CAT Lift Trucks

Service Manual

Chassis & Mast

MC

GP15N	CT25C-55001-up
GP15ZN	CT34-52001-up
GP18N	CT25C-75001-up
GP18ZN	CT34-72001-up
GP20CN	CT34-22001-up
GP20N	CT17D-10001-up
GP20ZN	CT35-10001-up
GP25N	CT17D-60001-up
GP25ZN	CT35-60001-up
GP30N	CT13F-40001-up
GP35N	CT13F-60001-up

GPE15N	CT34-00001-up
GPE18N	CT34-40001-up
GPE20CN	CT34-30001-up
GPE20N	CT17D-20001-up
GPE20ZN	CT35-20001-up
GPE25N	CT17D-70001-up
GPE25ZN	CT35-70001-up
GPE30N	CT13F-10001-up
GPE35N	CT13F-80001-up

DP15N	CT16D-54001-up
DP18N	CT16D-74001-up
DP20CN	CT16D-24001-up
DP20N	CT18C-20001-up
DP25N	CT18C-70001-up
DP30N	CT14E-10001-up
DP35N	CT14E-80001-up

For use with K15, K21, K25, S4Q2 and S4S Engine Service Manuals.

99719-3F110

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Diagnostic code	Diagnostic code name	Probable cause	Check items
D-63	Overheat (STEP 1)	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Temp sensor bad	3. Sensor connection check
		4. Controller bad	
D-64	Overheat (STEP 2)	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Temp sensor bad	3. Sensor connection check
		4. Controller bad	
D-71	Accelerator sensor warning	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Accelerator sensor bad	3. Sensor connection check
		4. Controller bad	
D-73	Engine rotation speed sensor warning	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Engine revolution sensor bad	3. Sensor connection check
		4. Controller bad	
D-75	Idle SW warning	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Idle switch bad	3. Idle switch check
		4. Controller bad	
D-76	Throttle close position warning	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Throttle close switch bad	3. Throttle close switch check
		4. Controller bad	
D-77	Throttle open position warning	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Throttle open switch bad	3. Throttle open switch check
		4. Controller bad	
D-78	Throttle original position warning	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Controller bad	
D-79	Throttle close switch sticking warning	1. Connector contact bad	1. Connector connection check
		2. Harness bad	2. Harness connection check
		3. Throttle close switch bad	3. Throttle close switch check
		4. Controller bad	

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13. Troubleshooting

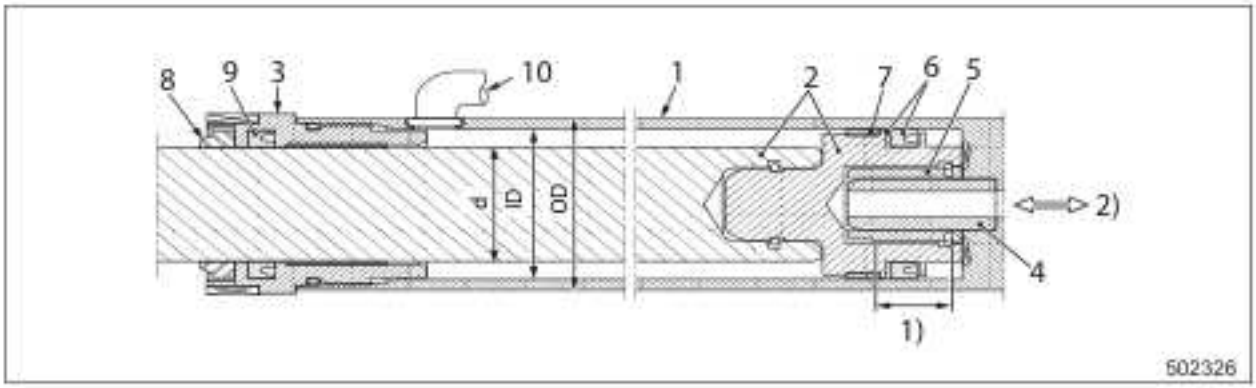
Foot brake

Condition	Possible cause	Action
Lack of braking force	Oil leaking past primary cup in master cylinder	If cylinder is not worn, replace piston cup. If piston cup is deformed, replace cap and also change brake oil with genuine brake oil
	Oil leaks from wheel cylinder cup	
	Oil leaks from oil pipe joint	Tighten or replace pipe and connector
	Shoe linings worn	Replace
	Shoe linings contaminated with oil or grease	Clean or replace
Too much pedal stroke	Air trapped in brake oil lines	Bleed air from master and wheel cylinders
	Piston cup defective in master cylinder	Replace
	Not enough brake oil in reserve tank	Refill
	Push rod to piston clearance too large in master cylinder	Adjustment
	Brake oil leakage	If cylinder is not worn, replace piston cup. If piston cup is deformed, replace cap and also change brake oil with genuine brake oil
	Automatic adjuster is not working	Check if cable guide and adjusting spring are correctly installed. When it does not work, replace cable with spring, lever and adjusting screw
Uneven braking effect	Lining or drum in less effective brake is contaminated with oil or grease	Wash with a cleaning fluid, if oil or grease on lining not removed, replace it
	Wobbly or loose-mounted drum in less effective brake	Replace drum. Adjust and tighten if loosely mounted
	Wheel tires are inflated unequally	Inflate to specified service pressure
Brake squeaks	Lining is hardened by heat	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 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
Abnormal noise during traveling	Clearance between lining and drum is too small	Adjustment
	Brake drum is significantly distorted	Repair or replace
Brake does not work	Brake lining is worn out beyond service limit	Replace
	Clearance between lining and drum is too large	Adjustment

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Main components of cylinder with a return pipe

- Simplex mast with a lift height of 3.5m (137.8 in.) or higher



1. Cylinder tube
2. Piston rod assembly
3. Cylinder head
4. Pipe (Integrated with cylinder tube)
5. Cushion bearing
6. U-ring, Back-up ring
7. Bushing
8. Wiper ring
9. U-ring
10. Return pipe

1) Cushion stroke: 2.3 mm (0.091 in.)
2) Oil inflow, outflow

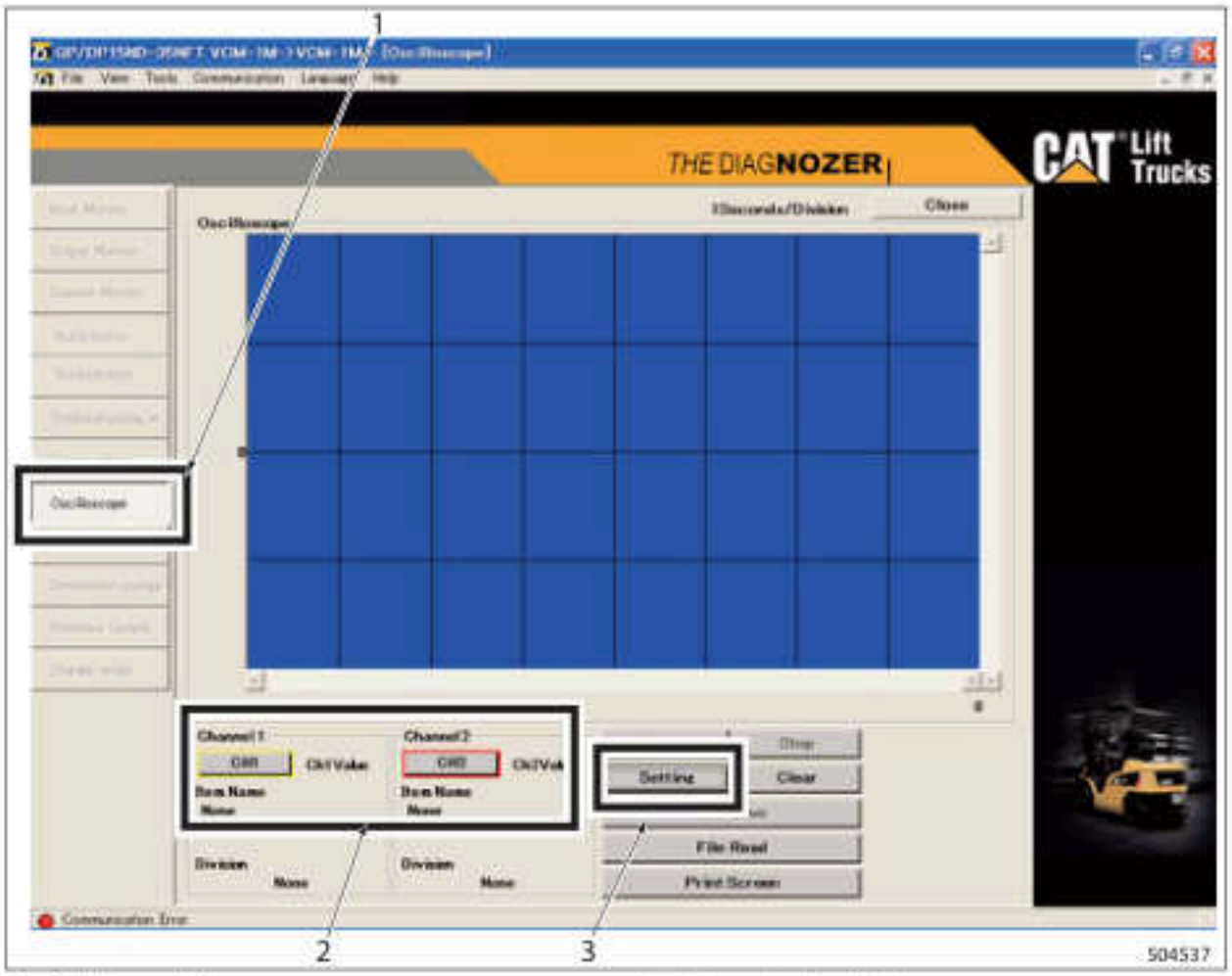
Cylinder dimensions (cylinder length and stroke vary depending on lift height)

Truck class	Mast type	Height	Rod diameter (d)	Cylinder inside diameter (ID)	Cylinder outside diameter (OD)	Cushion stroke	Presence of return pipe
1, 2 ton classes	Simplex mast	3.4 m (133.9 in.) or less	35 mm (1.38 in.)	45 mm (1.77 in.)	52 mm (2.05 in.)	23 mm (0.91 in.)	No
		3.5 m (137.8 in.) or more	35 mm (1.38 in.)	45 mm (1.77 in.)	52 mm (2.05 in.)	23 mm (0.91 in.)	Yes
	Triplex mast	-	35 mm (1.38 in.)	45 mm (1.77 in.)	52 mm (2.05 in.)	23 mm (0.91 in.)	No
2.5 ton class	Simplex mast	3.4 m (133.9 in.) or less	40 mm (1.57 in.)	50 mm (1.97 in.)	57 mm (2.24 in.)	23 mm (0.91 in.)	No
		3.5 m (137.8 in.) or more	40 mm (1.57 in.)	50 mm (1.97 in.)	57 mm (2.24 in.)	23 mm (0.91 in.)	Yes
	Triplex mast	-	40 mm (1.57 in.)	50 mm (1.97 in.)	57 mm (2.24 in.)	23 mm (0.91 in.)	No
3 ton class	Simplex mast	3.4 m (133.9 in.) or less	45 mm (1.77 in.)	55 mm (2.17 in.)	63 mm (2.48 in.)	23 mm (0.91 in.)	No
		3.5 m (137.8 in.) or more	45 mm (1.77 in.)	55 mm (2.17 in.)	63 mm (2.48 in.)	23 mm (0.91 in.)	Yes
	Triplex mast	-	45 mm (1.77 in.)	55 mm (2.17 in.)	63 mm (2.48 in.)	23 mm (0.91 in.)	No
3.5 ton class	Simplex mast	3.4 m (133.9 in.) or less	45 mm (1.77 in.)	60 mm (2.36 in.)	68 mm (2.68 in.)	23 mm (0.91 in.)	No
		3.5 m (137.8 in.) or more	45 mm (1.77 in.)	60 mm (2.36 in.)	68 mm (2.68 in.)	23 mm (0.91 in.)	Yes
	Triplex mast	-	45 mm (1.77 in.)	60 mm (2.36 in.)	68 mm (2.68 in.)	23 mm (0.91 in.)	No

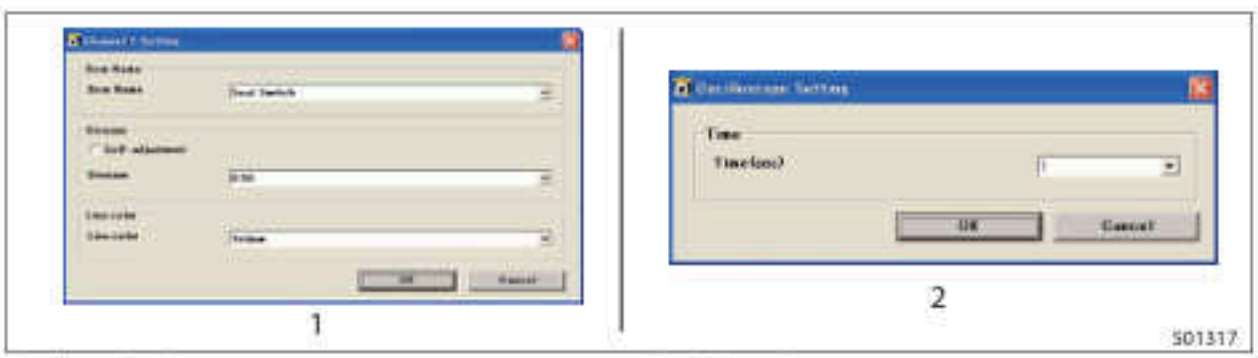
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Oscilloscope

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 specified input/output values. 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 data of the graph being displayed on the screen can be stored in the memory, and redisplayed later. The graph screen can be printed out on a printer by clicking the Print Screen button. Note that 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



1. Channel setting screen
2. Time axis set-up screen

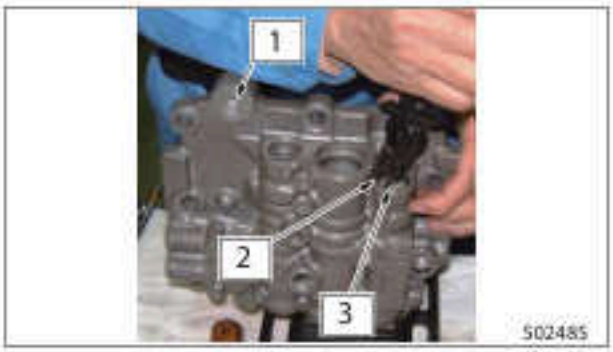
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6.8 Oil Seal and Plug, Removing

Regulator valve section

(1) Secure the control valve body in a vise so that inching lever mounting side faces up.

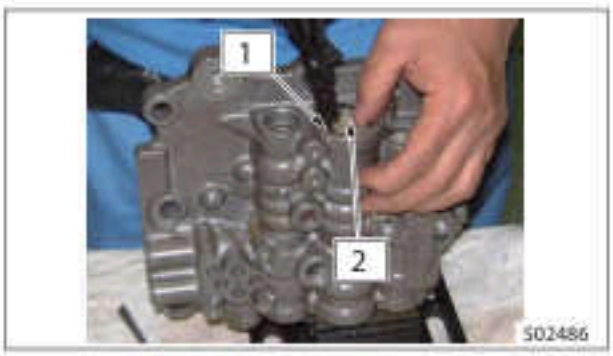
(2) Remove snapring from regulator valve section and remove main relief plug together with O-ring.



1. Inching lever mounting portion 3. Main relief plug
2. Snapring

Accumulator valve section

Remove snapring from accumulator valve section and remove accumulator plug together with O-ring.



1. Snapring 2. Accumulator plug

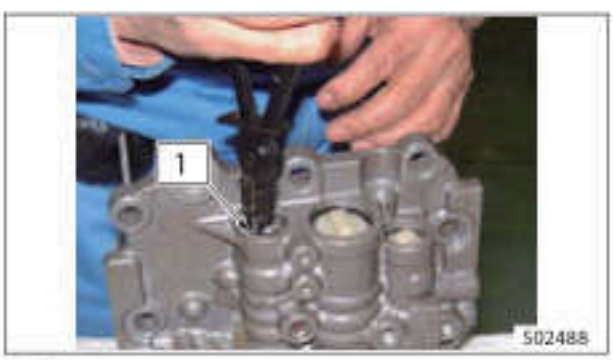
Regulator valve section

(1) Remove oil seal from inching rod.



1. Inching rod oil seal

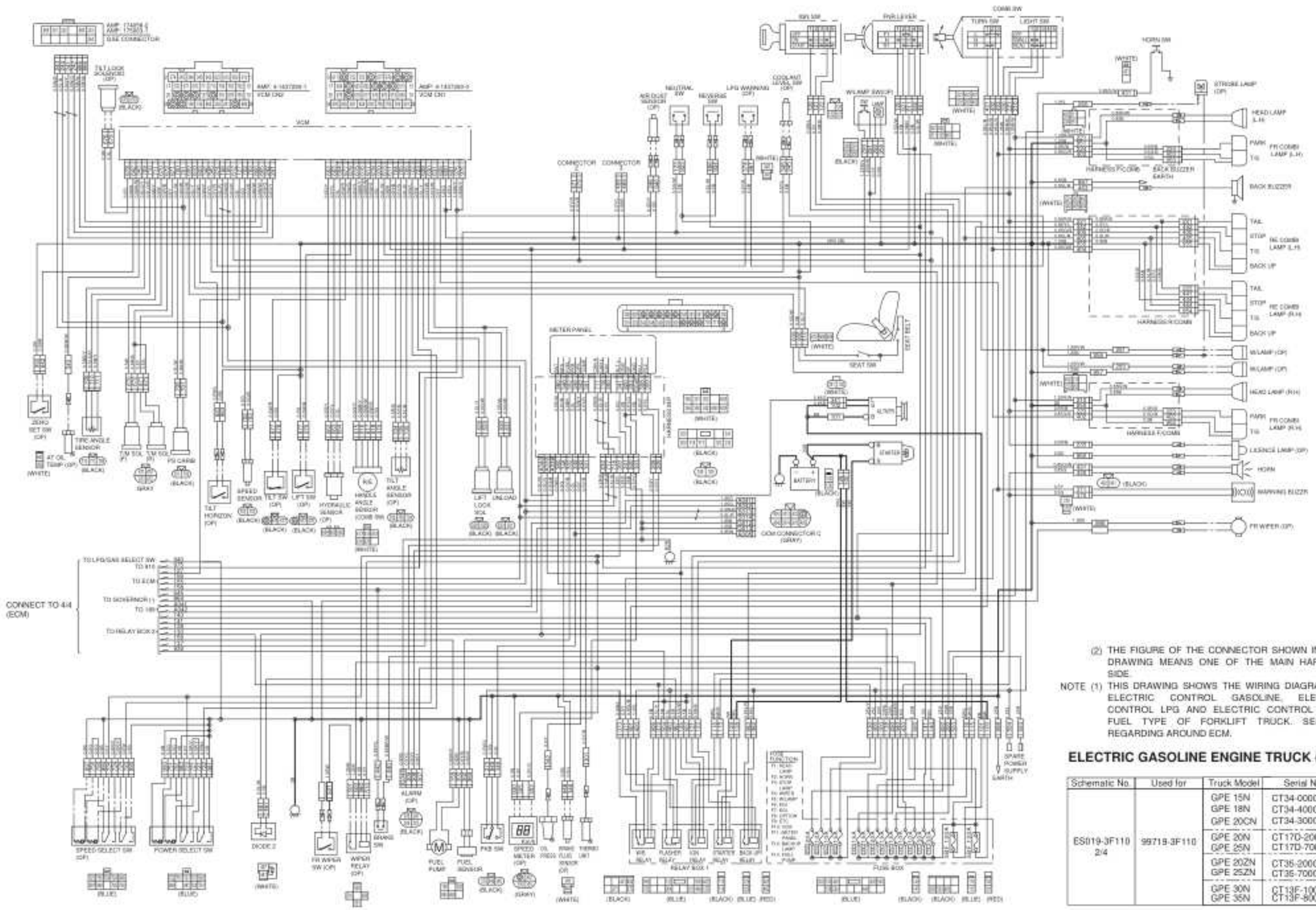
(2) Remove snapring from inching valve section.



1. Snapring

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Electrical Schematic (2/4)



(2) THE FIGURE OF THE CONNECTOR SHOWN IN THIS DRAWING MEANS ONE OF THE MAIN HARNESS SIDE.

NOTE (1) THIS DRAWING SHOWS THE WIRING DIAGRAM OF ELECTRIC CONTROL GASOLINE, ELECTRIC CONTROL LPG AND ELECTRIC CONTROL DUAL FUEL TYPE OF FORKLIFT TRUCK. SEE 4/4 REGARDING AROUND ECM.

ELECTRIC GASOLINE ENGINE TRUCK (MC)

Schematic No.	Used for	Truck Model	Serial No.
ES019-3F110 2/4	99719-3F110	GPE 15N	CT34-00001 up
		GPE 18N	CT34-40001 up
		GPE 20CN	CT34-30001 up
		GPE 20N	CT17D-20001 up
		GPE 25N	CT17D-70001 up
		GPE 20ZN	CT35-20001 up
		GPE 25ZN	CT35-70001 up
		GPE 30N	CT13F-10001 up
		GPE 35N	CT13F-80001 up

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