CAT® Lift Trucks

Service Manual

Controller

EP13TCB(J)	215E00001-up	264E00001-up
EP15TCB(J)	216E00001-up	265E00001-up
EP16/18/20TCB(J)	288E00001-up	266E00001-up
EP16/18/20TBCB(J)	283E00001-up	267E00001-up

99759-6U110

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● Load weight indication

CAUTION

- **For safe operation, the forklift truck is equipped with a load sensor, but the displayed value should be used as reference only.**
- **To calculate weight, you need to raise the fork about 500 mm above the floor and stop hydraulic and traveling operation.**
- **You cannot use this function to calculate and record official weights.**

Select "kg" mode.

Raise the fork about 500 mm above the floor. After releasing the hydraulic lever, the "LOAD" message flashes for 5 seconds because hydraulic pressure is fluctuating due to hydraulic operation.

Read the weight after the "LOAD" message stops flashing.

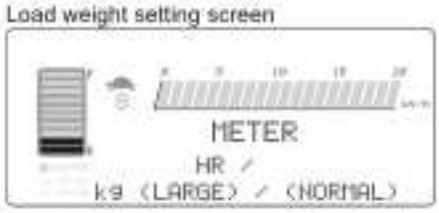
- If the loaded weight is more than 110% of the loading capacity shown on the name plate, the "LOAD" message changes to "OVER". "OVER" flashes in the display and the warning buzzer beeps.
- The overload settings can be changed.

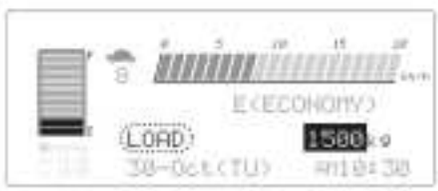
➡ **See"2-2-17.Load sensor check and calibration"on page 59.**

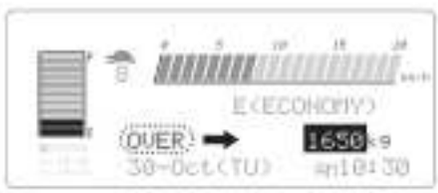
<Zero adjustment (for net weight)>

- If you want to substract pallet weight to get the net weight of the load, press ⊹ button. The zero adjust icon " ⊡ " appears in the display and the indicated weight changes to 0 (zero) kg.
- To turn this function off, press ⊹ button again.

Load weight setting screen









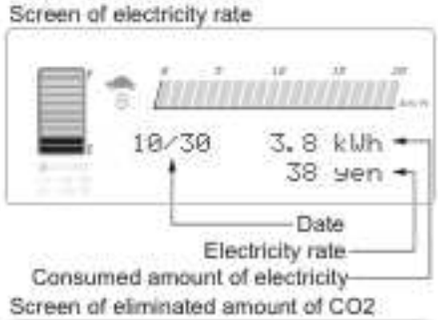
NOTE

You cannot switch to this function if the " LOAD " message is flashing.

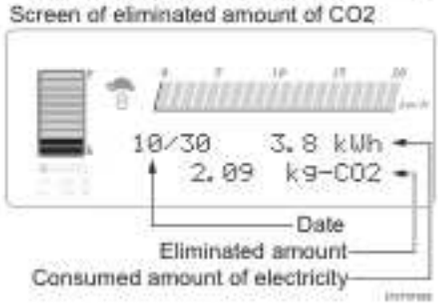
● Electricity consumption meter (built-in charger only)

When charging the battery, date [Month/Day], electricity consumed [kWh], and electricity rate [in Japanese Yen] (or reduced CO2 emissions [kg]) can be shown on the display.

Screen of electricity rate



Screen of eliminated amount of CO2



NOTE

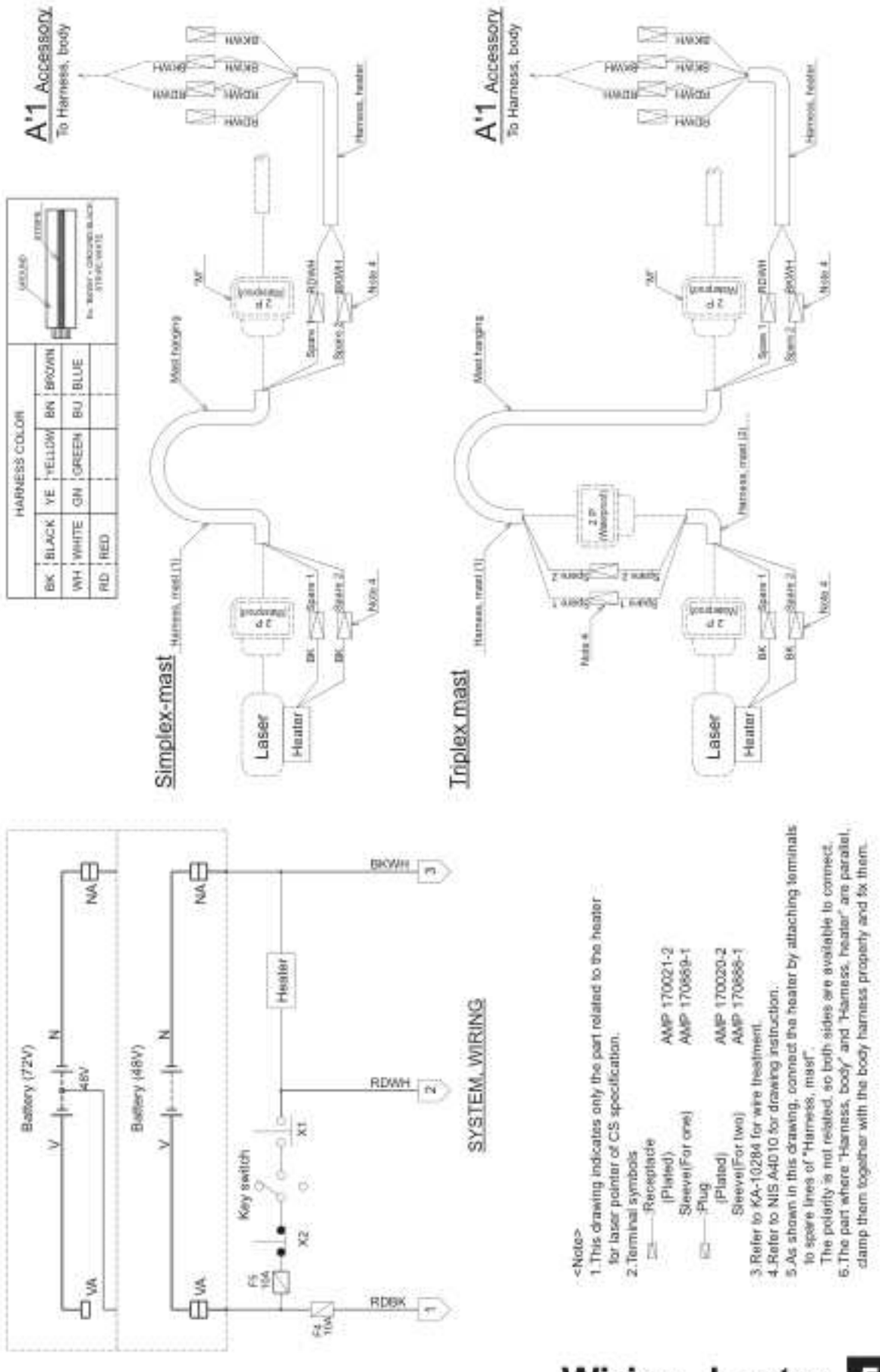
- **The default screen setting is "electricity rate". If you want to change these settings, please contact your local NICHIYU dealer.**
- **The electricity rate can only be shown in Japanese Yen. The default rate is 10 Yen/kWh. If you want to change these settings, please contact your local NICHIYU dealer.**
- **The data backup function retains data both for the last 7 days and for the last 2 months.**

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Cord	Error Message	Operation when the error is detected	Conditions for detecting error	CPU	Possible Cause
	FAIL CURRENT-TRAVEL	Main contactor trip	· Current flow in TRV/HYD board is 440 A or more. · Current flow in Traction motor (RMS value) is 335 A or more.	Travel	· Faulty Traction motor
	FAIL CURRENT-HYD		· Current flow in TRV/HYD board is 440 A or more. · Current flow in Hydraulic motor (RMS value) is 360 A or more..	Hyd	· Faulty Hydraulic motor
	FAIL VOLTAGE-TRAVEL		Voltage in CN3-36pin of TRV/HYD board is 24 V or less or 68 V or more.	Travel	· Electrical surge during travel operation
	FAIL VOLTAGE-HYD		Voltage in CN3-36pin of TRV/HYD board is 24 V or less or 68 V or more.	Hyd	· Electrical surge during hydraulic operation
	REDUCE DUTY OPERATION		The thermistor detects internal temperature in a FET module is 90 °C or more or -30 °C or less.	MPU	· Faulty thermistor in FET module · Faulty cooling fan * The error clears when the temperature is below 85 degrees and above -25 degrees.
	FAIL OPERATION		Travel operation or hydraulic operation trips Main contactor.		
	TURN OFF KEY SWITCH				· Travel or hydraulic operation malfunction
	RELEASE PARKING BRAKE	Continuous buzzer sound	The micro switch for parking brake is switched off and the seat switch for OIS is switched off.	EPS	· Leave the seat without applying the parking brake
	REPLENISH REFINED WATER FOR BATTERY		Electrolyte level sensor indicates a low level.	EPS	· Low on purified water
	REFILL BRAKE OIL			EPS	· Low on brake oil
	REFILL HYRRAULIC OIL			EPS	· Low on hydraulic oil
	CHARGE THE BATTERY	Lift speed is reduced by half.	Only the last two bars in the battery indicator light up.	EPS	· Battery needs charging
	RELEASE ACCEL TO NEUTRAL	Shutoff for Travel operation	When turning the key switch on, the directional switch is switched on and is indicating forward or reverse direction, and the accelerator is switched on (the accelerator pedal is depressed).	Travel	· Neutral safety
	OFF HYD. LEVER TO NEUTRAL	Shutoff for Hydraulic operation	When turning the key switch on, lift switch, tilt switch, or attachment switch switches on.	Hyd	· Neutral safety
	AOS FAIL OPERATION			EPS	· Emergency stop switch for "AOS" is pressed.
	RACK MISSET			EPS	
	APPLY PARKING BRAKE		The micro switch for parking brake is switched on, the directional switch is switched on and is indicating forward or reverse direction, and the accelerator is switched turned on (the accelerator pedal is depressed).	EPS	· Travel operation without releasing parking brake
	RETRACT THE BATTERY	Shutoff for Travel operation Shutoff for Hydraulic operation	When the battery stopper (retainer) is unlocked (and when voltage in CN3-41pin of TRV/HYD board is 5V): · Directional switch is switched on Forward or Reverse direction and Accelerator pedal is depressed. · Lift switch, Tilt switch, or Attachment switch is turned on.	Travel Hyd	· Neutral safety · The battery stopper (retainer) is removed.
	EEPROM ERROR	*FAIL CURRENT-WIPER		EPS	· Faulty EEPROM
	FAIL CURRENT-WIPER	Shutoff for Wiper operation	Wiper current is 2 A or more.	Travel (R)	· Faulty wiper
	PLEASE BE SEATED	Operation interlocked.	Operator does not sit on seat.	Travel	· Faulty seat switch
	PUT DIRECTIONAL LEVER INTO NEITRAL	Operation interlocked.	Directional switch is ON when key switch is turned ON.	Travel	· Directional switch
	FASTEN SEATBELT	Operation interlocked.	Operator does not fasten seatbelt when they sit on seat.	Travel	· Faulty seatbelt switch
	REFASTEN SEATBELT	Operation interlocked.	Seatbelt is fastened before operator sit on seat.	Travel	· Faulty seatbelt switch · Faulty seat switch

*In the "possible cause" of the upper list, only the main device is listed. It is necessary to check for the wiring failure (disconnection, short), connection failure of the connectors and malfunction of the control board.

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<Note>
1. This drawing indicates only the part related to the heater for laser pointer of CS specification.
2. Terminal symbols
Receptacle (Plated) AMP 170021-2
Sleeve(For one) AMP 170869-1
Plug (Plated) AMP 170020-2
Sleeve(For two) AMP 170868-1
3. Refer to KA-10284 for wire treatment.
4. Refer to NIS A4010 for drawing instruction.
5. As shown in this drawing, connect the heater by attaching terminals to spare lines of "Harness, mast".
The polarity is not related, so both sides are available to connect.
6. The part where "Harness, body" and "Harness, heater" are parallel, clamp them together with the body harness properly and fix them.

Wiring, heater 5-13.

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2-2-15. Error history memory 2

<Previously detected errors/abnormalities>

- Keep the rotary switch (RS) on the EPS controller at "9".

NOTE

- "Error history memory 2" displays all detectable error codes, including codes for which no problems have occurred. Only highlighted error codes have had a previous error event.
- If an error or abnormality was detected several times previously, the data of the most recent event is displayed under "Error/abnormality details".

●EPS controller



RS=9

When the rotary switch mode is set to OFF in the service setting.

ROTARY SW OFF/ON

Press (+) or (−) button for at least 3 seconds with pressing (MODE) button (Press (MODE) button first).

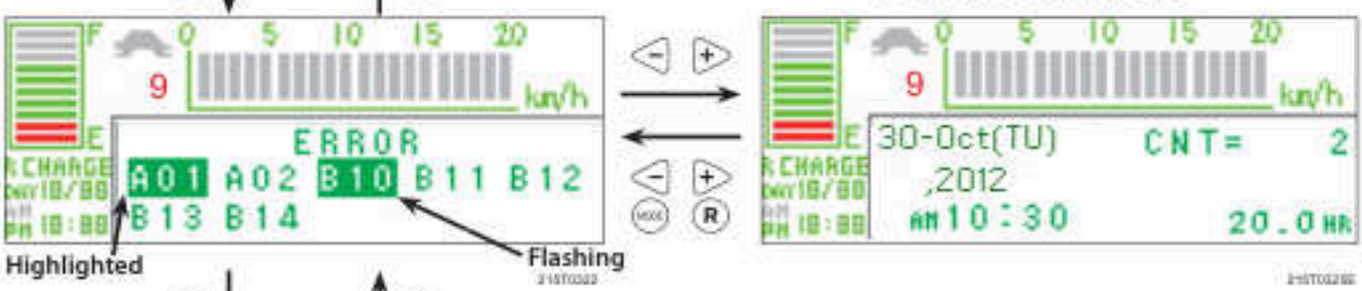
●"Error history memory 1" display

●Error/abnormality details

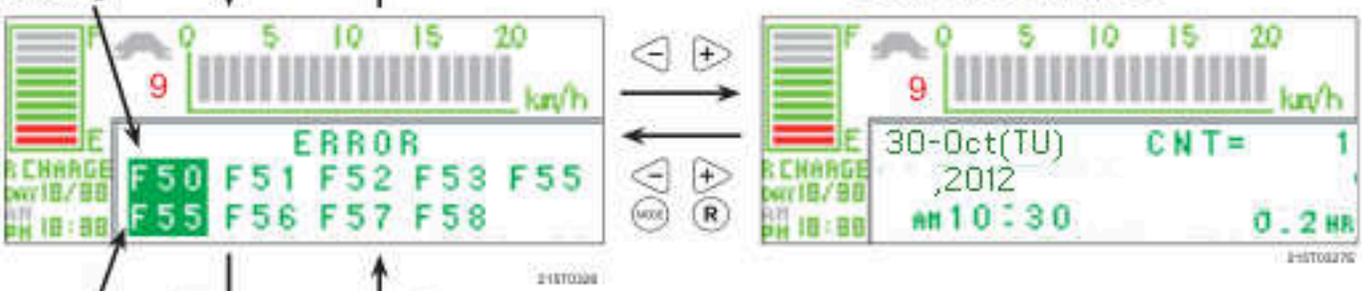
Details about error "A01"



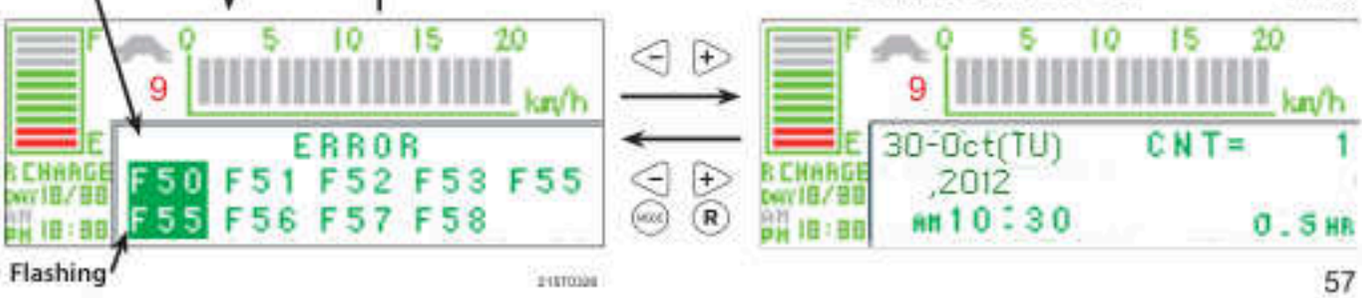
Details about error "B10"



Details about error "F50"



Details about error "F55"



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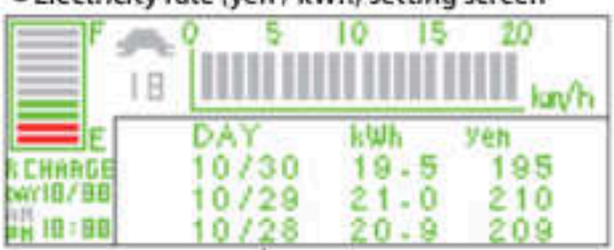
<How to check electricity consumption>

1. Turn on the key switch.
2. Press ◁ button in the normal screen. The following screen appears.

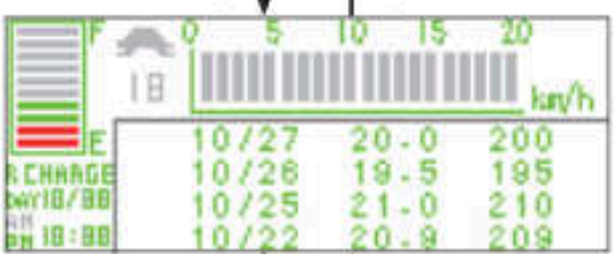
NOTE

- To change screens press (R) or (MODE) button.
- When traveling or doing hydraulic operations, the screen returns to the normal screen.
- You can record electricity rate and CO2 emission rate for the most recent 7 days.

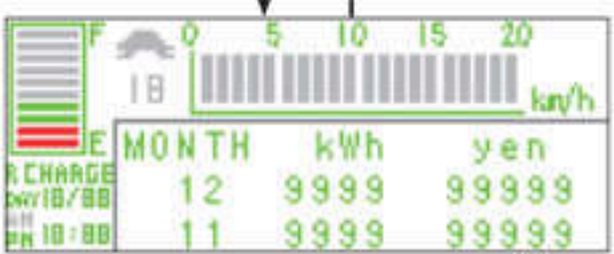
● Electricity rate (yen / kWh) setting screen



Display the most recent 3 days.



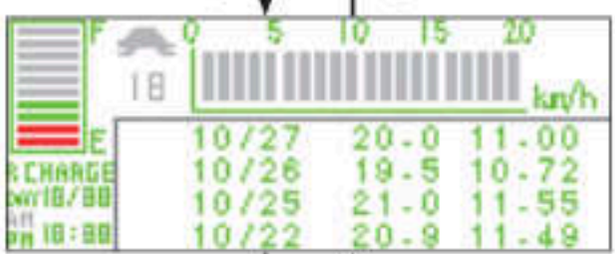
Display the remaining 4 days.

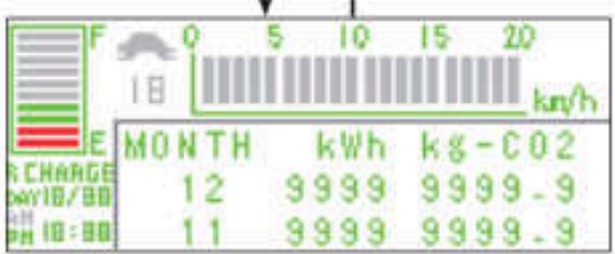


Display the most recent 2 months.

● CO2 emission rate (kg/kWh) setting screen







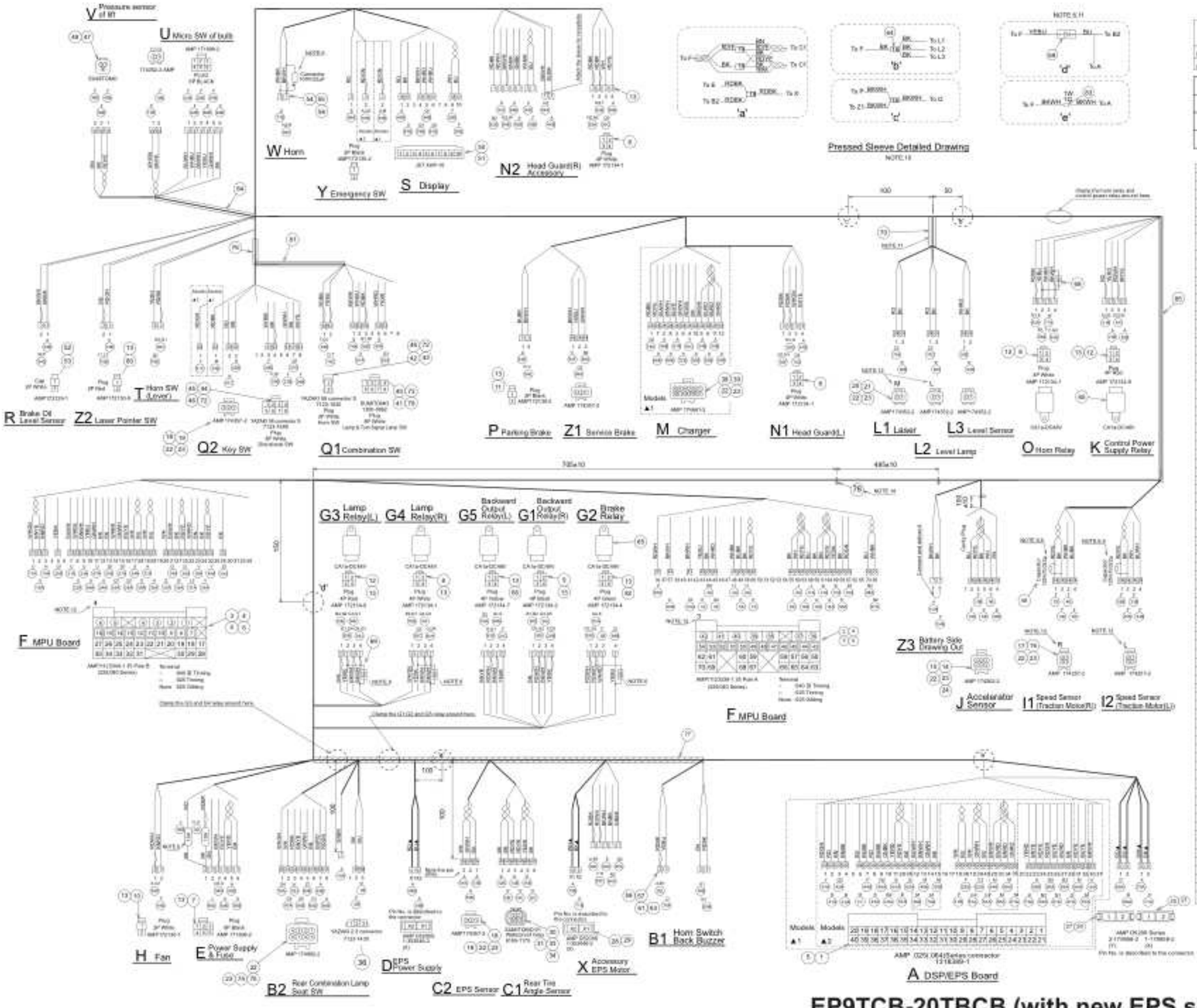
● Meter confirmation screen



NOTE

- When "CHARGER " is set to OFF in the option setting of a stationary charger, this setting screen is not displayed.
- When "Wh METER" is set to OFF in the option setting, this setting screen is not displayed.

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※The electric wire table is shown in the PARTS HARNESS (E0000-99000).

Part Number	Models	Quantity fo					PARTS HARNESS Part Number
		1	2	3	4	5	
84382-80011-2	▲1 With Without built-in charger(Overseas)	62	50	50	1	1	84382-80821
84382-80810-1	▲2 Without built-in charger(Japan domestic)	52	38	38	0	0	84382-80883

HARNESS COLOR						
BK	BLACK	YE	YELLOW	BN	BROWN	
WH	WHITE	GN	GREEN	BU	BLUE	
RD	RED					

※ Formidable substitutes can be used.

85		TUBE,CORRUGATED(BLACK) (200mm)	1	※	
84	37986-46120	TUBE,CORRUGATED(BLACK) (80mm)	1	※	
83		Regulator 130.3Ω	1		
82	37310-23080	Housing,Plug(2P Green) 172139-4	1		
81	37986-46120	Tube,Corrugate (Ø10 30mm)	1		
80	37310-23120	Housing,Plug(2P Red) 172130-0	1	※	
79	70062-21010	Retainer (Ø16.0)(T)	1		
78	37986-47300	Clamp,Push Mount (RD,Ø30.0)	3		
77		Tube,Spiral(White) (Ø16.0) 1200mm	1	※	
		Corrugate Tube(Black) (1200mm)	1	※	
76	37986-46120	Tube,Corrugate (Ø10 80mm)	1		
75	37310-20830	Plate,Double Lock(2P) 174960-1	1		
74	37310-20810	Housing,Plug(2P) 174960-2	1		
73	13822-21800	Receptacle(For Wire) 9240-4182 Taping	1		
72	13801-99890	Receptacle(For Wire) 7116-1361 Taping	3		
71	13802-10230	Fuse Comp. 10A(Mini-Ct)	2	※	
70	9852-00830	Tube,Wire	1		
69	9351-00804	Diode HED860	5	※	
68		Capacitor 105V(3.620uF	2		
67	39110-01300	Capacitor(105V,2.2uF)	1		
66	37310-31200	Housing,Plug(4P Yellow) 172138-7	1		
65	24609-00800	Relay CAN-DC(24V)-N AC(120-132)	1		
64	1812-00800	Terminal FNC1.25	6		
63	1901-00001	Sleeve(For One) 170681-1	6		
62	1211-04101	Strip Plug 170020-2 Taping	3		
61	1211-04101	Strip Plug Metal	2		
60	13800-04000	Sleeve(For two) 170680-0	1		
59	1901-00002	Sleeve(For One) 170680-1	1		
58	1901-00012	Wire Receptacle(m) 170021-2 Taping	15		
57	37810-01700	Wire Receptacle(m) Metal	4		
56	1901-00004	Sleeve(For two) 170682-0	1		
55	1901-00003	Sleeve(For One) 170682-2	1		
54	1901-04010	Receptacle 4170-2 Taping	2		
53	37810-21400	Tab Taping	2		
52	37810-21700	Housing,Cap(2P White) 172139-1	1		
51	37810-22900	Contact 8240-0053-PG-0	7		
50	13801-00800	Housing 2WP-70	1		
49					
48	37810-23000	Terminal(F) 1505-0110	3		
47	11201-01410	Housing,Connector(2P F.C-95)-2161	1		
46	13801-00800	Receptacle(For One) 7116-1361 Taping	9		
45	13801-00870	Holder,Base(3P) 7157-4036-30	1		
44	13801-99860	Housing,Plug(2P White) 1123-1660	1		
43	13801-99820	Holder,Base(2P) 7157-4035-30	1		
42	13801-99840	Housing,Plug(3P White) 1123-1620	1		
41	13802-21800	Receptacle(For One) 9240-4173 Taping	4		
40	13802-21800	Housing,Plug(6P White) 1390-0060	1		
39	37810-23170	Plate,Double Lock(12P) 174962-1	1		
38	37810-23100	Housing,Plug(12P) 174961-2	1		
37	13801-00800	Receptacle 7116-1361 Taping	2		
36	13801-99760	Housing,3P-F) 1123-1630	1		
35	13801-99760	Seal,Wire 1740-0870	3		
34	13801-99710	Receptacle 9240-0261	1		
33	13801-99760	Retainer(3P) 7116-1770	1		
32	13802-00700	Housing(6P-F Gray) 3-965-1170	1		
31	37810-22800	Tab	8		
30	37810-22850	Connector,Terminal(2P-M) 1-967945-2	2		
29	37810-22810	Connector,Receptacle(2P-F) 2-1719808-2	1		
28	37810-22860	Connector,Receptacle(2P-M) 1-1719808-2	1		
27	37810-21500	Seal(Cavity Plug) 172748-1	1		
26	13800-13600	Seal(Rubber Plug) 9030-4	N		
25	37810-23510	Receptacle(For Wire) 9240-4182 Taping	N		
24	37810-20710	Plate,Double Lock(2P) 174963-1	6		
23	37810-20810	Housing,Plug(2P) 174962-2	6		
22	37810-20780	Plate,Double Lock(3P) 174964-1	3		
21	37810-20860	Housing,Plug(3P) 174963-2	3		
20	37810-20790	Plate,Double Lock(4P) 174965-1	2		
19	37810-20870	Housing,Plug(4P) 174964-2	2		
18	37810-20800	Plate,Double Lock(6P) 174967-1	1		
17	37810-20880	Housing,Plug(6P) 174966-2	1		
16	37810-21400	Receptacle(For Wire) 7116-1361 Taping	1		
15	37810-21700	Housing,Plug(2P Red) 172139-0	2		
14	37810-21800	Housing,Plug(2P Black) 172139-2	2		
13	37810-21900	Housing,Plug(2P White) 172139-1	1		
12	37810-21700	Housing,Plug(4P Black) 172138-2	1		
11	37810-21900	Housing,Plug(4P White) 172139-1	4		
10	37810-21400	Housing,Plug(6P Black) 171969-2	2		
9	13800-62300	Receptacle(For Wire) 9240-4173 Taping	7		
8	13800-62300	Receptacle(For Wire) 9240-4173 Crimping	N		
7	13800-62300	Receptacle(For Wire) 9240-4173 Taping	10		
6	13800-62300	Housing,Plug(3P B) 1123-1630	1		
5	13800-62300	Housing,Plug(3P A) 1123-1630	1		
4	13800-00300	Housing,Plug(4P) 1318369-1	1		

Harness, body 5- 3.

EP9TCB-20TBCB (with new EPS sensor/Midori Sokki) 5-3-3.

MidWestTech | Caterpillar EP13TCB(J), EP15TCB(J), EP16TCB(J), EP18TCB(J), EP20TCB(J), EP16TBCB(J), EP18TBCB(J), EP20TBCB(J) Forklift Controller Service Manual | Publication 99759-6U110 Order the manual at mid-west-tech.com >