CAT® Lift Trucks

Service Manual

TB45 Gasoline Engine

For use with GP40K-GP50K Chassis Service Manual. 99789-66110

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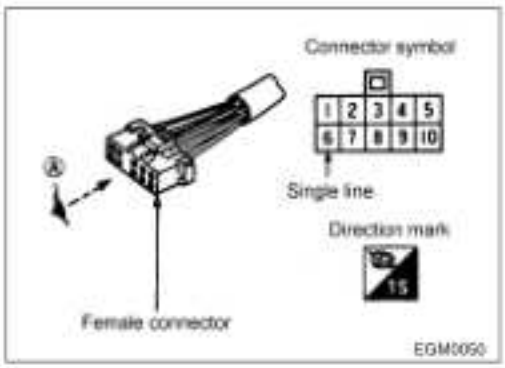
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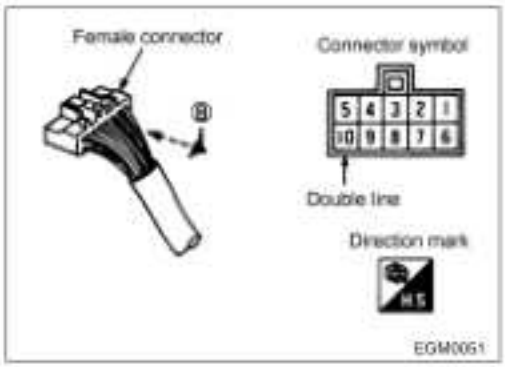
ECM Trouble Diagnosis (Cont'd)

SYMBOLS FOR HARNESS CONNECTOR

FEMALE CONNECTOR

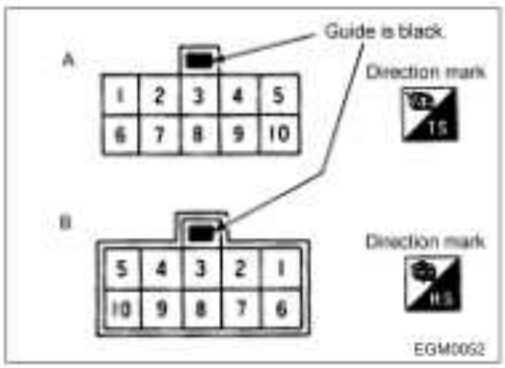


- When a harness connector is viewed from A (terminal side), the outer frame of the connector symbol is indicated with a single line. In addition, the direction indicator shows "TS" (Terminal Side) in description type font.



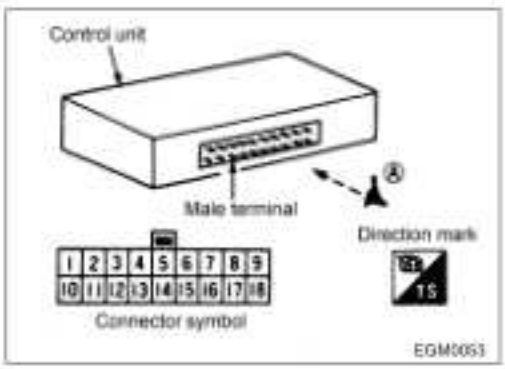
- When a harness connector is viewed from B (harness side), the outer frame of the connector symbol is indicated with double lines. In addition, the direction indicator shows "HS" (Harness Side) in description type font.
- Terminal assignments of a connector viewed from A and B are mirror images, indicating just as they are seen.

MALE CONNECTOR



The illustration method is the same as that for a female connector, the black guide box, however, indicates a male connector (the white guide box a female connector).

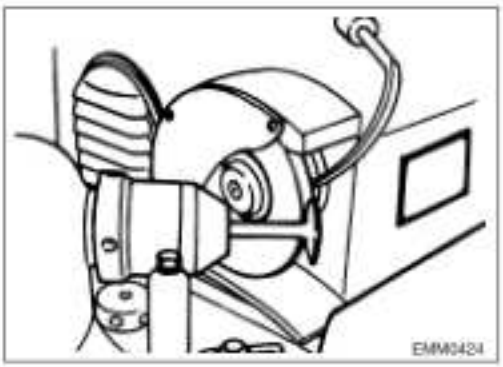
SINGLE UNIT (CONTROL UNIT)



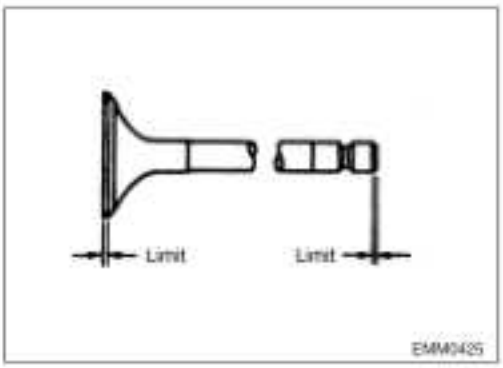
A single control unit is viewed only from A, and the illustration is as shown in the figure.

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Cylinder Head Assembly (Cont'd)



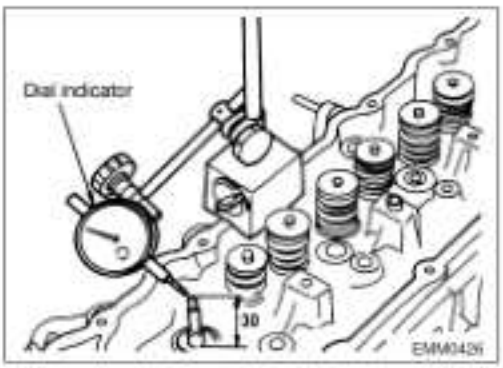
- Stem edge surface is corrected using oilstone.
- Keep corrections to a minimum due to surface reduction. Replace if outside the repair limit.



CORRECTION REPAIR LIMIT

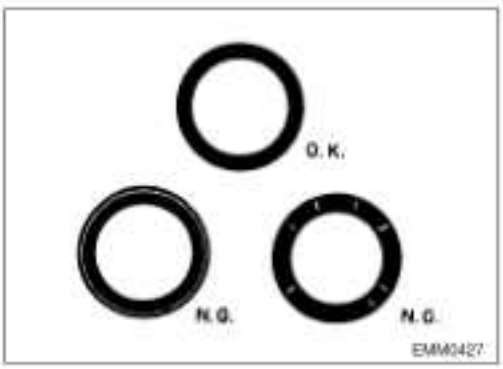
Face correction length:
Intake valve:
0.5 mm (0.020 in.) or less
Exhaust valve:
0.5 mm (0.020 in.) or less
Stem edge surface correction length:
Intake valve:
0.2 mm (0.008 in.)
Exhaust valve:
0.2 mm (0.008 in.)

3. Valve guide clearance



- Check before removing the valve guide.
- Make sure the valve stem diameter is within the standard. Refer to "Valve direction inspection" (previous page).
- Push the valve out toward the combustion chamber. Measure runout while pushing the stem edge surface toward the dial indicator.
- 1/2 of the dial indicator reading is the valve guide clearance.
  Standard:
  Intake:
  0.020 - 0.053 mm (0.0008 - 0.0021 in.)
  Exhaust:
  0.040 - 0.073 mm (0.0016 - 0.0029 in.)
  Repair limit:
  Intake:
  0.1 mm (0.004 in.)
  Exhaust:
  0.1 mm (0.004 in.)
- Replace cylinder head if it exceeds the limit.

4. Valve seat contact



- This inspection must be done after ensuring that the dimensions of the valve guide and the valve are within the standard.
- Check valve contact by applying red lead to valve seat contact surface.
- Make sure that contact surfaces are connected all around.
- Reseat the valve and check again if seating condition is not correct. Replace cylinder head if seating condition cannot be corrected by reseating.

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Diagnosis Chart by Symptom (Cont'd)

TB45 ENGINE RELATIONSHIP BETWEEN MALFUNCTIONING SYMPTOM AND THE ENGINE MAIN BODY/AUXILIARY COMPONENT

When the three elements of combustion, compression pressure, fuel mixture, and sparking are all normal, no malfunctions are caused in the gasoline-type engine.
The ECM controls the fuel mixture and sparking (ignition timing). But with malfunctions on the part of engine main body, malfunctioning symptoms result.
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.)

Symptoms		Impossible to start		Impossible to start		Poor idle					Poor driving control								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 drive	Knocking	Backfire	After-burn	At idle	Driving	During deceleration	During a heavy load	Overheat	Poor fuel	
Main unit symptom ◎ : Highly possible ● : Possible ▽ : Not very possible																									
Fuel mixture	Air sucked from oil level gauge								●	—		●	◎						—			—		—	Air-fuel ratio becomes LEAN. High air-fuel correction factor. Low suction power (vacuum pressure) of intake manifold. Use a pressure gauge to check the suction. Generally applicable to air suction in air intake system
	Air sucked from oil filler cap								●	—		●	◎						—			—		—	
	Air sucked from PCV hose (downstream of PCV)			◎	—				●	◎	◎	●	◎	◎	●	—	—		◎	◎		◎		—	
	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 at 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 shut off valve filter			◎	—				●	◎	◎	●	◎	◎	●	◎	◎		—	◎		◎			• Symptom depends on clogging status. This tends to happen during high-speed or high load operation.
	Valve deposit			◎	◎				—	—	◎	●	◎	◎	●	◎	◎		◎	◎	◎	◎		—	• The malfunction tends to happen during high-speed or high load operation (low vacuum).

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