CAT® Lift Trucks

Service Manual

Controller

EP10KRT PAC ETB10A-10001-up
EP12KRT PAC ETB10A-30001-up
EP15KRT PAC ETB10A-60001-up

99759-6H100

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Setup Options (Group 1)

Option #	Title of Option	Description	Range	Default Value
#1	Application Pre-Sets (Truck Operation Mode)	The value setting of the following 8 items are registered beforehand. Top travel speed, Acceleration rate, Traveling power, Accelerator regen adjustment, Brake regen adjustment, Start lift speed, Top lift speed, Tilt speed. Refer to the explanation for details.	A, b, C, d, E (1)	A
#2	Start Lift Speed	Beginning lift speed Start lift speed cannot exceed top lift speed. (1: SLOW → 10: FAST)	1 to 10 (4)	7
#3	Top Lift Speed	Lift speed when operating the lever at maximum	1 to 10 (4)	10
#4	Tilt Speed	Speed setting for tilt	1 to 10	5
#5	Attachment 1 Speed	Speed setting for attachment 1	1 to 10	3
#6	Attachment 2 Speed	Speed setting for attachment 2	1 to 10	1
#7	Top Travel Speed Limit	Maximum travel speed	5 to 14 [km/h] or 5 to 13 [km/h] (3)	13 or 14
#8	Acceleration Rate	Choice of acceleration rate (1: SLOW → 5: FAST)	1 to 5	2
#9	Traveling Power	Choice of power characteristic (1: ECONOMY, 2: STANDARD, 3: HIGH POWER)	1, 2, 3	2
#10	Service Indicator	This function notifies service personnel that maintenance time is approaching or has passed. It means the lapsed time when setting up. Approached: Icon flashes (20 hour) Passed :Icon turns on and power reduction (selected) (2) Refer to the explanation for details.	0, 0.1, 100, 150, ...950, 1000, L0.1 (6 min.), L100, L150, ..L950, L1000 (In increments of 50 [hour]) "L": power reduction 0: no action	0

NOTICE: (1) Before changing, when parameter data are different from the values of the selected mode, the truck mode indicator (A to E) flickers.
When the truck mode is changed, all parameter data is replaced by the set values of the selected mode.

(2) The data from the truck hour meter at set time is saved apart from the selected value. If the key switch is turned off without setting the DRS switch to R, the data at set time is maintained.
When the DRS switch is set to R, the data at set time is replaced by the current truck hour meter data.

(3) When #40 is set for "1.2 tons or more", the setting range is 5 to 13 [km/h].
For setting other than above, the setting range is 5 to 14 [km/h].

(4) The setting range is 1 to 10 for all models and all modes. But when #9 is set for "Economy", maximum pump speed is reduced to about 85% of "Standard" or "High power".

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Setup Options (Group 2)

Option #	Title of Option	Description	Range	Default Value	Harness Pin No.
#11	Auxiliary Input for Lift 1	Not used	0 to 2	0	30
#14	Auxiliary Input for Lift 2	Not used	0 to 2	0	40
#17	Auxiliary Input for Lift 3	Not used	0 to 2	0	41
#20	Stall Timer	This option allows to shut down truck when the traction motor torque is too high.	2 to 10 [sec]	5	–
#21	Regen Adjustment for Brake Regen	5 steps for regen power on brake regen.	1 to 5	3	–
#22	Regen Adjustment for Lever Regen	5 steps for regen power on lever regen	1 to 5	4	–
#23	Regen Adjustment for Accelerator Regen	5 steps for regen power on accelerator regen	1 to 5	3	–
#27	Tire Size Adjustment	This option is used to adjust the amount of tire wear. It changes truck's speed recognition.	0 to 40 (Diameter -20 to +20 mm)	20 (±0 mm)	–
#30	Auxiliary Input for Travel Speed	When the auxiliary input signal is on, travel speed or traction power is limited at value of set. The amount of maximum speed is defined at #31. The amount of power reduction is defined at #32.	0: Disabled 1: Travel speed limit (switch closed) 2: Power reduction (switch closed) 3: Travel speed limit (switch opened) 4: Power reduction (switch opened)	0	31
#31	Auxiliary Maximum Travel Speed Setting	This option determines the maximum travel speed limit of #30.	5 to 14 [km/h] or 5 to 13 [km/h] (3)	8	31
#32	Auxiliary Output Power Limit	This option determines the output traction power limit in % of #30.	0 to 100 [%]	70	31

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Problem: Traction Inverter, Overheating (E5)

(1) Situation
Display: "E5". Poor pulling power and acceleration.
Normal pump motor and power steering operations.

(2) Possible cause
Overheating of traction inverter, faulty traction inverter thermal sensor, open harness wiring, faulty DSP card of traction inverter, abnormal power supply of logic unit, faulty temperature of traction inverter.

(3) How the error code is triggered
Controller temperature is out of range at -25 °C to 100 °C (-13 °F to 212 °F).
Capacitor temperature is out of range at -25 °C to 110 °C (-13 °F to 230 °F).
It becomes normal when temperature is in the range of -20 °C to 70 °C (-4 °F to 158 °F)

(4) Checks
Let truck cool for 15 minutes.
Display: "E5".
Display: No "E5".

(5) Traction inverter becomes normal.

If problem recurs

(6) Check if truck is operated on steep upgrade or to pull large cargo load.

Normal

(7) Discharge the inverters. See page 1-60.
Check thermal paste applied on inverter mounting surface. Thermal paste film should be thin and even.
Normal
Abnormal

(8) Replace traction inverter. See page 1-61.

(9) Clean mounting surface, apply thermal paste, then reinstall inverter. See page 1-61.

(10) Disconnect battery plug. Wait until inverter temperature becomes close to room temperature.

(11) Discharge the inverters. See page 1-60.

Thermal

(12) Remove DSP card cover of traction inverter, then check harness looseness or wire breakage. See page 1-63.
Normal
Abnormal

14V Power supply

(13) Disconnect connector CN6 of traction inverter.
Disconnect connector CN4 of logic unit.
Check continuity between CN4-3 and CN6-17(252).
Check continuity between CN4-6 and CN6-20(255).
Continuity
No continuity

(14) Secure harness if loose.
Replace inverter if wire breaks. See page 1-61.

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Problem: Contactor Coil Fault (72)

(1) Situation
Display: "72". All truck operations except "lift down" inhibited. Line contactor OPEN.

(2) Possible cause
Faulty line contactor, faulty main harness, faulty logic unit.

(3) How the error code is triggered
With short circuit detection signal of logic card.

(4) Checks
Disconnect battery plug, then discharge the inverters. See page 1-60.

(5) Remove coil side terminals of line contactor.

(6) Check short circuit between coil terminal plus(+)(249) and minus(-) (247) of harness.

Not shorted

Shorted

(8) Repair or replace main harness.

(7) Measure coil resistance.
[27Ω at -30°C(-22°F) to 41Ω at 80°C(176°F)]

Abnormal

Normal

(9) Replace line contactor. See Chassis & Mast.

(10) Replace logic card of logic unit. See page 1-66.

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PDS Buzzer Does Not Sound

(1) Situation
No error code displayed.
When power turned off, PDS buzzer does not sound with release of parking brake.
When power turned on, PDS buzzer does not sound with release of parking brake and leaving seat.

(2) Possible cause
Faulty PDS buzzer, faulty main harness, faulty logic unit, faulty PDS relay, faulty parking brake switch.

(3) Checks
Disconnect battery plug, then discharge the inverters. See page 1-60.

(4) Disconnect connectors CN1, CN2, CN3 and CN4 of logic unit.
Disconnect connectors CN25 and CN26 of PDS relay.
Pull up disconnect switch.
Check continuity between CN4-13(25) and CN25(316).
Check continuity between CN4-13(25) and CN25(313).
Check continuity between CN4-13(25) and CN26(330).
Check continuity between CN4-16(22) and CN25(315).
Check continuity between CN4-16(22) and CN26(329).
Check continuity between battery (POS) and CN25(326).
Check continuity between CN1-44 and CN26(311).
Check continuity between CN2-34(109) and CN26(328).
Check continuity between CN24(314) and CN25(314).
Check continuity between CN24(312) and CN26(312).
Continuity — No continuity

(5) Measure resistance of PDS relay with connectors CN25 and CN26.
Measure resistance between CN25(315) and CN25(316).
Measure resistance between CN26(329) and CN26(330).
[867Ω at -30 °C (-22 °F) to 1355Ω at 80 °C (176 °F)]
Normal — Abnormal

(6) Repair or replace main harness.

(7) Check continuity of PDS relay with connectors CN25 and CN26.
Check continuity between CN25(314) and CN25(326).
Check continuity between CN26(312) and CN26(328).
Continuity — No continuity

(8) Replace faulty PDS relay.

(9) Release parking brake lever.
Check continuity between CN3-25(108) and CN26(328).
Continuity — No continuity

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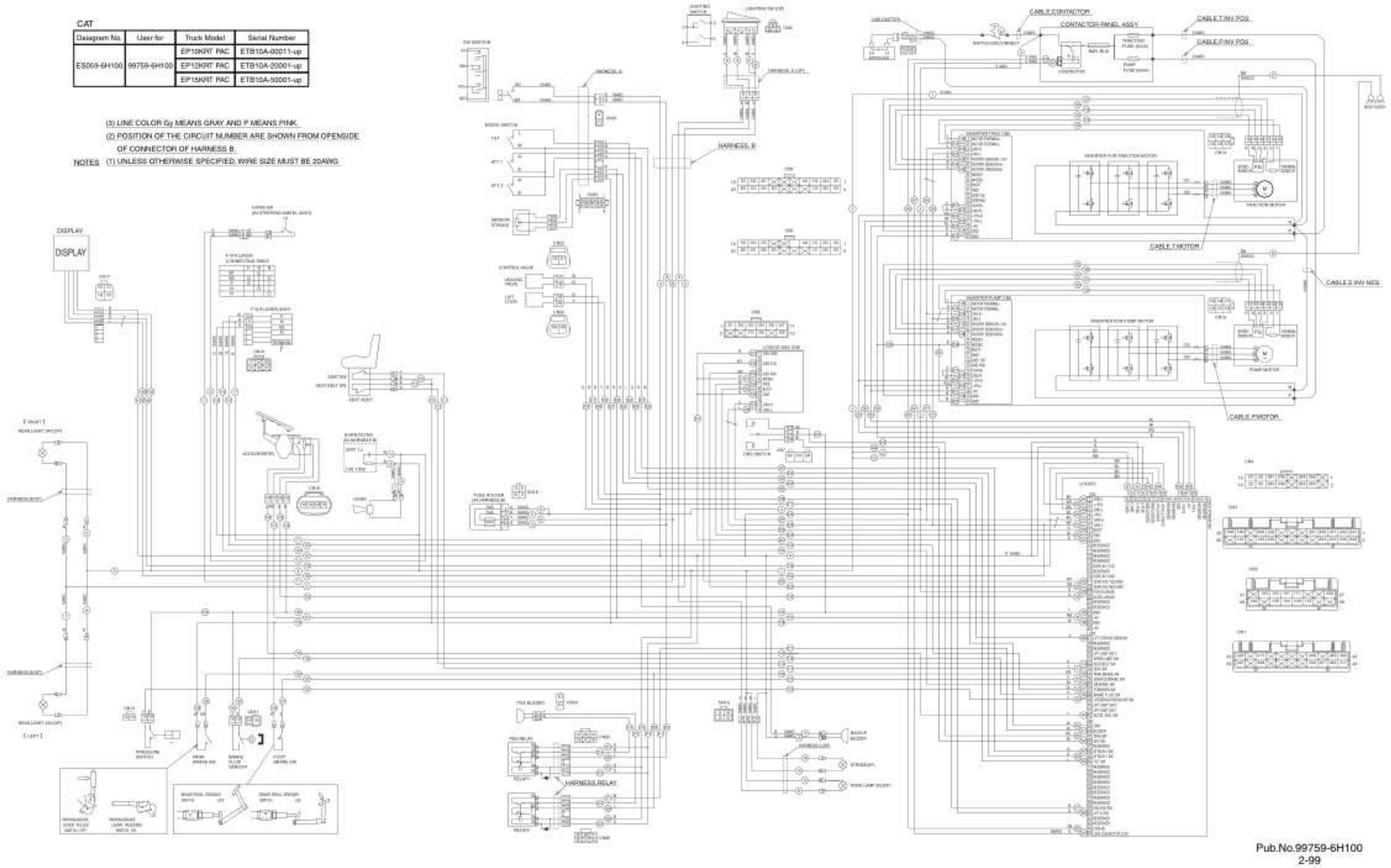
4. Electrical System Schematic

CAT

Datagram No.	User for	Truck Model	Serial Number
ES069-6H100	99759-6H100	EP10KRT PAC	ETB10A-00011-up
		EP12KRT PAC	ETB10A-20001-up
		EP15KRT PAC	ETB10A-50001-up

(3) LINE COLOR Gy MEANS GRAY AND P MEANS PINK.
(2) POSITION OF THE CIRCUIT NUMBER ARE SHOWN FROM OPENSIDE OF CONNECTOR OF HARNESS B.

NOTES (1) UNLESS OTHERWISE SPECIFIED, WIRE SIZE MUST BE 20AWG.



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