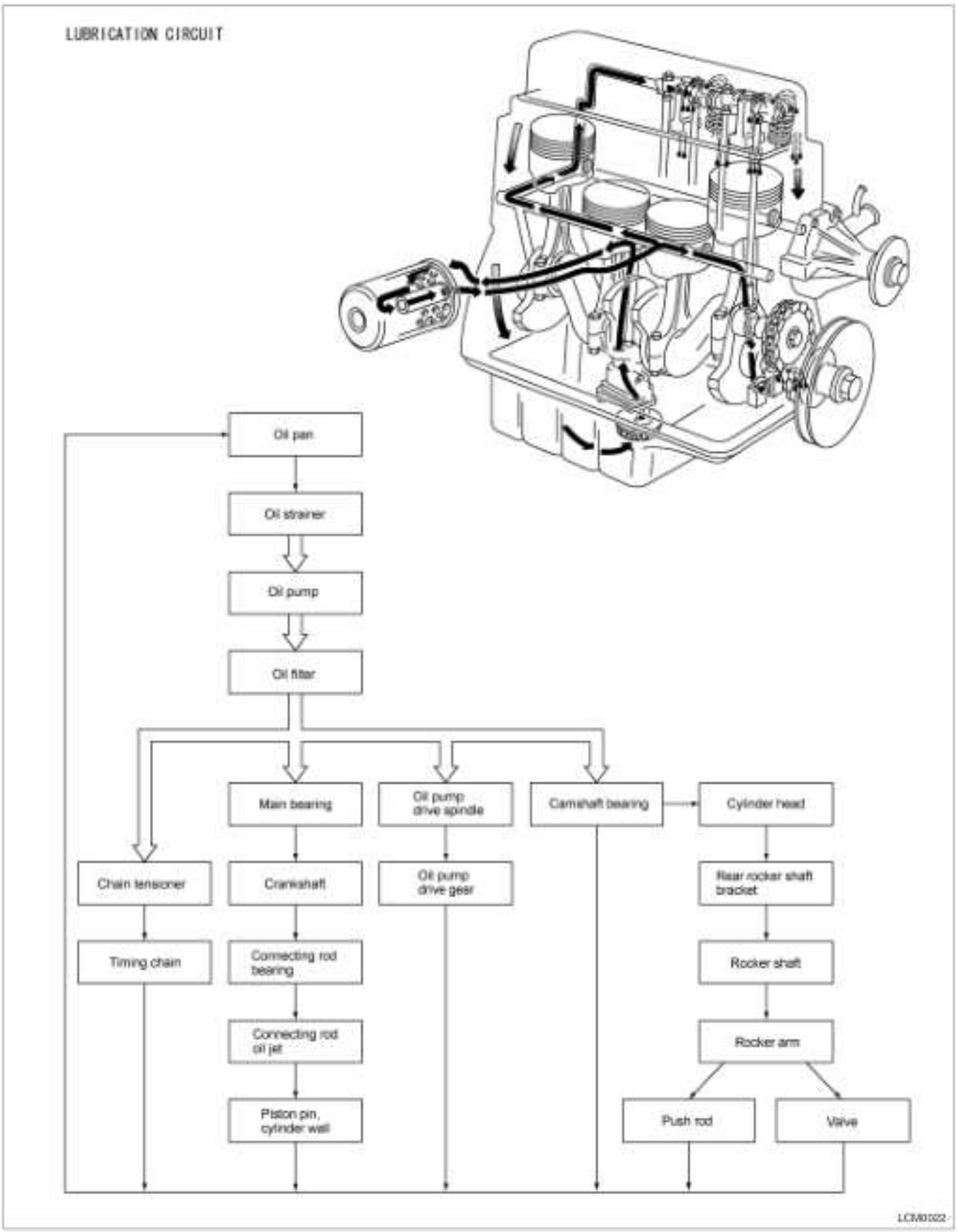
The table below shows the possible symptoms caused by the malfunction of engine main body system. It will be helpful in malfunction trouble diagnosis. (The table lists general symptoms and some may not be applicable.)

⊕: Highly possible
♦: Possible
∇: Not very possible

	Symptoms	Impossible to start		Poor starting		Poor idle					Poor driving								Engine stall				Other		Description/notable characteristics of the symptom
		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	
Fuel mixture	Air sucked from oil level gauge								♦	∇		♦	♦						∇			∇		∇	• Air-fuel ratio becomes LEAN. • High air-fuel correction factor.
	Air sucked from oil filler cap								♦	∇		♦	♦						∇			∇		∇	• Low suction power (vacuum pressure) of intake manifold.
	Air sucked from PCV hose (downstream of PCV)			♦	∇				♦	∇	♦	♦	♦	♦	♦	∇	∇		♦	♦		♦		∇	* Check the suction using a pressure gauge. * Generally applicable to air suction in air intake system
	Air sucked from intake manifold and gasket			♦	∇				♦	∇	♦	♦	♦	♦	♦	∇	∇		♦	♦		♦		∇	
	PCV kept open						♦		♦	∇		♦	♦	♦	♦									♦	• Noise (high hissing tone)
	Clogged fuel strainer			♦	∇				♦	∇	♦	♦	♦	♦	♦	♦	♦		∇	♦		♦			• Symptom depends on clogging status. This tends to happen during high-speed or high load operation.
	Clogged air cleaner element										♦	♦	♦	♦	♦									♦	
	Malfunctioning gasoline pressure regulator	∇	♦	♦	♦				♦	♦	♦	♦	♦	♦	♦				♦	♦	♦	♦			• Symptom varies depending on combustion pressure.
	Poor quality gasoline	∇	♦	♦	♦				♦	♦	♦	♦	♦	♦	♦	∇			♦	♦	♦	♦		∇	• Symptom varies depending on oil quality.
	Improper LPG fuel (cold area and propane ratio)	♦	♦	♦	♦				♦	♦	♦	♦	♦	♦	♦	∇			♦	♦	♦	♦		∇	• Starting ability in cold area is changed depending on propane ratio. • Use LPG with proper propane ratio.
	Malfunctioning LPG vaporizer pressure adjusting valve	∇	♦	♦	♦				♦	♦	♦	♦	♦	♦	♦				♦	♦	♦	♦			• If the pressure is low, it is caused by poor output during high-speed or high load operation. • If the pressure is excessively high, relief valve operates and engine stalls at rich.
	Clogged LPG vaporizer hot water circuit			♦	♦				♦	♦	♦	♦	♦	♦	♦				♦	♦	♦	♦			• Symptom depends on fuel temperature. This tends to happen during engine stall and is impossible to restart during engine warming up.
	Clogged LPG interception valve filter			♦	∇				♦	∇	♦	♦	♦	♦	♦				∇	♦		∇			• Symptom depends on clogging status. This tends to happen during high-speed or high load operation.
	Valve deposit			♦	♦				♦	∇	♦	♦	♦	♦	♦	♦	♦		♦	♦	♦	♦		∇	• Air-fuel ratio becomes LEAN. High air-fuel correction factor.
Sparking	Improper connection of wire connector			∇	∇	∇	∇	∇	∇	∇	∇	∇	∇	∇	∇			∇	∇	∇	∇	∇		∇	• Check that wiring route is proper.
	Poor connection of wire connector	∇	♦	♦	♦			♦	♦	♦	♦	♦	♦	♦				♦	♦	♦	♦	♦		♦	• Check that connector is slightly raised. Poor starting if slightly raised connectors are in all cylinders.
	Improper ignition timing adjustment			♦	♦				♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦	♦		♦	—
	Malfunctioning spark plug			♦	♦				♦	♦	♦	♦	♦	♦	♦				∇		∇	∇			• Check that the gap is proper. Check spark plug for electric wear, soil (fuel injection, smoking), and damaged insulator.
	Leakage from high-pressure parts	∇	♦	♦	♦				♦	♦	♦	♦	♦	♦	♦			♦	♦	♦		♦		♦	• Symptom varies depending on the level of leakage.

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Lubrication Schematic Diagram



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